GSMA

6 GHz in Europe
Mobile evolution in 6.425-7.125 GHz

Europe's future economic competitiveness will need fast, secure, and reliable connectivity, with 6G poised to play a central role. As spectrum demand intensifies, the full availability of the upper 6 GHz band (6.425–7.125 GHz) for mobile networks will support the rollout of next-generation 6G services.

Mobile networks are projected to contribute 8.4% of global GDP by 2030, yet without access to the upper 6 GHz band, this potential economic benefit may not be realised. The upper 6 GHz band's full availability is crucial for meeting 6G connectivity needs and sustaining Europe's digital and economic leadership.

MID-BANDS AND MOBILE DATA OVERVIEW

Data demand is rising | 6G future is taking shape in 200 MHz channels | **Mid-bands are indoor and outdoor** | Digital development needs macro-cell full-power 6 GHz

In Europe, data per connection will triple between 2024 and 2030 as 5G matures

2024 → 32 GB/month connection to
2030 → 97 GB/month/connection (3x)

Peak 6 GHz trial speeds: **12 Gbps**

IN THE GLOBAL SELECTION OF CITIES IN THIS REPORT:

The average economic benefit of **FULL-POWER LICENSED MOBILE IN UPPER 6 GHz** is

7×

GREATER THAN UNLICENSED

71%

of mobile data use is indoors and

29%

is outdoors

85% of indoor connectivity is provided by mid-bands with

15%

coming from low bands

IN THE CITIES STUDIED IN EUROPE:

71%

of urban indoor 5G use is provided by 3.5 GHz

Wi-Fi use:

22% Wi-Fi 4

46% Wi-Fi 5

32% Wi-Fi 6

Technology migration will enhance efficiency

Mid-band 4G download speeds are

3× higher than on low-bands

3.5 GHz 5G download speeds are **7×** times higher than low bands and

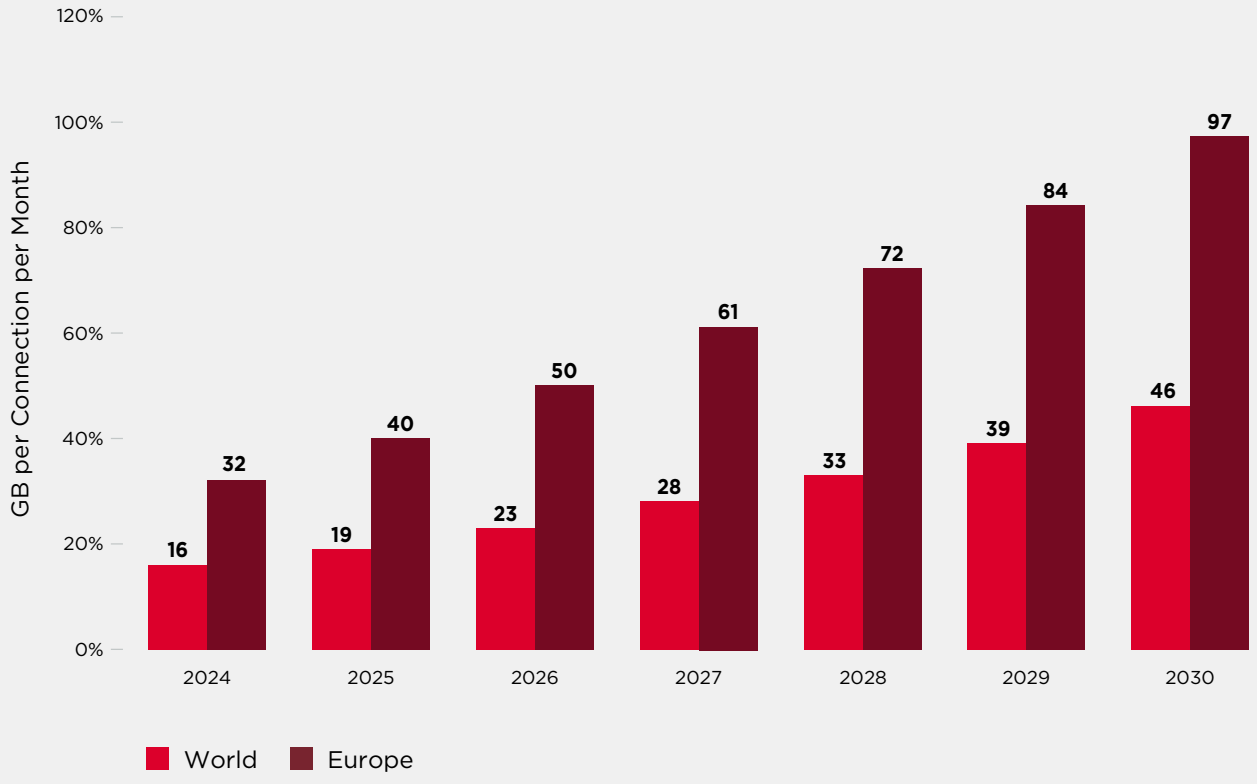
2.5× higher than lower mid-bands

Data growth

Mobile and fixed operators will need to manage significant traffic growth on their networks over the next decade. Global mobile traffic growth in 2023 was the largest of any year to date. The 2023 increase alone was greater than the absolute traffic level in 2018. Comparing 2024 and 2030, the traffic per connection is expected to be three times greater.

The introduction of 6G is anticipated to impact data growth further. It is important for regulators and policymakers to consider these absolute increases in network traffic rather than the percentage growth. Additional mobile spectrum such as the full upper 6 GHz band will provide the foundation for Europe to be a digital leader in the 6G era.

Figure 1
Europe's mobile data usage vs global average

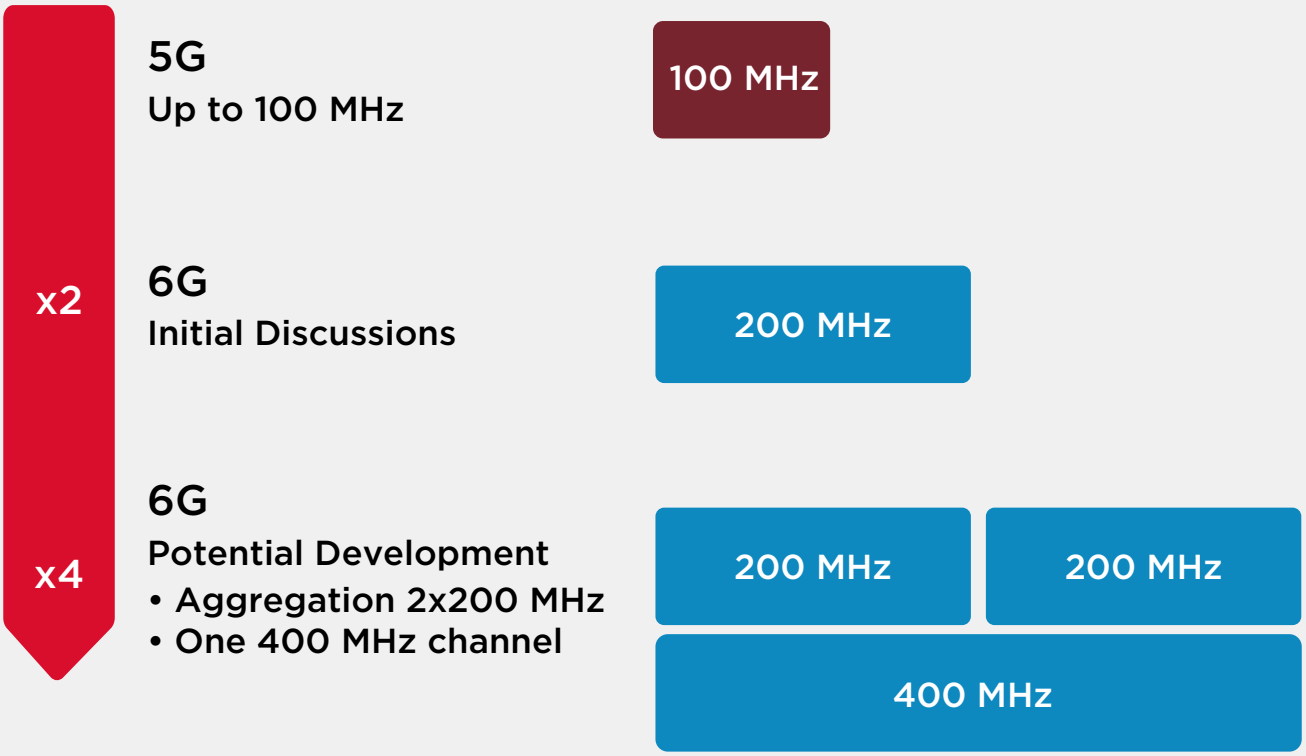


6G Channel Size

Each mobile generation has used wider channel sizes than the one before, from 1.25 MHz 2G channels to the 100 MHz channels used for 5G. The new 6G era in the 2030s will use 200-400 MHz channels to cater for capacity and speeds required to deliver 6G-era services and applications.

