August 20, 2024

CEPT RSPG

Re: *RSPG Questionnaire on upper 6GHz*

Via e-mail: cnect-RPSG@ec.europa.eu

Dear Representative/s,

Wireless Broadband Alliance (WBA®) is a global organization that connects people with the latest Wi-Fi initiatives. We are here to resolve business issues and enable collaborative opportunities for service providers, enterprises, and cities, enabling them to enhance the customer experience on Wi-Fi and optimize business opportunities that are being built on evolving technology and commercial developments. WBA's mission is to enable collaboration between service providers, technology companies and organizations to achieve broad technology adoption.

WBA appreciates the opportunity to provide comments in response to the Radio Spectrum Policy Group's public consultation questionnaire regarding 6,425 MHz to 7,125 MHz (the upper 6 GHz band).

In accordance with our mission, we have encouraged, sponsored, and monitored various projects around the world being rolled out by our members using Wi-Fi 6E and more recently Wi-Fi 7 equipment.

WBA were supportive of EC's 2021 Spectrum Decision[1] to authorize licence-exempt technologies to be used in the 5945-6425 MHz (the lower 6GHz band) and are also supportive[2] of countries around the world who have or are looking to open the 6425-7125 MHz band (the upper 6 GHz band) for Wi-Fi use. In this regard WBA members have subsequently invested and built an entire ecosystem for Wi-Fi, based on the allocation of the entire 6 GHz band for licence-exempt use, worldwide. In line with the mission of WBA[3] (apart from some general comments) this response is only covering the questions in detail from a perspective of possible Wi-Fi use of the upper 6GHz band.

[1] https://digital-strategy.ec.europa.eu/en/library/6ghz-harmonisation-decision-more-spectrum-available-better-and-faster-wi-fi

[2] Not all the WBA members endorse this position

[3] Not all the WBA members endorse the information provided

WBA would also note that it has members who have interests in both Wi-Fi and IMT technologies and have a variety of views on what the future use of the upper 6GHz band should look like.

l) Explain the demand for MFCN or WAS/RLAN in the upper 6 GHz band before and beyond 2030

- The demand for networks served by both technologies (Wi-Fi and MFCN) will increase in the future and this will present both economic and environmental challenges for industry and governments alike.
- Most of today's wireless traffic is indoor traffic and most of this traffic is carried over Wi-Fi networks connected to Fixed infrastructure, but it should also be noted that most of the outdoor traffic is carried over MFCN networks using IMT technologies.
- Wireless indoor connectivity through both public and private networks plays a critical role in today's digital infrastructure across Europe.
- Across Europe, about 90% of Internet traffic travels via fixed lines and is relayed to end users via Wi-Fi[4]. This trend is set to continue for the rest of this decade and beyond 2030.
- Independent analysis has also confirmed that the volume of traffic carried by Wi-Fi is growing much faster than the volume of traffic carried by mobile networks[5][6].
- It looks like initially the demand for additional spectrum will be for Wi-Fi as fixed-line and Wi-Fi traffic grows rapidly on the back of increased capacity demands for connectivity and use of Wi-Fi based AR/VR/MR and other innovative applications in enterprise, industrial and consumer networks.
- The data throughput combined with the latency capabilities of indoor Wi-Fi networks will be key for the success of AR/VR/MR devices.
- WBA and industry's work on initiatives like Passpoint and OpenRoaming to provide seamless roaming between different independent wireless networks/technologies (indoor/outdoor, public/private) will be essential to the success and scalability when designing cost effective wireless infrastructure and using spectrum effectively and efficiently in the future.
- According to European public mobile operators, between 70–80% of their current network capacity is to provide direct indoor connectivity to their customers from outdoor Macro Base stations.
- Persuading European network operators (public and private) to adopt and provide the capabilities for their users to use Passpoint and OpenRoaming, as a standard feature, will be key to offloading a good percentage of the current indoor traffic on public operator networks to indoor Wi-Fi networks and provide a minimal cost solution to any future demand and capacity problems for public mobile operators in Europe.

[4] Approximately, 92% of fixed broadband traffic in Europe is relayed via Wi-Fi, according to the ASSIA "State of Wi-Fi" report.

[5] Source: Jahresbericht Telekommunikation 2023

[6] Source: https://www.analysysmason.com/research/content/articles/bandwidth-overproduction-crisis-rdns0/

II) Provide information about the sustainability of the above-explained demand, especially the:

1) Environmental impact assessment

- Most Wi-Fi networks operate at low power levels, indeed much lower than cellular systems. This means that in many scenarios, Wi-Fi is the most energy-efficient indoor connectivity option. In particular, the French regulator ARCEP[7] found that the combination of fibre and Wi-Fi is the most efficient solution in terms of energy consumption, performance, and flexibility.
- Wi-Fi provides a highly efficient way to deliver high-speed connectivity indoors. By contrast, outdoor-to-indoor networks need to consume high levels of power to penetrate building walls, particularly for newer, more energy-efficient buildings. Connecting an indoor device to an outdoor base station will use considerably more energy.[8] As the result, stations consume more power and devices batteries need more frequent recharging. In addition, higher consumption of power results in increased battery wear and additional electronic waste.
- Wi-Fi connectivity enables people to fulfil tasks and conduct meetings remotely (including through future VR/AR/MR solutions), reducing energy consumption and emissions related to transportation.
- Widespread use of technologies like Passpoint and OpenRoaming could substantially reduce the overall environmental impact of future networks.

