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VIA ELECTRONIC FILING
CNECT-RSPG@ec.europa.eu

Re: Radio Spectrum Policy Group Opinion on the ITU-R World Radiocommunication Conference 2023, RSPG22-014 FINAL

Dear Radio Spectrum Policy Group Secretariat,

Wi-Fi Alliance commends the Radio Spectrum Policy Group ("RSPG") on its ongoing work in the area of European spectrum planning. The RSPG Opinion on the 2023 World Radiocommunication Conference (WRC-23) will inform and support the EU and its Member States preparations for the WRC-23.

Wi-Fi Alliance is a global, non-profit industry association of over 850 leading companies from dozens of countries devoted to seamless interoperability. With technology development, market building, and regulatory programs, Wi-Fi Alliance has enabled widespread adoption of Wi-Fi worldwide, certifying thousands of Wi-Fi products each year. Wi-Fi Alliance welcomes the opportunity to comment on this RSPG Opinion ("RSPG Opinion") concerning the WRC-23 Agenda Item 1.2 (6 425- 7 125 MHz) – Section 4.1.

Comments of Wi-Fi Alliance on the RSPG Opinion Concerning
WRC-23 Agenda Item 1.2 (6 425-7 125 MHz)

Wi-Fi Alliance shares the RSPG view that a future European policy strategy on 6 425-7 125 MHz should be based on a consideration of a number of questions regarding the best spectrum use for Europe. [1/] In this regard, Wi-Fi Alliance respectfully asks the RSPG to take in to account the following points:

Point #1 -- Wireless Access Systems including Radio Local Area Networks (WAS/RLANs) using Wi-Fi standards have become increasingly important in connecting people and devices across Europe and worldwide.

Hundreds of millions of people rely on Wi-Fi to connect billions of devices every day, and studies show this is increasing rapidly.[2/] In fact, Wi-Fi devices are now the primary means by which Europeans connect to the Internet.[3/] This central role will only increase in the future, because Wi-Fi technology is an essential complement to Fifth Generation wireless ("5G") networks. From 2G to 3G, from 3G to 4G and now moving to 5G, the dependence of cellular networks on Wi-Fi offload continues to increase. Wi-Fi's integral role in achieving Europe's connectivity objectives is appropriately recognized in the European Commission's 2030

1/ RSPG Opinion, Section 4.1.1 Link with EU policies, page 7

2/ *See Wi-Fi Celebrates 20 Years with More Than 20 Billion Anticipated Device Shipments over the Next Six Years*, ABI Research (Jun. 13, 2019) available at: https://www.abiresearch.com/press/wi-fi-celebrates-20-years-more-20-billion-anticipated-device-shipments-over-next-six-years/

3/ *See* CISCO, *Annual Internet Report Highlights Tool*, http://www.cisco.com/c/m/en_us/solutions/service-provider/vni-forecast-highlights.html (select "Rest of Western Europe" from the "Western Europe" drop-down menu and select "Devices/Connections and Applications" ("CISCO VNI") and check "Devices/Connection and Applications"). According to VNI, in Western Europe, there will be 2.8 billion wired/Wi-Fi connected devices by 2023, up from 1.6 billion in 2018 (11.1% CAGR).

Digital Compass: the European way for the Digital Decade, which underscores that the gigabit connectivity in the European digital transition requires Wi-Fi functionality. Importantly, Wi-Fi-enabled connectivity delivers billions of euros in economic value to the European consumers and enterprises. Indeed, a recent study by Telecom Advisory Services found that Wi-Fi generated over €406 billion for the EU economy in 2021, a number expected to grow to €565 billion by 2025.[4/]

As explained below, the 6 425-7 125 MHz frequency band ("upper 6 GHz band") is uniquely suited to deliver these connectivity benefits to the European consumers and business. Already, the upper 6 GHz band has been made available in several countries (representing more than 31% of the global GDP) on a license-exempt basis for Wi-Fi, and a range of low-cost, low-power equipment, capable of high data speeds is increasingly available as a result. Such equipment could support a wide variety of uses, achieving EU's communication policy objectives without disrupting important incumbent operations in the upper 6 GHz band.