The 700 MHz available in the upper 6 GHz band can only provide the bottom end of this 200-400 MHz channel size in a three-operator market but is still the most likely way of supporting sufficient channel sizes in Europe.

Figure 2
New channel sizes for new generations



Global socioeconomic benefits

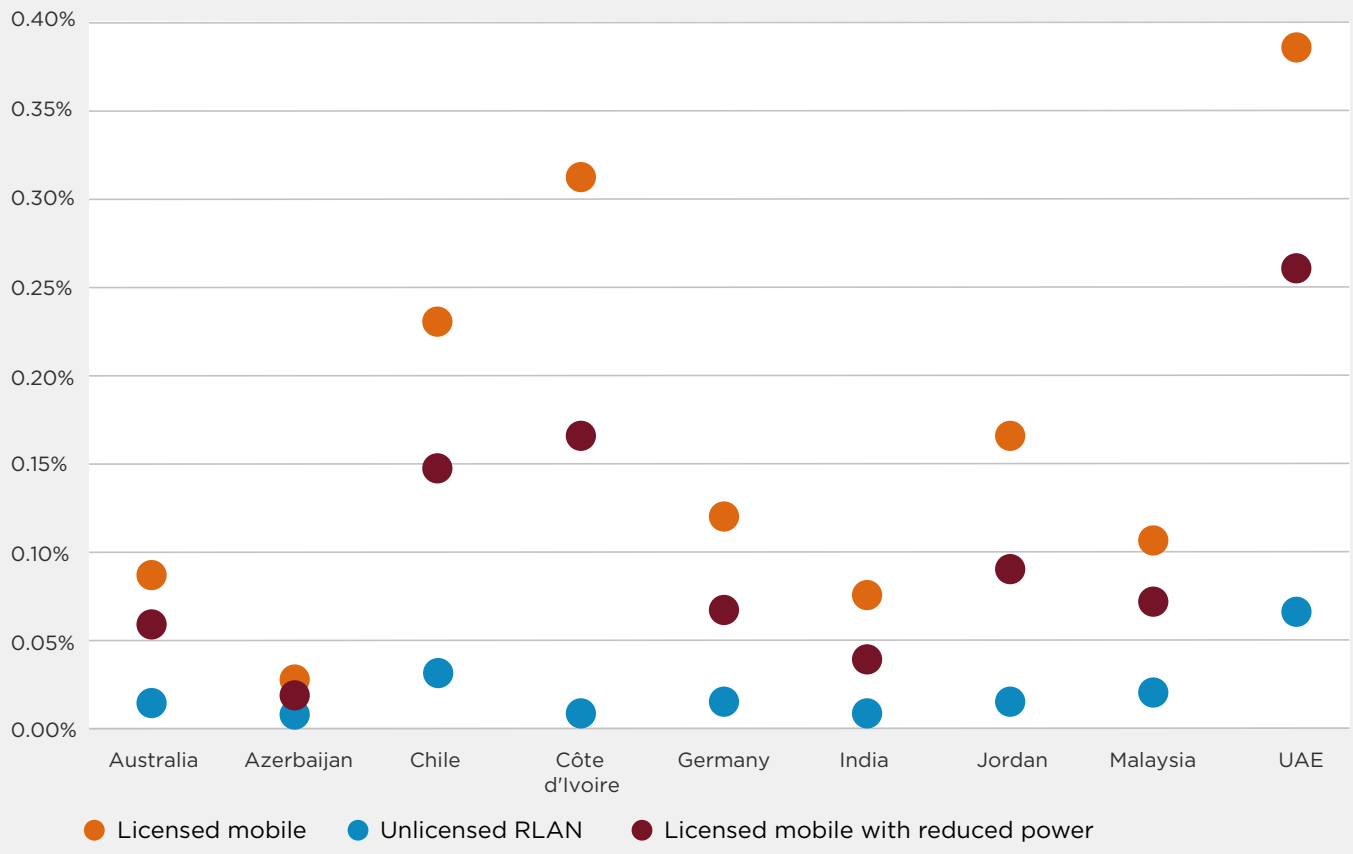
In 2024, GSMAi studied the potential economic benefits of three different policy options for the upper 6 GHz band in nine countries around the world.

