3GPP activity towards IMT-2020

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3GPP RAN ITU-R Ad-Hoc

3GPP Roadmap

2016	2017	2018	2019	2020	2021	2022

Release 15

- Early drop
- Rel 16
- Early phase 1 deployment
- Phase 1 deployment
- Phase 2 deployment
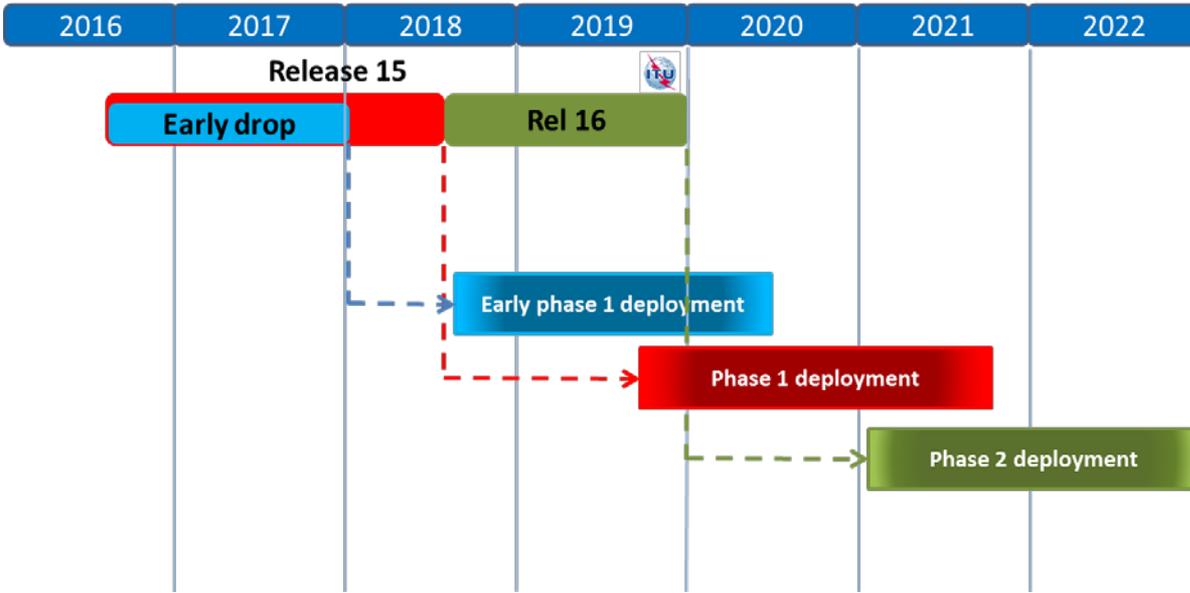
- 3GPP features will be phased as it will be not possible to standardize all in time for Rel-15 completion and early deployments

- Key requirement: NR design shall be **forward compatible** at its core so that efficient and 'optimized' features can be added in later releases

- Release 15 (aka phase 1, by June '18) will aim at enabling a first phase of expected deployments in 2020

- Release 16 (aka phase 2, by Dec '19)

- Additional "Early drop" milestone (Dec '17) added to support emerging market needs

3GPP System

- 3GPP aims to the definition of a full system (Radio and Core Network)
- 3GPP specifications will be labelled "5G" from Release 15 onwards
- 5G requirements
  - Service: TS 22.261 "Service requirements for next generation new services and markets"
  - Radio: TR 38.913 "Study on scenarios and requirements for next generation access technologies"
- Overall architecture (expected Dec 2017):
- TS 23.501: "System Architecture for the 5G System; Stage 2"
- TS 23.502: "Procedures for the 5G System; Stage 2"
- RAN aspects
  - TR 38.901: "Study on channel model for frequencies from 0.5 to 100 GHz"
  - TR 38.912: "Study on new radio access technology"
  - Technical specifications will be captured in the 36, 37 and 38 series