Point #2 -- Growing demand for Wi-Fi connectivity is driving the need for WAS/RLAN access to 6 425-7 125 MHz frequency band while IMT spectrum needs are questionable.

As the RSPG is aware, with extensive fiber deployments under the Gigabit Society initiative, the average data traffic volumes in Europe are increasing at over 20% per year. Considering that most of this connectivity and data traffic is distributed over Wi-Fi, it is expected that requirements on Wi-Fi will increase correspondingly (i.e., ~20% per year). In fact, forecasts estimate a three-fold increase in broadband data traffic over 2020-2025 period.[5]

Ever increasing data traffic volumes combined with expanding performance requirements and a growing number of devices continue to drive Wi-Fi spectrum needs. Wi-Fi Alliance commends the recent decision that partially mitigated Wi-Fi spectrum shortfall by allowing Wi-Fi operations in the 5 945-6 425 MHz band (lower 6 GHz band),[6] but access to the remaining portion of the 6 GHz (6 425-7 125 MHz band (i.e., upper 6 GHz band)) is urgently needed to meet advanced Wi-Fi connectivity requirement. This RSPG Opinion comes at a pivotal time in the development of the Wi-Fi ecosystem. Last year, Wi-Fi Alliance introduced the new Wi-Fi 6E brand to distinguish the latest generation Wi-Fi 6 devices that are capable of 6 GHz operation. Wi-Fi 6E brings a common industry name for Wi-Fi users to identify devices that offer the features and capabilities of Wi-Fi 6 – including higher performance, lower latency, and faster data rates – extended into the 5925–7125 MHz band. Wi-Fi 6E devices are quickly becoming available, following regulatory approvals in several countries. As the 6 GHz regulatory landscape evolves, Wi-Fi Alliance member companies continue to expand the Wi-Fi 6E ecosystem even further. Initial deployments in the band included Wi-Fi 6E consumer access points, smartphones, computers, and televisions, followed by enterprise-grade access points. Industrial environments are also expected to see strong adoption of Wi-Fi 6E to deliver applications including machine analytics, remote maintenance, and virtual employee training (see Wi-Fi Alliance 2022 Wi-Fi trends). Wi-Fi 6E utilizes the lower and upper 6 GHz bands to support much anticipated immersive experiences use

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4/ *Discover Wi-Fi: Value of Wi-Fi,* Wi-Fi Alliance, https://www.wi-fi.org/discover-wi-fi/value-of-wi-fi (last visited Feb. 22, 2021).

5 TV and Video Will Triple Average Home Monthly Internet Usage to Beyond 1 TB By 2025

6 Commission Implementing Decision of 17.6.2021 on the harmonised use of radio spectrum in the 5 945-6 425 MHz frequency band for the implementation of wireless access systems including radio local area networks (WAS/RLANs), available at: https://digital-strategy.ec.europa.eu/en/library/6ghz-harmonisation-decision-more-spectrum-available-better-and-faster-wi-fi

cases (e.g., VR/AR/XR, industrial IoT, automotive, telepresence, 3D-video, and other applications). The list of Wi-Fi 6E certified products is already growing. In 2021, over 300 million Wi-Fi 6E devices entered the market and over 350 million devices are expected in 2022. Regulatory harmonization in the 6 GHz band will create economies of scope and scale and produce a robust equipment market, benefitting European businesses, consumers, and the economy. But these benefits cannot be realized in the absence of Wi-Fi access to adequate spectrum capacity. Access to less than the entire 6 GHz band (i.e., lower and upper 6 GHz bands) would substantively reduce Wi-Fi 6E performance in terms of latency and data throughput. The 5945-6425 MHz band (i.e., 480 MHz) does not provide sufficient spectrum bandwidth to support future Wi-Fi connectivity. And, importantly, there are no alternative frequency bands that may address expanding Wi-Fi spectrum requirements in the future. In fact, the next generation of Wi-Fi (Wi-Fi 7) is being designed. [7/] Wi-Fi Alliance asks the RSPG to note that Wi-Fi 7 is designed to deliver unprecedented quality of service (QoS) benefits at higher data rates and lower latencies. But Wi-Fi 7 optimal performance will depend on access to multiple wider (e.g., 320 MHz) channels in the 6 GHz band– without Wi-Fi access to 6 425-7 125 MHz, European consumers and enterprises will not realize the full benefits of Wi-Fi 6E, Wi-Fi 7 and future generations of Wi-Fi technologies.

