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**3GPP's programme to provide
integrated public safety
communications through LTE**

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A GLOBAL INITIATIVE

Background

- 📶 Public safety networks today (TETRA, P25):
 - Narrowband, primarily for voice communication, limited data
- 📶 USA: \$7bn committed to build nationwide broadband public safety network
 - 20 MHz of dedicated spectrum in 700 MHz band
- 📶 UK: Emergency Services Mobile Communications Programme (ESMCP) considering options and requirements in the light of licence expiry for current (TETRA) systems from 2016 onwards
- 📶 Other countries expected to follow suit
- 📶 LTE is the prime candidate technology
 - Common technology will facilitate multi-agency inter-operability

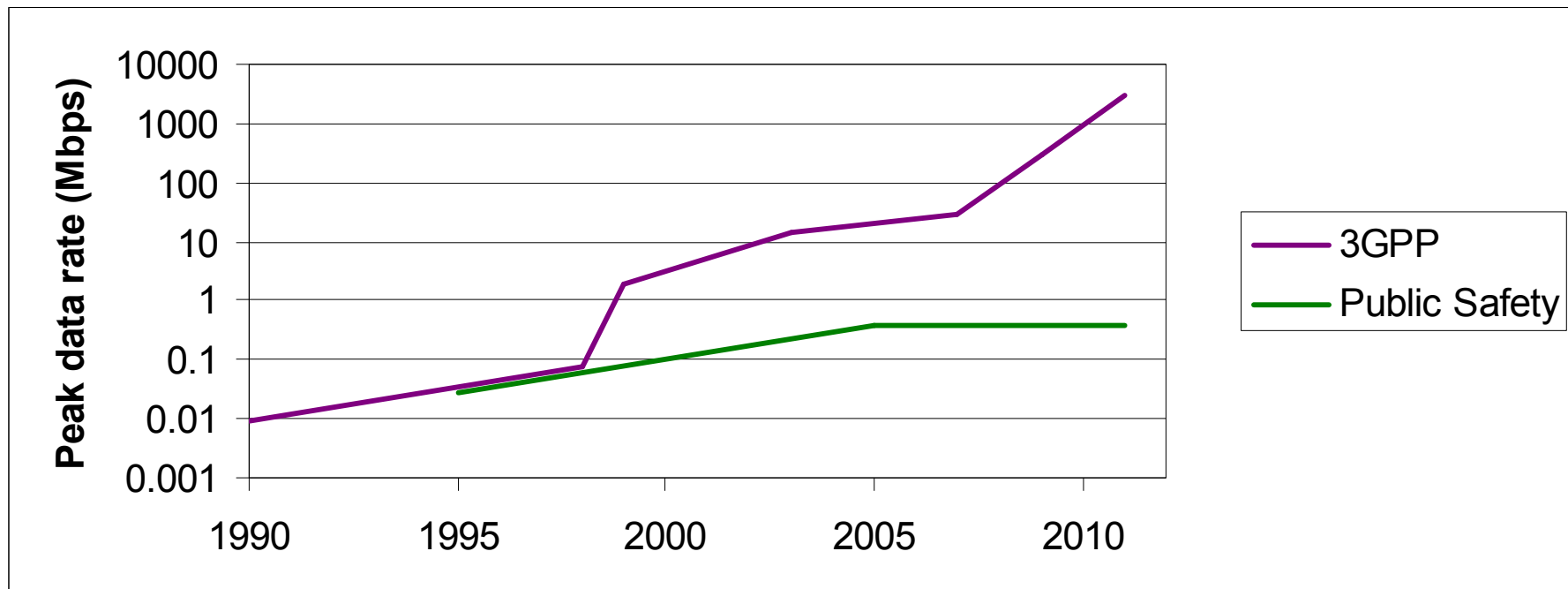


Commercial mobile systems offer...



Broadband communications

- High-rate data, low-latency video
- Would enable new improved ways of working for emergency services



Commercial mobile systems offer...

- 📶 Robust support for mobility
- 📶 Security
- 📶 Highly standardised and widely adopted technology
 - 213 commercial LTE networks already deployed in 81 countries
- 📶 Qos and Priority mechanisms, including preemption
- 📶 Economy of scale
 - Shared development costs
- 📶 Reliability
 - Shared testing effort
- 📶 Possibility of shared commercial / public safety networks
 - Shared infrastructure costs for wide-area coverage
 - Public safety traffic would be prioritized



LTE opens new and cost-effective possibilities for public safety communications

Public Safety communication systems require...



Reliability

- Functioning satisfactorily over long periods

Resilience

- Functioning satisfactorily under adverse circumstances

Push-to-talk / group call

- with low call setup time

Direct communication between terminals

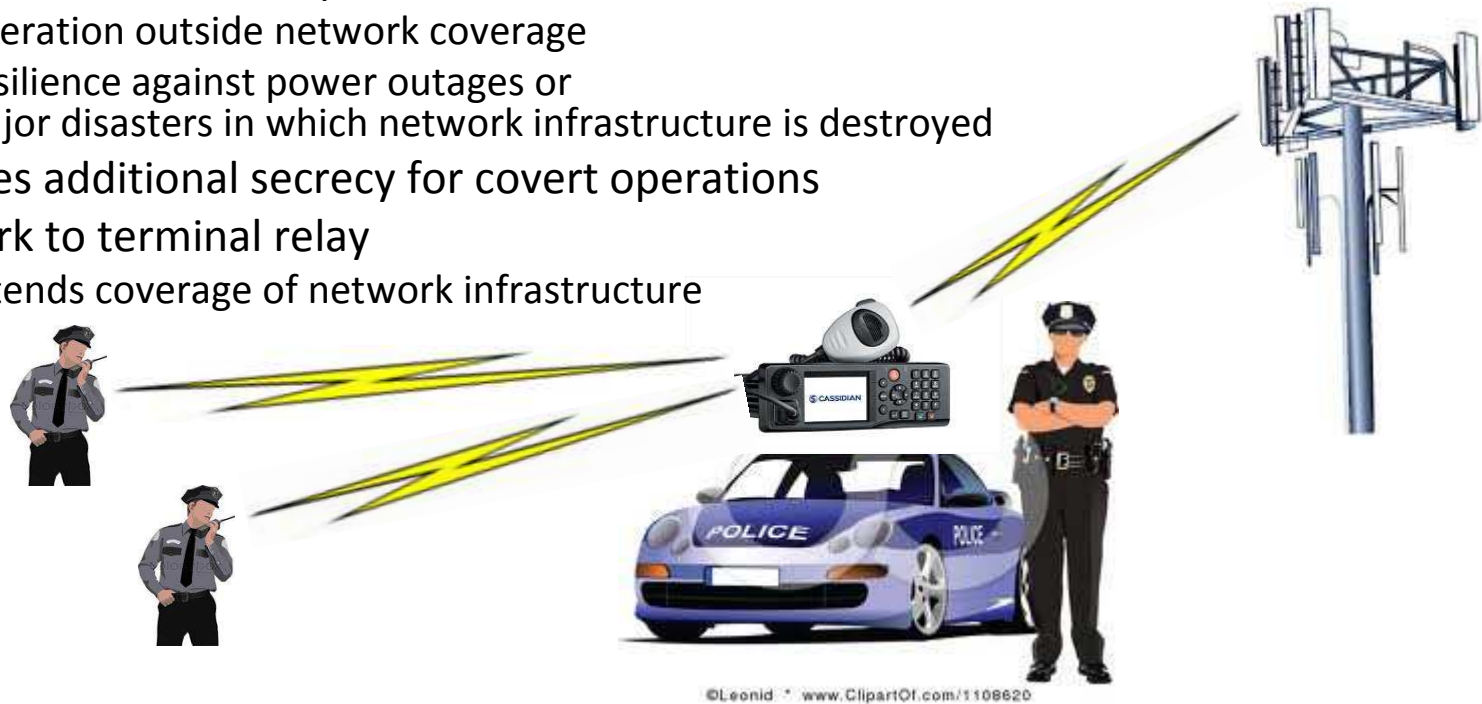
Off-network communication

Main special features being introduced into LTE by 3GPP for Public Safety networks



Proximity Services (ProSe) to enable direct communication between terminals

- Supports off-network operation
 - Operation outside network coverage
 - Resilience against power outages or major disasters in which network infrastructure is destroyed
- Provides additional secrecy for covert operations
- Network to terminal relay
 - Extends coverage of network infrastructure



Group Call System Enablers (GCSE) to support efficient group communications operations such as one-to-many calling and dispatcher working

3GPP objectives for public safety



 Preserve the strengths of LTE while adding features needed for public safety

- Mission-critical voice + Video + Data on a single device

 Maximise technical commonality between commercial and public safety features

- Provide the best and most cost effective solution for both applications

LTE with PS features can provide all required functionality in a single device


Direct Communication




- 📶 Priority of current studies in 3GPP is on the essential functionality to support Public Safety usage of LTE
 - Release 12 specification freeze planned for June 2014
- 📶 A simple broadcast communication mechanism is being studied first
 - Communication without prior device discovery phase
 - Accessibility may be restricted to members of a particular group, or even to a single device
 - Radio link optimisation features based on closed-loop feedback (for example) may be added later
- 📶 It is assumed that direct communication operates in uplink spectrum or uplink subframes
- 📶 It is assumed that direct transmission/reception does not use full duplex on a given carrier (from physical layer perspective)
- 📶 Details of transmission timing, synchronisation, signal design, radio resource management are under study

Group Communication and Push-to-Talk (PTT)



 Group Communication Service Enablers (GCSE) in LTE provides application layer functionality for group communication

- Will support:
 - Point-to-point and point-to-multipoint group communication
 - Multiple simultaneous groups
 - Large groups
 - Various media types (e.g., voice, video, text)
 - Priority and pre-emption
 - Event notifications to group members

 eMBMS (enhanced Multimedia Broadcast/Multicast Service) may be one mechanism to provide group communication over the air interface

Conclusions

- 📶 Capabilities of commercial LTE networks far surpass those of current public safety communication systems
- 📶 National government initiatives to upgrade public safety communications offer an opportunity for emergency services to benefit from the same capabilities to improve working methods
- 📶 3GPP is actively addressing key features such as direct communication and group communication in the Release 12 (2014) timeframe
- 📶 Integrated support for public safety communications requirements in LTE will offer a cost-effective, reliable and high-performance solution

LTE aims to be the technology of choice for Public Safety communications