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SERIES Q: SWITCHING AND SIGNALLING, AND
ASSOCIATED MEASUREMENTS AND TESTS

Signalling requirements and protocols for the NGN –
VoLTE/ViLTE network signalling

**IMS references to Release 12 for communication
between IMS and NGN networks to support
end-to-end service interoperability**

Recommendation ITU-T Q.3642

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Recommendation ITU-T Q.3642

IMS references to Release 12 for communication between IMS and NGN networks to support end-to-end service interoperability

Summary

In general, IP multimedia subsystem (IMS) implementation is based on a set of standards developed by different standards development organizations (SDOs). In this regard, there is an intention to develop a Recommendation which lists the references to specifications defining requirements for IMS to be used for the non-roaming architecture for 3GPP access as a basis for the communication between IMS and next generation networks (NGNs), in order to support end-to-end service interoperability.

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Recommendation ITU-T Q.3642

IMS references to Release 12 for communication between IMS and NGN networks to support end-to-end service interoperability

1 Scope

This Recommendation identifies the IP multimedia subsystem (IMS) specifications for the "ETSI Release 12" as the basis for communication between IMS and next generation networks (NGNs) in order to support end-to-end service interoperability.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

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3 Definitions

3.1 Terms defined elsewhere

None

3.2 Terms defined in this Recommendation

None

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

3GPP	3rd Generation Partnership Project
3PTY	Three-Party

ACR	Anonymous Communication Rejection
AOC	Advice of Charge
AS	Application Server
ATCF	Access Transfer Control Function
B2BUA	Back-to-Back User Agent
BFCP	Binary Floor Control Protocol
BGCF	Breakout Gateway Control Function
BICC	Bearer Independent Call Control
CAT	Customized Alerting Tone
CB	Communication Barring
CCBS	Completion of Communications to Busy Subscriber
CCNL	Completion of Communications on Not Logged-in
CCNR	Communication Completion on No Reply
CDIV	Communication Diversion
COLP	Connected Line Identification Presentation
COLR	Connected Line Identification Restriction
CONF	Conference
CRS	Customized Ringing Signal
CS	Circuit Switched
CSCF	Call Session Control Function
CUG	Closed User Group
CW	Communication Waiting
DRVCC	Dual Radio Voice Call Continuity
ECT	Explicit Communication Transfer
EIR	Equipment Identity Register
FA	Flexible Alerting
GPRS	General Packet Radio Services
GRUU	Globally Routable User agent URIs
HOLD	Communication HOLD
HSS	Home Subscriber Server
IBCF	Interconnection Border Control Function
ICB	Incoming Communication Barring
ICID	IMS Charging Identifier
ICS	IMS Centralized Services
ISUP	ISDN User Part
I-CSCF	Interrogating CSCF
II-NNI	Inter-IMS Network to Network Interface

IM	Instant Messaging
IM CN	IP multimedia (IM) core network (CN)
IMS	IP Multimedia Subsystem
IMS-ALG	IMS Application Level Gateway
IOI	Inter-Operator Identifier
IP-CAN	IP-Connectivity Access Network
IUT	Inter-UE Transfer
MBMS	Multimedia Broadcast Multicast Service
MCID	Malicious Communication Identification
MCPTT	Mission Critical Push-To-Talk
MGC	Media Gateway Controller
MGCF	Media Gateway Control Function
MGW	Media Gateway
MME	Mobility Management Entity
MMTEL	Multimedia Telephony
MPS	Multimedia Priority Service
MRB	Media Resource Broker
MRFC	Media Resource Function Controller
MRFP	Multimedia Resource Function Processor
MSRP	Message Session Relay Protocol
MTSI	Multimedia Telephony Service for IMS
MWI	Message Waiting Indication
NA(P)T-PT	Network Address (Port-Multiplexing) Translation-Protocol Translation
NGN	Next-Generation Network
NNI	Network to Network Interface
OCB	Outgoing Communication Barring
OIP	Originating Identification Presentation
OIR	Originating Identification Restriction
OMA	Open Mobile Alliance
OMR	Optimal Media Routeing
P-CSCF	Proxy CSCF
PCRF	Policy and Charging Rules Function
PLMN	Public Land Mobile Network
PNM	Personal Network Management
PRES	Presence
QoS	Quality of Service
RTT	Round-Trip Time

SDP	Session Description Protocol
SGSN	Serving GPRS Support Node
SIP	Session Initiation Protocol
SRVCC	Single Radio Voice Call Continuity
SS7	Signalling System no. 7
TIP	Terminating Identification Presentation
TIR	Terminating Identification Restriction
TrGW	Transition Gateway
UE	User Equipment
UMTS	Universal Mobile Telecommunications Service

5 Conventions

None

6 Introduction

This Recommendation identifies the IMS specifications for the "ETSI Release 12" as the basis for the communication between IMS and NGNs in order to support end-to-end service interoperability.

7 Overview of the interconnection between two different IM CN subsystems

Interconnection between two different IP multimedia (IM) core network (CN) (IM CN) subsystems shall be guaranteed in order to support end-to-end service interoperability. For this purpose, inter-IMS network to network interface (II-NNI) between two IM CN subsystem networks is adopted, according to the assumptions given in [ETSI TS 123 002] and [ETSI TS 123 228].

To support the delivery of IMS services between two separated IM CN subsystems, protocol interconnection has to occur:

- at a control plane level, in order that IMS procedures can be supported. In this case the adopted reference point is the Ici; and
- at a user plane level, where media streams are exchanged over the Izi reference point.

