

# Critical communications **standards** supporting a multi-vendor and interoperable environment

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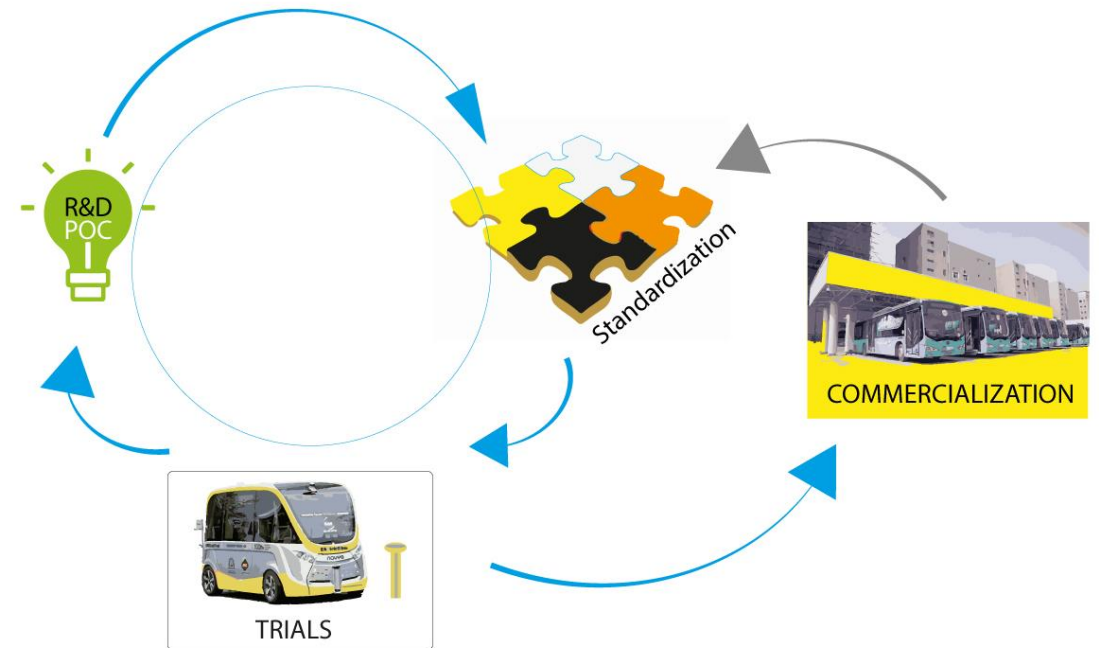


A founding Partner of



# The role of 3GPP

- 3GPP is part of the invention, proof of concept, **standardization**, trials, commercialization ...cycle
- Its role is to specify and maintain a complete system description for mobile telecommunications
- The system description is characterized by a number of standardized interfaces, not a description of standardized deployment
- This standardization approach enables an interoperable, multi-vendor approach to deployment and generates mass market economies of scale, without stifling innovation



