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Reference: Public Consultation on the Draft RSPG Opinion on ITU-R World Radiocommunication Conference 2023

Introduction

Meta Platforms Ireland Limited (Meta) appreciates this opportunity to respond to the Public Consultation on the Draft RSPG Opinion on ITU-R World Radiocommunication Conference 2023 (WRC-23). In particular, **Meta emphasizes its view that the preferred approach on the RSPG recommendation to Agenda Item 1.2 on the identification of the 6425-7125 MHz frequency band is Option 2 - "No IMT identification" for the reasons set forth below.**

EU Connectivity Objectives are Best Served with RLANs in the 6 GHz Band

According to the draft RPSG opinion on the ITU-R World Radiocommunication Conference 2023, the RSPG must identify relevant EU policies and law to inform the EU position towards WRC-23.[1] Making the upper 6 GHz spectrum available for unlicensed uses, including RLANs, would be foundational toward the accomplishment of the EU's Digital Decade connectivity objectives. This frequency range, together with the lower 6 GHz spectrum, would create a contiguous 1200MHz block of unlicensed spectrum, with room for multiple neighboring RLANs to simultaneously transfer data over blocks of 160 and 320 MHz without interference. 6 GHz Wi-Fi would also relieve the spectrum saturation that is currently slowing Wi-Fi services operating in the 2.4 GHz and 5 GHz bands.[2] As a result, the low-latency gigabit connectivity that will be necessary to the

[1] *Radio Spectrum Policy Group Draft Opinion*
[2] J.R. Fleish et al., *The Promise of WiFi in the 6 GHz Band* 3-6, 25 (2019).

metaverse and other high-bandwidth applications of the coming decades would be a practical, rather than theoretical, reality.[3]

Moreover, these benefits could be realized rapidly and seamlessly. Because other countries have already opened the entire 6 GHz spectrum to RLANs,[4] devices capable of high-speed 6 GHz RLAN connectivity are already on the market. And because RLANs and similar low-power uses would not interfere with incumbent uses, authorizing their use would not involve retooling any other networking technologies.

By contrast, reserving these frequencies for 5G IMT use would only stall progress toward the EU's objectives. *First*, it is not clear that IMT services would use the 6 GHz spectrum, because expansion within existing IMT priority bands remains incomplete.[5] *Second*, to the extent IMT services use the 6 GHz spectrum, they would be incentivized to divert resources from coverage extension to building out further bandwidth in already-covered areas, driving competition between mobile and fixed services. In other words, allocating this spectrum for IMT would perversely favor slowing the expansion of 5G across harder-to-cover areas in favor of adding capacity in areas already well served by IMT. *Third*, making this spectrum available to IMT requires cannibalizing existing, well-functioning satellite and fixed-link infrastructure, because the full fledged mobile networks cannot coexist with these services. *Fourth* and finally, allocating the upper 6 GHz spectrum to IMT services would preclude the EU from obtaining the additional innovation and investment benefits that are possible from allocating a large block of contiguous spectrum for Wi-Fi. In this regard, Meta notes that the actual quality of service delivered on mobile 5G networks is constrained by the network infrastructure and implementation trade-offs adopted by mobile operators. At this stage, 5G is particularly constrained by the scope of deployment as even widespread outdoor coverage is not expected to be achieved before 2030. Gaining access to the 6GHz band would not change this situation.

Meanwhile, permitting unlicensed operations to use the 6 GHz spectrum would still benefit IMT deployment. If fixed-link incumbents are not displaced by allocating the band to IMT services, for example, then fixed link operators can support and expand backhaul connectivity for 5G networks. Further, expanding Wi-Fi service would support mobile offload from IMT networks, helping mitigate capacity constraints that IMT carriers might experience as well as reducing the environmental footprint of connectivity. As for the goal of ensuring high-speed broadband is built out in rural areas, Wi-Fi can deliver rural broadband with fixed wireless links or satellite broadband connectivity through a

[3] *See* *6 GHz License Exempt: Why the full 1200 MHz and why now?*, Dynamic Spectrum Alliance (2022).
[4] See infra, Global Impacts
[5] *Quarterly Report 15: Status in March 2022* 5, 5G Observatory.

combination of wireless backhaul and local area network deployments. Finally, opening the spectrum to unlicensed applications would allow for more flexibility as technology develops compared with allocating the entire range to IMT uses.

