3GPP Advances in Critical Communications

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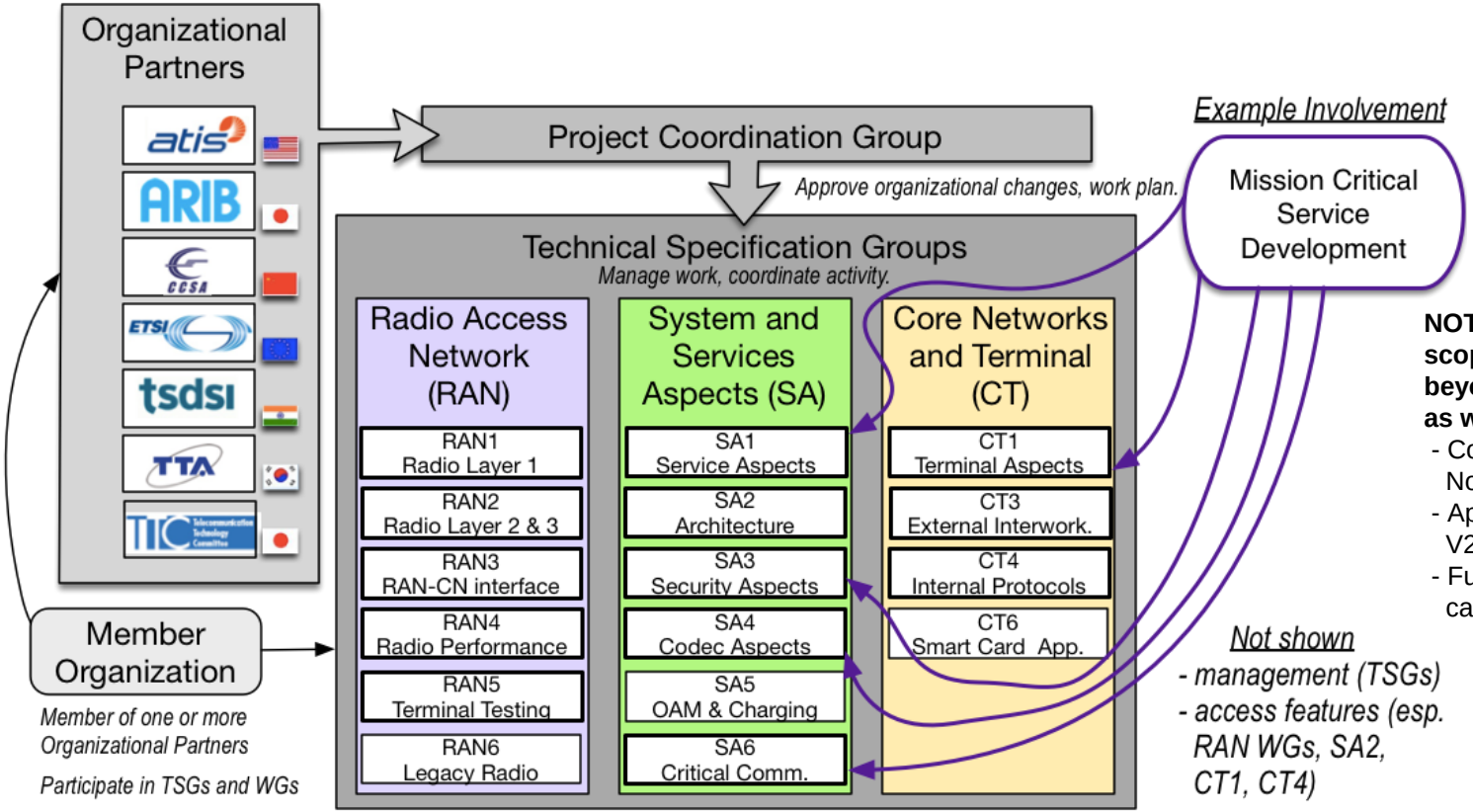
1) 3GPP MISSION CRITICAL STANDARDIZATION STATUS SUMMARY

