

Recommendation ITU-R M.2150-3

(02/2026)

M Series: Mobile, radiodetermination, amateur
and related satellite services

**Detailed specifications of the terrestrial
radio interfaces of International Mobile
Telecommunications-2020 (IMT-2020)**

Foreword

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P	Radio-wave propagation
RA	Radio astronomy
RS	Remote sensing systems
S	Fixed-satellite service
SA	Space applications and meteorology
SF	Frequency sharing and coordination between fixed-satellite and fixed service systems
SM	Spectrum management
SNG	Satellite news gathering
TF	Time signals and frequency standards emissions
V	Vocabulary and related subjects

***Note:** This ITU-R Recommendation was approved in English under the procedure detailed in Resolution ITU-R 1.*

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RECOMMENDATION ITU-R M.2150-3

**Detailed specifications of the terrestrial radio interfaces of
International Mobile Telecommunications-2020 (IMT-2020)**

(2021-2022-2023-2026)

Scope

This Recommendation identifies and provides the detailed specifications of the radio interfaces for the terrestrial component of International Mobile Telecommunications-2020 (IMT-2020) and provides the detailed radio interface specifications.

These radio interface specifications detail the feature and parameters of IMT-2020. IMT-2020 enables worldwide compatibility, international roaming, and access to the services under diverse usage scenarios, including enhanced mobile broadband (eMBB), massive machine type communications (mMTC) and ultra-reliable and low latency communications (URLLC).

Keywords

IMT, IMT-2020, Radio interface specifications, Enhanced Mobile Broadband (eMBB), massive Machine Type Communications (mMTC), Ultra-Reliable and Low Latency Communications (URLLC)

Abbreviations/Glossary

3GPP	3 rd Generation Partnership Project
AAS	Active antenna system
ARQ	Automatic repeat request
CA	Carrier aggregation
CoMP	Coordinated multipoint
CSI-RS	Channel state information reference symbol
DC	Dual connectivity
DFTS	Discrete Fourier transform-spread
DMRS	Demodulation reference signal
DRB	Data radio bearer
DRX	Discontinuous reception
eMBB	enhanced mobile broadband
EMC	Electromagnetic compatibility
FEC	Forward error correction
FSTD	Frequency switched transmit diversity
GCS	Global core specifications
GNSS	Global navigation satellite system
GPS	Global positioning system
H-ARQ	Hybrid – ARQ

ICIC	Inter-cell interference coordination
IMT	International Mobile Telecommunications
LTE	Long term evolution
LWA	LTE-WLAN aggregation
MAC	Medium access control
MBMS	Multimedia broadcast/multicast service
MBSFN	Multicast/broadcast over single frequency network
MCG	Master cell group
MIMO	Multiple input multiple output
MME	Mobility management entity
mMTC	massive machine type communications
MTC	Machine-type communication
NB-IOT	Narrowband internet of things
NR	New radio
OAM	Operation and maintenance
OFDM	Orthogonal frequency-division multiplexing
OFDMA	Orthogonal frequency-division multiple access
OTDOA	Observed time difference of arrival
PAPR	Peak-to-average power ratio
PDCP	Packet data convergence protocol
PDU	Protocol data unit
PHY	Physical layer
PPDR	Public protection and disaster relief
PRB	Physical resource block
ProSe	Proximity-based services
QoS	Quality of service
RIT	Radio interface technologies
RLC	Radio link control
RN	Relay node
RRC	Radio resource control
RRM	Radio resource management
SCG	Secondary cell group
SDP	Session description protocol
SDU	Service data unit
SFBC	Space-frequency block coding
SIP	Session initiation protocol

SON	Self-organizing networks
SRB	Signalling radio bearer
SRIT	Set of radio interface technologies
TAG	Timing advance group
TB	Transport block
TTI	Transmission time interval
UE	User equipment
URLLC	Ultra-reliable and low latency communications

Additional terms may be found in document 3GPP TR 21.905 “Vocabulary for 3GPP Specifications”.

Related documentation: ITU Recommendations, Reports, Document and Handbook¹

Recommendation ITU-R M.1036 – Frequency arrangements for implementation of the terrestrial component of International Mobile Telecommunications (IMT) in the bands identified for IMT in the Radio Regulations (RR)

Recommendation ITU-R M.1224 – Vocabulary of Terms for International Mobile Telecommunications (IMT)

Recommendation ITU-R M.1579 – Global circulation of IMT terrestrial terminals

Recommendation ITU-R M.1822 – Framework for services supported by IMT

Recommendation ITU-R M.2015 – Frequency arrangements for public protection and disaster relief radiocommunication systems in accordance with Resolution **646 (Rev.WRC-15)**

Recommendation ITU-R M.2083 – IMT Vision – Framework and overall objectives of the future development of IMT for 2020 and beyond

Report ITU-R M.2291 – The use of International Mobile Telecommunications for broadband public protection and disaster relief application

Report ITU-R M.2320 – Future technology trends of terrestrial IMT systems

Report ITU-R M.2334 – Passive and active antenna systems for base stations of IMT systems

Report ITU-R M.2370 – IMT traffic estimations for the years 2020 to 2030

Report ITU-R M.2375 – Architecture and topology of IMT networks

Report ITU-R M.2376 – Technical feasibility of IMT in bands above 6 GHz

Report ITU-R M.2410 – Minimum requirements related to technical performance for IMT-2020 radio interface(s)

Report ITU-R M.2411 – Requirements, evaluation criteria and submission templates for the development of IMT-2020

Report ITU-R M.2412 – Guidelines for evaluation of radio interface technologies for IMT-2020

Report ITU-R M.2441 – Emerging usage of the terrestrial component of International Mobile Telecommunication (IMT)

Report ITU-R M.2483 – The outcome of the evaluation, consensus building and decision of the IMT-2020 process (steps 4-7), including characteristics of IMT-2020 radio interfaces

Report ITU-R M.2498 – The outcome of Way Forward Option 2 for “ETSI (TC DECT) and DECT Forum Proponent” of the evaluation, consensus building and decision of the IMT-2020 process (Steps 4 to 7), including characteristics of IMT-2020 radio interfaces

¹ The latest edition of the Recommendation/Report in force should be used.

Resolution ITU-R 50 – Role of the Radiocommunication Sector in the ongoing development of IMT
 Resolution ITU-R 56 – Naming for International Mobile Telecommunications
 Resolution ITU-R 65 – Principles for the process of future development of IMT for 2020 and beyond
 Document IMT-2020/2 – Submission, evaluation process and consensus building for IMT-2020
 Handbook on International Mobile Telecommunications

The ITU Radiocommunication Assembly,

considering

- a) that IMT systems are mobile broadband systems including IMT-2000, IMT-Advanced and IMT-2020;
- b) that IMT-2020 systems include the new capabilities of IMT that go beyond those of IMT-2000 and IMT-Advanced², and will interwork with and complement existing IMT-systems and their enhancements;
- c) that IMT-2020 systems and beyond are envisaged to expand and support diverse usage scenarios and applications;
- d) that IMT-2020 systems provide access to a wide range of advanced communication applications supported by mobile and fixed networks;
- e) that ITU has contributed to standardization and harmonized use of IMT, which has provided telecommunication services on a global scale and global operation and economies of scale are key requirements for the success of mobile telecommunication systems;
- f) that IMT-2020 systems support low to high mobility applications and a wide range of data rates in accordance with user and service demands in multiple user environments;
- g) that the usage scenarios of IMT-2020 include enhanced Mobile Broadband, ultra-reliable and low latency communication and massive machine-type communication;
- h) that IMT-2020 systems support the machine type communications to realize the Internet of Things connecting a vast range of smart appliances, machines and other objects, beside supporting human communications;
- i) that IMT-2020 systems support ultra-reliable and low latency communications which are necessary in particular use cases;
- j) that IMT-2020 also has capabilities for high-quality multimedia applications within a wide range of services and platforms providing a significant improvement in performance, quality of service and user experience;
- k) that the key features of IMT-2020 are indicated in Recommendation ITU-R M.2083, and that the key requirements related to the minimum technical performance of IMT-2020 radio interface(s) are described in Report ITU-R M.2410 and the guidelines for evaluation of radio interface technologies for IMT-2020 are provided in Report ITU-R M.2412;
- l) that the capabilities of IMT-2020 systems are being continuously enhanced in line with technology developments;

² Recommendations ITU-R M.1457, ITU-R M.2012 and ITU-R M.2150 are three separate, independent, and self-contained Recommendations, each one with a specific scope. All Recommendations will evolve independently, and there could be some overlap reflected by commonality in content among the three documents.

- m)* that IMT systems support Public Protection and Disaster Relief (PPDR);
- n)* that IMT systems support the necessity of priority services;
- o)* that due to the large effective bandwidths required to support the very high data rates needed for the various services offered, allowances must be made for either much larger single carrier bandwidths (even as spectral efficiencies increase) or aggregation of RF carriers;
- p)* that IMT-2020 systems support wide contiguous spectrum bands, and thus expands the application of IMT;
- q)* that IMT systems provide various specific applications to facilitate development of the digital economy, e.g. e-manufacturing, e-agriculture, e-health, intelligent transport systems, smart city and traffic control, etc., which could bring requirements beyond current capabilities of IMT systems,

recognizing

- a)* that Resolution ITU-R 65 on the “Principles for the process of future development of IMT for 2020 and beyond” outlines the essential criteria and principles used in the process of developing the Recommendations and Reports for IMT-2020, including Recommendation(s) for the radio interface specification;
- b)* that frequency arrangements for IMT are addressed in the other ITU-R Recommendations and Reports, detailed in the related documentation section above,

noting

- a)* that Report ITU-R M.2483 contains the outcome of the evaluation, consensus building and decision of the IMT-2020 process (Steps 4 to 7), including the characteristics of the IMT-2020 radio interfaces;
- b)* that the detailed specifications indicated in the *recommends* 2 might include technical details which could be interpreted as “frequency arrangements for implementation of the terrestrial component of International Mobile Telecommunications” (partially due to different terminology usage);
- c)* that it is understood that technical details referred to in *noting b)* above are only intended to be interpreted as those necessary for “proper design and technical operation of the IMT system, and the establishment of minimum RF characteristics and minimum performance requirements”;
- d)* that Report ITU-R M.2498 contains the outcome of the evaluation, consensus building and decision of the IMT-2020 process (Steps 4 to 7) in Option -2 Re-evaluation process, including the characteristics of the IMT-2020 radio interfaces,

recommends

- 1 that the terrestrial radio interfaces for IMT-2020 should be:
 - “3GPP 5G-SRIT”³;
 - “3GPP 5G-RIT”⁴;
 - “5Gi”⁵;

³ Developed by 3GPP Proponent as “5G, Release 15 and beyond – LTE+NR SRIT”.

⁴ Developed by 3GPP Proponent as “5G, Release 15 and beyond – NR RIT”.

⁵ Developed by TSDSI as “5Gi RIT”.

– “DECT 5G-SRIT”⁶;

2 that the information provided or referenced in Annexes 1 to 4 should be used according to the terrestrial radio interfaces referred to in *recommends* 1 above as the complete set of standards for the detailed specifications of the terrestrial radio interfaces of IMT-2020.

Annex 1

Specification of the 3GPP 5G – SRIT⁷ radio interface technology

Background

IMT-2020 is a system with global development activity and the IMT-2020 terrestrial radio interface specifications identified in this Recommendation have been developed by the ITU in collaboration with the global core specifications (GCS) Proponents and the Transposing Organizations. It is noted from Document IMT-2020/20, that:

- The GCS Proponent must be one of the Radio interface technologies (RIT)/set of radio interface technologies (SRIT) Proponents for the relevant technology, and must have legal authority to grant to ITU-R the relevant legal usage rights to the relevant specifications provided within a GCS corresponding to a technology in Recommendation ITU-R M.2150.
- A Transposing Organization must have been authorized by the relevant GCS Proponent to produce transposed standards for a particular technology, and must have the relevant legal usage rights.

It is further noted that GCS Proponents and Transposing Organizations must also qualify appropriately under the auspices of Resolution ITU-R 9 and the ITU-R “Guidelines for the contribution of material of other organizations to the work of the Study Groups and for inviting other organizations to take part in the study of specific matters (Resolution ITU-R 9)”.

The ITU has provided the global and overall framework and requirements and has developed the Global Core Specification jointly with the GCS Proponent. The detailed standardization has been undertaken within the recognized Transposing Organizations which operate in concert with the GCS Proponent. This Recommendation therefore makes extensive use of references to externally developed specifications.

This approach was considered to be the most appropriate solution to enable completion of this Recommendation within the aggressive schedules set by the ITU and by the needs of administrations, operators and manufacturers.

This Recommendation has therefore been constructed to take full advantage of this method of work and to allow the global standardization timescales to be maintained. The main body of this Recommendation has been developed by the ITU, with each Annex containing references pointing to the location of the more detailed information.

This Annex 1 contains the detailed information developed by the ITU and “3GPP” (the GCS Proponent) and ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC (the transposing organizations).

⁶ Developed by ETSI as DECT-2020 and 3GPP 5G radio interface technology – SRIT.

⁷ Developed by 3GPP Proponent as “5G, Release 15 and beyond – LTE+NR SRIT”.

Such use of referencing enables timely completion and update of the high-level elements of this Recommendation, with change control procedures, transposition, and public enquiry procedures being undertaken within the external organization. This information has generally been adopted unchanged, recognizing the need to minimize duplication of work, and the need to facilitate and support an ongoing maintenance and update process.

This general agreement, noting that the detailed information of the radio interface should to a large extent be achieved by reference to the work of external organizations, highlights not only the ITU's significant role as a catalyst in stimulating, coordinating and facilitating the development of advanced telecommunications technologies, but also its forward-looking and flexible approach to the development of this and other telecommunications standards for the 21st century.

A more detailed understanding of the process for the development of the first release of this Recommendation may be found in Document IMT-2020/20.

1.1 Overview of the radio interface technology

The IMT-2020 specifications, known as 5G, have been developed by 3GPP and consist of long-term evolution (LTE) and new radio (NR) Releases 15 and beyond. In 3GPP terminology, the term Evolved-UMTS Terrestrial Radio Access (E-UTRA) is also used to signify the LTE radio interface.

5G is a set of radio interface technologies (RITs) consisting of E-UTRA/LTE as one component RIT and NR as the other component RIT. Both components are designed for operation in IMT spectrum.

5G fulfils all technical performance requirements in all five selected test environments: Indoor Hotspot – enhanced Mobile Broadband (eMBB), Dense Urban – eMBB, Rural – eMBB, Urban Macro – Ultra Reliable Low Latency Communication (URLLC) and Urban Macro – massive Machine Type Communication (mMTC).

Also, 5G fulfils the service and the spectrum requirements. Both component RITs, NR and E-UTRA/LTE, utilize the frequency bands below 7.125 GHz including frequency bands identified for International Mobile Telecommunication (IMT) in the ITU Radio Regulations. In addition, the NR component RIT can also utilize the frequency bands above 7.125 GHz, i.e. above 24.25 GHz, including frequency bands identified for IMT in the ITU Radio Regulations.

The complete set of standards for the terrestrial radio interface of IMT-2020 identified as 5G includes not only the key characteristics of IMT-2020 but also the additional capabilities of 5G both of which are continuing to be enhanced.

The 3GPP 5G System (5GS) also includes specifications for its non-radio aspects, such as the core network elements (the EPC Network and 5GC Network), security, codecs, network management, etc. These non-radio specifications are not included in the so-called “Global Core Specifications (GCS)” of IMT-2020.

1.1.1 Overview of the component RIT: E-UTRA/LTE

The E-UTRA/LTE Component RIT is based on releases 15 and 16 of LTE, and it is the evolution of the previous releases, encompassing both FDD and TDD. The E-UTRA/LTE RIT uses either 1) FDD operation and therefore is applicable for the operation with paired spectrum, or 2) TDD operation and therefore is applicable for the operation with unpaired spectrum. Both full-duplex and half-duplex FDD are supported. Aggregation of TDD and FDD spectrum is supported.

Transmission bandwidths up to 640 MHz are supported, yielding peak data rates up to roughly 32 Gbit/s in the downlink (DL) and 13.6 Gbit/s in the uplink (UL).

The downlink transmission scheme is based on conventional OFDM to provide a high degree of robustness against channel frequency selectivity while still allowing for low-complexity receiver implementations also at very large bandwidths.

The uplink transmission scheme is based on Discrete Fourier Transform-Spread OFDM (DFTS-OFDM). The use of this transmission scheme for the uplink is motivated by the lower Peak-to-Average Power Ratio (PAPR) of the transmitted signal compared to conventional OFDM. This allows for more efficient usage of the power amplifier in the User Equipment (UE), which translates into an increased coverage and/or reduced terminal power consumption. The uplink numerology (subcarrier spacing and symbol duration) is aligned with the downlink numerology. The Narrow-Band Internet of Things (NB-IoT) UL allows the allocation of a single-tone in addition to multi-tone DFTS-OFDM with the possibility of a lower subcarrier spacing in addition to the normal subcarrier spacing.

Channel coding is based on rate-1/3 turbo coding and is complemented by Hybrid-Automatic Repeat Request (HARQ) with soft combining to handle decoding errors at the receiver side. Data modulation supports Quadrature Phase Shift Keying (QPSK), 16QAM, 64QAM and 256QAM for both the downlink and the uplink. In downlink, 1024QAM is also supported.

NB-IoT supports QPSK and 16-QAM on DL and for UL when multi-tones are allocated; $\pi/2$ -BPSK and $\pi/4$ -QPSK are supported in UL when a single-tone is allocated. NB-IoT DL channel coding is based on tail biting convolutional code.

eMTC supports QPSK, 16QAM, and 64QAM in DL and QPSK, 16QAM in UL; $\pi/2$ -BPSK is supported in UL when two tones are allocated and QPSK is supported in UL for sub-PRB (physical resource block) allocation with more than two tones.

The E-UTRA/LTE RIT supports bandwidths from approximately 1.4 MHz to 640 MHz. NB-IoT supports 200 kHz bandwidth. Carrier aggregation, i.e. the simultaneous transmission of multiple component carriers in parallel to/from the same terminal/eNB, is used to support bandwidths greater than 20 MHz. Component carriers do not have to be contiguous in frequency and can even be located in different frequency bands in order to enable exploitation of fragmented spectrum allocations by means of spectrum aggregation.

Carrier Aggregation (CA) supports the functionality to aggregate TDD bands with different uplink and downlink allocations as well as the functionality to support multiple timing advances. Carrier Aggregation also supports aggregating FDD and TDD component carriers. Dual Connectivity (DC) allows aggregating component carriers of different eNBs that are connected via a non-ideal backhaul.

Channel-dependent scheduling in both the time and frequency domains is supported for both downlink and uplink with the base-station scheduler being responsible for (dynamically) selecting the transmission resource as well as the data rate. The basic operation is dynamic scheduling, where the base-station scheduler takes a decision for each 1 ms Transmission Time Interval (TTI), but there is also a possibility for semi-persistent scheduling. Apart from the basic TTI of 1ms, E-UTRA/LTE supports shortened TTI of $2/3$ OFDM symbols ($142 \mu\text{s}$) and one slot ($500 \mu\text{s}$). Semi-persistent scheduling enables transmission resources and data rates to be semi-statically allocated to a given User Equipment (UE) for a longer time period than one TTI in order to reduce the control-signalling overhead. For better uplink coverage, TTI bundling allows UEs to transmit in four consecutive TTIs. NB-IoT and enhanced MTC (eMTC) allow for widespread coverage extension by means of scheduling multiple TTIs (up to several thousands).

Multi-antenna transmission schemes are an integral part of E-UTRA/LTE RIT. Multi-antenna precoding with dynamic rank adaptation supports both spatial multiplexing (single-user Multiple Input Multiple Output (MIMO)) and beam-forming. Beam-forming by means of 2-dimensional antenna arrays can exploit the horizontal as well as the vertical spatial domains. Spatial multiplexing with up to eight layers in the downlink and four layers in the uplink is supported. Multi-user MIMO, where multiple users are assigned the same time-frequency resources, is also supported. Coordinated MultiPoint (CoMP) operation is also supported, where multiple transmission points or reception points are coordinated in their transmission or reception, respectively. The coordinated transmission points can belong to the same cell, to different cells of the same eNB or to different cells of different

eNBs. A discovery reference signal can be used to identify transmission points or cells for CoMP and/or Carrier aggregation operation. Finally, transmit diversity based on Space-Frequency Block Coding (SFBC) or a combination of SFBC and Frequency Switched Transmit Diversity (FSTD) is supported.

Inter-cell interference coordination (ICIC), where neighbouring cells exchange information aiding the scheduling in order to reduce interference, is supported for the E-UTRA/LTE RIT. ICIC can be used for homogenous deployments with non-overlapping cells of similar transmission power, as well as for heterogeneous deployments where a higher-power cell overlays one or several lower-power cells. In order to increase the potential of cell range expansion, functionality exists for terminal-side interference mitigation of reference and synchronization signals as well as the broadcast channel. A terminal-side mitigation of inter-cell interference caused by the data channel is supported with network assistance. A network-side interference mitigation technique is supported, which is based on the ability to turn on and off secondary cells.

Relaying functionality is included in E-UTRA/LTE RIT. A relay node (RN) appears as a conventional e-Node B to UEs but is wirelessly backhauled to the remaining part of the radio-access network using the LTE Release 10 radio-interface technology. E-UTRA/LTE RIT also supports sidelink communication via Proximity based Services (ProSe) UE-to-Network Relay.

E-UTRA/LTE RIT supports various types of machine-type communication. In order to better address the low-cost segment, a low-complexity terminal (Category 0) is supported, which has approximately 50% reduced modem complexity as compared to the least complex ‘normal’ UE (Category 1). Another 50% complexity reduction was made possible with eMTC (Category M1) and even more with NB-IoT (Category NB1). eMTC optionally supports half duplex (HD) operation and NB-IoT supports only HD. In addition, eMTC and NB-IoT extended the original LTE coverage area by ~15 dB and ~20 dB respectively. The narrow NB-IoT channel bandwidth of 200 kHz makes it possible to operate in re-farmed GSM channels or in LTE guardbands. In order to improve UE power consumption, a power saving State was introduced and extended Discontinuous Reception (eDRX) cycles range up to 10.24 seconds in connected mode and 43.69 minutes in idle mode. For eMTC and NB-IoT, it is possible to configure an additional uplink and an additional downlink carrier for traffic which is dedicated to a particular User Equipment, whilst common transmissions such as synchronization signals, and uplink transmissions during cell access, occur on the same carrier for all UEs. In 3GPP Rel-16, spectral efficiency is increased further for massive-MTC transmissions and reduced energy consumption for massive-MTC devices enabled e.g. uplink transmission using preconfigured resources in idle mode (allowing the device to skip random access procedures) and multi-transport-block scheduling in both the DL and UL transmission directions (reducing the control signalling overhead).

Sidelink transmissions are defined for ProSe Direct Discovery and ProSe Direct Communication between UEs. ProSe Direct Communication is targeting only Public Safety applications and allows terminals to communicate with each other directly without routing the data via the eNB. ProSe Direct Discovery allows discovering other terminals in close proximity. Direct communication is also supported when a terminal is out of LTE network coverage. Vehicular communication services can be provided by PC5 interface and/or Uu interface. Support of vehicle-to-everything (V2X) services via PC5 interface is provided by V2X sidelink communication.

E-UTRA/LTE RIT supports also Multicast Broadcast Multimedia Service (MBMS), allowing for multiple cells to jointly transmit multicast/broadcast data forming a single frequency network. Multiple subcarrier spacings and cyclic prefixes are supported, targeting different use cases (e.g. handheld, car-mounted, rooftop) and different inter-site distances (up to 100km ISD). E-UTRA/LTE RIT supports both mixed unicast/MBMS carriers and dedicated MBMS carriers.

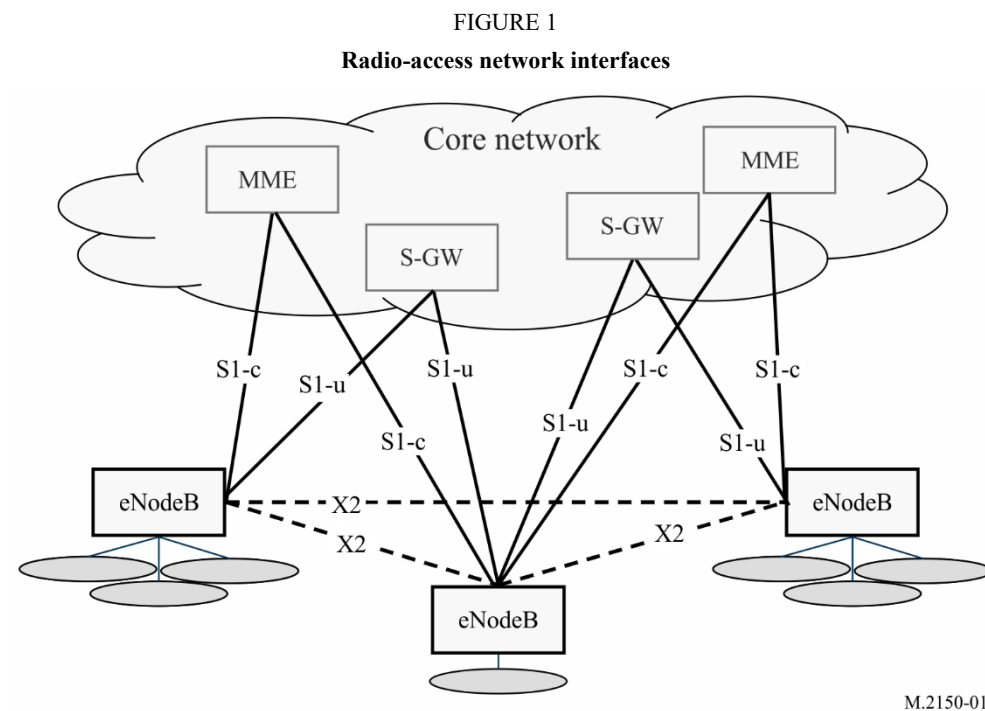
In order to enhance mobility robustness and performance, additional LTE mobility enhancements are introduced in 3GPP Rel-16. User data interruption is reduced during handover to 0 ms by dual-active-

protocol-stack handover. In addition, the robustness during handover is improved by conditional handover.

1.1.1.1 Network architecture

The radio-access network of E-UTRA/LTE RIT has a flat architecture with a single type of node, the eNodeB, which is responsible for all radio-related functions in one or several cells. The eNodeB is connected to the core network via the S1 interface, more specifically to the serving gateway (S-GW) by means of the user-plane part, S1-u, and to the Mobility Management Entity (MME) by means of the control-plane part, S1-c. One eNodeB can connect to multiple MMEs/S-GWs for the purpose of load sharing and redundancy. MMEs/S-GWs can be (re)selected for support of separate dedicated core networks that are designed to meet the requirements of a certain group of devices/customers.

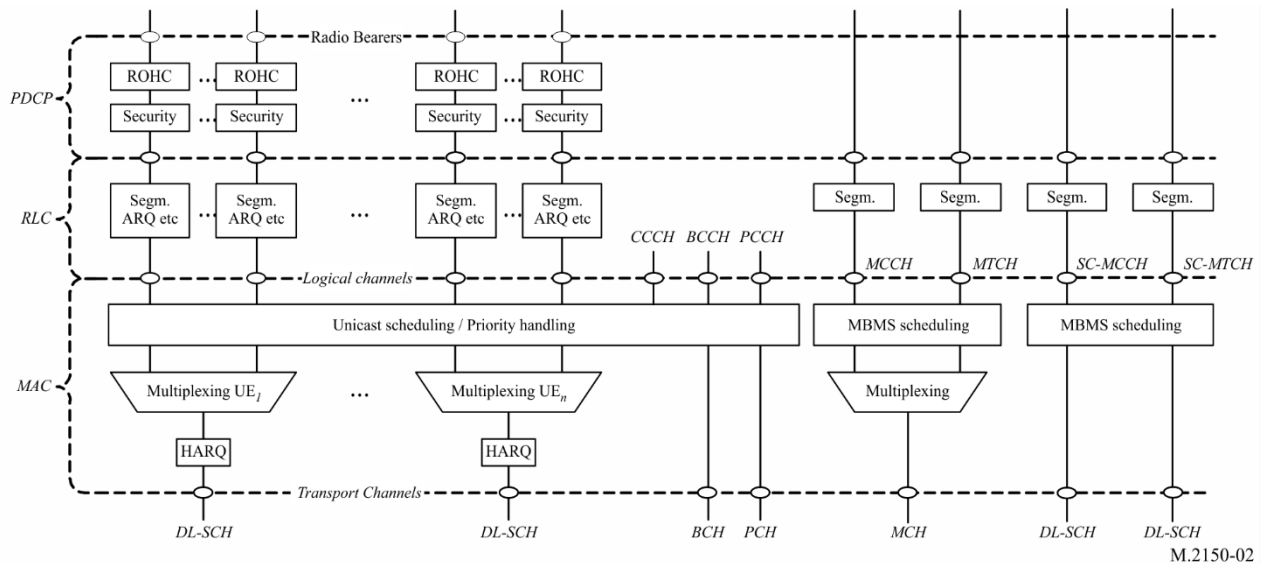
The X2 interface, connecting eNodeBs to each other, is mainly used to support active-mode mobility. This interface may also be used for multi-cell Radio Resource Management (RRM) functions such as ICIC or CoMP. The X2 interface is also used to support lossless mobility between neighbouring cells by means of packet forwarding. The architecture is shown in Fig. 1.



1.1.1.2 Layer 2 protocol architecture

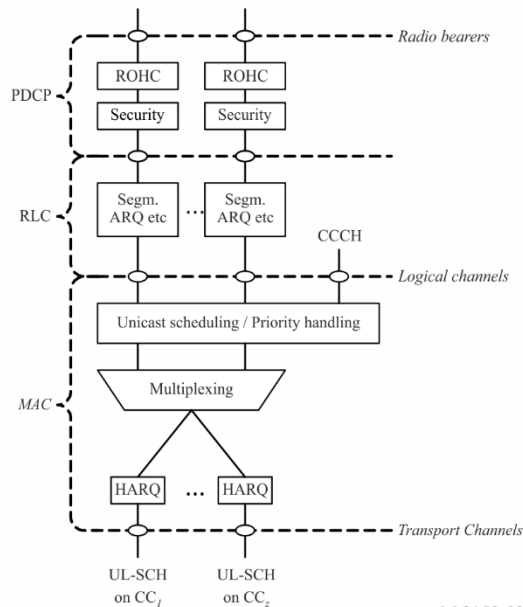
Layer 2 (L2) consists of several sub-layers: Packet Data Convergence Protocol (PDCP), Radio Link Control (RLC) and Medium Access Control (MAC). The downlink and uplink protocol structures are illustrated in Fig. 2 and Fig. 3, respectively. L2 provides one or more Radio Bearers to higher layers to which Internet Protocol (IP) packets are mapped according to their Quality-of-Service (QoS) requirements. L2/MAC Protocol Data Units (PDUs), also referred to as transport blocks, are created according to instantaneous scheduling decisions and delivered to the physical layer on one or several transport channels (one transport channel of the same type per component carrier).

FIGURE 2

Downlink L2 protocol structure

M.2150-02

FIGURE 3

Uplink L2 protocol structure

M.2150-03

Radio bearers are categorized into two groups: Data Radio Bearers (DRB) for UP data and Signalling Radio Bearers (SRB) for CP data.

In DC, a data radio bearer can be configured as Master Cell Group (MCG) bearer, Secondary Cell Group (SCG) bearer or a split bearer. The MCG bearer is served by the Master eNB (MeNB), SCG bearer by the Secondary eNB (SeNB) and the split bearer is served by both eNBs. For a split bearer, a common PDCP entity is located in the MeNB, but there are two RLC entities, one terminating in the MeNB and one in the SeNB. From Rel-15 onwards, a data packet of a data radio bearer can be duplicated increasing robustness.

1.1.1.2.1 Packet Data Convergence Protocol (PDCP)

Except for NB-IoT, the main services and functions of the PDCP sublayer for the User Plane (UP) include:

- Header compression and decompression of IP data flows using ROHC.
- Transfer of user data.
- In-sequence delivery of upper layer PDUs in the PDCP re-establishment procedure for RLC Acknowledged Mode (AM).
- For split bearers in Dual Connectivity (only supported in RLC AM mode): PDCP PDU routing for transmission and PDCP PDU reordering for reception.
- Duplicate detection of lower layer Service Data Units (SDUs) in the PDCP re-establishment procedure for RLC AM.
- Retransmission of PDCP SDUs at handover and, for split bearers in DC and LWA bearers, of PDCP PDUs at PDCP data-recovery procedure, for RLC AM.
- Ciphering and deciphering.
- Timer-based SDU discard in uplink;
- Duplication of PDCP PDUs;
- For PDCP duplication, reordering and duplicate detection at the receiver.

For NB-IoT UEs when AS security is activated, the main services and functions of the PDCP sublayer for the user plane include:

- Header compression and decompression: ROHC only;
- Transfer of user data;
- In-sequence delivery of upper layer PDUs in the PDCP re-establishment procedure for RLC AM;
- Duplicate detection of lower layer SDUs in the PDCP re-establishment procedure for RLC AM;
- Ciphering and deciphering;
- Timer-based SDU discard in uplink.

The main services and functions of the PDCP for the CP include:

- Ciphering and integrity protection and verification.
- Transfer of control plane data.

Except for NB-IoT, the main services and functions of the PDCP sublayer for the control plane also include:

- Duplication of PDCP PDUs;
- For PDCP duplication, reordering and duplicate detection at the receiver.

For an NB-IoT UE that supports Control Plane Cellular Internet of Things (CIoT) EPS optimizations only, PDCP is bypassed. For a NB-IoT UE that supports both Control Plane CIoT EPS optimizations and User Plane CIoT EPS optimizations PDCP is not used until AS security is activated.

PDCP uses the services provided by the RLC sub-layer. There is one PDCP entity per radio bearer configured for each UE.

1.1.1.2.2 Radio Link Control (RLC)

Radio Link Control (RLC) is responsible for:

- Transfer of upper layer PDUs.
- Error correction through ARQ (only for AM data transfer).
- Concatenation, segmentation and reassembly of RLC SDUs (only for Unacknowledged Mode (UM) and AM data transfer).
- Resegmentation of RLC data PDUs (only for AM data transfer).
- Reordering of RLC data PDUs (only for UM and AM data transfer).
- Duplicate detection (only for UM and AM data transfer).
- Protocol error detection (only for AM data transfer).
- RLC SDU discard (only for UM and AM data transfer).
- RLC re-establishment, except for a NB-IoT UE that only uses CP CIoT EPS optimizations.

Depending on the mode-of-operation, an RLC entity may provide all, a subset of, or none of the services above. The RLC can operate in three different modes:

- Transparent mode (TM), where the RLC is completely transparent and is in essence bypassed. This configuration is used for control-plane broadcast channels such as Broadcast Control Channel (BCCH), Common Control Channel (CCCH) and Paging Control Channel (PCCH) only where the information should reach multiple users.
- Unacknowledged mode (UM), where the RLC provides all the functionality above except error correction, is used when error-free delivery is not required, for example for Multicast Control Channel (MCCH) and Multicast Traffic Channel (MTCH) using Multimedia Broadcast over a Single Frequency Network (MBSFN) and for Voice-over-IP (VoIP).
- Acknowledged mode (AM), where the RLC provides all the services above, is the main mode-of-operation for TCP/IP packet data transmission on the Downlink Shared Channel (DL-SCH). Segmentation/reassembly, in-sequence delivery and retransmissions of erroneous data are all supported.

The RLC offers services to the PDCP in the form of *radio bearers* and uses services from the MAC layer in the form of *logical channels*. There is one RLC entity per radio bearer configured for each UE.

1.1.1.2.3 Medium Access Control (MAC)

The MAC layer is responsible for:

- Mapping between logical channels and transport channels.
- Multiplexing/demultiplexing of MAC SDUs belonging to one or different logical channels into/from transport blocks delivered to/from the physical layer on transport channels.
- Scheduling information reporting.
- Error correction through N-process stop-and-wait hybrid-ARQ (HARQ) with synchronous (for the uplink) and asynchronous (for the downlink) retransmissions.
- Priority handling between logical channels of one UE.
- Priority handling between UEs by means of dynamic scheduling.
- Multimedia Broadcast/Multicast Service (MBMS) identification.
- Transport format selection.
- Padding.

The ProSe specific services and functions of the MAC sublayer include:

- Radio resource selection;
- Packet filtering for Prose Direct Communication.

In case of DC, the UE is configured with two independent MAC entities, one for MCG and one for SCG.

The MAC offers services to the RLC in the form of logical channels. A logical channel is defined by the type of information it carries and is generally classified as a control channel, used for transmission of control and configuration information necessary for operating an E-UTRA/LTE RIT system, or as a traffic channel, used for the user data. The set of logical-channel types specified for E-UTRA/LTE RIT includes:

- Broadcast Control Channel (BCCH), used for broadcasting system control information.
- Bandwidth Reduced Broadcast Control Channel (BR-BCCH), used for broadcasting system control information to bandwidth limited eMTC UEs.
- Paging Control Channel (PCCH), a downlink channel used for paging when the network is not aware of the location of the UE and for system information change notifications.
- Common Control Channel (CCCH), used for transmission of control information between UEs and network when the UE has no Radio Resource Control (RRC) connection.
- Dedicated Control Channel (DCCH), used for transmission of control information to/from a mobile terminal when the UE has a RRC connection.
- Multicast Control Channel (MCCH), used for transmission of control information required for reception of the MTCH.
- Single-Cell Multicast Control Channel (SC-MCCH), used for transmission of control information required for reception of MBMS using Single-Cell Point-to-Multipoint (SC-PTM).
- Sidelink Broadcast Channel (SBCH) used for broadcasting sidelink system information from one UE to one or more other UE(s). This channel is used only by ProSe Direct Communication capable UEs.
- Dedicated Traffic Channel (DTCH), used for transmission of user data to/from a mobile terminal. This is the logical channel type used for transmission of all uplink and non-MBSFN downlink user data. DTCH is not supported for an NB-IoT UE that only uses CP CIoT EPS optimizations.
- Multicast Traffic Channel (MTCH), used for downlink transmission of MBMS services.
- Single-Cell Multicast Traffic Channel (SC-MTCH), used for downlink transmission of MBMS services using SC-PTM.
- Sidelink Traffic Channel (STCH) is a point-to-multipoint channel, for transfer of user information from one UE to other UEs. This channel is used only by Prose Direct Communication capable UEs.

For a NB-IoT UE that only uses CP CIoT EPS optimizations there is only one dedicated logical channel per UE.

From the physical layer, the MAC layer uses services in the form of Transport Channels. A transport channel is defined by how and with what characteristics the information is transmitted over the radio interface. Data on a transport channel is organized into transport blocks. In each Transmission Time Interval (TTI), at most one or two (in case of spatial multiplexing) transport blocks are transmitted per component carrier.

Associated with each transport block is a Transport Format (TF), specifying how the transport block is to be transmitted over the radio interface. The transport format includes information about the transport-block size, the modulation scheme, and the antenna mapping. The scheduler is responsible for (dynamically) determining the uplink as well as downlink transport format in each TTI.

The following transport-channel types are defined:

- The Broadcast Channel (BCH) has a fixed transport format, provided by the specifications. It is used for transmission of parts of the BCCH system information, more specifically the so-called Master Information Block (MIB).
- Paging Channel (PCH) is used for transmission of paging information from the PCCH logical channel. The PCH supports DRX to allow the mobile terminal to save battery power by waking up to receive the PCH only at predefined time instants.
- The downlink Shared Channel (DL-SCH) is the main transport-channel type used for transmission of downlink data in E-UTRA/LTE RIT. The DL-SCH supports dynamic rate adaptation and channel-dependent scheduling, HARQ with soft combining, and spatial multiplexing. It also supports DRX to reduce mobile-terminal power consumption while still providing an always-on experience.
The DL-SCH is also used for transmission of the parts of the BCCH system information not mapped to the BCH. For transmission to a terminal using multiple component carriers, the UE receives one DL-SCH per component carrier.
- The Multicast Channel (MCH) is used to support MBMS. It is characterized by a semi-static transport format and semi-persistent scheduling. In case of multi-cell transmission using MBSFN, the scheduling and transport format configuration is coordinated among the cells involved in the MBSFN transmission.
- The Uplink Shared Channel (UL-SCH) is the uplink counterpart to the DL-SCH, i.e. it is the uplink transport channel used for transmission of uplink data.
- The Random Access Channel (RACH) is also defined as an uplink transport channel although it does not carry transport blocks. The RACH is used in the uplink to respond to the paging message or to initiate the move to the RRC_CONNECTED state according to terminal data transmission needs.
- The Sidelink Broadcast Channel (SL-BCH) uses a pre-defined transport format.
- The Sidelink Discovery Channel (SL-DCH) supports both UE autonomous resource selection and scheduled resource allocation by eNodeB; it uses a fixed size, pre-defined format periodic broadcast transmission.
- The Sidelink Shared Channel (SL-SCH) supports both UE autonomous resource selection and scheduled resource allocation by eNodeB; it supports HARQ combining and dynamic link adaptation by varying the transmit power, modulation and coding.

The mapping between logical channels, transport channels and physical channels is illustrated in Fig. 4 for the downlink, Fig. 5 for the uplink, Fig. 6 for the sidelink, Fig. 7 for the NB-IoT downlink and Fig. 8 for the NB-IoT uplink.

FIGURE 4
Downlink channel mapping

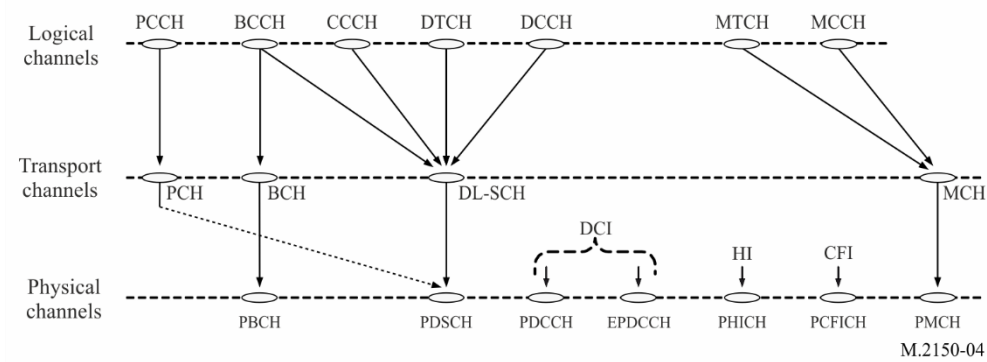


FIGURE 5
Uplink channel mapping

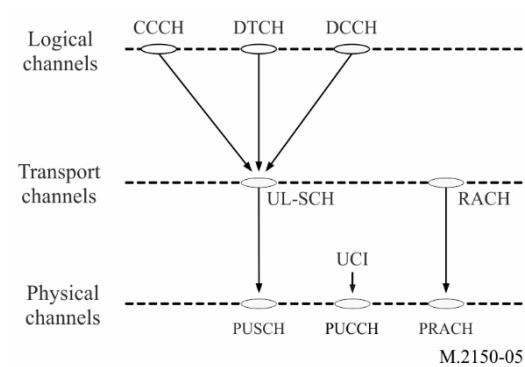


FIGURE 6
Sidelink channel mapping

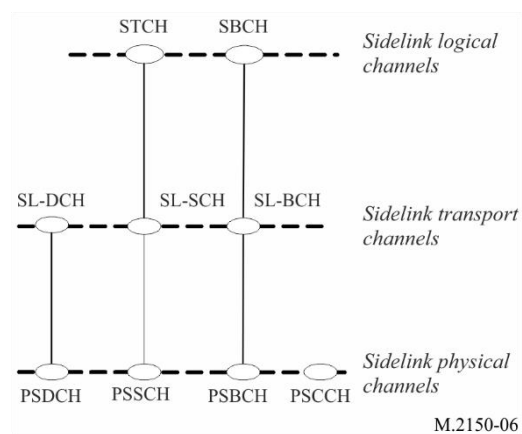


FIGURE 7

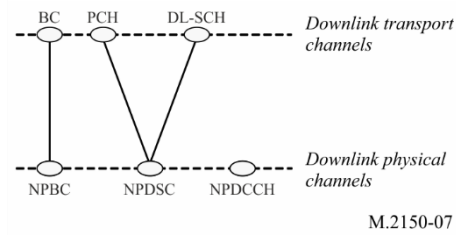
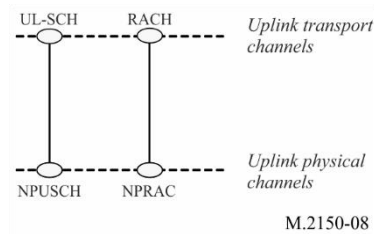
NB-IoT DL channel mapping

FIGURE 8

NB-IoT UL channel mapping**1.1.1.3 Physical layer**

The physical layer is responsible for:

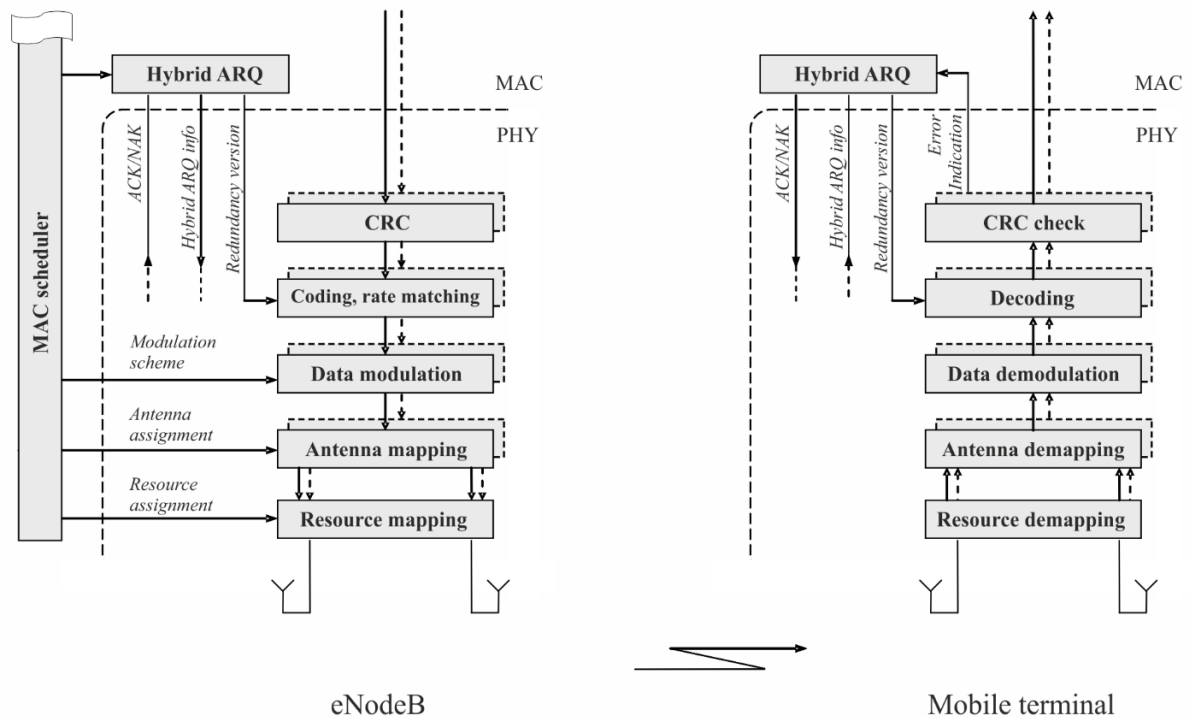
- modulation and demodulation of physical channels;
- error detection on the transport channel and indication to higher layers;
- forward Error Correction (FEC) encoding and decoding of transport channels;
- rate matching of the coded transport channel to physical channels;
- mapping of the coded transport channel onto physical channels according to Fig. 4 (downlink) and Fig. 5 (uplink);
- Hybrid-ARQ soft-combining;
- frequency and time synchronization;
- power weighting of physical channels;
- multi-antenna processing and beamforming;
- characteristic measurements and indication to higher layers; and
- RF processing.

A simplified overview of the processing for the DL-SCH is given in Fig. 9.

FIGURE 9

Simplified physical-layer processing for DL-SCH on one component carrier

1 or 2 transport blocks of dynamic size per TTI



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1.1.1.3.1 Physical channels

The following different types of physical channels are defined for the downlink:

- Physical Downlink Shared Channel (PDSCH): used for transmission of user and control plane data services.
- Physical Multicast Channel (PMCH): used for transmission of control and user-plane broadcast services during MBSFN subframes.
- Physical Downlink Control Channel (PDCCH): used for transmission of control information such as resource allocation, transport format and HARQ related information.
- Enhanced Physical Downlink Control Channel (EPDCCH): used for transmission of control information such as resource allocation, transport format and HARQ related information.
- MTC physical downlink control channel (MPDCCH): used for transmission of control information in bandwidth-reduced operation and/or using coverage extension mode.
- Physical Broadcast Channel (PBCH): used for conveying cell and/or system specific information.
- Physical Control Format Indicator Channel (PCFICH): used to indicate to the UE the control format (number of symbols comprising PDCCH, PHICH) of the current subframe.
- Physical Hybrid ARQ Indicator Channel (PHICH): used to convey the ACK/NAK information for UL (PUSCH) transmissions received at the eNodeB.

Three different types of physical channels are defined for the uplink:

- Physical Random Access Channel (PRACH): used to convey a preamble which is used to trigger a random-access procedure in the eNodeB.
- Physical Uplink Shared Channel (PUSCH): used to convey both user data and upper layer control information.

- Physical Uplink Control Channel (PUCCH): used to convey control information (scheduling requests, CQI, PMI, RI, HARQ ACK/NAK for PDSCH, etc.).

The following types of physical channels are defined for the sidelink:

- Physical sidelink broadcast channel (PSBCH): used to carry system and synchronization related information, transmitted from the UE.
- Physical sidelink discovery channel (PSDCH): used to carry ProSe Direct Discovery message from the UE.
- Physical sidelink control channel (PSCCH): used to carry control from a UE for ProSe Direct Communication.
- Physical sidelink shared channel (PSSCH): used to carry traffic from a UE for ProSe Direct Communication.

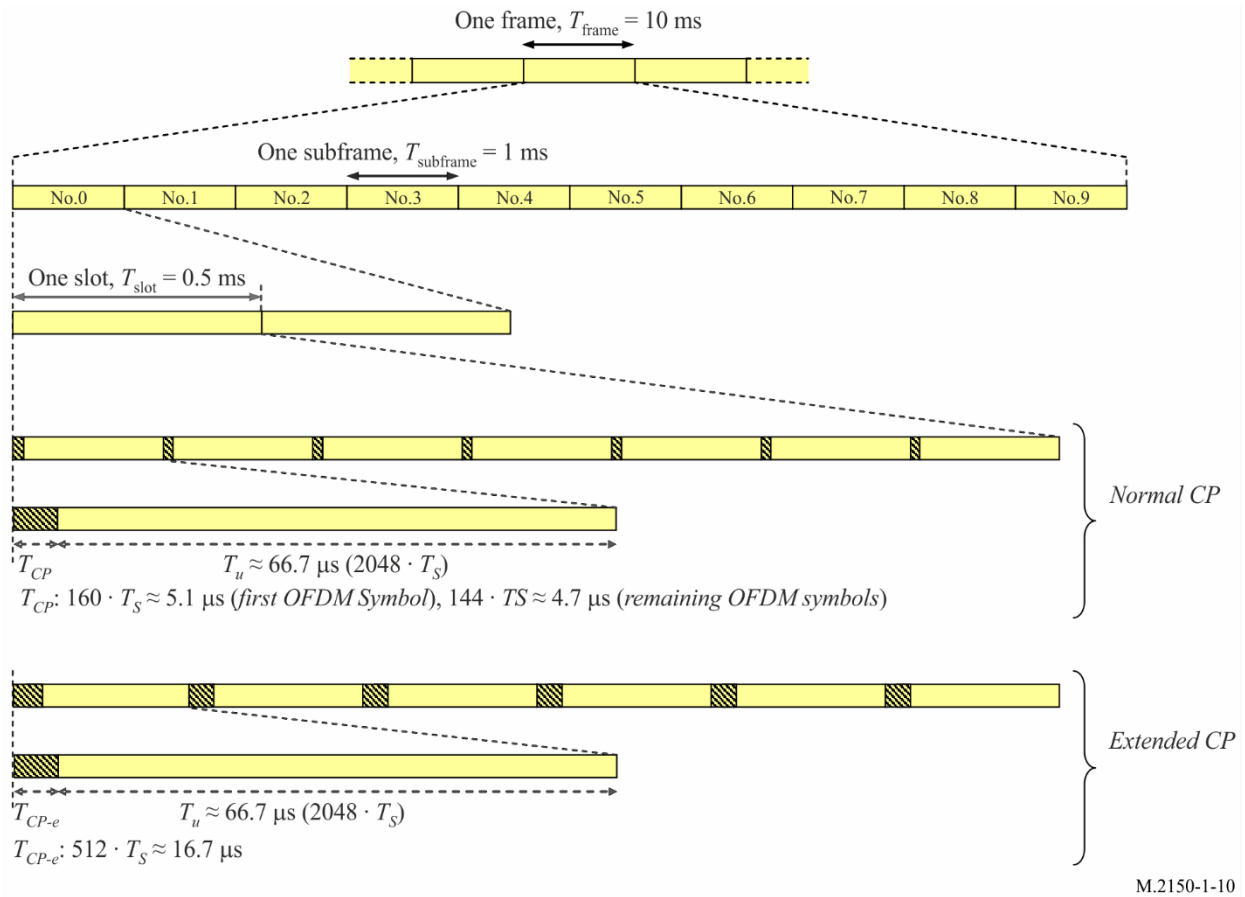
The following types of physical channels are defined for NB-IoT:

- Narrowband Physical broadcast channel (NPBCH) : used to carry the BCH for NB-IoT UEs. Used for conveying cell and/or system specific information using a transport block mapped to sixty four subframes within a 640 ms interval.
- Narrowband Physical downlink shared channel (NPDSCH): used to carry the DL-SCH and PCH for NB-IoT UEs.
- Narrowband Physical downlink control channel (NPDCCH): used to inform the NB-IoT UE about the resource allocation of PCH and DL-SCH. Carries the uplink scheduling grant for the NB-IoT UE. Carries the direct indication information.
- Narrowband Physical uplink shared channel (NPUSCH): used to carry the UL-SCH and Hybrid ARQ ACK/NAKs in response to downlink transmission for the NB-IoT UE.
- Narrowband Physical random access channel (NPRACH): used to carry the random access preamble for the NB-IoT UE.

1.1.1.3.2 Time-domain structure and duplex schemes

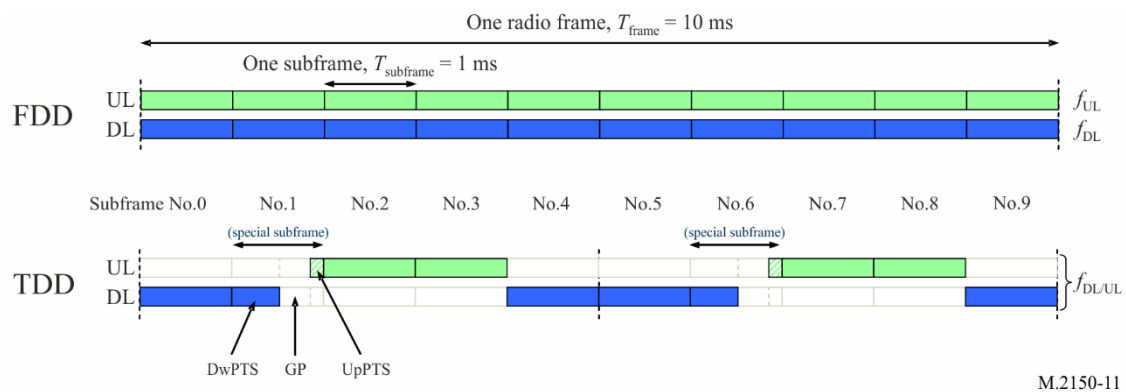
Figure 10 illustrates the high-level time-domain structure for transmission, with each (radio) frame of length 10 ms consisting of ten equally sized subframes of length 1 ms. Each subframe consists of two equally sized slots of length $T_{\text{slot}} = 0.5$ ms with each slot consisting of a number of OFDM symbols including cyclic prefix. For MBSFN transmission, slots of 1 ms and 3 ms are additionally defined.

FIGURE 10
E-UTRA/LTE RIT time-domain structure



The E-UTRA/LTE RIT can operate in both FDD and TDD modes as illustrated in Fig. 11. Although the time-domain structure is, in most respects, the same for FDD and TDD there are some differences between the two duplex modes, most notably the presence of a special subframe in the case of TDD. The special subframe is used to provide the necessary guard time for downlink-to-uplink switching.

FIGURE 11
Uplink/downlink time/frequency structure for FDD and TDD



For FDD operation (upper part of Fig. 11), there are two carrier frequencies for each component carrier, one for uplink transmission (f_{UL}) and one for downlink transmission (f_{DL}). During each frame, there are thus ten uplink subframes and ten downlink subframes and uplink and downlink

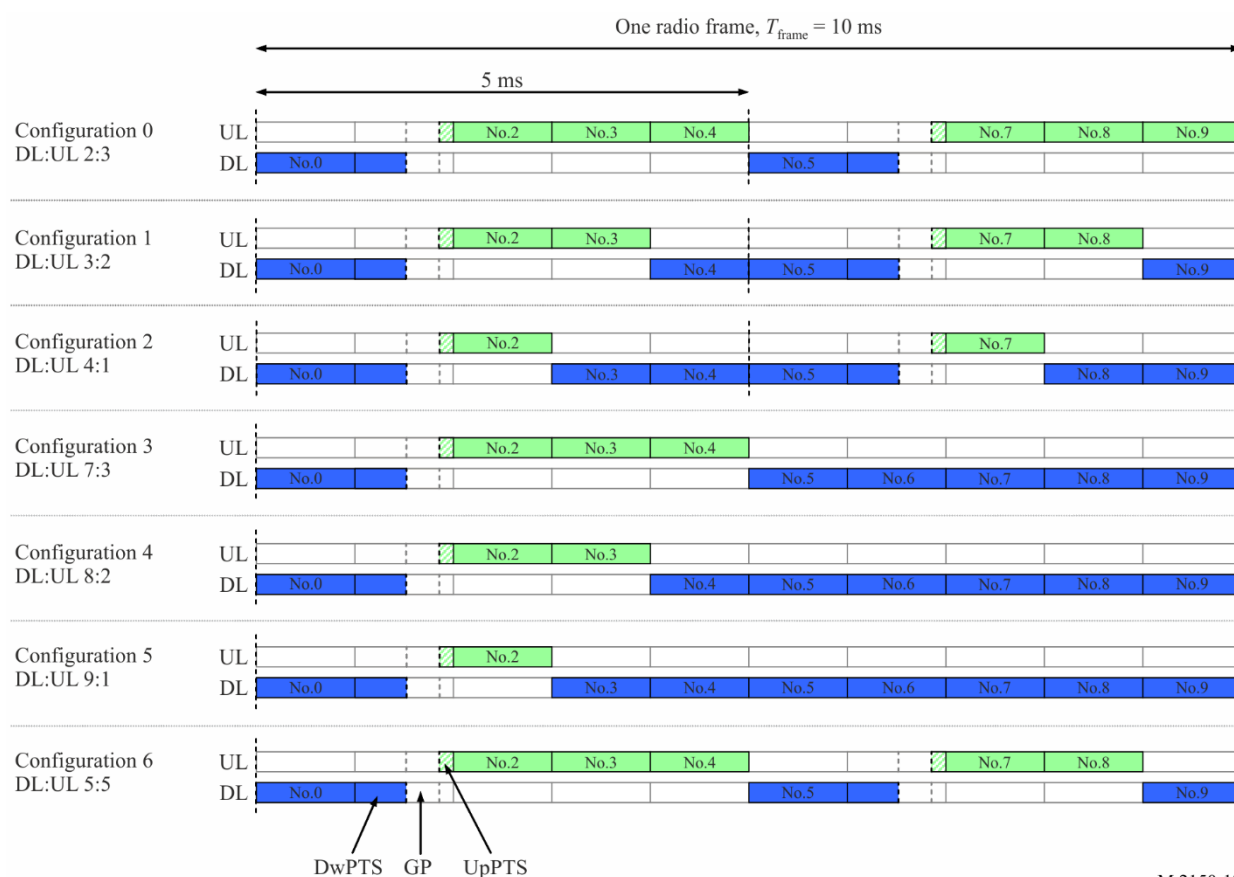
transmission can occur simultaneously within a cell. Half-duplex operation at the UE side is supported by the scheduler ensuring non-simultaneous reception and transmission at the UE.

For TDD operation (lower part of Fig. 11), there is only a single carrier frequency per component carrier and uplink and downlink transmissions are always separated in time also on a cell basis. As seen in the figure, some subframes are allocated for uplink transmissions and some subframes for downlink transmission with the switch between downlink and uplink occurring in the special subframe. The special subframe is split into three parts: a downlink part (DwPTS), a guard period (GP) where the switch occurs, and an uplink part (UpPTS). The DwPTS is in essence treated as a normal downlink subframe, although the amount of data that it is possible to transmit is smaller due to the reduced length of the DwPTS. The UpPTS can be used for channel sounding or random access. The DwPTS, GP, and UpPTS have configurable individual lengths to support different deployment scenarios, and a total length of 1 ms.

Different asymmetries in terms of the amount of resources allocated for uplink and downlink transmission, respectively, are provided through seven different downlink/uplink configurations as shown in Fig. 12. Where carrier aggregation is employed, the downlink/uplink configuration is identical across component carriers in the same band and may be the same or different across component carriers in different bands.

Coexistence between the E-UTRA/LTE RIT and other (IMT-2000) TDD systems such as TD-SCDMA is catered for by aligning the switch points between the two systems and selecting the appropriate special subframe configuration and uplink-downlink asymmetry.

FIGURE 12
Uplink-downlink asymmetries supported by the E-UTRA/LTE RIT



Sidelink transmissions use the same frame structure as the frame structure that is defined for uplink and downlink when UEs are in network coverage. However, the sidelink transmissions are restricted to a subset of the uplink resources in time and frequency domain.

The physical channel structure is similar to uplink transmissions and the same basic transmission scheme as the UL transmission scheme is used. However, sidelink is limited to single cluster transmissions and it uses a one symbol gap at the end of each sidelink subframe.

1.1.1.3.3 Physical layer processing

To the transport block(s) to be transmitted on a DL-SCH or UL-SCH, a Cyclic Redundancy Check is attached, followed by rate-1/3 Turbo coding for error correction (tail biting convolutional code for NPDSCH). Rate matching is used not only to match the number of coded bits to the amount of resources allocated for the DL-SCH/UL-SCH transmission, but also to generate the different redundancy versions as controlled by the HARQ protocol. When spatial multiplexing is employed, the processing is duplicated for the two transport blocks. After rate matching, the coded bits are modulated (QPSK, 16-QAM, 64-QAM, 256-QAM, and 1 024 QAM in DL, and QPSK, 16 QAM, 64 QAM, 256 QAM in UL). In the case of multi-antenna transmission, the modulation symbols are mapped to multiple layers and precoded before being mapped to the different antenna ports. Alternatively, transmit diversity can be applied. Finally, the (precoded) modulation symbols are mapped to the time-frequency resources allocated for the transmission.

Downlink transmission is based on conventional OFDM with a cyclic prefix. The subcarrier spacing is $\Delta f = 15$ kHz and two cyclic prefix lengths are supported: normal cyclic prefix ≈ 4.7 μ s and extended cyclic prefix ≈ 16.7 μ s. In the frequency domain, the number of resource blocks can range from 6 to 100 per component carrier (for channel bandwidths ranging from 1.4 to 20 MHz respectively), where a resource block is 180 kHz in the frequency domain. There can be up to 32 component carriers transmitted in parallel implying an overall bandwidth up to 640 MHz. In inband mode NB-IoT allocates a single resource block. In standalone mode, NB-IoT uses a channel bandwidth of 200 kHz.

Uplink transmission is based on Discrete Fourier Transform (DFT) Spread OFDM (DFTS-OFDM). DFTS-OFDM can be seen as a DFT precoder, followed by conventional OFDM with the same numerology as in the downlink. The NB-IoT UL allows allocation of a single-tone with $\Delta f = 3.75$ kHz or $\Delta f = 15$ kHz subcarrier spacing. Multiple DFT precoding sizes, corresponding to transmission with different scheduled bandwidths, can be used.

The remaining downlink transport channels (PCH, BCH, MCH) are based on the same general physical-layer processing as DL-SCH, although with some restrictions in the set of features used. MCH supports additional subcarrier spacings of 0.370, 1.25, 2.5 and 7.5 kHz are supported, with cyclic prefixes up to 300 μ s.

1.1.1.3.4 Multi-antenna transmission

A wide range of multi-antenna transmission schemes are supported in the downlink:

- Single-antenna transmission using a single cell-specific reference signal.
- Closed-loop spatial multiplexing, also known as codebook-based beam-forming or precoding, of up to four layers using cell-specific reference signals. Feedback reports from the terminal are used to assist the eNodeB in selecting a suitable precoding matrix.
- Open-loop spatial multiplexing, also known as large-delay cyclic delay diversity, of up to four layers using cell-specific reference signals.
- Spatial multiplexing of up to eight layers using UE-specific reference signals. The eNodeB may use feedback reports or exploit channel reciprocity to set the beam-forming weights.

- Transmit diversity based on Space-Frequency Block Coding (SFBC) or a combination of SFBC and Frequency Switched Transmit Diversity (FSTD).
- Multi-user MIMO where multiple terminals are assigned overlapping time-frequency resources.
- Non-precoded Channel State Information Reference Symbol (CSI-RS) operation is supported, which comprises schemes where different CSI-RS ports have the same wide beam width and direction and hence generally cell wide coverage.
- Beamformed CSI-RS operation is supported, which comprises schemes where (at least at a given time/frequency) CSI-RS ports have narrow beam widths and hence not cell wide coverage, and (at least from the eNB perspective) at least some CSI-RS port-resource combinations have different beam directions.
- Downlink Coordinated MultiPoint (DL-CoMP) operation where multiple transmission points are coordinated.

The following multi-antenna transmission schemes are supported in the uplink:

- Single-antenna transmission.
- Precoding supporting rank-adaptive spatial multiplexing with one up to four layers.
- Uplink Coordinated MultiPoint (UL-CoMP) operation where multiple reception points are coordinated.

1.1.1.3.5 Link adaptation and power control

According to the radio channel conditions, the Modulation and Coding Scheme (MCS) can be adapted flexibly. The same modulation and coding is applied to all resource units assigned to the same transport block within a TTI. Uplink power control determines the average power over a DFTS-OFDM symbol in which the physical channel is transmitted.

1.1.1.3.6 L1/L2 control signalling

Downlink Control Information (DCI) is transmitted on either a PDCCH or an EPDCCH. In bandwidth-reduced operation and/or when using coverage extension mode, a DCI is transmitted on an MPDCCH. For NB-IoT, a DCI is transmitted on NPDCCH.

The PDCCH is transmitted in the first one to three OFDM symbols of each downlink subframe in each component carrier with the number of OFDM symbols being indicated on the PCFICH. Downlink and uplink scheduling grants (consisting of UE identity, time-frequency resources and transport format) and HARQ acknowledgements are transmitted on the PDCCH and PHICH, respectively. Each grant is transmitted on a separate PDCCH using QPSK modulation and cell-specific reference signals.

The EPDCCH/MPDCCH is transmitted in pairs of Physical Resource Blocks (PRBs) multiplexed in frequency with the PDSCH; it carries downlink and uplink scheduling grants (consisting of UE identity, time-frequency resources and transport format). The EPDCCH/MPDCCH uses QPSK modulation and demodulation reference signals, and it may use either frequency-localized or frequency-distributed transmission.

For NB-IoT, the NPDCCH is transmitted in all available OFDM symbols of pairs of PRBs, with no multiplexing with NPDSCH; it carries downlink and uplink scheduling grants (consisting of UE identity, time-frequency resources and transport format). The NPDCCH uses QPSK modulation and narrowband reference signals.

Sidelink resource allocation can be transmitted on the PDCCH/EPDCCH.

Uplink control information (UCI), consisting of CSI, scheduling requests and hybrid-ARQ acknowledgements, is transmitted at the band edges of the primary uplink component carrier. Alternatively, parts of the control signalling can be multiplexed with data on PUSCH. To support downlink CoMP transmission, a UE may be configured with multiple CSI processes.

1.1.1.3.7 MBSFN operation

Multicast/Broadcast over Single Frequency Network (MBSFN) transmission, where the same signal is transmitted from multiple, time-synchronized cells, is supported by the MCH transport channel. One component carrier can support simultaneous unicast and broadcast support through time-domain multiplexing of MCH and DL-SCH transmissions.

1.1.2 Overview of the Component RIT: NR

The NR RIT as one component RIT represents the releases 15, 16, 17 and 18 of NR, which uses either 1) FDD operation and therefore is applicable for operation with paired spectrum or 2) TDD operation and therefore is applicable for operation with unpaired spectrum. Channel bandwidths up to 400 MHz and Carrier Aggregation over 16 component carriers are supported, yielding peak data rates up to roughly 140 Gbit/s in the downlink and 65 Gbit/s in the uplink.

1.1.2.1 Overall architecture

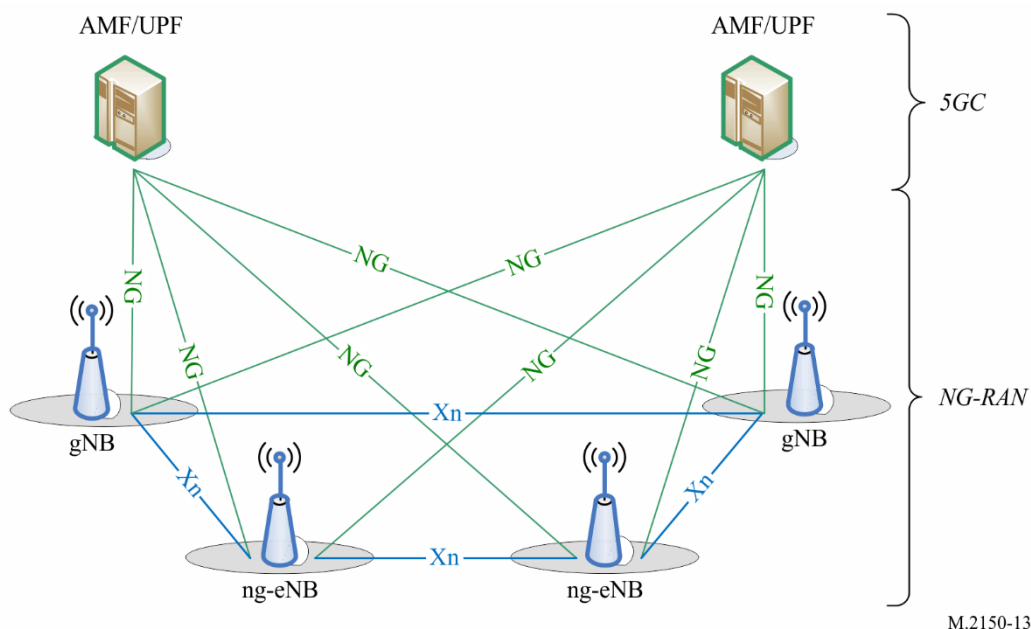
An NG-RAN node, is either:

- A gNB, providing NR user plane and control plane protocol terminations towards the UE; or
- An ng-eNB, providing E-UTRA user plane and control plane protocol terminations towards the UE.

NG-RAN nodes are interconnected by means of the interface named Xn. The gNBs and ng-eNBs are also connected by means of the NG interfaces to the 5GC, more specifically to the Access and Mobility Management Function (AMF) by means of the NG-C interface and to the User Plane Function (UPF) by means of the NG-U interface.

The NG-RAN architecture is illustrated in Fig. 13.

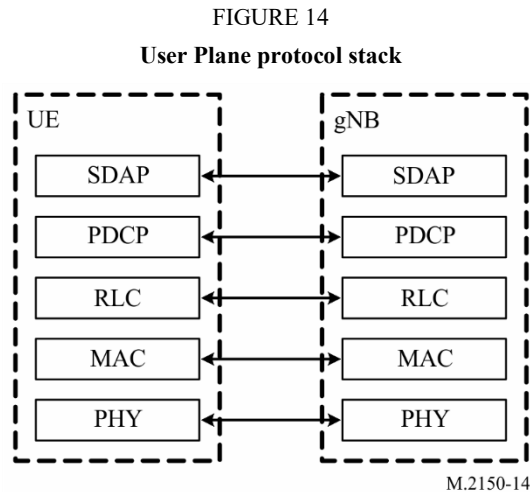
FIGURE 13
Overall Architecture



1.1.2.2 Radio protocol architecture

1.1.2.2.1 User Plane (UP)

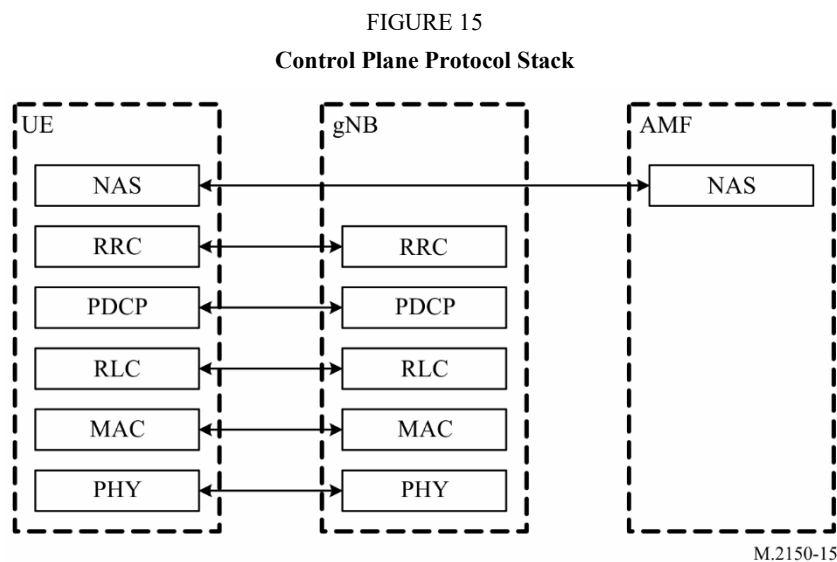
Figure 14 shows the protocol stack for the User Plane, where Service Data Adaptation Protocol (SDAP), PDCP, RLC and MAC sublayers (terminated in gNB on the network side) perform the functions listed in § 1.1.2.5.



1.1.2.2.2 Control Plane

Figure 15 shows the protocol stack for the control plane, where:

- PDCP, RLC and MAC sublayers (terminated in gNB on the network side) perform the functions listed in § 1.1.2.5;
- RRC (terminated in gNB on the network side) performs the functions listed in § 1.1.2.6;
- Non-Access Stratum (NAS) control protocol (terminated in AMF on the network side) performs the functions listed in 3GPP TS 23.501, for instance: authentication, mobility management, security control.

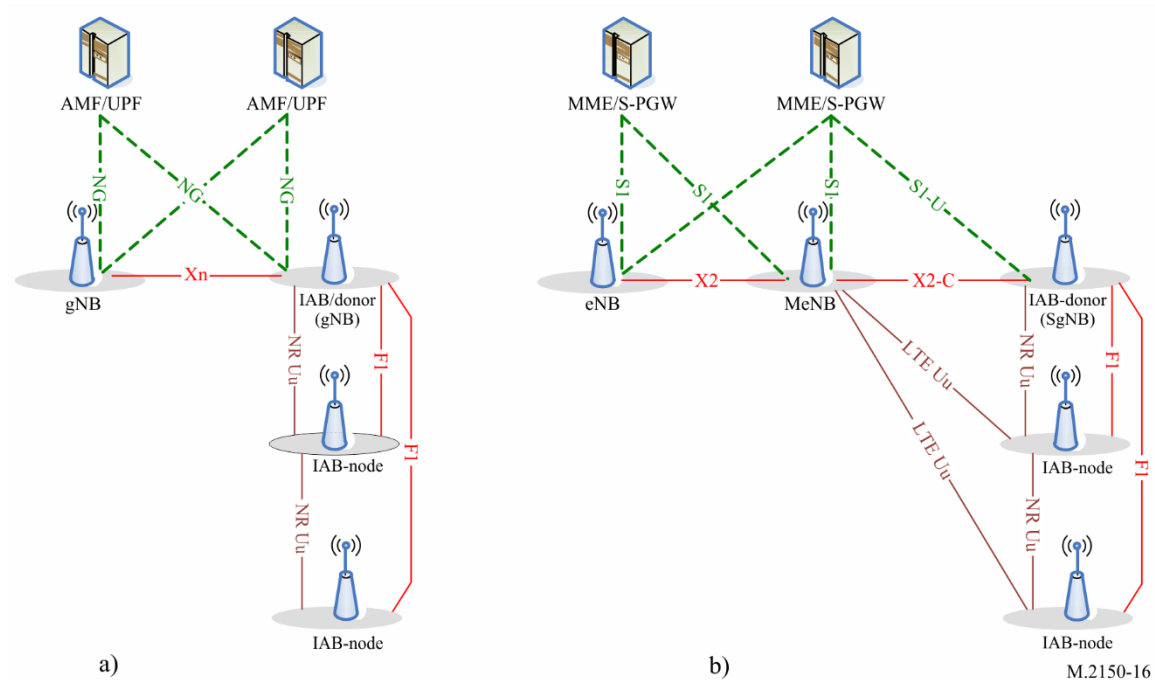


1.1.2.2.3 Integrated Access and Backhaul (IAB) architecture

From NR Rel-16, Integrated access and backhaul (IAB) enables wireless relaying in NG-RAN. The relaying node, referred to as the IAB-node, supports access and backhauling via NR. The terminating node of NR backhauling on the network side is referred to as the IAB-donor, which represents a gNB with additional functionality to support IAB. Backhauling can occur via a single or via multiple hops. The IAB architecture is shown in Fig. 16.

FIGURE 16

IAB architecture; a) IAB-node using SA mode with 5GCN; b) IAB-node using EN-DC



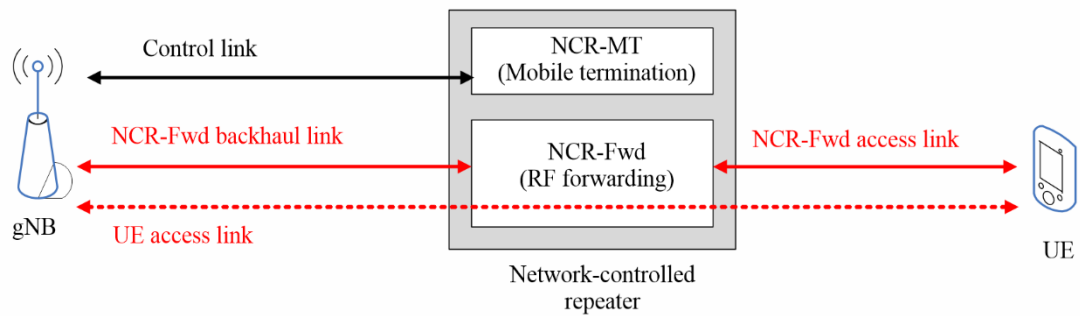
Mobile IAB introduces the *mobile IAB-node*, which is a RAN node that provides NR access links to UEs and an NR backhaul link to a parent node, and that can conduct physical mobility across the RAN area. The mobile IAB-node includes a *mobile IAB-MT* and a *mobile IAB-DU*. Mobile IAB supports the same functionality as IAB unless explicitly specified.

1.1.2.2.4 Network-Controlled Repeaters (NCR) architecture

A Network-Controlled Repeater node, referred to as NCR-node, is an RF repeater that enables wireless amplifying-and-forwarding functionality in NG-RAN. The NCR-node is capable of receiving and applying side control information from a gNB with additional functionality to support Network-Controlled Repeater.

The NCR-node comprises an NCR-MT and an NCR-Fwd. The NCR-MT is an entity supporting a subset of the UE functionality that communicates with the gNB to receive side control information via a control link based on the NR Uu interface. The NCR-Fwd is the function performing amplifying-and-forwarding of signals between gNB and UE via the NCR-Fwd backhaul link and NCR-Fwd access link, respectively. The NCR-node is modelled as depicted in Fig. 17.

FIGURE 17
Conceptual model of network-controlled repeater



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1.1.2.3 Multi-Radio Dual Connectivity (MR-DC)

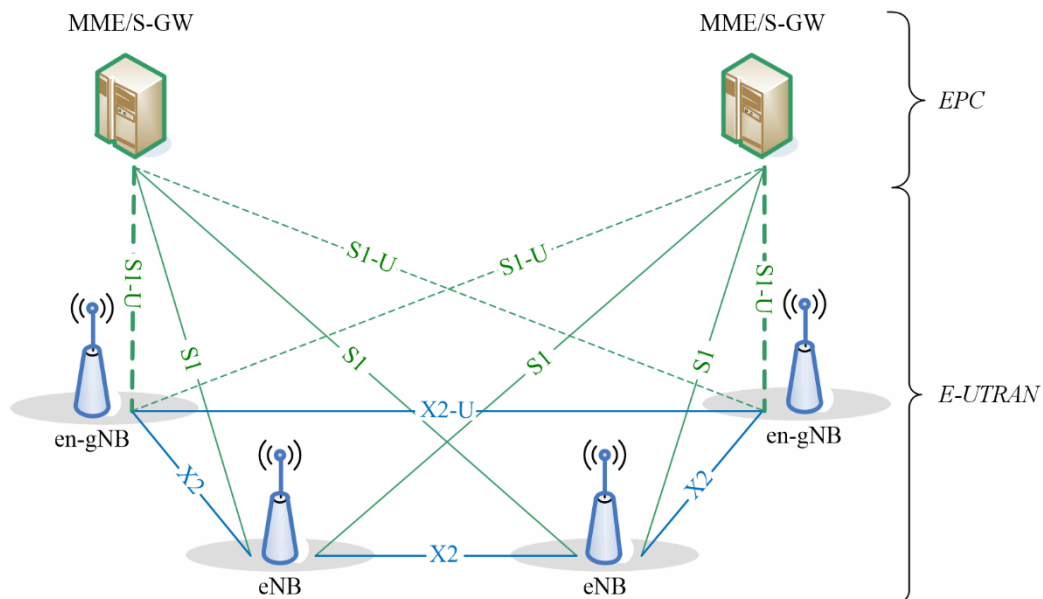
NG-RAN supports Multi-Radio Dual Connectivity (MR-DC) operation whereby a UE in the RRC_CONNECTED state is configured to utilise radio resources provided by two distinct schedulers, located in two different NG-RAN nodes connected via a non-ideal backhaul, one providing NR access and the other one providing either E-UTRA or NR access.

1.1.2.3.1 MR-DC with the EPC

E-UTRAN supports MR-DC via E-UTRA-NR Dual Connectivity (EN-DC), in which a UE is connected to one eNB that acts as a Master Node (MN) and one en-gNB that acts as a Secondary Node (SN). The eNB is connected to the EPC via the S1 interface and to the en-gNB via the X2 interface. The en-gNB might also be connected to the EPC via the S1-U interface and other en-gNBs via the X2-U interface.

The EN-DC architecture is illustrated in Fig. 18.

FIGURE 18
EN-DC overall architecture



M.2150-18

1.1.2.3.2 MR-DC with the 5GC

1.1.2.3.2.1 E-UTRA-NR Dual Connectivity

NG-RAN supports NG-RAN E-UTRA-NR Dual Connectivity (NGEN-DC), in which a UE is connected to one ng-eNB that acts as a MN and one gNB that acts as a SN. The ng-eNB is connected to the 5GC and the gNB is connected to the ng-eNB via the Xn interface.

1.1.2.3.2.2 NR-E-UTRA Dual Connectivity

NG-RAN supports NR-E-UTRA Dual Connectivity (NE-DC), in which a UE is connected to one gNB that acts as a MN and one ng-eNB that acts as a SN. The gNB is connected to 5GC and the ng-eNB is connected to the gNB via the Xn interface.

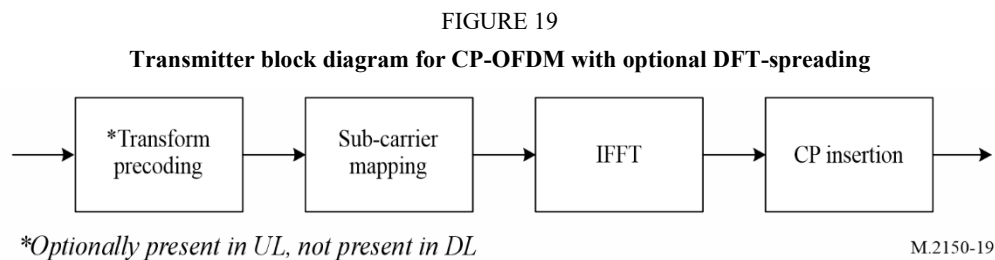
1.1.2.3.2.3 NR-NR Dual Connectivity

NG-RAN supports NR-NR Dual Connectivity (NR-DC), in which a UE is connected to one gNB that acts as a MN and another gNB that acts as a SN. The master gNB is connected to the 5GC via the NG interface and to the secondary gNB via the Xn interface. The secondary gNB might also be connected to the 5GC via the NG-U interface.

1.1.2.4 Physical layer

1.1.2.4.1 Waveform, numerology and frame structure

The downlink transmission waveform is conventional OFDM using a cyclic prefix. The uplink transmission waveform is conventional OFDM using a cyclic prefix with a transform precoding function performing DFT spreading that can be disabled or enabled.



The numerology is based on exponentially scalable sub-carrier spacing $\Delta f = 2^\mu \times 15$ kHz with $\mu = \{0, 1, 3, 4, 5, 6\}$ for Primary Synchronization Signal (PSS), Secondary Synchronization Signal (SSS) and PBCH and $\mu = \{0, 1, 2, 3, 5, 6\}$ for other channels. Normal Cyclic Prefix (CP) is supported for all sub-carrier spacings, Extended CP is supported for $\mu = 2$. 12 consecutive sub-carriers form a Physical Resource Block (PRB). Up to 275 PRBs are supported on a carrier.

TABLE 1
Supported transmission numerologies

μ	$\Delta f = 2^\mu \times 15$ [kHz]	Cyclic prefix	Supported for data	Supported for synch
0	15	Normal	Yes	Yes
1	30	Normal	Yes	Yes
2	60	Normal, Extended	Yes	No
3	120	Normal	Yes	Yes
4	240	Normal	No	Yes

TABLE 1 (*end*)

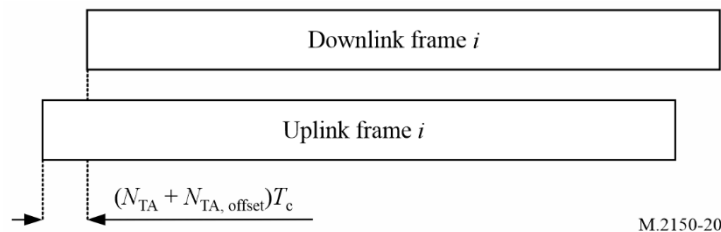
μ	$\Delta f = 2^\mu \times 15$ [kHz]	Cyclic prefix	Supported for data	Supported for synch
5	480	Normal	Yes	Yes
6	960	Normal	Yes	Yes

The UE may be configured with one or more bandwidth parts on a given component carrier, of which only one can be active at a time, as described in § 1.2.5.10. The active bandwidth part defines the UE's operating bandwidth within the cell's operating bandwidth. For initial access, and until the UE's configuration in a cell is received, the initial bandwidth part detected from system information is used.

Downlink and uplink transmissions are organized into frames of 10 ms duration, consisting of ten 1 ms subframes. Each frame is divided into two equally-sized half-frames of five subframes. The slot duration is 14 symbols with Normal CP and 12 symbols with Extended CP, and scales in time as a function sub-carrier spacing in use so that there is always an integral number of slots in a subframe.

Timing Advance (TA) is used to adjust the uplink frame timing relative to the downlink frame timing.

FIGURE 20

Uplink-downlink timing relation

Operation on both paired and unpaired spectrum is supported.

1.1.2.4.2 Downlink**1.1.2.4.2.1 Downlink transmission scheme**

Demodulation Reference Signal (DMRS) based spatial multiplexing is supported for Physical Downlink Shared Channel (PDSCH). Up to 8, 12, 16 and 24 orthogonal DL DMRS ports are supported for type 1, type 2, enhanced type 1 and enhanced type 2 DMRS respectively. Up to 8 orthogonal DL DMRS ports per UE are supported for Single-User MIMO (SU-MIMO) and up to 4 orthogonal DL DMRS ports per UE are supported for Multi-User MIMO (MU-MIMO). The number of SU-MIMO code words is one for 1 to 4 layers transmissions and two for 5 to 8 layers transmissions.

The DMRS and corresponding PDSCH are transmitted using the same precoding matrix and the UE does not need to know the precoding matrix to demodulate the transmission. The transmitter may use different precoder matrix for different parts of the transmission bandwidth, resulting in frequency selective precoding. The UE may also assume that the same precoding matrix is used across a set of Physical Resource Blocks (PRBs) denoted Precoding Resource Block Group (PRG).

Transmission durations from 2 to 14 symbols in a slot with a single PDSCH is supported.

Aggregation of multiple slots with Transport Block (TB) repetition is supported.

From Rel-16, enhancements for DL/UL MIMO are introduced, including enhancements on multi-Transmission Reception Points (TRPs) or multi-panel transmission improving reliability and robustness with both ideal and non-ideal backhaul.

1.1.2.4.2.2 Physical-layer processing for physical downlink shared channel

The downlink physical-layer processing of transport channels consists of the following steps:

- TB CRC attachment;
- code block segmentation and code block CRC attachment;
- channel coding: Low Density Parity Check (LDPC) coding;
- physical-layer hybrid-ARQ processing;
- rate matching;
- scrambling;
- modulation: QPSK, 16QAM, 64QAM, 256QAM and 1024QAM;
- layer mapping;
- mapping to assigned resources and antenna ports.

The UE may assume that at least one symbol with demodulation reference signal is present on each layer in which PDSCH is transmitted to a UE, and up to three additional DMRS symbols can be configured by higher layers.

Phase tracking RS may be transmitted on additional symbols to aid receiver phase tracking.

1.1.2.4.2.3 Physical downlink control channels

The Physical Downlink Control Channel (PDCCH) can be used to schedule DL transmissions on PDSCH and UL transmissions on PUSCH, where the Downlink Control Information (DCI) on PDCCH includes:

- downlink assignments containing at least modulation and coding format, resource allocation, and HARQ information related to DL-SCH;
- uplink scheduling grants containing at least modulation and coding format, resource allocation, and HARQ information related to UL-SCH.

In addition to scheduling, PDCCH can be used for:

- activation and deactivation of configured PUSCH transmission with configured grant;
- activation and deactivation of PDSCH semi-persistent transmission;
- notifying one or more UEs of the slot format;
- notifying one or more UEs of the PRB(s) and OFDM symbol(s) where the UE may assume no transmission is intended for the UE;
- transmission of Transmit Power Control (TPC) commands for PUCCH and PUSCH;
- transmission of one or more TPC commands for Sounding Reference Signal (SRS) transmissions by one or more UEs;
- Switching a UE's active bandwidth part;
- Initiating a random access procedure;
- Indicating the UE(s) to monitor the PDCCH during the next occurrence of the DRX on-duration;
- In IAB context, indicating the availability for soft symbols of an IAB-DU;
- Triggering one shot HARQ-ACK codebook feedback.

A UE monitors a set of PDCCH candidates in the configured monitoring occasions in one or more configured Control Resource SETs (CORESETs) according to the corresponding search space configurations.

A CORESET consists of a set of PRBs with a time duration of 1 to 3 OFDM symbols. The resource units Resource Element Groups (REGs) and Control Channel Elements (CCEs) are defined within a CORESET with each CCE consisting of a set of REGs. Control channels are formed by aggregation of CCEs. Different code rates for the control channels are realized by aggregating different number of CCEs. Interleaved and non-interleaved CCE-to-REG mapping are supported in a CORESET.

The PDCCH repetition is operated by using two search spaces which are explicitly linked by configuration provided by the RRC layer, and are associated with corresponding CORESETs. For PDCCH repetition, two linked search spaces are configured with the same number of candidates, and two PDCCH candidates in two search spaces are linked with the same candidate index. When PDCCH repetition is scheduled to a UE, an intra-slot repetition is allowed and each repetition has the same number of CCEs and coded bits, and corresponds to the same DCI payload.

Polar coding is used for PDCCH.

Each resource element group carrying PDCCH carries its own DMRS.

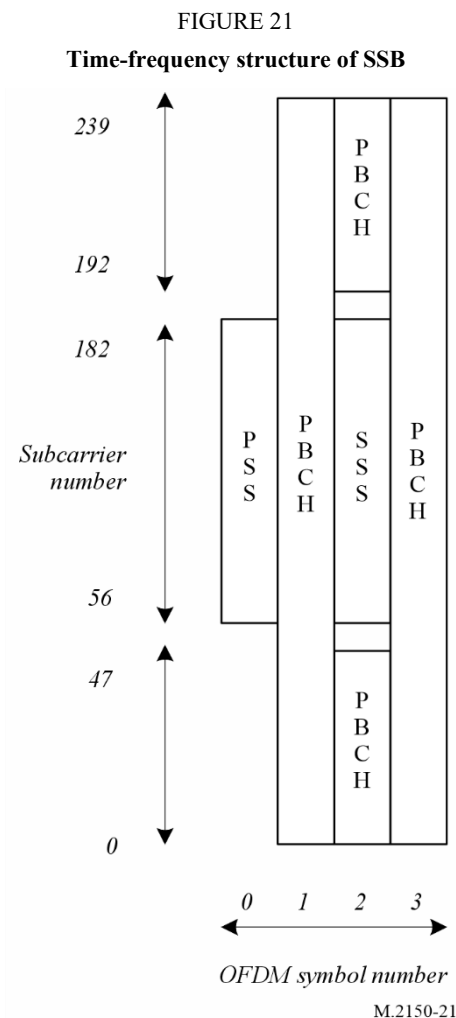
QPSK modulation is used for PDCCH.

1.1.2.4.2.4 Synchronization signal and PBCH block

The Synchronization Signal and PBCH block (SSB) consists of primary and secondary synchronization signals (PSS, SSS), each occupying 1 symbol and 127 subcarriers, and PBCH spanning across three OFDM symbols and 240 subcarriers, but on one symbol leaving an unused part in the middle for SSS as show in Fig. 21. For the 3 MHz channel bandwidth, the PBCH is further equally punctured from both edges to span 144 subcarriers. The possible time locations of SSBs within a half-frame are determined by sub-carrier spacing, and the periodicity of the half-frames where SSBs are transmitted is configured by the network. During a half-frame, different SSBs may be transmitted in different spatial directions (i.e. using different beams, spanning the coverage area of a cell).

Within the frequency span of a carrier, multiple SSBs can be transmitted. The Physical Cell Identifiers (PCIs) of SSBs transmitted in different frequency locations do not have to be unique, i.e. different SSBs in the frequency domain can have different PCIs. However, when an SSB is associated with a Remaining Minimum System Information (RMSI), the SSB corresponds to an individual cell, which has a unique NR Cell Global Identifier (NCGI). Such an SSB is referred to as a Cell-Defining SSB (CD-SSB). A PCell is always associated to a CD-SSB located on the synchronization raster.

When an SSB is not associated with an RMSI, the SSB is referred to as a non-Cell Defining SSB (NCD-SSB), which can be used to perform Radio Link Monitoring (RLM), Beam Failure Detection (BFD), and RRM measurements and measurements for RA resource selection inside the active DL BWP when the active BWP does not contain the CD-SSB. A UE may be configured with multiple SSBs provided that each BWP is configured with at most one SSB (CD-SSB or NCD-SSB).



Polar coding is used for the PBCH.

The UE may assume a band-specific sub-carrier spacing for the SSB unless a network has configured the UE to assume a different sub-carrier spacing.

PBCH symbols carry their own frequency-multiplexed DMRS.

QPSK modulation is used for PBCH.

1.1.2.4.2.5 Physical layer procedures

1.1.2.4.2.5.1 Link adaptation

Link adaptation (Adaptive Modulation and Coding (AMC)) with various modulation schemes and channel coding rates is applied to the PDSCH. The same coding and modulation are applied to all groups of resource blocks belonging to the same L2 Protocol Data Unit (PDU) scheduled for one user within one transmission duration and within a MIMO codeword.

For channel state estimation purposes, the UE may be configured to measure CSI-RS and estimate the downlink channel state based on the CSI-RS measurements. The UE reports the estimated channel state back to the gNB to be used in link adaptation.

1.1.2.4.2.5.2 Power control

Downlink power control can be used.

1.1.2.4.2.5.3 Cell search

Cell search is the procedure by which a UE acquires time and frequency synchronization with a cell and detects the Cell ID of that cell. NR cell search is based on the primary and secondary synchronization signals, and PBCH DMRS, located on the synchronization raster.

1.1.2.4.2.5.4 HARQ

Asynchronous Incremental Redundancy Hybrid ARQ is supported. The gNB provides the UE with the HARQ-ACK feedback timing either dynamically in the DCI or semi-statically in an RRC configuration.

The UE may be configured to receive code block group-based transmissions where retransmissions may be scheduled to carry only a sub-set of all the code blocks of a TB.

1.1.2.4.2.5.5 Reception of SIB1

The Master Information Block (MIB) on the PBCH provides the UE with parameters (e.g. CORESET#0 configuration) for monitoring of the PDCCH for scheduling PDSCH that carries the System Information Block 1 (SIB1). The PBCH may also indicate that there is no associated SIB1, in which case the UE may be pointed to another frequency from where to search for an SSB that is associated with a SIB1 as well as a frequency range where the UE may assume no SSB associated with SIB1 is present. The indicated frequency range is confined within a contiguous spectrum allocation of the same operator in which SSB is detected.

1.1.2.4.3 Uplink

1.1.2.4.3.1 Uplink transmission scheme

Two transmission schemes are supported for PUSCH: codebook-based transmission and non-codebook-based transmission.

For codebook-based transmission, the gNB provides the UE with a transmit precoding matrix indication in the DCI. The UE uses the indication to select the PUSCH transmit precoder from the codebook. For non-codebook-based transmission, the UE determines its PUSCH precoder based on the wideband SRS Resource Indicator (SRI) field from the DCI.

DMRS based spatial multiplexing is supported for PUSCH. For a given UE, up to four-layer or up to eight-layer transmissions are supported. Up to 8, 12, 16, and 24 orthogonal UL DMRS ports are supported for type 1, type 2, enhanced type 1, and enhanced type 2 DMRS respectively. The number of codewords is one for 1 to 4 layer transmission and two for 5 to 8 layer transmission. When transform precoding is used, only a single MIMO layer transmission is supported.

Transmission durations from 1 to 14 symbols in a slot with a single PUSCH is supported.

Aggregation of multiple slots with TB repetition is supported.

Two types of frequency hopping are supported, intra-slot frequency hopping, and in case of slot aggregation, inter-slot frequency hopping.

The PUSCH may be scheduled with DCI on the PDCCH, or a semi-static configured grant may be provided over RRC, where two types of operation are supported:

- The first PUSCH is triggered with a DCI, with subsequent PUSCH transmissions following the RRC configuration and scheduling received on the DCI, or
- The PUSCH is triggered by data arrival in the UE's transmit buffer and the PUSCH transmissions follow the RRC configuration.

1.1.2.4.3.2 Physical-layer processing for physical uplink shared channel

The uplink physical-layer processing of transport channels consists of the following steps:

- Transport Block CRC attachment;
- code block segmentation and Code Block CRC attachment;
- channel coding: LDPC coding;
- physical-layer HARQ processing;
- rate matching;
- scrambling;
- modulation: $\pi/2$ BPSK (with transform precoding only), QPSK, 16QAM, 64QAM and 256QAM;
- layer mapping, transform precoding (enabled/disabled by configuration), and pre-coding;
- mapping to assigned resources and antenna ports.

The UE transmits at least one symbol with Demodulation Reference Signal on each layer on each frequency hop in which the PUSCH is transmitted, and up to 3 additional DMRS symbols can be configured by higher layers.

Phase tracking RS may be transmitted on additional symbols to aid receiver phase tracking.

1.1.2.4.3.3 Physical uplink control channel

The physical uplink control channel (PUCCH) carries the Uplink Control Information (UCI) from the UE to the gNB. Five formats of PUCCH exist, depending on the duration of PUCCH and the UCI payload size.

- format #0: short PUCCH of 1 or 2 symbols with small UCI payloads of up to two bits with UE multiplexing capacity of up to 6 UEs with 1-bit payload in the same PRB;
- format #1: long PUCCH of 4-14 symbols with small UCI payloads of up to two bits with UE multiplexing capacity of up to 84 UEs without frequency hopping and 36 UEs with frequency hopping in the same PRB;
- format #2: short PUCCH of 1 or 2 symbols with large UCI payloads of more than two bits with no UE multiplexing capability in the same PRBs;
- format #3: long PUCCH of 4-14 symbols with large UCI payloads with no UE multiplexing capability in the same PRBs;
- format #4: long PUCCH of 4-14 symbols with moderate UCI payloads with multiplexing capacity of up to 4 UEs in the same PRBs.

The short PUCCH format of up to two UCI bits is based on sequence selection, while the short PUCCH format of more than two UCI bits frequency-multiplexes the UCI and the DMRS. The long PUCCH formats time-multiplex the UCI and DMRS. Frequency hopping is supported for long PUCCH formats and for short PUCCH formats of duration of two symbols. Short and long PUCCH formats can be repeated over multiple slots or sub-slots, where the repetition factor is either indicated dynamically in the DCI or semi-statically in an RRC configuration. UCI multiplexing in the PUSCH is supported when UCI and PUSCH transmissions coincide in time, either due to transmission of a UL-SCH transport block or due to triggering of A-CSI transmission without UL-SCH transport block. In addition, HARQ-ACK multiplexing of a certain priority in PUSCH of a different priority is supported when HARQ-ACK and PUSCH transmissions coincide in time, either due to transmission of a UL-SCH transport block or due to triggering of A-CSI transmission without UL-SCH transport block:

- UCI carrying HARQ-ACK feedback with 1 or 2 bits is multiplexed by puncturing the PUSCH;
- In all other cases the UCI is multiplexed by rate matching the PUSCH.

UCI consists of the following information:

- CSI;
- ACK/NAK;
- Scheduling request.

Simultaneous transmission of PUCCH and PUSCH associated with different priorities on cells of different bands in a PUCCH group is supported, where UCI multiplexing in the PUCCH associated with a priority in combination of UCI multiplexing in a PUSCH associated with a different priority is supported if the UCI multiplexed on PUSCH is of same priority as the PUSCH.

Simultaneous transmission of PUCCH and PUSCH associated with same priority on cells of different bands in a PUCCH group is supported.

QPSK and $\pi/2$ BPSK modulation can be used for long PUCCH with more than 2 bits of information, QPSK is used for a short PUCCH with more than 2 bits of information and BPSK and QPSK modulation can be used for a long PUCCH with up to two information bits.

Transform precoding is applied to a long PUCCH.

Channel coding used for uplink control information is described in Table 2.

TABLE 2

Channel coding for uplink control information

Uplink control information size including CRC, if present	Channel code
1	Repetition code
2	Simplex code
3-11	Reed Muller code
>11	Polar code

1.1.2.4.3.4 Random access

Random access preamble sequences of different lengths are supported. The sequence length 839 is applied with subcarrier spacings of 1.25 and 5 kHz, and the sequence length 139 is applied with subcarrier spacings of 15, 30, 60, 120, 480 and 960 kHz, sequence length of 571 is applied with subcarrier spacings of 30, 120, and 480 kHz, and sequence length 1 151 is applied with subcarrier spacings of 15 and 120 kHz respectively. Sequence length 839 supports unrestricted sets and restricted sets of Type A and Type B, while sequence lengths 139, 571 can be used for operation with only with subcarrier spacings of 120 kHz and 480 kHz and sequence lengths of 1 151 support unrestricted sets only with subcarrier spacings of 120 kHz.

Multiple PRACH preamble formats are defined with one or more PRACH OFDM symbols, and different cyclic prefixes and guard times. The PRACH preamble configuration to use is provided to the UE in the system information.

The UE calculates the PRACH transmit power for the retransmission of the preamble based on the most recent estimated pathloss and the power ramping counter value.

The system information provides information for the UE to determine the association between the SSB and the RACH resources. The Reference Signal Received Power (RSRP) threshold for SSB selection for RACH resource association is configurable by the network.

1.1.2.4.3.5 Physical layer procedures

1.1.2.4.3.5.1 Link adaptation

Four types of link adaptation are supported as follows:

- adaptive transmission bandwidth;
- adaptive transmission duration;
- transmission power control;
- adaptive modulation and channel coding rate.

For channel state estimation purposes, the UE may be configured to transmit SRS that the gNB may use to estimate the uplink channel state, and then use the estimate in link adaptation.

1.1.2.4.3.5.2 Uplink power control

The gNB determines the desired uplink transmit power and provides uplink transmit power control commands to the UE. The UE uses the provided uplink transmit power control commands to adjust its transmit power.

1.1.2.4.3.5.3 Uplink timing control

The gNB (including IAB-DU and IAB-donor-DU) determines the desired Timing Advance setting and provides that to the UE (or IAB-MT). The UE/IAB-MT uses the provided TA to determine its uplink transmit timing relative to the UE's/IAB-MTs observed downlink receive timing.

An IAB-node may support additional modes for uplink timing:

- The IAB-MT uses the provided TA plus a provided additional offset to determine its uplink transmission timing, to facilitate parent node's IAB-MT Rx / IAB-DU Rx multiplexing;
- The IAB-MT aligns its uplink transmission timing to that of the collocated IAB-DU downlink transmission timing, to facilitate IAB-MT Tx / IAB-DU Tx multiplexing of this IAB-node.

The IAB-node uplink timing mode is indicated by the parent node via MAC-CE.

1.1.2.4.3.5.4 HARQ

Asynchronous Incremental Redundancy Hybrid ARQ is supported. The gNB schedules each uplink transmission and retransmission using the uplink grant on the DCI.

The UE may be configured to transmit code block group-based transmissions where retransmissions may be scheduled to carry only a sub-set of all the code blocks of a transport block.

1.1.2.4.4 Carrier Aggregation (CA)

In Carrier Aggregation (CA), two or more Component Carriers (CCs) are aggregated. A UE may simultaneously receive or transmit on one or multiple CCs depending on its capabilities:

- A UE with single timing advance capability for CA can simultaneously receive and/or transmit on multiple CCs corresponding to multiple serving cells sharing the same timing advance (multiple serving cells grouped in one Timing Advance Group (TAG));
- A UE with multiple timing advance capability for CA can simultaneously receive and/or transmit on multiple CCs corresponding to multiple serving cells with different timing

advances (multiple serving cells grouped in multiple TAGs). NG-RAN ensures that each TAG contains at least one serving cell;

- A non-CA capable UE can receive on a single CC and transmit on a single CC corresponding to one serving cell only (one serving cell in one TAG).

CA is supported for both contiguous and non-contiguous CCs. When CA is deployed, frame timing and System Frame Number (SFN) are aligned across cells that can be aggregated. The maximum number of configured CCs for a UE is 16 for DL and 16 for UL. From Rel-16, cells with unaligned frame boundary can also be aggregated.

Multi-cell PDSCH/PUSCH scheduling with a single DCI is supported in order to reduce the control overhead for scheduling data on multiple cells in intra-band or inter-band multi-carrier operation.

1.1.2.4.5 Supplementary uplink

In conjunction with a UL/DL carrier pair (FDD band) or a bidirectional carrier (TDD band), a UE may be configured with additional, Supplementary Uplink (SUL). SUL differs from the aggregated uplink in that the UE may be scheduled to transmit either on the supplementary uplink or on the uplink of the carrier being supplemented, but not on both at the same time.

1.1.2.4.6 Uplink Tx switching

In uplink CA or SUL, a UE configured with uplink Tx switching can have Tx chain(s) dynamically from one uplink band or two uplink bands to another uplink band or two uplink bands for enabling up to 2Tx UL transmission in one uplink band or simultaneous UL transmissions in two uplink bands at a time.

1.1.2.4.7 Group transmission for Multicast and Broadcast Services (MBS) delivery

Resource efficient delivery of multicast/broadcast services is introduced for services of Point-To-Multipoint nature, such as for example public safety and mission critical services, V2X applications, IPTV, live video, software delivery over wireless and IoT applications.

For broadcast communication service, the same service and the same specific content data are provided simultaneously to all UEs in a geographical area. A broadcast communication service is delivered to the UEs using a broadcast session. A UE can receive a broadcast communication service in RRC_IDLE, RRC_INACTIVE and RRC_CONNECTED state.

For multicast communication service, the same service and the same specific content data are provided simultaneously to a dedicated set of UEs. A multicast communication service is delivered to the UEs using a multicast session. A UE can receive a multicast communication service in RRC_CONNECTED state with mechanisms such as Point-To-Point (PTP) and/or Point-To-Multipoint (PTM) delivery. HARQ feedback/retransmission can be applied to both PTP and PTM transmission.

1.1.2.4.8 Transport channels

The physical layer offers information transfer services to MAC and higher layers. The physical layer transport services are described by how and with what characteristics data are transferred over the radio interface.

Downlink transport channel types are:

- 1 Broadcast Channel (BCH) characterised by:
 - fixed, pre-defined transport format;
 - requirement to be broadcast in the entire coverage area of the cell, either as a single message or by beamforming different BCH instances.

2 Downlink Shared Channel (DL-SCH) characterised by:

- support for HARQ;
- support for dynamic link adaptation by varying the modulation, coding and transmit power;
- possibility to be broadcast in the entire cell;
- possibility to use beamforming;
- support for both dynamic and semi-static resource allocation;
- support for UE discontinuous reception (DRX) to enable UE power saving;
- support for group transmission for MBS delivery

3 Paging Channel (PCH) characterised by:

- support for UE discontinuous reception (DRX) to enable UE power saving (DRX cycle is indicated by the network to the UE);
- requirement to be broadcast in the entire coverage area of the cell, either as a single message or by beamforming different PCH instances;
- mapped to physical resources which can be used dynamically also for traffic/other control channels.

Uplink transport channel types are:

1 Uplink Shared Channel (UL-SCH) characterised by:

- possibility to use beamforming;
- support for dynamic link adaptation by varying the transmit power and potentially modulation and coding;
- support for HARQ;
- support for both dynamic and semi-static resource allocation.

2 Random Access Channel(s) (RACH) characterised by:

- limited control information;
- collision risk.

Sidelink transport channel types are:

1 Sidelink broadcast channel (SL-BCH) characterised by:

- pre-defined transport format.

2 Sidelink shared channel (SL-SCH) characterised by:

- support for unicast transmission, groupcast transmission and broadcast transmission;
- support for both UE autonomous resource selection and scheduled resource allocation by NG-RAN;
- support for both dynamic and semi-static resource allocation when UE is allocated resources by the NG-RAN;
- support for HARQ;
- support for dynamic link adaptation by varying the transmit power, modulation and coding;
- support for SL discontinuous reception (SL DRX) to enable UE power saving.

1.1.2.5 Layer 2

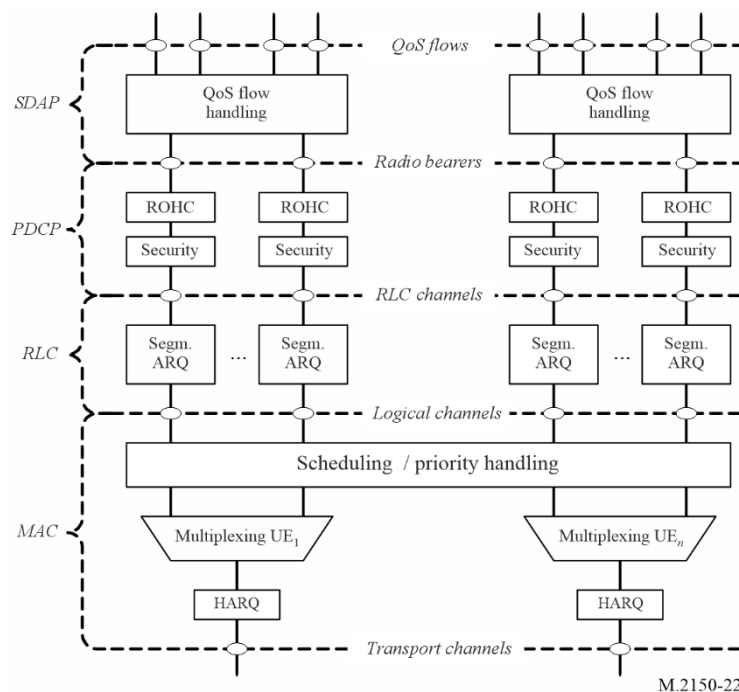
1.1.2.5.1 Overview

The layer 2 of NR is split into the following sublayers: Medium Access Control (MAC), Radio Link Control (RLC), Packet Data Convergence Protocol (PDCP) and Service Data Adaptation Protocol (SDAP). Figures 22 and 23 depict the Layer 2 architecture for downlink and uplink, where:

- the physical layer offers to the MAC sublayer transport channels;
- the MAC sublayer offers to the RLC sublayer logical channels;
- the RLC sublayer offers to the PDCP sublayer RLC channels;
- the PDCP sublayer offers to the SDAP sublayer radio bearers;
- the SDAP sublayer offers to 5GC QoS flows;
- Comp. refers to header compression or uplink data compression;
- Segm. refers to segmentation;
- control channels (BCCH, PCCH are not depicted for clarity).

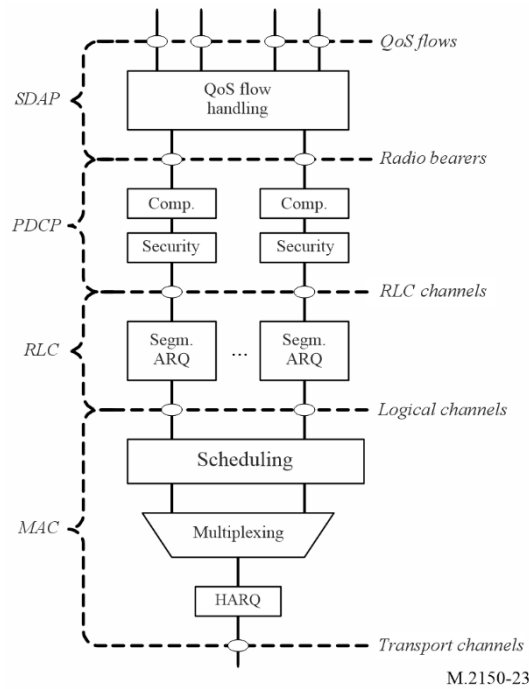
NOTE – The gNB may not be able to guarantee that a L2 buffer overflow will never occur. If such overflow occurs, the UE may discard packets from the L2 buffer.

FIGURE 22
Downlink layer 2 structure



M.2150-22

FIGURE 23

Uplink layer 2 structure

Similar to LTE, Radio bearers are categorized into two groups: DRBs for UP data and SRBs for CP data.

1.1.2.5.2 MAC sublayer

1.1.2.5.2.1 Services and functions

The main services and functions of the MAC sublayer are:

- mapping between logical channels and transport channels;
- multiplexing/demultiplexing of MAC SDUs belonging to one or different logical channels into/from transport blocks (TB) delivered to/from the physical layer on transport channels;
- scheduling information reporting;
- error correction through HARQ (one HARQ entity per cell in case of CA);
- priority handling between UEs by means of dynamic scheduling;
- priority handling between logical channels of one UE by means of logical channel prioritisation;
- padding.

A single MAC entity can support multiple numerologies, transmission timings and cells. Mapping restrictions in logical channel prioritisation control which numerology(ies), cell(s), and transmission timing(s) a logical channel can use.

1.1.2.5.2.2 Logical channels

Different kinds of data transfer services as offered by MAC. Each logical channel type is defined by what type of information is transferred. Logical channels are classified into two groups: Control Channels and Traffic Channels. Control channels are used for the transfer of control plane information only:

- Broadcast Control Channel (BCCH): a downlink channel for broadcasting system control information.
- Paging Control Channel (PCCH): a downlink channel that carries paging messages.
- Common Control Channel (CCCH): channel for transmitting control information between UEs and network. This channel is used for UEs having no RRC connection with the network.
- Dedicated Control Channel (DCCH): a point-to-point bi-directional channel that transmits dedicated control information between a UE and the network. Used by UEs having an RRC connection.

Traffic channels are used for the transfer of user plane information only:

- Dedicated Traffic Channel (DTCH): point-to-point channel, dedicated to one UE, for the transfer of user information. A DTCH can exist in both uplink and downlink.

The following logical channels are used for MBS delivery:

- MTCH: A point-to-multipoint downlink channel for transmitting MBS data of either multicast session or broadcast session from the network to the UE;
- DTCH: A point-to-point channel defined for transmitting MBS data of a multicast session from the network to the UE;
- MCCH: A point-to-multipoint downlink channel used for transmitting MBS broadcast control information associated to one or several MTCH(s) from the network to the UE.

1.1.2.5.2.3 Mapping to transport channels

In Downlink, the following connections between logical channels and transport channels exist:

- BCCH can be mapped to BCH;
- BCCH can be mapped to DL-SCH;
- PCCH can be mapped to PCH;
- CCCH can be mapped to DL-SCH;
- DCCH can be mapped to DL-SCH;
- DTCH can be mapped to DL-SCH.

The following connections between logical channels and transport channels for group transmission exist:

- MCCH can be mapped to DL-SCH;
- MTCH can be mapped to DL-SCH.

In Uplink, the following connections between logical channels and transport channels exist:

- CCCH can be mapped to UL-SCH;
- DCCH can be mapped to UL-SCH;
- DTCH can be mapped to UL-SCH.

1.1.2.5.2.4 HARQ

The HARQ functionality ensures delivery between peer entities at Layer 1. A single HARQ process supports one TB when the physical layer is not configured for downlink/uplink spatial multiplexing, and when the physical layer is configured for downlink/uplink spatial multiplexing, a single HARQ process supports one or multiple TBs.

1.1.2.5.3 RLC sublayer

1.1.2.5.3.1 Transmission modes

The RLC sublayer supports three transmission modes:

- Transparent Mode (TM);
- Unacknowledged Mode (UM);
- Acknowledged Mode (AM).

The RLC configuration is per logical channel with no dependency on numerologies and/or transmission durations, and ARQ can operate on any of the numerologies and/or transmission durations the logical channel is configured with.

For SRB0, paging and broadcast system information, TM mode is used. For other SRBs AM mode is used. For DRBs, either UM or AM mode are used.

1.1.2.5.3.2 Services and functions

The main services and functions of the RLC sublayer depend on the transmission mode and include:

- transfer of upper layer PDUs;
- sequence numbering independent of the one in PDCP (UM and AM);
- error Correction through ARQ (AM only);
- segmentation (AM and UM) and re-segmentation (AM only) of RLC SDUs;
- reassembly of SDU (AM and UM);
- duplicate Detection (AM only);
- RLC SDU discard (AM and UM);
- RLC re-establishment;
- protocol error detection (AM only).

1.1.2.5.3.3 ARQ

The ARQ within the RLC sublayer has the following characteristics:

- ARQ retransmits RLC SDUs or RLC SDU segments based on RLC status reports;
- polling for RLC status report is used when needed by RLC;
- the RLC receiver can also trigger a RLC status report after detecting a missing RLC SDU or RLC SDU segment.

1.1.2.5.4 PDCP sublayer

1.1.2.5.4.1 Services and functions

The main services and functions of the PDCP sublayer are:

- transfer of data (user plane or control plane);

- maintenance of PDCP SNs;
- header compression and decompression using the ROHC protocol;
- header compression and decompression using EHC protocol;
- compression and decompression of uplink PDCP SDUs: DEFLATE based UDC only;
- ciphering and deciphering;
- integrity protection and integrity verification;
- timer based SDU discard;
- for split bearers, routing;
- duplication;
- reordering and in-order delivery;
- out-of-order delivery;
- duplicate discarding.

Since PDCP does not allow COUNT to wrap around in DL and UL, it is up to the network to prevent this from happening (e.g. by using a release and add of the corresponding radio bearer or a full configuration).

1.1.2.5.5 SDAP Sublayer

The main services and functions of SDAP are:

- mapping between a QoS flow and a data radio bearer;

NOTE – When remapping an XR QoS flow carrying PDU sets from one DRB to another all SDAP SDUs belonging to a PDU Set should be mapped to the same DRB.

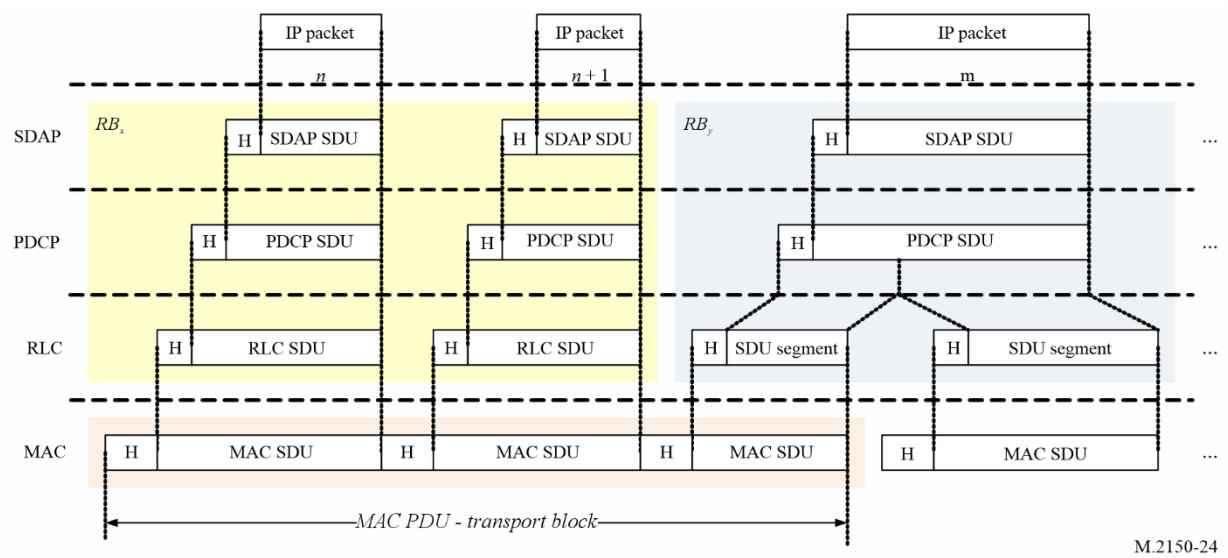
- marking QoS Flow ID (QFI) in both DL and UL packets.

A single protocol entity of SDAP is configured for each individual PDU session.

1.1.2.5.6 L2 data flow

An example of the Layer 2 Data Flow is depicted on Fig. 24, where a transport block is generated by MAC by concatenating two RLC PDUs from RB_x and one RLC PDU from RB_y . The two RLC PDUs from RB_x each corresponds to one IP packet (n and $n+1$) while the RLC PDU from RB_y is a segment of an IP packet (m).

FIGURE 24
Data flow example



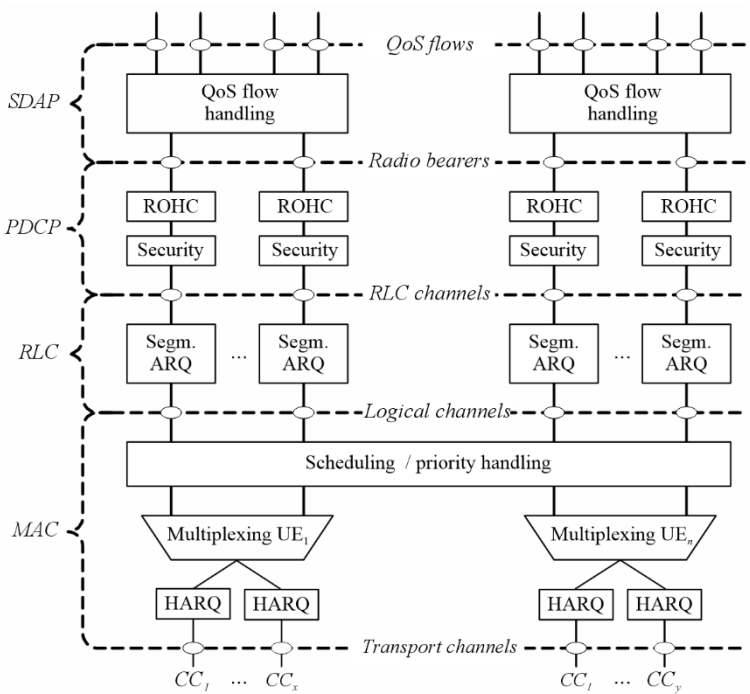
NOTE – H depicts the headers and subheaders.

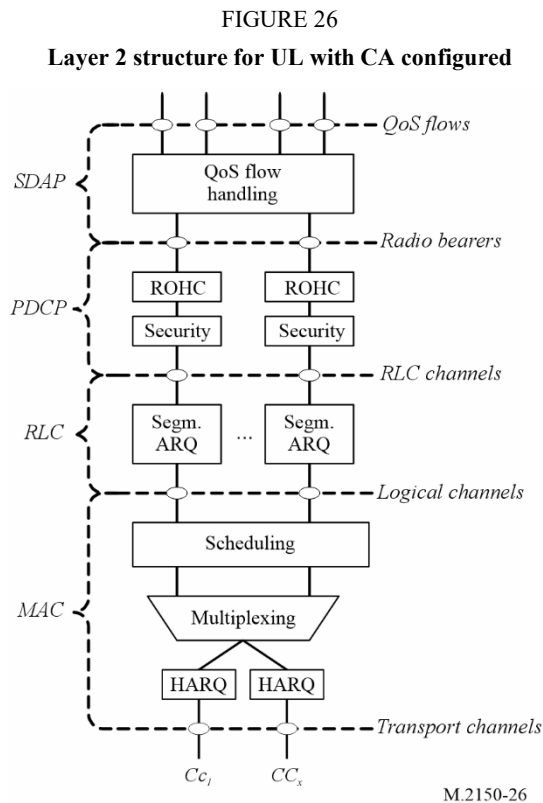
1.1.2.5.7 Carrier Aggregation (CA)

With CA, the multi-carrier nature of the physical layer is only exposed to the MAC layer for which one HARQ entity is required per serving cell as depicted on Figs 25 and 26 below:

- In both uplink and downlink, there is one independent HARQ entity per serving cell and one transport block is generated per assignment/grant per serving cell in the absence of spatial multiplexing. Each transport block and its potential HARQ retransmissions are mapped to a single serving cell.

FIGURE 25
Layer 2 structure for DL with CA configured





1.1.2.5.8 Dual Connectivity (DC)

When the UE is configured with a SCG, the UE is configured with two MAC entities: one MAC entity for the MCG and one MAC entity for the SCG.

1.1.2.5.9 Supplementary uplink

In case of Supplementary Uplink (SUL), the UE is configured with two ULs for one DL of the same cell, and uplink transmissions on those two ULs are controlled by the network to avoid overlapping PUSCH/PUCCH transmissions in time. Overlapping transmissions on PUSCH are avoided through scheduling while overlapping transmissions on PUCCH are avoided through configuration (PUCCH can only be configured for only one of the two ULs of the cell). In addition, initial access is supported in each of the uplink.

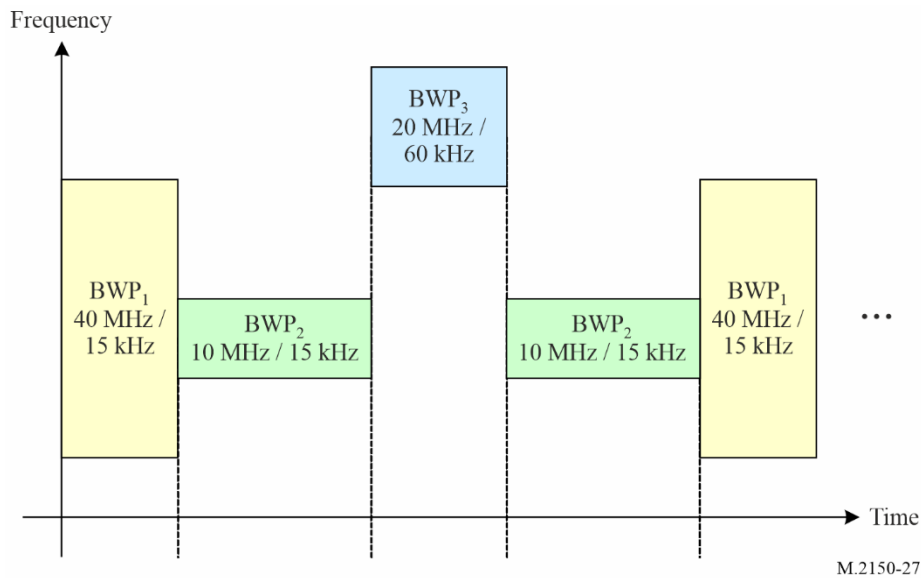
1.1.2.5.10 Bandwidth Adaptation (BA)

With Bandwidth Adaptation (BA), the receive and transmit bandwidth of a UE need not be as large as the bandwidth of the cell and can be adjusted: the width can be ordered to change (e.g. to shrink during period of low activity to save power); the location can move in the frequency domain (e.g. to increase scheduling flexibility); and the subcarrier spacing can be ordered to change (e.g. to allow different services). A subset of the total cell bandwidth of a cell is referred to as a Bandwidth Part (BWP) and BA is achieved by configuring the UE with BWP(s) and telling the UE which of the configured BWPs is currently the active one.

Figure 27 describes a scenario where three different BWPs are configured:

- BWP₁ with a width of 40 MHz and subcarrier spacing of 15 kHz;
- BWP₂ with a width of 10 MHz and subcarrier spacing of 15 kHz;
- BWP₃ with a width of 20 MHz and subcarrier spacing of 60 kHz.

FIGURE 27

BA example**1.1.2.5.11 Multiple Transmit/Receive Point Operation**

In Multiple Transmit/Receive Point (multi-TRP) operation, a serving cell can schedule the UE from four TRPs, providing better coverage, reliability and/or data rates for PDSCH, PDCCH, PUSCH and PUCCH.

1.1.2.6 Radio Resources Control (RRC)**1.1.2.6.1 Services and functions**

The main services and functions of the RRC sublayer include:

- broadcast of System Information related to AS and NAS;
- paging initiated by 5GC or NG-RAN;
- establishment, maintenance and release of an RRC connection between the UE and NG-RAN including:
 - addition, modification and release of Carrier Aggregation;
 - addition, modification and release of Dual Connectivity in NR or between E-UTRA and NR.
- security functions including key management;
- establishment, configuration, maintenance and release of Signalling Radio Bearers (SRBs) and Data Radio Bearers (DRBs);
- Mobility functions including:
 - handover and context transfer;
 - UE cell selection and reselection and control of cell selection and reselection;
 - inter-RAT mobility.
- QoS management functions;
- UE measurement reporting and control of the reporting;
- detection of and recovery from radio link failure;
- NAS message transfer to/from NAS from/to UE.

In order to enhance mobility robustness and performance, additional NR mobility enhancements are introduced in 3GPP Rel-16. User data interruption is reduced during handover to 0 ms by dual-active-protocol-stack handover. In addition, the robustness during handover is improved by a conditional handover.

In order to further reduce the mobility latency, additional NR mobility enhancements are introduced in 3GPP Rel-18. The L1/L2-triggered mobility procedure (LTM), where the cell switch is based on L1 measurements and triggered by MAC CE, enables the early UL and DL synchronization to target cell and the RACH-less handover, resulting in the minimized mobility interruption time.

1.1.2.6.2 Protocol States

RRC supports the following states which can be characterised as follows:

- RRC_IDLE:
 - Public Land Mobile Network (PLMN) selection;
 - broadcast of system information;
 - cell re-selection mobility;
 - paging for mobile terminated data is initiated by 5GC;
 - DRX for core network paging configured by NAS.
- RRC_INACTIVE:
 - PLMN selection;
 - broadcast of system information;
 - cell re-selection mobility;
 - paging is initiated by NG-RAN (RAN paging);
 - RAN-based notification area (RNA) is managed by NG-RAN;
 - DRX for RAN paging configured by NG-RAN;
 - 5GC – NG-RAN connection (both CP and UP) is established for UE;
 - the UE AS context is stored in NG-RAN and the UE;
 - NG-RAN knows the RNA which the UE belongs to;
 - Transfer of MBS multicast/broadcast data to the UE over MRB(s);
 - Transfer of unicast data and/or signalling to/from the UE over radio bearers configured for Small Data Transmission (SDT)
- RRC_CONNECTED:
 - 5GC – NG-RAN connection (both CP and UP) is established for UE;
 - the UE AS context is stored in NG-RAN and the UE;
 - NG-RAN knows the cell which the UE belongs to;
 - transfer of unicast data to/from the UE;
 - network controlled mobility including measurements.

1.1.3 Support of verticals

The E-UTRA/LTE and NR component RITs support a diverse set of mobile broadband (eMBB) services and other so-called “verticals”, including URLLC, Industrial IoT, Automotive/V2X, Private Networks (NPN), Reduced Capability (RedCap) NR devices and others. NR RIT supports in-band coexistence with NB-IoT and eMTC.

For optimal support of specific verticals, the NR RIT has been designed, or enhanced, with certain key features, or set of features. Taking few verticals as examples, a short summary of relevant NR RIT capabilities is provided below.

1.1.3.1 Ultra-Reliable and Low Latency Communications (URLLC) and Industrial IoT (IIoT)

For support of URLLC services, some of the main features supported by the NR RIT are:

- Logical Channel Priority (LCP) restrictions;
- Packet duplication with DC or CA;
- New QCI table for block error rate 10^{-5} ;
- Physical layer short transmission time interval (TTI).

From Rel-16 onwards, URLLC and IIoT use cases are further facilitated by:

- NR PDCP duplication enhancements;
- Prioritization/multiplexing enhancements;
- NR Time Sensitive Communications (TSC) related enhancements, e.g. Ethernet header compression;
- Precise time information delivery;
- Network timing synchronization status monitoring, and
- RAN feedback for adaptation of Burst Arrival Time and Periodicity.

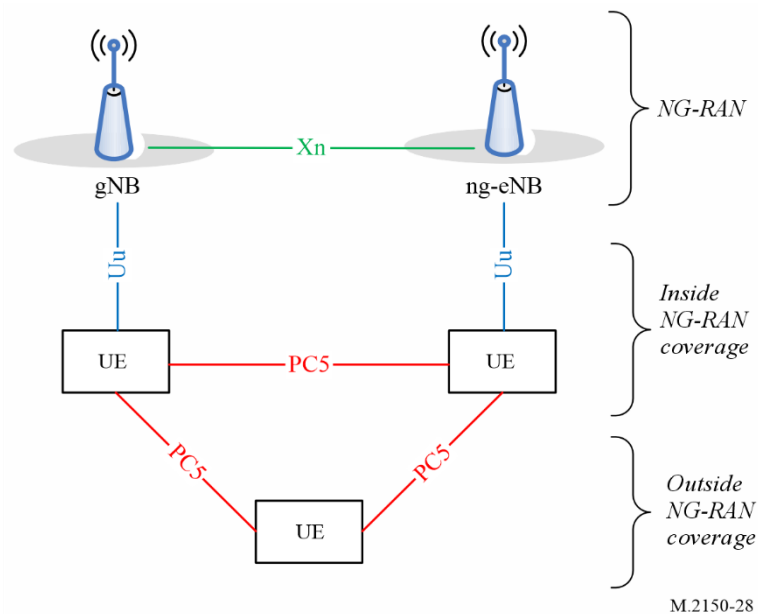
1.1.3.2 Vehicle-to-everything (V2X)

From Rel-16, NR RIT includes support of Vehicle-to-everything (V2X), mainly by means of NR sidelink communication over the PC5 interface, partly leveraging what was defined for E-UTRA V2X sidelink communication.

The architecture supporting the PC5 interface is illustrated in Fig. 28, for the overall NG-RAN (showing both NR and -EUTRA). Sidelink transmission and reception over the PC5 interface are supported when the UE is inside NG-RAN coverage, irrespective of which RRC state the UE is in, and when the UE is outside NG-RAN coverage.

FIGURE 28

NG-RAN architecture supporting the PC5 interface



NR sidelink communication can support three types of transmission modes (in the access stratum):

- Unicast, characterized by:
 - support of at least one PC5-RRC connection between peer UEs;
 - transmission and reception of control information and user traffic between peer UEs in sidelink;
 - support of sidelink feedback, for HARQ and link adaptation;
 - support of RLC AM;
 - Detection of radio link failure for the PC5 unicast connection;
- Groupcast, characterized by:
 - transmission and reception of user traffic among UEs belonging to a group in sidelink;
 - support of distance/range based sidelink HARQ feedback;
 - support of connection-less groupcast, and application managed groupcast
- Broadcast, characterized by transmission and reception of broadcast user traffic among UEs in sidelink.
 - NR sidelink communication may also be used to support other services than V2X, depending on service requirements.
- Sidelink discovery
 - The UE may perform NR sidelink discovery while in-coverage or out-of-coverage for non-relay operation.

1.1.3.3 Sidelink Relay

Sidelink relay supports 5G ProSe UE-to-Network Relay (U2N Relay) function to provide connectivity to the network for U2N Remote UE(s). Both L2 and L3 U2N Relay architectures are supported. The L3 U2N Relay architecture is transparent to the serving RAN of the U2N Relay UE, except for controlling sidelink resources.

1.1.3.4 Reduced Capability (RedCap) NR devices

A RedCap UE has reduced capabilities with the intention to have lower complexity with respect to non-RedCap UEs. It is mandatory for a RedCap UE to support 20 MHz maximum UE channel bandwidth in FR1 and 100 MHz in FR2. An eRedCap UE has further reduced capabilities with the intention to have lower complexity with respect to RedCap UEs. It is mandatory for an eRedCap UE to support reduced DL/UL peak data rate of 10 Mbit/s, with or without reduced baseband bandwidth of 5 MHz for unicast PDSCH/PUSCH in FR1.

CA, MR-DC, DAPS, CPAC (Conditional PSCell Addition/Change) and IAB related capabilities are not supported by RedCap UEs.

1.1.3.5 Positioning services

The DL Positioning Reference Signals (DL PRS) are defined to facilitate support of different positioning methods such as DL-TDOA, DL-AoD, multi-RTT through the following set of UE measurements DL RSTD, DL PRS-RSRP, and UE Rx-Tx time difference. Besides DL PRS signals, UE can use SSB and CSI-RS for RRM (RSRP and RSRQ) measurements for E-CID type of positioning.

The periodic, semipersistent and aperiodic transmission of Rel-15 SRS is defined for gNB UL RTOA, UL SRS-RSRP, UL-AoA measurements to facilitate support of UL TDOA and UL AoA positioning. The periodic, semipersistent and aperiodic transmission of SRS for positioning is defined for gNB UL RTOA, UL SRS-RSRP, UL-AoA, gNB Rx-Tx time difference measurements to facilitate support of UL TDOA, UL AoA and multi-RTT positioning methods.

The Sidelink Positioning Reference Signal (SL-PRS) is defined to facilitate Ranging/Sidelink positioning methods, such as SL-TOA, SL-TDOA, SL-RTT, SL-AoA, through the following set of measurements SL-PRS RSRP, RSRPP, RTOA, RSTD, Rx-Tx timing difference and AoA.

Low Power High Accuracy Positioning (LPHAP) is supported which includes: (i) enhancement of SRS for positioning configurations in RRC_INACTIVE state for UL and UL+DL positioning based on SRS for positioning validity area to avoid frequent reconfiguration of SRS for positioning upon serving cell changes; (ii) introduction of (e)DRX cycles longer than 10.24 seconds in RRC_INACTIVE state; (iii) alignment of (e)DRX cycles in RRC_INACTIVE state and DL PRS configurations, and (iv) support of measurements on DL PRS resources in RRC_IDLE state with reporting of the corresponding measurements when in RRC_CONNECTED state.

1.1.3.6 eXtended Reality Services

The support of eXtended Reality (XR) services that require high data rate and low latency communications.

1.1.3.6.1 Awareness

XR-Awareness relies on QoS flows, PDU Sets, Data Bursts and traffic assistance information.

1.1.3.6.2 Power Saving

Most XR video frame rates (15, 30, 45, 60, 72, 90 and 120 fps) correspond to periodicities that are not an integer (66.66, 33.33, 22.22, 16.66, 13.88, 11.11 and 8.33 ms respectively). The gNB may configure a DRX cycle expressed in rational numbers so that the DRX cycle matches those periodicities, e.g. for the traffic with a frame rate of 60 fps, the network may configure the UE with a DRX cycle of 50/3 ms.

Configured grants may be configured without the need for the UE to wake up to monitor possible grants for UL retransmissions of configured grants, thus increasing the number of power saving opportunities for the UE.

1.1.3.6.3 Capacity

The following enhancements for configured grant-based PUSCH transmission are introduced:

- Support of multiple CG PUSCH transmission occasions within a single period of a CG configuration;
- Indication of unused CG PUSCH occasion(s) of a CG configuration with Uplink Control Information multiplexed in CG PUSCH transmission of the CG configuration.

For Layer 2 enhancements.

In order to enhance the scheduling of uplink resources for XR, the following improvements are introduced:

- One additional buffer size table to reduce the quantisation errors in BSR reporting (e.g. for high bit rates);
- Delay Status Report (DSR) of buffered data via a dedicated MAC CE;
- Reporting of uplink assistance information (jitter range, burst arrival time, UL data burst periodicity) per QoS flow by the UE via UE Assistance Information. In case target gNB receives the burst arrival time from source gNB during the handover preparation procedure, the target gNB may use it by considering the SFN offset of the source gNB.

When the PSIH indicates that all PDUs of the PDU Set are needed for a QoS flow, as soon as one PDU of a PDU set is known to be lost, the remaining PDUs of that PDU Set can be considered as no longer needed by the application and may be subject to discard operation at the transmitter to free up radio resources.

1.1.3.6.4 Non-Homogeneous support of PDU set based handling in NG-RAN

During a handover from a gNB supporting PDU Set based handling to another gNB, the source gNB signals the PDU Set Information over Xn-U if the target node has signalled the support of PDU Set based handling in the Xn Handover Request Acknowledge message.

1.1.3.7 ECN marking for L4S and congestion information exposure

In order to support ECN marking for L4S at gNB, SMF provides ECN marking request per QoS flow level to the gNB as part of PDU Session Resource Management procedure. If the gNB supports ECN marking, it provides the status indication back to the SMF which is used by the SMF. During Xn Handover Preparation procedure, source gNB provides the ECN marking request to target gNB.

1.1.3.8 Support for Aerial UE Communication

NR connectivity for UEs capable of Aerial communication is supported via the following functionalities:

- subscription-based Aerial UE identification and authorization;
- altitude reporting based on the measurement event(s) where the UE's altitude has crossed a network-configured reference altitude threshold;
- altitude-dependent configurations which apply only to specific altitude regions;
- interference detection based on a measurement reporting that is triggered when a configured number of cells (i.e. larger than one) fulfils the triggering criteria simultaneously;
- signalling of flight path information from UE to NG-RAN and from the source gNB to target gNB during handover;
- location information reporting, including UE's horizontal and vertical velocity;
- transmitting of BRID and DAA messages via PC5 interface.

1.1.3.9 Support for Air to Ground Networks

In Air-to-ground (ATG) network, an NG-RAN consisting of ground-based gNBs, which provide cell towers that send signals up to an aircraft's antenna(s) of onboard ATG terminal, with typical vertical altitude of around 10,000m and take-off/landing altitudes down to 3000m.

CA and DC are not supported for ATG in this release of the specification.

1.1.3.10 Support of AI/ML for NG-RAN

Support of AI/ML for NG-RAN, as a RAN function, is used to facilitate Artificial Intelligence (AI) and Machine Learning (ML) techniques in NG-RAN.

The objective of AI/ML for NG-RAN is to improve network performance and user experience, through analysing the data collected and autonomously processed by the NG-RAN, which can yield further insights, e.g. for Network Energy Saving, Load Balancing, Mobility Optimization.

1.1.3.11 Non-Public Network

A Non-Public Network (NPN) is a network for non-public use, which includes Stand-Alone NPN (SNPN) and Public Network Integrated NPN (PNI-NPN), where:

- A Stand-Alone NPN (SNPN) is a network deployed for non-public use which does not rely on network functions provided by a PLMN. An SNPN is identified by a PLMN ID and a Network Identifier (NID) broadcast.
- A Public Network Integrated NPN (PNI-NPN) is a network deployed for non-public use which relies on network functions provided by a PLMN. In PNI-NPN, a Closed Access Groups (CAG) identifies a group of subscribers who are permitted to access one or more CAG cells associated to the CAG. A CAG is identified by a CAG identifier broadcast.

1.2 Detailed specification of the radio interface technology

Detailed specifications described in this Annex are developed around a “Global Core Specification” (GCS)⁸, which is related to externally developed materials incorporated by specific references for a specific technology. The process and use of the GCS, references, and related notifications and certifications are found as Document IMT-2020/20.

The IMT-2020 standards contained in this section are derived from the global core specification for 3GPP 5G-SRIT contained at [IMT-2020 Global Core Specifications](#). The following notes apply to the sections below:

- 1) The identified Transposing Organizations⁹ should make their reference material available from their website.

⁸ A “GCS” (Global Core Specification) is the set of specifications that defines a single RIT, an SRIT, or a component RIT within an SRIT.

⁹ The following identified Transposing Organizations have provided their transposed sets of standards information contained in this section:

- Association of Radio Industries and Businesses (ARIB)
- Alliance for Telecommunications Industry Solutions (ATIS)
- China Communications Standards Association (CCSA)
- European Telecommunications Standards Institute (ETSI)
- Telecommunications Standards Development Society, India (TSDSI)
- Telecommunications Technology Association (TTA)
- Telecommunication Technology Committee (TTC).

- The specific 3GPP specifications of the Global Core Specifications (GCS) for IMT-2020 and 5G that are being transposed in § 1.2.1 are summarized in Table 3.

PART A								
List of Specifications								
36.100 Series	36.200 Series	36.300 Series	36.400 Series	37.xxx Series	38.100 Series	38.200 Series	38.300 Series	38.400 Series
TS 36.101	TS 36.201	TS 36.300	TS 36.401	TS 37.104	TS 38.101-1	TS 38.201	TS 38.300	TS 38.400
TS 36.104	TS 36.211	TS 36.302	TS 36.410	TS 37.105	TS 38.101-2	TS 38.202	TS 38.304	TS 38.410
TS 36.106	TS 36.212	TS 36.304	TS 36.411	TS 37.113	TS 38.101-3	TS 38.211	TS 38.305	TS 38.411
TS 36.111	TS 36.213	TS 36.305	TS 36.412	TS 37.114	TS 38.104	TS 38.212	TS 38.306	TS 38.412
TS 36.113	TS 36.214	TS 36.306	TS 36.413	TS 37.320	TS 38.106	TS 38.213	TS 38.307	TS 38.413
TS 36.116	TS 36.216	TS 36.307	TS 36.414	TS 37.324	TS 38.113	TS 38.214	TS 38.314	TS 38.414
TS 36.124		TS 36.314	TS 36.420	TS 37.340	TS 38.114	TS 38.215	TS 38.321	TS 38.415
TS 36.133		TS 36.321	TS 36.421	TS 37.355	TS 38.124		TS 38.322	TS 38.420
		TS 36.322	TS 36.422	TS 37.460	TS 38.133		TS 38.323	TS 38.421
		TS 36.323	TS 36.423	TS 37.461	TS 38.174		TS 38.331	TS 38.422
		TS 36.331	TS 36.424	TS 37.462	TS 38.175		TS 38.340	TS 38.423
		TS 36.355	TS 36.425	TS 37.466			TS 38.351	TS 38.424
		TS 36.360	TS 36.440	TS 37.470			TS 38.355	TS 38.425
		TS 36.361	TS 36.441	TS 37.471				TS 38.455
			TS 36.442	TS 37.472				TS 38.460
			TS 36.443	TS 37.473				TS 38.461
			TS 36.444	TS 37.480				TS 38.462
			TS 36.445	TS 37.481				TS 38.463
			TS 36.455	TS 37.482				TS 38.470
			TS 36.456	TS 37.483				TS 38.471
			TS 36.457					TS 38.472
			TS 36.458					TS 38.473
			TS 36.459					TS 38.474
			TS 36.461					
			TS 36.462					
			TS 36.463					
			TS 36.464					
			TS 36.465					

PART B

Specification versions to be used

The specific versions of the 3GPP specifications that are to be used for the transpositions of those specifications listed in Table 3 are provided in the link below:

[Click here for the direct link to the GCS material.](#)

1.2.1 Titles and synopses of the global core specification and the transposed standards

1.2.1.1 Introduction

The standards documents referenced below, as transposed from the relevant 3GPP specifications, are provided by the identified *Transposing Organizations* as the transposed sets of standards for the terrestrial radio interface of IMT-2020 identified as 5G and includes not only the key characteristics of IMT-2020 but also the additional capabilities of 5G both of which are continuing to be enhanced.

