

## 3GPP LTE Interoperability

### Timeframe for Implementation of a New Standard

Public Safety chose 3GPP LTE specifically to be able to take advantage of commercial technology, with the additional innovation and larger equipment ecosystem that it brings. Unlike the major mobile operators, public safety agencies do not have the technical resources to be early pioneers with new standards, nor the buying power with major vendors.

In the mobile wireless industry, the true commercialization of a new standard has historically taken 4 to 6 years from the completion of the standards specification. “Commercialization” in the wireless industry is typically viewed as being the time when there is a reasonable range of interoperability-tested and approved user devices sufficient to allow mass rollout to customers.

Qualcomm suggested an even higher standard in a July 2009 public presentation “LTE Release 8 and beyond”, where they stated “~6-7 years from standards publication to ~50M subs for successful wireless standards”<sup>1</sup>. They show that GSM, CDMA, 802.11, EVDO, W-CDMA and HSPA have all taken 6 -7 years to 50m subscribers. 50 million may sound high, but it is small in the mobile wireless industry where there are currently more than 3 billion subscribers using 3GPP technology.<sup>2</sup>

3GPP W-CDMA took approximately 5 - 6 years to commercialization, with standardization in 1999 and scale rollout starting in 2004/2005. Wimax mobile (802.16e) was standardized in 2005, and saw the commencement of scale rollout of devices with Clearwire in 2008 and 2009, but with a very limited range of device types.

3GPP Release 8 LTE is expected to take a similar amount of time, as there is nothing inherent in the standards or the development process or interoperability testing that would allow this release to be commercialized significantly faster. Figure 1 below shows the typical timeline for commercialization of a new standard.

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<sup>1</sup> Qualcomm presentation July 2009 “LTE\_Benefits\_072109.pdf” [www.qualcomm.com](http://www.qualcomm.com)

<sup>2</sup> GSM Association - <http://www.gsmworld.com/about-us/index.htm>

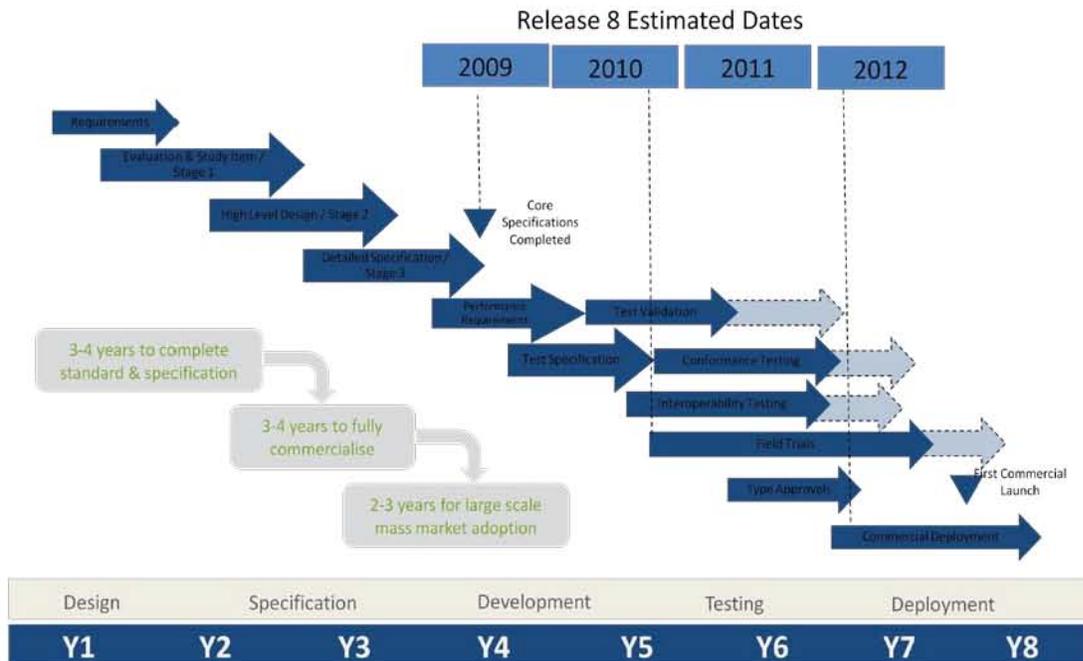


Figure 1 – Typical Timeframe for Implementation of a New Wireless Standard

The NPSTC 700 MHz Broadband Task Force recognized this in their report<sup>3</sup> - *“It should be well understood that the LTE standard (3GPP Release 8) is a relatively new standard in which a first draft just accepted in March 2009. Features and performance will grow with each release and iteration of LTE. NOTE: Previous standards work and deployment of existing W-CDMA, WiMAX and EVDO networks often happened 2-5 years after the standards were adopted”*. This is further evidence of widespread acknowledgement within the public safety community that LTE is not yet ready for interoperable public safety deployment.

### Interoperability Testing for 3GPP Release 8

3GPP itself does not perform interoperability testing (IOT) or certification for standards compliance. However, the RAN5 working group of 3GPP prepares test cases, which are used by the Global Certification Forum (GCF) to certify devices as meeting the test cases. The GCF is an active partnership between network operators, device manufacturers and the test industry<sup>4</sup>. This arrangement has been in place since 1999, and is used for all 3GPP releases.

<sup>3</sup> NPSTC 700 MHz Broadband Network Requirements Task Force, Technical Working Group, 700 MHz LTE Network Interoperability

<sup>4</sup> <http://www.3gpp.org/GCF-Certification-Scheme-to-boost>. Global Certification Forum – GCF– is an active partnership between network operators, device manufacturers and the test industry. In the ten years since its inception in 1999, GCF has created an independent certification programme to help ensure global interoperability between mobile devices and networks. By providing the focal point for the world’s most experienced practitioners in conformance testing, field

The GCF starting working on a global certification scheme for LTE devices in March 2008<sup>5</sup>, and is on schedule to release an LTE device certification scheme before the end of 2010<sup>6</sup>. Test equipment companies must then implement and prove these tests on their equipment, which is then used to test and certify user equipment.