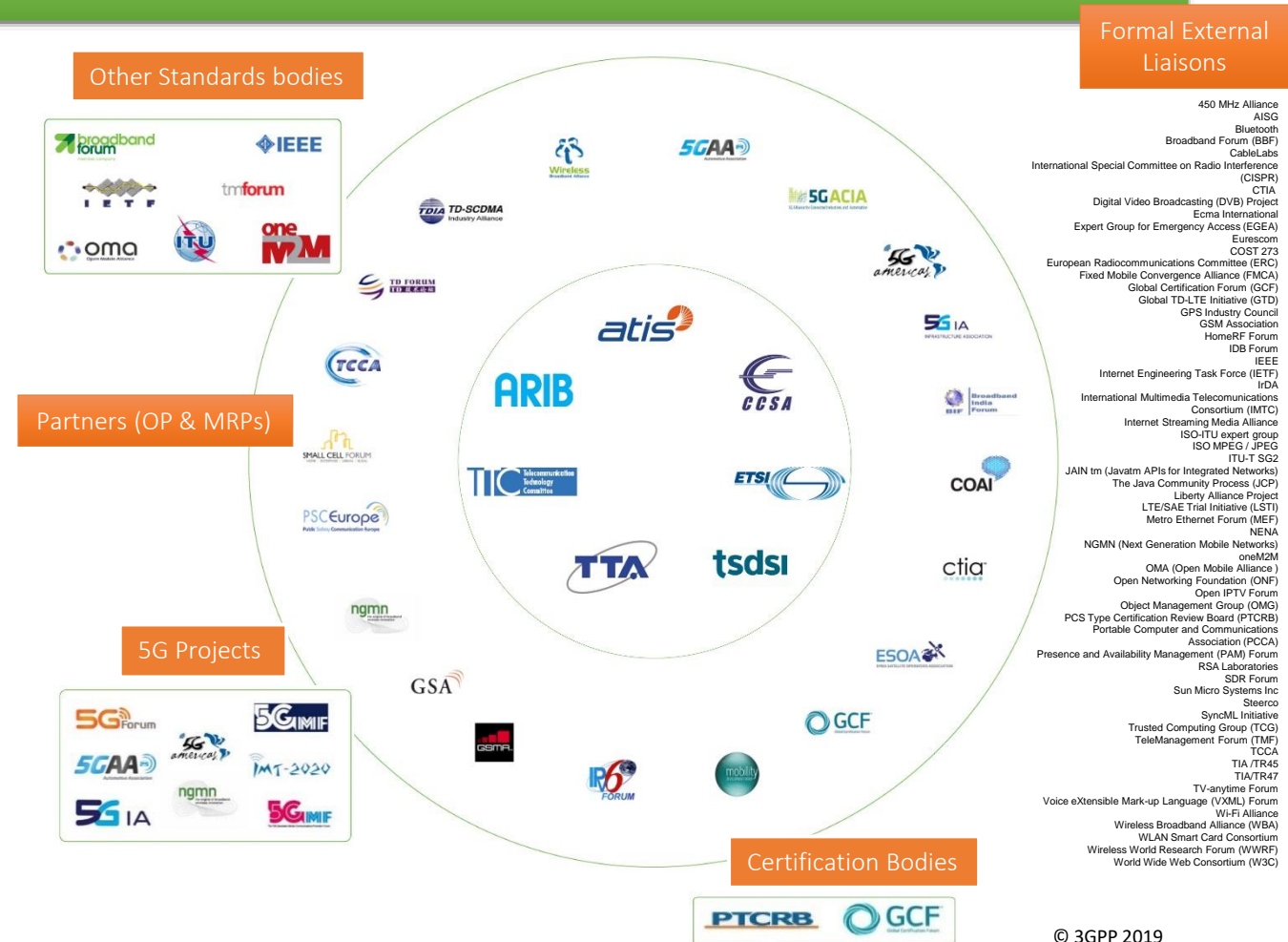
# 3GPP standards eco-system



Participation in 3GPP is made possible by companies and organizations becoming members of one of the 3GPP **Organizational Partners**, the seven Standards Developing Organizations (SDOs) - from China, Europe, India, Japan, Korea and the United States.

Specific inputs, in the form of market requirements may also come in to the Project via any of the twenty **Market Representation Partners** in 3GPP. These organizations have all signed up to the 3GPP Project scope and objectives.

There is also a lot of external cooperation with other standards bodies and a broad variety of other groups, by way of formal Liaisons.

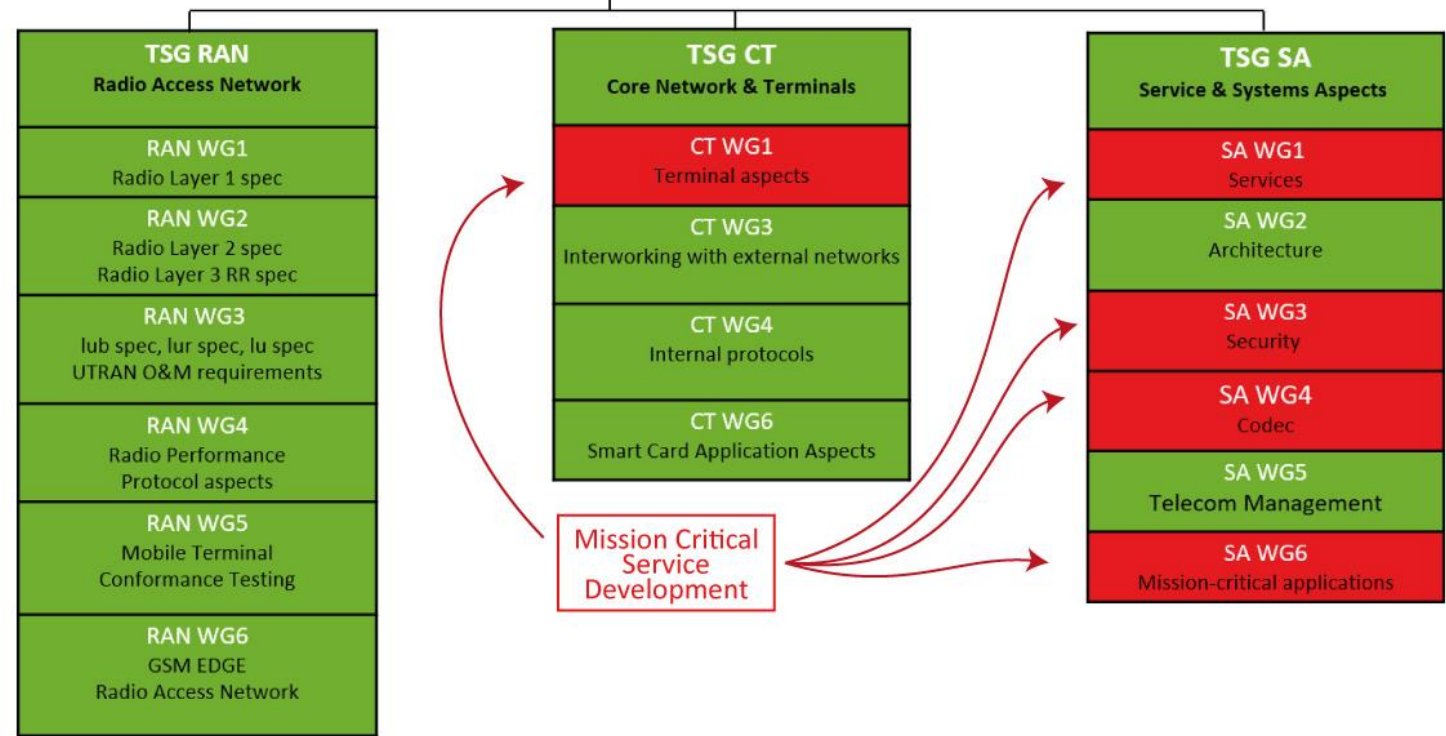


# 3GPP work on Mission Critical

- Working Groups concentrate on features – making progress across 3GPP ‘Releases’
- SA6 has the lead for mission critical applications, but other groups have significant work to do as well
- 3GPP working with a variety of industries for new services over LTE and 5G – There will be a benefit for MC applications (V2X, AR & VR, Satellite, broadcast, etc.)
- Interoperability testing on-going; example: MCPTT, data and video tests in ETSI & TCCA



Project Coordination Group (PCG)