1.2.1.2 Radio Layer 1

1.2.1.2.1 TS 36.201

Evolved Universal Terrestrial Radio Access (E-UTRA); LTE physical layer; General description

This document provides a general description of the physical layer of the E-UTRA radio interface. This document also describes the document structure of the 3GPP E-UTRA physical layer specifications, i.e. TS 36.200 series. The TS 36.200 series specifies the Uu point for the LTE mobile system, and defines the minimum level of specifications required for basic connections in terms of mutual connectivity and compatibility.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-36.201.V15.3.0	15.3.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/36/A36201-f30.pdf
ATIS	ATIS.3GPP.36.201V1530	15.3.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.201V1530	15.3.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.201V1530.docx
ETSI	ETSI TS 136 201 V15.3.0 (2020-04)	15.3.0	Published	14.04.2020	https://www.etsi.org/deliver/etsi_ts/136200_136299/136201/15.03.00_60/ts_136201v150300p.pdf
TSDSI	TSDSI STD T1.3GPP 36.201-15.3.0 V1.0.0	15.3.0	Published	30.08.2021	https://members.tdsi.in/index.php/s/TJ5e7eMFzoNENaw
TTA	TTAT.3G-36.201V15.3.0	15.3.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.201V15.3.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-36.201.V16.0.0	16.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/36/A36201-g00.pdf
ATIS	ATIS.3GPP.36.201V1600	16.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.201V1600	16.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.201V1600.docx
ETSI	ETSI TS 136 201 V16.0.0 (2020-07)	16.0.0	Published	20.07.2020	https://www.etsi.org/deliver/etsi_ts/136200_136299/136201/16.00.00_60/ts_136201v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.201-16.0.0 V1.0.0	16.0.0	Published	30.08.2021	https://members.tdsi.in/index.php/s/rNFgxpDe5zbTma
TTA	TTAT.3G-36.201V16.0.0	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.201V16.0.0&searchCate=TTAS

Release 17

ARIB	ARIB STD-T120-36.201.V17.0.0	17.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/36/A36201-h00.pdf
ATIS	ATIS.3GPP.36.201.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.201.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.201.V17.0.0.docx
ETSI	ETSI TS 136 201 V17.0.0 (2022-04)	17.0.0	Published	20.04.2022	https://www.etsi.org/deliver/etsi_ts/136200_136299/136201/17.00.00_60/ts_136201v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.201-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/oFAG4NYgpSWpf3A
TTA	TTAT.3G-36.201V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.201V17.0.0&searchCate=TTAS

Release 18

ARIB	ARIB STD-T120-36.201.V18.0.0	18.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/36/A36201-i00.pdf
ATIS	ATIS.3GPP.36.201.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.201.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.201.V18.0.0.docx
ETSI	ETSI TS 136 201 V18.0.0 (2024-05)	18.0.0	Published	02.05.2024	https://www.etsi.org/deliver/etsi_ts/136200_136299/136201/18.00.00_60/ts_136201v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.201-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/sCGsWxcG8yWrB3p
TTA	TTAT.3G-36.201V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.201V18.0.0&searchCate=TTAS

1.2.1.2.2 TS 36.211**Evolved Universal Terrestrial Radio Access (E-UTRA); Physical channels and modulation**

This document describes the physical channels and modulation for E-UTRA.

SDO	Document No.	Version	Status	Issued date	Location

Release 15

ARIB	ARIB STD-T120-36.211.V15.14.0	15.14.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/36/A36211-fe0.pdf
ATIS	ATIS.3GPP.36.211.V15.14.0	15.14.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.211.V15.14.0	15.14.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.211.V15.14.0.zip
ETSI	ETSI TS 136 211 V15.14.0 (2021-10)	15.14.0	Published	22.10.2021	https://www.etsi.org/deliver/etsi_ts/136200_136299/136211/15.14.00_60/ts_136211v151400p.pdf
TSDSI	TSDSI STD T1.3GPP 36.211-15.14.0 V1.1.0	15.14.0	Published	29.07.2022	https://members.tdsi.in/s/8fBRoRs3A5ebRbQ
TTA	TTAT.3G-36.211V15.14.0	15.14.0	Published	27.01.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.211V15.14.0&searchCate=TTAS

Release 16

ARIB	ARIB STD-T120-36.211.V16.8.0	16.8.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/36/A36211-g80.pdf
ATIS	ATIS.3GPP.36.211.V16.8.0	16.8.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.211.V16.8.0	16.8.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.211.V16.8.0.zip
ETSI	ETSI TS 136 211 V16.8.0 (2023-09)	16.8.0	Published	29.09.2023	https://www.etsi.org/deliver/etsi_ts/136200_136299/136211/16.08.00_60/ts_136211v160800p.pdf
TSDSI	TSDSI STD T1.3GPP 36.211-16.8.0 V1.2.0	16.8.0	Published	23.02.2024	https://members.tdsi.in/s/PoYeyKC63dtGNbe
TTA	TTAT.3G-36.211V16.8.0	16.8.0	Published	13.02.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.211V16.8.0&searchCate=TTAS

Release 17

ARIB	ARIB STD-T120-36.211.V17.4.0	17.4.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/36/A36211-h40.pdf
ATIS	ATIS.3GPP.36.211.V17.4.0	17.4.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.211.V17.4.0	17.4.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.211.V17.4.0.zip
ETSI	ETSI TS 136 211 V17.4.0 (2023-09)	17.4.0	Published	29.09.2023	https://www.etsi.org/deliver/etsi_ts/136200_136299/136211/17.04.00_60/ts_136211v170400p.pdf
TSDSI	TSDSI STD T1.3GPP 36.211-17.4.0 V1.3.0	17.4.0	Published	23.02.2024	https://members.tdsi.in/s/LMtKzBGfxdiYD7
TTA	TTAT.3G-36.211V17.4.0	17.4.0	Published	13.02.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.211V17.4.0&searchCate=TTAS

Release 18

ARIB	ARIB STD-T120-36.211.V18.0.1	18.0.1	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/36/A36211-i01.pdf
ATIS	ATIS.3GPP.36.211.V18.0.1	18.0.1	Published	13.02.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.211.V18.0.1	18.0.1	Published	13.02.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.211.V18.0.1.zip
ETSI	ETSI TS 136 211 V18.0.1 (2024-05)	18.0.1	Published	06.05.2024	https://www.etsi.org/deliver/etsi_ts/136200_136299/136211/18.00.01_60/ts_136211v180001p.pdf
TSDSI	TSDSI STD T1.3GPP 36.211-18.0.1 V1.0.0	18.0.1	Published	19.11.2024	https://members.tdsi.in/s/o2PEwCd2YQwbKmL
TTA	TTAT.3G-36.211V18.0.1	18.0.1	#N/A	#N/A	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.211V18.0.1&searchCate=TTAS

1.2.1.2.3 TS 36.212**Evolved Universal Terrestrial Radio Access (E-UTRA); Multiplexing and channel coding**

This document specifies the coding, multiplexing and mapping to physical channels for E-UTRA.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-36.212.V15.15.0	15.15.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/36/A36212-ff0.pdf
ATIS	ATIS.3GPP.36.212.V15.15.0	15.15.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.212.V15.15.0	15.15.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.212.V15.15.0.docx
ETSI	ETSI TS 136 212 V15.15.0 (2022-01)	15.15.0	Published	25.01.2022	https://www.etsi.org/deliver/etsi_ts/136200_136299/136212/15.15.00_60/ts_136212v151500p.pdf
TSDSI	TSDSI STD T1.3GPP 36.212-15.15.0 V1.1.0	15.15.0	Published	29.07.2022	https://members.tdsi.in/s/aWiCGKiDJ6Nofgx
TTA	TTAT.3G-36.212V15.15.0	15.15.0	Published	14.03.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.212V15.15.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-36.212.V16.7.0	16.7.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/36/A36212-g70.pdf
ATIS	ATIS.3GPP.36.212.V16.7.0	16.7.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.212.V16.7.0	16.7.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.212.V16.7.0.docx
ETSI	ETSI TS 136 212 V16.7.0 (2022-01)	16.7.0	Published	25.01.2022	https://www.etsi.org/deliver/etsi_ts/136200_136299/136212/16.07.00_60/ts_136212v160700p.pdf
TSDSI	TSDSI STD T1.3GPP 36.212-16.7.0 V1.1.0	16.7.0	Published	29.07.2022	https://members.tdsi.in/s/bqPinspGrEcBTco
TTA	TTAT.3G-36.212V16.7.0	16.7.0	Published	14.03.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.212V16.7.0&searchCate=TTAS

Release 17

ARIB	ARIB STD-T120-36.212.V17.1.0	17.1.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/36/A36212-h10.pdf
ATIS	ATIS.3GPP.36.212.V17.1.0	17.1.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.212.V17.1.0	17.1.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.212.V17.1.0.docx
ETSI	ETSI TS 136 212 V17.1.0 (2022-04)	17.1.0	Published	25.04.2022	https://www.etsi.org/deliver/etsi_ts/136200_136299/136212/17.01.00_60/ts_136212v170100p.pdf
TSDSI	TSDSI STD T1.3GPP 36.212-17.1.0 V1.0.0	17.1.0	Published	29.07.2022	https://members.tdsi.in/s/Wnbq6RFM2Jyozps
TTA	TTAT.3G-36.212V17.1.0	17.1.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.212V17.1.0&searchCate=TTAS

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ARIB	ARIB STD-T120-36.212.V18.0.0	18.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/36/A36212-i00.pdf
ATIS	ATIS.3GPP.36.212.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.212.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.212.V18.0.0.docx
ETSI	ETSI TS 136 212 V18.0.0 (2024-05)	18.0.0	Published	23.05.2024	https://www.etsi.org/deliver/etsi_ts/136200_136299/136212/18.00.00_60/ts_136212v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.212-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/CaFcdB4aJaXGm7F
TTA	TTAT.3G-36.212V18.0.0	18.0.0	Published	13.02.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.212V18.0.0&searchCate=TTAS

1.2.1.2.4 TS 36.213**Evolved Universal Terrestrial Radio Access (E-UTRA); Physical layer procedures**

This document specifies and establishes the characteristics of the physical layer procedures for E-UTRA.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-36.213.V15.16.0	15.16.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/36/A36213-fg0.pdf
ATIS	ATIS.3GPP.36.213.V15.16.0	15.16.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.213.V15.16.0	15.16.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.213.V15.16.0.zip
ETSI	ETSI TS 136 213 V15.16.0 (2022-10)	15.16.0	Published	19.10.2022	https://www.etsi.org/deliver/etsi_ts/136200_136299/136213/15.16.00_60/ts_136213v151600p.pdf
TSDSI	TSDSI STD T1.3GPP 36.213-15.16.0 V1.2.0	15.16.0	Published	17.01.2023	https://members.tdsi.in/s/xBAbmCPNHkaTarf
TTA	TTAT.3G-36.213V15.16.0	15.16.0	Published	11.01.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.213V15.16.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-36.213.V16.10.0	16.10.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/36/A36213-ga0.pdf
ATIS	ATIS.3GPP.36.213.V16.10.0	16.10.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.213.V16.10.0	16.10.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.213.V16.10.0.zip
ETSI	ETSI TS 136 213 V16.10.0 (2024-02)	16.10.0	Published	15.02.2024	https://www.etsi.org/deliver/etsi_ts/136200_136299/136213/16.10.00_60/ts_136213v161000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.213-16.10.0 V1.3.0	16.10.0	Published	29.05.2024	https://members.tdsi.in/s/LrJWnrldjRkfcEH
TTA	TTAT.3G-36.213V16.10.0	16.10.0	Published	08.05.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.213V16.10.0&searchCate=TTAS

Release 17

ARIB	ARIB STD-T120-36.213.V17.6.0	17.6.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/36/A36213-h60.pdf
ATIS	ATIS.3GPP.36.213.V17.6.0	17.6.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.213.V17.6.0	17.6.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.213.V17.6.0.zip
ETSI	ETSI TS 136 213 V17.6.0 (2024-02)	17.6.0	Published	15.02.2024	https://www.etsi.org/deliver/etsi_ts/136200_136299/136213/17.06.00_60/ts_136213v170600p.pdf
TSDSI	TSDSI STD T1.3GPP 36.213-17.6.0 V1.5.0	17.6.0	Published	29.05.2024	https://members.tdsi.in/s/dtBjqnm8FkLRLHs
TTA	TTAT.3G-36.213V17.6.0	17.6.0	Published	08.05.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.213V17.6.0&searchCate=TTAS

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ARIB	ARIB STD-T120-36.213.V18.2.0	18.2.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/36/A36213-i20.pdf
ATIS	ATIS.3GPP.36.213.V18.2.0	18.2.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.213.V18.2.0	18.2.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.213.V18.2.0.zip
ETSI	ETSI TS 136 213 V18.2.0 (2024-06)	18.2.0	Published	14.06.2024	https://www.etsi.org/deliver/etsi_ts/136200_136299/136213/18.02.00_60/ts_136213v180200p.pdf
TSDSI	TSDSI STD T1.3GPP 36.213-18.2.0 V1.0.0	18.2.0	Published	19.11.2024	https://members.tdsi.in/s/YQAW7CgScfdzASw
TTA	TTAT.3G-36.213V18.2.0	18.2.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.213V18.2.0&searchCate=TTAS

1.2.1.2.5 TS 36.214**Evolved Universal Terrestrial Radio Access (E-UTRA); Physical layer; Measurements**

This document contains the description and definition of the measurements done at the UE and network in order to support operation in idle mode and connected mode in E-UTRA.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-36.214.V15.5.0	15.5.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/36/A36214-f50.pdf
ATIS	ATIS.3GPP.36.214V1550	15.5.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.214V1550	15.5.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.214V1550.docx
ETSI	ETSI TS 136 214 V15.5.0 (2020-01)	15.5.0	Published	17.01.2020	https://www.etsi.org/deliver/etsi_ts/136200_136299/136214/15.05.00_60/ts_136214v150500p.pdf
TSDSI	TSDSI STD T1.3GPP 36.214-15.5.0 V1.0.0	15.5.0	Published	30.08.2021	https://members.tdsi.in/s/X4wisHJeDRXnaPn
TTA	TTAT.3G-36.214V15.5.0	15.5.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.214V15.5.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-36.214.V16.2.0	16.2.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/36/A36214-g20.pdf
ATIS	ATIS.3GPP.36.214.V16.2.0	16.2.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.214.V16.2.0	16.2.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.214.V16.2.0.docx
ETSI	ETSI TS 136 214 V16.2.0 (2021-04)	16.2.0	Published	20.04.2021	https://www.etsi.org/deliver/etsi_ts/136200_136299/136214/16.02.00_60/ts_136214v160200p.pdf
TSDSI	TSDSI STD T1.3GPP 36.214-16.2.0 V1.1.0	16.2.0	Published	29.07.2022	https://members.tdsi.in/s/ExaoPZDGAKaQaHFs
TTA	TTAT.3G-36.214V16.2.0	16.2.0	Published	10.06.2021	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.214V16.2.0&searchCate=TTAS

Release 17

ARIB	ARIB STD-T120-36.214.V17.0.0	17.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/36/A36214-h00.pdf
ATIS	ATIS.3GPP.36.214.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.214.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.214.V17.0.0.docx
ETSI	ETSI TS 136 214 V17.0.0 (2022-04)	17.0.0	Published	20.04.2022	https://www.etsi.org/deliver/etsi_ts/136200_136299/136214/17.00.00_60/ts_136214v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.214-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/dEWxwbbjLcTzoFd
TTA	TTAT.3G-36.214V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.214V17.0.0&searchCate=TTAS

Release 18

ARIB	ARIB STD-T120-36.214.V18.0.0	18.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/36/A36214-i00.pdf
ATIS	ATIS.3GPP.36.214.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.214.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.214.V18.0.0.docx
ETSI	ETSI TS 136 214 V18.0.0 (2024-05)	18.0.0	Published	02.05.2024	https://www.etsi.org/deliver/etsi_ts/136200_136299/136214/18.00.00_60/ts_136214v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.214-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/QsCJb8C8AoWJqLN
TTA	TTAT.3G-36.214V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.214V18.0.0&searchCate=TTAS

1.2.1.2.6 TS 36.216**Evolved Universal Terrestrial Radio Access (E-UTRA); Physical layer for relaying operation**

This document describes the characteristics of eNodeB – relay node transmissions.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-36.216.V15.0.0	15.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/36/A36216-f00.pdf
ATIS	ATIS.3GPP.36.216V1500	15.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.216V1500	15.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.216V1500.doc
ETSI	ETSI TS 136 216 V15.0.0 (2018-07)	15.0.0	Published	12.07.2018	https://www.etsi.org/deliver/etsi_ts/136200_136299/136216/15.00.00_60/ts_136216v150000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.216-15.0.0 V1.0.0	15.0.0	Published	30.08.2021	https://members.tdsi.in/s/Ki8YRnPA2AHngS3
TTA	TTAT.3G-36.216V15.0.0	15.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.216V15.0.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-36.216.V16.0.0	16.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/36/A36216-g00.pdf
ATIS	ATIS.3GPP.36.216V1600	16.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.216V1600	16.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.216V1600.doc
ETSI	ETSI TS 136 216 V16.0.0 (2020-07)	16.0.0	Published	20.07.2020	https://www.etsi.org/deliver/etsi_ts/136200_136299/136216/16.00.00_60/ts_136216v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.216-16.0.0 V1.0.0	16.0.0	Published	30.08.2021	https://members.tdsi.in/s/3DcKBZ9rge7SXd3
TTA	TTAT.3G-36.216V16.0.0	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.216V16.0.0&searchCate=TTAS

Release 17

ARIB	ARIB STD-T120-36.216.V17.0.0	17.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/36/A36216-h00.pdf
ATIS	ATIS.3GPP.36.216.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.216.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.216.V17.0.0.docx
ETSI	ETSI TS 136 216 V17.0.0 (2022-04)	17.0.0	Published	20.04.2022	https://www.etsi.org/deliver/etsi_ts/136200_136299/136216/17.00.00_60/ts_136216v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.216-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/C9r4zbRo7dooB2j
TTA	TTAT.3G-36.216V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.216V17.0.0&searchCate=TTAS

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ARIB	ARIB STD-T120-36.216.V18.0.0	18.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/36/A36216-i00.pdf
ATIS	ATIS.3GPP.36.216.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.216.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.216.V18.0.0.docx
ETSI	ETSI TS 136 216 V18.0.0 (2024-05)	18.0.0	Published	02.05.2024	https://www.etsi.org/deliver/etsi_ts/136200_136299/136216/18.00.00_60/ts_136216v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.216-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/DCdxFD3YpBQny6d
TTA	TTAT.3G-36.216V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.216V18.0.0&searchCate=TTAS

1.2.1.2.7 TS 38.201**NR; Physical layer; General description**

This document provides a general description of the physical layer of NR radio interface. This document also describes the document structure of the 3GPP physical layer specifications, i.e. TS 38.200 series.

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ARIB	ARIB STD-T120-38.201.V15.0.0	15.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38201-f00.pdf
ATIS	ATIS.3GPP.38.201.V15.0.0	15.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.201.V15.0.0	15.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.201.V15.0.0.docx
ETSI	ETSI TS 138 201 V15.0.0 (2018-09)	15.0.0	Published	18.09.2018	https://www.etsi.org/deliver/etsi_ts/138200_138299/138201/15.00.00_60/ts_138201v150000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.201-15.0.0 V1.0.0	15.0.0	Published	06.10.2020	https://members.tdsi.in/s/eTcG55LfwjgptTM
TTA	TTAT.3G-38.201V15.0.0	15.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.201V15.0.0&searchCate=TTAS

Release 16

ARIB	ARIB STD-T120-38.201.V16.0.0	16.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38201-g00.pdf
ATIS	ATIS.3GPP.38.201.V16.0.0	16.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.201.V16.0.0	16.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.201.V16.0.0.docx
ETSI	ETSI TS 138 201 V16.0.0 (2020-09)	16.0.0	Published	21.09.2020	https://www.etsi.org/deliver/etsi_ts/138200_138299/138201/16.00.00_60/ts_138201v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.201-16.0.0 V1.0.0	16.0.0	Published	06.10.2020	https://members.tdsi.in/s/fPq92DLdxwo2JPR
TTA	TTAT.3G-38.201V16.0.0	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.201V16.0.0&searchCate=TTAS

Release 17

ARIB	ARIB STD-T120-38.201.V17.0.0	17.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38201-h00.pdf
ATIS	ATIS.3GPP.38.201.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.201.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.201.V17.0.0.doc
ETSI	ETSI TS 138 201 V17.0.0 (2022-05)	17.0.0	Published	11.05.2022	https://www.etsi.org/deliver/etsi_ts/138200_138299/138201/17.00.00_60/ts_138201v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.201-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/tWT54rLwzzFXrDH
TTA	TTAT.3G-38.201V17.0.0	17.0.0	Published	14.03.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.201V17.0.0&searchCate=TTAS

Release 18

ARIB	ARIB STD-T120-38.201.V18.0.0	18.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38201-i00.pdf
ATIS	ATIS.3GPP.38.201.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.201.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.201.V18.0.0.doc
ETSI	ETSI TS 138 201 V18.0.0 (2024-05)	18.0.0	Published	27.05.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138201/18.00.00_60/ts_138201v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.201-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/f4j8DgWSikwnkmk
TTA	TTAT.3G-38.201V18.0.0	18.0.0	Published	13.02.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.201V18.0.0&searchCate=TTAS

1.2.1.2.8 TS 38.202**NR; Services provided by the physical layer**

This document is a technical specification of the services provided by the physical layer of 5G-NR to upper layers.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-38.202.V15.6.0	15.6.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38202-f60.pdf
ATIS	ATIS.3GPP.38.202.V15.6.0	15.6.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.202.V15.6.0	15.6.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.202.V15.6.0.docx
ETSI	ETSI TS 138 202 V15.6.0 (2020-01)	15.6.0	Published	21.01.2020	https://www.etsi.org/deliver/etsi_ts/138200_138299/138202/15.06.00_60/ts_138202v150600p.pdf
TSDSI	TSDSI STD T1.3GPP 38.202-15.6.0 V1.0.0	15.6.0	Published	06.10.2020	https://members.tdsi.in/s/i79c9BBFPNi7Ngg
TTA	TTAT.3G-38.202V15.6.0	15.6.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.202V15.6.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-38.202.V16.4.0	16.4.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38202-g40.pdf
ATIS	ATIS.3GPP.38.202.V16.4.0	16.4.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.202.V16.4.0	16.4.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.202.V16.4.0.docx
ETSI	ETSI TS 138 202 V16.4.0 (2024-02)	16.4.0	Published	01.02.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138202/16.04.00_60/ts_138202v160400p.pdf
TSDSI	TSDSI STD T1.3GPP 38.202-16.4.0 V1.2.0	16.4.0	Published	29.05.2024	https://members.tdsi.in/s/eaANKYx7F7xA8fS
TTA	TTAT.3G-38.202V16.4.0	16.4.0	Published	08.05.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.202V16.4.0&searchCate=TTAS

Release 17

ARIB	ARIB STD-T120-38.202.V17.5.0	17.5.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38202-h50.pdf
ATIS	ATIS.3GPP.38.202.V17.5.0	17.5.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.202.V17.5.0	17.5.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.202.V17.5.0.docx
ETSI	ETSI TS 138 202 V17.5.0 (2024-02)	17.5.0	Published	01.02.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138202/17.05.00_60/ts_138202v170500p.pdf
TSDSI	TSDSI STD T1.3GPP 38.202-17.5.0 V1.4.0	17.5.0	Published	29.05.2024	https://members.tdsi.in/s/6koBLoiigxgSWXy
TTA	TTAT.3G-38.202V17.5.0	17.5.0	Published	08.05.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.202V17.5.0&searchCate=TTAS

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ARIB	ARIB STD-T120-38.202.V18.4.0	18.4.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38202-i40.pdf
ATIS	ATIS.3GPP.38.202.V18.4.0	18.4.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.202.V18.4.0	18.4.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.202.V18.4.0.docx
ETSI	ETSI TS 138 202 V18.4.0 (2024-10)	18.4.0	Published	02.10.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138202/18.04.00_60/ts_138202v180400p.pdf
TSDSI	TSDSI STD T1.3GPP 38.202-18.4.0 V1.1.0	18.4.0	Published	02.03.2025	https://members.tdsi.in/s/pm2MeNYaNzMi9G7
TTA	TTAT.3G-38.202V18.4.0	18.4.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.202V18.4.0&searchCate=TTAS

1.2.1.2.9 TS 38.211**NR; Physical channels and modulation**

This document describes the physical channels and signals for 5G-NR.

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Release 15

ARIB	ARIB STD-T120-38.211.V15.10.0	15.10.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38211-fa0.pdf
ATIS	ATIS.3GPP.38.211.V15.10.0	15.10.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.211.V15.10.0	15.10.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.211.V15.10.0.docx
ETSI	ETSI TS 138 211 V15.10.0 (2022-01)	15.10.0	Published	25.01.2022	https://www.etsi.org/deliver/etsi_ts/138200_138299/138211/15.10.00_60/ts_138211v151000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.211-15.10.0 V1.1.0	15.10.0	Published	29.07.2022	https://members.tdsi.in/s/83TSy8QGnLpffFe
TTA	TTAT.3G-38.211V15.10.0	15.10.0	Published	14.03.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.211V15.10.0&searchCate=TTAS

Release 16

ARIB	ARIB STD-T120-38.211.V16.10.0	16.10.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38211-ga0.pdf
ATIS	ATIS.3GPP.38.211.V16.10.0	16.10.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.211.V16.10.0	16.10.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.211.V16.10.0.docx
ETSI	ETSI TS 138 211 V16.10.0 (2022-07)	16.10.0	Published	20.07.2022	https://www.etsi.org/deliver/etsi_ts/138200_138299/138211/16.10.00_60/ts_138211v161000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.211-16.10.0 V1.1.0	16.10.0	Published	29.07.2022	https://members.tdsi.in/s/sXJpwEqcWA278wq
TTA	TTAT.3G-38.211V16.10.0	16.10.0	Published	21.10.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.211V16.10.0&searchCate=TTAS

Release 17

ARIB	ARIB STD-T120-38.211.V17.9.0	17.9.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38211-h90.pdf
ATIS	ATIS.3GPP.38.211.V17.9.0	17.9.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.211.V17.9.0	17.9.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.211.V17.9.0.docx
ETSI	ETSI TS 138 211 V17.9.0 (2024-10)	17.9.0	Published	02.10.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138211/17.09.00_60/ts_138211v170900p.pdf
TSDSI	TSDSI STD T1.3GPP 38.211-17.9.0 V1.8.0	17.9.0	Published	02.03.2025	https://members.tdsi.in/s/GPOQPOxrQwTiiwH
TTA	TTAT.3G-38.211V17.9.0	17.9.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.211V17.9.0&searchCate=TTAS

Release 18

ARIB	ARIB STD-T120-38.211.V18.4.0	18.4.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38211-i40.pdf
ATIS	ATIS.3GPP.38.211.V18.4.0	18.4.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.211.V18.4.0	18.4.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.211.V18.4.0.docx
ETSI	ETSI TS 138 211 V18.4.0 (2024-10)	18.4.0	Published	02.10.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138211/18.04.00_60/ts_138211v180400p.pdf
TSDSI	TSDSI STD T1.3GPP 38.211-18.4.0 V1.1.0	18.4.0	Published	02.03.2025	https://members.tdsi.in/s/zrcSbAR38m4H3Yy
TTA	TTAT.3G-38.211V18.4.0	18.4.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.211V18.4.0&searchCate=TTAS

1.2.1.2.10 TS 38.212**NR; Multiplexing and channel coding**

This document specifies the coding, multiplexing and mapping to physical channels for 5G NR.

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Release 15					
ARIB	ARIB STD-T120-38.212.V15.13.0	15.13.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38212-fd0.pdf
ATIS	ATIS.3GPP.38.212.V15.13.0	15.13.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.212.V15.13.0	15.13.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.212.V15.13.0.docx
ETSI	ETSI TS 138 212 V15.13.0 (2022-01)	15.13.0	Published	25.01.2022	https://www.etsi.org/deliver/etsi_ts/138200_138299/138212/15.13.00_60/ts_138212v151300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.212-15.13.0 V1.1.0	15.13.0	Published	29.07.2022	https://members.tdsi.in/s/Yaxz3Jg2X59A6Nz
TTA	TTAT.3G-38.212V15.13.0	15.13.0	Published	14.03.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.212V15.13.0&searchCate=TTAS
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ARIB	ARIB STD-T120-38.212.V16.14.0	16.14.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38212-ge0.pdf
ATIS	ATIS.3GPP.38.212.V16.14.0	16.14.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.212.V16.14.0	16.14.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.212.V16.14.0.docx
ETSI	ETSI TS 138 212 V16.14.0 (2024-08)	16.14.0	Published	05.08.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138212/16.14.00_60/ts_138212v161400p.pdf
TSDSI	TSDSI STD T1.3GPP 38.212-16.14.0 V1.5.0	16.14.0	Published	19.11.2024	https://members.tdsi.in/s/aT5CP9opRABDWdz
TTA	TTAT.3G-38.212V16.14.0	16.14.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.212V16.14.0&searchCate=TTAS

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ATIS	ATIS.3GPP.38.212.V17.9.0	17.9.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.212.V17.9.0	17.9.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.212.V17.9.0.docx
ETSI	ETSI TS 138 212 V17.9.0 (2024-08)	17.9.0	Published	05.08.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138212/17.09.00_60/ts_138212v170900p.pdf
TSDSI	TSDSI STD T1.3GPP 38.212-17.9.0 V1.8.0	17.9.0	Published	19.11.2024	https://members.tdsi.in/s/4oZBfKJ57RbTwzt
TTA	TTAT.3G-38.212V17.9.0	17.9.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.212V17.9.0&searchCate=TTAS

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ARIB	ARIB STD-T120-38.212.V18.4.0	18.4.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38212-i40.pdf
ATIS	ATIS.3GPP.38.212.V18.4.0	18.4.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.212.V18.4.0	18.4.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.212.V18.4.0.docx
ETSI	ETSI TS 138 212 V18.4.0 (2024-10)	18.4.0	Published	02.10.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138212/18.04.00_60/ts_138212v180400p.pdf
TSDSI	TSDSI STD T1.3GPP 38.212-18.4.0 V1.1.0	18.4.0	Published	02.03.2025	https://members.tdsi.in/s/di8moiMrf2PytBa
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1.2.1.2.11 TS 38.213**NR; Physical layer procedures for control**

This document specifies and establishes the characteristics of the physical layer procedures for control operations in 5G-NR.

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Release 15					
ARIB	ARIB STD-T120-38.213.V15.15.0	15.15.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38213-ff0.pdf
ATIS	ATIS.3GPP.38.213.V15.15.0	15.15.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.213.V15.15.0	15.15.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.213.V15.15.0.docx
ETSI	ETSI TS 138 213 V15.15.0 (2022-07)	15.15.0	Published	20.07.2022	https://www.etsi.org/deliver/etsi_ts/138200_138299/138213/15.15.00_60/ts_138213v151500p.pdf
TSDSI	TSDSI STD T1.3GPP 38.213-15.15.0 V1.1.0	15.15.0	Published	29.07.2022	https://members.tdsi.in/s/o7iwns74DyZJrFJ
TTA	TTAT.3G-38.213V15.15.0	15.15.0	Published	21.10.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.213V15.15.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-38.213.V16.17.0	16.17.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38213-gh0.pdf
ATIS	ATIS.3GPP.38.213.V16.17.0	16.17.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.213.V16.17.0	16.17.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.213.V16.17.0.docx
ETSI	ETSI TS 138 213 V16.17.0 (2024-04)	16.17.0	Published	22.04.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138213/16.17.00_60/ts_138213v161700p.pdf
TSDSI	TSDSI STD T1.3GPP 38.213-16.17.0 V1.8.0	16.17.0	Published	22.07.2024	https://members.tdsi.in/s/ZSSoPxHE4XBKQ3s
TTA	TTAT.3G-38.213V16.17.0	16.17.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.213V16.17.0&searchCate=TTAS

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CCSA	CCSA.3GPP.38.213.V17.11.0	17.11.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.213.V17.11.0.docx
ETSI	ETSI TS 138 213 V17.11.0 (2024-10)	17.11.0	Published	02.10.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138213/17.11.00_60/ts_138213v171100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.213-17.11.0 V1.10.0	17.11.0	Published	02.03.2025	https://members.tdsi.in/s/nEMrMFtkbAwPraZ
TTA	TTAT.3G-38.213V17.11.0	17.11.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.213V17.11.0&searchCate=TTAS

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ATIS	ATIS.3GPP.38.213.V18.4.0	18.4.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.213.V18.4.0	18.4.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.213.V18.4.0.docx
ETSI	ETSI TS 138 213 V18.4.0 (2024-10)	18.4.0	Published	02.10.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138213/18.04.00_60/ts_138213v180400p.pdf
TSDSI	TSDSI STD T1.3GPP 38.213-18.4.0 V1.1.0	18.4.0	Published	02.03.2025	https://members.tdsi.in/s/MwLmBkMGZwWZpGp
TTA	TTAT.3G-38.213V18.4.0	18.4.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.213V18.4.0&searchCate=TTAS

1.2.1.2.12 TS 38.214**NR; Physical layer procedures for data**

This document specifies and establishes the characteristics of the physicals layer procedures of data channels for 5G-NR.

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ARIB	ARIB STD-T120-38.214.V15.16.0	15.16.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38214-fg0.pdf
ATIS	ATIS.3GPP.38.214.V15.16.0	15.16.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.214.V15.16.0	15.16.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.214.V15.16.0.docx
ETSI	ETSI TS 138 214 V15.16.0 (2022-04)	15.16.0	Published	26.04.2022	https://www.etsi.org/deliver/etsi_ts/138200_138299/138214/15.16.00_60/ts_138214v151600p.pdf
TSDSI	TSDSI STD T1.3GPP 38.214-15.16.0 V1.1.0	15.16.0	Published	29.07.2022	https://members.tdsi.in/s/KnpB9FgwannMJ3m
TTA	TTAT.3G-38.214V15.16.0	15.16.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.214V15.16.0&searchCate=TTAS

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ATIS	ATIS.3GPP.38.214.V16.17.0	16.17.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.214.V16.17.0	16.17.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.214.V16.17.0.docx
ETSI	ETSI TS 138 214 V16.17.0 (2024-08)	16.17.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138214/16.17.00_60/ts_138214v161700p.pdf
TSDSI	TSDSI STD T1.3GPP 38.214-16.17.0 V1.8.0	16.17.0	Published	19.11.2024	https://members.tdsi.in/s/HiDRm5QMN36ajoc
TTA	TTAT.3G-38.214V16.17.0	16.17.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.214V16.17.0&searchCate=TTAS

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ATIS	ATIS.3GPP.38.214.V17.11.0	17.11.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.214.V17.11.0	17.11.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.214.V17.11.0.docx
ETSI	ETSI TS 138 214 V17.11.0 (2024-10)	17.11.0	Published	02.10.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138214/17.11.00_60/ts_138214v171100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.214-17.11.0 V1.9.0	17.11.0	Published	02.03.2025	https://members.tdsi.in/s/gZ4X5Lrz9TmXyfw
TTA	TTAT.3G-38.214V17.11.0	17.11.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.214V17.11.0&searchCate=TTAS

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ATIS	ATIS.3GPP.38.214.V18.4.0	18.4.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.214.V18.4.0	18.4.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.214.V18.4.0.docx
ETSI	ETSI TS 138 214 V18.4.0 (2024-10)	18.4.0	Published	02.10.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138214/18.04.00_60/ts_138214v180400p.pdf
TSDSI	TSDSI STD T1.3GPP 38.214-18.4.0 V1.1.0	18.4.0	Published	02.03.2025	https://members.tdsi.in/s/zADzpmzBMZkwXAd
TTA	TTAT.3G-38.214V18.4.0	18.4.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.214V18.4.0&searchCate=TTAS

1.2.1.2.13 TS 38.215**NR; Physical layer measurements**

This document describes the physical layer measurements for NR.

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ARIB	ARIB STD-T120-38.215.V15.7.0	15.7.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38215-f70.pdf
ATIS	ATIS.3GPP.38.215.V15.7.0	15.7.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.215.V15.7.0	15.7.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.215.V15.7.0.docx
ETSI	ETSI TS 138 215 V15.7.0 (2020-07)	15.7.0	Published	20.07.2020	https://www.etsi.org/deliver/etsi_ts/138200_138299/138215/15.07.00_60/ts_138215v150700p.pdf
TSDSI	TSDSI STD T1.3GPP 38.215-15.7.0 V1.0.0	15.7.0	Published	06.10.2020	https://members.tdsi.in/s/AnM3WpZFZJbg7pb
TTA	TTAT.3G-38.215V15.7.0	15.7.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.215V15.7.0&searchCate=TTAS

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ARIB	ARIB STD-T120-38.215.V16.7.0	16.7.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38215-g70.pdf
ATIS	ATIS.3GPP.38.215.V16.7.0	16.7.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.215.V16.7.0	16.7.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.215.V16.7.0.docx
ETSI	ETSI TS 138 215 V16.7.0 (2024-02)	16.7.0	Published	01.02.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138215/16.07.00_60/ts_138215v160700p.pdf
TSDSI	TSDSI STD T1.3GPP 38.215-16.7.0 V1.3.0	16.7.0	Published	29.05.2024	https://members.tdsi.in/s/ZH6S3g6ModaxYjY
TTA	TTAT.3G-38.215V16.7.0	16.7.0	Published	08.05.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.215V16.7.0&searchCate=TTAS

Release 17

ARIB	ARIB STD-T120-38.215.V17.5.0	17.5.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38215-h50.pdf
ATIS	ATIS.3GPP.38.215.V17.5.0	17.5.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.215.V17.5.0	17.5.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.215.V17.5.0.docx
ETSI	ETSI TS 138 215 V17.5.0 (2024-08)	17.5.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138215/17.05.00_60/ts_138215v170500p.pdf
TSDSI	TSDSI STD T1.3GPP 38.215-17.5.0 V1.4.0	17.5.0	Published	19.11.2024	https://members.tdsi.in/s/9YEB6gPeKdztmCj
TTA	TTAT.3G-38.215V17.5.0	17.5.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.215V17.5.0&searchCate=TTAS

Release 18

ARIB	ARIB STD-T120-38.215.V18.3.0	18.3.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38215-i30.pdf
ATIS	ATIS.3GPP.38.215.V18.3.0	18.3.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.215.V18.3.0	18.3.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.215.V18.3.0.docx
ETSI	ETSI TS 138 215 V18.3.0 (2024-08)	18.3.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138215/18.03.00_60/ts_138215v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.215-18.3.0 V1.0.0	18.3.0	Published	19.11.2024	https://members.tdsi.in/s/rSF7CSJKCBY3Y2b
TTA	TTAT.3G-38.215V18.3.0	18.3.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.215V18.3.0&searchCate=TTAS

1.2.1.3 Radio Layers 2 & 3**1.2.1.3.1 TS 36.300****Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2**

This document provides an overview and overall description of the E-UTRAN radio interface protocol architecture. Details of the radio interface protocols are specified in companion specifications of the 36 series.

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ARIB	ARIB STD-T120-36.300.V15.14.0	15.14.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/36/A36300-fe0.pdf
ATIS	ATIS.3GPP.36.300.V15.14.0	15.14.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.300.V15.14.0	15.14.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.300.V15.14.0.docx
ETSI	ETSI TS 136 300 V15.14.0 (2023-01)	15.14.0	Published	19.01.2023	https://www.etsi.org/deliver/etsi_ts/136300_136399/136300/15.14.00_60/ts_136300v151400p.pdf
TSDSI	TSDSI STD T1.3GPP 36.300-15.14.0 V1.2.0	15.14.0	Published	02.05.2023	https://members.tdsi.in/s/CjfnNjcAx7bg4i5
TTA	TTAT.3G-36.300V15.14.0	15.14.0	Published	16.03.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.300V15.14.0&searchCate=TTAS

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ARIB	ARIB STD-T120-36.300.V16.9.0	16.9.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/36/A36300-g90.pdf
ATIS	ATIS.3GPP.36.300.V16.9.0	16.9.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.300.V16.9.0	16.9.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.300.V16.9.0.docx
ETSI	ETSI TS 136 300 V16.9.0 (2023-01)	16.9.0	Published	19.01.2023	https://www.etsi.org/deliver/etsi_ts/136300_136399/136300/16.09.00_60/ts_136300v160900p.pdf
TSDSI	TSDSI STD T1.3GPP 36.300-16.9.0 V1.2.0	16.9.0	Published	02.05.2023	https://members.tdsi.in/s/HNfDj2GeNL3BjeN
TTA	TTAT.3G-36.300V16.9.0	16.9.0	Published	16.03.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.300V16.9.0&searchCate=TTAS

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ARIB	ARIB STD-T120-36.300.V17.9.0	17.9.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/36/A36300-h90.pdf
ATIS	ATIS.3GPP.36.300.V17.9.0	17.9.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.300.V17.9.0	17.9.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.300.V17.9.0.docx
ETSI	ETSI TS 136 300 V17.9.0 (2024-10)	17.9.0	Published	14.10.2024	https://www.etsi.org/deliver/etsi_ts/136300_136399/136300/17.09.00_60/ts_136300v170900p.pdf
TSDSI	TSDSI STD T1.3GPP 36.300-17.9.0 V1.9.0	17.9.0	Published	02.03.2025	https://members.tdsi.in/s/tmN4Co2LgsT8zXo
TTA	TTAT.3G-36.300V17.9.0	17.9.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.300V17.9.0&searchCate=TTAS

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ARIB	ARIB STD-T120-36.300.V18.3.0	18.3.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/36/A36300-i30.pdf
ATIS	ATIS.3GPP.36.300.V18.3.0	18.3.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.300.V18.3.0	18.3.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.300.V18.3.0.docx
ETSI	ETSI TS 136 300 V18.3.0 (2024-10)	18.3.0	Published	14.10.2024	https://www.etsi.org/deliver/etsi_ts/136300_136399/136300/18.03.00_60/ts_136300v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 36.300-18.3.0 V1.1.0	18.3.0	Published	02.03.2025	https://members.tdsi.in/s/eiCpWgbNPpKHCCe
TTA	TTAT.3G-36.300V18.3.0	18.3.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.300V18.3.0&searchCate=TTAS

1.2.1.3.2 TS 36.302**Evolved Universal Terrestrial Radio Access (E-UTRA); Services provided by the physical layer**

This document is a technical specification of the services provided by the physical layer of E-UTRA to upper layers.

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Release 15					
ARIB	ARIB STD-T120-36.302.V15.3.0	15.3.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/36/A36302-f30.pdf
ATIS	ATIS.3GPP.36.302V1530	15.3.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.302V1530	15.3.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.302V1530.docx
ETSI	ETSI TS 136 302 V15.3.0 (2020-07)	15.3.0	Published	31.07.2020	https://www.etsi.org/deliver/etsi_ts/136300_136399/136302/15.03.00_60/ts_136302v150300p.pdf
TSDSI	TSDSI STD T1.3GPP 36.302-15.3.0 V1.0.0	15.3.0	Published	30.08.2021	https://members.tdsi.in/s/4Pxo9pXYjjT35xk
TTA	TTAT.3G-36.302V15.3.0	15.3.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.302V15.3.0&searchCate=TTAS

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ARIB	ARIB STD-T120-36.302.V16.1.0	16.1.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/36/A36302-g10.pdf
ATIS	ATIS.3GPP.36.302V1610	16.1.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.302V1610	16.1.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.302V1610.docx
ETSI	ETSI TS 136 302 V16.1.0 (2020-07)	16.1.0	Published	30.07.2020	https://www.etsi.org/deliver/etsi_ts/136300_136399/136302/16.01.00_60/ts_136302v160100p.pdf
TSDSI	TSDSI STD T1.3GPP 36.302-16.1.0 V1.0.0	16.1.0	Published	30.08.2021	https://members.tdsi.in/s/WQsLX9Yt2eTbRk7
TTA	TTAT.3G-36.302V16.1.0	16.1.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.302V16.1.0&searchCate=TTAS

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ATIS	ATIS.3GPP.36.302.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.302.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.302.V17.0.0.docx
ETSI	ETSI TS 136 302 V17.0.0 (2022-05)	17.0.0	Published	06.05.2022	https://www.etsi.org/deliver/etsi_ts/136300_136399/136302/17.00.00_60/ts_136302v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.302-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/Z2wLkXa95gADRsC
TTA	TTAT.3G-36.302V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.302V17.0.0&searchCate=TTAS

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ATIS	ATIS.3GPP.36.302.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.302.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.302.V18.0.0.docx
ETSI	ETSI TS 136 302 V18.0.0 (2024-05)	18.0.0	Published	15.05.2024	https://www.etsi.org/deliver/etsi_ts/136300_136399/136302/18.00.00_60/ts_136302v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.302-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/L98HDYzDSi8MxRt
TTA	TTAT.3G-36.302V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.302V18.0.0&searchCate=TTAS

1.2.1.3.3 TS 36.304**Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) procedures in idle mode**

This document specifies the Access Stratum (AS) part of the Idle Mode procedures applicable to a UE. This document specifies the model for the functional division between the NAS and AS in a UE. This document applies to all UEs that support at least E-UTRA, including multi-RAT UEs as described in 3GPP specifications, in the following cases: (i) When the UE is camped on an E-UTRA cell; (ii) When the UE is searching for a cell to camp on.

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Release 15					
ARIB	ARIB STD-T120-36.304.V15.8.0	15.8.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/36/A36304-f80.pdf
ATIS	ATIS.3GPP.36.304.V15.8.0	15.8.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.304.V15.8.0	15.8.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.304.V15.8.0.docx
ETSI	ETSI TS 136 304 V15.8.0 (2022-05)	15.8.0	Published	06.05.2022	https://www.etsi.org/deliver/etsi_ts/136300_136399/136304/15.08.00_60/ts_136304v150800p.pdf
TSDSI	TSDSI STD T1.3GPP 36.304-15.8.0 V1.1.0	15.8.0	Published	29.07.2022	https://members.tdsi.in/s/S8ZEjSHxZcwLjya
TTA	TTAT.3G-36.304V15.8.0	15.8.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.304V15.8.0&searchCate=TTAS

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ARIB	ARIB STD-T120-36.304.V16.9.0	16.9.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/36/A36304-g90.pdf
ATIS	ATIS.3GPP.36.304.V16.9.0	16.9.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.304.V16.9.0	16.9.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.304.V16.9.0.docx
ETSI	ETSI TS 136 304 V16.9.0 (2024-01)	16.9.0	Published	31.01.2024	https://www.etsi.org/deliver/etsi_ts/136300_136399/136304/16.09.00_60/ts_136304v160900p.pdf
TSDSI	TSDSI STD T1.3GPP 36.304-16.9.0 V1.3.0	16.9.0	Published	29.05.2024	https://members.tdsi.in/s/DG6qeK4y6tG8g4e
TTA	TTAT.3G-36.304V16.9.0	16.9.0	Published	08.05.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.304V16.9.0&searchCate=TTAS

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ATIS	ATIS.3GPP.36.304.V17.5.0	17.5.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.304.V17.5.0	17.5.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.304.V17.5.0.docx
ETSI	ETSI TS 136 304 V17.5.0 (2024-01)	17.5.0	Published	31.01.2024	https://www.etsi.org/deliver/etsi_ts/136300_136399/136304/17.05.00_60/ts_136304v170500p.pdf
TSDSI	TSDSI STD T1.3GPP 36.304-17.5.0 V1.5.0	17.5.0	Published	29.05.2024	https://members.tdsi.in/s/efd3yCJjHjkreY2
TTA	TTAT.3G-36.304V17.5.0	17.5.0	Published	08.05.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.304V17.5.0&searchCate=TTAS

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ARIB	ARIB STD-T120-36.304.V18.2.0	18.2.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/36/A36304-i20.pdf
ATIS	ATIS.3GPP.36.304.V18.2.0	18.2.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.304.V18.2.0	18.2.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.304.V18.2.0.docx
ETSI	ETSI TS 136 304 V18.2.0 (2024-08)	18.2.0	Published	08.08.2024	https://www.etsi.org/deliver/etsi_ts/136300_136399/136304/18.02.00_60/ts_136304v180200p.pdf
TSDSI	TSDSI STD T1.3GPP 36.304-18.2.0 V1.0.0	18.2.0	Published	19.11.2024	https://members.tdsi.in/s/DTEaqOstk3j5sX
TTA	TTAT.3G-36.304V18.2.0	18.2.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.304V18.2.0&searchCate=TTAS

1.2.1.3.4 TS 36.305**Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Stage 2 functional specification of User Equipment (UE) positioning in E-UTRAN**

This document specifies the stage 2 of the UE positioning function of E-UTRAN, which provides the mechanisms to support or assist the calculation of the geographical position of a UE. The purpose of this stage 2 specification is to define the E-UTRAN UE Positioning architecture, functional entities and operations to support positioning methods. This description is confined to the E-UTRAN Access Stratum. This stage 2 specification covers the E-UTRAN positioning methods, state descriptions, and message flows to support UE positioning.

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Release 15					
ARIB	ARIB STD-T120-36.305.V15.6.0	15.6.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/36/A36305-f60.pdf
ATIS	ATIS.3GPP.36.305.V15.6.0	15.6.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.305.V15.6.0	15.6.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.305.V15.6.0.docx
ETSI	ETSI TS 136 305 V15.6.0 (2023-07)	15.6.0	Published	24.07.2023	https://www.etsi.org/deliver/etsi_ts/136300_136399/136305/15.06.00_60/ts_136305v150600p.pdf
TSDSI	TSDSI STD T1.3GPP 36.305-15.6.0 V1.1.0	15.6.0	Published	11.02.2023	https://members.tdsi.in/s/Txo4NAJefPoxPD4
TTA	TTAT.3G-36.305V15.6.0	15.6.0	Published	27.10.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.305V15.6.0&searchCate=TTAS

Release 16

ARIB	ARIB STD-T120-36.305.V16.5.0	16.5.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/36/A36305-g50.pdf
ATIS	ATIS.3GPP.36.305.V16.5.0	16.5.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.305.V16.5.0	16.5.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.305.V16.5.0.docx
ETSI	ETSI TS 136 305 V16.5.0 (2023-07)	16.5.0	Published	24.07.2023	https://www.etsi.org/deliver/etsi_ts/136300_136399/136305/16.05.00_60/ts_136305v160500p.pdf
TSDSI	TSDSI STD T1.3GPP 36.305-16.5.0 V1.2.0	16.5.0	Published	11.02.2023	https://members.tdsi.in/s/tcKTkdE9QGa2AkS
TTA	TTAT.3G-36.305V16.5.0	16.5.0	Published	27.10.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.305V16.5.0&searchCate=TTAS

Release 17

ARIB	ARIB STD-T120-36.305.V17.3.0	17.3.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/36/A36305-h30.pdf
ATIS	ATIS.3GPP.36.305.V17.3.0	17.3.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.305.V17.3.0	17.3.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.305.V17.3.0.docx
ETSI	ETSI TS 136 305 V17.3.0 (2023-07)	17.3.0	Published	24.07.2023	https://www.etsi.org/deliver/etsi_ts/136300_136399/136305/17.03.00_60/ts_136305v170300p.pdf
TSDSI	TSDSI STD T1.3GPP 36.305-17.3.0 V1.3.0	17.3.0	Published	11.02.2023	https://members.tdsi.in/s/z9PsLaT88dwKMoG
TTA	TTAT.3G-36.305V17.3.0	17.3.0	Published	27.10.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.305V17.3.0&searchCate=TTAS

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ARIB	ARIB STD-T120-36.305.V18.0.0	18.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/36/A36305-i00.pdf
ATIS	ATIS.3GPP.36.305.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.305.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.305.V18.0.0.docx
ETSI	ETSI TS 136 305 V18.0.0 (2024-05)	18.0.0	Published	23.05.2024	https://www.etsi.org/deliver/etsi_ts/136300_136399/136305/18.00.00_60/ts_136305v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.305-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/r8g6idDpWi9nD8a
TTA	TTAT.3G-36.305V18.0.0	18.0.0	Published	08.05.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.305V18.0.0&searchCate=TTAS

1.2.1.3.5 TS 36.306**Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio access capabilities**

This document defines the E-UTRA UE Radio Access Capability Parameters.

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ARIB	ARIB STD-T120-36.306.V15.12.0	15.12.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/36/A36306-fc0.pdf
ATIS	ATIS.3GPP.36.306.V15.12.0	15.12.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.306.V15.12.0	15.12.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.306.V15.12.0.docx
ETSI	ETSI TS 136 306 V15.12.0 (2024-08)	15.12.0	Published	02.08.2024	https://www.etsi.org/deliver/etsi_ts/136300_136399/136306/15.12.00_60/ts_136306v151200p.pdf
TSDSI	TSDSI STD T1.3GPP 36.306-15.12.0 V1.2.0	15.12.0	Published	19.11.2024	https://members.tdsi.in/s/3np5GbLRS7D4SJY
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ATIS	ATIS.3GPP.36.306.V16.13.0	16.13.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.306.V16.13.0	16.13.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.306.V16.13.0.docx
ETSI	ETSI TS 136 306 V16.13.0 (2024-08)	16.13.0	Published	02.08.2024	https://www.etsi.org/deliver/etsi_ts/136300_136399/136306/16.13.00_60/ts_136306v161300p.pdf
TSDSI	TSDSI STD T1.3GPP 36.306-16.13.0 V1.5.0	16.13.0	Published	19.11.2024	https://members.tdsi.in/s/9F8CfpH3RMCcpcf
TTA	TTAT.3G-36.306V16.13.0	16.13.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.306V16.13.0&searchCate=TTAS

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ARIB	ARIB STD-T120-36.306.V17.7.0	17.7.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/36/A36306-h70.pdf
ATIS	ATIS.3GPP.36.306.V17.7.0	17.7.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.306.V17.7.0	17.7.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.306.V17.7.0.docx
ETSI	ETSI TS 136 306 V17.7.0 (2024-08)	17.7.0	Published	02.08.2024	https://www.etsi.org/deliver/etsi_ts/136300_136399/136306/17.07.00_60/ts_136306v170700p.pdf
TSDSI	TSDSI STD T1.3GPP 36.306-17.7.0 V1.7.0	17.7.0	Published	19.11.2024	https://members.tdsi.in/s/mx5y5XALCDRXCKt
TTA	TTAT.3G-36.306V17.7.0	17.7.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.306V17.7.0&searchCate=TTAS

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ARIB	ARIB STD-T120-36.306.V18.3.0	18.3.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/36/A36306-i30.pdf
ATIS	ATIS.3GPP.36.306.V18.3.0	18.3.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.306.V18.3.0	18.3.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.306.V18.3.0.docx
ETSI	ETSI TS 136 306 V18.3.0 (2024-10)	18.3.0	Published	14.10.2024	https://www.etsi.org/deliver/etsi_ts/136300_136399/136306/18.03.00_60/ts_136306v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 36.306-18.3.0 V1.1.0	18.3.0	Published	02.03.2025	https://members.tdsi.in/s/mctbmk57TCxM7s
TTA	TTAT.3G-36.306V18.3.0	18.3.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.306V18.3.0&searchCate=TTAS

1.2.1.3.6 TS 36.307**Evolved Universal Terrestrial Radio Access (E-UTRA); Requirements on User Equipments (UEs) supporting a release-independent frequency band**

This document specifies requirements on UEs supporting a frequency band that is independent of release. TSG-RAN has agreed that the standardization of new frequency bands may be independent of a release. However, in order to implement a UE that conforms to a particular release but supports a band of operation that is specified in a later release, it is necessary to specify some extra requirements. All frequency bands are fully specified in this release of the specifications. This document does not contain any requirements for UEs supporting frequency bands independent of release.

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Release 15					
ARIB	ARIB STD-T120-36.307.V15.10.0	15.10.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/36/A36307-fa0.pdf
ATIS	ATIS.3GPP.36.307.V15.10.0	15.10.0	Published	22.05.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.307.V15.10.0	15.10.0	Published	22.05.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.307.V15.10.0.docx
ETSI	ETSI TS 136 307 V15.10.0 (2023-04)	15.10.0	Published	26.04.2023	https://www.etsi.org/deliver/etsi_ts/136300_136399/136307/15.10.00_60/ts_136307v151000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.307-15.10.0 V1.2.0	15.10.0	Published	14.08.2023	https://members.tdsi.in/s/RML9cgd6iYe6Di5
TTA	TTAT.3G-36.307V15.10.0	15.10.0	Published	01.08.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.307V15.10.0&searchCate=TTAS

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ATIS	ATIS.3GPP.36.307.V16.6.0	16.6.0	Published	22.05.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.307.V16.6.0	16.6.0	Published	22.05.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.307.V16.6.0.docx
ETSI	ETSI TS 136 307 V16.6.0 (2023-04)	16.6.0	Published	26.04.2023	https://www.etsi.org/deliver/etsi_ts/136300_136399/136307/16.06.00_60/ts_136307v160600p.pdf
TSDSI	TSDSI STD T1.3GPP 36.307-16.6.0 V1.2.0	16.6.0	Published	14.08.2023	https://members.tdsi.in/s/xD97QQTY6FGfigf
TTA	TTAT.3G-36.307V16.6.0	16.6.0	Published	01.08.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.307V16.6.0&searchCate=TTAS

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ATIS	ATIS.3GPP.36.307.V17.7.0	17.7.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.307.V17.7.0	17.7.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.307.V17.7.0.docx
ETSI	ETSI TS 136 307 V17.7.0 (2024-05)	17.7.0	Published	14.05.2024	https://www.etsi.org/deliver/etsi_ts/136300_136399/136307/17.07.00_60/ts_136307v170700p.pdf
TSDSI	TSDSI STD T1.3GPP 36.307-17.7.0 V1.7.0	17.7.0	Published	22.07.2024	https://members.tdsi.in/s/HaKkWqwwEX2N9ms
TTA	TTAT.3G-36.307V17.7.0	17.7.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.307V17.7.0&searchCate=TTAS

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ATIS	ATIS.3GPP.36.307.V18.5.0	18.5.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.307.V18.5.0	18.5.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.307.V18.5.0.docx
ETSI	ETSI TS 136 307 V18.5.0 (2024-08)	18.5.0	Published	02.08.2024	https://www.etsi.org/deliver/etsi_ts/136300_136399/136307/18.05.00_60/ts_136307v180500p.pdf
TSDSI	TSDSI STD T1.3GPP 36.307-18.5.0 V1.0.0	18.5.0	Published	19.11.2024	https://members.tdsi.in/s/BFdDgKPwDFEdGdG
TTA	TTAT.3G-36.307V18.5.0	18.5.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.307V18.5.0&searchCate=TTAS

1.2.1.3.7 TS 36.314**Evolved Universal Terrestrial Radio Access (E-UTRA); Layer 2 – Measurements**

This document contains the description and definition of the measurements performed by E-UTRAN that are transferred over the standardized interfaces in order to support E-UTRA radio link operations, radio resource management (RRM), network operations and maintenance (OAM), and self-organizing networks (SON).

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ARIB	ARIB STD-T120-36.314.V15.2.0	15.2.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/36/A36314-f20.pdf
ATIS	ATIS.3GPP.36.314V1520	15.2.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.314V1520	15.2.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.314V1520.docx
ETSI	ETSI TS 136 314 V15.2.0 (2019-04)	15.2.0	Published	17.04.2019	https://www.etsi.org/deliver/etsi_ts/136300_136399/136314/15.02.00_60/ts_136314v150200p.pdf
TSDSI	TSDSI STD T1.3GPP 36.314-15.2.0 V1.0.0	15.2.0	Published	30.08.2021	https://members.tdsi.in/s/XSbPf74eG82nk9F
TTA	TTAT.3G-36.314V15.2.0	15.2.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.314V15.2.0&searchCate=TTAS

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ARIB	ARIB STD-T120-36.314.V16.0.0	16.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/36/A36314-g00.pdf
ATIS	ATIS.3GPP.36.314V1600	16.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.314V1600	16.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.314V1600.doc
ETSI	ETSI TS 136 314 V16.0.0 (2020-07)	16.0.0	Published	31.07.2020	https://www.etsi.org/deliver/etsi_ts/136300_136399/136314/16.00.00_60/ts_136314v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.314-16.0.0 V1.0.0	16.0.0	Published	30.08.2021	https://members.tdsi.in/s/QSLYKAb3n79HGLT
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CCSA	CCSA.3GPP.36.314.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.314.V17.0.0.doc
ETSI	ETSI TS 136 314 V17.0.0 (2022-05)	17.0.0	Published	06.05.2022	https://www.etsi.org/deliver/etsi_ts/136300_136399/136314/17.00.00_60/ts_136314v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.314-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/RomT9EAnpLCPjik
TTA	TTAT.3G-36.314V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.314V17.0.0&searchCate=TTAS

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ARIB	ARIB STD-T120-36.314.V18.0.0	18.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/36/A36314-i00.pdf
ATIS	ATIS.3GPP.36.314.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.314.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.314.V18.0.0.doc
ETSI	ETSI TS 136 314 V18.0.0 (2024-05)	18.0.0	Published	15.05.2024	https://www.etsi.org/deliver/etsi_ts/136300_136399/136314/18.00.00_60/ts_136314v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.314-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/AD8Rb2drawNLnNM
TTA	TTAT.3G-36.314V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.314V18.0.0&searchCate=TTAS

1.2.1.3.8 TS 36.321**Evolved Universal Terrestrial Radio Access (E-UTRA); Medium Access Control (MAC) protocol specification**

This document specifies the E-UTRA Medium Access Control (MAC) protocol.

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Release 15

ARIB	ARIB STD-T120-36.321.V15.11.0	15.11.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/36/A36321-fb0.pdf
ATIS	ATIS.3GPP.36.321.V15.11.0	15.11.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.321.V15.11.0	15.11.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.321.V15.11.0.docx
ETSI	ETSI TS 136 321 V15.11.0 (2021-01)	15.11.0	Published	20.01.2021	https://www.etsi.org/deliver/etsi_ts/136300_136399/136321/15.11.00_60/ts_136321v151100p.pdf
TSDSI	TSDSI STD T1.3GPP 36.321-15.11.0 V1.1.0	15.11.0	Published	29.07.2022	https://members.tdsi.in/s/aRno3GMk2xMdRA2
TTA	TTAT.3G-36.321V15.11.0	15.11.0	Published	16.03.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.321V15.11.0&searchCate=TTAS

Release 16

ARIB	ARIB STD-T120-36.321.V16.9.0	16.9.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/36/A36321-g90.pdf
ATIS	ATIS.3GPP.36.321.V16.9.0	16.9.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.321.V16.9.0	16.9.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.321.V16.9.0.docx
ETSI	ETSI TS 136 321 V16.9.0 (2024-01)	16.9.0	Published	31.01.2024	https://www.etsi.org/deliver/etsi_ts/136300_136399/136321/16.09.00_60/ts_136321v160900p.pdf
TSDSI	TSDSI STD T1.3GPP 36.321-16.9.0 V1.2.0	16.9.0	Published	29.05.2024	https://members.tdsi.in/s/kmKGA2BD2gflHYb
TTA	TTAT.3G-36.321V16.9.0	16.9.0	Published	08.05.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.321V16.9.0&searchCate=TTAS

Release 17

ARIB	ARIB STD-T120-36.321.V17.7.0	17.7.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/36/A36321-h70.pdf
ATIS	ATIS.3GPP.36.321.V17.7.0	17.7.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.321.V17.7.0	17.7.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.321.V17.7.0.docx
ETSI	ETSI TS 136 321 V17.7.0 (2024-01)	17.7.0	Published	31.01.2024	https://www.etsi.org/deliver/etsi_ts/136300_136399/136321/17.07.00_60/ts_136321v170700p.pdf
TSDSI	TSDSI STD T1.3GPP 36.321-17.7.0 V1.7.0	17.7.0	Published	29.05.2024	https://members.tdsi.in/s/AfnKGnrFxxsFPRi
TTA	TTAT.3G-36.321V17.7.0	17.7.0	Published	08.05.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.321V17.7.0&searchCate=TTAS

Release 18

ARIB	ARIB STD-T120-36.321.V18.3.0	18.3.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/36/A36321-i30.pdf
ATIS	ATIS.3GPP.36.321.V18.3.0	18.3.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.321.V18.3.0	18.3.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.321.V18.3.0.docx
ETSI	ETSI TS 136 321 V18.3.0 (2024-10)	18.3.0	Published	14.10.2024	https://www.etsi.org/deliver/etsi_ts/136300_136399/136321/18.03.00_60/ts_136321v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 36.321-18.3.0 V1.1.0	18.3.0	Published	02.03.2025	https://members.tdsi.in/s/ERdHxiCJ9CWibkC
TTA	TTAT.3G-36.321V18.3.0	18.3.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.321V18.3.0&searchCate=TTAS

1.2.1.3.9 TS 36.322**Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Link Control (RLC) protocol specification**

This document specifies the E-UTRA Radio Link Control (RLC) protocol.

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Release 15

ARIB	ARIB STD-T120-36.322.V15.4.0	15.4.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/36/A36322-f40.pdf
ATIS	ATIS.3GPP.36.322V1540	15.4.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.322V1540	15.4.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.322V1540.docx
ETSI	ETSI TS 136 322 V15.4.0 (2020-07)	15.4.0	Published	31.07.2020	https://www.etsi.org/deliver/etsi_ts/136300_136399/136322/15.04.00_60/ts_136322v150400p.pdf
TSDSI	TSDSI STD T1.3GPP 36.322-15.4.0 V1.0.0	15.4.0	Published	30.08.2021	https://members.tdsi.in/s/mG3Xqrx2iqpyXD2
TTA	TTAT.3G-36.322V15.4.0	15.4.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.322V15.4.0&searchCate=TTAS

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ARIB	ARIB STD-T120-36.322.V16.0.0	16.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/36/A36322-g00.pdf
ATIS	ATIS.3GPP.36.322V1600	16.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.322V1600	16.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.322V1600.docx
ETSI	ETSI TS 136 322 V16.0.0 (2020-07)	16.0.0	Published	31.07.2020	https://www.etsi.org/deliver/etsi_ts/136300_136399/136322/16.00.00_60/ts_136322v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.322-16.0.0 V1.0.0	16.0.0	Published	30.08.2021	https://members.tdsi.in/s/g3KfGmQJFwx627
TTA	TTAT.3G-36.322V16.0.0	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.322V16.0.0&searchCate=TTAS

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ARIB	ARIB STD-T120-36.322.V17.0.0	17.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/36/A36322-h00.pdf
ATIS	ATIS.3GPP.36.322.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.322.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.322.V17.0.0.docx
ETSI	ETSI TS 136 322 V17.0.0 (2022-05)	17.0.0	Published	06.05.2022	https://www.etsi.org/deliver/etsi_ts/136300_136399/136322/17.00.00_60/ts_136322v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.322-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/zWPExbBAa5iYXA4
TTA	TTAT.3G-36.322V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.322V17.0.0&searchCate=TTAS

Release 18

ARIB	ARIB STD-T120-36.322.V18.0.0	18.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/36/A36322-i00.pdf
ATIS	ATIS.3GPP.36.322.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.322.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.322.V18.0.0.docx
ETSI	ETSI TS 136 322 V18.0.0 (2024-05)	18.0.0	Published	15.05.2024	https://www.etsi.org/deliver/etsi_ts/136300_136399/136322/18.00.00_60/ts_136322v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.322-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/WEjNxqmpX9qMHx4
TTA	TTAT.3G-36.322V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.322V18.0.0&searchCate=TTAS

1.2.1.3.10 TS 36.323**Evolved Universal Terrestrial Radio Access (E-UTRA); Packet Data Convergence Protocol (PDCP) specification**

This document specifies the E-UTRA Packet Data Convergence Protocol (PDCP).

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Release 15

ARIB	ARIB STD-T120-36.323.V15.7.0	15.7.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/36/A36323-f70.pdf
ATIS	ATIS.3GPP.36.323.V15.7.0	15.7.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.323.V15.7.0	15.7.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.323.V15.7.0.docx
ETSI	ETSI TS 136 323 V15.7.0 (2022-01)	15.7.0	Published	20.01.2022	https://www.etsi.org/deliver/etsi_ts/136300_136399/136323/15.07.00_60/ts_136323v150700p.pdf
TSDSI	TSDSI STD T1.3GPP 36.323-15.7.0 V1.1.0	15.7.0	Published	29.07.2022	https://members.tdsi.in/s/9a7MmrwzArnApdS
TTA	TTAT.3G-36.323V15.7.0	15.7.0	Published	14.03.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.323V15.7.0&searchCate=TTAS

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ARIB	ARIB STD-T120-36.323.V16.7.0	16.7.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/36/A36323-g70.pdf
ATIS	ATIS.3GPP.36.323.V16.7.0	16.7.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.323.V16.7.0	16.7.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.323.V16.7.0.docx
ETSI	ETSI TS 136 323 V16.7.0 (2023-01)	16.7.0	Published	19.01.2023	https://www.etsi.org/deliver/etsi_ts/136300_136399/136323/16.07.00_60/ts_136323v160700p.pdf
TSDSI	TSDSI STD T1.3GPP 36.323-16.7.0 V1.2.0	16.7.0	Published	29.07.2022	https://members.tdsi.in/s/jRWnwn6EZdoS4Yy
TTA	TTAT.3G-36.323V16.7.0	16.7.0	Published	16.03.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.323V16.7.0&searchCate=TTAS

Release 17

ARIB	ARIB STD-T120-36.323.V17.2.0	17.2.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/36/A36323-h20.pdf
ATIS	ATIS.3GPP.36.323.V17.2.0	17.2.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.323.V17.2.0	17.2.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.323.V17.2.0.docx
ETSI	ETSI TS 136 323 V17.2.0 (2023-01)	17.2.0	Published	19.01.2023	https://www.etsi.org/deliver/etsi_ts/136300_136399/136323/17.02.00_60/ts_136323v170200p.pdf
TSDSI	TSDSI STD T1.3GPP 36.323-17.2.0 V1.2.0	17.2.0	Published	02.05.2023	https://members.tdsi.in/s/Nc9cW4xA7t94wLE
TTA	TTAT.3G-36.323V17.2.0	17.2.0	Published	16.03.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.323V17.2.0&searchCate=TTAS

Release 18

ARIB	ARIB STD-T120-36.323.V18.0.0	18.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/36/A36323-i00.pdf
ATIS	ATIS.3GPP.36.323.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.323.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.323.V18.0.0.docx
ETSI	ETSI TS 136 323 V18.0.0 (2024-05)	18.0.0	Published	15.05.2024	https://www.etsi.org/deliver/etsi_ts/136300_136399/136323/18.00.00_60/ts_136323v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.323-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/Wc57E8baTJyNNc6
TTA	TTAT.3G-36.323V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.323V18.0.0&searchCate=TTAS

1.2.1.3.11 TS 36.331**Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification**

This document specifies the Radio Resource Control protocol for the radio interface between UE and E-UTRAN as well as for the radio interface between RN and E-UTRAN. The scope of this document also includes: (i) the radio related information transported in a transparent container between source eNodeB and target eNodeB upon inter eNodeB handover; (ii) the radio related information transported in a transparent container between a source or target eNodeB and another system upon inter RAT handover.

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Release 15					
ARIB	ARIB STD-T120-36.331.V15.23.0	15.23.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/36/A36331-fn0.pdf
ATIS	ATIS.3GPP.36.331.V15.23.0	15.23.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.331.V15.23.0	15.23.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.331.V15.23.0.docx
ETSI	ETSI TS 136 331 V15.23.0 (2024-10)	15.23.0	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/136300_136399/136331/15.23.00_60/ts_136331v152300p.pdf
TSDSI	TSDSI STD T1.3GPP 36.331-15.23.0 V1.6.0	15.23.0	Published	02.03.2025	https://members.tdsi.in/s/oToRwdAMZ4Q8JdF
TTA	TTAT.3G-36.331V15.23.0	15.23.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.331V15.23.0&searchCate=TTAS

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ARIB	ARIB STD-T120-36.331.V16.17.0	16.17.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/36/A36331-gh0.pdf
ATIS	ATIS.3GPP.36.331.V16.17.0	16.17.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.331.V16.17.0	16.17.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.331.V16.17.0.docx
ETSI	ETSI TS 136 331 V16.17.0 (2024-11)	16.17.0	Published	20.11.2024	https://www.etsi.org/deliver/etsi_ts/136300_136399/136331/16.17.00_60/ts_136331v161700p.pdf
TSDSI	TSDSI STD T1.3GPP 36.331-16.17.0 V1.9.0	16.17.0	Published	02.03.2025	https://members.tdsi.in/s/2rPpQd9YEj4ByZz
TTA	TTAT.3G-36.331V16.17.0	16.17.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.331V16.17.0&searchCate=TTAS

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ARIB	ARIB STD-T120-36.331.V17.10.0	17.10.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/36/A36331-ha0.pdf
ATIS	ATIS.3GPP.36.331.V17.10.0	17.10.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.331.V17.10.0	17.10.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.331.V17.10.0.docx
ETSI	ETSI TS 136 331 V17.10.0 (2024-10)	17.10.0	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/136300_136399/136331/17.10.00_60/ts_136331v171000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.331-17.10.0 V1.10.0	17.10.0	Published	02.03.2025	https://members.tdsi.in/s/L4LHZzws59AcBL8
TTA	TTAT.3G-36.331V17.10.0	17.10.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.331V17.10.0&searchCate=TTAS

Release 18

ARIB	ARIB STD-T120-36.331.V18.3.1	18.3.1	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/36/A36331-i31.pdf
ATIS	ATIS.3GPP.36.331.V18.3.1	18.3.1	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.331.V18.3.1	18.3.1	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.331.V18.3.1.docx
ETSI	ETSI TS 136 331 V18.3.1 (2024-10)	18.3.1	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/136300_136399/136331/18.03.01_60/ts_136331v180301p.pdf
TSDSI	TSDSI STD T1.3GPP 36.331-18.3.1 V1.1.0	18.3.1	Published	02.03.2025	https://members.tdsi.in/s/QiZ339bA9gWxADP
TTA	TTAT.3G-36.331V18.3.1	18.3.1	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.331V18.3.1&searchCate=TTAS

1.2.1.3.12 TS 36.355**Evolved Universal Terrestrial Radio Access (E-UTRA); LTE Positioning Protocol (LPP)**

This document contains the definition of the LTE Positioning Protocol (LPP).

SDO	Document No.	Version	Status	Issued date	Location

Release 15

ARIB	ARIB STD-T120-36.355.V15.6.0	15.6.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/36/A36355-f60.pdf
ATIS	ATIS.3GPP.36.355.V15.6.0	15.6.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.355.V15.6.0	15.6.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.355.V15.6.0.docx
ETSI	ETSI TS 136 355 V15.6.0 (2020-01)	15.6.0	Published	17.01.2020	https://www.etsi.org/deliver/etsi_ts/136300_136399/136355/15.06.00_60/ts_136355v150600p.pdf
TSDSI	TSDSI STD T1.3GPP 36.355-15.6.0 V1.0.0	15.6.0	Published	06.10.2020	https://members.tdsi.in/s/iXxQ9cPrej5NDKE
TTA	TTAT.3G-36.355V15.6.0	15.6.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.355V15.6.0&searchCate=TTAS

Release 16

ARIB	ARIB STD-T120-36.355.V16.0.0	16.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/36/A36355-g00.pdf
ATIS	ATIS.3GPP.36.355.V16.0.0	16.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.355.V16.0.0	16.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.355.V16.0.0.docx
ETSI	ETSI TS 136 355 V16.0.0 (2020-07)	16.0.0	Published	31.07.2020	https://www.etsi.org/deliver/etsi_ts/136300_136399/136355/16.00.00_60/ts_136355v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.355-16.0.0 V1.0.0	16.0.0	Published	06.10.2020	https://members.tdsi.in/s/SRkjGQmebkQCC5p
TTA	TTAT.3G-36.355V16.0.0	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.355V16.0.0&searchCate=TTAS

Release 17

ARIB	ARIB STD-T120-36.355.V17.0.0	17.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/36/A36355-h00.pdf
ATIS	ATIS.3GPP.36.355.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.355.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.355.V17.0.0.docx
ETSI	ETSI TS 136 355 V17.0.0 (2022-05)	17.0.0	Published	06.05.2022	https://www.etsi.org/deliver/etsi_ts/136300_136399/136355/17.00.00_60/ts_136355v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.355-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/JcBOgyH34Z4ZKMb
TTA	TTAT.3G-36.355V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.355V17.0.0&searchCate=TTAS

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ARIB	ARIB STD-T120-36.355.V18.0.0	18.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/36/A36355-i00.pdf
ATIS	ATIS.3GPP.36.355.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.355.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.355.V18.0.0.docx
ETSI	ETSI TS 136 355 V18.0.0 (2024-05)	18.0.0	Published	15.05.2024	https://www.etsi.org/deliver/etsi_ts/136300_136399/136355/18.00.00_60/ts_136355v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.355-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/LRdpGpAScWzmJTJ
TTA	TTAT.3G-36.355V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.355V18.0.0&searchCate=TTAS

1.2.1.3.13 TS 36.360**Evolved Universal Terrestrial Radio Access (E-UTRA); LTE-WLAN Aggregation Adaptation Protocol (LWAAP) specification**

This document specifies the E-UTRA LTE-WLAN Aggregation Adaptation Protocol (LWAAP).

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-36.360.V15.0.0	15.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/36/A36360-f00.pdf
ATIS	ATIS.3GPP.36.360V1500	15.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.360V1500	15.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.360V1500.doc
ETSI	ETSI TS 136 360 V15.0.0 (2018-07)	15.0.0	Published	16.07.2018	https://www.etsi.org/deliver/etsi_ts/136300_136399/136360/15.00.00_60/ts_136360v150000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.360-15.0.0 V1.0.0	15.0.0	Published	30.08.2021	https://members.tdsi.in/s/pgYHccQnicFEXgA
TTA	TTAT.3G-36.360V15.0.0	15.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.360V15.0.0&searchCate=TTAS
TTC	TS-3GA-36.360(Rel15)v15.0.0	15.0.0	Published	28.09.2018	https://www.ttc.or.jp/st/docs/3gpps2018/TS/TS-3GA-36.360(Rel15)v15.0.0.pdf

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ARIB	ARIB STD-T120-36.360.V16.0.0	16.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/36/A36360-g00.pdf
ATIS	ATIS.3GPP.36.360V1600	16.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.360V1600	16.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.360V1600.doc
ETSI	ETSI TS 136 360 V16.0.0 (2020-07)	16.0.0	Published	31.07.2020	https://www.etsi.org/deliver/etsi_ts/136300_136399/136360/16.00.00_60/ts_136360v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.360-16.0.0 V1.0.0	16.0.0	Published	30.08.2021	https://members.tdsi.in/s/dPJLsYQqYWsbAX6
TTA	TTAT.3G-36.360V16.0.0	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.360V16.0.0&searchCate=TTAS
TTC	TS-3GA-36.360(Rel16)v16.0.0	16.0.0	Published	02.10.2020	https://www.ttc.or.jp/st/docs/3gpps2020/TS/TS-3GA-36_360_Rel16v16_0_0.pdf

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ARIB	ARIB STD-T120-36.360.V17.0.0	17.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/36/A36360-h00.pdf
ATIS	ATIS.3GPP.36.360.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.360.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.360.V17.0.0.doc
ETSI	ETSI TS 136 360 V17.0.0 (2022-05)	17.0.0	Published	06.05.2022	https://www.etsi.org/deliver/etsi_ts/136300_136399/136360/17.00.00_60/ts_136360v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.360-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/wBzzDcHHPpybFGB
TTA	TTAT.3G-36.360V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.360V17.0.0&searchCate=TTAS
TTC	TS-3GA-36.360(Rel17)v17.0.0	17.0.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-36.360v17.0.0.pdf

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ARIB	ARIB STD-T120-36.360.V18.0.0	18.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/36/A36360-i00.pdf
ATIS	ATIS.3GPP.36.360.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.360.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.360.V18.0.0.doc
ETSI	ETSI TS 136 360 V18.0.0 (2024-05)	18.0.0	Published	15.05.2024	https://www.etsi.org/deliver/etsi_ts/136300_136399/136360/18.00.00_60/ts_136360v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.360-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/4bYAJqf8ZjSCtKA
TTA	TTAT.3G-36.360V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.360V18.0.0&searchCate=TTAS
TTC	TS-3GA-36.360(Rel18)v18.0.0	18.0.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-36.360v18.0.0.pdf

1.2.1.3.14 TS 36.361**Evolved Universal Terrestrial Radio Access (E-UTRA); LTE/WLAN Radio Level Integration Using IPsec Tunnel (LWIP) encapsulation; Protocol specification**

This document specifies the LWIP Encapsulation Protocol.

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Release 15					
ARIB	ARIB STD-T120-36.361.V15.0.0	15.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/36/A36361-f00.pdf
ATIS	ATIS.3GPP.36.361V1500	15.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.361V1500	15.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.361V1500.doc
ETSI	ETSI TS 136 361 V15.0.0 (2018-07)	15.0.0	Published	16.07.2018	https://www.etsi.org/deliver/etsi_ts/136300_136399/136361/15.00.00_60/ts_136361v150000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.361-15.0.0 V1.0.0	15.0.0	Published	30.08.2021	https://members.tdsi.in/s/G2eBjbgivAo79cD

TTA	TTAT.3G-36.361V15.0.0 36.361V15.0.0&searchCate=TTAS	15.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.361V15.0.0&searchCate=TTAS
TTC	TS-3GA-36.361(Rel15)v15.0.0	15.0.0	Published	28.09.2018	https://www.ttc.or.jp/st/docs/3gpps2018/TS/TS-3GA-36.361(Rel15)v15.0.0.pdf
Release 16					
ARIB	ARIB STD-T120-36.361.V16.0.0	16.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/36/A36361-g00.pdf
ATIS	ATIS.3GPP.36.361V1600	16.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.361V1600 3_SRR1_ATIS/CCSA.3GPP.36.361V1600.doc	16.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRR1_ATIS/CCSA.3GPP.36.361V1600.doc
ETSI	ETSI TS 136 361 V16.0.0 (2020-07)	16.0.0	Published	31.07.2020	https://www.etsi.org/deliver/etsi_ts/136300_136399/136361/16.00.00_60/ts_136361v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.361-16.0.0 V1.0.0	16.0.0	Published	30.08.2021	https://members.tdsi.in/s/sn5eF8jL2WY7NFx
TTA	TTAT.3G-36.361V16.0.0 36.361V16.0.0&searchCate=TTAS	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.361V16.0.0&searchCate=TTAS
TTC	TS-3GA-36.361(Rel16)v16.0.0	16.0.0	Published	02.10.2020	https://www.ttc.or.jp/st/docs/3gpps2020/TS/TS-3GA-36_361_Rel16v16_0_0.pdf
Release 17					
ARIB	ARIB STD-T120-36.361.V17.0.0	17.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/36/A36361-h00.pdf
ATIS	ATIS.3GPP.36.361.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.361.V17.0.0 3_SRR1_ATIS/CCSA.3GPP.36.361.V17.0.0.doc	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRR1_ATIS/CCSA.3GPP.36.361.V17.0.0.doc
ETSI	ETSI TS 136 361 V17.0.0 (2022-05)	17.0.0	Published	06.05.2022	https://www.etsi.org/deliver/etsi_ts/136300_136399/136361/17.00.00_60/ts_136361v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.361-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/GCRoMbyT88ebB7A
TTA	TTAT.3G-36.361V17.0.0 36.361V17.0.0&searchCate=TTAS	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.361V17.0.0&searchCate=TTAS
TTC	TS-3GA-36.361(Rel17)v17.0.0	17.0.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-36.361v17.0.0.pdf
Release 18					
ARIB	ARIB STD-T120-36.361.V18.0.0	18.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/36/A36361-i00.pdf
ATIS	ATIS.3GPP.36.361.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.361.V18.0.0 3_SRR1_ATIS/CCSA.3GPP.36.361.V18.0.0.doc	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRR1_ATIS/CCSA.3GPP.36.361.V18.0.0.doc
ETSI	ETSI TS 136 361 V18.0.0 (2024-05)	18.0.0	Published	15.05.2024	https://www.etsi.org/deliver/etsi_ts/136300_136399/136361/18.00.00_60/ts_136361v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.361-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/X5SsFam3RsjsDm
TTA	TTAT.3G-36.361V18.0.0 36.361V18.0.0&searchCate=TTAS	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.361V18.0.0&searchCate=TTAS
TTC	TS-3GA-36.361(Rel18)v18.0.0	18.0.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-36.361v18.0.0.pdf

1.2.1.3.15 TS 37.320

Universal Terrestrial Radio Access (UTRA) and Evolved Universal Terrestrial Radio Access (E-UTRA); Radio measurement collection for Minimization of Drive Tests (MDT); Overall description; Stage 2

This document provides an overview and overall description of the minimization of drive tests functionality. The document describes functions and procedures to support collection of UE-specific measurements for MDT using Control Plane architecture, for both UTRAN and E-UTRAN. Details of the signalling procedures for single-RAT operation are specified in the appropriate radio interface protocol specification. Network operation and overall control of MDT is described in OAM specifications.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-37.320.V15.0.0	15.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/37/A37320-f00.pdf
ATIS	ATIS.3GPP.37.320V1500	15.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.37.320V1500	15.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.320V1500.doc
ETSI	ETSI TS 137 320 V15.0.0 (2018-07)	15.0.0	Published	16.07.2018	https://www.etsi.org/deliver/etsi_ts/137300_137399/137320/15.00.00_60/ts_137320v150000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.320-15.0.0 V1.0.0	15.0.0	Published	30.08.2021	https://members.tdsi.in/s/nEsiQ2arEtAsTff
TTA	TTAT.3G-37.320V15.0.0	15.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.320V15.0.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-37.320.V16.8.0	16.8.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/37/A37320-g80.pdf
ATIS	ATIS.3GPP.37.320.V16.8.0	16.8.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.37.320.V16.8.0	16.8.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.320.V16.8.0.docx
ETSI	ETSI TS 137 320 V16.8.0 (2022-05)	16.8.0	Published	06.05.2022	https://www.etsi.org/deliver/etsi_ts/137300_137399/137320/16.08.00_60/ts_137320v160800p.pdf
TSDSI	TSDSI STD T1.3GPP 37.320-16.8.0 V1.1.0	16.8.0	Published	29.07.2022	https://members.tdsi.in/s/oMANk67MSpaX2iM
TTA	TTAT.3G-37.320V16.8.0	16.8.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.320V16.8.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-37.320.V17.5.0	17.5.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/37/A37320-h50.pdf
ATIS	ATIS.3GPP.37.320.V17.5.0	17.5.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.37.320.V17.5.0	17.5.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.320.V17.5.0.docx
ETSI	ETSI TS 137 320 V17.5.0 (2023-10)	17.5.0	Published	09.10.2023	https://www.etsi.org/deliver/etsi_ts/137300_137399/137320/17.05.00_60/ts_137320v170500p.pdf
TSDSI	TSDSI STD T1.3GPP 37.320-17.5.0 V1.5.0	17.5.0	Published	23.02.2024	https://members.tdsi.in/s/LGt2C4iqeEtjdGY
TTA	TTAT.3G-37.320V17.5.0	17.5.0	Published	13.02.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.320V17.5.0&searchCate=TTAS
Release 18					
ARIB	ARIB STD-T120-37.320.V18.3.0	18.3.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/37/A37320-i30.pdf
ATIS	ATIS.3GPP.37.320.V18.3.0	18.3.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.37.320.V18.3.0	18.3.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.320.V18.3.0.docx
ETSI	ETSI TS 137 320 V18.3.0 (2024-10)	18.3.0	Published	14.10.2024	https://www.etsi.org/deliver/etsi_ts/137300_137399/137320/18.03.00_60/ts_137320v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 37.320-18.3.0 V1.1.0	18.3.0	Published	02.03.2025	https://members.tdsi.in/s/ZFismCcJpMKNa7J
TTA	TTAT.3G-37.320V18.3.0	18.3.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.320V18.3.0&searchCate=TTAS

1.2.1.3.16 TS 37.324**Evolved Universal Terrestrial Radio Access (E-UTRA) and NR; Service Data Adaptation Protocol (SDAP) specification**

This document specifies the Service Data Adaptation Protocol (SDAP) for a UE with connection to the 5G-CN.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-37.324.V15.1.0	15.1.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/37/A37324-f10.pdf
ATIS	ATIS.3GPP.37.324.V15.1.0	15.1.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.37.324.V15.1.0	15.1.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.324.V15.1.0.docx
ETSI	ETSI TS 137 324 V15.1.0 (2018-09)	15.1.0	Published	28.09.2018	https://www.etsi.org/deliver/etsi_ts/137300_137399/137324/15.01.00_60/ts_137324v150100p.pdf
TSDSI	TSDSI STD T1.3GPP 37.324-15.1.0 V1.0.0	15.1.0	Published	06.10.2020	https://members.tdsi.in/s/fGEka3JK6dEPk9z
TTA	TTAT.3G-37.324V15.1.0	15.1.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.324V15.1.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-37.324.V16.3.0	16.3.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/37/A37324-g30.pdf
ATIS	ATIS.3GPP.37.324.V16.3.0	16.3.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.37.324.V16.3.0	16.3.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.324.V16.3.0.docx
ETSI	ETSI TS 137 324 V16.3.0 (2021-09)	16.3.0	Published	09.08.2021	https://www.etsi.org/deliver/etsi_ts/137300_137399/137324/16.03.00_60/ts_137324v160300p.pdf
TSDSI	TSDSI STD T1.3GPP 37.324-16.3.0 V1.1.0	16.3.0	Published	29.07.2022	https://members.tdsi.in/s/kLf2K8YeoJa52y
TTA	TTAT.3G-37.324V16.3.0	16.3.0	Published	30.09.2021	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.324V16.3.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-37.324.V17.0.0	17.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/37/A37324-h00.pdf
ATIS	ATIS.3GPP.37.324.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.37.324.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.324.V17.0.0.docx
ETSI	ETSI TS 137 324 V17.0.0 (2022-05)	17.0.0	Published	06.05.2022	https://www.etsi.org/deliver/etsi_ts/137300_137399/137324/17.00.00_60/ts_137324v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.324-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/WtSrXb6GMXfwr72
TTA	TTAT.3G-37.324V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.324V17.0.0&searchCate=TTAS
Release 18					
ARIB	ARIB STD-T120-37.324.V18.0.0	18.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/37/A37324-i00.pdf
ATIS	ATIS.3GPP.37.324.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.37.324.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.324.V18.0.0.docx
ETSI	ETSI TS 137 324 V18.0.0 (2024-05)	18.0.0	Published	15.05.2024	https://www.etsi.org/deliver/etsi_ts/137300_137399/137324/18.00.00_60/ts_137324v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.324-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/gQgRAZG9G2zbgzY
TTA	TTAT.3G-37.324V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.324V18.0.0&searchCate=TTAS

1.2.1.3.17 TS 37.340

NR; Multi-connectivity; Overall description; Stage-2

This document provides an overview of the multi-connectivity operation using E-UTRA and NR radio access technologies. Details of the network and radio interface protocols are specified in companion specifications of the 36 and 38 series.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-37.340.V15.16.0	15.16.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/37/A37340-fg0.pdf
ATIS	ATIS.3GPP.37.340.V15.16.0	15.16.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.37.340.V15.16.0	15.16.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.340.V15.16.0.docx
ETSI	ETSI TS 137 340 V15.16.0 (2022-05)	15.16.0	Published	06.05.2022	https://www.etsi.org/deliver/etsi_ts/137300_137399/137340/15.16.00_60/ts_137340v151600p.pdf
TSDSI	TSDSI STD T1.3GPP 37.340-15.16.0 V1.1.0	15.16.0	Published	29.07.2022	https://members.tdsi.in/s/wY2GacfftFSLtQm
TTA	TTAT.3G-37.340V15.16.0	15.16.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.340V15.16.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-37.340.V16.13.0	16.13.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/37/A37340-gd0.pdf
ATIS	ATIS.3GPP.37.340.V16.13.0	16.13.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.37.340.V16.13.0	16.13.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.340.V16.13.0.docx
ETSI	ETSI TS 137 340 V16.13.0 (2023-10)	16.13.0	Published	09.10.2023	https://www.etsi.org/deliver/etsi_ts/137300_137399/137340/16.13.00_60/ts_137340v161300p.pdf
TSDSI	TSDSI STD T1.3GPP 37.340-16.13.0 V1.4.0	16.13.0	Published	23.02.2024	https://members.tdsi.in/s/9SDKkRsPjJZLjRf
TTA	TTAT.3G-37.340V16.13.0	16.13.0	Published	13.02.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.340V16.13.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-37.340.V17.7.0	17.7.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/37/A37340-h70.pdf
ATIS	ATIS.3GPP.37.340.V17.7.0	17.7.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.37.340.V17.7.0	17.7.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.340.V17.7.0.docx
ETSI	ETSI TS 137 340 V17.7.0 (2024-01)	17.7.0	Published	31.01.2024	https://www.etsi.org/deliver/etsi_ts/137300_137399/137340/17.07.00_60/ts_137340v170700p.pdf
TSDSI	TSDSI STD T1.3GPP 37.340-17.7.0 V1.6.0	17.7.0	Published	29.05.2024	https://members.tdsi.in/s/NkpTmb3feS47Tqc
TTA	TTAT.3G-37.340V17.7.0	17.7.0	Published	08.05.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.340V17.7.0&searchCate=TTAS
Release 18					
ARIB	ARIB STD-T120-37.340.V18.3.0	18.3.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/37/A37340-i30.pdf
ATIS	ATIS.3GPP.37.340.V18.3.0	18.3.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.37.340.V18.3.0	18.3.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.340.V18.3.0.docx
ETSI	ETSI TS 137 340 V18.3.0 (2024-10)	18.3.0	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/137300_137399/137340/18.03.00_60/ts_137340v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 37.340-18.3.0 V1.1.0	18.3.0	Published	02.03.2025	https://members.tdsi.in/s/7Bnfa9pPydg3bo4
TTA	TTAT.3G-37.340V18.3.0	18.3.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.340V18.3.0&searchCate=TTAS

1.2.1.3.18 TS 37.355**LTE Positioning Protocol (LPP)**

This document contains the definition of the LTE Positioning Protocol (LPP) for the radio access technologies E-UTRA/LTE and NR.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-37.355.V15.3.0	15.3.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/37/A37355-f30.pdf
ATIS	ATIS.3GPP.37.355.V15.3.0	15.3.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.37.355.V15.3.0	15.3.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.37.355.V15.3.0.docx
ETSI	ETSI TS 137 355 V15.3.0 (2022-05)	15.3.0	Published	06.05.2022	https://www.etsi.org/deliver/etsi_ts/137300_137399/137355/15.03.00_60/ts_137355v150300p.pdf
TSDSI	TSDSI STD T1.3GPP 37.355-15.3.0 V1.1.0	15.3.0	Published	29.07.2022	https://members.tdsi.in/s/ik3fsLZmA52jGGB
TTA	TTAT.3G-37.355V15.3.0	15.3.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.355V15.3.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-37.355.V16.13.0	16.13.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/37/A37355-gd0.pdf
ATIS	ATIS.3GPP.37.355.V16.13.0	16.13.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.37.355.V16.13.0	16.13.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.37.355.V16.13.0.docx
ETSI	ETSI TS 137 355 V16.13.0 (2024-05)	16.13.0	Published	07.05.2024	https://www.etsi.org/deliver/etsi_ts/137300_137399/137355/16.13.00_60/ts_137355v161300p.pdf
TSDSI	TSDSI STD T1.3GPP 37.355-16.13.0 V1.6.0	16.13.0	Published	22.07.2024	https://members.tdsi.in/s/RfBz96BZ2g4pa39
TTA	TTAT.3G-37.355V16.13.0	16.13.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.355V16.13.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-37.355.V17.8.0	17.8.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/37/A37355-h80.pdf
ATIS	ATIS.3GPP.37.355.V17.8.0	17.8.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.37.355.V17.8.0	17.8.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.37.355.V17.8.0.docx
ETSI	ETSI TS 137 355 V17.8.0 (2024-05)	17.8.0	Published	07.05.2024	https://www.etsi.org/deliver/etsi_ts/137300_137399/137355/17.08.00_60/ts_137355v170800p.pdf
TSDSI	TSDSI STD T1.3GPP 37.355-17.8.0 V1.8.0	17.8.0	Published	22.07.2024	https://members.tdsi.in/s/fME9dYD3dYCoE5S
TTA	TTAT.3G-37.355V17.8.0	17.8.0	Published	8/1/2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.355V17.8.0&searchCate=TTAS
Release 18					
ARIB	ARIB STD-T120-37.355.V18.3.0	18.3.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/37/A37355-i30.pdf
ATIS	ATIS.3GPP.37.355.V18.3.0	18.3.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.37.355.V18.3.0	18.3.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.37.355.V18.3.0.docx
ETSI	ETSI TS 137 355 V18.3.0 (2024-10)	18.3.0	Published	14.10.2024	https://www.etsi.org/deliver/etsi_ts/137300_137399/137355/18.03.00_60/ts_137355v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 37.355-18.3.0 V1.1.0	18.3.0	Published	02.03.2025	https://members.tdsi.in/s/pRFAb4xwH26sdDH
TTA	TTAT.3G-37.355V18.3.0	18.3.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.355V18.3.0&searchCate=TTAS

1.2.1.3.19 TS 38.300

NR; NR and NG-RAN Overall description; Stage-2

This document provides an overview and overall description of the NG-RAN and focuses on the radio interface protocol architecture of NR connected to 5GC (E-UTRA connected to 5GC is covered in the 36 series). Details of the radio interface protocols are specified in companion specifications of the 38 series.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-38.300.V15.18.0	15.18.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38300-fi0.pdf
ATIS	ATIS.3GPP.38.300.V15.18.0	15.18.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.300.V15.18.0	15.18.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.300.V15.18.0.docx
ETSI	ETSI TS 138 300 V15.18.0 (2024-10)	15.18.0	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138300/15.18.00_60/ts_138300v151800p.pdf
TSDSI	TSDSI STD T1.3GPP 38.300-15.18.0 V1.6.0	15.18.0	Published	02.03.2025	https://members.tdsi.in/s/ocj4NJ5fMaDnnw
TTA	TTAT.3G-38.300V15.18.0	15.18.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.300V15.18.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-38.300.V16.17.0	16.17.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38300-gh0.pdf
ATIS	ATIS.3GPP.38.300.V16.17.0	16.17.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.300.V16.17.0	16.17.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.300.V16.17.0.docx
ETSI	ETSI TS 138 300 V16.17.0 (2024-10)	16.17.0	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138300/16.17.00_60/ts_138300v161700p.pdf
TSDSI	TSDSI STD T1.3GPP 38.300-16.17.0 V1.9.0	16.17.0	Published	02.03.2025	https://members.tdsi.in/s/mktF32X6r8wGJo8
TTA	TTAT.3G-38.300V16.17.0	16.17.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.300V16.17.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-38.300.V17.10.0	17.10.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38300-ha0.pdf
ATIS	ATIS.3GPP.38.300.V17.10.0	17.10.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.300.V17.10.0	17.10.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.300.V17.10.0.docx
ETSI	ETSI TS 138 300 V17.10.0 (2024-10)	17.10.0	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138300/17.10.00_60/ts_138300v171000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.300-17.10.0 V1.10.0	17.10.0	Published	02.03.2025	https://members.tdsi.in/s/BdiKTkGfJEMCCCCg
TTA	TTAT.3G-38.300V17.10.0	17.10.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.300V17.10.0&searchCate=TTAS
Release 18					
ARIB	ARIB STD-T120-38.300.V18.3.0	18.3.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38300-i30.pdf
ATIS	ATIS.3GPP.38.300.V18.3.0	18.3.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.300.V18.3.0	18.3.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.300.V18.3.0.docx
ETSI	ETSI TS 138 300 V18.3.0 (2024-10)	18.3.0	Published	14.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138300/18.03.00_60/ts_138300v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.300-18.3.0 V1.1.0	18.3.0	Published	02.03.2025	https://members.tdsi.in/s/rwkqabpK4XC4aYA
TTA	TTAT.3G-38.300V18.3.0	18.3.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.300V18.3.0&searchCate=TTAS

1.2.1.3.20 TS 38.304**NR; User Equipment (UE) procedures in idle mode and in RRC Inactive state**

This document specifies the Access Stratum (AS) part of the UE procedures in RRC_IDLE state (also called Idle mode) and RRC_INACTIVE state. The non-access stratum (NAS) part of Idle mode procedures and processes is specified in TS 23.122.

This document specifies the model for the functional division between the NAS and AS in a UE.

This document applies to all UEs that support at least NR Radio Access, including multi-RAT UEs as described in 3GPP specifications, in the following cases:

- When the UE is camped on a NR cell;
- When the UE is searching for a cell to camp on.

NOTE – When the UE is camped on or searching for a cell to camp on belonging to other RATs, the UE behaviour is described in the specifications of the other RATs.

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Release 15					
ARIB	ARIB STD-T120-38.304.V15.8.0	15.8.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38304-f80.pdf
ATIS	ATIS.3GPP.38.304.V15.8.0	15.8.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.304.V15.8.0	15.8.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.38.304.V15.8.0.docx
ETSI	ETSI TS 138 304 V15.8.0 (2021-10)	15.8.0	Published	10.04.2021	https://www.etsi.org/deliver/etsi_ts/138300_138399/138304/15.08.00_60/ts_138304v150800p.pdf
TSDSI	TSDSI STD T1.3GPP 38.304-15.8.0 V1.1.0	15.8.0	Published	29.07.2022	https://members.tdsi.in/s/kA6kkZ6ZtJM5B7e
TTA	TTAT.3G-38.304V15.8.0	15.8.0	Published	27.01.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.304V15.8.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-38.304.V16.10.0	16.10.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38304-ga0.pdf
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CCSA	CCSA.3GPP.38.304.V16.10.0	16.10.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.38.304.V16.10.0.docx
ETSI	ETSI TS 138 304 V16.10.0 (2023-07)	16.10.0	Published	31.07.2023	https://www.etsi.org/deliver/etsi_ts/138300_138399/138304/16.10.00_60/ts_138304v161000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.304-16.10.0 V1.3.0	16.10.0	Published	11.02.2023	https://members.tdsi.in/s/cPrAH6fbdfboki
TTA	TTAT.3G-38.304V16.10.0	16.10.0	Published	27.10.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.304V16.10.0&searchCate=TTAS
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ARIB	ARIB STD-T120-38.304.V17.9.0	17.9.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38304-h90.pdf
ATIS	ATIS.3GPP.38.304.V17.9.0	17.9.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.304.V17.9.0	17.9.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.38.304.V17.9.0.docx
ETSI	ETSI TS 138 304 V17.9.0 (2024-08)	17.9.0	Published	12.08.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138304/17.09.00_60/ts_138304v170900p.pdf
TSDSI	TSDSI STD T1.3GPP 38.304-17.9.0 V1.8.0	17.9.0	Published	19.11.2024	https://members.tdsi.in/s/m67LnQA5GzGxsBF
TTA	TTAT.3G-38.304V17.9.0	17.9.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.304V17.9.0&searchCate=TTAS

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ARIB	ARIB STD-T120-38.304.V18.3.0	18.3.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38304-i30.pdf
ATIS	ATIS.3GPP.38.304.V18.3.0	18.3.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.304.V18.3.0	18.3.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.304.V18.3.0.docx
ETSI	ETSI TS 138 304 V18.3.0 (2024-10)	18.3.0	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138304/18.03.00_60/ts_138304v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.304-18.3.0 V1.1.0	18.3.0	Published	02.03.2025	https://members.tdsi.in/s/CpQz6T4mtX29QX6
TTA	TTAT.3G-38.304V18.3.0	18.3.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.304V18.3.0&searchCate=TTAS

1.2.1.3.21 TS 38.305**NG Radio Access Network (NG-RAN); Stage 2 functional specification of User Equipment (UE) positioning in NG-RAN**

This document specifies the stage 2 of the UE Positioning function of NG-RAN which provides the mechanisms to support or assist the calculation of the geographical position of a UE. UE position knowledge can be used, for example, in support of Radio Resource Management functions, as well as location-based services for operators, subscribers, and third-party service providers. The purpose of this stage 2 specification is to define the NG-RAN UE Positioning architecture, functional entities and operations to support positioning methods. This description is confined to the NG-RAN Access Stratum. It does not define or describe how the results of the UE position calculation can be utilised in the Core Network (e.g. LCS) or in NG-RAN (e.g. RRM).

UE Positioning may be considered as a network-provided enabling technology consisting of standardised service capabilities that enable the provision of location applications. The application(s) may be service provider specific. The description of the numerous and varied possible location applications which are enabled by this technology is outside the scope of this document. However, clarifying examples of how the functionality being described may be used to provide specific location services may be included.

This stage 2 specification covers the NG-RAN positioning methods, state descriptions, and message flows to support UE Positioning.

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ARIB	ARIB STD-T120-38.305.V15.10.0	15.10.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38305-fa0.pdf
ATIS	ATIS.3GPP.38.305.V15.10.0	15.10.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.305.V15.10.0	15.10.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.305.V15.10.0.docx
ETSI	ETSI TS 138 305 V15.10.0 (2023-07)	15.10.0	Published	26.07.2023	https://www.etsi.org/deliver/etsi_ts/138300_138399/138305/15.10.00_60/ts_138305v151000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.305-15.10.0 V1.2.0	15.10.0	Published	11.02.2023	https://members.tdsi.in/s/Wb9YQroWaN4MJfa
TTA	TTAT.3G-38.305V15.10.0	15.10.0	Published	27.10.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.305V15.10.0&searchCate=TTAS

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ARIB	ARIB STD-T120-38.305.V16.10.0	16.10.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38305-ga0.pdf
ATIS	ATIS.3GPP.38.305.V16.10.0	16.10.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.305.V16.10.0	16.10.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.305.V16.10.0.docx
ETSI	ETSI TS 138 305 V16.10.0 (2024-02)	16.10.0	Published	02.02.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138305/16.10.00_60/ts_138305v161000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.305-16.10.0 V1.4.0	16.10.0	Published	29.05.2024	https://members.tdsi.in/s/A6AcB2ytMExj58A
TTA	TTAT.3G-38.305V16.10.0	16.10.0	Published	08.05.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.305V16.10.0&searchCate=TTAS

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ARIB	ARIB STD-T120-38.305.V17.7.0	17.7.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38305-h70.pdf
ATIS	ATIS.3GPP.38.305.V17.7.0	17.7.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.305.V17.7.0	17.7.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.305.V17.7.0.docx
ETSI	ETSI TS 138 305 V17.7.0 (2024-02)	17.7.0	Published	02.02.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138305/17.07.00_60/ts_138305v170700p.pdf
TSDSI	TSDSI STD T1.3GPP 38.305-17.7.0 V1.7.0	17.7.0	Published	29.05.2024	https://members.tdsi.in/s/HbasPzrcWYDC9Kr
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ARIB	ARIB STD-T120-38.305.V18.3.0	18.3.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38305-i30.pdf
ATIS	ATIS.3GPP.38.305.V18.3.0	18.3.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.305.V18.3.0	18.3.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.305.V18.3.0.docx
ETSI	ETSI TS 138 305 V18.3.0 (2024-10)	18.3.0	Published	14.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138305/18.03.00_60/ts_138305v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.305-18.3.0 V1.1.0	18.3.0	Published	02.03.2025	https://members.tdsi.in/s/G4zycCfDfbxN7gD
TTA	TTAT.3G-38.305V18.3.0	18.3.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.305V18.3.0&searchCate=TTAS

1.2.1.3.22 TS 38.306**NR; User Equipment (UE) radio access capabilities**

This document defines the NR UE Radio Access Capability Parameters.

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Release 15					
ARIB	ARIB STD-T120-38.306.V15.26.0	15.26.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38306-fq0.pdf
ATIS	ATIS.3GPP.38.306.V15.26.0	15.26.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.306.V15.26.0	15.26.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.306.V15.26.0.docx
ETSI	ETSI TS 138 306 V15.26.0 (2024-10)	15.26.0	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138306/15.26.00_60/ts_138306v152600p.pdf
TSDSI	TSDSI STD T1.3GPP 38.306-15.26.0 V1.10.0	15.26.0	Published	02.03.2025	https://members.tdsi.in/s/G2PLac6fLsjBJTp
TTA	TTAT.3G-38.306V15.26.0	15.26.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.306V15.26.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-38.306.V16.18.0	16.18.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38306-gi0.pdf
ATIS	ATIS.3GPP.38.306.V16.18.0	16.18.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.306.V16.18.0	16.18.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.306.V16.18.0.docx
ETSI	ETSI TS 138 306 V16.18.0 (2024-10)	16.18.0	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138306/16.18.00_60/ts_138306v161800p.pdf
TSDSI	TSDSI STD T1.3GPP 38.306-16.18.0 V1.10.0	16.18.0	Published	02.03.2025	https://members.tdsi.in/s/EHbnSkkqzr7EZHY
TTA	TTAT.3G-38.306V16.18.0	16.18.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.306V16.18.0&searchCate=TTAS

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ARIB	ARIB STD-T120-38.306.V17.10.0	17.10.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38306-ha0.pdf
ATIS	ATIS.3GPP.38.306.V17.10.0	17.10.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.306.V17.10.0	17.10.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.306.V17.10.0.docx
ETSI	ETSI TS 138 306 V17.10.0 (2024-10)	17.10.0	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138306/17.10.00_60/ts_138306v171000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.306-17.10.0 V1.10.0	17.10.0	Published	02.03.2025	https://members.tdsi.in/s/HxTbET5q2zKF4Xj
TTA	TTAT.3G-38.306V17.10.0	17.10.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.306V17.10.0&searchCate=TTAS

Release 18

ARIB	ARIB STD-T120-38.306.V18.3.0	18.3.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38306-i30.pdf
ATIS	ATIS.3GPP.38.306.V18.3.0	18.3.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.306.V18.3.0	18.3.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.306.V18.3.0.docx
ETSI	ETSI TS 138 306 V18.3.0 (2024-10)	18.3.0	Published	14.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138306/18.03.00_60/ts_138306v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.306-18.3.0 V1.1.0	18.3.0	Published	02.03.2025	https://members.tdsi.in/s/4RKTxnbtRdiKNRP
TTA	TTAT.3G-38.306V18.3.0	18.3.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.306V18.3.0&searchCate=TTAS

1.2.1.3.23 TS 38.307**NR; Requirements on User Equipments (UEs) supporting a release-independent frequency band**

This document specifies requirements for UEs supporting release independent features such as additional NR operating bands and power classes on top of TS 38.101 and TS 38.133.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-38.307.V15.11.0	15.11.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38307-fb0.pdf
ATIS	ATIS.3GPP.38.307.V15.11.0	15.11.0	Published	22.05.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.307.V15.11.0	15.11.0	Published	22.05.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.307.V15.11.0.docx
ETSI	ETSI TS 138 307 V15.11.0 (2023-05)	15.11.0	Published	03.05.2023	https://www.etsi.org/deliver/etsi_ts/138300_138399/138307/15.11.00_60/ts_138307v151100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.307-15.11.0 V1.2.0	15.11.0	Published	14.08.2023	https://members.tdsi.in/s/mZ2YXtS3wTt274t
TTA	TTAT.3G-38.307V15.11.0	15.11.0	Published	01.08.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.307V15.11.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-38.307.V16.16.0	16.16.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38307-gg0.pdf
ATIS	ATIS.3GPP.38.307.V16.16.0	16.16.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.307.V16.16.0	16.16.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.307.V16.16.0.docx
ETSI	ETSI TS 138 307 V16.16.0 (2024-05)	16.16.0	Published	15.05.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138307/16.16.00_60/ts_138307v161600p.pdf
TSDSI	TSDSI STD T1.3GPP 38.307-16.16.0 V1.6.0	16.16.0	Published	22.07.2024	https://members.tdsi.in/s/AMQpMtFGipXkr5T
TTA	TTAT.3G-38.307V16.16.0	16.16.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.307V16.16.0&searchCate=TTAS

Release 17

ARIB	ARIB STD-T120-38.307.V17.13.0	17.13.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38307-hd0.pdf
ATIS	ATIS.3GPP.38.307.V17.13.0	17.13.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.307.V17.13.0	17.13.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.307.V17.13.0.docx
ETSI	ETSI TS 138 307 V17.13.0 (2024-08)	17.13.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138307/17.13.00_60/ts_138307v171300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.307-17.13.0 V1.8.0	17.13.0	Published	19.11.2024	https://members.tdsi.in/s/QcAXj9KKitCjr2Y
TTA	TTAT.3G-38.307V17.13.0	17.13.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.307V17.13.0&searchCate=TTAS

Release 18

ARIB	ARIB STD-T120-38.307.V18.2.0	18.2.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38307-i20.pdf
ATIS	ATIS.3GPP.38.307.V18.2.0	18.2.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.307.V18.2.0	18.2.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.307.V18.2.0.docx
ETSI	ETSI TS 138 307 V18.2.0 (2024-08)	18.2.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138307/18.02.00_60/ts_138307v180200p.pdf
TSDSI	TSDSI STD T1.3GPP 38.307-18.2.0 V1.0.0	18.2.0	Published	19.11.2024	https://members.tdsi.in/s/nJbCstnLAzdorPY
TTA	TTAT.3G-38.307V18.2.0	18.2.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.307V18.2.0&searchCate=TTAS

1.2.1.3.24 TS 38.314**NR; Layer 2 measurements**

This document contains the description and definition of the measurements performed by NR or the UE that are transferred over the standardised interfaces in order to support NR radio link operations, radio resource management (RRM), network operations and maintenance (OAM), minimization of drive tests (MDT) and self-organising networks (SON).

Only the differences relative to TS 28.552 are specified in this specification.

SDO	Document No.	Version	Status	Issued date	Location
Release 16					
ARIB	ARIB STD-T120-38.314.V16.4.0	16.4.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38314-g40.pdf
ATIS	ATIS.3GPP.38.314.V16.4.0	16.4.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.314.V16.4.0	16.4.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.314.V16.4.0.docx
ETSI	ETSI TS 138 314 V16.4.0 (2021-10)	16.4.0	Published	13.10.2021	https://www.etsi.org/deliver/etsi_ts/138300_138399/138314/16.04.00_60/ts_138314v160400p.pdf
TSDSI	TSDSI STD T1.3GPP 38.314-16.4.0 V1.1.0	16.4.0	Published	29.07.2022	https://members.tdsi.in/s/mZ2YXtS3wTt274t
TTA	TTAT.3G-38.314V16.4.0	16.4.0	Published	27.01.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.314V16.4.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-38.314.V17.5.0	17.5.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38314-h50.pdf
ATIS	ATIS.3GPP.38.314.V17.5.0	17.5.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.314.V17.5.0	17.5.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.314.V17.5.0.docx
ETSI	ETSI TS 138 314 V17.5.0 (2024-05)	17.5.0	Published	14.05.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138314/17.05.00_60/ts_138314v170500p.pdf
TSDSI	TSDSI STD T1.3GPP 38.314-17.5.0 V1.5.0	17.5.0	Published	22.07.2024	https://members.tdsi.in/s/ce9sRRHH2tWdREK
TTA	TTAT.3G-38.314V17.5.0	17.5.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.314V17.5.0&searchCate=TTAS

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ARIB	ARIB STD-T120-38.314.V18.0.0	18.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38314-i00.pdf
ATIS	ATIS.3GPP.38.314.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.314.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.38.314.V18.0.0.docx
ETSI	ETSI TS 138 314 V18.0.0 (2024-05)	18.0.0	Published	27.05.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138314/18.00.00_60/ts_138314v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.314-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/PATWfHRzFDMPdG4
TTA	TTAT.3G-38.314V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.314V18.0.0&searchCate=TTAS

1.2.1.3.25 TS 38.321**NR; Medium Access Control (MAC) protocol specification**

This document specifies the NR MAC protocol.

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ARIB	ARIB STD-T120-38.321.V15.13.0	15.13.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38321-fd0.pdf
ATIS	ATIS.3GPP.38.321.V15.13.0	15.13.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.321.V15.13.0	15.13.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.38.321.V15.13.0.docx
ETSI	ETSI TS 138 321 V15.13.0 (2022-05)	15.13.0	Published	06.05.2022	https://www.etsi.org/deliver/etsi_ts/138300_138399/138321/15.13.00_60/ts_138321v151300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.321-15.13.0 V1.1.0	15.13.0	Published	29.07.2022	https://members.tdsi.in/s/4NQmLiNYZMn46Pn
TTA	TTAT.3G-38.321V15.13.0	15.13.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.321V15.13.0&searchCate=TTAS

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ARIB	ARIB STD-T120-38.321.V16.17.0	16.17.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38321-gh0.pdf
ATIS	ATIS.3GPP.38.321.V16.17.0	16.17.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.321.V16.17.0	16.17.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.38.321.V16.17.0.docx
ETSI	ETSI TS 138 321 V16.17.0 (2024-10)	16.17.0	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138321/16.17.00_60/ts_138321v161700p.pdf
TSDSI	TSDSI STD T1.3GPP 38.321-16.17.0 V1.9.0	16.17.0	Published	02.03.2025	https://members.tdsi.in/s/E5QFpwLXBaB2Dy
TTA	TTAT.3G-38.321V16.17.0	16.17.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.321V16.17.0&searchCate=TTAS

Release 17

ARIB	ARIB STD-T120-38.321.V17.10.0	17.10.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38321-ha0.pdf
ATIS	ATIS.3GPP.38.321.V17.10.0	17.10.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.321.V17.10.0	17.10.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.38.321.V17.10.0.docx
ETSI	ETSI TS 138 321 V17.10.0 (2024-10)	17.10.0	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138321/17.10.00_60/ts_138321v171000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.321-17.10.0 V1.10.0	17.10.0	Published	02.03.2025	https://members.tdsi.in/s/HpSZYRLQodRpntp
TTA	TTAT.3G-38.321V17.10.0	17.10.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.321V17.10.0&searchCate=TTAS

Release 18

ARIB	ARIB STD-T120-38.321.V18.3.0	18.3.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38321-i30.pdf
ATIS	ATIS.3GPP.38.321.V18.3.0	18.3.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.321.V18.3.0	18.3.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.38.321.V18.3.0.docx
ETSI	ETSI TS 138 321 V18.3.0 (2024-10)	18.3.0	Published	14.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138321/18.03.00_60/ts_138321v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.321-18.3.0 V1.1.0	18.3.0	Published	02.03.2025	https://members.tdsi.in/s/dpPHkgmy2ErRaXd
TTA	TTAT.3G-38.321V18.3.0	18.3.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.321V18.3.0&searchCate=TTAS

1.2.1.3.26 TS 38.322**NR; Radio Link Control (RLC) protocol specification**

This document specifies the NR Radio Link Control (RLC) protocol for the UE – NR radio interface.

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Release 15					
ARIB	ARIB STD-T120-38.322.V15.5.0	15.5.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38322-f50.pdf
ATIS	ATIS.3GPP.38.322.V15.5.0	15.5.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.322.V15.5.0	15.5.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.38.322.V15.5.0.docx
ETSI	ETSI TS 138 322 V15.5.0 (2019-05)	15.5.0	Published	10.05.2019	https://www.etsi.org/deliver/etsi_ts/138300_138399/138322/15.05.00_60/ts_138322v150500p.pdf
TSDSI	TSDSI STD T1.3GPP 38.322-15.5.0 V1.0.0	15.5.0	Published	06.10.2020	https://members.tdsi.in/s/Qn9iZdpbf4ZrEn
TTA	TTAT.3G-38.322V15.5.0	15.5.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.322V15.5.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-38.322.V16.3.0	16.3.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38322-g30.pdf
ATIS	ATIS.3GPP.38.322.V16.3.0	16.3.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.322.V16.3.0	16.3.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.38.322.V16.3.0.docx
ETSI	ETSI TS 138 322 V16.3.0 (2022-08)	16.3.0	Published	17.08.2022	https://www.etsi.org/deliver/etsi_ts/138300_138399/138322/16.03.00_60/ts_138322v160300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.322-16.3.0 V1.1.0	16.3.0	Published	29.07.2022	https://members.tdsi.in/s/aR8BzQ4LHn9NByk
TTA	TTAT.3G-38.322V16.3.0	16.3.0	Published	21.10.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.322V16.3.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-38.322.V17.4.0	17.4.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38322-h40.pdf
ATIS	ATIS.3GPP.38.322.V17.4.0	17.4.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.322.V17.4.0	17.4.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.38.322.V17.4.0.docx
ETSI	ETSI TS 138 322 V17.4.0 (2024-05)	17.4.0	Published	15.05.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138322/17.04.00_60/ts_138322v170400p.pdf
TSDSI	TSDSI STD T1.3GPP 38.322-17.4.0 V1.4.0	17.4.0	Published	22.07.2024	https://members.tdsi.in/s/T5Zwi8wae5ESBFX
TTA	TTAT.3G-38.322V17.4.0	17.4.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.322V17.4.0&searchCate=TTAS

Release 18

ARIB	ARIB STD-T120-38.322.V18.1.0	18.1.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38322-i10.pdf
ATIS	ATIS.3GPP.38.322.V18.1.0	18.1.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.322.V18.1.0	18.1.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.38.322.V18.1.0.docx
ETSI	ETSI TS 138 322 V18.1.0 (2024-08)	18.1.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138322/18.01.00_60/ts_138322v180100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.322-18.1.0 V1.0.0	18.1.0	Published	19.11.2024	https://members.tdsi.in/s/pN2AT59JDGqQRoG
TTA	TTAT.3G-38.322V18.1.0	18.1.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.322V18.1.0&searchCate=TTAS

1.2.1.3.27 TS 38.323**NR; Packet Data Convergence Protocol (PDCP) specification**

This document provides the description of the Packet Data Convergence Protocol (PDCP).

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-38.323.V15.8.0	15.8.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38323-f80.pdf
ATIS	ATIS.3GPP.38.323.V15.8.0	15.8.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.323.V15.8.0	15.8.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.38.323.V15.8.0.docx
ETSI	ETSI TS 138 323 V15.8.0 (2021-09)	15.8.0	Published	09.10.2021	https://www.etsi.org/deliver/etsi_ts/138300_138399/138323/15.08.00_60/ts_138323v150800p.pdf
TSDSI	TSDSI STD T1.3GPP 38.323-15.8.0 V1.1.0	15.8.0	Published	29.07.2022	https://members.tdsi.in/s/9Fjep8Hb7YLN4e9
TTA	TTAT.3G-38.323V15.8.0	15.8.0	Published	30.09.2021	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.323V15.8.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-38.323.V16.8.0	16.8.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38323-g80.pdf
ATIS	ATIS.3GPP.38.323.V16.8.0	16.8.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.323.V16.8.0	16.8.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.38.323.V16.8.0.docx
ETSI	ETSI TS 138 323 V16.8.0 (2023-01)	16.8.0	Published	20.01.2023	https://www.etsi.org/deliver/etsi_ts/138300_138399/138323/16.08.00_60/ts_138323v160800p.pdf
TSDSI	TSDSI STD T1.3GPP 38.323-16.8.0 V1.2.0	16.8.0	Published	02.05.2023	https://members.tdsi.in/s/NfsjCam65FwJ5pG
TTA	TTAT.3G-38.323V16.8.0	16.8.0	Published	16.03.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.323V16.8.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-38.323.V17.5.0	17.5.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38323-h50.pdf
ATIS	ATIS.3GPP.38.323.V17.5.0	17.5.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.323.V17.5.0	17.5.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.38.323.V17.5.0.docx
ETSI	ETSI TS 138 323 V17.5.0 (2023-07)	17.5.0	Published	26.07.2023	https://www.etsi.org/deliver/etsi_ts/138300_138399/138323/17.05.00_60/ts_138323v170500p.pdf
TSDSI	TSDSI STD T1.3GPP 38.323-17.5.0 V1.5.0	17.5.0	Published	11.02.2023	https://members.tdsi.in/s/zm35Xt8A4zazpR6
TTA	TTAT.3G-38.323V17.5.0	17.5.0	Published	27.10.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.323V17.5.0&searchCate=TTAS

Release 18

ARIB	ARIB STD-T120-38.323.V18.3.0	18.3.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38323-i30.pdf
ATIS	ATIS.3GPP.38.323.V18.3.0	18.3.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.323.V18.3.0	18.3.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.323.V18.3.0.docx
ETSI	ETSI TS 138 323 V18.3.0 (2024-10)	18.3.0	Published	14.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138323/18.03.00_60/ts_138323v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.323-18.3.0 V1.1.0	18.3.0	Published	02.03.2025	https://members.tdsi.in/s/4cwDRbeYj2ZrSfK
TTA	TTAT.3G-38.323V18.3.0	18.3.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.323V18.3.0&searchCate=TTAS

1.2.1.3.28 TS 38.331**NR; Radio Resource Control (RRC); Protocol specification**

This document specifies the Radio Resource Control protocol for the radio interface between UE and NG-RAN.

The scope of this document also includes:

- the radio related information transported in a transparent container between source gNB and target gNB upon inter gNB handover;
- the radio related information transported in a transparent container between a source or target gNB and another system upon inter RAT handover.
- the radio related information transported in a transparent container between a source eNB and target gNB during E-UTRA-NR Dual Connectivity.

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Release 15

ARIB	ARIB STD-T120-38.331.V15.27.0	15.27.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38331-fr0.pdf
ATIS	ATIS.3GPP.38.331.V15.27.0	15.27.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.331.V15.27.0	15.27.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.331.V15.27.0.docx
ETSI	ETSI TS 138 331 V15.27.0 (2024-10)	15.27.0	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138331/15.27.00_60/ts_138331v152700p.pdf
TSDSI	TSDSI STD T1.3GPP 38.331-15.27.0 V1.10.0	15.27.0	Published	02.03.2025	https://members.tdsi.in/s/fwCsrwGc88qwSJL
TTA	TTAT.3G-38.331V15.27.0	15.27.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.331V15.27.0&searchCate=TTAS

Release 16

ARIB	ARIB STD-T120-38.331.V16.18.0	16.18.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38331-gi0.pdf
ATIS	ATIS.3GPP.38.331.V16.18.0	16.18.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.331.V16.18.0	16.18.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.331.V16.18.0.docx
ETSI	ETSI TS 138 331 V16.18.0 (2024-10)	16.18.0	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138331/16.18.00_60/ts_138331v161800p.pdf
TSDSI	TSDSI STD T1.3GPP 38.331-16.18.0 V1.10.0	16.18.0	Published	02.03.2025	https://members.tdsi.in/s/DOjki3oedpSXGEg
TTA	TTAT.3G-38.331V16.18.0	16.18.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.331V16.18.0&searchCate=TTAS

Release 17

ARIB	ARIB STD-T120-38.331.V17.10.0	17.10.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38331-ha0.pdf
ATIS	ATIS.3GPP.38.331.V17.10.0	17.10.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.331.V17.10.0	17.10.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.331.V17.10.0.docx

ETSI	ETSI TS 138 331 V17.10.0 (2024-10)	17.10.0	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138331/17.10.00_60/ts_138331v171000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.331-17.10.0 V1.10.0	17.10.0	Published	02.03.2025	https://members.tdsi.in/s/EX4bWYm6dZRLGbg
TTA	TTAT.3G-38.331V17.10.0	17.10.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.331V17.10.0&searchCate=TTAS

Release 18

ARIB	ARIB STD-T120-38.331.V18.3.0	18.3.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38331-i30.pdf
ATIS	ATIS.3GPP.38.331.V18.3.0	18.3.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.331.V18.3.0	18.3.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.38.331.V18.3.0.docx
ETSI	ETSI TS 138 331 V18.3.0 (2024-10)	18.3.0	Published	14.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138331/18.03.00_60/ts_138331v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.331-18.3.0 V1.1.0	18.3.0	Published	02.03.2025	https://members.tdsi.in/s/nDAKGfrfBEMeK7R
TTA	TTAT.3G-38.331V18.3.0	18.3.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.331V18.3.0&searchCate=TTAS

1.2.1.3.29 TS 38.340**NR; Backhaul Adaptation Protocol (BAP) specification**

This document provides description of the Backhaul Adaptation Protocol (BAP).

SDO	Document No.	Version	Status	Issued date	Location
Release 16					
ARIB	ARIB STD-T120-38.340.V16.5.0	16.5.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38340-g50.pdf
ATIS	ATIS.3GPP.38.340.V16.5.0	16.5.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.340.V16.5.0	16.5.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.38.340.V16.5.0.docx
ETSI	ETSI TS 138 340 V16.5.0 (2021-09)	16.5.0	Published	09.10.2021	https://www.etsi.org/deliver/etsi_ts/138300_138399/138340/16.05.00_60/ts_138340v160500p.pdf
TSDSI	TSDSI STD T1.3GPP 38.340-16.5.0 V1.1.0	16.5.0	Published	29.07.2022	https://members.tdsi.in/s/tjzJW53jLXbX8Ni
TTA	TTAT.3G-38.340V16.5.0	16.5.0	Published	30.09.2021	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.340V16.5.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-38.340.V17.5.0	17.5.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38340-h50.pdf
ATIS	ATIS.3GPP.38.340.V17.5.0	17.5.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.340.V17.5.0	17.5.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.38.340.V17.5.0.docx
ETSI	ETSI TS 138 340 V17.5.0 (2023-07)	17.5.0	Published	26.07.2023	https://www.etsi.org/deliver/etsi_ts/138300_138399/138340/17.05.00_60/ts_138340v170500p.pdf
TSDSI	TSDSI STD T1.3GPP 38.340-17.5.0 V1.5.0	17.5.0	Published	11.02.2023	https://members.tdsi.in/s/ZBWpWYL4XE67dpa
TTA	TTAT.3G-38.340V17.5.0	17.5.0	Published	27.10.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.340V17.5.0&searchCate=TTAS
Release 18					
ARIB	ARIB STD-T120-38.340.V18.1.0	18.1.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38340-i10.pdf
ATIS	ATIS.3GPP.38.340.V18.1.0	18.1.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.340.V18.1.0	18.1.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.38.340.V18.1.0.docx
ETSI	ETSI TS 138 340 V18.1.0 (2024-10)	18.1.0	Published	14.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138340/18.01.00_60/ts_138340v180100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.340-18.1.0 V1.1.0	18.1.0	Published	02.03.2025	https://members.tdsi.in/s/S3nKBGg3yxp8kKi
TTA	TTAT.3G-38.340V18.1.0	18.1.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.340V18.1.0&searchCate=TTAS

1.2.1.3.30 TS 38.351**NR; Sidelink Relay Adaptation Protocol (SRAP) Specification**

This document provides description of the Sidelink Relay Adaptation Protocol (SRAP).

SDO	Document No.	Version	Status	Issued date	Location
Release 17					
ARIB	ARIB STD-T120-38.351.V17.7.0	17.7.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38351-h70.pdf
ATIS	ATIS.3GPP.38.351.V17.7.0	17.7.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.351.V17.7.0	17.7.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.351.V17.7.0.docx
ETSI	ETSI TS 138 351 V17.7.0 (2024-05)	17.7.0	Published	13.05.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138351/17.07.00_60/ts_138351v170700p.pdf
TSDSI	TSDSI STD T1.3GPP 38.351-17.7.0 V1.7.0	17.7.0	Published	22.07.2024	https://members.tdsi.in/s/yJ6HZg74NWQ5ZYQ
TTA	TTAT.3G-38.351V17.7.0	17.7.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.351V17.7.0&searchCate=TTAS
Release 18					
ARIB	ARIB STD-T120-38.351.V18.2.0	18.2.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38351-i20.pdf
ATIS	ATIS.3GPP.38.351.V18.2.0	18.2.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.351.V18.2.0	18.2.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.351.V18.2.0.docx
ETSI	ETSI TS 138 351 V18.2.0 (2024-08)	18.2.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138351/18.02.00_60/ts_138351v180200p.pdf
TSDSI	TSDSI STD T1.3GPP 38.351-18.2.0 V1.0.0	18.2.0	Published	19.11.2024	https://members.tdsi.in/s/gqPgJxJiD3xsof2
TTA	TTAT.3G-38.351V18.2.0	18.2.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.351V18.2.0&searchCate=TTAS

1.2.1.3.31 TS 38.355**NR; Sidelink Positioning Protocol (SLPP); Protocol Specification**

This document specifies the Sidelink Positioning Protocol (SLPP) for the interface between UEs and between UE and LMF.

