# Welcome to the World of Standards

ETSI

World Class Standards

## CRITICAL BROADBAND STANDARDIZATION:

Outlining The Current Status Of International, Cooperation Towards Common Standards And Harmonized Spectrum For Mobile Broadband

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for Critical Communications Asia

# Technology migration for Critical Communications

## Today

Current voice applications

Current infrastructure

- Tetra/P25 based networks installed
- Applications focused on voice (group calls, push-to-talk)

## Short-term

LTE broadband applications

Current voice applications

Current infrastructure

LTE infrastructure

- New LTE infrastructure for new broadband data applications
- Tetra/P25 further evolving for voice using robust user equipment

## Target

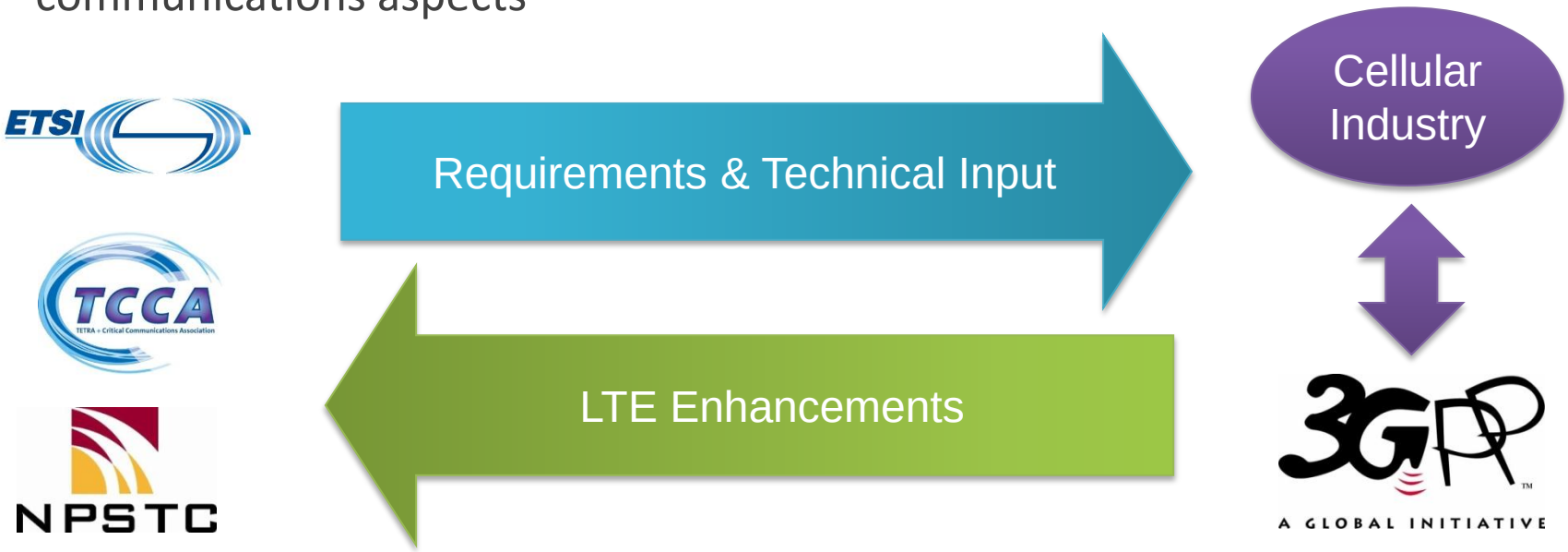
Data broadband & voice applications

LTE infrastructure

- LTE infrastructure for all services
- One applications infrastructure for all services
- LTE based devices for all applications

# ETSI TCCE co-operation with 3GPP on LTE

- LTE is a global success
- Need to preserve the strengths of LTE while adding features needed to support critical communications
- Maximising the technical commonality between commercial and critical communications aspects



# 3GPP Partnership

## Organizational Partners (SDOs)

- Regional standards organizations

  **ARIB, ATIS, CCSA, ETSI, TTA, TTC + TSDSI (Jan 2015)**

  (Asia, Europe & North America)


