



Backgrounder

LTE Advanced

3G, 4G, LTE, 3GPP, ITU – what does it all mean for mobile subscribers? For years, we have been promised incredible speeds, ubiquitous connections and easy access. And now, thanks to all those acronyms, it's just around the corner.

The state of the mobile industry: Mobile users are shifting from 3G to 4G connections as next generation networks are built around the world. Delivering blazing fast speeds and enhanced connectivity, 4G LTE has become the foundation of our mobile industry and embraced by millions of subscribers around the world. LTE Advanced builds on this success and delivers an improved user experience for multimedia, real-time gaming and a host of other applications.

What is LTE Advanced?: LTE Advanced is a next generation mobile technology developed by [Third Generation Partnership Project](#) (3GPP*) to be the primary successor to LTE, or Long Term Evolution. Current LTE networks, introduced in 2009, are a dramatic improvement over 3G networks in a number of ways, including data speeds. LTE Advanced is the next evolution of 4G networks.

LTE Advanced offers a number of features that provide major improvements compared to LTE. Primary among the enhancements are increased data rates, [which are up to 10 times faster](#) than current LTE; smoother handoffs between devices and towers for better coverage farther from cell towers; and the ability to transmit more data on limited spectrum – it's like turning up the spigot to get more water out of the same hose. Combined, these features lead to higher network capacity, more consistent connections and data that is faster and cheaper for consumers.

LTE Advanced incorporates a set of new technological innovations that will be rolled out over time, and include:

Carrier Aggregation: Carriers have built networks that utilize wireless radio frequency, or spectrum, that is often fragmented and scattered across wide ranges. This worked very well for 3G and LTE services but to make today's LTE networks even faster, large blocks of spectrum are needed. The wider the spectrum band, the higher the data rates carriers can deliver. LTE Advanced enables this next-level speed and capacity increase by allowing carriers to aggregate multiple smaller sections of spectrum into one large data pipe. This means LTE Advanced can deliver data rates that [are several times faster](#) than current LTE. A number of mobile operators around the world have announced plans to deploy LTE Advanced.

Multiple Input Multiple Output (MIMO): LTE Advanced allows devices to double the number of antennas used at both ends of the connection from four to eight (at the device and at the cell tower) to increase data rates or the number of users on a given swath of spectrum. MIMO also improves overall data capacity throughput in both directions (uplink and downlink) without increasing power usage.

Self-optimizing and self-healing: If the system goes down or demand for data changes, LTE Advanced networks can determine and adjust network resources accordingly.



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Coordinated Multipoint: Allows devices to connect and transmit data to multiple towers (base stations) simultaneously to improve signal strength and data speeds. Previously, mobile devices could only transmit to—and receive from—one tower at a time, and when there is only one tower nearby, it can mean reduced throughput and slower speeds.

LTE Advanced was approved by the International Telecommunication Union (ITU*) in 2009. Carriers around the world have begun rolling out different portions of the standard, starting with countries in Asia and Europe. ABI Research expects that 500 million mobile users will be on LTE Advanced by 2018.

The impact of LTE Advanced: Mobile customers are demanding more and more data at increasingly faster speeds, while the number of subscribers continues to grow exponentially. Today's users need data for high speed video streaming and similar applications but the use of data will only become more sophisticated as new types of applications emerge, such as telepresence, telemedicine, virtual reality and more.

Today, LTE Advanced meets data customers' needs over the limited spectrum available to carriers without the need to completely rebuild network infrastructure. It delivers more data bits per second over fewer hertz of the spectrum, all while providing backward compatibility with older LTE and 3G mobile devices.

Intel's role in next-generation mobile computing: Intel is a leader in mobile technology, and offers a number of options designed for mobile devices, as well as the networks that connect them to each other and the Internet. Intel also offers LTE and LTE Advanced modems for use in mobile handsets, ensuring that mobile devices deliver amazing speeds with minimal power requirements. Intel's latest LTE Advanced modem, the [Intel® XMM™ 726x](#) (XMM™ 7260 and XMM™ 7262 for use in TDD markets like China) delivers carrier aggregation of up to 40MHz—twice the bandwidth of standard LTE—and download speeds of up to 300 Mbps. Intel continues to work on more advanced modems to meet the evolving needs of the mobile industry.

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