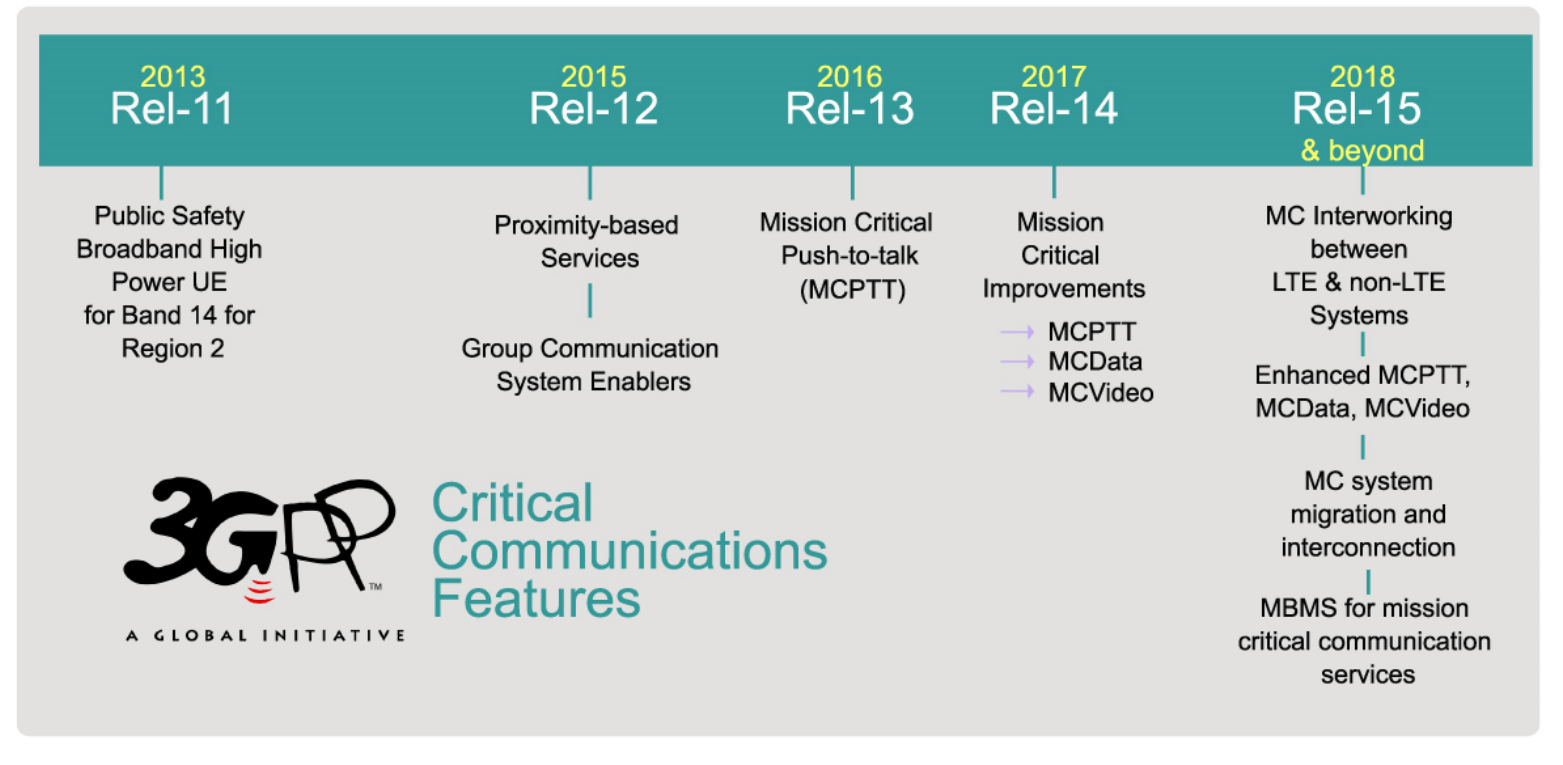
SA6 has expanded its scope to topics beyond critical communications, including:

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

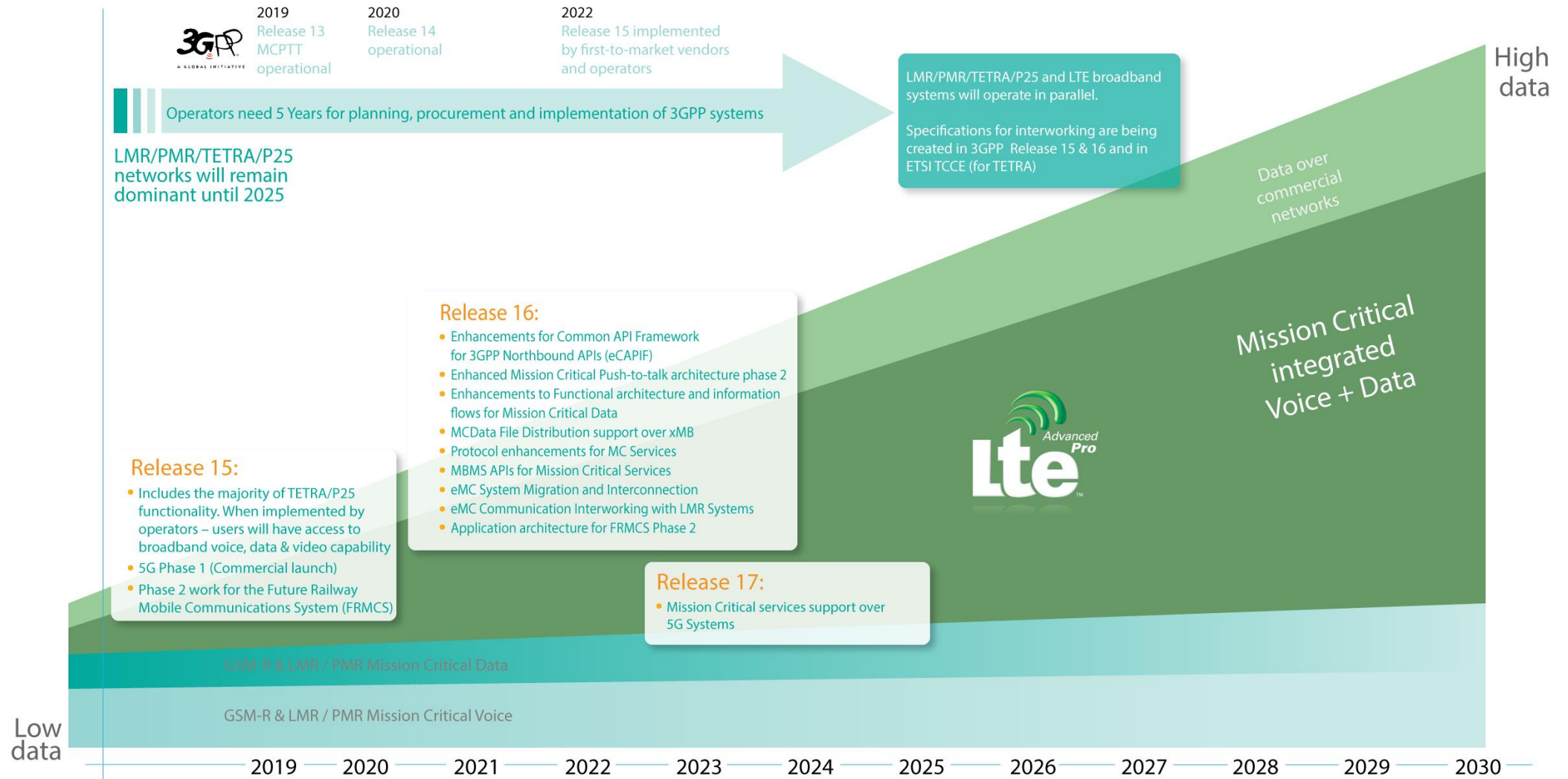
# 3GPP MC... evolution to date



MCPTT is a good example of how each new Release provides developers with a stable platform for the implementation of features at a given point – allowing for the addition of new functionality in subsequent Releases.



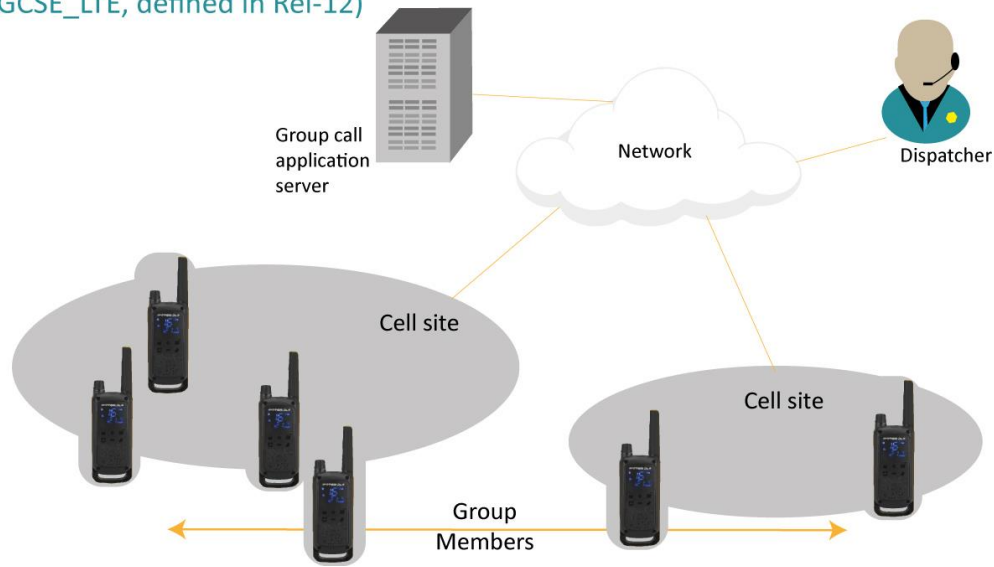
# 3GPP MC... evolution beyond 2019



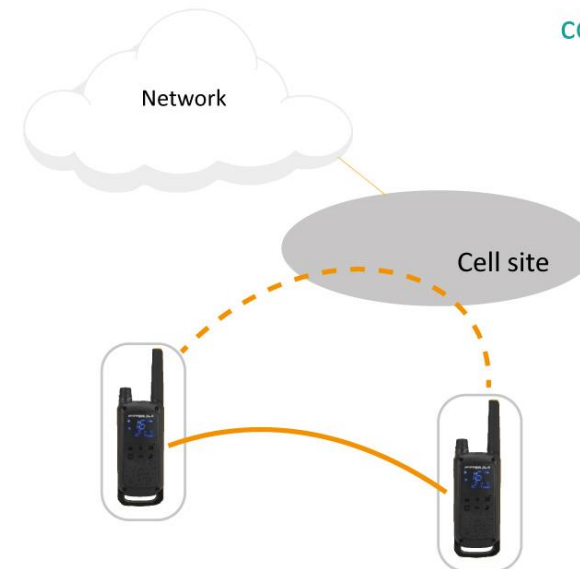


## In Release 13, the two fundamental modes of MCPTT were introduced: on- and off-network

When in the “on-network” context, MCPTT uses the standard 4G/LTE coverage, via the capabilities offered by Group Communications System Enablers for LTE (GCSE\_LTE, defined in Rel-12)



In the “off-network” context, the ProSe E-UTRA direct (UE-to-UE) Communication path is used for transport.



The ProSe direct communication path does not traverse the network infrastructure.