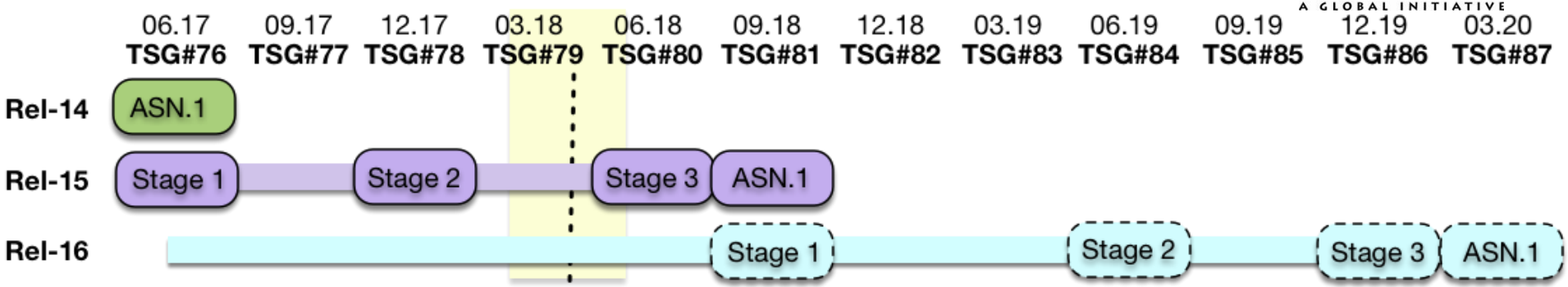
3GPP (A Critical Communications perspective)



NOTE: SA6 now has expanded scope and works on topics beyond critical communications as well, including:

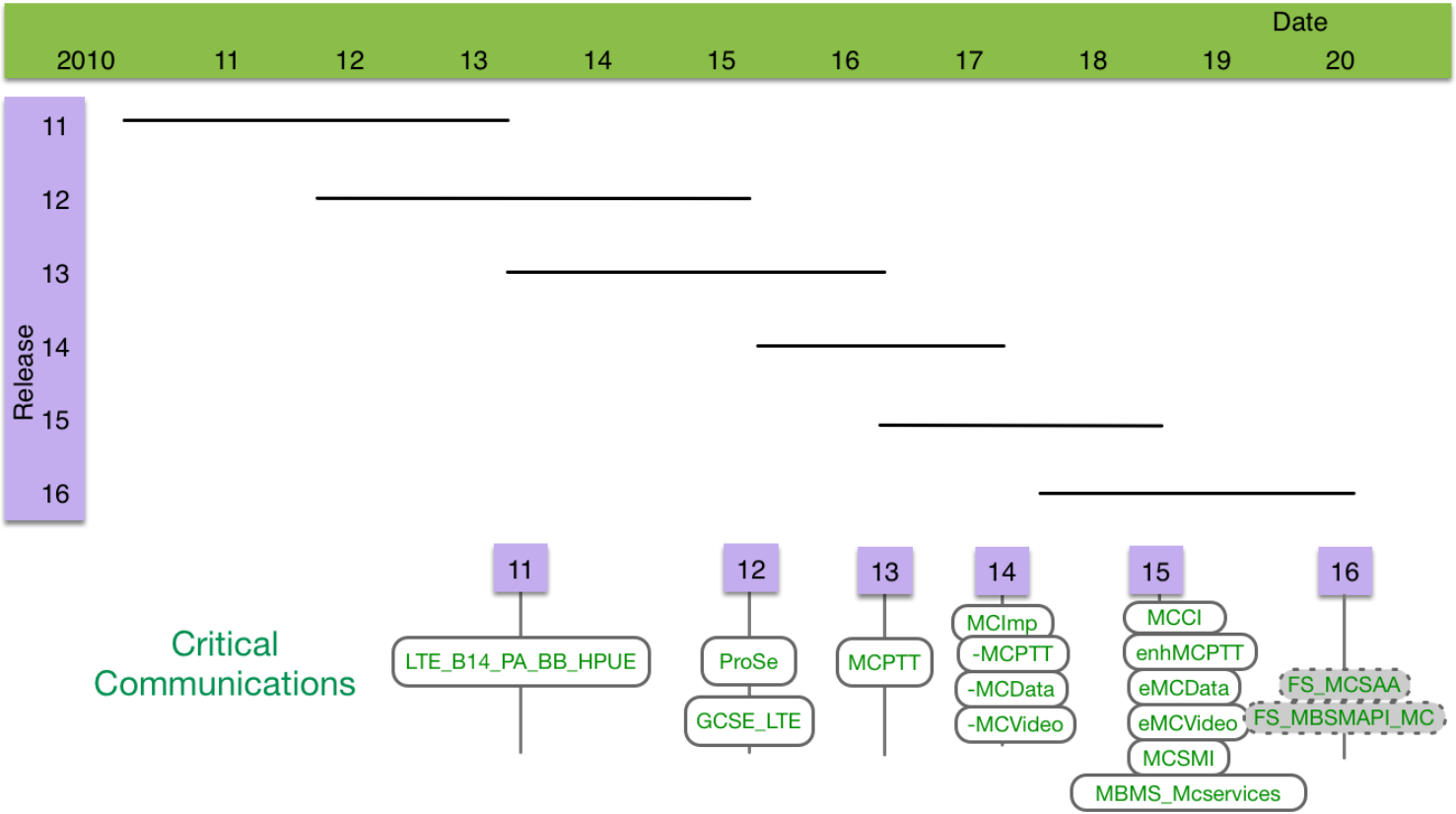
- Common API Framework for Northbound Interfaces
- Application layer support for V2X services
- Future Railway Communi-cations system