IP multimedia sessions are managed by the session initiation protocol (SIP). The transport mechanism for both SIP session signalling and media transport is IPv4 [IETF RFC 791] or IPv6 [IETF RFC 2460]. The ETSI profile of SIP defining the usage of SIP within the IM CN subsystem is specified in [ETSI TS 124 229].

The IMS/LTE basic configuration is shown in Figure 7-1, the inter-network interfaces between 3GPP and NGN networks are shown in Figure 7-2, and the general interconnection model is shown in Figure 7-3.

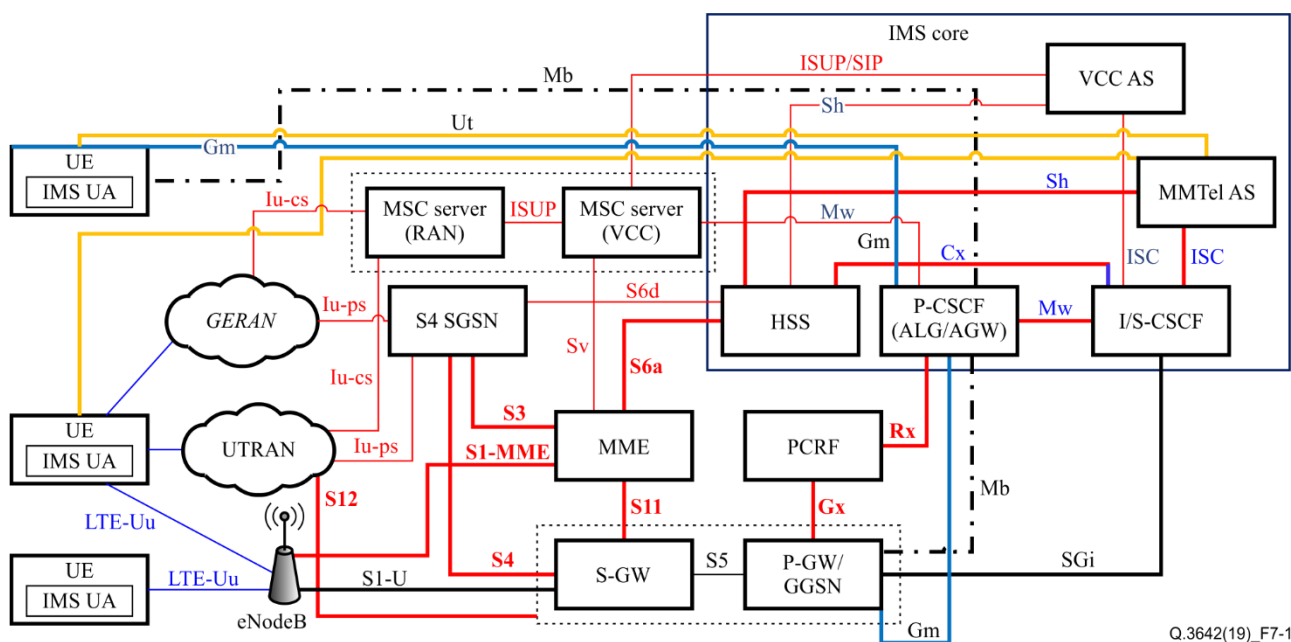


Figure 7-1 – IMS/LTE basic configuration

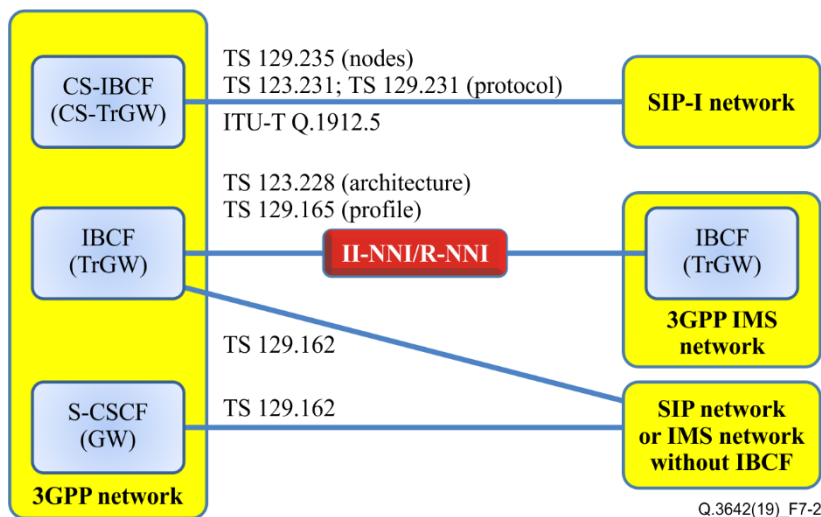
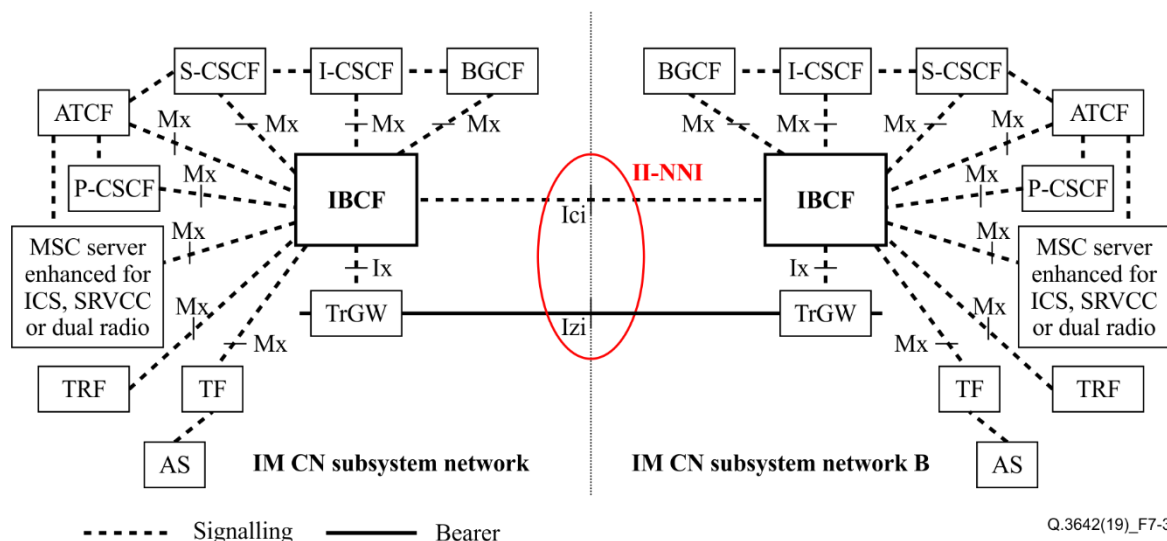