SDO	Document No.	Version	Status	Issued date	Location
Release 18					
ARIB	ARIB STD-T120-38.355.V18.3.0	18.3.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38355-i30.pdf
ATIS	ATIS.3GPP.38.355.V18.3.0	18.3.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.355.V18.3.0	18.3.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.355.V18.3.0.docx
ETSI	ETSI TS 138 355 V18.3.0 (2024-10)	18.3.0	Published	14.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138355/18.03.00_60/ts_138355v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.355-18.3.0 V1.1.0	18.3.0	Published	19.11.2024	https://members.tdsi.in/s/ZoJkX4tACYAqErN
TTA	TTAT.3G-38.355V18.3.0	18.3.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.355V18.3.0&searchCate=TTAS

1.2.1.4 Architecture

1.2.1.4.1 TS 36.401

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Architecture description

This document describes the overall architecture of the E-UTRAN, including internal interfaces and assumptions on the radio, S1 and X2 interfaces.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.36.401V1510	15.1.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.401V1510	15.1.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.401V1510.doc
ETSI	ETSI TS 136 401 V15.1.0 (2019-04)	15.1.0	Published	17.04.2019	https://www.etsi.org/deliver/etsi_ts/136400_136499/136401/15.01.00_60/ts_136401v150100p.pdf
TSDSI	TSDSI STD T1.3GPP 36.401-15.1.0 V1.0.0	15.1.0	Published	30.08.2021	https://members.tdsi.in/s/nHBd9ksFmYCjFLG
TTA	TTAT.3G-36.401V15.1.0	15.1.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.401V15.1.0&searchCate=TTAS
TTC	TS-3GA-36.401(Rel15)v15.1.0	15.1.0	Published	29.03.2019	https://www.ttc.or.jp/st/docs/3gpps2019/TS/TS-3GA-36.401(Rel15)v15.1.0.pdf
Release 16					
ATIS	ATIS.3GPP.36.401V1600	16.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.401V1600	16.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.401V1600.doc
ETSI	ETSI TS 136 401 V16.0.0 (2020-07)	16.0.0	Published	21.07.2020	https://www.etsi.org/deliver/etsi_ts/136400_136499/136401/16.00.00_60/ts_136401v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.401-16.0.0 V1.0.0	16.0.0	Published	30.08.2021	https://members.tdsi.in/s/wkNnEbDwGWZqgT6
TTA	TTAT.3G-36.401V16.0.0	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.401V16.0.0&searchCate=TTAS
TTC	TS-3GA-36.401(Rel16)v16.0.0	16.0.0	Published	02.10.2020	https://www.ttc.or.jp/st/docs/3gpps2020/TS/TS-3GA-36_401_Rel16v16_0_0.pdf
Release 17					
ATIS	ATIS.3GPP.36.401.V17.1.0	17.1.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.401.V17.1.0	17.1.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.401.V17.1.0.docx
ETSI	ETSI TS 136 401 V17.1.0 (2022-07)	17.1.0	Published	18.07.2022	https://www.etsi.org/deliver/etsi_ts/136400_136499/136401/17.01.00_60/ts_136401v170100p.pdf
TSDSI	TSDSI STD T1.3GPP 36.401-17.1.0 V1.1.0	17.1.0	Published	29.07.2022	https://members.tdsi.in/s/wxfLFZZ6PS4xKKb
TTA	TTAT.3G-36.401V17.1.0	17.1.0	Published	21.10.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.401V17.1.0&searchCate=TTAS
TTC	TS-3GA-36.401(Rel17)v17.1.0	17.1.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-36.401v17.1.0.pdf
Release 18					
ATIS	ATIS.3GPP.36.401.V18.1.0	18.1.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.401.V18.1.0	18.1.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.401.V18.1.0.docx
ETSI	ETSI TS 136 401 V18.1.0 (2024-08)	18.1.0	Published	02.08.2024	https://www.etsi.org/deliver/etsi_ts/136400_136499/136401/18.01.00_60/ts_136401v180100p.pdf
TSDSI	TSDSI STD T1.3GPP 36.401-18.1.0 V1.0.0	18.1.0	Published	19.11.2024	https://members.tdsi.in/s/EJWWJfJkPBa97mx
TTA	TTAT.3G-36.401V18.1.0	18.1.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.401V18.1.0&searchCate=TTAS
TTC	TS-3GA-36.401(Rel18)v18.1.0	18.1.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-36.401v18.1.0.pdf

1.2.1.4.2 TS 36.410

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 general aspects and principles

This document is an introduction to the 3GPP TS 36.41x series of technical specifications that define the S1 interface for the interconnection of the eNodeB component of the Evolved Universal Terrestrial Radio Access Network (E UTRAN) to the Core Network of the EPS system.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.36.410V1500	15.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.410V1500	15.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.410V1500.doc
ETSI	ETSI TS 136 410 V15.0.0 (2018-07)	15.0.0	Published	04.07.2018	https://www.etsi.org/deliver/etsi_ts/136400_136499/136410/15.00.00_60/ts_136410v150000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.410-15.0.0 V1.0.0	15.0.0	Published	30.08.2021	https://members.tdsi.in/s/bAyxXr7JwEotEcJ
TTA	TTAT.3G-36.410V15.0.0	15.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.410V15.0.0&searchCate=TTAS
TTC	TS-3GA-36.410(Rel15)v15.0.0	15.0.0	Published	28.09.2018	https://www.ttc.or.jp/st/docs/3gpps2018/TS/TS-3GA-36.410(Rel15)v15.0.0.pdf
Release 16					
ATIS	ATIS.3GPP.36.410V1600	16.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.410V1600	16.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.410V1600.doc
ETSI	ETSI TS 136 410 V16.0.0 (2020-07)	16.0.0	Published	21.07.2020	https://www.etsi.org/deliver/etsi_ts/136400_136499/136410/16.00.00_60/ts_136410v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.410-16.0.0 V1.0.0	16.0.0	Published	30.08.2021	https://members.tdsi.in/s/drBHjRsDLd95ENW
TTA	TTAT.3G-36.410V16.0.0	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.410V16.0.0&searchCate=TTAS
TTC	TS-3GA-36.410(Rel16)v16.0.0	16.0.0	Published	02.10.2020	https://www.ttc.or.jp/st/docs/3gpps2020/TS/TS-3GA-36_410_Rel16v16_0_0.pdf
Release 17					
ATIS	ATIS.3GPP.36.410.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.410.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.410.V17.0.0.doc
ETSI	ETSI TS 136 410 V17.0.0 (2022-05)	17.0.0	Published	02.05.2022	https://www.etsi.org/deliver/etsi_ts/136400_136499/136410/17.00.00_60/ts_136410v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.410-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/k5rFdBBQWB47gfw
TTA	TTAT.3G-36.410V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.410V17.0.0&searchCate=TTAS
TTC	TS-3GA-36.410(Rel17)v17.0.0	17.0.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-36.410v17.0.0.pdf
Release 18					
ATIS	ATIS.3GPP.36.410.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.410.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.410.V18.0.0.docx
ETSI	ETSI TS 136 410 V18.0.0 (2024-05)	18.0.0	Published	02.05.2024	https://www.etsi.org/deliver/etsi_ts/136400_136499/136410/18.00.00_60/ts_136410v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.410-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/eBinF4pTp6yXRZW
TTA	TTAT.3G-36.410V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.410V18.0.0&searchCate=TTAS
TTC	TS-3GA-36.410(Rel18)v18.0.0	18.0.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-36.410v18.0.0.pdf

1.2.1.4.3 TS 36.411

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 layer 1

This document specifies the standards allowed to implement layer 1 on the S1 interface. The specification of transmission delay requirements and O&M requirements are not in the scope of this document. In the following, “layer 1” and “physical layer” are assumed to be synonymous.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.36.411V1500	15.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.411V1500	15.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.411V1500.doc
ETSI	ETSI TS 136 411 V15.0.0 (2018-07)	15.0.0	Published	04.07.2018	https://www.etsi.org/deliver/etsi_ts/136400_136499/136411/15.00.00_60/ts_136411v150000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.411-15.0.0 V1.0.0	15.0.0	Published	30.08.2021	https://members.tdsi.in/s/cHcgcsjks8dKW0
TTA	TTAT.3G-36.411V15.0.0	15.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.411V15.0.0&searchCate=TTAS
TTC	TS-3GA-36.411(Rel15)v15.0.0	15.0.0	Published	28.09.2018	https://www.ttc.or.jp/st/docs/3gpps2018/TS/TS-3GA-36.411(Rel15)v15.0.0.pdf
Release 16					
ATIS	ATIS.3GPP.36.411V1600	16.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.411V1600	16.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.411V1600.doc
ETSI	ETSI TS 136 411 V16.0.0 (2020-07)	16.0.0	Published	21.07.2020	https://www.etsi.org/deliver/etsi_ts/136400_136499/136411/16.00.00_60/ts_136411v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.411-16.0.0 V1.0.0	16.0.0	Published	30.08.2021	https://members.tdsi.in/s/zJWG7jn9e5T5nGd
TTA	TTAT.3G-36.411V16.0.0	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.411V16.0.0&searchCate=TTAS
TTC	TS-3GA-36.411(Rel16)v16.0.0	16.0.0	Published	02.10.2020	https://www.ttc.or.jp/st/docs/3gpps2020/TS/TS-3GA-36_411_Rel16v16_0_0.pdf
Release 17					
ATIS	ATIS.3GPP.36.411.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.411.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.411.V17.0.0.doc
ETSI	ETSI TS 136 411 V17.0.0 (2022-05)	17.0.0	Published	02.05.2022	https://www.etsi.org/deliver/etsi_ts/136400_136499/136411/17.00.00_60/ts_136411v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.411-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/Y2nP7kcCS8qHpiA
TTA	TTAT.3G-36.411V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.411V17.0.0&searchCate=TTAS
TTC	TS-3GA-36.411(Rel17)v17.0.0	17.0.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-36.411v17.0.0.pdf
Release 18					
ATIS	ATIS.3GPP.36.411.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.411.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.411.V18.0.0.docx
ETSI	ETSI TS 136 411 V18.0.0 (2024-05)	18.0.0	Published	02.05.2024	https://www.etsi.org/deliver/etsi_ts/136400_136499/136411/18.00.00_60/ts_136411v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.411-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/gWBDfyJitwMkZLK
TTA	TTAT.3G-36.411V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.411V18.0.0&searchCate=TTAS
TTC	TS-3GA-36.411(Rel18)v18.0.0	18.0.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-36.411v18.0.0.pdf

1.2.1.4.4 TS 36.412

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 signalling transport

This document specifies the standards for signalling transport to be used across S1 interface. S1 interface is a logical interface between the eNodeB and the E-UTRAN core network. This document describes how the S1-AP signalling messages are transported over S1.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.36.412V1500	15.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.412V1500 3_SUIT_ATIS/CCSA.3GPP.36.412V1500.doc	15.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 136 412 V15.0.0 (2018-07)	15.0.0	Published	04.07.2018	https://www.etsi.org/deliver/etsi_ts/136400_136499/136412/15.00.00_60/ts_136412v150000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.412-15.0.0 V1.0.0	15.0.0	Published	30.08.2021	https://members.tdsi.in/s/34dWPGwsKxE6ksi
TTA	TTAT.3G-36.412V15.0.0 36.412V15.0.0&searchCate=TTAS	15.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-36.412(Rel15)v15.0.0	15.0.0	Published	28.09.2018	https://www.ttc.or.jp/st/docs/3gpps2018/TS/TS-3GA-36.412(Rel15)v15.0.0.pdf
Release 16					
ATIS	ATIS.3GPP.36.412V1600	16.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.412V1600 3_SUIT_ATIS/CCSA.3GPP.36.412V1600.doc	16.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 136 412 V16.0.0 (2020-09)	16.0.0	Published	21.09.2020	https://www.etsi.org/deliver/etsi_ts/136400_136499/136412/16.00.00_60/ts_136412v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.412-16.0.0 V1.0.0	16.0.0	Published	30.08.2021	https://members.tdsi.in/s/fZX8fFEizm3SiHq
TTA	TTAT.3G-36.412V16.0.0 36.412V16.0.0&searchCate=TTAS	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-36.412(Rel16)v16.0.0	16.0.0	Published	02.10.2020	https://www.ttc.or.jp/st/docs/3gpps2020/TS/TS-3GA-36_412_Rel16v16_0_0.pdf
Release 17					
ATIS	ATIS.3GPP.36.412.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.412.V17.0.0 3_SUIT_ATIS/CCSA.3GPP.36.412.V17.0.0.doc	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 136 412 V17.0.0 (2022-05)	17.0.0	Published	02.05.2022	https://www.etsi.org/deliver/etsi_ts/136400_136499/136412/17.00.00_60/ts_136412v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.412-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/7qr2QKzmGQNw8Ba
TTA	TTAT.3G-36.412V17.0.0 36.412V17.0.0&searchCate=TTAS	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-36.412(Rel17)v17.0.0	17.0.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-36.412v17.0.0.pdf
Release 18					
ATIS	ATIS.3GPP.36.412.V18.1.0	18.1.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.412.V18.1.0 3_SUIT_ATIS/CCSA.3GPP.36.412.V18.1.0.docx	18.1.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 136 412 V18.1.0 (2024-08)	18.1.0	Published	02.08.2024	https://www.etsi.org/deliver/etsi_ts/136400_136499/136412/18.01.00_60/ts_136412v180100p.pdf
TSDSI	TSDSI STD T1.3GPP 36.412-18.1.0 V1.0.0	18.1.0	Published	19.11.2024	https://members.tdsi.in/s/CKn85KqeYMoeTEZ
TTA	TTAT.3G-36.412V18.1.0 36.412V18.1.0&searchCate=TTAS	18.1.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-36.412(Rel18)v18.1.0	18.1.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-36.412v18.1.0.pdf

1.2.1.4.5 TS 36.413

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 Application Protocol (S1AP)

This document specifies the E-UTRAN radio network layer signalling protocol for the S1 interface. The S1 Application Protocol (S1AP) supports the functions of S1 interface by signalling procedures defined in this document.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.36.413.V15.11.0	15.11.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.413.V15.11.0	15.11.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_S1AP_ATIS/CCSA.3GPP.36.413.V15.11.0.doc
ETSI	ETSI TS 136 413 V15.11.0 (2022-05)	15.11.0	Published	02.05.2022	https://www.etsi.org/deliver/etsi_ts/136400_136499/136413/15.11.00_60/ts_136413v151100p.pdf
TSDSI	TSDSI STD T1.3GPP 36.413-15.11.0 V1.1.0	15.11.0	Published	29.07.2022	https://members.tdsi.in/s/7X4P2N8kFwKstio
TTA	TTAT.3G-36.413V15.11.0	15.11.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.413V15.11.0&searchCate=TTAS
TTC	TS-3GA-36.413(Rel15)v15.11.0	15.11.0	Published	08.07.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-36.413v15.11.0.pdf
Release 16					
ATIS	ATIS.3GPP.36.413.V16.14.0	16.14.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.413.V16.14.0	16.14.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_S1AP_ATIS/CCSA.3GPP.36.413.V16.14.0.docx
ETSI	ETSI TS 136 413 V16.14.0 (2024-04)	16.14.0	Published	22.04.2024	https://www.etsi.org/deliver/etsi_ts/136400_136499/136413/16.14.00_60/ts_136413v161400p.pdf
TSDSI	TSDSI STD T1.3GPP 36.413-16.14.0 V1.5.0	16.14.0	Published	22.07.2024	https://members.tdsi.in/s/cyxQeg2pGoX877N
TTA	TTAT.3G-36.413V16.14.0	16.14.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.413V16.14.0&searchCate=TTAS
TTC	TS-3GA-36.413(Rel16)v16.14.0	16.14.0	Published	05.07.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-36.413v16.14.0.pdf
Release 17					
ATIS	ATIS.3GPP.36.413.V17.6.0	17.6.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.413.V17.6.0	17.6.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_S1AP_ATIS/CCSA.3GPP.36.413.V17.6.0.docx
ETSI	ETSI TS 136 413 V17.6.0 (2024-04)	17.6.0	Published	22.04.2024	https://www.etsi.org/deliver/etsi_ts/136400_136499/136413/17.06.00_60/ts_136413v170600p.pdf
TSDSI	TSDSI STD T1.3GPP 36.413-17.6.0 V1.6.0	17.6.0	Published	22.07.2024	https://members.tdsi.in/s/oDoG4EnorbceJoNx
TTA	TTAT.3G-36.413V17.6.0	17.6.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.413V17.6.0&searchCate=TTAS
TTC	TS-3GA-36.413(Rel17)v17.6.0	17.6.0	Published	05.07.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-36.413v17.6.0.pdf
Release 18					
ATIS	ATIS.3GPP.36.413.V18.2.0	18.2.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.413.V18.2.0	18.2.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_S1AP_ATIS/CCSA.3GPP.36.413.V18.2.0.docx
ETSI	ETSI TS 136 413 V18.2.0 (2024-08)	18.2.0	Published	02.08.2024	https://www.etsi.org/deliver/etsi_ts/136400_136499/136413/18.02.00_60/ts_136413v180200p.pdf
TSDSI	TSDSI STD T1.3GPP 36.413-18.2.0 V1.0.0	18.2.0	Published	19.11.2024	https://members.tdsi.in/s/wNfAnyYdYGjXide
TTA	TTAT.3G-36.413V18.2.0	18.2.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.413V18.2.0&searchCate=TTAS
TTC	TS-3GA-36.413(Rel18)v18.2.0	18.2.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-36.413v18.2.0.pdf

1.2.1.4.6 TS 36.414

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 data transport

This document specifies the standards for user data transport protocols and related signalling protocols to establish user plane transport bearers over the S1 interface.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.36.414V1500	15.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.414V1500 3_SMIT_ATIS/CCSA.3GPP.36.414V1500.doc	15.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 136 414 V15.0.0 (2018-07)	15.0.0	Published	04.07.2018	https://www.etsi.org/deliver/etsi_ts/136400_136499/136414/15.00.00_60/ts_136414v150000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.414-15.0.0 V1.0.0	15.0.0	Published	30.08.2021	https://members.tdsi.in/s/CYPiswRDxMFDRsK
TTA	TTAT.3G-36.414V15.0.0 36.414V15.0.0&searchCate=TTAS	15.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-36.414(Rel15)v15.0.0	15.0.0	Published	28.09.2018	https://www.ttc.or.jp/st/docs/3gpps2018/TS/TS-3GA-36.414(Rel15)v15.0.0.pdf
Release 16					
ATIS	ATIS.3GPP.36.414V1600	16.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.414V1600 3_SMIT_ATIS/CCSA.3GPP.36.414V1600.doc	16.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 136 414 V16.0.0 (2020-07)	16.0.0	Published	21.07.2020	https://www.etsi.org/deliver/etsi_ts/136400_136499/136414/16.00.00_60/ts_136414v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.414-16.0.0 V1.0.0	16.0.0	Published	30.08.2021	https://members.tdsi.in/s/YRpiZKGTpN9pEZ8
TTA	TTAT.3G-36.414V16.0.0 36.414V16.0.0&searchCate=TTAS	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-36.414(Rel16)v16.0.0	16.0.0	Published	02.10.2020	https://www.ttc.or.jp/st/docs/3gpps2020/TS/TS-3GA-36_414_Rel16v16_0_0.pdf
Release 17					
ATIS	ATIS.3GPP.36.414.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.414.V17.0.0 3_SMIT_ATIS/CCSA.3GPP.36.414.V17.0.0.doc	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 136 414 V17.0.0 (2022-05)	17.0.0	Published	02.05.2022	https://www.etsi.org/deliver/etsi_ts/136400_136499/136414/17.00.00_60/ts_136414v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.414-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/PGQnfxGM4BCDemL
TTA	TTAT.3G-36.414V17.0.0 36.414V17.0.0&searchCate=TTAS	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-36.414(Rel17)v17.0.0	17.0.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-36.414v17.0.0.pdf
Release 18					
ATIS	ATIS.3GPP.36.414.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.414.V18.0.0 3_SMIT_ATIS/CCSA.3GPP.36.414.V18.0.0.docx	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 136 414 V18.0.0 (2024-05)	18.0.0	Published	02.05.2024	https://www.etsi.org/deliver/etsi_ts/136400_136499/136414/18.00.00_60/ts_136414v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.414-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/afydcjX3p2F7jGx
TTA	TTAT.3G-36.414V18.0.0 36.414V18.0.0&searchCate=TTAS	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-36.414(Rel18)v18.0.0	18.0.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-36.414v18.0.0.pdf

1.2.1.4.7 TS 36.420

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); X2 general aspects and principles

This document is an introduction to the TSG RAN TS 36.42x series of UMTS technical specifications that define the X2 interface. It is an interface for the interconnection of two E-UTRAN NodeB (eNodeB) components within the Evolved Universal Terrestrial Radio Access Network (E-UTRAN) architecture.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.36.420V1520	15.2.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.420V1520	15.2.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.420V1520.doc
ETSI	ETSI TS 136 420 V15.2.0 (2020-01)	15.2.0	Published	17.01.2020	https://www.etsi.org/deliver/etsi_ts/136400_136499/136420/15.02.00_60/ts_136420v150200p.pdf
TSDSI	TSDSI STD T1.3GPP 36.420-15.2.0 V1.0.0	15.2.0	Published	30.08.2021	https://members.tdsi.in/s/zLxHn56E7FJwYc8
TTA	TTAT.3G-36.420V15.2.0	15.2.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.420V15.2.0&searchCate=TTAS
TTC	TS-3GA-36.420(Rel15)v15.2.0	15.2.0	Published	16.04.2020	https://www.ttc.or.jp/st/docs/3gpps2020/TS/TS-3GA-36_420_Rel15v15_2_0.pdf
Release 16					
ATIS	ATIS.3GPP.36.420V1600	16.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.420V1600	16.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.420V1600.doc
ETSI	ETSI TS 136 420 V16.0.0 (2020-07)	16.0.0	Published	23.07.2020	https://www.etsi.org/deliver/etsi_ts/136400_136499/136420/16.00.00_60/ts_136420v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.420-16.0.0 V1.0.0	16.0.0	Published	30.08.2021	https://members.tdsi.in/s/f86J3n48qi3ggzN
TTA	TTAT.3G-36.420V16.0.0	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.420V16.0.0&searchCate=TTAS
TTC	TS-3GA-36.420(Rel16)v16.0.0	16.0.0	Published	02.10.2020	https://www.ttc.or.jp/st/docs/3gpps2020/TS/TS-3GA-36_420_Rel16v16_0_0.pdf
Release 17					
ATIS	ATIS.3GPP.36.420.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.420.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.420.V17.0.0.doc
ETSI	ETSI TS 136 420 V17.0.0 (2022-05)	17.0.0	Published	02.05.2022	https://www.etsi.org/deliver/etsi_ts/136400_136499/136420/17.00.00_60/ts_136420v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.420-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/tXApqE79pfA2HRE
TTA	TTAT.3G-36.420V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.420V17.0.0&searchCate=TTAS
TTC	TS-3GA-36.420(Rel17)v17.0.0	17.0.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-36.420v17.0.0.pdf
Release 18					
ATIS	ATIS.3GPP.36.420.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.420.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.420.V18.0.0.docx
ETSI	ETSI TS 136 420 V18.0.0 (2024-05)	18.0.0	Published	02.05.2024	https://www.etsi.org/deliver/etsi_ts/136400_136499/136420/18.00.00_60/ts_136420v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.420-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/KBEYcKMEmts2T7Y
TTA	TTAT.3G-36.420V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.420V18.0.0&searchCate=TTAS
TTC	TS-3GA-36.420(Rel18)v18.0.0	18.0.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-36.420v18.0.0.pdf

1.2.1.4.8 TS 36.421

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); X2 layer 1

This document specifies the standards allowed to implement Layer 1 on the X2 interface. The specification of transmission delay requirements and O&M requirements are not in the scope of this document. In the following “Layer 1” and “Physical Layer” are assumed to be synonymous.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.36.421V1500	15.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.421V1500 3_SRR1_ATIS/CCSA.3GPP.36.421V1500.doc	15.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 136 421 V15.0.0 (2018-07)	15.0.0	Published	04.07.2018	https://www.etsi.org/deliver/etsi_ts/136400_136499/136421/15.00.00_60/ts_136421v150000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.421-15.0.0 V1.0.0	15.0.0	Published	30.08.2021	https://members.tdsi.in/s/Jde5LGPqzSwykw
TTA	TTAT.3G-36.421V15.0.0 36.421V15.0.0&searchCate=TTAS	15.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-36.421(Rel15)v15.0.0	15.0.0	Published	28.09.2018	https://www.ttc.or.jp/st/docs/3gpps2018/TS/TS-3GA-36.421(Rel15)v15.0.0.pdf
Release 16					
ATIS	ATIS.3GPP.36.421V1600	16.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.421V1600 3_SRR1_ATIS/CCSA.3GPP.36.421V1600.doc	16.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 136 421 V16.0.0 (2020-07)	16.0.0	Published	21.07.2020	https://www.etsi.org/deliver/etsi_ts/136400_136499/136421/16.00.00_60/ts_136421v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.421-16.0.0 V1.0.0	16.0.0	Published	30.08.2021	https://members.tdsi.in/s/K9xBMbjrZK72Qkd
TTA	TTAT.3G-36.421V16.0.0 36.421V16.0.0&searchCate=TTAS	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-36.421(Rel16)v16.0.0	16.0.0	Published	02.10.2020	https://www.ttc.or.jp/st/docs/3gpps2020/TS/TS-3GA-36_421_Rel16v16_0_0.pdf
Release 17					
ATIS	ATIS.3GPP.36.421.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.421.V17.0.0 3_SRR1_ATIS/CCSA.3GPP.36.421.V17.0.0.doc	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 136 421 V17.0.0 (2022-05)	17.0.0	Published	02.05.2022	https://www.etsi.org/deliver/etsi_ts/136400_136499/136421/17.00.00_60/ts_136421v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.421-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/LC2cq7ixHnrkokm
TTA	TTAT.3G-36.421V17.0.0 36.421V17.0.0&searchCate=TTAS	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-36.421(Rel17)v17.0.0	17.0.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-36.421v17.0.0.pdf
Release 18					
ATIS	ATIS.3GPP.36.421.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.421.V18.0.0 3_SRR1_ATIS/CCSA.3GPP.36.421.V18.0.0.docx	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 136 421 V18.0.0 (2024-05)	18.0.0	Published	02.05.2024	https://www.etsi.org/deliver/etsi_ts/136400_136499/136421/18.00.00_60/ts_136421v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.421-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/64HGRfiKRnffB4Z
TTA	TTAT.3G-36.421V18.0.0 36.421V18.0.0&searchCate=TTAS	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-36.421(Rel18)v18.0.0	18.0.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-36.421v18.0.0.pdf

1.2.1.4.9 TS 36.422

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); X2 signalling transport

This document specifies the standards for Signalling Transport to be used across X2 interface. X2 interface is a logical interface between eNodeBs. This document describes how the X2-AP signalling messages are transported over X2.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.36.422V1510	15.1.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.422V1510	15.1.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.422V1510.docx
ETSI	ETSI TS 136 422 V15.1.0 (2019-04)	15.1.0	Published	17.04.2019	https://www.etsi.org/deliver/etsi_ts/136400_136499/136422/15.01.00_60/ts_136422v150100p.pdf
TSDSI	TSDSI STD T1.3GPP 36.422-15.1.0 V1.0.0	15.1.0	Published	30.08.2021	https://members.tdsi.in/s/TmfTBJ5fFffW8wE
TTA	TTAT.3G-36.422V15.1.0	15.1.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.422V15.1.0&searchCate=TTAS
TTC	TS-3GA-36.422(Rel15)v15.1.0	15.1.0	Published	29.03.2019	https://www.ttc.or.jp/st/docs/3gpps2019/TS/TS-3GA-36.422(Rel15)v15.1.0.pdf
Release 16					
ATIS	ATIS.3GPP.36.422.V16.2.0	16.2.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.422.V16.2.0	16.2.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.422.V16.2.0.docx
ETSI	ETSI TS 136 422 V16.2.0 (2023-07)	16.2.0	Published	18.07.2023	https://www.etsi.org/deliver/etsi_ts/136400_136499/136422/16.02.00_60/ts_136422v160200p.pdf
TSDSI	TSDSI STD T1.3GPP 36.422-16.2.0 V1.2.0	16.2.0	Published	11.02.2023	https://members.tdsi.in/s/mifWjswLzNY3Eg4
TTA	TTAT.3G-36.422V16.2.0	16.2.0	Published	27.10.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.422V16.2.0&searchCate=TTAS
TTC	TS-3GA-36.422(Rel16)v16.2.0	16.2.0	Published	05.10.2023	https://www.ttc.or.jp/st/docs/3gpp/2023/TS/TS-3GA-36.422v16.2.0.pdf
Release 17					
ATIS	ATIS.3GPP.36.422.V17.1.0	17.1.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.422.V17.1.0	17.1.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.422.V17.1.0.docx
ETSI	ETSI TS 136 422 V17.1.0 (2023-07)	17.1.0	Published	18.07.2023	https://www.etsi.org/deliver/etsi_ts/136400_136499/136422/17.01.00_60/ts_136422v170100p.pdf
TSDSI	TSDSI STD T1.3GPP 36.422-17.1.0 V1.1.0	17.1.0	Published	11.02.2023	https://members.tdsi.in/s/gBdC7yAcaTfTJqB
TTA	TTAT.3G-36.422V17.1.0	17.1.0	Published	27.10.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.422V17.1.0&searchCate=TTAS
TTC	TS-3GA-36.422(Rel17)v17.1.0	17.1.0	Published	05.10.2023	https://www.ttc.or.jp/st/docs/3gpp/2023/TS/TS-3GA-36.422v17.1.0.pdf
Release 18					
ATIS	ATIS.3GPP.36.422.V18.1.0	18.1.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.422.V18.1.0	18.1.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.422.V18.1.0.docx
ETSI	ETSI TS 136 422 V18.1.0 (2024-08)	18.1.0	Published	02.08.2024	https://www.etsi.org/deliver/etsi_ts/136400_136499/136422/18.01.00_60/ts_136422v180100p.pdf
TSDSI	TSDSI STD T1.3GPP 36.422-18.1.0 V1.0.0	18.1.0	Published	19.11.2024	https://members.tdsi.in/s/s7z34BwXxctCT2z
TTA	TTAT.3G-36.422V18.1.0	18.1.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.422V18.1.0&searchCate=TTAS
TTC	TS-3GA-36.422(Rel18)v18.1.0	18.1.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-36.422v18.1.0.pdf

1.2.1.4.10 TS 36.423**Evolved Universal Terrestrial Radio Access Network (E-UTRAN); X2 Application Protocol (X2AP)**

This document specifies the radio network layer signalling procedures of the control plane between eNodeBs in E-UTRAN. X2AP supports the functions of X2 interface by signalling procedures defined in this document.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.36.423.V15.14.0	15.14.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.423.V15.14.0	15.14.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.423.V15.14.0.docx
ETSI	ETSI TS 136 423 V15.14.0 (2023-10)	15.14.0	Published	02.10.2023	https://www.etsi.org/deliver/etsi_ts/136400_136499/136423/15.14.00_60/ts_136423v151400p.pdf
TSDSI	TSDSI STD T1.3GPP 36.423-15.14.0 V1.2.0	15.14.0	Published	23.02.2024	https://members.tdsi.in/s/eZA7Yo2PxxAktM3
TTA	TTAT.3G-36.423V15.14.0	15.14.0	Published	13.02.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.423V15.14.0&searchCate=TTAS
TTC	TS-3GA-36.423(Rel15)v15.14.0	15.14.0	Published	12.01.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-36.423v15.14.0.pdf
Release 16					
ATIS	ATIS.3GPP.36.423.V16.13.0	16.13.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.423.V16.13.0	16.13.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.423.V16.13.0.docx
ETSI	ETSI TS 136 423 V16.13.0 (2024-04)	16.13.0	Published	22.04.2024	https://www.etsi.org/deliver/etsi_ts/136400_136499/136423/16.13.00_60/ts_136423v161300p.pdf
TSDSI	TSDSI STD T1.3GPP 36.423-16.13.0 V1.4.0	16.13.0	Published	22.07.2024	https://members.tdsi.in/s/Cm9fxwQf385KCKF
TTA	TTAT.3G-36.423V16.13.0	16.13.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.423V16.13.0&searchCate=TTAS
TTC	TS-3GA-36.423(Rel16)v16.13.0	16.13.0	Published	05.07.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-36.423v16.13.0.pdf
Release 17					
ATIS	ATIS.3GPP.36.423.V17.7.0	17.7.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.423.V17.7.0	17.7.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.423.V17.7.0.docx
ETSI	ETSI TS 136 423 V17.7.0 (2024-04)	17.7.0	Published	22.04.2024	https://www.etsi.org/deliver/etsi_ts/136400_136499/136423/17.07.00_60/ts_136423v170700p.pdf
TSDSI	TSDSI STD T1.3GPP 36.423-17.7.0 V1.7.0	17.7.0	Published	22.07.2024	https://members.tdsi.in/s/Zxm3B9JM3YYnwD
TTA	TTAT.3G-36.423V17.7.0	17.7.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.423V17.7.0&searchCate=TTAS
TTC	TS-3GA-36.423(Rel17)v17.7.0	17.7.0	Published	05.07.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-36.423v17.7.0.pdf
Release 18					
ATIS	ATIS.3GPP.36.423.V18.2.0	18.2.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.423.V18.2.0	18.2.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.423.V18.2.0.docx
ETSI	ETSI TS 136 423 V18.2.0 (2024-08)	18.2.0	Published	02.08.2024	https://www.etsi.org/deliver/etsi_ts/136400_136499/136423/18.02.00_60/ts_136423v180200p.pdf
TSDSI	TSDSI STD T1.3GPP 36.423-18.2.0 V1.0.0	18.2.0	Published	19.11.2024	https://members.tdsi.in/s/q2JtR44a8rozdsw
TTA	TTAT.3G-36.423V18.2.0	18.2.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.423V18.2.0&searchCate=TTAS
TTC	TS-3GA-36.423(Rel18)v18.2.0	18.2.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-36.423v18.2.0.pdf

1.2.1.4.11 TS 36.424

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); X2 data transport

This document specifies the standards for user data transport protocols and related signalling protocols to establish user plane transport bearers over the X2 interface.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.36.424V1510	15.1.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.424V1510	15.1.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.424V1510.doc
ETSI	ETSI TS 136 424 V15.1.0 (2020-01)	15.1.0	Published	17.01.2020	https://www.etsi.org/deliver/etsi_ts/136400_136499/136424/15.01.00_60/ts_136424v150100p.pdf
TSDSI	TSDSI STD T1.3GPP 36.424-15.1.0 V1.0.0	15.1.0	Published	30.08.2021	https://members.tdsi.in/s/adZtaRbafkK2KX3
TTA	TTAT.3G-36.424V15.1.0	15.1.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.424V15.1.0&searchCate=TTAS
TTC	TS-3GA-36.424(Rel15)v15.1.0	15.1.0	Published	16.04.2020	https://www.ttc.or.jp/st/docs/3gpps2020/TS/TS-3GA-36_424_Rel15v15_1_0.pdf
Release 16					
ATIS	ATIS.3GPP.36.424V1600	16.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.424V1600	16.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.424V1600.doc
ETSI	ETSI TS 136 424 V16.0.0 (2020-07)	16.0.0	Published	21.07.2020	https://www.etsi.org/deliver/etsi_ts/136400_136499/136424/16.00.00_60/ts_136424v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.424-16.0.0 V1.0.0	16.0.0	Published	30.08.2021	https://members.tdsi.in/s/J4MKFXzCqBP4cKk
TTA	TTAT.3G-36.424V16.0.0	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.424V16.0.0&searchCate=TTAS
TTC	TS-3GA-36.424(Rel16)v16.0.0	16.0.0	Published	02.10.2020	https://www.ttc.or.jp/st/docs/3gpps2020/TS/TS-3GA-36_424_Rel16v16_0_0.pdf
Release 17					
ATIS	ATIS.3GPP.36.424.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.424.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.424.V17.0.0.doc
ETSI	ETSI TS 136 424 V17.0.0 (2022-05)	17.0.0	Published	02.05.2022	https://www.etsi.org/deliver/etsi_ts/136400_136499/136424/17.00.00_60/ts_136424v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.424-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/XH8JZWpPcSH8fsL
TTA	TTAT.3G-36.424V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.424V17.0.0&searchCate=TTAS
TTC	TS-3GA-36.424(Rel17)v17.0.0	17.0.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-36.424v17.0.0.pdf
Release 18					
ATIS	ATIS.3GPP.36.424.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.424.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.424.V18.0.0.docx
ETSI	ETSI TS 136 424 V18.0.0 (2024-05)	18.0.0	Published	02.05.2024	https://www.etsi.org/deliver/etsi_ts/136400_136499/136424/18.00.00_60/ts_136424v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.424-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/aAGsQyPmBnkKor3
TTA	TTAT.3G-36.424V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.424V18.0.0&searchCate=TTAS
TTC	TS-3GA-36.424(Rel18)v18.0.0	18.0.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-36.424v18.0.0.pdf

1.2.1.4.12 TS 36.425**Evolved Universal Terrestrial Radio Access Network (E-UTRAN); X2 interface user plane protocol**

This document specifies the X2 user plane protocol being used over the X2 interface.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.36.425V1500	15.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.425V1500	15.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.36.425V1500.doc
ETSI	ETSI TS 136 425 V15.0.0 (2018-07)	15.0.0	Published	04.07.2018	https://www.etsi.org/deliver/etsi_ts/136400_136499/136425/15.00.00_60/ts_136425v150000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.425-15.0.0 V1.0.0	15.0.0	Published	30.08.2021	https://members.tdsi.in/s/CjgDkXwnxN7iGWD
TTA	TTAT.3G-36.425V15.0.0	15.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.425V15.0.0&searchCate=TTAS
TTC	TS-3GA-36.425(Rel15)v15.0.0	15.0.0	Published	28.09.2018	https://www.ttc.or.jp/st/docs/3gpps2018/TS/TS-3GA-36.425(Rel15)v15.0.0.pdf
Release 16					
ATIS	ATIS.3GPP.36.425V1600	16.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.425V1600	16.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.36.425V1600.doc
ETSI	ETSI TS 136 425 V16.0.0 (2020-07)	16.0.0	Published	21.07.2020	https://www.etsi.org/deliver/etsi_ts/136400_136499/136425/16.00.00_60/ts_136425v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.425-16.0.0 V1.0.0	16.0.0	Published	30.08.2021	https://members.tdsi.in/s/WzNrFnT5bTQJBsT
TTA	TTAT.3G-36.425V16.0.0	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.425V16.0.0&searchCate=TTAS
TTC	TS-3GA-36.425(Rel16)v16.0.0	16.0.0	Published	02.10.2020	https://www.ttc.or.jp/st/docs/3gpps2020/TS/TS-3GA-36_425_Rel16v16_0_0.pdf
Release 17					
ATIS	ATIS.3GPP.36.425.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.425.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.36.425.V17.0.0.doc
ETSI	ETSI TS 136 425 V17.0.0 (2022-05)	17.0.0	Published	02.05.2022	https://www.etsi.org/deliver/etsi_ts/136400_136499/136425/17.00.00_60/ts_136425v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.425-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/H5424CY7Pot4QRH
TTA	TTAT.3G-36.425V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.425V17.0.0&searchCate=TTAS
TTC	TS-3GA-36.425(Rel17)v17.0.0	17.0.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-36.425v17.0.0.pdf
Release 18					
ATIS	ATIS.3GPP.36.425.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.425.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.36.425.V18.0.0.docx
ETSI	ETSI TS 136 425 V18.0.0 (2024-05)	18.0.0	Published	02.05.2024	https://www.etsi.org/deliver/etsi_ts/136400_136499/136425/18.00.00_60/ts_136425v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.425-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/aj4fQjDg4YnWfxP
TTA	TTAT.3G-36.425V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.425V18.0.0&searchCate=TTAS
TTC	TS-3GA-36.425(Rel18)v18.0.0	18.0.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-36.425v18.0.0.pdf

1.2.1.4.13 TS 36.440

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); General aspects and principles for interfaces supporting Multimedia Broadcast Multicast Service (MBMS) within E-UTRAN

This document describes the overall architecture of the interface for the provision of MBMS in the E-UTRAN. This includes also a description of the general aspects, assumptions and principles guiding the architecture and interface. The MBMS functions to be provided within that architecture are summarized. It introduces the TSG RAN TS 36.44x series of UMTS technical specifications that define the different interfaces introduced for MBMS provision in E-UTRAN.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.36.440V1500	15.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.440V1500 3_SMIT_ATIS/CCSA.3GPP.36.440V1500.doc	15.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 136 440 V15.0.0 (2018-09)	15.0.0	Published	28.09.2018	https://www.etsi.org/deliver/etsi_ts/136400_136499/136440/15.00.00_60/ts_136440v150000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.440-15.0.0 V1.0.0	15.0.0	Published	30.08.2021	https://members.tdsi.in/s/zznrMt6HkE8oiAK
TTA	TTAT.3G-36.440V15.0.0 36.440V15.0.0&searchCate=TTAS	15.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-36.440(Rel15)v15.0.0	15.0.0	Published	21.12.2018	https://www.ttc.or.jp/st/docs/3gpps2018/TS/TS-3GA-36.440(Rel15)v15.0.0.pdf
Release 16					
ATIS	ATIS.3GPP.36.440V1600	16.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.440V1600 3_SMIT_ATIS/CCSA.3GPP.36.440V1600.doc	16.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 136 440 V16.0.0 (2020-07)	16.0.0	Published	21.07.2020	https://www.etsi.org/deliver/etsi_ts/136400_136499/136440/16.00.00_60/ts_136440v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.440-16.0.0 V1.0.0	16.0.0	Published	30.08.2021	https://members.tdsi.in/s/SsAzfTG8XEmcYwg
TTA	TTAT.3G-36.440V16.0.0 36.440V16.0.0&searchCate=TTAS	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-36.440(Rel16)v16.0.0	16.0.0	Published	02.10.2020	https://www.ttc.or.jp/st/docs/3gpps2020/TS/TS-3GA-36_440_Rel16v16_0_0.pdf
Release 17					
ATIS	ATIS.3GPP.36.440.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.440.V17.0.0 3_SMIT_ATIS/CCSA.3GPP.36.440.V17.0.0.doc	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 136 440 V17.0.0 (2022-05)	17.0.0	Published	02.05.2022	https://www.etsi.org/deliver/etsi_ts/136400_136499/136440/17.00.00_60/ts_136440v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.440-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/xnQSCwm265FCZTg
TTA	TTAT.3G-36.440V17.0.0 36.440V17.0.0&searchCate=TTAS	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-36.440(Rel17)v17.0.0	17.0.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-36.440v17.0.0.pdf
Release 18					
ATIS	ATIS.3GPP.36.440.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.440.V18.0.0 3_SMIT_ATIS/CCSA.3GPP.36.440.V18.0.0.docx	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 136 440 V18.0.0 (2024-05)	18.0.0	Published	02.05.2024	https://www.etsi.org/deliver/etsi_ts/136400_136499/136440/18.00.00_60/ts_136440v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.440-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/zLBYFs23ErYCKYi
TTA	TTAT.3G-36.440V18.0.0 36.440V18.0.0&searchCate=TTAS	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-

TTC TS-3GA-36.440(Rel18)v18.0.0 18.0.0 Published 04.10.2024 <https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-36.440v18.0.0.pdf>

1.2.1.4.14 TS 36.441

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Layer 1 for interfaces supporting Multimedia Broadcast Multicast Service (MBMS) within E-UTRAN

This document specifies the standards allowed to implement layer 1 on the interfaces supporting Multimedia Broadcast Multicast Service (MBMS) within E-UTRAN. In the following, “layer 1” and “physical layer” are assumed to be synonymous.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.36.441V1500	15.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.441V1500	15.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.441V1500.doc
ETSI	ETSI TS 136 441 V15.0.0 (2018-09)	15.0.0	Published	28.09.2018	https://www.etsi.org/deliver/etsi_ts/136400_136499/136441/15.00.00_60/ts_136441v150000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.441-15.0.0 V1.0.0	15.0.0	Published	30.08.2021	https://members.tdsi.in/s/swjNW6LHHi2prfL
TTA	TTAT.3G-36.441V15.0.0	15.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.441V15.0.0&searchCate=TTAS
TTC	TS-3GA-36.441(Rel15)v15.0.0	15.0.0	Published	21.12.2018	https://www.ttc.or.jp/st/docs/3gpps2018/TS/TS-3GA-36.441(Rel15)v15.0.0.pdf
Release 16					
ATIS	ATIS.3GPP.36.441V1600	16.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.441V1600	16.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.441V1600.doc
ETSI	ETSI TS 136 441 V16.0.0 (2020-07)	16.0.0	Published	21.07.2020	https://www.etsi.org/deliver/etsi_ts/136400_136499/136441/16.00.00_60/ts_136441v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.441-16.0.0 V1.0.0	16.0.0	Published	30.08.2021	https://members.tdsi.in/s/r2APqJABKfr4MHT
TTA	TTAT.3G-36.441V16.0.0	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.441V16.0.0&searchCate=TTAS
TTC	TS-3GA-36.441(Rel16)v16.0.0	16.0.0	Published	02.10.2020	https://www.ttc.or.jp/st/docs/3gpps2020/TS/TS-3GA-36_441_Rel16v16_0_0.pdf
Release 17					
ATIS	ATIS.3GPP.36.441.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.441.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.441.V17.0.0.doc
ETSI	ETSI TS 136 441 V17.0.0 (2022-05)	17.0.0	Published	02.05.2022	https://www.etsi.org/deliver/etsi_ts/136400_136499/136441/17.00.00_60/ts_136441v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.441-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/xLjcoL7YaByjEZN
TTA	TTAT.3G-36.441V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.441V17.0.0&searchCate=TTAS
TTC	TS-3GA-36.441(Rel17)v17.0.0	17.0.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-36.441v17.0.0.pdf
Release 18					
ATIS	ATIS.3GPP.36.441.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.441.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.441.V18.0.0.docx
ETSI	ETSI TS 136 441 V18.0.0 (2024-05)	18.0.0	Published	02.05.2024	https://www.etsi.org/deliver/etsi_ts/136400_136499/136441/18.00.00_60/ts_136441v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.441-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/rTW3NB3tsSPEQr5
TTA	TTAT.3G-36.441V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.441V18.0.0&searchCate=TTAS
TTC	TS-3GA-36.441(Rel18)v18.0.0	18.0.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-36.441v18.0.0.pdf

1.2.1.4.15 TS 36.442

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Signalling Transport for interfaces supporting Multimedia Broadcast Multicast Service (MBMS) within E-UTRAN

This document specifies the standards for signalling transport to be used across M2 and M3 interfaces. M2 interface is a logical interface between the eNodeB and the MCE. M3 interface is a logical interface between the MCE and the MME. This document describes how the M2-AP signalling messages are transported over M2, and how the M3-AP signalling messages are transported over M3.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.36.442V1500	15.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.442V1500	15.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.442V1500.doc
ETSI	ETSI TS 136 442 V15.0.0 (2018-09)	15.0.0	Published	28.09.2018	https://www.etsi.org/deliver/etsi_ts/136400_136499/136442\15.00.00_60/ts_136442v150000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.442-15.0.0 V1.0.0	15.0.0	Published	30.08.2021	https://members.tdsi.in/s/ew99NCM56DCRiPf
TTA	TTAT.3G-36.442V15.0.0	15.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.442V15.0.0&searchCate=TTAS
TTC	TS-3GA-36.442(Rel15)v15.0.0	15.0.0	Published	21.12.2018	https://www.ttc.or.jp/st/docs/3gpps2018/TS/TS-3GA-36.442(Rel15)v15.0.0.pdf
Release 16					
ATIS	ATIS.3GPP.36.442V1600	16.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.442V1600	16.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.442V1600.doc
ETSI	ETSI TS 136 442 V16.0.0 (2020-07)	16.0.0	Published	21.07.2020	https://www.etsi.org/deliver/etsi_ts/136400_136499/136442\16.00.00_60/ts_136442v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.442-16.0.0 V1.0.0	16.0.0	Published	30.08.2021	https://members.tdsi.in/s/zfLmXybjLkRc7Sx
TTA	TTAT.3G-36.442V16.0.0	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.442V16.0.0&searchCate=TTAS
TTC	TS-3GA-36.442(Rel16)v16.0.0	16.0.0	Published	02.10.2020	https://www.ttc.or.jp/st/docs/3gpps2020/TS/TS-3GA-36_442_Rel16v16_0_0.pdf
Release 17					
ATIS	ATIS.3GPP.36.442.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.442.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.442.V17.0.0.doc
ETSI	ETSI TS 136 442 V17.0.0 (2022-05)	17.0.0	Published	02.05.2022	https://www.etsi.org/deliver/etsi_ts/136400_136499/136442\17.00.00_60/ts_136442v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.442-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/myPkLsxjY642ki5
TTA	TTAT.3G-36.442V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.442V17.0.0&searchCate=TTAS
TTC	TS-3GA-36.442(Rel17)v17.0.0	17.0.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-36.442v17.0.0.pdf
Release 18					
ATIS	ATIS.3GPP.36.442.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.442.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.442.V18.0.0.docx
ETSI	ETSI TS 136 442 V18.0.0 (2024-05)	18.0.0	Published	02.05.2024	https://www.etsi.org/deliver/etsi_ts/136400_136499/136442\18.00.00_60/ts_136442v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.442-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/4XiOkpr3FAjmNjS
TTA	TTAT.3G-36.442V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.442V18.0.0&searchCate=TTAS
TTC	TS-3GA-36.442(Rel18)v18.0.0	18.0.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-36.442v18.0.0.pdf

1.2.1.4.16 TS 36.443**Evolved Universal Terrestrial Radio Access Network (E-UTRAN); M2 Application Protocol (M2AP)**

This document specifies the E-UTRAN radio network layer signalling protocol for the M2 interface. The M2 Application Protocol (M2AP) supports the functions of M2 interface by signalling procedures defined in this document.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.36.443V1500	15.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.443V1500	15.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.443V1500.doc
ETSI	ETSI TS 136 443 V15.0.0 (2018-09)	15.0.0	Published	28.09.2018	https://www.etsi.org/deliver/etsi_ts/136400_136499/136443/15.00.00_60/ts_136443v150000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.443-15.0.0 V1.0.0	15.0.0	Published	30.08.2021	https://members.tdsi.in/s/7xsM2RJCdd2E92y
TTA	TTAT.3G-36.443V15.0.0	15.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.443V15.0.0&searchCate=TTAS
TTC	TS-3GA-36.443(Rel15)v15.0.0	15.0.0	Published	21.12.2018	https://www.ttc.or.jp/st/docs/3gpps2018/TS/TS-3GA-36.443(Rel15)v15.0.0.pdf
Release 16					
ATIS	ATIS.3GPP.36.443.V16.1.0	16.1.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.443.V16.1.0	16.1.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.443.V16.1.0.doc
ETSI	ETSI TS 136 443 V16.1.0 (2021-01)	16.1.0	Published	26.01.2021	https://www.etsi.org/deliver/etsi_ts/136400_136499/136443/16.01.00_60/ts_136443v160100p.pdf
TSDSI	TSDSI STD T1.3GPP 36.443-16.1.0 V1.1.0	16.1.0	Published	29.07.2022	https://members.tdsi.in/s/TpXLPXmNeRHEAqo
TTA	TTAT.3G-36.443V16.1.0	16.1.0	Published	16.03.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.443V16.1.0&searchCate=TTAS
TTC	TS-3GA-36.443(Rel16)v16.1.0	16.1.0	Published	09.04.2021	https://www.ttc.or.jp/st/docs/3gpp/2021/TS/TS-3GA-36.443v16.1.0.pdf
Release 17					
ATIS	ATIS.3GPP.36.443.V17.0.1	17.0.1	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.443.V17.0.1	17.0.1	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.443.V17.0.1.doc
ETSI	ETSI TS 136 443 V17.0.1 (2022-05)	17.0.1	Published	02.05.2022	https://www.etsi.org/deliver/etsi_ts/136400_136499/136443/17.00.01_60/ts_136443v170001p.pdf
TSDSI	TSDSI STD T1.3GPP 36.443-17.0.1 V1.1.0	17.0.1	Published	29.07.2022	https://members.tdsi.in/s/H8zGCzKrXKi9ot3
TTA	TTAT.3G-36.443V17.0.1	17.0.1	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.443V17.0.1&searchCate=TTAS
TTC	TS-3GA-36.443(Rel17)v17.0.1	17.0.1	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-36.443v17.0.1.pdf
Release 18					
ATIS	ATIS.3GPP.36.443.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.443.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.443.V18.0.0.docx
ETSI	ETSI TS 136 443 V18.0.0 (2024-05)	18.0.0	Published	02.05.2024	https://www.etsi.org/deliver/etsi_ts/136400_136499/136443/18.00.00_60/ts_136443v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.443-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/tH4RkpCxQLdY85S
TTA	TTAT.3G-36.443V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.443V18.0.0&searchCate=TTAS
TTC	TS-3GA-36.443(Rel18)v18.0.0	18.0.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-36.443v18.0.0.pdf

1.2.1.4.17 TS 36.444

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); M3 Application Protocol (M3AP)

This document specifies the E-UTRAN radio network layer signalling protocol for the M3 interface. The M3 Application Protocol (M3AP) supports the functions of M3 interface by signalling procedures defined in this document.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.36.444V1500	15.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.444V1500 3_SMIT_ATIS/CCSA.3GPP.36.444V1500.doc	15.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 136 444 V15.0.0 (2018-09)	15.0.0	Published	28.09.2018	https://www.etsi.org/deliver/etsi_ts/136400_136499/136444/15.00.00_60/ts_136444v150000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.444-15.0.0 V1.0.0	15.0.0	Published	30.08.2021	https://members.tdsi.in/s/7qgKdPonXf7oeMc
TTA	TTAT.3G-36.444V15.0.0 36.444V15.0.0&searchCate=TTAS	15.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-36.444(Rel15)v15.0.0	15.0.0	Published	21.12.2018	https://www.ttc.or.jp/st/docs/3gpps2018/TS/TS-3GA-36.444(Rel15)v15.0.0.pdf
Release 16					
ATIS	ATIS.3GPP.36.444V1600	16.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.444V1600 3_SMIT_ATIS/CCSA.3GPP.36.444V1600.doc	16.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 136 444 V16.0.0 (2020-07)	16.0.0	Published	21.07.2020	https://www.etsi.org/deliver/etsi_ts/136400_136499/136444/16.00.00_60/ts_136444v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.444-16.0.0 V1.0.0	16.0.0	Published	30.08.2021	https://members.tdsi.in/s/pz3yPrJCynDX8J7
TTA	TTAT.3G-36.444V16.0.0 36.444V16.0.0&searchCate=TTAS	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-36.444(Rel16)v16.0.0	16.0.0	Published	02.10.2020	https://www.ttc.or.jp/st/docs/3gpps2020/TS/TS-3GA-36_444_Rel16v16_0_0.pdf
Release 17					
ATIS	ATIS.3GPP.36.444.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.444.V17.0.0 3_SMIT_ATIS/CCSA.3GPP.36.444.V17.0.0.doc	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 136 444 V17.0.0 (2022-05)	17.0.0	Published	02.05.2022	https://www.etsi.org/deliver/etsi_ts/136400_136499/136444/17.00.00_60/ts_136444v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.444-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/3qSNwmdgreWxwia
TTA	TTAT.3G-36.444V17.0.0 36.444V17.0.0&searchCate=TTAS	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-36.444(Rel17)v17.0.0	17.0.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-36.444v17.0.0.pdf
Release 18					
ATIS	ATIS.3GPP.36.444.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.444.V18.0.0 3_SMIT_ATIS/CCSA.3GPP.36.444.V18.0.0.docx	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 136 444 V18.0.0 (2024-05)	18.0.0	Published	02.05.2024	https://www.etsi.org/deliver/etsi_ts/136400_136499/136444/18.00.00_60/ts_136444v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.444-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/sdWKKdjZAm9xgJp
TTA	TTAT.3G-36.444V18.0.0 36.444V18.0.0&searchCate=TTAS	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-36.444(Rel18)v18.0.0	18.0.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-36.444v18.0.0.pdf

1.2.1.4.18 TS 36.445**Evolved Universal Terrestrial Radio Access Network (E-UTRAN); M1 data transport**

This document specifies the standards for user data transport protocols over the E-UTRAN M1 interface.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.36.445V1500	15.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.445V1500	15.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.445V1500.doc
ETSI	ETSI TS 136 445 V15.0.0 (2018-09)	15.0.0	Published	28.09.2018	https://www.etsi.org/deliver/etsi_ts/136400_136499/136445/15.00.00_60/ts_136445v150000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.445-15.0.0 V1.0.0	15.0.0	Published	30.08.2021	https://members.tdsi.in/s/QCGFwEjZMCQ5FM2
TTA	TTAT.3G-36.445V15.0.0	15.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.445V15.0.0&searchCate=TTAS
TTC	TS-3GA-36.445(Rel15)v15.0.0	15.0.0	Published	21.12.2018	https://www.ttc.or.jp/st/docs/3gpps2018/TS/TS-3GA-36.445(Rel15)v15.0.0.pdf
Release 16					
ATIS	ATIS.3GPP.36.445V1600	16.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.445V1600	16.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.445V1600.doc
ETSI	ETSI TS 136 445 V16.0.0 (2020-07)	16.0.0	Published	21.07.2020	https://www.etsi.org/deliver/etsi_ts/136400_136499/136445/16.00.00_60/ts_136445v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.445-16.0.0 V1.0.0	16.0.0	Published	30.08.2021	https://members.tdsi.in/s/xJ82i4DQEfkbNR
TTA	TTAT.3G-36.445V16.0.0	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.445V16.0.0&searchCate=TTAS
TTC	TS-3GA-36.445(Rel16)v16.0.0	16.0.0	Published	02.10.2020	https://www.ttc.or.jp/st/docs/3gpps2020/TS/TS-3GA-36_445_Rel16v16_0_0.pdf
Release 17					
ATIS	ATIS.3GPP.36.445.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.445.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.445.V17.0.0.doc
ETSI	ETSI TS 136 445 V17.0.0 (2022-05)	17.0.0	Published	02.05.2022	https://www.etsi.org/deliver/etsi_ts/136400_136499/136445/17.00.00_60/ts_136445v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.445-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/HYBAnpgwy8Sn4cC
TTA	TTAT.3G-36.445V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.445V17.0.0&searchCate=TTAS
TTC	TS-3GA-36.445(Rel17)v17.0.0	17.0.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-36.445v17.0.0.pdf
Release 18					
ATIS	ATIS.3GPP.36.445.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.445.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.445.V18.0.0.docx
ETSI	ETSI TS 136 445 V18.0.0 (2024-05)	18.0.0	Published	02.05.2024	https://www.etsi.org/deliver/etsi_ts/136400_136499/136445/18.00.00_60/ts_136445v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.445-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/eganNzT6F4Qc2Rf
TTA	TTAT.3G-36.445V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.445V18.0.0&searchCate=TTAS
TTC	TS-3GA-36.445(Rel18)v18.0.0	18.0.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-36.445v18.0.0.pdf

1.2.1.4.19 TS 36.455

Evolved Universal Terrestrial Radio Access (E-UTRA); LTE Positioning Protocol A (LPPa)

This document specifies the control plane radio network layer signalling procedures between eNodeB and E-SMLC. LPPa supports the concerned functions by signalling procedures defined in this document.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.36.455V1521	15.2.1	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.455V1521	15.2.1	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRLT_ATIS/CCSA.3GPP.36.455V1521.doc
ETSI	ETSI TS 136 455 V15.2.1 (2019-04)	15.2.1	Published	17.04.2019	https://www.etsi.org/deliver/etsi_ts/136400_136499/136455/15.02.01_60/ts_136455v150201p.pdf
TSDSI	TSDSI STD T1.3GPP 36.455-15.2.1 V1.0.0	15.2.1	Published	30.08.2021	https://members.tdsi.in/s/brnMPRp8ErzTQdF
TTA	TTAT.3G-36.455V15.2.1	15.2.1	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.455V15.2.1&searchCate=TTAS
TTC	TS-3GA-36.455(Rel15)v15.2.1	15.2.1	Published	29.03.2019	https://www.ttc.or.jp/st/docs/3gpps2019/TS/TS-3GA-36.455(Rel15)v15.2.1.pdf
Release 16					
ATIS	ATIS.3GPP.36.455.V16.1.0	16.1.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.455.V16.1.0	16.1.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRLT_ATIS/CCSA.3GPP.36.455.V16.1.0.doc
ETSI	ETSI TS 136 455 V16.1.0 (2020-11)	16.1.0	Published	13.11.2020	https://www.etsi.org/deliver/etsi_ts/136400_136499/136455/16.01.00_60/ts_136455v160100p.pdf
TSDSI	TSDSI STD T1.3GPP 36.455-16.1.0 V1.1.0	16.1.0	Published	29.07.2022	https://members.tdsi.in/s/6W9yGi3qGjBPimW
TTA	TTAT.3G-36.455V16.1.0	16.1.0	Published	16.03.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.455V16.1.0&searchCate=TTAS
TTC	TS-3GA-36.455(Rel16)v16.1.0	16.1.0	Published	22.12.2020	https://www.ttc.or.jp/st/docs/3gpp/2020/TS/TS-3GA-36.455v16.1.0.pdf
Release 17					
ATIS	ATIS.3GPP.36.455.V17.1.0	17.1.0	Published	22.05.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.455.V17.1.0	17.1.0	Published	22.05.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRLT_ATIS/CCSA.3GPP.36.455.V17.1.0.doc
ETSI	ETSI TS 136 455 V17.1.0 (2023-04)	17.1.0	Published	26.04.2023	https://www.etsi.org/deliver/etsi_ts/136400_136499/136455/17.01.00_60/ts_136455v170100p.pdf
TSDSI	TSDSI STD T1.3GPP 36.455-17.1.0 V1.1.0	17.1.0	Published	14.08.2023	https://members.tdsi.in/s/LDCoKRpiq9PiRn3
TTA	TTAT.3G-36.455V17.1.0	17.1.0	Published	01.08.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.455V17.1.0&searchCate=TTAS
TTC	TS-3GA-36.455(Rel17)v17.1.0	17.1.0	Published	07.07.2023	https://www.ttc.or.jp/st/docs/3gpp/2023/TS/TS-3GA-36.455v17.1.0.pdf
Release 18					
ATIS	ATIS.3GPP.36.455.V18.1.0	18.1.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.455.V18.1.0	18.1.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRLT_ATIS/CCSA.3GPP.36.455.V18.1.0.docx
ETSI	ETSI TS 136 455 V18.1.0 (2024-08)	18.1.0	Published	02.08.2024	https://www.etsi.org/deliver/etsi_ts/136400_136499/136455/18.01.00_60/ts_136455v180100p.pdf
TSDSI	TSDSI STD T1.3GPP 36.455-18.1.0 V1.0.0	18.1.0	Published	19.11.2024	https://members.tdsi.in/s/zN5qranagR7fxxP
TTA	TTAT.3G-36.455V18.1.0	18.1.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.455V18.1.0&searchCate=TTAS
TTC	TS-3GA-36.455(Rel18)v18.1.0	18.1.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-36.455v18.1.0.pdf

1.2.1.4.20 TS 36.456**Evolved Universal Terrestrial Radio Access Network (E-UTRAN); SLM interface general aspects and principles**

This document is an introduction to the 3GPP TS 36.45x series of technical specifications that define the SLM interface for the interconnection of the Evolved Serving Mobile Location Centre (E-SMLC) to the Location Measurement Unit (LMU) components of the Evolved Universal Terrestrial Radio Access Network (E-UTRAN).

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.36.456V1500	15.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.456V1500	15.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRLT_ATIS/CCSA.3GPP.36.456V1500.doc
ETSI	ETSI TS 136 456 V15.0.0 (2018-07)	15.0.0	Published	04.07.2018	https://www.etsi.org/deliver/etsi_ts/136400_136499/136456/15.00.00_60/ts_136456v150000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.456-15.0.0 V1.0.0	15.0.0	Published	30.08.2021	https://members.tdsi.in/s/dtPky3CcrctQqtb
TTA	TTAT.3G-36.456V15.0.0	15.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.456V15.0.0&searchCate=TTAS
TTC	TS-3GA-36.456(Rel15)v15.0.0	15.0.0	Published	28.09.2018	https://www.ttc.or.jp/st/docs/3gpps2018/TS/TS-3GA-36.456(Rel15)v15.0.0.pdf
Release 16					
ATIS	ATIS.3GPP.36.456V1600	16.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.456V1600	16.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRLT_ATIS/CCSA.3GPP.36.456V1600.doc
ETSI	ETSI TS 136 456 V16.0.0 (2020-07)	16.0.0	Published	21.07.2020	https://www.etsi.org/deliver/etsi_ts/136400_136499/136456/16.00.00_60/ts_136456v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.456-16.0.0 V1.0.0	16.0.0	Published	30.08.2021	https://members.tdsi.in/s/LnFnPpLAdR5t2ng
TTA	TTAT.3G-36.456V16.0.0	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.456V16.0.0&searchCate=TTAS
TTC	TS-3GA-36.456(Rel16)v16.0.0	16.0.0	Published	02.10.2020	https://www.ttc.or.jp/st/docs/3gpps2020/TS/TS-3GA-36_456_Rel16v16_0_0.pdf
Release 17					
ATIS	ATIS.3GPP.36.456.V17.0.1	17.0.1	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.456.V17.0.1	17.0.1	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRLT_ATIS/CCSA.3GPP.36.456.V17.0.1.doc
ETSI	ETSI TS 136 456 V17.0.1 (2022-05)	17.0.1	Published	02.05.2022	https://www.etsi.org/deliver/etsi_ts/136400_136499/136456/17.00.01_60/ts_136456v170001p.pdf
TSDSI	TSDSI STD T1.3GPP 36.456-17.0.1 V1.1.0	17.0.1	Published	29.07.2022	https://members.tdsi.in/s/5L86SgZRweYp4Ht
TTA	TTAT.3G-36.456V17.0.1	17.0.1	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.456V17.0.1&searchCate=TTAS
TTC	TS-3GA-36.456(Rel17)v17.0.1	17.0.1	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-36.456v17.0.1.pdf
Release 18					
ATIS	ATIS.3GPP.36.456.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.456.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRLT_ATIS/CCSA.3GPP.36.456.V18.0.0.docx
ETSI	ETSI TS 136 456 V18.0.0 (2024-05)	18.0.0	Published	02.05.2024	https://www.etsi.org/deliver/etsi_ts/136400_136499/136456/18.00.00_60/ts_136456v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.456-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/WXDK2HA96KkFgNF
TTA	TTAT.3G-36.456V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.456V18.0.0&searchCate=TTAS
TTC	TS-3GA-36.456(Rel18)v18.0.0	18.0.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-36.456v18.0.0.pdf

1.2.1.4.21 TS 36.457

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); SLM interface layer 1

This document specifies the standards allowed to implement layer 1 on the SLM interface.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.36.457V1500	15.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.457V1500	15.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.457V1500.doc
ETSI	ETSI TS 136 457 V15.0.0 (2018-07)	15.0.0	Published	04.07.2018	https://www.etsi.org/deliver/etsi_ts/136400_136499/136457/15.00.00_60/ts_136457v150000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.457-15.0.0 V1.0.0	15.0.0	Published	30.08.2021	https://members.tdsi.in/s/3weQ4SMADjtnywa
TTA	TTAT.3G-36.457V15.0.0	15.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.457V15.0.0&searchCate=TTAS
TTC	TS-3GA-36.457(Rel15)v15.0.0	15.0.0	Published	28.09.2018	https://www.ttc.or.jp/st/docs/3gpps2018/TS/TS-3GA-36.457(Rel15)v15.0.0.pdf
Release 16					
ATIS	ATIS.3GPP.36.457V1600	16.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.457V1600	16.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.457V1600.doc
ETSI	ETSI TS 136 457 V16.0.0 (2020-07)	16.0.0	Published	21.07.2020	https://www.etsi.org/deliver/etsi_ts/136400_136499/136457/16.00.00_60/ts_136457v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.457-16.0.0 V1.0.0	16.0.0	Published	30.08.2021	https://members.tdsi.in/s/QtfJtqnpCDxHnyg
TTA	TTAT.3G-36.457V16.0.0	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.457V16.0.0&searchCate=TTAS
TTC	TS-3GA-36.457(Rel16)v16.0.0	16.0.0	Published	02.10.2020	https://www.ttc.or.jp/st/docs/3gpps2020/TS/TS-3GA-36_457_Rel16v16_0_0.pdf
Release 17					
ATIS	ATIS.3GPP.36.457.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.457.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.457.V17.0.0.doc
ETSI	ETSI TS 136 457 V17.0.0 (2022-05)	17.0.0	Published	02.05.2022	https://www.etsi.org/deliver/etsi_ts/136400_136499/136457/17.00.00_60/ts_136457v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.457-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/g3PCDB22HiagQc4
TTA	TTAT.3G-36.457V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.457V17.0.0&searchCate=TTAS
TTC	TS-3GA-36.457(Rel17)v17.0.0	17.0.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-36.457v17.0.0.pdf
Release 18					
ATIS	ATIS.3GPP.36.457.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.457.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.457.V18.0.0.docx
ETSI	ETSI TS 136 457 V18.0.0 (2024-05)	18.0.0	Published	02.05.2024	https://www.etsi.org/deliver/etsi_ts/136400_136499/136457/18.00.00_60/ts_136457v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.457-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/cK5CBPKoNsXd46R
TTA	TTAT.3G-36.457V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.457V18.0.0&searchCate=TTAS
TTC	TS-3GA-36.457(Rel18)v18.0.0	18.0.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-36.457v18.0.0.pdf

1.2.1.4.22 TS 36.458**Evolved Universal Terrestrial Radio Access Network (E-UTRAN); SLM interface signalling transport**

This document specifies the standards for signalling transport to be used across the SLM interface. The SLM interface is a logical interface between the LMU and the E-SMLC in the E-UTRAN core network. This document describes how the SLMAP signalling messages are transported over SLM.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.36.458V1500	15.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.458V1500	15.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.458V1500.doc
ETSI	ETSI TS 136 458 V15.0.0 (2018-07)	15.0.0	Published	04.07.2018	https://www.etsi.org/deliver/etsi_ts/136400_136499/136458/15.00.00_60/ts_136458v150000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.458-15.0.0 V1.0.0	15.0.0	Published	30.08.2021	https://members.tdsi.in/s/N92JQ3sjW5rtHc
TTA	TTAT.3G-36.458V15.0.0	15.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.458V15.0.0&searchCate=TTAS
TTC	TS-3GA-36.458(Rel15)v15.0.0	15.0.0	Published	28.09.2018	https://www.ttc.or.jp/st/docs/3gpps2018/TS/TS-3GA-36.458(Rel15)v15.0.0.pdf
Release 16					
ATIS	ATIS.3GPP.36.458V1600	16.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.458V1600	16.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.458V1600.doc
ETSI	ETSI TS 136 458 V16.0.0 (2020-07)	16.0.0	Published	21.07.2020	https://www.etsi.org/deliver/etsi_ts/136400_136499/136458/16.00.00_60/ts_136458v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.458-16.0.0 V1.0.0	16.0.0	Published	30.08.2021	https://members.tdsi.in/s/4b2sWnGBemA5PQw
TTA	TTAT.3G-36.458V16.0.0	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.458V16.0.0&searchCate=TTAS
TTC	TS-3GA-36.458(Rel16)v16.0.0	16.0.0	Published	02.10.2020	https://www.ttc.or.jp/st/docs/3gpps2020/TS/TS-3GA-36_458_Rel16v16_0_0.pdf
Release 17					
ATIS	ATIS.3GPP.36.458.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.458.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.458.V17.0.0.doc
ETSI	ETSI TS 136 458 V17.0.0 (2022-05)	17.0.0	Published	02.05.2022	https://www.etsi.org/deliver/etsi_ts/136400_136499/136458/17.00.00_60/ts_136458v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.458-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/dwnZqRWKB5wxPdP
TTA	TTAT.3G-36.458V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.458V17.0.0&searchCate=TTAS
TTC	TS-3GA-36.458(Rel17)v17.0.0	17.0.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-36.458v17.0.0.pdf
Release 18					
ATIS	ATIS.3GPP.36.458.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.458.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.458.V18.0.0.docx
ETSI	ETSI TS 136 458 V18.0.0 (2024-05)	18.0.0	Published	02.05.2024	https://www.etsi.org/deliver/etsi_ts/136400_136499/136458/18.00.00_60/ts_136458v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.458-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/5tpZcQGyRtiNNKo
TTA	TTAT.3G-36.458V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.458V18.0.0&searchCate=TTAS
TTC	TS-3GA-36.458(Rel18)v18.0.0	18.0.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-36.458v18.0.0.pdf

1.2.1.4.23 TS 36.459

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); SLm interface Application Protocol (SLmAP)

This document specifies the E-UTRAN radio network layer signalling protocol for the SLm interface. The SLm Application Protocol (SLmAP) supports the functions of the SLm interface by signalling procedures defined in this document.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.36.459V1500	15.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.459V1500	15.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRLT_ATIS/CCSA.3GPP.36.459V1500.doc
ETSI	ETSI TS 136 459 V15.0.0 (2018-07)	15.0.0	Published	04.07.2018	https://www.etsi.org/deliver/etsi_ts/136400_136499/136459/15.00.00_60/ts_136459v150000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.459-15.0.0 V1.0.0	15.0.0	Published	30.08.2021	https://members.tdsi.in/s/7WxFpJnBgJbp2Q
TTA	TTAT.3G-36.459V15.0.0	15.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.459V15.0.0&searchCate=TTAS
TTC	TS-3GA-36.459(Rel15)v15.0.0	15.0.0	Published	28.09.2018	https://www.ttc.or.jp/st/docs/3gpps2018/TS/TS-3GA-36.459(Rel15)v15.0.0.pdf
Release 16					
ATIS	ATIS.3GPP.36.459V1600	16.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.459V1600	16.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRLT_ATIS/CCSA.3GPP.36.459V1600.doc
ETSI	ETSI TS 136 459 V16.0.0 (2020-07)	16.0.0	Published	21.07.2020	https://www.etsi.org/deliver/etsi_ts/136400_136499/136459/16.00.00_60/ts_136459v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.459-16.0.0 V1.0.0	16.0.0	Published	30.08.2021	https://members.tdsi.in/s/xKBvy8YNotd7cxM
TTA	TTAT.3G-36.459V16.0.0	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.459V16.0.0&searchCate=TTAS
TTC	TS-3GA-36.459(Rel16)v16.0.0	16.0.0	Published	02.10.2020	https://www.ttc.or.jp/st/docs/3gpps2020/TS/TS-3GA-36_459_Rel16v16_0_0.pdf
Release 17					
ATIS	ATIS.3GPP.36.459.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.459.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRLT_ATIS/CCSA.3GPP.36.459.V17.0.0.doc
ETSI	ETSI TS 136 459 V17.0.0 (2022-05)	17.0.0	Published	02.05.2022	https://www.etsi.org/deliver/etsi_ts/136400_136499/136459/17.00.00_60/ts_136459v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.459-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/GpodyEiBxFyEXPT
TTA	TTAT.3G-36.459V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.459V17.0.0&searchCate=TTAS
TTC	TS-3GA-36.459(Rel17)v17.0.0	17.0.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-36.459v17.0.0.pdf
Release 18					
ATIS	ATIS.3GPP.36.459.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.459.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRLT_ATIS/CCSA.3GPP.36.459.V18.0.0.docx
ETSI	ETSI TS 136 459 V18.0.0 (2024-05)	18.0.0	Published	02.05.2024	https://www.etsi.org/deliver/etsi_ts/136400_136499/136459/18.00.00_60/ts_136459v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.459-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/H99k6BTF3KTr6Dx
TTA	TTAT.3G-36.459V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.459V18.0.0&searchCate=TTAS
TTC	TS-3GA-36.459(Rel18)v18.0.0	18.0.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-36.459v18.0.0.pdf

1.2.1.4.24 TS 36.461**Evolved Universal Terrestrial Radio Access Network (E-UTRAN) and Wireless LAN (WLAN); Xw layer 1**

This document specifies the standards allowed to implement Layer 1 on the Xw interface. The specification of transmission delay requirements and O&M requirements are not in the scope of this document.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-36.461.V15.0.0	15.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/36/A36461-f00.pdf
ATIS	ATIS.3GPP.36.461V1500	15.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.461V1500	15.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.36.461V1500.doc
ETSI	ETSI TS 136 461 V15.0.0 (2018-07)	15.0.0	Published	04.07.2018	https://www.etsi.org/deliver/etsi_ts/136400_136499/136461/15.00.00_60/ts_136461v150000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.461-15.0.0 V1.0.0	15.0.0	Published	30.08.2021	https://members.tdsi.in/s/mE6TbXBnPiSHWxt
TTA	TTAT.3G-36.461V15.0.0	15.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.461V15.0.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-36.461.V16.0.0	16.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/36/A36461-g00.pdf
ATIS	ATIS.3GPP.36.461V1600	16.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.461V1600	16.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.36.461V1600.doc
ETSI	ETSI TS 136 461 V16.0.0 (2020-07)	16.0.0	Published	23.07.2020	https://www.etsi.org/deliver/etsi_ts/136400_136499/136461/16.00.00_60/ts_136461v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.461-16.0.0 V1.0.0	16.0.0	Published	30.08.2021	https://members.tdsi.in/s/Hbjc239Ds2cpASp
TTA	TTAT.3G-36.461V16.0.0	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.461V16.0.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-36.461.V17.0.0	17.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/36/A36461-h00.pdf
ATIS	ATIS.3GPP.36.461.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.461.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.36.461.V17.0.0.doc
ETSI	ETSI TS 136 461 V17.0.0 (2022-05)	17.0.0	Published	02.05.2022	https://www.etsi.org/deliver/etsi_ts/136400_136499/136461/17.00.00_60/ts_136461v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.461-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/7daRZtR3WgZ6KcF
TTA	TTAT.3G-36.461V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.461V17.0.0&searchCate=TTAS
Release 18					
RIB	ARIB STD-T120-36.461.V18.0.0	18.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/36/A36461-i00.pdf
ATIS	ATIS.3GPP.36.461.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.461.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.36.461.V18.0.0.docx
ETSI	ETSI TS 136 461 V18.0.0 (2024-05)	18.0.0	Published	03.05.2024	https://www.etsi.org/deliver/etsi_ts/136400_136499/136461/18.00.00_60/ts_136461v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.461-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/WQ3WDrC5pkkfYTp
TTA	TTAT.3G-36.461V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.461V18.0.0&searchCate=TTAS

1.2.1.4.25 TS 36.462

Evolved Universal Terrestrial Radio Access Network (E-UTRAN) and Wireless LAN (WLAN); Xw signalling transport

This document specifies the standards for Signalling Transport to be used across the Xw interface. The Xw interface is a logical interface between the eNB and the WLAN Termination (WT). This document describes how the Xw-AP signalling messages are transported over Xw.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-36.462.V15.0.0	15.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/36/A36462-f00.pdf
ATIS	ATIS.3GPP.36.462V1500	15.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.462V1500	15.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.462V1500.doc
ETSI	ETSI TS 136 462 V15.0.0 (2018-07)	15.0.0	Published	04.07.2018	https://www.etsi.org/deliver/etsi_ts/136400_136499/136462/15.00.00_60/ts_136462v150000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.462-15.0.0 V1.0.0	15.0.0	Published	30.08.2021	https://members.tdsi.in/s/9gQMfg6aS8XdzqX
TTA	TTAT.3G-36.462V15.0.0	15.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.462V15.0.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-36.462.V16.0.0	16.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/36/A36462-g00.pdf
ATIS	ATIS.3GPP.36.462V1600	16.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.462V1600	16.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.462V1600.doc
ETSI	ETSI TS 136 462 V16.0.0 (2020-07)	16.0.0	Published	21.07.2020	https://www.etsi.org/deliver/etsi_ts/136400_136499/136462/16.00.00_60/ts_136462v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.462-16.0.0 V1.0.0	16.0.0	Published	30.08.2021	https://members.tdsi.in/s/HeKm7bos8Eo6YPT
TTA	TTAT.3G-36.462V16.0.0	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.462V16.0.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-36.462.V17.0.0	17.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/36/A36462-h00.pdf
ATIS	ATIS.3GPP.36.462.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.462.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.462.V17.0.0.doc
ETSI	ETSI TS 136 462 V17.0.0 (2022-05)	17.0.0	Published	02.05.2022	https://www.etsi.org/deliver/etsi_ts/136400_136499/136462/17.00.00_60/ts_136462v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.462-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/ZpodFSq42y3nf7H
TTA	TTAT.3G-36.462V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.462V17.0.0&searchCate=TTAS
Release 18					
ARIB	ARIB STD-T120-36.462.V18.0.0	18.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/36/A36462-i00.pdf
ATIS	ATIS.3GPP.36.462.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.462.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.462.V18.0.0.docx
ETSI	ETSI TS 136 462 V18.0.0 (2024-05)	18.0.0	Published	03.05.2024	https://www.etsi.org/deliver/etsi_ts/136400_136499/136462/18.00.00_60/ts_136462v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.462-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/j26CKHL3b47RJYE
TTA	TTAT.3G-36.462V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.462V18.0.0&searchCate=TTAS

1.2.1.4.26 TS 36.463**Evolved Universal Terrestrial Radio Access Network (E-UTRAN) and Wireless Local Area Network (WLAN); Xw application protocol (XwAP)**

This document specifies the signalling procedures of the control plane between an eNB and WLAN Termination (WT). The Xw Application Protocol (XwAP) supports the functions of Xw interface by signalling procedures defined in this document.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-36.463.V15.0.0	15.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/36/A36463-f00.pdf
ATIS	ATIS.3GPP.36.463V1500	15.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.463V1500	15.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.36.463V1500.doc
ETSI	ETSI TS 136 463 V15.0.0 (2018-07)	15.0.0	Published	04.07.2018	https://www.etsi.org/deliver/etsi_ts/136400_136499/136463/15.00.00_60/ts_136463v150000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.463-15.0.0 V1.0.0	15.0.0	Published	30.08.2021	https://members.tdsi.in/s/adX7cLRP3PSQpDy
TTA	TTAT.3G-36.463V15.0.0	15.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.463V15.0.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-36.463.V16.0.0	16.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/36/A36463-g00.pdf
ATIS	ATIS.3GPP.36.463V1600	16.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.463V1600	16.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.36.463V1600.doc
ETSI	ETSI TS 136 463 V16.0.0 (2020-07)	16.0.0	Published	21.07.2020	https://www.etsi.org/deliver/etsi_ts/136400_136499/136463/16.00.00_60/ts_136463v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.463-16.0.0 V1.0.0	16.0.0	Published	30.08.2021	https://members.tdsi.in/s/w9rYNCkWFzFDSbF
TTA	TTAT.3G-36.463V16.0.0	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.463V16.0.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-36.463.V17.0.0	17.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/36/A36463-h00.pdf
ATIS	ATIS.3GPP.36.463.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.463.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.36.463.V17.0.0.doc
ETSI	ETSI TS 136 463 V17.0.0 (2022-05)	17.0.0	Published	02.05.2022	https://www.etsi.org/deliver/etsi_ts/136400_136499/136463/17.00.00_60/ts_136463v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.463-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/Ex54tBtS7dpTiGR
TTA	TTAT.3G-36.463V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.463V17.0.0&searchCate=TTAS
Release 18					
ARIB	ARIB STD-T120-36.463.V18.0.0	18.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/36/A36463-i00.pdf
ATIS	ATIS.3GPP.36.463.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.463.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.36.463.V18.0.0.docx
ETSI	ETSI TS 136 463 V18.0.0 (2024-05)	18.0.0	Published	03.05.2024	https://www.etsi.org/deliver/etsi_ts/136400_136499/136463/18.00.00_60/ts_136463v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.463-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/TzWDFeJGwyKY3dc
TTA	TTAT.3G-36.463V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.463V18.0.0&searchCate=TTAS

1.2.1.4.27 TS 36.464

Evolved Universal Terrestrial Radio Access Network (E-UTRAN) and Wireless Local Area Network (WLAN); Xw data transport

This document specifies the standards for user data transport protocols and related signalling protocols to establish user plane transport bearers over the Xw interface for LTE/WLAN Aggregation (LWA).

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-36.464.V15.0.0	15.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/36/A36464-f00.pdf
ATIS	ATIS.3GPP.36.464V1500	15.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.464V1500	15.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.464V1500.doc
ETSI	ETSI TS 136 464 V15.0.0 (2018-07)	15.0.0	Published	04.07.2018	https://www.etsi.org/deliver/etsi_ts/136400_136499/136464\15.00.00_60/ts_136464v150000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.464-15.0.0 V1.0.0	15.0.0	Published	30.08.2021	https://members.tdsi.in/s/sjJF8qHN6ZGtCJe
TTA	TTAT.3G-36.464V15.0.0	15.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.464V15.0.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-36.464.V16.0.0	16.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/36/A36464-g00.pdf
ATIS	ATIS.3GPP.36.464V1600	16.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.464V1600	16.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.464V1600.doc
ETSI	ETSI TS 136 464 V16.0.0 (2020-07)	16.0.0	Published	21.07.2020	https://www.etsi.org/deliver/etsi_ts/136400_136499/136464\16.00.00_60/ts_136464v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.464-16.0.0 V1.0.0	16.0.0	Published	30.08.2021	https://members.tdsi.in/s/gGCwZKrtAMdb483
TTA	TTAT.3G-36.464V16.0.0	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.464V16.0.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-36.464.V17.0.0	17.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/36/A36464-h00.pdf
ATIS	ATIS.3GPP.36.464.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.464.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.464.V17.0.0.doc
ETSI	ETSI TS 136 464 V17.0.0 (2022-05)	17.0.0	Published	02.05.2022	https://www.etsi.org/deliver/etsi_ts/136400_136499/136464\17.00.00_60/ts_136464v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.464-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/sct7N6OppQopZJe
TTA	TTAT.3G-36.464V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.464V17.0.0&searchCate=TTAS
Release 18					
ARIB	ARIB STD-T120-36.464.V18.0.0	18.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/36/A36464-i00.pdf
ATIS	ATIS.3GPP.36.464.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.464.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.464.V18.0.0.docx
ETSI	ETSI TS 136 464 V18.0.0 (2024-05)	18.0.0	Published	03.05.2024	https://www.etsi.org/deliver/etsi_ts/136400_136499/136464\18.00.00_60/ts_136464v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.464-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/Rg3ZzTGCCfYWSc2
TTA	TTAT.3G-36.464V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.464V18.0.0&searchCate=TTAS

1.2.1.4.28 TS 36.465**Evolved Universal Terrestrial Radio Access Network (E-UTRAN) and Wireless Local Area Network (WLAN); Xw interface user plane protocol**

This document specifies the Xw user plane protocol being used over the Xw interface for LTE/WLAN Aggregation (LWA).

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-36.465.V15.0.0	15.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/36/A36465-f00.pdf
ATIS	ATIS.3GPP.36.465V1500	15.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.465V1500	15.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.465V1500.doc
ETSI	ETSI TS 136 465 V15.0.0 (2018-07)	15.0.0	Published	04.07.2018	https://www.etsi.org/deliver/etsi_ts/136400_136499/136465\15.00.00_60/ts_136465v150000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.465-15.0.0 V1.0.0	15.0.0	Published	30.08.2021	https://members.tdsi.in/s/Jek6az6eSydca4P
TTA	TTAT.3G-36.465V15.0.0	15.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.465V15.0.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-36.465.V16.0.0	16.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/36/A36465-g00.pdf
ATIS	ATIS.3GPP.36.465V1600	16.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.465V1600	16.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.465V1600.doc
ETSI	ETSI TS 136 465 V16.0.0 (2020-07)	16.0.0	Published	21.07.2020	https://www.etsi.org/deliver/etsi_ts/136400_136499/136465\16.00.00_60/ts_136465v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.465-16.0.0 V1.0.0	16.0.0	Published	30.08.2021	https://members.tdsi.in/s/ajidNGrTTLX2P2a
TTA	TTAT.3G-36.465V16.0.0	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.465V16.0.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-36.465.V17.0.0	17.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/36/A36465-h00.pdf
ATIS	ATIS.3GPP.36.465.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.465.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.465.V17.0.0.doc
ETSI	ETSI TS 136 465 V17.0.0 (2022-04)	17.0.0	Published	29.04.2022	https://www.etsi.org/deliver/etsi_ts/136400_136499/136465\17.00.00_60/ts_136465v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.465-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/iyAGDgcD7Jb4fmX
TTA	TTAT.3G-36.465V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.465V17.0.0&searchCate=TTAS
Release 18					
ARIB	ARIB STD-T120-36.465.V18.0.0	18.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/36/A36465-i00.pdf
ATIS	ATIS.3GPP.36.465.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.465.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.465.V18.0.0.docx
ETSI	ETSI TS 136 465 V18.0.0 (2024-05)	18.0.0	Published	03.05.2024	https://www.etsi.org/deliver/etsi_ts/136400_136499/136465\18.00.00_60/ts_136465v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.465-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/kq2kdifriXQ8roq
TTA	TTAT.3G-36.465V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.465V18.0.0&searchCate=TTAS

1.2.1.4.29 TS 37.460

Iuant interface: General aspects and principles

This document is an introduction to the 3GPP TS 37.46x series of Technical Specifications that define the Iuant Interface. The Iuant interface is applicable for UTRAN, E-UTRAN and NG-RAN. In this specification UTRAN, E-UTRAN and NG-RAN are denoted as “RAN”, whereas the corresponding network entities Node B, eNB, en-gNB and NG-RAN node are denoted as “RAN Node”. The logical Iuant interface is an interface internal to the RAN Node and defined to reside between the implementation specific O&M function and the RET antennas and between the implementation specific O&M function and the TMA control unit function.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-37.460.V15.2.0	15.2.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/37/A37460-f20.pdf
ATIS	ATIS.3GPP.37.460V1520	15.2.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.37.460V1520	15.2.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.460V1520.doc
ETSI	ETSI TS 137 460 V15.2.0 (2020-01)	15.2.0	Published	17.01.2020	https://www.etsi.org/deliver/etsi_ts/137400_137499/137460/15.02.00_60/ts_137460v150200p.pdf
TSDSI	TSDSI STD T1.3GPP 37.460-15.2.0 V1.0.0	15.2.0	Published	30.08.2021	https://members.tdsi.in/s/rp8JB3P2mmmSjaW
TTA	TTAT.3G-37.460V15.2.0	15.2.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.460V15.2.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-37.460.V16.0.0	16.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/37/A37460-g00.pdf
ATIS	ATIS.3GPP.37.460V1600	16.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.37.460V1600	16.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.460V1600.doc
ETSI	ETSI TS 137 460 V16.0.0 (2020-09)	16.0.0	Published	15.09.2020	https://www.etsi.org/deliver/etsi_ts/137400_137499/137460/16.00.00_60/ts_137460v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.460-16.0.0 V1.0.0	16.0.0	Published	30.08.2021	https://members.tdsi.in/s/Q2adpN3o944eo87
TTA	TTAT.3G-37.460V16.0.0	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.460V16.0.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-37.460.V17.0.0	17.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/37/A37460-h00.pdf
ATIS	ATIS.3GPP.37.460.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.37.460.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.460.V17.0.0.doc
ETSI	ETSI TS 137 460 V17.0.0 (2022-04)	17.0.0	Published	29.04.2022	https://www.etsi.org/deliver/etsi_ts/137400_137499/137460/17.00.00_60/ts_137460v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.460-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/x4YnRkAA4gSfc3W
TTA	TTAT.3G-37.460V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.460V17.0.0&searchCate=TTAS
Release 18					
ARIB	ARIB STD-T120-37.460.V18.0.0	18.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/37/A37460-i00.pdf
ATIS	ATIS.3GPP.37.460.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.37.460.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.460.V18.0.0.docx
ETSI	ETSI TS 137 460 V18.0.0 (2024-05)	18.0.0	Published	23.05.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137460/18.00.00_60/ts_137460v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.460-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/xFEdfBBcKbyWi4H
TTA	TTAT.3G-37.460V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.460V18.0.0&searchCate=TTAS

1.2.1.4.30 TS 37.461**Iuant interface: Layer 1**

This document specifies the standards allowed to implement layer 1 on the Iuant interface for UTRA, E-UTRA and NR.

The specification of transmission delay requirements and O&M requirements are not in the scope of this document.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-37.461.V15.5.0	15.5.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/37/A37461-f50.pdf
ATIS	ATIS.3GPP.37.461.V15.5.0	15.5.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.37.461.V15.5.0	15.5.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.461.V15.5.0.docx
ETSI	ETSI TS 137 461 V15.5.0 (2022-07)	15.5.0	Published	20.07.2022	https://www.etsi.org/deliver/etsi_ts/137400_137499/137461/15.05.00_60/ts_137461v150500p.pdf
TSDSI	TSDSI STD T1.3GPP 37.461-15.5.0 V1.1.0	15.5.0	Published	29.07.2022	https://members.tdsi.in/s/fPQrFZtwzAxWxww
TTA	TTAT.3G-37.461V15.5.0	15.5.0	Published	21.10.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.461V15.5.0&searchCate=TTAS
Release 16					
RIB	ARIB STD-T120-37.461.V16.1.0	16.1.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/37/A37461-g10.pdf
ATIS	ATIS.3GPP.37.461.V16.1.0	16.1.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.37.461.V16.1.0	16.1.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.461.V16.1.0.docx
ETSI	ETSI TS 137 461 V16.1.0 (2022-07)	16.1.0	Published	20.07.2022	https://www.etsi.org/deliver/etsi_ts/137400_137499/137461/16.01.00_60/ts_137461v160100p.pdf
TSDSI	TSDSI STD T1.3GPP 37.461-16.1.0 V1.1.0	16.1.0	Published	29.07.2022	https://members.tdsi.in/s/5ZdEG9MME32dF9x
TTA	TTAT.3G-37.461V16.1.0	16.1.0	Published	21.10.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.461V16.1.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-37.461.V17.1.0	17.1.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/37/A37461-h10.pdf
ATIS	ATIS.3GPP.37.461.V17.1.0	17.1.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.37.461.V17.1.0	17.1.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.461.V17.1.0.docx
ETSI	ETSI TS 137 461 V17.1.0 (2022-07)	17.1.0	Published	20.07.2022	https://www.etsi.org/deliver/etsi_ts/137400_137499/137461/17.01.00_60/ts_137461v170100p.pdf
TSDSI	TSDSI STD T1.3GPP 37.461-17.1.0 V1.1.0	17.1.0	Published	11.01.2022	https://members.tdsi.in/s/36rizmz5P3tKG6b
TTA	TTAT.3G-37.461V17.1.0	17.1.0	Published	21.10.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.461V17.1.0&searchCate=TTAS
Release 18					
ARIB	ARIB STD-T120-37.461.V18.0.0	18.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/37/A37461-i00.pdf
ATIS	ATIS.3GPP.37.461.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.37.461.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.461.V18.0.0.docx
ETSI	ETSI TS 137 461 V18.0.0 (2024-05)	18.0.0	Published	23.05.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137461/18.00.00_60/ts_137461v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.461-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/T5sfZLDZxs8nGDq
TTA	TTAT.3G-37.461V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.461V18.0.0&searchCate=TTAS

1.2.1.4.31 TS 37.462

Iuant interface: Signalling transport

This document specifies the signalling transport related to RETAP and TMAAP signalling to be used across the Iuant interface for UTRAN, E-UTRAN and NG-RAN. In this specification UTRAN, E-UTRAN and NG-RAN are denoted as “RAN”, whereas the corresponding network entities Node B, eNB, en-gNB and NG-RAN node are denoted as “RAN Node”. The logical Iuant interface is an interface internal to the RAN Node and defined to reside between the implementation specific O&M function and the RET antennas and between the implementation specific O&M function and the TMA control unit function.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-37.462.V15.2.0	15.2.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/37/A37462-f20.pdf
ATIS	ATIS.3GPP.37.462V1520	15.2.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.37.462V1520	15.2.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.462V1520.doc
ETSI	ETSI TS 137 462 V15.2.0 (2020-01)	15.2.0	Published	17.01.2020	https://www.etsi.org/deliver/etsi_ts/137400_137499/137462/15.02.00_60/ts_137462v150200p.pdf
TSDSI	TSDSI STD T1.3GPP 37.462-15.2.0 V1.0.0	15.2.0	Published	30.08.2021	https://members.tdsi.in/s/2GaBqs2bd2Yf3xo
TTA	TTAT.3G-37.462V15.2.0	15.2.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.462V15.2.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-37.462.V16.0.0	16.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/37/A37462-g00.pdf
ATIS	ATIS.3GPP.37.462V1600	16.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.37.462V1600	16.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.462V1600.doc
ETSI	ETSI TS 137 462 V16.0.0 (2020-09)	16.0.0	Published	17.09.2020	https://www.etsi.org/deliver/etsi_ts/137400_137499/137462/16.00.00_60/ts_137462v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.462-16.0.0 V1.0.0	16.0.0	Published	30.08.2021	https://members.tdsi.in/s/g9Kt9LZGbYbCdL9
TTA	TTAT.3G-37.462V16.0.0	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.462V16.0.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-37.462.V17.0.0	17.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/37/A37462-h00.pdf
ATIS	ATIS.3GPP.37.462.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.37.462.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.462.V17.0.0.doc
ETSI	ETSI TS 137 462 V17.0.0 (2022-04)	17.0.0	Published	29.04.2022	https://www.etsi.org/deliver/etsi_ts/137400_137499/137462/17.00.00_60/ts_137462v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.462-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/CTJZ93Cp93psYeL
TTA	TTAT.3G-37.462V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.462V17.0.0&searchCate=TTAS
Release 18					
ARIB	ARIB STD-T120-37.462.V18.0.0	18.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/37/A37462-i00.pdf
ATIS	ATIS.3GPP.37.462.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.37.462.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.462.V18.0.0.docx
ETSI	ETSI TS 137 462 V18.0.0 (2024-05)	18.0.0	Published	23.05.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137462/18.00.00_60/ts_137462v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.462-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/LNtXJoncpJyx6k9
TTA	TTAT.3G-37.462V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.462V18.0.0&searchCate=TTAS

1.2.1.4.32 TS 37.466

Iuant interface: Application part

This document is an introduction to the 3GPP TS 37.46x series of Technical Specifications that define the Iuant Interface. The Iuant interface is applicable for UTRAN, E-UTRAN and NG-RAN. In this specification UTRAN, E-UTRAN and NG-RAN are denoted as “RAN”, whereas the corresponding network entities Node B, eNB, en-gNB and NG-RAN node are denoted as “RAN Node”. The logical Iuant interface is an interface internal to the RAN Node and defined to reside between the implementation specific O&M function and the RET antennas together with the TMAs control unit function of the RAN Node.

This document is applicable for UTRAN, E-UTRAN and NG-RAN and specifies the *Remote Electrical Tilting Application Part (RETAP)* and the *Tower Mounted Amplifier Application Part (TMAAP)*. In this specification UTRAN, E-UTRAN and NG-RAN are denoted as “RAN”, whereas the corresponding network entities Node B, eNB, en-gNB and NG-RAN node are denoted as “RAN Node”. RETAP supports the functions of the Iuant interface between the implementation specific O&M transport function and the RET Antenna Control unit function, TMAAP supports the functions of the Iuant interface between the implementation specific O&M transport function and the TMA control function.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-37.466.V15.5.0	15.5.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/37/A37466-f50.pdf
ATIS	ATIS.3GPP.37.466V1550	15.5.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.37.466V1550	15.5.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.466V1550.doc
ETSI	ETSI TS 137 466 V15.5.0 (2020-01)	15.5.0	Published	17.01.2020	https://www.etsi.org/deliver/etsi_ts/137400_137499/137466/15.05.00_60/ts_137466v150500p.pdf
TSDSI	TSDSI STD T1.3GPP 37.466-15.5.0 V1.0.0	15.5.0	Published	30.08.2021	https://members.tdsi.in/s/4i7wDFgLLzsJqbd
TTA	TTAT.3G-37.466V15.5.0	15.5.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.466V15.5.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-37.466.V16.0.0	16.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/37/A37466-g00.pdf
ATIS	ATIS.3GPP.37.466V1600	16.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.37.466V1600	16.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.466V1600.doc
ETSI	ETSI TS 137 466 V16.0.0 (2020-09)	16.0.0	Published	18.09.2020	https://www.etsi.org/deliver/etsi_ts/137400_137499/137466/16.00.00_60/ts_137466v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.466-16.0.0 V1.0.0	16.0.0	Published	30.08.2021	https://members.tdsi.in/s/fjc9kzsw7P4pnPB
TTA	TTAT.3G-37.466V16.0.0	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.466V16.0.0&searchCate=TTAS
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ARIB	ARIB STD-T120-37.466.V17.0.0	17.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/37/A37466-h00.pdf
ATIS	ATIS.3GPP.37.466.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.37.466.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.466.V17.0.0.doc
ETSI	ETSI TS 137 466 V17.0.0 (2022-04)	17.0.0	Published	29.04.2022	https://www.etsi.org/deliver/etsi_ts/137400_137499/137466/17.00.00_60/ts_137466v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.466-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/ipj8DtGRydCygji
TTA	TTAT.3G-37.466V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.466V17.0.0&searchCate=TTAS

Release 18

ARIB	ARIB STD-T120-37.466.V18.0.0	18.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/37/A37466-i00.pdf
ATIS	ATIS.3GPP.37.466.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.37.466.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.466.V18.0.0.docx
ETSI	ETSI TS 137 466 V18.0.0 (2024-05)	18.0.0	Published	27.05.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137466/18.00.00_60/ts_137466v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.466-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/ZfBP348cdNoy4gM
TTA	TTAT.3G-37.466V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.466V18.0.0&searchCate=TTAS

1.2.1.4.33 TS 37.470**W1 interface; General aspects and principles**

This document is an introduction to the 3GPP TS 37.4xx series of technical specifications that define the W1 interface. The W1 interface provides means for interconnecting a ng-eNB-CU and a ng-eNB-DU of a ng-eNB within a NG-RAN.

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ARIB	ARIB STD-T120-37.470.V16.2.0	16.2.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/37/A37470-g20.pdf
ATIS	ATIS.3GPP.37.470.V16.2.0	16.2.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.37.470.V16.2.0	16.2.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.470.V16.2.0.doc
ETSI	ETSI TS 137 470 V16.2.0 (2020-09)	16.2.0	Published	15.09.2020	https://www.etsi.org/deliver/etsi_ts/137400_137499/137470/16.02.00_60/ts_137470v160200p.pdf
TSDSI	TSDSI STD T1.3GPP 37.470-16.2.0 V1.0.0	16.2.0	Published	06.10.2020	https://members.tdsi.in/s/7dCgZAcbmci6yZy
TTA	TTAT.3G-37.470V16.2.0	16.2.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.470V16.2.0&searchCate=TTAS

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RIB	ARIB STD-T120-37.470.V17.0.0	17.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/37/A37470-h00.pdf
ATIS	ATIS.3GPP.37.470.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.37.470.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.470.V17.0.0.doc
ETSI	ETSI TS 137 470 V17.0.0 (2022-04)	17.0.0	Published	29.04.2022	https://www.etsi.org/deliver/etsi_ts/137400_137499/137470/17.00.00_60/ts_137470v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.470-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/N4LCpSWj4FKXo2L
TTA	TTAT.3G-37.470V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.470V17.0.0&searchCate=TTAS

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ARIB	ARIB STD-T120-37.470.V18.0.0	18.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/37/A37470-i00.pdf
ATIS	ATIS.3GPP.37.470.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.37.470.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.470.V18.0.0.docx
ETSI	ETSI TS 137 470 V18.0.0 (2024-05)	18.0.0	Published	03.05.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137470/18.00.00_60/ts_137470v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.470-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/df6FW3Y9q9YSwR
TTA	TTAT.3G-37.470V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.470V18.0.0&searchCate=TTAS

1.2.1.4.34 TS 37.471**W1 interface; Layer 1**

This document specifies the standards allowed to implement Layer 1 on the W1 interface. The W1 interface provides means for interconnecting a ng-eNB-CU and a ng-eNB-DU of a ng-eNB within a NG-RAN.

The specification of transmission delay requirements and O&M requirements are not in the scope of this document.

In the following ‘Layer 1’ and ‘Physical Layer’ are assumed to be synonymous.

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Release 16					
ARIB	ARIB STD-T120-37.471.V16.1.0	16.1.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/37/A37471-g10.pdf
ATIS	ATIS.3GPP.37.471.V16.1.0	16.1.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.37.471.V16.1.0	16.1.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.471.V16.1.0.doc
ETSI	ETSI TS 137 471 V16.1.0 (2020-09)	16.1.0	Published	21.09.2020	https://www.etsi.org/deliver/etsi_ts/137400_137499/137471/16.01.00_60/ts_137471v160100p.pdf
TSDSI	TSDSI STD T1.3GPP 37.471-16.1.0 V1.0.0	16.1.0	Published	06.10.2020	https://members.tdsi.in/s/RYE9DCETYMec5mP
TTA	TTAT.3G-37.471V16.1.0	16.1.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.471V16.1.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-37.471.V17.0.0	17.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/37/A37471-h00.pdf
ATIS	ATIS.3GPP.37.471.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.37.471.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.471.V17.0.0.doc
ETSI	ETSI TS 137 471 V17.0.0 (2022-04)	17.0.0	Published	29.04.2022	https://www.etsi.org/deliver/etsi_ts/137400_137499/137471/17.00.00_60/ts_137471v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.471-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/KwRkqA2mm4nk8LZ
TTA	TTAT.3G-37.471V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.471V17.0.0&searchCate=TTAS
Release 18					
ARIB	ARIB STD-T120-37.471.V18.0.0	18.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/37/A37471-i00.pdf
ATIS	ATIS.3GPP.37.471.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.37.471.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.471.V18.0.0.docx
ETSI	ETSI TS 137 471 V18.0.0 (2024-05)	18.0.0	Published	03.05.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137471/18.00.00_60/ts_137471v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.471-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/P5Nc4NGmMFipa8L
TTA	TTAT.3G-37.471V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.471V18.0.0&searchCate=TTAS

1.2.1.4.35 TS 37.472

W1 interface; Signalling transport

This document specifies the standards for Signalling Transport to be used across the W1 interface. The W1 interface provides means for interconnecting a ng-eNB-CU and a ng-eNB-DU of a ng-eNB within a NG-RAN. This document describes how the W1AP signalling messages are transported over W1.

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Release 16					
ARIB	ARIB STD-T120-37.472.V16.2.0	16.2.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/37/A37472-g20.pdf
ATIS	ATIS.3GPP.37.472.V16.2.0	16.2.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.37.472.V16.2.0	16.2.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.472.V16.2.0.doc
ETSI	ETSI TS 137 472 V16.2.0 (2020-11)	16.2.0	Published	13.11.2020	https://www.etsi.org/deliver/etsi_ts/137400_137499/137472/16.02.00_60/ts_137472v160200p.pdf
TSDSI	TSDSI STD T1.3GPP 37.472-16.2.0 V1.1.0	16.2.0	Published	29.07.2022	https://members.tdsi.in/s/qSnFxFtJS23n7r
TTA	TTAT.3G-37.472V16.2.0	16.2.0	Published	16.03.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.472V16.2.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-37.472.V17.0.0	17.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/37/A37472-h00.pdf
ATIS	ATIS.3GPP.37.472.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.37.472.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.472.V17.0.0.doc
ETSI	ETSI TS 137 472 V17.0.0 (2022-04)	17.0.0	Published	29.04.2022	https://www.etsi.org/deliver/etsi_ts/137400_137499/137472/17.00.00_60/ts_137472v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.472-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/jk7M3xzajRoMDji
TTA	TTAT.3G-37.472V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.472V17.0.0&searchCate=TTAS
Release 18					
ARIB	ARIB STD-T120-37.472.V18.0.0	18.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/37/A37472-i00.pdf
ATIS	ATIS.3GPP.37.472.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.37.472.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.472.V18.0.0.docx
ETSI	ETSI TS 137 472 V18.0.0 (2024-05)	18.0.0	Published	03.05.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137472/18.00.00_60/ts_137472v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.472-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/naNdRJSJj4czwHY
TTA	TTAT.3G-37.472V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.472V18.0.0&searchCate=TTAS

1.2.1.4.36 TS 37.473

W1 interface; Application Protocol (W1AP)

This document specifies the 5G radio network layer signalling protocol for the W1 interface. The W1 interface provides means for interconnecting a ng-eNB-CU and a ng-eNB-DU of a ng-eNB within an NG-RAN. The W1 Application Protocol (W1AP) supports the functions of W1 interface by signalling procedures defined in this document. W1AP is developed in accordance with the general principles stated in TS 38.401 and TS 37.470.

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ARIB	ARIB STD-T120-37.473.V16.9.0	16.9.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/37/A37473-g90.pdf
ATIS	ATIS.3GPP.37.473.V16.9.0	16.9.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.37.473.V16.9.0	16.9.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.473.V16.9.0.docx
ETSI	ETSI TS 137 473 V16.9.0 (2022-07)	16.9.0	Published	20.07.2022	https://www.etsi.org/deliver/etsi_ts/137400_137499/137473/16.09.00_60/ts_137473v160900p.pdf
TSDSI	TSDSI STD T1.3GPP 37.473-16.9.0 V1.1.0	16.9.0	Published	29.07.2022	https://members.tdsi.in/s/BD2334weX2ADb7J
TTA	TTAT.3G-37.473V16.9.0	16.9.0	Published	21.10.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.473V16.9.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-37.473.V17.2.0	17.2.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/37/A37473-h20.pdf
ATIS	ATIS.3GPP.37.473.V17.2.0	17.2.0	Published	22.05.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.37.473.V17.2.0	17.2.0	Published	22.05.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.473.V17.2.0.docx
ETSI	ETSI TS 137 473 V17.2.0 (2023-04)	17.2.0	Published	27.04.2023	https://www.etsi.org/deliver/etsi_ts/137400_137499/137473/17.02.00_60/ts_137473v170200p.pdf
TSDSI	TSDSI STD T1.3GPP 37.473-17.2.0 V1.2.0	17.2.0	Published	14.08.2023	https://members.tdsi.in/s/eozzGWb2ExBjBq
TTA	TTAT.3G-37.473V17.2.0	17.2.0	Published	01.08.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.473V17.2.0&searchCate=TTAS
Release 18					
ARIB	ARIB STD-T120-37.473.V18.0.0	18.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/37/A37473-i00.pdf
ATIS	ATIS.3GPP.37.473.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.37.473.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.473.V18.0.0.docx
ETSI	ETSI TS 137 473 V18.0.0 (2024-05)	18.0.0	Published	03.05.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137473/18.00.00_60/ts_137473v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.473-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/7Efsr5Et2Dfw6aZ
TTA	TTAT.3G-37.473V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.473V18.0.0&searchCate=TTAS

1.2.1.4.37 TS 37.480

E1 general aspects and principles

This document is an introduction to the 3GPP TS 37.48x series of technical specifications that define the E1 interface. The E1 interface provides means for interconnecting a gNB-CU-CP and a gNB-CU-UP of a gNB-CU within an NG-RAN, or for interconnecting a gNB-CU-CP and a gNB-CU-UP of an en-gNB within an E-UTRAN, or for interconnecting an eNB-CP and an eNB-UP of an eNB within an E-UTRAN, or for interconnecting an ng-eNB-CU-CP and an ng-eNB-CU-UP of an ng-eNB-CU within an NG-RAN.

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Release 17					
ATIS	ATIS.3GPP.37.480.V17.2.0	17.2.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.37.480.V17.2.0 3 SRIT ATIS/CCSA.3GPP.37.480.V17.2.0.docx	17.2.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 137 480 V17.2.0 (2024-02)	17.2.0	Published	02.02.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137480/17.02.00_60/ts_137480v170200p.pdf
TSDSI	TSDSI STD T1.3GPP 37.480-17.2.0 V1.2.0	17.2.0	Published	29.05.2024	https://members.tdsi.in/s/nXaK3CsALpPE8Bj
TTA	TTAT.3G-37.480V17.2.0 37.480V17.2.0&searchCate=TTAS	17.2.0	Published	08.05.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-37.480(Rel17)v17.2.0	17.2.0	Published	05.04.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-37.480v17.2.0.pdf
Release 18					
ATIS	ATIS.3GPP.37.480.V18.1.0	18.1.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.37.480.V18.1.0 3 SRIT ATIS/CCSA.3GPP.37.480.V18.1.0.docx	18.1.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 137 480 V18.1.0 (2024-05)	18.1.0	Published	27.05.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137480/18.01.00_60/ts_137480v180100p.pdf
TSDSI	TSDSI STD T1.3GPP 37.480-18.1.0 V1.0.0	18.1.0	Published	19.11.2024	https://members.tdsi.in/s/2cWM3Rx53mxqBDT
TTA	TTAT.3G-37.480V18.1.0 37.480V18.1.0&searchCate=TTAS	18.1.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-37.480(Rel18)v18.1.0	18.1.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-37.480v18.1.0.pdf

1.2.1.4.38 TS 37.481**E1 layer 1**

This document specifies the standards allowed to implement layer 1 on the E1 interface.

The specification of transmission delay requirements and O&M requirements are not in the scope of this document.

SDO	Document No.	Version	Status	Issued date	Location
Release 17					
ATIS	ATIS.3GPP.37.481.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.37.481.V17.0.0 3_SUIT_ATIS/CCSA.3GPP.37.481.V17.0.0.docx	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.37.481.V17.0.0.docx
ETSI	ETSI TS 137 481 V17.0.0 (2022-04)	17.0.0	Published	07.04.2022	https://www.etsi.org/deliver/etsi_ts/137400_137499/137481/17.00.00_60/ts_137481v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.481-17.0.0 V1.0.0	17.0.0	Published	29.05.2024	https://members.tdsi.in/s/nXaK3CsALpPE8Bj
TTA	TTAT.3G-37.481V17.0.0 37.481V17.0.0&searchCate=TTAS	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.481V17.0.0&searchCate=TTAS
TTC	TS-3GA-37.481(Rel17)v17.0.0	17.0.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-37.481v17.0.0.pdf
Release 18					
ATIS	ATIS.3GPP.37.481.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.37.481.V18.0.0 3_SUIT_ATIS/CCSA.3GPP.37.481.V18.0.0.docx	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.37.481.V18.0.0.docx
ETSI	ETSI TS 137 481 V18.0.0 (2024-05)	18.0.0	Published	03.05.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137481/18.00.00_60/ts_137481v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.481-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/2cWM3Rx53mxqBDT
TTA	TTAT.3G-37.481V18.0.0 37.481V18.0.0&searchCate=TTAS	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.481V18.0.0&searchCate=TTAS
TTC	TS-3GA-37.481(Rel18)v18.0.0	18.0.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-37.481v18.0.0.pdf

1.2.1.4.39 TS 37.482**E1 signalling transport**

This document specifies the standards for Signalling Transport to be used across the E1 interface. The E1 interface provides means for the interconnection of gNB-CU-CP and gNB-CU-UP within the NG-RAN architecture (TS 38.401), or for the interconnection of ng-eNB-CU-CP and ng-eNB-CU-UP within the NG-RAN architecture (TS 38.401), or for the interconnection of eNB-CP and eNB-UP within the E-UTRAN architecture (TS 36.401).

SDO	Document No.	Version	Status	Issued date	Location
Release 17					
ATIS	ATIS.3GPP.37.482.V17.4.0	17.4.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.37.482.V17.4.0 3_SUIT_ATIS/CCSA.3GPP.37.482.V17.4.0.docx	17.4.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.37.482.V17.4.0.docx
ETSI	ETSI TS 137 482 V17.4.0 (2024-04)	17.4.0	Published	22.04.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137482/17.04.00_60/ts_137482v170400p.pdf
TSDSI	TSDSI STD T1.3GPP 37.482-17.4.0 V1.4.0	17.4.0	Published	22.07.2024	https://members.tdsi.in/s/3Ge8BrRxogLyDLP
TTA	TTAT.3G-37.482V17.4.0 37.482V17.4.0&searchCate=TTAS	17.4.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.482V17.4.0&searchCate=TTAS
TTC	TS-3GA-37.482(Rel17)v17.4.0	17.4.0	Published	05.07.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-37.482v17.4.0.pdf

Release 18

ATIS	ATIS.3GPP.37.482.V18.1.0	18.1.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.37.482.V18.1.0	18.1.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.482.V18.1.0.docx
ETSI	ETSI TS 137 482 V18.1.0 (2024-08)	18.1.0	Published	05.08.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137482/18.01.00_60/ts_137482v180100p.pdf
TSDSI	TSDSI STD T1.3GPP 37.482-18.1.0 V1.0.0	18.1.0	Published	19.11.2024	https://members.tdsi.in/s/zSE2siWb22oLoL9
TTA	TTAT.3G-37.482V18.1.0	18.1.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.482V18.1.0&searchCate=TTAS
TTC	TS-3GA-37.482(Rel18)v18.1.0	18.1.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-37.482v18.1.0.pdf

1.2.1.4.40 TS 37.483**E1 Application Protocol (E1AP)**

This document specifies the 5G radio network layer signalling protocol for the E1 interface. The E1 interface provides means for interconnecting a gNB-CU-CP and a gNB-CU-UP of a gNB within an NG-RAN, or for interconnecting a gNB-CU-CP and a gNB-CU-UP of an en-gNB within an E-UTRAN, or for interconnecting an eNB-CP and an eNB-UP of an eNB within an E-UTRAN, or for interconnecting an ng-eNB-CU-CP and an ng-eNB-CU-UP of an ng-eNB within an NG-RAN. The E1 Application Protocol (E1AP) supports the functions of E1 interface by signalling procedures defined in this document. E1AP is developed in accordance to the general principles stated in TS 38.401 and TS 37.480.

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Release 17

ATIS	ATIS.3GPP.37.483.V17.8.0	17.8.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.37.483.V17.8.0	17.8.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.483.V17.8.0.docx
ETSI	ETSI TS 137 483 V17.8.0 (2024-04)	17.8.0	Published	22.04.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137483/17.08.00_60/ts_137483v170800p.pdf
TSDSI	TSDSI STD T1.3GPP 37.483-17.8.0 V1.8.0	17.8.0	Published	22.07.2024	https://members.tdsi.in/s/fzWmctZfSSJxRkt
TTA	TTAT.3G-37.483V17.8.0	17.8.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.483V17.8.0&searchCate=TTAS
TTC	TS-3GA-37.483(Rel17)v17.8.0	17.8.0	Published	05.07.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-37.483v17.8.0.pdf

Release 18

ATIS	ATIS.3GPP.37.483.V18.2.0	18.2.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.37.483.V18.2.0	18.2.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.483.V18.2.0.docx
ETSI	ETSI TS 137 483 V18.2.0 (2024-08)	18.2.0	Published	05.08.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137483/18.02.00_60/ts_137483v180200p.pdf
TSDSI	TSDSI STD T1.3GPP 37.483-18.2.0 V1.0.0	18.2.0	Published	19.11.2024	https://members.tdsi.in/s/JoZN8dptryLQXL
TTA	TTAT.3G-37.483V18.2.0	18.2.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.483V18.2.0&searchCate=TTAS
TTC	TS-3GA-37.483(Rel18)v18.2.0	18.2.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-37.483v18.2.0.pdf

1.2.1.4.41 TS 38.401

NG-RAN; Architecture description

This document describes the overall architecture of the NG-RAN, including interfaces NG, Xn and F1 interfaces and their interaction with the radio interface.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.38.401.V15.10.0	15.10.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.401.V15.10.0	15.10.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.401.V15.10.0.doc
ETSI	ETSI TS 138 401 V15.10.0 (2023-10)	15.10.0	Published	02.10.2023	https://www.etsi.org/deliver/etsi_ts/138400_138499/138401/15.10.00_60/ts_138401v151000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.401-15.10.0 V1.2.0	15.10.0	Published	23.02.2024	https://members.tdsi.in/s/EHbegBgZKTaZjr8
TTA	TTAT.3G-38.401V15.10.0	15.10.0	Published	13.02.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.401V15.10.0&searchCate=TTAS
TTC	TS-3GA-38.401(Rel15)v15.10.0	15.10.0	Published	12.01.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.401v15.10.0.pdf
Release 16					
ATIS	ATIS.3GPP.38.401.V16.12.0	16.12.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.401.V16.12.0	16.12.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.401.V16.12.0.docx
ETSI	ETSI TS 138 401 V16.12.0 (2024-04)	16.12.0	Published	22.04.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138401/16.12.00_60/ts_138401v161200p.pdf
TSDSI	TSDSI STD T1.3GPP 38.401-16.12.0 V1.4.0	16.12.0	Published	22.07.2024	https://members.tdsi.in/s/nw4ny7tK5pqTmMT
TTA	TTAT.3G-38.401V16.12.0	16.12.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.401V16.12.0&searchCate=TTAS
TTC	TS-3GA-38.401(Rel16)v16.12.0	16.12.0	Published	05.07.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.401v16.12.0.pdf
Release 17					
ATIS	ATIS.3GPP.38.401.V17.10.0	17.10.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.401.V17.10.0	17.10.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.401.V17.10.0.docx
ETSI	ETSI TS 138 401 V17.10.0 (2024-09)	17.10.0	Published	26.09.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138401/17.10.00_60/ts_138401v171000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.401-17.10.0 V1.10.0	17.10.0	Published	02.03.2025	https://members.tdsi.in/s/wBsXCCWRxfFSdXD
TTA	TTAT.3G-38.401V17.10.0	17.10.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.401V17.10.0&searchCate=TTAS
TTC	TS-3GA-38.401(Rel17)v17.10.0	17.10.0	Published	10.01.2025	https://www.ttc.or.jp/st/docs/3gpp/2025/TS/TS-3GA-38.401v17.10.0.pdf
Release 18					
ATIS	ATIS.3GPP.38.401.V18.3.0	18.3.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.401.V18.3.0	18.3.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.401.V18.3.0.docx
ETSI	ETSI TS 138 401 V18.3.0 (2024-09)	18.3.0	Published	26.09.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138401/18.03.00_60/ts_138401v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.401-18.3.0 V1.1.0	18.3.0	Published	02.03.2025	https://members.tdsi.in/s/isjoRPXxcFF2gbM
TTA	TTAT.3G-38.401V18.3.0	18.3.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.401V18.3.0&searchCate=TTAS
TTC	TS-3GA-38.401(Rel18)v18.3.0	18.3.0	Published	10.01.2025	https://www.ttc.or.jp/st/docs/3gpp/2025/TS/TS-3GA-38.401v18.3.0.pdf

1.2.1.4.42 TS 38.410

NG-RAN; NG general aspects and principles

This document is an introduction to the 3GPP TS 38.41x series of technical specifications that define the NG interface for the interconnection of an NG-RAN node to the 5GC (5G Core Network).

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.38.410.V15.2.0	15.2.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.410.V15.2.0 3_SUIT_ATIS/CCSA.3GPP.38.410.V15.2.0.doc	15.2.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 410 V15.2.0 (2019-04)	15.2.0	Published	24.04.2019	https://www.etsi.org/deliver/etsi_ts/138400_138499/138410/15.02.00_60/ts_138410v150200p.pdf
TSDSI	TSDSI STD T1.3GPP 38.410-15.2.0 V1.0.0	15.2.0	Published	06.10.2020	https://members.tdsi.in/s/pcb2Ao2AmnE5AeY
TTA	TTAT.3G-38.410V15.2.0 38.410V15.2.0&searchCate=TTAS	15.2.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.410(Rel15)v15.2.0	15.2.0	Published	02.10.2020	https://www.ttc.or.jp/st/docs/3gpps2020/TS/TS-3GA-38_410_Rel15v15_2_0.pdf
Release 16					
ATIS	ATIS.3GPP.38.410.V16.4.0	16.4.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.410.V16.4.0 3_SUIT_ATIS/CCSA.3GPP.38.410.V16.4.0.doc	16.4.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 410 V16.4.0 (2021-10)	16.4.0	Published	20.10.2021	https://www.etsi.org/deliver/etsi_ts/138400_138499/138410/16.04.00_60/ts_138410v160400p.pdf
TSDSI	TSDSI STD T1.3GPP 38.410-16.4.0 V1.1.0	16.4.0	Published	29.07.2022	https://members.tdsi.in/s/BMDnKsXrmFgnQj7
TTA	TTAT.3G-38.410V16.4.0 38.410V16.4.0&searchCate=TTAS	16.4.0	Published	27.01.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.410(Rel16)v16.4.0	16.4.0	Published	14.01.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-38.410v16.4.0.pdf
Release 17					
ATIS	ATIS.3GPP.38.410.V17.1.0	17.1.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.410.V17.1.0 3_SUIT_ATIS/CCSA.3GPP.38.410.V17.1.0.docx	17.1.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 410 V17.1.0 (2022-07)	17.1.0	Published	20.07.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138410/17.01.00_60/ts_138410v170100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.410-17.1.0 V1.1.0	17.1.0	Published	11.01.2022	https://members.tdsi.in/s/ax9fFXNjgYC5KiT
TTA	TTAT.3G-38.410V17.1.0 38.410V17.1.0&searchCate=TTAS	17.1.0	Published	21.10.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.410(Rel17)v17.1.0	17.1.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-38.410v17.1.0.pdf
Release 18					
ATIS	ATIS.3GPP.38.410.V18.2.0	18.2.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.410.V18.2.0 3_SUIT_ATIS/CCSA.3GPP.38.410.V18.2.0.docx	18.2.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 410 V18.2.0 (2024-08)	18.2.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138410/18.02.00_60/ts_138410v180200p.pdf
TSDSI	TSDSI STD T1.3GPP 38.410-18.2.0 V1.0.0	18.2.0	Published	19.11.2024	https://members.tdsi.in/s/EgwtBJQPJ56SnPR
TTA	TTAT.3G-38.410V18.2.0 38.410V18.2.0&searchCate=TTAS	18.2.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.410(Rel18)v18.2.0	18.2.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.410v18.2.0.pdf

1.2.1.4.43 TS 38.411**NG-RAN; NG layer 1**

This document specifies the standards allowed to implement layer 1 on the NG interface.

The specification of transmission delay requirements and O&M requirements are not in the scope of this document.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.38.411.V15.0.0	15.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.411.V15.0.0 3_SUIT_ATIS/CCSA.3GPP.38.411.V15.0.0.doc	15.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 411 V15.0.0 (2018-07)	15.0.0	Published	04.07.2018	https://www.etsi.org/deliver/etsi_ts/138400_138499/138411/15.00.00_60/ts_138411v150000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.411-15.0.0 V1.0.0	15.0.0	Published	06.10.2020	https://members.tdsi.in/s/bqgZkBK5Fa9EPjT
TTA	TTAT.3G-38.411V15.0.0 38.411V15.0.0&searchCate=TTAS	15.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.411(Rel15)v15.0.0	15.0.0	Published	28.09.2018	https://www.ttc.or.jp/st/docs/3gpps2018/TS/TS-3GA-38.411(Rel15)v15.0.0.pdf
Release 16					
ATIS	ATIS.3GPP.38.411.V16.0.0	16.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.411.V16.0.0 3_SUIT_ATIS/CCSA.3GPP.38.411.V16.0.0.doc	16.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 411 V16.0.0 (2020-07)	16.0.0	Published	21.07.2020	https://www.etsi.org/deliver/etsi_ts/138400_138499/138411/16.00.00_60/ts_138411v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.411-16.0.0 V1.0.0	16.0.0	Published	06.10.2020	https://members.tdsi.in/s/iF93r3y2ws8ArLo
TTA	TTAT.3G-38.411V16.0.0 38.411V16.0.0&searchCate=TTAS	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.411(Rel16)v16.0.0	16.0.0	Published	02.10.2020	https://www.ttc.or.jp/st/docs/3gpps2020/TS/TS-3GA-38_411_Rel16v16_0_0.pdf
Release 17					
ATIS	ATIS.3GPP.38.411.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.411.V17.0.0 3_SUIT_ATIS/CCSA.3GPP.38.411.V17.0.0.doc	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 411 V17.0.0 (2022-04)	17.0.0	Published	29.04.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138411/17.00.00_60/ts_138411v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.411-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/rjJMbaEGiWWYi26
TTA	TTAT.3G-38.411V17.0.0 38.411V17.0.0&searchCate=TTAS	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.411(Rel17)v17.0.0	17.0.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-38.411v17.0.0.pdf
Release 18					
ATIS	ATIS.3GPP.38.411.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.411.V18.0.0 3_SUIT_ATIS/CCSA.3GPP.38.411.V18.0.0.docx	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 411 V18.0.0 (2024-05)	18.0.0	Published	03.05.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138411/18.00.00_60/ts_138411v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.411-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/gXR47fd3goayffT
TTA	TTAT.3G-38.411V18.0.0 38.411V18.0.0&searchCate=TTAS	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.411(Rel18)v18.0.0	18.0.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.411v18.0.0.pdf

1.2.1.4.44 TS 38.412

NG-RAN; NG signalling transport

This document specifies the standards for signalling transport to be used across NG interface. NG interface is a logical interface between the NG-RAN and the 5GC. This document describes how the NGAP signalling messages are transported over NG.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.38.412.V15.5.0	15.5.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.412.V15.5.0 3_SUIT_ATIS/CCSA.3GPP.38.412.V15.5.0.docx	15.5.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 412 V15.5.0 (2020-11)	15.5.0	Published	12.11.2020	https://www.etsi.org/deliver/etsi_ts/138400_138499/138412/15.05.00_60/ts_138412v150500p.pdf
TSDSI	TSDSI STD T1.3GPP 38.412-15.5.0 V1.1.0	15.5.0	Published	29.07.2022	https://members.tdsi.in/s/4p7S8T6YFPH9HJK
TTA	TTAT.3G-38.412V15.5.0 38.412V15.5.0&searchCate=TTAS	15.5.0	Published	16.03.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.412(Rel15)v15.5.0	15.5.0	Published	22.12.2020	https://www.ttc.or.jp/st/docs/3gpp/2020/TS/TS-3GA-38.412v15.5.0.pdf
Release 16					
ATIS	ATIS.3GPP.38.412.V16.2.0	16.2.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.412.V16.2.0 3_SUIT_ATIS/CCSA.3GPP.38.412.V16.2.0.docx	16.2.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 412 V16.2.0 (2023-07)	16.2.0	Published	28.07.2023	https://www.etsi.org/deliver/etsi_ts/138400_138499/138412/16.02.00_60/ts_138412v160200p.pdf
TSDSI	TSDSI STD T1.3GPP 38.412-16.2.0 V1.2.0	16.2.0	Published	11.02.2023	https://members.tdsi.in/s/7xjLotK2GZjoRbk
TTA	TTAT.3G-38.412V16.2.0 38.412V16.2.0&searchCate=TTAS	16.2.0	Published	27.10.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.412(Rel16)v16.2.0	16.2.0	Published	05.10.2023	https://www.ttc.or.jp/st/docs/3gpp/2023/TS/TS-3GA-38.412v16.2.0.pdf
Release 17					
ATIS	ATIS.3GPP.38.412.V17.1.0	17.1.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.412.V17.1.0 3_SUIT_ATIS/CCSA.3GPP.38.412.V17.1.0.docx	17.1.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 412 V17.1.0 (2023-07)	17.1.0	Published	28.07.2023	https://www.etsi.org/deliver/etsi_ts/138400_138499/138412/17.01.00_60/ts_138412v170100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.412-17.1.0 V1.1.0	17.1.0	Published	11.02.2023	https://members.tdsi.in/s/JC9fYqfECy8p4AD
TTA	TTAT.3G-38.412V17.1.0 38.412V17.1.0&searchCate=TTAS	17.1.0	Published	27.10.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.412(Rel17)v17.1.0	17.1.0	Published	05.10.2023	https://www.ttc.or.jp/st/docs/3gpp/2023/TS/TS-3GA-38.412v17.1.0.pdf
Release 18					
ATIS	ATIS.3GPP.38.412.V18.1.0	18.1.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.412.V18.1.0 3_SUIT_ATIS/CCSA.3GPP.38.412.V18.1.0.docx	18.1.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 412 V18.1.0 (2024-08)	18.1.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138412/18.01.00_60/ts_138412v180100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.412-18.1.0 V1.0.0	18.1.0	Published	19.11.2024	https://members.tdsi.in/s/MX4xctn7PnBDtgA
TTA	TTAT.3G-38.412V18.1.0 38.412V18.1.0&searchCate=TTAS	18.1.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.412(Rel18)v18.1.0	18.1.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.412v18.1.0.pdf

1.2.1.4.45 TS 38.413

NG-RAN; NG Application Protocol (NGAP)

This document specifies the radio network layer signalling protocol for the NG interface. The NG Application Protocol (NGAP) supports the functions of the NG interface by signalling procedures defined in this document. NGAP is developed in accordance with the general principles stated in TS 38.401 and TS 38.410.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.38.413.V15.13.0	15.13.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.413.V15.13.0 3_SUIT_ATIS/CCSA.3GPP.38.413.V15.13.0.doc	15.13.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 413 V15.13.0 (2021-10)	15.13.0	Published	20.10.2021	https://www.etsi.org/deliver/etsi_ts/138400_138499/138413/15.13.00_60/ts_138413v151300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.413-15.13.0 V1.1.0	15.13.0	Published	29.07.2022	https://members.tdsi.in/s/R2p96HixFqFkLp3
TTA	TTAT.3G-38.413V15.13.0 38.413V15.13.0&searchCate=TTAS	15.13.0	Published	27.01.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.413(Rel15)v15.13.0	15.13.0	Published	14.01.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-38.413v15.13.0.pdf
Release 16					
ATIS	ATIS.3GPP.38.413.V16.15.0	16.15.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.413.V16.15.0 3_SUIT_ATIS/CCSA.3GPP.38.413.V16.15.0.docx	16.15.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 413 V16.15.0 (2024-05)	16.15.0	Published	03.05.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138413/16.15.00_60/ts_138413v161500p.pdf
TSDSI	TSDSI STD T1.3GPP 38.413-16.15.0 V1.6.0	16.15.0	Published	22.07.2024	https://members.tdsi.in/s/jkgTkWGwmcMs3JR
TTA	TTAT.3G-38.413V16.15.0 38.413V16.15.0&searchCate=TTAS	16.15.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.413(Rel16)v16.15.0	16.15.0	Published	05.07.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.413v16.15.0.pdf
Release 17					
ATIS	ATIS.3GPP.38.413.V17.10.0	17.10.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.413.V17.10.0 3_SUIT_ATIS/CCSA.3GPP.38.413.V17.10.0.docx	17.10.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 413 V17.10.0 (2024-09)	17.10.0	Published	26.09.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138413/17.10.00_60/ts_138413v171000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.413-17.10.0 V1.10.0	17.10.0	Published	02.03.2025	https://members.tdsi.in/s/ByqymZ2JemoKtY
TTA	TTAT.3G-38.413V17.10.0 38.413V17.10.0&searchCate=TTAS	17.10.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.413(Rel17)v17.10.0	17.10.0	Published	10.01.2025	https://www.ttc.or.jp/st/docs/3gpp/2025/TS/TS-3GA-38.413v17.10.0.pdf
Release 18					
ATIS	ATIS.3GPP.38.413.V18.3.0	18.3.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.413.V18.3.0 3_SUIT_ATIS/CCSA.3GPP.38.413.V18.3.0.docx	18.3.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 413 V18.3.0 (2024-09)	18.3.0	Published	26.09.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138413/18.03.00_60/ts_138413v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.413-18.3.0 V1.1.0	18.3.0	Published	02.03.2025	https://members.tdsi.in/s/qmdWQXjYfgHqYQA
TTA	TTAT.3G-38.413V18.3.0 38.413V18.3.0&searchCate=TTAS	18.3.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.413(Rel18)v18.3.0	18.3.0	Published	10.01.2025	https://www.ttc.or.jp/st/docs/3gpp/2025/TS/TS-3GA-38.413v18.3.0.pdf

1.2.1.4.46 TS 38.414

NG-RAN; NG data transport

This document specifies the standards for user data transport protocols and related signalling protocols to establish user plane transport bearers over the NG interface.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.38.414.V15.3.0	15.3.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.414.V15.3.0 3_SUIT_ATIS/CCSA.3GPP.38.414.V15.3.0.doc	15.3.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 414 V15.3.0 (2020-07)	15.3.0	Published	23.07.2020	https://www.etsi.org/deliver/etsi_ts/138400_138499/138414/15.03.00_60/ts_138414v150300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.414-15.3.0 V1.0.0	15.3.0	Published	06.10.2020	https://members.tdsi.in/s/6yFx2WpW5tSLNm2
TTA	TTAT.3G-38.414V15.3.0 38.414V15.3.0&searchCate=TTAS	15.3.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.414(Rel15)v15.3.0	15.3.0	Published	02.10.2020	https://www.ttc.or.jp/st/docs/3gpps2020/TS/TS-3GA-38_414_Rel15v15_3_0.pdf
Release 16					
ATIS	ATIS.3GPP.38.414.V16.0.0	16.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.414.V16.0.0 3_SUIT_ATIS/CCSA.3GPP.38.414.V16.0.0.doc	16.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 414 V16.0.0 (2020-07)	16.0.0	Published	23.07.2020	https://www.etsi.org/deliver/etsi_ts/138400_138499/138414/16.00.00_60/ts_138414v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.414-16.0.0 V1.0.0	16.0.0	Published	06.10.2020	https://members.tdsi.in/s/X3f6yYYNWGPW7LW
TTA	TTAT.3G-38.414V16.0.0 38.414V16.0.0&searchCate=TTAS	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.414(Rel16)v16.0.0	16.0.0	Published	02.10.2020	https://www.ttc.or.jp/st/docs/3gpps2020/TS/TS-3GA-38_414_Rel16v16_0_0.pdf
Release 17					
ATIS	ATIS.3GPP.38.414.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.414.V17.0.0 3_SUIT_ATIS/CCSA.3GPP.38.414.V17.0.0.doc	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 414 V17.0.0 (2022-04)	17.0.0	Published	29.04.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138414/17.00.00_60/ts_138414v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.414-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/QTpTzJGMc8HLzRe
TTA	TTAT.3G-38.414V17.0.0 38.414V17.0.0&searchCate=TTAS	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.414(Rel17)v17.0.0	17.0.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-38.414v17.0.0.pdf
Release 18					
ATIS	ATIS.3GPP.38.414.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.414.V18.0.0 3_SUIT_ATIS/CCSA.3GPP.38.414.V18.0.0.docx	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 414 V18.0.0 (2024-05)	18.0.0	Published	06.05.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138414/18.00.00_60/ts_138414v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.414-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/Sb68SfpMSAj8e28
TTA	TTAT.3G-38.414V18.0.0 38.414V18.0.0&searchCate=TTAS	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.414(Rel18)v18.0.0	18.0.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.414v18.0.0.pdf

1.2.1.4.47 TS 38.415

NG-RAN; PDU session user plane protocol

This document specifies the PDU Session user plane protocol being used over the NG-U, Xn-U and N9 interfaces. Applicability to other interfaces is not precluded.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.38.415.V15.3.0	15.3.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.415.V15.3.0 3_SUIT_ATIS/CCSA.3GPP.38.415.V15.3.0.doc	15.3.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 415 V15.3.0 (2021-08)	15.3.0	Published	19.08.2021	https://www.etsi.org/deliver/etsi_ts/138400_138499/138415/15.03.00_60/ts_138415v150300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.415-15.3.0 V1.1.0	15.3.0	Published	29.07.2022	https://members.tdsi.in/s/KRSBYxEPCEQTdXC
TTA	TTAT.3G-38.415V15.3.0 38.415V15.3.0&searchCate=TTAS	15.3.0	Published	30.09.2021	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.415(Rel15)v15.3.0	15.3.0	Published	15.10.2021	https://www.ttc.or.jp/st/docs/3gpp/2021/TS/TS-3GA-38.415v15.3.0.pdf
Release 16					
ATIS	ATIS.3GPP.38.415.V16.6.0	16.6.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.415.V16.6.0 3_SUIT_ATIS/CCSA.3GPP.38.415.V16.6.0.doc	16.6.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 415 V16.6.0 (2022-01)	16.6.0	Published	21.01.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138415/16.06.00_60/ts_138415v160600p.pdf
TSDSI	TSDSI STD T1.3GPP 38.415-16.6.0 V1.1.0	16.6.0	Published	29.07.2022	https://members.tdsi.in/s/7mNcMwDEdijPjW9
TTA	TTAT.3G-38.415V16.6.0 38.415V16.6.0&searchCate=TTAS	16.6.0	Published	14.03.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.415(Rel16)v16.6.0	16.6.0	Published	08.04.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-38.415v16.6.0.pdf
Release 17					
ATIS	ATIS.3GPP.38.415.V17.1.0	17.1.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.415.V17.1.0 3_SUIT_ATIS/CCSA.3GPP.38.415.V17.1.0.docx	17.1.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 415 V17.1.0 (2024-02)	17.1.0	Published	02.02.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138415/17.01.00_60/ts_138415v170100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.415-17.1.0 V1.1.0	17.1.0	Published	29.05.2024	https://members.tdsi.in/s/ypJLQ4YysTBDn4F
TTA	TTAT.3G-38.415V17.1.0 38.415V17.1.0&searchCate=TTAS	17.1.0	Published	08.05.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.415(Rel17)v17.1.0	17.1.0	Published	05.04.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.415v17.1.0.pdf
Release 18					
ATIS	ATIS.3GPP.38.415.V18.1.0	18.1.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.415.V18.1.0 3_SUIT_ATIS/CCSA.3GPP.38.415.V18.1.0.docx	18.1.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 415 V18.1.0 (2024-05)	18.1.0	Published	27.05.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138415/18.01.00_60/ts_138415v180100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.415-18.1.0 V1.0.0	18.1.0	Published	19.11.2024	https://members.tdsi.in/s/jExztP6i6zzPQRm
TTA	TTAT.3G-38.415V18.1.0 38.415V18.1.0&searchCate=TTAS	18.1.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.415(Rel18)v18.1.0	18.1.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.415v18.1.0.pdf

1.2.1.4.48 TS 38.420

NG-RAN; Xn general aspects and principles

This document is an introduction to the TSG RAN TS 38.42x series of Technical Specifications that define the Xn interface. It is an interface for the interconnection of two NG-RAN nodes within the NG-RAN architecture (TS 38.401).

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.38.420.V15.2.0	15.2.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.420.V15.2.0 3_SUIT_ATIS/CCSA.3GPP.38.420.V15.2.0.doc	15.2.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 420 V15.2.0 (2019-04)	15.2.0	Published	24.04.2019	https://www.etsi.org/deliver/etsi_ts/138400_138499/138420/15.02.00_60/ts_138420v150200p.pdf
TSDSI	TSDSI STD T1.3GPP 38.420-15.2.0 V1.0.0	15.2.0	Published	06.10.2020	https://members.tdsi.in/s/tQRps7kLjLJtrnT
TTA	TTAT.3G-38.420V15.2.0 38.420V15.2.0&searchCate=TTAS	15.2.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.420(Rel15)v15.2.0	15.2.0	Published	29.03.2019	https://www.ttc.or.jp/st/docs/3gpps2019/TS/TS-3GA-38.420(Rel15)v15.2.0.pdf
Release 16					
ATIS	ATIS.3GPP.38.420.V16.0.0	16.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.420.V16.0.0 3_SUIT_ATIS/CCSA.3GPP.38.420.V16.0.0.doc	16.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 420 V16.0.0 (2020-07)	16.0.0	Published	21.07.2020	https://www.etsi.org/deliver/etsi_ts/138400_138499/138420/16.00.00_60/ts_138420v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.420-16.0.0 V1.0.0	16.0.0	Published	06.10.2020	https://members.tdsi.in/s/GpR6R8iCdNoBWew
TTA	TTAT.3G-38.420V16.0.0 38.420V16.0.0&searchCate=TTAS	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.420(Rel16)v16.0.0	16.0.0	Published	02.10.2020	https://www.ttc.or.jp/st/docs/3gpps2020/TS/TS-3GA-38_420_Rel16v16_0_0.pdf
Release 17					
ATIS	ATIS.3GPP.38.420.V17.2.0	17.2.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.420.V17.2.0 3_SUIT_ATIS/CCSA.3GPP.38.420.V17.2.0.docx	17.2.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 420 V17.2.0 (2022-10)	17.2.0	Published	14.10.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138420/17.02.00_60/ts_138420v170200p.pdf
TSDSI	TSDSI STD T1.3GPP 38.420-17.2.0 V1.2.0	17.2.0	Published	17.01.2023	https://members.tdsi.in/s/NyMwfb8eXHiA7Fs
TTA	TTAT.3G-38.420V17.2.0 38.420V17.2.0&searchCate=TTAS	17.2.0	Published	11.01.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.420(Rel17)v17.2.0	17.2.0	Published	13.01.2023	https://www.ttc.or.jp/st/docs/3gpp/2023/TS/TS-3GA-38.420v17.2.0.pdf
Release 18					
ATIS	ATIS.3GPP.38.420.V18.1.0	18.1.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.420.V18.1.0 3_SUIT_ATIS/CCSA.3GPP.38.420.V18.1.0.docx	18.1.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 420 V18.1.0 (2024-05)	18.1.0	Published	27.05.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138420/18.01.00_60/ts_138420v180100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.420-18.1.0 V1.0.0	18.1.0	Published	19.11.2024	https://members.tdsi.in/s/8xqc5EdrpmmH4w9
TTA	TTAT.3G-38.420V18.1.0 38.420V18.1.0&searchCate=TTAS	18.1.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.420(Rel18)v18.1.0	18.1.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.420v18.1.0.pdf

1.2.1.4.49 TS 38.421**NG-RAN; Xn layer 1**

This document specifies the standards allowed to implement layer 1 on the Xn interface.

The specification of transmission delay requirements and O&M requirements are not in the scope of this document.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.38.421.V15.1.0	15.1.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.421.V15.1.0 3_SUIT_ATIS/CCSA.3GPP.38.421.V15.1.0.doc	15.1.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 421 V15.1.0 (2019-10)	15.1.0	Published	16.10.2019	https://www.etsi.org/deliver/etsi_ts/138400_138499/138421/15.01.00_60/ts_138421v150100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.421-15.1.0 V1.0.0	15.1.0	Published	06.10.2020	https://members.tdsi.in/s/bXLMntk8Ykm6i65
TTA	TTAT.3G-38.421V15.1.0 38.421V15.1.0&searchCate=TTAS	15.1.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.421(Rel15)v15.1.0	15.1.0	Published	20.12.2019	https://www.ttc.or.jp/st/docs/3gpps2019/TS/TS-3GA-38.421(Rel15)v15.1.0.pdf
Release 16					
ATIS	ATIS.3GPP.38.421.V16.0.0	16.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.421.V16.0.0 3_SUIT_ATIS/CCSA.3GPP.38.421.V16.0.0.doc	16.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 421 V16.0.0 (2020-07)	16.0.0	Published	21.07.2020	https://www.etsi.org/deliver/etsi_ts/138400_138499/138421/16.00.00_60/ts_138421v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.421-16.0.0 V1.0.0	16.0.0	Published	06.10.2020	https://members.tdsi.in/s/SGXDkgkPqQaEBB
TTA	TTAT.3G-38.421V16.0.0 38.421V16.0.0&searchCate=TTAS	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.421(Rel16)v16.0.0	16.0.0	Published	02.10.2020	https://www.ttc.or.jp/st/docs/3gpps2020/TS/TS-3GA-38_421_Rel16v16_0_0.pdf
Release 17					
ATIS	ATIS.3GPP.38.421.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.421.V17.0.0 3_SUIT_ATIS/CCSA.3GPP.38.421.V17.0.0.doc	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 421 V17.0.0 (2022-04)	17.0.0	Published	29.04.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138421/17.00.00_60/ts_138421v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.421-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/4XwdJajEYiftGzg
TTA	TTAT.3G-38.421V17.0.0 38.421V17.0.0&searchCate=TTAS	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.421(Rel17)v17.0.0	17.0.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-38.421v17.0.0.pdf
Release 18					
ATIS	ATIS.3GPP.38.421.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.421.V18.0.0 3_SUIT_ATIS/CCSA.3GPP.38.421.V18.0.0.docx	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 421 V18.0.0 (2024-05)	18.0.0	Published	06.05.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138421/18.00.00_60/ts_138421v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.421-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/6Hws3zGsk8TAGHA
TTA	TTAT.3G-38.421V18.0.0 38.421V18.0.0&searchCate=TTAS	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.421(Rel18)v18.0.0	18.0.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.421v18.0.0.pdf

1.2.1.4.50 TS 38.422

NG-RAN; Xn signalling transport

This document specifies the standards for signalling transport to be used across Xn interface. The Xn interface provides means for interconnecting two NG-RAN nodes. The Xn interface is a logical interface between two nodes of the NG-RAN. This document describes how the XnAP signalling messages are transported over Xn.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.38.422.V15.4.0	15.4.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.422.V15.4.0	15.4.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIATIS/CCSA.3GPP.38.422.V15.4.0.doc
ETSI	ETSI TS 138 422 V15.4.0 (2020-01)	15.4.0	Published	17.01.2020	https://www.etsi.org/deliver/etsi_ts/138400_138499/138422\15.04.00_60/ts_138422v150400p.pdf
TSDSI	TSDSI STD T1.3GPP 38.422-15.4.0 V1.0.0	15.4.0	Published	06.10.2020	https://members.tdsi.in/s/83E54FRDbgcLXS5
TTA	TTAT.3G-38.422V15.4.0	15.4.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.422V15.4.0&searchCate=TTAS
TTC	TS-3GA-38.422(Rel15)v15.4.0	15.4.0	Published	16.04.2020	https://www.ttc.or.jp/st/docs/3gpps2020/TS/TS-3GA-38_422_Rel15v15_4_0.pdf
Release 16					
ATIS	ATIS.3GPP.38.422.V16.1.0	16.1.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.422.V16.1.0	16.1.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIATIS/CCSA.3GPP.38.422.V16.1.0.docx
ETSI	ETSI TS 138 422 V16.1.0 (2023-07)	16.1.0	Published	28.07.2023	https://www.etsi.org/deliver/etsi_ts/138400_138499/138422\16.01.00_60/ts_138422v160100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.422-16.1.0 V1.1.0	16.1.0	Published	11.02.2023	https://members.tdsi.in/s/jK5XTA9y85a2g7a
TTA	TTAT.3G-38.422V16.1.0	16.1.0	Published	27.10.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.422V16.1.0&searchCate=TTAS
TTC	TS-3GA-38.422(Rel16)v16.1.0	16.1.0	Published	05.10.2023	https://www.ttc.or.jp/st/docs/3gpp/2023/TS/TS-3GA-38.422v16.1.0.pdf
Release 17					
ATIS	ATIS.3GPP.38.422.V17.1.0	17.1.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.422.V17.1.0	17.1.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIATIS/CCSA.3GPP.38.422.V17.1.0.docx
ETSI	ETSI TS 138 422 V17.1.0 (2023-07)	17.1.0	Published	28.07.2023	https://www.etsi.org/deliver/etsi_ts/138400_138499/138422\17.01.00_60/ts_138422v170100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.422-17.1.0 V1.1.0	17.1.0	Published	11.02.2023	https://members.tdsi.in/s/4zC2YTQgsJn8mMG
TTA	TTAT.3G-38.422V17.1.0	17.1.0	Published	27.10.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.422V17.1.0&searchCate=TTAS
TTC	TS-3GA-38.422(Rel17)v17.1.0	17.1.0	Published	05.10.2023	https://www.ttc.or.jp/st/docs/3gpp/2023/TS/TS-3GA-38.422v17.1.0.pdf
Release 18					
ATIS	ATIS.3GPP.38.422.V18.1.0	18.1.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.422.V18.1.0	18.1.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIATIS/CCSA.3GPP.38.422.V18.1.0.docx
ETSI	ETSI TS 138 422 V18.1.0 (2024-08)	18.1.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138422\18.01.00_60/ts_138422v180100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.422-18.1.0 V1.0.0	18.1.0	Published	19.11.2024	https://members.tdsi.in/s/nZxTcjDCJ8RyS5x
TTA	TTAT.3G-38.422V18.1.0	18.1.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.422V18.1.0&searchCate=TTAS
TTC	TS-3GA-38.422(Rel18)v18.1.0	18.1.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.422v18.1.0.pdf

1.2.1.4.51 TS 38.423**NG-RAN; Xn Application Protocol (XnAP)**

This document specifies the radio network layer signalling procedures of the control plane between NG-RAN nodes in NG-RAN. XnAP supports the functions of the Xn interface by signalling procedures defined in this document. XnAP is developed in accordance with the general principles stated in TS 38.401 and TS 38.420.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.38.423.V15.20.0	15.20.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.423.V15.20.0	15.20.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.38.423.V15.20.0.docx
ETSI	ETSI TS 138 423 V15.20.0 (2024-09)	15.20.0	Published	26.09.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138423/15.20.00_60/ts_138423v152000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.423-15.20.0 V1.7.0	15.20.0	Published	02.03.2025	https://members.tdsi.in/s/WKrnRkbJW8JFBZY
TTA	TTAT.3G-38.423V15.20.0	15.20.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.423V15.20.0&searchCate=TTAS
TTC	TS-3GA-38.423(Rel15)v15.20.0	15.20.0	Published	10.01.2025	https://www.ttc.or.jp/st/docs/3gpp/2025/TS/TS-3GA-38.423v15.20.0.pdf
Release 16					
ATIS	ATIS.3GPP.38.423.V16.19.0	16.19.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.423.V16.19.0	16.19.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.38.423.V16.19.0.docx
ETSI	ETSI TS 138 423 V16.19.0 (2024-09)	16.19.0	Published	26.09.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138423/16.19.00_60/ts_138423v161900p.pdf
TSDSI	TSDSI STD T1.3GPP 38.423-16.19.0 V1.10.0	16.19.0	Published	02.03.2025	https://members.tdsi.in/s/crrjJcgfgMCiro9
TTA	TTAT.3G-38.423V16.19.0	16.19.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.423V16.19.0&searchCate=TTAS
TTC	TS-3GA-38.423(Rel16)v16.19.0	16.19.0	Published	10.01.2025	https://www.ttc.or.jp/st/docs/3gpp/2025/TS/TS-3GA-38.423v16.19.0.pdf
Release 17					
ATIS	ATIS.3GPP.38.423.V17.10.0	17.10.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.423.V17.10.0	17.10.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.38.423.V17.10.0.docx
ETSI	ETSI TS 138 423 V17.10.0 (2024-09)	17.10.0	Published	26.09.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138423/17.10.00_60/ts_138423v171000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.423-17.10.0 V1.10.0	17.10.0	Published	02.03.2025	https://members.tdsi.in/s/rA5RC9ooSy7FZbH
TTA	TTAT.3G-38.423V17.10.0	17.10.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.423V17.10.0&searchCate=TTAS
TTC	TS-3GA-38.423(Rel17)v17.10.0	17.10.0	Published	10.01.2025	https://www.ttc.or.jp/st/docs/3gpp/2025/TS/TS-3GA-38.423v17.10.0.pdf
Release 18					
ATIS	ATIS.3GPP.38.423.V18.3.0	18.3.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.423.V18.3.0	18.3.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.38.423.V18.3.0.docx
ETSI	ETSI TS 138 423 V18.3.0 (2024-09)	18.3.0	Published	26.09.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138423/18.03.00_60/ts_138423v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.423-18.3.0 V1.1.0	18.3.0	Published	02.03.2025	https://members.tdsi.in/s/LNw42AFCqTteLSZ
TTA	TTAT.3G-38.423V18.3.0	18.3.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.423V18.3.0&searchCate=TTAS
TTC	TS-3GA-38.423(Rel18)v18.3.0	18.3.0	Published	10.01.2025	https://www.ttc.or.jp/st/docs/3gpp/2025/TS/TS-3GA-38.423v18.3.0.pdf

1.2.1.4.52 TS 38.424

NG-RAN; Xn data transport

This document specifies the standards for user data transport protocols and related signalling protocols to establish user plane transport bearers over the Xn interface.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.38.424.V15.2.0	15.2.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.424.V15.2.0 3 SRIT ATIS/CCSA.3GPP.38.424.V15.2.0.doc	15.2.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 424 V15.2.0 (2019-07)	15.2.0	Published	23.07.2019	https://www.etsi.org/deliver/etsi_ts/138400_138499/138424/15.02.00_60/ts_138424v150200p.pdf
TSDSI	TSDSI STD T1.3GPP 38.424-15.2.0 V1.0.0	15.2.0	Published	06.10.2020	https://members.tdsi.in/s/LqzDFgxdnKT4LGa
TTA	TTAT.3G-38.424V15.2.0 38.424V15.2.0&searchCate=TTAS	15.2.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.424(Rel15)v15.2.0	15.2.0	Published	11.10.2019	https://www.ttc.or.jp/st/docs/3gpps2019/TS/TS-3GA-38.424(Rel15)v15.2.0.pdf
Release 16					
ATIS	ATIS.3GPP.38.424.V16.0.0	16.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.424.V16.0.0 3 SRIT ATIS/CCSA.3GPP.38.424.V16.0.0.doc	16.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 424 V16.0.0 (2020-07)	16.0.0	Published	21.07.2020	https://www.etsi.org/deliver/etsi_ts/138400_138499/138424/16.00.00_60/ts_138424v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.424-16.0.0 V1.0.0	16.0.0	Published	06.10.2020	https://members.tdsi.in/s/MmwefCdmKrY3sNe
TTA	TTAT.3G-38.424V16.0.0 38.424V16.0.0&searchCate=TTAS	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.424(Rel16)v16.0.0	16.0.0	Published	02.10.2020	https://www.ttc.or.jp/st/docs/3gpps2020/TS/TS-3GA-38_424_Rel16v16_0_0.pdf
Release 17					
ATIS	ATIS.3GPP.38.424.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.424.V17.0.0 3 SRIT ATIS/CCSA.3GPP.38.424.V17.0.0.doc	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 424 V17.0.0 (2022-04)	17.0.0	Published	29.04.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138424/17.00.00_60/ts_138424v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.424-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/cXZsacGRsf2rqAq
TTA	TTAT.3G-38.424V17.0.0 38.424V17.0.0&searchCate=TTAS	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.424(Rel17)v17.0.0	17.0.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-38.424v17.0.0.pdf
Release 18					
ATIS	ATIS.3GPP.38.424.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.424.V18.0.0 3 SRIT ATIS/CCSA.3GPP.38.424.V18.0.0.docx	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 424 V18.0.0 (2024-05)	18.0.0	Published	06.05.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138424/18.00.00_60/ts_138424v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.424-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/6iaQMPt2kef46mS
TTA	TTAT.3G-38.424V18.0.0 38.424V18.0.0&searchCate=TTAS	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.424(Rel18)v18.0.0	18.0.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.424v18.0.0.pdf

1.2.1.4.53 TS 38.425**NG-RAN; NR user plane protocol**

This document specifies the NR user plane protocol functions used within NG-RAN and, for EN-DC, within E-UTRAN. NR user plane protocol functions may reside in nodes terminating either the X2-U (for EN-DC) or the Xn-U or the F1-U interface.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.38.425.V15.7.0	15.7.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.425.V15.7.0 3_SUIT_ATIS/CCSA.3GPP.38.425.V15.7.0.doc	15.7.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 425 V15.7.0 (2020-11)	15.7.0	Published	12.11.2020	https://www.etsi.org/deliver/etsi_ts/138400_138499/138425/15.07.00_60/ts_138425v150700p.pdf
TSDSI	TSDSI STD T1.3GPP 38.425-15.7.0 V1.1.0	15.7.0	Published	29.07.2022	https://members.tdsi.in/s/8BWT34Rt2PJazRP
TTA	TTAT.3G-38.425V15.7.0 38.425V15.7.0&searchCate=TTAS	15.7.0	Published	08.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.425(Rel15)v15.7.0	15.7.0	Published	22.12.2020	https://www.ttc.or.jp/st/docs/3gpp/2020/TS/TS-3GA-38.425v15.7.0.pdf
Release 16					
ATIS	ATIS.3GPP.38.425.V16.3.0	16.3.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.425.V16.3.0 3_SUIT_ATIS/CCSA.3GPP.38.425.V16.3.0.doc	16.3.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 425 V16.3.0 (2021-04)	16.3.0	Published	28.04.2021	https://www.etsi.org/deliver/etsi_ts/138400_138499/138425/16.03.00_60/ts_138425v160300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.425-16.3.0 V1.1.0	16.3.0	Published	29.07.2022	https://members.tdsi.in/s/CZPrZLH8QA9Ez2F
TTA	TTAT.3G-38.425V16.3.0 38.425V16.3.0&searchCate=TTAS	16.3.0	Published	10.06.2021	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.425(Rel16)v16.3.0	16.3.0	Published	09.07.2021	https://www.ttc.or.jp/st/docs/3gpp/2021/TS/TS-3GA-38.425v16.3.0.pdf
Release 17					
ATIS	ATIS.3GPP.38.425.V17.3.0	17.3.0	Published	22.05.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.425.V17.3.0 3_SUIT_ATIS/CCSA.3GPP.38.425.V17.3.0.docx	17.3.0	Published	22.05.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 425 V17.3.0 (2023-05)	17.3.0	Published	05.05.2023	https://www.etsi.org/deliver/etsi_ts/138400_138499/138425/17.03.00_60/ts_138425v170300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.425-17.3.0 V1.3.0	17.3.0	Published	14.08.2023	https://members.tdsi.in/s/syPgYTYTEQR4MmH
TTA	TTAT.3G-38.425V17.3.0 38.425V17.3.0&searchCate=TTAS	17.3.0	Published	01.08.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.425(Rel17)v17.3.0	17.3.0	Published	07.07.2023	https://www.ttc.or.jp/st/docs/3gpp/2023/TS/TS-3GA-38.425v17.3.0.pdf
Release 18					
ATIS	ATIS.3GPP.38.425.V18.1.0	18.1.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.425.V18.1.0 3_SUIT_ATIS/CCSA.3GPP.38.425.V18.1.0.docx	18.1.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 425 V18.1.0 (2024-08)	18.1.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138425/18.01.00_60/ts_138425v180100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.425-18.1.0 V1.0.0	18.1.0	Published	19.11.2024	https://members.tdsi.in/s/EnpqWk8cq8DwCDL
TTA	TTAT.3G-38.425V18.1.0 38.425V18.1.0&searchCate=TTAS	18.1.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.425(Rel18)v18.1.0	18.1.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.425v18.1.0.pdf

1.2.1.4.54 TS 38.455

NG-RAN; NR Positioning Protocol A (NRPPa)

This document specifies the control plane radio network layer signalling procedures between a NG-RAN node and the LMF. NRPPa supports the concerned functions by signalling procedures defined in this document.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.38.455.V15.4.0	15.4.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.455.V15.4.0 3_SUIT_ATIS/CCSA.3GPP.38.455.V15.4.0.docx	15.4.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 455 V15.4.0 (2021-08)	15.4.0	Published	26.08.2021	https://www.etsi.org/deliver/etsi_ts/138400_138499/138455/15.04.00_60/ts_138455v150400p.pdf
TSDSI	TSDSI STD T1.3GPP 38.455-15.4.0 V1.1.0	15.4.0	Published	29.07.2022	https://members.tdsi.in/s/Qm6nzXK233wrAcX
TTA	TTAT.3G-38.455V15.4.0 38.455V15.4.0&searchCate=TTAS	15.4.0	Published	30.09.2021	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.455(Rel15)v15.4.0	15.4.0	Published	15.10.2021	https://www.ttc.or.jp/st/docs/3gpp/2021/TS/TS-3GA-38.455v15.4.0.pdf
Release 16					
ATIS	ATIS.3GPP.38.455.V16.13.0	16.13.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.455.V16.13.0 3_SUIT_ATIS/CCSA.3GPP.38.455.V16.13.0.docx	16.13.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 455 V16.13.0 (2024-02)	16.13.0	Published	02.02.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138455/16.13.00_60/ts_138455v161300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.455-16.13.0 V1.6.0	16.13.0	Published	29.05.2024	https://members.tdsi.in/s/KZSHRGLPYSLczfb
TTA	TTAT.3G-38.455V16.13.0 38.455V16.13.0&searchCate=TTAS	16.13.0	Published	08.05.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.455(Rel16)v16.13.0	16.13.0	Published	05.04.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.455v16.13.0.pdf
Release 17					
ATIS	ATIS.3GPP.38.455.V17.8.0	17.8.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.455.V17.8.0 3_SUIT_ATIS/CCSA.3GPP.38.455.V17.8.0.docx	17.8.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 455 V17.8.0 (2024-08)	17.8.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138455/17.08.00_60/ts_138455v170800p.pdf
TSDSI	TSDSI STD T1.3GPP 38.455-17.8.0 V1.8.0	17.8.0	Published	19.11.2024	https://members.tdsi.in/s/RTCiNDkNwCixKmR
TTA	TTAT.3G-38.455V17.8.0 38.455V17.8.0&searchCate=TTAS	17.8.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.455(Rel17)v17.8.0	17.8.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.455v17.8.0.pdf
Release 18					
ATIS	ATIS.3GPP.38.455.V18.3.0	18.3.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.455.V18.3.0 3_SUIT_ATIS/CCSA.3GPP.38.455.V18.3.0.docx	18.3.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 455 V18.3.0 (2024-09)	18.3.0	Published	26.09.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138455/18.03.00_60/ts_138455v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.455-18.3.0 V1.1.0	18.3.0	Published	02.03.2025	https://members.tdsi.in/s/kGZDGBaNGKL6pnt
TTA	TTAT.3G-38.455V18.3.0 38.455V18.3.0&searchCate=TTAS	18.3.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.455(Rel18)v18.3.0	18.3.0	Published	10.01.2025	https://www.ttc.or.jp/st/docs/3gpp/2025/TS/TS-3GA-38.455v18.3.0.pdf

1.2.1.4.55 TS 38.460**NG-RAN; E1 general aspects and principles**

This document is an introduction to the 3GPP TS 38.46x series of technical specifications that define the E1 interface. The E1 interface provides means for interconnecting a gNB-CU-CP and a gNB-CU-UP of a gNB-CU within an NG-RAN, or for interconnecting a gNB-CU-CP and a gNB-CU-UP of an en-gNB within an E-UTRAN.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.38.460.V15.4.0	15.4.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.460.V15.4.0	15.4.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIATIS/CCSA.3GPP.38.460.V15.4.0.doc
ETSI	ETSI TS 138 460 V15.4.0 (2019-07)	15.4.0	Published	23.07.2019	https://www.etsi.org/deliver/etsi_ts/138400_138499/138460/15.04.00_60/ts_138460v150400p.pdf
TSDSI	TSDSI STD T1.3GPP 38.460-15.4.0 V1.0.0	15.4.0	Published	06.10.2020	https://members.tdsi.in/s/CjQgSb8H3SZFmib
TTA	TTAT.3G-38.460V15.4.0	15.4.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.460V15.4.0&searchCate=TTAS
TTC	TS-3GA-38.460(Rel15)v15.4.0	15.4.0	Published	11.10.2019	https://www.ttc.or.jp/st/docs/3gpps2019/TS/TS-3GA-38.460(Rel15)v15.4.0.pdf
Release 16					
ATIS	ATIS.3GPP.38.460.V16.5.0	16.5.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.460.V16.5.0	16.5.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIATIS/CCSA.3GPP.38.460.V16.5.0.doc
ETSI	ETSI TS 138 460 V16.5.0 (2022-05)	16.5.0	Published	02.05.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138460/16.05.00_60/ts_138460v160500p.pdf
TSDSI	TSDSI STD T1.3GPP 38.460-16.5.0 V1.1.0	16.5.0	Published	29.07.2022	https://members.tdsi.in/s/RH5qoFXrP7A5bP8
TTA	TTAT.3G-38.460V16.5.0	16.5.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.460V16.5.0&searchCate=TTAS
TTC	TS-3GA-38.460(Rel16)v16.5.0	16.5.0	Published	08.07.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-38.460v16.5.0.pdf
Release 17					
ATIS	ATIS.3GPP.38.460.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.460.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIATIS/CCSA.3GPP.38.460.V17.0.0.doc
ETSI	ETSI TS 138 460 V17.0.0 (2022-05)	17.0.0	Published	02.05.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138460/17.00.00_60/ts_138460v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.460-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/4sxcQFAz3fnCfQP
TTA	TTAT.3G-38.460V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.460V17.0.0&searchCate=TTAS
TTC	TS-3GA-38.460(Rel17)v17.0.0	17.0.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-38.460v17.0.0.pdf
Release 18					
ATIS	ATIS.3GPP.38.460.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.460.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIATIS/CCSA.3GPP.38.460.V18.0.0.docx
ETSI	ETSI TS 138 460 V18.0.0 (2024-05)	18.0.0	Published	06.05.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138460/18.00.00_60/ts_138460v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.460-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/Fn8YeMM9crKwXBn
TTA	TTAT.3G-38.460V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.460V18.0.0&searchCate=TTAS
TTC	TS-3GA-38.460(Rel18)v18.0.0	18.0.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.460v18.0.0.pdf

1.2.1.4.56 TS 38.461

NG-RAN; E1 layer 1

This document specifies the standards allowed to implement layer 1 on the E1 interface.

The specification of transmission delay requirements and O&M requirements are not in the scope of this document.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.38.461.V15.1.0	15.1.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.461.V15.1.0 3_SUIT_ATIS/CCSA.3GPP.38.461.V15.1.0.doc	15.1.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 461 V15.1.0 (2019-10)	15.1.0	Published	16.10.2019	https://www.etsi.org/deliver/etsi_ts/138400_138499/138461/15.01.00_60/ts_138461v150100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.461-15.1.0 V1.0.0	15.1.0	Published	06.10.2020	https://members.tdsi.in/s/XrdStRYQ8QPjFdm
TTA	TTAT.3G-38.461V15.1.0 38.461V15.1.0&searchCate=TTAS	15.1.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.461(Rel15)v15.1.0	15.1.0	Published	20.12.2019	https://www.ttc.or.jp/st/docs/3gpps2019/TS/TS-3GA-38.461(Rel15)v15.1.0.pdf
Release 16					
ATIS	ATIS.3GPP.38.461.V16.0.0	16.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.461.V16.0.0 3_SUIT_ATIS/CCSA.3GPP.38.461.V16.0.0.doc	16.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 461 V16.0.0 (2020-07)	16.0.0	Published	21.07.2020	https://www.etsi.org/deliver/etsi_ts/138400_138499/138461/16.00.00_60/ts_138461v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.461-16.0.0 V1.0.0	16.0.0	Published	06.10.2020	https://members.tdsi.in/s/RMHScskHmQn9NrP
TTA	TTAT.3G-38.461V16.0.0 38.461V16.0.0&searchCate=TTAS	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.461(Rel16)v16.0.0	16.0.0	Published	02.10.2020	https://www.ttc.or.jp/st/docs/3gpps2020/TS/TS-3GA-38_461_Rel16v16_0_0.pdf
Release 17					
ATIS	ATIS.3GPP.38.461.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.461.V17.0.0 3_SUIT_ATIS/CCSA.3GPP.38.461.V17.0.0.doc	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 461 V17.0.0 (2022-05)	17.0.0	Published	02.05.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138461/17.00.00_60/ts_138461v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.461-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/robkwZYcsagzqsi
TTA	TTAT.3G-38.461V17.0.0 38.461V17.0.0&searchCate=TTAS	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.461(Rel17)v17.0.0	17.0.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-38.461v17.0.0.pdf
Release 18					
ATIS	ATIS.3GPP.38.461.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.461.V18.0.0 3_SUIT_ATIS/CCSA.3GPP.38.461.V18.0.0.docx	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 461 V18.0.0 (2024-05)	18.0.0	Published	06.05.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138461/18.00.00_60/ts_138461v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.461-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/Pc6YcDeFW933fYo
TTA	TTAT.3G-38.461V18.0.0 38.461V18.0.0&searchCate=TTAS	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.461(Rel18)v18.0.0	18.0.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.461v18.0.0.pdf

1.2.1.4.57 TS 38.462

NG-RAN; E1 signalling transport

This document specifies the standards for Signalling Transport to be used across the E1 interface. The E1 interface provides means for the interconnection of gNB-CU-CP and gNB-CU-UP within the NG-RAN architecture (TS 38.401).