Release 13

Release 14

Release 15

Release 16

- In Release 13, 3GPP Mission Critical communications were limited to voice - via Mission Critical Push-To-Talk (MCPTT)
- In Release 14, Video and Data communications are also possible

Rel-13: Optimized  
for voice (PTT)

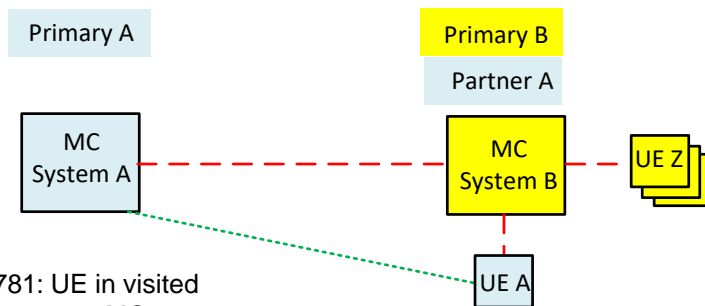


Rel-14: Voice, Video  
and Data combined



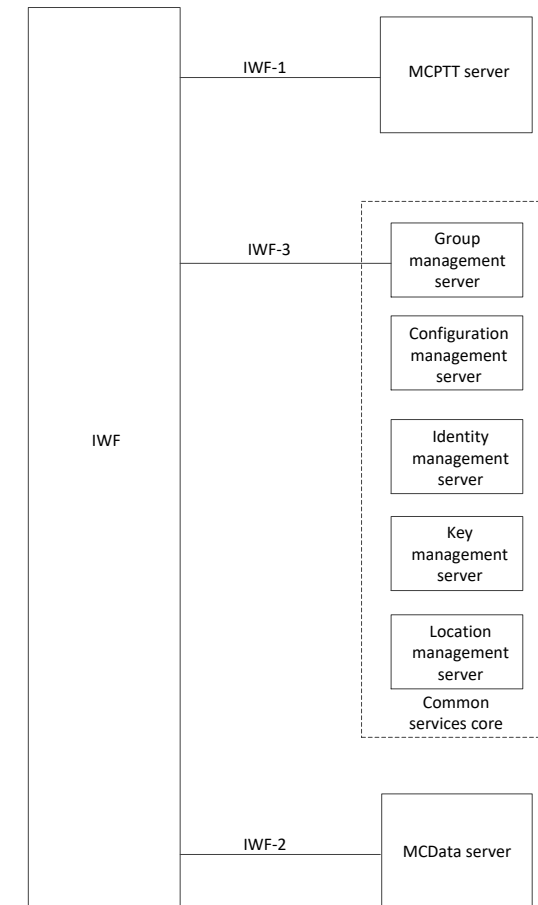


- Rel 15 brings major improvements for Video, Data, overall Security, etc.
- MC is adapted to work also on 5G networks (in addition to 4G/LTE)
- But, in Release 15, the focus also shifts towards **Interoperability between legacy and LTE systems**:
  - Study on “Migration and Interconnection for MC services” (in TR 23.781)
  - Interworking between LTE and non-LTE Systems (study and initial normative work): “MC Communication Interworking with Land Mobile Radio Systems” (in TS 23.283)



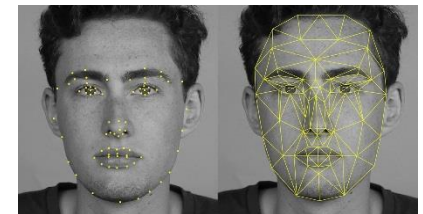
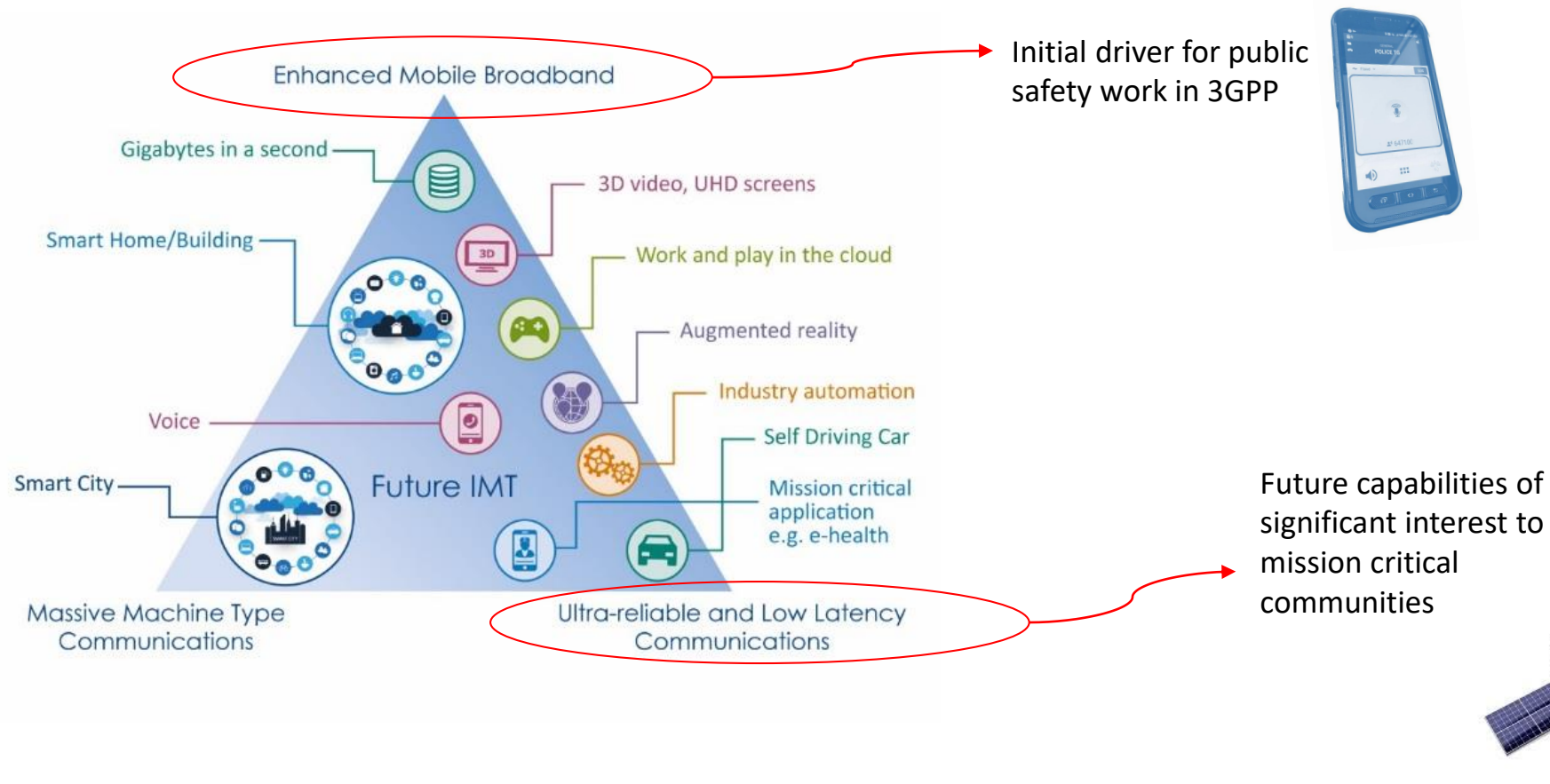
From TR 23.781: UE in visited network using partner MC system with connection to primary MC system

