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July 26, 2022

DG CNECT- Unit B4
European Commission

Re: World Radiocommunication Conference 2023 – EU position. Ref. Ares(2022)4716032 - 28/06/2022

Dear Sir/Madam,

The Dynamic Spectrum Alliance ("DSA")[1] appreciates the opportunity to provide comments to the European Commission ("Commission") regarding the EU Position on the 6425-7025 MHz and 7025-7125 MHz frequency bands ("6 GHz band") under Agenda Item 1.2 of the World Radiocommunication Conference 2023 ("WRC-23").

Connectivity goals of the Digital Decade

In the *Practical need for EU action* section of the reference document, the Commission states that "*The revision of the RRs at the WRC-23 may affect EU policies and law*" and lists as an example "*achieving the gigabit connectivity targets for people and businesses (through potential allocation of additional spectrum around 6 GHz for mobile/5G services, taking into account the current uses of this spectrum)*".

The DSA believes that the best way to achieve the gigabit connectivity targets for residents and businesses in Europe is through a holistic approach that would require recognizing and equally encouraging all the gigabit technologies that will be required in the EU in the next decade, including 5G, but also fibre, coax cable, satellite, fixed wireless access, and the latest generations

[1] The DSA is a global, cross-industry, not for profit organization advocating for laws, regulations, and economic best practices that will lead to more efficient utilization of spectrum, fostering innovation and affordable connectivity for all. We advocate for policies that promote unlicensed and dynamic access to spectrum to unleash economic growth and innovation. Additionally, we advocate for a variety of technologies that allow spectrum sharing enhancing broadband access. Our membership spans multinationals, small-and medium-sized enterprises, as well as academic, research and other organizations from around the world. A full list of DSA members is available on the DSA's website at www.dynamicspectrumalliance.org/members.

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of license-exempt technologies such as Wire Access Systems / Radio Local Area ("WAS/RLAN") Networks, of which Wi-Fi is an example. An approach to connectivity that exclusively focuses on 5G but that is silent on other gigabit broadband access technologies which can highly contribute to the availability of affordable and innovative services in the EU, does not fully recognize Europe's digital future. Particularly, such an approach does not consider the need for in-house, in-office or in-company connectivity which however is a necessary complement to the connectivity up to the network termination point.

We therefore strongly recommend that DG CNECT uses this opportunity of developing a recommendation for the EU position on the upper 6 GHz band at WRC-23 to more broadly consider the role played by different technologies, such as fibre, satellite, Wi-Fi, etc., as part of a diversified broadband ecosystem that can meet gigabit connectivity targets. **Such an approach would be essential to ensure an effective implementation of the guiding European principle of technology neutrality**.

One of the Digital Decade's 2030 connectivity targets is that "All EU households have gigabit connectivity"[2]. WAS/RLAN technologies are the cornerstone of gigabit connectivity in Europe. Today, as broadband speeds available to residential users are gradually increasing towards that goal, the link from a Wi-Fi access point to a user's Wi-Fi enabled device can develop into a bottleneck. It means that end users cannot benefit from such gigabit infrastructure without adequate local connectivity, which means WAS/RLAN resourced with an appropriate amount of spectrum. This is particularly apparent in households and enterprises where there are multiple users, each operating multiple Wi-Fi enabled devices at the same time. This trend became more evident globally during the time of the COVID pandemic. As parents worked from home and children studied remotely, there were often multiple video conference applications active on multiple devices concurrently.

In addition, while mobile/5G service is of key importance for the digitization of society, it does not and cannot function in a vacuum. The devices that leverage 5G also require different accompanying connectivity technologies. Smartphones typically do not only rely on mobile networks, but typically include many wireless technologies such as Wi-Fi, Bluetooth, GPS and Near-Field Communications and operate in an "always best connected" mode. External studies have also demonstrated that enterprise Wi-Fi deployments take a prominent role in enterprise

[2] *See* https://futurium.ec.europa.eu/en/digital-compass/digital-infrastructures

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offices, warehouses, factories, and similar sites, and will coexist with both public and private 5G, as well as various other wireless and fibre/fixed connectivity modes.[3]

Thanks to its low cost and easy deployment, Wi-Fi is thus a perfect complement to fibre and 5G and a main contributor to ensuring that the promise of digitalization reaches all Europeans, especially citizens and small businesses such as start-ups and SMEs[4]. Wi-Fi and 5G are in essence complementary technologies, both necessary to provide European citizens the wireless experience expected in a truly digital gigabit society.

