Long Term Evolution (LTE) Public Safety Information Sheet

Background

Mobile telecommunications has evolved tremendously since its development in the 1950s. In the 1980s, the first generation (1G) of wireless mobile telecommunications relayed analog radio signals to communicate between parties, utilizing various transmission technologies. The second generation (2G) relied on sending and receiving radio signals in digital format to efficiently use spectrum for greater penetration levels generally, allowing increases in system capacity and enhanced privacy. 2G also allowed the use of short messaging service (SMS), otherwise known as text messaging. The third generation (3G), which was introduced in 2003, is more standardized and increases the amount of data that can be sent when compared to 2G.

Fourth Generation Long Term Evolution

Today we are just beginning to see the introduction of the fourth generation (4G) cellular wireless telecommunications. 4G is based upon an all Internet Protocol (IP) packet switched network that supports mobile broadband access as well as multi-media applications with high data rates and low latencies utilizing spectrum efficiency by smooth handoffs and seamless roaming across multiple networks. Although not fully 4G, which is defined by having peak upload and download speeds of at least 100Mbps, Long Term Evolution (LTE), the standard created and adopted by the Third Generation Partnership Project (3GPP) through its Release 8, is the closest standardization of these objectives and has been accepted and adopted by national and international communities as the foundation for future mobile telecommunications. An important advantage of LTE is the fact that it is both backward and forward compatible, making network interconnection and interoperability more likely as technology continues to evolve.

To qualify as LTE, peak data rates must achieve 100Mbps download and 50Mbps upload within a 20 MHz bandwidth with a latency of less than 5 ms for up to 200 active users. It must also service support-enhanced multi-media broadcast multi-cast with mobility utilizing scalable bandwidths from within 1.4 MHz to 20 MHz range. LTE voice traffic will be supported by Voice over IP (VoIP) and will have key features or technologies such as Evolved Packet Core (EPC), Evolved Universal Terrestrial Radio Access Network (E-UTRAN), Orthogonal Frequency Division Multiplexing (OFDM), Multiple-Input Multiple-Output (MIMO), adaptive modulation and coding and support for two radio frame structures called Frame Structure Type 1, used for the LTE Frequency Division Duplex (FDD) mode systems (FDD) and Frame Structure Type 2 used for the LTE Time Division Duplex (TDD) systems.

LTE Architecture

LTE utilizes the E-UTRAN, which runs on 3GPP's network architecture standard, EPC. This simplifies functionality, eases handovers from one network to another and improves the quality of service for end users. In the physical layer, two key technologies such as OFDM and MIMO characterize major changes from 3G systems. Another key aspect of LTE systems is its simplified flat network architecture resulting from it being an all-IP, packet-based network that reduces latency and increases spectrum efficiency while simplifying network operations. Interference, an underlying problem with radio transmissions, is mitigated in LTE by making use of OFDM and MIMO techniques, along with many unique features such as inter-cell interference coordination (ICIC).

LTE Future

LTE realizes a high quality of service and experience on a multimedia platform that runs on a broadband network. This makes high data transfer possible without too much latency and enables mobility wherever the end users may be using any device that may wish. Currently, there are over 41 countries in progress or planning LTE deployments for mobile telecommunications with approximately 22 networks that will be in commercial service by the end of this year. This includes announced plans of several United States commercial operators, including in the 700 MHz band.

This year, the FCC, when granting the initial early deployments of the 700 MHz public safety broadband network, required the use of LTE technology.

For More Information

Visit the Public Safety and Homeland Security Bureau Web Site at **www.fcc.gov/pshs**

or

For more information about telecommunications issues, visit the FCC's Consumer & Governmental Affairs Bureau Web site at **www.fcc.gov/cgb** or call 1-888-CALL-FCC (1-888-225-5322) voice or 1-888-TELL-FCC (1-888-835-5322) TTY; faxing 1-866-418-0232; or write to:

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