



4G deployments and connections gather pace

More than 350 4G operators; 4G connections approaching 500M

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There were 352 operators with live commercial 4G-LTE networks globally as of the end of January 2015, with more than half of the world's mobile markets (124) covered by at least one LTE operator. This represents an increase of 88 compared to the same point in 2014, according to our latest research. Meanwhile, the number of LTE connections worldwide more than doubled between 2013 and 2014 from 200 million to around half a billion (490 million), meaning that 7% of the world's cellular connections (excluding M2M) were on LTE by the end of 2014, compared to just 3% a year earlier. By the end of 2015 we expect that more than 10% of connections globally will be on LTE, with this share rising to more than three in every ten connections by 2020.

Europe is home to the most LTE operators with more than 30% of the total (108), followed by Asia Pacific (66), Latin America (55) and North America (47). Conversely, the regions that have seen the fewest LTE launches are CIS (22), MENA (26) and SSA (32). However, while Asia Pacific accounts for only one in six of the world's LTE operators, it was home to almost half (47%) of LTE connections at the end of 2014, largely due to substantial LTE bases in South Korea, Japan and – increasingly – China. Similarly, North America accounted for around a third (32%) of all LTE connections, compared to just 14% for Europe. At the end of 2013 the developing world made up less than one in 20 global LTE connections, however this had risen to more than a quarter by the end of 2014, and by 2016 we expect the developing world to have overtaken developed world in terms of LTE connections.

China Mobile driving a major shift in the LTE landscape

This trend is being driven to a great extent by China's (and the world's) largest operator, China Mobile, which accounted for three in every ten new 4G connections worldwide during 2014. After launching its TD-LTE service at the end of December 2013, a combination of aggressive network rollout (410,000 base stations by Q2 2014) and competitive handset and tariff pricing – combined with the stalling of its domestic rivals' 4G launches – resulted in the operator's 4G base reaching 90 million by the end of 2014, making it the world's largest 4G operator by some distance. US operators Verizon and AT&T are second and third with 67 million and 43 million respectively at the end of 2014, with the US remaining the largest LTE market globally with 148 million connections. However, at current growth rates we expect China's LTE base to treble to 300 million by the end of 2015, comfortably overtaking the US.

In terms of 4G connections as a percentage of total connections, the most relevant metric on which to measure LTE adoption, South Korea is some way ahead of the rest of the world with two thirds of all connections on 4G by the end of 2014. As with their counterparts in the US (45% LTE adoption in Q4 2014), Japan (42%) and Australia (38%), operators in the country were assigned spectrum for LTE far in advance of many other regions. However, South Korean operators LG Uplus (80% LTE adoption in Q4 2014), KT (63%) and SK Telecom (61%) head up the list of the world's top ten operators in terms of LTE adoption as the relatively small land mass of the country allowed them to quickly reach nationwide coverage.

LTE spectrum bands

The example of these four pioneer markets demonstrates how the principal driver of LTE adoption is LTE coverage, which is in turn driven by the timing, type and amount of spectrum licensed for LTE services. South Korea, the US, Japan and Australia have all benefited from supportive regulatory frameworks that assigned spectrum for LTE use at an early stage, whereas in Europe, where LTE adoption stood at just 10% in Q4 2014, assignment of spectrum occurred at a slower rate. The type of spectrum is also important; for example, despite the size of the country, Verizon in the US was able to reach 97% population coverage within three years of launch due to its initial assignment of low frequency, high propagation ‘coverage band’ spectrum in the 700 MHz range.

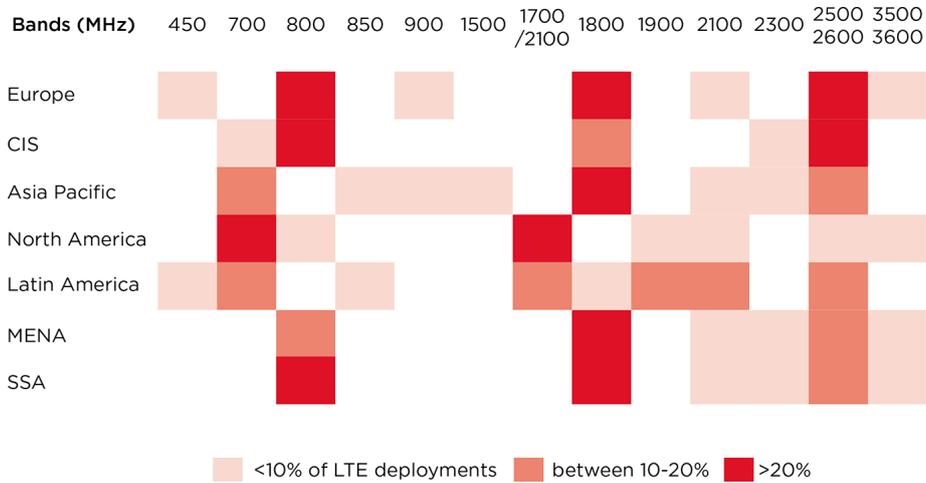
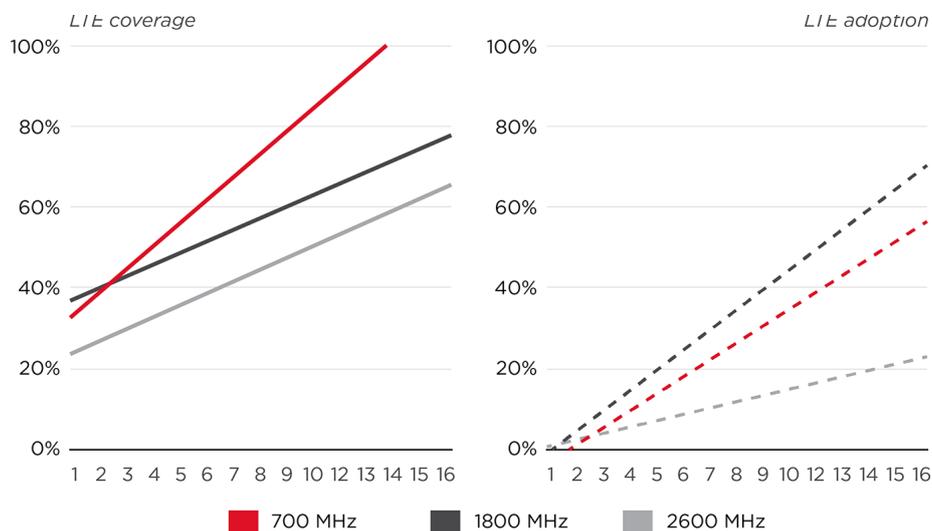