- licensed mobile use (Scenario 1)
- unlicensed RLAN use (Scenario 2)
- enabling shared use by reducing the power levels of mobile deployments (Scenario 3).

The greatest economic benefit was always achieved with Scenario 1, where the upper 6 GHz band is assigned to licensed, macro-cell mobile use with standard power levels. This is because mobile networks are more likely than Wi-Fi to face capacity constraints through to 2035, making additional spectrum critical for enhancing network performance and broader economic value, including with the arrival of 6G.

With a more efficient spectrum use, existing unlicensed bands (2.4 GHz, 5 GHz, and lower 6 GHz) are sufficient to handle future Wi-Fi demand. Shared use approaches that limit power substantially reduce capacity and benefits, while indoor/outdoor usage distinctions lack justification given most mobile traffic originates indoors.

Figure 3
Economic benefits of the three scenarios in nine countries
Proportion of expected GDP in 2035



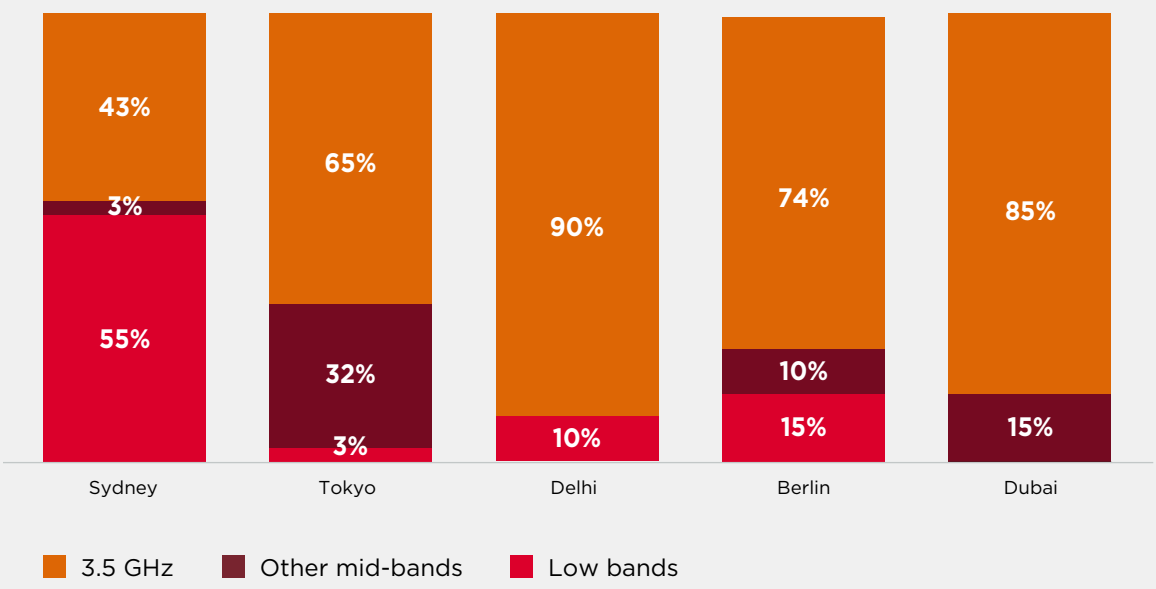
Source: GSMA Intelligence
Note: The results represent the net present value (NPV) of economic benefits over 2023–2035, expressed as a proportion of expected GDP in 2035 for each country. Appendix 1 includes details of the methodology and key assumptions, as well as a sensitivity analysis based on a data traffic approach to measuring demand.

Indoor-outdoor mobile usage

Data from a sample of global cities from SpeedTest Intelligence (provided by Ookla), shows that most mobile use is indoors and largely delivered over mid-band spectrum. In the case of indoor 5G, the majority of traffic is delivered using the 3.5 GHz frequency range.