In short, opening the upper 6 GHz spectrum to unlicensed applications such as RLANs would immediately and powerfully advance the EU's Digital Decade goals. Reserving that spectrum for IMT use would likely cause it to lie fallow in the near term, or at most to be used to benefit IMTs in competition against fixed services, with negative effects for diverse and widespread connectivity as well as environmental sustainability for the citizens of Europe.

A Diverse Group of End Users Benefit from the RLAN Access to the Full 6 GHz Band

Beyond facilitating the specific goals set forth in the Digital Decade plan, opening the entire 6 GHz spectrum to RLAN use would support expanded connectivity in the EU, to the benefit of end users, enterprises, and public entities. Internet Service Providers would also benefit because, as end users would benefit from improved fixed connectivity, appetite for faster fiber connectivity would likely grow.

Today, Wi-Fi is approximately sixteen times more spectrum-efficient than mobile; that is, for each megahertz assigned to Wi-Fi, sixteen times more data is delivered to the end user than is delivered for each megahertz assigned to mobile.[6] Accordingly, opening the 6 GHz band to Wi-Fi would multiply Europe's overall broadband Internet capacity.

Additionally, Wi-Fi delivers abundant, high QoS, affordable and reliable communication to end users. Wi-Fi is also environmentally sustainable, in particular by leveraging the low energy consumption properties of fiber networks and communicating wirelessly over short distances. Wi-Fi 6E and 7 provide additional technology improvements in terms of latency and traffic management (capacity) by leveraging clean and wide channels.

Wi-Fi will not only be used for RLANs, but will replace Bluetooth for Personal Area Networks, especially for advanced wearables such as AR/VR headsets. Such headsets must transmit large data rates but operate on very limited activity factors to reduce their energy consumption. Wi-Fi 6E and 7 are particularly efficient for such use cases. Although the 5945-6425MHz band has recently been opened to RLANs, it provides an

[6] In Europe, mobile networks presently operate on over 1 GHz of spectrum and deliver 23.5 EB of data per year, whereas Wi-Fi operates on 538.5 MHz of spectrum and delivers 199 EB of data per year.

insufficient number of clean channels for Wi-Fi 6E -- by opening just the lowest 6GHz band most end users likely would be limited to 80MHz channels, or even down to 40MHz in the context of enterprise uses.

The benefits of opening the upper 6GHz band would include:

- Ability to leverage 160 and 320MHz channels, unlocking the real benefits of Wi-Fi 7,
- Distribution of gigabit connectivity within premises (lower 6GHz does not enable gigabit in a realistic environment),
- Availability of predictable low latency communication, especially with the advent of Wi-Fi 7 on wide channels,
- Supporting the rise of wearables, indoor on LPI and outdoor on VLP, with significant benefits for the whole digital ecosystem, including MNOs.

In summary, opening the upper 6GHz band to RLAN will deliver gigabit connectivity to end users and enable the next computing revolution with the rise of wearables and the Metaverse.

While 5G will be an important part of Europe's digital future, it cannot provide the same kinds of benefits in the 6 GHz range that Wi-Fi can. Adding an IMT allocation to the 6 GHz band delivers meager incremental benefit to IMT because the 6 GHz band would principally support IMT licensees' ability to provide high-capacity service to outdoor users in densely populated areas. But the EU has already satisfied that use case by identifying the 26 GHz band as an EU priority 5G band.

5G in the 3.6 GHz range currently does not support low-latency applications.[7] To achieve this support would require substantial investment in the core network. In short, 5G users would derive much larger benefits from MNOs investing in improving coverage and quality of service applicable to current 5G services, rather than adding an additional upper high-frequency spectrum layer that would be limited to additional capacity situations, in the rare occasions where the capacity in priority bands is exhausted.