On the other hand, the spectrum needs of IMT networks are questionable at best, particularly in light of recent decisions on the 700 MHz, 3.5 GHz, 26 GHz and other frequency bands. According to statistics published by the UK[8] and German[9] regulators, only 1-3% of broadband traffic is carried over mobile networks. Thus, the IMT proponents' assertions on the need for identification in yet another frequency band (i.e., 6 425-7 125 MHz) are simply irrational. This fact is clearly evidenced by recently published European Commission's Digital Economy and Society Index 2022, "*spectrum assignment, an important precondition for the commercial launch of 5G, is still not complete: only 56% of the total 5G harmonized spectrum has been assigned, in the vast majority of Member States*".[10] Moreover, the IMT proponents are also advocating for alternative mid-band spectrum in the 7-15 GHz range. [11] Given that purported IMT spectrum needs can be accommodated in other frequency bands, Wi-Fi Alliance respectfully asks the RSPG to consider that the 6 425-7 125 MHz frequency range is the only mid-band spectrum that has been identified for Wi-Fi expansion by policymakers and industry worldwide. There is no alternative spectrum to support growing demand for Wi-Fi connectivity in Europe. Without access to the upper-6 GHz, Wi-Fi capabilities in Europe will be permanently impaired, undermining EU's connectivity goals and objectives.

Point #3 – Sharing studies confirm that International Mobile Telecommunications (IMT) networks cannot coexist with incumbent services in the 6 425-7 125 MHz frequency band

Similar to the lower-6 GHz, the upper-6 GHz band is predominately used by the Fixed Satellite Service (FSS) uplinks and extensive long distance and high capacity fixed microwave link deployments. Multiple spectrum sharing studies (e.g., ECC Report 302) along with the subsequent EC Decision (20)01 already established regulatory conditions that are necessary for WAS/RLAN coexistence with these important

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7/ *See* Wi-Fi 7: https://www.wi-fi.org/who-we-are/current-work-areas#Wi-Fi%207

8 Communications Market Report 2021, UK Ofcom (p. 3)

9 Tätigkeitsbericht Telekommunikation 2020/2021, BNetzA (p. 20 ff.)

10 *See* EC Digital Economy and Society Index 2022: overall progress but digital skills, SMEs and 5G networks lag behind available at https://ec.europa.eu/commission/presscorner/api/files/document/print/en/ip_22_4560/IP_22_4560_EN.pdf

11 *See for example*, GSA contribution on WRC-23 Agenda Item 10, PTA(22)038:

incumbent operations in the 6 GHz band. These conditions are acceptable for license-exempt WAS/RLAN networks (e.g., Wi-Fi) but are not feasible for *commercially viable* licensed 5G deployments.

To maintain the necessary quality of service, 5G wide-area networks require priority access to spectrum. Hence, licensed 5G networks cannot avoid interfering with or tolerate interference from the incumbent operations in the 6 425-7 125 MHz band. The RSPG Opinion accurately recognizes that IMT coexistence with fixed service deployments in the upper 6 GHz band has not been addressed[12/] while noting that the band "is heavily used by long distance and high capacity fixed links in Europe, such as for backhauling" and that "[i]n some countries, several fixed links belong to critical infrastructure." [13/] Similarly, IMT coexistence with the incumbent satellite services is not ensured. It is, therefore, unrealistic to expect that IMT networks can avoid interfering with and tolerate interference from other incumbent operations in the 6 425-7 125 MHz band. And relocation of incumbents to another frequency band, even if an alternative frequency band is made available, may not be economically viable and would require extensive transition periods (i.e., years). The RSPG should also take in to account that IMT implementation in the upper 6 GHz by some countries on a national level with bilateral cross-border coordination is impractical and contrary to the very premise of spectrum harmonization (intended goal of the IMT identification). And, as noted in the RSPG Opinion, the frequency band 6 425-7 075 MHz is used for Fixed Satellite Service (FSS) in the uplink direction.[14/] The EU member states are obligated by the international treaty to protect on-orbit FSS satellite receivers from interference that may be caused by the IMT network(s) deployed on their territories. This coexistence burden further undermines feasibility of IMT operations in the upper-6 GHz band. Conversely, Wi-Fi, built on IEEE 802.11 standards, has demonstrated the ability to coexist with and protect other spectrum users as evidenced by the EC Decision (20)01 and regulatory decision in several other countries. These protections are inherent to Wi-Fi technology and are critical to its efficient operations on a license-exempt basis worldwide. And the Wi-Fi industry is committed to implementing technical, operational, and regulatory solutions that ensure coexistence with ongoing, incumbent operations in the 6 GHz band.