Figure 7-2 – Inter-network interfaces between 3GPP and NGN networks



NOTE 1 – The TRF can reside in a standalone entity or can be combined with another functional entity.

NOTE 2 – This figure is from [ETSI TS 129 165].

Figure 7-3 – Inter-IMS network to network interface between two IM CN subsystem networks

8 Technical specifications structure

This clause provides an overview of the IMS specifications for networks. Details for these specifications are found in clause 9.

The following text describes the numbering scheme for the specifications and reports for the fourth-generation mobile system (4G).

The following ETSI standards and descriptions are used for guidance only and may be further revised in the future.

The ETSI standards are:

- 122-series Service aspects ("Stage 1");
- 123-series Technical realization ("Stage 2");
- 124-series Signalling protocols ("Stage 3") – user equipment to network;
- 126-series CODECs;
- 127-series Data;
- 129-series Signalling protocols ("Stage 3") – intra-fixed-network;
- 131-series Subscriber identity module (SIM/USIM), IC cards. Test specifications;
- 132-series Operations, administration, maintenance, and provisioning (OAM&P) and charging;
- 133-series Security aspects;
- 135-series Security algorithms.

NOTE 1 – Technical specifications in this series are not included in the scope of this Recommendation. They are described in [ITU-R M.2012].

NOTE 2 – Technical specifications in these series are not included in the scope of this Recommendation.

9 Technical specifications

9.1 122-series: Service aspects

9.1.1 ETSI TS 122 115: Service aspects; charging and billing

This document describes the service aspects of charging and billing of 4G.

This document is not intended to duplicate existing standards or standards being developed by other groups on these topics, and will reference these where appropriate. The document will elaborate on the charging requirements described in the charging principles in [ETSI TS 122 001] service principles. It will allow the generation of accurate charging information to be used in commercial and contractual relationships between the parties concerned.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 122 115	12.3.0	Published	2015	https://www.etsi.org/deliver/etsi_ts/122/100_122199/122115/12.03.00_60/ts_122115v120300p.pdf

9.2 123-series: Technical realization

9.2.1 ETSI TS 123 002: Network architecture

This document offers an overview of the public land mobile network (PLMN) and its architectures and configuration. The configuration and the functional entities of the PLMN and the interfaces between them are described on a general level in order to cope with possible implementations. These descriptions include interfaces between and within the core networks, access networks, user equipment (UE), different service platforms, different domains and subsystems, and functional entities within domains and subsystems.

This document covers different architectural aspects with varying levels of detail. In general, other specifications shall be referred to for further details; these specifications enable the reader to acquire the full understanding of a system or service feature.

This document does not cover, or even list, all features of PLMNs.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 123 002	12.7.0	Published	2015	https://www.etsi.org/deliver/etsi_ts/123/000_123099/123002/12.07.00_60/ts_123002v120700p.pdf

9.2.2 ETSI TS 123 167: IP multimedia subsystem emergency sessions

This document defines the stage-2 service description for emergency services in the IP multimedia core network subsystem including the elements necessary to support IP multimedia emergency services.

[ITU-T I.130] describes a three-stage method for characterisation of telecommunication services, and [ITU-T Q.65] defines stage 2 of the method.

This document also covers the access network aspects that are crucial for the provisioning of IMS emergency services.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 123 167	12.1.0	Published	2015	https://www.etsi.org/deliver/etsi_ts/123/100_123199/123167/12.01.00_60/ts_123167v120100p.pdf

9.2.3 ETSI TS 123 203: Policy and charging control architecture

This document specifies the overall stage-2 level functionality for policy and charging control that encompasses the following high-level functions for IP-connectivity access networks (IP-CANs) (e.g., general packet radio services (GPRS), industrial wireless local area network (IWLAN), fixed broadband):

- flow based charging, including charging control and online credit control;
- policy control (e.g., gating control, quality of service (QoS) control).

	Document No.	Version	Status	Issued date	Location
ETSI	TS 123 203	12.11.0	Published	2016	https://www.etsi.org/deliver/etsi_ts/123200_123299/123203/12.11.00_60/ts_123203v121100p.pdf

9.2.4 ETSI TS 123 228: Interconnection border control function

An interconnection border control function (IBCF) provides application-specific functions at the SIP/session description protocol (SDP) protocol layer in order to perform interconnection between IM CN subsystem networks by using the Ici reference point. According to [ETSI TS 123 228], IBCF can act both as an entry point and as an exit point for the IM CN subsystem network.

