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:

- 4.5 GHz
  - eMBB
    - Dense urban area deployment to complement low-bands and mid-bands
- 350 MHz
  - FWA
    - 350 MHz to 1.2 GHz to complement low and mid-bands
- 150 MHz
  - Enterprise Networks
    - Approximate enterprise networks capacity requirement by 2030.

High-band spectrum

- 20 GHz
- 30 GHz
- 40 GHz
- 50 GHz
- 60 GHz
- 70 GHz
- 80 GHz

- 26 GHz
  - 24.25-27.5 GHz
- 40 GHz
  - 37-43.5 GHz
- 28 GHz
  - 26.5-29.5 GHz
- 66 GHz
  - 66-71 GHz

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
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.

5G FWA
mmWave spectrum needs, dense urban areas by city

<table>
<thead>
<tr>
<th>City</th>
<th>MHz</th>
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</thead>
<tbody>
<tr>
<td>Paris</td>
<td>600</td>
</tr>
<tr>
<td>Madrid</td>
<td>250</td>
</tr>
<tr>
<td>New York</td>
<td>700</td>
</tr>
<tr>
<td>São Paulo</td>
<td>150</td>
</tr>
<tr>
<td>Johannesburg</td>
<td>300</td>
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<tr>
<td>Moscow</td>
<td>400</td>
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<tr>
<td>Istanbul</td>
<td>300</td>
</tr>
<tr>
<td>Beijing</td>
<td>300</td>
</tr>
<tr>
<td>Ho Chi Minh</td>
<td>350</td>
</tr>
<tr>
<td>Mumbai</td>
<td>200</td>
</tr>
</tbody>
</table>

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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