5G networks are now being deployed on a large scale while work continues on the more-complex features

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Analysys Mason recently updated its *Global race to 5G* report, which was originally published in April 2018 and commissioned by the US cellular industry trade association, CTIA.[1][2] The new report was released in April 2019, and includes new analysis that takes the latest 5G developments into account, including the first commercial launches.[3] The key objectives of the report were identifying the main 5G deployments worldwide and comparing them with those in the USA. As such, both the original and the updated report contrast and rank the 5G readiness in the nations considered.[4]

There have been a number of new developments in 5G so far in 2019

The latest report provides details about the technical and commercial launch of 5G networks in several countries worldwide. Most of these networks support consumer-based mobile broadband services in the 3.5GHz '5G mid-band' range of frequencies using the non-standalone (NSA) implementation specified in the 3GPP standards. This is most likely to be because many of the 5G consumer devices that are becoming available for use in 2019 support this frequency band (one of the 3GPP 5G Frequency Range 1 (FR1) bands below 6GHz). By contrast, 5G services in the USA have initially been launched using the higher Frequency Range 2 (FR2) spectrum in the millimetre-wave range (specifically the 28GHz band in the USA). Regulators in many other markets worldwide are also looking at making millimetre-wave spectrum available, initially either in the 26GHz or 28GHz band, or both.

The latest country rankings for 5G readiness show that the USA has moved from third place in 2018 into joint-first place with China. South Korea, Japan and the UK follow, in that order. This is illustrated in Figure 1, using a composite index that reflects 5G readiness in terms of industry commitments, the amount of low/mid/high-band spectrum and the timelines for its availability, the total mobile spectrum allocated for 5G and the government support for 5G.

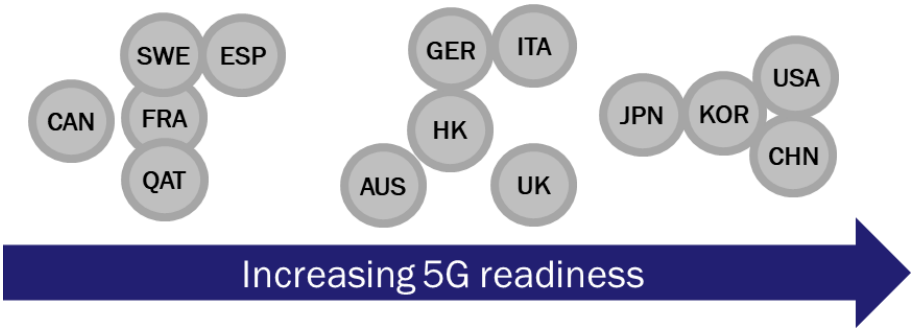
1 CTIA is the leading trade association for the wireless industry in the USA. It represents companies in all parts of the wireless ecosystem including mobile network operators, equipment manufacturers, software providers and other providers of products and services involved in the mobile wireless marketplace.

2 CTIA (2018), *Global Race to 5G – Spectrum and Infrastructure Plans and Priorities*. Available at https://www.ctia.org/news/global-race-to-5g-spectrum-and-infrastructure-plans-and-priorities.

3 CTIA (2019), *The Global Race to 5G Spring 2019 Update*. Available at https://www.ctia.org/news/the-global-race-to-5g-spring-2019-update.

4 Australia, Canada, China, France, Germany, Hong Kong, Italy, Japan, Qatar, Spain, South Korea, Sweden, the UK and the USA.

Figure 1: Overall 5G readiness scores, 2019



Source: Analysys Mason, 2019

As explained in the report, the improvement in the USA's position compared to that in 2018 is due to significant investment in 5G networks by the US wireless industry, action from the government and FCC to reform infrastructure policies and a commitment from the FCC to make more spectrum available to wireless operators. However, the availability of 5G mid-band spectrum must improve rapidly if the USA is to retain this lead in the coming years. The availability of 3.5GHz spectrum in countries other than the USA has further improved since the publication of our updated report in April 2019; auctions of 3.5GHz spectrum have been completed in Austria and Germany and are at an advanced planning stage in several other countries. It has also become clear that 5G NSA networks will be launched in China using several FR1 bands (2.6GHz and 3.5GHz). Our report found that the USA ranked tenth for the availability of mid-band spectrum; this is in stark contrast with its joint-first rank for both industry 5G commitment/deployment (along with South Korea) and the availability of low (below 3GHz) and high bands (FR2).

5G networks are expected to be migrated to standalone architecture in the next few years

One consequence of 5G services being rolled out using NSA implementations in the 3.5GHz band is that 4G (LTE) technologies are still required to manage network connections. Over time, it is expected that this will change. Networks will migrate to a standalone (SA) architecture,[5] potentially using a variety of FR1 and FR2 bands seamlessly across different environments and coverage areas. The launch of standalone networks is expected to be the point at which the full range of anticipated 5G services will emerge, including improved capabilities for mobile operators to provide industry-specific services tailored to the needs of different vertical sectors. There is also the possibility that standalone industrial networks will emerge as an alternative to using a mobile operator's network for industrial use cases (subject to suitable spectrum being available). However, many complexities remain because the specifications for 3GPP Release 16 are still being worked on. Operators will also need to ensure a smooth migration to SA networks, having launched NSA implementations initially (in terms of device capabilities, coverage areas and the frequencies used, for example). We have assumed that operators in countries where 5G NSA implementations have already been launched will be well-placed to migrate these services to SA in due course.

Analysys Mason's consulting advice can help operators and regulators to clarify the challenges of 5G. For further advice, please contact Janette Stewart, Principal.

5 Or a non-standalone architecture where the 5G network controls connections; for simplicity, we refer to these as 5G standalone, as they are not contingent on 4G connections.