MNOs would, of course, stand to benefit from a decision to reserve the upper 6 GHz spectrum for their use. The band would allow them to reduce investments in the medium term by delaying further buildout of resources in existing bands in favor of adding 6 GHz functionality to existing infrastructure. Preventing RLANs from operating in the upper 6 GHz spectrum would also artificially limit the performance of fixed access, and would

[7] Currently, 5G networks are delivering service at approximately 30 ms latency. *Three UK Tops Ookla's 5G Mobile Broadband Speeds Study – H1 2022*, ISPreview (July 11, 2022). Wi-Fi typically delivers service at about 8 ms for 5 GHz and 12 ms for 2.4 GHz. *State of Wi-Fi Reporting*, Assia (2021).

therefore tend to direct traffic over mobile networks, where MNOs enjoy better margins (at a higher cost to end users). Finally, if MNOs own the spectrum, they can establish a connectivity gatekeeper position in relation to enterprises, who would have no choice but to rely on MNOs' services.

RLAN Access to the Full 6 GHz Band Optimizes the Propagation Characteristics of the Band

The 6 GHz spectrum, being a relatively high-frequency range, is suitable for high transfer speeds but suffers from poor propagation. In particular, 6 GHz signals are more attenuated when passing through the walls of buildings ("building loss") than the lower-frequency Wi-Fi ranges in current use (2.4 GHz and 5 GHz).[8] This weak propagation actually represents an advantage for low-power use cases such as RLANs: a 6 GHz signal from such a device will pass outside the building it is extended to cover, and therefore interfere with other signals and networks, less than Wi-Fi signals in the currently authorized license-exempt ranges.[9]

The EU 5G observatory provides valuable insights on whether the upper 6GHz band could support faster and more widespread coverage of 5G, see Figure 2.

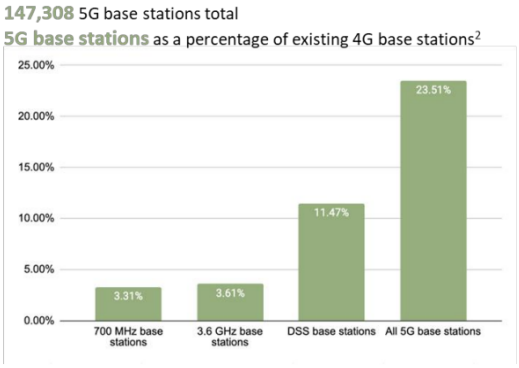


Figure 2: EU 5G deployment per band as of end of year 2021. (DSS = Dynamic Spectrum Sharing)

The observatory clarifies that most base stations upgraded to 5G are actually using 4G spectrum through Dynamic Spectrum Sharing (DSS). This is understandable as 4G spectrum is far superior than 3.6 GHz in terms of coverage. Only 3.6% of existing 4G base stations have been upgraded to support 3.6 GHz.

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[8] Recommendation ITU-R P.2109-1 (2019).

[9] *See Unlicensed Use of the 6 GHz Band: Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz*, U.S. Federal Communications Commission ¶ 100, 107 (2020) ("FCC Order") (noting that "building attenuation is a key factor in minimizing the potential for harmful interference from indoor low-power access points").

The upper 6GHz band has inferior propagation characteristics compared with the 3.6 GHz band, let alone the 4G bands. MNOs provide 5G coverage first in the 700 MHz band and 4G bands, then in the 3.6 GHz band and, in a hypothetical scenario of running out of capacity, would they then be interested in the upper 6GHz band. The upper 6 GHz band would only be relevant from a fraction of the base stations already equipped with 3.6 GHz, i.e. much less than 3% of the 4G base stations. **It is clear, therefore, that the 3.6 GHz band is far from being intensively used, especially from a coverage standpoint, and that the 6 GHz band is even less suitable for 5G massification.**

From Meta's perspective, **it is clear that the upper 6GHz would not increase 5G coverage.** The upper 6GHz could actually have a negative impact on the coverage of 5G as MNOs would redirect some of the investment from 5G coverage bands to the upper 6 GHz band, hence slowing down the progress of 5G coverage.