3GPP deployment scenarios
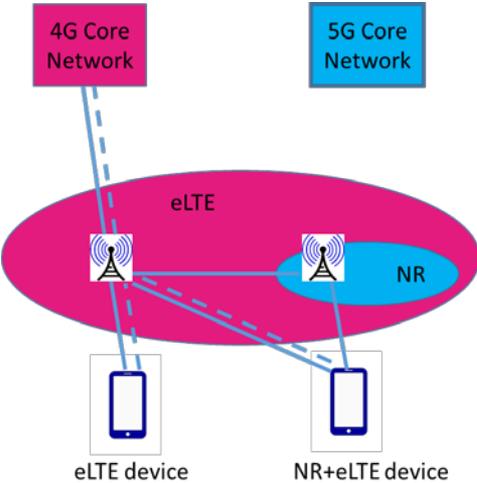
December 2017:
- NR Non Stand-Alone (NSA) - The eNB is the master node
- 4G Core Network (EPC)
- Enanced LTE (eLTE)
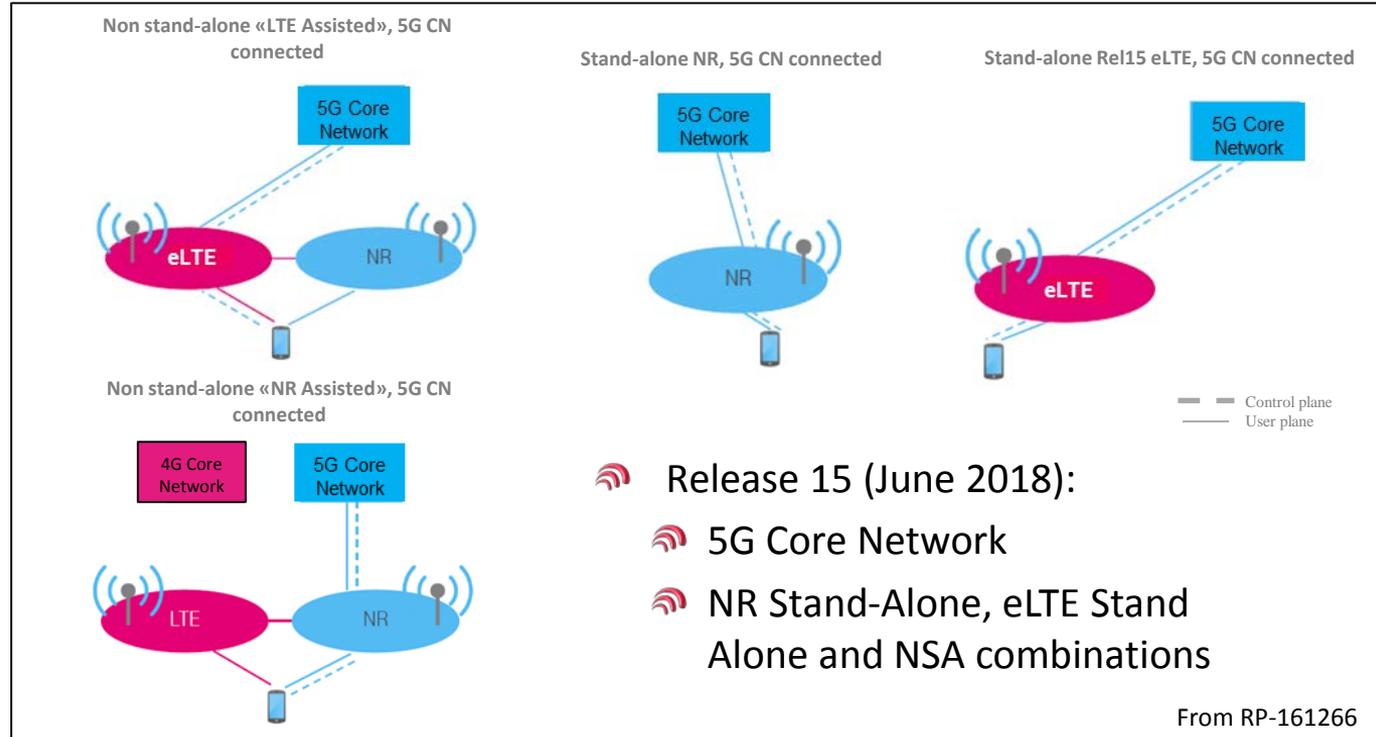
Release 15 (June 2018):
- 5G Core Network
- NR Stand-Alone, eLTE Stand Alone and NSA combinations

From RP-161266

Release 15 contents (Radio)

- R15 **NR** WID (RP-172115)
- R15 **LTE**: LTE/NGC integration, Enhanced reliability and short TTI (URLLC per LTE), enhancements of MTC & NB-IOT, C- V2X Phase II, Fixed Wireless Access, FeCoMP, Positioning enhancements, eVideo, QoE reporting, CA utilization