## Market Representative Partners

- 14 Market partners representing the broader industry

  4G Americas, CDMA Development Group,

  Cellular Operators Association of India (COAI),

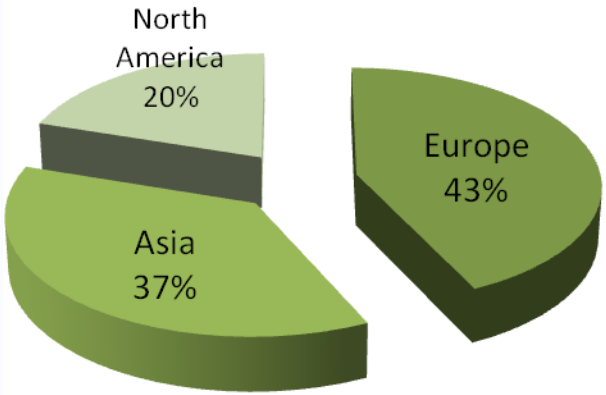
  GSA, GSMA, IMS Forum, InfoCommunication Union, IPV6 Forum,

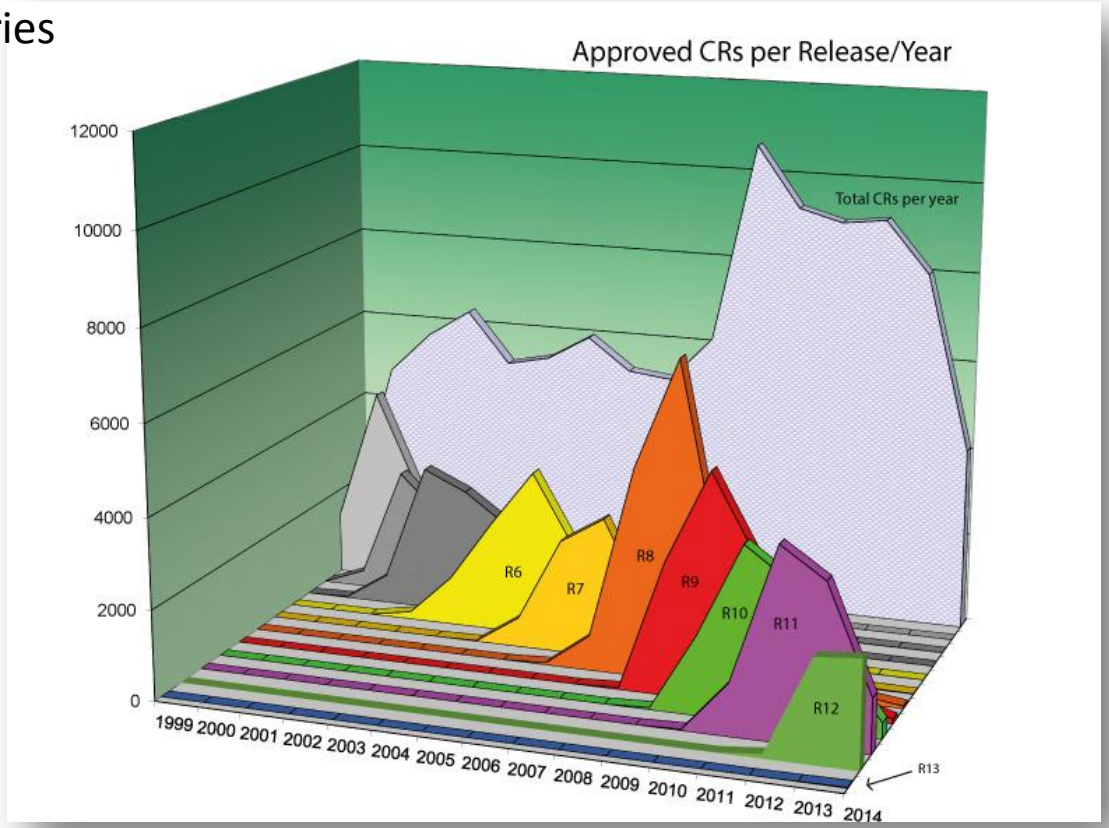
  NGMN Alliance, Small Cell Forum, TCCA, TD Industry Alliance, TD-Forum, UMTS Forum

# 3GPP Facts and figures

- ~400 Companies from 39 Countries
- 50.000 delegate days per year
- 40.000 documents per year
- 1.200 specs per Release
- New Release every ~18 months

## Participation by Region



# Whole System Approach

## Radio Interfaces

- Higher data throughput
- Lower latency
- More spectrum flexibility
- Improved CAPEX and OPEX

## The Core network

- All-IP network
- Support of non-3GPP accesses
- Improved security
- Greater device diversity