RLANs Can Best Share the 6 GHz Band with Incumbents

The frequencies in the 6 GHz band are currently used for satellite services and fixed links, including certain high-capacity long-distance links that play critical roles in smart grids and the finance sector. As the EC concluded when opening the lower 6 GHz band to unlicensed use, RLANs are unlikely to interfere with these incumbent uses because they do not create interference over wide areas.[10] However, IMT use of this spectrum for 5G networking would interfere with, and likely preclude, continued service from the existing network infrastructure investments that incumbents have made.[11] Deterministic and statistical studies from Germany confirmed that, in general, the only way for IMT and fixed links to share is to be separated by very large distances. Administrations supporting IMT in Europe increasingly admit that the introduction of IMT in the band would require clearing the band from fixed links[12]. And, studies on satellite coexistence by Saudi Arabia

[10] *Commission Implementing Decision (EU) 2021/1067 of 17 June 2021 on the harmonised use of radio spectrum in the 5945-6425 MHz frequency band for the implementation of wireless access systems including radio local area networks (WAS/RLANs)*, 2021 O.J. (L 232) 232/2; FCC Order ¶¶ 112-72 (analyzing various studies and concluding that low-power, indoor unlicensed use of the 6 GHz spectrum did not pose a meaningful risk of interference with incumbent uses); R. Fleish et al., *The Promise of WiFi in the 6 GHz Band* 24-25 (2019). Coexistence of Wi-Fi with satellite and fixed links in the 6GHz band has been extensively studied in ECC Report 302 and ECC Report 316, leading to the coexistence sharing framework established in ECC Decision (20)01.

[11] Regulators have issued studies investigating coexistence between IMT and incumbent systems, but these studies were unable to clearly conclude that 5G deployment is feasible—even though they assumed a very limited deployment in terms of total number of IMT base stations, base station power, and positioning of base stations. Rep. ITU-R S.2357-0 at 15; *see, e.g., Sharing and compatibility studies of IMT systems with FSS satellites in the frequency band 6,425-7,075 MHz*, GSOA (2022); Pastukh et al., *Sharing Studies between 5G IoT Networks and Fixed Service in the 6425-7125 MHz Band with Monte Carlo Simulation Analysis*, Sensors 22, 1587 (2022).

[12] During the GSMA's '5G Spectrum Needs: Vision 2030' event, the Head of International Affairs at ANFR (l'Agence Nationale des Fréquences) clearly states that fixed links can be moved and that the band will be seen in the context of 6G. See https://youtu.be/5YfNzgEzaaQ at 30' onwards.

and the Global Satellite Operators Association (GSOA) conclude that IMT deployment would lead to significant interference to satellites. A study by Globalstar indicates that IMT deployment would need to be restricted between 40 and 180 km around a satellite earth station to avoid interference. These results were derived under the assumption that IMT would have an extremely limited deployment in the band, per ITU WP 5D assumptions. Such deployment would bring minimal benefits to end users, as the frequency band would be sparsely and sub-optimally used with significant resulting constraints for the IMT service. Any more successful IMT deployment would undoubtedly lead to interference with satellites. On the other hand, RLANs, Satellite, Fixed Links and Radio-Astronomy[13] can not only share, but also flourish in the band without unduly restricting each other.

Sharing the same spectrum is only beneficial to the extent the constraints necessary to support sharing do not impair the functionality of the services involved. Some studies have proposed a sort of geographical "sharing" between 5G services and 6 GHz incumbents, but in effect, this would just be a mechanism to reallocate the band by allocating specific geographical areas either to fixed uses, or to mobile IMT operations. The presence of 5G facilities in a given area would still exclude incumbents, and vice versa.

