

Saturation in the existing 3G networks, increasing demand for higher data rates and the need for spectral efficiency are driving the demand for 4G network deployments globally. Of the two prominent 4G technologies, long term evolution (LTE) is set to edge out Wi-Max in the global mobile network deployment space.

One of the key reasons behind this trend is that LTE technology offers a smoother transition from the GSM/ UMTS/HSPA/CDMA-based networks for both operators and subscribers, GSM being the dominant mobile standard worldwide.

While over 500 Wi-Max networks have already been deployed across 140 countries, LTE is catching up fast. As of October 2011, 206 major mobile operators across the world had announced their plans for shifting to LTE technology. Of these 182 operators were committed to launch LTE-frequency division duplex (FDD), 24 operators were committed to launch LTE-time division duplex (TDD) and 35 operators had already launched commercial LTE services.

Among the most notable LTE deployments in the second half of 2011 were AT&T (USA), Roger Wireless (Canada), LG U+ (South Korea), SK Telecom (South Korea) and Etisalat (UAE).

Around mid-2011, Wi-Max had over 20 million subscribers worldwide while LTE had about 5 million subscribers. However, LTE is set to bridge this gap as it would soon achieve greater levels of coverage and economies of scale than Wi-Max, with major operators such as Clearwire and Yota opting to migrate to LTE technology. As of end-2011, the number of LTE subscribers had reached 9 million.

The US market in particular has witnessed a rapid uptake of LTE-based services. The country's telecom operators, particularly Verizon Wireless, have been trailblazers in the nascent LTE market. By end-September 2011, Verizon Wireless had more than 3.1 million LTE subscribers, accounting for a significant 60 per cent of the worldwide total.

China is another key 4G market, which has announced LTE as a preferred technology. The country's largest telecom operator, China Mobile plans to combine LTE-TDD with LTE-FDD in order to create a much larger platform for LTE-TDD technology. The company unveiled its plans for large-scale deployment of LTE-TDD across the country at the GSMA Mobile World Congress 2012. According to Li Yu, president, China Mobile, commercial LTE services would

be available by 2013.

Japan and South Korea, two other countries leading in terms of 4G (LTE) deployments, are expected to be amongst the top five markets globally in terms of subscriber base.

Emerging trends and future outlook

Strategic partnerships: This is the dominant trend amongst 4G operators, who have realised that in order to survive in the market they must cooperate with each other and share resources such as capital, infrastructure and spectrum.

This trend has been behind synergies between some of the largest operators in the world, paving the way for advanced 4G networks. For instance, US-based Sprint and LightSquared entered into a partnership to share their networks. Now, LightSquared has the right to sell access to Sprint's LTE network, while Sprint can piggyback on the other's existing network capacity where needed. This partnership is mutually beneficial for both carriers. LightSquared would not have to incur high capital investment costs as Sprint's architecture can support the former's LTE network on the same base stations as its CDMA network, and Sprint would have access to LightSquared's spectrum.

Another US-based operator, Clearwire trialled both LTE-TDD and LTE-FDD and confirmed that it would deploy "LTE-Advanced-ready" network technology in addition to its existing mobile Wi-Max network. The operator also plans to use LTE-TDD technology. Further, Clearwire is collaborating with China Mobile on LTE-TDD devices and the two companies will work together to accelerate the time-to-market availability of high volume LTE-TDD chipsets and devices. These devices are likely to be commercially available in 2012.

Revenues: According to a research report by Mind Commerce, LTE revenues increased from \$0.6 billion in 2010 to over \$2.1 billion in 2011.

Countries with developed markets such as the US and Japan, and several Tier 1 operators in Western Europe, the Middle East and Asia-Pacific have emerged as leaders in the LTE space.

As of December 2011, the North American region accounted for over 42 per cent of the total LTE infrastructure revenue.

According to the report, global 2G/3G/4G cellular network infrastructure revenues are set to increase from \$46 billion in 2010 to over \$51 billion by 2015 at a compound annual growth rate (CAGR) of 5 per cent, with LTE accounting for more than 20 per cent of the revenue share.

Major vendors such as Ericsson, Alcatel-Lucent, Nokia Siemens Networks and Huawei are likely to account for more than 80 per cent of this revenue. The 4G LTE market, in particular, would grow at a CAGR of 45 per cent, from \$2.1 billion in 2011 to cross \$13 billion by 2015. From a regional perspective, Asia-Pacific is expected to account for over 68 per cent of the revenue by 2015, indicating a significant shift in market share.

Device market: Having already witnessed over 269 unique device launches and shipments of over 8 million units in 2011, the LTE devices ecosystem is set to grow at a CAGR of over 104 per cent over the next five years, according to a Research and Markets study.

LTE technology is driving the current mobile device and equipment market, and is expected to claim a major share of spending on wireless devices over the next few years as mobile carriers migrate to 3GPP-based next-generation wireless technology. Research and Markets has predicted that by 2016 there would be nearly 300 million LTE device shipments across the world, with revenues of over \$82 billion.

Equipment: The mobile infrastructure LTE equipment market is estimated to grow at a CAGR of 45 per cent over the next five years, according to the Dell'Oro Group. LTE macro shipments would drive LTE revenues in the early to middle part of the forecast period. Outdoor metro and pico eNode B shipments are expected to exceed macro shipments in 2016. 3GPP RAN technologies are estimated to grow at a CAGR of 6 per cent during the same period.

Another research group, IHS iSuppli has forecasted that the global capital spending on LTE technology would witness a threefold increase, from \$8.7 billion in 2012 to \$24.3 billion in 2013. LTE infrastructure spending in 2015 is estimated to rise to \$36.1 billion, as compared to \$9 billion for 3.5G. At this pace, LTE is expected to overtake 3.5G, which will end its five-year run in 2015 as the dominant category in wireless infrastructure gear spending.

In comparison, the global Wi-Max equipment market is expected to grow from \$1.92 billion in 2011 to \$9.21 billion by 2016, at a CAGR of 36.83 per cent.

Challenges ahead

The first 4G handset was introduced in March 2010 and 4G connectivity is proliferating at a fast pace as major telecom operators across the world are deploying high speed networks. However, it is still a technology in transition and has a long way to go. The majority of LTE launches in both emerging and advanced markets have been with cellular modems. Unfortunately, the LTE handset ecosystem is not well developed and devices are still expensive. Carriers and device manufacturers need to take some important factors into consideration before shifting to the next generation of data connectivity like continued support for 3G networks, faster speeds and improved efficiency to help preserve the battery life of the handsets. These measures would go a long way in driving the growth of 4G technologies across the world.

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