Trials have shown that 6 GHz can deliver comparable indoor coverage to the 3.5 GHz range. Evidence also suggests the upper 6 GHz band can effectively provide an additional capacity layer in urban areas and meet the majority of indoor and outdoor requirements.

Figure 4
Distribution of 5G indoor mobile scans by spectrum band



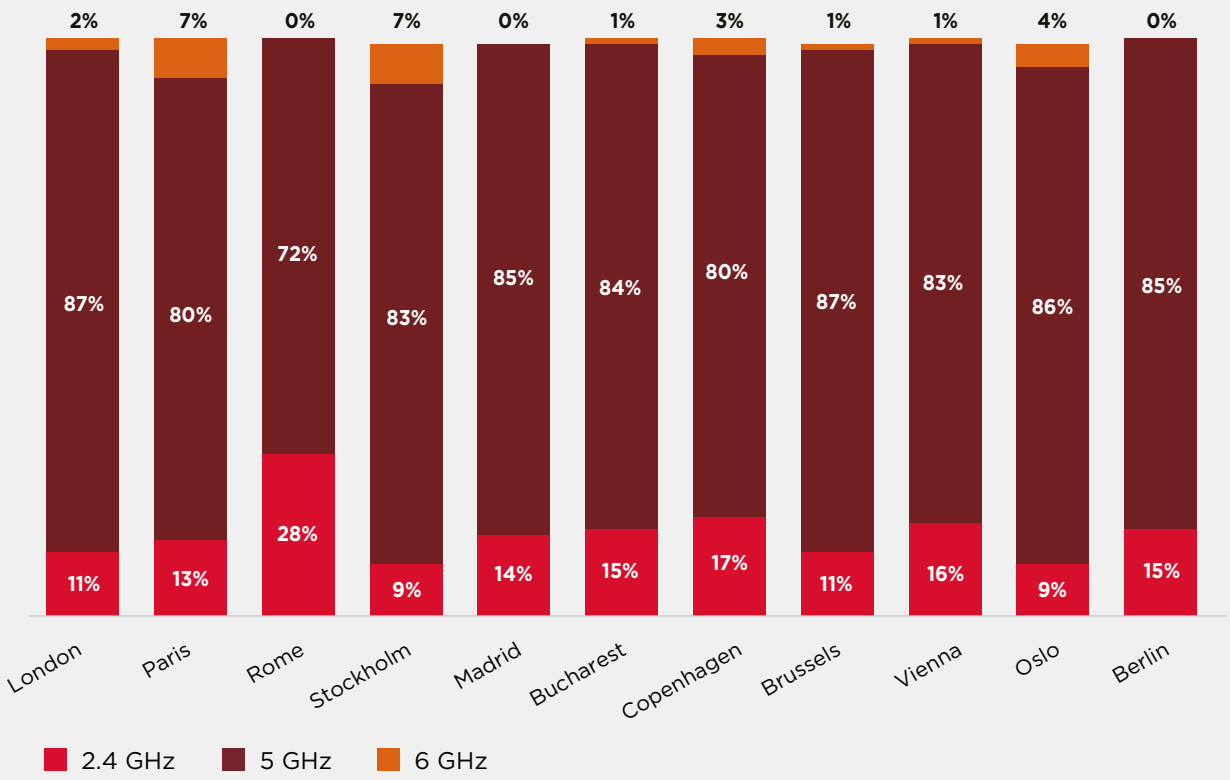
Source: GSMA Intelligence analysis, based on Speedtest Intelligence data provided by Ookla

Note: Low bands refer to frequencies below 1 GHz, while lower mid-bands refer to frequencies between 1 and 3 GHz. The 3.5 GHz range refers to frequencies in the 3.3–4.2 GHz range and excludes mmWave bands.

Europe: clear pathway for Wi-Fi evolution in lower 6 GHz

Data gathered by Ookla across Europe during 2024 and 2025 in 11 European capitals shows that some countries have no connections in the lower 6 GHz band using Wi-Fi 6E technologies while even the highest users only have single-digit percentages of total Wi-Fi connections in the lower 6 GHz. Spectrum in the 2.4 GHz and 5 GHz ranges carry the majority of today's European Wi-Fi traffic, leaving the band 5.925-6.425 GHz open to the future evolution of Wi-Fi technology.