Likewise, sharing spectrum between mobile networks outside buildings and Wi-Fi within buildings could prove challenging, at least in urban areas where both systems would require very dense deployment and very high quality of service. License-exempt devices such as 5G NR-U and Wi-Fi have embedded technical mechanisms to effectively share bandwidth, but wide area 5G networks are designed to operate on exclusive spectrum. More advanced sharing mechanisms exist—for example, database-driven dynamic spectrum access—but requiring their use to facilitate 5G overlap in the upper 6 GHz spectrum could have profound implications for the market; it may inhibit or prevent the adoption of new technology due to the difficulty of predicting spectrum availability at the user's location, and by preventing harmonization with the global ecosystem. At bottom, Wi-Fi is a mass-market opportunity. Saddling a mass-market ecosystem with localized 5G deployments frustrates the scale economies necessary to deliver a cost-effective product to consumers and businesses and constrains the European Union's ability to realize the benefits of investment, innovation, and competitive entry that unlicensed spectrum can offer.

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[13] Studies related to sharing with Radio-Astronomy are under way in the European Conference of Postal and Telecommunications Administrations (CEPT). While it is too early to identify conclusions, it seems that the risk of interference from Wi-Fi to Radio-Astronomy would be limited for LPI and restricted to a geographical area around the observation sites for VLP. A number of regulatory measures can be discussed to guarantee the protection of radio-astronomy without overly restricting the usability of the band for Wi-Fi.

IMT Identification Is Unnecessary and Would Eliminate Flexibility Within the 6 GHz Spectrum

While IMT proponents suggest that an IMT identification increases flexibility at a national level, experience suggests the polar opposite. The IMT identification of a band significantly compromises the prospect for any other service to operate in the band in the long term. This in turn prevents new investment and innovation for these services.

An IMT identification is sure to be interpreted as a strong sign that the band should be licensed to MNOs, irrespective of any decision taken by Europe. For example, the IMT identification of the 66-71 GHz band by the WRC-19[14] created a move to license that band to such a degree that, despite its designation for unlicensed use in the EU, the band is still not harmonized and opened to license-exempt devices even within the EU, two years after the decision implementation date.[15] There is today no certainty that the 66-71 GHz band will ever be open to license-exempt devices in many countries, due to the confusion, uncertainty and lack of clarity triggered by the IMT identification of the band by the WRC-19. To date, there has still never been a single IMT deployment in this band.

Meanwhile, Europe has demonstrated that an IMT identification is not necessary for a successful IMT deployment. The 3400-3800 MHz band is a European 5G success story despite the lack of IMT identification in the 3600-3800 MHz range. This experience shows that harmonization on a single-market basis is sufficient to guarantee IMT equipment availability.

The 6 GHz Question Is a Matter Of Core EU Policy

Europe must recognize that the question of how to deploy connectivity in the upper 6 GHz band is a strategic decision impacting EU's key objectives with far-reaching societal consequences that must take priority over narrow spectrum-management considerations. The decision will undoubtedly have a large impact on the terminals ecosystem and, of course, on the single market. It will directly enable Europe to achieve its policy goals related to the digital decade, or prevent them from being achieved. It will either favor or impede sustainable connectivity to help enterprises and end users in their green transition.

To date, countries representing a large share of the world's GDP have already opened the

[14] WRC Resolution 241 (WRC-19).
[15] *See* Commission Implementing Decision (EU) 2022/180 L 29/35 (2022).

entire 6 GHz spectrum to unlicensed use.[16] If the EU joins these countries, which include important EU trade and political partners, it is likely that near-total global harmonization of 6 GHz spectrum policy will follow, with concomitant "benefits for the availability of affordable and high-quality equipment, interoperability of services, and more efficient usage of spectrum in the EU single market."[17] By contrast, allocating the upper 6 GHz spectrum to IMT services would tend to fragment the market for network equipment and align EU member states with the network ecosystems of economies that rely on a greater degree of national planning and lesser degrees of bottom-up innovation and investment. The drawbacks to end users in terms of affordability, choice, and travel usability of both Wi-Fi and IMT devices would be staggering while severely impacting Europe's digital sovereignty. Such alignment would likely hold into later generations of IMT such as 6G, given services' practice of reusing frequencies.[18]

