700MHz spectrum will be crucial to the 5G business case and will create new vendor opportunities

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Most of the 5G deployments around the world so far have used mid-band spectrum such as the 3.5GHz band, which supports high levels of capacity. These first deployments have been based on 5G New Radio non-standalone (NSA), which still relies on the 4G core, so operators have tended to use their existing 4G networks to achieve wide-ranging mobile broadband coverage.

However, as operators migrate to 5G standalone (SA) and aim to deliver advanced 5G-enabled services to users and industries in every location, broad 5G coverage will become critical to the business case for both consumer and B2B services. That business case will be greatly enhanced if operators can deploy 5G using spectrum in sub-GHz bands such as the700MHz band, because this supports better range and indoor penetration than higher-frequency bands, and dramatically reduces the cost of ubiquitous coverage while improving the end-user experience.

The business case for the next phase of 5G deployments will be greatly enhanced by low-band spectrum

5G has initially been deployed with a focus on dense urban areas and high capacity, but this approach will not be sufficient to deliver a strong 5G business case for the medium term. Over 70% of respondents to Analysys Mason's survey of more than 100 mobile operators said that their business case required an extension of 5G coverage such that the 5G footprint would be at least the size of the 4G footprint within the first 5 years of deployment. Some operators will need to move more quickly than this, particularly if they are prioritising rural broadband services or IoT applications that need ubiquitous coverage, such as vehicle tracking. The migration to 5G SA, which is gathering momentum in 2021, will be both a driver and an enabler of 5G coverage expansion, meaning that operators will not have to rely on the 4G network for complete mobile broadband coverage.

However, 5G SA will not be able to support ubiquitous 5G coverage with operators' current 5G spectrum bands. These are concentrated around 3.5GHz and support high capacity, but have limited cell range and indoor penetration. Furthermore, more cells are required to cover the same area when using spectrum in the mid-band than when using sub-GHz spectrum such as that in the 700MHz band.

The 700MHz band has been identified by the ITU as a primary band for 5G and it brings many benefits for operators' business case. In particular, it allows operators to deliver high-quality connectivity to every user at a far lower cost than for the 3.5GHz band, and it enables deep indoor penetration within buildings. Australian operator TPG says that the use of 700MHz spectrum will enable it to reach 85% of the country's population in the six largest cities by the end of 2021. As a result, it will be cost-effective for the operator to deliver a wide range of new revenue-generating services that also have social and economic impact, including:

- fixed and mobile broadband services to underserved communities, enabled by deep and broad 5G coverage
- fixed and mobile broadband services that rely on deep indoor coverage to support an optimal 5G user experience in homes and workplaces

- newly emerging applications and revenue streams that require broad coverage, especially selected IoT use cases such as intelligent transport.

The 700MHz band complements other spectrum bands and supports the optimal balance between capacity and coverage. It delivers the best economics for operators and the best experience for consumers and businesses.

Sub-GHz spectrum is only slowly becoming available in many countries, which may delay commercial benefits

Regulators in some countries have already awarded 700MHz spectrum licences; examples include China, Germany, Poland and the UK. Regulators in some other countries are awarding 5G spectrum licences in other sub-GHz bands, but the 700MHz band looks to be the most globally harmonised option.

Progress is slow in many countries, and this will limit operators' ability to expand and monetise 5G in the coming years. Indeed, regulators in only 20 countries worldwide had allocated sub-6GHz spectrum for 5G by the end of 1Q 2021. More than half of the EU member states missed the EU deadline of assigning 700MHz spectrum licences for 5G by the end of 2020.[1] Auctions have been held in some countries, but in some of these, the prices have been prohibitively high. For example, there were no bids for 700MHz licences in India in 1Q 2021 because of the very high reserve prices.

It is critical that regulators accelerate the process of making 700MHz spectrum available, and they should ensure that it is affordable for operators. If they do not, operators' ability to extend their 5G coverage will be constrained, which will limit their commercial options and delay the availability of new services for consumers and businesses. This, in turn, will make it challenging for governments to achieve their 5G-related socio-economic objectives.

There are clear opportunities for operators and vendors in countries where spectrum in the 700MHz band is available

17 operators have deployed 5G commercially using spectrum in the 700MHz band as of April 2021.[2] China provides a good example of the benefits of opening up the 700MHz band at an early stage in 5G deployment. The three Chinese operators invested in deploying a total of approximately 600 000 base stations in 2020; this figure is expected to reach 1.7 million in 2021. This roll-out will extend 5G to a large number of communities and will enhance the 5G business case for operators. In turn, the size of the Chinese telecoms market will help to drive scale in the 700MHz 5G ecosystem worldwide, thereby improving costs for operators in any countries in which the spectrum is available.

Of course, deployments in the 700MHz band enhance the 5G business case for vendors too, and for the ecosystem as a whole. China Mobile provides a particularly large-scale case study. It announced the results of its 700MHz procurement on 18 July 2021; Huawei will provide 60% of the equipment alongside four other vendors. China Mobile will build approximately 480 000 700MHz base stations in 2021–2022 (including 400 000 in 2021), which will complement its existing network using mid-band 2.6GHz spectrum. It will also procure 1.74 million multiband antennas support 700MHz spectrum.

1 GSMA (May 2021), *Spectrum Navigator, Q1 2021.* Available at: https://www.gsma.com/spectrum/wp-content/uploads/2021/03/Spectrum-Navigator-Q1-2021.pdf.

2 For more information, see Analysys Mason's 5G deployment tracker.

China Mobile will share its network with new mobile entrant China Broadcasting Network (CBN), which was awarded a national 700MHz licence and will contribute the spectrum and its content partnerships to the alliance. The aim is to expand 5G coverage rapidly but cost-effectively so as to support new use cases and enable a combined 'network+content' ecosystem.

This huge Chinese deployment will help to drive a large-scale ecosystem and facilitate deployments around the world. As such, it will create new opportunities for the vendors that have taken an early role in the development of 700MHz equipment.

China Mobile believes that its greatly expanded 5G coverage will enable it to extend the benefits of 5G connectivity to the majority of users and businesses by the end of 2022. It will support advanced applications and experiences and will close the digital divide. Similar advantages are being targeted by other operators, suppliers and governments worldwide. Regulators should act now to open up this spectrum and ensure that their countries secure the maximum benefits of 5G, and that operators and suppliers can reap the rewards of a robust global ecosystem.

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