From TS 23.283: Functional model for application plane for interworking



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# The bigger 5G picture



# 3GPP 5G Timeline



## Release timing



## Two phases for the normative 5G work:

- Phase 1 (Rel-15) addresses the more urgent subset for commercial deployments
- Phase 2 (Rel-16) Completes the 3GPP IMT 2020 submission (ITU-R) and addresses all identified use cases & requirements

Release 13

Release 14

Release 15

Release 16

- Release 16 brings normative work resulting from the Rel-15 studies on **Interoperability**: migration and interconnect between MCPTT systems, **interconnect** between MCPTT systems
- Interworking between LTE and non-LTE Systems: Stage 3
- In Release 16, the commonalities between the specific networks defined for Mission Critical and other types of specific networks, mainly Railways and Maritime, will be enforced
- Studies ongoing for discreet listening and logging as well as location enhancements

#### Release 16:

- Enhancements for Common API Framework for 3GPP Northbound APIs (eCAPIF)
- Enhanced Mission Critical Push-to-talk architecture phase 2
- Enhancements to Functional architecture and information flows for Mission Critical Data
- MCDATA File Distribution support over xMB
- Protocol enhancements for MC Services
- MBMS APIs for Mission Critical Services
- eMC System Migration and Interconnection
- eMC Communication Interworking with LMR Systems
- Application architecture for FRMCS Phase 2