3GPP Status Overview

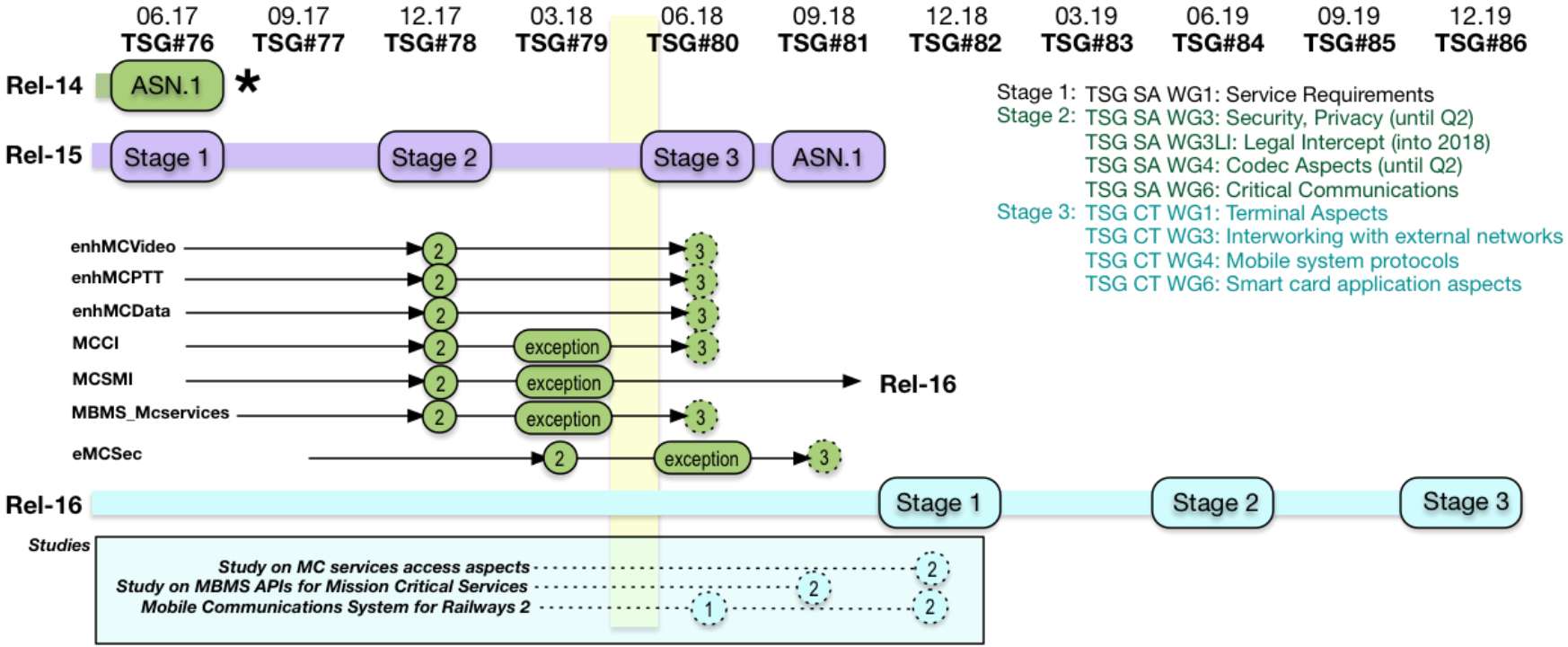


- Rel-14 is fully frozen and in maintenance.
- Rel-15 (5G phase 1 release)
  - Stage 1 and 2 have frozen. Maintenance relents already (not fully dominating the work.)
  - Stage 3 freeze approaches soon – this is an immense effort in most working groups.
- Rel-16 (5G phase 2 release)
  - Stage 1 studies and work items are completing.
  - Stage 2 studies have begun and progress well.

3GPP Critical Communication Standards



Critical Communications Work Summary



* Stage 1 normative specifications for MCVideo and MCData were approved in Rel-14.
Stage 1 normative specifications for MCCI, MCSMI, MCPTT were approved in Rel-13.

2) RELEASE 15 MISSION CRITICAL FEATURES

Rel-15 Mission Critical Common Core Enhancements

- New Capabilities (TS 23.280)
  - MC server-initiated group de-affiliation (more robust & controlled), including in partner systems.
  - Enhanced Group Regrouping (for different MC services)
  - Resource Management (moved from MCPTT to common services)
  - Priority handling between MC servers
  - Resource Request to MC server
  - Provision of Group Dynamic Data
- These enhancements are undertaken as part of ongoing work on MCPTT, MCVideo and MCData.

Rel-15 MCPTT Enhancements

- New Capabilities (TS 23.379)
  - Unicast media flow stop and resume (allows for efficiency)
  - Floor acknowledgement added (optional & useful at times)
  - Server-initiated broadcast group call release (better interworking expected)

Rel-15 MCData Enhancements

MCData

Rel-14: *Uplink Data Transaction; Distribute Downlink Data (unicast and multicast); Replicate Data; Store and Forward; Reporting Functions off-network as well as on-network; Supports service configuration, affiliation / de-affiliation for group control*

	On-network	Off-Network	Functional Models	
Short Data Service (SDS)	• ★	• ★	• ★	Send 'small data items' (1 PDU) to receiving users. ***Application-specific*** payload support.
File Distribution	•	★	•	Apply policies for reception (location, privilege) Associated with metadata (URL, size, etc.); Allow user interaction; HTTP or multicast file distribution.
Data Streaming			•	Request, start, stop, terminate, etc. data streams.
Enhanced Status	•	•	N/A	Updates of (arbitrary) status, potentially continuously.
Transmission Control	•		•	For specific services: request indications, control timing, request transmission, etc.
Conversation Management	•		N/A	To aggregate MCData transmissions for a given activity
Communication Release	•		N/A	Supports termination of reception of MCData.