Yet, Studies, such as the ASSIA study on Wi-Fi[5] and its DSA companion whitepaper[6] on the consequences of the report's findings, demonstrate that Europe is facing a severe Wi-Fi spectrum crunch in years to come, significantly sooner than 2030. **Indoor connectivity carries the vast majority of internet traffic[7]** and Europe currently has no spectrum strategy to respond to this connectivity challenge. Wi-Fi is by far the main wireless connectivity mean for EU citizens and businesses and they should not experience a connectivity "bottleneck" because not enough spectrum is dedicated to handle the current and future demand and to enable the innovative use cases that require larger channels with additional bandwidth.

There is an insufficient amount of spectrum in the 5 GHz band in Europe to meet forecasted demand for licence-exempt Wi-Fi access as most sub-bands are either not available on a European-wide basis or come with significant restrictions attached to protect incumbents. Even the additional 480 MHz recently opened in the 6 GHz band will not be able to fully satisfy the future demand for local wireless connectivity capacity. In acknowledgment of this demand, Europe should open the 6425-7125 MHz band for technology-neutral licence-exempt use by Wi-Fi 6E, Wi-Fi 7, 5G NR-U that can share the band with other technologies.

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[3] *See, e.g.* "Revisiting Wireless Internet Connectivity: 5G vs Wi-Fi 6 - ScienceDirect" and "Enterprise wi-fi 6/7 is here to stay: 5G is not enough (stlpartners.com)"

[4] See "Open Letter to European Union Institutions: Ensuring Wi-Fi Connectivity in an Innovative and Truly Connected European Gigabit Society", available online at: http://dynamicspectrumalliance.org/wp-content/uploads/2021/11/20211129-Open-Letter-to-EU-Institutions.pdf

[5] ASSIA "State of Wi-Fi" report, http://dynamicspectrumalliance.org/wp-content/uploads/2021/06/ASSIA-DSA-Summit-Presentation-v7.8.pdf.

[6] Lessons from the Assia Report on "Wi-Fi and Broadband Data", http://dynamicspectrumalliance.org/wp-content/uploads/2021/11/Lessons-from-the-Assia-Report-on-Wi-Fi-and-Broadband-Data.pdf.

[7] How do Europeans connect to the Internet, http://dynamicspectrumalliance.org/wp-content/uploads/2022/06/DSA-WhitePaper-How-do-Europeans-connect-to-the-Internet.pdf

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The current standard Wi-Fi 6E and future standard Wi-Fi 7 provide gigabit speeds and very low latencies, being able to boost innovative applications based on other networks (such as 5G, 6G, satellite or fibre). One example that illustrates the need to enable Wi-Fi and 5G altogether is Augmented Reality and Virtual Reality ("AR/VR"). Advanced AR/VR systems, when on the go, will use both a Wi-Fi 6E/7 link to connect the headset with a computing device (usually a smartphone) and a 5G connection to the internet. The Wi-Fi link is essential to allow light AR/VR headsets, and such headsets in turn can contribute to 5G revenues and therefore support 5G investments.

When it comes to the ambition to leverage 5G in Europe, we are convinced that the identification of the 6425-7125 MHz band for IMT will not fulfil that purpose. Currently, this band is widely used by fixed services and fixed satellite services. If Europe would support IMT identification in the upper 6 GHz band under Agenda Item 1.2 at WRC-23 and ITU Region 1 were to identify the band for IMT, there is a danger that Europe would be left trailing behind other parts of the world in terms of broadband connectivity and innovation. Whereas the Wi-Fi ecosystem has already certified hundreds of devices that can operate across the 5925-7125 MHz band and the market has already seen large Wi-Fi 6E deployments, the IMT ecosystem would have to invest considerable time and resources to develop and deploy compatible devices in the 6 GHz band, following lengthy and complex licence assignment processes.