Formal Release 8 LTE certification testing can begin once the above referenced certification scheme is released by the GCF, and therefore this will start after the end of 2010. IOT testing and certification typically takes around 2 years, as evidenced by Wimax Forum IOT testing for Wimax mobile (802.16e).

Separate compliance certification for US bands is carried out by the PCS Type Certification Review Board (PTCRB), using the test cases prepared for the GCF by the 3GPP RAN5 working group, and following a similar process to the GCF. As they are reliant on the completion of the same test cases by 3GPP, and the same test validation by test equipment companies, their time timeframe can be expected to be similar to the GCF.

In advance of formal GCF certification of devices, some commercial operators are performing their own IOT testing with their chosen infrastructure vendor(s) and a very limited range of User Equipment. This will then be a “private” interoperability arrangement, and gives no guarantee of the wide interoperability between networks and user equipment of multiple vendors, that Public Safety requires.

The GCF’s Field Trial Agreement Group (FTAG) is working on a limited set of test cases, but these are intended for field trials with a limited range of devices, and not for wide interoperability between devices and networks. The target completion date for these test cases to be written is June 2010<sup>7</sup>, but testing can be expected to take another 12 months based on historical precedents.

It is clear from the above that a sufficient range of certified 3GPP Release 8 compliant devices to support the roaming and interoperability required by Public Safety is not likely to be available until 2012 at the earliest, and therefore Release 8 is not ready for **systems operating** under the proposed waivers prior to 2012. Making waivers conditional upon Release 8 would defeat the purpose of waivers, which we understand to be to allow public safety to meet immediate needs, drive innovation, jump start the band 14 equipment ecosystem, and gain experience with mobile broadband.

### **Definition of Standards Releases for Interoperability**

The Commission has historically avoided regulation of wireless technology standards, which can be difficult both to define, and to maintain as standards evolve.

LTE is not a discrete standard in its own right, but rather a new access network architecture(E-UTRAN) and core network architecture (EPC) (currently at Release 8) in the 3GPP family of standards, which will evolve with further releases at approximately yearly intervals. It is designed to be backwards

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trials and certification, GCF establishes global best practice for the certification of mobile phones and the ever-expanding range of devices that incorporate wireless broadband connectivity.

<sup>5</sup> <http://www.3gpp.org/GCF-Certification-Scheme-to-boost>.

<sup>6</sup> [http://www.globalcertificationforum.org/WebSite/Public/LTE\\_Certification.aspx](http://www.globalcertificationforum.org/WebSite/Public/LTE_Certification.aspx)

<sup>7</sup> <http://www.3gpp.org/GCF-Certification-Scheme-to-boost>.

compatible with HSPA and GSM, and furthermore, an LTE network cannot be implemented without the use of supporting specifications developed for earlier 3GPP releases, such as those relating to subscriber authentication. In other words, “Release 8” cannot be used alone in a regulatory definition for the purposes of the waivers.

While there is no easy solution to the complex problem of regulating wireless standards, IPWireless suggests that the Emergency Response Interoperability Center (ERIC) should define a “Release 8 Interoperability Profile” of 3GPP documents, together with other requirements, to be met by an “Interoperability Date” to be defined. As a minimum, the Interoperability Profile should include:

- A list of all 3GPP standards that are required to be complied with (including E-UTRAN, EPC and the necessary related specifications)
- System Identifiers plan (PLMN numbering plan)
- Interfaces required for interoperability between networks
- UE band classes to be supported

The Interoperability Date should be determined by the following

- The Interoperability Profile has been published by ERIC
- A minimum of 15 user devices suitable for public safety use, from at least 5 different vendors, have received full GCF or PTCRB Certification, and FCC Equipment Authorization for band 14.
- The 4 largest 3GPP commercial operators (as determined by GSMA statistics) in the world support roaming and interoperability of Release 8 devices between their networks
- Public safety roaming interfaces between networks being in place
- Clearing house arrangements for public safety roaming being in place

### **Systems Operating under Waivers**

Prior to the Interoperability Date, we propose that Public Safety mobile broadband systems in the 700 MHz band be permitted to operate using other 3GPP based access network architectures from earlier 3GPP releases, conditional upon a commitment to upgrade to meet the Interoperability Profile by the Interoperability Date,

### **Summary**

There is clearly value in some public safety organizations being able to take early advantage of 700 MHz mobile broadband, both to meet immediate operational requirements, and to gain valuable experience with deploying and operating the technology.

Public Safety requires technology that is generally commercially available, with certified interoperable user equipment, and proven performance and stability. The public safety does not have the resources of the commercial carriers (for whom LTE was designed) to pioneer new technology and perform private interoperability testing.

It is clear from the information provided above that a sufficient range of certified interoperable LTE equipment for public safety is not likely to be available until 2012 at the earliest.

IPWireless continues to support the choice of 3GPP Release 8 LTE for interoperable public safety networks. However, prior to the availability of compliant and interoperable Release 8 equipment being available (as well as all the necessary interfaces, policies and clearing house arrangements for roaming), there is a clear need to allow other mature 3GPP technologies to be deployed initially, and which can be easily upgraded to Release 8 for interoperability.

We propose a workable arrangement that allows systems to be deployed early under waivers, subject to being upgraded to meet an "Interoperability Profile" defined by ERIC by an "Interoperability Date" proposed by the Commission.