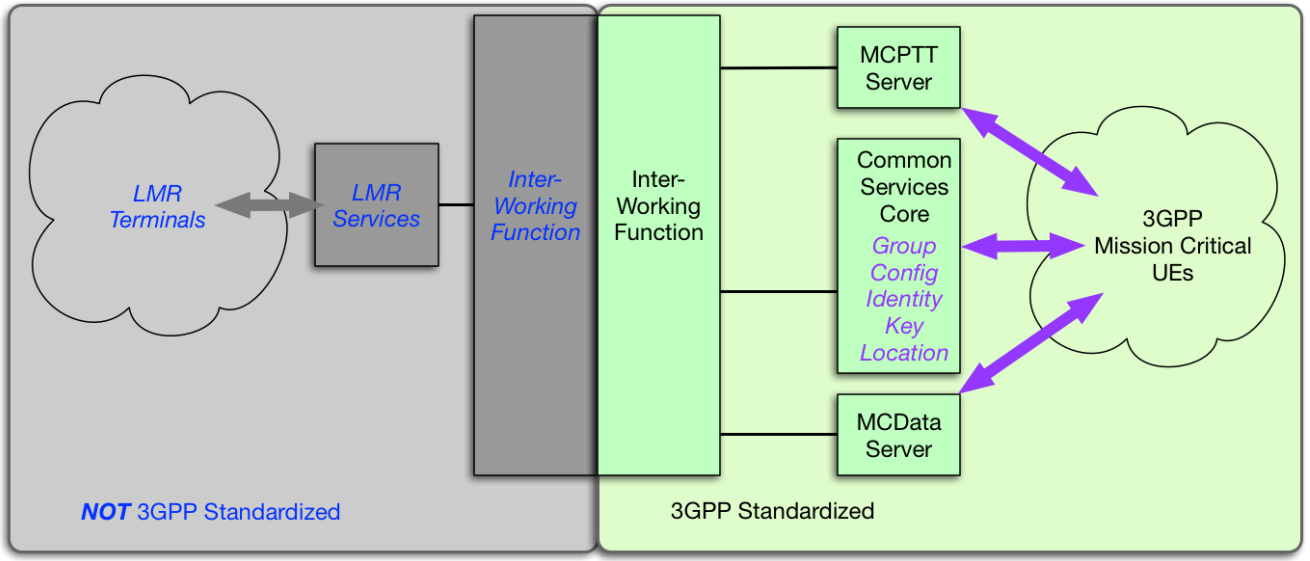
★ **Added in Release 15**

Rel-15 MCVideo Enhancements

- Service type for group regrouping
- Camera query
- Video capabilities sharing enhancement
- MC Video Emergency Private Call
- Mutual Adaptation during MC Video Communication

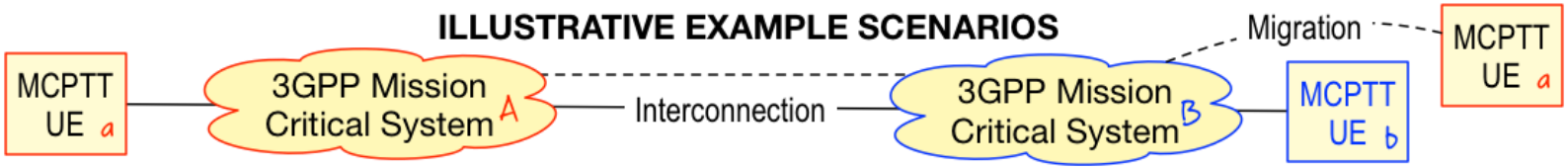
Rel-15 Mission Critical Interworking with Land Mobile Radio Systems (MCCI)

- New specification – TS 23.283
- Services & functions in the 3GPP system: interaction with the IWF to include LMR terminals.
- **Currently it appears that stage 3 will conclude in Rel-16.**



Rel-15 MC System Migration and Interconnection

- **Addition of Support for Complex Scenarios, e.g. Inter-Agency Collaboration**
  - **Interconnection** allows communication of users in distinct 3GPP mission critical systems (e.g. two agencies.)
  - **Migration** allows a user from one 3GPP mission critical system to obtain service *directly* from another.