Currently, European mobile network operators ("MNOs") greatly benefit from Wi-Fi's capacity to offload traffic from cellular mobile devices; if this capacity were not available, IMT/5G networks would be more costly, as mobile operators would need to deploy many more small cells in dense urban areas to offer gigabit throughput and provide adequate quality of service, and this would be to mobile users only. Because of the attenuation of signals from outdoor 5G base stations (building entry loss), 5G indoor coverage and performance would be severely limited. Providing 5G gigabit connectivity indoors would require the deployment of a completely new infrastructure, parallel to the existing Wi-Fi one which will be prohibitive from both a commercial and an environmental point of view.

Implications on EU Green transition plans

EU Position on WRC-23 Agenda Item 1.2 covering the upper 6 GHz frequency band will significantly contribute to the European Green transition plans. The Dynamic Spectrum Alliance highlights the importance of having adequate and sufficient harmonized spectrum for the development of wireless services in the EU, including those particularly well positioned to help combat climate change.

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A recent report published by ARCEP[8] highlights that 70-80% of the network emissions are due to the access network and that fibre networks are ten times more effective than mobile networks to deliver data in an energy efficient manner. In the same vein, a study comparing, amongst other things, the energy efficiency of 5G Fixed Wireless Access (FWA) and pure fibre deployments in Sweden[9], concludes that FWA solutions have significantly higher levels of energy consumption than the pure fibre-based solution. This is particularly relevant for the 6 GHz band which, if identified for IMT would require MNOs to increase transmission power to compensate for the increased propagation loss resulting from the higher operating frequency and the base station antenna placement below rooftop.

Against this evidence, regulators can positively contribute to reduced emissions by promoting an energy-efficient mix of technologies, with 5G networks where mobility is needed and fibre networks as the first connectivity option otherwise. Given that the primary way to connect to fibre networks is via a Wi-Fi connection, a combination of full-fibre and energy-efficient Wi-Fi technologies such as Wi-Fi 6E and Wi-Fi 7 represents the greenest way to connect indoors (Analysis Mason, June 2020).[10]

But this is not to say that the EU should consider a scenario where IMT is identified for outdoor use at WRC-23 for the upper 6 GHz band, under the assumption that WAS/RLAN can be made available for indoor use, subsequently, through the process initiated in SE-45. At the EIRP levels required for outdoor IMT macro cells to operate in the upper 6 GHz band, outside of the harmful interference caused to incumbent operations in the band, the licensed IMT signal would overwhelm both the license-exempt Low Power Indoor ("LPI") devices and the license-exempt Very Low Power ("VLP") devices operating in the vicinity.

The ITU has forecast[11] that the energy used by mobile networks around the globe will emit 73.0 Mt CO2 equivalent (CO2e) in 2025, compared with 35.2 Mt CO2e for fixed networks. Considering the share of mobile data and fixed broadband lines in Europe, around 4.8 Mt CO2e will be emitted

[8] Achieving Digital Sustainability Report, https://en.arcep.fr/uploads/tx_gspublication/achieving-digital-sustainability-report-dec2020.pdf

[9] Li, Jie; Forzati, Marco. Conference Paper 'Cost, performance and energy consumption of 5G fixed wireless access versus pure fiber-based broadband in Sweden' ITS Online Event, 14-17 June 2020.

[10] "A combination of full-fibre and low-power-mode Wi-Fi 6 represents a more efficient and a greener way to connect wirelessly in the indoor environment than mobile" (Analysys Mason Full fibre access as strategic infrastructure: strengthening public policy for Europe, June 2020).