The functionalities of IBCF are indicated in [ETSI TS 123 228] and specified in [ETSI TS 124 229]. They include:

- network topology hiding;
- application level gateway (for instance enabling communication between IPv6 and IPv4 SIP applications, or between a SIP application in a private IP address space and a SIP application outside this address space);
- controlling transport plane functions;
- controlling media plane adaptations;
- screening of SIP signalling information;
- selecting the appropriate signalling interconnect;
- generation of charging data records;
- privacy protection; and
- inclusion of a transit inter-operator identifier (IOI) in requests when acting as an entry point for a transit network and in responses when acting as an exit point for a transit network.

Based on local configuration, the IBCF performs transit routing functions as specified in [ETSI TS 124 229] clause I.2.

The IBCF acts as a back-to-back user agent (B2BUA) when it performs IMS application level gateway (IMS-ALG) functionality.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 123 228	V12.10.0	Published	2016	https://www.etsi.org/deliver/etsi_ts/123200_123299/123228/12.10.00_60/ts_123228v121000p.pdf

9.2.5 ETSI TS 123 002: Transition gateway

According to [ETSI TS 123 002], the transition gateway (TrGW) is located at the network borders within the media path and is controlled by an IBCF. Forwarding of media streams between IM CN subsystem networks is applied over the Izi reference point.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 123 002	V12.7.0	Published	2015	https://www.etsi.org/deliver/etsi_ts/123000_123099/123002/12.07.00_60/ts_123002v120700p.pdf

9.2.6 ETSI TS 123 153: Transition gateway

This document specifies the stage 2 description of the out-of-band transcoder control for speech services. It describes the principles and procedures to support transcoder free operation, tandem free operation and the interworking between TrFO and TFO. Transcoder at the edge is also part of this document. The document specifies functions, procedures and information which apply to GERAN Iu mode.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 123 153	V12.0.0	Published	2014	https://www.etsi.org/deliver/etsi_ts/123100_123199/123153/12.00.00_60/ts_123153v120000p.pdf

9.2.7 ETSI TS 123 205: Bearer-independent circuit-switched core network

This document defines the stage 2 description for the bearer independent CS core network. The stage 2 shall cover the information flow between the GMSC server, MSC server and media gateways. Note that nothing in this document shall preclude an implementation of a combined MSC server and MGW. This document shall show the CS core network termination of the Iu interface in order to cover the information flow stimulus to the core network and describe the interaction with the supplementary and value added services and capabilities.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 123 205	V12.1.0	Published	2015	https://www.etsi.org/deliver/etsi_ts/123200_123299/123205/12.01.00_60/ts_123205v120100p.pdf

9.3 124-series: Signalling protocols - user equipment to network

9.3.1 TS 124 229: IP multimedia call control protocol based on SIP and SDP; Stage 3

This document defines a call control protocol for use in the IM CN subsystem based on the SIP, and the associated SDP.

This document is applicable to:

- the interface between the UE and the call session control function (CSCF);
- the interface between the CSCF and any other CSCF;
- the interface between the CSCF and an application server (AS);
- the interface between the CSCF and the media gateway control function (MGCF);
- the interface between the S-CSCF and the media resource function controller (MRFC);
- the interface between the CSCF and the breakout gateway control function (BGCF);
- the interface between the BGCF and the MGCF;
- the interface between the BGCF and any other BGCF; and
- the interface between the CSCF and an external multimedia IP network.

Where possible, this document specifies the requirements for this protocol by reference to specifications produced by the IETF within the scope of the SIP and SDP. Where this is not possible,

extensions to the SIP and SDP are defined within this document. The document has therefore been structured in order to allow both forms of specification.

As the IM CN subsystem is designed to interwork with different IP-CANs, the IP-CAN independent aspects of the IM CN subsystem are described in the main body and Annex A of this Recommendation. Aspects for connecting a UE to the IM CN subsystem through specific types of IP-CANs are documented separately in the annexes or in separate documents.

NOTE – This document covers only the usage of the SIP and SDP to communicate with the entities of the IM CN subsystem. It is possible, and not precluded, to use the capabilities of GPRS to allow a terminal containing a SIP UA to communicate with SIP servers or SIP UAs outside the IM CN subsystem, and therefore utilize the services provided by those SIP servers. The usage of the SIP and SDP for communicating with SIP servers or SIP UAs outside the IM CN subsystem is outside the scope of this document.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 124 229	12.22.0	Published	2019	https://www.etsi.org/deliver/etsi_ts/124200_124299/124229/12.22.00_60/ts_124229v122200p.pdf

9.3.2 ETSI TS 124 608: Terminating identification presentation and terminating identification restriction using IP multimedia core network subsystem; Protocol specification

This document specifies the stage-3 protocol description of the terminating identification presentation (TIP) and terminating identification restriction (TIR) services, based on stages one and two of the ISDN connected line identification presentation (COLP) and connected line identification restriction (COLR) supplementary services. It provides the protocol details in the IM CN subsystem based on the SIP and the SDP.

Service-specific requirements in accordance with [ETSI TS 124 608] shall be supported over the II-NNI.

The P-Asserted-Identity header field and the Privacy header field with values "id", "user", "none", "header" and "critical" shall be supported at the II-NNI.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 124 608	12.0.0	Published	2014	https://www.etsi.org/deliver/etsi_ts/124600_124699/124608/12.00.00_60/ts_124608v120000p.pdf

9.3.3 ETSI TS 124 607: Originating identification presentation and originating identification restriction using IP multimedia core network subsystem; Protocol specification

This document specifies the stage-3 protocol description of the TIP and TIR services, based on stages one and two of the ISDN COLP and COLR supplementary services. It provides the protocol details in the IM CN subsystem based on the SIP and the SDP.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 124 607	12.2.0	Published	2015	https://www.etsi.org/deliver/etsi_ts/124600_124699/124607/12.02.00_60/ts_124607v120200p.pdf

9.3.4 ETSI TS 124 610: Communication HOLD using IP multimedia core network subsystem; Protocol specification

This document specifies the stage-3 protocol description of the communication hold (HOLD) services, based on stages one and two of the ISDN Hold (HOLD) supplementary services. It provides the protocol details in the IM CN subsystem based on the SIP and the SDP.