Point #4 – IMT identification in the 6 425-7 125 MHz frequency band will not enable commercially viable 5G deployments but will impede introduction of the latest Wi-Fi technologies and associated benefits in Europe.

Wi-Fi Alliance respectfully asks the RSPG to consider that even if the WRC-23 were to identify the 6 425-7 125 MHz band for IMT in some countries, significant time (i.e., years) and investments (i.e., billions of euros) would be required to develop, implement, deploy and operate 5G (IMT) networks in the upper-6 GHz band. It is unlikely that such IMT networks would be commercially viable, given their limited market scale and harmonization. Proposed "macro-base station" or other quasi-IMT implementations simply lack the economies of scope and scale necessary for a robust equipment ecosystem or commercial viability. In short, additional spectrum identification for IMT will not address the underlying problems of 5G network deployments in Europe. [15/]

In the meantime, the latest Wi-Fi technology, operating in the 6 GHz band, is already on the market, empowering tremendous connectivity benefits which are ready to be provided to European businesses,

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12/ RSPG Opinion, Section 4.1, page 7

13/ RSPG Opinion, Section 4.1.1, page 8

14/ RSPG Opinion, Section 4.1.1 Link with EU policies, page 7

15/ *See* EC Digital Economy and Society Index 2022: overall progress but digital skills, SMEs and 5G networks lag behind

consumers, and the economy. Access to less than the entire 6 GHz band (1180 MHz) for license-exempt use would substantively reduce Wi-Fi 6E performance in terms of QoS, latency and data throughput. Wi-Fi Alliance respectfully asks the RSPG to note that the 5 945-7 125 MHz band is uniquely suited to accommodate the urgent need for additional Wi-Fi spectrum access for the following reasons:

- Self-coordinating, multi-channel Wi-Fi networks relying on dynamic random spectrum access and contention-based protocols require access to multiple channels to maintain acceptable performance. The current Wi-Fi standard (IEEE 802.11ax, Wi-Fi 6/6E) specifies channel bandwidths of up to 160 MHz, while the next amendment under development (Extremely High Throughput, Wi-Fi 7) will specify channel bandwidths of up to 320 MHz. The 480 MHz is simply insufficient to accommodate multiple 320 MHz channels.
- Access to 1180 MHz in the 6 GHz band will enable new technologies, innovations and improvements in wireless connectivity. Contiguous spectrum would allow for wider, non-overlapping Wi-Fi channels with harmonized technical conditions. With access to 1180 MHz of contiguous spectrum (i.e., 5 945-7 125 MHz), 14 additional 80 MHz channels, 7 additional 160 MHz channels or 3 additional 320 MHz channels can be enabled to support high-bandwidth applications that require faster data throughput and lower latency such as high-definition video streaming and virtual reality. Wi-Fi 6E and subsequent generations of Wi-Fi technology will leverage these wider channels and additional capacity to deliver greater network performance and support more Wi-Fi users at once, even in very dense and congested environments, enabling automation, e-learning, e-health and many other Gigabit use cases.
- Wi-Fi devices operating in the 5 925-7 125 MHz band are already introduced in many countries (Brazil, Canada, Saudi Arabia, South Korea, US and others). Regulatory harmonization with Europe would reduce equipment costs, improve availability and deliver the economic benefits described above.