## Services

- More IMS applications
- Greater session continuity

## Legacy

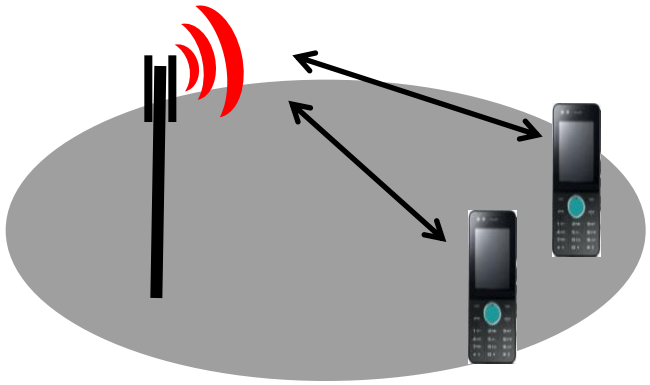
- Interworking

# Mission Critical Push to Talk (MCPTT)

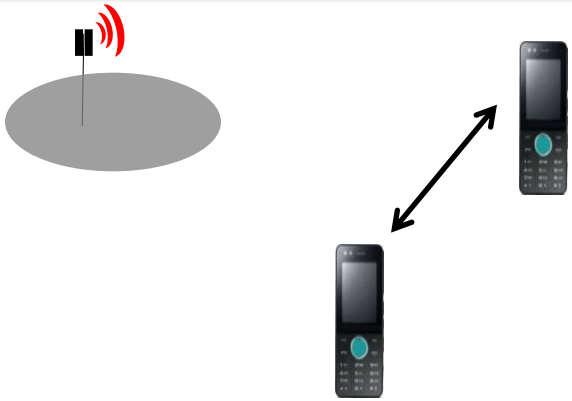
- Several Standards Development Organizations were working in the MCPTT space (e.g., 3GPP, ETSI and OMA)
- In August 2014 a joint decision was taken to focus all MCPTT work into 3GPP
- Application layer to maintain groups, join/leave groups, floor control, pre-emption, security, etc.
- Types of calls
  - “Regular” group call
  - Broadcast group call, e.g. user broadcast: no response expected by initiating user
  - Group call based on priorities, e.g. emergency group call: high priority group call that could pre-empt other in-progress calls
  - Private calls: one-to-one calls
- Interworking with legacy Public Safety systems (P25 & TETRA) will be addressed

# Proximity Services (ProSe) - Discovery

**Discovery via the operator network**



**Discovery via the direct radio links**



- Devices are able to discover other devices by using direct radio links or via the operator network (intra-/inter-cell).
  - In Release 12 both discovery options supported in network coverage scenarios only.
- Always-on type of operation
  - Not necessarily related to ongoing or upcoming data communications between the devices.
- Open and restricted (i.e. explicit permission from the ProSe-enabled device being discovered) discovery.
- Potentially large numbers of concurrently participating ProSe-enabled devices are supported

# Proximity Services (ProSe) - Communication

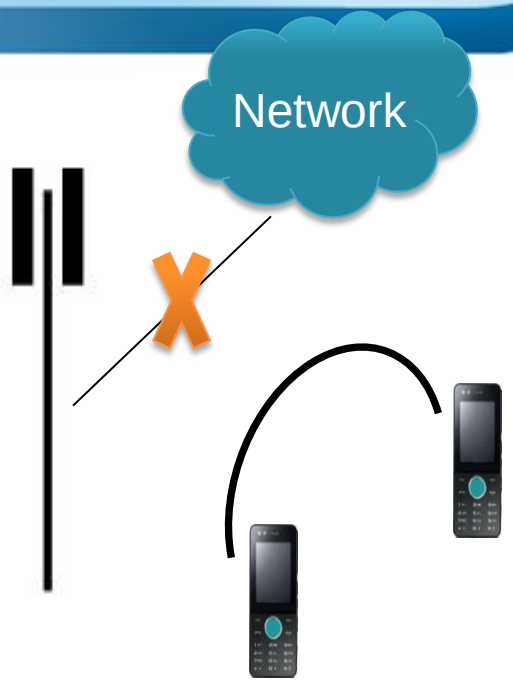
**One-to-many broadcast even in the absence of infrastructure**

*Animated image*

- Broadcast communications in physical layer (i.e. no feedback loop) and is connectionless
- Works in complete absence of infrastructure as well.
- The direct user plane communication service for transmission of IP packets is provided by the radio layer
- Group security keys are derived from a shared secret to encrypt all user data for that group
- Communications between two devices does not depend on a separate link, e.g. to eNB
- Users are able to operate independently of network
- Final group/user identification done on higher layers

# Isolated E-UTRAN Operation for Public Safety (IOPS)

- Requirements definition work complete for Release 13
- Resilience to loss/lack of backhaul for Critical Communications
- Supports locally routed communication in E-UTRAN
  - for “nomadic” eNodeBs operating without backhaul connectivity
  - for “regular” eNodeBs experiencing temporary loss of backhaul connectivity



# LTE for Critical Communications

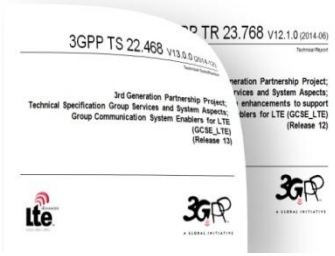
**June 2012**

- First Work Item created to enable LTE for Public Safety
- Broad support, rapid start to the work

**December 2012**

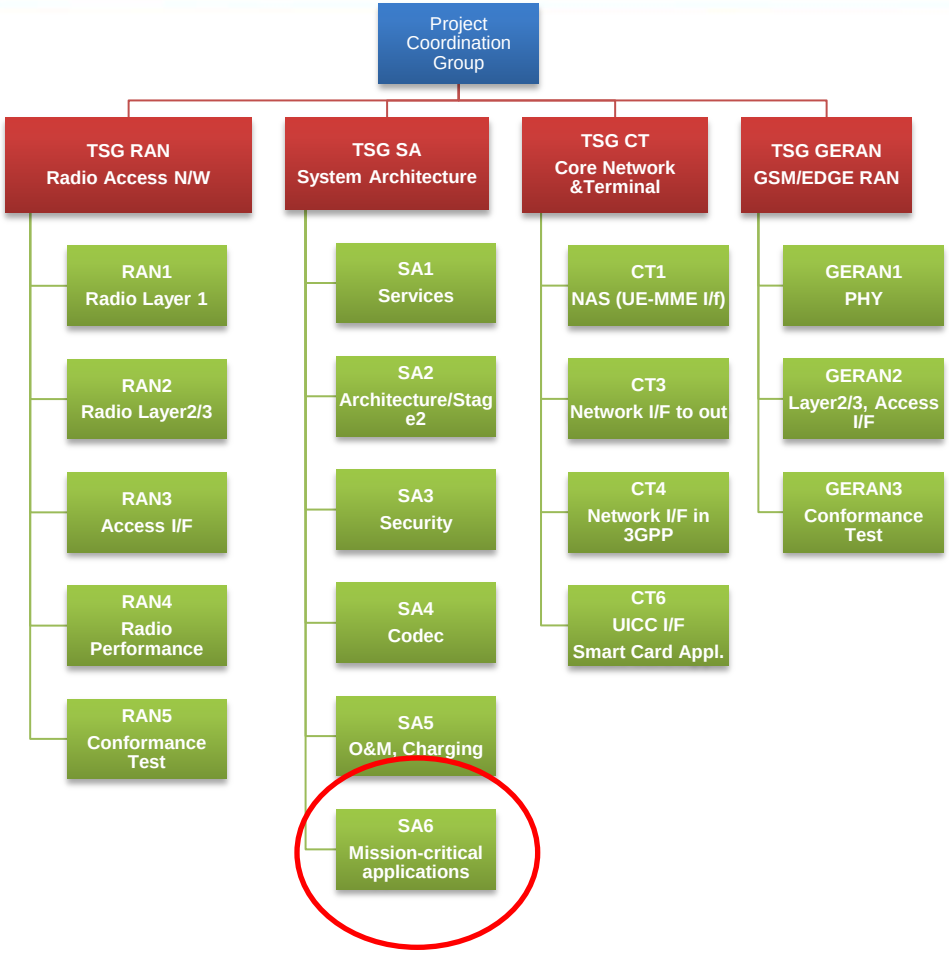
- 3GPP SA#58 selected key priorities for Rel-12
- Public Safety selected as key strategic area for Rel-12

**Today**




- First set of features for Public Safety completed in Rel-12
- Rel-13 work well underway

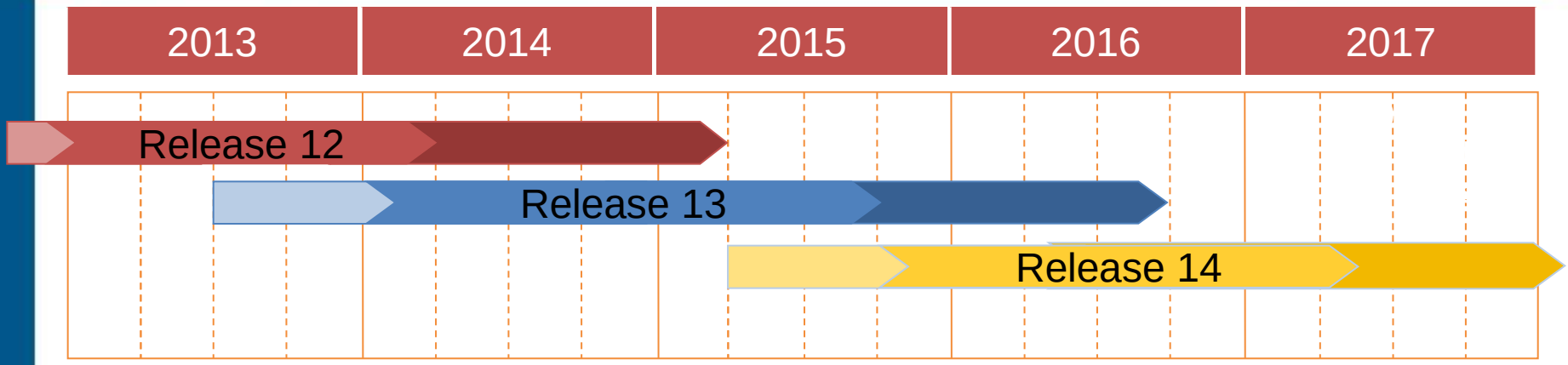
# 3GPP Technical groups




New Working Group SA6 - dedicated to Mission-critical applications

- 3GPP SA6 working group (created December 2014) is responsible for Mission-critical applications
- SA6#2 (Feb 2015) elected officials
- Working quickly to meet the demand:
  - TR 23.779 - Study on the Application Architecture to support MCPTT services ready by June 2015;
  - The first 3GPP specification covering the Application Architecture for MCPTT over LTE by September 2015;
  - …followed by the protocol and security specifications during the early part of 2016

# 3GPP Releases




**Rel-12**

- Device-to-device communications (D2D)
- Proximity Services (ProSe)
- Group Communcations (GCSE)

**Rel-13**

- Device-to-device communications (D2D) contd..
- Proximity Services (ProSe) contd…
- Group Communcations (GCSE) contd…
- Isolated E-UTRAN Operation for Public Safety (IOPS)
- Mission Critical Push to Talk (MCPTT)

**REL-14**

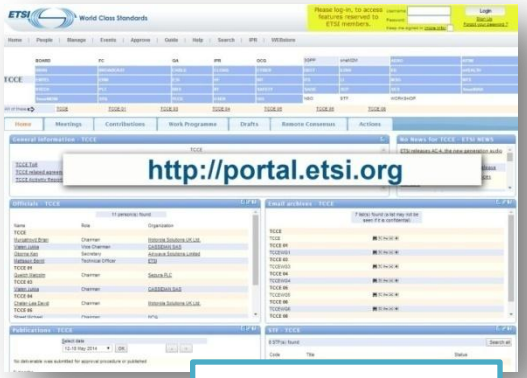
- Process starts 2015

# Dedicated Public Safety Spectrum?

- EC 700 MHz Mandate
  - The CEPT Electronics Communications Committee (ECC) recently adopted harmonised technical conditions for 694-790 MHz ('700 MHz') band in the EU for Mobile/Fixed Communications Networks (MFCN)
  - The Block-Edge Masks for the MFCN Base Stations have been engineered to allow the use of PPDR in the duplex gap (the gap between the transmit & receive frequencies) as a National option. (Other options are PMSE or M2M.)
- Preparation for WRC-15 where agenda item on requirements for PPDR
  - ECC CEPT Report 199 on User requirements and spectrum needs for future European broadband PPDR systems
  - The CEPT draft interim report A on the EC Mandate on 700 MHz is now published as CEPT Report 53 (Nov 2014). This sets the preferred technical arrangements for the 700 MHz and, going into WRC-15. (In this report it is noted that LTE technology is expected to be the future technology to meet broadband PPDR needs)
  - Studies are being carried out in ITU-R WP5A
  - At ETSI: System Reference document on additional spectrum requirements for future Public Safety and Security (PSS) wireless communication systems in the UHF bands revised (TR 102 628)
- If such spectrum is put in place, European Standards will ensure interoperability of PPDR systems

# Conclusions

- The *standardization* of Critical Communication systems is essential…and so is the *participation* of the Critical Communications community in preparing those standards
- Adapting public cellular systems to support Critical Communications is a complex task
- A meticulous approach is required
- It takes time and resources to develop high quality standards
- 3GPP is competent and capable of delivering results
- The rewards will be high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# Thank you!