Release 15 NR features

R15 NR WID (RP-172115)

- Radio architectures and RAN interfaces
- NR-LTE co-existence mechanisms
- Support co-existence of LTE UL and NR UL within the bandwidth of an LTE component carrier and co-existence of LTE DL and NR DL within the bandwidth of an LTE component carrier
- Support of ultra-reliable part of URLLC
- Radio Access Network architecture, interface protocols and procedures for functional split between central and distributed units
- Normative stage-2/3 specification of one higher layer split (based on centralised PDCP/RRC and decentralised RLC/MAC/PHY)
- Dual Connectivity between E-UTRA and NR and within NR
- Carrier Aggregation within NR
- Support for network slicing
- Support for PWS and IMS voice
- Support of (SON) functions: Automatic Neighboring Relation (ANR); NG/Xx/Xn setup
- Inter-RAT mobility between NR and E-UTRA

Release 15 Features (System)

- 5G Core Network (5G CN)
  - System WIDs: Stage 1 (SMARTER, TS 22.261), Stage 2 System Aspects (5GS_Ph1, TS 23.501, TS 23.502) and Security Aspects (5GS_Ph1-SEC, TS 33.501)
  - EPC enhancements to support 5G New Radio via Dual Connectivity (EDCE5)
- Enhanced Packet Core (EPC)
  - Enhancement of V2X, MTC Enhancement, PS Data Off Phase 2, Security Assurance for 3GPP network products, HPLMN Radio Access Technology deployment optimization, Unlicensed Spectrum Offloading System
- 5G Core Network
  - Network slicing
  - QoS framework (enhanced beyond EPC's framework), Policy framework
  - Mobility framework, Session management, Support for session and service continuity and efficient user plane paths, Service Based Control Plane Architecture
  - Network capability exposure
  - Untrusted Non-3GPP access support
- EPC enhancements to support 5G New Radio via Dual Connectivity
  - Alignment of specifications
  - Support for E-UTRAN URLLC capabilities

Initial studies for Release 16 (Radio)

- Some feasibility studies:

  - **NR**: Non-Orthogonal Multiple Access (NOMA), eV2V, Relay, CU-DU lower layer split, Test methods for New Radio (OTA measurements)

  - **LTE**: Architecture Evolution for E-UTRAN (split CU-DU for LTE), Study on Aerials (planned to be part of Rel 15)

Initial progress on Release 16 (System)

- Requirements
  - Concluded normative 5G requirements (Aspects not yet included in Rel-15)
    - TS 22.261: " Service requirements for next generation new services and markets"
  - Some requirements currently being studied
    - LAN Support in 5G, Positioning Use Cases, Enhancements to the Public Warning System
- Architecture Studies for the 5G System
  - Agreed studies for aspects not yet included in Rel-15
    - Cellular IoT support and evolution for the 5G System
    - Wireless and Wireline Convergence for 5G system architecture
    - Access Traffic Steering, Splitting between 3GPP and non-3GPP access
    - Topology Enhancements
  - Other aspects under evaluation
    - 5G Support for Broadcast/Multicast Capabilities, Off-Network Communication, Relay UEs
    - 5G Minimal connectivity within extreme rural deployments
    - 5G Trusted Non-3GPP Access (essentially required by Wireline-Wireless Convergence)