- Features include: Group & other configuration for interconnection & migration, user profile & subscription aspects for migration, temporary grouping rules, interconnection affiliation, EPC-roaming to support migration, media replication, configuration enforcement, MCVideo support, migration credential retrieval

Rel-15 MONESTARY

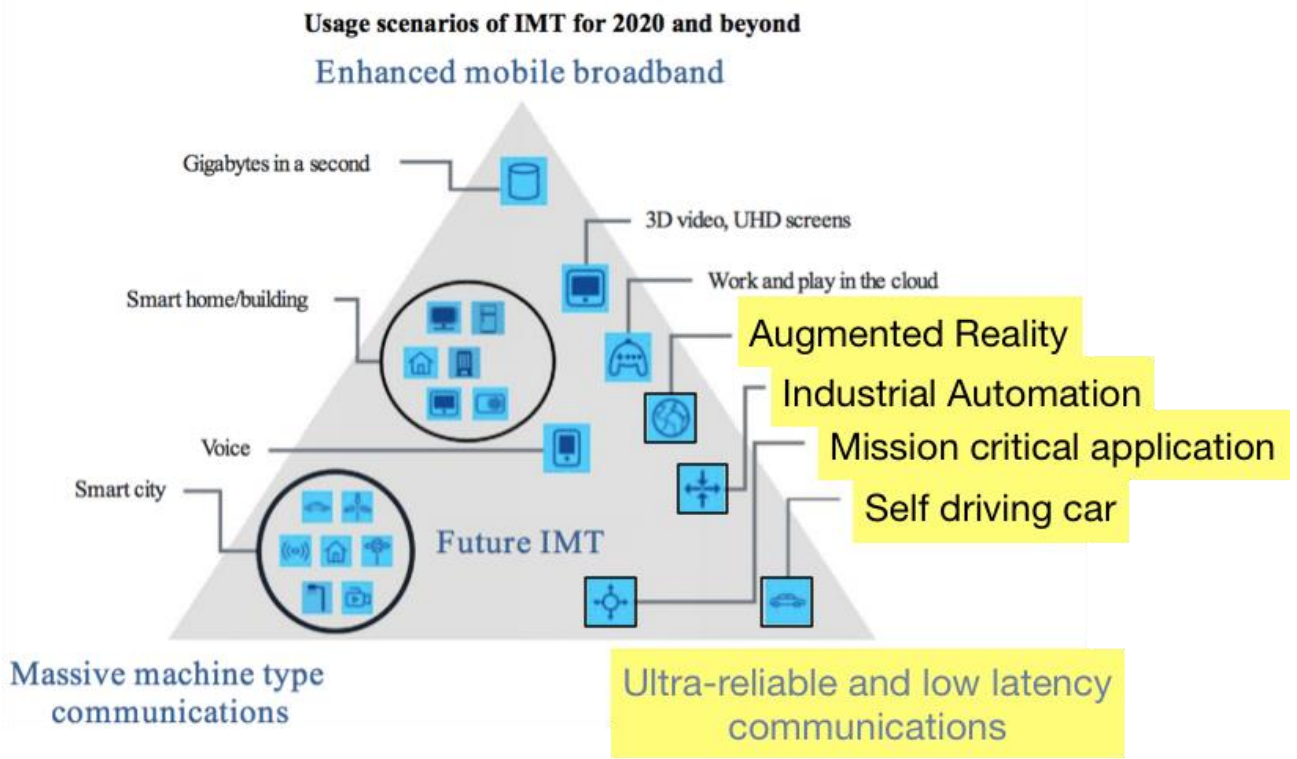
- Enhancements to MCPTT motivated by Future Mobile Rail Communication Service requirements
  - Multi-talker control (including floor release message)
  - Functional alias(es)
- Introduction of Rail-related features will continue in Rel-16.

