Public Safety Makes Big Strides in LTE Standards Process

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By Sandra Wendelken, Editor

In a positive development for the nationwide public-safety broadband network, the Long Term Evolution (LTE) standards process identified public safety as a key strategic area for the commercial standard, and work is under way to add public-safety features to the technology in the next release.

At its December workshop, the Third Generation Partnership Project (3GPP) Technical Specification Group (TSG) Service and System Aspects (SA) identified three key strategic areas for LTE Release 12. One of these areas was public safety, including proximity services (direct mode) and group communications (push to talk or PTT). Mission-critical voice was not added to Release 12, but direct mode and PTT are two features essential to public safety.

The standards work equally encompasses both the regulatory and commercial aspects. TSG-SA is the main plenary of 3GPP and is responsible for the overall architecture and service capabilities of systems based on 3GPP specifications with responsibility for cross TSG coordination.

“One of the key points emphasized several times was that standards should ensure maximum commonality between regulatory and commercial aspects,” said Balazs

Bertenyi, chairman of 3GPP SA. "This allows the public-safety and critical-communications community to leverage the economies of scale of the LTE ecosystem as much as possible. The main drivers from a regulatory perspective have so far come from the U.S. and the U.K., but other regions are expected to get more active as work progresses."

The system level requirements definition phase (stage one) for LTE Release 12 has been well under way for several months. This phase is expected to conclude in June.

As the requirements become more stable and mature, the system architecture work (stage two) will get under way. The necessary work tasks have already been entered into 3GPP's work program, and stage two work starts in the first quarter of this year. Once the architecture work is close to completion, protocol specification work (stage three) may commence, likely around early 2014.

Work on LTE radio-specific aspects of device-to-device direct mode has also started in parallel and is expected to be part of the Release 12 radio standards. "I expect the majority of the basic public-safety and critical-communications functionality, such as direct communications and group communications, to be included in Release 12," Bertenyi said. "I expect the pubic-safety work to continue in Release 13 to complete standards for the full set of required functions beyond direct communications and group features.

"We have to recognize, though, that the technology space of public safety and critical communications is rather substantial. There are a whole set of specific functions that imply a rather different network and terminal behavior compared to commercial LTE technology, and hence, require detailed design considerations. I would expect that such specific functions will also be addressed in 3GPP, albeit in a phased manner."

The timeline currently set for Release 12 calls for a functional completion in June 2014. There is typically a 12- to 18-month cycle before the availability of new 3GPP features in commercial implementations.

"I expect the completion dates set for Release 12 to be reassessed once there is a more elaborate understanding developed in 3GPP with respect to the amount and nature of system impacts that the public-safety functions entail," Bertenyi said. "This may result in a three- to six-month delay compared with current timelines."

No official proposal for a mission-critical voice work item has emerged, but offline discussions have been ongoing to analyze the best way forward, Bertenyi said. 3GPP owns the IP multimedia specifications, and the Open Mobile Alliance (OMA) owns the PTT specs. The solution will likely come out of these areas with possible critical communications-specific additions, he said.

"All interested parties understand that mission-critical voice will need to be addressed," Bertenyi said.

Benefits of a Unified Voice

Bertenyi said public-safety features entered 3GPP's radar at rapid speeds in the first half of 2012. Although the early commitment of the U.S. public-safety community to LTE and the allocation of federal funds to build a nationwide public-safety LTE network were initial sparks, benefits for commercial carriers are likely the largest driver. "In general, there is a deep desire in the 3GPP community to make LTE available and a suitable radio technology also in areas that have traditionally been beyond the reach of cellular operators," he said. "Carriers have been fighting an ever decreasing average revenue per user (ARPU) and return on their investment in network infrastructure expansions.

Opening doors towards new business opportunities is one of the means to fight these trends."

Andrew Thiessen, Public Safety Communications Research (PSCR) lead electrical engineer who attends 3GPP meetings and has been instrumental in touting the importance of public-safety features at 3GPP meetings, said the backing of European carriers has been a huge benefit for integrating public-safety requirements into the standard.

"European cellular operators are looking to be the public-safety operators of the future," he said. "So there is a strong common interest both from the cellular community and the public-safety community to make this happen."

The U.S. public-safety commitment to LTE is soon to be followed by other countries, including Canada and the United Kingdom, said Bertenyi. Thiessen agreed that there is a global interest in public-safety features in LTE. Australia has allocated public-safety broadband spectrum at 800 MHz. Canada is likely to follow the U.S. plan for public-safety broadband spectrum, and Taiwan is considering allocating public-safety broadband spectrum, he said.

"All of Europe is lobbying for public safety," Thiessen said. "Since February 2012, we've had more traction."

"In the past, public-safety technology was fragmented across the different regions — Project 25 (P25), TETRA, etc.," Bertenyi said. "LTE presents a unique opportunity to come to a single global technology base in a manner that leverages commercially available solutions as much as possible. There is a very good cooperation in place between the different public-safety organizations thanks to an early realization that global har-

monization is essential to get the project off the ground as fast as possible."

Thiessen said the public-safety community working with the 3GPP representatives is comprised of four main groups of players — handset and infrastructure vendors, commercial operators, the First Responder Network Authority (FirstNet) board, and global public-safety groups including the Association of Public-Safety Communications Officials (APCO) Global Alliance, TETRA + Critical Communications Association (TCCA), National Public Safety Telecommunications Council (NPSTC) and U.K. Home Office.

Although the early hurdles have been cleared, there is still much work to be done, Thiessen said. A meeting last week in Prague focused on more details specific to the public-safety requirements. Maintaining the momentum by completing the necessary standards tasks is critical, he said.

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