Figure 1: Share of LTE deployments by frequency band, by region (January 2015)

Source: GSMA Intelligence

However, with near nationwide coverage established in leading markets but demand for data growing exponentially, particularly in urban areas, LTE spectrum auctions since 2010 have tended to focus on ‘capacity bands’ above 1 GHz. In the 185 spectrum auctions that took place across 120 countries between 2010 and 2014, the amount of capacity spectrum auctioned was at least twice that of coverage spectrum in every region. Figure 1 shows the range of frequencies in which LTE (including multi-band) networks have launched since 2009. While the presence of 13 separate bands demonstrates an initial lack of harmonisation at the global level, the clustering around the digital dividend bands (700 MHz, 800 MHz), the refarmed 1800 MHz band and the IMT-extension bands (2500-2690 MHz) shows the progress that has been made toward regional spectrum harmonisation. Between them, these three bands account for three quarters of all LTE networks currently operating.

Figures 2 and 3 illustrate the relationship between spectrum band, population coverage and adoption for operators using the three most prevalent LTE spectrum bands (for multi-band operators the data refers to the initial deployment band). Figure 2 shows that on average, after three years of operation (12 quarters), LTE networks using the lowest frequency (digital dividend) band, 700 MHz, had reached around 90 percent coverage, compared to around two thirds for the higher 1800 MHz band and just over half for the 2600 MHz IMT-extension ‘capacity band’. LTE adoption lags coverage in a uniform way for the digital dividend and IMT-extension bands as shown in Figure 3, but adoption relative to coverage is typically faster for the refarmed 1800 MHz band. As discussed in our [earlier report], this is due to the proliferation of available devices in this range as, unlike the other two bands, 1800 MHz has been used in cellular operation for several years and is supported in most smartphone models.



Figures 2 & 3: Average LTE coverage and adoption, quarter after launch, reporting operators only

Source: GSMA Intelligence

Other factors in LTE adoption

While European countries still lag their counterparts in Asia Pacific and North America, some operators in the region have been able to drive significant LTE adoption due to the greater device availability offered by using refarmed spectrum. Of the ten operators with the highest level of LTE adoption in Europe in Q4 2014, which are clustered in Denmark, France, Norway, Sweden and the UK, nine made their initial LTE launches in either the 900 MHz or 1800 MHz bands. While many had the advantage of early LTE launches (e.g Netcom in Norway and Telia in Sweden in October 2009), the UK's EE is now Europe's largest 4G operator in terms of connections with 7.7 million in Q4 2014, despite launching its 1800 MHz LTE service relatively late in October 2012. The operator had almost a third (31%) of its connections on 4G at the end of 2014, compared to 16% for O2 UK and 11% for Vodafone UK, which both launched LTE in August 2013 on 800 MHz and 800/2600 MHz respectively.

Yet the operator with the highest level of 4G adoption in the UK is the country's smallest, 3, which announced 3.1 million LTE connections in December 2014, one year after launch. Utilising the 1800 MHz band has played a part in the operator reaching 38% LTE adoption, however, pricing has also been a factor that has contributed to its rapid 4G take-up. 3 has employed a different pricing strategy to its domestic competitors in terms of 4G, offering the technology to customers at no additional charge to its 3G tariffs. With many of those customers already owning 1800 MHz LTE compatible devices, the operator has been able to instantly migrate a significant number of connections from 3G to 4G via an over-the-air software upgrade. We expect this tariffing strategy to mirror the approach taken by early LTE pioneers such as AT&T in the US and Telstra in Australia, which also initially offered LTE at no extra charge but then gradually moved to a tiered data tariff model.