This document is applicable to the UE and AS which are intended to support the HOLD supplementary service.

Service-specific requirements in accordance with [ETSI TS 124 610] shall be supported over the II-NNI.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 124 610	12.6.0	Published	2015	https://www.etsi.org/deliver/etsi_ts/124600_124699/124610/12.06.00_60/ts_124610v120600p.pdf

9.3.5 ETSI TS 124 604: Communication diversion using IP multimedia core network subsystem; Protocol specification

This document specifies the stage-3 protocol description of the communication diversion (CDIV) supplementary services, based on stages one and two of the ISDN CDIV supplementary services. It provides the protocol details in the IM CN subsystem based on the SIP and the SDP. This document is applicable to the UE and ASs which are intended to support the CDIV supplementary service.

Service-specific requirements in accordance with [ETSI TS 124 604] shall be supported over the II-NNI.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 124 604	12.09.0	Published	2016	https://www.etsi.org/deliver/etsi_ts/124600_124699/124604/12.09.00_60/ts_124604v120900p.pdf

9.3.6 ETSI TS 124 605: Conference using IP multimedia core network subsystem; Protocol specification

This document specifies the stage-3 protocol description of the conference (CONF) service based on stages one and two of the ISDN CONF supplementary service. It provides the protocol details in the IM CN subsystem based on the SIP and the SDP.

This document specifies centralized conferencing, using a conference focus; distributed conferencing is out of scope.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 124 605	12.5.0	Published	2015	https://www.etsi.org/deliver/etsi_ts/124600_124699/124605/12.05.00_60/ts_124605v120500p.pdf

9.3.7 ETSI TS 124 629: Explicit communication transfer using IP multimedia core network subsystem; Protocol specification

This document specifies the stage-3 protocol description of the explicit communication transfer (ECT) supplementary service, based on stages one and two of the ISDN ECT supplementary service. It provides the protocol details in the IM CN subsystem based on the SIP and the SDP.

This document is applicable to the UE and AS which are intended to support the ECT supplementary service.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 124 629	12.7.0	Published	2016	https://www.etsi.org/deliver/etsi_ts/124600_124699/124629/12.07.00_60/ts_124629v120700p.pdf

9.3.8 ETS TS 124 616: Malicious communication identification using IP multimedia core network subsystem; Protocol specification

This document specifies the stage-3 protocol description of the malicious communication identification (MCID) service based on stages one and two of ISDN malicious call identification supplementary service. It provides the protocol details in the IM CN subsystem based on the SIP and the SDP. The MCID service will store session-related information independent of the service requested.

This document is applicable to the UE and AS which are intended to support the MCID supplementary service.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 124 616	12.1.0	Published	2014	https://www.etsi.org/deliver/etsi_ts/124600_124699/124616/12.01.00_60/ts_124616v120100p.pdf

9.3.9 ETSI TS 124 642: Completion of communications to busy subscriber and completion of communications by no reply using IP multimedia core network subsystem; Protocol specification

This document specifies the stage-3 protocol description of the completion of communications to busy subscriber (CCBS) service, the completion of communications on no reply (CCNR) service and completion of communications on not logged-in (CCNL) service, based on stages one and two of the ISDN supplementary services. It provides the protocol details in the IM CN subsystem based on the SIP and the SDP.

The CCBS service enables user A, encountering a busy destination B, to have the communication completed without having to make a new communication attempt when destination B becomes not busy.

The CCNR supplementary service enables user A, encountering destination B which does not answer the communication (No Reply), to have the communication completed without having to make a new communication attempt when the destination becomes not busy after having initiated an activity.

The CCNL supplementary service enables user A, encountering destination B which is not registered with the IMS network, to have the communication completed without having to make a new communication attempt when the destination becomes registered.

This document is applicable to the UE and AS which are intended to support the CCBS and CCNR supplementary services.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 124 642	12.0.0	Published	2014	https://www.etsi.org/deliver/etsi_ts/124600_124699/124642/12.00.00_60/ts_124642v120000p.pdf

9.3.10 ETSI TS 124 606: Message waiting indication using IP multimedia core network subsystem; Protocol specification

This document specifies the stage-3 protocol description of the message waiting indication (MWI) service, based on stages one and two of the ISDN MWI supplementary services. It provides the protocol details in the IM CN subsystem based on the SIP and the SDP.

This document is applicable to the UE and AS which are intended to support the MWI supplementary service.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 124 606	12.0.0	Published	2014	https://www.etsi.org/deliver/etsi_ts/124600_124699/124606/12.00.00_60/ts_124606v120000p.pdf

9.3.11 ETSI 124 654: Closed user group using IP multimedia core network subsystem; Protocol specification

This document specifies the stage-3 protocol description of the closed user group (CUG) service, based on stages one and two of the ISDN communication diversion supplementary services. It provides the protocol details in the IM CN subsystem based on the SIP and the SDP.