Rel-15 MBMS_Mcservices

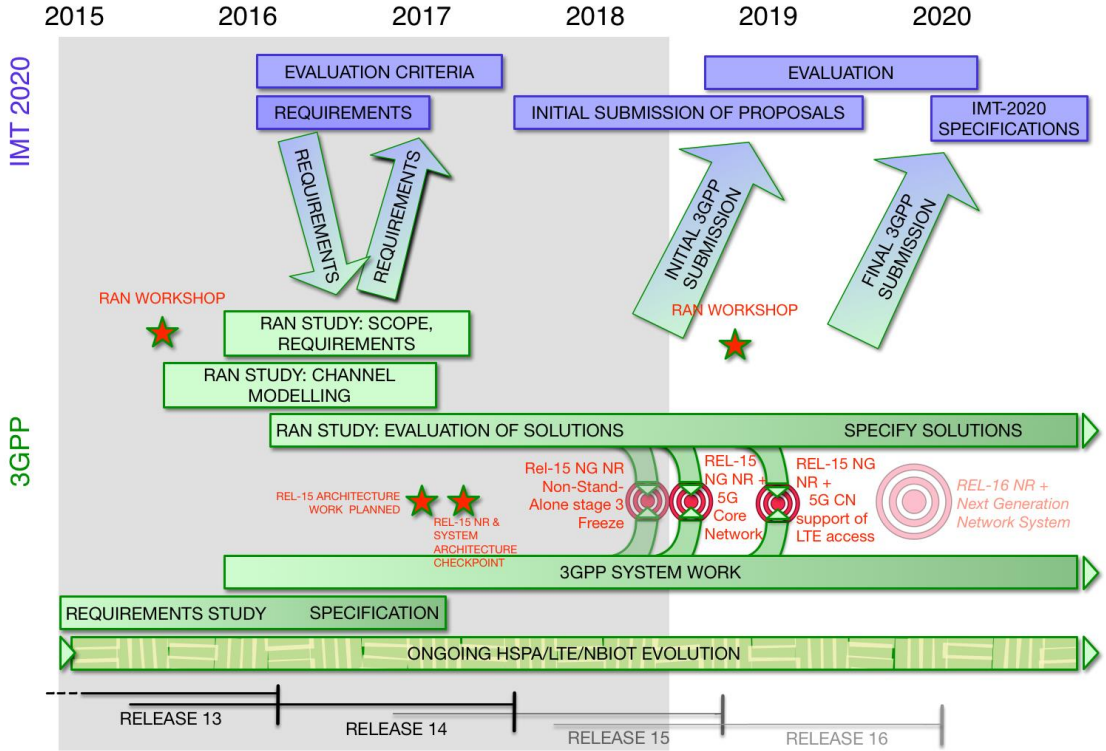
- Enhancements to MBMS support for MC services
  - MBMS bearer event notification
  - Forward Error Correction for mission critical services (including FEC for the media)
  - Header compression for MC services over MBMS
  - Multi-server MBMS bearer coordination
  - MBMS Packet Recovery
- In Rel-16: MBMS APIs may be introduced.

