



High-Band Spectrum for 5G

Achieving low-latency, high-capacity networks with mmWave spectrum



High-band spectrum or mmWave is essential for the deployment of high-capacity, low-latency 5G networks. It complements low and mid-band spectrum implementations in dense urban areas and provides fibre-like connectivity through 5G fixed wireless access (FWA) technologies.

5 GHz

Will be needed, on average, in each country to satisfy demand including:



eMBB

Dense urban area deployment to complement low-bands and mid-bands

4.5 GHz



FWA

350 MHz to 1.2 GHz to complement low and mid-bands

350 MHz



Enterprise Networks

Approximate enterprise networks capacity requirement by 2030:

150 MHz

High-band spectrum



Use cases for high-band spectrum

Several 5G use cases depend on mmWave spectrum for successful deployment: enhanced mobile broadband (eMBB), especially in dense urban areas; FWA using mmWave can provide fibre-like speeds.

Morning at home



Watching news, morning shows or educational programmes

Video calls with family and friends

Train/subway station commute



Enjoying streaming
Downloading video

School or university



Hybrid classes: physical + virtual
Immersive XR learning

Work in office, enterprise, factory



Cloud-based and virtual desktop applications
Wire-free production equipment

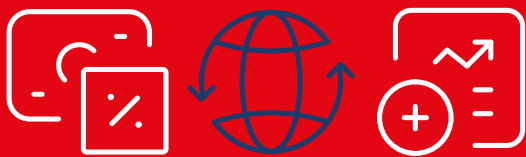
Shopping mall and high street



AR-assisted navigation and shopping
Digital signage

GDP impact in 2030

\$220bn



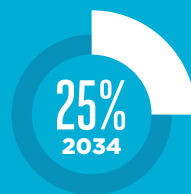
Source: The socio-economic benefits of Mid-band 5G services, February 2022

The growing importance of mmWaves



52%

Rapid rise:
mmWave contribution to GDP to grow 52% annually



The share of 5G services using mmWaves

Source: The socio-economic benefits of mmWave 5G, December 2018

eMBB Capacity

Depending on the urban characteristics and income level of an urban area and the expected 5G penetration, an average of between 3 GHz to 4.5 GHz of mmWave spectrum will be needed to satisfy demand for eMBB.



Expected amount of mmWave spectrum needed for 5G eMBB based on data consumption.

Early adopters
4.5 GHz

Other countries
3 GHz



As data consumption on smartphones continues to grow after 2030, all countries will need more high-band spectrum beyond the initial 3GHz.

FWA Capacity

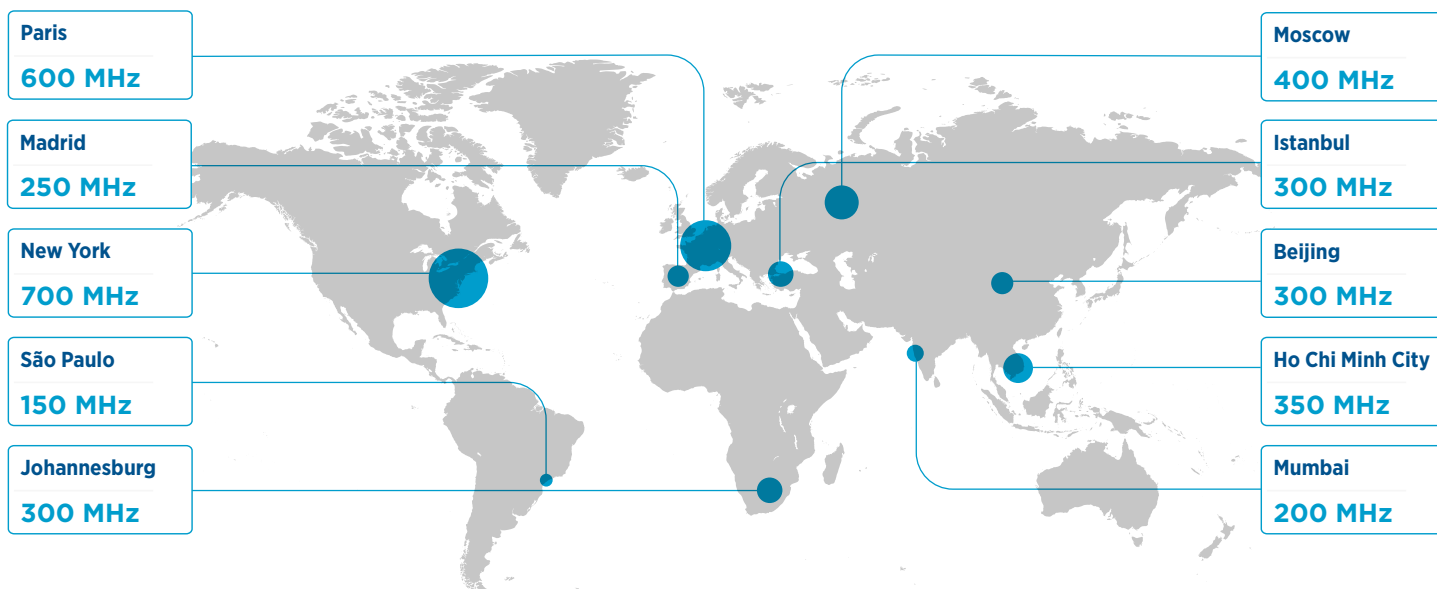
FWA is one of the main 5G use cases and a key solution for delivering broadband connectivity objectives. mmWave spectrum provides greater bandwidth to support lower-latency and gigabit speeds.

mmWave spectrum need for 5G FWA:



5G FWA

mmWave spectrum needs, dense urban areas by city



The GSMA carried out a study to show precise spectrum needs in certain urban areas.

The full report can be accessed at www.gsma.com/spectrum/resources/mmwave-5g-benefits/
For more on 5G spectrum visit: <https://www.gsma.com/spectrum/5g-spectrum-guide/>

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