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.38.462.V15.8.0	15.8.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.462.V15.8.0 3_SUIT_ATIS/CCSA.3GPP.38.462.V15.8.0.docx	15.8.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 462 V15.8.0 (2024-04)	15.8.0	Published	23.04.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138462/15.08.00_60/ts_138462v150800p.pdf
TSDSI	TSDSI STD T1.3GPP 38.462-15.8.0 V1.2.0	15.8.0	Published	22.07.2024	https://members.tdsi.in/s/M9kSMtdrses9bax
TTA	TTAT.3G-38.462V15.8.0 38.462V15.8.0&searchCate=TTAS	15.8.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.462(Rel15)v15.8.0	15.8.0	Published	05.07.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.462v15.8.0.pdf
Release 16					
ATIS	ATIS.3GPP.38.462.V16.4.0	16.4.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.462.V16.4.0 3_SUIT_ATIS/CCSA.3GPP.38.462.V16.4.0.docx	16.4.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 462 V16.4.0 (2024-08)	16.4.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138462/16.04.00_60/ts_138462v160400p.pdf
TSDSI	TSDSI STD T1.3GPP 38.462-16.4.0 V1.4.0	16.4.0	Published	19.11.2024	https://members.tdsi.in/s/R7LxCCHKR93zPaa
TTA	TTAT.3G-38.462V16.4.0 38.462V16.4.0&searchCate=TTAS	16.4.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.462(Rel16)v16.4.0	16.4.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.462v16.4.0.pdf
Release 17					
ATIS	ATIS.3GPP.38.462.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.462.V17.0.0 3_SUIT_ATIS/CCSA.3GPP.38.462.V17.0.0.docx	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 462 V17.0.0 (2022-05)	17.0.0	Published	02.05.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138462/17.00.00_60/ts_138462v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.462-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/LccWABpdL7Kop6p
TTA	TTAT.3G-38.462V17.0.0 38.462V17.0.0&searchCate=TTAS	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.462(Rel17)v17.0.0	17.0.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-38.462v17.0.0.pdf
Release 18					
ATIS	ATIS.3GPP.38.462.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.462.V18.0.0 3_SUIT_ATIS/CCSA.3GPP.38.462.V18.0.0.docx	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 462 V18.0.0 (2024-05)	18.0.0	Published	06.05.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138462/18.00.00_60/ts_138462v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.462-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/wA4DrGMZ3mscinz
TTA	TTAT.3G-38.462V18.0.0 38.462V18.0.0&searchCate=TTAS	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.462(Rel18)v18.0.0	18.0.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.462v18.0.0.pdf

1.2.1.4.58 TS 38.463

NG-RAN; E1 Application Protocol (E1AP)

This document specifies the 5G radio network layer signalling protocol for the E1 interface. The E1 interface provides means for interconnecting a gNB-CU-CP and a gNB-CU-UP of a gNB within an NG-RAN, or for interconnecting a gNB-CU-CP and a gNB-CU-UP of an en-gNB within an E-UTRAN. The E1 Application Protocol (E1AP) supports the functions of E1 interface by signalling procedures defined in this document. E1AP is developed in accordance to the general principles stated in TS 38.401 and TS 38.460.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.38.463.V15.13.0	15.13.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.463.V15.13.0	15.13.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.463.V15.13.0.docx
ETSI	ETSI TS 138 463 V15.13.0 (2023-10)	15.13.0	Published	02.10.2023	https://www.etsi.org/deliver/etsi_ts/138400_138499/138463/15.13.00_60/ts_138463v151300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.463-15.13.0 V1.4.0	15.13.0	Published	23.02.2024	https://members.tdsi.in/s/SfpX3GCEyKs2wC7
TTA	TTAT.3G-38.463V15.13.0	15.13.0	Published	13.02.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.463V15.13.0&searchCate=TTAS
TTC	TS-3GA-38.463(Rel15)v15.13.0	15.13.0	Published	12.01.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.463v15.13.0.pdf
Release 16					
ATIS	ATIS.3GPP.38.463.V16.16.0	16.16.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.463.V16.16.0	16.16.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.463.V16.16.0.docx
ETSI	ETSI TS 138 463 V16.16.0 (2024-02)	16.16.0	Published	02.02.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138463/16.16.00_60/ts_138463v161600p.pdf
TSDSI	TSDSI STD T1.3GPP 38.463-16.16.0 V1.7.0	16.16.0	Published	29.05.2024	https://members.tdsi.in/s/EJ2aa8a6p6mxZR7
TTA	TTAT.3G-38.463V16.16.0	16.16.0	Published	08.05.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.463V16.16.0&searchCate=TTAS
TTC	TS-3GA-38.463(Rel16)v16.16.0	16.16.0	Published	05.04.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.463v16.16.0.pdf
Release 17					
ATIS	ATIS.3GPP.38.463.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.463.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.463.V17.0.0.doc
ETSI	ETSI TS 138 463 V17.0.0 (2022-05)	17.0.0	Published	02.05.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138463/17.00.00_60/ts_138463v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.463-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/GpPCKzdwWsY9aYw
TTA	TTAT.3G-38.463V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.463V17.0.0&searchCate=TTAS
TTC	TS-3GA-38.463(Rel17)v17.0.0	17.0.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-38.463v17.0.0.pdf
Release 18					
ATIS	ATIS.3GPP.38.463.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.463.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.463.V18.0.0.docx
ETSI	ETSI TS 138 463 V18.0.0 (2024-05)	18.0.0	Published	06.05.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138463/18.00.00_60/ts_138463v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.463-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/9o4yMMkifSZYdtL
TTA	TTAT.3G-38.463V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.463V18.0.0&searchCate=TTAS
TTC	TS-3GA-38.463(Rel18)v18.0.0	18.0.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.463v18.0.0.pdf

1.2.1.4.59 TS 38.470**NG-RAN; F1 general aspects and principles**

This document is an introduction to the 3GPP TS 38.47x series of technical specifications that define the F1 interface. The F1 interface provides means for interconnecting a gNB-CU and a gNB-DU of a gNB within an NG-RAN, or for interconnecting a gNB-CU and a gNB-DU of an en-gNB within an E-UTRAN.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.38.470.V15.8.0	15.8.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.470.V15.8.0	15.8.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.38.470.V15.8.0.docx
ETSI	ETSI TS 138 470 V15.8.0 (2021-08)	15.8.0	Published	27.08.2021	https://www.etsi.org/deliver/etsi_ts/138400_138499/138470/15.08.00_60/ts_138470v150800p.pdf
TSDSI	TSDSI STD T1.3GPP 38.470-15.8.0 V1.1.0	15.8.0	Published	29.07.2022	https://members.tdsi.in/s/CERXsL78xeZAPQM
TTA	TTAT.3G-38.470V15.8.0	15.8.0	Published	30.09.2021	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.470V15.8.0&searchCate=TTAS
TTC	TS-3GA-38.470(Rel15)v15.8.0	15.8.0	Published	15.10.2021	https://www.ttc.or.jp/st/docs/3gpp/2021/TS/TS-3GA-38.470v15.8.0.pdf
Release 16					
ATIS	ATIS.3GPP.38.470.V16.11.0	16.11.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.470.V16.11.0	16.11.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.38.470.V16.11.0.docx
ETSI	ETSI TS 138 470 V16.11.0 (2023-10)	16.11.0	Published	06.10.2023	https://www.etsi.org/deliver/etsi_ts/138400_138499/138470/16.11.00_60/ts_138470v161100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.470-16.11.0 V1.6.0	16.11.0	Published	23.02.2024	https://members.tdsi.in/s/ENYeSBp4nawzNYy
TTA	TTAT.3G-38.470V16.11.0	16.11.0	Published	13.02.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.470V16.11.0&searchCate=TTAS
TTC	TS-3GA-38.470(Rel16)v16.11.0	16.11.0	Published	12.01.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.470v16.11.0.pdf
Release 17					
ATIS	ATIS.3GPP.38.470.V17.6.0	17.6.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.470.V17.6.0	17.6.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.38.470.V17.6.0.docx
ETSI	ETSI TS 138 470 V17.6.0 (2023-10)	17.6.0	Published	06.10.2023	https://www.etsi.org/deliver/etsi_ts/138400_138499/138470/17.06.00_60/ts_138470v170600p.pdf
TSDSI	TSDSI STD T1.3GPP 38.470-17.6.0 V1.6.0	17.6.0	Published	23.02.2024	https://members.tdsi.in/s/9nb7b3b9poYGk7J
TTA	TTAT.3G-38.470V17.6.0	17.6.0	Published	13.02.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.470V17.6.0&searchCate=TTAS
TTC	TS-3GA-38.470(Rel17)v17.6.0	17.6.0	Published	12.01.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.470v17.6.0.pdf
Release 18					
ATIS	ATIS.3GPP.38.470.V18.3.0	18.3.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.470.V18.3.0	18.3.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.38.470.V18.3.0.docx
ETSI	ETSI TS 138 470 V18.3.0 (2024-09)	18.3.0	Published	26.09.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138470/18.03.00_60/ts_138470v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.470-18.3.0 V1.1.0	18.3.0	Published	02.03.2025	https://members.tdsi.in/s/wiQewKCqdbRDBes
TTA	TTAT.3G-38.470V18.3.0	18.3.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.470V18.3.0&searchCate=TTAS
TTC	TS-3GA-38.470(Rel18)v18.3.0	18.3.0	Published	10.01.2025	https://www.ttc.or.jp/st/docs/3gpp/2025/TS/TS-3GA-38.470v18.3.0.pdf

1.2.1.4.60 TS 38.471

NG-RAN; F1 layer 1

This document specifies the standards allowed to implement Layer 1 on the F1 interface. The F1 interface provides means for interconnecting a gNB-CU and a gNB-DU of a gNB within an NG-RAN, or for interconnecting a gNB-CU and a gNB-DU of an en-gNB within an E-UTRAN.

The specification of transmission delay requirements and O&M requirements are not in the scope of this document.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.38.471.V15.0.0	15.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.471.V15.0.0 3 SRIT ATIS/CCSA.3GPP.38.471.V15.0.0.doc	15.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 471 V15.0.0 (2018-09)	15.0.0	Published	18.09.2018	https://www.etsi.org/deliver/etsi_ts/138400_138499/138471/15.00.00_60/ts_138471v150000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.471-15.0.0 V1.0.0	15.0.0	Published	06.10.2020	https://members.tdsi.in/s/6HHDRT8g4SL3wE7
TTA	TTAT.3G-38.471V15.0.0 38.471V15.0.0&searchCate=TTAS	15.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.471(Rel15)v15.0.0	15.0.0	Published	28.09.2018	https://www.ttc.or.jp/st/docs/3gpps2018/TS/TS-3GA-38.471(Rel15)v15.0.0.pdf
Release 16					
ATIS	ATIS.3GPP.38.471.V16.0.0	16.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.471.V16.0.0 3 SRIT ATIS/CCSA.3GPP.38.471.V16.0.0.doc	16.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 471 V16.0.0 (2020-07)	16.0.0	Published	21.07.2020	https://www.etsi.org/deliver/etsi_ts/138400_138499/138471/16.00.00_60/ts_138471v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.471-16.0.0 V1.0.0	16.0.0	Published	06.10.2020	https://members.tdsi.in/s/4Wf9PPdEtEidfJk
TTA	TTAT.3G-38.471V16.0.0 38.471V16.0.0&searchCate=TTAS	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.471(Rel16)v16.0.0	16.0.0	Published	02.10.2020	https://www.ttc.or.jp/st/docs/3gpps2020/TS/TS-3GA-38_471_Rel16v16_0_0.pdf
Release 17					
ATIS	ATIS.3GPP.38.471.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.471.V17.0.0 3 SRIT ATIS/CCSA.3GPP.38.471.V17.0.0.doc	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 471 V17.0.0 (2022-04)	17.0.0	Published	29.04.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138471/17.00.00_60/ts_138471v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.471-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/Zow2mGbFdyZAwNb
TTA	TTAT.3G-38.471V17.0.0 38.471V17.0.0&searchCate=TTAS	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.471(Rel17)v17.0.0	17.0.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-38.471v17.0.0.pdf
Release 18					
ATIS	ATIS.3GPP.38.471.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.471.V18.0.0 3 SRIT ATIS/CCSA.3GPP.38.471.V18.0.0.docx	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 471 V18.0.0 (2024-05)	18.0.0	Published	06.05.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138471/18.00.00_60/ts_138471v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.471-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/oE47yE8dam8sswQ
TTA	TTAT.3G-38.471V18.0.0 38.471V18.0.0&searchCate=TTAS	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.471(Rel18)v18.0.0	18.0.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.471v18.0.0.pdf

1.2.1.4.61 TS 38.472**NG-RAN; F1 signalling transport**

This document specifies the standards for Signalling Transport to be used across the F1 interface. The F1 interface provides means for interconnecting a gNB-CU and a gNB-DU of a gNB within an NG-RAN, or for interconnecting a gNB-CU and a gNB-DU of an en-gNB within an E-UTRAN. This document describes how the F1AP signalling messages are transported over F1.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.38.472.V15.7.0	15.7.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.472.V15.7.0	15.7.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIATIS/CCSA.3GPP.38.472.V15.7.0.doc
ETSI	ETSI TS 138 472 V15.7.0 (2020-11)	15.7.0	Published	12.11.2020	https://www.etsi.org/deliver/etsi_ts/138400_138499/138472/15.07.00_60/ts_138472v150700p.pdf
TSDSI	TSDSI STD T1.3GPP 38.472-15.7.0 V1.1.0	15.7.0	Published	29.07.2022	https://members.tdsi.in/s/QcCAGPntEAFZa7
TTA	TTAT.3G-38.472V15.7.0	15.7.0	Published	16.03.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.472V15.7.0&searchCate=TTAS
TTC	TS-3GA-38.472(Rel15)v15.7.0	15.7.0	Published	22.12.2020	https://www.ttc.or.jp/st/docs/3gpp/2020/TS/TS-3GA-38.472v15.7.0.pdf
Release 16					
ATIS	ATIS.3GPP.38.472.V16.2.0	16.2.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.472.V16.2.0	16.2.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIATIS/CCSA.3GPP.38.472.V16.2.0.docx
ETSI	ETSI TS 138 472 V16.2.0 (2023-07)	16.2.0	Published	19.07.2023	https://www.etsi.org/deliver/etsi_ts/138400_138499/138472/16.02.00_60/ts_138472v160200p.pdf
TSDSI	TSDSI STD T1.3GPP 38.472-16.2.0 V1.2.0	16.2.0	Published	11.02.2023	https://members.tdsi.in/s/mAxmGBnRnDzi4PA
TTA	TTAT.3G-38.472V16.2.0	16.2.0	Published	27.10.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.472V16.2.0&searchCate=TTAS
TTC	TS-3GA-38.472(Rel16)v16.2.0	16.2.0	Published	05.10.2023	https://www.ttc.or.jp/st/docs/3gpp/2023/TS/TS-3GA-38.472v16.2.0.pdf
Release 17					
ATIS	ATIS.3GPP.38.472.V17.2.0	17.2.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.472.V17.2.0	17.2.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIATIS/CCSA.3GPP.38.472.V17.2.0.docx
ETSI	ETSI TS 138 472 V17.2.0 (2023-07)	17.2.0	Published	19.07.2023	https://www.etsi.org/deliver/etsi_ts/138400_138499/138472/17.02.00_60/ts_138472v170200p.pdf
TSDSI	TSDSI STD T1.3GPP 38.472-17.2.0 V1.2.0	17.2.0	Published	11.02.2023	https://members.tdsi.in/s/R24sWjkffDaNbDA
TTA	TTAT.3G-38.472V17.2.0	17.2.0	Published	27.10.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.472V17.2.0&searchCate=TTAS
TTC	TS-3GA-38.472(Rel17)v17.2.0	17.2.0	Published	05.10.2023	https://www.ttc.or.jp/st/docs/3gpp/2023/TS/TS-3GA-38.472v17.2.0.pdf
Release 18					
ATIS	ATIS.3GPP.38.472.V18.1.0	18.1.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.472.V18.1.0	18.1.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIATIS/CCSA.3GPP.38.472.V18.1.0.docx
ETSI	ETSI TS 138 472 V18.1.0 (2024-08)	18.1.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138472/18.01.00_60/ts_138472v180100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.472-18.1.0 V1.0.0	18.1.0	Published	19.11.2024	https://members.tdsi.in/s/X79fCWCWe6iL7CC
TTA	TTAT.3G-38.472V18.1.0	18.1.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.472V18.1.0&searchCate=TTAS
TTC	TS-3GA-38.472(Rel18)v18.1.0	18.1.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.472v18.1.0.pdf

1.2.1.4.62 TS 38.473

NG-RAN; F1 Application Protocol (F1AP)

This document specifies the 5G radio network layer signalling protocol for the F1 interface. The F1 interface provides means for interconnecting a gNB-CU and a gNB-DU of a gNB within an NG-RAN, or for interconnecting a gNB-CU and a gNB-DU of an en-gNB within an E-UTRAN. The F1 Application Protocol (F1AP) supports the functions of F1 interface by signalling procedures defined in this document. F1AP is developed in accordance with the general principles stated in TS 38.401 and TS 38.470.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.38.473.V15.18.0	15.18.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.473.V15.18.0	15.18.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.38.473.V15.18.0.docx
ETSI	ETSI TS 138 473 V15.18.0 (2024-09)	15.18.0	Published	26.09.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138473/15.18.00_60/ts_138473v151800p.pdf
TSDSI	TSDSI STD T1.3GPP 38.473-15.18.0 V1.3.0	15.18.0	Published	02.03.2025	https://members.tdsi.in/s/b44DGKf4eSrZkss
TTA	TTAT.3G-38.473V15.18.0	15.18.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.473V15.18.0&searchCate=TTAS
TTC	TS-3GA-38.473(Rel15)v15.18.0	15.18.0	Published	10.01.2025	https://www.ttc.or.jp/st/docs/3gpp/2025/TS/TS-3GA-38.473v15.18.0.pdf
Release 16					
ATIS	ATIS.3GPP.38.473.V16.19.0	16.19.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.473.V16.19.0	16.19.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.38.473.V16.19.0.docx
ETSI	ETSI TS 138 473 V16.19.0 (2024-09)	16.19.0	Published	26.09.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138473/16.19.00_60/ts_138473v161900p.pdf
TSDSI	TSDSI STD T1.3GPP 38.473-16.19.0 V1.10.0	16.19.0	Published	02.03.2025	https://members.tdsi.in/s/aG5ZcgTmWZeHoab
TTA	TTAT.3G-38.473V16.19.0	16.19.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.473V16.19.0&searchCate=TTAS
TTC	TS-3GA-38.473(Rel16)v16.19.0	16.19.0	Published	10.01.2025	https://www.ttc.or.jp/st/docs/3gpp/2025/TS/TS-3GA-38.473v16.19.0.pdf
Release 17					
ATIS	ATIS.3GPP.38.473.V17.10.0	17.10.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.473.V17.10.0	17.10.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.38.473.V17.10.0.docx
ETSI	ETSI TS 138 473 V17.10.0 (2024-09)	17.10.0	Published	26.09.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138473/17.10.00_60/ts_138473v171000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.473-17.10.0 V1.10.0	17.10.0	Published	02.03.2025	https://members.tdsi.in/s/B4fYxtHkrZmC4bE
TTA	TTAT.3G-38.473V17.10.0	17.10.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.473V17.10.0&searchCate=TTAS
TTC	TS-3GA-38.473(Rel17)v17.10.0	17.10.0	Published	10.01.2025	https://www.ttc.or.jp/st/docs/3gpp/2025/TS/TS-3GA-38.473v17.10.0.pdf
Release 18					
ATIS	ATIS.3GPP.38.473.V18.3.0	18.3.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.473.V18.3.0	18.3.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.38.473.V18.3.0.docx
ETSI	ETSI TS 138 473 V18.3.0 (2024-09)	18.3.0	Published	26.09.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138473/18.03.00_60/ts_138473v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.473-18.3.0 V1.1.0	18.3.0	Published	02.03.2025	https://members.tdsi.in/s/QNJLHGC7Yr5w8wk
TTA	TTAT.3G-38.473V18.3.0	18.3.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.473V18.3.0&searchCate=TTAS
TTC	TS-3GA-38.473(Rel18)v18.3.0	18.3.0	Published	10.01.2025	https://www.ttc.or.jp/st/docs/3gpp/2025/TS/TS-3GA-38.473v18.3.0.pdf

1.2.1.4.63 TS 38.474**NG-RAN; F1 data transport**

This document specifies the standards for user data transport protocols and related signalling protocols to establish user plane transport bearers over the F1 interface. The F1 interface provides means for interconnecting a gNB-CU and a gNB-DU of a gNB within an NG-RAN, or for interconnection a gNB-CU and a gNB-DU of an en-gNB within an E-UTRAN.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.38.474.V15.3.0	15.3.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.474.V15.3.0	15.3.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIATIS/CCSA.3GPP.38.474.V15.3.0.doc
ETSI	ETSI TS 138 474 V15.3.0 (2019-10)	15.3.0	Published	16.10.2019	https://www.etsi.org/deliver/etsi_ts/138400_138499/138474\15.03.00_60/ts_138474v150300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.474-15.3.0 15.3.0	15.3.0	Published	06.10.2020	https://members.tdsi.in/s/tRyZRTQGpiGw9oF
TTA	TTAT.3G-38.474V15.3.0	15.3.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.474V15.3.0&searchCate=TTAS
TTC	TS-3GA-38.474(Rel15)v15.3.0	15.3.0	Published	20.12.2019	https://www.ttc.or.jp/st/docs/3gpps2019/TS/TS-3GA-38.474(Rel15)v15.3.0.pdf
Release 16					
ATIS	ATIS.3GPP.38.474.V16.1.0	16.1.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.474.V16.1.0	16.1.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIATIS/CCSA.3GPP.38.474.V16.1.0.doc
ETSI	ETSI TS 138 474 V16.1.0 (2021-01)	16.1.0	Published	26.01.2021	https://www.etsi.org/deliver/etsi_ts/138400_138499/138474\16.01.00_60/ts_138474v160100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.474-16.1.0 16.1.0	16.1.0	Published	29.07.2022	https://members.tdsi.in/s/WpHwaw3JdTNB8rB
TTA	TTAT.3G-38.474V16.1.0	16.1.0	Published	16.03.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.474V16.1.0&searchCate=TTAS
TTC	TS-3GA-38.474(Rel16)v16.1.0	16.1.0	Published	09.04.2021	https://www.ttc.or.jp/st/docs/3gpp/2021/TS/TS-3GA-38.474v16.1.0.pdf
Release 17					
ATIS	ATIS.3GPP.38.474.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.474.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIATIS/CCSA.3GPP.38.474.V17.0.0.doc
ETSI	ETSI TS 138 474 V17.0.0 (2022-04)	17.0.0	Published	29.04.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138474\17.00.00_60/ts_138474v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.474-17.0.0 17.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/6xaDeWNxizXEXNY
TTA	TTAT.3G-38.474V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.474V17.0.0&searchCate=TTAS
TTC	TS-3GA-38.474(Rel17)v17.0.0	17.0.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-38.474v17.0.0.pdf
Release 18					
ATIS	ATIS.3GPP.38.474.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.474.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIATIS/CCSA.3GPP.38.474.V18.0.0.docx
ETSI	ETSI TS 138 474 V18.0.0 (2024-05)	18.0.0	Published	06.05.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138474\18.00.00_60/ts_138474v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.474-18.0.0 18.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/4aTjdFqsidx6ay7
TTA	TTAT.3G-38.474V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.474V18.0.0&searchCate=TTAS
TTC	TS-3GA-38.474(Rel18)v18.0.0	18.0.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.474v18.0.0.pdf

1.2.1.5 Radio-frequency aspects

1.2.1.5.1 TS 36.101

Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio transmission and reception

This document establishes the minimum RF characteristics and minimum performance requirements for E-UTRA User Equipment (UE).

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-36.101.V15.23.0	15.23.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/36/A36101-fn0.pdf
ATIS	ATIS.3GPP.36.101.V15.23.0	15.23.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.101.V15.23.0	15.23.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.101.V15.23.0.zip
TSDSI	TSDSI STD T1.3GPP 36.101-15.23.0 V1.5.0	15.23.0	Published	23.02.2024	https://members.tdsi.in/s/MdGgKsekYK22sew
TTA	TTAT.3G-36.101V15.23.0	15.23.0	Published	13.02.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.101V15.23.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-36.101.V16.21.0	16.21.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/36/A36101-gk0.pdf
ATIS	ATIS.3GPP.36.101.V16.21.0	16.21.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.101.V16.21.0	16.21.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.101.V16.21.0.zip
TSDSI	TSDSI STD T1.3GPP 36.101-16.21.0 V1.8.0	16.21.0	Published	02.03.2025	https://members.tdsi.in/s/6mJYr3mHHcziXnY
TTA	TTAT.3G-36.101V16.21.0	16.21.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.101V16.21.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-36.101.V17.14.0	17.14.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/36/A36101-he0.pdf
ATIS	ATIS.3GPP.36.101.V17.14.0	17.14.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.101.V17.14.0	17.14.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.101.V17.14.0.zip
TSDSI	TSDSI STD T1.3GPP 36.101-17.14.0 V1.9.0	17.14.0	Published	02.03.2025	https://members.tdsi.in/s/JWa6JjDXwpbD2nJ
TTA	TTAT.3G-36.101V17.14.0	17.14.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.101V17.14.0&searchCate=TTAS
Release 18					
ARIB	ARIB STD-T120-36.101.V18.7.0	18.7.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/36/A36101-i70.pdf
ATIS	ATIS.3GPP.36.101.V18.7.0	18.7.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.101.V18.7.0	18.7.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.101.V18.7.0.zip
TSDSI	TSDSI STD T1.3GPP 36.101-18.7.0 V1.1.0	18.7.0	Published	02.03.2025	https://members.tdsi.in/s/EKe9XwPoNEqCXw5
TTA	TTAT.3G-36.101V18.7.0	18.7.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.101V18.7.0&searchCate=TTAS

1.2.1.5.2 TS 36.104

Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) radio transmission and reception

This document establishes the minimum RF characteristics and minimum performance requirements of E-UTRA Base Station (BS).

SDO	Document No.	Version	Status	Issued date	Location

Release 15

ARIB	ARIB STD-T120-36.104.V15.15.0	15.15.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/36/A36104-ff0.pdf
ATIS	ATIS.3GPP.36.104.V15.15.0	15.15.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.104.V15.15.0	15.15.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.104.V15.15.0.docx
TSDSI	TSDSI STD T1.3GPP 36.104-15.15.0 V1.1.0	15.15.0	Published	29.07.2022	https://members.tdsi.in/s/YM9tyGcebNtCSMj
TTA	TTAT.3G-36.104V15.15.0	15.15.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.104V15.15.0&searchCate=TTAS

Release 16

ARIB	ARIB STD-T120-36.104.V16.16.0	16.16.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/36/A36104-gg0.pdf
ATIS	ATIS.3GPP.36.104.V16.16.0	16.16.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.104.V16.16.0	16.16.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.104.V16.16.0.docx
TSDSI	TSDSI STD T1.3GPP 36.104-16.16.0 V1.4.0	16.16.0	Published	22.07.2024	https://members.tdsi.in/s/n7b3z934CSF4BoH
TTA	TTAT.3G-36.104V16.16.0	16.16.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.104V16.16.0&searchCate=TTAS

Release 17

ARIB	ARIB STD-T120-36.104.V17.12.0	17.12.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/36/A36104-hc0.pdf
ATIS	ATIS.3GPP.36.104.V17.12.0	17.12.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.104.V17.12.0	17.12.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.104.V17.12.0.docx
TSDSI	TSDSI STD T1.3GPP 36.104-17.12.0 V1.7.0	17.12.0	Published	22.07.2024	https://members.tdsi.in/s/dbjLGCoQgLBXNPF
TTA	TTAT.3G-36.104V17.12.0	17.12.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.104V17.12.0&searchCate=TTAS

Release 18

ARIB	ARIB STD-T120-36.104.V18.5.0	18.5.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/36/A36104-i50.pdf
ATIS	ATIS.3GPP.36.104.V18.5.0	18.5.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.104.V18.5.0	18.5.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.104.V18.5.0.docx
TSDSI	TSDSI STD T1.3GPP 36.104-18.5.0 V1.0.0	18.5.0	Published	19.11.2024	https://members.tdsi.in/s/YzisoTiJzSSZc4
TTA	TTAT.3G-36.104V18.5.0	18.5.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.104V18.5.0&searchCate=TTAS

1.2.1.5.3 TS 36.106

Evolved Universal Terrestrial Radio Access (E-UTRA); FDD repeater radio transmission and reception

This document establishes the minimum RF characteristics of E-UTRA FDD Repeater.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.36.106V1500	15.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.106V1500	15.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.106V1500.doc
TSDSI	TSDSI STD T1.3GPP 36.106-15.0.0 V1.0.0	15.0.0	Published	30.08.2021	https://members.tdsi.in/s/ZXDJ7oK7YcBwgcg
TTA	TTAT.3G-36.106V15.0.0	15.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.106V15.0.0&searchCate=TTAS
Release 16					
ATIS	ATIS.3GPP.36.106V1600	16.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.106V1600	16.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.106V1600.doc
TSDSI	TSDSI STD T1.3GPP 36.106-16.0.0 V1.0.0	16.0.0	Published	30.08.2021	https://members.tdsi.in/s/mDagEJCXcqNpxB
TTA	TTAT.3G-36.106V16.0.0	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.106V16.0.0&searchCate=TTAS
Release 17					
ATIS	ATIS.3GPP.36.106.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.106.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.106.V17.0.0.docx
TSDSI	TSDSI STD T1.3GPP 36.106-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/4eq7BsaTw9HLSSm
TTA	TTAT.3G-36.106V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.106V17.0.0&searchCate=TTAS
Release 18					
ATIS	ATIS.3GPP.36.106.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.106.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.106.V18.0.0.docx
TSDSI	TSDSI STD T1.3GPP 36.106-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/fnGZ5rPgZG5rRNX
TTA	TTAT.3G-36.106V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.106V18.0.0&searchCate=TTAS

1.2.1.5.4 TS 36.111

Location Measurement Unit (LMU) performance specification; Network based positioning systems in Evolved Universal Terrestrial Radio Access Network (E-UTRAN)

This document establishes the Location Measurement Unit (LMU) minimum UTDOA positioning requirement for the FDD and TDD mode of E-UTRAN.

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Release 15					
ARIB	ARIB STD-T120-36.111.V15.0.0	15.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/36/A36111-f00.pdf
ATIS	ATIS.3GPP.36.111V1500	15.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.111V1500	15.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.111V1500.doc
ETSI	ETSI TS 136 111 V15.0.0 (2018-11)	15.0.0	Published	12.11.2018	https://www.etsi.org/deliver/etsi_ts/136100_136199/136111/15.00.00_60/ts_136111v150000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.111-15.0.0 V1.0.0	15.0.0	Published	30.08.2021	https://members.tdsi.in/s/f5n334yHHXoZPn4
TTA	TTAT.3G-36.111V15.0.0	15.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.111V15.0.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-36.111.V16.0.0	16.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/36/A36111-g00.pdf
ATIS	ATIS.3GPP.36.111V1600	16.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.111V1600	16.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.111V1600.doc
ETSI	ETSI TS 136 111 V16.0.0 (2020-07)	16.0.0	Published	21.07.2020	https://www.etsi.org/deliver/etsi_ts/136100_136199/136111/16.00.00_60/ts_136111v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.111-16.0.0 V1.0.0	16.0.0	Published	30.08.2021	https://members.tdsi.in/s/pLb4LCEbqzSXNoa
TTA	TTAT.3G-36.111V16.0.0	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.111V16.0.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-36.111.V17.0.0	17.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/36/A36111-h00.pdf
ATIS	ATIS.3GPP.36.111.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.111.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.111.V17.0.0.docx
ETSI	ETSI TS 136 111 V17.0.0 (2022-04)	17.0.0	Published	27.04.2022	https://www.etsi.org/deliver/etsi_ts/136100_136199/136111/17.00.00_60/ts_136111v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.111-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/HM299HsPCepfWMm
TTA	TTAT.3G-36.111V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.111V17.0.0&searchCate=TTAS
Release 18					
ARIB	ARIB STD-T120-36.111.V18.0.0	18.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/36/A36111-i00.pdf
ATIS	ATIS.3GPP.36.111.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.111.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.111.V18.0.0.docx
ETSI	ETSI TS 136 111 V18.0.0 (2024-05)	18.0.0	Published	07.05.2024	https://www.etsi.org/deliver/etsi_ts/136100_136199/136111/18.00.00_60/ts_136111v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.111-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/pJDYsjXNnXxk4DH
TTA	TTAT.3G-36.111V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.111V18.0.0&searchCate=TTAS

1.2.1.5.5 TS 36.113

Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) and repeater ElectroMagnetic Compatibility (EMC)

This document covers the assessment of E-UTRA base stations, repeaters and associated ancillary equipment in respect of Electromagnetic Compatibility (EMC). This document specifies the applicable test conditions, performance assessment and performance criteria for E-UTRA base stations, repeaters and associated ancillary equipment in one of the following categories: (i) base stations of E-UTRA meeting the requirements of TS 36.104, with conformance demonstrated by compliance to TS 36.141; (ii) repeaters of FDD E-UTRA meeting the requirements of TS 36.106, with conformance demonstrated by compliance to TS 36.143. The environment classification used in this document refers to the environment classification used in IEC 61000-6-1 and IEC 61000-6-3. The EMC requirements have been selected to ensure an adequate level of compatibility for apparatus at residential, commercial and light industrial environments. The levels, however, do not cover extreme cases which may occur in any location but with low probability of occurrence.

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ARIB	ARIB STD-T120-36.113.V15.7.0	15.7.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/36/A36113-f70.pdf
ATIS	ATIS.3GPP.36.113.V15.7.0	15.7.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.113.V15.7.0	15.7.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.113.V15.7.0.docx
ETSI	ETSI TS 136 113 V15.7.0 (2024-05)	15.7.0	Published	07.05.2024	https://www.etsi.org/deliver/etsi_ts/136100_136199/136113/15.07.00_60/ts_136113v150700p.pdf
TSDSI	TSDSI STD T1.3GPP 36.113-15.7.0 V1.3.0	15.7.0	Published	22.07.2024	https://members.tdsi.in/s/cLQjLiJnLR55DgL
TTA	TTAT.3G-36.113V15.7.0	15.7.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.113V15.7.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-36.113.V16.5.0	16.5.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/36/A36113-g50.pdf
ATIS	ATIS.3GPP.36.113.V16.5.0	16.5.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.113.V16.5.0	16.5.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.113.V16.5.0.docx
ETSI	ETSI TS 136 113 V16.5.0 (2024-05)	16.5.0	Published	07.05.2024	https://www.etsi.org/deliver/etsi_ts/136100_136199/136113/16.05.00_60/ts_136113v160500p.pdf
TSDSI	TSDSI STD T1.3GPP 36.113-16.5.0 V1.3.0	16.5.0	Published	22.07.2024	https://members.tdsi.in/s/SGbcSdsMoGgM42m
TTA	TTAT.3G-36.113V16.5.0	16.5.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.113V16.5.0&searchCate=TTAS
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ARIB	ARIB STD-T120-36.113.V17.3.0	17.3.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/36/A36113-h30.pdf
ATIS	ATIS.3GPP.36.113.V17.3.0	17.3.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.113.V17.3.0	17.3.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.113.V17.3.0.docx
ETSI	ETSI TS 136 113 V17.3.0 (2024-05)	17.3.0	Published	14.05.2024	https://www.etsi.org/deliver/etsi_ts/136100_136199/136113/17.03.00_60/ts_136113v170300p.pdf
TSDSI	TSDSI STD T1.3GPP 36.113-17.3.0 V1.3.0	17.3.0	Published	22.07.2024	https://members.tdsi.in/s/ZYz3GEqS8HMMrrW
TTA	TTAT.3G-36.113V17.3.0	17.3.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.113V17.3.0&searchCate=TTAS

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ARIB	ARIB STD-T120-36.113.V18.1.0	18.1.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/36/A36113-i10.pdf
ATIS	ATIS.3GPP.36.113.V18.1.0	18.1.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.113.V18.1.0	18.1.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.113.V18.1.0.docx
ETSI	ETSI TS 136 113 V18.1.0 (2024-05)	18.1.0	Published	14.05.2024	https://www.etsi.org/deliver/etsi_ts/136100_136199/136113/18.01.00_60/ts_136113v180100p.pdf
TSDSI	TSDSI STD T1.3GPP 36.113-18.1.0 V1.0.0	18.1.0	Published	19.11.2024	https://members.tdsi.in/s/4PaNx6k2HpKnBJW
TTA	TTAT.3G-36.113V18.1.0	18.1.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.113V18.1.0&searchCate=TTAS

1.2.1.5.6 TS 36.116**Evolved Universal Terrestrial Radio Access (E-UTRA); Relay radio transmission and reception**

This document establishes the minimum RF characteristics and minimum performance requirements of E-UTRA Relay.

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ATIS	ATIS.3GPP.36.116V1500	15.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.116V1500	15.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.116V1500.doc
ETSI	ETSI TS 136 116 V15.0.0 (2018-11)	15.0.0	Published	12.11.2018	https://www.etsi.org/deliver/etsi_ts/136100_136199/136116/15.00.00_60/ts_136116v150000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.116-15.0.0 V1.0.0	15.0.0	Published	30.08.2021	https://members.tdsi.in/s/We9bJJzWkjdzSZig
TTA	TTAT.3G-36.116V15.0.0	15.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.116V15.0.0&searchCate=TTAS

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ATIS	ATIS.3GPP.36.116V1600	16.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.116V1600	16.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.116V1600.doc
ETSI	ETSI TS 136 116 V16.0.0 (2020-07)	16.0.0	Published	21.07.2020	https://www.etsi.org/deliver/etsi_ts/136100_136199/136116/16.00.00_60/ts_136116v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.116-16.0.0 V1.0.0	16.0.0	Published	30.08.2021	https://members.tdsi.in/s/rNYaJLPWa9xBCNi
TTA	TTAT.3G-36.116V16.0.0	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.116V16.0.0&searchCate=TTAS

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CCSA	CCSA.3GPP.36.116.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.116.V17.0.0.docx
ETSI	ETSI TS 136 116 V17.0.0 (2022-04)	17.0.0	Published	27.04.2022	https://www.etsi.org/deliver/etsi_ts/136100_136199/136116/17.00.00_60/ts_136116v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.116-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/aFig9xSiigXEpGP
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CCSA	CCSA.3GPP.36.116.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.116.V18.0.0.docx
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TSDSI	TSDSI STD T1.3GPP 36.116-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/22gJHKdCRndEQOF
TTA	TTAT.3G-36.116V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.116V18.0.0&searchCate=TTAS

1.2.1.5.7 TS 36.124**Evolved Universal Terrestrial Radio Access (E-UTRA); Electromagnetic compatibility (EMC) requirements for mobile terminals and ancillary equipment**

This document establishes the essential EMC requirements for “3rd generation” digital cellular mobile terminal equipment and ancillary accessories in combination with a 3GPP E-UTRA user equipment (UE). This document specifies the applicable EMC tests, the methods of measurement, the frequency range, the limits and the minimum performance criteria for all types of E-UTRA UEs and their accessories. Requirements for the radiated emission from the enclosure port of integral antenna equipment and ancillaries have been included. The immunity requirements have been selected to ensure an adequate level of compatibility for apparatus in residential, commercial, light industrial and vehicular environments. The levels, however, do not cover extreme cases, which may occur in any location but with low probability of occurrence. Compliance of radio equipment to the requirements of this document does not signify compliance to any requirement related to the use of the equipment (i.e. licensing requirements). Compliance to the requirements of this document does not signify compliance to any safety requirement. However, any temporary or permanent unsafe condition caused by EMC is considered as non-compliance.

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CCSA	CCSA.3GPP.36.124.V15.4.0	15.4.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.124.V15.4.0.docx
ETSI	ETSI TS 136 124 V15.4.0 (2022-07)	15.4.0	Published	21.07.2022	https://www.etsi.org/deliver/etsi_ts/136100_136199/136124/15.04.00_60/ts_136124v150400p.pdf
TSDSI	TSDSI STD T1.3GPP 36.124-15.4.0 V1.1.0	15.4.0	Published	29.07.2022	https://members.tdsi.in/s/pnGEjjaPg6BtA8a
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ATIS	ATIS.3GPP.36.124.V16.3.0	16.3.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.124.V16.3.0	16.3.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.36.124.V16.3.0.docx
ETSI	ETSI TS 136 124 V16.3.0 (2022-07)	16.3.0	Published	21.07.2022	https://www.etsi.org/deliver/etsi_ts/136100_136199/136124/16.03.00_60/ts_136124v160300p.pdf
TSDSI	TSDSI STD T1.3GPP 36.124-16.3.0 V1.1.0	16.3.0	Published	29.07.2022	https://members.tdsi.in/s/2CSFNqL3iYi6w4d
TTA	TTAT.3G-36.124V16.3.0	16.3.0	Published	21.10.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.124V16.3.0&searchCate=TTAS

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ARIB	ARIB STD-T120-36.124.V17.1.0	17.1.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/36/A36124-h10.pdf
ATIS	ATIS.3GPP.36.124.V17.1.0	17.1.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.124.V17.1.0	17.1.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.36.124.V17.1.0.docx
ETSI	ETSI TS 136 124 V17.1.0 (2022-07)	17.1.0	Published	21.07.2022	https://www.etsi.org/deliver/etsi_ts/136100_136199/136124/17.01.00_60/ts_136124v170100p.pdf
TSDSI	TSDSI STD T1.3GPP 36.124-17.1.0 V1.1.0	17.1.0	Published	29.07.2022	https://members.tdsi.in/s/pXqtY6GZxNEFDcS
TTA	TTAT.3G-36.124V17.1.0	17.1.0	Published	21.10.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.124V17.1.0&searchCate=TTAS

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ARIB	ARIB STD-T120-36.124.V18.0.0	18.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/36/A36124-i00.pdf
ATIS	ATIS.3GPP.36.124.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.124.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.36.124.V18.0.0.docx
ETSI	ETSI TS 136 124 V18.0.0 (2024-05)	18.0.0	Published	23.05.2024	https://www.etsi.org/deliver/etsi_ts/136100_136199/136124/18.00.00_60/ts_136124v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 36.124-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/TGnwKQKSq6aSBER
TTA	TTAT.3G-36.124V18.0.0	18.0.0	Published	08.05.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.124V18.0.0&searchCate=TTAS

1.2.1.5.8 TS 36.133**Evolved Universal Terrestrial Radio Access (E-UTRA); Requirements for support of radio resource management**

This document specifies requirements for support of Radio Resource Management for the FDD and TDD modes of E-UTRA. These requirements include requirements on measurements in UTRAN and the UE as well as requirements on node dynamical behaviour and interaction, in terms of delay and response characteristics.

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Release 15					
ARIB	ARIB STD-T120-36.133.V15.22.0	15.22.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/36/A36133-fm0.pdf
ATIS	ATIS.3GPP.36.133.V15.22.0	15.22.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.36.133.V15.22.0	15.22.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.36.133.V15.22.0.zip
ETSI	ETSI TS 136 133 V15.22.0 (2024-10)	15.22.0	Published	11.10.2024	https://www.etsi.org/deliver/etsi_ts/136100_136199/136133/15.22.00_60/ts_136133v152200p.pdf
TSDSI	TSDSI STD T1.3GPP 36.133-15.22.0 V1.7.0	15.22.0	Published	02.03.2025	https://members.tdsi.in/s/NrwfZSZnjnKTnRf
TTA	TTAT.3G-36.133V15.22.0	15.22.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.133V15.22.0&searchCate=TTAS
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ARIB	ARIB STD-T120-36.133.V16.21.0	16.21.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/36/A36133-gk0.pdf
ATIS	ATIS.3GPP.36.133.V16.21.0	16.21.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.36.133.V16.21.0	16.21.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.36.133.V16.21.0.zip
ETSI	ETSI TS 136 133 V16.21.0 (2024-10)	16.21.0	Published	16.10.2024	https://www.etsi.org/deliver/etsi_ts/136100_136199/136133/16.21.00_60/ts_136133v162100p.pdf
TSDSI	TSDSI STD T1.3GPP 36.133-16.21.0 V1.8.0	16.21.0	Published	02.03.2025	https://members.tdsi.in/s/ctwFB2ettyd2xi
TTA	TTAT.3G-36.133V16.21.0	16.21.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.133V16.21.0&searchCate=TTAS

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ARIB	ARIB STD-T120-36.133.V17.14.0	17.14.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/36/A36133-he0.pdf
ATIS	ATIS.3GPP.36.133.V17.14.0	17.14.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.36.133.V17.14.0	17.14.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.133.V17.14.0.zip
ETSI	ETSI TS 136 133 V17.14.0 (2024-10)	17.14.0	Published	15.10.2024	https://www.etsi.org/deliver/etsi_ts/136100_136199/136133/17.14.00_60/ts_136133v171400p.pdf
TSDSI	TSDSI STD T1.3GPP 36.133-17.14.0 V1.9.0	17.14.0	Published	02.03.2025	https://members.tdsi.in/s/dcy2cNbK4XkLqsw
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ARIB	ARIB STD-T120-36.133.V18.7.0	18.7.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/36/A36133-i70.pdf
ATIS	ATIS.3GPP.36.133.V18.7.0	18.7.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.36.133.V18.7.0	18.7.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.36.133.V18.7.0.zip
ETSI	ETSI TS 136 133 V18.7.0 (2024-10)	18.7.0	Published	14.10.2024	https://www.etsi.org/deliver/etsi_ts/136100_136199/136133/18.07.00_60/ts_136133v180700p.pdf
TSDSI	TSDSI STD T1.3GPP 36.133-18.7.0 V1.1.0	18.7.0	Published	02.03.2025	https://members.tdsi.in/s/yfzRcTegoeRwP5n
TTA	TTAT.3G-36.133V18.7.0	18.7.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-36.133V18.7.0&searchCate=TTAS

1.2.1.5.9 TS 37.104**NE, E-UTRA, UTRA and GSM/EDGE; Multi-Standard Radio (MSR) Base Station (BS) radio transmission and reception**

This document establishes the minimum RF characteristics of E-UTRA, UTRA and GSM/EDGE Multi-Standard Radio (MSR) Base Station (BS). Requirements for multi-RAT and single-RAT operation of MSR BS are covered in this document. The requirements in this document for E-UTRA and UTRA single-RAT operation of MSR BS are also applicable to E-UTRA and UTRA multi-carrier capable single-RAT BS. Requirements for GSM BS that are only single-RAT capable are not covered.

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ATIS	ATIS.3GPP.37.104.V15.19.0	15.19.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.37.104.V15.19.0	15.19.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.104.V15.19.0.docx
ETSI	ETSI TS 137 104 V15.19.0 (2023-10)	15.19.0	Published	13.10.2023	https://www.etsi.org/deliver/etsi_ts/137100_137199/137104/15.19.00_60/ts_137104v151900p.pdf
TSDSI	TSDSI STD T1.3GPP 37.104-15.19.0 V1.3.0	15.19.0	Published	30.08.2021	https://members.tdsi.in/s/w2XSBKqaPTBJiFo
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CCSA	CCSA.3GPP.37.104.V16.20.0	16.20.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.37.104.V16.20.0.docx
ETSI	ETSI TS 137 104 V16.20.0 (2024-05)	16.20.0	Published	03.05.2024	https://www.etsi.org/deliver/etsi_ts/137100_137199/137104/16.20.00_60/ts_137104v162000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.104-16.20.0 V1.7.0	16.20.0	Published	30.08.2021	https://members.tdsi.in/s/9AwkEdX7qiGGF6o
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ETSI	ETSI TS 137 104 V17.13.0 (2024-08)	17.13.0	Published	12.08.2024	https://www.etsi.org/deliver/etsi_ts/137100_137199/137104/17.13.0_60/ts_137104v171300p.pdf
TSDSI	TSDSI STD T1.3GPP 37.104-17.13.0 V1.8.0	17.13.0	Published	19.11.2024	https://members.tdsi.in/s/giMBtFHpZEGqWdo
TTA	TTAT.3G-37.104V17.13.0	17.13.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.104V17.13.0&searchCate=TTAS

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CCSA	CCSA.3GPP.37.104.V18.6.0	18.6.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.37.104.V18.6.0.docx
ETSI	ETSI TS 137 104 V18.6.0 (2024-08)	18.6.0	Published	12.08.2024	https://www.etsi.org/deliver/etsi_ts/137100_137199/137104/18.06.00_60/ts_137104v180600p.pdf
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1.2.1.5.10 TS 37.105**Active Antenna System (AAS) Base Station (BS) transmission and reception**

This document establishes the RF characteristics, the RF minimum requirements and minimum performance requirements for E-UTRA AAS Base Station (BS), the FDD mode of UTRA AAS Base Station (BS), the 1,28 Mchip/s TDD mode of UTRA AAS Base Station (BS) in single RAT and any MSR AAS Base Station (BS) implementation of these RATs.

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CCSA	CCSA.3GPP.37.105.V15.20.0	15.20.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.37.105.V15.20.0.docx
ETSI	ETSI TS 137 105 V15.20.0 (2024-08)	15.20.0	Published	12.08.2024	https://www.etsi.org/deliver/etsi_ts/137100_137199/137105/15.20.00_60/ts_137105v152000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.105-15.20.0 V1.4.0	15.20.0	Published	19.11.2024	https://members.tdsi.in/s/23pWA5gMMw9rKZs
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CCSA	CCSA.3GPP.37.105.V16.16.0	16.16.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.37.105.V16.16.0.docx
ETSI	ETSI TS 137 105 V16.16.0 (2024-08)	16.16.0	Published	12.08.2024	https://www.etsi.org/deliver/etsi_ts/137100_137199/137105/16.16.00_60/ts_137105v161600p.pdf
TSDSI	TSDSI STD T1.3GPP 37.105-16.16.0 V1.5.0	16.16.0	Published	19.11.2024	https://members.tdsi.in/s/85weYjxewGASTzi
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ETSI	ETSI TS 137 105 V17.10.0 (2024-08)	17.10.0	Published	12.08.2024	https://www.etsi.org/deliver/etsi_ts/137100_137199/137105/17.10.0_60/ts_137105v171000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.105-17.10.0 V1.5.0	17.10.0	Published	19.11.2024	https://members.tdsi.in/s/BmtNWDnk7Tcqe7c
TTA	TTAT.3G-37.105V17.10.0	17.10.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.105V17.10.0&searchCate=TTAS

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ETSI	ETSI TS 137 105 V18.5.0 (2024-08)	18.5.0	Published	12.08.2024	https://www.etsi.org/deliver/etsi_ts/137100_137199/137105/18.05.00_60/ts_137105v180500p.pdf
TSDSI	TSDSI STD T1.3GPP 37.105-18.5.0 V1.0.0	18.5.0	Published	19.11.2024	https://members.tdsi.in/s/gG5ZnSEdbtFx34
TTA	TTAT.3G-37.105V18.5.0	18.5.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.105V18.5.0&searchCate=TTAS

1.2.1.5.11 TS 37.113**NR, E-UTRA, UTRA and GSM/EDGE; Multi-Standard Radio (MSR) Base Station (BS) Electromagnetic Compatibility (EMC)**

This document covers the assessment of E-UTRA, UTRA and GSM/EDGE Multi-Standard Radio (MSR) Base Stations and associated ancillary equipment in respect of Electromagnetic Compatibility (EMC). This document specifies the applicable test conditions, performance assessment and performance criteria for E-UTRA, UTRA and GSM/EDGE Base Stations and associated ancillary equipment in one of the following categories: (i) Multi-Standard Radio (MSR) Base Stations for E-UTRA, UTRA and GSM/EDGE meeting the requirements of TS 37.104, with conformance demonstrated by compliance to TS 37.141; (ii) Base Stations for E-UTRA meeting the requirements of TS 36.104, with conformance demonstrated by compliance to TS 36.141; (iii) Base Stations for UTRA FDD meeting the requirements of TS 25.104, with conformance demonstrated by compliance to TS 25.141; (iv) Base Stations for UTRA TDD meeting the requirements of TS 25.105, with conformance demonstrated by compliance to TS 25.142; (v) Base Stations for GSM/EDGE meeting the requirements of TS 45.005, with conformance demonstrated by compliance to TS 51.021. The environment classification used in this document refers to the environment classification used in IEC 61000-6-1 and IEC 61000-6-3.

The EMC requirements have been selected to ensure an adequate level of compatibility for apparatus at residential, commercial and light industrial environments. The levels, however, do not cover extreme cases which may occur in any location but with low probability of occurrence.

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CCSA	CCSA.3GPP.37.113.V15.14.0	15.14.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.37.113.V15.14.0.docx
ETSI	ETSI TS 137 113 V15.14.0 (2024-01)	15.14.0	Published	29.01.2024	https://www.etsi.org/deliver/etsi_ts/137100_137199/137113/15.14.00_60/ts_137113v151400p.pdf
TSDSI	TSDSI STD T1.3GPP 37.113-15.14.0 V1.4.0	15.14.0	Published	29.05.2024	https://members.tdsi.in/s/xwtGrG7DwS5wsCc
TTA	TTAT.3G-37.113V15.14.0	15.14.0	Published	08.05.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.113V15.14.0&searchCate=TTAS

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CCSA	CCSA.3GPP.37.113.V16.6.0	16.6.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.37.113.V16.6.0.docx
ETSI	ETSI TS 137 113 V16.6.0 (2024-05)	16.6.0	Published	14.05.2024	https://www.etsi.org/deliver/etsi_ts/137100_137199/137113/16.06.00_60/ts_137113v160600p.pdf
TSDSI	TSDSI STD T1.3GPP 37.113-16.6.0 V1.5.0	16.6.0	Published	22.07.2024	https://members.tdsi.in/s/eWg7EmMABcM6r2c
TTA	TTAT.3G-37.113V16.6.0	16.6.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.113V16.6.0&searchCate=TTAS

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CCSA	CCSA.3GPP.37.113.V17.4.0	17.4.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.37.113.V17.4.0.docx
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TSDSI	TSDSI STD T1.3GPP 37.113-17.4.0 V1.4.0	17.4.0	Published	22.07.2024	https://members.tdsi.in/s/yz5SrMCmrd7kCAS
TTA	TTAT.3G-37.113V17.4.0	17.4.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.113V17.4.0&searchCate=TTAS

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CCSA	CCSA.3GPP.37.113.V18.1.0	18.1.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.37.113.V18.1.0.docx
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TSDSI	TSDSI STD T1.3GPP 37.113-18.1.0 V1.0.0	18.1.0	Published	19.11.2024	https://members.tdsi.in/s/btWrKpX4BxN5dX4
TTA	TTAT.3G-37.113V18.1.0	18.1.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.113V18.1.0&searchCate=TTAS

1.2.1.5.12 TS 37.114**Active Antenna System (AAS) Base Station (BS) Electromagnetic Compatibility (EMC)**

This document covers the assessment of E-UTRA, UTRA and Multi-Standard Radio (MSR) Active Antenna Systems Base Stations in respect of Electromagnetic Compatibility (EMC).

This document specifies the applicable test conditions, performance assessment and performance criteria for E-UTRA and UTRA Base Stations and associated ancillary equipment in one of the following categories:

- Active Antenna System Base Station for E-UTRA, UTRA and MSR meeting the requirements of 3GPP TS 37.105, with conformance demonstrated by compliance to 3GPP TS 37.145.

The scope of this document is AAS BS with TAB connectors for every transceiver unit at the Transceiver Array Boundary. Requirement, procedures and values of an AAS Base Station without TAB connectors are not included in this document and are FFS.

The environment classification used in this document refers to the residential, commercial and light industrial environment classification used in IEC 61000-6-1 and IEC 61000-6-3.

The EMC requirements have been selected to ensure an adequate level of compatibility for apparatus at residential, commercial and light industrial environments. The levels, however, do not cover extreme cases which may occur in any location but with low probability of occurrence.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.37.114.V15.10.0	15.10.0	Published	22.05.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.37.114.V15.10.0	15.10.0	Published	22.05.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.37.114.V15.10.0.docx
ETSI	ETSI TS 137 114 V15.10.0 (2023-04)	15.10.0	Published	27.04.2023	https://www.etsi.org/deliver/etsi_ts/137100_137199/137114/15.10.00_60/ts_137114v151000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.114-15.10.0 V1.1.0	15.10.0	Published	14.08.2023	https://members.tdsi.in/s/9KqfHJznxYtko67
TTA	TTAT.3G-37.114V15.10.0	15.10.0	Published	01.08.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.114V15.10.0&searchCate=TTAS
Release 16					
ATIS	ATIS.3GPP.37.114.V16.1.0	16.1.0	Published	22.05.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.37.114.V16.1.0	16.1.0	Published	22.05.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.37.114.V16.1.0.docx
ETSI	ETSI TS 137 114 V16.1.0 (2023-04)	16.1.0	Published	27.04.2023	https://www.etsi.org/deliver/etsi_ts/137100_137199/137114/16.01.00_60/ts_137114v160100p.pdf
TSDSI	TSDSI STD T1.3GPP 37.114-16.1.0 V1.1.0	16.1.0	Published	14.08.2023	https://members.tdsi.in/s/AJLWnsaHbmjEZ
TTA	TTAT.3G-37.114V16.1.0	16.1.0	Published	01.08.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.114V16.1.0&searchCate=TTAS
Release 17					
ATIS	ATIS.3GPP.37.114.V17.1.0	17.1.0	Published	22.05.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.37.114.V17.1.0	17.1.0	Published	22.05.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.37.114.V17.1.0.docx
ETSI	ETSI TS 137 114 V17.1.0 (2023-04)	17.1.0	Published	27.04.2023	https://www.etsi.org/deliver/etsi_ts/137100_137199/137114/17.01.00_60/ts_137114v170100p.pdf
TSDSI	TSDSI STD T1.3GPP 37.114-17.1.0 V1.1.0	17.1.0	Published	14.08.2023	https://members.tdsi.in/s/j8nDCScGrefii4w
TTA	TTAT.3G-37.114V17.1.0	17.1.0	Published	01.08.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.114V17.1.0&searchCate=TTAS
Release 18					
ATIS	ATIS.3GPP.37.114.V18.1.0	18.1.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.37.114.V18.1.0	18.1.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.37.114.V18.1.0.docx
ETSI	ETSI TS 137 114 V18.1.0 (2024-05)	18.1.0	Published	14.05.2024	https://www.etsi.org/deliver/etsi_ts/137100_137199/137114/18.01.00_60/ts_137114v180100p.pdf
TSDSI	TSDSI STD T1.3GPP 37.114-18.1.0 V1.0.0	18.1.0	Published	19.11.2024	https://members.tdsi.in/s/oSyPcgkD7RLczBt
TTA	TTAT.3G-37.114V18.1.0	18.1.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.114V18.1.0&searchCate=TTAS

1.2.1.5.13 TS 38.101-1**NR; User Equipment (UE) radio transmission and reception; Part 1: Range 1 Standalone**

This document establishes the minimum RF requirements for NR User Equipment (UE) operating on frequency Range 1.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-38.101-1.V15.27.0	15.27.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38101-1-fr0.pdf
ATIS	ATIS.3GPP.38.101-1.V15.27.0	15.27.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.101-1.V15.27.0	15.27.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.38.101-1.V15.27.0.zip
ETSI	ETSI TS 138 101-1 V15.27.0 (2024-10)	15.27.0	Published	23.10.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138101/15.27.00_60/ts_138101v152700p.pdf
TSDSI	TSDSI STD T1.3GPP 38.101-1-15.27.0 V1.10.0	15.27.0	Published	02.03.2025	https://members.tdsi.in/s/SWmREjALZ6i4SP5
TTA	TTAT.3G-38.101-1V15.27.0	15.27.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.101-1V15.27.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-38.101-1.V16.21.0	16.21.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38101-1-gk0.pdf
ATIS	ATIS.3GPP.38.101-1.V16.21.0	16.21.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.101-1.V16.21.0	16.21.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.38.101-1.V16.21.0.zip
ETSI	ETSI TS 138 101-1 V16.21.0 (2024-10)	16.21.0	Published	23.10.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138101/16.21.00_60/ts_138101v162100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.101-1-16.21.0 V1.10.0	16.21.0	Published	02.03.2025	https://members.tdsi.in/s/A3243GYX9XyZmrT
TTA	TTAT.3G-38.101-1V16.21.0	16.21.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.101-1V16.21.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-38.101-1.V17.15.0	17.15.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38101-1-hf0.pdf
ATIS	ATIS.3GPP.38.101-1.V17.15.0	17.15.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.101-1.V17.15.0	17.15.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.38.101-1.V17.15.0.zip
ETSI	ETSI TS 138 101-1 V17.15.0 (2024-11)	17.15.0	Published	14.11.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138101/17.15.00_60/ts_138101v171500p.pdf
TSDSI	TSDSI STD T1.3GPP 38.101-1-17.15.0 V1.10.0	17.15.0	Published	02.03.2025	https://members.tdsi.in/s/wapeoaSrpqyRb2L
TTA	TTAT.3G-38.101-1V17.15.0	17.15.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.101-1V17.15.0&searchCate=TTAS
Release 18					
ARIB	ARIB STD-T120-38.101-1.V18.7.0	18.7.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38101-1-i70.pdf
ATIS	ATIS.3GPP.38.101-1.V18.7.0	18.7.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.101-1.V18.7.0	18.7.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.38.101-1.V18.7.0.zip
ETSI	ETSI TS 138 101-1 V18.7.0 (2024-11)	18.7.0	Published	14.11.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138101/18.07.00_60/ts_138101v180700p.pdf
TSDSI	TSDSI STD T1.3GPP 38.101-1-18.7.0 V1.1.0	18.7.0	Published	02.03.2025	https://members.tdsi.in/s/k6E4rX5nNn8gmeY
TTA	TTAT.3G-38.101-1V18.7.0	18.7.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.101-1V18.7.0&searchCate=TTAS

1.2.1.5.14 TS 38.101-2**NR; User Equipment (UE) radio transmission and reception; Part 2: Range 2 Standalone**

This document establishes the minimum RF requirements for NR User Equipment (UE) operating on frequency Range 2.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-38.101-2.V15.26.0	15.26.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38101-2-fq0.pdf
ATIS	ATIS.3GPP.38.101-2.V15.26.0	15.26.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.101-2.V15.26.0	15.26.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.38.101-2.V15.26.0.docx
ETSI	ETSI TS 138 101-2 V15.26.0 (2024-08)	15.26.0	Published	05.08.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/13810102/15.26.00_60/ts_13810102v152600p.pdf
TSDSI	TSDSI STD T1.3GPP 38.101-2-15.26.0 V1.9.0	15.26.0	Published	19.11.2024	https://members.tdsi.in/s/SDXFHypWEo2NdPx
TTA	TTAT.3G-38.101-2V15.26.0	15.26.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.101-2V15.26.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-38.101-2.V16.20.0	16.20.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38101-2-gj0.pdf
ATIS	ATIS.3GPP.38.101-2.V16.20.0	16.20.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.101-2.V16.20.0	16.20.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.38.101-2.V16.20.0.docx
ETSI	ETSI TS 138 101-2 V16.20.0 (2024-08)	16.20.0	Published	05.08.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/13810102/16.20.00_60/ts_13810102v162000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.101-2-16.20.0 V1.9.0	16.20.0	Published	19.11.2024	https://members.tdsi.in/s/Kmj2nykw9338xdj
TTA	TTAT.3G-38.101-2V16.20.0	16.20.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.101-2V16.20.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-38.101-2.V17.15.0	17.15.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38101-2-hf0.pdf
ATIS	ATIS.3GPP.38.101-2.V17.15.0	17.15.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.101-2.V17.15.0	17.15.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.38.101-2.V17.15.0.docx
ETSI	ETSI TS 138 101-2 V17.15.0 (2024-10)	17.15.0	Published	03.10.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/13810102/17.15.00_60/ts_13810102v171500p.pdf
TSDSI	TSDSI STD T1.3GPP 38.101-2-17.15.0 V1.10.0	17.15.0	Published	02.03.2025	https://members.tdsi.in/s/pySGdQMzNJ7ayrt
TTA	TTAT.3G-38.101-2V17.15.0	17.15.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.101-2V17.15.0&searchCate=TTAS
Release 18					
ARIB	ARIB STD-T120-38.101-2.V18.7.0	18.7.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38101-2-i70.pdf
ATIS	ATIS.3GPP.38.101-2.V18.7.0	18.7.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.101-2.V18.7.0	18.7.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.38.101-2.V18.7.0.docx
ETSI	ETSI TS 138 101-2 V18.7.0 (2024-10)	18.7.0	Published	03.10.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/13810102/18.07.00_60/ts_13810102v180700p.pdf
TSDSI	TSDSI STD T1.3GPP 38.101-2-18.7.0 V1.1.0	18.7.0	Published	02.03.2025	https://members.tdsi.in/s/bMmHpY6LfawTzLY
TTA	TTAT.3G-38.101-2V18.7.0	18.7.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.101-2V18.7.0&searchCate=TTAS

1.2.1.5.15 TS 38.101-3**NR; User Equipment (UE) radio transmission and reception; Part 3: Range 1 and Range 2 Interworking operation with other radios**

This document establishes the minimum RF requirements for NR User Equipment (UE) Interworking operation with other radios. This includes but is not limited to additional requirements for carrier aggregation or NR dual connectivity between Range 1 and Range 2 and additional requirements due to NR non-standalone (NSA) operation mode with E-UTRA.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-38.101-3.V15.26.0	15.26.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38101-3-fq0.pdf
ATIS	ATIS.3GPP.38.101-3.V15.26.0	15.26.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.101-3.V15.26.0	15.26.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.38.101-3.V15.26.0.zip
ETSI	ETSI TS 138 101-3 V15.26.0 (2024-08)	15.26.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/13810103/15.26.00_60/ts_13810103v152600p.pdf
TSDSI	TSDSI STD T1.3GPP 38.101-3-15.26.0 V1.8.0	15.26.0	Published	19.11.2024	https://members.tdsi.in/s/Ckpwd5JGLmH5LKD
TTA	TTAT.3G-38.101-3V15.26.0	15.26.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.101-3V15.26.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-38.101-3.V16.21.0	16.21.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38101-3-gk0.pdf
ATIS	ATIS.3GPP.38.101-3.V16.21.0	16.21.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.101-3.V16.21.0	16.21.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.38.101-3.V16.21.0.zip
ETSI	ETSI TS 138 101-3 V16.21.0 (2024-10)	16.21.0	Published	23.10.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/13810103/16.21.00_60/ts_13810103v162100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.101-3-16.21.0 V1.10.0	16.21.0	Published	02.03.2025	https://members.tdsi.in/s/qnsWsBcigBer7cg
TTA	TTAT.3G-38.101-3V16.21.0	16.21.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.101-3V16.21.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-38.101-3.V17.15.0	17.15.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38101-3-hf0.pdf
ATIS	ATIS.3GPP.38.101-3.V17.15.0	17.15.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.101-3.V17.15.0	17.15.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.38.101-3.V17.15.0.zip
ETSI	ETSI TS 138 101-3 V17.15.0 (2024-10)	17.15.0	Published	23.10.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/13810103/17.15.00_60/ts_13810103v171500p.pdf
TSDSI	TSDSI STD T1.3GPP 38.101-3-17.15.0 V1.10.0	17.15.0	Published	02.03.2025	https://members.tdsi.in/s/XwKyPyRDsxmMDwT
TTA	TTAT.3G-38.101-3V17.15.0	17.15.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.101-3V17.15.0&searchCate=TTAS
Release 18					
ARIB	ARIB STD-T120-38.101-3.V18.7.0	18.7.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38101-3-i70.pdf
ATIS	ATIS.3GPP.38.101-3.V18.7.0	18.7.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.101-3.V18.7.0	18.7.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.38.101-3.V18.7.0.zip
ETSI	ETSI TS 138 101-3 V18.7.0 (2024-11)	18.7.0	Published	07.11.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/13810103/18.07.00_60/ts_13810103v180700p.pdf
TSDSI	TSDSI STD T1.3GPP 38.101-3-18.7.0 V1.1.0	18.7.0	Published	02.03.2025	https://members.tdsi.in/s/W88LMFAoS5LaH6R
TTA	TTAT.3G-38.101-3V18.7.0	18.7.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.101-3V18.7.0&searchCate=TTAS

1.2.1.5.16 TS 38.104

NR; Base Station (BS) radio transmission and reception

This document establishes the minimum RF characteristics and minimum performance requirements of NR and NB-IoT operation in NR in-band Base Station (BS).

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Release 15					
ARIB	ARIB STD-T120-38.104.V15.20.0	15.20.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38104-fj0.pdf
ATIS	ATIS.3GPP.38.104.V15.20.0	15.20.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.104.V15.20.0	15.20.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.38.104.V15.20.0.docx
ETSI	ETSI TS 138 104 V15.20.0 (2024-05)	15.20.0	Published	07.05.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138104/15.20.00_60/ts_138104v152000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.104-15.20.0 V1.4.0	15.20.0	Published	22.07.2024	https://members.tdsi.in/s/KqtgJAtsJYD8xn7
TTA	TTAT.3G-38.104V15.20.0	15.20.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.104V15.20.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-38.104.V16.20.0	16.20.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38104-gj0.pdf
ATIS	ATIS.3GPP.38.104.V16.20.0	16.20.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.104.V16.20.0	16.20.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.38.104.V16.20.0.docx
ETSI	ETSI TS 138 104 V16.20.0 (2024-08)	16.20.0	Published	12.08.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138104/16.20.00_60/ts_138104v162000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.104-16.20.0 V1.9.0	16.20.0	Published	19.11.2024	https://members.tdsi.in/s/EzQBZcAXesHEtdH
TTA	TTAT.3G-38.104V16.20.0	16.20.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.104V16.20.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-38.104.V17.15.0	17.15.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38104-hf0.pdf
ATIS	ATIS.3GPP.38.104.V17.15.0	17.15.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.104.V17.15.0	17.15.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.38.104.V17.15.0.docx
ETSI	ETSI TS 138 104 V17.15.0 (2024-10)	17.15.0	Published	03.10.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138104/17.15.00_60/ts_138104v171500p.pdf
TSDSI	TSDSI STD T1.3GPP 38.104-17.15.0 V1.10.0	17.15.0	Published	02.03.2025	https://members.tdsi.in/s/aQsrFNdK74LcQFX
TTA	TTAT.3G-38.104V17.15.0	17.15.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.104V17.15.0&searchCate=TTAS
Release 18					
ARIB	ARIB STD-T120-38.104.V18.7.0	18.7.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38104-i70.pdf
ATIS	ATIS.3GPP.38.104.V18.7.0	18.7.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.104.V18.7.0	18.7.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.38.104.V18.7.0.docx
ETSI	ETSI TS 138 104 V18.7.0 (2024-10)	18.7.0	Published	04.10.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138104/18.07.00_60/ts_138104v180700p.pdf
TSDSI	TSDSI STD T1.3GPP 38.104-18.7.0 V1.1.0	18.7.0	Published	02.03.2025	https://members.tdsi.in/s/SXPxPeNPf46aqPQ
TTA	TTAT.3G-38.104V18.7.0	18.7.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.104V18.7.0&searchCate=TTAS

1.2.1.5.17 TS 38.106

NR repeater radio transmission and reception

This document establishes the minimum RF characteristics of NR Repeater.

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Release 17					
ATIS	ATIS.3GPP.38.106.V17.10.0	17.10.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.106.V17.10.0	17.10.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.38.106.V17.10.0.docx
ETSI	ETSI TS 138 106 V17.10.0 (2024-10)	17.10.0	Published	03.10.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138106/17.10.00_60/ts_138106v171000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.106-17.10.0 V1.10.0	17.10.0	Published	02.03.2025	https://members.tdsi.in/s/xbFpofDtedECYP8
TTA	TTAT.3G-38.106V17.10.0	17.10.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.106V17.10.0&searchCate=TTAS
Release 18					
ATIS	ATIS.3GPP.38.106.V18.6.0	18.6.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.106.V18.6.0	18.6.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.38.106.V18.6.0.docx
ETSI	ETSI TS 138 106 V18.6.0 (2024-10)	18.6.0	Published	03.10.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138106/18.06.00_60/ts_138106v180600p.pdf
TSDSI	TSDSI STD T1.3GPP 38.106-18.6.0 V1.1.0	18.6.0	Published	02.03.2025	https://members.tdsi.in/s/gqjaZLFAYsZDAya
TTA	TTAT.3G-38.106V18.6.0	18.6.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.106V18.6.0&searchCate=TTAS

1.2.1.5.18 TS 38.113

NR; Base Station (BS) ElectroMagnetic Compatibility (EMC)

This document covers the assessment of NR Base Station (BS) and ancillary equipment in respect of Electromagnetic Compatibility (EMC).

This document specifies the applicable test conditions, performance assessment and performance criteria for base stations and associated ancillary equipment in the following categories:

- BS equipped with antenna connectors or *TAB connectors* which are possible to be terminated during EMC testing, meeting the *BS type I-C* and *BS type I-H* RF requirements of TS 38.104, with conformance demonstrated by compliance to TS 38.141-1.
- BS not equipped with antenna connectors nor *TAB connectors*, i.e. with antenna elements radiating during the EMC testing, meeting the *BS type I-O* and *BS type 2-O* RF requirements of TS 38.104, with conformance demonstrated by compliance to TS 38.141-2.

The scope of this document is twofold:

- Requirements, procedures and values of a BS with antenna connectors or *TAB connectors*,
- Requirements, procedures and values of a BS without antenna connectors, nor *TAB connectors*.

The environment classification used in this document refers to the residential, commercial and light industrial environment classification used in IEC 61000-6-1 and IEC 61000-6-3.

The EMC requirements have been selected to ensure an adequate level of compatibility for apparatus at residential, commercial and light industrial environments. The levels, however, do not cover extreme cases which may occur in any location but with low probability of occurrence.

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Release 15					
ARIB	ARIB STD-T120-38.113.V15.20.0	15.20.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38113-fj0.pdf
ATIS	ATIS.3GPP.38.113.V15.20.0	15.20.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.113.V15.20.0	15.20.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.38.113.V15.20.0.docx
ETSI	ETSI TS 138 113 V15.20.0 (2024-08)	15.20.0	Published	05.08.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138113/15.20.00_60/ts_138113v152000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.113-15.20.0 V1.5.0	15.20.0	Published	19.11.2024	https://members.tdsi.in/s/aK3cZP4sBeJGF8d
TTA	TTAT.3G-38.113V15.20.0	15.20.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.113V15.20.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-38.113.V16.11.0	16.11.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38113-gb0.pdf
ATIS	ATIS.3GPP.38.113.V16.11.0	16.11.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.113.V16.11.0	16.11.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.38.113.V16.11.0.docx
ETSI	ETSI TS 138 113 V16.11.0 (2024-08)	16.11.0	Published	05.08.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138113/16.11.00_60/ts_138113v161100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.113-16.11.0 V1.6.0	16.11.0	Published	19.11.2024	https://members.tdsi.in/s/dJZeFqapNdYcFp2
TTA	TTAT.3G-38.113V16.11.0	16.11.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.113V16.11.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-38.113.V17.7.0	17.7.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38113-h70.pdf
ATIS	ATIS.3GPP.38.113.V17.7.0	17.7.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.113.V17.7.0	17.7.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.38.113.V17.7.0.docx
ETSI	ETSI TS 138 113 V17.7.0 (2024-08)	17.7.0	Published	05.08.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138113/17.07.00_60/ts_138113v170700p.pdf
TSDSI	TSDSI STD T1.3GPP 38.113-17.7.0 V1.7.0	17.7.0	Published	19.11.2024	https://members.tdsi.in/s/xnKgqofXEsfDAX9
TTA	TTAT.3G-38.113V17.7.0	17.7.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.113V17.7.0&searchCate=TTAS
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ARIB	ARIB STD-T120-38.113.V18.3.0	18.3.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38113-i30.pdf
ATIS	ATIS.3GPP.38.113.V18.3.0	18.3.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.113.V18.3.0	18.3.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SMIT_ATIS/CCSA.3GPP.38.113.V18.3.0.docx
ETSI	ETSI TS 138 113 V18.3.0 (2024-08)	18.3.0	Published	05.08.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138113/18.03.00_60/ts_138113v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.113-18.3.0 V1.0.0	18.3.0	Published	19.11.2024	https://members.tdsi.in/s/Z9JFZ5MjMoTQ3k9
TTA	TTAT.3G-38.113V18.3.0	18.3.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.113V18.3.0&searchCate=TTAS

1.2.1.5.19 TS 38.114

NR; Repeaters ElectroMagnetic Compatibility (EMC)

This document covers the assessment of NR repeater and ancillary equipment in respect of Electromagnetic Compatibility (EMC).

This document specifies the applicable requirements, procedures, test conditions, performance assessment and performance criteria for NR repeater and associated ancillary equipment in the following categories:

- NR repeater equipped with antenna connectors which are possible to be terminated during EMC testing, meeting the repeater type 1-C RF requirements of TS 38.106, with conformance demonstrated by compliance to TS 38.115-1.
- NR repeater not equipped with antenna connectors, i.e. with antenna elements radiating during the EMC testing, meeting the repeater type 2-O RF requirements of TS 38.106, with conformance demonstrated by compliance to TS 38.115-2.

The environment classification used in this document refers to the residential, commercial and light industrial environment classification used in IEC 61000-6-1 and IEC 61000-6-3.

The EMC requirements have been selected to ensure an adequate level of compatibility for apparatus at residential, commercial and light industrial environments. The levels, however, do not cover extreme cases which may occur in any location but with low probability of occurrence.

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Release 17					
ATIS	ATIS.3GPP.38.114.V17.6.0	17.6.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.114.V17.6.0	17.6.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.38.114.V17.6.0.docx
ETSI	ETSI TS 138 114 V17.6.0 (2024-08)	17.6.0	Published	05.08.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138114/17.06.00_60/ts_138114v170600p.pdf
TSDSI	TSDSI STD T1.3GPP 38.114-17.6.0 V1.6.0	17.6.0	Published	19.11.2024	https://members.tdsi.in/s/w3XcsHMS6fCoGoK
TTA	TTAT.3G-38.114V17.6.0	17.6.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.114V17.6.0&searchCate=TTAS
Release 18					
ATIS	ATIS.3GPP.38.114.V18.3.0	18.3.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.114.V18.3.0	18.3.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.38.114.V18.3.0.docx
ETSI	ETSI TS 138 114 V18.3.0 (2024-10)	18.3.0	Published	03.10.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138114/18.03.00_60/ts_138114v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.114-18.3.0 V1.1.0	18.3.0	Published	02.03.2025	https://members.tdsi.in/s/pWXF2C6Z2JPbJkp
TTA	TTAT.3G-38.114V18.3.0	18.3.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.114V18.3.0&searchCate=TTAS

1.2.1.5.20 TS 38.124

NR; Electromagnetic compatibility (EMC) requirements for mobile terminals and ancillary equipment

This document establishes the essential EMC requirements for “3rd generation” digital cellular mobile terminal equipment and ancillary accessories in combination with a 3GPP NR user equipment (UE).

The equipment conforming to the requirements laid out in this document and used in its intended electromagnetic environment in accordance with the manufacturer’s instructions

- shall not generate electromagnetic disturbances at a level which may interfere with the intended operation of other equipment;
- has an adequate level of intrinsic immunity to electromagnetic disturbances to operate as intended;

This document specifies the applicable EMC tests, methods of measurement, frequency ranges, applicable limits and minimum performance criteria for all types of NR UE(s) and their accessories. NR base station equipment operating within network infrastructure is outside the scope of this document. However, this document does cover mobile and portable equipment that is intended to be operated in a fixed location while connected to the AC mains. NR base station equipment operating within network infrastructure is covered by the technical specification TS 38.113.

Requirements for the radiated emission from the enclosure port of integral antenna equipment and ancillaries are included in this document. Technical specifications for conducted emissions from the antenna connector are found in the 3GPP specifications for the radio interface, e.g. TS 38.xyz, for the effective use of the radio spectrum.

Requirements for the radiated emissions from the enclosure port and ancillaries cover two cases:

- UE equipment supporting operations in a frequency range for which antenna connectors are available (i.e. for operations in Frequency Range 1 as defined in e.g. TS 38.101-1 for the radio interface)
- UE equipment supporting operations in a frequency range for which only integral antennas may be available (i.e. for operations in Frequency Range 2 as defined in e.g. TS 38.101-2 for the radio interface)

The immunity requirements are selected to ensure an adequate level of compatibility for apparatus in residential, commercial, light industrial and vehicular environments. The levels, however, do not cover extreme cases, which may occur in any location but with low probability of occurrence.

Compliance of radio equipment to the requirements of this document does not signify compliance to any requirement related to the use of the equipment (i.e. licensing requirements).

Compliance to the requirements of this document does not signify compliance to any safety requirement. However, any temporary or permanent unsafe condition caused by EMC is considered as non-compliance.

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Release 15					
ARIB	ARIB STD-T120-38.124.V15.8.0	15.8.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38124-f80.pdf
ATIS	ATIS.3GPP.38.124.V15.8.0	15.8.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.124.V15.8.0	15.8.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.124.V15.8.0.docx
ETSI	ETSI TS 138 124 V15.8.0 (2022-08)	15.8.0	Published	10.08.2022	https://www.etsi.org/deliver/etsi_ts/138100_138199/138124/15.08.00_60/ts_138124v150800p.pdf
TSDSI	TSDSI STD T1.3GPP 38.124-15.8.0 V1.1.0	15.8.0	Published	29.07.2022	https://members.tdsi.in/s/t8xYkWmfCXfGAjt
TTA	TTAT.3G-38.124V15.8.0	15.8.0	Published	21.10.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.124V15.8.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-38.124.V16.5.0	16.5.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38124-g50.pdf
ATIS	ATIS.3GPP.38.124.V16.5.0	16.5.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.124.V16.5.0	16.5.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.124.V16.5.0.docx
ETSI	ETSI TS 138 124 V16.5.0 (2022-08)	16.5.0	Published	10.08.2022	https://www.etsi.org/deliver/etsi_ts/138100_138199/138124/16.05.00_60/ts_138124v160500p.pdf
TSDSI	TSDSI STD T1.3GPP 38.124-16.5.0 V1.1.0	16.5.0	Published	29.07.2022	https://members.tdsi.in/s/HbZKKBBMWCqteZq
TTA	TTAT.3G-38.124V16.5.0	16.5.0	Published	21.10.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.124V16.5.0&searchCate=TTAS

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ARIB	ARIB STD-T120-38.124.V17.2.0	17.2.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38124-h20.pdf
ATIS	ATIS.3GPP.38.124.V17.2.0	17.2.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.124.V17.2.0	17.2.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.38.124.V17.2.0.docx
ETSI	ETSI TS 138 124 V17.2.0 (2022-10)	17.2.0	Published	19.10.2022	https://www.etsi.org/deliver/etsi_ts/138100_138199/138124/17.02.00_60/ts_138124v170200p.pdf
TSDSI	TSDSI STD T1.3GPP 38.124-17.2.0 V1.1.0	17.2.0	Published	17.01.2023	https://members.tdsi.in/s/JCwmG4AcZYa8E3F
TTA	TTAT.3G-38.124V17.2.0	17.2.0	Published	11.01.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.124V17.2.0&searchCate=TTAS

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ARIB	ARIB STD-T120-38.124.V18.1.0	18.1.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38124-i10.pdf
ATIS	ATIS.3GPP.38.124.V18.1.0	18.1.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.124.V18.1.0	18.1.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.38.124.V18.1.0.docx
ETSI	ETSI TS 138 124 V18.1.0 (2024-05)	18.1.0	Published	27.05.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138124/18.01.00_60/ts_138124v180100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.124-18.1.0 V1.0.0	18.1.0	Published	19.11.2024	https://members.tdsi.in/s/LQPGzpDLHPfKCYS
TTA	TTAT.3G-38.124V18.1.0	18.1.0	Published	08.05.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.124V18.1.0&searchCate=TTAS

1.2.1.5.21 TS 38.133**NR; Requirements for support of radio resource management**

This document specifies requirements for support of Radio Resource Management for the FDD and TDD modes of New Radio (NR). These requirements include requirements on measurements in NR and the UE as well as requirements on node dynamical behaviour and interaction, in terms of delay and response characteristics.

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Release 15					
ARIB	ARIB STD-T120-38.133.V15.27.0	15.27.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38133-fr0.pdf
ATIS	ATIS.3GPP.38.133.V15.27.0	15.27.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.133.V15.27.0	15.27.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.38.133.V15.27.0.zip
ETSI	ETSI TS 138 133 V15.27.0 (2024-11)	15.27.0	Published	12.11.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138133/15.27.00_60/ts_138133v152700p.pdf
TSDSI	TSDSI STD T1.3GPP 38.133-15.27.0 V1.10.0	15.27.0	Published	02.03.2025	https://members.tdsi.in/s/gFNqvqLRMEmsbeN
TTA	TTAT.3G-38.133V15.27.0	15.27.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.133V15.27.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-38.133.V16.21.0	16.21.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38133-gk0.pdf
ATIS	ATIS.3GPP.38.133.V16.21.0	16.21.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.133.V16.21.0	16.21.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SUIT_ATIS/CCSA.3GPP.38.133.V16.21.0.zip
ETSI	ETSI TS 138 133 V16.21.0 (2024-11)	16.21.0	Published	12.11.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138133/16.21.00_60/ts_138133v162100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.133-16.21.0 V1.10.0	16.21.0	Published	02.03.2025	https://members.tdsi.in/s/dRRasDMMzbQKkia
TTA	TTAT.3G-38.133V16.21.0	16.21.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.133V16.21.0&searchCate=TTAS

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ARIB	ARIB STD-T120-38.133.V17.15.0	17.15.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38133-hf0.pdf
ATIS	ATIS.3GPP.38.133.V17.15.0	17.15.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.133.V17.15.0	17.15.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.133.V17.15.0.zip
ETSI	ETSI TS 138 133 V17.15.0 (2024-11)	17.15.0	Published	15.11.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138133/17.15.00_60/ts_138133v171500p.pdf
TSDSI	TSDSI STD T1.3GPP 38.133-17.15.0 V1.10.0	17.15.0	Published	02.03.2025	https://members.tdsi.in/s/PrPaQGsTSMtH5yQ
TTA	TTAT.3G-38.133V17.15.0	17.15.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.133V17.15.0&searchCate=TTAS

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ARIB	ARIB STD-T120-38.133.V18.7.0	18.7.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38133-i70.pdf
ATIS	ATIS.3GPP.38.133.V18.7.0	18.7.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.133.V18.7.0	18.7.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.133.V18.7.0.zip
ETSI	ETSI TS 138 133 V18.7.0 (2024-11)	18.7.0	Published	15.11.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138133/18.07.00_60/ts_138133v180700p.pdf
TSDSI	TSDSI STD T1.3GPP 38.133-18.7.0 V1.1.0	18.7.0	Published	02.03.2025	https://members.tdsi.in/s/MqkyapEs4F6yG3G
TTA	TTAT.3G-38.133V18.7.0	18.7.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.133V18.7.0&searchCate=TTAS

1.2.1.5.22 TS 38.174**NR; Integrated Access and Backhaul (IAB) radio transmission and reception**

This document establishes the minimum RF characteristics, minimum radio resource management (RRM) requirements, RRM test cases and minimum performance requirements of NR Integrated access and backhaul (IAB).

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Release 16					
ARIB	ARIB STD-T120-38.174.V16.11.0	16.11.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38174-gb0.pdf
ATIS	ATIS.3GPP.38.174.V16.11.0	16.11.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.174.V16.11.0	16.11.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.174.V16.11.0.docx
ETSI	ETSI TS 138 174 V16.11.0 (2024-08)	16.11.0	Published	05.08.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138174/16.11.00_60/ts_138174v161100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.174-16.11.0 V1.5.0	16.11.0	Published	19.11.2024	https://members.tdsi.in/s/ZcpCz8YP79ack6G
TTA	TTAT.3G-38.174V16.11.0	16.11.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.174V16.11.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-38.174.V17.8.0	17.8.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38174-h80.pdf
ATIS	ATIS.3GPP.38.174.V17.8.0	17.8.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.174.V17.8.0	17.8.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.174.V17.8.0.docx
ETSI	ETSI TS 138 174 V17.8.0 (2024-08)	17.8.0	Published	05.08.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138174/17.08.00_60/ts_138174v170800p.pdf
TSDSI	TSDSI STD T1.3GPP 38.174-17.8.0 V1.8.0	17.8.0	Published	19.11.2024	https://members.tdsi.in/s/ndBPk4WfpTBcbHQ
TTA	TTAT.3G-38.174V17.8.0	17.8.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.174V17.8.0&searchCate=TTAS

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ARIB	ARIB STD-T120-38.174.V18.6.0	18.6.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38174-i60.pdf
ATIS	ATIS.3GPP.38.174.V18.6.0	18.6.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.174.V18.6.0	18.6.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.174.V18.6.0.docx
ETSI	ETSI TS 138 174 V18.6.0 (2024-10)	18.6.0	Published	02.10.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138174/18.06.00_60/ts_138174v180600p.pdf
TSDSI	TSDSI STD T1.3GPP 38.174-18.6.0 V1.1.0	18.6.0	Published	02.03.2025	https://members.tdsi.in/s/zHabE5N5z7pR55H
TTA	TTAT.3G-38.174V18.6.0	18.6.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.174V18.6.0&searchCate=TTAS

1.2.1.5.23 TS 38.175**NR; Integrated Access and Backhaul (IAB) Electromagnetic Compatibility (EMC)**

This document covers the assessment for NR Integrated access and backhaul (IAB) node and associated ancillary equipment in respect of Electromagnetic Compatibility (EMC).

This document specifies the applicable test conditions, performance assessment and performance criteria for NR Integrated access and backhaul (IAB) node and associated ancillary equipment.

The environment classification used in this document refers to the residential, commercial and light industrial environment classification used in IEC 61000-6-1 and IEC 61000-6-3.

The EMC requirements have been selected to ensure an adequate level of compatibility for apparatus at residential, commercial and light industrial environments. The levels, however, do not cover extreme cases which may occur in any location but with low probability of occurrence.

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ARIB	ARIB STD-T120-38.175.V16.7.0	16.7.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38175-g70.pdf
ATIS	ATIS.3GPP.38.175.V16.7.0	16.7.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.175.V16.7.0	16.7.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.175.V16.7.0.docx
ETSI	ETSI TS 138 175 V16.7.0 (2024-02)	16.7.0	Published	01.02.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138175/16.07.00_60/ts_138175v160700p.pdf
TSDSI	TSDSI STD T1.3GPP 38.175-16.7.0 V1.4.0	16.7.0	Published	29.05.2024	https://members.tdsi.in/s/9wb9Z6NTkP9Y4mC
TTA	TTAT.3G-38.175V16.7.0	16.7.0	Published	08.05.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.175V16.7.0&searchCate=TTAS

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ATIS	ATIS.3GPP.38.175.V17.5.0	17.5.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.175.V17.5.0	17.5.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.175.V17.5.0.docx
ETSI	ETSI TS 138 175 V17.5.0 (2024-02)	17.5.0	Published	01.02.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138175/17.05.00_60/ts_138175v170500p.pdf
TSDSI	TSDSI STD T1.3GPP 38.175-17.5.0 V1.5.0	17.5.0	Published	29.05.2024	https://members.tdsi.in/s/X44GtHNW57MNFw7
TTA	TTAT.3G-38.175V17.5.0	17.5.0	Published	08.05.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.175V17.5.0&searchCate=TTAS

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ARIB	ARIB STD-T120-38.175.V18.1.0	18.1.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38175-i10.pdf
ATIS	ATIS.3GPP.38.175.V18.1.0	18.1.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.175.V18.1.0	18.1.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_SRIT_ATIS/CCSA.3GPP.38.175.V18.1.0.docx
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TSDSI	TSDSI STD T1.3GPP 38.175-18.1.0 V1.0.0	18.1.0	Published	19.11.2024	https://members.tdsi.in/s/sTDTpr5j2PBnAy
TTA	TTAT.3G-38.175V18.1.0	18.1.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.175V18.1.0&searchCate=TTAS

1.2.2 Other specifications

Other specifications addressing radio and device testing, but not part of the GCS, are listed in this Section.

Information on system and core network specifications can be found in the 3GPP web site for a complete system perspective. These system and core network specifications address the network, terminal, and service aspects required to provide an integrated mobility solution including aspects such as user services, connectivity, interoperability, mobility and roaming, security, codecs and media, operations and maintenance, charging, etc.

All the 3GPP specifications can be found at the following link: <https://www.3gpp.org/specifications/specification-numbering>. 3GPP specifications are reviewed and updated after each Technical Specification Group Plenary meeting (held every year in March, June, September and December).

1.2.2.1 TS 36.112

Location Measurement Unit (LMU) conformance specification; Network based positioning systems in Evolved Universal Terrestrial Radio Access Network (E-UTRAN)

This document establishes the conformance requirements for E-UTRAN Location Measurement Units (LMU) operating in the FDD or TDD mode.

1.2.2.2 TS 36.117

Evolved Universal Terrestrial Radio Access (E-UTRA); Relay conformance testing

This document specifies the Radio Frequency (RF) test methods and conformance requirements for E-UTRA Relay. These have been derived from and are consistent with the E-UTRA Relay specifications defined in TS 36.116.

1.2.2.3 TS 36.141

Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) conformance testing

This document specifies the Radio Frequency (RF) test methods and conformance requirements for E-UTRA Base Stations (BS) operating either in the FDD mode (used in paired bands) or the TDD mode (used in unpaired bands). These have been derived from and are consistent with the E-UTRA Base Station (BS) specifications defined in TS 36.104.

1.2.2.4 TS 36.143

Evolved Universal Terrestrial Radio Access (E-UTRA); FDD repeater conformance testing

This document specifies the Radio Frequency (RF) test methods and conformance requirements for E-UTRA FDD Repeater. These have been derived from and are consistent with the E-UTRA FDD repeater specifications defined in TS 36.106.

1.2.2.5 TS 36.171

Evolved Universal Terrestrial Radio Access (E-UTRA); Requirements for Support of Assisted Global Navigation Satellite System (A-GNSS)

This document establishes the minimum performance requirements for A-GNSS (including A-GPS) for FDD or TDD mode of E-UTRA for the User Equipment (UE).

1.2.2.6 TS 37.141

E-UTRA, UTRA and GSM/EDGE; Multi-Standard Radio (MSR) Base Station (BS) conformance testing

This document specifies the Radio Frequency (RF) test methods and conformance requirements for E-UTRA, UTRA and GSM/EDGE Multi-Standard Radio (MSR) Base Station (BS).

1.2.2.7 TS 37.144

User Equipment (UE) and Mobile Station (MS) GSM, UTRA and E-UTRA over the air performance requirements

This document establishes over the air antenna minimum requirements for user equipment (UE) and mobile station (MS).

Handheld UE requirements are defined for roaming bands for the speech position (beside the head and beside the head and hand) and hand phantom browsing mode position. Laptop mounted equipment requirements are defined for roaming bands for the data transfer position (laptop ground plane phantom). Laptop embedded equipment requirements are defined for roaming bands for the data transfer position (free space).

All bands are potential roaming bands, and the requirements for roaming bands shall therefore be fulfilled for all bands supported by a UE/MS.

Requirements for operating bands are dependent on how the network has been built and are thus operator specific and cannot be specified here. Recommended performance values for operating bands (Annex B) are however included in this specification for information. It should be recognised that the ability to meet the recommended performance values depends on the number of frequency bands supported by the UE/MS.

1.2.2.8 TS 37.145-1

Active Antenna System (AAS) Base Station (BS) conformance testing; Part 1: conducted conformance testing

This document specifies the Radio Frequency (RF) test methods and conformance requirements for Single RAT E-UTRA, UTRA and Multi-Standard Radio (MSR) UTRA and EUTRA Active Antenna System (AAS) Base Station (BS). These have been derived from, and are consistent with the E-UTRA, UTRA AAS BS specification defined in 3GPP TS 25.104. The technical specification is in two parts: part 1 (this document) covers conducted requirements and part 2 covers radiated requirements.

1.2.2.9 TS 37.145-2

Active Antenna System (AAS) Base Station (BS) conformance testing; Part 2: radiated conformance testing

This document specifies the Radio Frequency (RF) test methods and conformance requirements for Single RAT E-UTRA, UTRA and Multi-Standard Radio (MSR) UTRA and EUTRA Active Antenna System (AAS) Base Station (BS). These have been derived from, and are consistent with the E-UTRA, UTRA AAS BS specification defined in 3GPP TS 25.104. The technical specification is in two parts, part 1 covers conducted requirements and part 2 (this document) covers radiated requirements.

1.2.2.10 TS 37.171

Universal Terrestrial Radio Access (UTRA) and Evolved UTRA (E-UTRA); User Equipment (UE) performance requirements for RAT-Independent Positioning Enhancements

This document establishes the minimum performance requirements for RAT-Independent Positioning Enhancements (e.g. MBS positioning technology) for FDD or TDD mode of UTRA and E-UTRA for the User Equipment (UE).

1.2.2.11 TS 38.101-4

NR; User Equipment (UE) radio transmission and reception; Part 4: Performance requirements

This document establishes the minimum performance requirements for NR User Equipment (UE).

1.2.2.12 TS 38.141-1

NR; Base Station (BS) conformance testing Part 1: Conducted conformance testing

This document specifies the Radio Frequency (RF) test methods and conformance requirements for NR Base Station (BS) *Type 1-C* and *Type 1-H*. These have been derived from and are consistent with the conducted requirements for *BS Type 1-C* and *BS Type 1-H* in NR BS specification defined in TS 38.104.

- A *BS type 1-C* only has conducted requirements, so it requires compliance to this specification only.
- A *BS type 1-H* has both conducted and radiated requirements, so it requires compliance to the applicable requirements of this specification and TS 38.141-2.
- *BS type 1-O* and *BS type 2-O* have only radiated requirements, so they require compliance to TS 38.141-2 only.

1.2.2.13 TS 38.141-2

NR; Base Station (BS) conformance testing Part 2: Radiated conformance testing

This document specifies the Radio Frequency (RF) test methods and conformance requirements for NR Base Station (BS) *type 1-H*, *BS type 1-O* and *BS type 2-O*. These have been derived from and are consistent with the radiated requirements for *BS type 1-H*, *BS type 1-O* and *BS type 2-O* in BS specification defined in TS 38.104.

- A *BS type 1-C* only has conducted requirements, so it does not require compliance to this specification.
- A *BS type 1-H* has both conducted and radiated requirements, so it requires compliance to the applicable requirements of this specification and TS 38.141-1.
- *BS type 1-O* and *BS type 2-O* have only radiated requirements, so they require compliance to this specification only.

1.2.2.14 TS 38.151

NR; User Equipment (UE) Multiple Input Multiple Output (MIMO) Over-the-Air (OTA) performance requirements

This document establishes the Multiple Input Multiple Output (MIMO) Over-the-Air (OTA) performance requirements for NR UEs operating on frequency Range 1 and frequency Range 2, for NR standalone (SA) and NR non-standalone (NSA) operation mode. The corresponding test methodologies are also presented in the Annex of this Technical Specification.

1.2.2.15 TS 38.171**NR; Requirements for support of Assisted Global Navigation Satellite System (A-GNSS)**

This document establishes the minimum requirements for both UE based and UE assisted FDD or TDD A-GNSS terminals which have NG-RAN access via gNB (in SA NR, NR-DC or NE-DC NR operation mode) or via ng-eNB (in EN-DC operation mode) and which are supporting A-GNSS in 5GS via LPP between UE and LMF as described in TS 38.305.

1.2.2.16 TS 38.176-1**NR; Integrated Access and Backhaul (IAB) conformance testing; Part 1: Conducted conformance testing**

This document establishes the minimum RF characteristics and minimum performance requirements of NR Integrated access and backhaul (IAB).

This document specifies the Radio Frequency (RF) test methods and conformance requirements for NR Integrated access and backhaul (IAB) type 1-H. These have been derived from, and are consistent with the conducted requirements for NR Integrated access and backhaul (IAB) type 1-H in NR Integrated access and backhaul specification defined in TS 38.174.

An IAB type 1-H has both conducted and radiated requirements so it requires compliance to the applicable requirements of this document and TS 38.176-2.

IAB type 1-O and IAB type 2-O have only radiated requirements so they require compliance to TS 38.176-2 only.

1.2.2.17 TS 38.176-2**NR; Integrated Access and Backhaul (IAB) conformance testing; Part 2: Radiated conformance testing**

This document specifies the Radio Frequency (RF) test methods and conformance requirements for NR Integrated access and backhaul: IAB type 1-H, IAB type 1-O and IAB type 2-O. These have been derived from, and are consistent with the radiated requirements for IAB type 1-H, IAB type 1-O and IAB type 2-O in BS specification defined in TS 38.174.

A IAB type 1-H has both conducted and radiated requirements, so it requires compliance to the applicable requirements of this document and TS 38.176-1.

IAB type 1-O and IAB type 2-O have only radiated requirements, so they require compliance to this document only.

1.2.2.18 TS 36.508**Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Packet Core (EPC); Common test environments for User Equipment (UE) conformance testing**

This document contains definitions of reference conditions and test signals, default parameters, reference radio bearer configurations used in radio bearer interoperability testing, common radio bearer configurations for other test purposes, common requirements for test equipment and generic set-up procedures for use in conformance tests for the 3rd Generation E-UTRAN User Equipment (UE).

1.2.2.19 TS 36.509**Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Packet Core (EPC); Special conformance testing functions for User Equipment (UE)**

This document defines for User Equipment (UE) in E-UTRA FDD or TDD mode those special functions and their activation/deactivation methods that are required in UE for conformance testing purposes.

This document also describes the operation of these special functions for UEs supporting E-UTRA FDD or TDD mode, when operating in UTRA FDD and TDD mode, in GSM/GPRS mode, and in CDMA2000 mode.

1.2.2.20 TS 36.521-1**Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) conformance specification; Radio transmission and reception; Part 1: Conformance testing**

This document specifies the measurement procedures for the conformance test of the user equipment (UE) that contain transmitting characteristics, receiving characteristics and performance requirements as part of the 3G Long Term Evolution (3G LTE). Conformance test for the support of RRM (Radio Resource Management) are specified in TS 36.521-3.

The requirements are listed in different clauses only if the corresponding parameters deviate. More generally, tests are only applicable to those mobiles that are intended to support the appropriate functionality. To indicate the circumstances in which tests apply, this is noted in the “definition and applicability” part of the test.

For example, only Release 8 and later UE declared to support LTE shall be tested for this functionality. In the event that for some tests different conditions apply for different releases, this is indicated within the text of the test itself.

1.2.2.21 TS 36.521-2**Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) conformance specification; Radio transmission and reception; Part 2: Implementation Conformance Statement (ICS)**

This document provides the ICS proforma for 3G Evolved Universal Terrestrial Radio Access (E-UTRA) User Equipment (UE), in compliance with the relevant requirements, and in accordance with the relevant guidance given in ISO/IEC 9646-1 and ISO/IEC 9646-7.

This document specifies the recommended applicability statement for the test cases included in 3GPP TS 36.521-1 and 3GPP TS 36.521-3. These applicability statements are based on the features implemented in the UE.

Special conformance testing functions can be found in 3GPP TS 36.509 and the common test environments are included in 3GPP TS 36.508.

This document is valid for UE implemented according to 3GPP releases starting from Release 8 up to the Release indicated on the cover page of this document.

1.2.2.22 TS 36.521-3

Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) conformance specification; Radio transmission and reception; Part 3: Radio Resource Management (RRM) conformance testing

This document specifies the measurement procedures for the conformance test of the user equipment (UE) that contain requirements for support of RRM (Radio Resource Management) as part of the 3G Long Term Evolution (3G LTE).

The requirements are listed in different clauses only if the corresponding parameters deviate. More generally, tests are only applicable to those mobiles that are intended to support the appropriate functionality. To indicate the circumstances in which tests apply, this is noted in the “test applicability” part of the test.

For example, only Release 8 and later UE declared to support LTE shall be tested for this functionality. In the event that for some tests different conditions apply for different releases, this is indicated within the text of the test itself.

1.2.2.23 TS 36.523-1

Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Packet Core (EPC); User Equipment (UE) conformance specification; Part 1: Protocol conformance specification

This document specifies the protocol conformance testing for the 3rd Generation E-UTRAN User Equipment (UE).

This is the first part of a multi-part test specification. The following information can be found in this part:

- the overall test structure;
- the test configurations;
- the conformance requirement and reference to the core specifications;
- the test purposes; and
- a brief description of the test procedure, the specific test requirements and short message exchange table.

The following information relevant to testing could be found in accompanying specifications:

- the default setting of the test parameters (TS 36.508);
- the applicability of each test case (TS 36.523-2).

A detailed description of the expected sequence of messages could be found in the 3rd part of this test specification.

The Implementation Conformance Statement (ICS) pro-forma could be found in the 2nd part of this document.

This document is valid for UE implemented according to 3GPP releases starting from Release 8 up to the Release indicated on the cover page of this document.

1.2.2.24 TS 36.523-2

Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Packet Core (EPC); User Equipment (UE) conformance specification; Part 2: Implementation Conformance Statement (ICS) proforma specification

This document provides the ICS proforma for 3rd Generation User Equipment (UE), in compliance with the relevant EPS (E-UTRA/EPC) requirements, and in accordance with the relevant guidance given in ISO/IEC 9646-1 and ISO/IEC 9646-7.

This document also specifies a recommended applicability statement for the test cases included in TS 36.523-1. These applicability statements are based on the features implemented in the UE.

Special conformance testing functions can be found in TS 36.509 and the common test environments are included in 3GPP TS 36.508.

This document is valid for UE complying with EPS (E-UTRA/EPC) and implemented according to 3GPP releases starting from Release 8 up to the Release indicated on the cover page of this document.

1.2.2.25 TS 36.523-3

Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Packet Core (EPC); User Equipment (UE) conformance specification; Part 3: Test suites

This document specifies the protocol and signalling conformance testing in TTCN-3 for the 3GPP UE at the UE-E-UTRAN radio interface.

The following TTCN test specification and design considerations can be found in this document:

- the test system architecture;
- the overall test suite structure;
- the test models and ASP definitions;
- the test methods and usage of communication ports definitions;
- the test configurations;
- the design principles and assumptions;
- TTCN styles and conventions;
- the partial PIXIT proforma;
- the test suites.

The Abstract Test Suites designed in the document are based on the test cases specified in prose (3GPP TS 36.523-1). The applicability of the individual test cases is specified in the test ICS proforma specification (3GPP TS 36.523-2).

This document is valid for UE implemented according to 3GPP Rel-9 upwards.

1.2.2.26 TS 36.579-1

Mission Critical (MC) services over LTE; Part 1: Common test environment

This document defines the common test environment required for testing Client and Server implementations for compliance to the Mission Critical Services over LTE protocol requirements defined by 3GPP.

It contains definitions of reference conditions and test signals, default messages and other parameters, generic procedures, and common requirements for test equipment with the goal for facilitating testing in general and test procedures specification in particular. Various parts of its content are referred to

from other parts of the Mission Critical Services over LTE protocol conformance testing specification e.g. TS 36.579-2 and TS 36.579-3.

This document does not define the common test environment required for testing the implementation of the underlying LTE protocols, i.e. the LTE bearers used for transport of the Mission Critical Services signalling and media. This is defined in TS 36.508 and referred to from this document whenever needed.

In regard to default messages or other information elements contents, this document refers to content defined in requirements specifications specified by 3GPP or other organisations. In the case of Session Initiation Protocol (SIP) and Session Description Protocol (SDP) information elements this document refers to those specified in TS 34.229-1 and explicitly specifies only those relevant for the purposes of the Mission Critical Services over LTE protocol conformance testing.

In this release of the specification only Mission Critical Push To Talk (MCPTT) Services are considered. Future releases may include other Mission Critical Services.

1.2.2.27 TS 36.579-2

Mission Critical (MC) services over LTE; Part 2: Mission Critical Push To Talk (MCPTT) User Equipment (UE) Protocol conformance specification

This document specifies the protocol conformance testing for testing a MCPTT Client for compliance to the Mission Critical Push To Talk (MCPTT) over LTE protocol requirements defined by 3GPP.

In particular this document contains:

- the overall test structure;
- the test configurations;
- the conformance requirement and reference to the core specifications;
- the test purposes; and
- a brief description of the test procedure, the specific test requirements and short message exchange table.

This document is valid for MCPTT Clients implemented according to 3GPP releases starting from Release 13 up to the Release indicated on the cover page of this document.

The following information relevant to testing specified in this document could be found in accompanying specifications:

- default setting of the test parameters TS 36.579-1;
- Implementation Conformance Statement (ICS) TS 36.579-4 and Implementation eXtra Information for Testing (IXIT) TS 36.579-5;
- the applicability of each test case TS 36.579-4.

The test cases are expected to be executed through the 3GPP radio interface. This document does not specify the protocol conformance testing for the EPS (LTE) bearers which carry the MCPTT data sent or received by the MCPTT Client and which are required to be supported by the UE in which the MCPTT Client is installed. This is defined in TS 36.523-1.

1.2.2.28 TS 36.579-3

Mission Critical (MC) services over LTE; Part 3: Mission Critical Push To Talk (MCPTT) Server Application conformance specification

This document specifies the protocol conformance testing for testing a MCPTT Server for compliance to the Mission Critical Push To Talk (MCPTT) over LTE protocol requirements defined by 3GPP. This document addresses only MCPTT Server-Client, and, MCPTT Server-Server communication scenarios. It does not cover e.g. MCPTT Server-EPS, MCPTT Server-SIP Core, etc. scenarios which involve interfaces which implementation may widely vary.

In particular this specification contains:

- the overall test structure;
- the test configurations;
- the conformance requirement and reference to the core specifications;
- the test purposes; and
- a brief description of the test procedure, the specific test requirements and short message exchange table.

This document is valid for MCPTT Servers implemented according to 3GPP releases starting from Release 13 up to the Release indicated on the cover page of this document.

The following information relevant to testing specified in this document could be found in accompanying specifications:

- default setting of the test parameters TS 36.579-1;
- Implementation Conformance Statement (ICS) TS 36.579-4 and Implementation eXtra Information for Testing (IXIT) TS 36.579-5;
- the applicability of each test case TS 36.579-4.

This document does not specify the protocol conformance testing for the EPS (LTE) bearers which carry the MCPTT data sent or received by the MCPTT Server. The specification of such testing is out of the scope of RAN5.

1.2.2.29 TS 36.579-4

Mission Critical (MC) services over LTE; Part 4: Test Applicability and Implementation Conformance Statement (ICS) proforma specification

This document provides the Implementation Conformance Statement (ICS) proforma for testing Client or Server implementations for compliance to the Mission Critical Services over LTE protocol requirements defined by 3GPP, and in accordance with the relevant guidance given in ISO/IEC 9646-1 and ISO/IEC 9646-7.

This document specifies the recommended applicability statement for the test cases included in 3GPP TS 36.579-2 and 3GPP TS 36.579-3. These applicability statements are based on the features implemented in the Client or the Server respectively.

This document is valid for Mission Critical Services Servers and Clients implemented according to 3GPP releases starting from Release 13 up to the Release indicated on the cover page of this document.

This document does not specify applicability or ICS for protocol conformance testing for the EPS (LTE) bearers which carry the Mission Critical Services data sent or received by the Client and/or the Server. These are defined in TS 36.523-2.

1.2.2.30 TS 36.579-5

Mission Critical (MC) services over LTE; Part 5: Abstract test suite (ATS)

This document specifies the protocol and signalling conformance testing in TTCN-3 for the Mission Critical services over LTE signalling and protocol requirements defined by 3GPP.

The following TTCN test specification and design considerations can be found in this document:

- the test system architecture;
- the overall test suite structure;
- the test models and ASP definitions;
- the test methods and usage of communication ports definitions;
- the test configurations;
- the design principles and assumptions;
- TTCN styles and conventions;
- the partial Implementation eXtra Information for Testing (IXIT) proforma;
- the test suites.

The Abstract Test Suites designed in the document are based on the test cases specified in 3GPP TS 36.579-2. The test cases specified in 3GPP TS 36.579-3 are out of scope of this document.

The applicability of the individual test cases is specified in the test ICS proforma specification in 3GPP TS 36.579-4). Where appropriate the Abstract Test Suites belonging to this specification may refer to other Abstract Test Suites e.g. 3GPP TS 36.523-3 for test requirements related to the EPS (LTE) bearers which carry the Mission Critical services data.

This document is valid for TTCN development for Mission Critical services clients' conformance tests according to 3GPP Releases starting from Release 13 up to the Release indicated on the cover page of this document.

1.2.2.31 TS 36.579-6

Mission Critical (MC) services over LTE; Part 6: Mission Critical Video (MCVideo) User Equipment (UE) Protocol conformance specification

This document specifies the protocol conformance testing for testing a MCVideo Client for compliance to the Mission Critical Video (MCVideo) over LTE protocol requirements defined by 3GPP.

In particular this document contains:

- the overall test structure;
- the test configurations;
- the conformance requirement and reference to the core specifications;
- the test purposes; and
- a brief description of the test procedure, the specific test requirements and short message exchange table.

This document is valid for MCVideo Clients implemented according to 3GPP releases starting from Release 13 up to the Release indicated on the cover page of this document.

The following information relevant to testing specified in this document could be found in accompanying specifications:

- default setting of the test parameters TS 36.579-1;
- Implementation Conformance Statement (ICS) TS 36.579-4 and Implementation eXtra Information for Testing (IXIT) TS 36.579-5;
- the applicability of each test case TS 36.579-4.

The test cases are expected to be executed through the 3GPP radio interface. This document does not specify the protocol conformance testing for the EPS (LTE) bearers which carry the MCVideo data sent or received by the MCVideo Client and which are required to be supported by the UE in which the MCVideo Client is installed. This is defined in TS 36.523-1.

1.2.2.32 TS 36.579-7

Mission Critical (MC) services over LTE; Part 7: Mission Critical Data (MCData) User Equipment (UE) Protocol conformance specification

This document specifies the protocol conformance testing for testing a MCData Client for compliance to the Mission Critical Video (MCData) over LTE protocol requirements defined by 3GPP.

In particular this document contains:

- the overall test structure;
- the test configurations;
- the conformance requirement and reference to the core specifications;
- the test purposes; and
- a brief description of the test procedure, the specific test requirements and short message exchange table.

This document is valid for MCData Clients implemented according to 3GPP releases starting from Release 13 up to the Release indicated on the cover page of this document.

The following information relevant to testing specified in this document could be found in accompanying specifications:

- default setting of the test parameters TS 36.579-1;
- Implementation Conformance Statement (ICS) TS 36.579-4 and Implementation eXtra Information for Testing (IXIT) TS 36.579-5;
- the applicability of each test case TS 36.579-4.

The test cases are expected to be executed through the 3GPP radio interface. This document does not specify the protocol conformance testing for the EPS (LTE) bearers which carry the MCData data sent or received by the MCData Client and which are required to be supported by the UE in which the MCData Client is installed. This is defined in TS 36.523-1.

1.2.2.33 TS 37.544

Universal Terrestrial Radio Access (UTRA) and Evolved UTRA (E-UTRA); User Equipment (UE) Over The Air (OTA) performance; Conformance testing

This document describes the test procedure for the radiated performances measurements of the user equipment (UE).

The handheld UE measurement procedures explained in this document are defined for roaming bands for the speech mode position (beside the head and beside the head and hand) and hand phantom browsing mode position. Laptop mounted equipment (LME) measurement procedures are defined for

roaming bands for the data mode transfer position (laptop ground plane phantom). Laptop embedded equipment (LEE) measurement procedures are defined for roaming bands for the data mode transfer position (free space).

The browsing mode position explained in this document applies when the UE is held in hand, but not pressed against ear (such as web browsing and navigation).

The data mode transfer position (free space) explained in this document applies when the UE is used away from the user's head. Free space measurements are applicable to devices used in the data mode transfer position that consist of the laptop mounted equipment (LME) plug-in UEs and laptop embedded equipment (LEE) UEs.

All bands are potential roaming bands, and the requirements for roaming bands shall therefore be fulfilled for all bands supported by a UE.

Radiated performance of multiple-antenna receivers for handheld UE is defined for roaming bands in free space configuration.

Recommended performance values for operating bands (Annex I) are however included in this specification for information. It should be recognised that the ability to meet the recommended performance values depends on the number of frequency bands supported by the UE.

The radiated radio tests considered here are:

- 1) The measurement of the Total Radiated Power (TRP)
- 2) The measurement of the Total Radiated Sensitivity (TRS)
- 3) The measurement of Total Radiated Multi-antenna Sensitivity (TRMS)

The test procedure described in this document measures the performance of the transmitter and the receiver, including the antenna and also the effects of the user.

1.2.2.34 TS 37.571-1

Universal Terrestrial Radio Access (UTRA) and Evolved UTRA (E-UTRA) and Evolved Packet Core (EPC); User Equipment (UE) conformance specification for UE positioning; Part 1: Conformance test specification

This document specifies the procedures for the conformance test of the measurement requirements for FDD mode of UTRA and FDD or TDD mode of E-UTRA for the User Equipment (UE) that supports one or more of the defined positioning methods. These positioning methods are for UTRA: Assisted Global Positioning System (A-GPS), Assisted Global Navigation Satellite Systems (A-GNSS) and for E-UTRA: Assisted Global Navigation Satellite System (A-GNSS), Observed Time Difference of Arrival (OTDOA), Enhanced Cell ID (ECID).

Tests are only applicable to those mobiles that are intended to support the appropriate functionality. To indicate the circumstances in which tests apply, this is noted in the "Test applicability" part of the test.

The Implementation Conformance Statement (ICS) pro-forma could be found in the 3rd part of this document.

1.2.2.35 TS 37.571-2

Universal Terrestrial Radio Access (UTRA) and Evolved UTRA (E-UTRA) and Evolved Packet Core (EPC); User Equipment (UE) conformance specification for UE positioning; Part 2: Protocol conformance

This document specifies the protocol conformance testing for the 3rd Generation UTRAN and E-UTRAN User Equipment (UE) supporting UE positioning.

This is the second part of a multi-part test specification. The following information can be found in this part:

- the overall protocol conformance test structure;
- the protocol conformance test configurations;
- the conformance requirement and reference to the core specifications;
- the test purposes; and
- a brief description of the test procedure, the specific test requirements and short message exchange table.

The Implementation Conformance Statement (ICS) pro-forma could be found in the 3rd part of this document.

This document is valid for UE supporting UE positioning implemented according to 3GPP releases starting from Release 99 up to the Release indicated on the cover page of this document.

1.2.2.36 TS 37.571-3

Universal Terrestrial Radio Access (UTRA) and Evolved UTRA (E-UTRA) and Evolved Packet Core (EPC); User Equipment (UE) conformance specification for UE positioning; Part 3: Implementation Conformance Statement (ICS)

This document provides the ICS proforma for 3rd Generation UTRAN and E-UTRAN User Equipment (UE) supporting UE positioning, in compliance with the relevant requirements, and in accordance with the relevant guidance given in ISO/IEC 9646-1 and ISO/IEC 9646-7.

This document also specifies a recommended applicability statement for the test cases included in 3GPP TS 37.571-1 and 3GPP TS 37.571-2. These applicability statements are based on the features implemented in the UE.

Special conformance testing functions can be found in 3GPP TS 34.109 for UTRA and 3GPP TS 36.509 for E-UTRA. The common test environments are included in 3GPP TS 34.108 for UTRA and in 3GPP TS 36.508 for E-UTRA.

This document is valid for UE supporting UE positioning implemented according to 3GPP releases starting from Release 99 up to the Release indicated on the cover page of this document.

1.2.2.37 TS 37.571-4

Universal Terrestrial Radio Access (UTRA) and Evolved UTRA (E-UTRA) and Evolved Packet Core (EPC); User Equipment (UE) conformance specification for UE positioning; Part 4: Test suites

This document specifies the protocol and signalling conformance testing in TTCN for the UE:

- A-GPS at the UTRA Uu interface;
- LTE positioning at the LTE-Uu interface;
- A-GNSS at the UTRA Uu interface.

The following TTCN test specification and design considerations can be found in this document:

- Test system architecture;
- Test models and ASP definitions;
- Test methods and usage of communication ports definitions;
- Test configurations;
- Design principles and assumptions;

- TTCN styles and conventions;
- Partial PIXIT proforma;
- Test suites in TTCN-2 and TTCN-3;
- The Test Suites designed and implemented in this document are based on the test specifications in prose in 3GPP TS 37.571-2;
- The applicability of the individual test cases is specified in the test ICS proforma specification in 3GPP TS 37.571-3.

1.2.2.38 TS 37.571-5

Universal Terrestrial Radio Access (UTRA) and Evolved UTRA (E-UTRA) and Evolved Packet Core (EPC); User Equipment (UE) conformance specification for UE positioning; Part 5: Test scenarios and assistance data

This document specifies the test scenarios and assistance data required for the conformance test for FDD or TDD mode of UTRA and E-UTRA for the User Equipment (UE) that supports one or more of the defined positioning methods. For UTRA these are Assisted Global Positioning System (A-GPS) and Assisted Global Navigation Satellite System (A-GNSS). For E-UTRA these are A-GNSS, Observed Time Difference of Arrival (OTDOA) and Enhanced Cell ID (ECID).

1.2.2.39 TS 38.508-1

5GS; User Equipment (UE) conformance specification; Part 1: Common test environment

This document defines the test environment for the 5G System.

This specification covers all aspects, including NG-RAN, 5GC and interworking between 5GS and EPS used for conformance tests of User Equipment (UE).

1.2.2.40 TS 38.508-2

5GS; User Equipment (UE) conformance specification; Part 2: Common Implementation Conformance Statement (ICS) proforma

This document provides the Implementation Conformance Statement (ICS) proforma for 5G New Radio (NR) User Equipment (UE), in compliance with the relevant requirements.

Special conformance testing functions can be found in 3GPP TS 38.509 and 3GPP TS 36.509 and the common test environments are included in 3GPP TS 38.508-1 and 3GPP TS 36.508.

This document is valid for UE implemented according to 3GPP Releases starting from Release 15 up to the Release indicated on the cover page of this document.

1.2.2.41 TS 38.509

5GS; Special conformance testing functions for User Equipment (UE)

This document defines for User Equipment (UE) those special functions and their activation/deactivation methods that are required in the UE for conformance testing purposes when the UE is connected to the 5G System (5GS) via its radio interface(s).

The document also describes the operation of these special functions when the 5GS capable UEs are connected via a non-5GS system e.g. E-UTRA FDD or TDD system.

Depending on the 5GS system's architecture some relevant for the UE for conformance testing special functions may be defined in TS 36.509.

1.2.2.42 TS 38.521-1**NR; User Equipment (UE) conformance specification; Radio transmission and reception; Part 1: Range 1 standalone**

This document specifies the measurement procedures for the conformance test of the user equipment (UE) that contain RF characteristics for frequency Range 1 as part of the 5G-NR.

The requirements are listed in different clauses only if the corresponding parameters deviate. More generally, tests are only applicable to those mobiles that are intended to support the appropriate functionality. To indicate the circumstances in which tests apply, this is noted in the “*definition and applicability*” part of the test.

For example, only Release 15 and later UE declared to support 5G-NR shall be tested for this functionality. In the event that for some tests different conditions apply for different releases, this is indicated within the text of the test itself.

1.2.2.43 TS 38.521-2**NR; User Equipment (UE) conformance specification; Radio transmission and reception; Part 2: Range 2 standalone**

This document specifies the measurement procedures for the conformance test of the user equipment (UE) that contain RF characteristics for frequency Range 2 as part of the 5G-NR.

The requirements are listed in different clauses only if the corresponding parameters deviate. More generally, tests are only applicable to those mobiles that are intended to support the appropriate functionality. To indicate the circumstances in which tests apply, this is noted in the “*definition and applicability*” part of the test.

For example, only Release 15 and later UE declared to support 5G-NR shall be tested for this functionality. In the event that for some tests different conditions apply for different releases, this is indicated within the text of the test itself.

1.2.2.44 TS 38.521-3**NR; User Equipment (UE) conformance specification; Radio transmission and reception; Part 3: Range 1 and Range 2 Interworking operation with other radios**

This document specifies the measurement procedures for the conformance test of the user equipment (UE) that contain RF characteristics for carrier aggregation between Range 1 and Range 2 and additional requirements due to NR non-standalone (NSA) operation mode with E-UTRA.

The requirements are listed in different clauses only if the corresponding parameters deviate. More generally, tests are only applicable to those mobiles that are intended to support the appropriate functionality. To indicate the circumstances in which tests apply, this is noted in the “*definition and applicability*” part of the test.

For example, only Release 15 and later UE declared to support 5G-NR shall be tested for this functionality. In the event that for some tests different conditions apply for different releases, this is indicated within the text of the test itself.

1.2.2.45 TS 38.521-4**NR; User Equipment (UE) conformance specification; Radio transmission and reception; Part 4: Performance**

This document specifies the measurement procedures for the conformance test of the user equipment (UE) that contain performance requirements as part of 5G-NR.

The requirements are listed in different clauses only if the corresponding parameters deviate. More generally, tests are only applicable to those mobiles that are intended to support the appropriate functionality. To indicate the circumstances in which tests apply, this is noted in the “*definition and applicability*” part of the test.

For example, only Release 15 and later UE declared to support 5G-NR shall be tested for this functionality. In the event that for some tests different conditions apply for different releases, this is indicated within the text of the test itself.

1.2.2.46 TS 38.522

NR; User Equipment (UE) conformance specification; Applicability of radio transmission, radio reception and radio resource management test cases

This document provides the Implementation Conformance Statement (ICS) proforma for 5G New Radio (NR) User Equipment (UE), in compliance with the relevant requirements.

This document specifies the recommended applicability statement for the test cases included in 3GPP TS 38.521-1, TS 38.521-2, TS 38.521-3, TS 38.521-4 and TS 38.533. These applicability statements are based on the features implemented in the UE.

Special conformance testing functions can be found in 3GPP TS 38.509 and the common test environments are included in 3GPP TS 38.508-1. Common implementation conformance statement (ICS) proforma can be found in 3GPP TS 38.508-2.

1.2.2.47 TS 38.523-1

5GS; User Equipment (UE) conformance specification; Part 1: Protocol

This document specifies the protocol conformance testing for the 3GPP UE connecting to the 5G System (5GS) via its radio interface(s).

The following information can be found in this document (first part of a multi-part test specification):

- the overall test structure;
- the test configurations;
- the conformance requirement and references to the core specifications;
- the test purposes; and
- a brief description of the test procedure, the specific test requirements and short message exchange table.

The applicability of the individual test cases is specified in the ICS proforma specification (3GPP TS 38.523-2). The Test Suites are specified in part 3 (3GPP TS 38.523-3).

1.2.2.48 TS 38.523-2

5GS; User Equipment (UE) conformance specification; Part 2: Applicability of protocol test cases

This document provides the applicability of protocol test cases proforma for 5G New Radio (NR) User Equipment (UE), in compliance with the relevant requirements.

This document specifies the recommended applicability statement for the test cases included in 3GPP TS 38.523-1 and 3GPP TS 38.523-3. These applicability statements are based on the features implemented in the UE.

Special conformance testing functions can be found in 3GPP TS 38.509 and 3GPP TS 36.509 and the common test environments are included in 3GPP TS 38.508-1 and 3GPP TS 36.508.

1.2.2.49 TS 38.523-3

5GS; User Equipment (UE) conformance specification; Part 3: Protocol Test Suites

This document specifies the protocol and signalling conformance testing in TTCN-3 for the 3GPP UE connecting to the 5G System (5GS) via its radio interface(s).

The following TTCN test specification and design considerations can be found in this document:

- the test system architecture;
- the overall test suite structure;
- the test models and ASP definitions;
- the test methods and usage of communication ports definitions;
- the test configurations;
- the design principles and assumptions;
- TTCN styles and conventions;
- the partial PIXIT proforma;
- the test suites.

The Test Suites designed in the document are based on the test cases specified in prose in 3GPP TS 38.523-1. The applicability of the individual test cases is specified in 3GPP TS 38.523-2.

1.2.2.50 TS 38.533

NR; User Equipment (UE) conformance specification; Radio Resource Management (RRM)

This document specifies the measurement procedures for the conformance test of the user equipment (UE) that contain requirements for support of RRM (Radio Resource Management) as part of the 5G New Radio (5G-NR). This document covers NR Range 1, NR Range 2 and Interworking.

The requirements are listed in different clauses only if the corresponding parameters deviate. More generally, tests are only applicable to those mobiles that are intended to support the appropriate functionality. To indicate the circumstances in which tests apply, this is noted in the “*test applicability*” part of the test.

1.2.2.51 TS 34.229-1

Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); User Equipment (UE) conformance specification; Part 1: Protocol conformance specification

This document specifies the protocol conformance testing for the User Equipment (UE) supporting the Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP).

This is the first part of a multi-part test specification. The following information can be found in this part:

- the overall test structure;
- the test configurations;
- the conformance requirement and reference to the core specifications;
- the test purposes; and
- a brief description of the test procedure, the specific test requirements and short message exchange table.

The following information relevant to testing can be found in accompanying specifications:

- the applicability of each test case.

1.2.2.52 TS 34.229-2

Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); User Equipment (UE) conformance specification; Part 2: Implementation Conformance Statement (ICS) specification

This document provides the Implementation Conformance Statement (ICS) proforma for 3rd Generation User Equipment (UE) supporting the Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP), in compliance with the relevant requirements, and in accordance with the relevant guidance given in ISO/IEC 9646-7 and ETSI ETS 300 406.

1.2.2.53 TS 34.229-3

Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); User Equipment (UE) conformance specification; Part 3: Abstract test suite (ATS)

This document specifies the protocol conformance testing in TTCN for the 3GPP User Equipment (UE) at the Gm interface.

This document is the 3rd part of a multi-part test specification, 3GPP TS 34.229. The following TTCN test specification and design considerations can be found in this document

- the overall test suite structure;
- the testing architecture;
- the test methods and PCO definitions;
- the test configurations;
- the design principles, assumptions, and used interfaces to the TTCN tester (System Simulator);
- TTCN styles and conventions;
- the partial PIXIT proforma;
- the TTCN files for the mentioned protocols tests.

The Abstract Test Suites designed in the document are based on the test cases specified in prose (3GPP TS 34.229-1).

1.2.2.54 TS 34.229-5

Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); User Equipment (UE) conformance specification; Part 5: Protocol conformance specification using 5G System (5GS)

This document specifies the protocol conformance testing for the User Equipment (UE) supporting the Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP) when using the 5G System (5GS).

This is the fifth part of a multi-part test specification. The following information can be found in this part:

- the overall test structure;
- the test configurations;
- the conformance requirement and reference to the core specifications;

- the test purposes; and
- the test procedure.

The following information relevant to testing can be found in accompanying specifications:

- Implementation Conformance Statement (ICS) pro-forma and the applicability of each test case.

Annex 2

Specification of the 3GPP 5G – RIT¹ radio interface technology

Background

IMT-2020 is a system with global development activity and the IMT-2020 terrestrial radio interface specifications identified in this Recommendation have been developed by the ITU in collaboration with the GCS Proponents and the Transposing Organizations. It is noted from Document IMT-2020/20, that:

- The GCS Proponent must be one of the RIT/SRIT Proponents for the relevant technology, and must have legal authority to grant to ITU-R the relevant legal usage rights to the relevant specifications provided within a GCS corresponding to a technology in Recommendation ITU-R M.2150.
- A Transposing Organization must have been authorized by the relevant GCS Proponent to produce transposed standards for a particular technology and must have the relevant legal usage rights.

It is further noted that GCS Proponents and Transposing Organizations must also qualify appropriately under the auspices of Resolution ITU-R 9 and the ITU-R “Guidelines for the contribution of material of other organizations to the work of the Study Groups and for inviting other organizations to take part in the study of specific matters (Resolution ITU-R 9)”.

The ITU has provided the global and overall framework and requirements and has developed the Global Core Specification jointly with the GCS Proponent. The detailed standardization has been undertaken within the recognized Transposing Organizations which operate in concert with the GCS Proponent. This Recommendation therefore makes extensive use of references to externally developed specifications.

This approach was considered to be the most appropriate solution to enable completion of this Recommendation within the aggressive schedules set by the ITU and by the needs of administrations, operators and manufacturers.

This Recommendation has therefore been constructed to take full advantage of this method of work and to allow the global standardization timescales to be maintained. The main body of this Recommendation has been developed by the ITU, with each Annex containing references pointing to the location of the more detailed information.

This Annex 2 contains the detailed information developed by the ITU and “3GPP” (the GCS Proponent) and ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC (the Transposing Organizations).

¹ Developed by 3GPP Proponent as “5G, Release 15 and beyond – NR RIT”.

Such use of referencing enables timely completion and update of the high-level elements of this Recommendation, with change control procedures, transposition, and public enquiry procedures being undertaken within the external organization. This information has generally been adopted unchanged, recognizing the need to minimize duplication of work, and the need to facilitate and support an ongoing maintenance and update process.

This general agreement, noting that the detailed information of the radio interface should to a large extent be achieved by reference to the work of external organizations, highlights not only the ITU's significant role as a catalyst in stimulating, coordinating and facilitating the development of advanced telecommunications technologies, but also its forward-looking and flexible approach to the development of this and other telecommunications standards for the 21st century.

A more detailed understanding of the process for the development of the first release of this Recommendation may be found in Document IMT-2020/20.

2.1 Overview of the radio interface technology

The IMT-2020 specifications known as 5G have been developed by 3GPP and encompass NR Releases 15 and beyond.

New Radio (NR) is designed for operation in IMT spectrum and fulfils all technical performance requirements in all five selected test environments: Indoor Hotspot – enhanced Mobile Broadband (eMBB), Dense Urban – eMBB, Rural – eMBB, Urban Macro – Ultra Reliable Low Latency Communication (URLLC) and Urban Macro – massive Machine Type Communication (mMTC).

Also, NR fulfils the service and the spectrum requirements. NR utilizes the frequency bands below 7.125 GHz including frequency bands identified for International Mobile Telecommunication (IMT) in the ITU Radio Regulations. In addition, NR can also utilize the frequency bands above 7.125 GHz, i.e. above 24.25 GHz, including frequency bands identified for IMT in the ITU Radio Regulations.

The complete set of standards for the terrestrial radio interface of IMT-2020 identified as 3GPP 5G – RIT. NR – includes not only the key characteristics of IMT-2020 but also the additional capabilities of NR both of which are continuing to be enhanced.

The 3GPP 5G System (5GS) also includes specifications for its non-radio aspects, such as the core network elements (the Enhanced Packet Core (EPC) Network and 5G Core (5GC) Network), security, codecs, network management, etc. These non-radio specifications are not included in the so-called “Global Core Specifications (GCS)” of IMT-2020.

2.1.1 Overview of the system aspects of the NR RIT

The NR RIT represents the releases 15, 16, 17 and 18 of NR, which uses either 1) FDD operation and therefore is applicable for operation with paired spectrum or 2) TDD operation and therefore is applicable for operation with unpaired spectrum. Channel bandwidths up to 400 MHz and Carrier Aggregation over 16 component carriers are supported, yielding peak data rates up to roughly 140 Gbit/s in the downlink and 65 Gbit/s in the uplink.

2.1.1.1 Overall architecture

The NG Radio Access Network (NG-RAN) includes NG-RAN nodes that support multiple radio access (e.g. NR, MR-DC of NR and E-UTRA², etc). The RIT considers the gNB as an NG-RAN node providing NR user plane and control plane protocol terminations towards the UE and connected via

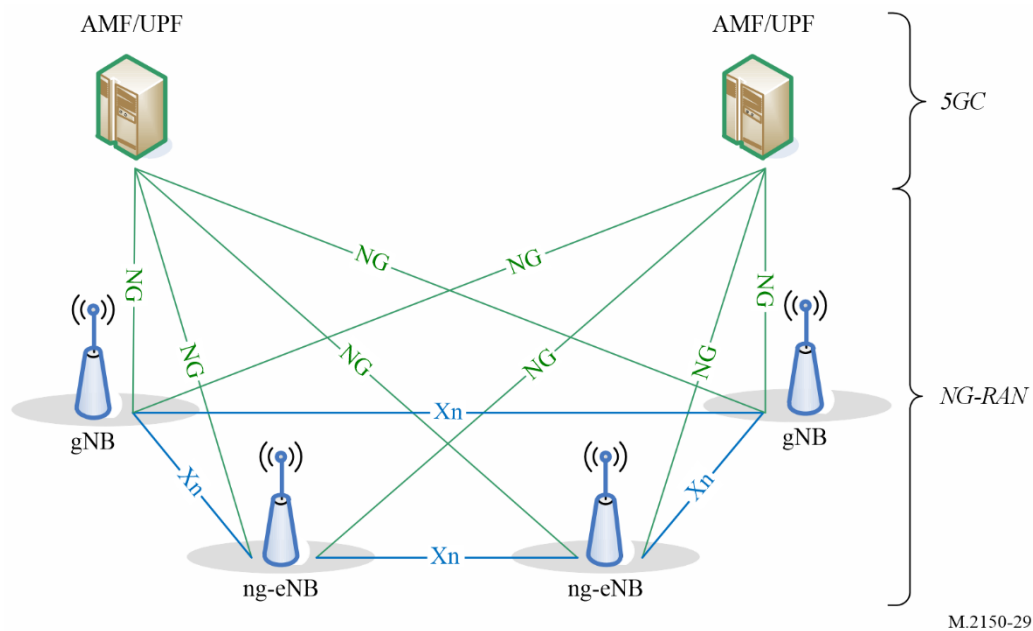
² In 3GPP terminology, the term Evolved-UMTS Terrestrial Radio Access (E-UTRA) is also used to signify the LTE radio interface.

the NG interface to the 5GC, and the ng-eNB as NG-RAN node for Multi-Radio Dual Connectivity only.

NG-RAN nodes are interconnected by means of the interface named Xn. The gNBs and ng-eNBs are also connected by means of the NG interfaces to the 5GC, more specifically to the Access and Mobility Management Function (AMF) by means of the NG-C interface and to the User Plane Function (UPF) by means of the NG-U interface.

The NG-RAN architecture is illustrated in Fig. 29 below.

FIGURE 29
Overall Architecture

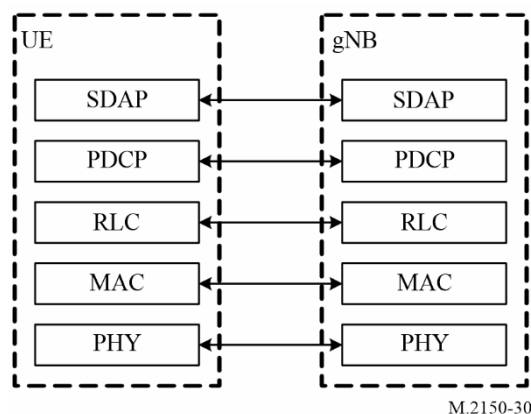


2.1.1.2 Radio protocol architecture

2.1.1.2.1 User Plane (UP)

Figure 30 shows the protocol stack for the User Plane, where Service Data Adaptation Protocol (SDAP), PDCP, RLC and MAC sublayers (terminated in gNB on the network side) perform the functions listed in § 2.1.1.5.

FIGURE 30
User Plane protocol stack

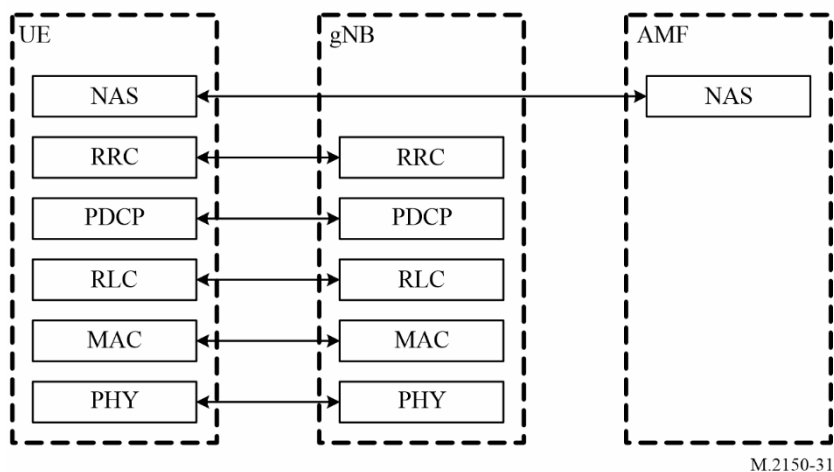


2.1.1.2.2 Control Plane

Figure 31 shows the protocol stack for the control plane, where:

- PDCP, RLC and MAC sublayers (terminated in gNB on the network side) perform the functions listed in § 2.1.1.5;
- RRC (terminated in gNB on the network side) performs the functions listed in § 2.1.1.6;
- Non-Access Stratum (NAS) control protocol (terminated in AMF on the network side) performs the functions listed in 3GPP TS 23.501, for instance: authentication, mobility management, security control.

FIGURE 31
Control Plane protocol stack

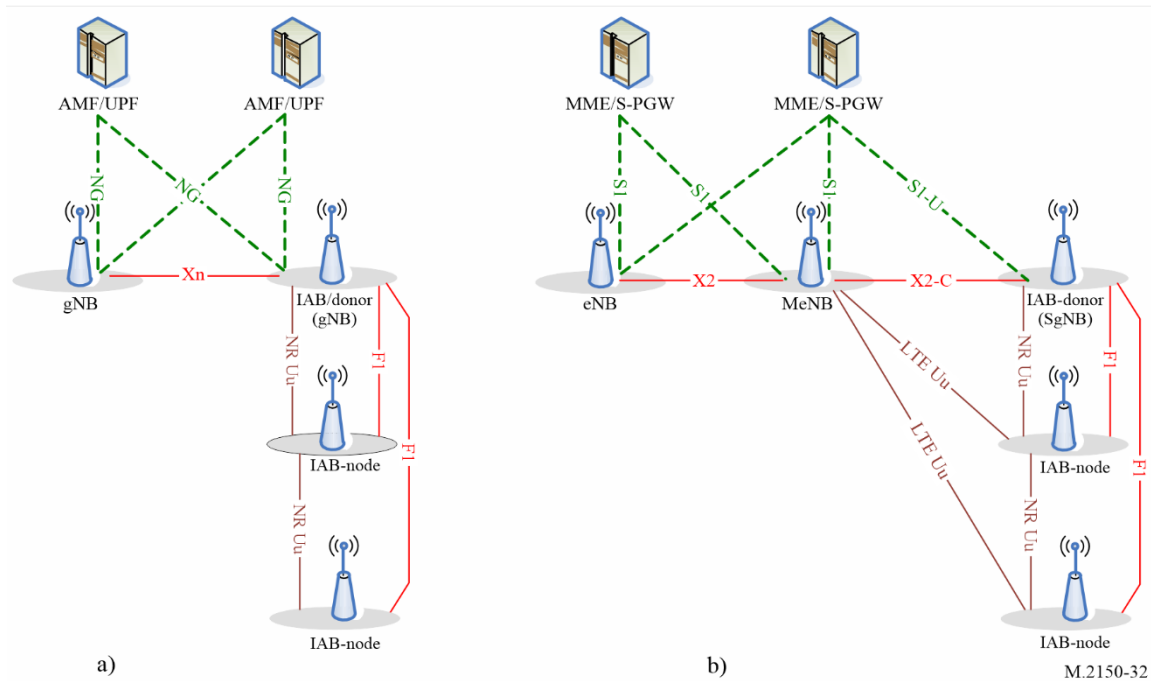


2.1.1.2.3 Integrated access and Backhaul (IAB) architecture

From NR Rel-16, Integrated access and backhaul (IAB) enables wireless relaying in NG-RAN. The relaying node, referred to as the IAB-node, supports access and backhauling via NR. The terminating node of NR backhauling on the network side is referred to as the IAB-donor, which represents a gNB with additional functionality to support IAB. Backhauling can occur via a single or via multiple hops. The IAB architecture is shown in Fig. 32.

FIGURE 32

IAB architecture; a) IAB-node using SA mode with 5GCN; b) IAB-node using EN-DC



Mobile IAB introduces the *mobile IAB-node*, which is a RAN node that provides NR access links to UEs and an NR backhaul link to a parent node, and that can conduct physical mobility across the RAN area. The mobile IAB-node includes a *mobile IAB-MT* and a *mobile IAB-DU*. Mobile IAB supports the same functionality as IAB unless explicitly specified.

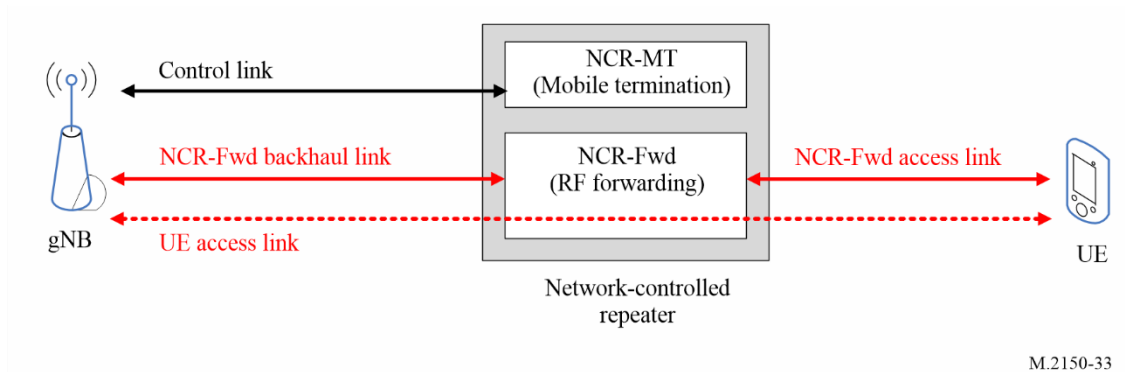
2.1.1.2.4 Network-Controlled Repeaters (NCR) architecture

A Network-Controlled Repeater node, referred to as NCR-node, is an RF repeater that enables wireless amplifying-and-forwarding functionality in NG-RAN. The NCR-node is capable of receiving and applying side control information from a gNB with additional functionality to support Network-Controlled Repeater.

The NCR-node comprises an NCR-MT and an NCR-Fwd. The NCR-MT is an entity supporting a subset of the UE functionality that communicates with the gNB to receive side control information via a control link based on the NR Uu interface. The NCR-Fwd is the function performing amplifying-and-forwarding of signals between gNB and UE via the NCR-Fwd backhaul link and NCR-Fwd access link, respectively. The NCR-node is modelled as depicted in Fig. 33.

FIGURE 33

Conceptual model of network-controlled repeater



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2.1.1.3 Multi-Radio Dual Connectivity (MR-DC)

NG-RAN supports Multi-Radio Dual Connectivity (MR-DC) operation whereby a UE in the RRC_CONNECTED state is configured to utilise radio resources provided by two distinct schedulers, located in two different NG-RAN nodes connected via a non-ideal backhaul, one providing NR access and the other one providing either E-UTRA or NR access. In MR-DC, one NG-RAN node acts as a Master Node (MN) and another NG-RAN node acts as a Secondary Node (SN).

NR may also be used as part of MR-DC configuration when combined with E-UTRA, within either an NG-RAN or E-UTRAN. For the case of NR-NR Dual Connectivity (NR-DC), a UE is connected to one gNB that acts as a MN and another gNB that acts as a SN. The master gNB is connected to the 5GC via the NG interface and to the secondary gNB via the Xn interface. The secondary gNB might also be connected to the 5GC via the NG-U interface.

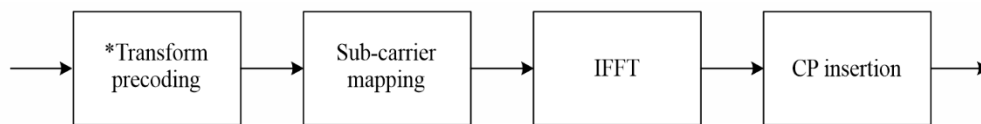
2.1.1.4 Physical layer

2.1.1.4.1 Waveform, numerology and frame structure

The downlink transmission waveform is conventional OFDM using a cyclic prefix. The uplink transmission waveform is conventional OFDM using a cyclic prefix with a transform precoding function performing DFT spreading that can be disabled or enabled.

FIGURE 34

Transmitter block diagram for CP-OFDM with optional DFT-spreading



**Optionally present in UL, not present in DL*

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The numerology is based on exponentially scalable sub-carrier spacing $\Delta f = 2^\mu \times 15$ kHz with $\mu = \{0, 1, 3, 4, 5, 6\}$ for Primary Synchronization Signal (PSS), Secondary Synchronization Signal (SSS) and PBCH and $\mu = \{0, 1, 2, 3, 5, 6\}$ for other channels. Normal Cyclic Prefix (CP) is supported for all sub-carrier spacings, Extended CP is supported for $\mu = 2$. 12 consecutive sub-carriers form a Physical Resource Block (PRB). Up to 275 PRBs are supported on a carrier.

TABLE 4
Supported transmission numerologies

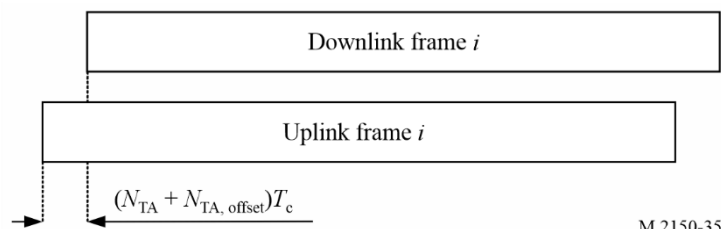
μ	$\Delta f = 2^\mu \times 15$ [kHz]	Cyclic prefix	Supported for data	Supported for synch
0	15	Normal	Yes	Yes
1	30	Normal	Yes	Yes
2	60	Normal, Extended	Yes	No
3	120	Normal	Yes	Yes
4	240	Normal	No	Yes
5	480	Normal	Yes	Yes
6	960	Normal	Yes	Yes

The UE may be configured with one or more bandwidth parts on a given component carrier, of which only one can be active at a time, as described in § 2.1.1.5.10. The active bandwidth part defines the UE's operating bandwidth within the cell's operating bandwidth. For initial access, and until the UE's configuration in a cell is received, the initial bandwidth part detected from system information is used.