[11] ITU, Greenhouse gas emissions trajectories for the information and communication technology sector compatible with the UNFCCC Paris Agreement, 2020.

from fixed networks and 10 Mt CO2e from mobile networks in the EU. That suggests fixed networks produce less than half the CO2e of mobile networks, even though they transport more than ten times the amount of data.

Opening the 6425-7125 MHz band to license-exempt access by WAS/RLAN devices rather than identifying it to IMT in Europe, under Agenda Item 1.2. would have additional environmental benefits which we recommend be taken into account[12].

Spectrum needs

The need for the upper 6 GHz band to be identified for 5G is speculative at best. Today, Europe's 5G networks are operating well below capacity. A study of mobile data usage in 2021 found that, even in the top 5 percent busiest sectors, 5G traffic is running at only 7.7 percent of capacity on average[13]. Importantly, large amounts of spectrum that has been identified for 5G IMT has not been assigned. The main priority in Europe should be to encourage assignment by member states of those frequencies that are already identified for IMT and to increase usage of assigned bands. A recent report prepared for the Commission on gigabit broadband investment identifies some more fundamental challenges. There is a section entitled, "Except for smart cities, 5G deployment is not today in investors' radar".[14] MNOs should be making investments to build out gigabit networks on currently allocated bands for 5G rather than spend money to acquire additional spectrum licenses for spectrum that most likely be warehoused for years.

The DSA believes it is important for the Commission and the mobile network operators to spend their energies focusing the best means for investing and deploying 5G throughout Europe to meet the 2030 Digital Decade target. An IMT identification in upper 6 GHz band would lead to incumbents having to relocate to other spectrum bands and foreclose the possibility of WAS/RLAN sharing the band with incumbents. If the upper 6 GHz band is identified for IMT, it

[12] DSA Response to RSPG consultation on the role of spectrum in climate change, available at http://dynamicspectrumalliance.org/wp-content/uploads/2021/09/DSA-response-to-RSPG-consultation-on-role-of-spectrum-in-climate-change.pdf

[13] Analysis based on the 82 5G networks considered in EU27 by Rewheel reseach's study *"Mobile data usage in 2021 and 4G & 5G operator capacity potential"*, published in March 2022. https://research.rewheel.fi/downloads/Mobile_data_usage_2021_capacity_potential_170_operators_50_countries_PUBLIC_VERSION.pdf (last visited 15 July 2022).

[14] European Commission, Investing in local and regional Gigabit broadband deployment: Opportunities and challenges for market investors in the EU, (prepared by Visionary Analytics, CBO Consulting, and Idate Digiworld), March 2022. A study on investing in local and regional Gigabit broadband deployment: Opportunities and challenges for market investors in the EU | Shaping Europe's digital future (europa.eu)

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will lead to the band lying fallow, where it could otherwise be put to good use by incumbents and WAS/RLANs in supporting Digital Decade goals.

Conclusion

The Dynamic Spectrum Alliance respectfully asks the European Commission to adopt a "No Change" position on the WRC-23 Agenda Item 1.2 for the 6425-7125 MHz band. Incumbents have indicated that IMT use of the band 6425-7125 MHz would not be compatible with current and future satellite use of the band. Even more importantly, a possible IMT identification in the 6 GHz band would undermine the possibility for European citizens and enterprises to enjoy the socio-economic benefits that license-exempt technologies, such as Wi-Fi 6E and Wi-Fi 7, will deliver. Also, a possible IMT identification of the 6 GHz would be questionable from a sustainability perspective. And in any event, no global IMT harmonization is expected for the 6 GHz band because it is under study only in ITU Region 1 and several administrations in the three ITU regions have decided to enable license-exempt access to the entire band instead of identifying it for IMT.

Regarding the 6425-7125 MHz band, under study in Agenda Item 1.2, Europe should follow the principle of technology neutrality, take into account its green transition goals, and prioritise the interest of consumers and end users, which in this particular case clearly benefit more from incumbent services in the band and Wi-Fi than from IMT.

Respectfully submitted,

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