Figure 5
Distribution of Wi-Fi 6/6E scans by band

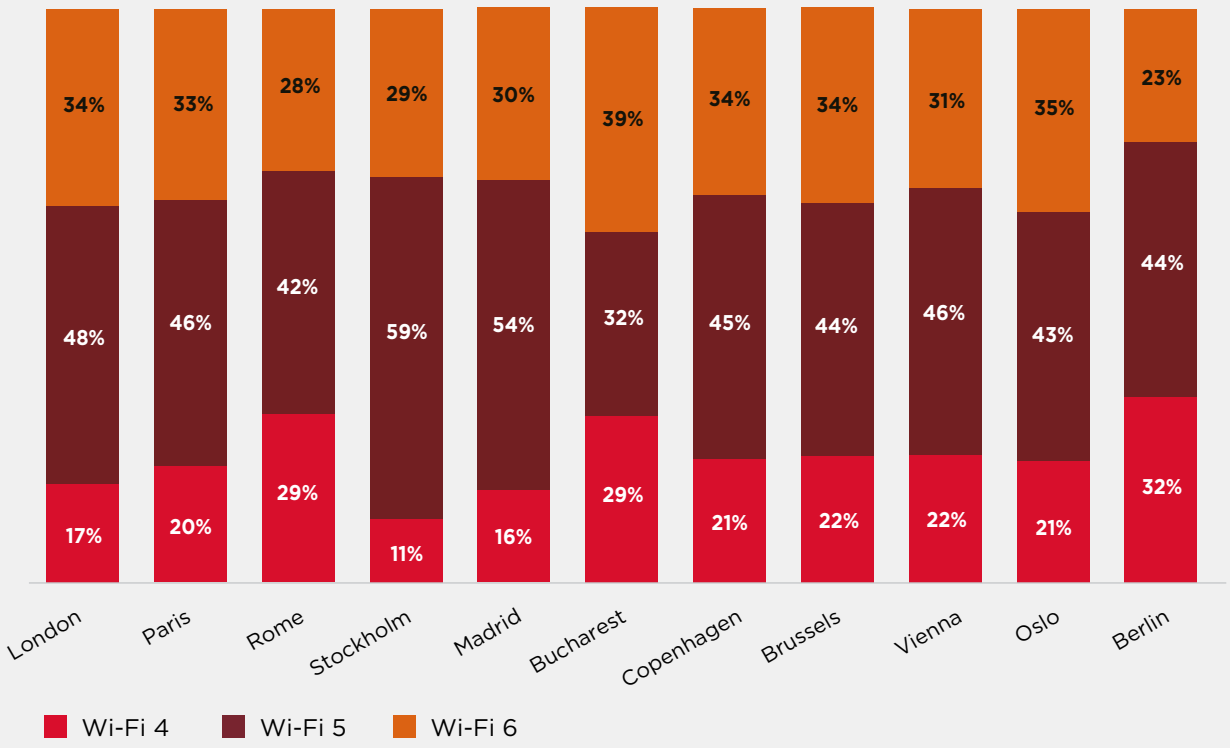


Distribution of Wi-Fi scans by technology

Today, Europe relies on older Wi-Fi technologies, especially as around a third of scans indicate that Wi-Fi 4 is still being used. 11-32% of usage was on Wi-Fi 4 with only 11-32% using the more spectrally efficient Wi-Fi 6 technology

Upgrading to Wi-Fi 6 technology allows for greater efficiency, while optimising indoor deployments (for example, with additional access points, mesh network solutions and using Wi-Fi boosters) can also improve quality.