This document is applicable to the UE and AS which are intended to support the CUG supplementary service.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 124 654	12.0.0	Published	2014	https://www.etsi.org/deliver/etsi_ts/124600_124699/124654/12.00.00_60/ts_124654v120000p.pdf

9.3.12 ETSI TS 124 611: Anonymous communication rejection and communication barring using IP multimedia core network subsystem; Protocol specification

This document specifies the stage-3 protocol description of the anonymous communication rejection (ACR) and communication barring (CB) supplementary service, based on stages one and two of the ISDN supplementary service anonymous call rejection, incoming communication barring (ICB) and outgoing communication barring (OCB). It provides the protocol details in the IM CN subsystem based on the SIP and the SDP.

This document is applicable to the UE and AS which are intended to support the ACR and CB supplementary services.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 124 611	12.04.0	Published	2015	https://www.etsi.org/deliver/etsi_ts/124600_124699/124611/12.04.00_60/ts_124611v120400p.pdf

9.3.13 ETSI TS 124 147: Conferencing using the IP multimedia core network subsystem; Stage 3

This document provides the protocol details for conferencing within the IP multimedia core network subsystem based on the SIP, SIP events, the SDP and the binary floor control protocol (BFCP).

The functionalities for conference policy control (with respective standardised protocols) are felt to be essential for a complete IMS conferencing service, but are not specified in this version of IMS conferencing and are for further study.

This document does not cover the signalling between an MRFC and a multimedia resource function processor (MRFP).

Where possible, this document specifies the requirements for this protocol by reference to specifications produced by the IETF within the scope of the SIP, SIP events, SDP and BFCP, either directly, or as modified by [ETSI TS 124 229]. Where this is not possible, extensions to SIP are defined. This document has therefore been structured to allow both forms of specification.

The document is applicable to ASs, MRFCs, MRFPs, MGCFs and to the UE providing conferencing capabilities.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 124 147	12.7.0	Published	2017	https://www.etsi.org/deliver/etsi_ts/124100_124199/124147/12.07.00_60/ts_124147v120700p.pdf

9.3.14 ETSI TS 124 628: Common basic communication procedures using IP multimedia core network (CN) subsystem

This document describes the stage-3 protocol for basic communication procedures common to several services in the IM CN subsystem when at least one AS is included in the communication. The common procedures are based on stage-3 specifications for supplementary services.

This document contains examples of signalling flows for the common basic communication procedures.

This document is applicable to the UE and AS which are intended to support the common basic communication procedures.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 124 628	12.4.0	Published	2016	https://www.etsi.org/deliver/etsi_ts/124600_124699/124628/12.04.00_60/ts_124628v120400p.pdf

9.3.15 ETSI TS 124 615: Communication waiting using IP multimedia core network (CN) subsystem

This document specifies the stage-3 protocol description of the communication waiting (CW) service, based on stage one and stage two of the ISDN call waiting supplementary services. It provides the protocol details in the IM CN subsystem based on the SIP and the SDP.

The CW service enables a user to be informed that very limited resources are available for an incoming communication. The user then has the choice of accepting, rejecting or ignoring the waiting call (as per basic call procedures).

This document is applicable to the UE and AS which are intended to support the CW supplementary service.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 124 615	12.3.0	Published	2015	https://www.etsi.org/deliver/etsi_ts/124600_124699/124615/12.03.00_60/ts_124615v120300p.pdf

9.3.16 ETSI TS 124 173: IMS multimedia telephony communication service and supplementary services; Stage 3

This document provides the protocol details for multimedia telephony communication service and associated supplementary services in the IM CN subsystem based on the requirements defined in [ETSI TS 124 173].

Multimedia telephony and supplementary services allow users to establish communications between them and enrich that by enabling supplementary services.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 124 173	12.3.0	Published	2015	https://www.etsi.org/deliver/etsi_ts/124100_124199/124173/12.03.00_60/ts_124173v120300p.pdf

9.4 126-series: CODECs

9.4.1 ETSI TS 126 114: IP multimedia subsystem; Multimedia telephony; Media handling and interaction

This document specifies a client for the multimedia telephony service for IMS (MTSI) supporting conversational speech (including DTMF), video and text transported over RTP with the scope to deliver a user experience equivalent to or better than that of circuit-switched (CS) conversational services using the same amount of network resources. It defines media handling (e.g., signalling, transport, jitter buffer management, packet-loss handling, adaptation), as well as interactivity (e.g., adding or dropping media during a call). The focus is to ensure a reliable and interoperable service with a predictable media quality, while allowing for flexibility in the service offerings.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 126 114	12.16.0	Published	2017	https://www.etsi.org/deliver/etsi_ts/126100_126199/126114/12.16.00_60/ts_126114v121600p.pdf

9.5 129-series: Signalling protocols - intra-fixed-network

9.5.1 ETSI TS 129 162: Interworking between the IM CN subsystem and IP networks

The IM CN subsystem interworks with the external IP networks through the Mb reference point.

This document details the interworking between the IM CN subsystem and external IP networks for IM service support. It addresses the issues of control plane interworking, user plane interworking and IP version interworking.

The IP version interworking, between IPv4 [IETF RFC 791] "*Internet Protocol*", and IPv6 [IETF RFC 2460] "*Internet Protocol, Version 6 (IPv6) Specification*" is detailed in terms of the processes and protocol mappings required to support both mobile originated and terminated calls.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 129 162	12.7.0	Published	2015	https://www.etsi.org/deliver/etsi_ts/129100_129199/129162/12.07.00_60/ts_129162v120700p.pdf

9.5.2 ETSI TS 129 163: Interworking between the IP multimedia core network subsystem and circuit-switched networks

This document specifies the principles of interworking between the ETSI IM CN subsystem and bearer independent call control (BICC)/ISDN user part (ISUP) based legacy circuit-switched (CS) networks, in order to support IM basic voice calls.