3) 3GPP 5G STANDARDIZATION AND MISSION CRITICAL COMMUNICATIONS

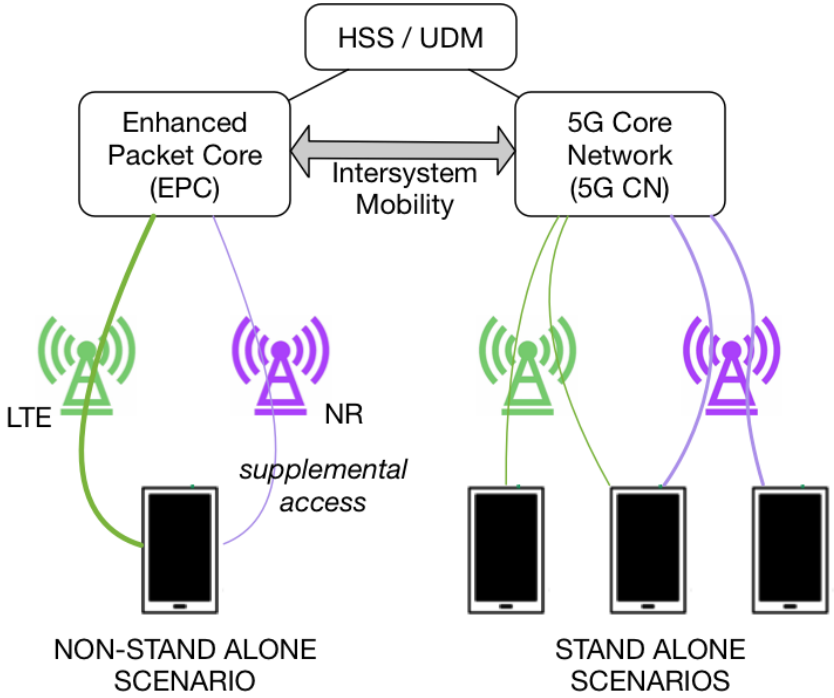
Target: New Vertical Sectors



3GPP's 5G Program and IMT-2020



Rel-15 Release, supported Scenarios



Stage 3 freeze:	12.17	12.18	12.18	06.18
Option [see 38.801):	3	7	4	2

Release 16 Prospects

- Priorities will be set in June, TSG#80 in RAN & SA
- Priority areas under discussion include:
  - System-wide
    - URLLC enhancements (system-wide, e.g. Industrial Automation)
    - 5G Satellite (NR for non-terrestrial networks, network aspects)
  - Network-side (mainly)
    - mIoT enhancements (C-IOT 5GC support, mainly)
    - 5GC enhancements (service based architecture, network slicing, wireless-wireline convergence, …) – also ongoing enhancement of the 4G EPC
    - 5G Local Area Networks
  - Radio-side (mainly)
    - NR enhancements (spectral efficiency, beyond 52.6 GHz, coverage, data collection)

5G Relation to Mission Critical Communication and Services

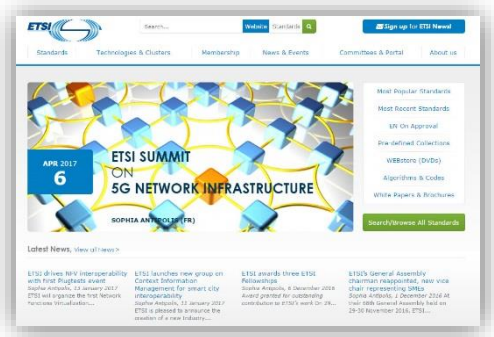
- 5G Core Network Support
  - Slicing and QoS
  - Network Exposure and Service Based Architecture
- URLLC capabilities

For future consideration

  - Reliable services may improve MC service offerings
- NR (New Radio) and potentially other accesses
  - Rel-16 Mission Critical study on support of MC services removing ‘over LTE.’

Study Item Already Agreed in SA6

Thank you. Questions?



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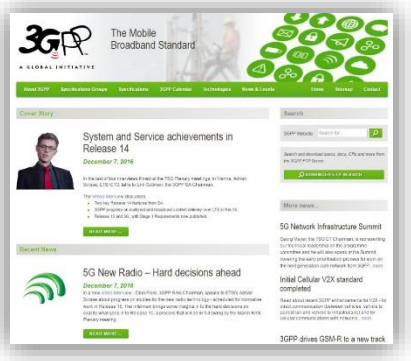

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- More Information on the MCPTT test event and other eCall and 112 testing events at the ETSI / 3GPP stand in the exhibition.
- You can also pick up a poster on 3GPP Mission Critical Work.
- Please join in and take on some of the work.