Downlink and uplink transmissions are organized into frames of 10 ms duration, consisting of ten 1 ms subframes. Each frame is divided into two equally sized half-frames of five subframes. The slot duration is 14 symbols with Normal CP and 12 symbols with Extended CP, and scales in time as a function sub-carrier spacing in use so that there is always an integral number of slots in a subframe.

Timing Advance (TA) is used to adjust the uplink frame timing relative to the downlink frame timing.

FIGURE 35
Uplink-downlink timing relation



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Operation on both paired and unpaired spectrum is supported.

2.1.1.4.2 Downlink

2.1.1.4.2.1 Downlink transmission scheme

Demodulation Reference Signal (DMRS) based spatial multiplexing is supported for Physical Downlink Shared Channel (PDSCH). Up to 8, 12, 16 and 24 orthogonal DL DMRS ports are supported for type 1, type 2, enhanced type 1 and enhanced type 2 DMRS respectively. Up to 8 orthogonal DL DMRS ports per UE are supported for Single-User MIMO (SU-MIMO) and up to 4 orthogonal DL DMRS ports per UE are supported for Multi-User MIMO (MU-MIMO). The number of SU-MIMO code words is one for 1-4 layers transmissions and two for 5-8 layers transmissions.

The DMRS and corresponding PDSCH are transmitted using the same precoding matrix and the UE does not need to know the precoding matrix to demodulate the transmission. The transmitter may use different precoder matrix for different parts of the transmission bandwidth, resulting in frequency

selective precoding. The UE may also assume that the same precoding matrix is used across a set of Physical Resource Blocks (PRBs) denoted Precoding Resource Block Group (PRG).

Transmission durations from 2 to 14 symbols in a slot with a single PDSCH is supported.

Aggregation of multiple slots with Transport Block (TB) repetition is supported.

From Rel-16, enhancements for DL/UL MIMO are introduced, including enhancements on multi-Transmission Reception Points (TRPs) or multi-panel transmission improving reliability and robustness with both ideal and non-ideal backhaul.

2.1.1.4.2.2 Physical-layer processing for physical downlink shared channel

The downlink physical-layer processing of transport channels consists of the following steps:

- TB CRC attachment;
- code block segmentation and code block CRC attachment;
- channel coding: Low Density Parity Check (LDPC) coding;
- physical-layer hybrid-ARQ processing;
- rate matching;
- scrambling;
- modulation: QPSK, 16QAM, 64QAM, 256QAM and 1024QAM;
- layer mapping;
- mapping to assigned resources and antenna ports.

The UE may assume that at least one symbol with demodulation reference signal is present on each layer in which PDSCH is transmitted to a UE, and up to three additional DMRS symbols can be configured by higher layers.

Phase tracking RS may be transmitted on additional symbols to aid receiver phase tracking.

2.1.1.4.2.3 Physical downlink control channels

The Physical Downlink Control Channel (PDCCH) can be used to schedule DL transmissions on PDSCH and UL transmissions on PUSCH, where the Downlink Control Information (DCI) on PDCCH includes:

- downlink assignments containing at least modulation and coding format, resource allocation, and HARQ information related to DL-SCH;
- uplink scheduling grants containing at least modulation and coding format, resource allocation, and HARQ information related to UL-SCH.

In addition to scheduling, PDCCH can be used for

- activation and deactivation of configured PUSCH transmission with configured grant;
- activation and deactivation of PDSCH semi-persistent transmission;
- notifying one or more UEs of the slot format;
- notifying one or more UEs of the PRB(s) and OFDM symbol(s) where the UE may assume no transmission is intended for the UE;
- transmission of Transmit Power Control (TPC) commands for PUCCH and PUSCH;
- transmission of one or more TPC commands for Sounding Reference Signal (SRS) transmissions by one or more UEs;
- Switching a UE's active bandwidth part;
- Initiating a random access procedure;

- Indicating the UE(s) to monitor the PDCCH during the next occurrence of the DRX on-duration;
- In IAB context, indicating the availability for soft symbols of an IAB-DU;
- Triggering one shot HARQ-ACK codebook feedback.

A UE monitors a set of PDCCH candidates in the configured monitoring occasions in one or more configured COntrol REsource SETs (CORESETs) according to the corresponding search space configurations.

A CORESET consists of a set of PRBs with a time duration of 1 to 3 OFDM symbols. The resource units Resource Element Groups (REGs) and Control Channel Elements (CCEs) are defined within a CORESET with each CCE consisting a set of REGs. Control channels are formed by aggregation of CCEs. Different code rates for the control channels are realized by aggregating different number of CCEs. Interleaved and non-interleaved CCE-to-REG mapping are supported in a CORESET.

The PDCCH repetition is operated by using two search spaces which are explicitly linked by configuration provided by the RRC layer, and are associated with corresponding CORESETs. For PDCCH repetition, two linked search spaces are configured with the same number of candidates, and two PDCCH candidates in two search spaces are linked with the same candidate index. When PDCCH repetition is scheduled to a UE, an intra-slot repetition is allowed and each repetition has the same number of CCEs and coded bits, and corresponds to the same DCI payload.

Polar coding is used for PDCCH.

Each resource element group carrying PDCCH carries its own DMRS.

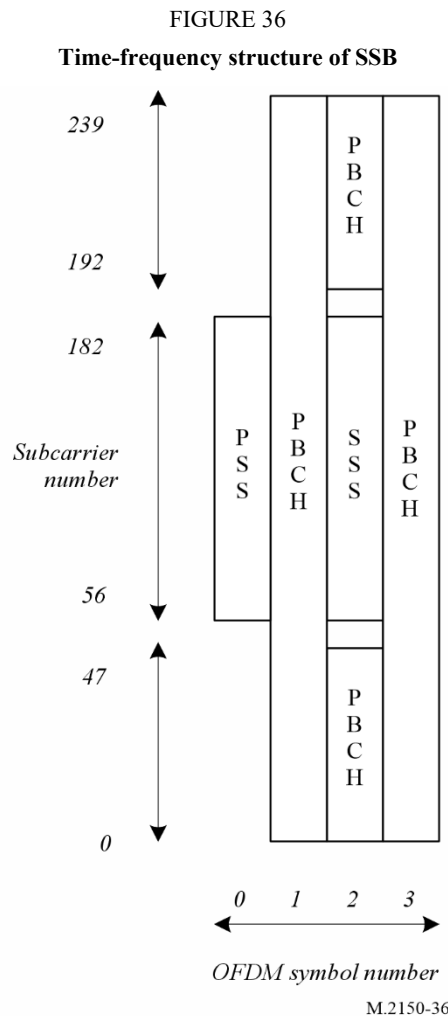
QPSK modulation is used for PDCCH.

2.1.1.4.2.4 Synchronization signal and PBCH block

The Synchronization Signal and PBCH block (SSB) consists of primary and secondary synchronization signals (PSS, SSS), each occupying 1 symbol and 127 subcarriers, and PBCH spanning across three OFDM symbols and 240 subcarriers, but on one symbol leaving an unused part in the middle for SSS as show in Fig. 36. For the 3 MHz channel bandwidth, the PBCH is further equally punctured from both edges to span 144 subcarriers. The possible time locations of SSBs within a half-frame are determined by sub-carrier spacing, and the periodicity of the half-frames where SSBs are transmitted is configured by the network. During a half-frame, different SSBs may be transmitted in different spatial directions (i.e. using different beams, spanning the coverage area of a cell).

Within the frequency span of a carrier, multiple SSBs can be transmitted. The Physical Cell Identifiers (PCIs) of SSBs transmitted in different frequency locations do not have to be unique, i.e. different SSBs in the frequency domain can have different PCIs. However, when an SSB is associated with a Remaining Minimum System Information (RMSI), the SSB corresponds to an individual cell, which has a unique NR Cell Global Identifier (NCGI). Such an SSB is referred to as a Cell-Defining SSB (CD-SSB). A PCell is always associated to a CD-SSB located on the synchronization raster.

When an SSB is not associated with an RMSI, the SSB is referred to as a non-Cell Defining SSB (NCD-SSB), which can be used to perform Radio Link Monitoring (RLM), Beam Failure Detection (BFD), and RRM measurements and measurements for RA resource selection inside the active DL BWP when the active BWP does not contain the CD-SSB. A UE may be configured with multiple SSBs provided that each BWP is configured with at most one SSB (CD-SSB or NCD-SSB).



Polar coding is used for the PBCH.

The UE may assume a band-specific sub-carrier spacing for the SSB unless a network has configured the UE to assume a different sub-carrier spacing.

PBCH symbols carry their own frequency-multiplexed DMRS.

QPSK modulation is used for PBCH.

2.1.1.4.2.5 Physical layer procedures

2.1.1.4.2.5.1 Link adaptation

Link adaptation (Adaptive Modulation and Coding (AMC)) with various modulation schemes and channel coding rates is applied to the PDSCH. The same coding and modulation is applied to all groups of resource blocks belonging to the same L2 Protocol Data Unit (PDU) scheduled for one user within one transmission duration and within a MIMO codeword.

For channel state estimation purposes, the UE may be configured to measure CSI-RS and estimate the downlink channel state based on the CSI-RS measurements. The UE reports the estimated channel state back to the gNB to be used in link adaptation.

2.1.1.4.2.5.2 Power control

Downlink power control can be used.

2.1.1.4.2.5.3 Cell search

Cell search is the procedure by which a UE acquires time and frequency synchronization with a cell and detects the Cell ID of that cell. NR cell search is based on the primary and secondary synchronization signals, and PBCH DMRS, located on the synchronization raster.

2.1.1.4.2.5.4 HARQ

Asynchronous Incremental Redundancy Hybrid ARQ is supported. The gNB provides the UE with the HARQ-ACK feedback timing either dynamically in the DCI or semi-statically in an RRC configuration.

The UE may be configured to receive code block group-based transmissions where retransmissions may be scheduled to carry only a sub-set of all the code blocks of a TB.

2.1.1.4.2.5.5 Reception of SIB1

The Master Information Block (MIB) on the PBCH provides the UE with parameters (e.g. CORESET#0 configuration) for monitoring of the PDCCH for scheduling PDSCH that carries the System Information Block 1 (SIB1). The PBCH may also indicate that there is no associated SIB1, in which case the UE may be pointed to another frequency from where to search for an SSB that is associated with a SIB1 as well as a frequency range where the UE may assume no SSB associated with SIB1 is present. The indicated frequency range is confined within a contiguous spectrum allocation of the same operator in which SSB is detected.

2.1.1.4.3 Uplink

2.1.1.4.3.1 Uplink transmission scheme

Two transmission schemes are supported for PUSCH: codebook-based transmission and non-codebook-based transmission.

For codebook-based transmission, the gNB provides the UE with a transmit precoding matrix indication in the DCI. The UE uses the indication to select the PUSCH transmit precoder from the codebook. For non-codebook-based transmission, the UE determines its PUSCH precoder based on the wideband SRS Resource Indicator (SRI) field from the DCI.

DMRS based spatial multiplexing is supported for PUSCH. For a given UE, up to four-layer transmissions or up to eight-layer are supported. Up to 8, 12, 16 and 24 orthogonal UL DMRS ports are supported for type 1, type 2, enhanced type 1, and enhanced type 2 DMRS respectively. The number of codewords is one for 1 to 4 layer transmission and two for 5 to 8 layer transmission. When transform precoding is used, only a single MIMO layer transmission is supported.

Transmission durations from 1 to 14 symbols in a slot with a single PUSCH is supported.

Aggregation of multiple slots with TB repetition is supported.

Two types of frequency hopping are supported, intra-slot frequency hopping, and in case of slot aggregation, inter-slot frequency hopping.

The PUSCH may be scheduled with DCI on the PDCCH, or a semi-static configured grant may be provided over RRC, where two types of operation are supported:

- The first PUSCH is triggered with a DCI, with subsequent PUSCH transmissions following the RRC configuration and scheduling received on the DCI, or
- The PUSCH is triggered by data arrival in the UE's transmit buffer and the PUSCH transmissions follow the RRC configuration.

2.1.1.4.3.2 Physical-layer processing for physical uplink shared channel

The uplink physical-layer processing of transport channels consists of the following steps:

- Transport Block CRC attachment;
- code block segmentation and Code Block CRC attachment;
- channel coding: LDPC coding;
- physical-layer HARQ processing;
- rate matching;
- scrambling;
- modulation: $\pi/2$ BPSK (with transform precoding only), QPSK, 16QAM, 64QAM and 256QAM;
- layer mapping, transform precoding (enabled/disabled by configuration), and pre-coding;
- mapping to assigned resources and antenna ports.

The UE transmits at least one symbol with Demodulation Reference Signal on each layer on each frequency hop in which the PUSCH is transmitted, and up to three additional DMRS symbols can be configured by higher layers.

Phase tracking RS may be transmitted on additional symbols to aid receiver phase tracking.

2.1.1.4.3.3 Physical uplink control channel

The physical uplink control channel (PUCCH) carries the Uplink Control Information (UCI) from the UE to the gNB. Five formats of PUCCH exist, depending on the duration of PUCCH and the UCI payload size.

- format #0: short PUCCH of 1 or 2 symbols with small UCI payloads of up to two bits with UE multiplexing capacity of up to 6 UEs with 1-bit payload in the same PRB;
- format #1: long PUCCH of 4 to 14 symbols with small UCI payloads of up to two bits with UE multiplexing capacity of up to 84 UEs without frequency hopping and 36 UEs with frequency hopping in the same PRB;
- format #2: short PUCCH of 1 or 2 symbols with large UCI payloads of more than two bits with no UE multiplexing capability in the same PRBs;
- format #3: long PUCCH of 4 to 14 symbols with large UCI payloads with no UE multiplexing capability in the same PRBs;
- format #4: long PUCCH of 4 to 14 symbols with moderate UCI payloads with multiplexing capacity of up to 4 UEs in the same PRBs.

The short PUCCH format of up to two UCI bits is based on sequence selection, while the short PUCCH format of more than two UCI bits frequency-multiplexes the UCI and the DMRS. The long PUCCH formats time-multiplex the UCI and DMRS. Frequency hopping is supported for long PUCCH formats and for short PUCCH formats of duration of two symbols. Short and long PUCCH formats can be repeated over multiple slots or sub-slots, where the repetition factor is either indicated dynamically in the DCI or semi-statically in an RRC configuration. UCI multiplexing in the PUSCH is supported when UCI and PUSCH transmissions coincide in time, either due to transmission of a UL-SCH transport block or due to triggering of A-CSI transmission without UL-SCH transport block. In addition, HARQ-ACK multiplexing of a certain priority in PUSCH of a different priority is supported when HARQ-ACK and PUSCH transmissions coincide in time, either due to transmission of a UL-SCH transport block or due to triggering of A-CSI transmission without UL-SCH transport block:

- UCI carrying HARQ-ACK feedback with 1 or 2 bits is multiplexed by puncturing the PUSCH;
- In all other cases the UCI is multiplexed by rate matching the PUSCH.

UCI consists of the following information:

- CSI;
- ACK/NAK;
- Scheduling request.

Simultaneous transmission of PUCCH and PUSCH associated with different priorities on cells of different bands in a PUCCH group is supported, where UCI multiplexing in the PUCCH associated with a priority in combination of UCI multiplexing in a PUSCH associated with a different priority is supported if the UCI multiplexed on PUSCH is of same priority as the PUSCH.

Simultaneous transmission of PUCCH and PUSCH associated with same priority on cells of different bands in a PUCCH group is supported.

QPSK and $\pi/2$ BPSK modulation can be used for long PUCCH with more than 2 bits of information, QPSK is used for a short PUCCH with more than 2 bits of information and BPSK and QPSK modulation can be used for a long PUCCH with up to 2 information bits.

Transform precoding is applied to a long PUCCH.

Channel coding used for uplink control information is described in Table 5.

TABLE 5

Channel coding for uplink control information

Uplink control information size including CRC, if present	Channel code
1	Repetition code
2	Simplex code
3-11	Reed Muller code
>11	Polar code

2.1.1.4.3.4 Random access

Random access preamble sequences of different lengths are supported. The sequence length 839 is applied with subcarrier spacings of 1.25 and 5 kHz, and the sequence length 139 is applied with subcarrier spacings of 15, 30, 60, 120, 480 and 960 kHz, sequence length of 571 is applied with subcarrier spacings of 30, 120, and 480 kHz, and sequence length 1 151 is applied with subcarrier spacings of 15 and 120 kHz respectively. Sequence length 839 supports unrestricted sets and restricted sets of Type A and Type B, while sequence lengths 139, 571 can be used for operation with only with subcarrier spacings of 120 kHz and 480 kHz and sequence lengths of 1 151 support unrestricted sets only with subcarrier spacings of 120 kHz.

Multiple PRACH preamble formats are defined with one or more PRACH OFDM symbols, and different cyclic prefixes and guard times. The PRACH preamble configuration to use is provided to the UE in the system information.

The UE calculates the PRACH transmit power for the retransmission of the preamble based on the most recent estimated pathloss and the power ramping counter value.

The system information provides information for the UE to determine the association between the SSB and the RACH resources. The Reference Signal Received Power (RSRP) threshold for SSB selection for RACH resource association is configurable by the network.

2.1.1.4.3.5 Physical layer procedures

2.1.1.4.3.5.1 Link adaptation

Four types of link adaptation are supported as follows:

- adaptive transmission bandwidth;
- adaptive transmission duration;
- transmission power control;
- adaptive modulation and channel coding rate.

For channel state estimation purposes, the UE may be configured to transmit SRS that the gNB may use to estimate the uplink channel state, and then use the estimate in link adaptation.

2.1.1.4.3.5.2 Uplink power control

The gNB determines the desired uplink transmit power and provides uplink transmit power control commands to the UE. The UE uses the provided uplink transmit power control commands to adjust its transmit power.

2.1.1.4.3.5.3 Uplink timing control

The gNB (including IAB-DU and IAB-donor-DU) determines the desired Timing Advance setting and provides that to the UE (or IAB-MT). The UE/IAB-MT uses the provided TA to determine its uplink transmit timing relative to the UE's/IAB-MTs observed downlink receive timing.

An IAB-node may support additional modes for uplink timing:

- The IAB-MT uses the provided TA plus a provided additional offset to determine its uplink transmission timing, to facilitate parent node's IAB-MT Rx / IAB-DU Rx multiplexing;
- The IAB-MT aligns its uplink transmission timing to that of the collocated IAB-DU downlink transmission timing, to facilitate IAB-MT Tx / IAB-DU Tx multiplexing of this IAB-node.

The IAB-node uplink timing mode is indicated by the parent node via MAC-CE.2.1.1.4.3.5.4 HARQ

Asynchronous Incremental Redundancy Hybrid ARQ is supported. The gNB schedules each uplink transmission and retransmission using the uplink grant on the DCI.

The UE may be configured to transmit code block group-based transmissions where retransmissions may be scheduled to carry only a sub-set of all the code blocks of a transport block.

2.1.1.4.4 Carrier Aggregation (CA)

In Carrier Aggregation (CA), two or more Component Carriers (CCs) are aggregated. A UE may simultaneously receive or transmit on one or multiple CCs depending on its capabilities:

- a UE with single timing advance capability for CA can simultaneously receive and/or transmit on multiple CCs corresponding to multiple serving cells sharing the same timing advance (multiple serving cells grouped in one Timing Advance Group (TAG));
- a UE with multiple timing advance capability for CA can simultaneously receive and/or transmit on multiple CCs corresponding to multiple serving cells with different timing advances (multiple serving cells grouped in multiple TAGs). NG-RAN ensures that each TAG contains at least one serving cell;

- a non-CA capable UE can receive on a single CC and transmit on a single CC corresponding to one serving cell only (one serving cell in one TAG).

CA is supported for both contiguous and non-contiguous CCs. When CA is deployed, frame timing and System Frame Number (SFN) are aligned across cells that can be aggregated. The maximum number of configured CCs for a UE is 16 for DL and 16 for UL. From Rel-16, cells with unaligned frame boundary can also be aggregated.

Multi-cell PDSCH/PUSCH scheduling with a single DCI is supported in order to reduce the control overhead for scheduling data on multiple cells in intra-band or inter-band multi-carrier operation.

2.1.1.4.5 Supplementary uplink

In conjunction with a UL/DL carrier pair (FDD band) or a bidirectional carrier (TDD band), a UE may be configured with additional, Supplementary Uplink (SUL). SUL differs from the aggregated uplink in that the UE may be scheduled to transmit either on the supplementary uplink or on the uplink of the carrier being supplemented, but not on both at the same time.

2.1.1.4.6 Uplink Tx switching

In uplink CA or SUL, a UE configured with uplink Tx switching can have Tx chain(s) dynamically from one uplink band or two uplink bands to another uplink band or two uplink bands for enabling up to 2Tx UL transmission in one uplink band or simultaneous UL transmissions in two uplink bands at a time.

2.1.1.4.7 Group transmission for Multicast and Broadcast Services (MBS) delivery

Resource efficient delivery of multicast/broadcast services is introduced for services of Point-To-Multipoint nature, such as for example public safety and mission critical services, V2X applications, IPTV, live video, software delivery over wireless and IoT applications.

For broadcast communication service, the same service and the same specific content data are provided simultaneously to all UEs in a geographical area. A broadcast communication service is delivered to the UEs using a broadcast session. A UE can receive a broadcast communication service in RRC_IDLE, RRC_INACTIVE and RRC_CONNECTED state.

For multicast communication service, the same service and the same specific content data are provided simultaneously to a dedicated set of UEs. A multicast communication service is delivered to the UEs using a multicast session. A UE can receive a multicast communication service in RRC_CONNECTED state with mechanisms such as Point-To-Point (PTP) and/or Point-To-Multipoint (PTM) delivery. HARQ feedback/retransmission can be applied to both PTP and PTM transmission.

2.1.1.4.8 Transport channels

The physical layer offers information transfer services to MAC and higher layers. The physical layer transport services are described by how and with what characteristics data are transferred over the radio interface.

Downlink transport channel types are:

- 1 Broadcast Channel (BCH) characterised by:
 - fixed, pre-defined transport format;
 - requirement to be broadcast in the entire coverage area of the cell, either as a single message or by beamforming different BCH instances.
- 2 Downlink Shared Channel (DL-SCH) characterised by:
 - support for HARQ;

- support for dynamic link adaptation by varying the modulation, coding and transmit power;
 - possibility to be broadcast in the entire cell;
 - possibility to use beamforming;
 - support for both dynamic and semi-static resource allocation;
 - support for UE discontinuous reception (DRX) to enable UE power saving;
 - support for group transmission for MBS delivery.
- 3 Paging Channel (PCH) characterised by:
- support for UE discontinuous reception (DRX) to enable UE power saving (DRX cycle is indicated by the network to the UE);
 - requirement to be broadcast in the entire coverage area of the cell, either as a single message or by beamforming different PCH instances;
 - mapped to physical resources which can be used dynamically also for traffic/other control channels.

Uplink transport channel types are:

- 1 Uplink Shared Channel (UL-SCH) characterised by:
- possibility to use beamforming;
 - support for dynamic link adaptation by varying the transmit power and potentially modulation and coding;
 - support for HARQ;
 - support for both dynamic and semi-static resource allocation.
- 2 Random Access Channel(s) (RACH) characterised by:
- limited control information;
 - collision risk.

Sidelink transport channel types are:

- 1 Sidelink broadcast channel (SL-BCH) characterised by:
- pre-defined transport format.
- 2 Sidelink shared channel (SL-SCH) characterised by:
- support for unicast transmission, groupcast transmission and broadcast transmission;
 - support for both UE autonomous resource selection and scheduled resource allocation by NG-RAN;
 - support for both dynamic and semi-static resource allocation when UE is allocated resources by the NG-RAN;
 - support for HARQ;
 - support for dynamic link adaptation by varying the transmit power, modulation and coding;
 - support for SL discontinuous reception (SL DRX) to enable UE power saving.

2.1.1.5 Layer 2

2.1.1.5.1 Overview

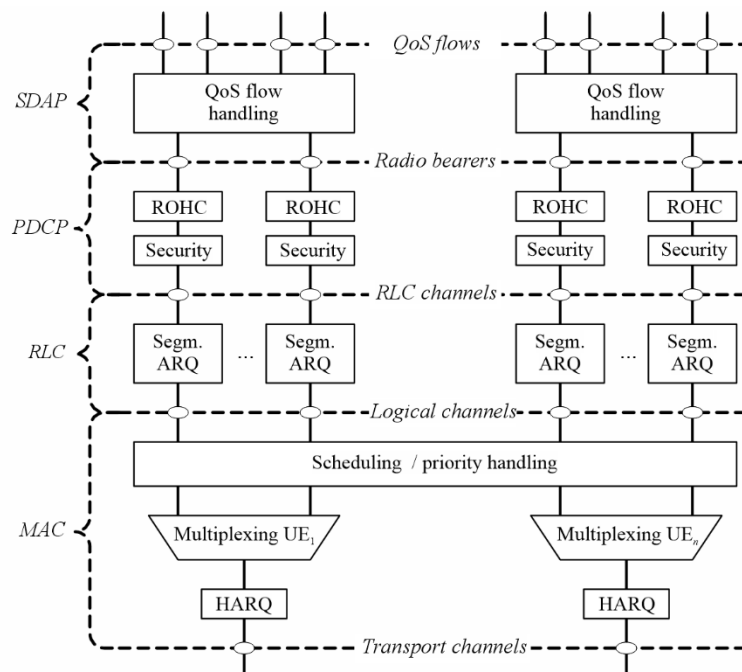
The layer 2 of NR is split into the following sublayers: Medium Access Control (MAC), Radio Link Control (RLC), Packet Data Convergence Protocol (PDCP) and Service Data Adaptation Protocol (SDAP). Figures 37 and 38 depict the Layer 2 architecture for downlink and uplink, where:

- the physical layer offers to the MAC sublayer transport channels;

- the MAC sublayer offers to the RLC sublayer logical channels;
- the RLC sublayer offers to the PDCP sublayer RLC channels;
- the PDCP sublayer offers to the SDAP sublayer radio bearers;
- the SDAP sublayer offers to 5GC QoS flows;
- Comp. refers to header compression or uplink data compression;
- Segm. refers to segmentation;
- control channels (BCCH, PCCH are not depicted for clarity).

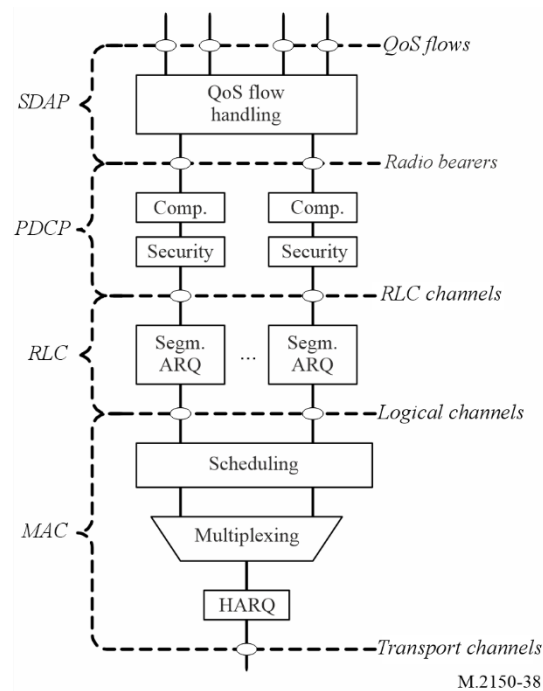
NOTE – The gNB may not be able to guarantee that a L2 buffer overflow will never occur. If such overflow occurs, the UE may discard packets from the L2 buffer.

FIGURE 37
Downlink layer 2 structure



M.2150-37

FIGURE 38

Uplink layer 2 structure

Similar to LTE, Radio bearers are categorized into two groups: DRBs for UP data and SRBs for CP data.

2.1.1.5.2 MAC Sublayer

2.1.1.5.2.1 Services and Functions

The main services and functions of the MAC sublayer are:

- mapping between logical channels and transport channels;
- multiplexing/demultiplexing of MAC SDUs belonging to one or different logical channels into/from transport blocks (TB) delivered to/from the physical layer on transport channels;
- scheduling information reporting;
- error correction through HARQ (one HARQ entity per cell in case of CA);
- priority handling between UEs by means of dynamic scheduling;
- priority handling between logical channels of one UE by means of logical channel prioritisation;
- padding.

A single MAC entity can support multiple numerologies, transmission timings and cells. Mapping restrictions in logical channel prioritisation control which numerology(ies), cell(s), and transmission timing(s) a logical channel can use.

2.1.1.5.2.2 Logical channels

Different kinds of data transfer services as offered by MAC. Each logical channel type is defined by what type of information is transferred. Logical channels are classified into two groups: control channels and traffic channels. Control channels are used for the transfer of control plane information only:

- Broadcast Control Channel (BCCH): a downlink channel for broadcasting system control information.
- Paging Control Channel (PCCH): a downlink channel that carries paging messages.
- Common Control Channel (CCCH): channel for transmitting control information between UEs and network. This channel is used for UEs having no RRC connection with the network.
- Dedicated Control Channel (DCCH): a point-to-point bi-directional channel that transmits dedicated control information between a UE and the network. Used by UEs having an RRC connection.

Traffic channels are used for the transfer of user plane information only:

- Dedicated Traffic Channel (DTCH): point-to-point channel, dedicated to one UE, for the transfer of user information. A DTCH can exist in both uplink and downlink.

The following logical channels are used for MBS delivery:

- MTCH: A point-to-multipoint downlink channel for transmitting MBS data of either multicast session or broadcast session from the network to the UE;
- DTCH: A point-to-point channel defined for transmitting MBS data of a multicast session from the network to the UE;
- MCCH: A point-to-multipoint downlink channel used for transmitting MBS broadcast control information associated to one or several MTCH(s) from the network to the UE.

2.1.1.5.2.3 Mapping to Transport Channels

In Downlink, the following connections between logical channels and transport channels exist:

- BCCH can be mapped to BCH;
- BCCH can be mapped to DL-SCH;
- PCCH can be mapped to PCH;
- CCCH can be mapped to DL-SCH;
- DCCH can be mapped to DL-SCH;
- DTCH can be mapped to DL-SCH.

The following connections between logical channels and transport channels for group transmission exist:

- MCCH can be mapped to DL-SCH;
- MTCH can be mapped to DL-SCH.

In Uplink, the following connections between logical channels and transport channels exist:

- CCCH can be mapped to UL-SCH;
- DCCH can be mapped to UL-SCH;
- DTCH can be mapped to UL-SCH.

2.1.1.5.2.4 HARQ

The HARQ functionality ensures delivery between peer entities at Layer 1. A single HARQ process supports one TB when the physical layer is not configured for downlink/uplink spatial multiplexing, and when the physical layer is configured for downlink/uplink spatial multiplexing, a single HARQ process supports one or multiple TBs.

2.1.1.5.3 RLC sublayer

2.1.1.5.3.1 Transmission modes

The RLC sublayer supports three transmission modes:

- Transparent Mode (TM);
- Unacknowledged Mode (UM);
- Acknowledged Mode (AM).

The RLC configuration is per logical channel with no dependency on numerologies and/or transmission durations, and ARQ can operate on any of the numerologies and/or transmission durations the logical channel is configured with.

For SRB0, paging and broadcast system information, TM mode is used. For other SRBs AM mode is used. For DRBs, either UM or AM mode are used.

2.1.1.5.3.2 Services and functions

The main services and functions of the RLC sublayer depend on the transmission mode and include:

- transfer of upper layer PDUs;
- sequence numbering independent of the one in PDCP (UM and AM);
- error Correction through ARQ (AM only);
- segmentation (AM and UM) and re-segmentation (AM only) of RLC SDUs;
- reassembly of SDU (AM and UM);
- duplicate Detection (AM only);
- RLC SDU discard (AM and UM);
- RLC re-establishment;
- protocol error detection (AM only).

2.1.1.5.3.3 ARQ

The ARQ within the RLC sublayer has the following characteristics:

- ARQ retransmits RLC SDUs or RLC SDU segments based on RLC status reports;
- polling for RLC status report is used when needed by RLC;
- the RLC receiver can also trigger a RLC status report after detecting a missing RLC SDU or RLC SDU segment.

2.1.1.5.4 PDCP sublayer

2.1.1.5.4.1 Services and functions

The main services and functions of the PDCP sublayer are:

- transfer of data (user plane or control plane);
- maintenance of PDCP SNs;
- header compression and decompression using the ROHC protocol;
- header compression and decompression using EHC protocol;
- compression and decompression of uplink PDCP SDUs: DEFLATE based UDC only;
- ciphering and deciphering;
- integrity protection and integrity verification;

- timer based SDU discard;
- for split bearers, routing;
- duplication;
- reordering and in-order delivery;
- out-of-order delivery;
- duplicate discarding.

Since PDCP does not allow COUNT to wrap around in DL and UL, it is up to the network to prevent this from happening (e.g. by using a release and add of the corresponding radio bearer or a full configuration).

2.1.1.5.5 SDAP Sublayer

The main services and functions of SDAP are:

- mapping between a QoS flow and a data radio bearer;

NOTE – When remapping an XR QoS flow carrying PDU sets from one DRB to another all SDAP SDUs belonging to a PDU Set should be mapped to the same DRB.

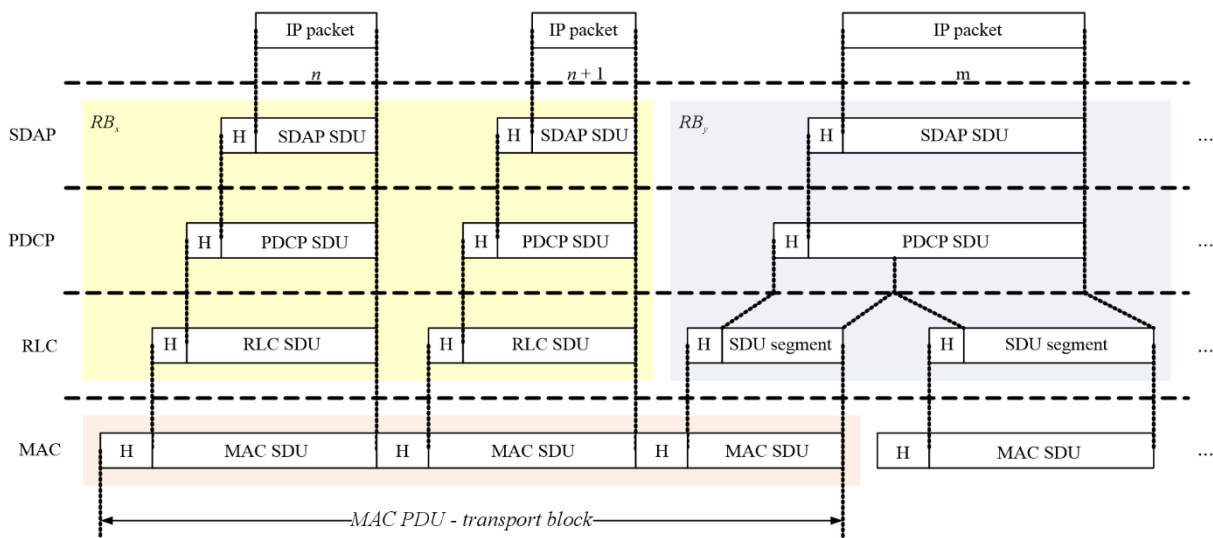
- marking QoS Flow ID (QFI) in both DL and UL packets.

A single protocol entity of SDAP is configured for each individual PDU session.

2.1.1.5.6 L2 data flow

An example of the Layer 2 Data Flow is depicted on Fig. 39, where a transport block is generated by MAC by concatenating two RLC PDUs from RB_x and one RLC PDU from RB_y . The two RLC PDUs from RB_x each corresponds to one IP packet (n and $n+1$) while the RLC PDU from RB_y is a segment of an IP packet (m).

FIGURE 39
Data flow example



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NOTE – H depicts the headers and subheaders.

2.1.1.5.7 Carrier Aggregation (CA)

With CA, the multi-carrier nature of the physical layer is only exposed to the MAC layer for which one HARQ entity is required per serving cell as depicted on Figs 40 and 41 below:

- In both uplink and downlink, there is one independent HARQ entity per serving cell and one transport block is generated per assignment/grant per serving cell in the absence of spatial multiplexing. Each transport block and its potential HARQ retransmissions are mapped to a single serving cell.

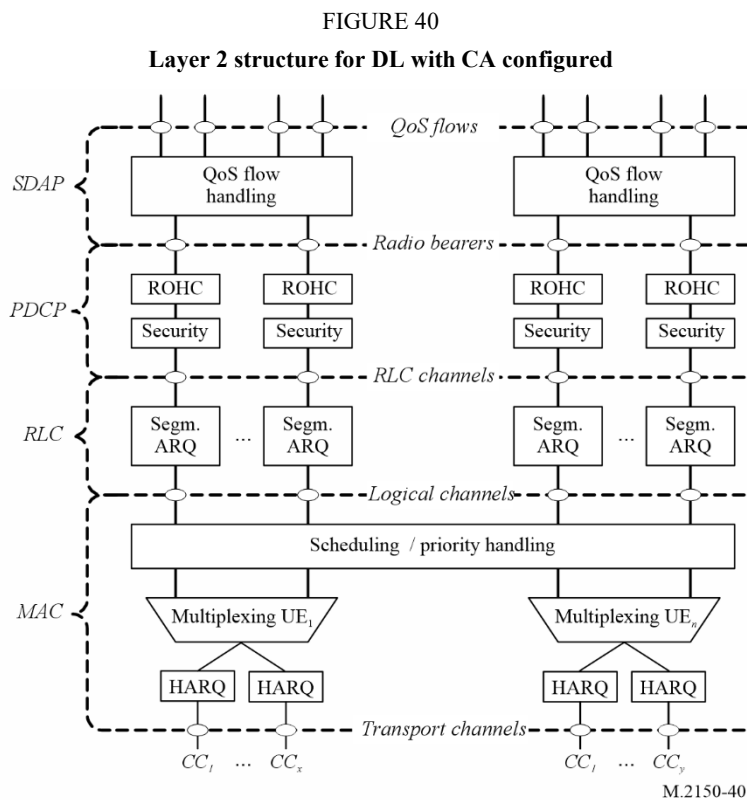
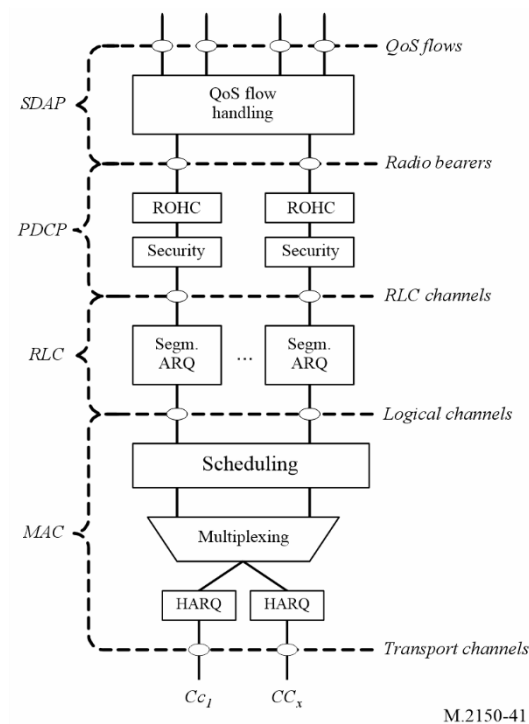


FIGURE 41

Layer 2 structure for UL with CA configured**2.1.1.5.8 Dual Connectivity (DC)**

When the UE is configured with a SCG, the UE is configured with two MAC entities: one MAC entity for the MCG and one MAC entity for the SCG.

2.1.1.5.9 Supplementary uplink

In case of Supplementary Uplink (SUL), the UE is configured with two ULs for one DL of the same cell, and uplink transmissions on those two ULs are controlled by the network to avoid overlapping PUSCH/PUCCH transmissions in time. Overlapping transmissions on PUSCH are avoided through scheduling while overlapping transmissions on PUCCH are avoided through configuration (PUCCH can only be configured for only one of the two ULs of the cell). In addition, initial access is supported in each of the uplink.

2.1.1.5.10 Bandwidth Adaptation (BA)

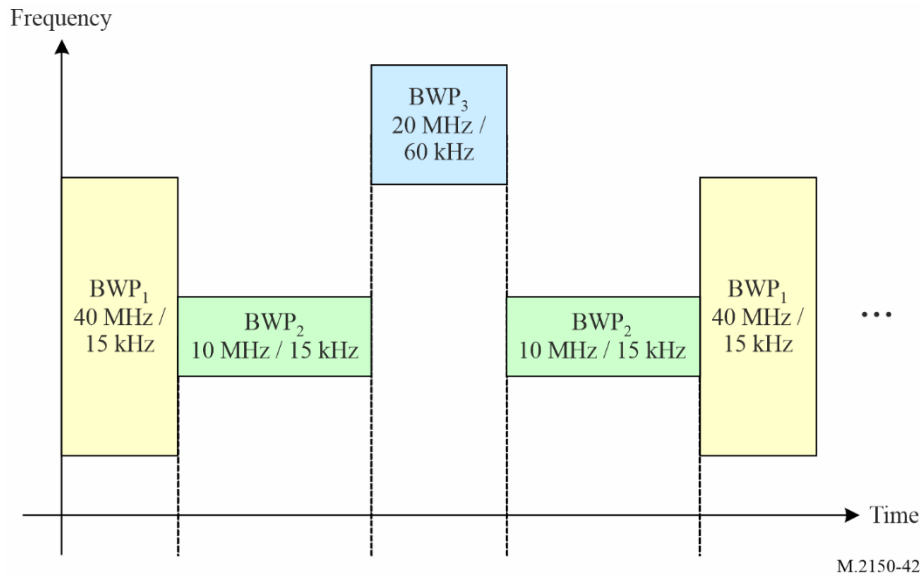
With Bandwidth Adaptation, the receive and transmit bandwidth of a UE need not be as large as the bandwidth of the cell and can be adjusted: the width can be ordered to change (e.g. to shrink during period of low activity to save power); the location can move in the frequency domain (e.g. to increase scheduling flexibility); and the subcarrier spacing can be ordered to change (e.g. to allow different services). A subset of the total cell bandwidth of a cell is referred to as a Bandwidth Part (BWP) and BA is achieved by configuring the UE with BWP(s) and telling the UE which of the configured BWPs is currently the active one.

Figure 42 describes a scenario where three different BWPs are configured:

- BWP₁ with a width of 40 MHz and subcarrier spacing of 15 kHz;
- BWP₂ with a width of 10 MHz and subcarrier spacing of 15 kHz;
- BWP₃ with a width of 20 MHz and subcarrier spacing of 60 kHz.

FIGURE 42

BA example



2.1.1.5.11 Multiple Transmit/Receive Point Operation

In Multiple Transmit/Receive Point (multi-TRP) operation, a serving cell can schedule the UE from four TRPs, providing better coverage, reliability and/or data rates for PDSCH, PDCCH, PUSCH and PUCCH.

2.1.1.6 Radio Resources Control (RRC)

2.1.1.6.1 Services and functions

The main services and functions of the RRC sublayer include:

- broadcast of System Information related to AS and NAS;
- paging initiated by 5GC or NG-RAN;
- establishment, maintenance and release of an RRC connection between the UE and NG-RAN including:
 - addition, modification and release of Carrier Aggregation;
 - addition, modification and release of Dual Connectivity in NR or between E-UTRA and NR;
- security functions including key management;
- establishment, configuration, maintenance and release of Signalling Radio Bearers (SRBs) and Data Radio Bearers (DRBs);
- Mobility functions including:
 - handover and context transfer;
 - UE cell selection and reselection and control of cell selection and reselection;
 - inter-RAT mobility;
- QoS management functions;
- UE measurement reporting and control of the reporting;
- detection of and recovery from radio link failure;
- NAS message transfer to/from NAS from/to UE.

In order to enhance mobility robustness and performance, additional NR mobility enhancements are introduced in 3GPP Rel-16. User data interruption is reduced during handover to 0 ms by dual-active-protocol-stack handover. In addition, the robustness during handover is improved by a conditional handover.

In order to further reduce the mobility latency, additional NR mobility enhancements are introduced in 3GPP Rel-18. The L1/L2-triggered mobility procedure (LTM), where the cell switch is based on L1 measurements and triggered by MAC CE, enables the early UL and DL synchronization to target cell and the RACH-less handover, resulting in the minimized mobility interruption time.

2.1.1.6.2 Protocol states

RRC supports the following states which can be characterised as follows:

- RRC_IDLE:
 - Public Land Mobile Network (PLMN) selection;
 - broadcast of system information;
 - cell re-selection mobility;
 - paging for mobile terminated data is initiated by 5GC;
 - DRX for core network paging configured by NAS.
- RRC_INACTIVE:
 - PLMN selection;
 - broadcast of system information;
 - cell re-selection mobility;
 - paging is initiated by NG-RAN (RAN paging);
 - RAN-based notification area (RNA) is managed by NG-RAN;
 - DRX for RAN paging configured by NG-RAN;
 - 5GC – NG-RAN connection (both CP and UP) is established for UE;
 - the UE AS context is stored in NG-RAN and the UE;
 - NG-RAN knows the RNA which the UE belongs to;
 - Transfer of MBS multicast/broadcast data to the UE over MRB(s);
 - Transfer of unicast data and/or signalling to/from the UE over radio bearers configured for Small Data Transmission (SDT).
- RRC_CONNECTED:
 - 5GC – NG-RAN connection (both CP and UP) is established for UE;
 - the UE AS context is stored in NG-RAN and the UE;
 - NG-RAN knows the cell which the UE belongs to;
 - transfer of unicast data to/from the UE;
 - network controlled mobility including measurements.

2.1.2 Support of verticals

The NR RIT supports a diverse set of mobile broadband (eMBB) services and other so-called “verticals”, including URLLC, Industrial IoT, Automotive/V2X, Private Networks (NPN), Reduced Capability (RedCap) NR devices and others. NR RIT supports in-band coexistence with NB-IoT and eMTC.

For optimal support of specific verticals, the NR RIT has been designed, or enhanced, with certain key features, or set of features. Taking few verticals as examples, a short summary of relevant NR RIT capabilities is provided below.

2.1.2.1 Ultra-Reliable and Low Latency Communications (URLLC) and Industrial IoT (IIoT)

For support of Ultra-Reliable and Low Latency Communications services, some of the main features supported by the NR RIT are:

- Logical Channel Priority (LCP) restrictions
- Packet duplication with DC or CA
- New QCI table for block error rate 10^{-5}
- Physical layer short transmission time interval (TTI).

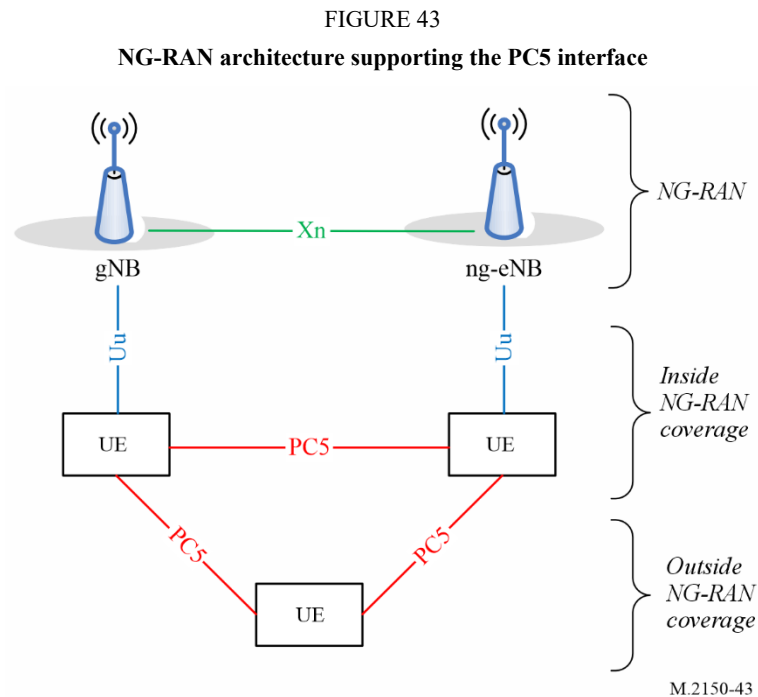
From Rel-16 onwards, URLLC and Industrial IoT use cases are further facilitated by NR PDCP duplication enhancements:

- Prioritization/multiplexing enhancements;
- NR Time Sensitive Communications (TSC) related enhancements, e.g. Ethernet header compression;
- Precise time information delivery;
- Network timing synchronization status monitoring; and
- RAN feedback for adaptation of Burst Arrival Time and Periodicity.

2.1.2.2 Vehicle-to-everything (V2X)

From Rel-16, NR RIT includes support of Vehicle-to-everything (V2X), mainly by means of NR sidelink communication over the PC5 interface, partly leveraging what was defined for E-UTRA V2X sidelink communication.

The architecture supporting the PC5 interface is illustrated in Fig. 43, for the overall NG-RAN (showing both NR and EUTRA). Sidelink transmission and reception over the PC5 interface are supported when the UE is inside NG-RAN coverage, irrespective of which RRC state the UE is in, and when the UE is outside NG-RAN coverage.



NR sidelink communication can support three types of transmission modes (in the access stratum):

- Unicast, characterized by:
 - support of at least one PC5-RRC connection between peer UEs;
 - transmission and reception of control information and user traffic between peer UEs in sidelink;
 - support of sidelink feedback, for HARQ and link adaptation;
 - support of RLC AM;
 - Detection of radio link failure for the PC5 unicast connection.
- Groupcast, characterized by:
 - transmission and reception of user traffic among UEs belonging to a group in sidelink;
 - support of distance/range based sidelink HARQ feedback;
 - support of connection-less groupcast, and application managed groupcast.
- Broadcast, characterized by transmission and reception of broadcast user traffic among UEs in sidelink.
- Sidelink discovery
 - The UE may perform NR sidelink discovery while in-coverage or out-of-coverage for non-relay operation.

NR sidelink communication may also be used to support other services than V2X, depending on service requirements.

2.1.2.3 Sidelink Relay

Sidelink relay supports 5G ProSe UE-to-Network Relay (U2N Relay) function to provide connectivity to the network for U2N Remote UE(s). Both L2 and L3 U2N Relay architectures are supported. The L3 U2N Relay architecture is transparent to the serving RAN of the U2N Relay UE, except for controlling sidelink resources.

2.1.2.4 Reduced Capability (RedCap) NR devices

A RedCap UE has reduced capabilities with the intention to have lower complexity with respect to non-RedCap UEs. It is mandatory for a RedCap UE to support 20 MHz maximum UE channel bandwidth in FR1 and 100 MHz in FR2. An eRedCap UE has further reduced capabilities with the intention to have lower complexity with respect to RedCap UEs. It is mandatory for an eRedCap UE to support reduced DL/UL peak data rate of 10 Mbit/s, with or without reduced baseband bandwidth of 5 MHz for unicast PDSCH/PUSCH in FR1.

CA, MR-DC, DAPS, CPAC (Conditional PSCell Addition/Change) and IAB related capabilities are not supported by RedCap UEs.

2.1.2.5 Positioning services

The DL Positioning Reference Signals (DL PRS) are defined to facilitate support of different positioning methods such as DL-TDOA, DL-AoD, multi-RTT through the following set of UE measurements DL RSTD, DL PRS-RSRP, and UE Rx-Tx time difference. Besides DL PRS signals, UE can use SSB and CSI-RS for RRM (RSRP and RSRQ) measurements for E-CID type of positioning.

The periodic, semipersistent and aperiodic transmission of Rel-15 SRS is defined for gNB UL RTOA, UL SRS-RSRP, UL-AoA measurements to facilitate support of UL TDOA and UL AoA positioning. The periodic, semipersistent and aperiodic transmission of SRS for positioning is defined for gNB UL RTOA, UL SRS-RSRP, UL-AoA, gNB Rx-Tx time difference measurements to facilitate support of UL TDOA, UL AoA and multi-RTT positioning methods.

The Sidelink Positioning Reference Signal (SL-PRS) is defined to facilitate Ranging/Sidelink positioning methods, such as SL-TOA, SL-TDOA, SL-RTT, SL-AoA, through the following set of measurements SL-PRS RSRP, RSRPP, RTOA, RSTD, Rx-Tx timing difference and AoA.

LPHAP (Low Power High Accuracy Positioning) is supported which includes: (i) enhancement of SRS for positioning configurations in RRC_INACTIVE state for UL and UL+DL positioning based on SRS for positioning validity area to avoid frequent reconfiguration of SRS for positioning upon serving cell changes; (ii) introduction of (e)DRX cycles longer than 10.24 seconds in RRC_INACTIVE state; (iii) alignment of (e)DRX cycles in RRC_INACTIVE state and DL PRS configurations, and (iv) support of measurements on DL PRS resources in RRC_IDLE state with reporting of the corresponding measurements when in RRC_CONNECTED state.

2.1.3.6 eXtended Reality Services

The support of eXtended Reality (XR) services that require high data rate and low latency communications.

2.1.3.6.1 Awareness

XR-Awareness relies on QoS flows, PDU Sets, Data Bursts and traffic assistance information.

2.1.3.6.2 Power Saving

Most XR video frame rates (15, 30, 45, 60, 72, 90 and 120 fps) correspond to periodicities that are not an integer (66.66, 33.33, 22.22, 16.66, 13.88, 11.11 and 8.33 ms respectively). The gNB may configure a DRX cycle expressed in rational numbers so that the DRX cycle matches those periodicities, e.g. for the traffic with a frame rate of 60 fps, the network may configure the UE with a DRX cycle of 50/3 ms.

Configured grants may be configured without the need for the UE to wake up to monitor possible grants for UL retransmissions of configured grants, thus increasing the number of power saving opportunities for the UE.

2.1.3.6.3 Capacity

The following enhancements for configured grant-based PUSCH transmission are introduced:

- Support of multiple CG PUSCH transmission occasions within a single period of a CG configuration;
- Indication of unused CG PUSCH occasion(s) of a CG configuration with Uplink Control Information multiplexed in CG PUSCH transmission of the CG configuration.

For Layer 2 enhancements.

In order to enhance the scheduling of uplink resources for XR, the following improvements are introduced:

- One additional buffer size table to reduce the quantisation errors in BSR reporting (e.g. for high bit rates);
- Delay Status Report (DSR) of buffered data via a dedicated MAC CE;
- Reporting of uplink assistance information (jitter range, burst arrival time, UL data burst periodicity) per QoS flow by the UE via UE Assistance Information. In case target gNB receives the burst arrival time from source gNB during the handover preparation procedure, the target gNB may use it by considering the SFN offset of the source gNB.

When the PSIH indicates that all PDUs of the PDU Set are needed for a QoS flow, as soon as one PDU of a PDU set is known to be lost, the remaining PDUs of that PDU Set can be considered as no longer needed by the application and may be subject to discard operation at the transmitter to free up radio resources.

2.1.3.6.4 Non-Homogeneous support of PDU set based handling in NG-RAN

During a handover from a gNB supporting PDU Set based handling to another gNB, the source gNB signals the PDU Set Information over Xn-U if the target node has signalled the support of PDU Set based handling in the Xn Handover Request Acknowledge message.

2.1.3.7 ECN marking for L4S and congestion information exposure

In order to support ECN marking for L4S at gNB, SMF provides ECN marking request per QoS flow level to the gNB as part of PDU Session Resource Management procedure. If the gNB supports ECN marking, it provides the status indication back to the SMF which is used by the SMF. During Xn Handover Preparation procedure, source gNB provides the ECN marking request to target gNB.

2.1.3.8 Support for Aerial UE Communication

NR connectivity for UEs capable of Aerial communication is supported via the following functionalities:

- subscription-based Aerial UE identification and authorization;
- altitude reporting based on the measurement event(s) where the UE's altitude has crossed a network-configured reference altitude threshold;
- altitude-dependent configurations which apply only to specific altitude regions;
- interference detection based on a measurement reporting that is triggered when a configured number of cells (i.e., larger than one) fulfils the triggering criteria simultaneously;
- signalling of flight path information from UE to NG-RAN and from the source gNB to target gNB during handover;
- location information reporting, including UE's horizontal and vertical velocity;
- transmitting of BRID and DAA messages via PC5 interface.

2.1.3.9 Support for Air to Ground Networks

In Air-to-ground (ATG) network, an NG-RAN consisting of ground-based gNBs, which provide cell towers that send signals up to an aircraft's antenna(s) of onboard ATG terminal, with typical vertical altitude of around 10 000 m and take-off/landing altitudes down to 3 000 m.

CA and DC are not supported for ATG in this release of the specification.

2.1.3.10 Support of AI/ML for NG-RAN

Support of AI/ML for NG-RAN, as a RAN function, is used to facilitate Artificial Intelligence (AI) and Machine Learning (ML) techniques in NG-RAN.

The objective of AI/ML for NG-RAN is to improve network performance and user experience, through analysing the data collected and autonomously processed by the NG-RAN, which can yield further insights, e.g., for Network Energy Saving, Load Balancing, Mobility Optimization.

2.1.3.11 Non-Public Network

A Non-Public Network (NPN) is a network for non-public use, which includes Stand-Alone NPN (SNPN) and Public Network Integrated NPN (PNI-NPN) where:

- A Stand-Alone NPN (SNPN) is a network deployed for non-public use which does not rely on network functions provided by a PLMN. An SNPN is identified by a PLMN ID and a Network Identifier (NID) broadcast.
- A Public Network Integrated NPN (PNI-NPN) is a network deployed for non-public use which relies on network functions provided by a PLMN. In PNI-NPN, a Closed Access Groups (CAG) identifies a group of subscribers who are permitted to access one or more CAG cells associated to the CAG. A CAG is identified by a CAG identifier broadcast.

2.2 Detailed specification of the radio interface technology

Detailed specifications described in this Annex are developed around a “Global Core Specification” (GCS)³, which is related to externally developed materials incorporated by specific references for a specific technology. The process and use of the GCS, references, and related notifications and certifications are found as Document IMT-2020/20.

The IMT-2020 standards contained in this section are derived from the global core specification for 3GPP 5G-RIT contained at [IMT-2020 Global Core Specifications](#). The following notes apply to the sections below:

- 1) The identified Transposing Organizations⁴ should make their reference material available from their website.

³ A “GCS” (Global Core Specification) is the set of specifications that defines a single RIT, an SRIT, or a component RIT within an SRIT.

⁴ The following identified Transposing Organizations have provided their transposed sets of standards information contained in this section:

- Association of Radio Industries and Businesses (ARIB)
- Alliance for Telecommunications Industry Solutions (ATIS)
- China Communications Standards Association (CCSA)
- European Telecommunications Standards Institute (ETSI)
- Telecommunications Standards Development Society, India (TSDSI)

- 2) This information was supplied by the Transposing Organizations and relates to their own deliverables of the transposed global core specification.

Section 2.2.1 contains titles and synopses of the Global Core Specification of IMT-2020 radio interface technology entitled 3GPP 5G-RIT and the related hyperlinks to the transposed standards.

The specific 3GPP specifications of the Global Core Specifications (GCS) for IMT-2020 and 5G that are being transposed in § 2.2.1 are summarized in Table 6:

TABLE 6
3GPP specifications in § 2.2.1 that are to be transposed

PART A				
List of Specifications				
37.xxx Series	38.100 Series	38.200 Series	38.300 Series	38.400 Series
TS 37.104	TS 38.101-1	TS 38.201	TS 38.300	TS 38.401
TS 37.105	TS 38.101-2	TS 38.202	TS 38.304	TS 38.410
TS 37.113	TS 38.101-3	TS 38.211	TS 38.305	TS 38.411
TS 37.114	TS 38.104	TS 38.212	TS 38.306	TS 38.412
TS 37.320	TS 38.106	TS 38.213	TS 38.307	TS 38.413
TS 37.324	TS 38.113	TS 38.214	TS 38.314	TS 38.414
TS 37.340	TS 38.114	TS 38.215	TS 38.321	TS 38.415
TS 37.355	TS 38.124		TS 38.322	TS 38.420
TS 37.460	TS 38.133		TS 38.323	TS 38.421
TS 37.461	TS 38.174		TS 38.331	TS 38.422
TS 37.462	TS 38.175		TS 38.340	TS 38.423
TS 37.466			TS 38.351	TS 38.424
TS 37.470			TS 38.355	TS 38.425
TS 37.471				TS 38.455
TS 37.472				TS 38.460
TS 37.473				TS 38.461
TS 37.480				TS 38.462
TS 37.481				TS 38.463
TS 37.482				TS 38.470
TS 37.483				TS 38.471
				TS 38.472
				TS 38.473
				TS 38.474
PART B				
Specification versions to be used				
The specific versions of the 3GPP specifications that are to be used for the transpositions of those specifications listed in Table 6 are provided in the link below:				
Click here for the direct link to the GCS material.				

-
- Telecommunications Technology Association (TTA)
 - Telecommunication Technology Committee (TTC).

2.2.1 Titles and synopses of the global core specification and the transposed standards

2.2.1.1 Introduction

The standards documents referenced below, as transposed from the relevant 3GPP specifications, are provided by the identified *Transposing Organizations* as the transposed sets of standards for the terrestrial radio interface of IMT-2020 identified as 5G and includes not only the key characteristics of IMT-2020 but also the additional capabilities of 5G both of which are continuing to be enhanced.

2.2.1.2 Radio Layer 1

2.2.1.2.1 TS 38.201

NR; Physical layer; General description

This document provides a general description of the physical layer of NR radio interface. This document also describes the document structure of the 3GPP physical layer specifications, i.e. TS 38.200 series.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-38.201.V15.0.0	15.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38201-f00.pdf
ATIS	ATIS.3GPP.38.201.V15.0.0	15.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.201.V15.0.0	15.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.201.V15.0.0.doc
ETSI	ETSI TS 138 201 V15.0.0 (2018-09)	15.0.0	Published	18.09.2018	https://www.etsi.org/deliver/etsi_ts/138200_138299/138201/15.00.00_60/ts_138201v150000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.201-15.0.0 V1.0.0	15.0.0	Published	06.10.2020	https://members.tdsi.in/s/eTcG55LfwjgptTM
TTA	TTAT.3G-38.201V15.0.0	15.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.201V15.0.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-38.201.V16.0.0	16.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38201-g00.pdf
ATIS	ATIS.3GPP.38.201.V16.0.0	16.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.201.V16.0.0	16.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.201.V16.0.0.doc
ETSI	ETSI TS 138 201 V16.0.0 (2020-09)	16.0.0	Published	21.09.2020	https://www.etsi.org/deliver/etsi_ts/138200_138299/138201/16.00.00_60/ts_138201v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.201-16.0.0 V1.0.0	16.0.0	Published	06.10.2020	https://members.tdsi.in/s/fPq92DLdxwo2JPR
TTA	TTAT.3G-38.201V16.0.0	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.201V16.0.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-38.201.V17.0.0	17.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38201-h00.pdf
ATIS	ATIS.3GPP.38.201.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.201.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.201.V17.0.0.doc
ETSI	ETSI TS 138 201 V17.0.0 (2022-05)	17.0.0	Published	11.05.2022	https://www.etsi.org/deliver/etsi_ts/138200_138299/138201/17.00.00_60/ts_138201v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.201-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/tWT54rLwzzFXrDH
TTA	TTAT.3G-38.201V17.0.0	17.0.0	Published	14.03.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.201V17.0.0&searchCate=TTAS

Release 18

ARIB	ARIB STD-T120-38.201.V18.0.0	18.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38201-i00.pdf
ATIS	ATIS.3GPP.38.201.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.201.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.201.V18.0.0.doc
ETSI	ETSI TS 138 201 V18.0.0 (2024-05)	18.0.0	Published	27.05.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138201/18.00.00_60/ts_138201v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.201-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/f4j8DgWSikwnkmk
TTA	TTAT.3G-38.201V18.0.0	18.0.0	Published	13.02.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.201V18.0.0&searchCate=TTAS

2.2.1.2.2 TS 38.202**NR; Services provided by the physical layer**

This document is a technical specification of the services provided by the physical layer of 5G-NR to upper layers.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-38.202.V15.6.0	15.6.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38202-f60.pdf
ATIS	ATIS.3GPP.38.202.V15.6.0	15.6.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.202.V15.6.0	15.6.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.202.V15.6.0.docx
ETSI	ETSI TS 138 202 V15.6.0 (2020-01)	15.6.0	Published	21.01.2020	https://www.etsi.org/deliver/etsi_ts/138200_138299/138202/15.06.00_60/ts_138202v150600p.pdf
TSDSI	TSDSI STD T1.3GPP 38.202-15.6.0 V1.0.0	15.6.0	Published	06.10.2020	https://members.tdsi.in/s/i79c9BBFPNi7Ngg
TTA	TTAT.3G-38.202V15.6.0	15.6.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.202V15.6.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-38.202.V16.4.0	16.4.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38202-g40.pdf
ATIS	ATIS.3GPP.38.202.V16.4.0	16.4.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.202.V16.4.0	16.4.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.202.V16.4.0.docx
ETSI	ETSI TS 138 202 V16.4.0 (2024-02)	16.4.0	Published	01.02.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138202/16.04.00_60/ts_138202v160400p.pdf
TSDSI	TSDSI STD T1.3GPP 38.202-16.4.0 V1.2.0	16.4.0	Published	29.05.2024	https://members.tdsi.in/s/eaANKYx7F7xA8fS
TTA	TTAT.3G-38.202V16.4.0	16.4.0	Published	08.05.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.202V16.4.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-38.202.V17.5.0	17.5.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38202-h50.pdf
ATIS	ATIS.3GPP.38.202.V17.5.0	17.5.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.202.V17.5.0	17.5.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.202.V17.5.0.docx
ETSI	ETSI TS 138 202 V17.5.0 (2024-02)	17.5.0	Published	01.02.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138202/17.05.00_60/ts_138202v170500p.pdf
TSDSI	TSDSI STD T1.3GPP 38.202-17.5.0 V1.4.0	17.5.0	Published	29.05.2024	https://members.tdsi.in/s/6koBLoiigxgSWXy
TTA	TTAT.3G-38.202V17.5.0	17.5.0	Published	08.05.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.202V17.5.0&searchCate=TTAS

Release 18

ARIB	ARIB STD-T120-38.202.V18.4.0	18.4.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38202-i40.pdf
ATIS	ATIS.3GPP.38.202.V18.4.0	18.4.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.202.V18.4.0	18.4.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.202.V18.4.0.docx
ETSI	ETSI TS 138 202 V18.4.0 (2024-10)	18.4.0	Published	02.10.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138202/18.04.00_60/ts_138202v180400p.pdf
TSDSI	TSDSI STD T1.3GPP 38.202-18.4.0 V1.1.0	18.4.0	Published	02.03.2025	https://members.tdsi.in/s/pm2MeNYaNzMi9G7
TTA	TTAT.3G-38.202V18.4.0	18.4.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.202V18.4.0&searchCate=TTAS

2.2.1.2.3 TS 38.211**NR; Physical channels and modulation**

This document describes the physical channels and signals for 5G-NR.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-38.211.V15.10.0	15.10.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38211-fa0.pdf
ATIS	ATIS.3GPP.38.211.V15.10.0	15.10.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.211.V15.10.0	15.10.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.211.V15.10.0.docx
ETSI	ETSI TS 138 211 V15.10.0 (2022-01)	15.10.0	Published	25.01.2022	https://www.etsi.org/deliver/etsi_ts/138200_138299/138211/15.10.00_60/ts_138211v151000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.211-15.10.0 V1.1.0	15.10.0	Published	29.07.2022	https://members.tdsi.in/s/83TSy8QGnLpffFe
TTA	TTAT.3G-38.211V15.10.0	15.10.0	Published	14.03.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.211V15.10.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-38.211.V16.10.0	16.10.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38211-ga0.pdf
ATIS	ATIS.3GPP.38.211.V16.10.0	16.10.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.211.V16.10.0	16.10.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.211.V16.10.0.docx
ETSI	ETSI TS 138 211 V16.10.0 (2022-07)	16.10.0	Published	20.07.2022	https://www.etsi.org/deliver/etsi_ts/138200_138299/138211/16.10.00_60/ts_138211v161000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.211-16.10.0 V1.1.0	16.10.0	Published	29.07.2022	https://members.tdsi.in/s/sXJpwEqcWA278wq
TTA	TTAT.3G-38.211V16.10.0	16.10.0	Published	21.10.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.211V16.10.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-38.211.V17.9.0	17.9.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38211-h90.pdf
ATIS	ATIS.3GPP.38.211.V17.9.0	17.9.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.211.V17.9.0	17.9.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.211.V17.9.0.docx
ETSI	ETSI TS 138 211 V17.9.0 (2024-10)	17.9.0	Published	02.10.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138211/17.09.00_60/ts_138211v170900p.pdf
TSDSI	TSDSI STD T1.3GPP 38.211-17.9.0 V1.8.0	17.9.0	Published	02.03.2025	https://members.tdsi.in/s/GPOQPOxrQwTiiwH
TTA	TTAT.3G-38.211V17.9.0	17.9.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.211V17.9.0&searchCate=TTAS

Release 18

ARIB	ARIB STD-T120-38.211.V18.4.0	18.4.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38211-i40.pdf
ATIS	ATIS.3GPP.38.211.V18.4.0	18.4.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.211.V18.4.0	18.4.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.211.V18.4.0.docx
ETSI	ETSI TS 138 211 V18.4.0 (2024-10)	18.4.0	Published	02.10.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138211/18.04.00_60/ts_138211v180400p.pdf
TSDSI	TSDSI STD T1.3GPP 38.211-18.4.0 V1.1.0	18.4.0	Published	02.03.2025	https://members.tdsi.in/s/zrcSbAR38m4H3Yy
TTA	TTAT.3G-38.211V18.4.0	18.4.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.211V18.4.0&searchCate=TTAS

2.2.1.2.4 TS 38.212**NR; Multiplexing and channel coding**

This document specifies the coding, multiplexing and mapping to physical channels for 5G NR.

SDO	Document No.	Version	Status	Issued date	Location

Release 15

ARIB	ARIB STD-T120-38.212.V15.13.0	15.13.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38212-fd0.pdf
ATIS	ATIS.3GPP.38.212.V15.13.0	15.13.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.212.V15.13.0	15.13.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.212.V15.13.0.docx
ETSI	ETSI TS 138 212 V15.13.0 (2022-01)	15.13.0	Published	25.01.2022	https://www.etsi.org/deliver/etsi_ts/138200_138299/138212/15.13.00_60/ts_138212v151300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.212-15.13.0 V1.1.0	15.13.0	Published	29.07.2022	https://members.tdsi.in/s/Yaxz3Jg2X59A6Nz
TTA	TTAT.3G-38.212V15.13.0	15.13.0	Published	14.03.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.212V15.13.0&searchCate=TTAS

Release 16

ARIB	ARIB STD-T120-38.212.V16.14.0	16.14.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38212-ge0.pdf
ATIS	ATIS.3GPP.38.212.V16.14.0	16.14.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.212.V16.14.0	16.14.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.212.V16.14.0.docx
ETSI	ETSI TS 138 212 V16.14.0 (2024-08)	16.14.0	Published	05.08.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138212/16.14.00_60/ts_138212v161400p.pdf
TSDSI	TSDSI STD T1.3GPP 38.212-16.14.0 V1.5.0	16.14.0	Published	19.11.2024	https://members.tdsi.in/s/aT5CP9opRABDWdz
TTA	TTAT.3G-38.212V16.14.0	16.14.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.212V16.14.0&searchCate=TTAS

Release 17

ARIB	ARIB STD-T120-38.212.V17.9.0	17.9.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38212-h90.pdf
ATIS	ATIS.3GPP.38.212.V17.9.0	17.9.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.212.V17.9.0	17.9.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.212.V17.9.0.docx
ETSI	ETSI TS 138 212 V17.9.0 (2024-08)	17.9.0	Published	05.08.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138212/17.09.00_60/ts_138212v170900p.pdf
TSDSI	TSDSI STD T1.3GPP 38.212-17.9.0 V1.8.0	17.9.0	Published	19.11.2024	https://members.tdsi.in/s/4oZBfKJ57RbTwzt
TTA	TTAT.3G-38.212V17.9.0	17.9.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.212V17.9.0&searchCate=TTAS

Release 18

ARIB	ARIB STD-T120-38.212.V18.4.0	18.4.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38212-i40.pdf
ATIS	ATIS.3GPP.38.212.V18.4.0	18.4.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.212.V18.4.0	18.4.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.212.V18.4.0.docx
ETSI	ETSI TS 138 212 V18.4.0 (2024-10)	18.4.0	Published	02.10.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138212/18.04.00_60/ts_138212v180400p.pdf
TSDSI	TSDSI STD T1.3GPP 38.212-18.4.0 V1.1.0	18.4.0	Published	02.03.2025	https://members.tdsi.in/s/di8moiMrf2PytBa
TTA	TTAT.3G-38.212V18.4.0	18.4.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.212V18.4.0&searchCate=TTAS

2.2.1.2.5 TS 38.213**NR; Physical layer procedures for control**

This document specifies and establishes the characteristics of the physical layer procedures for control operations in 5G-NR.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-38.213.V15.15.0	15.15.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38213-ff0.pdf
ATIS	ATIS.3GPP.38.213.V15.15.0	15.15.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.213.V15.15.0	15.15.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.213.V15.15.0.docx
ETSI	ETSI TS 138 213 V15.15.0 (2022-07)	15.15.0	Published	20.07.2022	https://www.etsi.org/deliver/etsi_ts/138200_138299/138213/15.15.00_60/ts_138213v151500p.pdf
TSDSI	TSDSI STD T1.3GPP 38.213-15.15.0 V1.1.0	15.15.0	Published	22.07.2024	https://members.tdsi.in/s/ZSSoPxHE4XBKQ3s
TTA	TTAT.3G-38.213V15.15.0	15.15.0	Published	21.10.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.213V15.15.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-38.213.V16.17.0	16.17.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38213-gh0.pdf
ATIS	ATIS.3GPP.38.213.V16.17.0	16.17.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.213.V16.17.0	16.17.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.213.V16.17.0.docx
ETSI	ETSI TS 138 213 V16.17.0 (2024-04)	16.17.0	Published	22.04.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138213/16.17.00_60/ts_138213v161700p.pdf
TSDSI	TSDSI STD T1.3GPP 38.213-16.17.0 V1.8.0	16.17.0	Published	22.07.2024	https://members.tdsi.in/s/2j9q6Ayk8bomTMX
TTA	TTAT.3G-38.213V16.17.0	16.17.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.213V16.17.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-38.213.V17.11.0	17.11.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38213-hb0.pdf
ATIS	ATIS.3GPP.38.213.V17.11.0	17.11.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.213.V17.11.0	17.11.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.213.V17.11.0.docx
ETSI	ETSI TS 138 213 V17.11.0 (2024-10)	17.11.0	Published	02.10.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138213/17.11.00_60/ts_138213v171100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.213-17.11.0 V1.10.0	17.11.0	Published	02.03.2025	https://members.tdsi.in/s/nEMrMFtkbAwPraZ
TTA	TTAT.3G-38.213V17.11.0	17.11.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.213V17.11.0&searchCate=TTAS

Release 18

ARIB	ARIB STD-T120-38.213.V18.4.0	18.4.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38213-i40.pdf
ATIS	ATIS.3GPP.38.213.V18.4.0	18.4.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.213.V18.4.0	18.4.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.213.V18.4.0.docx
ETSI	ETSI TS 138 213 V18.4.0 (2024-10)	18.4.0	Published	02.10.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138213/18.04.00_60/ts_138213v180400p.pdf
TSDSI	TSDSI STD T1.3GPP 38.213-18.4.0 V1.1.0	18.4.0	Published	02.03.2025	https://members.tdsi.in/s/MwLmBkMGZwWZpGp
TTA	TTAT.3G-38.213V18.4.0	18.4.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.213V18.4.0&searchCate=TTAS

2.2.1.2.6 TS 38.214**NR; Physical layer procedures for data**

This document specifies and establishes the characteristics of the physical layer procedures of data channels for 5G-NR.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-38.214.V15.16.0	15.16.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38214-fg0.pdf
ATIS	ATIS.3GPP.38.214.V15.16.0	15.16.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.214.V15.16.0	15.16.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.214.V15.16.0.docx
ETSI	ETSI TS 138 214 V15.16.0 (2022-04)	15.16.0	Published	26.04.2022	https://www.etsi.org/deliver/etsi_ts/138200_138299/138214/15.16.00_60/ts_138214v151600p.pdf
TSDSI	TSDSI STD T1.3GPP 38.214-15.16.0 V1.1.0	15.16.0	Published	29.07.2022	https://members.tdsi.in/s/KnpB9FgwanMJ3m
TTA	TTAT.3G-38.214V15.16.0	15.16.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.214V15.16.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-38.214.V16.17.0	16.17.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38214-gh0.pdf
ATIS	ATIS.3GPP.38.214.V16.17.0	16.17.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.214.V16.17.0	16.17.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.214.V16.17.0.docx
ETSI	ETSI TS 138 214 V16.17.0 (2024-08)	16.17.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138214/16.17.00_60/ts_138214v161700p.pdf
TSDSI	TSDSI STD T1.3GPP 38.214-16.17.0 V1.8.0	16.17.0	Published	19.11.2024	https://members.tdsi.in/s/HiDRm5QMN36ajoc
TTA	TTAT.3G-38.214V16.17.0	16.17.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.214V16.17.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-38.214.V17.11.0	17.11.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38214-hb0.pdf
ATIS	ATIS.3GPP.38.214.V17.11.0	17.11.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.214.V17.11.0	17.11.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.214.V17.11.0.docx
ETSI	ETSI TS 138 214 V17.11.0 (2024-10)	17.11.0	Published	02.10.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138214/17.11.00_60/ts_138214v171100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.214-17.11.0 V1.9.0	17.11.0	Published	02.03.2025	https://members.tdsi.in/s/gZ4X5Lrz9TmXyfw
TTA	TTAT.3G-38.214V17.11.0	17.11.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.214V17.11.0&searchCate=TTAS

Release 18

ARIB	ARIB STD-T120-38.214.V18.4.0	18.4.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38214-i40.pdf
ATIS	ATIS.3GPP.38.214.V18.4.0	18.4.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.214.V18.4.0	18.4.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.214.V18.4.0.docx
ETSI	ETSI TS 138 214 V18.4.0 (2024-10)	18.4.0	Published	02.10.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138214/18.04.00_60/ts_138214v180400p.pdf
TSDSI	TSDSI STD T1.3GPP 38.214-18.4.0 V1.1.0	18.4.0	Published	02.03.2025	https://members.tdsi.in/s/zADzpmzBMZkwXAd
TTA	TTAT.3G-38.214V18.4.0	18.4.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.214V18.4.0&searchCate=TTAS

2.2.1.2.7 TS 38.215**NR; Physical layer measurements**

This document describes the physical layer measurements for NR.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-38.215.V15.7.0	15.7.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38215-f70.pdf
ATIS	ATIS.3GPP.38.215.V15.7.0	15.7.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.215.V15.7.0	15.7.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.215.V15.7.0.docx
ETSI	ETSI TS 138 215 V15.7.0 (2020-07)	15.7.0	Published	20.07.2020	https://www.etsi.org/deliver/etsi_ts/138200_138299/138215/15.07.00_60/ts_138215v150700p.pdf
TSDSI	TSDSI STD T1.3GPP 38.215-15.7.0 V1.0.0	15.7.0	Published	06.10.2020	https://members.tdsi.in/s/AnM3WpZFZJbg7pb
TTA	TTAT.3G-38.215V15.7.0	15.7.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.215V15.7.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-38.215.V16.7.0	16.7.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38215-g70.pdf
ATIS	ATIS.3GPP.38.215.V16.7.0	16.7.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.215.V16.7.0	16.7.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.215.V16.7.0.docx
ETSI	ETSI TS 138 215 V16.7.0 (2024-02)	16.7.0	Published	01.02.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138215/16.07.00_60/ts_138215v160700p.pdf
TSDSI	TSDSI STD T1.3GPP 38.215-16.7.0 V1.3.0	16.7.0	Published	29.05.2024	https://members.tdsi.in/s/ZH6S3g6ModaxYjY
TTA	TTAT.3G-38.215V16.7.0	16.7.0	Published	08.05.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.215V16.7.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-38.215.V17.5.0	17.5.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38215-h50.pdf
ATIS	ATIS.3GPP.38.215.V17.5.0	17.5.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.215.V17.5.0	17.5.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.215.V17.5.0.docx
ETSI	ETSI TS 138 215 V17.5.0 (2024-08)	17.5.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138215/17.05.00_60/ts_138215v170500p.pdf
TSDSI	TSDSI STD T1.3GPP 38.215-17.5.0 V1.4.0	17.5.0	Published	19.11.2024	https://members.tdsi.in/s/9YEB6gPeKdztmCj
TTA	TTAT.3G-38.215V17.5.0	17.5.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.215V17.5.0&searchCate=TTAS

Release 18

ARIB	ARIB STD-T120-38.215.V18.3.0	18.3.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38215-i30.pdf
ATIS	ATIS.3GPP.38.215.V18.3.0	18.3.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.215.V18.3.0	18.3.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.215.V18.3.0.docx
ETSI	ETSI TS 138 215 V18.3.0 (2024-08)	18.3.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138215/18.03.00_60/ts_138215v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.215-18.3.0 V1.0.0	18.3.0	Published	19.11.2024	https://members.tdsi.in/s/rSF7CSJKCBY3Y2b
TTA	TTAT.3G-38.215V18.3.0	18.3.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.215V18.3.0&searchCate=TTAS

2.2.1.3 Radio Layers 2 & 3**2.2.1.3.1 TS 37.320****Universal Terrestrial Radio Access (UTRA) and Evolved Universal Terrestrial Radio Access (E-UTRA); Radio measurement collection for Minimization of Drive Tests (MDT); Overall description; Stage 2**

This document provides an overview and overall description of the minimization of drive tests functionality. The document describes functions and procedures to support collection of UE-specific measurements for MDT using Control Plane architecture, for both UTRAN and E-UTRAN. Details of the signalling procedures for single-RAT operation are specified in the appropriate radio interface protocol specification. Network operation and overall control of MDT is described in OAM specifications.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-37.320.V15.0.0	15.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/37/A37320-f00.pdf
ATIS	ATIS.3GPP.37.320V1500	15.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.37.320V1500	15.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.320.V16.8.0.docx
ETSI	ETSI TS 137 320 V15.0.0 (2018-07)	15.0.0	Published	16.07.2018	https://www.etsi.org/deliver/etsi_ts/137300_137399/137320/15.00.00_60/ts_137320v150000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.320-15.0.0 V1.0.0	15.0.0	Published	30.08.2021	https://members.tdsi.in/s/nEsiQ2arEtAsTff
TTA	TTAT.3G-37.320V15.0.0	15.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.320V15.0.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-37.320.V16.8.0	16.8.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/37/A37320-g80.pdf
ATIS	ATIS.3GPP.37.320.V16.8.0	16.8.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.37.320.V16.8.0	16.8.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.320.V17.5.0.docx
ETSI	ETSI TS 137 320 V16.8.0 (2022-05)	16.8.0	Published	06.05.2022	https://www.etsi.org/deliver/etsi_ts/137300_137399/137320/16.08.00_60/ts_137320v160800p.pdf
TSDSI	TSDSI STD T1.3GPP 37.320-16.8.0 V1.1.0	16.8.0	Published	29.07.2022	https://members.tdsi.in/s/oMANk67MSpaX2iM
TTA	TTAT.3G-37.320V16.8.0	16.8.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.320V16.8.0&searchCate=TTAS

Release 17

ARIB	ARIB STD-T120-37.320.V17.5.0	17.5.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/37/A37320-h50.pdf
ATIS	ATIS.3GPP.37.320.V17.5.0	17.5.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.37.320.V17.5.0	17.5.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.320.V18.3.0.docx
ETSI	ETSI TS 137 320 V17.5.0 (2023-10)	17.5.0	Published	09.10.2023	https://www.etsi.org/deliver/etsi_ts/137300_137399/137320/17.05.00_60/ts_137320v170500p.pdf
TSDSI	TSDSI STD T1.3GPP 37.320-17.5.0 V1.5.0	17.5.0	Published	29.07.2022	https://members.tdsi.in/s/LGt2C4iqeEtjdGY
TTA	TTAT.3G-37.320V17.5.0	17.5.0	Published	13.02.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.320V17.5.0&searchCate=TTAS

Release 18

ARIB	ARIB STD-T120-37.320.V18.3.0	18.3.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/37/A37320-i30.pdf
ATIS	ATIS.3GPP.37.320.V18.3.0	18.3.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.37.320.V18.3.0	18.3.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.320V1500.doc
ETSI	ETSI TS 137 320 V18.3.0 (2024-10)	18.3.0	Published	14.10.2024	https://www.etsi.org/deliver/etsi_ts/137300_137399/137320/18.03.00_60/ts_137320v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 37.320-18.3.0 V1.1.0	18.3.0	Published	02.03.2025	https://members.tdsi.in/s/ZFismCcJpMKNa7J
TTA	TTAT.3G-37.320V18.3.0	18.3.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.320V18.3.0&searchCate=TTAS

2.2.1.3.2 TS 37.324**Evolved Universal Terrestrial Radio Access (E-UTRA) and NR; Service Data Adaptation Protocol (SDAP) specification**

This document specifies the Service Data Adaptation Protocol (SDAP) for a UE with connection to the 5G-CN.

SDO	Document No.	Version	Status	Issued date	Location

Release 15

ARIB	ARIB STD-T120-37.324.V15.1.0	15.1.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/37/A37324-f10.pdf
ATIS	ATIS.3GPP.37.324.V15.1.0	15.1.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.37.324.V15.1.0	15.1.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.324.V15.1.0.doc
ETSI	ETSI TS 137 324 V15.1.0 (2018-09)	15.1.0	Published	28.09.2018	https://www.etsi.org/deliver/etsi_ts/137300_137399/137324/15.01.00_60/ts_137324v150100p.pdf
TSDSI	TSDSI STD T1.3GPP 37.324-15.1.0 V1.0.0	15.1.0	Published	06.10.2020	https://members.tdsi.in/s/fGEka3JK6dEPk9z
TTA	TTAT.3G-37.324V15.1.0	15.1.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.324V15.1.0&searchCate=TTAS

Release 16

ARIB	ARIB STD-T120-37.324.V16.3.0	16.3.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/37/A37324-g30.pdf
ATIS	ATIS.3GPP.37.324.V16.3.0	16.3.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.37.324.V16.3.0	16.3.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.324.V16.3.0.docx
ETSI	ETSI TS 137 324 V16.3.0 (2021-09)	16.3.0	Published	09.08.2021	https://www.etsi.org/deliver/etsi_ts/137300_137399/137324/16.03.00_60/ts_137324v160300p.pdf
TSDSI	TSDSI STD T1.3GPP 37.324-16.3.0 V1.1.0	16.3.0	Published	29.07.2022	https://members.tdsi.in/s/kLf2K8YeoJa52y
TTA	TTAT.3G-37.324V16.3.0	16.3.0	Published	30.09.2021	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.324V16.3.0&searchCate=TTAS

Release 17

ARIB	ARIB STD-T120-37.324.V17.0.0	17.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/37/A37324-h00.pdf
ATIS	ATIS.3GPP.37.324.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.37.324.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.324.V17.0.0.docx
ETSI	ETSI TS 137 324 V17.0.0 (2022-05)	17.0.0	Published	06.05.2022	https://www.etsi.org/deliver/etsi_ts/137300_137399/137324/17.00.00_60/ts_137324v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.324-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/WtSrXb6GMXfwr72
TTA	TTAT.3G-37.324V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.324V17.0.0&searchCate=TTAS

Release 18

ARIB	ARIB STD-T120-37.324.V18.0.0	18.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/37/A37324-i00.pdf
ATIS	ATIS.3GPP.37.324.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.37.324.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.324.V18.0.0.docx
ETSI	ETSI TS 137 324 V18.0.0 (2024-05)	18.0.0	Published	15.05.2024	https://www.etsi.org/deliver/etsi_ts/137300_137399/137324/18.00.00_60/ts_137324v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.324-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/gQgRAZG9G2zbgyY
TTA	TTAT.3G-37.324V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.324V18.0.0&searchCate=TTAS

2.2.1.3.3 TS 37.340**NR; Multi-connectivity; Overall description; Stage-2**

This document provides an overview of the multi-connectivity operation using E-UTRA and NR radio access technologies. Details of the network and radio interface protocols are specified in companion specifications of the 36 and 38 series.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-37.340.V15.16.0	15.16.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/37/A37340-fg0.pdf
ATIS	ATIS.3GPP.37.340.V15.16.0	15.16.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.37.340.V15.16.0	15.16.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.340.V15.16.0.docx
ETSI	ETSI TS 137 340 V15.16.0 (2022-05)	15.16.0	Published	06.05.2022	https://www.etsi.org/deliver/etsi_ts/137300_137399/137340/15.16.00_60/ts_137340v151600p.pdf
TSDSI	TSDSI STD T1.3GPP 37.340-15.16.0 V1.1.0	15.16.0	Published	29.07.2022	https://members.tdsi.in/s/wY2GacfftFSLtQm
TTA	TTAT.3G-37.340V15.16.0	15.16.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.340V15.16.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-37.340.V16.13.0	16.13.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/37/A37340-gd0.pdf
ATIS	ATIS.3GPP.37.340.V16.13.0	16.13.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.37.340.V16.13.0	16.13.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.340.V16.13.0.docx
ETSI	ETSI TS 137 340 V16.13.0 (2023-10)	16.13.0	Published	09.10.2023	https://www.etsi.org/deliver/etsi_ts/137300_137399/137340/16.13.00_60/ts_137340v161300p.pdf
TSDSI	TSDSI STD T1.3GPP 37.340-16.13.0 V1.4.0	16.13.0	Published	23.02.2024	https://members.tdsi.in/s/9SDKkRsPjJZLjRf
TTA	TTAT.3G-37.340V16.13.0	16.13.0	Published	13.02.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.340V16.13.0&searchCate=TTAS

Release 17

ARIB	ARIB STD-T120-37.340.V17.7.0	17.7.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/37/A37340-h70.pdf
ATIS	ATIS.3GPP.37.340.V17.7.0	17.7.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.37.340.V17.7.0	17.7.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.340.V17.7.0.docx
ETSI	ETSI TS 137 340 V17.7.0 (2024-01)	17.7.0	Published	31.01.2024	https://www.etsi.org/deliver/etsi_ts/137300_137399/137340/17.07.00_60/ts_137340v170700p.pdf
TSDSI	TSDSI STD T1.3GPP 37.340-17.7.0 V1.6.0	17.7.0	Published	29.05.2024	https://members.tdsi.in/s/NkpTmB3fcS47Tqc
TTA	TTAT.3G-37.340V17.7.0	17.7.0	Published	08.05.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.340V17.7.0&searchCate=TTAS

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ARIB	ARIB STD-T120-37.340.V18.3.0	18.3.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/37/A37340-i30.pdf
ATIS	ATIS.3GPP.37.340.V18.3.0	18.3.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.37.340.V18.3.0	18.3.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.340.V18.3.0.docx
ETSI	ETSI TS 137 340 V18.3.0 (2024-10)	18.3.0	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/137300_137399/137340/18.03.00_60/ts_137340v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 37.340-18.3.0 V1.1.0	18.3.0	Published	02.03.2025	https://members.tdsi.in/s/7Bnfa9pPydg3bo4
TTA	TTAT.3G-37.340V18.3.0	18.3.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.340V18.3.0&searchCate=TTAS

2.2.1.3.4 TS 37.355**LTE Positioning Protocol (LPP)**

This document contains the definition of the LTE Positioning Protocol (LPP) for the radio access technologies E-UTRA/LTE and NR.

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Release 15					
ARIB	ARIB STD-T120-37.355.V15.3.0	15.3.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/37/A37355-f30.pdf
ATIS	ATIS.3GPP.37.355.V15.3.0	15.3.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.37.355.V15.3.0	15.3.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.355.V15.3.0.docx
ETSI	ETSI TS 137 355 V15.3.0 (2022-05)	15.3.0	Published	06.05.2022	https://www.etsi.org/deliver/etsi_ts/137300_137399/137355/15.03.00_60/ts_137355v150300p.pdf
TSDSI	TSDSI STD T1.3GPP 37.355-15.3.0 V1.1.0	15.3.0	Published	29.07.2022	https://members.tdsi.in/s/ik3fsLZmA52jGGB
TTA	TTAT.3G-37.355V15.3.0	15.3.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.355V15.3.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-37.355.V16.13.0	16.13.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/37/A37355-gd0.pdf
ATIS	ATIS.3GPP.37.355.V16.13.0	16.13.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.37.355.V16.13.0	16.13.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.355.V16.13.0.docx
ETSI	ETSI TS 137 355 V16.13.0 (2024-05)	16.13.0	Published	07.05.2024	https://www.etsi.org/deliver/etsi_ts/137300_137399/137355/16.13.00_60/ts_137355v161300p.pdf
TSDSI	TSDSI STD T1.3GPP 37.355-16.13.0 V1.6.0	16.13.0	Published	22.07.2024	https://members.tdsi.in/s/RFbz96BZ2g4pa39
TTA	TTAT.3G-37.355V16.13.0	16.13.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.355V16.13.0&searchCate=TTAS

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ARIB	ARIB STD-T120-37.355.V17.8.0	17.8.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/37/A37355-h80.pdf
ATIS	ATIS.3GPP.37.355.V17.8.0	17.8.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.37.355.V17.8.0	17.8.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.355.V17.8.0.docx
ETSI	ETSI TS 137 355 V17.8.0 (2024-05)	17.8.0	Published	07.05.2024	https://www.etsi.org/deliver/etsi_ts/137300_137399/137355/17.08.00_60/ts_137355v170800p.pdf
TSDSI	TSDSI STD T1.3GPP 37.355-17.8.0 V1.8.0	17.8.0	Published	22.07.2024	https://members.tdsi.in/s/fME9dYD3dYCoe5S
TTA	TTAT.3G-37.355V17.8.0	17.8.0	Published	01.08.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.355V17.8.0&searchCate=TTAS

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ATIS	ATIS.3GPP.37.355.V18.3.0	18.3.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.37.355.V18.3.0	18.3.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.355.V18.3.0.docx
ETSI	ETSI TS 137 355 V18.3.0 (2024-10)	18.3.0	Published	14.10.2024	https://www.etsi.org/deliver/etsi_ts/137300_137399/137355/18.03.00_60/ts_137355v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 37.355-18.3.0 V1.1.0	18.3.0	Published	02.03.2025	https://members.tdsi.in/s/pRFAb4xwH26sdDH
TTA	TTAT.3G-37.355V18.3.0	18.3.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.355V18.3.0&searchCate=TTAS

2.2.1.3.5 TS 38.300**NR; NR and NG-RAN Overall description; Stage-2**

This document provides an overview and overall description of the NG-RAN and focuses on the radio interface protocol architecture of NR connected to 5GC (E-UTRA connected to 5GC is covered in the 36 series). Details of the radio interface protocols are specified in companion specifications of the 38 series.

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ARIB	ARIB STD-T120-38.300.V15.18.0	15.18.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38300-fi0.pdf
ATIS	ATIS.3GPP.38.300.V15.18.0	15.18.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.300.V15.18.0	15.18.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.300.V15.18.0.docx
ETSI	ETSI TS 138 300 V15.18.0 (2024-10)	15.18.0	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138300/15.18.00_60/ts_138300v151800p.pdf
TSDSI	TSDSI STD T1.3GPP 38.300-15.18.0 V1.6.0	15.18.0	Published	02.03.2025	https://members.tdsi.in/s/ocj4NJj5fMaDnnw
TTA	TTAT.3G-38.300V15.18.0	15.18.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.460V15.2.0&searchCate=TTAS

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ARIB	ARIB STD-T120-38.300.V16.17.0	16.17.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38300-gh0.pdf
ATIS	ATIS.3GPP.38.300.V16.17.0	16.17.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.300.V16.17.0	16.17.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.300.V16.17.0.docx
ETSI	ETSI TS 138 300 V16.17.0 (2024-10)	16.17.0	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138300/16.17.00_60/ts_138300v161700p.pdf
TSDSI	TSDSI STD T1.3GPP 38.300-16.17.0 V1.9.0	16.17.0	Published	02.03.2025	https://members.tdsi.in/s/mktF32X6r8wGJo8
TTA	TTAT.3G-38.300V16.17.0	16.17.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.300V16.17.0&searchCate=TTAS

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ARIB	ARIB STD-T120-38.300.V17.10.0	17.10.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38300-ha0.pdf
ATIS	ATIS.3GPP.38.300.V17.10.0	17.10.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.300.V17.10.0	17.10.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.300.V17.10.0.docx
ETSI	ETSI TS 138 300 V17.10.0 (2024-10)	17.10.0	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138300/17.10.00_60/ts_138300v171000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.300-17.10.0 V1.10.0	17.10.0	Published	02.03.2025	https://members.tdsi.in/s/BdiKtKgfJEMCCCg
TTA	TTAT.3G-38.300V17.10.0	17.10.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.300V17.10.0&searchCate=TTAS

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ARIB	ARIB STD-T120-38.300.V18.3.0	18.3.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38300-i30.pdf
ATIS	ATIS.3GPP.38.300.V18.3.0	18.3.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.300.V18.3.0	18.3.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.300.V18.3.0.docx
ETSI	ETSI TS 138 300 V18.3.0 (2024-10)	18.3.0	Published	14.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138300/18.03.00_60/ts_138300v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.300-18.3.0 V1.1.0	18.3.0	Published	02.03.2025	https://members.tdsi.in/s/rwkqabpK4XC4aYA
TTA	TTAT.3G-38.300V18.3.0	18.3.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.300V18.3.0&searchCate=TTAS

2.2.1.3.6 TS 38.304**NR; User Equipment (UE) procedures in idle mode and in RRC Inactive state**

This document specifies the Access Stratum (AS) part of the UE procedures in RRC_IDLE state (also called Idle mode) and RRC_INACTIVE state. The non-access stratum (NAS) part of Idle mode procedures and processes is specified in TS 23.122.

This document specifies the model for the functional division between the NAS and AS in a UE.

This document applies to all UEs that support at least NR Radio Access, including multi-RAT UEs as described in 3GPP specifications, in the following cases:

- When the UE is camped on a NR cell;
- When the UE is searching for a cell to camp on;

NOTE – When the UE is camped on or searching for a cell to camp on belonging to other RATs, the UE behaviour is described in the specifications of the other RATs.

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ARIB	ARIB STD-T120-38.304.V15.8.0	15.8.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38304-f80.pdf
ATIS	ATIS.3GPP.38.304.V15.8.0	15.8.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.304.V15.8.0	15.8.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.304.V.16.10.0.docx
ETSI	ETSI TS 138 304 V15.8.0 (2021-10)	15.8.0	Published	10.04.2021	https://www.etsi.org/deliver/etsi_ts/138300_138399/138304/15.08.00_60/ts_138304v150800p.pdf
TSDSI	TSDSI STD T1.3GPP 38.304-15.8.0 V1.1.0	15.8.0	Published	29.07.2022	https://members.tdsi.in/s/kA6kkZ6ZtJM5B7e
TTA	TTAT.3G-38.304V15.8.0	15.8.0	Published	27.01.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.304V15.8.0&searchCate=TTAS

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CCSA	CCSA.3GPP.38.304.V16.10.0	16.10.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.304.V15.8.0.docx
ETSI	ETSI TS 138 304 V16.10.0 (2023-07)	16.10.0	Published	31.07.2023	https://www.etsi.org/deliver/etsi_ts/138300_138399/138304/16.10.00_60/ts_138304v161000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.304-16.10.0 V1.3.0	16.10.0	Published	02.11.2023	https://members.tdsi.in/s/cPrAH6fbdofofokj
TTA	TTAT.3G-38.304V16.10.0	16.10.0	Published	27.10.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.304V16.10.0&searchCate=TTAS

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CCSA	CCSA.3GPP.38.304.V17.9.0	17.9.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.304.V17.9.0.docx
ETSI	ETSI TS 138 304 V17.9.0 (2024-08)	17.9.0	Published	12.08.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138304/17.09.00_60/ts_138304v170900p.pdf
TSDSI	TSDSI STD T1.3GPP 38.304-17.9.0 V1.8.0	17.9.0	Published	19.11.2024	https://members.tdsi.in/s/m67LnQA5GzGxsBF
TTA	TTAT.3G-38.304V17.9.0	17.9.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.304V17.9.0&searchCate=TTAS

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ATIS	ATIS.3GPP.38.304.V18.3.0	18.3.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.304.V18.3.0	18.3.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.304.V18.3.0.docx
ETSI	ETSI TS 138 304 V18.3.0 (2024-10)	18.3.0	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138304/18.03.00_60/ts_138304v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.304-18.3.0 V1.1.0	18.3.0	Published	02.03.2025	https://members.tdsi.in/s/CpQz6T4mtX29QX6
TTA	TTAT.3G-38.304V18.3.0	18.3.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.304V18.3.0&searchCate=TTAS

2.2.1.3.7 TS 38.305**NG Radio Access Network (NG-RAN); Stage 2 functional specification of User Equipment (UE) positioning in NG-RAN**

This document specifies the stage 2 of the UE Positioning function of NG-RAN which provides the mechanisms to support or assist the calculation of the geographical position of a UE. UE position knowledge can be used, for example, in support of Radio Resource Management functions, as well as location-based services for operators, subscribers, and third-party service providers. The purpose of this stage 2 specification is to define the NG-RAN UE Positioning architecture, functional entities and operations to support positioning methods. This description is confined to the NG-RAN Access Stratum. It does not define or describe how the results of the UE position calculation can be utilised in the Core Network (e.g. LCS) or in NG-RAN (e.g. RRM).

UE Positioning may be considered as a network-provided enabling technology consisting of standardised service capabilities that enable the provision of location applications. The application(s) may be service provider specific. The description of the numerous and varied possible location applications which are enabled by this technology is outside the scope of this document. However, clarifying examples of how the functionality being described may be used to provide specific location services may be included.

This stage 2 specification covers the NG-RAN positioning methods, state descriptions, and message flows to support UE Positioning.

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CCSA	CCSA.3GPP.38.305.V15.10.0	15.10.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.305.V15.10.0.docx
ETSI	ETSI TS 138 305 V15.10.0 (2023-07)	15.10.0	Published	26.07.2023	https://www.etsi.org/deliver/etsi_ts/138300_138399/138305/15.10.00_60/ts_138305v151000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.305-15.10.0 V1.2.0	15.10.0	Published	02.11.2023	https://members.tdsi.in/s/Wb9YQroWaN4MJfa
TTA	TTAT.3G-38.305V15.10.0	15.10.0	Published	27.10.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.305V15.10.0&searchCate=TTAS

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ATIS	ATIS.3GPP.38.305.V16.10.0	16.10.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.305.V16.10.0	16.10.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.305.V16.10.0.docx
ETSI	ETSI TS 138 305 V16.10.0 (2024-02)	16.10.0	Published	02.02.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138305/16.10.00_60/ts_138305v161000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.305-16.10.0 V1.4.0	16.10.0	Published	29.05.2024	https://members.tdsi.in/s/A6AcB2ytMExj58A
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Release 17

ARIB	ARIB STD-T120-38.305.V17.7.0	17.7.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38305-h70.pdf
ATIS	ATIS.3GPP.38.305.V17.7.0	17.7.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.305.V17.7.0	17.7.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.305.V17.7.0.docx
ETSI	ETSI TS 138 305 V17.7.0 (2024-02)	17.7.0	Published	02.02.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138305/17.07.00_60/ts_138305v170700p.pdf
TSDSI	TSDSI STD T1.3GPP 38.305-17.7.0 V1.7.0	17.7.0	Published	29.05.2024	https://members.tdsi.in/s/HbasPzrcWYDC9Kr
TTA	TTAT.3G-38.305V17.7.0	17.7.0	Published	08.05.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.305V17.7.0&searchCate=TTAS

Release 18

ARIB	ARIB STD-T120-38.305.V18.3.0	18.3.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38305-i30.pdf
ATIS	ATIS.3GPP.38.305.V18.3.0	18.3.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.305.V18.3.0	18.3.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.305.V18.3.0.docx
ETSI	ETSI TS 138 305 V18.3.0 (2024-10)	18.3.0	Published	14.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138305/18.03.00_60/ts_138305v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.305-18.3.0 V1.1.0	18.3.0	Published	02.03.2025	https://members.tdsi.in/s/G4zycCfDfbxN7gD
TTA	TTAT.3G-38.305V18.3.0	18.3.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.305V18.3.0&searchCate=TTAS

2.2.1.3.8 TS 38.306

NR; User Equipment (UE) radio access capabilities

This document defines the NR UE Radio Access Capability Parameters.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-38.306.V15.26.0	15.26.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38306-fq0.pdf
ATIS	ATIS.3GPP.38.306.V15.26.0	15.26.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.306.V15.26.0	15.26.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.306.V15.26.0.docx
ETSI	ETSI TS 138 306 V15.26.0 (2024-10)	15.26.0	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138306/15.26.00_60/ts_138306v152600p.pdf
TSDSI	TSDSI STD T1.3GPP 38.306-15.26.0 V1.10.0	15.26.0	Published	02.03.2025	https://members.tdsi.in/s/G2PLac6fLsjBJTp
TTA	TTAT.3G-38.306V15.26.0	15.26.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.306V15.26.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-38.306.V16.18.0	16.18.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38306-gi0.pdf
ATIS	ATIS.3GPP.38.306.V16.18.0	16.18.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.306.V16.18.0	16.18.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.306.V16.18.0.docx
ETSI	ETSI TS 138 306 V16.18.0 (2024-10)	16.18.0	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138306/16.18.00_60/ts_138306v161800p.pdf
TSDSI	TSDSI STD T1.3GPP 38.306-16.18.0 V1.10.0	16.18.0	Published	02.03.2025	https://members.tdsi.in/s/EHbnSkkqzr7EZHY
TTA	TTAT.3G-38.306V16.18.0	16.18.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.306V16.18.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-38.306.V17.10.0	17.10.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38306-ha0.pdf
ATIS	ATIS.3GPP.38.306.V17.10.0	17.10.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.306.V17.10.0	17.10.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.306.V17.10.0.docx
ETSI	ETSI TS 138 306 V17.10.0 (2024-10)	17.10.0	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138306/17.10.00_60/ts_138306v171000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.306-17.10.0 V1.10.0	17.10.0	Published	02.03.2025	https://members.tdsi.in/s/HxTbET5q2zKF4Xj
TTA	TTAT.3G-38.306V17.10.0	17.10.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.306V17.10.0&searchCate=TTAS
Release 18					
ARIB	ARIB STD-T120-38.306.V18.3.0	18.3.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38306-i30.pdf
ATIS	ATIS.3GPP.38.306.V18.3.0	18.3.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.306.V18.3.0	18.3.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.306.V18.3.0.docx
ETSI	ETSI TS 138 306 V18.3.0 (2024-10)	18.3.0	Published	14.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138306/18.03.00_60/ts_138306v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.306-18.3.0 V1.1.0	18.3.0	Published	02.03.2025	https://members.tdsi.in/s/4RKTxnbtRdiKNRP
TTA	TTAT.3G-38.306V18.3.0	18.3.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.306V18.3.0&searchCate=TTAS

2.2.1.3.9 TS 38.307

NR; Requirements on User Equipments (UEs) supporting a release-independent frequency band

This document specifies requirements for UEs supporting release independent features such as additional NR operating bands and power classes on top of TS 38.101 and TS 38.133.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-38.307.V15.11.0	15.11.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38307-fb0.pdf
ATIS	ATIS.3GPP.38.307.V15.11.0	15.11.0	Published	22.05.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.307.V15.11.0	15.11.0	Published	22.05.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.307.V15.11.0.docx
ETSI	ETSI TS 138 307 V15.11.0 (2023-05)	15.11.0	Published	03.05.2023	https://www.etsi.org/deliver/etsi_ts/138300_138399/138307/15.11.00_60/ts_138307v151100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.307-15.11.0 V1.2.0	15.11.0	Published	14.08.2023	https://members.tdsi.in/s/fNwREeYpSdSGWdk
TTA	TTAT.3G-38.307V15.11.0	15.11.0	Published	01.08.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.307V15.11.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-38.307.V16.16.0	16.16.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38307-gg0.pdf
ATIS	ATIS.3GPP.38.307.V16.16.0	16.16.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.307.V16.16.0	16.16.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.307.V16.16.0.docx
ETSI	ETSI TS 138 307 V16.16.0 (2024-05)	16.16.0	Published	15.05.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138307/16.16.00_60/ts_138307v161600p.pdf
TSDSI	TSDSI STD T1.3GPP 38.307-16.16.0 V1.6.0	16.16.0	Published	22.07.2024	https://members.tdsi.in/s/AMOpMtFGipXkr5T
TTA	TTAT.3G-38.307V16.16.0	16.16.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.307V16.16.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-38.307.V17.13.0	17.13.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38307-hd0.pdf
ATIS	ATIS.3GPP.38.307.V17.13.0	17.13.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.307.V17.13.0	17.13.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.307.V17.13.0.docx
ETSI	ETSI TS 138 307 V17.13.0 (2024-08)	17.13.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138307/17.13.00_60/ts_138307v171300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.307-17.13.0 V1.8.0	17.13.0	Published	19.11.2024	https://members.tdsi.in/s/QcAXi9KKitCJr2Y
TTA	TTAT.3G-38.307V17.13.0	17.13.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.307V17.13.0&searchCate=TTAS
Release 18					
ARIB	ARIB STD-T120-38.307.V18.2.0	18.2.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38307-i20.pdf
ATIS	ATIS.3GPP.38.307.V18.2.0	18.2.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.307.V18.2.0	18.2.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.307.V18.2.0.docx
ETSI	ETSI TS 138 307 V18.2.0 (2024-08)	18.2.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138307/18.02.00_60/ts_138307v180200p.pdf
TSDSI	TSDSI STD T1.3GPP 38.307-18.2.0 V1.0.0	18.2.0	Published	19.11.2024	https://members.tdsi.in/s/nJbCstnLAzdorPY
TTA	TTAT.3G-38.307V18.2.0	18.2.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.307V18.2.0&searchCate=TTAS

2.2.1.3.10 TS 38.314

NR; Layer 2 measurements

This document contains the description and definition of the measurements performed by NR or the UE that are transferred over the standardised interfaces in order to support NR radio link operations, radio resource management (RRM), network operations and maintenance (OAM), minimization of drive tests (MDT) and self-organising networks (SON).

Only the differences relative to TS 28.552 are specified in this specification.

SDO	Document No.	Version	Status	Issued date	Location
Release 16					
ARIB	ARIB STD-T120-38.314.V16.4.0	16.4.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38314-g40.pdf
ATIS	ATIS.3GPP.38.314.V16.4.0	16.4.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.314.V16.4.0	16.4.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.314.V16.4.0.docx
ETSI	ETSI TS 138 314 V16.4.0 (2021-10)	16.4.0	Published	13.10.2021	https://www.etsi.org/deliver/etsi_ts/138300_138399/138314/16.04.00_60/ts_138314v160400p.pdf
TSDSI	TSDSI STD T1.3GPP 38.314-16.4.0 V1.1.0	16.4.0	Published	29.07.2022	https://members.tdsi.in/s/mZ2YXtS3wTt274t
TTA	TTAT.3G-38.314V16.4.0	16.4.0	Published	27.01.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.314V16.4.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-38.314.V17.5.0	17.5.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38314-h50.pdf
ATIS	ATIS.3GPP.38.314.V17.5.0	17.5.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.314.V17.5.0	17.5.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.314.V17.5.0.docx
ETSI	ETSI TS 138 314 V17.5.0 (2024-05)	17.5.0	Published	14.05.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138314/17.05.00_60/ts_138314v170500p.pdf
TSDSI	TSDSI STD T1.3GPP 38.314-17.5.0 V1.5.0	17.5.0	Published	22.07.2024	https://members.tdsi.in/s/ce9sRRHH2tWdREK
TTA	TTAT.3G-38.314V17.5.0	17.5.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.314V17.5.0&searchCate=TTAS
Release 18					
ARIB	ARIB STD-T120-38.314.V18.0.0	18.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38314-i00.pdf
ATIS	ATIS.3GPP.38.314.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.314.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.314.V18.0.0.docx
ETSI	ETSI TS 138 314 V18.0.0 (2024-05)	18.0.0	Published	27.05.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138314/18.00.00_60/ts_138314v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.314-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/PATWfHRzFDMPdG4
TTA	TTAT.3G-38.314V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.314V18.0.0&searchCate=TTAS

2.2.1.3.11 TS 38.321

NR; Medium Access Control (MAC) protocol specification

This document specifies the NR MAC protocol.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-38.321.V15.13.0	15.13.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38321-fd0.pdf
ATIS	ATIS.3GPP.38.321.V15.13.0	15.13.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.321.V15.13.0	15.13.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.321.V15.13.0.docx
ETSI	ETSI TS 138 321 V15.13.0 (2022-05)	15.13.0	Published	06.05.2022	https://www.etsi.org/deliver/etsi_ts/138300_138399/138321/15.13.00_60/ts_138321v151300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.321-15.13.0 V1.1.0	15.13.0	Published	29.07.2022	https://members.tdsi.in/s/4NQmLiNYZMn46Pn
TTA	TTAT.3G-38.321V15.13.0	15.13.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.321V15.13.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-38.321.V16.17.0	16.17.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38321-gh0.pdf
ATIS	ATIS.3GPP.38.321.V16.17.0	16.17.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.321.V16.17.0	16.17.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.321.V16.17.0.docx
ETSI	ETSI TS 138 321 V16.17.0 (2024-10)	16.17.0	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138321/16.17.00_60/ts_138321v161700p.pdf
TSDSI	TSDSI STD T1.3GPP 38.321-16.17.0 V1.9.0	16.17.0	Published	02.03.2025	https://members.tdsi.in/s/E5QFpwLXBaSb2Dy
TTA	TTAT.3G-38.321V16.17.0	16.17.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.321V16.17.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-38.321.V17.10.0	17.10.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38321-ha0.pdf
ATIS	ATIS.3GPP.38.321.V17.10.0	17.10.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.321.V17.10.0	17.10.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.321.V17.10.0.docx
ETSI	ETSI TS 138 321 V17.10.0 (2024-10)	17.10.0	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138321/17.10.00_60/ts_138321v171000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.321-17.10.0 V1.10.0	17.10.0	Published	02.03.2025	https://members.tdsi.in/s/HpSZYRL_EodRpntp
TTA	TTAT.3G-38.321V17.10.0	17.10.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.321V17.10.0&searchCate=TTAS
Release 18					
ARIB	ARIB STD-T120-38.321.V18.3.0	18.3.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38321-i30.pdf
ATIS	ATIS.3GPP.38.321.V18.3.0	18.3.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.321.V18.3.0	18.3.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.321.V18.3.0.docx
ETSI	ETSI TS 138 321 V18.3.0 (2024-10)	18.3.0	Published	14.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138321/18.03.00_60/ts_138321v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.321-18.3.0 V1.1.0	18.3.0	Published	02.03.2025	https://members.tdsi.in/s/dpPHkgmy2ErRaXd
TTA	TTAT.3G-38.321V18.3.0	18.3.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.321V18.3.0&searchCate=TTAS

2.2.1.3.12 TS 38.322**NR; Radio Link Control (RLC) protocol specification**

This document specifies the NR Radio Link Control (RLC) protocol for the UE – NR radio interface.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-38.322.V15.5.0	15.5.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38322-f50.pdf
ATIS	ATIS.3GPP.38.322.V15.5.0	15.5.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.322.V15.5.0	15.5.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.322.V15.5.0.docx
ETSI	ETSI TS 138 322 V15.5.0 (2019-05)	15.5.0	Published	10.05.2019	https://www.etsi.org/deliver/etsi_ts/138300_138399/138322/15.05.00_60/ts_138322v150500p.pdf
TSDSI	TSDSI STD T1.3GPP 38.322-15.5.0 V1.0.0	15.5.0	Published	06.10.2020	https://members.tdsi.in/s/Qn9iZdpbf4ZrEn
TTA	TTAT.3G-38.322V15.5.0	15.5.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.322V15.5.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-38.322.V16.3.0	16.3.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38322-g30.pdf
ATIS	ATIS.3GPP.38.322.V16.3.0	16.3.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.322.V16.3.0	16.3.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.322.V16.3.0.docx
ETSI	ETSI TS 138 322 V16.3.0 (2022-08)	16.3.0	Published	17.08.2022	https://www.etsi.org/deliver/etsi_ts/138300_138399/138322/16.03.00_60/ts_138322v160300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.322-16.3.0 V1.1.0	16.3.0	Published	29.07.2022	https://members.tdsi.in/s/aR8BzQ4LHn9NByk
TTA	TTAT.3G-38.322V16.3.0	16.3.0	Published	21.10.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.322V16.3.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-38.322.V17.4.0	17.4.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38322-h40.pdf
ATIS	ATIS.3GPP.38.322.V17.4.0	17.4.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.322.V17.4.0	17.4.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.322.V17.4.0.docx
ETSI	ETSI TS 138 322 V17.4.0 (2024-05)	17.4.0	Published	15.05.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138322/17.04.00_60/ts_138322v170400p.pdf
TSDSI	TSDSI STD T1.3GPP 38.322-17.4.0 V1.4.0	17.4.0	Published	22.07.2024	https://members.tdsi.in/s/T5Zwi8wae5ESBFX
TTA	TTAT.3G-38.322V17.4.0	17.4.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.322V17.4.0&searchCate=TTAS
Release 18					
ARIB	ARIB STD-T120-38.322.V18.1.0	18.1.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38322-i10.pdf
ATIS	ATIS.3GPP.38.322.V18.1.0	18.1.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.322.V18.1.0	18.1.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.322.V18.1.0.docx
ETSI	ETSI TS 138 322 V18.1.0 (2024-08)	18.1.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138322/18.01.00_60/ts_138322v180100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.322-18.1.0 V1.0.0	18.1.0	Published	19.11.2024	https://members.tdsi.in/s/pN2AT59JDGqQRoG
TTA	TTAT.3G-38.322V18.1.0	18.1.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.322V18.1.0&searchCate=TTAS

2.2.1.3.13 TS 38.323

NR; Packet Data Convergence Protocol (PDCP) specification

This document provides the description of the Packet Data Convergence Protocol (PDCP).

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-38.323.V15.8.0	15.8.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38323-f80.pdf
ATIS	ATIS.3GPP.38.323.V15.8.0	15.8.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.323.V15.8.0	15.8.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.323.V15.8.0.docx
ETSI	ETSI TS 138 323 V15.8.0 (2021-09)	15.8.0	Published	09.10.2021	https://www.etsi.org/deliver/etsi_ts/138300_138399/138323/15.08.00_60/ts_138323v150800p.pdf
TSDSI	TSDSI STD T1.3GPP 38.323-15.8.0 V1.1.0	15.8.0	Published	29.07.2022	https://members.tdsi.in/s/9Fjep8Hb7YLN4e9
TTA	TTAT.3G-38.323V15.8.0	15.8.0	Published	30.09.2021	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.323V15.8.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-38.323.V16.8.0	16.8.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38323-g80.pdf
ATIS	ATIS.3GPP.38.323.V16.8.0	16.8.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.323.V16.8.0	16.8.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.323.V16.8.0.docx
ETSI	ETSI TS 138 323 V16.8.0 (2023-01)	16.8.0	Published	20.01.2023	https://www.etsi.org/deliver/etsi_ts/138300_138399/138323/16.08.00_60/ts_138323v160800p.pdf
TSDSI	TSDSI STD T1.3GPP 38.323-16.8.0 V1.2.0	16.8.0	Published	02.05.2023	https://members.tdsi.in/s/NfsjCam65FwJ5pG
TTA	TTAT.3G-38.323V16.8.0	16.8.0	Published	16.03.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.323V16.8.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-38.323.V17.5.0	17.5.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38323-h50.pdf
ATIS	ATIS.3GPP.38.323.V17.5.0	17.5.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.323.V17.5.0	17.5.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.323.V17.5.0.docx
ETSI	ETSI TS 138 323 V17.5.0 (2023-07)	17.5.0	Published	26.07.2023	https://www.etsi.org/deliver/etsi_ts/138300_138399/138323/17.05.00_60/ts_138323v170500p.pdf
TSDSI	TSDSI STD T1.3GPP 38.323-17.5.0 V1.5.0	17.5.0	Published	02.11.2023	https://members.tdsi.in/s/zm35Xt8A4zazpR6
TTA	TTAT.3G-38.323V17.5.0	17.5.0	Published	27.10.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.323V17.5.0&searchCate=TTAS
Release 18					
ARIB	ARIB STD-T120-38.323.V18.3.0	18.3.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38323-i30.pdf
ATIS	ATIS.3GPP.38.323.V18.3.0	18.3.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.323.V18.3.0	18.3.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.323.V18.3.0.docx
ETSI	ETSI TS 138 323 V18.3.0 (2024-10)	18.3.0	Published	14.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138323/18.03.00_60/ts_138323v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.323-18.3.0 V1.1.0	18.3.0	Published	02.03.2025	https://members.tdsi.in/s/4cwDRBeYj2ZrSfK
TTA	TTAT.3G-38.323V18.3.0	18.3.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.323V18.3.0&searchCate=TTAS

2.2.1.3.14 TS 38.331

NR; Radio Resource Control (RRC); Protocol specification

This document specifies the Radio Resource Control protocol for the radio interface between UE and NG-RAN.

The scope of this document also includes:

- the radio related information transported in a transparent container between source gNB and target gNB upon inter gNB handover;
- the radio related information transported in a transparent container between a source or target gNB and another system upon inter RAT handover.
- the radio related information transported in a transparent container between a source eNB and target gNB during E-UTRA-NR Dual Connectivity.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-38.331.V15.27.0	15.27.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38331-fr0.pdf
ATIS	ATIS.3GPP.38.331.V15.27.0	15.27.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.331.V15.27.0	15.27.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.331.V15.27.0.docx
ETSI	ETSI TS 138 331 V15.27.0 (2024-10)	15.27.0	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138331/15.27.00_60/ts_138331v152700p.pdf
TSDSI	TSDSI STD T1.3GPP 38.331-15.27.0 V1.10.0	15.27.0	Published	02.03.2025	https://members.tdsi.in/s/fwCsrwGe88qwSJL
TTA	TTAT.3G-38.331V15.27.0	15.27.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.331V15.27.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-38.331.V16.18.0	16.18.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38331-gi0.pdf
ATIS	ATIS.3GPP.38.331.V16.18.0	16.18.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.331.V16.18.0	16.18.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.331.V16.18.0.docx
ETSI	ETSI TS 138 331 V16.18.0 (2024-10)	16.18.0	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138331/16.18.00_60/ts_138331v161800p.pdf
TSDSI	TSDSI STD T1.3GPP 38.331-16.18.0 V1.10.0	16.18.0	Published	02.03.2025	https://members.tdsi.in/s/DQjki3oedpSXGEg
TTA	TTAT.3G-38.331V16.18.0	16.18.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.331V16.18.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-38.331.V17.10.0	17.10.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38331-ha0.pdf
ATIS	ATIS.3GPP.38.331.V17.10.0	17.10.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.331.V17.10.0	17.10.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.331.V17.10.0.docx
ETSI	ETSI TS 138 331 V17.10.0 (2024-10)	17.10.0	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138331/17.10.00_60/ts_138331v171000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.331-17.10.0 V1.10.0	17.10.0	Published	02.03.2025	https://members.tdsi.in/s/EX4bWYm6dZRLGbg
TTA	TTAT.3G-38.331V17.10.0	17.10.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.331V17.10.0&searchCate=TTAS

Release 18

ARIB	ARIB STD-T120-38.331.V18.3.0	18.3.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38331-i30.pdf
ATIS	ATIS.3GPP.38.331.V18.3.0	18.3.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.331.V18.3.0	18.3.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.331.V18.3.0.docx
ETSI	ETSI TS 138 331 V18.3.0 (2024-10)	18.3.0	Published	14.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138331/18.03.00_60/ts_138331v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.331-18.3.0 V1.1.0	18.3.0	Published	02.03.2025	https://members.tdsi.in/s/nDAKGfrfBEMeK7R
TTA	TTAT.3G-38.331V18.3.0	18.3.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.331V18.3.0&searchCate=TTAS

2.2.1.3.15 TS 38.340**NR; Backhaul Adaptation Protocol (BAP) specification**

This document provides description of the Backhaul Adaptation Protocol (BAP).

SDO	Document No.	Version	Status	Issued date	Location
Release 16					
ARIB	ARIB STD-T120-38.340.V16.5.0	16.5.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38340-g50.pdf
ATIS	ATIS.3GPP.38.340.V16.5.0	16.5.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.340.V16.5.0	16.5.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.340.V16.5.0.docx
ETSI	ETSI TS 138 340 V16.5.0 (2021-09)	16.5.0	Published	09.10.2021	https://www.etsi.org/deliver/etsi_ts/138300_138399/138340/16.05.00_60/ts_138340v160500p.pdf
TSDSI	TSDSI STD T1.3GPP 38.340-16.5.0 V1.1.0	16.5.0	Published	29.07.2022	https://members.tdsi.in/s/tjzJW53jLXbX8Ni
TTA	TTAT.3G-38.340V16.5.0	16.5.0	Published	30.09.2021	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.340V16.5.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-38.340.V17.5.0	17.5.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38340-h50.pdf
ATIS	ATIS.3GPP.38.340.V17.5.0	17.5.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.340.V17.5.0	17.5.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.340.V17.5.0.docx
ETSI	ETSI TS 138 340 V17.5.0 (2023-07)	17.5.0	Published	26.07.2023	https://www.etsi.org/deliver/etsi_ts/138300_138399/138340/17.05.00_60/ts_138340v170500p.pdf
TSDSI	TSDSI STD T1.3GPP 38.340-17.5.0 V1.5.0	17.5.0	Published	02.11.2023	https://members.tdsi.in/s/ZBWpWYL4XE67dpa
TTA	TTAT.3G-38.340V17.5.0	17.5.0	Published	27.10.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.340V17.5.0&searchCate=TTAS
Release 18					
ARIB	ARIB STD-T120-38.340.V18.1.0	18.1.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38340-i10.pdf
ATIS	ATIS.3GPP.38.340.V18.1.0	18.1.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.340.V18.1.0	18.1.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.340.V18.1.0.docx
ETSI	ETSI TS 138 340 V18.1.0 (2024-10)	18.1.0	Published	14.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138340/18.01.00_60/ts_138340v180100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.340-18.1.0 V1.1.0	18.1.0	Published	02.03.2025	https://members.tdsi.in/s/S3nKBGg3yxp8kKi
TTA	TTAT.3G-38.340V18.1.0	18.1.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.340V18.1.0&searchCate=TTAS

2.2.1.3.16 TS 38.351

NR; Sidelink Relay Adaptation Protocol (SRAP) Specification

This document provides description of the Sidelink Relay Adaptation Protocol (SRAP).

SDO	Document No.	Version	Status	Issued date	Location
Release 17					
ARIB	ARIB STD-T120-38.351.V17.7.0	17.7.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38351-h70.pdf
ATIS	ATIS.3GPP.38.351.V17.7.0	17.7.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.351.V17.7.0	17.7.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.351.V17.7.0.docx
ETSI	ETSI TS 138 351 V17.7.0 (2024-05)	17.7.0	Published	13.05.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138351/17.07.00_60/ts_138351v170700p.pdf
TSDSI	TSDSI STD T1.3GPP 38.351-17.7.0 V1.7.0	17.7.0	Published	22.07.2024	https://members.tdsi.in/s/yJ6HZg74NWQ5ZY0
TTA	TTAT.3G-38.351V17.7.0	17.7.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.351V17.7.0&searchCate=TTAS
Release 18					
ARIB	ARIB STD-T120-38.351.V18.2.0	18.2.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38351-i20.pdf
ATIS	ATIS.3GPP.38.351.V18.2.0	18.2.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.351.V18.2.0	18.2.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.351.V18.2.0.docx
ETSI	ETSI TS 138 351 V18.2.0 (2024-08)	18.2.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138351/18.02.00_60/ts_138351v180200p.pdf
TSDSI	TSDSI STD T1.3GPP 38.351-18.2.0 V1.0.0	18.2.0	Published	19.11.2024	https://members.tdsi.in/s/gqPgjxJiD3xsof2
TTA	TTAT.3G-38.351V18.2.0	18.2.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.351V18.2.0&searchCate=TTAS

2.2.1.3.16 TS 38.355

NR; Sidelink Positioning Protocol (SLPP); Protocol Specification

This document specifies the Sidelink Positioning Protocol (SLPP) for the interface between UEs and between UE and LMF.

2.2.1.4 Architecture

SDO	Document No.	Version	Status	Issued date	Location
Release 18					
ARIB	ARIB STD-T120-38.355.V18.3.0	18.3.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38355-i30.pdf
ATIS	ATIS.3GPP.38.355.V18.3.0	18.3.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.355.V18.3.0	18.3.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.355.V18.3.0.docx
ETSI	ETSI TS 138 355 V18.3.0 (2024-10)	18.3.0	Published	14.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138355/18.03.00_60/ts_138355v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.355-18.3.0 V1.1.0	18.3.0	Published	19.11.2024	https://members.tdsi.in/s/ZojkX4tACYAqErN
TTA	TTAT.3G-38.355V18.3.0	18.3.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.355V18.3.0&searchCate=TTAS

2.2.1.4.1 TS 37.460

Iuant interface: General aspects and principles

This document is an introduction to the 3GPP TS 37.46x series of Technical Specifications that define the Iuant Interface. The Iuant interface is applicable for UTRAN, E-UTRAN and NG-RAN. In this specification UTRAN, E-UTRAN and NG-RAN are denoted as “RAN”, whereas the corresponding network entities Node B, eNB, en-gNB and NG-RAN node are denoted as “RAN Node”. The logical Iuant interface is an interface internal to the RAN Node and defined to reside between the implementation specific O&M function and the RET antennas and between the implementation specific O&M function and the TMA control unit function.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-37.460.V15.2.0	15.2.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/37/A37460-f20.pdf
ATIS	ATIS.3GPP.37.460V1520	15.2.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.37.460V1520	15.2.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.460.V17.0.0.doc
ETSI	ETSI TS 137 460 V15.2.0 (2020-01)	15.2.0	Published	17.01.2020	https://www.etsi.org/deliver/etsi_ts/137400_137499/137460/15.02.00_60/ts_137460v150200p.pdf
TSDSI	TSDSI STD T1.3GPP 37.460-15.2.0 V1.0.0	15.2.0	Published	06.10.2020	https://members.tdsi.in/s/rp8JB3P2mmmSjaW
TTA	TTAT.3G-37.460V15.2.0	15.2.0	Published	11.09.2020	
Release 16					
ARIB	ARIB STD-T120-37.460.V16.0.0	16.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/37/A37460-g00.pdf
ATIS	ATIS.3GPP.37.460V1600	16.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.37.460V1600	16.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.460.V18.0.0.docx
ETSI	ETSI TS 137 460 V16.0.0 (2020-09)	16.0.0	Published	15.09.2020	https://www.etsi.org/deliver/etsi_ts/137400_137499/137460/16.00.00_60/ts_137460v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.460 -16.0.0 V1.0.0	16.0.0	Published	30.08.2021	https://members.tdsi.in/s/Q2adpN3o944eo87
TTA	TTAT.3G-37.460V16.0.0	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.460V16.0.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-37.460.V17.0.0	17.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/37/A37460-h00.pdf
ATIS	ATIS.3GPP.37.460.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.37.460.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.460V1520.doc
ETSI	ETSI TS 137 460 V17.0.0 (2022-04)	17.0.0	Published	29.04.2022	https://www.etsi.org/deliver/etsi_ts/137400_137499/137460/17.00.00_60/ts_137460v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.460-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/x4YnRkAA4gSfc3W
TTA	TTAT.3G-37.460V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.460V17.0.0&searchCate=TTAS
Release 18					
ARIB	ARIB STD-T120-37.460.V18.0.0	18.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/37/A37460-i00.pdf
ATIS	ATIS.3GPP.37.460.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.37.460.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.460V1600.doc
ETSI	ETSI TS 137 460 V18.0.0 (2024-05)	18.0.0	Published	23.05.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137460/18.00.00_60/ts_137460v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.460-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/xfEDfBBcKbyWi4H
TTA	TTAT.3G-37.460V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.460V18.0.0&searchCate=TTAS

2.2.1.4.2 TS 37.461

Iuant interface: Layer 1

This document specifies the standards allowed to implement layer 1 on the Iuant interface for UTRA, E-UTRA and NR.

The specification of transmission delay requirements and O&M requirements are not in the scope of this document.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-37.461.V15.5.0	15.5.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/37/A37461-f50.pdf
ATIS	ATIS.3GPP.37.461.V15.5.0	15.5.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.37.461.V15.5.0	15.5.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.461.V15.5.0.docx
ETSI	ETSI TS 137 461 V15.5.0 (2022-07)	15.5.0	Published	20.07.2022	https://www.etsi.org/deliver/etsi_ts/137400_137499/137461\15.05.00_60/ts_137461v150500p.pdf
TSDSI	TSDSI STD T1.3GPP 37.461-15.5.0 V1.1.0	15.5.0	Published	29.07.2022	https://members.tdsi.in/s/fPQrFZtwzAxWxww
TTA	TTAT.3G-37.461V15.5.0	15.5.0	Published	21.10.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.461V15.5.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-37.461.V16.1.0	16.1.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/37/A37461-g10.pdf
ATIS	ATIS.3GPP.37.461.V16.1.0	16.1.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.37.461.V16.1.0	16.1.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.461.V16.1.0.docx
ETSI	ETSI TS 137 461 V16.1.0 (2022-07)	16.1.0	Published	20.07.2022	https://www.etsi.org/deliver/etsi_ts/137400_137499/137461\16.01.00_60/ts_137461v160100p.pdf
TSDSI	TSDSI STD T1.3GPP 37.461-16.1.0 V1.1.0	16.1.0	Published	29.07.2022	https://members.tdsi.in/s/5ZdEG9MME32dF9x
TTA	TTAT.3G-37.461V16.1.0	16.1.0	Published	21.10.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.461V16.1.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-37.461.V17.1.0	17.1.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/37/A37461-h10.pdf
ATIS	ATIS.3GPP.37.461.V17.1.0	17.1.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.37.461.V17.1.0	17.1.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.461.V17.1.0.docx
ETSI	ETSI TS 137 461 V17.1.0 (2022-07)	17.1.0	Published	20.07.2022	https://www.etsi.org/deliver/etsi_ts/137400_137499/137461\17.01.00_60/ts_137461v170100p.pdf
TSDSI	TSDSI STD T1.3GPP 37.461-17.1.0 V1.1.0	17.1.0	Published	29.07.2022	https://members.tdsi.in/s/36rizmz5P3tKG6b
TTA	TTAT.3G-37.461V17.1.0	17.1.0	Published	21.10.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.461V17.1.0&searchCate=TTAS
Release 18					
ARIB	ARIB STD-T120-37.461.V18.0.0	18.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/37/A37461-i00.pdf
ATIS	ATIS.3GPP.37.461.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.37.461.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.461.V18.0.0.docx
ETSI	ETSI TS 137 461 V18.0.0 (2024-05)	18.0.0	Published	23.05.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137461\18.00.00_60/ts_137461v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.461-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/T5sfZLDZxs8nGDq
TTA	TTAT.3G-37.461V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.461V18.0.0&searchCate=TTAS

2.2.1.4.3 TS 37.462

Iuant interface: Signalling transport

This document specifies the signalling transport related to RETAP and TMAAP signalling to be used across the Iuant interface for UTRAN, E-UTRAN and NG-RAN. In this specification UTRAN, E-UTRAN and NG-RAN are denoted as “RAN”, whereas the corresponding network entities Node B, eNB, en-gNB and NG-RAN node are denoted as “RAN Node”. The logical Iuant interface is an interface internal to the RAN Node and defined to reside between the implementation specific O&M function and the RET antennas and between the implementation specific O&M function and the TMA control unit function.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-37.462.V15.2.0	15.2.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/37/A37462-f20.pdf
ATIS	ATIS.3GPP.37.462V1520	15.2.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.37.462V1520	15.2.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.462.V17.0.0.doc
ETSI	ETSI TS 137 462 V15.2.0 (2020-01)	15.2.0	Published	17.01.2020	https://www.etsi.org/deliver/etsi_ts/137400_137499/137462\15.02.00_60/ts_137462v150200p.pdf
TSDSI	TSDSI STD T1.3GPP 37.462-15.2.0 V1.0.0	15.2.0	Published	30.08.2021	https://members.tdsi.in/index.php/s/KNsFQxJedmeTETQ
TTA	TTAT.3G-37.462V15.2.0	15.2.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.462V15.2.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-37.462.V16.0.0	16.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/37/A37462-g00.pdf
ATIS	ATIS.3GPP.37.462V1600	16.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.37.462V1600	16.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.462.V18.0.0.docx
ETSI	ETSI TS 137 462 V16.0.0 (2020-09)	16.0.0	Published	17.09.2020	https://www.etsi.org/deliver/etsi_ts/137400_137499/137462\16.00.00_60/ts_137462v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.462-16.0.0 V1.0.0	16.0.0	Published	06.10.2020	https://members.tdsi.in/s/g9Kt9LZGbYbCdL9
TTA	TTAT.3G-37.462V16.0.0	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.462V16.0.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-37.462.V17.0.0	17.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/37/A37462-h00.pdf
ATIS	ATIS.3GPP.37.462.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.37.462.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.462V1520.doc
ETSI	ETSI TS 137 462 V17.0.0 (2022-04)	17.0.0	Published	29.04.2022	https://www.etsi.org/deliver/etsi_ts/137400_137499/137462\17.00.00_60/ts_137462v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.462-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/CTJZ93Cp93psYeL
TTA	TTAT.3G-37.462V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.462V17.0.0&searchCate=TTAS
Release 18					
ARIB	ARIB STD-T120-37.462.V18.0.0	18.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/37/A37462-i00.pdf
ATIS	ATIS.3GPP.37.462.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.37.462.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.462V1600.doc
ETSI	ETSI TS 137 462 V18.0.0 (2024-05)	18.0.0	Published	23.05.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137462\18.00.00_60/ts_137462v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.462-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/LNtXJonepJyx6k9
TTA	TTAT.3G-37.462V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.462V18.0.0&searchCate=TTAS

2.2.1.4.4 TS 37.466

Iuant interface: Application part

This document is an introduction to the 3GPP TS 37.46x series of Technical Specifications that define the Iuant Interface. The Iuant interface is applicable for UTRAN, E-UTRAN and NG-RAN. In this specification UTRAN, E-UTRAN and NG-RAN are denoted as “RAN”, whereas the corresponding network entities Node B, eNB, en-gNB and NG-RAN node are denoted as “RAN Node”. The logical Iuant interface is an interface internal to the RAN Node and defined to reside between the implementation specific O&M function and the RET antennas together with the TMAs control unit function of the RAN Node.

This document is applicable for UTRAN, E-UTRAN and NG-RAN and specifies the *Remote Electrical Tilting Application Part (RETAP)* and the *Tower Mounted Amplifier Application Part (TMAAP)*. In this specification UTRAN, E-UTRAN and NG-RAN are denoted as “RAN”, whereas the corresponding network entities Node B, eNB, en-gNB and NG-RAN node are denoted as “RAN Node”. RETAP supports the functions of the Iuant interface between the implementation specific O&M transport function and the RET Antenna Control unit function, TMAAP supports the functions of the Iuant interface between the implementation specific O&M transport function and the TMA control function.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-37.466.V15.5.0	15.5.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/37/A37466-f50.pdf
ATIS	ATIS.3GPP.37.466V1550	15.5.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.37.466V1550	15.5.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.466.V17.0.0.doc
ETSI	ETSI TS 137 466 V15.5.0 (2020-01)	15.5.0	Published	17.01.2020	https://www.etsi.org/deliver/etsi_ts/137400_137499/137466/15.05.00_60/ts_137466v150500p.pdf
TSDSI	TSDSI STD T1.3GPP 37.466-15.5.0 V1.0.0	15.5.0	Published	30.08.2021	https://members.tdsi.in/s/4i7wDFgLLzsJqbd
TTA	TTAT.3G-37.466V15.5.0	15.5.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.466V15.5.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-37.466.V16.0.0	16.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/37/A37466-g00.pdf
ATIS	ATIS.3GPP.37.466V1600	16.0.0	Published	28.06.2021	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.37.466V1600	16.0.0	Published	28.06.2021	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.466.V18.0.0.docx
ETSI	ETSI TS 137 466 V16.0.0 (2020-09)	16.0.0	Published	18.09.2020	https://www.etsi.org/deliver/etsi_ts/137400_137499/137466/16.00.00_60/ts_137466v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.466-16.0.0 V1.0.0	16.0.0	Published	30.08.2021	https://members.tdsi.in/s/ijc9kzsw7P4pnPB
TTA	TTAT.3G-37.466V16.0.0	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.466V16.0.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-37.466.V17.0.0	17.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/37/A37466-h00.pdf
ATIS	ATIS.3GPP.37.466.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.37.466.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.466V1550.doc
ETSI	ETSI TS 137 466 V17.0.0 (2022-04)	17.0.0	Published	29.04.2022	https://www.etsi.org/deliver/etsi_ts/137400_137499/137466/17.00.00_60/ts_137466v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.466-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/ipj8DtGRydCygji
TTA	TTAT.3G-37.466V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.466V17.0.0&searchCate=TTAS

Release 18

ARIB	ARIB STD-T120-37.466.V18.0.0	18.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/37/A37466-i00.pdf
ATIS	ATIS.3GPP.37.466.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.37.466.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.466V1600.doc
ETSI	ETSI TS 137 466 V18.0.0 (2024-05)	18.0.0	Published	27.05.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137466/18.00.00_60/ts_137466v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.466-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/ZfBP348cdNoy4gM
TTA	TTAT.3G-37.466V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.466V18.0.0&searchCate=TTAS

2.2.1.4.5 TS 37.470**W1 interface; General aspects and principles**

This document is an introduction to the 3GPP TS 37.4xx series of technical specifications that define the W1 interface. The W1 interface provides means for interconnecting a ng-eNB-CU and a ng-eNB-DU of a ng-eNB within a NG-RAN.

SDO	Document No.	Version	Status	Issued date	Location
Release 16					
ARIB	ARIB STD-T120-37.470.V16.2.0	16.2.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/37/A37470-g20.pdf
ATIS	ATIS.3GPP.37.470.V16.2.0	16.2.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.37.470.V16.2.0	16.2.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.470.V16.2.0.doc
ETSI	ETSI TS 137 470 V16.2.0 (2020-09)	16.2.0	Published	15.09.2020	https://www.etsi.org/deliver/etsi_ts/137400_137499/137470/16.02.00_60/ts_137470v160200p.pdf
TSDSI	TSDSI STD T1.3GPP 37.470-16.2.0 V1.0.0	16.2.0	Published	06.10.2020	https://members.tdsi.in/s/7dCgZAcbmci6yZy
TTA	TTAT.3G-37.470V16.2.0	16.2.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.470V16.2.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-37.470.V17.0.0	17.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/37/A37470-h00.pdf
ATIS	ATIS.3GPP.37.470.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.37.470.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.470.V17.0.0.doc
ETSI	ETSI TS 137 470 V17.0.0 (2022-04)	17.0.0	Published	29.04.2022	https://www.etsi.org/deliver/etsi_ts/137400_137499/137470/17.00.00_60/ts_137470v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.470-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/N4LCpSWj4FKXo2L
TTA	TTAT.3G-37.470V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.470V17.0.0&searchCate=TTAS
Release 18					
ARIB	ARIB STD-T120-37.470.V18.0.0	18.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/37/A37470-i00.pdf
ATIS	ATIS.3GPP.37.470.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.37.470.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.470.V18.0.0.docx
ETSI	ETSI TS 137 470 V18.0.0 (2024-05)	18.0.0	Published	03.05.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137470/18.00.00_60/ts_137470v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.470-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/df6FW3Y9q9YSwR
TTA	TTAT.3G-37.470V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.470V18.0.0&searchCate=TTAS

2.2.1.4.6 TS 37.471

W1 interface; Layer 1

This document specifies the standards allowed to implement Layer 1 on the W1 interface. The W1 interface provides means for interconnecting a ng-eNB-CU and a ng-eNB-DU of a ng-eNB within a NG-RAN.

The specification of transmission delay requirements and O&M requirements are not in the scope of this document.

SDO	Document No.	Version	Status	Issued date	Location
Release 16					
ARIB	ARIB STD-T120-37.471.V16.1.0	16.1.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/37/A37471-g10.pdf
ATIS	ATIS.3GPP.37.471.V16.1.0	16.1.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.37.471.V16.1.0	16.1.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.471.V16.1.0.doc
ETSI	ETSI TS 137 471 V16.1.0 (2020-09)	16.1.0	Published	21.09.2020	https://www.etsi.org/deliver/etsi_ts/137400_137499/137471/16.01.00_60/ts_137471v160100p.pdf
TSDSI	TSDSI STD T1.3GPP 37.471-16.1.0 V1.0.0	16.1.0	Published	06.10.2020	https://members.tdsi.in/s/RYE9DCETYMec5mP
TTA	TTAT.3G-37.471V16.1.0	16.1.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.471V16.1.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-37.471.V17.0.0	17.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/37/A37471-h00.pdf
ATIS	ATIS.3GPP.37.471.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.37.471.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.471.V17.0.0.doc
ETSI	ETSI TS 137 471 V17.0.0 (2022-04)	17.0.0	Published	29.04.2022	https://www.etsi.org/deliver/etsi_ts/137400_137499/137471/17.00.00_60/ts_137471v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.471-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/KwRkqA2mm4nk8LZ
TTA	TTAT.3G-37.471V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.471V17.0.0&searchCate=TTAS
Release 18					
ARIB	ARIB STD-T120-37.471.V18.0.0	18.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/37/A37471-i00.pdf
ATIS	ATIS.3GPP.37.471.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.37.471.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.471.V18.0.0.docx
ETSI	ETSI TS 137 471 V18.0.0 (2024-05)	18.0.0	Published	03.05.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137471/18.00.00_60/ts_137471v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.471-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/P5Nc4NGmMFipa8L
TTA	TTAT.3G-37.471V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.471V18.0.0&searchCate=TTAS

2.2.1.4.7 TS 37.472

W1 interface; Signalling transport

This document specifies the standards for Signalling Transport to be used across the W1 interface. The W1 interface provides means for interconnecting a ng-eNB-CU and a ng-eNB-DU of a ng-eNB within a NG-RAN. This document describes how the W1AP signalling messages are transported over W1.

SDO	Document No.	Version	Status	Issued date	Location
Release 16					
ARIB	ARIB STD-T120-37.472.V16.2.0	16.2.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/37/A37472-g20.pdf
ATIS	ATIS.3GPP.37.472.V16.2.0	16.2.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.37.472.V16.2.0	16.2.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.472.V16.2.0.doc
ETSI	ETSI TS 137 472 V16.2.0 (2020-11)	16.2.0	Published	13.11.2020	https://www.etsi.org/deliver/etsi_ts/137400_137499/137472/16.02.00_60/ts_137472v160200p.pdf
TSDSI	TSDSI STD T1.3GPP 37.472-16.2.0 V1.1.0	16.2.0	Published	29.07.2022	https://members.tdsi.in/s/qSnFxFtJ523n7r
TTA	TTAT.3G-37.472V16.2.0	16.2.0	Published	16.03.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.472V16.2.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-37.472.V17.0.0	17.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/37/A37472-h00.pdf
ATIS	ATIS.3GPP.37.472.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.37.472.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.472.V17.0.0.doc
ETSI	ETSI TS 137 472 V17.0.0 (2022-04)	17.0.0	Published	29.04.2022	https://www.etsi.org/deliver/etsi_ts/137400_137499/137472/17.00.00_60/ts_137472v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.472-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/jk7M3xzajRoMDjj
TTA	TTAT.3G-37.472V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.472V17.0.0&searchCate=TTAS
Release 18					
ARIB	ARIB STD-T120-37.472.V18.0.0	18.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/37/A37472-i00.pdf
ATIS	ATIS.3GPP.37.472.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.37.472.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.472.V18.0.0.docx
ETSI	ETSI TS 137 472 V18.0.0 (2024-05)	18.0.0	Published	03.05.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137472/18.00.00_60/ts_137472v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.472-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/naNdRJSJ4czwHY
TTA	TTAT.3G-37.472V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.472V18.0.0&searchCate=TTAS

2.2.1.4.8 TS 37.473

W1 interface; Application Protocol (W1AP)

This document specifies the 5G radio network layer signalling protocol for the W1 interface. The W1 interface provides means for interconnecting a ng-eNB-CU and a ng-eNB-DU of a ng-eNB within an NG-RAN. The W1 Application Protocol (W1AP) supports the functions of W1 interface by signalling procedures defined in this document. W1AP is developed in accordance with the general principles stated in TS 38.401 and TS 37.470.

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Release 16					
ARIB	ARIB STD-T120-37.473.V16.9.0	16.9.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/37/A37473-g90.pdf
ATIS	ATIS.3GPP.37.473.V16.9.0	16.9.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.37.473.V16.9.0	16.9.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.473.V16.9.0.docx
ETSI	ETSI TS 137 473 V16.9.0 (2022-07)	16.9.0	Published	20.07.2022	https://www.etsi.org/deliver/etsi_ts/137400_137499/137473/16.09.00_60/ts_137473v160900p.pdf
TSDSI	TSDSI STD T1.3GPP 37.473-16.9.0 V1.1.0	16.9.0	Published	29.07.2022	https://members.tdsi.in/s/BD2334weX2ADb7J
TTA	TTAT.3G-37.473V16.9.0	16.9.0	Published	21.10.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.473V16.9.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-37.473.V17.2.0	17.2.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/37/A37473-h20.pdf
ATIS	ATIS.3GPP.37.473.V17.2.0	17.2.0	Published	22.05.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.37.473.V17.2.0	17.2.0	Published	22.05.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.473.V17.2.0.docx
ETSI	ETSI TS 137 473 V17.2.0 (2023-04)	17.2.0	Published	27.04.2023	https://www.etsi.org/deliver/etsi_ts/137400_137499/137473/17.02.00_60/ts_137473v170200p.pdf
TSDSI	TSDSI STD T1.3GPP 37.473-17.2.0 V1.2.0	17.2.0	Published	14.08.2023	https://members.tdsi.in/s/eozzGWb2ExBjBq
TTA	TTAT.3G-37.473V17.2.0	17.2.0	Published	01.08.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.473V17.2.0&searchCate=TTAS
Release 18					
ARIB	ARIB STD-T120-37.473.V18.0.0	18.0.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/37/A37473-i00.pdf
ATIS	ATIS.3GPP.37.473.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.37.473.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.473.V18.0.0.docx
ETSI	ETSI TS 137 473 V18.0.0 (2024-05)	18.0.0	Published	03.05.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137473/18.00.00_60/ts_137473v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.473-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/7Efsr5Et2Dfw6aZ
TTA	TTAT.3G-37.473V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.473V18.0.0&searchCate=TTAS

2.2.1.4.9 TS 37.480

E1 general aspects and principles

This document is an introduction to the 3GPP TS 37.48x series of technical specifications that define the E1 interface. The E1 interface provides means for interconnecting a gNB-CU-CP and a gNB-CU-UP of a gNB-CU within an NG-RAN, or for interconnecting a gNB-CU-CP and a gNB-CU-UP of an en-gNB within an E-UTRAN, or for interconnecting an eNB-CP and an eNB-UP of an eNB within an E-UTRAN, or for interconnecting an ng-eNB-CU-CP and an ng-eNB-CU-UP of an ng-eNB-CU within an NG-RAN.