IMT-2020 submission - timeplan

From RP-172098
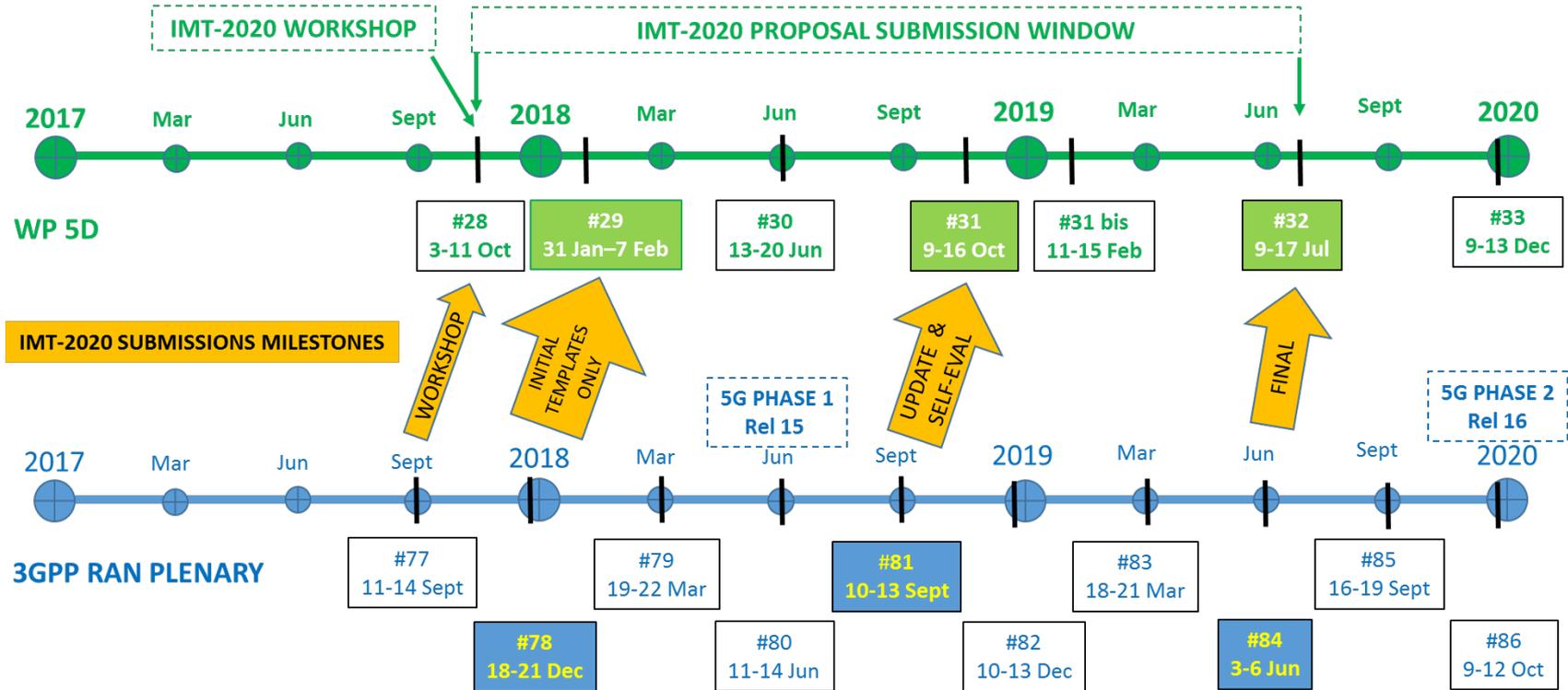
IMT-2020 submission - timeplan

Submission Milestone Name	3GPP Meeting	ITU-R Meeting	General Submission Content	Submission Templates (Release Basis)	Self- Evaluation (Release Basis)
Workshop	RAN # 77 Sept 2017	WP 5D #28 Oct 2017	Overview	-	-
Initial Templates Only	RAN # 78 Dec 2017	WP 5D # 29 Feb 2018	Description Templates	Description Templates 5.2.3 (R15)	-
Update & Self-Eval	RAN # 81 Sept 2018	WP 5D # 31 Oct 2018	Description Templates Compliance Templates Self-Evaluation	Description Templates 5.2.3 (R15) Compliance Templates 5.2.4 (R15)	Self-Evaluation (R15)
Final	RAN # 84 June 2019	WP 5D # 32 July 2019	Description Templates Compliance Templates Self-Evaluation	Description Templates 5.2.3 (R15+R16) Compliance Templates 5.2.4 (R15+R16)	Self-Evaluation (R15+R16)

From RP-172098

IMT-2020 submission format

- **Submission 1**
  - SRIT
    - Component RIT: NR (*)
    - Component RIT: EUTRA/LTE
      - incl. standalone LTE, NB-IoT, eMTC, and LTE-NR DC
    - full 38 and 36 series, and subset of 37 series
- **Submission 2** (In addition to the above)
  - NR RIT (*)
- **Naming**
  - Name : 5G
  - Footnote: Developed by 3GPP as 5G, Release 15 and beyond

(*) The plan is to leverage the NR RIT (in submission 2) as the NR component RIT in submission 1; NR details TBD

Thanks
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