Further ramifications of allocating the upper 6 GHz spectrum to IMT use cases include the likelihood that this allocation would undercut the development of already-allocated IMT spectrum along EU borders. While the EU has allocated the 3.6 GHz spectrum for IMT usage, some of its immediate neighbors have not. Because wireless signals can travel across national boundaries, EU border states must seek cooperation from neighboring countries to implement EU wireless policy. However, opening a broad new band for 5G development would weaken EU member states' negotiating hand when seeking cooperation on 3.6 GHz development; neighboring countries would likely push the EU to focus on 6 GHz IMT and be less cooperative on 3.4 GHz, complicating EU realization of 3.6 GHz as a priority band. The result, again, would be a challenge to the EU's digital sovereignty along its borders.

In summary, the EU's decision has the potential to impact connectivity, availability, affordability, sustainability, and independence.

Reserving 6 GHz for 6G Is Not a Defensible Policy Proposal

Some IMT proponents have suggested considering the upper 6 GHz band as a candidate band for 6G. Initially, such proposals are not supported by ITU compatibility studies, which are based on a limited 5G deployment. Even supposing 6G were to have the same characteristics as 5G, any large scale 6G deployment would then interfere with incumbent services. Countries proposing the upper 6 GHz band to become EU priority band for 6G should also admit that they intend to remove any existing satellite and fixed

[16] *Countries Enabling Wi-Fi 6E*, Wi-Fi Alliance.
[17] Call for evidence – Ares(2022)4716032 (June 28, 2022)
[18] *Commission Implementing Decision (EU) 2022/173*, 2022 O.J. L. 28/30 (discussing Europe's plan to ensure that "all bands already harmonized for mobile networks are fit for 5G use, including the . . . 1,800 MHz frequency band[]").

link from the band to fully refarm the band for IMT use.

Irrespective of the existential threat to existing systems, it is completely premature to identify and reserve a band for 6G when 6G's spectrum requirements are not defined and will not be realized for another decade. Proposing not to use the 6 GHz band for the next 10 years simply as a cautionary measure would be wholly unreasonable, particularly in view of the connectivity benefits that Wi-Fi can immediately deliver. The upper 6 GHz band is also likely to be inadequate for 6G, as 6G is likely to have different spectrum requirements than 5G.

Finally, as discussed more fully in previous sections, identifying the upper 6 GHz spectrum for IMT would take EU policy out of alignment with other major markets' spectrum policies, potentially complicating EU citizens' access to products produced for other Western markets. It would also not prevent further 6G spectrum discussions in Europe, as 6G proponents would look for an additional globally harmonized band to avoid supply chain difficulties.

In conclusion:

- Supporting NOC directly supports the EU connectivity objectives and the EU Green transition,
- The 6425-7125 MHz has inferior propagation compared with the 3.6 GHz band which is still practically unused in Europe (3.6% of 4G base stations equipped),
- Successful IMT deployment cannot share the band with satellite and fixed links. Sharing would require stringent limitations to IMT deployments, ultimately preventing any significant connectivity benefit to end users.
- Flexibility in the future use of the band is best achieved by supporting NOC.
- All data published by regulators clearly indicates that the best spectrum use is achieved by RLAN. This relevance will only grow as fiber reaches out more and more premises in the coming years.

The RSPG must take EU policy, in particular the digital and green transition, into account and therefore cannot support an IMT identification of the upper 6 GHz band. Should the RSPG not be ready to make a decision on the best long-term use of the band, it should strongly support NOC in the band - i.e. oppose an IMT identification - to maintain flexibility in the future use of the band.

The RSPG is invited to find additional technical, economical and regulatory clarification in Meta's recent contribution to the EU call for evidence on WRC-23.

Respectfully submitted,

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