SDO	Document No.	Version	Status	Issued date	Location
Release 17					
ATIS	ATIS.3GPP.37.480.V17.2.0	17.2.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.37.480.V17.2.0 3_RIT_ATIS/CCSA.3GPP.37.480.V17.2.0.docx	17.2.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 137 480 V17.2.0 (2024-02)	17.2.0	Published	02.02.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137480/17.02.00_60/ts_137480v170200p.pdf
TSDSI	TSDSI STD T1.3GPP 37.480-17.2.0 V1.2.0	17.2.0	Published	29.05.2024	https://members.tdsi.in/s/nXaK3CsALpPE8Bj
TTA	TTAT.3G-37.480V17.2.0 37.480V17.2.0&searchCate=TTAS	17.2.0	Published	08.05.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-37.480(Rel17)v17.2.0	17.2.0	Published	05.04.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-37.480v17.2.0.pdf
Release 18					
ATIS	ATIS.3GPP.37.480.V18.1.0	18.1.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.37.480.V18.1.0 3_RIT_ATIS/CCSA.3GPP.37.480.V18.1.0.docx	18.1.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 137 480 V18.1.0 (2024-05)	18.1.0	Published	27.05.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137480/18.01.00_60/ts_137480v180100p.pdf
TSDSI	TSDSI STD T1.3GPP 37.480-18.1.0 V1.0.0	18.1.0	Published	19.11.2024	https://members.tdsi.in/s/2cWM3Rx53mxqBDT
TTA	TTAT.3G-37.480V18.1.0 37.480V18.1.0&searchCate=TTAS	18.1.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-37.480(Rel18)v18.1.0	18.1.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-37.480v18.1.0.pdf

2.2.1.4.10 TS 37.481

E1 layer 1

This document specifies the standards allowed to implement layer 1 on the E1 interface.

The specification of transmission delay requirements and O&M requirements are not in the scope of this document.

SDO	Document No.	Version	Status	Issued date	Location
Release 17					
ATIS	ATIS.3GPP.37.481.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.37.481.V17.0.0 3_RIT_ATIS/CCSA.3GPP.37.481.V17.0.0.doc	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 137 481 V17.0.0 (2022-04)	17.0.0	Published	07.04.2022	https://www.etsi.org/deliver/etsi_ts/137400_137499/137481/17.00.00_60/ts_137481v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.481-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/dm65dLH8msHx3Em
TTA	TTAT.3G-37.481V17.0.0 37.481V17.0.0&searchCate=TTAS	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-37.481(Rel17)v17.0.0	17.0.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-37.481v17.0.0.pdf

Release 18

ATIS	ATIS.3GPP.37.481.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.37.481.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.481.V18.0.0.docx
ETSI	ETSI TS 137 481 V18.0.0 (2024-05)	18.0.0	Published	03.05.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137481/18.00.00_60/ts_137481v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.481-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/6NtNPFDEJn2dnZs
TTA	TTAT.3G-37.481V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.481V18.0.0&searchCate=TTAS
TTC	TS-3GA-37.481(Rel18)v18.0.0	18.0.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-37.481v18.0.0.pdf

2.2.1.4.11 TS 37.482**E1 signalling transport**

This document specifies the standards for Signalling Transport to be used across the E1 interface. The E1 interface provides means for the interconnection of gNB-CU-CP and gNB-CU-UP within the NG-RAN architecture (TS 38.401), or for the interconnection of ng-eNB-CU-CP and ng-eNB-CU-UP within the NG-RAN architecture (TS 38.401), or for the interconnection of eNB-CP and eNB-UP within the E-UTRAN architecture (TS 36.401).

SDO	Document No.	Version	Status	Issued date	Location

Release 17

ATIS	ATIS.3GPP.37.482.V17.4.0	17.4.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.37.482.V17.4.0	17.4.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.482.V17.4.0.docx
ETSI	ETSI TS 137 482 V17.4.0 (2024-04)	17.4.0	Published	22.04.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137482/17.04.00_60/ts_137482v170400p.pdf
TSDSI	TSDSI STD T1.3GPP 37.482-17.4.0 V1.4.0	17.4.0	Published	22.07.2024	https://members.tdsi.in/s/3Ge8BrRxogLyDLP
TTA	TTAT.3G-37.482V17.4.0	17.4.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.482V17.4.0&searchCate=TTAS
TTC	TS-3GA-37.482(Rel17)v17.4.0	17.4.0	Published	05.07.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-37.482v17.4.0.pdf

Release 18

ATIS	ATIS.3GPP.37.482.V18.1.0	18.1.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.37.482.V18.1.0	18.1.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.482.V18.1.0.docx
ETSI	ETSI TS 137 482 V18.1.0 (2024-08)	18.1.0	Published	05.08.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137482/18.01.00_60/ts_137482v180100p.pdf
TSDSI	TSDSI STD T1.3GPP 37.482-18.1.0 V1.0.0	18.1.0	Published	19.11.2024	https://members.tdsi.in/s/zSE2siWb22oLoL9
TTA	TTAT.3G-37.482V18.1.0	18.1.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.482V18.1.0&searchCate=TTAS
TTC	TS-3GA-37.482(Rel18)v18.1.0	18.1.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-37.482v18.1.0.pdf

2.2.1.4.12 TS 37.483

E1 Application Protocol (E1AP)

This document specifies the 5G radio network layer signalling protocol for the E1 interface. The E1 interface provides means for interconnecting a gNB-CU-CP and a gNB-CU-UP of a gNB within an NG-RAN, or for interconnecting a gNB-CU-CP and a gNB-CU-UP of an en-gNB within an E-UTRAN, or for interconnecting an eNB-CP and an eNB-UP of an eNB within an E-UTRAN, or for interconnecting an ng-eNB-CU-CP and an ng-eNB-CU-UP of an ng-eNB within an NG-RAN. The E1 Application Protocol (E1AP) supports the functions of E1 interface by signalling procedures defined in this document. E1AP is developed in accordance with the general principles stated in TS 38.401 and TS 37.480.

SDO	Document No.	Version	Status	Issued date	Location
Release 17					
ATIS	ATIS.3GPP.37.483.V17.8.0	17.8.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.37.483.V17.8.0 3_RIT_ATIS/CCSA.3GPP.37.483.V17.8.0.docx	17.8.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 137 483 V17.8.0 (2024-04)	17.8.0	Published	22.04.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137483/17.08.00_60/ts_137483v170800p.pdf
TSDSI	TSDSI STD T1.3GPP 37.483-17.8.0 V1.8.0	17.8.0	Published	22.07.2024	https://members.tdsi.in/s/fzWmctZfSSJxRkt
TTA	TTAT.3G-37.483V17.8.0 37.483V17.8.0&searchCate=TTAS	17.8.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-37.483(Rel17)v17.8.0	17.8.0	Published	05.07.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-37.483v17.8.0.pdf
Release 18					
ATIS	ATIS.3GPP.37.483.V18.2.0	18.2.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.37.483.V18.2.0 3_RIT_ATIS/CCSA.3GPP.37.483.V18.2.0.docx	18.2.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 137 483 V18.2.0 (2024-08)	18.2.0	Published	05.08.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137483/18.02.00_60/ts_137483v180200p.pdf
TSDSI	TSDSI STD T1.3GPP 37.483-18.2.0 V1.0.0	18.2.0	Published	19.11.2024	https://members.tdsi.in/s/JoZN8dptryLQXL
TTA	TTAT.3G-37.483V18.2.0 37.483V18.2.0&searchCate=TTAS	18.2.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-37.483(Rel18)v18.2.0	18.2.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-37.483v18.2.0.pdf

2.2.1.4.13 TS 38.401

NG-RAN; Architecture description

This document describes the overall architecture of the NG-RAN, including interfaces NG, Xn and F1 interfaces and their interaction with the radio interface.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.38.401.V15.10.0	15.10.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.401.V15.10.0 3_RIT_ATIS/CCSA.3GPP.38.401.V15.10.0.doc	15.10.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-
ETSI	ETSI TS 138 401 V15.10.0 (2023-10)	15.10.0	Published	02.10.2023	https://www.etsi.org/deliver/etsi_ts/138400_138499/138401/15.10.00_60/ts_138401v151000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.401-15.10.0 V1.2.0	15.10.0	Published	23.02.2024	https://members.tdsi.in/s/EHbegBgzKtZjr8
TTA	TTAT.3G-38.401V15.10.0 38.401V15.10.0&searchCate=TTAS	15.10.0	Published	13.02.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-
TTC	TS-3GA-38.401(Rel15)v15.10.0	15.10.0	Published	12.01.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.401v15.10.0.pdf

Release 16

ATIS	ATIS.3GPP.38.401.V16.12.0	16.12.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.401.V16.12.0	16.12.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.401.V16.12.0.docx
ETSI	ETSI TS 138 401 V16.12.0 (2024-04)	16.12.0	Published	22.04.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138401/16.12.00_60/ts_138401v161200p.pdf
TSDSI	TSDSI STD T1.3GPP 38.401-16.12.0 V1.4.0	16.12.0	Published	22.07.2024	https://members.tdsi.in/s/nw4ny7tK5pqTmMT
TTA	TTAT.3G-38.401V16.12.0	16.12.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.401V16.12.0&searchCate=TTAS
TTC	TS-3GA-38.401(Rel16)v16.12.0	16.12.0	Published	05.07.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.401v16.12.0.pdf

Release 17

ATIS	ATIS.3GPP.38.401.V17.10.0	17.10.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.401.V17.10.0	17.10.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.401.V17.10.0.docx
ETSI	ETSI TS 138 401 V17.10.0 (2024-09)	17.10.0	Published	26.09.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138401/17.10.00_60/ts_138401v171000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.401-17.10.0 V1.10.0	17.10.0	Published	02.03.2025	https://members.tdsi.in/s/wBsXCCWRxfSdXD
TTA	TTAT.3G-38.401V17.10.0	17.10.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.401V17.10.0&searchCate=TTAS
TTC	TS-3GA-38.401(Rel17)v17.10.0	17.10.0	Published	10.01.2025	https://www.ttc.or.jp/st/docs/3gpp/2025/TS/TS-3GA-38.401v17.10.0.pdf

Release 18

ATIS	ATIS.3GPP.38.401.V18.3.0	18.3.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.401.V18.3.0	18.3.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.401.V18.3.0.docx
ETSI	ETSI TS 138 401 V18.3.0 (2024-09)	18.3.0	Published	26.09.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138401/18.03.00_60/ts_138401v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.401-18.3.0 V1.1.0	18.3.0	Published	02.03.2025	https://members.tdsi.in/s/isoRPXxcFF2gbM
TTA	TTAT.3G-38.401V18.3.0	18.3.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.401V18.3.0&searchCate=TTAS
TTC	TS-3GA-38.401(Rel18)v18.3.0	18.3.0	Published	10.01.2025	https://www.ttc.or.jp/st/docs/3gpp/2025/TS/TS-3GA-38.401v18.3.0.pdf

2.2.1.4.14 TS 38.410**NG-RAN; NG general aspects and principles**

This document is an introduction to the 3GPP TS 38.41x series of technical specifications that define the NG interface for the interconnection of an NG-RAN node to the 5GC (5G Core Network).

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Release 15					
ATIS	ATIS.3GPP.38.410.V15.2.0	15.2.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.410.V15.2.0	15.2.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.410.V15.2.0.doc
ETSI	ETSI TS 138 410 V15.2.0 (2019-04)	15.2.0	Published	24.04.2019	https://www.etsi.org/deliver/etsi_ts/138400_138499/138410/15.02.00_60/ts_138410v150200p.pdf
TSDSI	TSDSI STD T1.3GPP 38.410-15.2.0 V1.0.0	15.2.0	Published	06.10.2020	https://members.tdsi.in/s/pcb2Ao2AmnE5AeY
TTA	TTAT.3G-38.410V15.2.0	15.2.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.410V15.2.0&searchCate=TTAS
TTC	TS-3GA-38.410(Rel15)v15.2.0	15.2.0	Published	02.10.2020	https://www.ttc.or.jp/st/docs/3gpps2020/TS/TS-3GA-38_410_Rel15v15_2_0.pdf

Release 16

ATIS	ATIS.3GPP.38.410.V16.4.0	16.4.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.410.V16.4.0	16.4.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.410.V16.4.0.doc
ETSI	ETSI TS 138 410 V16.4.0 (2021-10)	16.4.0	Published	20.10.2021	https://www.etsi.org/deliver/etsi_ts/138400_138499/138410/16.04.00_60/ts_138410v160400p.pdf
TSDSI	TSDSI STD T1.3GPP 38.410-16.4.0 V1.1.0	16.4.0	Published	29.07.2022	https://members.tdsi.in/s/BMDnkSxrmFgnQj7
TTA	TTAT.3G-38.410V16.4.0	16.4.0	Published	27.01.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.410V16.4.0&searchCate=TTAS
TTC	TS-3GA-38.410(Rel16)v16.4.0	16.4.0	Published	14.01.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-38.410v16.4.0.pdf

Release 17

ATIS	ATIS.3GPP.38.410.V17.1.0	17.1.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.410.V17.1.0	17.1.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.410.V17.1.0.docx
ETSI	ETSI TS 138 410 V17.1.0 (2022-07)	17.1.0	Published	20.07.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138410/17.01.00_60/ts_138410v170100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.410-17.1.0 V1.1.0	17.1.0	Published	29.07.2022	https://members.tdsi.in/s/ax9fFXNjgYC5KiT
TTA	TTAT.3G-38.410V17.1.0	17.1.0	Published	21.10.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.410V17.1.0&searchCate=TTAS
TTC	TS-3GA-38.410(Rel17)v17.1.0	17.1.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-38.410v17.1.0.pdf

Release 18

ATIS	ATIS.3GPP.38.410.V18.2.0	18.2.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.410.V18.2.0	18.2.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.410.V18.2.0.docx
ETSI	ETSI TS 138 410 V18.2.0 (2024-08)	18.2.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138410/18.02.00_60/ts_138410v180200p.pdf
TSDSI	TSDSI STD T1.3GPP 38.410-18.2.0 V1.0.0	18.2.0	Published	19.11.2024	https://members.tdsi.in/s/EgwtBJQPJ56SnPR
TTA	TTAT.3G-38.410V18.2.0	18.2.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.410V18.2.0&searchCate=TTAS
TTC	TS-3GA-38.410(Rel18)v18.2.0	18.2.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.410v18.2.0.pdf

2.2.1.4.15 TS 38.411**NG-RAN; NG layer 1**

This document specifies the standards allowed to implement layer 1 on the NG interface.

The specification of transmission delay requirements and O&M requirements are not in the scope of this document.

SDO	Document No.	Version	Status	Issued date	Location

Release 15

ATIS	ATIS.3GPP.38.411.V15.0.0	15.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.411.V15.0.0	15.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.411.V15.0.0.doc
ETSI	ETSI TS 138 411 V15.0.0 (2018-07)	15.0.0	Published	04.07.2018	https://www.etsi.org/deliver/etsi_ts/138400_138499/138411/15.00.00_60/ts_138411v150000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.411-15.0.0 V1.0.0	15.0.0	Published	06.10.2020	https://members.tdsi.in/s/bqgZkBK5Fa9EPjT
TTA	TTAT.3G-38.411V15.0.0	15.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.411V15.0.0&searchCate=TTAS
TTC	TS-3GA-38.411(Rel15)v15.0.0	15.0.0	Published	28.09.2018	https://www.ttc.or.jp/st/docs/3gpp/2018/TS/TS-3GA-38.411(Rel15)v15.0.0.pdf

Release 16

ATIS	ATIS.3GPP.38.411.V16.0.0	16.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.411.V16.0.0	16.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.411.V16.0.0.doc
ETSI	ETSI TS 138 411 V16.0.0 (2020-07)	16.0.0	Published	21.07.2020	https://www.etsi.org/deliver/etsi_ts/138400_138499/138411/16.00.00_60/ts_138411v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.411-16.0.0 V1.0.0	16.0.0	Published	06.10.2020	https://members.tdsi.in/s/iF93r3y2ws8ArLo
TTA	TTAT.3G-38.411V16.0.0	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.411V16.0.0&searchCate=TTAS
TTC	TS-3GA-38.411(Rel16)v16.0.0	16.0.0	Published	02.10.2020	https://www.ttc.or.jp/st/docs/3gpps2020/TS/TS-3GA-38_411_Rel16v16_0_0.pdf

Release 17

ATIS	ATIS.3GPP.38.411.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.411.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.411.V17.0.0.doc
ETSI	ETSI TS 138 411 V17.0.0 (2022-04)	17.0.0	Published	29.04.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138411/17.00.00_60/ts_138411v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.411-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/rjJMbaEGiWWYi26
TTA	TTAT.3G-38.411V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.411V17.0.0&searchCate=TTAS
TTC	TS-3GA-38.411(Rel17)v17.0.0	17.0.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-38.411v17.0.0.pdf

Release 18

ATIS	ATIS.3GPP.38.411.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.411.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.411.V18.0.0.docx
ETSI	ETSI TS 138 411 V18.0.0 (2024-05)	18.0.0	Published	03.05.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138411/18.00.00_60/ts_138411v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.411-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/gXR47fd3goayFFt
TTA	TTAT.3G-38.411V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.411V18.0.0&searchCate=TTAS
TTC	TS-3GA-38.411(Rel18)v18.0.0	18.0.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.411v18.0.0.pdf

2.2.1.4.16 TS 38.412**NG-RAN; NG signalling transport**

This document specifies the standards for signalling transport to be used across NG interface. NG interface is a logical interface between the NG-RAN and the 5GC. This document describes how the NGAP signalling messages are transported over NG.

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Release 15

ATIS	ATIS.3GPP.38.412.V15.5.0	15.5.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.412.V15.5.0	15.5.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.412.V15.5.0.doc
ETSI	ETSI TS 138 412 V15.5.0 (2020-11)	15.5.0	Published	12.11.2020	https://www.etsi.org/deliver/etsi_ts/138400_138499/138412/15.05.00_60/ts_138412v150500p.pdf
TSDSI	TSDSI STD T1.3GPP 38.412-15.5.0 V1.1.0	15.5.0	Published	29.07.2022	https://members.tdsi.in/s/4p7S8T6YFPH9HJK
TTA	TTAT.3G-38.412V15.5.0	15.5.0	Published	16.03.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.412V15.5.0&searchCate=TTAS
TTC	TS-3GA-38.412(Rel15)v15.5.0	15.5.0	Published	22.12.2020	https://www.ttc.or.jp/st/docs/3gpp/2020/TS/TS-3GA-38.412v15.5.0.pdf

Release 16

ATIS	ATIS.3GPP.38.412.V16.2.0	16.2.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.412.V16.2.0	16.2.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.412.V16.2.0.docx
ETSI	ETSI TS 138 412 V16.2.0 (2023-07)	16.2.0	Published	28.07.2023	https://www.etsi.org/deliver/etsi_ts/138400_138499/138412/16.02.00_60/ts_138412v160200p.pdf
TSDSI	TSDSI STD T1.3GPP 38.412-16.2.0 V1.2.0	16.2.0	Published	02.11.2023	https://members.tdsi.in/s/7xjLotK2GZjoRbk
TTA	TTAT.3G-38.412V16.2.0	16.2.0	Published	27.10.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.412V16.2.0&searchCate=TTAS
TTC	TS-3GA-38.412(Rel16)v16.2.0	16.2.0	Published	05.10.2023	https://www.ttc.or.jp/st/docs/3gpp/2023/TS/TS-3GA-38.412v16.2.0.pdf

Release 17

ATIS	ATIS.3GPP.38.412.V17.1.0	17.1.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.412.V17.1.0	17.1.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.412.V17.1.0.docx
ETSI	ETSI TS 138 412 V17.1.0 (2023-07)	17.1.0	Published	28.07.2023	https://www.etsi.org/deliver/etsi_ts/138400_138499/138412/17.01.00_60/ts_138412v170100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.412-17.1.0 V1.1.0	17.1.0	Published	02.11.2023	https://members.tdsi.in/s/JC9fYqfECy8p4AD
TTA	TTAT.3G-38.412V17.1.0	17.1.0	Published	27.10.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.412V17.1.0&searchCate=TTAS
TTC	TS-3GA-38.412(Rel17)v17.1.0	17.1.0	Published	05.10.2023	https://www.ttc.or.jp/st/docs/3gpp/2023/TS/TS-3GA-38.412v17.1.0.pdf

Release 18

ATIS	ATIS.3GPP.38.412.V18.1.0	18.1.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.412.V18.1.0	18.1.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.412.V18.1.0.docx
ETSI	ETSI TS 138 412 V18.1.0 (2024-08)	18.1.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138412/18.01.00_60/ts_138412v180100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.412-18.1.0 V1.0.0	18.1.0	Published	19.11.2024	https://members.tdsi.in/s/MX4xctn7PnBDtgA
TTA	TTAT.3G-38.412V18.1.0	18.1.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.412V18.1.0&searchCate=TTAS
TTC	TS-3GA-38.412(Rel18)v18.1.0	18.1.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.412v18.1.0.pdf

2.2.1.4.17 TS 38.413**NG-RAN; NG Application Protocol (NGAP)**

This document specifies the radio network layer signalling protocol for the NG interface. The NG Application Protocol (NGAP) supports the functions of the NG interface by signalling procedures defined in this document. NGAP is developed in accordance with the general principles stated in TS 38.401 and TS 38.410.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.38.413.V15.13.0	15.13.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.413.V15.13.0	15.13.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.413.V15.13.0.docx
ETSI	ETSI TS 138 413 V15.13.0 (2021-10)	15.13.0	Published	20.10.2021	https://www.etsi.org/deliver/etsi_ts/138400_138499/138413/15.13.00_60/ts_138413v151300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.413-15.13.0 V1.1.0	15.13.0	Published	29.07.2022	https://members.tdsi.in/s/R2p96HixFqFkLp3
TTA	TTAT.3G-38.413V15.13.0	15.13.0	Published	27.01.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.413V15.13.0&searchCate=TTAS
TTC	TS-3GA-38.413(Rel15)v15.13.0	15.13.0	Published	14.01.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-38.413v15.13.0.pdf

Release 16

ATIS	ATIS.3GPP.38.413.V16.15.0	16.15.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.413.V16.15.0	16.15.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.413.V16.15.0.docx
ETSI	ETSI TS 138 413 V16.15.0 (2024-05)	16.15.0	Published	03.05.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138413/16.15.00_60/ts_138413v161500p.pdf
TSDSI	TSDSI STD T1.3GPP 38.413-16.15.0 V1.6.0	16.15.0	Published	22.07.2024	https://members.tdsi.in/s/jkgTkWGwmcMs3JR
TTA	TTAT.3G-38.413V16.15.0	16.15.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.413V16.15.0&searchCate=TTAS
TTC	TS-3GA-38.413(Rel16)v16.15.0	16.15.0	Published	05.07.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.413v16.15.0.pdf

Release 17

ATIS	ATIS.3GPP.38.413.V17.10.0	17.10.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.413.V17.10.0	17.10.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.413.V17.10.0.docx
ETSI	ETSI TS 138 413 V17.10.0 (2024-09)	17.10.0	Published	26.09.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138413/17.10.00_60/ts_138413v171000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.413-17.10.0 V1.10.0	17.10.0	Published	02.03.2025	https://members.tdsi.in/s/ByqymZ2JemoKttY
TTA	TTAT.3G-38.413V17.10.0	17.10.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.413V17.10.0&searchCate=TTAS
TTC	TS-3GA-38.413(Rel17)v17.10.0	17.10.0	Published	10.01.2025	https://www.ttc.or.jp/st/docs/3gpp/2025/TS/TS-3GA-38.413v17.10.0.pdf

Release 18

ATIS	ATIS.3GPP.38.413.V18.3.0	18.3.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.413.V18.3.0	18.3.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.413.V18.3.0.docx
ETSI	ETSI TS 138 413 V18.3.0 (2024-09)	18.3.0	Published	26.09.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138413/18.03.00_60/ts_138413v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.413-18.3.0 V1.1.0	18.3.0	Published	02.03.2025	https://members.tdsi.in/s/qmdWQXjYfgHqYQA
TTA	TTAT.3G-38.413V18.3.0	18.3.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.413V18.3.0&searchCate=TTAS
TTC	TS-3GA-38.413(Rel18)v18.3.0	18.3.0	Published	10.01.2025	https://www.ttc.or.jp/st/docs/3gpp/2025/TS/TS-3GA-38.413v18.3.0.pdf

2.2.1.4.18 TS 38.414**NG-RAN; NG data transport**

This document specifies the standards for user data transport protocols and related signalling protocols to establish user plane transport bearers over the NG interface.

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Release 15					
ATIS	ATIS.3GPP.38.414.V15.3.0	15.3.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.414.V15.3.0	15.3.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.414.V15.3.0.doc
ETSI	ETSI TS 138 414 V15.3.0 (2020-07)	15.3.0	Published	23.07.2020	https://www.etsi.org/deliver/etsi_ts/138400_138499/138414/15.03.00_60/ts_138414v150300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.414-15.3.0 V1.0.0	15.3.0	Published	06.10.2020	https://members.tdsi.in/s/6yFx2WpW5tSLNm2
TTA	TTAT.3G-38.414V15.3.0	15.3.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.414V15.3.0&searchCate=TTAS
TTC	TS-3GA-38.414(Rel15)v15.3.0	15.3.0	Published	02.10.2020	https://www.ttc.or.jp/st/docs/3gpps2020/TS/TS-3GA-38_414_Rel15v15_3_0.pdf

Release 16

ATIS	ATIS.3GPP.38.414.V16.0.0	16.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.414.V16.0.0	16.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.414.V16.0.0.doc
ETSI	ETSI TS 138 414 V16.0.0 (2020-07)	16.0.0	Published	23.07.2020	https://www.etsi.org/deliver/etsi_ts/138400_138499/138414/16.00.00_60/ts_138414v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.414-16.0.0 V1.0.0	16.0.0	Published	06.10.2020	https://members.tdsi.in/s/X3f6yYYNWGPW7LW
TTA	TTAT.3G-38.414V16.0.0	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.414V16.0.0&searchCate=TTAS
TTC	TS-3GA-38.414(Rel16)v16.0.0	16.0.0	Published	02.10.2020	https://www.ttc.or.jp/st/docs/3gpps2020/TS/TS-3GA-38_414_Rel16v16_0_0.pdf

Release 17

ATIS	ATIS.3GPP.38.414.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.414.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.414.V17.0.0.doc
ETSI	ETSI TS 138 414 V17.0.0 (2022-04)	17.0.0	Published	29.04.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138414/17.00.00_60/ts_138414v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.414-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/QTpTzJGMc8HLzRe
TTA	TTAT.3G-38.414V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.414V17.0.0&searchCate=TTAS
TTC	TS-3GA-38.414(Rel17)v17.0.0	17.0.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-38.414v17.0.0.pdf

Release 18

ATIS	ATIS.3GPP.38.414.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.414.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.414.V18.0.0.docx
ETSI	ETSI TS 138 414 V18.0.0 (2024-05)	18.0.0	Published	06.05.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138414/18.00.00_60/ts_138414v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.414-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/Sb68SfpMSAj8e28
TTA	TTAT.3G-38.414V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.414V18.0.0&searchCate=TTAS
TTC	TS-3GA-38.414(Rel18)v18.0.0	18.0.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.414v18.0.0.pdf

2.2.1.4.19 TS 38.415**NG-RAN; PDU session user plane protocol**

This document specifies the PDU Session user plane protocol being used over the NG-U, Xn-U and N9 interfaces. Applicability to other interfaces is not precluded.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.38.415.V15.3.0	15.3.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.415.V15.3.0	15.3.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.415.V15.3.0.doc
ETSI	ETSI TS 138 415 V15.3.0 (2021-08)	15.3.0	Published	19.08.2021	https://www.etsi.org/deliver/etsi_ts/138400_138499/138415/15.03.00_60/ts_138415v150300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.415-15.3.0 V1.1.0	15.3.0	Published	29.07.2022	https://members.tdsi.in/s/KRSBYxEPCEQTdXC
TTA	TTAT.3G-38.415V15.3.0	15.3.0	Published	30.09.2021	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.415V15.3.0&searchCate=TTAS
TTC	TS-3GA-38.415(Rel15)v15.3.0	15.3.0	Published	15.10.2021	https://www.ttc.or.jp/st/docs/3gpp/2021/TS/TS-3GA-38.415v15.3.0.pdf

Release 16

ATIS	ATIS.3GPP.38.415.V16.6.0	16.6.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.415.V16.6.0	16.6.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.415.V16.6.0.doc
ETSI	ETSI TS 138 415 V16.6.0 (2022-01)	16.6.0	Published	21.01.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138415/16.06.00_60/ts_138415v160600p.pdf
TSDSI	TSDSI STD T1.3GPP 38.415-16.6.0 V1.1.0	16.6.0	Published	29.07.2022	https://members.tdsi.in/s/7mNcMwDEdjjPjW9
TTA	TTAT.3G-38.415V16.6.0	16.6.0	Published	14.03.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.415V16.6.0&searchCate=TTAS
TTC	TS-3GA-38.415(Rel16)v16.6.0	16.6.0	Published	08.04.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-38.415v16.6.0.pdf

Release 17

ATIS	ATIS.3GPP.38.415.V17.1.0	17.1.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.415.V17.1.0	17.1.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.415.V17.1.0.docx
ETSI	ETSI TS 138 415 V17.1.0 (2024-02)	17.1.0	Published	02.02.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138415/17.01.00_60/ts_138415v170100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.415-17.1.0 V1.1.0	17.1.0	Published	29.05.2024	https://members.tdsi.in/s/ypJLQ4YsTBDn4F
TTA	TTAT.3G-38.415V17.1.0	17.1.0	Published	08.05.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.415V17.1.0&searchCate=TTAS
TTC	TS-3GA-38.415(Rel17)v17.1.0	17.1.0	Published	05.04.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.415v17.1.0.pdf

Release 18

ATIS	ATIS.3GPP.38.415.V18.1.0	18.1.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.415.V18.1.0	18.1.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.415.V18.1.0.docx
ETSI	ETSI TS 138 415 V18.1.0 (2024-05)	18.1.0	Published	27.05.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138415/18.01.00_60/ts_138415v180100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.415-18.1.0 V1.0.0	18.1.0	Published	19.11.2024	https://members.tdsi.in/s/jExztpRi6zzPQrM
TTA	TTAT.3G-38.415V18.1.0	18.1.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.415V18.1.0&searchCate=TTAS
TTC	TS-3GA-38.415(Rel18)v18.1.0	18.1.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.415v18.1.0.pdf

2.2.1.4.20 TS 38.420**NG-RAN; Xn general aspects and principles**

This document is an introduction to the TSG RAN TS 38.42x series of Technical Specifications that define the Xn interface. It is an interface for the interconnection of two NG-RAN nodes within the NG-RAN architecture (TS 38.401).

SDO	Document No.	Version	Status	Issued date	Location

Release 15

ATIS	ATIS.3GPP.38.420.V15.2.0	15.2.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.420.V15.2.0	15.2.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.420.V15.2.0.doc
ETSI	ETSI TS 138 420 V15.2.0 (2019-04)	15.2.0	Published	24.04.2019	https://www.etsi.org/deliver/etsi_ts/138400_138499/138420/15.02.00_60/ts_138420v150200p.pdf
TSDSI	TSDSI STD T1.3GPP 38.420-15.2.0 V1.0.0	15.2.0	Published	06.10.2020	https://members.tdsi.in/s/tQRps7kLjLJtnT
TTA	TTAT.3G-38.420V15.2.0	15.2.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.420V15.2.0&searchCate=TTAS
TTC	TS-3GA-38.420(Rel15)v15.2.0	15.2.0	Published	29.03.2019	https://www.ttc.or.jp/st/docs/3gpp/2019/TS/TS-3GA-38.420(Rel15)v15.2.0.pdf

Release 16

ATIS	ATIS.3GPP.38.420.V16.0.0	16.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.420.V16.0.0	16.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.420.V16.0.0.doc
ETSI	ETSI TS 138 420 V16.0.0 (2020-07)	16.0.0	Published	21.07.2020	https://www.etsi.org/deliver/etsi_ts/138400_138499/138420/16.00.00_60/ts_138420v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.420-16.0.0 V1.0.0	16.0.0	Published	06.10.2020	https://members.tdsi.in/s/GpR6R8iCdNoBWew
TTA	TTAT.3G-38.420V16.0.0	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.420V16.0.0&searchCate=TTAS
TTC	TS-3GA-38.420(Rel16)v16.0.0	16.0.0	Published	02.10.2020	https://www.ttc.or.jp/st/docs/3gpps2020/TS/TS-3GA-38_420_Rel16v16_0_0.pdf

Release 17

ATIS	ATIS.3GPP.38.420.V17.2.0	17.2.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.420.V17.2.0	17.2.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.420.V17.2.0.docx
ETSI	ETSI TS 138 420 V17.2.0 (2022-10)	17.2.0	Published	14.10.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138420/17.02.00_60/ts_138420v170200p.pdf
TSDSI	TSDSI STD T1.3GPP 38.420-17.2.0 V1.2.0	17.2.0	Published	17.01.2023	https://members.tdsi.in/s/NyMwfb8eXHiA7Fs
TTA	TTAT.3G-38.420V17.2.0	17.2.0	Published	11.01.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.420V17.2.0&searchCate=TTAS
TTC	TS-3GA-38.420(Rel17)v17.2.0	17.2.0	Published	13.01.2023	https://www.ttc.or.jp/st/docs/3gpp/2023/TS/TS-3GA-38.420v17.2.0.pdf

Release 18

ATIS	ATIS.3GPP.38.420.V18.1.0	18.1.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.420.V18.1.0	18.1.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.420.V18.1.0.docx
ETSI	ETSI TS 138 420 V18.1.0 (2024-05)	18.1.0	Published	27.05.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138420/18.01.00_60/ts_138420v180100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.420-18.1.0 V1.0.0	18.1.0	Published	19.11.2024	https://members.tdsi.in/s/8xqc5EdrmmmH4w9
TTA	TTAT.3G-38.420V18.1.0	18.1.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.420V18.1.0&searchCate=TTAS
TTC	TS-3GA-38.420(Rel18)v18.1.0	18.1.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.420v18.1.0.pdf

2.2.1.4.21 TS 38.421**NG-RAN; Xn layer 1**

This document specifies the standards allowed to implement layer 1 on the Xn interface.

The specification of transmission delay requirements and O&M requirements are not in the scope of this document.

SDO	Document No.	Version	Status	Issued date	Location

Release 15

ATIS	ATIS.3GPP.38.421.V15.1.0	15.1.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.421.V15.1.0	15.1.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.421.V15.1.0.doc
ETSI	ETSI TS 138 421 V15.1.0 (2019-10)	15.1.0	Published	16.10.2019	https://www.etsi.org/deliver/etsi_ts/138400_138499/138421/15.01.00_60/ts_138421v150100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.421-15.1.0 V1.0.0	15.1.0	Published	06.10.2020	https://members.tdsi.in/s/bXLmNtk8Ykm6i65
TTA	TTAT.3G-38.421V15.1.0	15.1.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.421V15.1.0&searchCate=TTAS
TTC	TS-3GA-38.421(Rel15)v15.1.0	15.1.0	Published	20.12.2019	https://www.ttc.or.jp/st/docs/3gpps2019/TS/TS-3GA-38.421(Rel15)v15.1.0.pdf

Release 16

ATIS	ATIS.3GPP.38.421.V16.0.0	16.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.421.V16.0.0	16.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.421.V16.0.0.doc
ETSI	ETSI TS 138 421 V16.0.0 (2020-07)	16.0.0	Published	21.07.2020	https://www.etsi.org/deliver/etsi_ts/138400_138499/138421\16.00.00_60/ts_138421v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.421-16.0.0 V1.0.0	16.0.0	Published	06.10.2020	https://members.tdsi.in/s/SGXDkgkPqQaEBB
TTA	TTAT.3G-38.421V16.0.0	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.421V16.0.0&searchCate=TTAS
TTC	TS-3GA-38.421(Rel16)v16.0.0	16.0.0	Published	02.10.2020	https://www.ttc.or.jp/st/docs/3gpps2020/TS/TS-3GA-38_421_Rel16v16_0_0.pdf

Release 17

ATIS	ATIS.3GPP.38.421.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.421.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.421.V17.0.0.doc
ETSI	ETSI TS 138 421 V17.0.0 (2022-04)	17.0.0	Published	29.04.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138421\17.00.00_60/ts_138421v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.421-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/4XwdJajEYiftGzg
TTA	TTAT.3G-38.421V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.421V17.0.0&searchCate=TTAS
TTC	TS-3GA-38.421(Rel17)v17.0.0	17.0.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-38.421v17.0.0.pdf

Release 18

ATIS	ATIS.3GPP.38.421.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.421.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.421.V18.0.0.docx
ETSI	ETSI TS 138 421 V18.0.0 (2024-05)	18.0.0	Published	06.05.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138421\18.00.00_60/ts_138421v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.421-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/6Hws3zGsk8TAGHA
TTA	TTAT.3G-38.421V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.421V18.0.0&searchCate=TTAS
TTC	TS-3GA-38.421(Rel18)v18.0.0	18.0.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.421v18.0.0.pdf

2.2.1.4.22 TS 38.422**NG-RAN; Xn signalling transport**

This document specifies the standards for signalling transport to be used across Xn interface. The Xn interface provides means for interconnecting two NG-RAN nodes. The Xn interface is a logical interface between two nodes of the NG-RAN. This document describes how the XnAP signalling messages are transported over Xn.

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Release 15

ATIS	ATIS.3GPP.38.422.V15.4.0	15.4.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.422.V15.4.0	15.4.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.422.V15.4.0.doc
ETSI	ETSI TS 138 422 V15.4.0 (2020-01)	15.4.0	Published	17.01.2020	https://www.etsi.org/deliver/etsi_ts/138400_138499/138422\15.04.00_60/ts_138422v150400p.pdf
TSDSI	TSDSI STD T1.3GPP 38.422-15.4.0 V1.0.0	15.4.0	Published	06.10.2020	https://members.tdsi.in/s/83E54FRDbgcLXS5
TTA	TTAT.3G-38.422V15.4.0	15.4.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.422V15.4.0&searchCate=TTAS
TTC	TS-3GA-38.422(Rel15)v15.4.0	15.4.0	Published	16.04.2020	https://www.ttc.or.jp/st/docs/3gpps2020/TS/TS-3GA-38_422_Rel15v15_4_0.pdf

Release 16

ATIS	ATIS.3GPP.38.422.V16.1.0	16.1.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.422.V16.1.0	16.1.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.422.V16.1.0.docx
ETSI	ETSI TS 138 422 V16.1.0 (2023-07)	16.1.0	Published	28.07.2023	https://www.etsi.org/deliver/etsi_ts/138400_138499/138422/16.01.00_60/ts_138422v160100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.422-16.1.0 V1.1.0	16.1.0	Published	02.11.2023	https://members.tdsi.in/s/jK5XTA9y85a2g7a
TTA	TTAT.3G-38.422V16.1.0	16.1.0	Published	27.10.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.422V16.1.0&searchCate=TTAS
TTC	TS-3GA-38.422(Rel16)v16.1.0	16.1.0	Published	05.10.2023	https://www.ttc.or.jp/st/docs/3gpp/2023/TS/TS-3GA-38.422v16.1.0.pdf

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ATIS	ATIS.3GPP.38.422.V17.1.0	17.1.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.422.V17.1.0	17.1.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.422.V17.1.0.docx
ETSI	ETSI TS 138 422 V17.1.0 (2023-07)	17.1.0	Published	28.07.2023	https://www.etsi.org/deliver/etsi_ts/138400_138499/138422/17.01.00_60/ts_138422v170100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.422-17.1.0 V1.1.0	17.1.0	Published	02.11.2023	https://members.tdsi.in/s/4zC2YTQgsJn8mMG
TTA	TTAT.3G-38.422V17.1.0	17.1.0	Published	27.10.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.422V17.1.0&searchCate=TTAS
TTC	TS-3GA-38.422(Rel17)v17.1.0	17.1.0	Published	05.10.2023	https://www.ttc.or.jp/st/docs/3gpp/2023/TS/TS-3GA-38.422v17.1.0.pdf

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CCSA	CCSA.3GPP.38.422.V18.1.0	18.1.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.422.V18.1.0.docx
ETSI	ETSI TS 138 422 V18.1.0 (2024-08)	18.1.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138422/18.01.00_60/ts_138422v180100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.422-18.1.0 V1.0.0	18.1.0	Published	19.11.2024	https://members.tdsi.in/s/nZxTcjDCJ8RyS5x
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2.2.1.4.23 TS 38.423**NG-RAN; Xn Application Protocol (XnAP)**

This document specifies the radio network layer signalling procedures of the control plane between NG-RAN nodes in NG-RAN. XnAP supports the functions of the Xn interface by signalling procedures defined in this document. XnAP is developed in accordance with the general principles stated in TS 38.401 and TS 38.420.

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TSDSI	TSDSI STD T1.3GPP 38.423-15.20.0 V1.7.0	15.20.0	Published	02.03.2025	https://members.tdsi.in/s/WKrmRkbJW8JFBZY
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ATIS	ATIS.3GPP.38.423.V16.19.0	16.19.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.423.V16.19.0	16.19.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.423.V16.19.0.docx
ETSI	ETSI TS 138 423 V16.19.0 (2024-09)	16.19.0	Published	26.09.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138423/16.19.00_60/ts_138423v161900p.pdf
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TTA	TTAT.3G-38.423V16.19.0	16.19.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.423V16.19.0&searchCate=TTAS
TTC	TS-3GA-38.423(Rel16)v16.19.0	16.19.0	Published	10.01.2025	https://www.ttc.or.jp/st/docs/3gpp/2025/TS/TS-3GA-38.423v16.19.0.pdf

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ETSI	ETSI TS 138 423 V17.10.0 (2024-09)	17.10.0	Published	26.09.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138423/17.10.00_60/ts_138423v171000p.pdf
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TTC	TS-3GA-38.423(Rel17)v17.10.0	17.10.0	Published	10.01.2025	https://www.ttc.or.jp/st/docs/3gpp/2025/TS/TS-3GA-38.423v17.10.0.pdf

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ATIS	ATIS.3GPP.38.423.V18.3.0	18.3.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.423.V18.3.0	18.3.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.423.V18.3.0.docx
ETSI	ETSI TS 138 423 V18.3.0 (2024-09)	18.3.0	Published	26.09.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138423/18.03.00_60/ts_138423v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.423-18.3.0 V1.1.0	18.3.0	Published	02.03.2025	https://members.tdsi.in/s/LNw42AFCqTteLSZ
TTA	TTAT.3G-38.423V18.3.0	18.3.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.423V18.3.0&searchCate=TTAS
TTC	TS-3GA-38.423(Rel18)v18.3.0	18.3.0	Published	10.01.2025	https://www.ttc.or.jp/st/docs/3gpp/2025/TS/TS-3GA-38.423v18.3.0.pdf

2.2.1.4.24 TS 38.424**NG-RAN; Xn data transport**

This document specifies the standards for user data transport protocols and related signalling protocols to establish user plane transport bearers over the Xn interface.

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CCSA	CCSA.3GPP.38.424.V15.2.0	15.2.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.424.V15.2.0.doc
ETSI	ETSI TS 138 424 V15.2.0 (2019-07)	15.2.0	Published	23.07.2019	https://www.etsi.org/deliver/etsi_ts/138400_138499/138424/15.02.00_60/ts_138424v150200p.pdf
TSDSI	TSDSI STD T1.3GPP 38.424-15.2.0 V1.0.0	15.2.0	Published	06.10.2020	https://members.tdsi.in/s/LqzDFgxndnKT4LGa
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TTC	TS-3GA-38.424(Rel15)v15.2.0	15.2.0	Published	11.10.2019	https://www.ttc.or.jp/st/docs/3gpps2019/TS/TS-3GA-38.424(Rel15)v15.2.0.pdf

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CCSA	CCSA.3GPP.38.424.V16.0.0	16.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.424.V16.0.0.doc
ETSI	ETSI TS 138 424 V16.0.0 (2020-07)	16.0.0	Published	21.07.2020	https://www.etsi.org/deliver/etsi_ts/138400_138499/138424/16.00.00_60/ts_138424v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.424-16.0.0 V1.0.0	16.0.0	Published	06.10.2020	https://members.tdsi.in/s/MmwefCdmKrY3sNe
TTA	TTAT.3G-38.424V16.0.0	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.424V16.0.0&searchCate=TTAS
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ATIS	ATIS.3GPP.38.424.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.424.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.424.V17.0.0.doc
ETSI	ETSI TS 138 424 V17.0.0 (2022-04)	17.0.0	Published	29.04.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138424/17.00.00_60/ts_138424v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.424-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/cXZsacGRsf2rqAq
TTA	TTAT.3G-38.424V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.424V17.0.0&searchCate=TTAS
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ETSI	ETSI TS 138 424 V18.0.0 (2024-05)	18.0.0	Published	06.05.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138424/18.00.00_60/ts_138424v180000p.pdf
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TTA	TTAT.3G-38.424V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.424V18.0.0&searchCate=TTAS
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2.2.1.4.25 TS 38.425**NG-RAN; NR user plane protocol**

This document specifies the NR user plane protocol functions used within NG-RAN and, for EN-DC, within E-UTRAN. NR user plane protocol functions may reside in nodes terminating either the X2-U (for EN-DC) or the Xn-U or the F1-U interface.

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ETSI	ETSI TS 138 425 V15.7.0 (2020-11)	15.7.0	Published	12.11.2020	https://www.etsi.org/deliver/etsi_ts/138400_138499/138425/15.07.00_60/ts_138425v150700p.pdf
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TTC	TS-3GA-38.425(Rel15)v15.7.0	15.7.0	Published	22.12.2020	https://www.ttc.or.jp/st/docs/3gpp/2020/TS/TS-3GA-38.425v15.7.0.pdf

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ETSI	ETSI TS 138 425 V16.3.0 (2021-04)	16.3.0	Published	28.04.2021	https://www.etsi.org/deliver/etsi_ts/138400_138499/138425/16.03.00_60/ts_138425v160300p.pdf
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TTA	TTAT.3G-38.425V16.3.0	16.3.0	Published	10.06.2021	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.425V16.3.0&searchCate=TTAS
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ETSI	ETSI TS 138 425 V17.3.0 (2023-05)	17.3.0	Published	05.05.2023	https://www.etsi.org/deliver/etsi_ts/138400_138499/138425/17.03.00_60/ts_138425v170300p.pdf
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TTA	TTAT.3G-38.425V17.3.0	17.3.0	Published	01.08.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.425V17.3.0&searchCate=TTAS
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2.2.1.4.26 TS 38.455**NG-RAN; NR Positioning Protocol A (NRPPa)**

This document specifies the control plane radio network layer signalling procedures between a NG-RAN node and the LMF. NRPPa supports the concerned functions by signalling procedures defined in this document.

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Release 15

ATIS	ATIS.3GPP.38.455.V15.4.0	15.4.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.455.V15.4.0	15.4.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.455.V15.4.0.doc
ETSI	ETSI TS 138 455 V15.4.0 (2021-08)	15.4.0	Published	26.08.2021	https://www.etsi.org/deliver/etsi_ts/138400_138499/138455/15.04.00_60/ts_138455v150400p.pdf
TSDSI	TSDSI STD T1.3GPP 38.455-15.4.0 V1.1.0	15.4.0	Published	29.07.2022	https://members.tdsi.in/s/Qm6nzXK233wrAcX
TTA	TTAT.3G-38.455V15.4.0	15.4.0	Published	30.09.2021	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.455V15.4.0&searchCate=TTAS
TTC	TS-3GA-38.455(Rel15)v15.4.0	15.4.0	Published	15.10.2021	https://www.ttc.or.jp/st/docs/3gpp/2021/TS/TS-3GA-38.455v15.4.0.pdf

Release 16

ATIS	ATIS.3GPP.38.455.V16.13.0	16.13.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.455.V16.13.0	16.13.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.455.V16.13.0.docx
ETSI	ETSI TS 138 455 V16.13.0 (2024-02)	16.13.0	Published	02.02.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138455/16.13.00_60/ts_138455v161300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.455-16.13.0 V1.6.0	16.13.0	Published	29.05.2024	https://members.tdsi.in/s/KZSHRGLPYSLczfb
TTA	TTAT.3G-38.455V16.13.0	16.13.0	Published	08.05.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.455V16.13.0&searchCate=TTAS
TTC	TS-3GA-38.455(Rel16)v16.13.0	16.13.0	Published	05.04.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.455v16.13.0.pdf

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ATIS	ATIS.3GPP.38.455.V17.8.0	17.8.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.455.V17.8.0	17.8.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.455.V17.8.0.docx
ETSI	ETSI TS 138 455 V17.8.0 (2024-08)	17.8.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138455/17.08.00_60/ts_138455v170800p.pdf
TSDSI	TSDSI STD T1.3GPP 38.455-17.8.0 V1.8.0	17.8.0	Published	19.11.2024	https://members.tdsi.in/s/RTCiNDkNwCixKmR
TTA	TTAT.3G-38.455V17.8.0	17.8.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.455V17.8.0&searchCate=TTAS
TTC	TS-3GA-38.455(Rel17)v17.8.0	17.8.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.455v17.8.0.pdf

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ATIS	ATIS.3GPP.38.455.V18.3.0	18.3.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.455.V18.3.0	18.3.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.455.V18.3.0.docx
ETSI	ETSI TS 138 455 V18.3.0 (2024-09)	18.3.0	Published	26.09.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138455/18.03.00_60/ts_138455v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.455-18.3.0 V1.1.0	18.3.0	Published	02.03.2025	https://members.tdsi.in/s/kGZDGBaNGKL6pnt
TTA	TTAT.3G-38.455V18.3.0	18.3.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.455V18.3.0&searchCate=TTAS
TTC	TS-3GA-38.455(Rel18)v18.3.0	18.3.0	Published	10.01.2025	https://www.ttc.or.jp/st/docs/3gpp/2025/TS/TS-3GA-38.455v18.3.0.pdf

2.2.1.4.27 TS 38.460**NG-RAN; E1 general aspects and principles**

This document is an introduction to the 3GPP TS 38.46x series of technical specifications that define the E1 interface. The E1 interface provides means for interconnecting a gNB-CU-CP and a gNB-CU-UP of a gNB-CU within an NG-RAN, or for interconnecting a gNB-CU-CP and a gNB-CU-UP of an en-gNB within an E-UTRAN.

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Release 15					
ATIS	ATIS.3GPP.38.460.V15.4.0	15.4.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.460.V15.4.0	15.4.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.460.V15.4.0.doc
ETSI	ETSI TS 138 460 V15.4.0 (2019-07)	15.4.0	Published	23.07.2019	https://www.etsi.org/deliver/etsi_ts/138400_138499/138460/15.04.00_60/ts_138460v150400p.pdf
TSDSI	TSDSI STD T1.3GPP 38.460-15.4.0 V1.0.0	15.4.0	Published	06.10.2020	https://members.tdsi.in/s/CjQgSb8H3SZFmib
TTA	TTAT.3G-38.460V15.4.0	15.4.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.460V15.4.0&searchCate=TTAS
TTC	TS-3GA-38.460(Rel15)v15.4.0	15.4.0	Published	11.10.2019	https://www.ttc.or.jp/st/docs/3gpp/2019/TS/TS-3GA-38.460(Rel15)v15.4.0.pdf

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ATIS	ATIS.3GPP.38.460.V16.5.0	16.5.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.460.V16.5.0	16.5.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.460.V16.5.0.doc
ETSI	ETSI TS 138 460 V16.5.0 (2022-05)	16.5.0	Published	02.05.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138460/16.05.00_60/ts_138460v160500p.pdf
TSDSI	TSDSI STD T1.3GPP 38.460-16.5.0 V1.1.0	16.5.0	Published	29.07.2022	https://members.tdsi.in/s/RH5qoFXrP7A5bP8
TTA	TTAT.3G-38.460V16.5.0	16.5.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.460V16.5.0&searchCate=TTAS
TTC	TS-3GA-38.460(Rel16)v16.5.0	16.5.0	Published	08.07.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-38.460v16.5.0.pdf

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ATIS	ATIS.3GPP.38.460.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.460.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.460.V17.0.0.doc
ETSI	ETSI TS 138 460 V17.0.0 (2022-05)	17.0.0	Published	02.05.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138460/17.00.00_60/ts_138460v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.460-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/4sxcQFAz3fnCfQP
TTA	TTAT.3G-38.460V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.460V17.0.0&searchCate=TTAS
TTC	TS-3GA-38.460(Rel17)v17.0.0	17.0.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-38.460v17.0.0.pdf

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ATIS	ATIS.3GPP.38.460.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.460.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.460.V18.0.0.docx
ETSI	ETSI TS 138 460 V18.0.0 (2024-05)	18.0.0	Published	06.05.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138460/18.00.00_60/ts_138460v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.460-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/Fn8YeMM9crKwXBn
TTA	TTAT.3G-38.460V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.460V18.0.0&searchCate=TTAS
TTC	TS-3GA-38.460(Rel18)v18.0.0	18.0.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.460v18.0.0.pdf

2.2.1.4.28 TS 38.461**NG-RAN; E1 layer 1**

This document specifies the standards allowed to implement layer 1 on the E1 interface.

The specification of transmission delay requirements and O&M requirements are not in the scope of this document.

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ATIS	ATIS.3GPP.38.461.V15.1.0	15.1.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.461.V15.1.0	15.1.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.461.V15.1.0.doc
ETSI	ETSI TS 138 461 V15.1.0 (2019-10)	15.1.0	Published	16.10.2019	https://www.etsi.org/deliver/etsi_ts/138400_138499/138461/15.01.00_60/ts_138461v150100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.461-15.1.0 V1.0.0	15.1.0	Published	06.10.2020	https://members.tdsi.in/s/XrdStRYQ8QPjFdm
TTA	TTAT.3G-38.461V15.1.0	15.1.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.461V15.1.0&searchCate=TTAS
TTC	TS-3GA-38.461(Rel15)v15.1.0	15.1.0	Published	20.12.2019	https://www.ttc.or.jp/st/docs/3gpp/2019/TS/TS-3GA-38.461(Rel15)v15.1.0.pdf

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ATIS	ATIS.3GPP.38.461.V16.0.0	16.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.461.V16.0.0	16.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.461.V16.0.0.doc
ETSI	ETSI TS 138 461 V16.0.0 (2020-07)	16.0.0	Published	21.07.2020	https://www.etsi.org/deliver/etsi_ts/138400_138499/138461\16.00.00_60/ts_138461v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.461-16.0.0 V1.0.0	16.0.0	Published	06.10.2020	https://members.tdsi.in/s/RMHScskHmQn9NrP
TTA	TTAT.3G-38.461V16.0.0	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.461V16.0.0&searchCate=TTAS
TTC	TS-3GA-38.461(Rel16)v16.0.0	16.0.0	Published	02.10.2020	https://www.ttc.or.jp/st/docs/3gpps2020/TS/TS-3GA-38_461_Rel16v16_0_0.pdf

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ATIS	ATIS.3GPP.38.461.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.461.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.461.V17.0.0.doc
ETSI	ETSI TS 138 461 V17.0.0 (2022-05)	17.0.0	Published	02.05.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138461\17.00.00_60/ts_138461v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.461-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/robkwZYcsagzqi
TTA	TTAT.3G-38.461V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.461V17.0.0&searchCate=TTAS
TTC	TS-3GA-38.461(Rel17)v17.0.0	17.0.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-38.461v17.0.0.pdf

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ATIS	ATIS.3GPP.38.461.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.461.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.461.V18.0.0.docx
ETSI	ETSI TS 138 461 V18.0.0 (2024-05)	18.0.0	Published	06.05.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138461\18.00.00_60/ts_138461v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.461-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/Pc6YcDeFW933fYo
TTA	TTAT.3G-38.461V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.461V18.0.0&searchCate=TTAS
TTC	TS-3GA-38.461(Rel18)v18.0.0	18.0.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.461v18.0.0.pdf

2.2.1.4.29 TS 38.462**NG-RAN; E1 signalling transport**

This document specifies the standards for Signalling Transport to be used across the E1 interface. The E1 interface provides means for the interconnection of gNB-CU-CP and gNB-CU-UP within the NG-RAN architecture (TS 38.401).

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ATIS	ATIS.3GPP.38.462.V15.8.0	15.8.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.462.V15.8.0	15.8.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.462.V15.8.0.docx
ETSI	ETSI TS 138 462 V15.8.0 (2024-04)	15.8.0	Published	23.04.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138462\15.08.00_60/ts_138462v150800p.pdf
TSDSI	TSDSI STD T1.3GPP 38.462-15.8.0 V1.2.0	15.8.0	Published	22.07.2024	https://members.tdsi.in/s/M9kSMtdrses9bax
TTA	TTAT.3G-38.462V15.8.0	15.8.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.462V15.8.0&searchCate=TTAS
TTC	TS-3GA-38.462(Rel15)v15.8.0	15.8.0	Published	05.07.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.462v15.8.0.pdf

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ATIS	ATIS.3GPP.38.462.V16.4.0	16.4.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.462.V16.4.0	16.4.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.462.V16.4.0.docx
ETSI	ETSI TS 138 462 V16.4.0 (2024-08)	16.4.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138462/16.04.00_60/ts_138462v160400p.pdf
TSDSI	TSDSI STD T1.3GPP 38.462-16.4.0 V1.4.0	16.4.0	Published	19.11.2024	https://members.tdsi.in/s/R7LxCCHKR93zPaa
TTA	TTAT.3G-38.462V16.4.0	16.4.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.462V16.4.0&searchCate=TTAS
TTC	TS-3GA-38.462(Rel16)v16.4.0	16.4.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.462v16.4.0.pdf

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ATIS	ATIS.3GPP.38.462.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.462.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.462.V17.0.0.doc
ETSI	ETSI TS 138 462 V17.0.0 (2022-05)	17.0.0	Published	02.05.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138462/17.00.00_60/ts_138462v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.462-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/LccWABpdL7Kop6p
TTA	TTAT.3G-38.462V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.462V17.0.0&searchCate=TTAS
TTC	TS-3GA-38.462(Rel17)v17.0.0	17.0.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-38.462v17.0.0.pdf

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ATIS	ATIS.3GPP.38.462.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.462.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.462.V18.0.0.docx
ETSI	ETSI TS 138 462 V18.0.0 (2024-05)	18.0.0	Published	06.05.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138462/18.00.00_60/ts_138462v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.462-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/wA4DrGMZ3mscizn
TTA	TTAT.3G-38.462V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.462V18.0.0&searchCate=TTAS
TTC	TS-3GA-38.462(Rel18)v18.0.0	18.0.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.462v18.0.0.pdf

2.2.1.4.30 TS 38.463**NG-RAN; E1 Application Protocol (E1AP)**

This document specifies the 5G radio network layer signalling protocol for the E1 interface. The E1 interface provides means for interconnecting a gNB-CU-CP and a gNB-CU-UP of a gNB within an NG-RAN, or for interconnecting a gNB-CU-CP and a gNB-CU-UP of an en-gNB within an E-UTRAN. The E1 Application Protocol (E1AP) supports the functions of E1 interface by signalling procedures defined in this document. E1AP is developed in accordance to the general principles stated in TS 38.401 and TS 38.460.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.38.463.V15.13.0	15.13.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.463.V15.13.0	15.13.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.463.V15.13.0.docx
ETSI	ETSI TS 138 463 V15.13.0 (2023-10)	15.13.0	Published	02.10.2023	https://www.etsi.org/deliver/etsi_ts/138400_138499/138463/15.13.00_60/ts_138463v151300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.463-15.13.0 V1.4.0	15.13.0	Published	23.02.2024	https://members.tdsi.in/s/SfpX3GCEyKs2wC7
TTA	TTAT.3G-38.463V15.13.0	15.13.0	Published	13.02.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.463V15.13.0&searchCate=TTAS
TTC	TS-3GA-38.463(Rel15)v15.13.0	15.13.0	Published	12.01.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.463v15.13.0.pdf

Release 16

ATIS	ATIS.3GPP.38.463.V16.16.0	16.16.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.463.V16.16.0	16.16.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.463.V16.16.0.docx
ETSI	ETSI TS 138 463 V16.16.0 (2024-02)	16.16.0	Published	02.02.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138463/16.16.00_60/ts_138463v161600p.pdf
TSDSI	TSDSI STD T1.3GPP 38.463-16.16.0 V1.7.0	16.16.0	Published	29.05.2024	https://members.tdsi.in/s/EJ2aa8a6p6mxZR7
TTA	TTAT.3G-38.463V16.16.0	16.16.0	Published	08.05.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.463V16.16.0&searchCate=TTAS
TTC	TS-3GA-38.463(Rel16)v16.16.0	16.16.0	Published	05.04.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.463v16.16.0.pdf

Release 17

ATIS	ATIS.3GPP.38.463.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.463.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.463.V17.0.0.doc
ETSI	ETSI TS 138 463 V17.0.0 (2022-05)	17.0.0	Published	02.05.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138463/17.00.00_60/ts_138463v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.463-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/GpPCKzdwWsY9aYw
TTA	TTAT.3G-38.463V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.463V17.0.0&searchCate=TTAS
TTC	TS-3GA-38.463(Rel17)v17.0.0	17.0.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-38.463v17.0.0.pdf

Release 18

ATIS	ATIS.3GPP.38.463.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.463.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.463.V18.0.0.docx
ETSI	ETSI TS 138 463 V18.0.0 (2024-05)	18.0.0	Published	06.05.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138463/18.00.00_60/ts_138463v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.463-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/9o4yMMkifSZYdtL
TTA	TTAT.3G-38.463V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.463V18.0.0&searchCate=TTAS
TTC	TS-3GA-38.463(Rel18)v18.0.0	18.0.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.463v18.0.0.pdf

2.2.1.4.31 TS 38.470**NG-RAN; F1 general aspects and principles**

This document is an introduction to the 3GPP TS 38.47x series of technical specifications that define the F1 interface. The F1 interface provides means for interconnecting a gNB-CU and a gNB-DU of a gNB within an NG-RAN, or for interconnecting a gNB-CU and a gNB-DU of an en-gNB within an E-UTRAN.

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Release 15

ATIS	ATIS.3GPP.38.470.V15.8.0	15.8.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.470.V15.8.0	15.8.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.470.V15.8.0.doc
ETSI	ETSI TS 138 470 V15.8.0 (2021-08)	15.8.0	Published	27.08.2021	https://www.etsi.org/deliver/etsi_ts/138400_138499/138470/15.08.00_60/ts_138470v150800p.pdf
TSDSI	TSDSI STD T1.3GPP 38.470-15.8.0 V1.1.0	15.8.0	Published	29.07.2022	https://members.tdsi.in/s/CERXsL78xeZAPQM
TTA	TTAT.3G-38.470V15.8.0	15.8.0	Published	30.09.2021	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.470V15.8.0&searchCate=TTAS
TTC	TS-3GA-38.470(Rel15)v15.8.0	15.8.0	Published	15.10.2021	https://www.ttc.or.jp/st/docs/3gpp/2021/TS/TS-3GA-38.470v15.8.0.pdf

Release 16

ATIS	ATIS.3GPP.38.470.V16.11.0	16.11.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.470.V16.11.0	16.11.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.470.V16.11.0.docx
ETSI	ETSI TS 138 470 V16.11.0 (2023-10)	16.11.0	Published	06.10.2023	https://www.etsi.org/deliver/etsi_ts/138400_138499/138470/16.11.00_60/ts_138470v161100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.470-16.11.0 V1.6.0	16.11.0	Published	23.02.2024	https://members.tdsi.in/s/ENYeSBp4nawzNYy
TTA	TTAT.3G-38.470V16.11.0	16.11.0	Published	13.02.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.470V16.11.0&searchCate=TTAS
TTC	TS-3GA-38.470(Rel16)v16.11.0	16.11.0	Published	12.01.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.470v16.11.0.pdf

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ATIS	ATIS.3GPP.38.470.V17.6.0	17.6.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.470.V17.6.0	17.6.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.470.V17.6.0.docx
ETSI	ETSI TS 138 470 V17.6.0 (2023-10)	17.6.0	Published	06.10.2023	https://www.etsi.org/deliver/etsi_ts/138400_138499/138470/17.06.00_60/ts_138470v170600p.pdf
TSDSI	TSDSI STD T1.3GPP 38.470-17.6.0 V1.6.0	17.6.0	Published	23.02.2024	https://members.tdsi.in/s/9nb7b3b9poYGk7J
TTA	TTAT.3G-38.470V17.6.0	17.6.0	Published	13.02.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.470V17.6.0&searchCate=TTAS
TTC	TS-3GA-38.470(Rel17)v17.6.0	17.6.0	Published	12.01.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.470v17.6.0.pdf

Release 18

ATIS	ATIS.3GPP.38.470.V18.3.0	18.3.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.470.V18.3.0	18.3.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.470.V18.3.0.docx
ETSI	ETSI TS 138 470 V18.3.0 (2024-09)	18.3.0	Published	26.09.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138470/18.03.00_60/ts_138470v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.470-18.3.0 V1.1.0	18.3.0	Published	02.03.2025	https://members.tdsi.in/s/wiQewKCqdbRDBes
TTA	TTAT.3G-38.470V18.3.0	18.3.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.470V18.3.0&searchCate=TTAS
TTC	TS-3GA-38.470(Rel18)v18.3.0	18.3.0	Published	10.01.2025	https://www.ttc.or.jp/st/docs/3gpp/2025/TS/TS-3GA-38.470v18.3.0.pdf

2.2.1.4.32 TS 38.471**NG-RAN; F1 layer 1**

This document specifies the standards allowed to implement Layer 1 on the F1 interface. The F1 interface provides means for interconnecting a gNB-CU and a gNB-DU of a gNB within an NG-RAN, or for interconnecting a gNB-CU and a gNB-DU of an en-gNB within an E-UTRAN.

The specification of transmission delay requirements and O&M requirements are not in the scope of this document.

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ATIS	ATIS.3GPP.38.471.V15.0.0	15.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.471.V15.0.0	15.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.471.V15.0.0.doc
ETSI	ETSI TS 138 471 V15.0.0 (2018-09)	15.0.0	Published	18.09.2018	https://www.etsi.org/deliver/etsi_ts/138400_138499/138471/15.00.00_60/ts_138471v150000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.471-15.0.0 V1.0.0	15.0.0	Published	06.10.2020	https://members.tdsi.in/s/6HHDRT8g4SL3wE7
TTA	TTAT.3G-38.471V15.0.0	15.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.471V15.0.0&searchCate=TTAS
TTC	TS-3GA-38.471(Rel15)v15.0.0	15.0.0	Published	28.09.2018	https://www.ttc.or.jp/st/docs/3gpp/2018/TS/TS-3GA-38.471(Rel15)v15.0.0.pdf

Release 16

ATIS	ATIS.3GPP.38.471.V16.0.0	16.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.471.V16.0.0	16.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.471.V16.0.0.doc
ETSI	ETSI TS 138 471 V16.0.0 (2020-07)	16.0.0	Published	21.07.2020	https://www.etsi.org/deliver/etsi_ts/138400_138499/138471/16.00.00_60/ts_138471v160000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.471-16.0.0 V1.0.0	16.0.0	Published	06.10.2020	https://members.tdsi.in/s/4Wf9PPdEtEidfJk
TTA	TTAT.3G-38.471V16.0.0	16.0.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.471V16.0.0&searchCate=TTAS
TTC	TS-3GA-38.471(Rel16)v16.0.0	16.0.0	Published	02.10.2020	https://www.ttc.or.jp/st/docs/3gpps2020/TS/TS-3GA-38_471_Rel16v16_0_0.pdf

Release 17

ATIS	ATIS.3GPP.38.471.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.471.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.471.V17.0.0.doc
ETSI	ETSI TS 138 471 V17.0.0 (2022-04)	17.0.0	Published	29.04.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138471/17.00.00_60/ts_138471v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.471-17.0.0 V1.0.0	17.0.0	Published	29.07.2022	https://members.tdsi.in/s/Zow2mGbFdyZAwNb
TTA	TTAT.3G-38.471V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.471V17.0.0&searchCate=TTAS
TTC	TS-3GA-38.471(Rel17)v17.0.0	17.0.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-38.471v17.0.0.pdf

Release 18

ATIS	ATIS.3GPP.38.471.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.471.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.471.V18.0.0.docx
ETSI	ETSI TS 138 471 V18.0.0 (2024-05)	18.0.0	Published	06.05.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138471/18.00.00_60/ts_138471v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.471-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/oE47yE8dam8sswQ
TTA	TTAT.3G-38.471V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.471V18.0.0&searchCate=TTAS
TTC	TS-3GA-38.471(Rel18)v18.0.0	18.0.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.471v18.0.0.pdf

2.2.1.4.33 TS 38.472**NG-RAN; F1 signalling transport**

This document specifies the standards for Signalling Transport to be used across the F1 interface. The F1 interface provides means for interconnecting a gNB-CU and a gNB-DU of a gNB within an NG-RAN, or for interconnecting a gNB-CU and a gNB-DU of an en-gNB within an E-UTRAN. This document describes how the F1AP signalling messages are transported over F1.

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Release 15

ATIS	ATIS.3GPP.38.472.V15.7.0	15.7.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.472.V15.7.0	15.7.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.472.V15.7.0.doc
ETSI	ETSI TS 138 472 V15.7.0 (2020-11)	15.7.0	Published	12.11.2020	https://www.etsi.org/deliver/etsi_ts/138400_138499/138472/15.07.00_60/ts_138472v150700p.pdf
TSDSI	TSDSI STD T1.3GPP 38.472-15.7.0 V1.1.0	15.7.0	Published	29.07.2022	https://members.tdsi.in/s/QcCAGPrtEAFZa7
TTA	TTAT.3G-38.472V15.7.0	15.7.0	Published	16.03.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.472V15.7.0&searchCate=TTAS
TTC	TS-3GA-38.472(Rel15)v15.7.0	15.7.0	Published	22.12.2020	https://www.ttc.or.jp/st/docs/3gpp/2020/TS/TS-3GA-38.472v15.7.0.pdf

Release 16

ATIS	ATIS.3GPP.38.472.V16.2.0	16.2.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.472.V16.2.0	16.2.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.472.V16.2.0.docx
ETSI	ETSI TS 138 472 V16.2.0 (2023-07)	16.2.0	Published	19.07.2023	https://www.etsi.org/deliver/etsi_ts/138400_138499/138472/16.02.00_60/ts_138472v160200p.pdf
TSDSI	TSDSI STD T1.3GPP 38.472-16.2.0 V1.2.0	16.2.0	Published	02.11.2023	https://members.tdsi.in/s/mAxmGBnRnDzi4PA
TTA	TTAT.3G-38.472V16.2.0	16.2.0	Published	27.10.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.472V16.2.0&searchCate=TTAS
TTC	TS-3GA-38.472(Rel16)v16.2.0	16.2.0	Published	05.10.2023	https://www.ttc.or.jp/st/docs/3gpp/2023/TS/TS-3GA-38.472v16.2.0.pdf

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ATIS	ATIS.3GPP.38.472.V17.2.0	17.2.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.472.V17.2.0	17.2.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.472.V17.2.0.docx
ETSI	ETSI TS 138 472 V17.2.0 (2023-07)	17.2.0	Published	19.07.2023	https://www.etsi.org/deliver/etsi_ts/138400_138499/138472/17.02.00_60/ts_138472v170200p.pdf
TSDSI	TSDSI STD T1.3GPP 38.472-17.2.0 V1.2.0	17.2.0	Published	11.02.2023	https://members.tdsi.in/s/R24sWjkffDaNbDA
TTA	TTAT.3G-38.472V17.2.0	17.2.0	Published	27.10.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.472V17.2.0&searchCate=TTAS
TTC	TS-3GA-38.472(Rel17)v17.2.0	17.2.0	Published	05.10.2023	https://www.ttc.or.jp/st/docs/3gpp/2023/TS/TS-3GA-38.472v17.2.0.pdf

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ATIS	ATIS.3GPP.38.472.V18.1.0	18.1.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.472.V18.1.0	18.1.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.472.V18.1.0.docx
ETSI	ETSI TS 138 472 V18.1.0 (2024-08)	18.1.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138472/18.01.00_60/ts_138472v180100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.472-18.1.0 V1.0.0	18.1.0	Published	19.11.2024	https://members.tdsi.in/s/X79fCWCWe6iL7CC
TTA	TTAT.3G-38.472V18.1.0	18.1.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.472V18.1.0&searchCate=TTAS
TTC	TS-3GA-38.472(Rel18)v18.1.0	18.1.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.472v18.1.0.pdf

2.2.1.4.34 TS 38.473**NG-RAN; F1 Application Protocol (F1AP)**

This document specifies the 5G radio network layer signalling protocol for the F1 interface. The F1 interface provides means for interconnecting a gNB-CU and a gNB-DU of a gNB within an NG-RAN, or for interconnecting a gNB-CU and a gNB-DU of an en-gNB within an E-UTRAN. The F1 Application Protocol (F1AP) supports the functions of F1 interface by signalling procedures defined in this document. F1AP is developed in accordance with the general principles stated in TS 38.401 and TS 38.470.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.38.473.V15.18.0	15.18.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.473.V15.18.0	15.18.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.473.V15.18.0.docx
ETSI	ETSI TS 138 473 V15.18.0 (2024-09)	15.18.0	Published	26.09.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138473/15.18.00_60/ts_138473v151800p.pdf
TSDSI	TSDSI STD T1.3GPP 38.473-15.18.0 V1.3.0	15.18.0	Published	02.03.2025	https://members.tdsi.in/s/b44DGKf4eSrZkss
TTA	TTAT.3G-38.473V15.18.0	15.18.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.473V15.18.0&searchCate=TTAS
TTC	TS-3GA-38.473(Rel15)v15.18.0	15.18.0	Published	10.01.2025	https://www.ttc.or.jp/st/docs/3gpp/2025/TS/TS-3GA-38.473v15.18.0.pdf

Release 16

ATIS	ATIS.3GPP.38.473.V16.19.0	16.19.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.473.V16.19.0	16.19.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.473.V16.19.0.docx
ETSI	ETSI TS 138 473 V16.19.0 (2024-09)	16.19.0	Published	26.09.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138473/16.19.00_60/ts_138473v161900p.pdf
TSDSI	TSDSI STD T1.3GPP 38.473-16.19.0 V1.10.0	16.19.0	Published	02.03.2025	https://members.tdsi.in/s/aG5ZcgTmWZeHoab
TTA	TTAT.3G-38.473V16.19.0	16.19.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.473V16.19.0&searchCate=TTAS
TTC	TS-3GA-38.473(Rel16)v16.19.0	16.19.0	Published	10.01.2025	https://www.ttc.or.jp/st/docs/3gpp/2025/TS/TS-3GA-38.473v16.19.0.pdf

Release 17

ATIS	ATIS.3GPP.38.473.V17.10.0	17.10.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.473.V17.10.0	17.10.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.473.V17.10.0.docx
ETSI	ETSI TS 138 473 V17.10.0 (2024-09)	17.10.0	Published	26.09.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138473/17.10.00_60/ts_138473v171000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.473-17.10.0 V1.10.0	17.10.0	Published	02.03.2025	https://members.tdsi.in/s/B4fYxtHKrZmC4bE
TTA	TTAT.3G-38.473V17.10.0	17.10.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.473V17.10.0&searchCate=TTAS
TTC	TS-3GA-38.473(Rel17)v17.10.0	17.10.0	Published	10.01.2025	https://www.ttc.or.jp/st/docs/3gpp/2025/TS/TS-3GA-38.473v17.10.0.pdf

Release 18

ATIS	ATIS.3GPP.38.473.V18.3.0	18.3.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.473.V18.3.0	18.3.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.473.V18.3.0.docx
ETSI	ETSI TS 138 473 V18.3.0 (2024-09)	18.3.0	Published	26.09.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138473/18.03.00_60/ts_138473v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.473-18.3.0 V1.1.0	18.3.0	Published	02.03.2025	https://members.tdsi.in/s/QNJLHGC7Yr5w8wk
TTA	TTAT.3G-38.473V18.3.0	18.3.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.473V18.3.0&searchCate=TTAS
TTC	TS-3GA-38.473(Rel18)v18.3.0	18.3.0	Published	10.01.2025	https://www.ttc.or.jp/st/docs/3gpp/2025/TS/TS-3GA-38.473v18.3.0.pdf

2.2.1.4.35 TS 38.474**NG-RAN; F1 data transport**

This document specifies the standards for user data transport protocols and related signalling protocols to establish user plane transport bearers over the F1 interface. The F1 interface provides means for interconnecting a gNB-CU and a gNB-DU of a gNB within an NG-RAN, or for interconnection a gNB-CU and a gNB-DU of an en-gNB within an E-UTRAN.

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Release 15

ATIS	ATIS.3GPP.38.474.V15.3.0	15.3.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.474.V15.3.0	15.3.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.474.V15.3.0.doc
ETSI	ETSI TS 138 474 V15.3.0 (2019-10)	15.3.0	Published	16.10.2019	https://www.etsi.org/deliver/etsi_ts/138400_138499/138474/15.03.00_60/ts_138474v150300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.474-15.3.0 V1.0.0	15.3.0	Published	06.10.2020	https://members.tdsi.in/s/tRyZRTQGpiGw9oF
TTA	TTAT.3G-38.474V15.3.0	15.3.0	Published	11.09.2020	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.474V15.3.0&searchCate=TTAS
TTC	TS-3GA-38.474(Rel15)v15.3.0	15.3.0	Published	20.12.2019	https://www.ttc.or.jp/st/docs/3gpps2019/TS/TS-3GA-38.474(Rel15)v15.3.0.pdf

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ATIS	ATIS.3GPP.38.474.V16.1.0	16.1.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.474.V16.1.0	16.1.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.474.V16.1.0.docx
ETSI	ETSI TS 138 474 V16.1.0 (2021-01)	16.1.0	Published	26.01.2021	https://www.etsi.org/deliver/etsi_ts/138400_138499/138474/16.01.00_60/ts_138474v160100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.474-16.1.0 V1.1.0	16.1.0	Published	29.07.2022	https://members.tdsi.in/s/WpHwaw3JdTNB8rB
TTA	TTAT.3G-38.474V16.1.0	16.1.0	Published	16.03.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.474V16.1.0&searchCate=TTAS
TTC	TS-3GA-38.474(Rel16)v16.1.0	16.1.0	Published	09.04.2021	https://www.ttc.or.jp/st/docs/3gpp/2021/TS/TS-3GA-38.474v16.1.0.pdf

Release 17

ATIS	ATIS.3GPP.38.474.V17.0.0	17.0.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.474.V17.0.0	17.0.0	Published	21.02.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.474.V17.0.0.docx
ETSI	ETSI TS 138 474 V17.0.0 (2022-04)	17.0.0	Published	29.04.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138474/17.00.00_60/ts_138474v170000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.474-17.0.0 V1.0.0	17.0.0	Published	29.07.2023	https://members.tdsi.in/s/6xaDeWNxizXEXNY
TTA	TTAT.3G-38.474V17.0.0	17.0.0	Published	05.08.2022	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.474V17.0.0&searchCate=TTAS
TTC	TS-3GA-38.474(Rel17)v17.0.0	17.0.0	Published	07.10.2022	https://www.ttc.or.jp/st/docs/3gpp/2022/TS/TS-3GA-38.474v17.0.0.pdf

Release 18

ATIS	ATIS.3GPP.38.474.V18.0.0	18.0.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.474.V18.0.0	18.0.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.474.V18.0.0.docx
ETSI	ETSI TS 138 474 V18.0.0 (2024-05)	18.0.0	Published	06.05.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138474/18.00.00_60/ts_138474v180000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.474-18.0.0 V1.0.0	18.0.0	Published	19.11.2024	https://members.tdsi.in/s/4aTjdFqsidx6ay7
TTA	TTAT.3G-38.474V18.0.0	18.0.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.474V18.0.0&searchCate=TTAS
TTC	TS-3GA-38.474(Rel18)v18.0.0	18.0.0	Published	04.10.2024	https://www.ttc.or.jp/st/docs/3gpp/2024/TS/TS-3GA-38.474v18.0.0.pdf

2.2.1.5 Radio-frequency aspects**2.2.1.5.1 TS 37.104****NR, E-UTRA, UTRA and GSM/EDGE; Multi-Standard Radio (MSR) Base Station (BS) radio transmission and reception**

This document establishes the minimum RF characteristics of E-UTRA, UTRA and GSM/EDGE Multi-Standard Radio (MSR) Base Station (BS). Requirements for multi-RAT and single-RAT operation of MSR BS are covered in this document. The requirements in this document for E-UTRA and UTRA single-RAT operation of MSR BS are also applicable to E-UTRA and UTRA multi-carrier capable single-RAT BS. Requirements for GSM BS that are only single-RAT capable are not covered.

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Release 15					
ATIS	ATIS.3GPP.37.104.V15.19.0	15.19.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.37.104.V15.19.0	15.19.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.104.V15.19.0.docx
ETSI	ETSI TS 137 104 V15.19.0 (2023-10)	15.19.0	Published	13.10.2023	https://www.etsi.org/deliver/etsi_ts/137100_137199/137104/15.19.00_60/ts_137104v151900p.pdf
TSDSI	TSDSI STD T1.3GPP 37.104-15.19.0 V1.5.0	15.19.0	Published	23.02.2024	https://members.tdsi.in/s/w2XSBKqaPTBJiFo
TTA	TTAT.3G-37.104V15.19.0	15.19.0	Published	13.02.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.104V16.20.0&searchCate=TTAS

Release 16

ATIS	ATIS.3GPP.37.104.V16.20.0	16.20.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.37.104.V16.20.0	16.20.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.104.V16.20.0.docx
ETSI	ETSI TS 137 104 V16.20.0 (2024-05)	16.20.0	Published	03.05.2024	https://www.etsi.org/deliver/etsi_ts/137100_137199/137104/16.20.00_60/ts_137104v162000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.104-16.20.0 V1.8.0	16.20.0	Published	22.07.2024	https://members.tdsi.in/s/9AwkEdX7qiGGF6o
TTA	TTAT.3G-37.104V16.20.0	16.20.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.104V17.13.0&searchCate=TTAS

Release 17

ATIS	ATIS.3GPP.37.104.V17.13.0	17.13.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.37.104.V17.13.0	17.13.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.104.V17.13.0.docx
ETSI	ETSI TS 137 104 V17.13.0 (2024-08)	17.13.0	Published	12.08.2024	https://www.etsi.org/deliver/etsi_ts/137100_137199/137104/17.13.00_60/ts_137104v171300p.pdf
TSDSI	TSDSI STD T1.3GPP 37.104-17.13.0 V1.9.0	17.13.0	Published	19.11.2024	https://members.tdsi.in/s/giMBtFHpZEGqWdo
TTA	TTAT.3G-37.104V17.13.0	17.13.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.104V18.6.0&searchCate=TTAS

Release 18

ATIS	ATIS.3GPP.37.104.V18.6.0	18.6.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.37.104.V18.6.0	18.6.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.104.V18.6.0.docx
ETSI	ETSI TS 137 104 V18.6.0 (2024-08)	18.6.0	Published	12.08.2024	https://www.etsi.org/deliver/etsi_ts/137100_137199/137104/18.06.00_60/ts_137104v180600p.pdf
TSDSI	TSDSI STD T1.3GPP 37.104-18.6.0 V1.1.0	18.6.0	Published	19.11.2024	https://members.tdsi.in/s/P24YKmTqD9L3kTG
TTA	TTAT.3G-37.104V18.6.0	18.6.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.105V15.20.0&searchCate=TTAS

2.2.1.5.2 TS 37.105**Active Antenna System (AAS) Base Station (BS) transmission and reception**

This document establishes the RF characteristics, the RF minimum requirements and minimum performance requirements for E-UTRA AAS Base Station (BS), the FDD mode of UTRA AAS Base Station (BS), the 1,28 Mchip/s TDD mode of UTRA AAS Base Station (BS) in single RAT and any MSR AAS Base Station (BS) implementation of these RATs.

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Release 15

ATIS	ATIS.3GPP.37.105.V15.20.0	15.20.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.37.105.V15.20.0	15.20.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.105.V15.20.0.docx
ETSI	ETSI TS 137 105 V15.20.0 (2024-08)	15.20.0	Published	12.08.2024	https://www.etsi.org/deliver/etsi_ts/137100_137199/137105/15.20.00_60/ts_137105v152000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.105-15.20.0 V1.4.0	15.20.0	Published	19.11.2024	https://members.tdsi.in/s/23pWA5gMMw9rKZs
TTA	TTAT.3G-37.105V15.20.0	15.20.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.105V16.16.0&searchCate=TTAS

Release 16

ATIS	ATIS.3GPP.37.105.V16.16.0	16.16.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.37.105.V16.16.0	16.16.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.105.V16.16.0.docx
ETSI	ETSI TS 137 105 V16.16.0 (2024-08)	16.16.0	Published	12.08.2024	https://www.etsi.org/deliver/etsi_ts/137100_137199/137105/16.16.00/ts_137105v161600p.pdf
TSDSI	TSDSI STD T1.3GPP 37.105-16.16.0 V1.5.0	16.16.0	Published	19.11.2024	https://members.tdsi.in/s/85weYjxewGASTzi
TTA	TTAT.3G-37.105V16.16.0	16.16.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.105V17.10.0&searchCate=TTAS

Release 17

ATIS	ATIS.3GPP.37.105.V17.10.0	17.10.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.37.105.V17.10.0	17.10.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.105.V17.10.0.docx
ETSI	ETSI TS 137 105 V17.10.0 (2024-08)	17.10.0	Published	12.08.2024	https://www.etsi.org/deliver/etsi_ts/137100_137199/137105/17.10.00_60/ts_137105v171000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.105-17.10.0 V1.5.0	17.10.0	Published	19.11.2024	https://members.tdsi.in/s/BmtNWDnk7Tcqc7c
TTA	TTAT.3G-37.105V17.10.0	17.10.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.105V18.5.0&searchCate=TTAS

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ATIS	ATIS.3GPP.37.105.V18.5.0	18.5.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.37.105.V18.5.0	18.5.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.105.V18.5.0.docx
ETSI	ETSI TS 137 105 V18.5.0 (2024-08)	18.5.0	Published	12.08.2024	https://www.etsi.org/deliver/etsi_ts/137100_137199/137105/18.05.00_60/ts_137105v180500p.pdf
TSDSI	TSDSI STD T1.3GPP 37.105-18.5.0 V1.0.0	18.5.0	Published	19.11.2024	https://members.tdsi.in/s/gG5ZnSEdbtFx34
TTA	TTAT.3G-37.105V18.5.0	18.5.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.113V15.14.0&searchCate=TTAS

2.2.1.5.3 TS 37.113**NR, E-UTRA, UTRA and GSM/EDGE; Multi-Standard Radio (MSR) Base Station (BS) Electromagnetic Compatibility (EMC)**

This document covers the assessment of E-UTRA, UTRA and GSM/EDGE Multi-Standard Radio (MSR) Base Stations and associated ancillary equipment in respect of Electromagnetic Compatibility (EMC). This document specifies the applicable test conditions, performance assessment and performance criteria for E-UTRA, UTRA and GSM/EDGE Base Stations and associated ancillary equipment in one of the following categories: (i) Multi-Standard Radio (MSR) Base Stations for E-UTRA, UTRA and GSM/EDGE meeting the requirements of TS 37.104, with conformance demonstrated by compliance to TS 37.141; (ii) Base Stations for E-UTRA meeting the requirements of TS 36.104, with conformance demonstrated by compliance to TS 36.141; (iii) Base Stations for UTRA FDD meeting the requirements of TS 25.104, with conformance demonstrated by compliance to TS 25.141; (iv) Base Stations for UTRA TDD meeting the requirements of TS 25.105, with conformance demonstrated by compliance to TS 25.142; (v) Base Stations for GSM/EDGE meeting the requirements of TS 45.005, with conformance demonstrated by compliance to TS 51.021. The environment classification used in this document refers to the environment classification used in IEC 61000-6-1 and IEC 61000-6-3.

The EMC requirements have been selected to ensure an adequate level of compatibility for apparatus at residential, commercial and light industrial environments. The levels, however, do not cover extreme cases which may occur in any location but with low probability of occurrence.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.37.113.V15.14.0	15.14.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.37.113.V15.14.0	15.14.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.113.V15.14.0.docx
ETSI	ETSI TS 137 113 V15.14.0 (2024-01)	15.14.0	Published	29.01.2024	https://www.etsi.org/deliver/etsi_ts/137100_137199/137113/15.14.00_60/ts_137113v151400p.pdf
TSDSI	TSDSI STD T1.3GPP 37.113-15.14.0 V1.4.0	15.14.0	Published	29.05.2024	https://members.tdsi.in/s/xwtGrG7DwS5wsCc
TTA	TTAT.3G-37.113V15.14.0	15.14.0	Published	08.05.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.113V16.6.0&searchCate=TTAS
Release 16					
ATIS	ATIS.3GPP.37.113.V16.6.0	16.6.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.37.113.V16.6.0	16.6.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.113.V16.6.0.docx
ETSI	ETSI TS 137 113 V16.6.0 (2024-05)	16.6.0	Published	14.05.2024	https://www.etsi.org/deliver/etsi_ts/137100_137199/137113/16.06.00_60/ts_137113v160600p.pdf
TSDSI	TSDSI STD T1.3GPP 37.113-16.6.0 V1.5.0	16.6.0	Published	22.07.2024	https://members.tdsi.in/s/eWg7EmMABcM6r2c
TTA	TTAT.3G-37.113V16.6.0	16.6.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.113V17.4.0&searchCate=TTAS
Release 17					
ATIS	ATIS.3GPP.37.113.V17.4.0	17.4.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.37.113.V17.4.0	17.4.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.113.V17.4.0.docx
ETSI	ETSI TS 137 113 V17.4.0 (2024-05)	17.4.0	Published	14.05.2024	https://www.etsi.org/deliver/etsi_ts/137100_137199/137113/17.04.00_60/ts_137113v170400p.pdf
TSDSI	TSDSI STD T1.3GPP 37.113-17.4.0 V1.4.0	17.4.0	Published	22.07.2024	https://members.tdsi.in/s/yZ5SrMCmrd7kCAS
TTA	TTAT.3G-37.113V17.4.0	17.4.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.113V18.1.0&searchCate=TTAS
Release 18					
ATIS	ATIS.3GPP.37.113.V18.1.0	18.1.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.37.113.V18.1.0	18.1.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.113.V18.1.0.docx
ETSI	ETSI TS 137 113 V18.1.0 (2024-05)	18.1.0	Published	14.05.2024	https://www.etsi.org/deliver/etsi_ts/137100_137199/137113/18.01.00_60/ts_137113v180100p.pdf
TSDSI	TSDSI STD T1.3GPP 37.113-18.1.0 V1.0.0	18.1.0	Published	19.11.2024	https://members.tdsi.in/s/btWrKpX4BxN5dX4
TTA	TTAT.3G-37.113V18.1.0	18.1.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.114V15.10.0&searchCate=TTAS

2.2.1.5.4 TS 37.114

Active Antenna System (AAS) Base Station (BS) Electromagnetic Compatibility (EMC)

This document covers the assessment of E-UTRA, UTRA and Multi-Standard Radio (MSR) Active Antenna Systems Base Stations in respect of Electromagnetic Compatibility (EMC).

This document specifies the applicable test conditions, performance assessment and performance criteria for E-UTRA and UTRA Base Stations and associated ancillary equipment in one of the following categories:

- Active Antenna System Base Station for E-UTRA, UTRA and MSR meeting the requirements of 3GPP TS 37.105, with conformance demonstrated by compliance to 3GPP TS 37.145.

The scope of this document is AAS BS with TAB connectors for every transceiver unit at the Transceiver Array Boundary. Requirement, procedures and values of an AAS Base Station without TAB connectors are not included in this document and are FFS.

The environment classification used in this document refers to the residential, commercial and light industrial environment classification used in IEC 61000-6-1 and IEC 61000-6-3.

The EMC requirements have been selected to ensure an adequate level of compatibility for apparatus at residential, commercial and light industrial environments. The levels, however, do not cover extreme cases which may occur in any location but with low probability of occurrence.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ATIS	ATIS.3GPP.37.114.V15.10.0	15.10.0	Published	22.05.2023	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.37.114.V15.10.0	15.10.0	Published	22.05.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.114.V15.10.0.docx
ETSI	ETSI TS 137 114 V15.10.0 (2023-04)	15.10.0	Published	27.04.2023	https://www.etsi.org/deliver/etsi_ts/137100_137199/137114/15.10.00_60/ts_137114v151000p.pdf
TSDSI	TSDSI STD T1.3GPP 37.114-15.10.0 V1.1.0	15.10.0	Published	14.08.2023	https://members.tdsi.in/s/9KqfHJznxYtko67
TTA	TTAT.3G-37.114V15.10.0	15.10.0	Published	01.08.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.114V16.1.0&searchCate=TTAS
Release 16					
ATIS	ATIS.3GPP.37.114.V16.1.0	16.1.0	Published	22.05.2023	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.37.114.V16.1.0	16.1.0	Published	22.05.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.114.V16.1.0.docx
ETSI	ETSI TS 137 114 V16.1.0 (2023-04)	16.1.0	Published	27.04.2023	https://www.etsi.org/deliver/etsi_ts/137100_137199/137114/16.01.00_60/ts_137114v160100p.pdf
TSDSI	TSDSI STD T1.3GPP 37.114-16.1.0 V1.1.0	16.1.0	Published	14.08.2023	https://members.tdsi.in/s/AJLWnsgaHbmojEZ
TTA	TTAT.3G-37.114V16.1.0	16.1.0	Published	01.08.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.114V17.1.0&searchCate=TTAS
Release 17					
ATIS	ATIS.3GPP.37.114.V17.1.0	17.1.0	Published	22.05.2023	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.37.114.V17.1.0	17.1.0	Published	22.05.2023	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.114.V17.1.0.docx
ETSI	ETSI TS 137 114 V17.1.0 (2023-04)	17.1.0	Published	27.04.2023	https://www.etsi.org/deliver/etsi_ts/137100_137199/137114/17.01.00_60/ts_137114v170100p.pdf
TSDSI	TSDSI STD T1.3GPP 37.114-17.1.0 V1.1.0	17.1.0	Published	14.08.2023	https://members.tdsi.in/s/j8nDCScGrefii4w
TTA	TTAT.3G-37.114V17.1.0	17.1.0	Published	01.08.2023	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.114V18.1.0&searchCate=TTAS

Release 18

ATIS	ATIS.3GPP.37.114.V18.1.0	18.1.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.37.114.V18.1.0	18.1.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.37.114.V18.1.0.docx
ETSI	ETSI TS 137 114 V18.1.0 (2024-05)	18.1.0	Published	14.05.2024	https://www.etsi.org/deliver/etsi_ts/137100_137199/137114/18.01.00_60/ts_137114v180100p.pdf
TSDSI	TSDSI STD T1.3GPP 37.114-18.1.0 V1.0.0	18.1.0	Published	19.11.2024	https://members.tdsi.in/s/oSyPcgkD7RLczBt
TTA	TTAT.3G-37.114V18.1.0	18.1.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-37.320V15.0.0&searchCate=TTAS

2.2.1.5.5 TS 38.101-1**NR; User Equipment (UE) radio transmission and reception; Part 1: Range 1 Standalone**

This document establishes the minimum RF requirements for NR User Equipment (UE) operating on frequency Range 1.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-38.101-1.V15.27.0	15.27.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38101-1-fr0.pdf
ATIS	ATIS.3GPP.38.101-1.V15.27.0	15.27.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.101-1.V15.27.0	15.27.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.101-1.V15.27.0.zip
ETSI	ETSI TS 138 101-1 V15.27.0 (2024-10)	15.27.0	Published	23.10.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138101/15.27.00_60/ts_138101v152700p.pdf
TSDSI	TSDSI STD T1.3GPP 38.101-15.27.0 V1.10.0	15.27.0	Published	02.03.2025	https://members.tdsi.in/s/SWmREjALZ6i4SP5
TTA	TTAT.3G-38.101-1V15.27.0	15.27.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.101-1V16.21.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-38.101-1.V16.21.0	16.21.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38101-1-gl0.pdf
ATIS	ATIS.3GPP.38.101-1.V16.21.0	16.21.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.101-1.V16.21.0	16.21.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.101-1.V16.21.0.zip
ETSI	ETSI TS 138 101-1 V16.21.0 (2024-10)	16.21.0	Published	23.10.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138101/16.21.00_60/ts_138101v162100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.101-16.21.0 V1.10.0	16.21.0	Published	02.03.2025	https://members.tdsi.in/s/A3243GYX9XyZmrT
TTA	TTAT.3G-38.101-1V16.21.0	16.21.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.101-1V17.15.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-38.101-1.V17.15.0	17.15.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38101-1-hf0.pdf
ATIS	ATIS.3GPP.38.101-1.V17.15.0	17.15.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.101-1.V17.15.0	17.15.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.101-1.V17.15.0.zip
ETSI	ETSI TS 138 101-1 V17.15.0 (2024-11)	17.15.0	Published	14.11.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138101/17.15.00_60/ts_138101v171500p.pdf
TSDSI	TSDSI STD T1.3GPP 38.101-17.15.0 V1.10.0	17.15.0	Published	02.03.2025	https://members.tdsi.in/s/wapeoaSrpqyRb2L
TTA	TTAT.3G-38.101-1V17.15.0	17.15.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.101-1V18.7.0&searchCate=TTAS

Release 18

ARIB	ARIB STD-T120-38.101-1.V18.7.0	18.7.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38101-1-i70.pdf
ATIS	ATIS.3GPP.38.101-1.V18.7.0	18.7.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.101-1.V18.7.0	18.7.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.101-1.V18.7.0.zip
ETSI	ETSI TS 138 101-1 V18.7.0 (2024-11)	18.7.0	Published	14.11.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/13810101/18.07.00_60/ts_13810101v180700p.pdf
TSDSI	TSDSI STD T1.3GPP 38.101-18.7.0 V1.1.0	18.7.0	Published	02.03.2025	https://members.tdsi.in/s/k6E4rX5nNn8gmeY
TTA	TTAT.3G-38.101-1V18.7.0	18.7.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.101-2V15.26.0&searchCate=TTAS

2.2.1.5.6 TS 38.101-2**NR; User Equipment (UE) radio transmission and reception; Part 2: Range 2 Standalone**

This document establishes the minimum RF requirements for NR User Equipment (UE) operating on frequency Range 2.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-38.101-2.V15.26.0	15.26.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38101-2-fq0.pdf
ATIS	ATIS.3GPP.38.101-2.V15.26.0	15.26.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.101-2.V15.26.0	15.26.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.101-2.V15.26.0.docx
ETSI	ETSI TS 138 101-2 V15.26.0 (2024-08)	15.26.0	Published	05.08.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/13810102/15.26.00_60/ts_13810102v152600p.pdf
TSDSI	TSDSI STD T1.3GPP 38.101-15.26.0 V1.9.0	15.26.0	Published	19.11.2024	https://members.tdsi.in/s/SDXFFHypWEo2NdPx
TTA	TTAT.3G-38.101-2V15.26.0	15.26.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.101-2V16.20.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-38.101-2.V16.20.0	16.20.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38101-2-gk0.pdf
ATIS	ATIS.3GPP.38.101-2.V16.20.0	16.20.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.101-2.V16.20.0	16.20.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.101-2.V16.20.0.docx
ETSI	ETSI TS 138 101-2 V16.20.0 (2024-08)	16.20.0	Published	05.08.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/13810102/16.20.00_60/ts_13810102v162000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.101-16.20.0 V1.9.0	16.20.0	Published	19.11.2024	https://members.tdsi.in/s/wWLP9654wjaBFBp
TTA	TTAT.3G-38.101-2V16.20.0	16.20.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.101-2V17.15.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-38.101-2.V17.15.0	17.15.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38101-2-hf0.pdf
ATIS	ATIS.3GPP.38.101-2.V17.15.0	17.15.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.101-2.V17.15.0	17.15.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.101-2.V17.15.0.docx
ETSI	ETSI TS 138 101-2 V17.15.0 (2024-10)	17.15.0	Published	03.10.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/13810102/17.15.00_60/ts_13810102v171500p.pdf
TSDSI	TSDSI STD T1.3GPP 38.101-17.15.0 V1.10.0	17.15.0	Published	02.03.2025	https://members.tdsi.in/s/pySGdQMzNJ7ayrt
TTA	TTAT.3G-38.101-2V17.15.0	17.15.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.101-2V18.7.0&searchCate=TTAS

Release 18

ARIB	ARIB STD-T120-38.101-2.V18.7.0	18.7.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38101-2-i70.pdf
ATIS	ATIS.3GPP.38.101-2.V18.7.0	18.7.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.101-2.V18.7.0	18.7.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.101-2.V18.7.0.docx
ETSI	ETSI TS 138 101-2 V18.7.0 (2024-10)	18.7.0	Published	03.10.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/13810102/18.07.00_60/ts_13810102v180700p.pdf
TSDSI	TSDSI STD T1.3GPP 38.101-18.7.0 V1.1.0	18.7.0	Published	02.03.2025	https://members.tdsi.in/s/bMmHpY6LfawTzLY
TTA	TTAT.3G-38.101-2V18.7.0	18.7.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.101-3V15.26.0&searchCate=TTAS

2.2.1.5.7 TS 38.101-3**NR; User Equipment (UE) radio transmission and reception; Part 3: Range 1 and Range 2 Interworking operation with other radios**

This document establishes the minimum RF requirements for NR User Equipment (UE) Interworking operation with other radios. This includes but is not limited to additional requirements for carrier aggregation or NR dual connectivity between Range 1 and Range 2 and additional requirements due to NR non-standalone (NSA) operation mode with E-UTRA.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-38.101-3.V15.26.0	15.26.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38101-3-fq0.pdf
ATIS	ATIS.3GPP.38.101-3.V15.26.0	15.26.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.101-3.V15.26.0	15.26.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.101-3.V15.26.0.zip
ETSI	ETSI TS 138 101-3 V15.26.0 (2024-08)	15.26.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/13810103/15.26.00_60/ts_13810103v152600p.pdf
TSDSI	TSDSI STD T1.3GPP 38.101-15.26.0 V1.8.0	15.26.0	Published	19.11.2024	https://members.tdsi.in/s/Ckpwd5JGLmH5LKD
TTA	TTAT.3G-38.101-3V15.26.0	15.26.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.101-3V16.21.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-38.101-3.V16.21.0	16.21.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38101-3-gl0.pdf
ATIS	ATIS.3GPP.38.101-3.V16.21.0	16.21.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.101-3.V16.21.0	16.21.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.101-3.V16.21.0.zip
ETSI	ETSI TS 138 101-3 V16.21.0 (2024-10)	16.21.0	Published	23.10.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/13810103/16.21.00_60/ts_13810103v162100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.101-16.21.0 V1.10.0	16.21.0	Published	02.03.2025	https://members.tdsi.in/s/qnsWsBgigBer7cg
TTA	TTAT.3G-38.101-3V16.21.0	16.21.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.101-3V17.15.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-38.101-3.V17.15.0	17.15.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38101-3-hf0.pdf
ATIS	ATIS.3GPP.38.101-3.V17.15.0	17.15.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.101-3.V17.15.0	17.15.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.101-3.V17.15.0.zip
ETSI	ETSI TS 138 101-3 V17.15.0 (2024-10)	17.15.0	Published	23.10.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/13810103/17.15.00_60/ts_13810103v171500p.pdf
TSDSI	TSDSI STD T1.3GPP 38.101-17.15.0 V1.10.0	17.15.0	Published	02.03.2025	https://members.tdsi.in/s/XwKyPyRDsxmMDwT
TTA	TTAT.3G-38.101-3V17.15.0	17.15.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.101-3V18.7.0&searchCate=TTAS

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ARIB	ARIB STD-T120-38.101-3.V18.7.0	18.7.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38101-3-i70.pdf
ATIS	ATIS.3GPP.38.101-3.V18.7.0	18.7.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.101-3.V18.7.0	18.7.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.101-3.V18.7.0.zip
ETSI	ETSI TS 138 101-3 V18.7.0 (2024-11)	18.7.0	Published	07.11.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/13810103/18.07.00_60/ts_13810103v180700p.pdf
TSDSI	TSDSI STD T1.3GPP 38.101-18.7.0 V1.1.0	18.7.0	Published	02.03.2025	https://members.tdsi.in/s/W88LMFAoS5LaH6R
TTA	TTAT.3G-38.101-3V18.7.0	18.7.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.104V15.20.0&searchCate=TTAS

2.2.1.5.8 TS 38.104**NR; Base Station (BS) radio transmission and reception**

This document establishes the minimum RF characteristics and minimum performance requirements of NR and NB-IoT operation in NR in-band Base Station (BS).

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ARIB	ARIB STD-T120-38.104.V15.20.0	15.20.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38104-fk0.pdf
ATIS	ATIS.3GPP.38.104.V15.20.0	15.20.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.104.V15.20.0	15.20.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.104.V15.20.0.docx
ETSI	ETSI TS 138 104 V15.20.0 (2024-05)	15.20.0	Published	07.05.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138104/15.20.00_60/ts_138104v152000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.104-15.20.0 V1.4.0	15.20.0	Published	22.07.2024	https://members.tdsi.in/s/KqtgJAtsJYD8xn7
TTA	TTAT.3G-38.104V15.20.0	15.20.0	Published	12.08.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.104V16.20.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-38.104.V16.20.0	16.20.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38104-gk0.pdf
ATIS	ATIS.3GPP.38.104.V16.20.0	16.20.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.104.V16.20.0	16.20.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.104.V16.20.0.docx
ETSI	ETSI TS 138 104 V16.20.0 (2024-08)	16.20.0	Published	12.08.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138104/16.20.00_60/ts_138104v162000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.104-16.20.0 V1.9.0	16.20.0	Published	19.11.2024	https://members.tdsi.in/s/EzQBZcAXesHEtDh
TTA	TTAT.3G-38.104V16.20.0	16.20.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.104V17.15.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-38.104.V17.15.0	17.15.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38104-hf0.pdf
ATIS	ATIS.3GPP.38.104.V17.15.0	17.15.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.104.V17.15.0	17.15.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.104.V17.15.0.docx
ETSI	ETSI TS 138 104 V17.15.0 (2024-10)	17.15.0	Published	03.10.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138104/17.15.00_60/ts_138104v171500p.pdf
TSDSI	TSDSI STD T1.3GPP 38.104-17.15.0 V1.10.0	17.15.0	Published	02.03.2025	https://members.tdsi.in/s/aQsrFNdK74LcQFX
TTA	TTAT.3G-38.104V17.15.0	17.15.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.104V18.7.0&searchCate=TTAS

Release 18

ARIB	ARIB STD-T120-38.104.V18.7.0	18.7.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38104-i70.pdf
ATIS	ATIS.3GPP.38.104.V18.7.0	18.7.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.104.V18.7.0	18.7.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.104.V18.7.0.docx
ETSI	ETSI TS 138 104 V18.7.0 (2024-10)	18.7.0	Published	04.10.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138104/18.07.00_60/ts_138104v180700p.pdf
TSDSI	TSDSI STD T1.3GPP 38.104-18.7.0 V1.1.0	18.7.0	Published	02.03.2025	https://members.tdsi.in/s/SXPxPeNPf46aqPQ
TTA	TTAT.3G-38.104V18.7.0	18.7.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.106V17.10.0&searchCate=TTAS

2.2.1.5.9 TS 38.106**NR repeater radio transmission and reception**

This document establishes the minimum RF characteristics of NR Repeater.

SDO	Document No.	Version	Status	Issued date	Location
Release 17					
ATIS	ATIS.3GPP.38.106.V17.10.0	17.10.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.106.V17.10.0	17.10.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.106.V17.10.0.docx
ETSI	ETSI TS 138 106 V17.10.0 (2024-10)	17.10.0	Published	03.10.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138106/17.10.00_60/ts_138106v171000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.106-17.10.0 V1.10.0	17.10.0	Published	02.03.2025	https://members.tdsi.in/s/xbFpofDtedECYP8
TTA	TTAT.3G-38.106V17.10.0	17.10.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.106V18.6.0&searchCate=TTAS
Release 18					
ATIS	ATIS.3GPP.38.106.V18.6.0	18.6.0	Published	03.01.2025	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.106.V18.6.0	18.6.0	Published	03.01.2025	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.106.V18.6.0.docx
ETSI	ETSI TS 138 106 V18.6.0 (2024-10)	18.6.0	Published	03.10.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138106/18.06.00_60/ts_138106v180600p.pdf
TSDSI	TSDSI STD T1.3GPP 38.106-18.6.0 V1.1.0	18.6.0	Published	02.03.2025	https://members.tdsi.in/s/gqjaZLFAYsZDAYa
TTA	TTAT.3G-38.106V18.6.0	18.6.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.113V15.20.0&searchCate=TTAS

2.2.1.5.10 TS 38.113**NR; Base Station (BS) ElectroMagnetic Compatibility (EMC)**

This document covers the assessment of NR Base Station (BS) and ancillary equipment in respect of Electromagnetic Compatibility (EMC).

This document specifies the applicable test conditions, performance assessment and performance criteria for base stations and associated ancillary equipment in the following categories:

- BS equipped with antenna connectors or *TAB connectors* which are possible to be terminated during EMC testing, meeting the *BS type I-C* and *BS type I-H* RF requirements of TS 38.104, with conformance demonstrated by compliance to TS 38.141-1.

- BS not equipped with antenna connectors nor *TAB connectors*, i.e. with antenna elements radiating during the EMC testing, meeting the *BS type 1-O* and *BS type 2-O* RF requirements of TS 38.104, with conformance demonstrated by compliance to TS 38.141-2.

The scope of this document is twofold:

- Requirements, procedures and values of a BS with antenna connectors or *TAB connectors*,
- Requirements, procedures and values of a BS without antenna connectors, nor *TAB connectors*.

The environment classification used in this document refers to the residential, commercial and light industrial environment classification used in IEC 61000-6-1 and IEC 61000-6-3.

The EMC requirements have been selected to ensure an adequate level of compatibility for apparatus at residential, commercial and light industrial environments. The levels, however, do not cover extreme cases which may occur in any location but with low probability of occurrence.

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Release 15					
ARIB	ARIB STD-T120-38.113.V15.20.0	15.20.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel15/38/A38113-fk0.pdf
ATIS	ATIS.3GPP.38.113.V15.20.0	15.20.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-15
CCSA	CCSA.3GPP.38.113.V15.20.0	15.20.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.113.V15.20.0.docx
ETSI	ETSI TS 138 113 V15.20.0 (2024-08)	15.20.0	Published	05.08.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138113/15.20.00_60/ts_138113v152000p.pdf
TSDSI	TSDSI STD T1.3GPP 38.113-15.20.0 V1.5.0	15.20.0	Published	19.11.2024	https://members.tdsi.in/s/aK3cZP4sBeJGF8d
TTA	TTAT.3G-38.113V15.20.0	15.20.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.113V16.11.0&searchCate=TTAS
Release 16					
ARIB	ARIB STD-T120-38.113.V16.11.0	16.11.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel16/38/A38113-gb0.pdf
ATIS	ATIS.3GPP.38.113.V16.11.0	16.11.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-16
CCSA	CCSA.3GPP.38.113.V16.11.0	16.11.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.113.V16.11.0.docx
ETSI	ETSI TS 138 113 V16.11.0 (2024-08)	16.11.0	Published	05.08.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138113/16.11.00_60/ts_138113v161100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.113-16.11.0 V1.6.0	16.11.0	Published	19.11.2024	https://members.tdsi.in/s/dJZeFqapNdYcFp2
TTA	TTAT.3G-38.113V16.11.0	16.11.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.113V17.0&searchCate=TTAS
Release 17					
ARIB	ARIB STD-T120-38.113.V17.7.0	17.7.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38113-h70.pdf
ATIS	ATIS.3GPP.38.113.V17.7.0	17.7.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.113.V17.7.0	17.7.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.113.V17.7.0.docx
ETSI	ETSI TS 138 113 V17.7.0 (2024-08)	17.7.0	Published	05.08.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138113/17.07.00_60/ts_138113v170700p.pdf
TSDSI	TSDSI STD T1.3GPP 38.113-17.7.0 V1.7.0	17.7.0	Published	19.11.2024	https://members.tdsi.in/s/xnKgqofXEsfDAX9
TTA	TTAT.3G-38.113V17.7.0	17.7.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.113V18.3.0&searchCate=TTAS

Release 18

ARIB	ARIB STD-T120-38.113.V18.3.0	18.3.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38113-i30.pdf
ATIS	ATIS.3GPP.38.113.V18.3.0	18.3.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.113.V18.3.0	18.3.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.113.V18.3.0.docx
ETSI	ETSI TS 138 113 V18.3.0 (2024-08)	18.3.0	Published	05.08.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138113/18.03.00_60/ts_138113v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.113-18.3.0 V1.0.0	18.3.0	Published	19.11.2024	https://members.tdsi.in/s/Z9JFZ5MjMoTQ3k9
TTA	TTAT.3G-38.113V18.3.0	18.3.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.114V17.6.0&searchCate=TTAS

2.21.5.11 TS 38.114**NR; Repeaters ElectroMagnetic Compatibility (EMC)**

This document covers the assessment of NR repeater and ancillary equipment in respect of Electromagnetic Compatibility (EMC).

This document specifies the applicable requirements, procedures, test conditions, performance assessment and performance criteria for NR repeater and associated ancillary equipment in the following categories:

- NR repeater equipped with antenna connectors which are possible to be terminated during EMC testing, meeting the repeater type 1-C RF requirements of TS 38.106, with conformance demonstrated by compliance to TS 38.115-1.
- NR repeater not equipped with antenna connectors, i.e. with antenna elements radiating during the EMC testing, meeting the repeater type 2-O RF requirements of TS 38.106, with conformance demonstrated by compliance to TS 38.115-2.

The environment classification used in this document refers to the residential, commercial and light industrial environment classification used in IEC 61000-6-1 and IEC 61000-6-3.

The EMC requirements have been selected to ensure an adequate level of compatibility for apparatus at residential, commercial and light industrial environments. The levels, however, do not cover extreme cases which may occur in any location but with low probability of occurrence.

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ETSI	ETSI TS 138 114 V18.3.0 (2024-10)	18.3.0	Published	03.10.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138114/18.03.00_60/ts_138114v180300p.pdf
TSDSI	TSDSI STD T1.3GPP 38.114-18.3.0 V1.1.0	18.3.0	Published	02.03.2025	https://members.tdsi.in/s/pWXF2C6Z2JPbJkp
TTA	TTAT.3G-38.114V18.3.0	18.3.0	Published	31.01.2025	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.124V15.8.0&searchCate=TTAS

2.2.1.5.12 TS 38.124**NR; Electromagnetic compatibility (EMC) requirements for mobile terminals and ancillary equipment**

This document establishes the essential EMC requirements for “3rd generation” digital cellular mobile terminal equipment and ancillary accessories in combination with a 3GPP NR user equipment (UE).

The equipment conforming to the requirements laid out in this document and used in its intended electromagnetic environment in accordance with the manufacturer’s instructions

- shall not generate electromagnetic disturbances at a level which may interfere with the intended operation of other equipment;
- has an adequate level of intrinsic immunity to electromagnetic disturbances to operate as intended;

This document specifies the applicable EMC tests, methods of measurement, frequency ranges, applicable limits and minimum performance criteria for all types of NR UE(s) and their accessories. NR base station equipment operating within network infrastructure is outside the scope of this document. However, this document does cover mobile and portable equipment that is intended to be operated in a fixed location while connected to the AC mains. NR base station equipment operating within network infrastructure is covered by the technical specification TS 38.113.

Requirements for the radiated emission from the enclosure port of integral antenna equipment and ancillaries are included in this document. Technical specifications for conducted emissions from the antenna connector are found in the 3GPP specifications for the radio interface, e.g. TS 38.xyz, for the effective use of the radio spectrum.

Requirements for the radiated emissions from the enclosure port and ancillaries cover two cases:

- UE equipment supporting operations in a frequency range for which antenna connectors are available (i.e. for operations in Frequency Range 1 as defined in e.g. TS 38.101-1 for the radio interface);
- UE equipment supporting operations in a frequency range for which only integral antennas may be available (i.e. for operations in Frequency Range 2 as defined in e.g. TS 38.101-2 for the radio interface).

The immunity requirements are selected to ensure an adequate level of compatibility for apparatus in residential, commercial, light industrial and vehicular environments. The levels, however, do not cover extreme cases, which may occur in any location but with low probability of occurrence.

Compliance of radio equipment to the requirements of this document does not signify compliance to any requirement related to the use of the equipment (i.e. licensing requirements).

Compliance to the requirements of this document does not signify compliance to any safety requirement. However, any temporary or permanent unsafe condition caused by EMC is considered as non-compliance.

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ATIS	ATIS.3GPP.38.124.V15.8.0	15.8.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-15
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ETSI	ETSI TS 138 124 V15.8.0 (2022-08)	15.8.0	Published	10.08.2022	https://www.etsi.org/deliver/etsi_ts/138100_138199/138124/15.08.00_60/ts_138124v150800p.pdf
TSDSI	TSDSI STD T1.3GPP 38.124-15.8.0 V1.1.0	15.8.0	Published	29.07.2022	https://members.tdsi.in/s/t8xYkWmfCXfGAjt
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ATIS	ATIS.3GPP.38.124.V16.5.0	16.5.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-16
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ETSI	ETSI TS 138 124 V16.5.0 (2022-08)	16.5.0	Published	10.08.2022	https://www.etsi.org/deliver/etsi_ts/138100_138199/138124/16.05.00_60/ts_138124v160500p.pdf
TSDSI	TSDSI STD T1.3GPP 38.124-16.5.0 V1.1.0	16.5.0	Published	29.07.2022	https://members.tdsi.in/s/HbZKKBBMWcqeZq
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ARIB	ARIB STD-T120-38.124.V17.2.0	17.2.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel17/38/A38124-h20.pdf
ATIS	ATIS.3GPP.38.124.V17.2.0	17.2.0	Published	21.02.2023	https://www.atis.org/3gpp-transpositions#Rel-17
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ETSI	ETSI TS 138 124 V17.2.0 (2022-10)	17.2.0	Published	19.10.2022	https://www.etsi.org/deliver/etsi_ts/138100_138199/138124/17.02.00_60/ts_138124v170200p.pdf
TSDSI	TSDSI STD T1.3GPP 38.124-17.2.0 V1.1.0	17.2.0	Published	17.01.2023	https://members.tdsi.in/s/JCwmG4AcZYa8E3F
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2.2.1.5.13 TS 38.133**NR; Requirements for support of radio resource management**

This document specifies requirements for support of Radio Resource Management for the FDD and TDD modes of New Radio (NR). These requirements include requirements on measurements in NR and the UE as well as requirements on node dynamical behaviour and interaction, in terms of delay and response characteristics.

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TSDSI	TSDSI STD T1.3GPP 38.133-15.27.0 V1.10.0	15.27.0	Published	02.03.2025	https://members.tdsi.in/s/gFNqyqLRMEmsbeN
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TSDSI	TSDSI STD T1.3GPP 38.133-16.21.0 V1.10.0	16.21.0	Published	02.03.2025	https://members.tdsi.in/s/dRRasDMMzbQKkia
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TSDSI	TSDSI STD T1.3GPP 38.133-17.15.0 V1.10.0	17.15.0	Published	02.03.2025	https://members.tdsi.in/s/PrPaOGsTSMtH5yQ
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2.2.1.5.14 TS 38.174**NR; Integrated Access and Backhaul (IAB) radio transmission and reception**

This document establishes the minimum RF characteristics, minimum radio resource management (RRM) requirements, RRM test cases and minimum performance requirements of NR Integrated access and backhaul (IAB).

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TSDSI	TSDSI STD T1.3GPP 38.174-17.8.0 V1.8.0	17.8.0	Published	19.11.2024	https://members.tdsi.in/s/ndBPK4WfpTBcbHQ
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ETSI	ETSI TS 138 174 V18.6.0 (2024-10)	18.6.0	Published	02.10.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138174/18.06.00_60/ts_138174v180600p.pdf
TSDSI	TSDSI STD T1.3GPP 38.174-18.6.0 V1.1.0	18.6.0	Published	02.03.2025	https://members.tdsi.in/s/zHabE5N5z7pR55H
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2.2.1.5.15 TS 38.175**NR; Integrated Access and Backhaul (IAB) Electromagnetic Compatibility (EMC)**

This document covers the assessment for NR Integrated access and backhaul (IAB) node and associated ancillary equipment in respect of Electromagnetic Compatibility (EMC).

This document specifies the applicable test conditions, performance assessment and performance criteria for NR Integrated access and backhaul (IAB) node and associated ancillary equipment.

The environment classification used in this document refers to the residential, commercial and light industrial environment classification used in IEC 61000-6-1 and IEC 61000-6-3.

The EMC requirements have been selected to ensure an adequate level of compatibility for apparatus at residential, commercial and light industrial environments. The levels, however, do not cover extreme cases which may occur in any location but with low probability of occurrence.

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CCSA	CCSA.3GPP.38.175.V16.7.0	16.7.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.175.V16.7.0.docx
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TSDSI	TSDSI STD T1.3GPP 38.175-16.7.0 V1.4.0	16.7.0	Published	29.05.2024	https://members.tdsi.in/s/9wb9Z6NTkP9Y4mC
TTA	TTAT.3G-38.175V16.7.0	16.7.0	Published	08.05.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.175V17.5.0&searchCate=TTAS
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ATIS	ATIS.3GPP.38.175.V17.5.0	17.5.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-17
CCSA	CCSA.3GPP.38.175.V17.5.0	17.5.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.175.V17.5.0.docx
ETSI	ETSI TS 138 175 V17.5.0 (2024-02)	17.5.0	Published	01.02.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138175/17.05.00_60/ts_138175v170500p.pdf
TSDSI	TSDSI STD T1.3GPP 38.175-17.5.0 V1.5.0	17.5.0	Published	29.05.2024	https://members.tdsi.in/s/X44GtHNW57MNFw7
TTA	TTAT.3G-38.175V17.5.0	17.5.0	Published	08.05.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.175V18.1.0&searchCate=TTAS
Release 18					
ARIB	ARIB STD-T120-38.175.V18.1.0	18.1.0	Published	25.03.2025	https://www.arib.or.jp/english/html/overview/doc/T120_T23_SPECS/ARIB-STD-T120/Rel18/38/A38175-i10.pdf
ATIS	ATIS.3GPP.38.175.V18.1.0	18.1.0	Published	27.08.2024	https://www.atis.org/3gpp-transpositions#Rel-18
CCSA	CCSA.3GPP.38.175.V18.1.0	18.1.0	Published	27.08.2024	https://www.ccsa.org.cn/api/portalsFile/downloadOldFile?type=17&oldFileUrl=2025/M.2150-3_RIT_ATIS/CCSA.3GPP.38.175.V18.1.0.docx
ETSI	ETSI TS 138 175 V18.1.0 (2024-08)	18.1.0	Published	05.08.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138175/18.01.00_60/ts_138175v180100p.pdf
TSDSI	TSDSI STD T1.3GPP 38.175-18.1.0 V1.0.0	18.1.0	Published	19.11.2024	https://members.tdsi.in/s/sTDTpr5j2PBnAy
TTA	TTAT.3G-38.175V18.1.0	18.1.0	Published	11.11.2024	https://www.tta.or.kr/eng/ttaSearchEngView.do?key=461&searchStandardNo=TTAT.3G-38.201V15.0.0&searchCate=TTAS

2.2.2 Other specifications

Other specifications addressing radio and device testing, but not part of the GCS, are listed in this section.

Information on system and core network specifications can be found in the 3GPP web site for a complete system perspective. These system and core network specifications address the network, terminal, and service aspects required to provide an integrated mobility solution including aspects such as user services, connectivity, interoperability, mobility and roaming, security, codecs and media, operations and maintenance, charging, etc.

All the 3GPP specifications can be found at the following link: <https://www.3gpp.org/specifications/specification-numbering>. 3GPP specifications are reviewed and updated after each Technical Specification Group Plenary meeting (held every year in March, June, September and December).

2.2.2.1 TS 37.141

E-UTRA, UTRA and GSM/EDGE; Multi-Standard Radio (MSR) Base Station (BS) conformance testing

This document specifies the Radio Frequency (RF) test methods and conformance requirements for E-UTRA, UTRA and GSM/EDGE Multi-Standard Radio (MSR) Base Station (BS).

2.2.2.2 TS 37.144

User Equipment (UE) and Mobile Station (MS) GSM, UTRA and E-UTRA over the air performance requirements

This document establishes over the air antenna minimum requirements for user equipment (UE) and mobile station (MS).

Handheld UE requirements are defined for roaming bands for the speech position (beside the head and beside the head and hand) and hand phantom browsing mode position. Laptop mounted equipment requirements are defined for roaming bands for the data transfer position (laptop ground plane phantom). Laptop embedded equipment requirements are defined for roaming bands for the data transfer position (free space).

All bands are potential roaming bands, and the requirements for roaming bands shall therefore be fulfilled for all bands supported by a UE/MS.

Requirements for operating bands are dependent on how the network has been built and are thus operator specific and cannot be specified here. Recommended performance values for operating bands (Annex B) are however included in this specification for information. It should be recognised that the ability to meet the recommended performance values depends on the number of frequency bands supported by the UE/MS.

2.2.2.3 TS 37.145-1

Active Antenna System (AAS) Base Station (BS) conformance testing; Part 1: conducted conformance testing

This document specifies the Radio Frequency (RF) test methods and conformance requirements for Single RAT E-UTRA, UTRA and Multi-Standard Radio (MSR) UTRA and EUTRA Active Antenna System (AAS) Base Station (BS). These have been derived from, and are consistent with the E-UTRA, UTRA AAS BS specification defined in 3GPP TS 25.104. The technical specification is in two parts: part 1 (this document) covers conducted requirements and part 2 covers radiated requirements.

2.2.2.4 TS 37.145-2**Active Antenna System (AAS) Base Station (BS) conformance testing; Part 2: radiated conformance testing**

This document specifies the Radio Frequency (RF) test methods and conformance requirements for Single RAT E-UTRA, UTRA and Multi-Standard Radio (MSR) UTRA and EUTRA Active Antenna System (AAS) Base Station (BS). These have been derived from, and are consistent with the E-UTRA, UTRA AAS BS specification defined in 3GPP TS 25.104. The technical specification is in two parts, part 1 covers conducted requirements and part 2 (this document) covers radiated requirements.

2.2.2.5 TS 37.171**Universal Terrestrial Radio Access (UTRA) and Evolved UTRA (E-UTRA); User Equipment (UE) performance requirements for RAT-Independent Positioning Enhancements**

This document establishes the minimum performance requirements for RAT-Independent Positioning Enhancements (e.g. MBS positioning technology) for FDD or TDD mode of UTRA and E-UTRA for the User Equipment (UE).

2.2.2.6 TS 38.101-4**NR; User Equipment (UE) radio transmission and reception; Part 4: Performance requirements**

This document establishes the minimum performance requirements for NR User Equipment (UE).

2.2.2.7 TS 38.141-1**NR; Base Station (BS) conformance testing Part 1: Conducted conformance testing**

This document specifies the Radio Frequency (RF) test methods and conformance requirements for NR Base Station (BS) *Type 1-C* and *Type 1-H*. These have been derived from, and are consistent with the conducted requirements for *BS Type 1-C* and *BS Type 1-H* in NR BS specification defined in TS 38.104.

- A *BS type 1-C* only has conducted requirements, so it requires compliance to this specification only.
- A *BS type 1-H* has both conducted and radiated requirements, so it requires compliance to the applicable requirements of this specification and TS 38.141-2.
- *BS type 1-O* and *BS type 2-O* have only radiated requirements, so they require compliance to TS 38.141-2 only.

2.2.2.8 TS 38.141-2**NR; Base Station (BS) conformance testing Part 2: Radiated conformance testing**

This document specifies the Radio Frequency (RF) test methods and conformance requirements for NR Base Station (BS) *type 1-H*, *BS type 1-O* and *BS type 2-O*. These have been derived from, and are consistent with the radiated requirements for *BS type 1-H*, *BS type 1-O* and *BS type 2-O* in BS specification defined in TS 38.104.

- A *BS type 1-C* only has conducted requirements, so it does not require compliance to this specification.
- A *BS type 1-H* has both conducted and radiated requirements, so it requires compliance to the applicable requirements of this specification and TS 38.141-1.

- *BS type 1-O and BS type 2-O* have only radiated requirements, so they require compliance to this specification only.

2.2.2.9 TS 38.151

NR; User Equipment (UE) Multiple Input Multiple Output (MIMO) Over-the-Air (OTA) performance requirements

This document establishes the Multiple Input Multiple Output (MIMO) Over-the-Air (OTA) performance requirements for NR UEs operating on frequency Range 1 and frequency Range 2, for NR standalone (SA) and NR non-standalone (NSA) operation mode. The corresponding test methodologies are also presented in the Annex of this Technical Specification.

2.2.2.10 TS 38.171

NR; Requirements for support of Assisted Global Navigation Satellite System (A-GNSS)

This document establishes the minimum requirements for both UE based and UE assisted FDD or TDD A-GNSS terminals which have NG-RAN access via gNB (in SA NR, NR-DC or NE-DC NR operation mode) or via ng-eNB (in EN-DC operation mode) and which are supporting A-GNSS in 5GS via LPP between UE and LMF as described in TS 38.305.

2.2.2.11 TS 38.176-1

NR; Integrated Access and Backhaul (IAB) conformance testing; Part 1: Conducted conformance testing

This document establishes the minimum RF characteristics and minimum performance requirements of NR Integrated access and backhaul (IAB).

This document specifies the Radio Frequency (RF) test methods and conformance requirements for NR Integrated access and backhaul (IAB) type 1-H. These have been derived from, and are consistent with the conducted requirements for NR Integrated access and backhaul (IAB) type 1-H in NR Integrated access and backhaul specification defined in TS 38.174.

An IAB type 1-H has both conducted and radiated requirements so it requires compliance to the applicable requirements of this document and TS 38.176-2.

IAB type 1-O and IAB type 2-O have only radiated requirements so they require compliance to TS 38.176-2 only.

2.2.2.12 TS 38.176-2

NR; Integrated Access and Backhaul (IAB) conformance testing; Part 2: Radiated conformance testing

This document specifies the Radio Frequency (RF) test methods and conformance requirements for NR Integrated access and backhaul: IAB type 1-H, IAB type 1-O and IAB type 2-O. These have been derived from, and are consistent with the radiated requirements for IAB type 1-H, IAB type 1-O and IAB type 2-O in BS specification defined in TS 38.174.

A IAB type 1-H has both conducted and radiated requirements, so it requires compliance to the applicable requirements of this document and TS 38.176-1.

IAB type 1-O and IAB type 2-O have only radiated requirements, so they require compliance to this document only.

2.2.2.13 TS 37.571-1

Universal Terrestrial Radio Access (UTRA) and Evolved UTRA (E-UTRA) and Evolved Packet Core (EPC); User Equipment (UE) conformance specification for UE positioning; Part 1: Conformance test specification

This document specifies the procedures for the conformance test of the measurement requirements for FDD mode of UTRA and FDD or TDD mode of E-UTRA for the User Equipment (UE) that supports one or more of the defined positioning methods. These positioning methods are for UTRA: Assisted Global Positioning System (A-GPS), Assisted Global Navigation Satellite Systems (A-GNSS) and for E-UTRA: Assisted Global Navigation Satellite System (A-GNSS), Observed Time Difference of Arrival (OTDOA), Enhanced Cell ID (ECID).

Tests are only applicable to those mobiles that are intended to support the appropriate functionality. To indicate the circumstances in which tests apply, this is noted in the “Test applicability” part of the test.

The Implementation Conformance Statement (ICS) pro-forma could be found in the 3rd part of this document.

2.2.2.14 TS 37.571-2

Universal Terrestrial Radio Access (UTRA) and Evolved UTRA (E-UTRA) and Evolved Packet Core (EPC); User Equipment (UE) conformance specification for UE positioning; Part 2: Protocol conformance

This document specifies the protocol conformance testing for the 3rd Generation UTRAN and E-UTRAN User Equipment (UE) supporting UE positioning.

This is the second part of a multi-part test specification. The following information can be found in this part:

- the overall protocol conformance test structure;
- the protocol conformance test configurations;
- the conformance requirement and reference to the core specifications;
- the test purposes; and
- a brief description of the test procedure, the specific test requirements and short message exchange table.

The Implementation Conformance Statement (ICS) pro-forma could be found in the 3rd part of this document.

This document is valid for UE supporting UE positioning implemented according to 3GPP releases starting from Release 99 up to the Release indicated on the cover page of this document.

2.2.2.15 TS 37.571-3

Universal Terrestrial Radio Access (UTRA) and Evolved UTRA (E-UTRA) and Evolved Packet Core (EPC); User Equipment (UE) conformance specification for UE positioning; Part 3: Implementation Conformance Statement (ICS)

This document provides the ICS proforma for 3rd Generation UTRAN and E-UTRAN User Equipment (UE) supporting UE positioning, in compliance with the relevant requirements, and in accordance with the relevant guidance given in ISO/IEC 9646-1 and ISO/IEC 9646-7.

This document also specifies a recommended applicability statement for the test cases included in 3GPP TS 37.571-1 and 3GPP TS 37.571-2. These applicability statements are based on the features implemented in the UE.

Special conformance testing functions can be found in 3GPP TS 34.109 for UTRA and 3GPP TS 36.509 for E-UTRA. The common test environments are included in 3GPP TS 34.108 for UTRA and in 3GPP TS 36.508 for E-UTRA.

This document is valid for UE supporting UE positioning implemented according to 3GPP releases starting from Release 99 up to the Release indicated on the cover page of this document.

2.2.2.16 TS 37.571-4

Universal Terrestrial Radio Access (UTRA) and Evolved UTRA (E-UTRA) and Evolved Packet Core (EPC); User Equipment (UE) conformance specification for UE positioning; Part 4: Test suites

This document specifies the protocol and signalling conformance testing in TTCN for the UE:

- A-GPS at the UTRA Uu interface;
- LTE positioning at the LTE-Uu interface;
- A-GNSS at the UTRA Uu interface.

The following TTCN test specification and design considerations can be found in this document:

- Test system architecture;
- Test models and ASP definitions;
- Test methods and usage of communication ports definitions;
- Test configurations;
- Design principles and assumptions;
- TTCN styles and conventions;
- Partial PIXIT proforma;
- Test suites in TTCN-2 and TTCN-3;
- The Test Suites designed and implemented in this document are based on the test specifications in prose in 3GPP TS 37.571-2;
- The applicability of the individual test cases is specified in the test ICS proforma specification in 3GPP TS 37.571-3.

2.2.2.17 TS 37.571-5

Universal Terrestrial Radio Access (UTRA) and Evolved UTRA (E-UTRA) and Evolved Packet Core (EPC); User Equipment (UE) conformance specification for UE positioning; Part 5: Test scenarios and assistance data

This document specifies the test scenarios and assistance data required for the conformance test for FDD or TDD mode of UTRA and E-UTRA for the User Equipment (UE) that supports one or more of the defined positioning methods. For UTRA these are Assisted Global Positioning System (A-GPS) and Assisted Global Navigation Satellite System (A-GNSS). For E-UTRA these are A-GNSS, Observed Time Difference of Arrival (OTDOA) and Enhanced Cell ID (ECID).

2.2.2.18 TS 38.508-1

5GS; User Equipment (UE) conformance specification; Part 1: Common test environment

This document defines the test environment for the 5G System.

This specification covers all aspects, including NG-RAN, 5GC and interworking between 5GS and EPS used for conformance tests of User Equipment (UE).

2.2.2.19 TS 38.508-2**5GS; User Equipment (UE) conformance specification; Part 2: Common Implementation Conformance Statement (ICS) proforma**

This document provides the Implementation Conformance Statement (ICS) proforma for 5G New Radio (NR) User Equipment (UE), in compliance with the relevant requirements.

Special conformance testing functions can be found in 3GPP TS 38.509 and 3GPP TS 36.509 and the common test environments are included in 3GPP TS 38.508-1 and 3GPP TS 36.508.

This document is valid for UE implemented according to 3GPP Releases starting from Release 15 up to the Release indicated on the cover page of this document.

2.2.2.20 TS 38.509**5GS; Special conformance testing functions for User Equipment (UE)**

This document defines for User Equipment (UE) those special functions and their activation/deactivation methods that are required in the UE for conformance testing purposes when the UE is connected to the 5G System (5GS) via its radio interface(s).

The document also describes the operation of these special functions when the 5GS capable UEs are connected via a non-5GS system e.g. E-UTRA FDD or TDD system.

Depending on the 5GS system's architecture some relevant for the UE for conformance testing special functions may be defined in TS 36.509.

2.2.2.21 TS 38.521-1**NR; User Equipment (UE) conformance specification; Radio transmission and reception; Part 1: Range 1 standalone**

This document specifies the measurement procedures for the conformance test of the user equipment (UE) that contain RF characteristics for frequency Range 1 as part of the 5G-NR.

The requirements are listed in different clauses only if the corresponding parameters deviate. More generally, tests are only applicable to those mobiles that are intended to support the appropriate functionality. To indicate the circumstances in which tests apply, this is noted in the "definition and applicability" part of the test.

For example, only Release 15 and later UE declared to support 5G-NR shall be tested for this functionality. In the event that for some tests different conditions apply for different releases, this is indicated within the text of the test itself.

2.2.2.22 TS 38.521-2**NR; User Equipment (UE) conformance specification; Radio transmission and reception; Part 2: Range 2 standalone**

This document specifies the measurement procedures for the conformance test of the user equipment (UE) that contain RF characteristics for frequency Range 2 as part of the 5G-NR.

The requirements are listed in different clauses only if the corresponding parameters deviate. More generally, tests are only applicable to those mobiles that are intended to support the appropriate functionality. To indicate the circumstances in which tests apply, this is noted in the "definition and applicability" part of the test.

For example, only Release 15 and later UE declared to support 5G-NR shall be tested for this functionality. In the event that for some tests different conditions apply for different releases, this is indicated within the text of the test itself.

2.2.2.23 TS 38.521-3

NR; User Equipment (UE) conformance specification; Radio transmission and reception; Part 3: Range 1 and Range 2 Interworking operation with other radios

This document specifies the measurement procedures for the conformance test of the user equipment (UE) that contain RF characteristics for carrier aggregation between Range 1 and Range 2 and additional requirements due to NR non-standalone (NSA) operation mode with E-UTRA.

The requirements are listed in different clauses only if the corresponding parameters deviate. More generally, tests are only applicable to those mobiles that are intended to support the appropriate functionality. To indicate the circumstances in which tests apply, this is noted in the “*definition and applicability*” part of the test.

For example, only Release 15 and later UE declared to support 5G-NR shall be tested for this functionality. In the event that for some tests different conditions apply for different releases, this is indicated within the text of the test itself.

2.2.2.24 TS 38.521-4

NR; User Equipment (UE) conformance specification; Radio transmission and reception; Part 4: Performance

This document specifies the measurement procedures for the conformance test of the user equipment (UE) that contain performance requirements as part of 5G-NR.

The requirements are listed in different clauses only if the corresponding parameters deviate. More generally, tests are only applicable to those mobiles that are intended to support the appropriate functionality. To indicate the circumstances in which tests apply, this is noted in the “*definition and applicability*” part of the test.

For example, only Release 15 and later UE declared to support 5G-NR shall be tested for this functionality. In the event that for some tests different conditions apply for different releases, this is indicated within the text of the test itself.

2.2.2.25 TS 38.522

NR; User Equipment (UE) conformance specification; Applicability of radio transmission, radio reception and radio resource management test cases

This document provides the Implementation Conformance Statement (ICS) proforma for 5G New Radio (NR) User Equipment (UE), in compliance with the relevant requirements.

This document specifies the recommended applicability statement for the test cases included in 3GPP TS 38.521-1, TS 38.521-2, TS 38.521-3, TS 38.521-4 and TS 38.533. These applicability statements are based on the features implemented in the UE.

Special conformance testing functions can be found in 3GPP TS 38.509 and the common test environments are included in 3GPP TS 38.508-1. Common implementation conformance statement (ICS) proforma can be found in 3GPP TS 38.508-2.

2.2.2.26 TS 38.523-1

5GS; User Equipment (UE) conformance specification; Part 1: Protocol

This document specifies the protocol conformance testing for the 3GPP UE connecting to the 5G System (5GS) via its radio interface(s).

The following information can be found in this document (first part of a multi-part test specification):

- the overall test structure;

- the test configurations;
- the conformance requirement and references to the core specifications;
- the test purposes; and
- a brief description of the test procedure, the specific test requirements and short message exchange table.

The applicability of the individual test cases is specified in the ICS proforma specification (3GPP TS 38.523-2). The Test Suites are specified in part 3 (3GPP TS 38.523-3).

2.2.2.27 TS 38.523-2

5GS; User Equipment (UE) conformance specification; Part 2: Applicability of protocol test cases

This document provides the applicability of protocol test cases proforma for 5G New Radio (NR) User Equipment (UE), in compliance with the relevant requirements.

This document specifies the recommended applicability statement for the test cases included in 3GPP TS 38.523-1 and 3GPP TS 38.523-3. These applicability statements are based on the features implemented in the UE.

Special conformance testing functions can be found in 3GPP TS 38.509 and 3GPP TS 36.509 and the common test environments are included in 3GPP TS 38.508-1 and 3GPP TS 36.508.

2.2.2.28 TS 38.523-3

5GS; User Equipment (UE) conformance specification; Part 3: Protocol Test Suites

This document specifies the protocol and signalling conformance testing in TTCN-3 for the 3GPP UE connecting to the 5G System (5GS) via its radio interface(s).

The following TTCN test specification and design considerations can be found in this document:

- the test system architecture;
- the overall test suite structure;
- the test models and ASP definitions;
- the test methods and usage of communication ports definitions;
- the test configurations;
- the design principles and assumptions;
- TTCN styles and conventions;
- the partial PIXIT proforma;
- the test suites.

The Test Suites designed in the document are based on the test cases specified in prose in 3GPP TS 38.523-1. The applicability of the individual test cases is specified in 3GPP TS 38.523-2.

2.2.2.29 TS 38.533

NR; User Equipment (UE) conformance specification; Radio Resource Management (RRM)

This document specifies the measurement procedures for the conformance test of the user equipment (UE) that contain requirements for support of RRM (Radio Resource Management) as part of the 5G New Radio (5G-NR). This document covers NR Range 1, NR Range 2 and Interworking.

The requirements are listed in different clauses only if the corresponding parameters deviate. More generally, tests are only applicable to those mobiles that are intended to support the appropriate

functionality. To indicate the circumstances in which tests apply, this is noted in the “*test applicability*” part of the test.

2.2.2.30 TS 34.229-1

Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); User Equipment (UE) conformance specification; Part 1: Protocol conformance specification

This document specifies the protocol conformance testing for the User Equipment (UE) supporting the Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP).

This is the first part of a multi-part test specification. The following information can be found in this part:

- the overall test structure;
- the test configurations;
- the conformance requirement and reference to the core specifications;
- the test purposes; and
- a brief description of the test procedure, the specific test requirements and short message exchange table.

The following information relevant to testing can be found in accompanying specifications:

- the applicability of each test case.

2.2.2.31 TS 34.229-2

Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); User Equipment (UE) conformance specification; Part 2: Implementation Conformance Statement (ICS) specification

This document provides the Implementation Conformance Statement (ICS) proforma for 3rd Generation User Equipment (UE) supporting the Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP), in compliance with the relevant requirements, and in accordance with the relevant guidance given in ISO/IEC 9646-7 and ETSI ETS 300 406.

2.2.2.32 TS 34.229-3

Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); User Equipment (UE) conformance specification; Part 3: Abstract test suite (ATS)

This document specifies the protocol conformance testing in TTCN for the 3GPP User Equipment (UE) at the Gm interface.

This document is the 3rd part of a multi-part test specification, 3GPP TS 34.229. The following TTCN test specification and design considerations can be found in this document:

- the overall test suite structure;
- the testing architecture;
- the test methods and PCO definitions;
- the test configurations;
- the design principles, assumptions, and used interfaces to the TTCN tester (System Simulator);

- TTCN styles and conventions;
- the partial PIXIT proforma;
- the TTCN files for the mentioned protocols tests.

The Abstract Test Suites designed in the document are based on the test cases specified in prose (3GPP TS 34.229-1).

2.2.2.33 TS 34.229-5

Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); User Equipment (UE) conformance specification; Part 5: Protocol conformance specification using 5G System (5GS)

This document specifies the protocol conformance testing for the User Equipment (UE) supporting the Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP) when using the 5G System (5GS).

This is the fifth part of a multi-part test specification. The following information can be found in this part:

- the overall test structure;
- the test configurations;
- the conformance requirement and reference to the core specifications;
- the test purposes; and
- the test procedure.

The following information relevant to testing can be found in accompanying specifications:

- Implementation Conformance Statement (ICS) pro-forma and the applicability of each test case.

Annex 3

Specification of the 5Gi¹ radio interface technology

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¹ Developed by TSDSI as “5Gi RIT”.

Background

IMT-2020 is a system with global development activity and the IMT-2020 terrestrial radio interface specifications identified in this Recommendation have been developed by the ITU in collaboration with the GCS Proponents and the Transposing Organizations. It is noted from Document IMT-2020/20, that:

- The GCS Proponent must be one of the RIT/SRIT Proponents for the relevant technology, and must have legal authority to grant to ITU-R the relevant legal usage rights to the relevant specifications provided within a GCS corresponding to a technology in Recommendation ITU-R M.[IMT-2020.SPECS].
- A Transposing Organization must have been authorized by the relevant GCS Proponent to produce transposed standards for a particular technology and must have the relevant legal usage rights.

It is further noted that GCS Proponents and Transposing Organizations must also qualify appropriately under the auspices of Resolution ITU-R 9 and the ITU-R “Guidelines for the contribution of material of other organizations to the work of the Study Groups and for inviting other organizations to take part in the study of specific matters (Resolution ITU-R 9)”.

The ITU has provided the global and overall framework and requirements and has developed the Global Core Specification jointly with the GCS Proponent. The detailed standardization has been undertaken within the recognized Transposing Organizations which operate in concert with the GCS Proponent. This Recommendation therefore makes extensive use of references to externally developed specifications.

This approach was considered to be the most appropriate solution to enable completion of this Recommendation within the aggressive schedules set by the ITU and by the needs of administrations, operators and manufacturers.

This Recommendation has therefore been constructed to take full advantage of this method of work and to allow the global standardization timescales to be maintained. The main body of this Recommendation has been developed by the ITU, with each Annex containing references pointing to the location of the more detailed information.

This Annex 3 contains the detailed information developed by the ITU and “TSDSI” (the GCS Proponent and Transposing Organizations).

Such use of referencing enables timely completion and update of the high-level elements of this Recommendation, with change control procedures, transposition, and public enquiry procedures being undertaken within the external organization. This information has generally been adopted unchanged, recognizing the need to minimize duplication of work, and the need to facilitate and support an ongoing maintenance and update process.

This general agreement, noting that the detailed information of the radio interface should to a large extent be achieved by reference to the work of external organizations, highlights not only the ITU’s significant role as a catalyst in stimulating, coordinating and facilitating the development of advanced telecommunications technologies, but also its forward-looking and flexible approach to the development of this and other telecommunications standards for the 21st century.

A more detailed understanding of the process for the development of the first release of this Recommendation may be found in Document IMT-2020/20.

3.1 Overview of the radio interface technology

TSDSI RIT is a versatile radio interface that fulfils all the technical performance requirements of IMT 2020 across all the different test environments. This RIT focuses on connecting the next generation of devices and providing services across various sectors. In particular, this RIT focuses on:

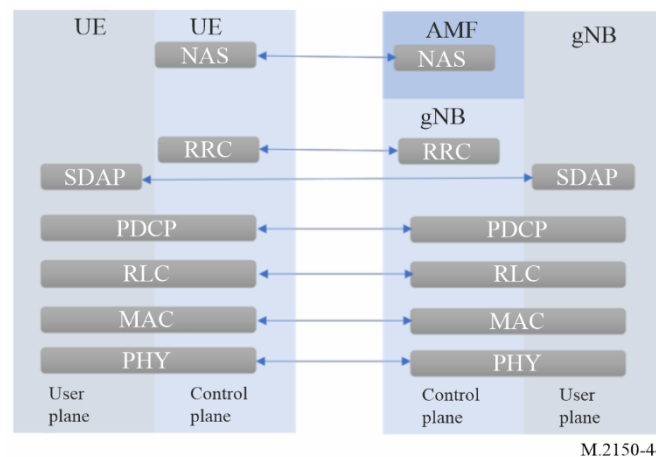
- 1 Enhanced spectral efficiency and broadband access;
- 2 Low latency communication;
- 3 Support millions of IOT devices;
- 4 Power efficiency;
- 5 High speed connectivity;
- 6 Large Coverage (in particular for Rural areas);
- 7 Support multiple frequency bands including mmWave spectrum.

While, the current specifications provide a robust RIT, the specification also provides a framework on which future enhancements can be supported, providing a future-proof technology. In the following sections, we provide a basic description of the RIT. The complete details of the RIT can be found in the specification documents.

3.1.1 System and protocol architecture

The overall RAN protocol architecture is shown in Fig. 44.

FIGURE 44
Control-plane and user-plane protocol stack (AMF is not part of the RAN)



M.2150-44

- 1 Physical layer is responsible for coding (decoding), modulation (demodulation), rate adaptation, multi-antenna processing and appropriate waveform generation.
- 2 Medium-Access Control (MAC) layer is responsible for scheduling, hybrid-ARQ and multiplexing of logical channels. Physical layer interacts with MAC using transport channels.
- 3 Radio-link Control (RLC) layer is responsible for packet segmentation and handling retransmissions. MAC layer interfaces with RLC layer using logical channels.
- 4 Packet Data Convergence Protocol (PDCP) layer provides in-sequence delivery of packets, ciphering functionality and integrity protection. RLC interacts with PDCP using RLC channels
- 5 Service Data Application Protocol (SDAP) layer is primarily responsible for managing radio bearers and maintaining QoS requirements.