Point #5 – Wi-Fi significantly outperforms IMT in energy efficiency.

Wi-Fi Alliance enthusiastically supports spectrum policy alignment under the EU Green Deal policy initiative and climate goals. In this regard, Wi-Fi Alliance wishes to emphasize that Wi-Fi technology excels in low-power, cognitive radio techniques including spectrum sensing, spectrum sharing and adaptive transmission. These techniques enable Wi-Fi to significantly outperform IMT in energy efficiency, [16/] particularly in conjunction with extensive fiber-to-home and cable broadband deployments in Europe.[17/] With EU's broadband rollout based on the on Connectivity for a European Gigabit Society by 2025 as well as the vision set by the Digital Decade for Europe's digital transformation by 2030 to connect European citizens and businesses with very high-capacity networks, Wi-Fi (and not IMT) will play an increasingly important role in delivering this connectivity to end users.

16/ *See* Energy Efficiency in Wireless Networks by Oswald Jumira, Sherali Zeadally available at https://www.wiley.com/en-us/Energy+Efficiency+in+Wireless+Networks-p-9781848214446

17/ In 2021, the coverage of networks connecting buildings with fibre reached 50% of households, driving overall fixed very high capacity network coverage up to 70% (100% target by 2030) -- *See* EC Digital Economy and Society Index 2022: overall progress but digital skills, SMEs and 5G networks lag behind

Notably, the RSPG astutely recognized that the current EU framework already seeks to facilitate the rollout of indoor networks in the effort to combat climate change. [18/] In this regard, Wi-Fi Alliance asks the RSPG to consider that, under the Green Deal, the EU aims to significantly improve energy efficiency of buildings across Europe.[19/] One consequence of such improvements would be that the even more energy from an indoor device (i.e., Low Power Indoor AP) transmissions will be contained indoors, as intended, further improving WAS/RLAN coexistence in the 6 GHz band. In contrast, a wide-area network (i.e., IMT) connectivity between an outdoor base-station and an indoor-device will incur more degradation from building structure attenuation, further undermining the feasibility of such IMT networks in the 6 425-7 125 MHz band.

Conclusion

Policymakers worldwide recognize that wireless connectivity is increasingly dependent on Wi-Fi and that Wi-Fi delivers significant socioeconomic benefits. The advantages of a harmonized Wi-Fi across the 6 GHz band in Europe include commonality of equipment, economies of scale, larger markets, increased competition, lower product prices, and a wider choice of products, to name just a few. As other countries proceed to authorize WAS/RLAN deployments in the 6 425-7 125 MHz band, timely action facilitating similar regulatory framework is imperative to enabling wireless connectivity in Europe. Conversely, lack of spectrum access to the upper-6 GHz band or regulatory uncertainty resulting from the IMT identification may impair current and future Wi-Fi generations in Europe.

In light of the above, on the issue of WRC-23 Agenda Item 1.2 (6 425-7 125 MHz), Wi-Fi Alliance respectfully asks the RSPG to adopt the proposed Option 2 as its recommendation:

> ***"Option 2 on the band 6 425 - 7 125 MHz - "No IMT identification":***
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> ***The RSPG recommends, that as a common policy approach the EU Member States should not support identification for IMT of the frequency band 6 425 - 7 125 MHz.***
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> ***End of Option 2 "***[20/]

Respectfully submitted,
/s/ Alex Roytblat
WI-FI ALLIANCE
Alex Roytblat

18/ *See The RSPG Opinion on the role of radio spectrum policy to help combat climate change*, Opinion no. 27, RSPG21-041 Final, 24 November 2021 available at https://rspg-spectrum.eu/wp-content/uploads/2021/11/RSPG21-041final-RSPG_Opinion_on_climate_change.pdf

19/ *See* European Commission, "A Renovation Wave for Europe – Greening our buildings, creating jobs, improving lives" strategy, available at https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficient-buildings/renovation-wave_en

20/ RSPG Opinion, Section 4.1, page 9

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