2) Social economic impact

- Wi-Fi boosts GDP growth by providing low-cost broadband access and helping to bridge the digital divide by making the most of whatever backhaul connectivity solution is available. It is also a fundamental building block of the digital economy, allowing organisations to deliver digital services that benefit citizens and fuel economic growth.
- As Wi-Fi allows several individuals to share a single broadband Internet connection, the service becomes more affordable, thereby increasing Internet accessibility and narrowing the digital divide.
- Widespread use of technologies like Passpoint and OpenRoaming could substantially reduce the cost of providing future connectivity to address future indoor capacity hot spot issues for public mobile operators.
- Wi-Fi equipment is currently capable of using the entire 6GHz band (5925-7125MHz) so any delay in access to additional spectrum for Wi-Fi will put Europe at a competitive disadvantage to countries who have enabled access to the full 6GHz band, as well as any potential economic benefits that not opening the band sooner may have accrued.
- The widespread availability of compatible equipment means most Wi-Fi users would see an immediate benefit from licence-exempt access to the entire 6 GHz band.
- The 6 GHz band is important for future enterprise networks to be able to guarantee better level of QoS (including bounded latency) to several users on the same AP.

[7] The digital environmental footprint in France: ADEME and Arcep report to the Government, 19 January 2022. Available online

[8] To provide indoor coverage from outdoor base stations, MFCN has to compensate for the 23dB building entry loss (ITU-R P2109, 30/70 Thermal/Traditional, 50%). As a result, 200 times more power is required to cover indoor than outdoor.

Currently APs in the 2.4/5 GHz bands cannot guarantee the required QoS needed for future users due increased congestion and impacts on Wi-Fi performance in the bands requiring DFS.

- To guarantee the desired scalable throughputs/latency, a minimum number of 80/160 MHz channels need to be available in the 6 GHz band and this will be very important for providing cost effective solutions for the needs of future enterprise networks in Europe.

III) Provide information about:

1) the possible role of the upper 6GHz for MFCN or WAS/RLAN

- On its own, the lower 6 GHz band (5945-6425 MHz) won't provide sufficient spectrum to support the goals of the EU's Gigabit Infrastructure Act and the Digital Decade Policy Programme 2030 for all indoor scenarios.[9] [10]
- In Europe, there are currently only five 160 MHz channels available for licence-exempt usage, two of which are in the 5 GHz band with DFS restrictions and, therefore, mostly unavailable[11].
- In the world's leading economies that have made the full 1200 MHz in the 6 GHz band available, operators have seen significantly reduced congestion and substantial performance increases in networks when deploying Wi-Fi 6E particularly in enterprise networks providing connectivity to universities, stadia, airports and other busy industrial locations.

2) use cases, expected deployments (e.g. number of BS for MFCN) and timeframe

- Fibre speeds are increasing fast. Already today, some EMEA operators are offering fibre broadband with speeds of up to 25 Gbps to residential customers. Governments can only capitalise on the huge investments in fibre by allowing citizens and industry to make use of the tremendous speeds available through latest generation of 6 GHz capable Wi-Fi.
- With access to the 6 GHz band, Wi-Fi 6E and Wi-Fi 7 can support industrial applications, such as factory robots and sensors, AR/VR/MR, healthcare monitors and wireless medical equipment, that have stringent QoS (quality of service) requirements.
- Unlike previous generations of Wi-Fi, Wi-Fi 6/6E and Wi-Fi 7 are based on OFDMA technology and are thereby able to achieve very high QoS levels, particularly in managed networks assuming that sufficient spectrum is available.
- According to Intel[12], AR/VR applications require a minimum throughput of between 400 Mbps to 2.35 Gbps and a maximum streaming interactive latency on the order of 10ms.

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[9] See Gigabit Infrastructure Act at https://digital-strategy.ec.europa.eu/en/policies/gigabit-infrastructure-act; Europe's Digital Decade Policy Programme available at https://digital-strategy.ec.europa.eu/en/policies/europes-digital-decade

[10] https://plumconsulting.co.uk/wpdm-package/mar-2024-wifi-spectrum-requirements/

[11] Also, in practical deployments, smaller channel widths will generally be selected at 5 GHz to give more channel reuse options and accommodate legacy devices.

[12] Source: Spectrum Needs of Wi-Fi 7 paper

IV) Provide information about standardisation and technology impact

- The new Wi-Fi technologies, Wi-Fi 6E and Wi-Fi 7, enable compatible devices to benefit from higher data rates, greater responsiveness, increased capacity, better performance in environments with many connected devices, and higher power efficiency, among other improvements.
- The eighth generation of Wi-Fi technology (Wi-Fi 8) is set to prioritise ultra-high reliability as its key characteristic, as opposed to previous standards, which focused on increasing peak throughput.
- Passpoint and OpenRoaming standards that provide seamless roaming and handoff between different independent wireless networks/technologies (indoor/outdoor, public/private) will substantially improve future wireless connectivity options for all users within the European digital infrastructure

WBA will be happy to engage with the RSPG for any follow up discussions.

Sincerely,

WBA Policy & Regulatory Affairs Work Group

WBA contact: contactus@wballiance.com