- 6 Radio Resource Control (RRC) layer is responsible for handling RAN control-plane procedures, transmission of configuration and system parameters.

3.1.2 Physical layer

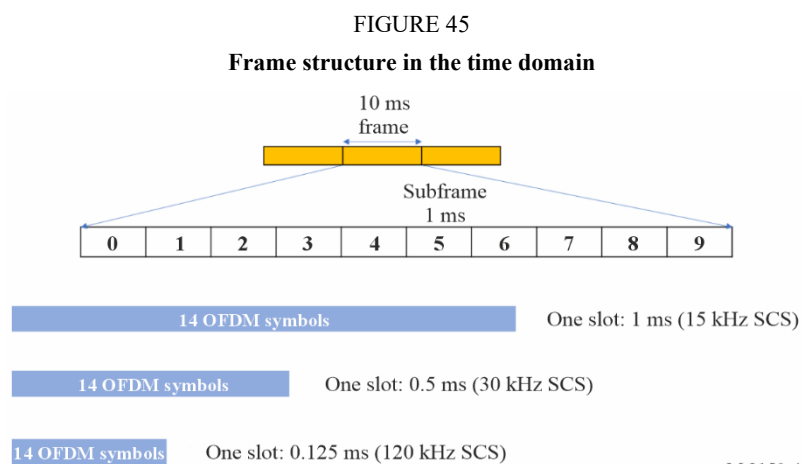
3.1.2.1 Waveform and frame structure

TSDSI RIT offers a flexible waveform and frame structure to support applications with various requirements. The underlying waveform is based on Orthogonal Frequency Division Multiplexing (OFDM) with cyclic prefix (CP). In uplink, in addition to OFDM, DFT spreading can also be applied to reduce the cubic metric. The waveforms support multiple sub-carrier spacings to accommodate transmission at mmWave frequencies and also achieve lower latency transmissions. The supported sub-carrier spacings and the supported frequency ranges are shown in Table 7 below. Here FR1 indicates sub-6 GHz bands while FR2 indicates mmWave bands.

TABLE 7
Allowed SCS

μ	$\Delta f = 2^\mu \times 15 \text{ kHz}$	CP	Frequency
0	15	Normal	FR1
1	30	Normal	FR1
2	60	Normal / Extended	FR1/FR2
3	120	Normal	FR2
4	240	Normal	FR2

OFDMA based time-frequency grid is used for packing multiple users, synchronization and reference signals. Slot (see Fig. 45) is a fundamental unit of scheduling in the TSDSI RIT and always consists of 14 OFDM symbols. Slots make up subframes (1 ms duration), ten of which in turn make up a frame (10 ms duration).



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In the frequency domain, the finest granularity of resource allocation is the RE (resource elements) which have a bandwidth of the SCS being used. Twelve RE make a physical resource block and the RIT supports a maximum of 275 PRB on a carrier. The RIT supports multiple bandwidths and different carrier frequencies. Both paired and un-paired spectrum are supported by the RIT.

3.1.2.2 Downlink

3.1.2.2.1 Downlink Data Channel

The downlink transport block (TB) processing consists of the following steps:

- 1 TB CRC attachment
- 2 Code-block segmentation
- 3 LDPC channel coding
- 4 Rate matching, interleaving and scrambling
- 5 Modulation (QPSK, 16 QAM, 64 QAM, 256 QAM)
- 6 Layer mapping
- 7 Mapping to antenna ports

For single user MIMO, up to 4 layers are supported by one TB and up to 8 layers are supported by two TBs. Demodulation reference signals (DMRS) are incorporated in the frequency grid for channel estimation by the UE. Up to 12 orthogonal DMRS ports are supported in the downlink and can be used for estimating the precoding matrix being used. A user can be allocated any number of PRB's within his BWP and 2- 14 OFDM symbols in the time domain in a slot.

3.1.2.2.2 Control channels

The physical downlink control channel (PDCCH) provides the following information to the UE:

- DL resources of PDSCH, HARQ and related information required for PDSCH demodulation and decoding;
- UL scheduling grant for PUSCH and HARQ.

Other information related to slot format, pre-emption, UL power control, SRS etc.

The PDCCH consists of control resource sets (CORESETS). The characteristics of a CORESET are:

- Up to three OFDM symbols in time;
- Always contained within the active bandwidth part (BWP) of a UE;
- Occupies any position within a slot;
- Consists of control channel elements (CCE). 1 CCE is 6 resource element groups (REGs) where 1 REG is one resource block in 1 OFDM symbol. The CCE-to-REG mapping can be either interleaved or non-interleaved;
- 1, 2, 4, 8, or 16 aggregation level of CCEs are possible;
- Contains PDCCH DMRS for demodulation;
- PDCCH can be beamformed.

The payload transmitted on a PDCCH is Downlink Control Information (DCI). The characteristics of DCI are:

- QPSK modulated symbols;
- Polar coding;
- 24-bit CRC.

The PDCCH is blindly decoded by the UEs. To reduce the number of blind decoding's, search spaces are provided. The search space can be device specific (to a particular UE) or common (for a group of UEs).

3.1.2.2.3 Synchronization and Initial Cell Access

3.1.2.2.3.1 SS/PBCH

The synchronization signals and PBCH (SSB) block spans four OFDM symbols and 240 subcarriers. They are used for frequency locking and downlink time sync. The numerology and time domain location are dependent on the carrier frequency.

The PSS and SSS intrinsically hold the ID of the cell, and the PBCH carries the Master Information Block (MIB). The PBCH also has an associated DMRS and is polar encoded.

SSB is transmitted as bursts of 5ms. Each burst can contain up to 8 SSB in FR1 and 64 SSB in FR2. The gNB may transmit each SSB of a burst in a different direction using multiple beams.

3.1.2.2.3.2 Cell Search

The UE searches for SSB centred at a frequency raster which is much sparser than the channel raster enabling faster detection. If the UE detects multiple SSBs, it chooses the beam with maximum power.

3.1.2.2.3.3 SIB/MSI

The MIB along with SystemInformationBlock1 forms the minimum system information which is transmitted periodically. The MIB is transmitted in PBCH and it provides the CORESET0 info to decode the SIB1. Additional SIBs are transmitted on the request of UE or if triggered by the network

3.1.2.3 Uplink

3.1.2.3.1 Data channels

The uplink transport block (TB) processing consists of the following steps:

- 1 TB CRC attachment;
- 2 Code-block segmentation and CRC attachment;
- 3 LDPC channel coding;
- 4 Rate matching;
- 5 Modulation (shaped $\pi/2$ BPSK, QPSK, 16 QAM, 64 QAM, 256 QAM);
- 6 Layer mapping and transform precoding;
- 7 Mapping to antenna ports.

The entire uplink transmission is scheduled by DCI or semi-statically scheduled by RRC. In the uplink, the entire 14 symbols can be used for transmission of data. Demodulation reference signals (DMRS) are incorporated in the frequency grid for channel estimation by the UE. The UE has at least one DMRS in each layer and up to three additional DMRS can be configured. Codebook and non-codebook-based MIMO transmissions are supported. The gNB provides the precoder information via DCI for the codebook transmission.

3.1.2.3.2 Control channels

The uplink control information (UCI) consists of the following:

- HARQ for PDSCH;
- Channel state information (CSI);
- Scheduling request (SR).

The UCI is transmitted either on the physical uplink control channel (PUCCH) or on the PUSCH. PUCCH formats are of two types; short and long.

Short PUCCH format consists of formats 0 and 2 which can occupy up to two OFDM symbols.

TABLE 8
Short PUCCH formats

Format	Characteristics
0	– Transmits at most 2 bits – Low PAPR sequence – HARQ/SR
2	– Transmits more than 2 bits – HARQ/CSI/SR – Reed Muller/Polar code – QPSK modulation

Long PUCCH format consists of 1, 3 and 4 which can occupy 4 to 14 OFDM symbols.

TABLE 9
Long PUCCH formats

Format	Characteristics
1	– At most 2 bits – BPSK/QPSK – Low PAPR sequence
3	– More than 2 bits – Reed Muller/Polar code – DMRS included
4	– More than 2 bits – Same as PUCCH format 3 but code-multiplexing of multiple devices in the same resource is allowed – DMRS included

In case of transmission on PUSCH, the UCI is multiplexed with the data.

3.1.2.3.3 Random access

The RACH process synchronizes the UE to the gNB in time in the UL direction by estimating the timing advance needed for the UE. ZC sequences are used for the initial random access procedure. RACH occasions occur in different frequency and time locations and have multiple formats and sequence lengths. Each occasion has 64 possible preambles formats and can be used for various deployments. The format and occasion of PRACH is conveyed by the SIB1 message. In addition, for beam management, a notion of PRACH-SSB association that conveys the beam ID with maximum power to the gNB is also introduced.

3.1.2.4 MIMO Capabilities

The RIT supports deployments of large-scale massive MIMO systems to enhance coverage as well as capacity. It can support both TDD and FDD configurations in quite a flexible manner. The MIMO features support is crucial for both sub6GHz bands and mmWave bands. The specification is in general a beam-based technology to support both these spectrum bands.

For the downlink transmissions, the DMRS is designed to support up to 12 users via MU-MIMO techniques in the downlink via 12 orthogonal DMRS ports. Specifically, a maximum of 8 orthogonal DL DMRS ports per UE are allowed in the Single-User MIMO (SU-MIMO) mode of operation and a maximum of 4 orthogonal DL DMRS ports per UE are supported for Multi-User MIMO (MU-MIMO) mode. The number of SU-MIMO code words is one for 1 to 4 layers transmissions and two for 5 to 8 layers transmissions.

The specification supports both codebook-based and non-codebook-based precoding mechanisms for MIMO transmissions. For codebook-based mechanisms, two kinds of CSI feedback mechanisms are supported, mainly Type-I and Type-II aka low-resolution and high-resolution CSI feedback. Efforts are made to ensure the feedback from the users is minimized and yet achieve significant gains in the downlink transmission in MU-MIMO mode.

For the case of uplink, closed loop DMRS based spatial multiplexing is supported. For a given user, a maximum of up to four-layer transmissions are supported while the number of codewords is limited to one. When transform precoding is used i.e. DFT-s-OFDM transmission, only a single MIMO layer transmission is supported.

The specification also supports multiple transmission-reception points such as in the case of coordinated multiple point transmission, multiple antenna panel transmissions among others. These support use cases such as avoiding blockages in higher frequencies and enhance reliability.

3.1.2.5 Support for URLLC

The RIT supports ultra-reliable and low latency communications which is useful in many industry verticals such as smart factories, industry automation, smart cities among others. The reliability level that can be achieved is 99.9999% and very low latency is supported. The control plane and user plane latencies are ensured to be less than 10 ms and 1 ms respectively. Some main technical features that are part of the RIT to support this feature are:

- 1 Shaped Pi/2 BPSK modulation scheme to support higher reliability even at low SNRs;
- 2 Mini-slot (less than 1 full slot) transmissions to support fast transmissions and faster ACK/NACK feedback mechanisms;
- 3 Different numerologies to support smaller slot durations to aid URLLC transmissions;
- 4 Repetitions across slots, slot aggregation, higher aggregation levels for control channel, a separate MCS/CQI table;
- 5 Traffic pre-emption to allow URLLC data packets through;
- 6 Restrictions on logical channel priorities;
- 7 Supporting packet duplication via dual connectivity and carrier aggregation;
- 8 Ethernet header compression to reduce the latency among others.

As can be seen, the features are across various protocol layers to ensure a true low latency mechanism.

3.1.2.6 HARQ

HARQ functionality ensures delivery of packets between peer entities at Physical layer. When the Physical layer is not configured for downlink/uplink spatial multiplexing, HARQ process supports only one TB. When the Physical layer is configured, HARQ process supports one or more TBs.

3.1.2.7 Supplementary Uplink (SUL)

In case of supplementary Uplink (SUL), UE will be configured with two Uplinks (2 ULs) for one Downlink of the same cell. The uplink transmissions on both ULs are controlled by the network to avoid overlapping of transmissions in PUSCH/PUCCH in time.

Note:

- Overlapping transmissions on PUSCH are avoided through scheduling;
- Overlapping transmissions on PUCCH are avoided through configuration (PUCCH can only be configured for only one of the two ULs of the cell).

In addition to these, initial access is supported on each of the uplink.

3.1.2.8 Carrier Aggregation (CA)

In TSDSI RIT, with carrier aggregation multi carrier nature of physical layer is exposed to MAC layer where transmissions through multiple carriers can be aggregated for which one HARQ entity is required for each serving cell.

In both uplink and downlink, there is one independent HARQ entity for each serving cell and one transport block is generated per assignment per serving cell in the absence of spatial multiplexing. Note that each transport block and its HARQ retransmissions are mapped to a single serving cell.

3.1.2.9 Bandwidth Adaptation (BW)

In TSDSI RIT the receive and transmit bandwidth of a UE need not be as large as the bandwidth of the cell. With bandwidth adaptation, the bandwidth of the UE can be adjusted i.e. as an example the following parameters can be adjusted to achieve adaptability.

- 1 Bandwidth can be ordered to change i.e. it can be adjusted according to the activity of the user in order to meet power constraints;
- 2 Location can move in frequency domain in order to increase scheduling flexibility;
- 3 Subcarrier spacing can be ordered to change to allow different services.

A subset of the total cell bandwidth is referred to as Bandwidth part (BWP). The Bandwidth adaptation is achieved by configuring UE with BWPs and letting the UE know which BWPs is currently the active one. Note that a maximum of only four bandwidths can be specified in DL and UL.

3.1.2.10 Support for Higher Power Efficiency

3.1.2.10.1 Network

When there is no active data transfer between the network and the UE, the network saves power by remaining on for some duration and sleeping for the rest. The on duration consists of transmission of SSB with PBCH, RMSI and paging signal which needs to be monitored by UEs. During the sleep duration, there is no transmission or reception to/from the UE.

3.1.2.10.2 UE

The UE can be in any one of the states at the given time:

- 1 Idle;
- 2 Inactive;
- 3 Active.

During the idle/inactive modes, the UE does not perform any active data communication with the network. It uses the discontinuous reception (DRX) cycle to save power consumption. The DRX

cycle consists of an ‘on’ duration and ‘off’ duration which is signalled by the network to the UE. During the ‘off’ duration, there UE sleeps (there is no transmission or reception). During ‘on’ duration, the UE performs SSB monitoring, paging monitoring and radio resource management (RRM) measurement. This is to ensure that the UE synchronised in downlink with its network and also keeps a track of when it needs to wake up for active data transfer. Once it receives a paging message, the UE wakes up. It starts the inactivity timer and remains active until the time expires. There are two types of DRX cycles;

- 1 long DRX cycle; and
- 2 short DRX cycle (within the ‘off’ duration of the long DRX cycle).

The following documents provide details of the RF interface and the physical layer:

- T3.9038.211 NR; Physical channels and modulation;
- T3.9038.212 NR; Multiplexing and channel coding;
- T3.9038.213 NR; Physical layer procedures for control;
- T3.9038.214 NR; Physical layer procedures for data;
- T3.9038.101-1 NR; User Equipment (UE) radio transmission and reception; Part 1: Range 1 Standalone;
- T3.9038.101-2 NR; User Equipment (UE) radio transmission and reception; Part 2: Range 2 Standalone;
- T3.9038.104 NR; Base Station (BS) radio transmission and reception.

3.1.3 Layer 2

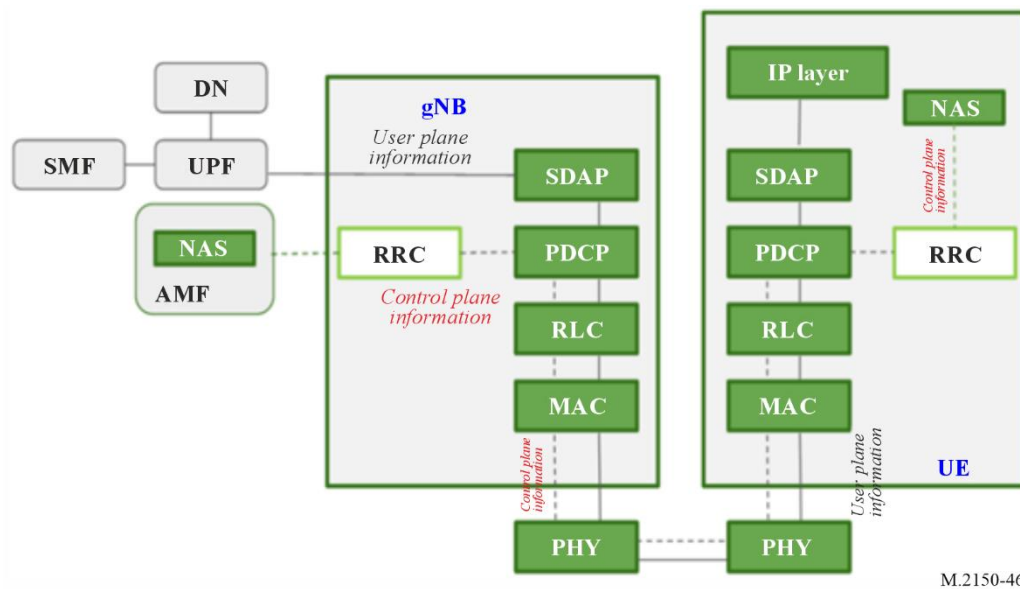
3.1.3.1 Overview

Layer 2 of TSDSI RIT has the following sublayers

- 1 SDAP (Service Data Adaptation Protocol);
- 2 PDCCP (Packet Data Convergence Protocol);
- 3 RLC (Radio Link Control);
- 4 MAC (Medium Access Control).

The architecture of TSDSI RIT with Layer 2 and Layer 3 is depicted in Fig. 46.

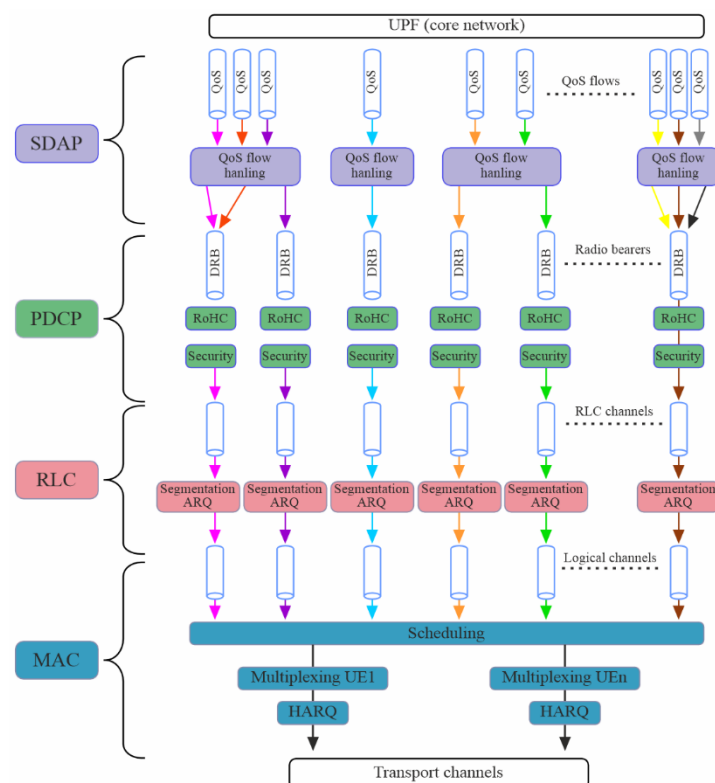
FIGURE 46
Architecture of TSDSI RIT logical layer



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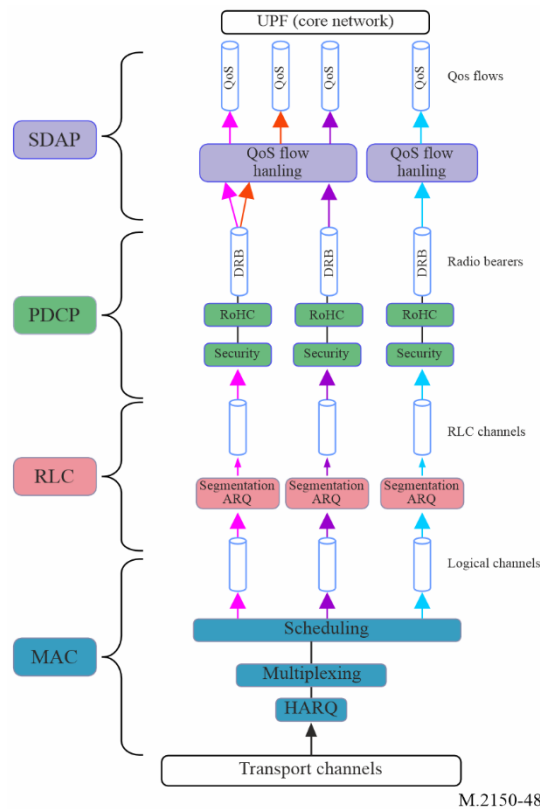
Control Plane information from RRC (Layer 3) flows through PDCP, RLC, MAC sublayers of Layer 2 stack, whereas user plane data from UPF (CN) flows through SDAP, PDCP, RLC, MAC sublayers of Layer 2 stack. SDAP receives data from Core Network through QoS flows. SDAP offers data to PDCP via Radio Bearers. PDCP offers data to RLC via RLC channels/logical channels. RLC offers data to MAC via logical channels. MAC offers data to the Physical layer via Transport channels. The downlink and uplink architectures for user plane data flow are depicted in Figs 47 and 48.

FIGURE 47
Downlink user plane architecture of Layer 2



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FIGURE 48

Uplink user plane architecture of Layer 2

M.2150-48

3.1.3.2 Channels**3.1.3.2.1 QoS flows**

SDAP offers data to Core Network via QoS (Quality of Service) flows.

Data is separated into QoS flows based on the QoS requirements.

3.1.3.2.2 Radio bearers

PDCP offers data to SDAP via Radio Bearers. There are two types of radio bearers.

- 1 SRB (Signalling Radio Bearer)
- 2 DRB (Data Radio Bearer)

SRBs are used for transfer of signalling information/Control Plane data.

DRBs are used for transfer of Data plane information/User Plane data.

3.1.3.2.3 Logical channels

There are two kinds of logical channels.

Control Channels:

- 1 Traffic Channels

Control channels are used for transfer of control plane information. Traffic channels are used for transfer of user plane information. Each of the logical channels is defined by what type of information is being transferred by or to the MAC Layer.

Control Channels:

- 1 BCCH (Broadcast Control Channel): It is a downlink channel used for broadcasting system control information
- 2 PCCH (Paging Control Channel): It is a downlink channel used for carrying paging messages
- 3 CCCH (Common Control Channel): For UEs having no RRC connection with the network, this channel is used for transmitting control information between UEs and network (RAN)
- 4 DCCH (Dedicated Control Channel): After RRC connection establishment, DCCH is a point-to-point bi-directional channel that transmits dedicated control information between a UE and the network.

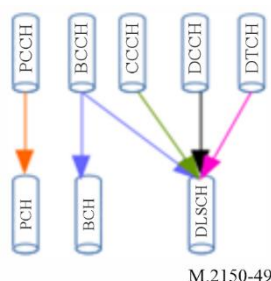
Traffic Channels:

- 1 DTCH (Dedicated Traffic Channel): It is a bi-directional channel which establishes a point-to-point communication between UE and network used for transfer of data plane information/user information.

3.1.3.2.4 Mapping of logical channels to Transport Channels

The mapping of logical channels to the downlink transport channels is given in Fig. 49.

FIGURE 49
Downlink mapping of logical to transport channels
(Logical channels)



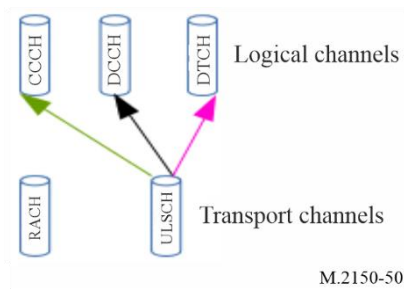
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In Downlink:

- 1 PCCH is mapped to PCH;
- 2 Part of BCCH information is sent through BCH and part of BCCH is sent through DLSCH;
- 3 CCCH is mapped to DLSCH;
- 4 DCCH is mapped to DLSCH;
- 5 DTCH is mapped to DLSCH.

The mapping of logical channels to the downlink transport channels is given in Fig. 50.

FIGURE 50
Uplink mapping of transport to logical channels



In Uplink:

- 1 CCCH is mapped to UL-SCH;
- 2 DCCH is mapped to UL-SCH;
- 3 DTCH is mapped to UL-SCH.

3.1.3.2.5 Sublayers

3.1.3.2.5.1 SDAP

Key Functions:

- 1 Mapping between a QoS flow and a data radio bearer;
- 2 Marking QoS flow ID (QFI) in both DL and UL packets.

The typical downlink and uplink architectures of SDAP are depicted in Figs 51 and 52.

FIGURE 51
SDAP downlink architecture

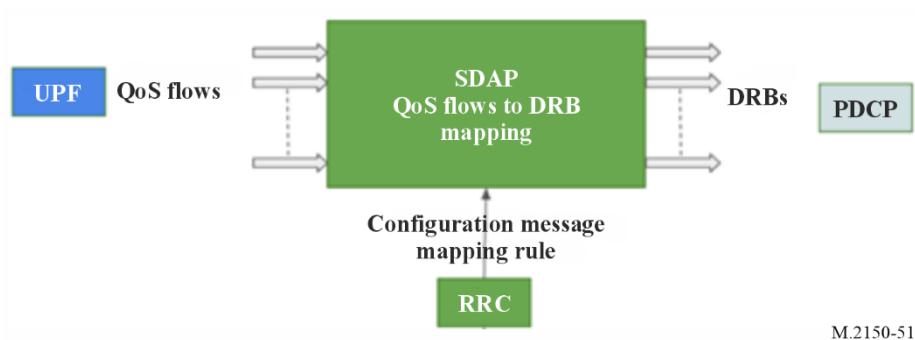
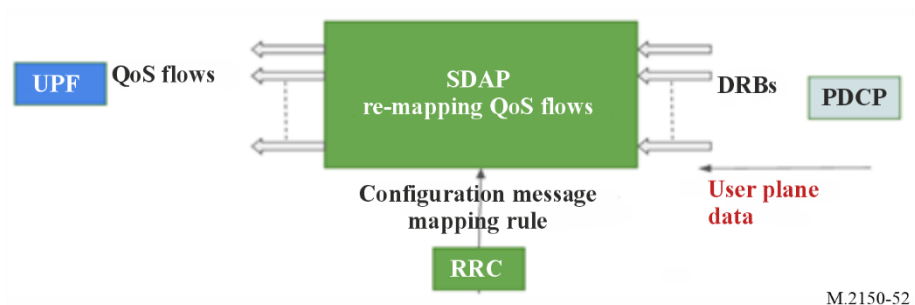


FIGURE 52
SDAP uplink architecture



3.1.3.2.5.2 PDCP

Key functions:

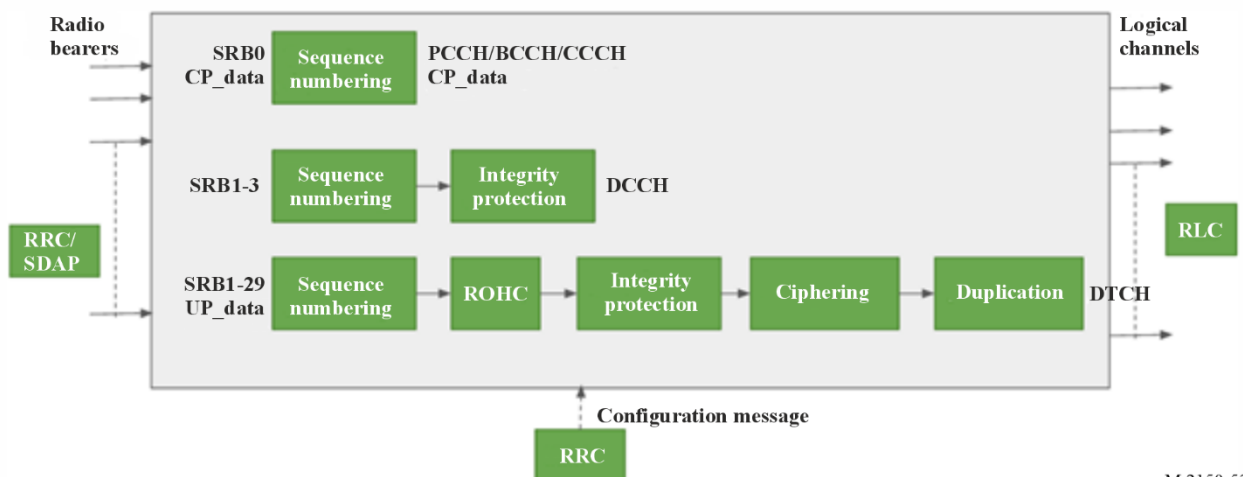
- 1 Addition and Removal and sequence number;
- 2 Header compression and de-compression;
- 3 Cipherring and de-cipherring;
- 4 Integrity Protection;
- 5 Duplicate detection and reordering of packets (if in-order delivery is requested by upper layers).

The typical downlink and uplink architectures of PDCP are depicted in Figs 53 and 54.

FIGURE 53

Downlink architecture of PDCP

PDCP_DL_gNB

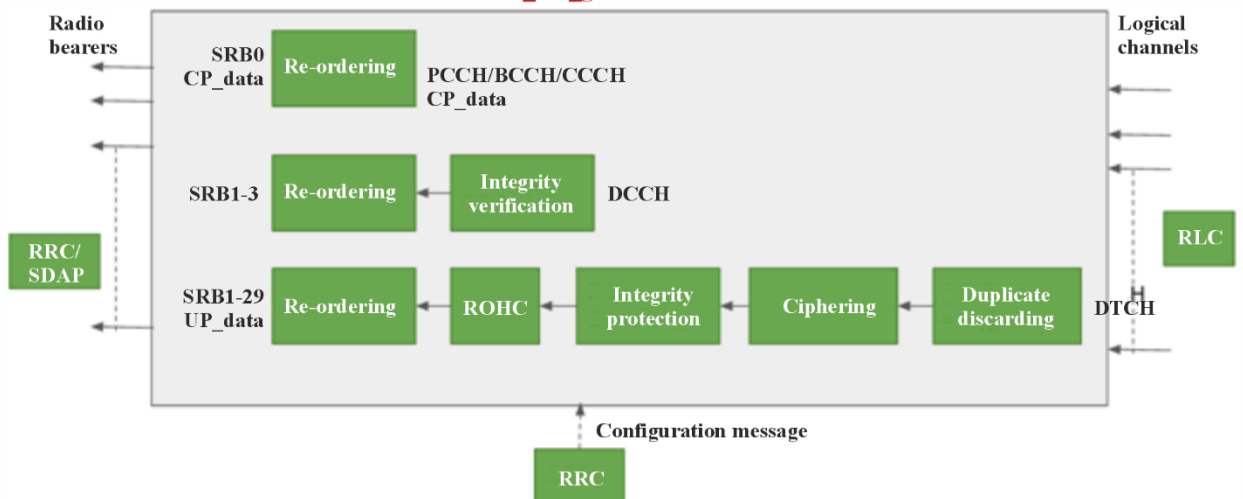


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FIGURE 54

Uplink architecture of PDCP

PDCP_UL_gNB



M.2150-54

3.1.3.2.5.3 RLC

Key functions:

- 1 Transfer of upper layer PDUs;
- 2 Sequence numbering independent of the one in PDCP;
- 3 Error Correction through ARQ;
- 4 Segmentation and re-segmentation.

The typical downlink and uplink architectures of RLC are depicted in Figs 55 and 56.

FIGURE 55
Downlink architecture of RLC

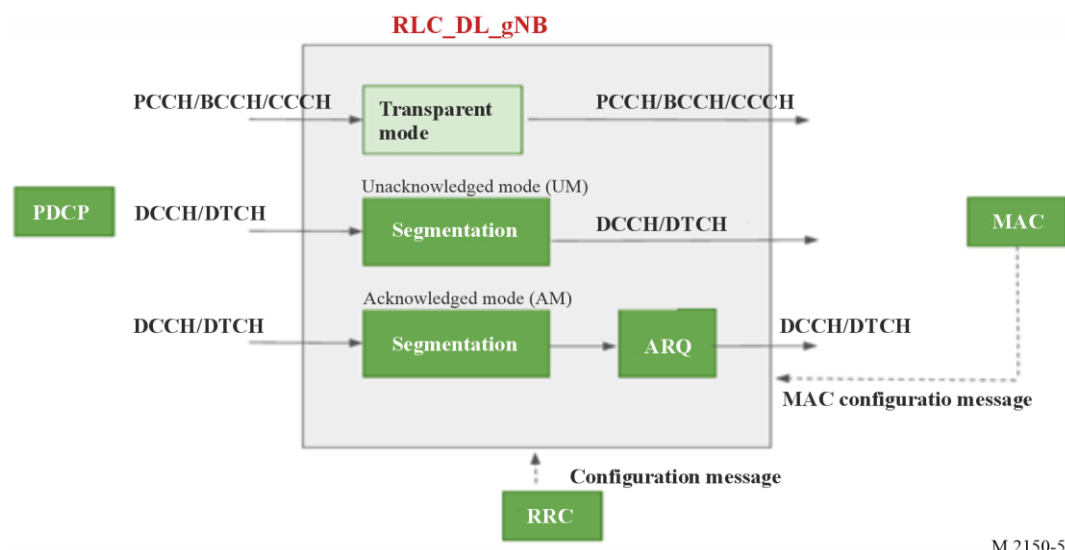
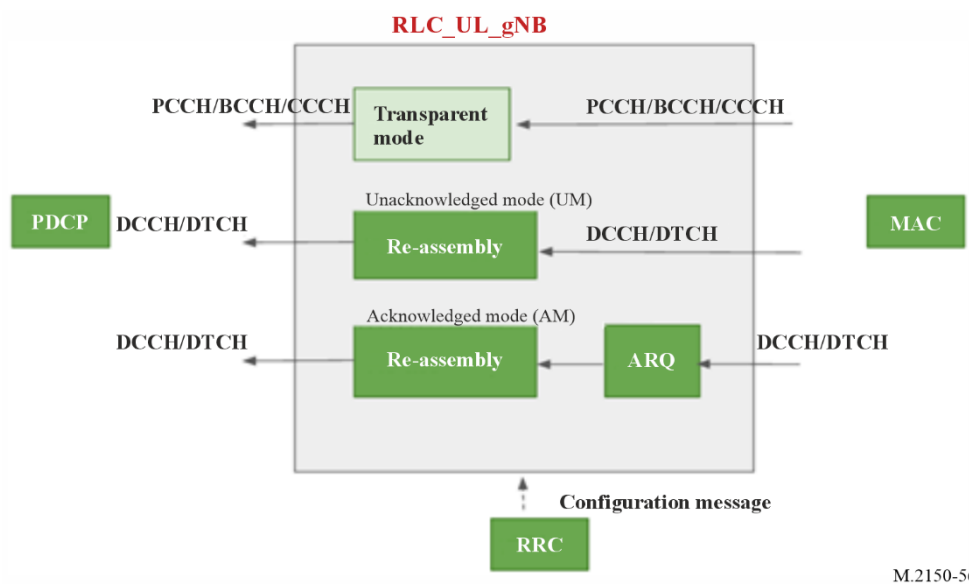


FIGURE 56
Uplink architecture of RLC



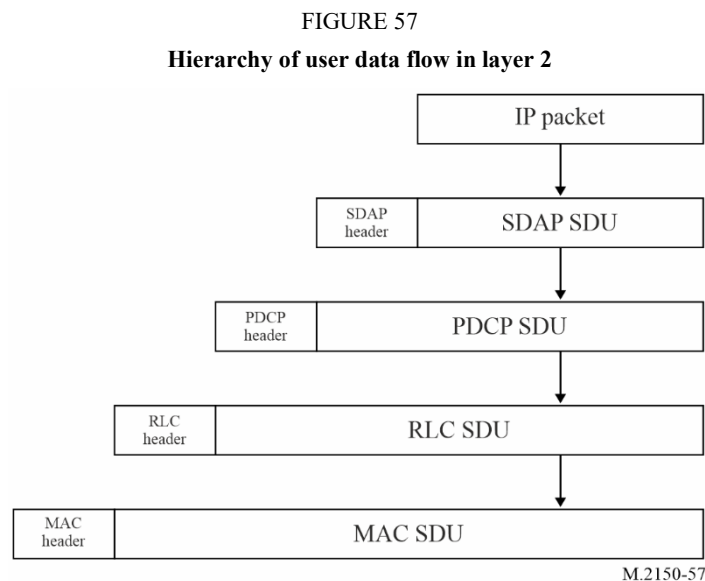
3.1.3.2.5.4 MAC

Key functions:

- 1 Mapping between logical channels and transport channels;
- 2 Multiplexing/demultiplexing of MAC SDUs belonging to one or different logical channels into/from transport blocks (TB) delivered to/from the physical layer on transport channels;
- 3 Scheduling Information Reporting;
- 4 Error correction through HARQ;
- 5 Priority handling between UEs by means of dynamic scheduling;
- 6 Priority handling between logical channels of one UE by means of logical channel prioritization;
- 7 Padding.

3.1.3.3 Data flow

A simple model depicting the hierarchy of user data flow in Layer 2 is given in Fig. 57.



The following documents provide details about the layers described above:

- T3.9038.321 NR; Medium Access Control (MAC) protocol specification
- T3.9038.322 NR; Radio Link Control (RLC) protocol specification
- T3.9038.323 NR; Packet Data Convergence Protocol (PDCP) specification
- T3.9037.324 Evolved Universal Terrestrial Radio Access (E-UTRA) and NR; Service Data Adaptation Protocol (SDAP) specification

3.1.4 Radio Resources Control (RRC)

The overview of the functions and services of RRC are given below:

- Paging transmission, initiated by Core network or RAN.
- Broadcast of system information.
- Security functions including generation and maintaining security keys.
- RRC connection establishment, maintenance, release between UE and RAN which includes the CA and dual connectivity.

- SRB (Signalling Radio Bearer) and DRB (Data Radio bearer) establishment, maintenance, configuration and release.
- Radio Link Failure functions, which includes detection and recovery procedures.
- Mobility related functions, includes the handover procedures and cell selection procedures.
- UE measurements maintenance and reporting of those measurements to the RAN.
- QOS Management procedures.
- Transfer of NAS messages.

The protocol states supported by RRC are:

- RRC IDLE
- RRC INACTIVE
- RRC ACTIVE

The characteristics of each of the different states are given as follows.

3.1.4.1 RRC IDLE:

- System Information broadcast and reception.
- Public Land Mobile Network (PLMN) selection.
- Cell selection and re-selection.
- Paging for mobile terminated data is initiated by the Core Network.
- DRX for core network paging.
- Performing UE Measurements and reporting.

3.1.4.2 RRC INACTIVE:

- PLMN selection.
- Broadcast and reception of System information.
- Cell re-selection.
- Paging initiated by RAN.
- RNA (RAN based Notification Area) is maintained.
- Connection between NG-C and CP for control plane data, NG-U and UP for user plane data is maintained.
- UE AS context is stored in NG-RAN and UE
- DRX for RAN paging.
- Performing UE Measurements and reporting.

3.1.4.3 RRC ACTIVE:

- Establishment of NGRAN and CORE, UP and CP connections for a user.
- UE AS context is stored in NG-RAN and UE.
- Cell re-selection.
- Transfer and Reception of UE unicast messages.
- Performing UE Measurements and reporting.
- NG-RAN knows the cell UE belongs to.
- Mobility functionalities.

More details about the RRC layer can be found in the following documents:

- T3.9038.331 NR; Radio Resource Control (RRC); Protocol specification
- T3.9038.304 NR; User Equipment (UE) procedures in idle mode and in RRC Inactive state

3.1.5 RIT support for mMTC

The specifications support mMTC applications via a narrow band technology named as NB-IoT. NB-IoT supports 200 kHz bandwidth with 1 PRB scheduling. It significantly enhances the coverage by means of scheduling multiple TTIs for every physical channel transmission. It supports mainly three modes of transmissions – in-band, guard band and standalone and is flexible due to this reason.

In NB-IoT, Uplink transmission is based on Discrete Fourier Transform (DFT) Spread OFDM (DFTS-OFDM). DFTS-OFDM can be seen as a DFT precoder, followed by conventional OFDM with the same numerology as in the downlink. The Narrow-Band Internet of Things (NB-IoT) UL allows the allocation of a single-tone in addition to multi-tone DFTS-OFDM with the possibility of a lower subcarrier spacing in addition to the normal subcarrier spacing. The NB-IoT UL allows allocation of a single-tone with $Df = 3.75$ kHz or $Df = 15$ kHz subcarrier spacing. In the DL, only conventional OFDM is supported with 15 kHz sub-carrier spacing.

NB-IoT supports QPSK on DL and UL, and additionally $\pi/2$ -BPSK, $\pi/4$ -QPSK are supported in uplink when a single-tone is allocated and spectrum shaped $\pi/2$ BPSK modulation when multiple tones are allocated. The UE capability signalling and activation/de-activation of shaped $\pi/2$ BPSK modulation is supported by RRC signalling.

The following types of physical channels are defined for NB-IoT:

- Narrowband Physical broadcast channel (NPBCH): used to carry the broadcast channel information for NB-IoT UEs. This channel carries cell and/or system specific information.
- Narrowband Physical downlink shared channel (NPDSCH): used to carry the data payloads and paging information for NB-IoT UEs.
- Narrowband Physical downlink control channel (NPDCCH): used to inform the NB-IoT UE about the resource allocation NPDSCH. It also carries the uplink scheduling grant for the NB-IoT UE.
- Narrowband Physical uplink shared channel (NPUSCH): used to carry the uplink data payloads from the user and Hybrid ARQ ACK/NAKs in response to downlink transmission for the NB-IoT UE.
- Narrowband Physical random access channel (NPRACH): used to carry the random access preamble for the NB-IoT UE

Power efficiency is supported for the IoT devices via long sleep and DRX cycles. For NB-IoT, an extended DRX cycle of 10.24s is supported in RRC Connected. In RRC Idle, the maximum DRX cycle is 2.91 hours. For PSM, the maximum PSM time is 310 hours which ensures a long battery life for the UE.

Details about NB-IoT can be found in the following specifications:

- T3.9036.211 Evolved Universal Terrestrial Radio Access (E-UTRA); Physical channels and modulation
- T3.9036.212 Evolved Universal Terrestrial Radio Access (E-UTRA); Multiplexing and channel coding
- T3.9036.213 Evolved Universal Terrestrial Radio Access (E-UTRA); Physical layer procedures
- T3.9036.101 Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio transmission and reception

- T3.9036.104 Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) radio transmission and reception

3.2 Detailed specification of the radio interface technology

Detailed specifications described in this Annex are developed around a “Global Core Specification” (GCS), which is related to externally developed materials incorporated by specific references for a specific technology. The process and use of the GCS, references, and related notifications and certifications are found as Document IMT-2020/20.

The IMT-2020 standards contained in this section are derived from the global core specification for 5Gi contained at IMT-2020 [Global Core Specifications](#). The following notes apply to the sections below:

- 1) The identified Transposing Organizations² should make their reference material available from their website.
- 2) This information was supplied by the Transposing Organizations and relates to their own deliverables of the transposed global core specification.

Section 3.2.1 contains titles and synopses of the Global Core Specification of the IMT-2020 radio interface technology entitled 5Gi and the related hyperlinks to the transposed standards.

The specific TSDSI specifications of the Global Core Specifications (GCS) for IMT-2020 and 5Gi that are being transposed in § 3.2.1 are summarized in Table 10:

² The following identified Transposing Organizations have provided their transposed sets of standards information contained in this section:

- Telecommunications Standards Development Society, India (TSDSI).

TABLE 10
TSDSI specifications in § 3.2.1 that are to be transposed

See Note a) and Note b) below the Table				
Part A ³ : List of specifications				
TSDSI Specifications list				
T3.9036.101	T3.9036.323	T3.9036.457	T3.9038.101-1	T3.9038.401
T3.9036.104	T3.9036.331	T3.9036.458	T3.9038.101-2	T3.9038.410
T3.9036.106	T3.9036.355	T3.9036.459	T3.9038.101-3	T3.9038.411
T3.9036.111	T3.9036.360	T3.9036.461	T3.9038.104	T3.9038.412
T3.9036.113	T3.9036.361	T3.9036.462	T3.9038.113	T3.9038.413
T3.9036.116		T3.9036.463	T3.9038.124	T3.9038.414
T3.9036.124	T3.9036.401	T3.9036.464	T3.9038.133	T3.9038.415
T3.9036.133	T3.9036.410	T3.9036.465		T3.9038.420
	T3.9036.411		T3.9038.201	T3.9038.421
T3.9036.201	T3.9036.412	T3.9037.104	T3.9038.202	T3.9038.422
T3.9036.211	T3.9036.413	T3.9037.105	T3.9038.211	T3.9038.423
T3.9036.212	T3.9036.414	T3.9037.113	T3.9038.212	T3.9038.424
T3.9036.213	T3.9036.420	T3.9037.114	T3.9038.213	T3.9038.425
T3.9036.214	T3.9036.421	T3.9037.320	T3.9038.214	T3.9038.455
T3.9036.216	T3.9036.422	T3.9037.324	T3.9038.215	T3.9038.460
	T3.9036.423	T3.9037.340		T3.9038.461
T3.9036.300	T3.9036.424	T3.9037.355	T3.9038.300	T3.9038.462
T3.9036.302	T3.9036.425	T3.9037.460	T3.9038.304	T3.9038.463
T3.9036.304	T3.9036.440	T3.9037.461	T3.9038.305	T3.9038.470
T3.9036.305	T3.9036.441	T3.9037.462	T3.9038.306	T3.9038.471
T3.9036.306	T3.9036.442	T3.9037.466	T3.9038.307	T3.9038.472
T3.9036.307	T3.9036.443	T3.9037.470	T3.9038.314	T3.9038.473
T3.9036.314	T3.9036.444	T3.9037.471	T3.9038.321	T3.9038.474
T3.9036.321	T3.9036.445	T3.9037.472	T3.9038.322	
T3.9036.322	T3.9036.455	T3.9037.473	T3.9038.323	
	T3.9036.456		T3.9038.331	
			T3.9038.340	
Part B: Specifications versions to be used				
The specific versions of the TSDSI specifications that are to be used for the transpositions of those specifications listed in Table 10 are provided in the link below: Click here for the direct link to the GCS material				

³ The NB-IoT technology for this GCS is supported using T3.9036.1XX, T3.9036.2XX, T3.9036.3XX, and T3.9036.4XX series specifications.

Specifically, the following is noted for Table 10:

Notes on specification versions to be utilized for the Global Core Specifications (GCS):

Note a) In conjunction with Table 10, the published TSDSI specifications versions as of 3 August 2020, shall be utilized as the basis for the specific GCS version.

Note b) Furthermore, these specific GCS versions in alignment with Note a) above are to be utilized in the transpositions of those specifications listed in Table 10 into the corresponding standards by the designated Transposing Organizations indicated in the Certification B provided by the TSDSI GCS Proponent to ITU-R under the IMT-2020 process. See Table 10, Part B.

3.2.1 Titles and synopses of the global core specification and the transposed standards

3.2.1.1 Introduction

The standards documents referenced below, as transposed from the relevant TSDSI specifications, are provided by the identified Transposing Organizations as the transposed sets of standards for the terrestrial radio interface of IMT-2020 identified as **5Gi** and includes not only the key characteristics of IMT-2020 but also the additional capabilities of 5Gi both of which are continuing to be enhanced.

3.2.1.2 Radio Layer 1

3.2.1.2.1 T3.9036.201

Evolved Universal Terrestrial Radio Access (E-UTRA); LTE physical layer; General description

This document provides a general description of the physical layer of the E-UTRA radio interface.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.201-15.2.0 V1.0.1	V1.0.1	Published	01.10.2020	https://members.tdsi.in/index.php/s/gKBAGbGqDS8Amrc

3.2.1.2.2 T3.9036.211

Evolved Universal Terrestrial Radio Access (E-UTRA); Physical channels and modulation

This document describes the physical channels and modulation for E-UTRA.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.211-15.6.0 V1.0.1	V1.0.1	Published	01.10.2020	https://members.tdsi.in/index.php/s/KSRsRtKxJgAixpf

3.2.1.2.3 T3.9036.212

Evolved Universal Terrestrial Radio Access (E-UTRA); Multiplexing and channel coding

This document specifies the coding, multiplexing and mapping to physical channels for E-UTRA.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.212-15.6.0 V1.0.1	V1.0.1	Published	01.10.2020	https://members.tdsi.in/index.php/s/6XTfGA5Gn2MxEkq

3.2.1.2.4 T3.9036.213

Evolved Universal Terrestrial Radio Access (E-UTRA); Physical layer procedures

This document specifies and establishes the characteristics of the physical layer procedures for E-UTRA.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.213-15.6.0 V1.0.1	V1.0.1	Published	01.10.2020	https://members.tdsi.in/index.php/s/Zr8T2YebTaSEjc8

3.2.1.2.5 T3.9036.214**Evolved Universal Terrestrial Radio Access (E-UTRA); Physical layer; Measurements**

This document contains the description and definition of the measurements done at the UE and network in order to support operation in idle mode and connected mode in E-UTRA.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.214-15.3.0 V1.0.1	V1.0.1	Published	01.10.2020	https://members.tdsi.in/index.php/s/cAF7AeeXoy47DNm

3.2.1.2.6 T3.9036.216**Evolved Universal Terrestrial Radio Access (E-UTRA); Physical layer for relaying operation**

This document describes the characteristics of eNodeB – relay node transmissions.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.216-15.0.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/qm2gA5NWyCKKxMK

3.2.1.2.7 T3.9038.201

NR; Physical layer; General description

This document provides a general description of the physical layer of the radio interface. This document also describes the document structure of the physical layer specifications, i.e. T3.9038.200 series.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.201-15.0.0 V1.0.1	V1.0.1	Published	01.10.2020	https://members.tdsi.in/index.php/s/MPp4LiaJg8RYQX8

3.2.1.2.8 T3.9038.202**NR; Services provided by the physical layer**

This document is a technical specification of the services provided by the physical layer of radio interface to upper layers.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.202-15.4.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/A4expLrZW3kMWp5

3.2.1.2.9 T3.9038.211**NR; Physical channels and modulation**

This document describes the physical channels and signals for the radio interface.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.211-15.5.0 V1.0.1	V1.0.1	Published	01.10.2020	https://members.tdsi.in/index.php/s/dt7kfjBZ7x6jxa2

3.2.1.2.10 T3.9038.212**NR; Multiplexing and channel coding**

This document specifies the coding, multiplexing and mapping to physical channels for the radio interface.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.212-15.5.0 V1.0.1	V1.0.1	Published	01.10.2020	https://members.tdsi.in/index.php/s/BPoNcifiSn57Ysw

3.2.1.2.11 T3.9038.213**NR; Physical layer procedures for control**

This document specifies and establishes the characteristics of the physical layer procedures for control operations in the radio interface technology.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.213-15.5.0 V1.0.1	V1.0.1	Published	01.10.2020	https://members.tdsi.in/index.php/s/E9nnLdTkJ4pCEXS

3.2.1.2.12 T3.9038.214**NR; Physical layer procedures for data**

This document specifies and establishes the characteristics of the physical layer procedures of data channels for radio interface.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.214-15.5.0 V1.0.1	V1.0.1	Published	01.10.2020	https://members.tdsi.in/index.php/s/tB9WYoMjmsC8RES

3.2.1.2.13 T3.9038.215**NR; Physical layer measurements**

This document describes the physical layer measurements for radio interface.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.215-15.4.0 V1.0.1	V1.0.1	Published	01.10.2020	https://members.tdsi.in/index.php/s/pQb7JJtEmsZFSfR

3.2.1.3 Radio Layers 2 & 3

3.2.1.3.1 T3.9036.300

Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2

This document provides an overview and overall description of the E-UTRAN radio interface protocol architecture. Details of the radio interface protocols are specified in companion specifications of the 36 series.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.300-15.6.0	V1.0.1	Published	01.10.2020	https://members.tsdSI.in/index.php/s/FY5DJwbSmWyFB8F

3.2.1.3.2 T3.9036.302

Evolved Universal Terrestrial Radio Access (E-UTRA); Services provided by the physical layer

This document is a technical specification of the services provided by the physical layer of E-UTRA to upper layers.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.302-15.2.0	V1.0.0	Published	01.10.2020	https://members.tsdSI.in/index.php/s/TZCrBtaPRE8xixA

3.2.1.3.3 T3.9036.304

Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) procedures in idle mode

This document specifies the Access Stratum (AS) part of the Idle Mode procedures applicable to a UE. This document specifies the model for the functional division between the NAS and AS in a UE. This document applies to all UEs that support at least E-UTRA, including multi-RAT UEs as described in the specifications, in the following cases: (i) When the UE is camped on an E-UTRA cell; (ii) When the UE is searching for a cell to camp on.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.304-15.4.0	V1.0.1	Published	01.10.2020	https://members.tsdSI.in/index.php/s/J469b4s9Bak58M

3.2.1.3.4 T3.9036.305

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Stage 2 functional specification of User Equipment (UE) positioning in E-UTRAN

This document specifies the stage 2 of the UE positioning function of E-UTRAN, which provides the mechanisms to support or assist the calculation of the geographical position of a UE. The purpose of this stage 2 specification is to define the E-UTRAN UE Positioning architecture, functional entities and operations to support positioning methods. This description is confined to the E-UTRAN Access Stratum. This stage 2 specification covers the E-UTRAN positioning methods, state descriptions, and message flows to support UE positioning.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.305-15.4.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/nMaJt9ZeNNy8ZjQ

3.2.1.3.5 T3.9036.306

Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio access capabilities

This document defines the E-UTRA UE Radio Access Capability Parameters.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.306-15.5.0 V1.0.1	V1.0.1	Published	01.10.2020	https://members.tdsi.in/index.php/s/FPj2WiM4Be5XBCE

3.2.1.3.6 T3.9036.307

Evolved Universal Terrestrial Radio Access (E-UTRA); Requirements on User Equipments (UEs) supporting a release-independent frequency band

This document specifies requirements on UEs supporting a frequency band that is independent of release. In order to implement a UE that conforms to a particular release but supports a band of operation that is specified in a later release, it is necessary to specify some extra requirements. All frequency bands are fully specified in this release of the specifications. This document does not contain any requirements for UEs supporting frequency bands independent of release.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.307-15.5.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/xd5z59aHSD98c8K

3.2.1.3.7 T3.9036.314

Evolved Universal Terrestrial Radio Access (E-UTRA); Layer 2 – Measurements

This document contains the description and definition of the measurements performed by E-UTRAN that are transferred over the standardized interfaces in order to support E-UTRA radio link operations, radio resource management (RRM), network operations and maintenance (OAM), and self-organizing networks (SON).

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.314-15.2.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/PMEzjpWmFngSmNJ

3.2.1.3.8 T3.9036.321

Evolved Universal Terrestrial Radio Access (E-UTRA); Medium Access Control (MAC) protocol specification

This document specifies the E-UTRA Medium Access Control (MAC) protocol.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.321-15.6.0 V1.0.1	V1.0.1	Published	01.10.2020	https://members.tdsi.in/index.php/s/2f7z6PDG4KosmnC

3.2.1.3.9 T3.9036.322**Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Link Control (RLC) protocol specification**

This document specifies the E-UTRA Radio Link Control (RLC) protocol.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.322-15.2.0 V1.0.1	V1.0.1	Published	01.10.2020	https://members.tdsi.in/index.php/s/96HWsLnDibom45f

3.2.1.3.10 T3.9036.323**Evolved Universal Terrestrial Radio Access (E-UTRA); Packet Data Convergence Protocol (PDCP) specification**

This document specifies the E-UTRA Packet Data Convergence Protocol (PDCP).

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.323-15.4.0 V1.0.1	V1.0.1	Published	01.10.2020	https://members.tdsi.in/index.php/s/Mnq3qsqOrPS7kqd

3.2.1.3.11 T3.9036.331**Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification**

This document specifies the Radio Resource Control protocol for the radio interface between UE and E-UTRAN as well as for the radio interface between RN and E-UTRAN. The scope of this document also includes: (i) the radio related information transported in a transparent container between source eNodeB and target eNodeB upon inter eNodeB handover; (ii) the radio related information transported in a transparent container between a source or target eNodeB and another system upon inter RAT handover.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.331-15.6.0 V1.0.1	V1.0.1	Published	01.10.2020	https://members.tdsi.in/index.php/s/5EnKrHJ4f8McDpM

3.2.1.3.12 T3.9036.355**Evolved Universal Terrestrial Radio Access (E-UTRA); LTE Positioning Protocol (LPP)**

This document contains the definition of the LTE Positioning Protocol (LPP).

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.355-15.4.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/ziCMTR6M7WxcqR7

3.2.1.3.13 T3.9036.360**Evolved Universal Terrestrial Radio Access (E-UTRA); LTE-WLAN Aggregation Adaptation Protocol (LWAAP) specification**

This document specifies the E-UTRA LTE-WLAN Aggregation Adaptation Protocol (LWAAP).

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.360-15.0.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/z5eXkrQaSWYKQHF

3.2.1.3.14 T3.9036.361**Evolved Universal Terrestrial Radio Access (E-UTRA); LTE/WLAN Radio Level Integration Using IPsec Tunnel (LWIP) encapsulation; Protocol specification**

This document specifies the LWIP Encapsulation Protocol.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.361-15.0.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/qXBnDp4rFqw9cmy

3.2.1.3.15 T3.9037.320**Universal Terrestrial Radio Access (UTRA) and Evolved Universal Terrestrial Radio Access (E-UTRA); Radio measurement collection for Minimization of Drive Tests (MDT); Overall description; Stage 2**

This document provides an overview and overall description of the minimization of drive tests functionality. The document describes functions and procedures to support collection of UE-specific measurements for MDT using Control Plane architecture, for both UTRAN and E-UTRAN. Details of the signalling procedures for single-RAT operation are specified in the appropriate radio interface protocol specification. Network operation and overall control of MDT is described in OAM specifications.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9037.320-15.0.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/H4Tgk23SCabNWwS

3.2.1.3.16 T3.9037.324**Evolved Universal Terrestrial Radio Access (E-UTRA) and NR; Service Data Adaptation Protocol (SDAP) specification**

This document specifies the Service Data Adaptation Protocol (SDAP) for a UE with connection to the core network.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9037.324-15.1.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/o3zHFn32262BY7d

3.2.1.3.17 T3.9037.340**NR; Multi-connectivity; Overall description; Stage-2**

This document provides an overview of the multi-connectivity operation. Details of the network and radio interface protocols are specified in companion specifications of the 36 and 38 series.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9037.340-15.5.0 V1.0.1	V1.0.1	Published	01.10.2020	https://members.tdsi.in/index.php/s/ftmsjgxFdC2Z22

3.2.1.3.18 T3.9037.355**LTE Positioning Protocol (LPP)**

This document contains the definition of the LTE Positioning Protocol (LPP) for the radio access technologies.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9037.355-15.0.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/a5X2kj4QRDfwpRD

3.2.1.3.19 T3.9038.300**NR; NR and NG-RAN Overall description; Stage-2**

This document provides an overview and overall description of the RAN. Details of the radio interface protocols are specified in companion specifications of the 38 series.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.300-15.5.0 V1.0.1	V1.0.1	Published	01.10.2020	https://members.tdsi.in/index.php/s/RtRg3TYe36o7pjN

3.2.1.3.20 T3.9038.304**NR; User Equipment (UE) procedures in idle mode and in RRC Inactive state**

This document specifies the Access Stratum (AS) part of the UE procedures in RRC_IDLE state (also called Idle mode) and RRC_INACTIVE state.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.304-15.3.0 V1.0.1	V1.0.1	Published	01.10.2020	https://members.tdsi.in/index.php/s/kGF2c4baMpxNZrk

3.2.1.3.21 T3.9038.305**NG Radio Access Network (NG-RAN); Stage 2 functional specification of User Equipment (UE) positioning in NG-RAN**

This document specifies the stage 2 of the UE Positioning function of the RAN which provides the mechanisms to support or assist the calculation of the geographical position of a UE.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.305-15.3.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/Gb2EQaCArcngocw

3.2.1.3.22 T3.9038.306**NR; User Equipment (UE) radio access capabilities**

This document defines the UE Radio Access Capability Parameters.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.306-15.5.0 V1.0.1	V1.0.1	Published	01.10.2020	https://members.tdsi.in/index.php/s/RyzbXAoQSGa2qHK

3.2.1.3.23 T3.9038.307**NR; Requirements on User Equipments (UEs) supporting a release-independent frequency band**

This document specifies requirements for UEs supporting release independent features such as additional radio operating bands and power classes.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.307-15.2.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/xYCAcALRbwCqbB9

3.2.1.3.24 T3.9038.314**NR; Layer 2 measurements**

This document contains the description and definition of the measurements performed by the radio or the UE that are transferred over the standardised interfaces in order to support radio link operations, radio resource management (RRM), network operations and maintenance (OAM), minimization of drive tests (MDT) and self-organising networks (SON).

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.314-16.0.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/bzKyHfzYt6e3Cow

3.2.1.3.25 T3.9038.321**NR; Medium Access Control (MAC) protocol specification**

This document specifies the MAC protocol.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.321-15.5.0 V1.0.1	V1.0.1	Published	01.10.2020	https://members.tsdSI.in/index.php/s/npFE8EjjxT2Wrc8

3.2.1.3.26 T3.9038.322**NR; Radio Link Control (RLC) protocol specification**

This document specifies the Radio Link Control (RLC) protocol.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.322-15.5.0 V1.0.1	V1.0.1	Published	01.10.2020	https://members.tsdSI.in/index.php/s/2idWFeG3WFFXWSk

3.2.1.3.27 T3.9038.323**NR; Packet Data Convergence Protocol (PDCP) specification**

This document provides the description of the Packet Data Convergence Protocol (PDCP).

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.323-15.5.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tsdSI.in/index.php/s/GJRCSgaDB9iBMH

3.2.1.3.28 T3.9038.331**NR; Radio Resource Control (RRC); Protocol specification**

This document specifies the Radio Resource Control protocol for the radio interface between the UE and the RAN.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.331-15.5.1 V1.0.1	V1.0.1	Published	01.10.2020	https://members.tsdSI.in/index.php/s/tTDDnpxdgNsycA7

3.2.1.3.29 T3.9038.340**NR; Backhaul Adaptation Protocol (BAP) specification**

This document provides description of the Backhaul Adaptation Protocol (BAP).

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.340-16.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/WGsTFmziY7ZyFpK

3.2.1.4 Architecture

3.2.1.4.1 T3.9036.401

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Architecture description

This document describes the overall architecture of the E-UTRAN, including internal interfaces and assumptions on the radio, S1 and X2 interfaces.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.401-15.1.0	V1.0.1	Published	01.10.2020	https://members.tdsi.in/index.php/s/yZTmXqQqMBQD74o

3.2.1.4.2 T3.9036.410

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 general aspects and principles

This document is an introduction to the TSDSI T3.9036.41x series of technical specifications that define the S1 interface for the interconnection of the eNodeB component of the Evolved Universal Terrestrial Radio Access Network (E-UTRAN) to the Core Network of the EPS system.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.410-15.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/e2xMdKCzgFd3kJ6

3.2.1.4.3 T3.9036.411

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 layer 1

This document specifies the standards allowed to implement layer 1 on the S1 interface. The specification of transmission delay requirements and O&M requirements are not in the scope of this document. In the following, “layer 1” and “physical layer” are assumed to be synonymous.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.411-15.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/KBCfaLAZi8LnJSb

3.2.1.4.4 T3.9036.412

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 signalling transport

This document specifies the standards for signalling transport to be used across S1 interface. S1 interface is a logical interface between the eNodeB and the E-UTRAN core network. This document describes how the S1-AP signalling messages are transported over S1.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.412-15.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/Cb8ZGFxY6aaFZtk

3.2.1.4.5 T3.9036.413

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 Application Protocol (S1AP)

This document specifies the E-UTRAN radio network layer signalling protocol for the S1 interface. The S1 Application Protocol (S1AP) supports the functions of S1 interface by signalling procedures defined in this document.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.413-15.6.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/wAG7Xe88dZHTzGW

3.2.1.4.6 T3.9036.414

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 data transport

This document specifies the standards for user data transport protocols and related signalling protocols to establish user plane transport bearers over the S1 interface.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.414-15.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/M7pKGDWTLGsZiR9

3.2.1.4.7 T3.9036.420

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); X2 general aspects and principles

This document is an introduction to the T3.9036.42x series of UMTS technical specifications that define the X2 interface. It is an interface for the interconnection of two E-UTRAN NodeB (eNodeB) components within the Evolved Universal Terrestrial Radio Access Network (EUTRAN) architecture.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.420-15.1.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/4M6NfGAzykKKC3k

3.2.1.4.8 T3.9036.421

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); X2 layer 1

This document specifies the standards allowed to implement Layer 1 on the X2 interface. The specification of transmission delay requirements and O & M requirements are not in the scope of this document. In the following “Layer 1” and “Physical Layer” are assumed to be synonymous.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.421-15.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/5nLXnbC67QJNHQ8

3.2.1.4.9 T3.9036.422**Evolved Universal Terrestrial Radio Access Network (E-UTRAN); X2 signalling transport**

This document specifies the standards for Signalling Transport to be used across X2 interface. X2 interface is a logical interface between eNodeBs. This document describes how the X2-AP signalling messages are transported over X2.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.422-15.1.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tsdSI.in/index.php/s/3Bi4fQ246AdsNXj

3.2.1.4.10 T3.9036.423**Evolved Universal Terrestrial Radio Access Network (E-UTRAN); X2 Application Protocol (X2AP)**

This document specifies the radio network layer signalling procedures of the control plane between eNodeBs in E-UTRAN. X2AP supports the functions of X2 interface by signalling procedures defined in this document.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.423-15.6.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tsdSI.in/index.php/s/bZk4CQ58jRdHewe

3.2.1.4.11 T3.9036.424**Evolved Universal Terrestrial Radio Access Network (E-UTRAN); X2 data transport**

This document specifies the standards for user data transport protocols and related signalling protocols to establish user plane transport bearers over the X2 interface.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.424-15.0.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tsdSI.in/index.php/s/aFdbgW4BPY4Cet

3.2.1.4.12 T3.9036.425**Evolved Universal Terrestrial Radio Access Network (E-UTRAN); X2 interface user plane protocol**

This document specifies the X2 user plane protocol being used over the X2 interface.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.425-15.0.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tsdSI.in/index.php/s/ws5Ja7oTGXgbYNj

3.2.1.4.13 T3.9036.440**Evolved Universal Terrestrial Radio Access Network (E-UTRAN); General aspects and principles for interfaces supporting Multimedia Broadcast Multicast Service (MBMS) within E-UTRAN**

This document describes the overall architecture of the interface for the provision of MBMS in the E-UTRAN. This also includes a description of the general aspects, assumptions and principles guiding the architecture and interface.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.440-15.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/3nMsTgP4f4pqfsf

3.2.1.4.14 T3.9036.441**Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Layer 1 for interfaces supporting Multimedia Broadcast Multicast Service (MBMS) within E-UTRAN**

This document specifies the standards allowed to implement layer 1 on the interfaces supporting Multimedia Broadcast Multicast Service (MBMS) within E-UTRAN. In the following, “layer 1” and “physical layer” are assumed to be synonymous.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.441-15.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/PAbHSPj3qYfpgAJ

3.2.1.4.15 T3.9036.442**Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Signalling Transport for interfaces supporting Multimedia Broadcast Multicast Service (MBMS) within E-UTRAN**

This document specifies the standards for signalling transport to be used across M2 and M3 interfaces. M2 interface is a logical interface between the eNodeB and the MCE. M3 interface is a logical interface between the MCE and the MME. This document describes how the M2-AP signalling messages are transported over M2, and how the M3-AP signalling messages are transported over M3.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.442-15.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/3gZ4pfYxkFfysrF

3.2.1.4.16 T3.9036.443**Evolved Universal Terrestrial Radio Access Network (E-UTRAN); M2 Application Protocol (M2AP)**

This document specifies the E-UTRAN radio network layer signalling protocol for the M2 interface. The M2 Application Protocol (M2AP) supports the functions of M2 interface by signalling procedures defined in this document.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.443-15.0.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/xCyfH8KgcPnpA66

3.2.1.4.17 T3.9036.444**Evolved Universal Terrestrial Radio Access Network (E-UTRAN); M3 Application Protocol (M3AP)**

This document specifies the E-UTRAN radio network layer signalling protocol for the M3 interface. The M3 Application Protocol (M3AP) supports the functions of M3 interface by signalling procedures defined in this document.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.444-15.0.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/4gwZQ3NEj5bxqrt

3.2.1.4.18 T3.9036.445**Evolved Universal Terrestrial Radio Access Network (E-UTRAN); M1 data transport**

This document specifies the standards for user data transport protocols over the E-UTRAN M1 interface.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.445-15.0.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/J7tQw4zMq5tJDLA

3.2.1.4.19 T3.9036.455**Evolved Universal Terrestrial Radio Access (E-UTRA); LTE Positioning Protocol A (LPPa)**

This document specifies the control plane radio network layer signalling procedures between eNodeB and E-SMLC. LPPa supports the concerned functions by signalling procedures defined in this document.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.455-15.2.1 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/44qtwBrbWTWNmg

3.2.1.4.20 T3.9036.456**Universal Terrestrial Radio Access (UTRA) and Evolved Universal Terrestrial Radio Access (E-UTRA); SLm interface general aspects and principles**

This document is an introduction to the technical specifications that define the SLm interface for the interconnection of the Evolved Serving Mobile Location Centre (E-SMLC) to the Location Measurement Unit (LMU) components of the Evolved Universal Terrestrial Radio Access Network (E-UTRAN).

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.456-15.0.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/SsWwPrEZmGTMe2Y

3.2.1.4.21 T3.9036.457**Universal Terrestrial Radio Access (UTRA) and Evolved Universal Terrestrial Radio Access (E-UTRA); SLm interface layer 1**

This document specifies the standards allowed to implement layer 1 on the SLm interface.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.457-15.0.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/cgwBY8M8pbaXX6e

3.2.1.4.22 T3.9036.458**Universal Terrestrial Radio Access (UTRA) and Evolved Universal Terrestrial Radio Access (E-UTRA); SLm interface signalling transport**

This document specifies the standards for signalling transport to be used across the SLm interface. The SLm interface is a logical interface between the LMU and the E-SMLC in the E-UTRAN core network. This document describes how the SLmAP signalling messages are transported over SLm.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.458-15.0.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/w64bBQzdF6En9H4

3.2.1.4.23 T3.9036.459**Universal Terrestrial Radio Access (UTRA) and Evolved Universal Terrestrial Radio Access (E-UTRA); SLm interface Application Protocol (SLmAP)**

This document specifies the E-UTRAN radio network layer signalling protocol for the SLm interface. The SLm Application Protocol (SLmAP) supports the functions of the SLm interface by signalling procedures defined in this document.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.459-15.0.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/F6xzLD28q2TRerG

3.2.1.4.24 T3.9036.461**Evolved Universal Terrestrial Radio Access Network (E-UTRAN) and Wireless LAN (WLAN); Xw layer 1**

This document specifies the standards allowed to implement Layer 1 on the Xw interface. The specification of transmission delay requirements and O&M requirements are not in the scope of this document.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.461-15.0.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/irx3Yz5kBMxbL6p

3.2.1.4.25 T3.9036.462**Evolved Universal Terrestrial Radio Access Network (E-UTRAN) and Wireless LAN (WLAN); Xw signalling transport**

This document specifies the standards for Signalling Transport to be used across the Xw interface. The Xw interface is a logical interface between the eNB and the WLAN Termination (WT). This document describes how the Xw-AP signalling messages are transported over Xw.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.462-15.0.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/9k59Fo34CqtHALm

3.2.1.4.26 T3.9036.463**Evolved Universal Terrestrial Radio Access Network (E-UTRAN) and Wireless Local Area Network (WLAN); Xw application protocol (XwAP)**

This document specifies the signalling procedures of the control plane between an eNB and WLAN Termination (WT). The Xw Application Protocol (XwAP) supports the functions of Xw interface by signalling procedures defined in this document.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.463-15.0.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/DzQATYF6nLqkmeK

3.2.1.4.27 T3.9036.464**Evolved Universal Terrestrial Radio Access Network (E-UTRAN) and Wireless Local Area Network (WLAN); Xw data transport**

This document specifies the standards for user data transport protocols and related signalling protocols to establish user plane transport bearers over the Xw interface for LTE/WLAN Aggregation (LWA).

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.464-15.0.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/kjKnDSAcDdFWsDN

3.2.1.4.28 T3.9036.465**Evolved Universal Terrestrial Radio Access Network (E-UTRAN) and Wireless Local Area Network (WLAN); Xw interface user plane protocol**

This document specifies the Xw user plane protocol being used over the Xw interface for LTE/WLAN Aggregation (LWA).

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.465-15.0.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/ErKQaYorG5FaRHF

3.2.1.4.29 T3.9037.460**Iuant interface: General aspects and principles**

This document is an introduction to the Technical Specifications that define the Iuant Interface.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9037.460-15.1.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/F3GzKM4r3iCLRxD

3.2.1.4.30 T3.9037.461**Iuant interface: Layer 1**

This document specifies the standards allowed to implement layer 1 on the Iuant interface. The specification of transmission delay requirements and O&M requirements are not in the scope of this document.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9037.461-15.4.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/bBT3npZLrdmikT8

3.2.1.4.31 T3.9037.462**Iuant interface: Signalling transport**

This document specifies the signalling transport related to RETAP and TMAAP signalling to be used across the Iuant interface.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9037.462-15.1.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/2WbEGtKaXWLxFOa

3.2.1.4.32 T3.9037.466**Iuant interface: Application part**

This document is an introduction to the Technical Specifications that define the Iuant Interface applications.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9037.466-15.4.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/kNdSZJdkpLX8pgd

3.2.1.4.33 T3.9037.470**W1 interface; General aspects and principles**

This document is an introduction to the technical specifications that define the W1 interface.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9037.470-16.0.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/jNqb9jQz3jAka7p

3.2.1.4.34 T3.9037.471**W1 interface; Layer 1**

This document specifies the standards allowed to implement Layer 1 on the W1 interface.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9037.471-16.0.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/TWMeNnxyWHs73SC

3.2.1.4.35 T3.9037.472**W1 interface; Signalling transport**

This document specifies the standards for Signalling Transport to be used across the W1 interface.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9037.472-16.0.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/t3aqrwRoSYcc6YH

3.2.1.4.36 T3.9037.473**W1 interface; Application Protocol (W1AP)**

This document specifies the radio network layer signalling protocol for the W1 interface.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9037.473-16.0.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/Hm4xFD7BzjbNfQb

3.2.1.4.37 T3.9038.401**NG-RAN; Architecture description**

This document describes the overall architecture of the NG-RAN, including interfaces NG, Xn and F1 interfaces and their interaction with the radio interface.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.401-15.5.0 V1.0.1	V1.0.1	Published	01.10.2020	https://members.tdsi.in/index.php/s/JQwsbgercBXNCWk

3.2.1.4.38 T3.9038.410**NG-RAN; NG general aspects and principles**

This document is an introduction to the technical specifications that define the NG interface for the interconnection of an NG-RAN node to the core network.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.410-15.2.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/zaYSKaL25gotbdq

3.2.1.4.39 T3.9038.411**NG-RAN; NG layer 1**

This document specifies the standards allowed to implement layer 1 on the NG interface.

The specification of transmission delay requirements and O&M requirements are not in the scope of this document.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.411-15.0.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/nYsQcp3HiDfNdia

3.2.1.4.40 T3.9038.412**NG-RAN; NG signalling transport**

This document specifies the standards for signalling transport to be used across NG interface. NG interface is a logical interface between the NG-RAN and the core network. This document describes how the NGAP signalling messages are transported over NG.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.412-15.1.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/DxPYPJSGkFybaNY

3.2.1.4.41 T3.9038.413**NG-RAN; NG Application Protocol (NGAP)**

This document specifies the radio network layer signalling protocol for the NG interface. The NG Application Protocol (NGAP) supports the functions of the NG interface by signalling procedures defined in this document. NGAP is developed in accordance to the general principles stated in T3.9038.401 and T3.9038.410.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.413-15.3.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/JHNTRNW9HNrEiEP

3.2.1.4.42 T3.9038.414**NG-RAN; NG data transport**

This document specifies the standards for user data transport protocols and related signalling protocols to establish user plane transport bearers over the NG interface.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.414-15.1.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/tYyGwtdqipYjfzs

3.2.1.4.43 T3.9038.415**NG-RAN; PDU session user plane protocol**

This document specifies the PDU Session user plane protocol being used over the NG-U, Xn-U and N9 interfaces. Applicability to other interfaces is not precluded.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.415-15.2.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/TSG2tD56c4Z88wX

3.2.1.4.44 T3.9038.420**NG-RAN; Xn general aspects and principles**

This document is an introduction to the Technical Specifications that define the Xn interface. It is an interface for the interconnection of two NG-RAN nodes within the NG-RAN architecture (T3.9038.401).

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.420-15.2.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/TbNqGWeyirc5dfs

3.2.1.4.45 T3.9038.421**NG-RAN; Xn layer 1**

This document specifies the standards allowed to implement layer 1 on the Xn interface.

The specification of transmission delay requirements and O&M requirements are not in the scope of this document.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.421-15.0.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/qYz4H4ZyHCGTXoM

3.2.1.4.46 T3.9038.422**NG-RAN; Xn signalling transport**

This document specifies the standards for signalling transport to be used across Xn interface. The Xn interface provides means for interconnecting two NG-RAN nodes. The Xn interface is a logical interface between two nodes of the NG-RAN. This document describes how the XnAP signalling messages are transported over Xn.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.422-15.2.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/tqxkYL6zxyFAAWC

3.2.1.4.47 T3.9038.423**NG-RAN; Xn Application Protocol (XnAP)**

This document specifies the radio network layer signalling procedures of the control plane between NG-RAN nodes in NG-RAN. XnAP supports the functions of the Xn interface by signalling procedures defined in this document. XnAP is developed in accordance to the general principles stated in T3.9038.401 and T3.9038.420.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.423-15.3.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/WxZYXtb5cyingGr

3.2.1.4.48 T3.9038.424**NG-RAN; Xn data transport**

This document specifies the standards for user data transport protocols and related signalling protocols to establish user plane transport bearers over the Xn interface.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.424-15.1.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/cFfPDfsY55GX5ic

3.2.1.4.49 T3.9038.425**NG-RAN; NR user plane protocol**

This document specifies the user plane protocol functions used within NG-RAN and, for EN-DC, within E-UTRAN. User plane protocol functions may reside in nodes terminating either the X2-U (for EN-DC) or the Xn-U or the F1-U interface.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.425-15.5.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/fNR3MexmS7jb4mG

3.2.1.4.50 T3.9038.455**NG-RAN; NR Positioning Protocol A (NRPPa)**

This document specifies the control plane radio network layer signalling procedures between a NG-RAN node and the LMF. NRPPa supports the concerned functions by signalling procedures defined in this document.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.455-15.2.1	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/aCZbitPZfXnms3F

3.2.1.4.51 T3.9038.460**NG-RAN; E1 general aspects and principles**

This document is an introduction to the technical specifications that define the E1 interface. The E1 interface provides means for interconnecting a gNB-CU-CP and a gNB-CU-UP of a gNB-CU within an NG-RAN, or for interconnecting a gNB-CU-CP and a gNB-CU-UP of an en-gNB within an E-UTRAN.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.460-15.3.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/kFwosYKZpCDpFs5

3.2.1.4.52 T3.9038.461**NG-RAN; E1 layer 1**

This document specifies the standards allowed to implement layer 1 on the E1 interface.

The specification of transmission delay requirements and O&M requirements are not in the scope of this document.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.461-15.0.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/QQtjxbbaipZzXsR

3.2.1.4.53 T3.9038.462**NG-RAN; E1 signalling transport**

This document specifies the standards for Signalling Transport to be used across the E1 interface.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.462-15.3.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/984NWGDpjfmsdR3

3.2.1.4.54 T3.9038.463**NG-RAN; E1 Application Protocol (E1AP)**

This document specifies the radio network layer signalling protocol for the E1 interface.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.463-15.3.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/DfctiCRgggB89rG

3.2.1.4.55 T3.9038.470**NG-RAN; F1 general aspects and principles**

This document is an introduction to the technical specifications that define the F1 interface.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.470-15.5.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/4KrPwiMA3Abs9RA

3.2.1.4.56 T3.9038.471**NG-RAN; F1 layer 1**

This document specifies the standards allowed to implement Layer 1 on the F1 interface.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.471-15.0.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/rttDSB5ywD7SKay

3.2.1.4.57 T3.9038.472**NG-RAN; F1 signalling transport**

This document specifies the standards for Signalling Transport to be used across the F1 interface.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.472-15.3.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/WLNfJEGBs2KasJ

3.2.1.4.58 T3.9038.473**NG-RAN; F1 Application Protocol (F1AP)**

This document specifies the radio network layer signalling protocol for the F1 interface.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.473-15.5.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/6FtEN9cfcP2jAWP

3.2.1.4.59 T3.9038.474**NG-RAN; F1 data transport**

This document specifies the standards for user data transport protocols and related signalling protocols to establish user plane transport bearers over the F1 interface.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.474-15.2.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/mJycF66RJdJpAag

3.2.1.5 Radio-frequency aspects**3.2.1.5.1 T3.9036.101****Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio transmission and reception**

This document establishes the minimum RF characteristics and minimum performance requirements for E-UTRA User Equipment (UE).

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.101-15.7.0 V1.0.1	V1.0.1	Published	01.10.2020	https://members.tdsi.in/index.php/s/SeeXLcaPriPxXNJ

3.2.1.5.2 T3.9036.104**Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) radio transmission and reception**

This document establishes the minimum RF characteristics and minimum performance requirements of E-UTRA Base Station (BS).

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.104-15.7.0 V1.0.1	V1.0.1	Published	01.10.2020	https://members.tdsi.in/index.php/s/DcemEbQz2qYcw8a

3.2.1.5.3 T3.9036.106**Evolved Universal Terrestrial Radio Access (E-UTRA); FDD repeater radio transmission and reception**

This document establishes the minimum RF characteristics of E-UTRA FDD Repeater.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.106-15.0.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/rYJs8HyfbRHP6Bx

3.2.1.5.4 T3.9036.111**Location Measurement Unit (LMU) performance specification; Network based positioning systems in Evolved Universal Terrestrial Radio Access Network (E-UTRAN)**

This document establishes the Location Measurement Unit (LMU) minimum UTDOA positioning requirement for the FDD and TDD mode of E-UTRAN.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.111-15.0.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/NJcxdxMSPaHXFgN

3.2.1.5.5 T3.9036.113**Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) and repeater ElectroMagnetic Compatibility (EMC)**

This document covers the assessment of E-UTRA base stations, repeaters and associated ancillary equipment in respect of Electromagnetic Compatibility (EMC).

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.113-15.3.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/soQ2A4Hgqf7rz9m

3.2.1.5.6 T3.9036.116**Evolved Universal Terrestrial Radio Access (E-UTRA); Relay radio transmission and reception**

This document establishes the minimum RF characteristics and minimum performance requirements of E-UTRA Relay.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.116-15.0.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/NtgEWRRXnX6iRCe

3.2.1.5.7 T3.9036.124**Evolved Universal Terrestrial Radio Access (E-UTRA); Electromagnetic compatibility (EMC) requirements for mobile terminals and ancillary equipment**

This document establishes the essential EMC requirements for “3rd generation” digital cellular mobile terminal equipment and ancillary accessories in combination with a E-UTRA user equipment (UE). This document specifies the applicable EMC tests, the methods of measurement, the frequency range, the limits and the minimum performance criteria for all types of E-UTRA UEs and their accessories. Requirements for the radiated emission from the enclosure port of integral antenna equipment and ancillaries have been included. The immunity requirements have been selected to ensure an adequate level of compatibility for apparatus in residential, commercial, light industrial and vehicular environments. The levels, however, do not cover extreme cases, which may occur in any location but with low probability of occurrence. Compliance of radio equipment to the requirements of this document does not signify compliance to any requirement related to the use of the equipment (i.e. licensing requirements). Compliance to the requirements of this document does not signify compliance to any safety requirement. However, any temporary or permanent unsafe condition caused by EMC is considered as non-compliance.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.124-15.2.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/97toS29aTrjjddF

3.2.1.5.8 T3.9036.133**Evolved Universal Terrestrial Radio Access (E-UTRA); Requirements for support of radio resource management**

This document specifies requirements for support of Radio Resource Management for the FDD and TDD modes of E-UTRA. These requirements include requirements on measurements in UTRAN and the UE as well as requirements on node dynamical behaviour and interaction, in terms of delay and response characteristics.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9036.133-15.7.0 V1.0.1	V1.0.1	Published	01.10.2020	https://members.tdsi.in/index.php/s/55Ke6D2bnzzdEnF

3.2.1.5.9 T3.9037.104**NR, E-UTRA, UTRA and GSM/EDGE; Multi-Standard Radio (MSR) Base Station (BS) radio transmission and reception**

This document establishes the minimum RF characteristics of E-UTRA, UTRA and GSM/EDGE Multi-Standard Radio (MSR) Base Station (BS). Requirements for multi-RAT and single-RAT operation of MSR BS are covered in this document. The requirements in this document for E-UTRA and UTRA single-RAT operation of MSR BS are also applicable to E-UTRA and UTRA multi-carrier capable single-RAT BS. Requirements for GSM BS that are only single-RAT capable are not covered.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9037.104-15.6.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/ESF9jKwC68eYEEL

3.2.1.5.10 T3.9037.105**Active Antenna System (AAS) Base Station (BS) transmission and reception**

This document establishes the RF characteristics, the RF minimum requirements and minimum performance requirements for E-UTRA AAS Base Station (BS), the FDD mode of UTRA AAS Base Station (BS), the 1,28 Mchip/s TDD mode of UTRA AAS Base Station (BS) in single RAT and any MSR AAS Base Station (BS) implementation of these RATs.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9037.105-15.5.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/gwRgCLxjWmfyMSi

3.2.1.5.11 T3.9037.113**NR, E-UTRA, UTRA and GSM/EDGE; Multi-Standard Radio (MSR) Base Station (BS) Electromagnetic Compatibility (EMC)**

This document covers the assessment of E-UTRA, UTRA and GSM/EDGE Multi-Standard Radio (MSR) Base Stations and associated ancillary equipment in respect of Electromagnetic Compatibility (EMC).

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9037.113-15.5.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/kwNd4QbNYMDKC9r

3.2.1.5.12 T3.9037.114**Active Antenna System (AAS) Base Station (BS) Electromagnetic Compatibility (EMC)**

This document covers the assessment of E-UTRA, UTRA and Multi-Standard Radio (MSR) Active Antenna Systems Base Stations in respect of Electromagnetic Compatibility (EMC).

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9037.114-15.4.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/EGXbF9K3grqKtzK

3.2.1.5.13 T3.9038.101-1**NR; User Equipment (UE) radio transmission and reception; Part 1: Range 1 Standalone**

This document establishes the minimum RF requirements for User Equipment (UE) operating on frequency Range 1.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.101-1-15.5.0	V1.0.1	Published	01.10.2020	https://members.tdsi.in/index.php/s/TCQSJbpzWri4EgG

3.2.1.5.14 T3.9038.101-2**NR; User Equipment (UE) radio transmission and reception; Part 2: Range 2 Standalone**

This document establishes the minimum RF requirements for User Equipment (UE) operating on frequency Range 2.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.101-2-15.5.0	V1.0.1	Published	01.10.2020	https://members.tdsi.in/index.php/s/NEy8HwxaAoRQMzy

3.2.1.5.15 T3.9038.101-3**NR; User Equipment (UE) radio transmission and reception; Part 3: Range 1 and Range 2 Interworking operation with other radios**

This document establishes the minimum RF requirements for User Equipment (UE) Interworking operation with other radios. This includes but is not limited to additional requirements for carrier aggregation or dual connectivity between Range 1 and Range 2 and additional requirements due to non-standalone (NSA) operation mode with E-UTRA.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.101-3-15.5.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tsdSI.in/index.php/s/CwHFSqGZL9eSZfd

3.2.1.5.16 T3.9038.104**NR; Base Station (BS) radio transmission and reception**

This document establishes the minimum RF characteristics and minimum performance requirements of the radio interface and NB-IoT operation in in-band Base Station (BS).

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.104-15.5.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tsdSI.in/index.php/s/Qn3AZZ9XWegA87q

3.2.1.5.17 T3.9038.113**NR; Base Station (BS) ElectroMagnetic Compatibility (EMC)**

This document covers the assessment of Base Station (BS) and ancillary equipment in respect of Electromagnetic Compatibility (EMC).

This document specifies the applicable test conditions, performance assessment and performance criteria for base stations and associated ancillary equipment in the following categories:

- BS equipped with antenna connectors or TAB connectors which are possible to be terminated during EMC testing, meeting the BS type 1-C and BS type 1-H RF requirements of T3.9038.104.
- BS not equipped with antenna connectors nor TAB connectors, i.e. with antenna elements radiating during the EMC testing, meeting the BS type 1-O and BS type 2-O RF requirements of T3.9038.104.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.113-15.5.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tsdSI.in/index.php/s/CaXtozdzkAjeZdc

3.2.1.5.18 T3.9038.124**NR; Electromagnetic compatibility (EMC) requirements for mobile terminals and ancillary equipment**

This document establishes the essential EMC requirements for “3rd generation” digital cellular mobile terminal equipment and ancillary accessories in combination with a user equipment (UE).

The equipment conforming to the requirements laid out in this document and used in its intended electromagnetic environment in accordance with the manufacturer’s instructions:

- shall not generate electromagnetic disturbances at a level which may interfere with the intended operation of other equipment;
- has an adequate level of intrinsic immunity to electromagnetic disturbances to operate as intended.

This document specifies the applicable EMC tests, methods of measurement, frequency ranges, applicable limits and minimum performance criteria for all types of UE(s) and their accessories. Base station equipment operating within network infrastructure is outside the scope of this document. However, this document does cover mobile and portable equipment that is intended to be operated in a fixed location while connected to the AC mains. Base station equipment operating within network infrastructure is covered by the technical specification T3.9038.113.

Requirements for the radiated emission from the enclosure port of integral antenna equipment and ancillaries are included in this document. Technical specifications for conducted emissions from the antenna connector are found in the specifications for the radio interface, e.g. T3.9038.xyz, for the effective use of the radio spectrum.

Requirements for the radiated emissions from the enclosure port and ancillaries cover two cases:

- UE equipment supporting operations in a frequency range for which antenna connectors are available (i.e. for operations in Frequency Range 1 as defined in e.g. T3.9038.101-1 for the radio interface);
- UE equipment supporting operations in a frequency range for which only integral antennas may be available (i.e. for operations in Frequency Range 2 as defined in e.g. T3.9038.101-2 for the radio interface).

The immunity requirements are selected to ensure an adequate level of compatibility for apparatus in residential, commercial, light industrial and vehicular environments. The levels, however, do not cover extreme cases, which may occur in any location but with low probability of occurrence.

Compliance of radio equipment to the requirements of this document does not signify compliance to any requirement related to the use of the equipment (i.e. licensing requirements).

Compliance to the requirements of this document does not signify compliance to any safety requirement. However, any temporary or permanent unsafe condition caused by EMC is considered as non-compliance.

SDO	Document No.	Version	Status	Issued date	Location

Version 1

TSDSI	TSDSI STD T3.9038.124-15.2.0 V1.0.0	V1.0.0	Published	01.10.2020	https://members.tdsi.in/index.php/s/tdkFWfwqHytEBB

3.2.1.5.19 T3.9038.133**NR; Requirements for support of radio resource management**

This document specifies requirements for support of Radio Resource Management for the FDD and TDD modes of the radio interface.

SDO	Document No.	Version	Status	Issued date	Location
Version 1					
TSDSI	TSDSI STD T3.9038.133-15.5.0 V1.0.1	V1.0.1	Published	01.10.2020	https://members.tdsi.in/index.php/s/qjcfpj2DYL3yY3X

Annex 4

**Specification of the DECT 5G – SRIT¹
radio interface technology**

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Background

IMT-2020 is a system with global development activity and the IMT-2020 terrestrial radio interface specifications identified in this Recommendation have been developed by the ITU in collaboration with the **GCS Proponents** and the **Transposing Organizations**. It is noted from Document IMT-2020/20, that:

- The **GCS Proponent** must be one of the **RIT/SRIT Proponents** for the relevant technology, **and** must have legal authority to grant to ITU-R the relevant legal usage rights to the relevant specifications provided within a GCS corresponding to a technology in Recommendation ITU-R M.2150.
- A **Transposing Organization** must have been authorized by the relevant **GCS Proponent** to produce transposed standards for a particular technology **and** must have the relevant legal usage rights.

It is further noted that **GCS Proponents** and **Transposing Organizations** must also qualify appropriately under the auspices of Resolution ITU-R 9 and the ITU-R “Guidelines for the contribution of material of other organizations to the work of the Study Groups and for inviting other organizations to take part in the study of specific matters (Resolution ITU-R 9)”.

The ITU has provided the global and overall framework and requirements and has developed the Global Core Specification jointly with the **GCS Proponent**. The detailed standardization has been undertaken within the recognized **Transposing Organizations** which operate in concert with the **GCS Proponent**. This Recommendation therefore makes extensive use of references to externally developed specifications.

This approach was considered to be the most appropriate solution to enable completion of this Recommendation within the aggressive schedules set by the ITU and by the needs of administrations, operators and manufacturers.

This Recommendation has therefore been constructed to take full advantage of this method of work and to allow the global standardization time-scales to be maintained. The main body of this

¹ Developed by ETSI as DECT-2020 and 3GPP 5G radio interface technology – SRIT.

Recommendation has been developed by the ITU, with each Annex containing references pointing to the location of the more detailed information.

This Annex 4 contains the detailed information developed by the ITU and ETSI (the *GCS Proponent* and *Transposing Organizations*).

Such use of referencing enables timely completion and update of the high-level elements of this Recommendation, with change control procedures, transposition, and public enquiry procedures being undertaken within the external organization. This information has generally been adopted unchanged, recognizing the need to minimize duplication of work, and the need to facilitate and support an ongoing maintenance and update process.

This general agreement, noting that the detailed information of the radio interface should to a large extent be achieved by reference to the work of external organizations, highlights not only the ITU's significant role as a catalyst in stimulating, coordinating and facilitating the development of advanced telecommunications technologies, but also its forward-looking and flexible approach to the development of this and other telecommunications standards for the 21st century.

A more detailed understanding of the process for the development of the first release of this Recommendation may be found in Document IMT-2020/20.

4.1 Overview of the radio interface technology

The IMT-2020 specifications have been developed by ETSI TC DECT and 3GPP and consist of DECT-2020 NR Releases 1 and beyond and 3GPP NR Releases 15 and beyond.

The specification is a set of Radio Interface Technologies (RITs) consisting of DECT-2020 NR as one component RIT and 3GPP NR as the other component RIT. Both components are designed for operation in IMT spectrum.

The SRIT and the component RIT 3GPP NR fulfil all technical performance requirements in all five selected test environments: Indoor Hotspot – enhanced Mobile Broadband (eMBB), Dense Urban – eMBB, Rural – eMBB, Urban Macro – Ultra Reliable Low Latency Communication (URLLC) and Urban Macro – massive Machine Type Communication (mMTC). The component RIT DECT-2020 NR fulfils the technical performance requirements in two selected test environments: Urban Macro – Ultra Reliable Low Latency Communication (URLLC) and Urban Macro – massive Machine Type Communication (mMTC).

Also, the SRIT fulfils the service and the spectrum requirements. Both component RITs, DECT-2020 NR and 3GPP NR, utilize the frequency bands below 6 GHz identified for International Mobile Telecommunication (IMT) in the ITU Radio Regulations. In addition, the 3GPP NR component RIT can also utilize the frequency bands above 6 GHz, i.e. above 24.25 GHz, identified for IMT in the ITU Radio Regulations.

4.1.1 Overview of the component RIT: DECT-2020 NR

4.1.1.1 General

DECT-2020 NR is a Radio Interface Technology (RIT) designed to provide a slim but powerful technology foundation for wireless applications deployed in various use cases and markets.

This radio interface technology supports all kind of applications including, but is not limited to, Cordless Telephony, Audio Streaming Applications, Professional Audio Applications, consumer and industrial applications of Internet of Things (IoT) such as industry and building automation and monitoring, utility and smart city applications, and in general solutions for local area deployments

(indoor or outdoor) for Ultra-Reliable Low Latency (URLLC) and massive Machine Type Communication (mMTC) as envisioned by ITU-R for IMT-2020.

In general, DECT-2020 NR as a technology foundation is targeted for local area wireless applications, which can be deployed anywhere by anyone at any time. The technology supports autonomous and automatic operation with minimal maintenance effort. Where applicable, interworking functions to wide area networks (WAN). e.g. PLMN, satellite, fibre, and internet protocols foster the vision of a network of networks.

DECT-2020 NR can be used as foundation for:

- Very reliable Point-to-Point and Point-to-Multipoint Wireless Links provisioning (e.g. cable replacement solutions);
- Local Area Wireless Access Networks following a star topology as in classical DECT deployment supporting URLLC use cases, and
- Self-Organizing Local Area Wireless Access Networks following a mesh network topology, which enables to support mMTC use cases.

DECT-2020 NR applies similar design principles as in legacy DECT and DECT ULE. Especially the inherent feature of automatic interference management allows deployments without extensive frequency planning. The Mesh networking capability of DECT-2020 NR enables application-driven network topologies and deployments in e.g. IoT and mMTC use scenarios such that the link budget of classical cellular base-station to user equipment constellations is no longer a limiting factor.

The DECT-2020 NR physical layer is in principle suited for addressing frequency bands below 6 GHz. The physical layer employs Cyclic Prefix Orthogonal Frequency Division Multiplexing (CP-OFDM) combined with Time Division Multiple Access (TDMA) and Frequency Division Multiple Access (FDMA) in a Time Division Duplex (TDD) communication manner. The physical layer employs multiple numerologies, with different subcarrier spacings and corresponding Cyclic Prefix lengths and FFT sizes, allowing operation with different channel bandwidths, and optimize operations in different frequency bands and propagation environments. The physical layer supports advanced channel coding (Turbo coding) for both control and physical channels and Hybrid ARQ with incremental redundancy, which enables fast re-transmission. Advanced channel coding together with Hybrid ARQ ensures very reliable communication.

Additionally, the physical layer supports, fast link adaptation, transmit and receiver diversity, as well as MIMO operations up to 8 streams.

DECT-2020 NR (i.e. PHY layer numerology and MAC algorithms) is designed to enable coexistence with legacy DECT and DECT evolution in current frequency bands allocated to DECT.

4.1.1.2 System and network architectures

4.1.1.2.1 Wireless point-to-point and point-to-multipoint links

Wireless point-to-point links involve two radio devices communicating with each other. A typical application is the cable replacement by a wireless link established between two radio devices requiring communicating with each other.

Compared to wireline systems, wireless comes with the benefit that point to multipoint communication is an inherent feature of radio propagation, so that the support of broadcast and multicast messages from one point to multiple points is just a matter of protocol.

The radio connection between two or more radio devices is enabled by one RD selecting to operate in FT mode (RD_{FT}) and initiate radio resource coordination and beacon transmissions. Other RD(s) perform association procedure in PT mode (RD_{PT}) with the RD_{FT} .

4.1.1.2.2 Local area wireless access networks in cellular network topology

A single-cell network topology involves in principle two types of Radio Devices (RDs): an RD operates in FT mode (RD_{FT}) as a base station, which is a component of the fixed network infrastructure, other RDs operate in PT mode (RD_{PT}).

RD_{FT} is coordinating radio resources, and serves a communication cell by being the central communication point for RD_{PT} , which can be portable device.

A multi-cell topology is a deployment of multiple RD_{FT} as base stations in a fixed network infrastructure, where each base station is serving its own dedicated cell area and RD_{PT} can move from one cell area to the other.

4.1.1.2.3 Mesh network topology

4.1.1.2.3.1 Introduction

In DECT-2020 NR mesh network devices can communicate directly to each other extending the range of network and increasing the reliability of communication. The role of the involved radio devices may change autonomously depending the context of the communication. Each radio device can act as a node transmitting a message, as a node forwarding any message from other radio device or as a node being the destination of a message. Each radio device can communicate directly (device to device) or, if not in range, indirectly – via other radio devices establishing a communication route – with each other which minimizes the probability of outage.

Mesh topology can support high device densities and the autonomous routing enables to adapt dynamically mobile users and interference.

Mesh operation supports autonomous routing. In order to achieve efficient mMTC operation the mesh system is scalable to very high number of devices in a network, the routing is based on cost value, without the need to maintain routing tables in each device.

The key requirements how the scalability can be achieved are:

- All radio devices can route data. Whether RD is routing data is based on an autonomous decision of the RD. In addition, an RD may be configured to operate in PT mode only, e.g. due to low battery resources.
- Radio device does local decisions of the radio resources, e.g. how radio devices use Hybrid ARQ, selects modulation and coding and so forth in each radio link.
- Radio device may change their operating mode between FT mode (RD_{FT}), PT mode (RD_{PT}), or both FT and PT modes ($RD_{FT,PT}$), autonomously based on local decisions;
- No central coordinator(s), enabling the massive scale of the network.
- Radio device operating in RD_{FT} or $RD_{FT,PT}$ mode coordinates local radio resources.
- Support of multiple backend connected Radio devices that operate in FT mode (RD_{FT}).
- RDs can operate with multiple radio channels.

4.1.1.2.3.2 Mesh system operation

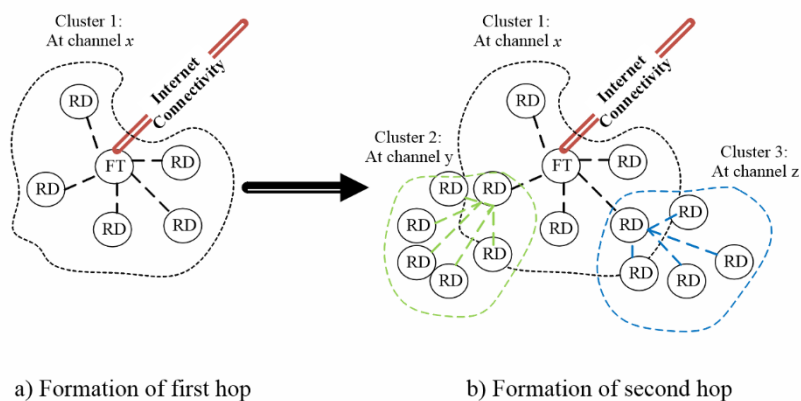
The mesh system operation is based on a clustered tree topology where each RD decides the next hop individually based available routes towards to RD providing the connection to external internet in FT mode (RD_{FT}). Each radio device has knowledge of the next uplink and downlink hop in the clustered tree and RD_{FT} , or $RD_{FT,PT}$ in each cluster controls radio resources and transmissions independently.

The formation of clustered tree topology has following steps:

- An RD which has internet connectivity, RD_{FT} , in FT mode i.e. *Sink* selects operating frequency (or frequencies) and initiates a beacon transmission indicating that it has a route to the external world. This enables other RDs to detect it and associate with it. Beacons indicate all necessary parameters how to perform association, such as frame timing and how radio resources are used and the set of routing parameters. This association does not differentiate from the association process in other system architectures.
- RD detecting a beacon from another RD evaluates the connection based on the information included in the received beacon. Based on the information and signal quality the RD does an independent association decision to which RD_{FT} or $RD_{FT,PT}$ to associate. RD monitors its neighbourhood and may autonomously initiate an association process towards another RD based on routing cost.
- Process continues to next hops and so on and it is illustrated in Fig. 58.

FIGURE 58

Formation of the clustered tree mesh topology



M.2150-58

Once the RD has connectivity to the next hop, it can start sending data towards the RD in FT mode. It can simply use a specific address value to indicate that the data is addressed to a backend. A backend system or other RDs can send DL data to the associated RD. The network can have multiple backends sharing the same mesh network connectivity.

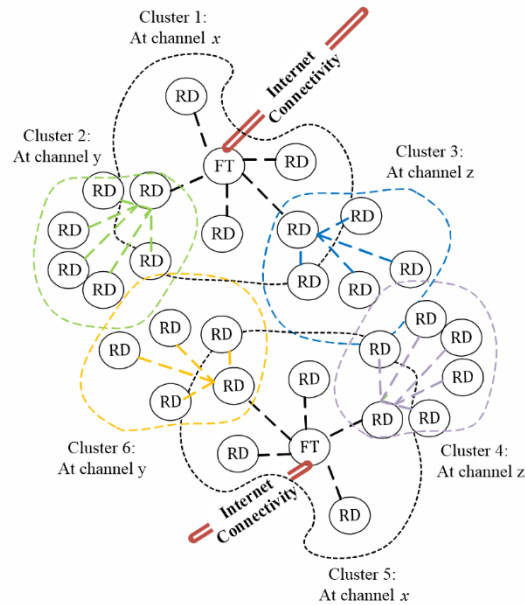
The basic beaconing and association procedures between RDs in mesh topology and in star topology are the same. To enable battery powered RDs which are capable for routing data, the beacon transmission interval will be longer.

Beaconing intervals extend to several seconds depending on the actual use case enabling low power RDs and routing RDs operations. On the other hand, when RD is mains powered, the beaconing period could be more frequent.

The system operation with multiple RDs in FT mode (*sinks*) is illustrated in Fig. 59. The process of forming clusters is identical and an RD may choose to change its association to the next hop RD regardless if the next hop RD will provide connectivity to a different RD_{FT} having the backend connection. Figure 59 also illustrates the case when there is an $RD_{FT,PT}$ that does not yet have any associated RD_{PT} .

FIGURE 59

Example formation of the clusters in multiple FT scenario



M.2150-59

4.1.1.2.3.3 Uplink routing

RD associates to the next hop RD based on received beacons quality attributes such as Received Signal Strength Indicator (RSSI) measurement from a beacon signal which assist it to determine the pathloss. If both DL pathloss and UL pathloss are such that connection can be established, the RD transmitting this beacon is considered as *potential next hop*. If RD detects multiple beacons from multiple RDs that meet the criteria of reliable connection, the RD considers the *route cost*. The *route cost* expresses the cost of route to deliver data to the *sink*, i.e. to the RD_{FT} that has a backend connection to the internet. RD may select the RD_{FT} or RD_{FT,PT} for association which indicates the smallest *cost*.

The way the RD calculates the value for *route cost* is left to implementation, as detailed calculation can be dependent on multiple factors, such as RD capabilities, data rate, interference and BLER, own load i.e. data amount to be delivered, available battery energy, etc. Route cost value will increase at least 1 in every hop. The maximum route cost value is 254, which is not seen as a limiting factor in real deployments.

Routing has also a *sink address*, which is the long RD ID (32 bits) of the RD_{FT} having the internet connection. When system supports multiple RD_{FT}s, (the actual number of RD_{FT}s can be significantly large), RD may send short packet to backend so that that the backend can update its knowledge of where different RDs are located in the mesh network and send DL traffic only to the correct RD_{FT}.

The third routing parameter *application sequence number*, provides identification for network level application data that needs to be distributed in the DL direction to all members of the network. The application sequence number is used by the RD associated to next hop to identify whether the application data has changed compared to current application data. If sequence number is increased the RD requests the application data from its next hop.

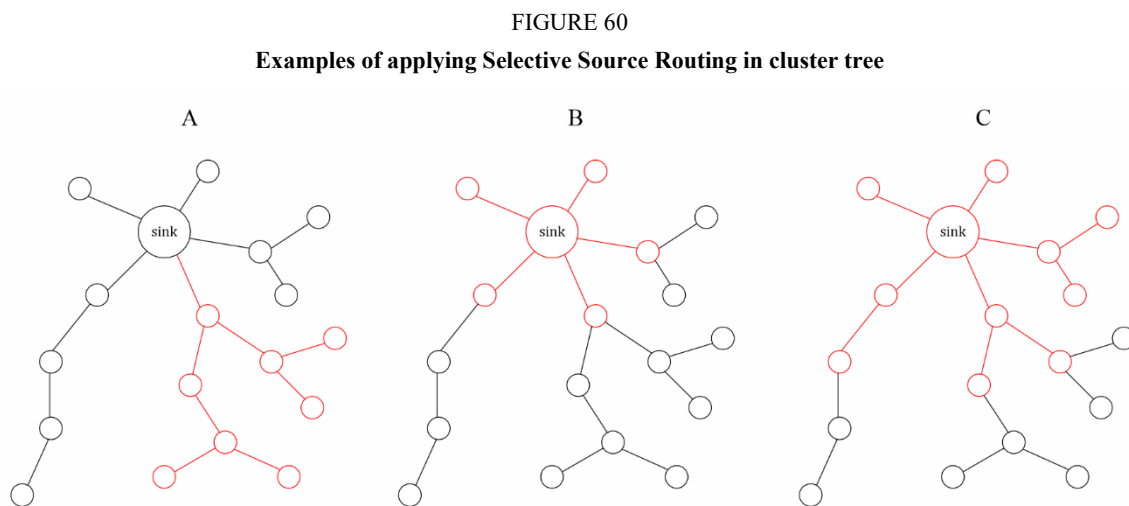
The actual application data is outside of the scope of DECT-2020 NR but it can contain e.g. configuration data of the RD application such as measurement quantities and corresponding reporting frequencies etc.

4.1.1.2.3.4 Downlink routing

DECT-2020 NR standard defines three tools for downlink routing: Selective Flooding, Selective Source Routing and Cached Downlink Routing. Each downlink routing method is based on the cluster tree topology.

Selective Flooding is a basic mechanism to send downlink packets without maintaining routing tables. It uses the cluster tree topology to reach the RDs lower in the tree. Sink and each RD in FT mode forward the downlink unicast packets to each of their associated member RDs in FT mode. The mechanism provides robust delivery for downlink packets where packets towards the target RD travels the same route as any uplink packet with the cost that data packets are also received by RDs that are not the destination. However, the Selective Flooding defines that if one of the member-RDs is the actual destination RD of the packet, then the packet is only sent to that member. In addition to unicast downlink packets the Selective Flooding can be used for downlink broadcast and multicast packet.

Selective Source Routing is intended to minimize the need of flooding in downlink routing for unicast packets. Each RD registers itself and its parent RD to the Sink, which enables the Sink to maintain a routing table and create an exact downlink path to each RD to be appended in the downlink messages. The *Selective Source Routing* in DECT-2020 NR provides options to control and manage both registration messages and parts of the network where *Selective Source Routing* is in use. The Sink can define which branches of the cluster tree the DL source routing is applied, while others are flooded. Sink can also define how many hops are included in the DL source routing, while the remaining hops are flooded. Figure 60 depicts three examples how selective source routing can be applied to a branch (A), one hop (B) and two hops (C) in a cluster tree mesh network.



M.2150-60

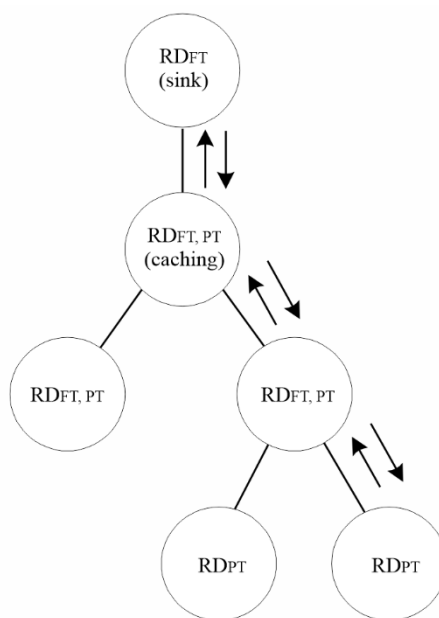
The source routing information is disseminated using beacon or unicast messages. Each RD in FT mode forwards the given Sink originated source routing information, increasing the Hop-count by one at every hop. Also, the Source Routing ID is updated to the ID of the RD in FT mode at every hop, until it is no more changed when the hop-limit is exceeded.

Each RD that associates to another RD, checks whether the Sink and/or Source Routing ID is changed compared to the previous association. If one or both have changed, the associating RD sends a new registration. If they both are the same as in the previous association, the associating RD does not send registration, i.e., it has changed its location in the cluster tree in a way that does not affect the downlink routing by the Sink.

The downlink packets are composed by the sink appended with the downlink path. Each RD in FT mode on the path forwards the packet only to the specified next hop RD until the destination RD is reached. If the next hop addresses are all consumed (edge of the source routing is reached) without yet reaching the destination RD, the packet is forwarded using Selected Flooding.

Cached Downlink Routing is based on a local capability of any RD in FT mode (Sink or any routing RD) to learn from which of its member RDs the packets of RDs further away in the cluster tree come from, an example topology is depicted in Fig. 61. The RD in FT mode stores such linkage of the member RD address and the source address of the original RD sending an uplink packet. When a downlink packet with the destination address equal to that source address arrives the RD can, instead of flooding, send the downlink packet only the member RD that was linked.

FIGURE 61
Example of Cached downlink routing in cluster tree



M.2150-61

The validity of the route caching information is subject to the topology changes and therefore expected to be used primarily in case a downlink packet is expected soon after the uplink packet.

Cached downlink routing can be applied together with the *Selective Flooding* or *Selective Source Routing*. In case of *Selective Source Routing*, it is applied only outside of the hop limit, where *Selective Flooding* applies.

4.1.1.2.3.5 Routing between RDs

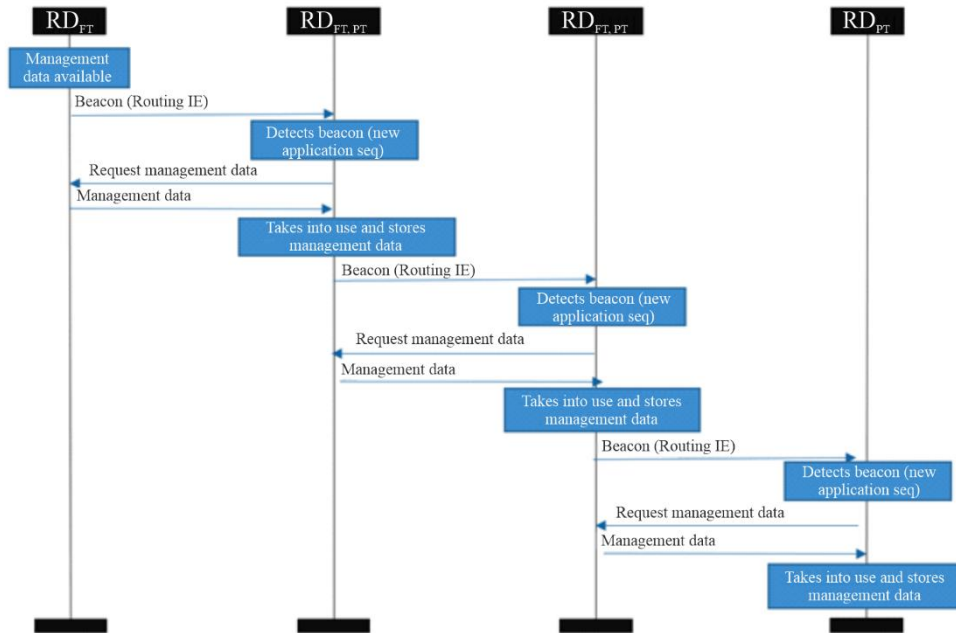
Packet routing between RDs in cluster tree topology uses selective hop-limited flooding, where RD transmits data to only destination if there is association between RD and RD that is the destination of the packet. Otherwise, data is flooded in radio neighbourhood with a limited hop count defined by the originating RD.

4.1.1.2.3.6 Configuration data distribution

The configuration data distribution mechanism is used to provide an efficient and reliable way of distributing the data to the RDs in the DECT-2020 network. Each RD operating in FT mode shall store the configuration data and transfer this data to associated RDs based on RD request. The

application sequence number is advertised in beacon messages in the Route Info IE “application sequence number”-field to indicate the current version of the configuration data. Figure 62 illustrates a configuration data distribution in the system with a local request procedure.

FIGURE 62
Logical presentation of the configuration/management data distribution

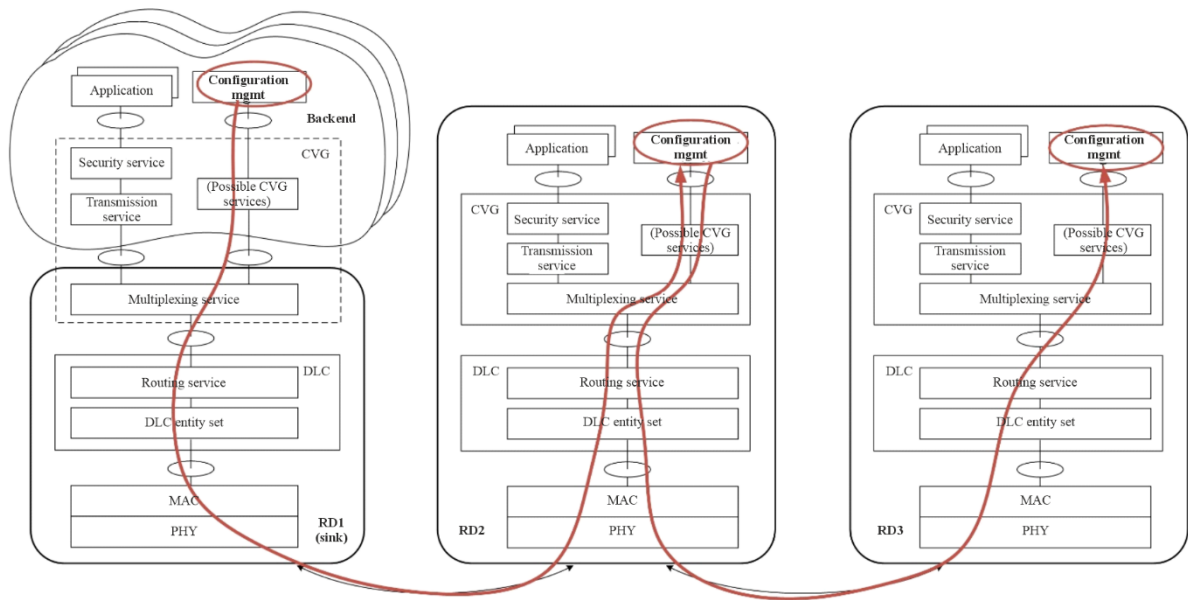


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The configuration data distribution function is agnostic to the actual data content and usage and may be used by multiple different management entities with different data sets that may reside in the DECT-2020 NR protocol stack or higher layers.

Figure 63 illustrates the protocol architecture for the configuration data in the DECT-2020 NR system.

FIGURE 63

Configuration data management protocol architecture

M.2150-63

The configuration data distribution flow is as follows:

- Each RD in FT-mode advertises the sequence number of its currently stored configuration data in its beacons using the Route Info IE.
- When an RD in PT mode receives a Route Info IE “application sequence number” -field with higher sequence number from in RD FT in mode that it is associated, it sends a configuration data request message to the RD FT in mode. If an RD uses data transmission without association, as defined in clause 5.5.1 it may transmit configuration data request without association.
- The configuration data request message is identified from endpoint address reserved for this purpose as defined in Annex A in ETSI TS 103 636-5 [4].
- The RD in FT mode responds with a configuration data response message with the configuration data as payload. The configuration data is identified from endpoint address reserved for this purpose as defined in Annex A in ETSI TS 103 636-5 [4]. The configuration data may comprise multiple configuration response messages.

An RD in PT mode shall initiate a configuration data request in the following cases:

- The RD does not have any valid configuration data.
- The RD identifies a sequence in the received beacon message that is higher from its own stored sequence.
- The RD identifies a sink address in the Route Info IE received in the beacon message that differs from the previous sink address.

4.1.1.2.4 Interworking

The interworking with 3GPP 5G networks is supported by DECT-2020 NR via interworking profiles. DECT-2020 can be connected as untrusted non-3GPP access network to the 5G Core Network via a Non-3GPP Inter-Working-Function (N3IWF) or as a trusted non-3GPP access network via a Trusted Non-3GPP Gateway Function (TNGF).

Figures 64 and 65 provide an overview on the network architecture restricted to the relevant entities. For details refer to ETSI TS 123 501.

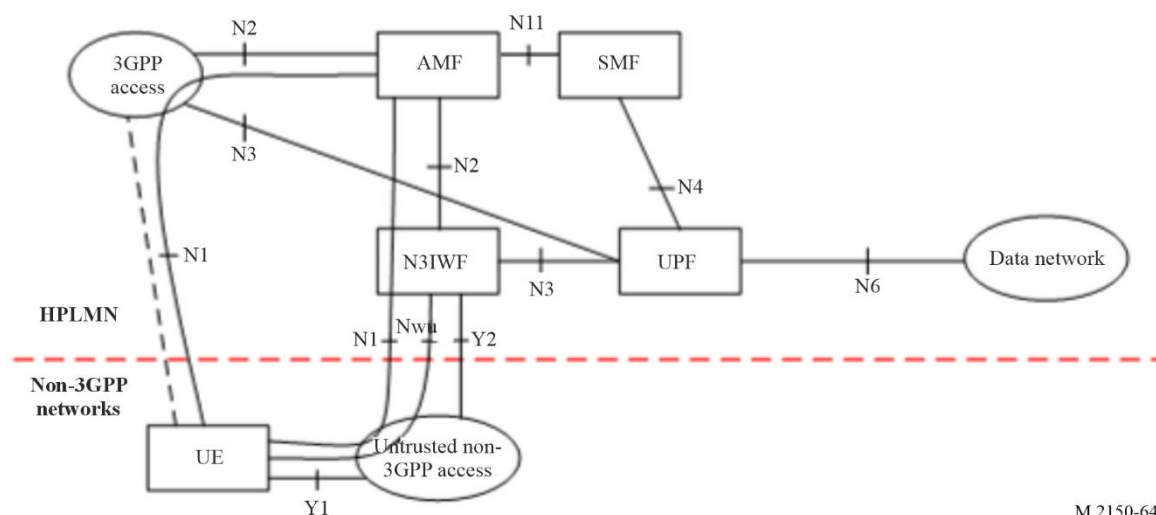
A DECT-2020 FT can, for example, act as an intelligent gateway to the 3GPP network. In the case of untrusted Non-3GPP access the DECT-2020 FP is connected via N3IWF, while in case of trusted Non-3GPP access the DECT-2020 FT connects via TNGF.

A DECT-2020 PT if it supports both technologies can act as well as UE of the 3GPP network. Depending on capabilities of the DECT-2020, a PT can be part of both networks in parallel or on demand.

DECT-2020 provides “standalone” non-3GPP accesses to the 5G Core Network, so a DECT-2020 network is operated fully independent and outside of the 3GPP NG-RAN.

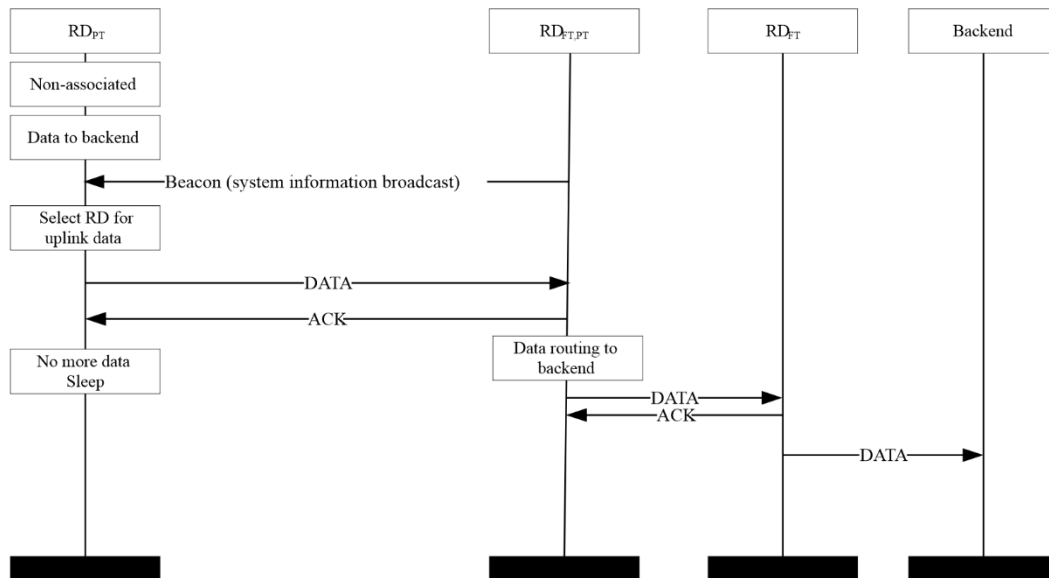
FIGURE 64

Non-roaming architecture for 5G Core Network with untrusted non-3GPP access



M.2150-64

FIGURE 65

Non-roaming architecture for 5G Core Network with trusted non-3GPP access

M.2150-66

4.1.1.2.5 Energy optimization features

The data transmission without association enables a radio device to transmit data to an FT without performing association with it. Based on the target address in routing PDU, the data can be routed to the backend as depicted in Fig. 66 or to other RD in the network.

The RD in FT mode enables this operation by indicating support of this feature in Network and Cluster beacon messages. Additionally, an RD performing such transmission, has been authenticated and RD has obtained the necessary MAC and CVG end-to-end security keys, and other system configuration parameters in advance. This can be achieved by an external configuration method or by using normal data transfer in the associated mode.

Before initiating the transmission, the RD searches the network and cluster beacons to detect at least one RD operating in FT mode. If multiple RDs in FT mode are found select RD for uplink data as selecting RD in for association as defined in clause 5.1.4 of ETSI TS 103 636-3. RD applies the configuration received from the beacon messages including RACH resources.

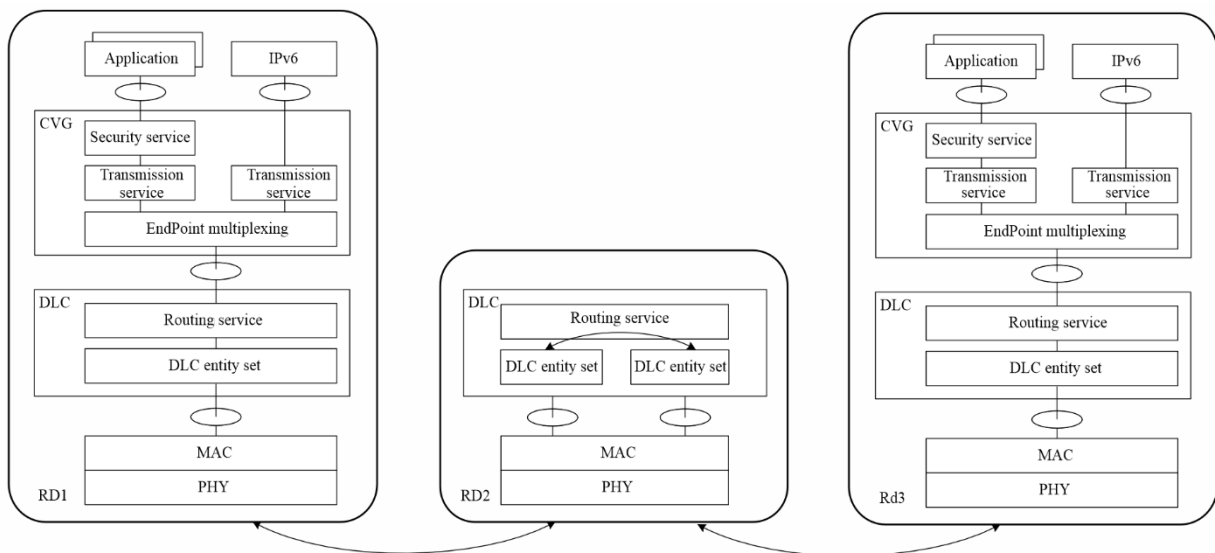
The RD sends data from the application-specific Endpoint and in mesh system operation sets the target address in routing IE set to “any sink” or RD ID that is the final target of the data as defined in clause 5.2.8 of ETSI TS 103 636-5. It uses the Unicast header option in MAC PDU as defined in clause 6.3.3 of ETSI TS 103 636-4.

When RD in FT-mode receives the data, it can recognize from the Unicast header that it does not have an association with the sending RD. RD in FT-mode sends an acknowledgement to the data transmission. RD may include MAC IEs containing application data in the MAC PDU sent as response. FT may also use an Association Request message to enable the RD in PT to move normal associated state for obtaining normal connectivity. The RD in FT mode makes routing decisions based on routing IE as defined in clause 5.2.8 of ETSI TS 103 636-5.

After receiving acknowledgement to all transmitted data and performing all MAC protocol actions, the RD sending data without association may sleep until new data is to be sent.

FIGURE 68

Illustration of overall protocol architecture



M.2150-68

4.1.1.3.2 Physical layer

4.1.1.3.2.1 Physical layer functions and capabilities

The DECT-2020 NR physical layer is in principle suitable to address frequency bands below 6 GHz. The physical layer employs Cyclic Prefix Orthogonal Frequency Division Multiplexing (CP-OFDM) combined with Time Division Multiple Access (TDMA) and Frequency Division Multiple Access (FDMA) in a Time Division Duplex (TDD) communication manner.

Subcarrier spacing is defined by the subcarrier scaling factor μ , resulting either in 27 kHz, 54 kHz, 108 kHz or 216 kHz OFDM subcarriers spacing. In addition, the fourier transform scaling factor β can be set to allow different transmission bandwidths for each configuration of the subcarrier spacing. This results in the support of nominal RF bandwidth from 1,728 MHz up to 221,184 MHz.

The physical layer can perform the following functions in order to provide the data transport service:

- Error detection on the physical channel and indication to higher layers;
- FEC encoding/decoding of the physical channel;
- Hybrid ARQ soft-combining;
- Rate matching of the coded physical channel data to physical channels;
- Mapping of the coded physical channel data onto physical channels;
- Modulation and demodulation of physical channels;
- Frequency and time synchronisation;
- Radio characteristics measurements and indication to higher layers;
- Multiple Input Multiple Output (MIMO) antenna processing;
- Transmit Diversity (TX diversity);
- Beamforming.

The physical channels defined are:

- the Physical Control Channel (PCC);

- the Physical Data Channel (PDC).

The modulation schemes supported are:

- BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM and 1024-QAM.

The channel coding scheme for transport blocks in all physical channels is Turbo Coding with a coding rate of $R=1/3$, two 8-state constituent encoders and a turbo code internal interleaver. Trellis termination is used for the turbo coding. Before the turbo coding, transport blocks are segmented into byte aligned segments with a maximum information block size. Error detection is supported by the use of 16 or 24 bit CRC as specified for a given physical channel.

4.1.1.3.2.2 Radio characteristics

Radio characteristics of DECT-2020 NR combined with the physical layer supports nominal RF bandwidth from 1,728 MHz up to 221,184 MHz. The current release focuses on URLLC and mMTC use cases.

The radio channel numbering scheme enables to assign channels from 450 MHz up to 5 875 MHz organized into 17 different operating bands.

The transmitter output power can be adapted to different types of application requirements and support use cases like battery powered industrial applications, which enables the support for high equipment density use cases. The RX-TX transition time is defined to operate within the guard interval (GI), which enables a very competitive low latency operation with hybrid ARQ operation.

Receiver requirement defines the minimum performance for the radio device with hybrid ARQ support. The reference sensitivity levels scale depending on the operating bandwidths.

Measurement requirements are defined for channel access purposes and to support radio environment quality reporting for mobility and mesh routing purposes.

The requirements are defined keeping in mind the state of art in performance, low power consumption and competitive implementation cost.

4.1.1.3.3 Medium access control layer

4.1.1.3.3.1 Introduction

The objective of this section is to provide an overview on the MAC protocol layer architecture, the used identities, the used transport channels and the mapping of the MAC PDU into the physical layer packet.

The descriptions provided are a model of the MAC layer i.e. it does not specify or restrict implementations.

4.1.1.3.3.2 MAC structure

The overall MAC structure is depicted in Fig. 69. The MAC layer provides DTCH and MTCH logical channels for transferring higher layer data. The flow of the higher layer data and MAC internal messages to physical channels is depicted with black solid lines. The grey dashed line corresponds to MAC internal control interfaces between the MAC function and the MAC control entity.

FIGURE 69
MAC structure overview

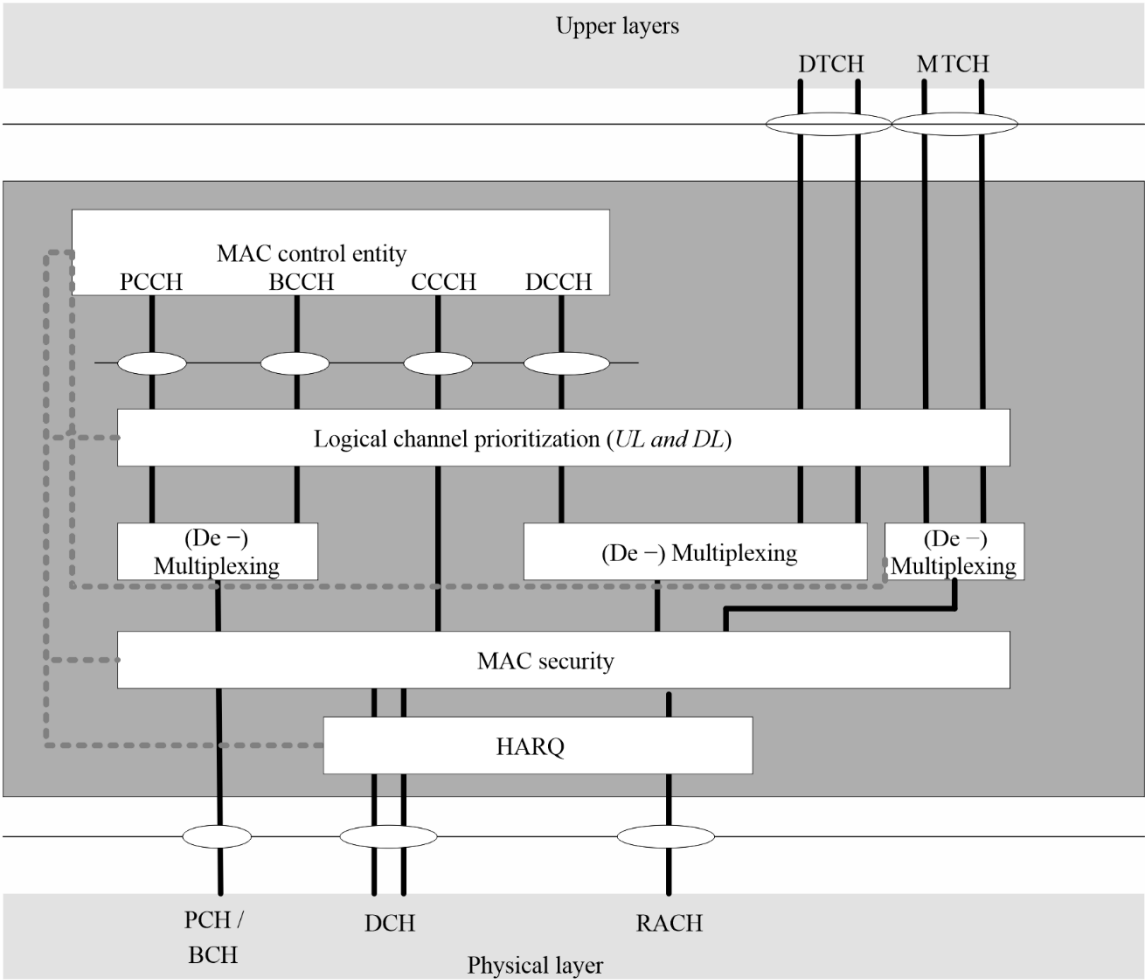
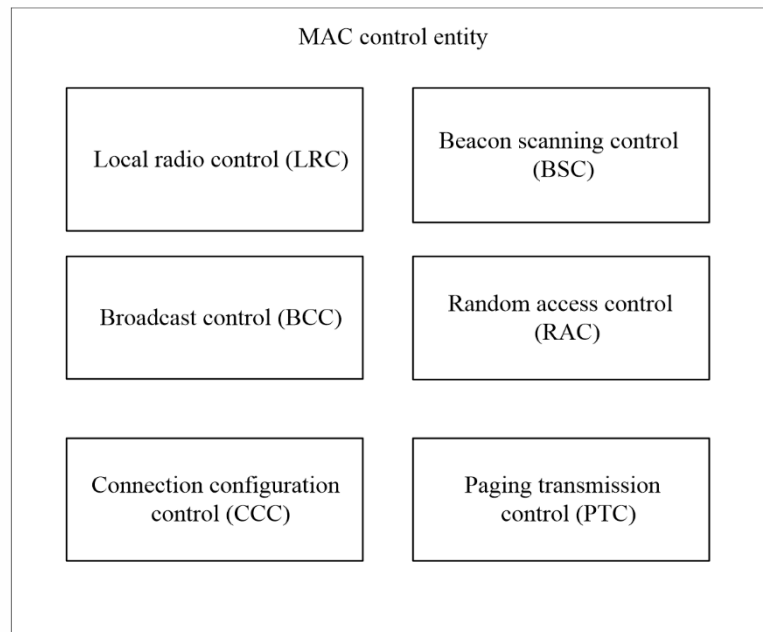


FIGURE 70
MAC control entity



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The MAC layer of the Radio Device (RD) handles transmission and reception of the following transport channels:

- Paging and Broadcast Channel (PCH/BCH);
- Dedicated Channel (DCH);
- Random Access Channel (RACH).

The MAC control entity is depicted in Fig. 70.

4.1.1.3.3 Identities

Network ID

The Network ID has a length of 32 bits, and first 24 MSB bits are used to identify a DECT-2020 NR network uniquely from other DECT-2020 NR networks. The 8 LSB bits of the network ID are selected locally to minimize collision with other networks.

The network ID is transmitted periodically in a beacon frame as plain text enabling other RDs to detect which network the transmitted beacon belongs to.

Long Radio Device ID (Long RD ID)

The long radio device ID has a length of 32 bits, and it identifies a radio device uniquely in a single DECT-2020 NR network. An RD obtains the long RD ID as part of the authentication process over the DECT-2020 NR system or via manual provision or by using another communication channel.

The long RD ID is used:

- in association procedure to recognize associating RDs uniquely;
- in MAC layer security procedures;
- in packet routing in mesh system operation to identify original source and final target receiver of the routed data packet.

The long RD ID is transmitted in the MAC PDU to:

- identify the receiver and the transmitter of the packet in the association procedure for exchanging short RD IDs, or
- when transmitter of the frame considers that there is potential confusion on short RD IDs.

Short Radio Device ID (Short RD ID)

The short radio device ID has length of 16 bits, and it identifies a radio device locally in the DECT-2020 NR network.

The short RD ID is used in the transmitter or receiver fields of the PHY control field to identify transmitter and receiver of the packet.

The short RD ID is exchanged during the association procedure between RDs performing association so that linkage between short RD ID and long RD ID is obtained by both associating RD. Each radio device randomly selects Short RD ID value that it uses in the association.

4.1.1.3.3.4 Services

The MAC layer provides the following services to upper layers:

- data transfer;
- radio resource allocation.

The MAC layer expects the following services from the physical layer:

- data transfer services in physical layer packets;
- measurements.

4.1.1.3.3.5 Functions

The MAC layer supports the following control functions in the MAC control entity:

- Local radio control (LRC): This function is overall in charge of the radio resource in the local coordination area, when the RD coordinates local radio resources, i.e. operates as FT.
- Paging transmission control (PTC): This function controls paging message transmission when RD coordinates local radio resources, i.e. operates as FT.
- Broadcast control (BCC): This functionality controls Beacon and other broadcast/multicast transmissions.
- Random Access control (RAC): This functionality is in charge of random access transmissions.
- Beacon Scanning control (BSC): This function controls scanning operations.
- Connection configuration control (CCC): This functionality controls multiplexing, mapping data to transport channel, MCS, HARQ configuration, MAC security and handovers with LRC.

The MAC layer supports the following transmission functions:

- paging and broadcast signalling;
- control signalling;
- RD device capability signalling;
- radio resource management by channel selection and channel access procedures;
- logical channel prioritisation;
- mapping between logical channels and transport channels;

- multiplexing of MAC SDUs from one or different logical channels onto MAC PDU to be delivered to the physical layer on transport channels;
- demultiplexing of MAC SDUs to one or different logical channels from transport blocks MAC PDU delivered from the physical layer via transport channels;
- error correction through HARQ;
- MAC layer security by providing integrity protection and ciphering.

4.1.1.3.3.6 Channel structure

The MAC layer provides data transfer services on logical channels. To accommodate different kinds of data transfer services, multiple types of logical channels are defined i.e. each supporting transfer of a particular type of information.

Each logical channel type is defined by what type of information is transferred. MAC has a set of internal logical channels and logical channels to higher layers.

The MAC layer has the control and traffic channels listed in Table 11.

TABLE 11

Logical channels provided by MAC

Logical channel name	Acronym	Available for higher layers	Control channel	Traffic channel
Broadcast Control Channel	BCCH		X	
Paging Control Channel	PCCH		X	
Common Control Channel	CCCH		X	
Dedicated Control Channel	DCCH		X	
Dedicated Traffic Channel	DTCH	X		X
Multicast Traffic Channel	MTCH	X		X

The MAC sublayer uses the transport channels listed in Table 12.

TABLE 12

Transport channels used by MAC

Transport channel name	Acronym	Downlink	Uplink
Paging and Broadcast Channel	PCH/BCH	X	
Dedicated Channel	DCH	X	X
Random Access Channel	RACH	X	X

Logical channels can be mapped as described in Table 13.

TABLE 13
Channel mapping

Transport channel Logical channel	PCH/BCH	DCH	RACH
BCCH	X		
PCCH	X		
CCCH			X
DCCH	X	X	X
DTCH		X	X
MTCH	X		X

In packet transmission transport channels are mapped to the Physical Data Channel (PDC) carried in the physical layer packet. Additionally, MAC provides the number of used spatial streams, and content of the Physical Layer Control Field to the physical layer. The Physical Layer Control Field is mapped to the Physical Control Channel (PCC) of the physical layer packet.

4.1.1.3.4 Mobility and State Transitions

4.1.1.3.4.1 Overview

The RDPT operates in the following states: non-associated and associated. The mobility support, i.e. handover, is applicable for an RD which is associated to one or more RD_{FT} or RD_{FT,PT}. The different handover procedures are introduced in § 4.1.1.3.4.2, wherein the handover functionality is the same in both star and mesh topologies.

4.1.1.3.4.2 Intra DECT-2020 NR Mobility

The involved handover procedures may be intra-cell or inter cell. The intra-cell handover means RD_{PT} or RD_{FT,PT} changes its association from an instance (e.g. sector) of an RD_{FT} or RD_{FT,PT} into another instance of the same RD_{FT} or RD_{FT,PT}. The inter-cell handovers consider changing association from an RD_{FT} or RD_{FT,PT} into another RD_{FT} or RD_{FT,PT}.

Intra-cell handover may be controlled by either the radio devices acting as RD_{FT} or RD_{PT} and triggered when the quality on allocated resources becomes poor and other free resources exist. Detection of free resources is based on a spectrum sensing and beacon measurements and takes into account the activity of other uncoordinated systems. Seamless handover is supported, by allocating new resource before releasing old ones.

The radio device sends a handover-request (part of association request process) to the detected RD_{FT} on the selected random-access channel indicated in beacon message. If the RD_{FT} accepts the request, it indicates the position of the new resources and the connection is established, and data delivery can be switched over. After that the old resources will be released.

Inter-cell handover is generally controlled by the RD_{PT} and triggered when quality on allocated resources becomes poor and/or another suitable RD_{FT} is detected. Seamless handover with 0 ms interruption time is supported. The RD_{PT} sends a handover-request as indicated in intra-cell case to the new RD_{FT} on the selected random access channel. If the RD_{FT} accepts the request, then it indicates the position of the new resource allocation and the data will be switched over. After that the old resource will be released.

Handover between two DECT-2020 NR systems is performed in the same way as inter-cell handover. Both systems should be interconnected by the proper network infrastructure.

4.1.1.3.5 Data Link Control

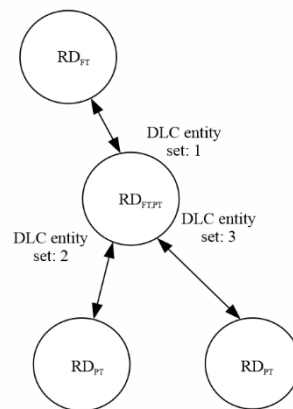
4.1.1.3.5.1 DLC Entities and Architecture

The DLC architecture is depicted in Fig. 71. There is single routing service entity in each RD.

There is a single DLC entity set for each radio link between an RD in PT mode and an RD in FT mode. For an RD operating in both FT and PT mode in mesh clustered three, the RD has:

- One DLC entity set for the RD that it has performed association with.
- One DLC entity set for each RD that has performed association with it, as depicted in Fig. 71.

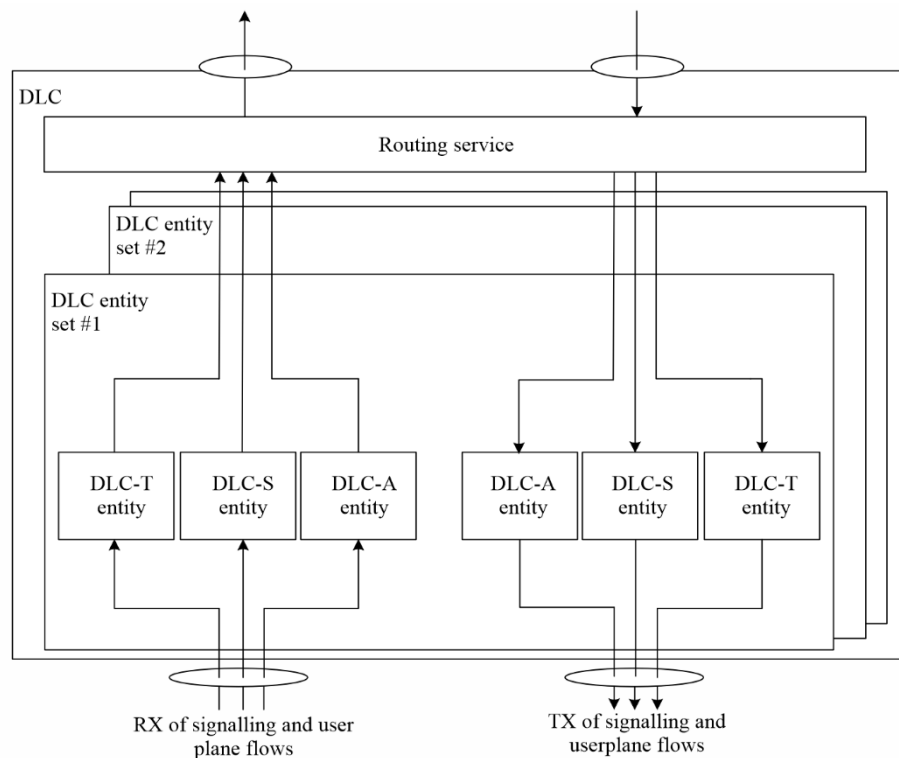
FIGURE 71
DLC entity sets for RD operating in both FT and PT mode



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Additionally, an RD has a DLC entity set for Broadcast and RD to RD communication.

FIGURE 72
DLC architecture



M.2150-72

DLC entity set comprises one DLC entity for a DCH/MTCH seen by the MAC layer, as identified in a MAC flow in the MAC multiplexing header.

A DLC entity can be operating in following service modes based on QoS and application data format requirements:

- Service type 0: Transparent mode (DLC-T)
- Service type 1: Segmentation mode (DLC-S)
- Service type 2: DLC ARQ mode (DLC-A)
- Service type 3: Segmentation and ARQ mode (DLC-SA)

4.1.1.3.5.2 Routing services

Routing services support the following:

- Packet Routing from RD to backend (uplink) with special unicast address reserved for backend.
- Packet routing from backend (downlink) to RDs with unicast, multicast or broadcast address.
- Packet Routing between RDs, with unicast, multicast or broadcast address with hop-limited flooding.

4.1.1.3.6 Convergence Layer

4.1.1.3.6.1 General

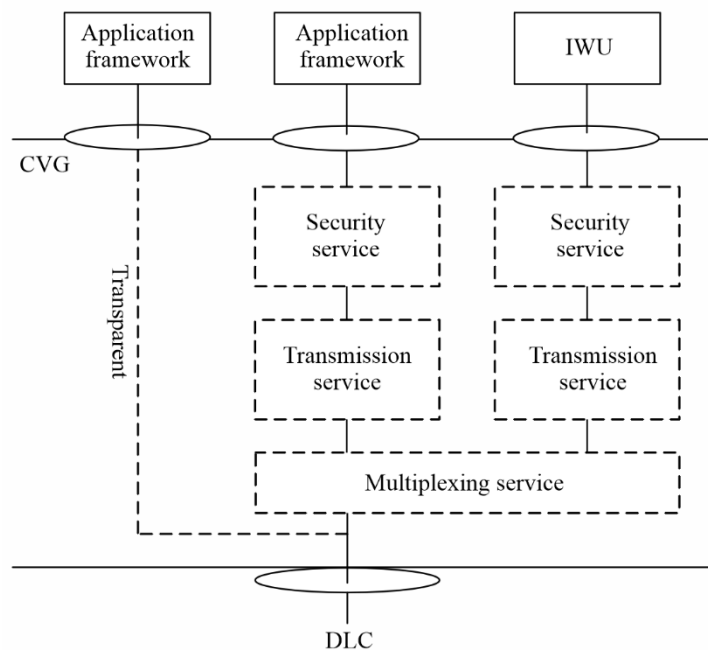
The CVG layer operates end-to-end between the terminal entities. Intermediate nodes in a mesh network do not process the CVG layer payload.

The convergence layer provides the following services:

- Multiplexing service:
 - Identification and multiplexing of higher layer data (see § 4.1.1.3.6.3).
- Transmission service:
 - Segmentation and reassembly, retransmission, flow control, lifetime control, duplicate removal, and delivery order of SDUs routed over the DECT-2020 NR network.
 - A set of Tx service types are defined to implement practical combinations of the transmission procedures (see § 4.1.1.3.6.2).
- Security service:
 - Cipherring and integrity protection of messages.

The use of the services is optional, but they follow the hierarchy depicted in the layer architecture as in Fig. 73.

FIGURE 73
CVG architecture



M.2150-73

4.1.1.3.6.2 CVG Service types

The CVG layer's service types are related to the CVG procedures as defined in Table 13A. However, the use of CVG Security, Multiplexing, Duplicate removal and Delivery order procedures are independent of the CVG service type.