This document addresses the areas of control and user plane interworking between the IM CN subsystem and CS networks through the network functions, which include the MGCF and IM-MGW. For the specification of control plane interworking, areas such as the interworking between the SIP and BICC or ISUP are detailed in terms of the processes and protocol mappings required for the support of both IM originated and terminated voice calls.

Other areas addressed encompass the transport protocol and signalling issues for negotiation and mapping of bearer capabilities and QoS information.

This document specifies the interworking between the 3GPP profile of the SIP (as detailed according to [ETSI TS 124 229]) and BICC or ISUP, as specified in [ITU-T Q.1902.1] to [ITUT Q.1902.6]: "*Bearer Independent Call Control*" and [ITU-T Q.761] to [ITU-T Q.764]: "*Signalling System No. 7 – ISDN User Part*", respectively.

This document addresses two interworking scenarios with respect to the properties of the CS network:

- 1) the CS network does not use any ETSI-specific additions;
- 2) the CS network uses ETSI-specific additions.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 129 163	12.15.0	Published	2019	https://www.etsi.org/deliver/etsi_ts/129100_129199/129163/12.15.00_60/ts_129163v121500p.pdf

9.5.3 ETSI TS 129 165: Inter-IMS network to network interface

This document addresses the II-NNI consisting of Ici and Izi reference points between IMS networks in order to support end-to-end service interoperability.

This document addresses the issues related to control plane signalling (ETSI usage of SIP and SDP protocols, required SIP headers), as well as other interconnecting aspects like security, numbering/naming/addressing and user plane issues as transport protocol, media and codecs covered in a widespread set of ETSI specifications. A profiling of the II-NNI is also provided.

Charging aspects will be addressed as far as SIP signalling is concerned.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 129 165	12.20.0	Published	2019	https://www.etsi.org/deliver/etsi_ts/129100_129199/129165/12.20.00_60/ts_129165v122000p.pdf

9.5.4 ETSI TS 129 202: Signalling system No. 7 signalling transport in core network; Stage 3

This document defines the possible protocol architectures for transport of signalling system no. 7 (SS7) signalling protocols in a core network.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 129 202	12.0.0	Published	2014	https://www.etsi.org/deliver/etsi_ts/129200_129299/129202/12.00.00_60/ts_129202v120000p.pdf

9.5.5 ETSI TS 129 204: Signalling system No. 7 security gateway; Architecture, functional description and protocol details

This document provides functional description of the SS7 security gateway. This document also covers network architecture, routing considerations and protocol details.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 129 204	12.0.0	Published	2014	https://www.etsi.org/deliver/etsi_ts/129200_129299/129204/12.00.00_60/ts_129204v120000p.pdf

9.5.6 ETSI TS 129 212: Policy and charging control; Reference points

This document provides the stage-3 specification of the Gx, Gxx and Sd reference points for the present release. The functional requirements and the stage-2 specifications of the Gx, Gxx and

Sd reference points are contained in [ETSI TS 123 203]. The Gx reference point lies between the policy and charging rule function and the policy and charging enforcement function. The Gxx reference point lies between the policy and charging rule function and the bearer binding and event reporting function. The Sd reference point lies between the policy and charging rule function and the traffic detection function.

Whenever it is possible, this document specifies the requirements for the protocol by reference to specifications produced by the IETF within the scope of Diameter. Where this is not possible, extensions to Diameter are defined.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 129 212	12.13.0	Published	2016	https://www.etsi.org/deliver/etsi_ts/129200_129299/129212/12.13.00_60/ts_129212v121300p.pdf

9.5.7 ETSI TS 129 213: Policy and charging control signalling flows and QoS parameter mapping

This specification adds detailed flows of policy and charging control (PCC) over the Rx and Gx reference points and their relationship with the bearer level signalling flows over the Gn interface.

The calls flows depicted in this specification represent usual cases, i.e., not all situations are covered. Detailed information provided in [ETSI TS 129 212] and [ETSI TS 129 214] shall be taken into consideration.

This specification also describes the binding and the mapping of QoS parameters among SDP, universal mobile telecommunications service (UMTS) QoS parameters, and QoS authorization parameters.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 129 213	12.14.0	Published	2019	https://www.etsi.org/deliver/etsi_ts/129200_129299/129213/12.14.00_60/ts_129213v121400p.pdf

9.5.8 ETSI TS 129 214: Policy and charging control over Rx reference point

This document provides the stage-3 specification of the Rx reference point for the present release. The functional requirements and the stage-2 specifications of the Rx reference point are contained in [ETSI TS 23 203]. The Rx reference point lies between the application function and the policy and charging rule function.

Whenever it is possible, this document specifies the requirements for the protocol by reference to specifications produced by the IETF within the scope of Diameter. Where this is not possible, extensions to Diameter are defined.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 129 214	12.12.0	Published	2016	https://www.etsi.org/deliver/etsi_ts/129200_129299/129214/12.12.00_60/ts_129214v121200p.pdf

9.5.9 ETSI TS 129 231: Application of SIP-I protocols to circuit-switched core network architecture; Stage 3

This document describes the protocols to be used when SIP-I is optionally used as a call control protocol in an ETSI CS core network on Nc interface, see [ETSI TS 123 231]. The SIP-I protocol operates between (G)MSC servers. The SIP-I architecture consists of a number of protocols. The following types of protocols are described: call control protocol, resource control protocols and user

plane protocol for this architecture. The architecture complies with the requirements imposed by [ETSI TS 123 231] and [ETSI TS 123 153].

Interworking of SIP-I on Nc to external networks is described by [ETSI TS 129 235].