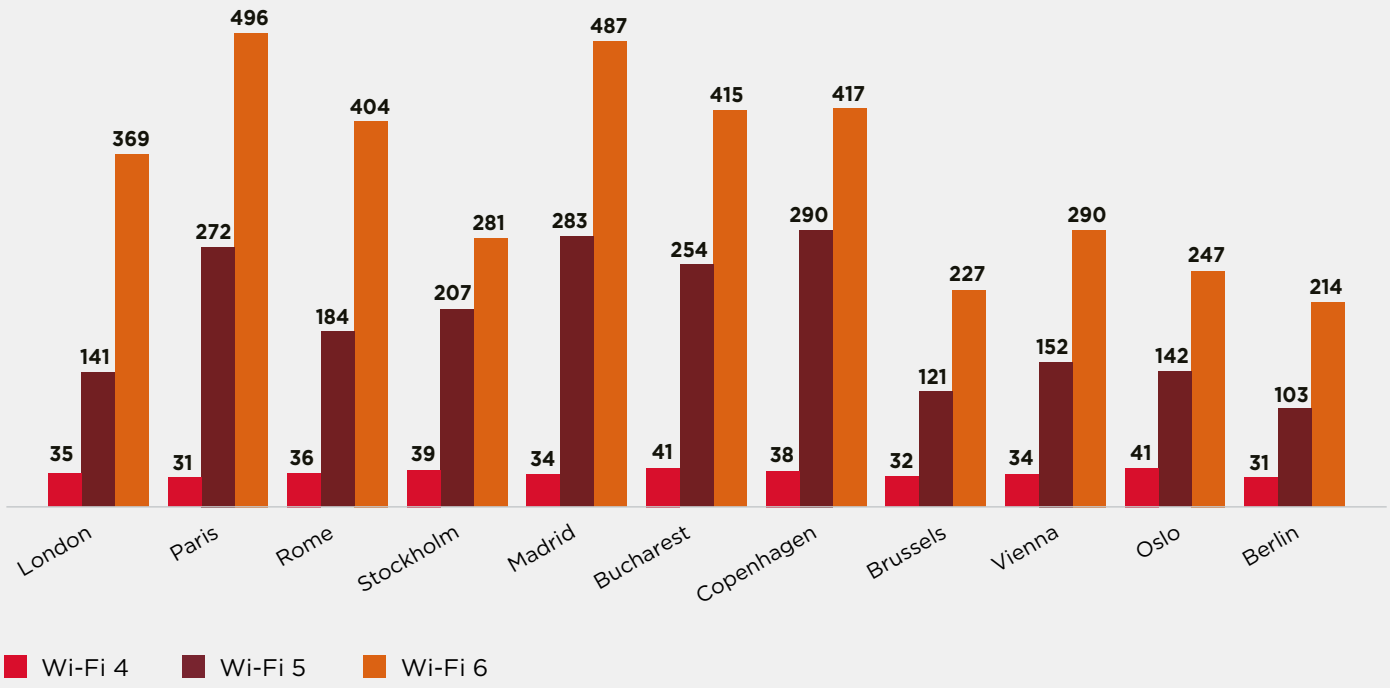
Figure 6
Distribution of Wi-Fi scans by technology



Median Wi-Fi download speeds by technology (Mbps)

Recent data also highlights the impact newer Wi-Fi technologies can have on delivering faster speeds using existing spectrum bands. While the lower 6 GHz band (5.925-6.425 GHz) is a new expansion band for Wi-Fi to evolve into, Wi-Fi 6 today is providing fast user experiences using largely 2.4 GHz and 5 GHz spectrum.

Figure 7
Median Wi-Fi download speeds by technology (Mbps) in 11 European cities



Conclusion

Licensed 6 GHz spectrum can ensure that mobile connectivity will support Europe's digital goals going into the 2030s. With the lower 6 GHz band Wi-Fi allocation, Europe has ensured that spectrum capacity is available for Wi-Fi evolution. It is now time to ensure that mobile is given the same potential with fair and balanced regulation that allows licensed mobile access to the full upper 6 GHz band at 6.425-7.125 GHz.

6 GHz highlights

- Licensed 6 GHz capacity is required to carry the increasing data demand and can support Europe's 6G leadership.
- Spectrum capacity needs for 6G deployments should consider channel sizes of 200-400 MHz.
- Timely availability of licensed upper 6 GHz mobile spectrum, at reasonable conditions and price, will drive cost-efficient network deployment, help lower the broadband usage gap and support digital inclusion.
- There is scope to improve the efficiency of unlicensed Wi-Fi spectrum use, with upgrades from Wi-Fi 4 and Wi-Fi 5 to the latest technologies.
- The lower 6 GHz band is an almost entirely unused space in which Wi-Fi can evolve.
- The full upper 6 GHz (6425-7125 MHz) should be made available to full-power macrocell IMT, without any additional power restrictions or sharing mechanisms.