TABLE 13A
CVG Service types and features

	Transparent	Sequence numbering	Segmentation and reassembly	Lifetime	Flow control	ARQ
Service type 0	X	–	–	–	–	–
Service type 1	–	X	–	–	–	–
Service type 2	–	X	X	–	–	–
Service type 3	–	X	X	X	X	X(*)
Service type 4	–	X	X	X	X	X

NOTE – (*) = uses ARQ in a limited manner.

4.1.1.3.6.3 Data identification and multiplexing

Convergence layer provides identification and multiplexing of higher layer data using different CVG level multiplexing procedures: Endpoint (EP) multiplexing and Mux tag multiplexing.

Endpoint multiplexing is based on using a 2-octet EP mux field. The EP mux address space is divided into different purposes, for free use, for Public specifications and for Company specific use. Other than free use values are allocated by ETSI on request. This makes it possible to identify data globally, for example, a public specification value is allocated to IPv6 datagrams.

Mux tag enables multiplexing of higher layer data using a short, 3-bit identifier, by enumerating the values locally.

4.1.2 Overview of the Component RIT: 3GPP NR

The NR RIT as one component RIT represents the releases 15, 16, 17 and 18 of NR, which uses either 1) FDD operation and therefore is applicable for operation with paired spectrum, or 2) TDD operation and therefore is applicable for operation with unpaired spectrum. Channel bandwidths up to 400 MHz and Carrier Aggregation over 16 component carriers are supported, yielding peak data rates up to roughly 140 Gbit/s in the downlink and 65 Gbit/s in the uplink.

4.1.2.1 Overall architecture

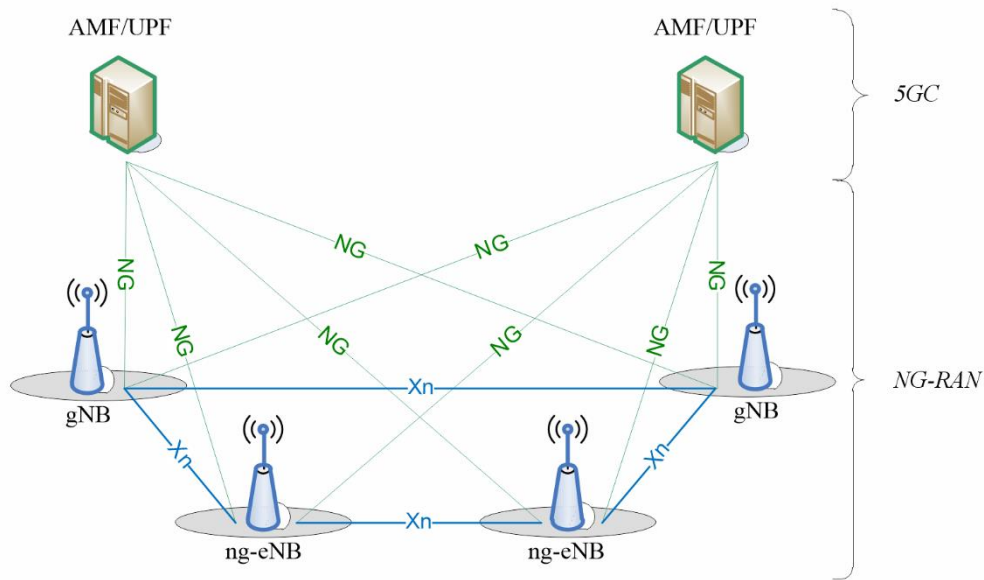
The NG Radio Access Network (NG-RAN) includes NG-RAN nodes that support multiple radio access (e.g. NR, MR-DC of NR and E-UTRA¹⁴, etc). The RIT considers the gNB as an NG-RAN node providing NR user plane and control plane protocol terminations towards the UE and connected via the NG interface to the 5GC, and the ng-eNB as NG-RAN node for Multi-Radio Dual Connectivity only.

NG-RAN nodes are interconnected by means of the interface named Xn. The gNBs and ng-eNBs are also connected by means of the NG interfaces to the 5GC, more specifically to the Access and Mobility Management Function (AMF) by means of the NG-C interface and to the User Plane Function (UPF) by means of the NG-U interface.

The NG-RAN architecture is illustrated in Fig. 74.

¹⁴ In 3GPP terminology, the term Evolved-UMTS Terrestrial Radio Access (E-UTRA) is also used to signify the LTE radio interface.

FIGURE 74
Overall architecture



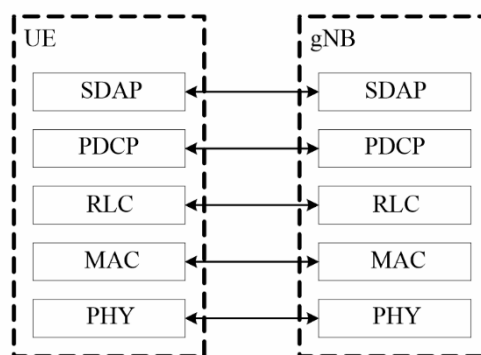
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4.1.2.2 Radio protocol architecture

4.1.2.2.1 User Plane (UP)

Figure 75 shows the protocol stack for the User Plane, where Service Data Adaptation Protocol (SDAP), PDCP, RLC and MAC sublayers (terminated in gNB on the network side) perform the functions listed in § 4.1.2.5.

FIGURE 75
User Plane protocol stack



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4.1.2.2.2 Control Plane

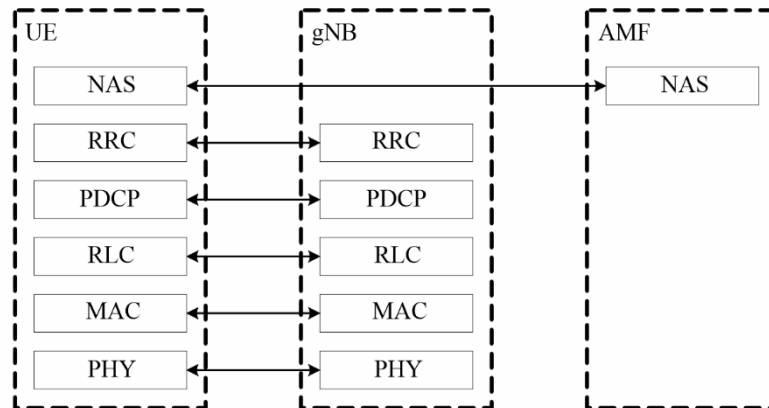
Figure 76 shows the protocol stack for the control plane, where:

- PDCP, RLC and MAC sublayers (terminated in gNB on the network side) perform the functions listed in § 4.1.2.5;
- RRC (terminated in gNB on the network side) performs the functions listed in § 4.1.2.6;

- Non-Access Stratum (NAS) control protocol (terminated in AMF on the network side) performs the functions listed in 3GPP TS 23.501, for instance: authentication, mobility management, security control.

FIGURE 76

Control Plane Protocol Stack



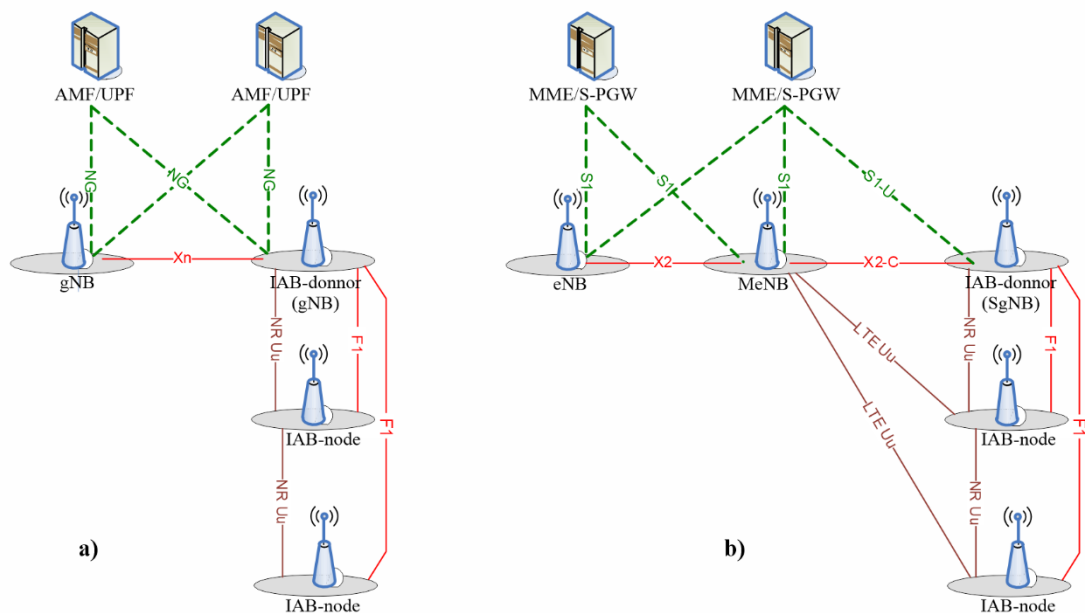
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4.1.2.2.3 Integrated Access and Backhaul (IAB) architecture

From NR Rel-16, Integrated access and backhaul (IAB) enables wireless relaying in NG-RAN. The relaying node, referred to as the IAB-node, supports access and backhauling via NR. The terminating node of NR backhauling on the network side is referred to as the IAB-donor, which represents a gNB with additional functionality to support IAB. Backhauling can occur via a single or via multiple hops. The IAB architecture is shown in Fig. 77.

FIGURE 77

IAB architecture; a) IAB-node using SA mode with 5GCN; b) IAB-node using EN-DC



M.2150-77

Mobile IAB introduces the mobile IAB-node, which is a RAN node that provides NR access links to UEs and an NR backhaul link to a parent node, and that can conduct physical mobility across the RAN area. The mobile IAB-node includes a mobile IAB-MT and a mobile IAB-DU. Mobile IAB supports the same functionality as IAB unless explicitly specified.

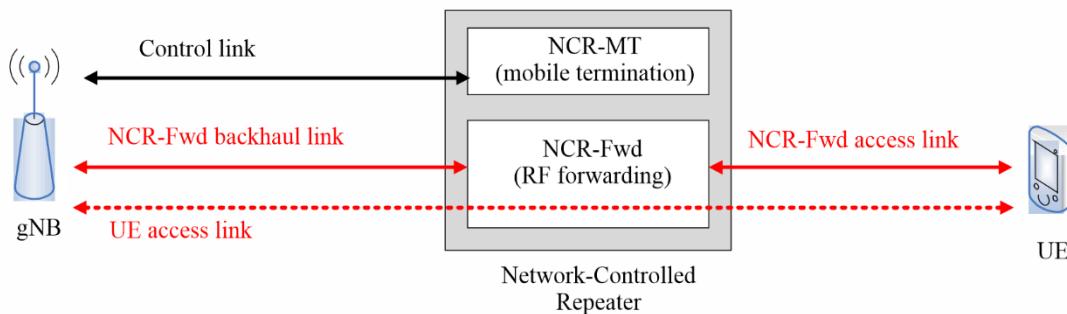
4.1.2.2.4 Network-Controlled Repeaters (NCR) architecture

A Network-Controlled Repeater node, referred to as NCR-node, is an RF repeater that enables wireless amplifying-and-forwarding functionality in NG-RAN. The NCR-node is capable of receiving and applying side control information from a gNB with additional functionality to support Network-Controlled Repeater.

The NCR-node comprises an NCR-MT and an NCR-Fwd. The NCR-MT is an entity supporting a subset of the UE functionality that communicates with the gNB to receive side control information via a control link based on the NR Uu interface. The NCR-Fwd is the function performing amplifying-and-forwarding of signals between gNB and UE via the NCR-Fwd backhaul link and NCR-Fwd access link, respectively. The NCR-node is modelled as depicted in Fig. 78.

FIGURE 78

Conceptual model of network-controlled repeater



M.2150-78

4.1.2.3 Multi-Radio Dual Connectivity (MR-DC)

NG-RAN supports Multi-Radio Dual Connectivity (MR-DC) operation whereby a UE in the RRC_CONNECTED state is configured to utilise radio resources provided by two distinct schedulers, located in two different NG-RAN nodes connected via a non-ideal backhaul, one providing NR access and the other one providing either E-UTRA or NR access. In MR-DC, one NG-RAN node acts as a Master Node (MN) and another NG-RAN node acts as a Secondary Node (SN).

NR may also be used as part of MR-DC configuration when combined with E-UTRA, within either an NG-RAN or E-UTRAN. For the case of NR-NR Dual Connectivity (NR-DC), a UE is connected to one gNB that acts as a MN and another gNB that acts as a SN. The master gNB is connected to the 5GC via the NG interface and to the secondary gNB via the Xn interface. The secondary gNB might also be connected to the 5GC via the NG-U interface.

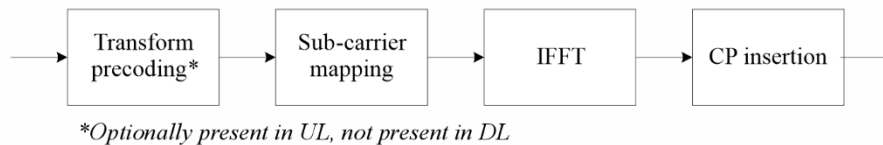
4.1.2.4 Physical layer

4.1.2.4.1 Waveform, numerology and frame structure

The downlink transmission waveform is conventional OFDM using a cyclic prefix. The uplink transmission waveform is conventional OFDM using a cyclic prefix with a transform precoding function performing DFT spreading that can be disabled or enabled.

FIGURE 79

Transmitter block diagram for CP-OFDM with optional DFT-spreading



M.2150-79

The numerology is based on exponentially scalable sub-carrier spacing $\Delta f = 2^\mu \times 15$ kHz with $\mu = \{0,1,3,4,5,6\}$ for Primary Synchronization Signal (PSS), Secondary Synchronization Signal (SSS) and PBCH and $\mu = \{0,1,2,3,5,6\}$ for other channels. Normal Cyclic Prefix (CP) is supported for all sub-carrier spacings, Extended CP is supported for $\mu = 2$. 12 consecutive sub-carriers form a Physical Resource Block (PRB). Up to 275 PRBs are supported on a carrier.

TABLE 14

Supported transmission numerologies

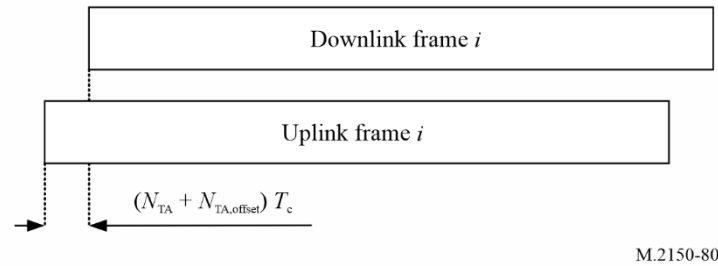
μ	$\Delta f = 2^\mu \cdot 15$ [kHz]	Cyclic prefix	Supported for data	Supported for synch
0	15	Normal	Yes	Yes
1	30	Normal	Yes	Yes
2	60	Normal, Extended	Yes	No
3	120	Normal	Yes	Yes
4	240	Normal	No	Yes
5	480	Normal	Yes	Yes
6	960	Normal	Yes	Yes

The UE may be configured with one or more bandwidth parts on a given component carrier, of which only one can be active at a time, as described in § 4.1.2.5.10. The active bandwidth part defines the UE μ s operating bandwidth within the cell's operating bandwidth. For initial access, and until the UE's configuration in a cell is received, the initial bandwidth part detected from system information is used.

Downlink and uplink transmissions are organized into frames of 10 ms duration, consisting of ten 1 ms subframes. Each frame is divided into two equally-sized half-frames of five subframes. The slot duration is 14 symbols with Normal CP and 12 symbols with Extended CP, and scales in time as a function sub-carrier spacing in use so that there is always an integral number of slots in a subframe.

Timing Advance (TA) is used to adjust the uplink frame timing relative to the downlink frame timing.

FIGURE 80
Uplink-downlink timing relation



Operation on both paired and unpaired spectrum is supported.

4.1.2.4.2 Downlink

4.1.2.4.2.1 Downlink transmission scheme

Demodulation Reference Signal (DMRS) based spatial multiplexing is supported for Physical Downlink Shared Channel (PDSCH). Up to 8, 12, 16 and 24 orthogonal DL DMRS ports are supported for type 1, type 2, enhanced type 1 and enhanced type 2 DMRS respectively. Up to 8 orthogonal DL DMRS ports per UE are supported for Single-User MIMO (SU-MIMO) and up to 4 orthogonal DL DMRS ports per UE are supported for Multi-User MIMO (MU-MIMO). The number of SU-MIMO code words is one for 1 to 4 layers transmissions and two for 5 to 8 layers transmissions.

The DMRS and corresponding PDSCH are transmitted using the same precoding matrix and the UE does not need to know the precoding matrix to demodulate the transmission. The transmitter may use different precoder matrix for different parts of the transmission bandwidth, resulting in frequency selective precoding. The UE may also assume that the same precoding matrix is used across a set of Physical Resource Blocks (PRBs) denoted Precoding Resource Block Group (PRG).

Transmission durations from 2 to 14 symbols in a slot with a single PDSCH is supported.

Aggregation of multiple slots with Transport Block (TB) repetition is supported.

From Rel-16, enhancements for DL/UL MIMO are introduced, including enhancements on multi-Transmission Reception Points (TRPs) or multi-panel transmission improving reliability and robustness with both ideal and non-ideal backhaul.

4.1.2.4.2.2 Physical-layer processing for physical downlink shared channel

The downlink physical-layer processing of transport channels consists of the following steps:

- TB CRC attachment;
- code block segmentation and code block CRC attachment;
- channel coding: Low Density Parity Check (LDPC) coding;
- physical-layer hybrid-ARQ processing;
- rate matching;
- scrambling;
- modulation: QPSK, 16QAM, 64QAM, 256QAM and 1024QAM;
- layer mapping;
- mapping to assigned resources and antenna ports.

The UE may assume that at least one symbol with demodulation reference signal is present on each layer in which PDSCH is transmitted to a UE, and up to three additional DMRS symbols can be configured by higher layers.

Phase tracking RS may be transmitted on additional symbols to aid receiver phase tracking.

4.1.2.4.2.3 Physical downlink control channels

The Physical Downlink Control Channel (PDCCH) can be used to schedule DL transmissions on PDSCH and UL transmissions on PUSCH, where the Downlink Control Information (DCI) on PDCCH includes:

- downlink assignments containing at least modulation and coding format, resource allocation, and HARQ information related to DL-SCH;
- uplink scheduling grants containing at least modulation and coding format, resource allocation, and HARQ information related to UL-SCH.

In addition to scheduling, PDCCH can be used for:

- activation and deactivation of configured PUSCH transmission with configured grant;
- activation and deactivation of PDSCH semi-persistent transmission;
- notifying one or more UEs of the slot format;
- notifying one or more UEs of the PRB(s) and OFDM symbol(s) where the UE may assume no transmission is intended for the UE;
- transmission of Transmit Power Control (TPC) commands for PUCCH and PUSCH;
- transmission of one or more TPC commands for Sounding Reference Signal (SRS) transmissions by one or more UEs;
- Switching a UE's active bandwidth part;
- Initiating a random access procedure;
- Indicating the UE(s) to monitor the PDCCH during the next occurrence of the DRX on-duration;
- In IAB context, indicating the availability for soft symbols of an IAB-DU;
- Triggering one shot HARQ-ACK codebook feedback.

A UE monitors a set of PDCCH candidates in the configured monitoring occasions in one or more configured Control Resource SETs (CORESETs) according to the corresponding search space configurations.

A CORESET consists of a set of PRBs with a time duration of 1 to 3 OFDM symbols. The resource units Resource Element Groups (REGs) and Control Channel Elements (CCEs) are defined within a CORESET with each CCE consisting a set of REGs. Control channels are formed by aggregation of CCEs. Different code rates for the control channels are realized by aggregating different number of CCEs. Interleaved and non-interleaved CCE-to-REG mapping are supported in a CORESET.

The PDCCH repetition is operated by using two search spaces which are explicitly linked by configuration provided by the RRC layer, and are associated with corresponding CORESETs. For PDCCH repetition, two linked search spaces are configured with the same number of candidates, and two PDCCH candidates in two search spaces are linked with the same candidate index. When PDCCH repetition is scheduled to a UE, an intra-slot repetition is allowed and each repetition has the same number of CCEs and coded bits, and corresponds to the same DCI payload.

Polar coding is used for PDCCH.

Each resource element group carrying PDCCH carries its own DMRS.

QPSK modulation is used for PDCCH.

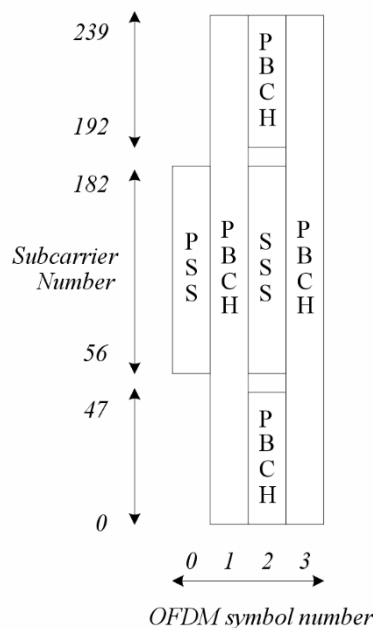
4.1.2.4.2.4 Synchronization signal and PBCH block

The Synchronization Signal and PBCH block (SSB) consists of primary and secondary synchronization signals (PSS, SSS), each occupying one symbol and 127 subcarriers, and PBCH spanning across three OFDM symbols and 240 subcarriers, but on one symbol leaving an unused part in the middle for SSS as show in Fig. 81. For the 3 MHz channel bandwidth, the PBCH is further equally punctured from both edges to span 144 subcarriers. The possible time locations of SSBs within a half-frame are determined by sub-carrier spacing, and the periodicity of the half-frames where SSBs are transmitted is configured by the network. During a half-frame, different SSBs may be transmitted in different spatial directions (i.e. using different beams, spanning the coverage area of a cell).

Within the frequency span of a carrier, multiple SSBs can be transmitted. The Physical Cell Identifiers (PCIs) of SSBs transmitted in different frequency locations do not have to be unique, i.e. different SSBs in the frequency domain can have different PCIs. However, when an SSB is associated with a Remaining Minimum System Information (RMSI), the SSB corresponds to an individual cell, which has a unique NR Cell Global Identifier (NCGI). Such an SSB is referred to as a Cell-Defining SSB (CD-SSB). A PCell is always associated to a CD-SSB located on the synchronization raster.

When an SSB is not associated with an RMSI, the SSB is referred to as a non-Cell Defining SSB (NCD-SSB), which can be used to perform Radio Link Monitoring (RLM), Beam Failure Detection (BFD), and RRM measurements and measurements for RA resource selection inside the active DL BWP when the active BWP does not contain the CD-SSB. A UE may be configured with multiple SSBs provided that each BWP is configured with at most one SSB (CD-SSB or NCD-SSB).

FIGURE 81
Time-frequency structure of SSB



Polar coding is used for the PBCH.

The UE may assume a band-specific sub-carrier spacing for the SSB unless a network has configured the UE to assume a different sub-carrier spacing.

PBCH symbols carry their own frequency-multiplexed DMRS.

QPSK modulation is used for PBCH.

4.1.2.4.2.5 Physical layer procedures

4.1.2.4.2.5.1 Link adaptation

Link adaptation (Adaptive Modulation and Coding (AMC)) with various modulation schemes and channel coding rates is applied to the PDSCH. The same coding and modulation is applied to all groups of resource blocks belonging to the same L2 Protocol Data Unit (PDU) scheduled for one user within one transmission duration and within a MIMO codeword.

For channel state estimation purposes, the UE may be configured to measure CSI-RS and estimate the downlink channel state based on the CSI-RS measurements. The UE reports the estimated channel state back to the gNB to be used in link adaptation.

4.1.2.4.2.5.2 Power control

Downlink power control can be used.

4.1.2.4.2.5.3 Cell search

Cell search is the procedure by which a UE acquires time and frequency synchronization with a cell and detects the Cell ID of that cell. NR cell search is based on the primary and secondary synchronization signals, and PBCH DMRS, located on the synchronization raster.

4.1.2.4.2.5.4 HARQ

Asynchronous Incremental Redundancy Hybrid ARQ is supported. The gNB provides the UE with the HARQ-ACK feedback timing either dynamically in the DCI or semi-statically in an RRC configuration.

The UE may be configured to receive code block group-based transmissions where retransmissions may be scheduled to carry only a sub-set of all the code blocks of a TB.

4.1.2.4.2.5.5 Reception of SIB1

The Master Information Block (MIB) on the PBCH provides the UE with parameters (e.g. CORESET#0 configuration) for monitoring of the PDCCH for scheduling PDSCH that carries the System Information Block 1 (SIB1). The PBCH may also indicate that there is no associated SIB1, in which case the UE may be pointed to another frequency from where to search for an SSB that is associated with a SIB1 as well as a frequency range where the UE may assume no SSB associated with SIB1 is present. The indicated frequency range is confined within a contiguous spectrum allocation of the same operator in which SSB is detected.

4.1.2.4.3 Uplink

4.1.2.4.3.1 Uplink transmission scheme

Two transmission schemes are supported for PUSCH: codebook-based transmission and non-codebook based transmission.

For codebook-based transmission, the gNB provides the UE with a transmit precoding matrix indication in the DCI. The UE uses the indication to select the PUSCH transmit precoder from the codebook. For non-codebook-based transmission, the UE determines its PUSCH precoder based on the wideband SRS Resource Indicator (SRI) field from the DCI.

DMRS based spatial multiplexing is supported for PUSCH. For a given UE, up to four-layer transmissions or up to eight-layer are supported. Up to 8, 12, 16 and 24 orthogonal UL DMRS ports are supported for type 1, type 2, enhanced type 1, and enhanced type 2 DMRS respectively. The number of codewords is one for 1 to 4 layer transmission and two for 5 to 8 layer transmission. When transform precoding is used, only a single MIMO layer transmission is supported.

Transmission durations from 1 to 14 symbols in a slot with a single PUSCH is supported.

Aggregation of multiple slots with TB repetition is supported.

Two types of frequency hopping are supported, intra-slot frequency hopping, and in case of slot aggregation, inter-slot frequency hopping.

The PUSCH may be scheduled with DCI on the PDCCH, or a semi-static configured grant may be provided over RRC, where two types of operation are supported:

- The first PUSCH is triggered with a DCI, with subsequent PUSCH transmissions following the RRC configuration and scheduling received on the DCI, or
- The PUSCH is triggered by data arrival in the UE's transmit buffer and the PUSCH transmissions follow the RRC configuration.

4.1.2.4.3.2 Physical-layer processing for physical uplink shared channel

The uplink physical-layer processing of transport channels consists of the following steps:

- Transport Block CRC attachment;
- code block segmentation and Code Block CRC attachment;
- channel coding: LDPC coding;
- physical-layer HARQ processing;
- rate matching;
- scrambling;
- modulation: $\pi/2$ BPSK (with transform precoding only), QPSK, 16QAM, 64QAM and 256QAM;
- layer mapping, transform precoding (enabled/disabled by configuration), and pre-coding;
- mapping to assigned resources and antenna ports.

The UE transmits at least one symbol with Demodulation Reference Signal on each layer on each frequency hop in which the PUSCH is transmitted, and up to three additional DMRS symbols can be configured by higher layers.

Phase tracking RS may be transmitted on additional symbols to aid receiver phase tracking.

4.1.2.4.3.3 Physical uplink control channel

The physical uplink control channel (PUCCH) carries the Uplink Control Information (UCI) from the UE to the gNB. Five formats of PUCCH exist, depending on the duration of PUCCH and the UCI payload size.

- format #0: short PUCCH of 1 or 2 symbols with small UCI payloads of up to two bits with UE multiplexing capacity of up to 6 UEs with 1-bit payload in the same PRB;

- format #1: long PUCCH of 4 to 14 symbols with small UCI payloads of up to two bits with UE multiplexing capacity of up to 84 UEs without frequency hopping and 36 UEs with frequency hopping in the same PRB;
- format #2: short PUCCH of 1 or 2 symbols with large UCI payloads of more than two bits with no UE multiplexing capability in the same PRBs;
- format #3: long PUCCH of 4 to 14 symbols with large UCI payloads with no UE multiplexing capability in the same PRBs;
- format #4: long PUCCH of 4 to 14 symbols with moderate UCI payloads with multiplexing capacity of up to 4 UEs in the same PRBs.

The short PUCCH format of up to two UCI bits is based on sequence selection, while the short PUCCH format of more than two UCI bits frequency-multiplexes the UCI and the DMRS. The long PUCCH formats time-multiplex the UCI and DMRS. Frequency hopping is supported for long PUCCH formats and for short PUCCH formats of duration of two symbols. Short and long PUCCH formats can be repeated over multiple slots or sub-slots, where the repetition factor is either indicated dynamically in the DCI or semi-statically in an RRC configuration.

UCI multiplexing in the PUSCH is supported when UCI and PUSCH transmissions coincide in time, either due to transmission of a UL-SCH transport block or due to triggering of A-CSI transmission without UL-SCH transport block. In addition, HARQ-ACK multiplexing of a certain priority in PUSCH of a different priority is supported when HARQ-ACK and PUSCH transmissions coincide in time, either due to transmission of a UL-SCH transport block or due to triggering of A-CSI transmission without UL-SCH transport block:

- UCI carrying HARQ-ACK feedback with 1 or 2 bits is multiplexed by puncturing the PUSCH;
- In all other cases the UCI is multiplexed by rate matching the PUSCH.

UCI consists of the following information:

- CSI;
- ACK/NAK;
- Scheduling request.

Simultaneous transmission of PUCCH and PUSCH associated with different priorities on cells of different bands in a PUCCH group is supported, where UCI multiplexing in the PUCCH associated with a priority in combination of UCI multiplexing in a PUSCH associated with a different priority is supported if the UCI multiplexed on PUSCH is of same priority as the PUSCH.

Simultaneous transmission of PUCCH and PUSCH associated with same priority on cells of different bands in a PUCCH group is supported.

QPSK and $\pi/2$ BPSK modulation can be used for long PUCCH with more than 2 bits of information, QPSK is used for a short PUCCH with more than 2 bits of information and BPSK and QPSK modulation can be used for a long PUCCH with up to two information bits.

Transform precoding is applied to a long PUCCH.

Channel coding used for uplink control information is described in Table 15.

TABLE 15

Channel coding for uplink control information

Uplink Control Information size including CRC, if present	Channel code
1	Repetition code
2	Simplex code
3-11	Reed Muller code
> 11	Polar code

4.1.2.4.3.4 Random access

Random access preamble sequences of different lengths are supported. The sequence length 839 is applied with subcarrier spacings of 1.25 and 5 kHz, and the sequence length 139 is applied with subcarrier spacings of 15, 30, 60, 120, 480 and 960 kHz, sequence length of 571 is applied with subcarrier spacings of 30, 120, and 480 kHz, and sequence length 1151 is applied with subcarrier spacings of 15 and 120 kHz respectively. Sequence length 839 supports unrestricted sets and restricted sets of Type A and Type B, while sequence lengths 139, 571, can be used for operation with only with subcarrier spacings of 120 kHz and 480 kHz and sequence lengths of 1151 support unrestricted sets only with subcarrier spacings of 120 kHz.

Multiple PRACH preamble formats are defined with one or more PRACH OFDM symbols, and different cyclic prefixes and guard times. The PRACH preamble configuration to use is provided to the UE in the system information.

The UE calculates the PRACH transmit power for the retransmission of the preamble based on the most recent estimated pathloss and the power ramping counter value.

The system information provides information for the UE to determine the association between the SSB and the RACH resources. The Reference Signal Received Power (RSRP) threshold for SSB selection for RACH resource association is configurable by the network.

4.1.2.4.3.5 Physical layer procedures**4.1.2.4.3.5.1 Link adaptation**

Four types of link adaptation are supported as follows:

- adaptive transmission bandwidth;
- adaptive transmission duration;
- transmission power control;
- adaptive modulation and channel coding rate.

For channel state estimation purposes, the UE may be configured to transmit SRS that the gNB may use to estimate the uplink channel state, and then use the estimate in link adaptation.

4.1.2.4.3.5.2 Uplink power control

The gNB determines the desired uplink transmit power and provides uplink transmit power control commands to the UE. The UE uses the provided uplink transmit power control commands to adjust its transmit power.

4.1.2.4.3.5.3 Uplink timing control

The gNB (including IAB-DU and IAB-donor-DU) determines the desired Timing Advance setting and provides that to the UE (or IAB-MT). The UE/IAB-MT uses the provided TA to determine its uplink transmit timing relative to the UE's/IAB-MTs observed downlink receive timing.

An IAB-node may support additional modes for uplink timing:

- The IAB-MT uses the provided TA plus a provided additional offset to determine its uplink transmission timing, to facilitate parent node's IAB-MT Rx / IAB-DU Rx multiplexing;
- The IAB-MT aligns its uplink transmission timing to that of the collocated IAB-DU downlink transmission timing, to facilitate IAB-MT Tx / IAB-DU Tx multiplexing of this IAB-node.

The IAB-node uplink timing mode is indicated by the parent node via MAC-CE.

4.1.2.4.3.5.4 HARQ

Asynchronous Incremental Redundancy Hybrid ARQ is supported. The gNB schedules each uplink transmission and retransmission using the uplink grant on the DCI.

The UE may be configured to transmit code block group based transmissions where retransmissions may be scheduled to carry only a sub-set of all the code blocks of a transport block.

4.1.2.4.4 Carrier Aggregation (CA)

In Carrier Aggregation (CA), two or more Component Carriers (CCs) are aggregated. A UE may simultaneously receive or transmit on one or multiple CCs depending on its capabilities:

- A UE with single timing advance capability for CA can simultaneously receive and/or transmit on multiple CCs corresponding to multiple serving cells sharing the same timing advance (multiple serving cells grouped in one Timing Advance Group (TAG));
- A UE with multiple timing advance capability for CA can simultaneously receive and/or transmit on multiple CCs corresponding to multiple serving cells with different timing advances (multiple serving cells grouped in multiple TAGs). NG-RAN ensures that each TAG contains at least one serving cell;
- A non-CA capable UE can receive on a single CC and transmit on a single CC corresponding to one serving cell only (one serving cell in one TAG).

CA is supported for both contiguous and non-contiguous CCs. When CA is deployed, frame timing and System Frame Number (SFN) are aligned across cells that can be aggregated. The maximum number of configured CCs for a UE is 16 for DL and 16 for UL. From Rel-16, cells with unaligned frame boundary can also be aggregated.

Multi-cell PDSCH/PUSCH scheduling with a single DCI is supported in order to reduce the control overhead for scheduling data on multiple cells in intra-band or inter-band multi-carrier operation.

4.1.2.4.5 Supplementary uplink

In conjunction with a UL/DL carrier pair (FDD band) or a bidirectional carrier (TDD band), a UE may be configured with additional, Supplementary Uplink (SUL). SUL differs from the aggregated uplink in that the UE may be scheduled to transmit either on the supplementary uplink or on the uplink of the carrier being supplemented, but not on both at the same time.

4.1.2.4.6 Uplink Tx switching

In uplink CA or SUL, a UE configured with uplink Tx switching can have Tx chain(s) dynamically from one uplink band or two uplink bands to another uplink band or two uplink bands for enabling

up to 2Tx UL transmission in one uplink band or simultaneous UL transmissions in two uplink bands at a time.

4.1.2.4.7 Group transmission for Multicast and Broadcast Services (MBS) delivery

Resource efficient delivery of multicast/broadcast services is introduced for services of Point-To-Multipoint nature, such as for example public safety and mission critical services, V2X applications, IPTV, live video, software delivery over wireless and IoT applications.

For broadcast communication service, the same service and the same specific content data are provided simultaneously to all UEs in a geographical area. A broadcast communication service is delivered to the UEs using a broadcast session. A UE can receive a broadcast communication service in RRC_IDLE, RRC_INACTIVE and RRC_CONNECTED state.

For multicast communication service, the same service and the same specific content data are provided simultaneously to a dedicated set of UEs. A multicast communication service is delivered to the UEs using a multicast session. A UE can receive a multicast communication service in RRC_CONNECTED state with mechanisms such as Point-To-Point (PTP) and/or Point-To-Multipoint (PTM) delivery. HARQ feedback/retransmission can be applied to both PTP and PTM transmission.

4.1.2.4.8 Transport channels

The physical layer offers information transfer services to MAC and higher layers. The physical layer transport services are described by how and with what characteristics data are transferred over the radio interface.

Downlink transport channel types are:

- 1 Broadcast Channel (BCH) characterised by:
 - fixed, pre-defined transport format;
 - requirement to be broadcast in the entire coverage area of the cell, either as a single message or by beamforming different BCH instances.
- 2 Downlink Shared Channel (DL-SCH) characterised by:
 - support for HARQ;
 - support for dynamic link adaptation by varying the modulation, coding and transmit power;
 - possibility to be broadcast in the entire cell;
 - possibility to use beamforming;
 - support for both dynamic and semi-static resource allocation;
 - support for UE discontinuous reception (DRX) to enable UE power saving;
 - support for group transmission for MBS delivery.
- 3 Paging Channel (PCH) characterised by:
 - support for UE discontinuous reception (DRX) to enable UE power saving (DRX cycle is indicated by the network to the UE);
 - requirement to be broadcast in the entire coverage area of the cell, either as a single message or by beamforming different PCH instances;
 - mapped to physical resources which can be used dynamically also for traffic/other control channels.

Uplink transport channel types are:

- 1 Uplink Shared Channel (UL-SCH) characterised by:
 - possibility to use beamforming;
 - support for dynamic link adaptation by varying the transmit power and potentially modulation and coding;
 - support for HARQ;
 - support for both dynamic and semi-static resource allocation.
- 2 Random Access Channel(s) (RACH) characterised by:
 - limited control information;
 - collision risk.

Sidelink transport channel types are:

- 1 Sidelink broadcast channel (SL-BCH) characterised by:
 - pre-defined transport format.
- 2 Sidelink shared channel (SL-SCH) characterised by:
 - support for unicast transmission, groupcast transmission and broadcast transmission;
 - support for both UE autonomous resource selection and scheduled resource allocation by NG-RAN;
 - support for both dynamic and semi-static resource allocation when UE is allocated resources by the NG-RAN;
 - support for HARQ;
 - support for dynamic link adaptation by varying the transmit power, modulation and coding;
 - support for SL discontinuous reception (SL DRX) to enable UE power saving.

4.1.2.5 Layer 2

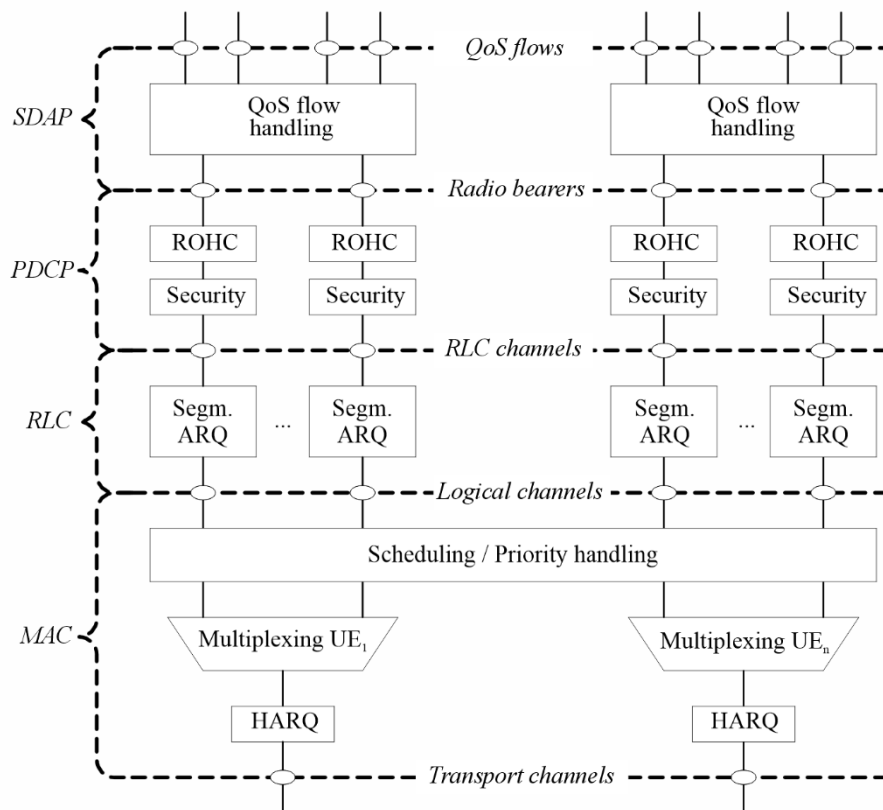
4.1.2.5.1 Overview

The layer 2 of NR is split into the following sublayers: Medium Access Control (MAC), Radio Link Control (RLC), Packet Data Convergence Protocol (PDCP) and Service Data Adaptation Protocol (SDAP). Figures 82 and 83 depict the Layer 2 architecture for downlink and uplink, where:

- the physical layer offers to the MAC sublayer transport channels;
- the MAC sublayer offers to the RLC sublayer logical channels;
- the RLC sublayer offers to the PDCP sublayer RLC channels;
- the PDCP sublayer offers to the SDAP sublayer radio bearers;
- the SDAP sublayer offers to 5GC QoS flows;
- Comp. refers to header compression or uplink data compression;
- Segm. refers to segmentation;
- control channels (BCCH, PCCH are not depicted for clarity).

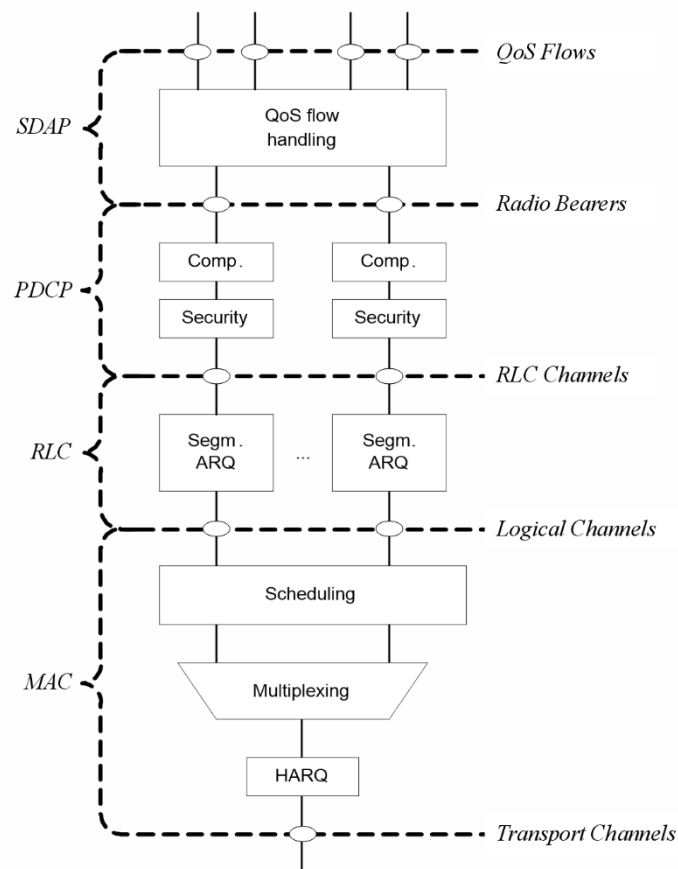
NOTE – The gNB may not be able to guarantee that a L2 buffer overflow will never occur. If such overflow occurs, the UE may discard packets from the L2 buffer.

FIGURE 82
Downlink layer 2 structure



M.2150-82

FIGURE 83
Uplink layer 2 structure



M.2150-83

Similar to LTE, Radio bearers are categorized into two groups: DRBs for UP data and SRBs for CP data.

4.1.2.5.2 MAC sublayer

4.1.2.5.2.1 Services and functions

The main services and functions of the MAC sublayer are:

- mapping between logical channels and transport channels;
- multiplexing/demultiplexing of MAC SDUs belonging to one or different logical channels into/from transport blocks (TB) delivered to/from the physical layer on transport channels;
- scheduling information reporting;
- error correction through HARQ (one HARQ entity per cell in case of CA);
- priority handling between UEs by means of dynamic scheduling;
- priority handling between logical channels of one UE by means of logical channel prioritisation;
- padding.

A single MAC entity can support multiple numerologies, transmission timings and cells. Mapping restrictions in logical channel prioritisation control which numerology(ies), cell(s), and transmission timing(s) a logical channel can use.

4.1.2.5.2.2 Logical channels

Different kinds of data transfer services as offered by MAC. Each logical channel type is defined by what type of information is transferred. Logical channels are classified into two groups: Control Channels and Traffic Channels. Control channels are used for the transfer of control plane information only:

- Broadcast Control Channel (BCCH): a downlink channel for broadcasting system control information.
- Paging Control Channel (PCCH): a downlink channel that carries paging messages.
- Common Control Channel (CCCH): channel for transmitting control information between UEs and network. This channel is used for UEs having no RRC connection with the network.
- Dedicated Control Channel (DCCH): a point-to-point bi-directional channel that transmits dedicated control information between a UE and the network. Used by UEs having an RRC connection.

Traffic channels are used for the transfer of user plane information only:

- Dedicated Traffic Channel (DTCH): point-to-point channel, dedicated to one UE, for the transfer of user information. A DTCH can exist in both uplink and downlink.

The following logical channels are used for MBS delivery:

- MTCH: A point-to-multipoint downlink channel for transmitting MBS data of either multicast session or broadcast session from the network to the UE;
- DTCH: A point-to-point channel defined for transmitting MBS data of a multicast session from the network to the UE;
- MCCH: A point-to-multipoint downlink channel used for transmitting MBS broadcast control information associated to one or several MTCH(s) from the network to the UE.

4.1.2.5.2.3 Mapping to transport channels

In Downlink, the following connections between logical channels and transport channels exist:

- BCCH can be mapped to BCH;
- BCCH can be mapped to DL-SCH;
- PCCH can be mapped to PCH;
- CCCH can be mapped to DL-SCH;
- DCCH can be mapped to DL-SCH;
- DTCH can be mapped to DL-SCH.

The following connections between logical channels and transport channels for group transmission exist:

- MCCH can be mapped to DL-SCH;
- MTCH can be mapped to DL-SCH.

In Uplink, the following connections between logical channels and transport channels exist:

- CCCH can be mapped to UL-SCH;
- DCCH can be mapped to UL-SCH;
- DTCH can be mapped to UL-SCH.

4.1.2.5.2.4 HARQ

The HARQ functionality ensures delivery between peer entities at Layer 1. A single HARQ process supports one TB when the physical layer is not configured for downlink/uplink spatial multiplexing, and when the physical layer is configured for downlink/uplink spatial multiplexing, a single HARQ process supports one or multiple TBs.

4.1.2.5.3 RLC sublayer

4.1.2.5.3.1 Transmission modes

The RLC sublayer supports three transmission modes:

- Transparent Mode (TM);
- Unacknowledged Mode (UM);
- Acknowledged Mode (AM).

The RLC configuration is per logical channel with no dependency on numerologies and/or transmission durations, and ARQ can operate on any of the numerologies and/or transmission durations the logical channel is configured with.

For SRB0, paging and broadcast system information, TM mode is used. For other SRBs AM mode is used. For DRBs, either UM or AM mode are used.

4.1.2.5.3.2 Services and functions

The main services and functions of the RLC sublayer depend on the transmission mode and include:

- transfer of upper layer PDUs;
- sequence numbering independent of the one in PDCP (UM and AM);
- error correction through ARQ (AM only);
- segmentation (AM and UM) and re-segmentation (AM only) of RLC SDUs;
- reassembly of SDU (AM and UM);
- duplicate detection (AM only);
- RLC SDU discard (AM and UM);
- RLC re-establishment;
- protocol error detection (AM only).

4.1.2.5.3.3 ARQ

The ARQ within the RLC sublayer has the following characteristics:

- ARQ retransmits RLC SDUs or RLC SDU segments based on RLC status reports;
- polling for RLC status report is used when needed by RLC;
- the RLC receiver can also trigger a RLC status report after detecting a missing RLC SDU or RLC SDU segment.

4.1.2.5.4 PDCP sublayer

4.1.2.5.4.1 Services and functions

The main services and functions of the PDCP sublayer are:

- transfer of data (user plane or control plane);
- maintenance of PDCP SNs;

- header compression and decompression using the ROHC protocol;
- header compression and decompression using EHC protocol;
- compression and decompression of uplink PDCP SDUs: DEFLATE based UDC only;
- ciphering and deciphering;
- integrity protection and integrity verification;
- timer based SDU discard;
- for split bearers, routing;
- duplication;
- reordering and in-order delivery;
- out-of-order delivery;
- duplicate discarding.

Since PDCP does not allow COUNT to wrap around in DL and UL, it is up to the network to prevent this from happening (e.g. by using a release and add of the corresponding radio bearer or a full configuration).

4.1.2.5.5 SDAP sublayer

The main services and functions of SDAP are:

- mapping between a QoS flow and a data radio bearer;

NOTE – When remapping an XR QoS flow carrying PDU sets from one DRB to another all SDAP SDUs belonging to a PDU Set should be mapped to the same DRB.

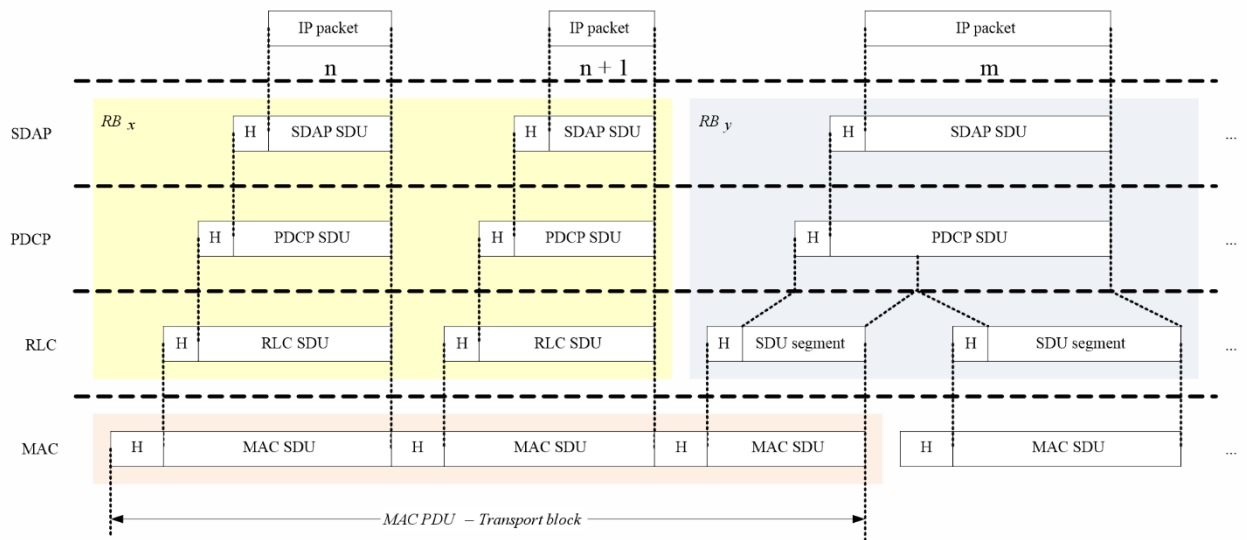
- marking QoS Flow ID (QFI) in both DL and UL packets.

A single protocol entity of SDAP is configured for each individual PDU session.

4.1.2.5.6 L2 data flow

An example of the Layer 2 Data Flow is depicted on Fig. 84, where a transport block is generated by MAC by concatenating two RLC PDUs from RB_x and one RLC PDU from RB_y . The two RLC PDUs from RB_x each corresponds to one IP packet (n and $n+1$) while the RLC PDU from RB_y is a segment of an IP packet (m).

FIGURE 84
Data flow example



M.2150-84

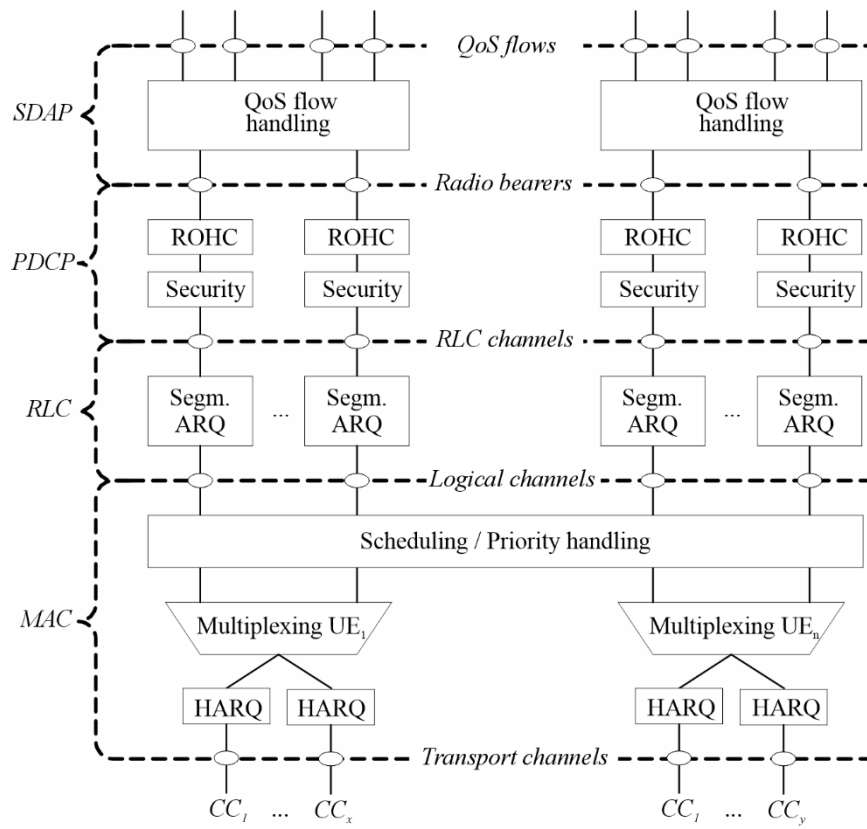
NOTE – H depicts the headers and subheaders.

4.1.2.5.7 Carrier aggregation (CA)

With CA, the multi-carrier nature of the physical layer is only exposed to the MAC layer for which one HARQ entity is required per serving cell as depicted on Figs 85 and 86 below:

- In both uplink and downlink, there is one independent HARQ entity per serving cell and one transport block is generated per assignment/grant per serving cell in the absence of spatial multiplexing. Each transport block and its potential HARQ retransmissions are mapped to a single serving cell.

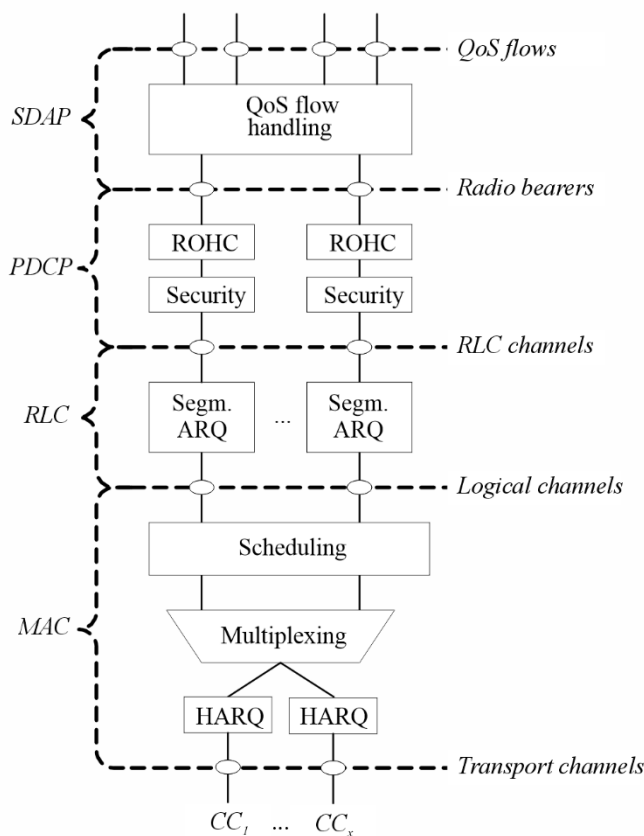
FIGURE 85

Layer 2 structure for DL with CA configured

M.2150-85

FIGURE 86

Layer 2 structure for UL with CA configured



M.2150-86

4.1.2.5.8 Dual connectivity (DC)

When the UE is configured with a SCG, the UE is configured with two MAC entities: one MAC entity for the MCG and one MAC entity for the SCG.

4.1.2.5.9 Supplementary uplink

In case of Supplementary Uplink (SUL), the UE is configured with two ULs for one DL of the same cell, and uplink transmissions on those two ULs are controlled by the network to avoid overlapping PUSCH/PUCCH transmissions in time. Overlapping transmissions on PUSCH are avoided through scheduling while overlapping transmissions on PUCCH are avoided through configuration (PUCCH can only be configured for only one of the two ULs of the cell). In addition, initial access is supported in each of the uplink.

4.1.2.5.10 Bandwidth adaptation (BA)

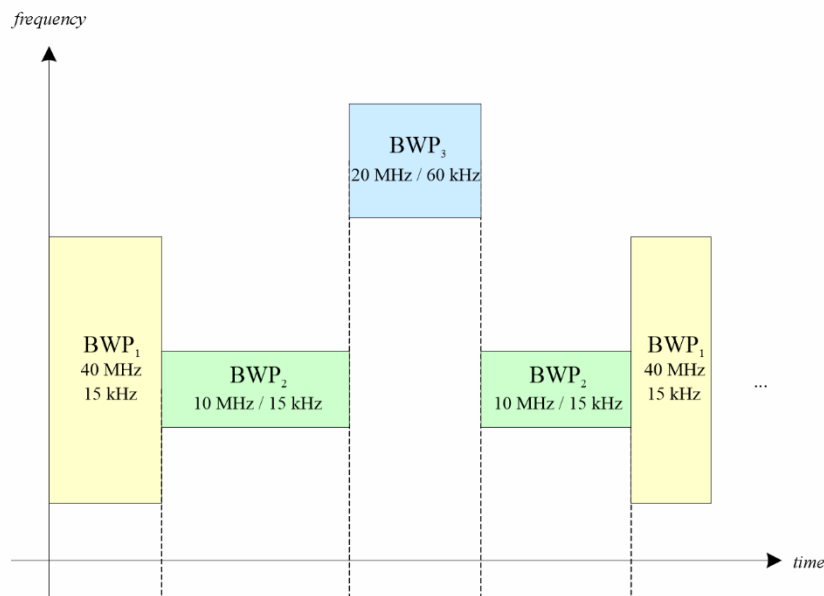
With Bandwidth Adaptation, the receive and transmit bandwidth of a UE need not be as large as the bandwidth of the cell and can be adjusted: the width can be ordered to change (e.g. to shrink during period of low activity to save power); the location can move in the frequency domain (e.g. to increase scheduling flexibility); and the subcarrier spacing can be ordered to change (e.g. to allow different services). A subset of the total cell bandwidth of a cell is referred to as a Bandwidth Part (BWP) and BA is achieved by configuring the UE with BWP(s) and telling the UE which of the configured BWPs is currently the active one.

Figure 87 describes a scenario where three different BWPs are configured:

- BWP₁ with a width of 40 MHz and subcarrier spacing of 15 kHz;
- BWP₂ with a width of 10 MHz and subcarrier spacing of 15 kHz;
- BWP₃ with a width of 20 MHz and subcarrier spacing of 60 kHz.

FIGURE 87

BA example



M.2150-87

4.1.2.5.11 Multiple Transmit/Receive Point Operation

In Multiple Transmit/Receive Point (multi-TRP) operation, a serving cell can schedule the UE from four TRPs, providing better coverage, reliability and/or data rates for PDSCH, PDCCH, PUSCH and PUCCH.

4.1.2.6 Radio Resources Control (RRC)

4.1.2.6.1 Services and functions

The main services and functions of the RRC sublayer include:

- broadcast of System Information related to AS and NAS;
- paging initiated by 5GC or NG-RAN;
- establishment, maintenance and release of an RRC connection between the UE and NG-RAN including:
 - addition, modification and release of CA;
 - addition, modification and release of Dual Connectivity in NR or between E-UTRA and NR;
- security functions including key management;
- establishment, configuration, maintenance and release of Signalling Radio Bearers (SRBs) and Data Radio Bearers (DRBs);
- Mobility functions including:

- handover and context transfer;
- UE cell selection and reselection and control of cell selection and reselection;
- inter-RAT mobility;
- QoS management functions;
- UE measurement reporting and control of the reporting;
- detection of and recovery from radio link failure;
- NAS message transfer to/from NAS from/to UE.

In order to enhance mobility robustness and performance, additional NR mobility enhancements are introduced in 3GPP Rel-16. User data interruption is reduced during handover to 0 ms by dual-active-protocol-stack handover. In addition, the robustness during handover is improved by a conditional handover.

In order to further reduce the mobility latency, additional NR mobility enhancements are introduced in 3GPP Rel-18. The L1/L2-triggered mobility procedure (LTM), where the cell switch is based on L1 measurements and triggered by MAC CE, enables the early UL and DL synchronization to target cell and the RACH-less handover, resulting in the minimized mobility interruption time.

4.1.2.6.2 Protocol states

RRC supports the following states which can be characterised as follows:

- **RRC_IDLE:**
 - Public Land Mobile Network (PLMN) selection;
 - broadcast of system information;
 - cell re-selection mobility;
 - paging for mobile terminated data is initiated by 5GC;
 - DRX for core network paging configured by NAS.
- **RRC_INACTIVE:**
 - PLMN selection;
 - broadcast of system information;
 - cell re-selection mobility;
 - paging is initiated by NG-RAN (RAN paging);
 - RAN-based notification area (RNA) is managed by NG-RAN;
 - DRX for RAN paging configured by NG-RAN;
 - 5GC – NG-RAN connection (both CP and UP) is established for UE;
 - the UE AS context is stored in NG-RAN and the UE;
 - NG-RAN knows the RNA which the UE belongs to;
 - Transfer of MBS multicast/broadcast data to the UE over MRB(s);
 - Transfer of unicast data and/or signalling to/from the UE over radio bearers configured for Small Data Transmission (SDT).
- **RRC_CONNECTED:**
 - 5GC – NG-RAN connection (both CP and UP) is established for UE;
 - the UE AS context is stored in NG-RAN and the UE;
 - NG-RAN knows the cell which the UE belongs to;

- transfer of unicast data to/from the UE;
- network controlled mobility including measurements.

4.2 Detailed specifications of the radio interface technology

Detailed specifications described in this Annex are developed around a Global Core Specification (GCS), which is related to externally developed materials incorporated by specific references for a specific technology. The process and use of the GCS, references, and related notifications and certifications are found as Document IMT-2020/20, *Process and the Use Of Global Core Specification (GCS), References and Related Certifications in Conjunction With Recommendation ITU-R M.2150*.

The IMT-2020 standards contained in this section are derived from the global core specification for the DECT 5G-SRIT technology contained at the ITU-R URL location specified in Table 1 Part B and Table 2 Part B. The following notes apply to the sections below:

- 1) The identified Transposing Organizations¹⁵ should make their reference material available from their website.
- 2) This information was supplied by the Transposing Organizations and relates to their own deliverables of the transposed global core specification.

Section 2.1 contains titles and synopses of the Global Core Specification of IMT-2020 radio interface technology and the related hyperlinks to the transposed standards.

The specific 3GPP specifications of the Global Core Specifications (GCS) for the SRIT component RIT '3GPP NR' that are being transposed in § 2.1 are summarized in Table 16.

¹⁵ The following identified Transposing Organizations have provided their transposed sets of standards information contained in this section:

- European Telecommunications Standards Institute (ETSI).

TABLE 16

3GPP specifications in § 2.1 that are to be transposed for component RIT ‘3GPP NR’

PART A				
List of specifications				
37.xxx Series	38.100 Series	38.200 Series	38.300 Series	38.400 Series
TS 37.104	TS 38.101-1	TS 38.201	TS 38.300	TS 38.401
TS 37.105	TS 38.101-2	TS 38.202	TS 38.304	TS 38.410
TS 37.113	TS 38.101-3	TS 38.211	TS 38.305	TS 38.411
TS 37.114	TS 38.104	TS 38.212	TS 38.306	TS 38.412
TS 37.320	TS 38.106	TS 38.213	TS 38.307	TS 38.413
TS 37.324	TS 38.113	TS 38.214	TS 38.314	TS 38.414
TS 37.340	TS 38.114	TS 38.215	TS 38.321	TS 38.415
TS 37.355	TS 38.124		TS 38.322	TS 38.420
TS 37.460	TS 38.133		TS 38.323	TS 38.421
TS 37.461	TS 38.174		TS 38.331	TS 38.422
TS 37.462	TS 38.175		TS 38.340	TS 38.423
TS 37.466			TS 38.351	TS 38.424
TS 37.470			TS 38.355	TS 38.425
TS 37.471				TS 38.455
TS 37.472				TS 38.460
TS 37.473				TS 38.461
TS 37.480				TS 38.462
TS 37.481				TS 38.463
TS 37.482				TS 38.470
TS 37.483				TS 38.471
				TS 38.472
				TS 38.473
				TS 38.474
PART B				
Specification versions to be used				
The specific versions of the 3GPP specifications that are to be used for the transpositions of those specifications listed in Table 16 are provided in the link below: Click here for the direct link to the GCS material.				

The specific ETSI specifications of the Global Core Specifications (GCS) for the SRIT component RIT ‘*ETSI DECT-2020 NR*’ that are being transposed in § 2.2 are summarized in Table 17.

TABLE 17

**ETSI specifications in § 2.1 that are to be transposed for component
RIT ‘ETSI DECT-2020 NR’**

PART A	
List of specifications	
	TS 103 636-1
	TS 103 636-2
	TS 103 636-3
	TS 103 636-4
	TS 103 636-5
	TS 103 634
	TS 103 874-1
	TS 103 874-2
	TS 103 874-3
PART B	
Specification versions to be used	
The specific versions of the DECT specifications that are to be used for the transpositions of those specifications listed in Table 17 are provided in the link below: Click here for the direct link to the GCS material.	

4.2.1 Titles and synopses of the global core specification and the transposed standards for the component RIT 3GPP NR

4.2.1.1 Introduction

The standards documents referenced below, as transposed from the relevant 3GPP specifications, are provided by ETSI as the transposed sets of standards for the terrestrial radio interface of IMT-2020 identified as 5G and includes not only the key characteristics of IMT-2020 but also the additional capabilities of 5G both of which are continuing to be enhanced.

4.2.1.2 Radio Layer 1

4.2.1.2.1 TS 38.201

NR; Physical layer; General description

This document provides a general description of the physical layer of NR radio interface. This document also describes the document structure of the 3GPP physical layer specifications, i.e. TS 38.200 series.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 201	15.0.0	Published	18.09.2018	https://www.etsi.org/deliver/etsi_ts/138200_138299/138201/15.00.00_60/ts_138201v150000p.pdf
Release 16					
ETSI	ETSI TS 138 201	16.0.0	Published	21.09.2020	https://www.etsi.org/deliver/etsi_ts/138200_138299/138201/16.00.00_60/ts_138201v160000p.pdf
Release 17					
ETSI	ETSI TS 138 201	17.0.0	Published	11.05.2022	https://www.etsi.org/deliver/etsi_ts/138200_138299/138201/17.00.00_60/ts_138201v170000p.pdf
Release 18					
ETSI	ETSI TS 138 201	18.0.0	Published	27.05.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138201/18.00.00_60/ts_138201v180000p.pdf

4.2.1.2.2 TS 38.202

NR; Services provided by the physical layer

This document is a technical specification of the services provided by the physical layer of 5G-NR to upper layers.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 202	15.6.0	Published	21.01.2020	https://www.etsi.org/deliver/etsi_ts/138200_138299/138202/15.06.00_60/ts_138202v150600p.pdf
Release 16					
ETSI	ETSI TS 138 202	16.4.0	Published	01.02.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138202/16.04.00_60/ts_138202v160400p.pdf
Release 17					
ETSI	ETSI TS 138 202	17.5.0	Published	01.02.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138202/17.05.00_60/ts_138202v170500p.pdf
Release 18					
ETSI	ETSI TS 138 202	18.4.0	Published	02.10.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138202/18.04.00_60/ts_138202v180400p.pdf

4.2.1.2.3 TS 38.211

NR; Physical channels and modulation

This document describes the physical channels and signals for 5G-NR.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 211	15.10.0	Published	26.01.2022	https://www.etsi.org/deliver/etsi_ts/138200_138299/138211/15.10.00_60/ts_138211v151000p.pdf
Release 16					
ETSI	ETSI TS 138 211	16.10.0	Published	20.07.2022	https://www.etsi.org/deliver/etsi_ts/138200_138299/138211/16.10.00_60/ts_138211v161000p.pdf
Release 17					
ETSI	ETSI TS 138 211	17.9.0	Published	02.10.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138211/17.09.00_60/ts_138211v170900p.pdf
Release 18					
ETSI	ETSI TS 138 211	18.4.0	Published	02.10.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138211/18.04.00_60/ts_138211v180400p.pdf

4.2.1.2.4 TS 38.212

NR; Multiplexing and channel coding

This document specifies the coding, multiplexing and mapping to physical channels for 5G NR.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 212	15.13.0	Published	26.01.2022	https://www.etsi.org/deliver/etsi_ts/138200_138299/138212/15.13.00_60/ts_138212v151300p.pdf
Release 16					
ETSI	ETSI TS 138 212	16.14.0	Published	05.08.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138212/16.14.00_60/ts_138212v161400p.pdf
Release 17					
ETSI	ETSI TS 138 212	17.9.0	Published	05.08.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138212/17.09.00_60/ts_138212v170900p.pdf
Release 18					
ETSI	ETSI TS 138 212	18.4.0	Published	02.10.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138212/18.04.00_60/ts_138212v180400p.pdf

4.2.1.2.5 TS 38.213

NR; Physical layer procedures for control

This document specifies and establishes the characteristics of the physical layer procedures for control operations in 5G-NR.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 213	15.15.0	Published	20.07.2022	https://www.etsi.org/deliver/etsi_ts/138200_138299/138213/15.15.00_60/ts_138213v151500p.pdf
Release 16					
ETSI	ETSI TS 138 213	16.17.0	Published	22.04.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138213/16.17.00_60/ts_138213v161700p.pdf

Release 17

SDO	Document No.	Version	Status	Issued date	Location
ETSI	ETSI TS 138 213	17.11.0	Published	02.10.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138213/17.11.00_60/ts_138213v171100p.pdf

Release 18

ETSI	ETSI TS 138 213	18.4.0	Published	02.10.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138213/18.04.00_60/ts_138213v180400p.pdf

4.2.1.2.6 TS 38.214**NR; Physical layer procedures for data**

This document specifies and establishes the characteristics of the physicals layer procedures of data channels for 5G-NR.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 214	15.16.0	Published	26.04.2022	https://www.etsi.org/deliver/etsi_ts/138200_138299/138214/15.16.00_60/ts_138214v151600p.pdf
Release 16					
ETSI	ETSI TS 138 214	16.17.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138214/16.17.00_60/ts_138214v161700p.pdf
Release 17					
ETSI	ETSI TS 138 214	17.11.0	Published	02.10.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138214/17.11.00_60/ts_138214v171100p.pdf
Release 18					
ETSI	ETSI TS 138 214	18.4.0	Published	02.10.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138214/18.04.00_60/ts_138214v180400p.pdf

4.2.1.2.7 TS 38.215**NR; Physical layer measurements**

This document describes the physical layer measurements for NR.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 215	15.7.0	Published	20.07.2020	https://www.etsi.org/deliver/etsi_ts/138200_138299/138215/15.07.00_60/ts_138215v150700p.pdf
Release 16					
ETSI	ETSI TS 138 215	16.7.0	Published	01.02.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138215/16.07.00_60/ts_138215v160700p.pdf
Release 17					
ETSI	ETSI TS 138 215	17.5.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138215/17.05.00_60/ts_138215v170500p.pdf
Release 18					
ETSI	ETSI TS 138 215	18.3.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138200_138299/138215/18.03.00_60/ts_138215v180300p.pdf

4.2.1.3 Radio Layers 2 and 3

4.2.1.3.1 TS 37.320

Universal Terrestrial Radio Access (UTRA) and Evolved Universal Terrestrial Radio Access (E-UTRA); Radio measurement collection for Minimization of Drive Tests (MDT); Overall description; Stage 2

This document provides an overview and overall description of the minimization of drive tests functionality. The document describes functions and procedures to support collection of UE-specific measurements for MDT using Control Plane architecture, for both UTRAN and E-UTRAN. Details of the signalling procedures for single-RAT operation are specified in the appropriate radio interface protocol specification. Network operation and overall control of MDT is described in OAM specifications.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 137 320	15.0.0	Published	16.07.2018	https://www.etsi.org/deliver/etsi_ts/137300_137399/137320/15.00.00_60/ts_137320v150000p.pdf
Release 16					
ETSI	ETSI TS 137 320	16.8.0	Published	06.05.2022	https://www.etsi.org/deliver/etsi_ts/137300_137399/137320/16.08.00_60/ts_137320v160800p.pdf
Release 17					
ETSI	ETSI TS 137 320	17.5.0	Published	09.10.2023	https://www.etsi.org/deliver/etsi_ts/137300_137399/137320/17.05.00_60/ts_137320v170500p.pdf
Release 18					
ETSI	ETSI TS 137 320	18.3.0	Published	20.01.2023	https://www.etsi.org/deliver/etsi_ts/137300_137399/137320/18.03.00_60/ts_137320v180300p.pdf

4.2.1.3.2 TS 37.324

Evolved Universal Terrestrial Radio Access (E-UTRA) and NR; Service Data Adaptation Protocol (SDAP) specification

This document specifies the Service Data Adaptation Protocol (SDAP) for a UE with connection to the 5G-CN.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 137 324	15.1.0	Published	28.09.2018	https://www.etsi.org/deliver/etsi_ts/137300_137399/137324/15.01.00_60/ts_137324v150100p.pdf
Release 16					
ETSI	ETSI TS 137 324	16.3.0	Published	08.09.2021	https://www.etsi.org/deliver/etsi_ts/137300_137399/137324/16.03.00_60/ts_137324v160300p.pdf
Release 17					
ETSI	ETSI TS 137 324	17.0.0	Published	09.05.2022	https://www.etsi.org/deliver/etsi_ts/137300_137399/137324/17.00.00_60/ts_137324v170000p.pdf
Release 18					
ETSI	ETSI TS 137 324	18.0.0	Published	15.05.2024	https://www.etsi.org/deliver/etsi_ts/137300_137399/137324/18.00.00_60/ts_137324v180000p.pdf

4.2.1.3.3 TS 37.340

NR; Multi-connectivity; Overall description; Stage-2

This document provides an overview of the multi-connectivity operation using E-UTRA and NR radio access technologies. Details of the network and radio interface protocols are specified in companion specifications of the 36 and 38 series.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 137 340	15.16.0	Published	06.05.2022	https://www.etsi.org/deliver/etsi_ts/137300_137399/137340/15.16.00_60/ts_137340v151600p.pdf
Release 16					
ETSI	ETSI TS 137 340	16.13.0	Published	09.10.2023	https://www.etsi.org/deliver/etsi_ts/137300_137399/137340/16.13.00_60/ts_137340v161300p.pdf
Release 17					
ETSI	ETSI TS 137 340	17.7.0	Published	31.01.2024	https://www.etsi.org/deliver/etsi_ts/137300_137399/137340/17.07.00_60/ts_137340v170700p.pdf
Release 18					
ETSI	ETSI TS 137 340	18.3.0	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/137300_137399/137340/18.03.00_60/ts_137340v180300p.pdf

4.2.1.3.4 TS 37.355

LTE Positioning Protocol (LPP)

This document contains the definition of the LTE Positioning Protocol (LPP) for the radio access technologies E-UTRA/LTE and NR.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 137 355	15.3.0	Published	09.05.2022	https://www.etsi.org/deliver/etsi_ts/137300_137399/137355/15.03.00_60/ts_137355v150300p.pdf
Release 16					
ETSI	ETSI TS 137 355	16.13.0	Published	07.05.2024	https://www.etsi.org/deliver/etsi_ts/137300_137399/137355/16.13.00_60/ts_137355v161300p.pdf
Release 17					
ETSI	ETSI TS 137 355	17.8.0	Published	07.05.2024	https://www.etsi.org/deliver/etsi_ts/137300_137399/137355/17.08.00_60/ts_137355v170800p.pdf
Release 18					
ETSI	ETSI TS 137 355	18.3.0	Published	14.10.2024	https://www.etsi.org/deliver/etsi_ts/137300_137399/137355/18.03.00_60/ts_137355v180300p.pdf

4.2.1.3.5 TS 38.300

NR; NR and NG-RAN Overall description; Stage-2

This document provides an overview and overall description of the NG-RAN and focuses on the radio interface protocol architecture of NR connected to 5GC (E-UTRA connected to 5GC is covered in the 36 series). Details of the radio interface protocols are specified in companion specifications of the 38 series.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 300	15.18.0	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138300/15.18.00_60/ts_138300v151800p.pdf

Release 16

SDO	Document No.	Version	Status	Issued date	Location
ETSI	ETSI TS 138 300	16.17.0	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138300/16.17.00_60/ts_138300v161700p.pdf

Release 17

ETSI	ETSI TS 138 300	17.10.0	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138300/17.10.00_60/ts_138300v171000p.pdf

Release 18

ETSI	ETSI TS 138 300	18.3.0	Published	14.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138300/18.03.00_60/ts_138300v180300p.pdf

4.2.1.3.6 TS 38.304**NR; User Equipment (UE) procedures in idle mode and in RRC Inactive state**

This document specifies the Access Stratum (AS) part of the UE procedures in RRC_IDLE state (also called Idle mode) and RRC_INACTIVE state. The non-access stratum (NAS) part of Idle mode procedures and processes is specified in TS 23.122.

This document specifies the model for the functional division between the NAS and AS in a UE.

This document applies to all UEs that support at least NR Radio Access, including multi-RAT UEs as described in 3GPP specifications, in the following cases:

- When the UE is camped on a NR cell;
- When the UE is searching for a cell to camp on.

NOTE – When the UE is camped on or searching for a cell to camp on belonging to other RATs, the UE behaviour is described in the specifications of the other RATs.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 304	15.8.0	Published	10.04.2021	https://www.etsi.org/deliver/etsi_ts/138300_138399/138304/15.08.00_60/ts_138304v150800p.pdf
Release 16					
ETSI	ETSI TS 138 304	16.10.0	Published	31.07.2023	https://www.etsi.org/deliver/etsi_ts/138300_138399/138304/16.10.00_60/ts_138304v161000p.pdf
Release 17					
ETSI	ETSI TS 138 304	17.9.0	Published	12.08.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138304/17.09.00_60/ts_138304v170900p.pdf
Release 18					
ETSI	ETSI TS 138 304	18.3.0	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138304/18.03.00_60/ts_138304v180300p.pdf

4.2.1.3.7 TS 38.305**NG Radio Access Network (NG-RAN); Stage 2 functional specification of User Equipment (UE) positioning in NG-RAN**

This document specifies the stage 2 of the UE Positioning function of NG-RAN which provides the mechanisms to support or assist the calculation of the geographical position of a UE. UE position knowledge can be used, for example, in support of Radio Resource Management functions, as well as location-based services for operators, subscribers, and third-party service providers. The purpose of this stage 2 specification is to define the NG-RAN UE Positioning architecture, functional entities and operations to support positioning methods. This description is confined to the NG-RAN Access Stratum. It does not define or describe how the results of the UE position calculation can be utilised in the Core Network (e.g., LCS) or in NG-RAN (e.g., RRM).

UE Positioning may be considered as a network-provided enabling technology consisting of standardised service capabilities that enable the provision of location applications. The application(s) may be service provider specific. The description of the numerous and varied possible location applications which are enabled by this technology is outside the scope of this document. However, clarifying examples of how the functionality being described may be used to provide specific location services may be included.

This stage 2 specification covers the NG-RAN positioning methods, state descriptions, and message flows to support UE Positioning.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 305	15.10.0	Published	26.07.2023	https://www.etsi.org/deliver/etsi_ts/138300_138399/138305/15.10.00_60/ts_138305v151000p.pdf
Release 16					
ETSI	ETSI TS 138 305	16.10.0	Published	02.02.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138305/16.10.00_60/ts_138305v161000p.pdf
Release 17					
ETSI	ETSI TS 138 305	17.7.0	Published	02.02.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138305/17.07.00_60/ts_138305v170700p.pdf
Release 18					
ETSI	ETSI TS 138 305	18.3.0	Published	14.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138305/18.03.00_60/ts_138305v180300p.pdf

4.2.1.3.8 TS 38.306

NR; User Equipment (UE) radio access capabilities

This document defines the NR UE Radio Access Capability Parameters.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 306	15.26.0	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138306/15.26.00_60/ts_138306v152600p.pdf
Release 16					
ETSI	ETSI TS 138 306	16.18.0	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138306/16.18.00_60/ts_138306v161800p.pdf
Release 17					
ETSI	ETSI TS 138 306	17.10.0	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138306/17.10.00_60/ts_138306v171000p.pdf
Release 18					
ETSI	ETSI TS 138 306	18.3.0	Published	14.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138306/18.03.00_60/ts_138306v180300p.pdf

4.2.1.3.9 TS 38.307

NR; Requirements on User Equipments (UEs) supporting a release-independent frequency band

This document specifies requirements for UEs supporting release independent features such as additional NR operating bands and power classes on top of TS 38.101 and TS 38.133.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 307	15.11.0	Published	03.05.2023	https://www.etsi.org/deliver/etsi_ts/138300_138399/138307/15.11.00_60/ts_138307v151100p.pdf

Release 16

SDO	Document No.	Version	Status	Issued date	Location
ETSI	ETSI TS 138 307	16.16.0	Published	15.05.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138307/16.16.00_60/ts_138307v161600p.pdf

Release 17

ETSI	ETSI TS 138 307	17.13.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138307/17.13.00_60/ts_138307v171300p.pdf

Release 18

ETSI	ETSI TS 138 307	18.2.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138307/18.02.00_60/ts_138307v180200p.pdf

4.2.1.3.10 TS 38.314**NR; Layer 2 measurements**

This document contains the description and definition of the measurements performed by NR or the UE that are transferred over the standardised interfaces in order to support NR radio link operations, radio resource management (RRM), network operations and maintenance (OAM), minimization of drive tests (MDT) and self-organising networks (SON).

Only the differences relative to TS 28.552 are specified in this specification.

SDO	Document No.	Version	Status	Issued date	Location
Release 16					
ETSI	ETSI TS 138 314	16.4.0	Published	13.10.2021	https://www.etsi.org/deliver/etsi_ts/138300_138399/138314/16.04.00_60/ts_138314v160400p.pdf
Release 17					
ETSI	ETSI TS 138 314	17.5.0	Published	14.05.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138314/17.05.00_60/ts_138314v170500p.pdf
Release 18					
ETSI	ETSI TS 138 314	18.0.0	Published	27.05.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138314/18.00.00_60/ts_138314v180000p.pdf

4.2.1.3.11 TS 38.321**NR; Medium Access Control (MAC) protocol specification**

This document specifies the NR MAC protocol.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 321	15.13.0	Published	06.05.2022	https://www.etsi.org/deliver/etsi_ts/138300_138399/138321/15.13.00_60/ts_138321v151300p.pdf
Release 16					
ETSI	ETSI TS 138 321	16.17.0	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138321/16.17.00_60/ts_138321v161700p.pdf
Release 17					
ETSI	ETSI TS 138 321	17.10.0	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138321/17.10.00_60/ts_138321v171000p.pdf
Release 18					
ETSI	ETSI TS 138 321	18.3.0	Published	14.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138321/18.03.00_60/ts_138321v180300p.pdf

4.2.1.3.12 TS 38.322

NR; Radio Link Control (RLC) protocol specification

This document specifies the NR Radio Link Control (RLC) protocol for the UE – NR radio interface.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 322	15.5.0	Published	10.05.2019	https://www.etsi.org/deliver/etsi_ts/138300_138399/138322/15.05.00_60/ts_138322v150500p.pdf
Release 16					
ETSI	ETSI TS 138 322	16.3.0	Published	17.08.2022	https://www.etsi.org/deliver/etsi_ts/138300_138399/138322/16.03.00_60/ts_138322v160300p.pdf
Release 17					
ETSI	ETSI TS 138 322	17.4.0	Published	15.05.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138322/17.04.00_60/ts_138322v170400p.pdf
Release 18					
ETSI	ETSI TS 138 322	18.1.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138322/18.01.00_60/ts_138322v180100p.pdf

4.2.1.3.13 TS 38.323

NR; Packet Data Convergence Protocol (PDCP) specification

This document provides the description of the Packet Data Convergence Protocol (PDCP).

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 323	15.8.0	Published	09.10.2021	https://www.etsi.org/deliver/etsi_ts/138300_138399/138323/15.08.00_60/ts_138323v150800p.pdf
Release 16					
ETSI	ETSI TS 138 323	16.8.0	Published	20.01.2023	https://www.etsi.org/deliver/etsi_ts/138300_138399/138323/16.08.00_60/ts_138323v160800p.pdf
Release 17					
ETSI	ETSI TS 138 323	17.5.0	Published	26.07.2023	https://www.etsi.org/deliver/etsi_ts/138300_138399/138323/17.05.00_60/ts_138323v170500p.pdf
Release 18					
ETSI	ETSI TS 138 323	18.3.0	Published	14.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138323/18.03.00_60/ts_138323v180300p.pdf

4.2.1.3.14 TS 38.331

NR; Radio Resource Control (RRC); Protocol specification

This document specifies the Radio Resource Control protocol for the radio interface between UE and NG-RAN.

The scope of this document also includes:

- the radio related information transported in a transparent container between source gNB and target gNB upon inter gNB handover;
- the radio related information transported in a transparent container between a source or target gNB and another system upon inter RAT handover;
- the radio related information transported in a transparent container between a source eNB and target gNB during E-UTRA-NR Dual Connectivity.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 331	15.27.1	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138331/15.27.00_60/ts_138331v152700p.pdf
Release 16					
ETSI	ETSI TS 138 331	16.18.0	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138331/16.18.00_60/ts_138331v161800p.pdf
Release 17					
ETSI	ETSI TS 138 331	17.10.0	Published	17.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138331/17.10.00_60/ts_138331v171000p.pdf
Release 18					
ETSI	ETSI TS 138 331	18.3.0	Published	14.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138331/18.03.00_60/ts_138331v180300p.pdf

4.2.1.3.15 TS 38.340

NR; Backhaul Adaptation Protocol (BAP) specification

This document provides description of the Backhaul Adaptation Protocol (BAP).

SDO	Document No.	Version	Status	Issued date	Location
Release 16					
ETSI	ETSI TS 138 340	16.5.0	Published	09.10.2021	https://www.etsi.org/deliver/etsi_ts/138300_138399/138340/16.05.00_60/ts_138340v160500p.pdf
Release 17					
ETSI	ETSI TS 138 340	17.5.0	Published	26.07.2023	https://www.etsi.org/deliver/etsi_ts/138300_138399/138340/17.05.00_60/ts_138340v170500p.pdf
Release 18					
ETSI	ETSI TS 138 340	18.1.0	Published	14.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138340/18.01.00_60/ts_138340v180100p.pdf

4.2.1.3.16 TS 38.351

NR; Sidelink Relay Adaptation Protocol (SRAP) specification

This document provides description of the Sidelink Relay Adaptation Protocol (SRAP).

SDO	Document No.	Version	Status	Issued date	Location
Release 17					
ETSI	ETSI TS 138 351	17.7.0	Published	13.05.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138351/17.07.00_60/ts_138351v170700p.pdf
Release 18					
ETSI	ETSI TS 138 351	18.2.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138351/18.02.00_60/ts_138351v180200p.pdf

4.2.1.3.17 TS 38.355

NR; Sidelink Positioning Protocol (SLPP); Protocol Specification

This document specifies the Sidelink Positioning Protocol (SLPP) for the interface between UEs and between UE and LMF.

SDO	Document No.	Version	Status	Issued date	Location
Release 18					
ETSI	ETSI TS 138 355	18.3.0	Published	14.10.2024	https://www.etsi.org/deliver/etsi_ts/138300_138399/138355/18.03.00_60/ts_138355v180300p.pdf

4.2.1.4 Architecture

4.2.1.4.1 TS 37.460

Iuant interface: General aspects and principles

This document is an introduction to the 3GPP TS 37.46x series of Technical Specifications that define the Iuant Interface. The Iuant interface is applicable for UTRAN, E-UTRAN and NG-RAN. In this specification UTRAN, E-UTRAN and NG-RAN are denoted as “RAN”, whereas the corresponding network entities Node B, eNB, en-gNB and NG-RAN node are denoted as “RAN Node”. The logical Iuant interface is an interface internal to the RAN Node and defined to reside between the implementation specific O&M function and the RET antennas and between the implementation specific O&M function and the TMA control unit function.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 137 460	15.2.0	Published	17.01.2020	https://www.etsi.org/deliver/etsi_ts/137400_137499/137460/15.02.00_60/ts_137460v150200p.pdf
Release 16					
ETSI	ETSI TS 137 460	16.0.0	Published	15.09.2020	https://www.etsi.org/deliver/etsi_ts/137400_137499/137460/16.00.00_60/ts_137460v160000p.pdf
Release 17					
ETSI	ETSI TS 137 460	17.0.0	Published	29.04.2022	https://www.etsi.org/deliver/etsi_ts/137400_137499/137460/17.00.00_60/ts_137460v170000p.pdf
Release 18					
ETSI	ETSI TS 137 460	18.0.0	Published	23.05.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137460/18.00.00_60/ts_137460v180000p.pdf

4.2.1.4.2 TS 37.461

Iuant interface: Layer 1

This document specifies the standards allowed to implement layer 1 on the Iuant interface for UTRA, E-UTRA and NR.

The specification of transmission delay requirements and O&M requirements are not in the scope of this document.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 137 461	15.5.0	Published	20.07.2022	https://www.etsi.org/deliver/etsi_ts/137400_137499/137461/15.05.00_60/ts_137461v150500p.pdf
Release 16					
ETSI	ETSI TS 137 461	16.1.0	Published	20.07.2022	https://www.etsi.org/deliver/etsi_ts/137400_137499/137461/16.01.00_60/ts_137461v160100p.pdf
Release 17					
ETSI	ETSI TS 137 461	17.1.0	Published	20.07.2022	https://www.etsi.org/deliver/etsi_ts/137400_137499/137461/17.01.00_60/ts_137461v170100p.pdf
Release 18					
ETSI	ETSI TS 137 461	18.0.0	Published	23.05.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137461/18.00.00_60/ts_137461v180000p.pdf

4.2.1.4.3 TS 37.462

Iuant interface: Signalling transport

This document specifies the signalling transport related to RETAP and TMAAP signalling to be used across the Iuant interface for UTRAN, E-UTRAN and NG-RAN. In this specification UTRAN, E-UTRAN and NG-RAN are denoted as “RAN”, whereas the corresponding network entities Node B, eNB, en-gNB and NG-RAN node are denoted as “RAN Node”. The logical Iuant interface is an interface internal to the RAN Node and defined to reside between the implementation specific O&M function and the RET antennas and between the implementation specific O&M function and the TMA control unit function.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 137 462	15.2.0	Published	17.01.2020	https://www.etsi.org/deliver/etsi_ts/137400_137499/137462/15.02.00_60/ts_137462v150200p.pdf
Release 16					
ETSI	ETSI TS 137 462	16.0.0	Published	17.09.2020	https://www.etsi.org/deliver/etsi_ts/137400_137499/137462/16.00.00_60/ts_137462v160000p.pdf
Release 17					
ETSI	ETSI TS 137 462	17.0.0	Published	29.04.2022	https://www.etsi.org/deliver/etsi_ts/137400_137499/137462/17.00.00_60/ts_137462v170000p.pdf
Release 18					
ETSI	ETSI TS 137 462	18.0.0	Published	23.05.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137462/18.00.00_60/ts_137462v180000p.pdf

4.2.1.4.4 TS 37.466

Iuant interface: Application part

This document is an introduction to the 3GPP TS 37.46x series of Technical Specifications that define the Iuant Interface. The Iuant interface is applicable for UTRAN, E-UTRAN and NG-RAN. In this specification UTRAN, E-UTRAN and NG-RAN are denoted as “RAN”, whereas the corresponding network entities Node B, eNB, en-gNB and NG-RAN node are denoted as “RAN Node”. The logical Iuant interface is an interface internal to the RAN Node and defined to reside between the implementation specific O&M function and the RET antennas together with the TMAs control unit function of the RAN Node.

This document is applicable for UTRAN, E-UTRAN and NG-RAN and specifies the *Remote Electrical Tilting Application Part (RETAP)* and the *Tower Mounted Amplifier Application Part (TMAAP)*. In this specification UTRAN, E-UTRAN and NG-RAN are denoted as “RAN”, whereas the corresponding network entities Node B, eNB, en-gNB and NG-RAN node are denoted as “RAN Node”. RETAP supports the functions of the Iuant interface between the implementation specific O&M transport function and the RET Antenna Control unit function, TMAAP supports the functions of the Iuant interface between the implementation specific O&M transport function and the TMA control function.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 137 466	15.5.0	Published	17.01.2020	https://www.etsi.org/deliver/etsi_ts/137400_137499/137466/15.05.00_60/ts_137466v150500p.pdf
Release 16					
ETSI	ETSI TS 137 466	16.0.0	Published	18.09.2020	https://www.etsi.org/deliver/etsi_ts/137400_137499/137466/16.00.00_60/ts_137466v160000p.pdf
Release 17					
ETSI	ETSI TS 137 466	17.0.0	Published	29.04.2022	https://www.etsi.org/deliver/etsi_ts/137400_137499/137466/17.00.00_60/ts_137466v170000p.pdf
Release 18					
ETSI	ETSI TS 137 466	18.0.0	Published	27.05.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137466/18.00.00_60/ts_137466v180000p.pdf

4.2.1.4.5 TS 37.470

W1 interface; General aspects and principles

This document is an introduction to the 3GPP TS 37.4xx series of technical specifications that define the W1 interface. The W1 interface provides means for interconnecting a ng-eNB-CU and a ng-eNB-DU of a ng-eNB within a NG-RAN.

SDO	Document No.	Version	Status	Issued date	Location
Release 16					
ETSI	ETSI TS 137 470	16.2.0	Published	15.09.2020	https://www.etsi.org/deliver/etsi_ts/137400_137499/137470/16.02.00_60/ts_137470v160200p.pdf
Release 17					
ETSI	ETSI TS 137 470	17.0.0	Published	29.04.2022	https://www.etsi.org/deliver/etsi_ts/137400_137499/137470/17.00.00_60/ts_137470v170000p.pdf
Release 18					
ETSI	ETSI TS 137 470	18.0.0	Published	03.05.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137470/18.00.00_60/ts_137470v180000p.pdf

4.2.1.4.6 TS 37.471

W1 interface; Layer 1

This document specifies the standards allowed to implement Layer 1 on the W1 interface. The W1 interface provides means for interconnecting a ng-eNB-CU and a ng-eNB-DU of a ng-eNB within a NG-RAN.

The specification of transmission delay requirements and O&M requirements are not in the scope of this document.

SDO	Document No.	Version	Status	Issued date	Location
Release 16					
ETSI	ETSI TS 137 471	16.1.0	Published	21.09.2020	https://www.etsi.org/deliver/etsi_ts/137400_137499/137471/16.01.00_60/ts_137471v160100p.pdf
Release 17					
ETSI	ETSI TS 137 471	17.0.0	Published	29.04.2022	https://www.etsi.org/deliver/etsi_ts/137400_137499/137471/17.00.00_60/ts_137471v170000p.pdf
Release 18					
ETSI	ETSI TS 137 471	18.0.0	Published	03.05.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137471/18.00.00_60/ts_137471v180000p.pdf

4.2.1.4.7 TS 37.472

W1 interface; Signalling transport

This document specifies the standards for Signalling Transport to be used across the W1 interface. The W1 interface provides means for interconnecting a ng-eNB-CU and a ng-eNB-DU of a ng-eNB within a NG-RAN. This document describes how the W1AP signalling messages are transported over W1.

SDO	Document No.	Version	Status	Issued date	Location
Release 16					
ETSI	ETSI TS 137 472	16.2.0	Published	16.11.2020	https://www.etsi.org/deliver/etsi_ts/137400_137499/137472/16.02.00_60/ts_137472v160200p.pdf
Release 17					
ETSI	ETSI TS 137 472	17.0.0	Published	29.04.2022	https://www.etsi.org/deliver/etsi_ts/137400_137499/137472/17.00.00_60/ts_137472v170000p.pdf

Release 18

SDO	Document No.	Version	Status	Issued date	Location
ETSI	ETSI TS 137 472	18.0.0	Published	03.05.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137472/18.00.00_60/ts_137472v180000p.pdf

4.2.1.4.8 TS 37.473**W1 interface; Application Protocol (W1AP)**

This document specifies the 5G radio network layer signalling protocol for the W1 interface. The W1 interface provides means for interconnecting a ng-eNB-CU and a ng-eNB-DU of a ng-eNB within an NG-RAN. The W1 Application Protocol (W1AP) supports the functions of W1 interface by signalling procedures defined in this document. W1AP is developed in accordance to the general principles stated in TS 38.401 and TS 37.470.

SDO	Document No.	Version	Status	Issued date	Location
Release 16					
ETSI	ETSI TS 137 473	16.9.0	Published	20.07.2022	https://www.etsi.org/deliver/etsi_ts/137400_137499/137473/16.09.00_60/ts_137473v160900p.pdf
Release 17					
ETSI	ETSI TS 137 473	17.2.0	Published	27.04.2023	https://www.etsi.org/deliver/etsi_ts/137400_137499/137473/17.02.00_60/ts_137473v170200p.pdf
Release 18					
ETSI	ETSI TS 137 473	18.0.0	Published	03.05.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137473/18.00.00_60/ts_137473v180000p.pdf

4.2.1.4.9 TS 37.480**E1 general aspects and principles**

This document is an introduction to the 3GPP TS 37.48x series of technical specifications that define the E1 interface. The E1 interface provides means for interconnecting a gNB-CU-CP and a gNB-CU-UP of a gNB-CU within an NG-RAN, or for interconnecting a gNB-CU-CP and a gNB-CU-UP of an en-gNB within an E-UTRAN, or for interconnecting an eNB-CP and an eNB-UP of an eNB within an E-UTRAN, or for interconnecting an ng-eNB-CU-CP and an ng-eNB-CU-UP of an ng-eNB-CU within an NG-RAN.

SDO	Document No.	Version	Status	Issued date	Location
Release 17					
ETSI	ETSI TS 137 480	17.2.0	Published	02.02.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137480/17.02.00_60/ts_137480v170200p.pdf
Release 18					
ETSI	ETSI TS 137 480	18.1.0	Published	27.05.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137480/18.01.00_60/ts_137480v180100p.pdf

4.2.1.4.10 TS 37.481**E1 layer 1**

This document specifies the standards allowed to implement layer 1 on the E1 interface.

The specification of transmission delay requirements and O&M requirements are not in the scope of this document.

SDO	Document No.	Version	Status	Issued date	Location
Release 17					
ETSI	ETSI TS 137 481	17.0.0	Published	07.04.2022	https://www.etsi.org/deliver/etsi_ts/137400_137499/137481/17.00.00_60/ts_137481v170000p.pdf
Release 18					
ETSI	ETSI TS 137 481	18.0.0	Published	03.05.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137481/18.00.00_60/ts_137481v180000p.pdf

4.2.1.4.11 TS 37.482

E1 signalling transport

This document specifies the standards for Signalling Transport to be used across the E1 interface. The E1 interface provides means for the interconnection of gNB-CU-CP and gNB-CU-UP within the NG-RAN architecture (TS 38.401), or for the interconnection of ng-eNB-CU-CP and ng-eNB-CU-UP within the NG-RAN architecture (TS 38.401), or for the interconnection of eNB-CP and eNB-UP within the E-UTRAN architecture (TS 36.401).

SDO	Document No.	Version	Status	Issued date	Location
Release 17					
ETSI	ETSI TS 137 482	17.4.0	Published	22.04.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137482/17.04.00_60/ts_137482v170400p.pdf
Release 18					
ETSI	ETSI TS 137 482	18.1.0	Published	05.08.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137482/18.01.00_60/ts_137482v180100p.pdf

4.2.1.4.12 TS 37.483

E1 Application Protocol (E1AP)

This document specifies the 5G radio network layer signalling protocol for the E1 interface. The E1 interface provides means for interconnecting a gNB-CU-CP and a gNB-CU-UP of a gNB within an NG-RAN, or for interconnecting a gNB-CU-CP and a gNB-CU-UP of an en-gNB within an E-UTRAN, or for interconnecting an eNB-CP and an eNB-UP of an eNB within an E-UTRAN, or for interconnecting an ng-eNB-CU-CP and an ng-eNB-CU-UP of an ng-eNB within an NG-RAN. The E1 Application Protocol (E1AP) supports the functions of E1 interface by signalling procedures defined in this document. E1AP is developed in accordance to the general principles stated in TS 38.401 and TS 37.480.

SDO	Document No.	Version	Status	Issued date	Location
Release 17					
ETSI	ETSI TS 137 483	17.8.0	Published	22.04.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137483/17.08.00_60/ts_137483v170800p.pdf
Release 18					
ETSI	ETSI TS 137 483	18.2.0	Published	05.08.2024	https://www.etsi.org/deliver/etsi_ts/137400_137499/137483/18.02.00_60/ts_137483v180200p.pdf

4.2.1.4.13 TS 38.401

NG-RAN; Architecture description

This document describes the overall architecture of the NG-RAN, including interfaces NG, Xn and F1 interfaces and their interaction with the radio interface.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 401	15.10.0	Published	02.10.2023	https://www.etsi.org/deliver/etsi_ts/138400_138499/138401/15.10.00_60/ts_138401v151000p.pdf
Release 16					
ETSI	ETSI TS 138 401	16.12.0	Published	22.04.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138401/16.12.00_60/ts_138401v161200p.pdf
Release 17					
ETSI	ETSI TS 138 401	17.10.0	Published	26.09.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138401/17.10.00_60/ts_138401v171000p.pdf
Release 18					
ETSI	ETSI TS 138 401	18.3.0	Published	26.09.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138401/18.03.00_60/ts_138401v180300p.pdf

4.2.1.4.14 TS 38.410

NG-RAN; NG general aspects and principles

This document is an introduction to the 3GPP TS 38.41x series of technical specifications that define the NG interface for the interconnection of an NG-RAN node to the 5GC (5G Core Network).

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 410	15.2.0	Published	24.04.2019	https://www.etsi.org/deliver/etsi_ts/138400_138499/138410/15.02.00_60/ts_138410v150200p.pdf
Release 16					
ETSI	ETSI TS 138 410	16.4.0	Published	20.10.2021	https://www.etsi.org/deliver/etsi_ts/138400_138499/138410/16.04.00_60/ts_138410v160400p.pdf
Release 17					
ETSI	ETSI TS 138 410	17.1.0	Published	20.07.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138410/17.01.00_60/ts_138410v170100p.pdf
Release 18					
ETSI	ETSI TS 138 410	18.2.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138410/18.02.00_60/ts_138410v180200p.pdf

4.2.1.4.15 TS 38.411

NG-RAN; NG layer 1

This document specifies the standards allowed to implement layer 1 on the NG interface.

The specification of transmission delay requirements and O&M requirements are not in the scope of this document.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 411	15.0.0	Published	04.07.2018	https://www.etsi.org/deliver/etsi_ts/138400_138499/138411/15.00.00_60/ts_138411v150000p.pdf
Release 16					
ETSI	ETSI TS 138 411	16.0.0	Published	21.07.2020	https://www.etsi.org/deliver/etsi_ts/138400_138499/138411/16.00.00_60/ts_138411v160000p.pdf
Release 17					
ETSI	ETSI TS 138 411	17.0.0	Published	29.04.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138411/17.00.00_60/ts_138411v170000p.pdf
Release 18					
ETSI	ETSI TS 138 411	18.0.0	Published	03.05.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138411/18.00.00_60/ts_138411v180000p.pdf

4.2.1.4.16 TS 38.412**NG-RAN; NG signalling transport**

This document specifies the standards for signalling transport to be used across NG interface. NG interface is a logical interface between the NG-RAN and the 5GC. This document describes how the NGAP signalling messages are transported over NG.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 412	15.5.0	Published	12.11.2020	https://www.etsi.org/deliver/etsi_ts/138400_138499/138412/15.05.00_60/ts_138412v150500p.pdf
Release 16					
ETSI	ETSI TS 138 412	16.2.0	Published	28.07.2023	https://www.etsi.org/deliver/etsi_ts/138400_138499/138412/16.02.00_60/ts_138412v160200p.pdf
Release 17					
ETSI	ETSI TS 138 412	17.1.0	Published	28.07.2023	https://www.etsi.org/deliver/etsi_ts/138400_138499/138412/17.01.00_60/ts_138412v170100p.pdf
Release 18					
ETSI	ETSI TS 138 412	18.1.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138412/18.01.00_60/ts_138412v180100p.pdf

4.2.1.4.17 TS 38.413**NG-RAN; NG Application Protocol (NGAP)**

This document specifies the radio network layer signalling protocol for the NG interface. The NG Application Protocol (NGAP) supports the functions of the NG interface by signalling procedures defined in this document. NGAP is developed in accordance to the general principles stated in TS 38.401 and TS 38.410.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 413	15.13.0	Published	20.10.2021	https://www.etsi.org/deliver/etsi_ts/138400_138499/138413/15.13.00_60/ts_138413v151300p.pdf
Release 16					
ETSI	ETSI TS 138 413	16.15.0	Published	03.05.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138413/16.15.00_60/ts_138413v161500p.pdf
Release 17					
ETSI	ETSI TS 138 413	17.10.0	Published	26.09.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138413/17.10.00_60/ts_138413v171000p.pdf
Release 18					
ETSI	ETSI TS 138 413	18.3.0	Published	26.09.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138413/18.03.00_60/ts_138413v180300p.pdf

4.2.1.4.18 TS 38.414**NG-RAN; NG data transport**

This document specifies the standards for user data transport protocols and related signalling protocols to establish user plane transport bearers over the NG interface.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 414	15.3.0	Published	23.07.2020	https://www.etsi.org/deliver/etsi_ts/138400_138499/138414/15.03.00_60/ts_138414v150300p.pdf
Release 16					
ETSI	ETSI TS 138 414	16.0.0	Published	23.07.2020	https://www.etsi.org/deliver/etsi_ts/138400_138499/138414/16.00.00_60/ts_138414v160000p.pdf
Release 17					
ETSI	ETSI TS 138 414	17.0.0	Published	29.04.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138414/17.00.00_60/ts_138414v170000p.pdf
Release 18					
ETSI	ETSI TS 138 414	18.0.0	Published	06.05.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138414/18.00.00_60/ts_138414v180000p.pdf

4.2.1.4.19 TS 38.415

NG-RAN; PDU session user plane protocol

This document specifies the PDU Session user plane protocol being used over the NG-U, Xn-U and N9 interfaces. Applicability to other interfaces is not precluded.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 415	15.3.0	Published	19.08.2021	https://www.etsi.org/deliver/etsi_ts/138400_138499/138415/15.03.00_60/ts_138415v150300p.pdf
Release 16					
ETSI	ETSI TS 138 415	16.6.0	Published	21.01.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138415/16.06.00_60/ts_138415v160600p.pdf
Release 17					
ETSI	ETSI TS 138 415	17.1.0	Published	02.02.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138415/17.01.00_60/ts_138415v170100p.pdf
Release 18					
ETSI	ETSI TS 138 415	18.1.0	Published	27.05.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138415/18.01.00_60/ts_138415v180100p.pdf

4.2.1.4.20 TS 38.420

NG-RAN; Xn general aspects and principles

This document is an introduction to the TSG RAN TS 38.42x series of Technical Specifications that define the Xn interface. It is an interface for the interconnection of two NG-RAN nodes within the NG-RAN architecture (TS 38.401).

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 420	15.2.0	Published	24.04.2019	https://www.etsi.org/deliver/etsi_ts/138400_138499/138420/15.02.00_60/ts_138420v150200p.pdf
Release 16					
ETSI	ETSI TS 138 420	16.0.0	Published	21.07.2020	https://www.etsi.org/deliver/etsi_ts/138400_138499/138420/16.00.00_60/ts_138420v160000p.pdf
Release 17					
ETSI	ETSI TS 138 420	17.2.0	Published	14.10.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138420/17.02.00_60/ts_138420v170200p.pdf

Release 18

SDO	Document No.	Version	Status	Issued date	Location
ETSI	ETSI TS 138 420	18.1.0	Published	27.05.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138420/18.01.00_60/ts_138420v180100p.pdf

4.2.1.4.21 TS 38.421**NG-RAN; Xn layer 1**

This document specifies the standards allowed to implement layer 1 on the Xn interface.

The specification of transmission delay requirements and O&M requirements are not in the scope of this document.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 421	15.1.0	Published	16.10.2019	https://www.etsi.org/deliver/etsi_ts/138400_138499/138421/15.01.00_60/ts_138421v150100p.pdf
Release 16					
ETSI	ETSI TS 138 421	16.0.0	Published	21.07.2020	https://www.etsi.org/deliver/etsi_ts/138400_138499/138421/16.00.00_60/ts_138421v160000p.pdf
Release 17					
ETSI	ETSI TS 138 421	17.0.0	Published	29.04.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138421/17.00.00_60/ts_138421v170000p.pdf
Release 18					
ETSI	ETSI TS 138 421	18.0.0	Published	06.05.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138421/18.00.00_60/ts_138421v180000p.pdf

4.2.1.4.22 TS 38.422**NG-RAN; Xn signalling transport**

This document specifies the standards for signalling transport to be used across Xn interface. The Xn interface provides means for interconnecting two NG-RAN nodes. The Xn interface is a logical interface between two nodes of the NG-RAN. This document describes how the XnAP signalling messages are transported over Xn.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 422	15.4.0	Published	17.01.2020	https://www.etsi.org/deliver/etsi_ts/138400_138499/138422/15.04.00_60/ts_138422v150400p.pdf
Release 16					
ETSI	ETSI TS 138 422	16.1.0	Published	28.07.2023	https://www.etsi.org/deliver/etsi_ts/138400_138499/138422/16.01.00_60/ts_138422v160100p.pdf
Release 17					
ETSI	ETSI TS 138 422	17.1.0	Published	28.07.2023	https://www.etsi.org/deliver/etsi_ts/138400_138499/138422/17.01.00_60/ts_138422v170100p.pdf
Release 18					
ETSI	ETSI TS 138 422	18.1.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138422/18.01.00_60/ts_138422v180100p.pdf

4.2.1.4.23 TS 38.423**NG-RAN; Xn Application Protocol (XnAP)**

This document specifies the radio network layer signalling procedures of the control plane between NG-RAN nodes in NG-RAN. XnAP supports the functions of the Xn interface by signalling procedures defined in this document. XnAP is developed in accordance to the general principles stated in TS 38.401 and TS 38.420.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 423	15.20.0	Published	26.09.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138423/15.20.00_60/ts_138423v152000p.pdf
Release 16					
ETSI	ETSI TS 138 423	16.19.0	Published	26.09.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138423/16.19.00_60/ts_138423v161900p.pdf
Release 17					
ETSI	ETSI TS 138 423	17.10.0	Published	26.09.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138423/17.10.00_60/ts_138423v171000p.pdf
Release 18					
ETSI	ETSI TS 138 423	18.3.0	Published	26.09.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138423/18.03.00_60/ts_138423v180300p.pdf

4.2.1.4.24 TS 38.424**NG-RAN; Xn data transport**

This document specifies the standards for user data transport protocols and related signalling protocols to establish user plane transport bearers over the Xn interface.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 424	15.2.0	Published	23.07.2019	https://www.etsi.org/deliver/etsi_ts/138400_138499/138424/15.02.00_60/ts_138424v150200p.pdf
Release 16					
ETSI	ETSI TS 138 424	16.0.0	Published	21.07.2020	https://www.etsi.org/deliver/etsi_ts/138400_138499/138424/16.00.00_60/ts_138424v160000p.pdf
Release 17					
ETSI	ETSI TS 138 424	17.0.0	Published	29.04.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138424/17.00.00_60/ts_138424v170000p.pdf
Release 18					
ETSI	ETSI TS 138 424	18.0.0	Published	06.05.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138424/18.00.00_60/ts_138424v180000p.pdf

4.2.1.4.25 TS 38.425**NG-RAN; NR user plane protocol**

This document specifies the NR user plane protocol functions used within NG-RAN and, for EN-DC, within E-UTRAN. NR user plane protocol functions may reside in nodes terminating either the X2-U (for EN-DC) or the Xn-U or the F1-U interface.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 425	15.7.0	Published	12.11.2020	https://www.etsi.org/deliver/etsi_ts/138400_138499/138425/15.07.00_60/ts_138425v150700p.pdf
Release 16					
ETSI	ETSI TS 138 425	16.3.0	Published	28.04.2021	https://www.etsi.org/deliver/etsi_ts/138400_138499/138425/16.03.00_60/ts_138425v160300p.pdf
Release 17					
ETSI	ETSI TS 138 425	17.3.0	Published	05.05.2023	https://www.etsi.org/deliver/etsi_ts/138400_138499/138425/17.03.00_60/ts_138425v170300p.pdf
Release 18					
ETSI	ETSI TS 138 425	18.1.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138425/18.01.00_60/ts_138425v180100p.pdf

4.2.1.4.26 TS 38.455

NG-RAN; NR Positioning Protocol A (NRPPa)

This document specifies the control plane radio network layer signalling procedures between a NG-RAN node and the LMF. NRPPa supports the concerned functions by signalling procedures defined in this document.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 455	15.4.0	Published	26.08.2021	https://www.etsi.org/deliver/etsi_ts/138400_138499/138455/15.04.00_60/ts_138455v150400p.pdf
Release 16					
ETSI	ETSI TS 138 455	16.13.0	Published	02.02.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138455/16.13.00_60/ts_138455v161300p.pdf
Release 17					
ETSI	ETSI TS 138 455	17.8.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138455/17.08.00_60/ts_138455v170800p.pdf
Release 18					
ETSI	ETSI TS 138 455	18.3.0	Published	26.09.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138455/18.03.00_60/ts_138455v180300p.pdf

4.2.1.4.27 TS 38.460

NG-RAN; E1 general aspects and principles

This document is an introduction to the 3GPP TS 38.46x series of technical specifications that define the E1 interface. The E1 interface provides means for interconnecting a gNB-CU-CP and a gNB-CU-UP of a gNB-CU within an NG-RAN, or for interconnecting a gNB-CU-CP and a gNB-CU-UP of an en-gNB within an E-UTRAN.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 460	15.4.0	Published	23.07.2019	https://www.etsi.org/deliver/etsi_ts/138400_138499/138460/15.04.00_60/ts_138460v150400p.pdf
Release 16					
ETSI	ETSI TS 138 460	16.5.0	Published	02.05.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138460/16.05.00_60/ts_138460v160500p.pdf
Release 17					
ETSI	ETSI TS 138 460	17.0.0	Published	02.05.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138460/17.00.00_60/ts_138460v170000p.pdf

Release 18

SDO	Document No.	Version	Status	Issued date	Location
ETSI	ETSI TS 138 460	18.0.0	Published	06.05.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138460/18.00.00_60/ts_138460v180000p.pdf

4.2.1.4.28 TS 38.461**NG-RAN; E1 layer 1**

This document specifies the standards allowed to implement layer 1 on the E1 interface.

The specification of transmission delay requirements and O&M requirements are not in the scope of this document.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 461	15.1.0	Published	16.10.2019	https://www.etsi.org/deliver/etsi_ts/138400_138499/138461/15.01.00_60/ts_138461v150100p.pdf
Release 16					
ETSI	ETSI TS 138 461	16.0.0	Published	21.07.2020	https://www.etsi.org/deliver/etsi_ts/138400_138499/138461/16.00.00_60/ts_138461v160000p.pdf
Release 17					
ETSI	ETSI TS 138 461	17.0.0	Published	02.05.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138461/17.00.00_60/ts_138461v170000p.pdf
Release 18					
ETSI	ETSI TS 138 461	18.0.0	Published	06.05.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138461/18.00.00_60/ts_138461v180000p.pdf

4.2.1.4.29 TS 38.462**NG-RAN; E1 signalling transport**

This document specifies the standards for Signalling Transport to be used across the E1 interface. The E1 interface provides means for the interconnection of gNB-CU-CP and gNB-CU-UP within the NG-RAN architecture (TS 38.401).

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 462	15.8.0	Published	23.04.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138462/15.08.00_60/ts_138462v150800p.pdf
Release 16					
ETSI	ETSI TS 138 462	16.4.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138462/16.04.00_60/ts_138462v160400p.pdf
Release 17					
ETSI	ETSI TS 138 462	17.0.0	Published	02.05.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138462/17.00.00_60/ts_138462v170000p.pdf
Release 18					
ETSI	ETSI TS 138 462	18.0.0	Published	06.05.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138462/18.00.00_60/ts_138462v180000p.pdf

4.2.1.4.30 TS 38.463**NG-RAN; E1 Application Protocol (E1AP)**

This document specifies the 5G radio network layer signalling protocol for the E1 interface. The E1 interface provides means for interconnecting a gNB-CU-CP and a gNB-CU-UP of a gNB within an NG-RAN, or for interconnecting a gNB-CU-CP and a gNB-CU-UP of an en-gNB within an E-UTRAN. The E1 Application Protocol (E1AP) supports the functions of E1 interface by signalling procedures defined in this document. E1AP is developed in accordance to the general principles stated in TS 38.401 and TS 38.460.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 463	15.13.0	Published	14.10.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138463/15.13.00_60/ts_138463v151300p.pdf
Release 16					
ETSI	ETSI TS 138 463	16.16.0	Published	17.01.2023	https://www.etsi.org/deliver/etsi_ts/138400_138499/138463/16.16.00_60/ts_138463v161600p.pdf
Release 17					
ETSI	ETSI TS 138 463	17.0.0	Published	02.05.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138463/17.00.00_60/ts_138463v170000p.pdf
Release 18					
ETSI	ETSI TS 138 463	18.0.0	Published	06.05.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138463/18.00.00_60/ts_138463v180000p.pdf

4.2.1.4.31 TS 38.470**NG-RAN; F1 general aspects and principles**

This document is an introduction to the 3GPP TS 38.47x series of technical specifications that define the F1 interface. The F1 interface provides means for interconnecting a gNB-CU and a gNB-DU of a gNB within an NG-RAN, or for interconnecting a gNB-CU and a gNB-DU of an en-gNB within an E-UTRAN.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 470	15.8.0	Published	27.08.2021	https://www.etsi.org/deliver/etsi_ts/138400_138499/138470/15.08.00_60/ts_138470v150800p.pdf
Release 16					
ETSI	ETSI TS 138 470	16.11.0	Published	06.10.2023	https://www.etsi.org/deliver/etsi_ts/138400_138499/138470/16.11.00_60/ts_138470v161100p.pdf
Release 17					
ETSI	ETSI TS 138 470	17.6.0	Published	06.10.2023	https://www.etsi.org/deliver/etsi_ts/138400_138499/138470/17.06.00_60/ts_138470v170600p.pdf
Release 18					
ETSI	ETSI TS 138 470	18.3.0	Published	26.09.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138470/18.03.00_60/ts_138470v180300p.pdf

4.2.1.4.32 TS 38.471**NG-RAN; F1 layer 1**

This document specifies the standards allowed to implement Layer 1 on the F1 interface. The F1 interface provides means for interconnecting a gNB-CU and a gNB-DU of a gNB within an NG-RAN, or for interconnecting a gNB-CU and a gNB-DU of an en-gNB within an E-UTRAN.

The specification of transmission delay requirements and O&M requirements are not in the scope of this document.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 471	15.0.0	Published	18.09.2018	https://www.etsi.org/deliver/etsi_ts/138400_138499/138471/15.00.00_60/ts_138471v150000p.pdf
Release 16					
ETSI	ETSI TS 138 471	16.0.0	Published	21.07.2020	https://www.etsi.org/deliver/etsi_ts/138400_138499/138471/16.00.00_60/ts_138471v160000p.pdf
Release 17					
ETSI	ETSI TS 138 471	17.0.0	Published	29.04.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138471/17.00.00_60/ts_138471v170000p.pdf
Release 18					
ETSI	ETSI TS 138 471	18.0.0	Published	06.05.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138471/18.00.00_60/ts_138471v180000p.pdf

4.2.1.4.33 TS 38.472

NG-RAN; F1 signalling transport

This document specifies the standards for Signalling Transport to be used across the F1 interface. The F1 interface provides means for interconnecting a gNB-CU and a gNB-DU of a gNB within an NG-RAN, or for interconnecting a gNB-CU and a gNB-DU of an en-gNB within an E-UTRAN. This document describes how the F1AP signalling messages are transported over F1.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 472	15.7.0	Published	12.11.2020	https://www.etsi.org/deliver/etsi_ts/138400_138499/138472/15.07.00_60/ts_138472v150700p.pdf
Release 16					
ETSI	ETSI TS 138 472	16.2.0	Published	19.07.2023	https://www.etsi.org/deliver/etsi_ts/138400_138499/138472/16.02.00_60/ts_138472v160200p.pdf
Release 17					
ETSI	ETSI TS 138 472	17.2.0	Published	19.07.2023	https://www.etsi.org/deliver/etsi_ts/138400_138499/138472/17.02.00_60/ts_138472v170200p.pdf
Release 18					
ETSI	ETSI TS 138 472	18.1.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138472/18.01.00_60/ts_138472v180100p.pdf

4.2.1.4.34 TS 38.473

NG-RAN; F1 Application Protocol (F1AP)

This document specifies the 5G radio network layer signalling protocol for the F1 interface. The F1 interface provides means for interconnecting a gNB-CU and a gNB-DU of a gNB within an NG-RAN, or for interconnecting a gNB-CU and a gNB-DU of an en-gNB within an E-UTRAN. The F1 Application Protocol (F1AP) supports the functions of F1 interface by signalling procedures defined in this document. F1AP is developed in accordance to the general principles stated in TS 38.401 and TS 38.470.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 473	15.18.0	Published	26.09.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138473/15.18.00_60/ts_138473v151800p.pdf

Release 16

SDO	Document No.	Version	Status	Issued date	Location
ETSI	ETSI TS 138 473	16.19.0	Published	26.09.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138473/16.19.00_60/ts_138473v161900p.pdf

Release 17

ETSI	ETSI TS 138 473	17.10.0	Published	26.09.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138473/17.10.00_60/ts_138473v171000p.pdf

Release 18

ETSI	ETSI TS 138 473	18.3.0	Published	26.09.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138473/18.03.00_60/ts_138473v180300p.pdf

4.2.1.4.35 TS 38.474**NG-RAN; F1 data transport**

This document specifies the standards for user data transport protocols and related signalling protocols to establish user plane transport bearers over the F1 interface. The F1 interface provides means for interconnecting a gNB-CU and a gNB-DU of a gNB within an NG-RAN, or for interconnection a gNB-CU and a gNB-DU of an en-gNB within an E-UTRAN.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 474	15.3.0	Published	16.10.2019	https://www.etsi.org/deliver/etsi_ts/138400_138499/138474/15.03.00_60/ts_138474v150300p.pdf
Release 16					
ETSI	ETSI TS 138 474	16.1.0	Published	26.01.2021	https://www.etsi.org/deliver/etsi_ts/138400_138499/138474/16.01.00_60/ts_138474v160100p.pdf
Release 17					
ETSI	ETSI TS 138 474	17.0.0	Published	29.04.2022	https://www.etsi.org/deliver/etsi_ts/138400_138499/138474/17.00.00_60/ts_138474v170000p.pdf
Release 18					
ETSI	ETSI TS 138 474	18.0.0	Published	06.05.2024	https://www.etsi.org/deliver/etsi_ts/138400_138499/138474/18.00.00_60/ts_138474v180000p.pdf

4.2.1.5 Radio-frequency aspects**4.2.1.5.1 TS 37.104****NR, E-UTRA, UTRA and GSM/EDGE; Multi-Standard Radio (MSR) Base Station (BS) radio transmission and reception**

This document establishes the minimum RF characteristics of E-UTRA, UTRA and GSM/EDGE Multi-Standard Radio (MSR) Base Station (BS). Requirements for multi-RAT and single-RAT operation of MSR BS are covered in this document. The requirements in this document for E-UTRA and UTRA single-RAT operation of MSR BS are also applicable to E-UTRA and UTRA multi-carrier capable single-RAT BS. Requirements for GSM BS that are only single-RAT capable are not covered.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 137 104	15.19.0	Published	13.10.2023	https://www.etsi.org/deliver/etsi_ts/137100_137199/137104/15.19.00_60/ts_137104v151900p.pdf
Release 16					
ETSI	ETSI TS 137 104	16.20.0	Published	03.05.2024	https://www.etsi.org/deliver/etsi_ts/137100_137199/137104/16.20.00_60/ts_137104v162000p.pdf

Release 17

SDO	Document No.	Version	Status	Issued date	Location
ETSI	ETSI TS 137 104	17.13.0	Published	12.08.2024	https://www.etsi.org/deliver/etsi_ts/137100_137199/137104/17.13.00_60/ts_137104v171300p.pdf

Release 18

ETSI	ETSI TS 137 104	18.6.0	Published	12.08.2024	https://www.etsi.org/deliver/etsi_ts/137100_137199/137104/18.06.00_60/ts_137104v180600p.pdf

4.2.1.5.2 TS 37.105**Active Antenna System (AAS) Base Station (BS) transmission and reception**

This document establishes the RF characteristics, the RF minimum requirements and minimum performance requirements for E-UTRA AAS Base Station (BS), the FDD mode of UTRA AAS Base Station (BS), the 1,28 Mchip/s TDD mode of UTRA AAS Base Station (BS) in single RAT and any MSR AAS Base Station (BS) implementation of these RATs.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 137 105	15.20.0	Published	12.08.2024	https://www.etsi.org/deliver/etsi_ts/137100_137199/137105/15.20.00_60/ts_137105v152000p.pdf
Release 16					
ETSI	ETSI TS 137 105	16.16.0	Published	12.08.2024	https://www.etsi.org/deliver/etsi_ts/137100_137199/137105/16.16.00_60/ts_137105v161600p.pdf
Release 17					
ETSI	ETSI TS 137 105	17.10.0	Published	12.08.2024	https://www.etsi.org/deliver/etsi_ts/137100_137199/137105/17.10.00_60/ts_137105v171000p.pdf
Release 18					
ETSI	ETSI TS 137 105	18.5.0	Published	12.08.2024	https://www.etsi.org/deliver/etsi_ts/137100_137199/137105/18.05.00_60/ts_137105v180500p.pdf

4.2.1.5.3 TS 37.113**NR, E-UTRA, UTRA and GSM/EDGE; Multi-Standard Radio (MSR) Base Station (BS) Electromagnetic Compatibility (EMC)**

This document covers the assessment of E-UTRA, UTRA and GSM/EDGE Multi-Standard Radio (MSR) Base Stations and associated ancillary equipment in respect of Electromagnetic Compatibility (EMC). This document specifies the applicable test conditions, performance assessment and performance criteria for E-UTRA, UTRA and GSM/EDGE Base Stations and associated ancillary equipment in one of the following categories: (i) Multi-Standard Radio (MSR) Base Stations for E-UTRA, UTRA and GSM/EDGE meeting the requirements of TS 37.104, with conformance demonstrated by compliance to TS 37.141; (ii) Base Stations for E-UTRA meeting the requirements of TS 36.104, with conformance demonstrated by compliance to TS 36.141; (iii) Base Stations for UTRA FDD meeting the requirements of TS 25.104, with conformance demonstrated by compliance to TS 25.141; (iv) Base Stations for UTRA TDD meeting the requirements of TS 25.105, with conformance demonstrated by compliance to TS 25.142; (v) Base Stations for GSM/EDGE meeting the requirements of TS 45.005, with conformance demonstrated by compliance to TS 51.021. The environment classification used in this document refers to the environment classification used in IEC 61000-6-1 and IEC 61000-6-3.

The EMC requirements have been selected to ensure an adequate level of compatibility for apparatus at residential, commercial and light industrial environments. The levels, however, do not cover extreme cases which may occur in any location but with low probability of occurrence.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 137 113	15.14.0	Published	29.01.2024	https://www.etsi.org/deliver/etsi_ts/137100_137199/137113/15.14.00_60/ts_137113v151400p.pdf
Release 16					
ETSI	ETSI TS 137 113	16.6.0	Published	14.05.2024	https://www.etsi.org/deliver/etsi_ts/137100_137199/137113/16.06.00_60/ts_137113v160600p.pdf
Release 17					
ETSI	ETSI TS 137 113	17.4.0	Published	14.05.2024	https://www.etsi.org/deliver/etsi_ts/137100_137199/137113/17.04.00_60/ts_137113v170400p.pdf
Release 18					
ETSI	ETSI TS 137 113	18.1.0	Published	14.05.2024	https://www.etsi.org/deliver/etsi_ts/137100_137199/137113/18.01.00_60/ts_137113v180100p.pdf

4.2.1.5.4 TS 37.114

Active Antenna System (AAS) Base Station (BS) Electromagnetic Compatibility (EMC)

This document covers the assessment of E-UTRA, UTRA and Multi-Standard Radio (MSR) Active Antenna Systems Base Stations in respect of Electromagnetic Compatibility (EMC).

This document specifies the applicable test conditions, performance assessment and performance criteria for E-UTRA and UTRA Base Stations and associated ancillary equipment in one of the following categories:

- Active Antenna System Base Station for E-UTRA, UTRA and MSR meeting the requirements of 3GPP TS 37.105, with conformance demonstrated by compliance to 3GPP TS 37.145.

The scope of this document is AAS BS with TAB connectors for every transceiver unit at the Transceiver Array Boundary. Requirement, procedures and values of an AAS Base Station without TAB connectors are not included in this document and are FFS.

The environment classification used in this document refers to the residential, commercial and light industrial environment classification used in IEC 61000-6-1 and IEC 61000-6-3.

The EMC requirements have been selected to ensure an adequate level of compatibility for apparatus at residential, commercial and light industrial environments. The levels, however, do not cover extreme cases which may occur in any location but with low probability of occurrence.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 137 114	15.10.0	Published	27.04.2023	https://www.etsi.org/deliver/etsi_ts/137100_137199/137114/15.10.00_60/ts_137114v151000p.pdf
Release 16					
ETSI	ETSI TS 137 114	16.1.0	Published	27.04.2023	https://www.etsi.org/deliver/etsi_ts/137100_137199/137114/16.01.00_60/ts_137114v160100p.pdf
Release 17					
ETSI	ETSI TS 137 114	17.1.0	Published	27.04.2023	https://www.etsi.org/deliver/etsi_ts/137100_137199/137114/17.01.00_60/ts_137114v170100p.pdf
Release 18					
ETSI	ETSI TS 137 114	18.1.0	Published	14.05.2024	https://www.etsi.org/deliver/etsi_ts/137100_137199/137114/18.01.00_60/ts_137114v180100p.pdf

4.2.1.5.5 TS 38.101-1**NR; User Equipment (UE) radio transmission and reception; Part 1: Range 1 Standalone**

This document establishes the minimum RF requirements for NR User Equipment (UE) operating on frequency Range 1.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 101-1	15.27.0	Published	23.10.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/13810101/15.27.00_60/ts_13810101v152700p.pdf
Release 16					
ETSI	ETSI TS 138 101-1	16.21.0	Published	23.10.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/13810101/16.21.00_60/ts_13810101v162100p.pdf
Release 17					
ETSI	ETSI TS 138 101-1	17.15.0	Published	14.11.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/13810101/17.15.00_60/ts_13810101v171500p.pdf
Release 18					
ETSI	ETSI TS 138 101-1	18.7.0	Published	14.11.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/13810101/18.07.00_60/ts_13810101v180700p.pdf

4.2.1.5.6 TS 38.101-2**NR; User Equipment (UE) radio transmission and reception; Part 2: Range 2 Standalone**

This document establishes the minimum RF requirements for NR User Equipment (UE) operating on frequency Range 2.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 101-2	15.26.0	Published	05.08.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/13810102/15.26.00_60/ts_13810102v152600p.pdf
Release 16					
ETSI	ETSI TS 138 101-2	16.20.0	Published	05.08.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/13810102/16.20.00_60/ts_13810102v162000p.pdf
Release 17					
ETSI	ETSI TS 138 101-2	17.15.0	Published	03.10.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/13810102/17.15.00_60/ts_13810102v171500p.pdf
Release 18					
ETSI	ETSI TS 138 101-2	18.7.0	Published	03.10.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/13810102/18.07.00_60/ts_13810102v180700p.pdf

4.2.1.5.7 TS 38.101-3**NR; User Equipment (UE) radio transmission and reception; Part 3: Range 1 and Range 2 Interworking operation with other radios**

This document establishes the minimum RF requirements for NR User Equipment (UE) Interworking operation with other radios. This includes but is not limited to additional requirements for carrier aggregation or NR dual connectivity between Range 1 and Range 2 and additional requirements due to NR non-standalone (NSA) operation mode with E-UTRA.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 101-3	15.26.0	Published	07.08.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/13810103/15.26.00_60/ts_13810103v152600p.pdf

Release 16

SDO	Document No.	Version	Status	Issued date	Location
ETSI	ETSI TS 138 101-3	16.21.0	Published	23.10.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/13810103/16.21.00_60/ts_13810103v162100p.pdf

Release 17

ETSI	ETSI TS 138 101-3	17.15.0	Published	23.10.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/13810103/17.15.00_60/ts_13810103v171500p.pdf

Release 18

ETSI	ETSI TS 138 101-3	18.7.0	Published	07.11.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/13810103/18.07.00_60/ts_13810103v180700p.pdf

4.2.1.5.8 TS 38.104**NR; Base Station (BS) radio transmission and reception**

This document establishes the minimum RF characteristics and minimum performance requirements of NR and NB-IoT operation in NR in-band Base Station (BS).

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 104	15.20.0	Published	07.05.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138104/15.20.00_60/ts_138104v152000p.pdf
Release 16					
ETSI	ETSI TS 138 104	16.20.0	Published	12.08.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138104/16.20.00_60/ts_138104v162000p.pdf
Release 17					
ETSI	ETSI TS 138 104	17.15.0	Published	03.10.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138104/17.15.00_60/ts_138104v171500p.pdf
Release 18					
ETSI	ETSI TS 138 104	18.7.0	Published	04.10.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138104/18.07.00_60/ts_138104v180700p.pdf

4.2.1.5.9 TS 38.106**NR repeater radio transmission and reception**

This document establishes the minimum RF characteristics of NR Repeater.

SDO	Document No.	Version	Status	Issued date	Location
Release 17					
ETSI	ETSI TS 138 106	17.10.0	Published	03.10.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138106/17.10.00_60/ts_138106v171000p.pdf
Release 18					
ETSI	ETSI TS 138 106	18.6.0	Published	03.10.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138106/18.06.00_60/ts_138106v180600p.pdf

4.2.1.5.10 TS 38.113**NR; Base Station (BS) ElectroMagnetic Compatibility (EMC)**

This document covers the assessment of NR Base Station (BS) and ancillary equipment in respect of Electromagnetic Compatibility (EMC).

This document specifies the applicable test conditions, performance assessment and performance criteria for base stations and associated ancillary equipment in the following categories:

- BS equipped with antenna connectors or TAB connectors which are possible to be terminated during EMC testing, meeting the BS type 1-C and BS type 1-H RF requirements of TS 38.104, with conformance demonstrated by compliance to TS 38.141-1.
- BS not equipped with antenna connectors nor TAB connectors, i.e. with antenna elements radiating during the EMC testing, meeting the BS type 1-O and BS type 2-O RF requirements of TS 38.104, with conformance demonstrated by compliance to TS 38.141-2.

The scope of this document is twofold:

- Requirements, procedures and values of a BS with antenna connectors or TAB connectors,
- Requirements, procedures and values of a BS without antenna connectors, nor TAB connectors.

The environment classification used in this document refers to the residential, commercial and light industrial environment classification used in IEC 61000-6-1 and IEC 61000-6-3.

The EMC requirements have been selected to ensure an adequate level of compatibility for apparatus at residential, commercial and light industrial environments. The levels, however, do not cover extreme cases which may occur in any location but with low probability of occurrence.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 113	15.20.0	Published	05.08.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138113/15.20.00_60/ts_138113v152000p.pdf
Release 16					
ETSI	ETSI TS 138 113	16.11.0	Published	05.08.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138113/16.11.00_60/ts_138113v161100p.pdf
Release 17					
ETSI	ETSI TS 138 113	17.7.0	Published	05.08.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138113/17.07.00_60/ts_138113v170700p.pdf
Release 18					
ETSI	ETSI TS 138 113	18.3.0	Published	05.08.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138113/18.03.00_60/ts_138113v180300p.pdf

4.2.1.5.11 TS 38.114

NR; Repeaters ElectroMagnetic Compatibility (EMC)

This document covers the assessment of NR repeater and ancillary equipment in respect of Electromagnetic Compatibility (EMC).

This document specifies the applicable requirements, procedures, test conditions, performance assessment and performance criteria for NR repeater and associated ancillary equipment in the following categories:

- NR repeater equipped with antenna connectors which are possible to be terminated during EMC testing, meeting the repeater type 1-C RF requirements of TS 38.106, with conformance demonstrated by compliance to TS 38.115-1.
- NR repeater not equipped with antenna connectors, i.e. with antenna elements radiating during the EMC testing, meeting the repeater type 2-O RF requirements of TS 38.106, with conformance demonstrated by compliance to TS 38.115-2.

The environment classification used in this document refers to the residential, commercial and light industrial environment classification used in IEC 61000-6-1 and IEC 61000-6-3.

The EMC requirements have been selected to ensure an adequate level of compatibility for apparatus at residential, commercial and light industrial environments. The levels, however, do not cover extreme cases which may occur in any location but with low probability of occurrence.

SDO	Document No.	Version	Status	Issued date	Location
Release 17					
ETSI	ETSI TS 138 114	17.6.0	Published	05.08.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138114/17.06.00_60/ts_138114v170600p.pdf
Release 18					
ETSI	ETSI TS 138 114	18.3.0	Published	03.10.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138114/18.03.00_60/ts_138114v180300p.pdf

4.2.1.5.12 TS 38.124

NR; Electromagnetic compatibility (EMC) requirements for mobile terminals and ancillary equipment

This document establishes the essential EMC requirements for “3rd generation” digital cellular mobile terminal equipment and ancillary accessories in combination with a 3GPP NR user equipment (UE).

The equipment conforming to the requirements laid out in this document and used in its intended electromagnetic environment in accordance with the manufacturer’s instructions:

- shall not generate electromagnetic disturbances at a level which may interfere with the intended operation of other equipment;
- has an adequate level of intrinsic immunity to electromagnetic disturbances to operate as intended;

This document specifies the applicable EMC tests, methods of measurement, frequency ranges, applicable limits and minimum performance criteria for all types of NR UE(s) and their accessories. NR base station equipment operating within network infrastructure is outside the scope of this document. However, this document does cover mobile and portable equipment that is intended to be operated in a fixed location while connected to the AC mains. NR base station equipment operating within network infrastructure is covered by the technical specification TS 38.113.

Requirements for the radiated emission from the enclosure port of integral antenna equipment and ancillaries are included in this document. Technical specifications for conducted emissions from the antenna connector are found in the 3GPP specifications for the radio interface, e.g. TS 38.xyz, for the effective use of the radio spectrum.

Requirements for the radiated emissions from the enclosure port and ancillaries cover two cases:

- UE equipment supporting operations in a frequency range for which antenna connectors are available (i.e. for operations in Frequency Range 1 as defined in e.g. TS 38.101-1 for the radio interface)
- UE equipment supporting operations in a frequency range for which only integral antennas may be available (i.e. for operations in Frequency Range 2 as defined in e.g. TS 38.101-2 for the radio interface)

The immunity requirements are selected to ensure an adequate level of compatibility for apparatus in residential, commercial, light industrial and vehicular environments. The levels however, do not cover extreme cases, which may occur in any location but with low probability of occurrence.

Compliance of radio equipment to the requirements of this document does not signify compliance to any requirement related to the use of the equipment (i.e. licensing requirements).

Compliance to the requirements of this document does not signify compliance to any safety requirement. However, any temporary or permanent unsafe condition caused by EMC is considered as non-compliance.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 124	15.8.0	Published	10.08.2022	https://www.etsi.org/deliver/etsi_ts/138100_138199/138124/15.08.00_60/ts_138124v150800p.pdf
Release 16					
ETSI	ETSI TS 138 124	16.5.0	Published	10.08.2022	https://www.etsi.org/deliver/etsi_ts/138100_138199/138124/16.05.00_60/ts_138124v160500p.pdf
Release 17					
ETSI	ETSI TS 138 124	17.2.0	Published	19.10.2022	https://www.etsi.org/deliver/etsi_ts/138100_138199/138124/17.02.00_60/ts_138124v170200p.pdf
Release 18					
ETSI	ETSI TS 138 124	18.1.0	Published	27.05.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138124/18.01.00_60/ts_138124v180100p.pdf

4.2.1.5.13 TS 38.133

NR; Requirements for support of radio resource management

This document specifies requirements for support of Radio Resource Management for the FDD and TDD modes of New Radio (NR). These requirements include requirements on measurements in NR and the UE as well as requirements on node dynamical behaviour and interaction, in terms of delay and response characteristics.

SDO	Document No.	Version	Status	Issued date	Location
Release 15					
ETSI	ETSI TS 138 133	15.27.0	Published	12.11.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138133/15.27.00_60/ts_138133v152700p.pdf
Release 16					
ETSI	ETSI TS 138 133	16.21.0	Published	12.11.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138133/16.21.00_60/ts_138133v162100p.pdf
Release 17					
ETSI	ETSI TS 138 133	17.15.0	Published	15.11.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138133/17.15.00_60/ts_138133v171500p.pdf
Release 18					
ETSI	ETSI TS 138 133	18.7.0	Published	15.11.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138133/18.07.00_60/ts_138133v180700p.pdf

4.2.1.5.14 TS 38.174

NR; Integrated Access and Backhaul (IAB) radio transmission and reception

This document establishes the minimum RF characteristics and minimum performance requirements of NR Integrated access and backhaul (IAB).

SDO	Document No.	Version	Status	Issued date	Location
Release 16					
ETSI	ETSI TS 138 174	16.11.0	Published	05.08.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138174/16.11.00_60/ts_138174v161100p.pdf

Release 17

ETSI	ETSI TS 138 174	17.8.0	Published	05.08.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138174/17.08.00_60/ts_138174v170800p.pdf

Release 18

ETSI	ETSI TS 138 174	18.6.0	Published	02.10.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138174/18.06.00_60/ts_138174v180600p.pdf

4.2.1.5.15 TS 38.175

NR; Integrated Access and Backhaul (IAB) Electromagnetic Compatibility (EMC)

This document covers the assessment for NR Integrated access and backhaul (IAB) node and associated ancillary equipment in respect of Electromagnetic Compatibility (EMC).

This document specifies the applicable test conditions, performance assessment and performance criteria for NR Integrated access and backhaul (IAB) node and associated ancillary equipment.

The environment classification used in this document refers to the residential, commercial and light industrial environment classification used in IEC 61000-6-1 and IEC 61000-6-3.

The EMC requirements have been selected to ensure an adequate level of compatibility for apparatus at residential, commercial and light industrial environments. The levels, however, do not cover extreme cases which may occur in any location but with low probability of occurrence.

SDO	Document No.	Version	Status	Issued date	Location
Release 16					
ETSI	ETSI TS 138 175	16.7.0	Published	01.02.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138175/16.07.00_60/ts_138175v160700p.pdf
Release 17					
ETSI	ETSI TS 138 175	17.5.0	Published	01.02.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138175/17.05.00_60/ts_138175v170500p.pdf
Release 18					
ETSI	ETSI TS 138 175	18.1.0	Published	05.08.2024	https://www.etsi.org/deliver/etsi_ts/138100_138199/138175/18.01.00_60/ts_138175v180100p.pdf

4.2.2 Titles and synopses of the global core specification and the transposed standards for the component RIT DECT-2020 NR

4.2.2.1 Introduction

The standards documents referenced below, as transposed from the relevant ETSI specifications, are provided by ETSI as the transposed sets of standards for the terrestrial radio interface of IMT-2020 identified as DECT-2020 NR.

4.2.2.2 ETSI TS 103 636-1

DECT-2020 New Radio (NR); Part 1: Overview

This document provides an overview on DECT-2020 NR including layers, system and network architectures envisioned for this release. Further it provides an overview to the other technical parts of TS 103 636 and their interrelation.

SDO	Document No.	Version	Status	Issued date	Location
Release 1					
ETSI	ETSI TS 103 636-1	1.5.1	Published	06.03.2024	https://www.etsi.org/deliver/etsi_ts/103600_103699/10363601/01.05.01_60/ts_10363601v010501p.pdf
Release 2					
ETSI	ETSI TS 103 636-1	2.1.1	Published	25.10.2024	https://www.etsi.org/deliver/etsi_ts/103600_103699/10363601/02.01.01_60/ts_10363601v020101p.pdf

4.2.2.3 ETSI TS 103 636-2

DECT-2020 New Radio (NR); Part 2: Radio reception and transmission requirements

This document establishes the minimum RF requirements for DECT2020 New Radio (NR) Radio Devices (RD). For clarity these requirements cover both fixed termination point (FT) as well as portable termination point (PT).

SDO	Document No.	Version	Status	Issued date	Location
Release 1					
ETSI	ETSI TS 103 636-2	1.5.1	Published	06.03.2024	https://www.etsi.org/deliver/etsi_ts/103600_103699/10363602/01.05.01_60/ts_10363602v010501p.pdf
Release 2					
ETSI	ETSI TS 103 636-2	2.1.1	Published	25.10.2024	https://www.etsi.org/deliver/etsi_ts/103600_103699/10363602/02.01.01_60/ts_10363602v020101p.pdf

4.2.2.4 ETSI TS 103 636-3

DECT-2020 New Radio (NR); Part 3: Physical Layer

This document specifies the PHYsical layer (PHY) and interaction between PHY and MAC layer.

SDO	Document No.	Version	Status	Issued date	Location
Release 1					
ETSI	ETSI TS 103 636-3	1.5.1	Published	06.03.2024	https://www.etsi.org/deliver/etsi_ts/103600_103699/10363603/01.05.01_60/ts_10363603v010501p.pdf
Release 2					
ETSI	ETSI TS 103 636-3	2.1.1	Published	25.10.2024	https://www.etsi.org/deliver/etsi_ts/103600_103699/10363603/02.01.01_60/ts_10363603v020101p.pdf

4.2.2.5 ETSI TS 103 636-4

DECT-2020 New Radio (NR); Part 4: MAC layer

This document specifies Medium Access Control (MAC) layer and interaction between MAC layer and physical layer and higher layers.

SDO	Document No.	Version	Status	Issued date	Location
Release 1					
ETSI	ETSI TS 103 636-4	1.5.1	Published	06.03.2024	https://www.etsi.org/deliver/etsi_ts/103600_103699/10363604/01.05.01_60/ts_10363604v010501p.pdf
Release 2					
ETSI	ETSI TS 103 636-4	2.1.1	Published	25.10.2024	https://www.etsi.org/deliver/etsi_ts/103600_103699/10363604/02.01.01_60/ts_10363604v020101p.pdf

4.2.2.6 ETSI TS 103 636-5

DECT-2020 New Radio (NR); Part 5: DLC and Convergence layers

This document specifies the Data Link Control (DLC) and Convergence layer (CVG) between DECT-2020 NR radio interface and different application protocols.

SDO	Document No.	Version	Status	Issued date	Location
Release 1					
ETSI	ETSI TS 103 636-5	1.5.1	Published	06.03.2024	https://www.etsi.org/deliver/etsi_ts/103600_103699/10363605/01.05.01_60/ts_10363605v010501p.pdf
Release 2					
ETSI	ETSI TS 103 636-5	2.1.1	Published	25.10.2024	https://www.etsi.org/deliver/etsi_ts/103600_103699/10363605/02.01.01_60/ts_10363605v020101p.pdf

4.2.2.7 ETSI TS 103 634

Digital Enhanced Cordless Telecommunications (DECT); Low Complexity Communication Codec plus (LC3plus)

This document contains the specification of the Low Complexity Communication Codec plus (LC3plus). The specification includes a full algorithmic description of both the encoder and the decoder. It includes reference fixed-point and floating-point ANSI C source code and conformance test procedures.

SDO	Document No.	Version	Status	Issued date	Location
Release 1					
ETSI	ETSI TS 103 634	1.5.1	Published	13.06.2024	https://www.etsi.org/deliver/etsi_ts/103600_103699/103634/01.05.01_60/ts_103634v010501p.pdf

4.2.2.8 ETSI TS 103 874-1

DECT-2020 New Radio (NR); Access Profile; Part 1: Overview

The present document provides an overview of the DECT-2020 NR profiles.

SDO	Document No.	Version	Status	Issued date	Location
Release 1					
ETSI	ETSI TS 103 874-1	1.1.1	Published	25.10.2024	https://www.etsi.org/deliver/etsi_ts/103800_103899/10387401/01.01.01_60/ts_10387401v010101p.pdf

4.2.2.9 ETSI TS 103 874-2

DECT-2020 New Radio (NR); Access Profile; Part 2: Smart Metering, City and Buildings

The present document specifies the access profile requirements and recommendations of smart metering, city and buildings as well as any other similarly applicable use case for the DECT-2020 New Radio (NR).

SDO	Document No.	Version	Status	Issued date	Location
Release 1					
ETSI	ETSI TS 103 874-2	1.1.1	Published	06.09.2024	https://www.etsi.org/deliver/etsi_ts/103800_103899/10387402/01.01.01_60/ts_10387402v010101p.pdf

4.2.2.10 ETSI TS 103 874-3

DECT-2020 New Radio (NR); Access Profile; Part 3: IPv6 Profile

Internet protocol is the most common protocol for communicating between devices, hosts and back-end systems in modern network environments. Internet-of-Things (IoT) is the integration of various devices to the Internet, enabling data collection and device control in various systems.

DECT-2020, especially in mesh network topology, is well suited for IoT needs. Due to the specific features in DECT 2020 and in mesh networking more generally, the present document recommends features, operations and protocols how to best integrate the IPv6 technologies and protocols to operating over DECT-2020 radio network.

SDO	Document No.	Version	Status	Issued date	Location
Release 1					
ETSI	ETSI TS 103 874-3	1.1.1	Published	25.10.2024	https://www.etsi.org/deliver/etsi_ts/103800_103899/10387403/01.01.01_60/ts_10387403v010101p.pdf