# Satellite

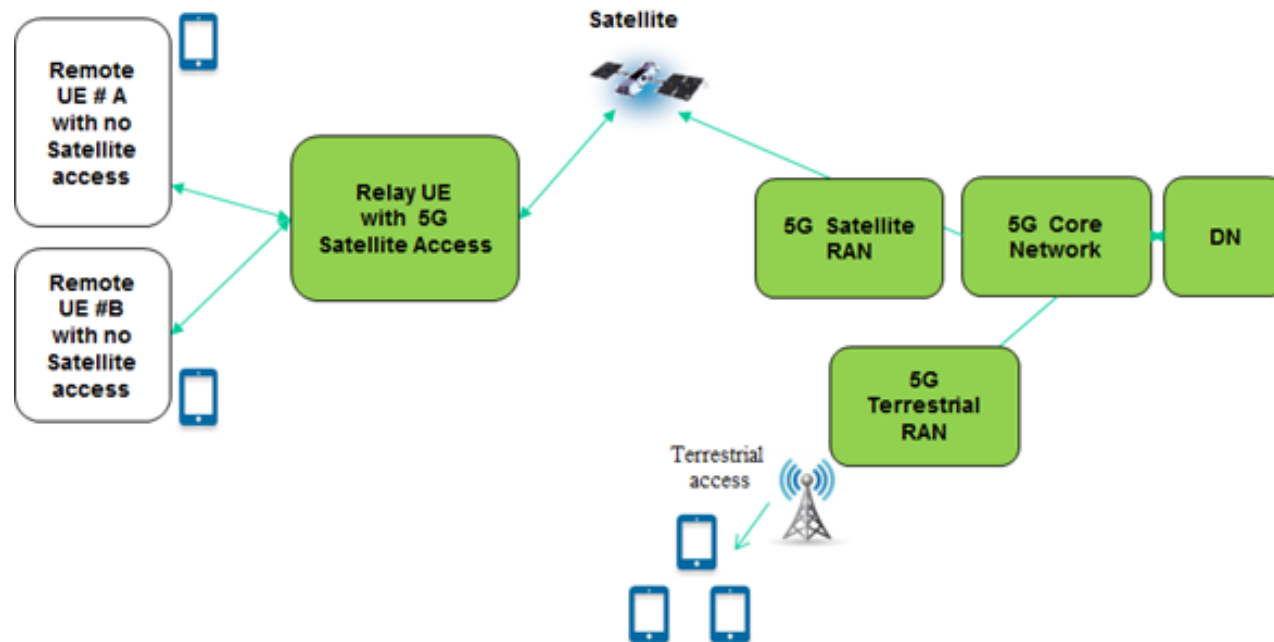
Use case example

# 5G satellite standardisation

Defining the 5G satellite component and its interfaces with other networks

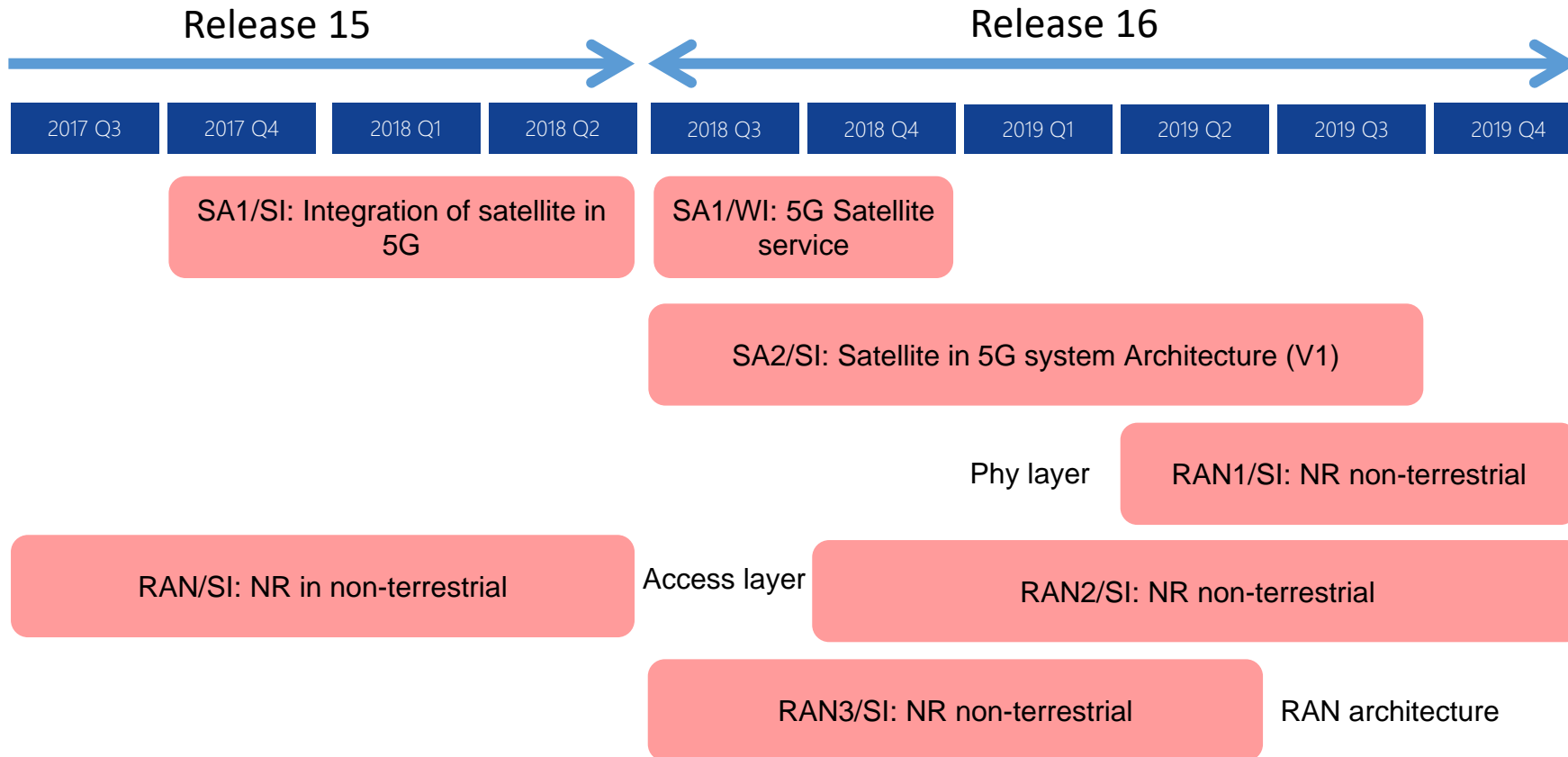


- Service requirements for next generation new services and markets
- Study on using Satellite Access in 5G - Stage 1
- Study on New Radio (NR) to support Non Terrestrial Networks