This document is valid for a third-generation PLMN (UMTS) complying with Release 9 and later.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 129 231	12.0.0	Published	2014	https://www.etsi.org/deliver/etsi_ts/129_200_129299/129231/12.00.00_60/ts_1_29231v120000p.pdf

9.5.10 ETSI TS 129 232: Media gateway controller – Media gateway interface; Stage 3

This document describes the protocol to be used on the media gateway controller (MGC) – Media gateway (MGW) interface. The media gateway controllers covered in this specification are the MSC server and the GMSC server. The basis for this protocol is the [ITU-T H.248.1] MEGACO protocol as specified in ITU-T and IETF. The BICC architecture, as described in [ETSI TS 123 205] and [ETSI TS 129 205], defines the usage of this protocol.

This specification describes the changes to [ITU-T H.248.1]/MEGACO which are needed to handle 3G-specific traffic cases. This is done by using the [ITU-T H.248.1]/MEGACO standard extension mechanism.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 129 232	12.1.0	Published	2015	https://www.etsi.org/deliver/etsi_ts/129_200_129299/129232/12.01.00_60/ts_1_29232v120100p.pdf

9.5.11 ETSI TS 129 235: Interworking between SIP-I based circuit-switched core network and other networks

This document specifies the interworking between a SIP-I based CS core network, as specified in [ETSI TS 123 231] and [ETSI TS 129 231], with out-of-band transcoder control-related procedures in [ETSI TS 123 153], and:

- an external SIP-I based signalling network compliant to [ITU-T Q.1912.5];
- an ISUP ([ITU-T Q.761] to [ITU-T Q.764]) based network such as an ISUP based ETSI CS domain or an PSTN;
- a BICC ([ITU-T Q.1902.1] to [ITU-T Q.1902.6]) based network such as an BICC-based ETSI CS domain as specified in [ETSI TS 123 205] and [ETSI TS 129 205];
- an Internet multimedia subsystem, as specified in [ETSI TS 123 228] and [ETSI TS 124 229].

	Document No.	Version	Status	Issued date	Location
ETSI	TS 129 235	12.2.0	Published	2019	https://www.etsi.org/deliver/etsi_ts/129_200_129299/129235/12.02.00_60/ts_1_29235v120200p.pdf

9.5.12 ETSI TS 129 238: Interconnection border control functions – Transition gateway interface, Ix interface; Stage 3

This document describes the protocol to be used on the IBCF – transition gateway (TrGW) interface and the CS-IBCF – CS-TrGW interface. The basis for this protocol is the [ITU-T H.248.1] protocol.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 129 238	12.5.0	Published	2015	https://www.etsi.org/deliver/etsi_ts/129200_129299/129238/12.05.00_60/ts_129238v120500p.pdf

9.5.13 ETSI TS 129 272: Evolved packet system; Mobility management entity and serving GPRS support node related interfaces based on Diameter protocol

This document describes the mobility management entity (MME) and serving GPRS support node (SGSN) related diameter-based interfaces towards the home subscriber server (HSS), and the MME and the SGSN related diameter-based interface towards the equipment identity register (EIR).

	Document No.	Version	Status	Issued date	Location
ETSI	TS 129 272	12.11.0	Published	2018	https://www.etsi.org/deliver/etsi_ts/129200_129299/129272/12.11.00_60/ts_129272v121100p.pdf

9.5.14 ETSI TS 129 292: Interworking between the IP multimedia core network subsystem and MSC server for IMS centralized services

This document specifies the principles of interworking between the IM CN subsystem and CS domain in order to enable ICS for UEs using CS domain access.

This document addresses the area of registration procedures interworking between the CS domain and IM CN subsystem.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 129 292	12.7.0	Published	2018	https://www.etsi.org/deliver/etsi_ts/129200_129299/129292/12.07.00_60/ts_129292v120700p.pdf

9.5.15 ETSI TS 129 079: Optimal media routeing within the IP multimedia subsystem; Stage 3

This document defines optional optimal media routeing (OMR) procedures that can be applied by entities in the IMS that control media resources and are capable of manipulating the SDP as defined by [IETF RFC 4566].

	Document No.	Version	Status	Issued date	Location
ETSI	TS 129 079	12.3.0	Published	2015	https://www.etsi.org/deliver/etsi_ts/129000_129099/129079/12.03.00_60/ts_129079v120300p.pdf

9.5.16 ETSI TS 129 658: SIP transfer of IP multimedia service tariff information; Protocol specification

This document specifies stage three of the real-time transfer of tariff information between a charge determination point (CDP) and a charge generation point (CGP) by means of the SIP.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 129 658	12.0.0	Published	2014	https://www.etsi.org/deliver/etsi_ts/129600_129699/129658/12.00.00_60/ts_129658v120000p.pdf

9.5.17 ETSI TS 129 205: Application of Q.1900 series to bearer independent Circuit Switched (CS) core network architecture

This document describes the protocols to be used when [ITU-T Q.1902] "Bearer Independent Call Control" is used as call control protocol in a 3GPP Bearer Independent CS core network 3GPP TS 23.205. Recommendations [ITU-T Q.1902.1], [ITU-T Q.1902.2], [ITU-T Q.1902.3], [ITU-T Q.1902.4], [ITU-T Q.1902.5] and [ITU-T Q.1902.6] operate between (G) MSC servers. The BICC architecture as described in [ITU-T Q.1902] consists of a number of protocols. The following types of protocols are described: call control protocol, bearer control protocols and a resource control protocol for this architecture.

	Document No.	Version	Status	Issued date	Location
ETSI	TS 129 205	12.0.0	Published	2014	https://www.etsi.org/deliver/etsi_ts/129200_129299/129205/12.00.00_60/ts_129205v120000p.pdf

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