# LTE Updates Geared Towards Meeting Broadband Needs of Public Safety

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Over the past few years, the calls to utilize LTE technology in public safety networks have become stronger, mostly to address the need for broadband and other data-intensive services. The implementation of LTE offers distinct advantages in protecting first responders, as well as citizens, especially given the recent updates that have made the technology better suited for mission critical applications. While it offers much promise, the integration of LTE certainly does not signal the end of LMR networks.

LTE can deliver high-bandwidth mobile data, allowing mobile devices to stream video or quickly transfer large amounts of data. As part of its evolution, features specific to mission critical communications are being integrated into LTE technology. These enhancements are important, as LTE data services are attractive to police officers, EMS teams and fire departments.

## High-bandwidth Benefits

Broadband data applications address the strong desire for situational awareness amongst public safety officials. A perfect example is how many police officers are now equipped with body cameras for their safety and to document encounters that can be used as a defense in case of a lawsuit. However, many of these cameras can only record video, meaning it cannot be viewed until the officer returns to the precinct. LTE-enabled live streaming allows a video to be transmitted to a command center where superiors can maintain real-time tactical situational awareness.



It is the broadband potential of LTE that makes it so appealing to public safety officials and agencies. It is also why the three most influential public safety organizations in the U.S. – the Association of Public-Safety Communications Officials (APCO), the National Emergency Number Association (NENA) and the National Public-Safety Telecommunications Council (NPSTC) – have endorsed LTE as the technological standard for the FirstNet broadband network for first responders.

## Mission Critical Functionality

LTE was initially developed for commercial applications. While that makes it a cost-effective, high-bandwidth option, it also means adjustments must be made for it to be mission-critical worthy. The 3rd Generational Partnership Project (3GPP), the organization responsible for advancing LTE, has been working diligently over the past several years to make the necessary changes to address the public safety community. LMR Industry groups like APCO, the European Telecommunications Standards Institute (ETSI), TETRA and Critical Communications Association (TCCA), and the U.S. National Institute of Standards and Technology (NIST) have been cooperating with 3GPP to ensure broad representation on adding capabilities to support mission critical applications. Releases 12 and 13 of the 3GPP LTE specification were the first steps, but more is required for adoption into public safety.

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About 70 percent of the features of Release 12 directly enhances mission critical functionality. These updates added many security features to protect systems from unauthorized users, eavesdropping, denial of services attacks and other security risks, thus making the systems viable for public safety. In addition, Proximity Services and Group Call System enablers were incorporated to address mission-critical applications.

Proximity services allow mobile devices to identify other nearby UE, enabling optimized Device-to-Device calls, which allow first responders to communicate when the network is either down or nonexistent. The 3GPP definition of Proximity Services also includes features exclusively available to public safety applications. One example is user equipment network relay, which lets one mobile act as a relay between two others, allowing communication without going through the network. Included in Release 13 was Mission Critical Push-To-Talk (MCPTT), which is scheduled for 2018. MCPTT is expected to have equivalent features and functionality to current LMR systems. While Releases 12 and 13 included many features that would assist first responders in emergency situations when traditional network communications cannot function, more are on the horizon. Release 14 is expected to be complete later this year. With it, 3GPP will continue to add public safety features to LTE. A large focus is expected to be placed on mission-critical video and data, both features that require broadband services, meaning LTE will continue to grow in importance.

## LMR and LTE

Though LTE will see increased use in the public safety/critical communications world, it will not replace LMR. Rather, the two technologies will co-exist for the foreseeable future. This poses a potential problem for public safety professionals and contractors responsible for the operation of mission critical networks, as we discussed in this previous post. Test solutions must be able to test both LMR and LTE to simplify maintenance and operations, as well as control costs. One such solution is the Anritsu LMR Master™ S412E.

The handheld analyzer features optional LTE measurement capabilities that can be used for FDD LTE test on the downlink. An RF quality analyzer can be used to make RF measurements, including channel spectrum (channel power and occupied bandwidth), reference signal power and spectral emission mask. Understanding the utilization over time of LTE resources is crucial; modulation displays such as Power vs. Resource Block are used to confirm signal level, utilization and other critical parameters. The LMR Master also supports Over-the-Air (OTA) scanner measurements of LTE DL coverage quality, including six sync power levels and dominance greater than 10 dB. The OTA scanner validates sectors present in a given location.
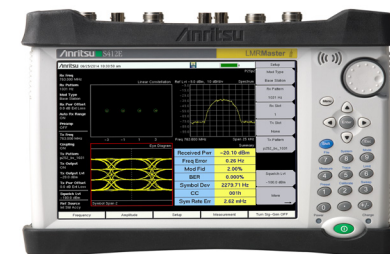


Confirming that both existing LMR and emerging LTE networks are properly installed and maintained is critical to create the safest possible environment for the public and first responders. Anritsu's LMR Master S412E is the only solution that provides a quick, easy and cost-effective means of verifying the operation of both networks and diagnosing problems if necessary.

To learn more about their unique challenges and test techniques, download this white paper entitled, 'The impact of LTE on the LMR industry.'