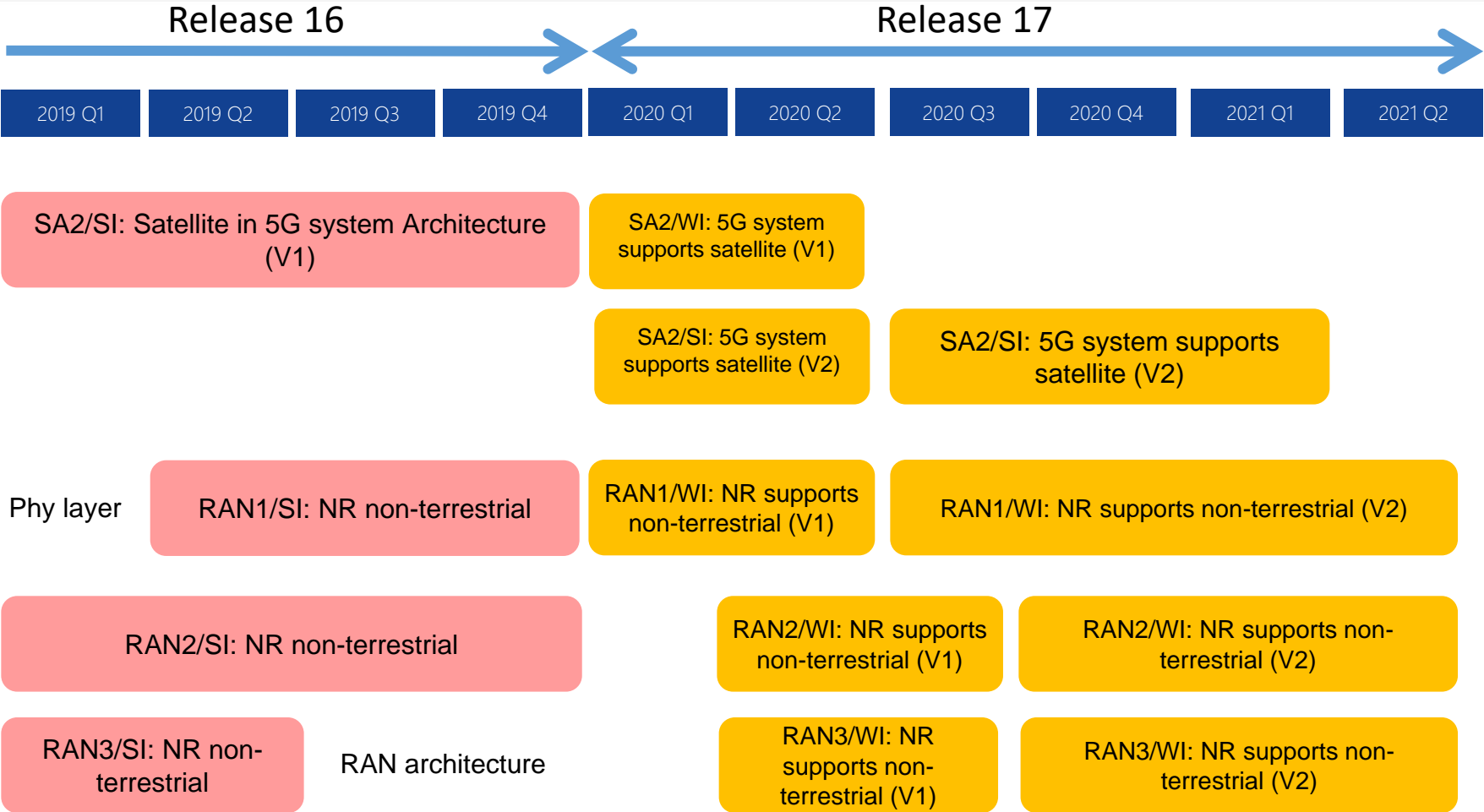
# 5G satellite standardisation

Current status and plans..



# 5G satellite standardisation

Current status and plans..



V1 mandatory features  
V2 enhancing features

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The Standards People

# ETSI Mission Critical Plugtests™




# ETSI 2nd MCPTT Plugtests Results

-  2<sup>nd</sup> Plugtests event was hosted by the [Texas A&M Internet2 Technology Evaluation Center](#) (ITEC) at the Disaster City in College Station, Texas (June 2018)
-  The capabilities of MCPTT, MCDATA and MCVIDEO were put to the test during a week-long event of intensive testing of more than 300 combinations of vendors and equipment, based on [3GPP Release 14](#).
-  31 vendors with 120 participants were onsite
-  Execution of more than 2000 tests, based on a test plan with more than 100 test cases, with a 92 per cent success rate.
-  ETSI TS 103 564 with Plugtests scenarios is available on ETSI website.

# ETSI 3rd MCX Plugtests Results

-  MCPTT becomes MCX (the “X” stands for PTT, VIDEO and DATA).
-  First remote Plugtests within the MCX Plugtests programme was held from 3rd Dec 2018 until 31st Jan 2019.
-  During these 2 months sessions, 1000 test cases were run between 26 Vendors with a 92% success rate. More than 150 test sessions were executed between different vendors.
-  Vendors were connected via ETSI HIVE VPN with each other to test their MC implementations.
-  Over-The-Top testing was done without real LTE radio equipment.
-  ETSI will feedback observations found during the Plugtests to 3GPP Working groups for clarification.

# ETSI 4th MCX Plugtests Planning

-  ETSI, in partnership with Suomen Erillisverkot Oy (State Security Networks Group Finland) and the support of TCCA and European Commission, will organize the fourth MCX Plugtests Event which will take place from 23<sup>rd</sup> to 27<sup>th</sup> September 2019 at the Savonia University of Applied Sciences, KUOPIO, FINLAND.
-  Real implementations with LTE radio equipment will be put to test in face to face MCX Plugtests.
-  ETSI TS 103 564 will be enhanced to include new test cases.





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ETSI TCCE

# ETSI TCCE

(TETRA and Critical Communications Evolution)



- TCCE continues to maintain the TETRA standards,
- The flagship standard i.e. the air interface specification (EN 300 392-2/TS 100 392-2) is regularly revised and a new revision has recently been published as have
- A set of 10 specifications for Interworking at the Transport layer independent Inter-System Interface (ISI).
- A specification for the format for the transport of TETRA speech over mission critical broadband systems is currently pending publication as is
- Plugtests™ scenarios for Mission Critical Services





The Standards People

# ETSI EMTEL & ETSI-EENA Interoperability

# Next Generation 112 architecture (NG112)










- NG112 will allow citizens to contact emergency services with technologies they use to communicate every day, e.g. multimedia capabilities.
- Work on NG112 is currently being developed at ETSI with EMTEL [TS 103 479](#) describing an IP-based architecture, the core elements and corresponding technical interfaces for network independent access to emergency services.
- NG112 addresses three major objectives
  - Communication between citizens and emergency services
  - Interoperability between emergency services
  - Open Standards approach
- Joint ETSI-EENA Interoperability events showed that the NG112 technology is mature and that a large number of vendors provide the various elements of the NG112 equipment chain that interoperate with each other.



# Conclusions



-  Standardization of interfaces enables an interoperable, multi-vendor approach to deployment and generates mass market economies of scale
-  The public safety community is fully integrated into 3GPP and first 3GPP-based deployments are imminent
-  Rel-15 and now Rel-16 have a special focus on **Interoperability between legacy and LTE systems**
-  A diverse set of industry sectors are also engaging with 3GPP – Which will add scale and efficiency of future features
-  Plugtests for Mission Critical services are essential in ensuring interoperability and building confidence
-  The TETRA standard will remain in use for many years to come and needs to be maintained
-  Emergency Calling capabilities need to be modernized (NG112) to allow citizens to contact emergency services with technologies they use every day

# Supporting BAPCO 2019 & Critical Communications Europe



🌿 We have a brochure on these topics on the ETSI / 3GPP stand at J13

Brochure:



Stand J13:

