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VIA EMAIL (CNECT-RSPG@ec.europa.eu)

**Radio Spectrum Policy Group – Secretariat
DG CNECT B4: Spectrum – Office: BU33 7/065
European Commission, B-1048
Bruxelles, Belgium**

RE: Work Programme for 2020 and beyond (for public consultation)

Facebook is pleased to submit these comments in response to the Radio Spectrum Policy Group's (RSPG) consultation regarding its Work Programme for 2020 and beyond.¹ Facebook responds specifically to the RSPG's work items regarding, "Spectrum sharing – pioneer initiatives and bands" and "Additional spectrum needs and guidance on the fast rollout of future wireless broadband networks."²

Facebook's mission is to give people the power to build community and bring the world closer together. And connecting people is a critical first step in executing this mission. Today, nearly half of the world's population is still not connected to the Internet.³ Among those that have connectivity, many are under-connected. Connecting these people is a complicated effort that requires not just bringing network infrastructure to more people, but establishing a regulatory environment that fosters innovation and encourages investment.

To do its part, Facebook, working with a range of partners, has launched several initiatives focused on connecting the unconnected and under-connected. It will take a mix of technical solutions to bring connectivity to all. As such, Facebook has been investing in research and development efforts in a range of technologies, including mobile, for both licensed and license-exempt operation, satellite, and aerial, such as high altitude platform stations ("HAPS").

Improving connectivity in Europe and around the world means pursuing spectrum policies that maximize the utilization of this limited resource and promote the expansion of both

¹European Commission Directorate-General for Communications Network, Content and Technology, Radio Spectrum Policy Group, Work Programme for 2020 and beyond (for public consultation) at https://rspg-spectrum.eu/wp-content/uploads/2019/10/RSPG19-029final-RSPG_work_programme_20_and_beyond.pdf ("RSPG Consultation").

² *Id.* at 3.

³ International Telecommunication Union, Measuring the Information Society Report 2018-Volume 1 at 2 (11 Dec. 2018) at <https://www.itu.int/en/ITU-D/Statistics/Documents/publications/misr2018/MISR-2018-Vol-1-E.pdf>.

the capacity and coverage of wireless networks. To this end, the RSPG's leadership will be invaluable toward advancing new spectrum sharing technologies in Member States. As the RSPG explores dynamic spectrum sharing, Facebook encourages the RSPG to investigate the use of a multi-tier spectrum sharing model. In addition, Facebook recommends that the RSPG considers how spectrum sharing can enhance competition and improve rural connectivity. Moreover, as the RSPG assesses additional spectrum needs for 5G in Europe, Facebook encourages the RSPG to conclude that the full 6 GHz band (5925-7125 MHz) should be license-exempt and that both license-exempt and lightly licensed spectrum will become a critical complement to licensed spectrum in 5G-capable networks.

1. The RSPG's leadership is needed to advance spectrum sharing across its Member States.

Facebook commends the RSPG for recognizing through the working group on European Spectrum Strategy that "spectrum sharing needs further action, especially with regard to its potential to achieve more efficient use of radio spectrum, and to give incentives for innovation."⁴ Enabling and promoting the sharing of scarce spectrum resources will be critical to meeting spectrum demand today and in the long-term. While significant technology developments have increased spectrum efficiency to deliver wireless services (*e.g.* LTE for mobile broadband), demand for spectrum has increased due to the use of bandwidth intensive applications like video. Moreover, high-speed delivery of services through the use of 4G and 5G technologies and developments like the Internet of Things (IoT) have led to demand for spectrum across every economic sector, including agriculture, transport, and energy. While the continued rise in data traffic means both fixed and mobile services rely on access to growing amounts of spectrum to meet demand, it is increasingly difficult to open access to new frequency bands since they are encumbered by the delivery of other public (or commercial) services. Clearing encumbered spectrum not only requires significant new investment, but also requires regulators to relocate existing users to suitable spectrum, which can be a major challenge.

Given the growing demand for spectrum, the challenges involved in clearing spectrum, and ongoing technology developments, shared spectrum access can help regulators balance the needs of multiple spectrum users while also keeping spectrum open to innovation by new users. Furthermore, spectrum sharing can open new avenues to competition and rural connectivity solutions.

a. A tiered spectrum sharing model ("TSSM") would be an effective mechanism for enabling sharing and increasing spectrum use.

Around the world, regulators are introducing policies to encourage spectrum sharing through different approaches, such as, Licensed Shared Access (LSA) and tiered spectrum access, among others. For example, Facebook, alongside other companies across the industry, is working to evaluate and promote the development of the automated frequency coordination

⁴ RSPG Consultation at 3.

mechanism (AFC) that the Federal Communications Commission has proposed to use in the 6 GHz band proposed rulemaking.⁵ Through this work and other efforts such as the Citizens Broadband Radio Service in the United States,⁶ Facebook believes that a tiered spectrum sharing model (“TSSM”) can be a very effective mechanism for enabling important new use cases and increasing spectrum utilization. In TSSM, a regulator can allow new users to access spectrum licensed to incumbent users while incumbent operations are protected from interference. By allowing new users to access spectrum in local areas, such users can fill in network gaps, bring service to areas that are not effectively covered, such as underserved rural areas, and deploy specialized local and private networks. And by allowing these users to access spectrum in specific geographies that would typically be licensed nationally, new users can address local connectivity needs on a smaller scale and in a way that is financially sustainable.

b. Spectrum sharing can enhance competition and rural connectivity.

In addition to ensuring the efficient use of spectrum resources, sharing can also enhance competition and rural connectivity. For example, through the use of a neutral host platform, spectrum sharing can increase competitive options for network capacity. A neutral host platform that shares both passive and active resources such as spectrum, Radio Access Network (RAN) edge node (*e.g.* LTE eNodeB) or a Wi-Fi access point in managed or private spaces (*e.g.* stadiums, commercial buildings) can have several advantages. Neutral host networks reduce capital expenses for hosted operators and have the potential to reduce operating expenses as well. In addition, depending on the specific active and passive components shared among hosted operators, neutral host networks can ultimately benefit consumers through better connectivity. Recently, in the United Kingdom, Ofcom created a “low power shared access licence,” which allows parties to access spectrum in localized areas and facilitates the deployment of local networks in different sectors.⁷

Moreover, spectrum sharing can be used to extend rural coverage and make the provision of service to rural areas economically sustainable. To this end, spectrum policies should be sufficiently flexible to allow for spectrum use by multiple parties in high-cost rural areas. For example, in a rural area, if a third party infrastructure provider can deploy radio access network

⁵ See *Unlicensed Use of the 6 GHz Band et al.*, Notice of Proposed Rulemaking, ET Docket No. 18-295, FCC 18-147 (rel. Oct. 24, 2018) at <https://docs.fcc.gov/public/attachments/FCC-18-147A1.pdf>. (“6 GHz NPRM”).

⁶ See Federal Communications Commission, “3.5 GHz Band/Citizens Broadband Radio Service” at <https://www.fcc.gov/wireless/bureau-divisions/broadband-division/35-ghz-band/35-ghz-band-citizens-broadband-radio>.

⁷ See Ofcom, Enabling wireless innovation through local licensing: Shared access to spectrum supporting mobile technology, at https://www.ofcom.org.uk/_data/assets/pdf_file/0033/157884/enabling-wireless-innovation-through-local-licensing.pdf. (“Ofcom Shared Access to Spectrum Decision”).

(RAN) equipment that can support customers from multiple mobile operators on a single physical network, users from different competing mobile operators would be able to use the same channel in a rural area without the expense of roaming fees or requiring mobile virtual network operator (MVNO) relationships between operators. This can reduce costs for operators and thereby consumers.⁸ Similarly, national regulatory authorities can establish special spectrum licenses that allow access to licensed mobile spectrum that is not currently in use in rural areas. For example, Ofcom in the UK recently determined to allow operators in rural areas to apply for access to licensed mobile spectrum through a new shared access license, which would authorize a single base station and any connected terminal stations.⁹ This license structure is intended to allow rural fixed wireless providers or third parties looking to provide rural mobile coverage access to licensed mobile spectrum that is not in use by incumbent operators.

In light of the above, Facebook recommends that to achieve effective and efficient use of spectrum, and to enhance competition and rural connectivity, the RSPG should move forward with further action to encourage the development of spectrum sharing technologies and policy frameworks in Member States, such as a TSSM. Facebook agrees that the RSPG's facilitation of trials will help to advance spectrum sharing as well as improve collaboration among Member States.¹⁰

2. License-exempt and lightly licensed spectrum will be a critical complement to licensed 5G-capable networks.

5G will create new opportunities for connectivity. 5G—encompassing multiple technologies—will enable new classes of applications and use cases. 5G, as part of next generation broadband networks, will enhance the capacity and capability of networks for those that are already connected, while also presenting opportunities to connect the unconnected and under-connected through innovative access and backhaul technologies. As the world moves toward 5G and advanced broadband networks, ever-increasing demand for spectrum puts increasing pressure on limited spectrum resources. In addition to further developing spectrum sharing, Facebook recommends that the RSPG considers the importance of a balanced approach to licensed, license-exempt, and lightly licensed spectrum.

⁸ For example, in Peru, in rural areas without infrastructure, the regulatory authority supports rural infrastructure providers by helping to broker agreements between such providers and existing mobile network providers that hold spectrum licenses in such areas. See New Approach to Rural Connectivity: The Case of Peru (<https://www.telefonica.com/documents/341171/3051513/New+Approach+to+Rural+Connectivity.pdf/ac83ffd3-8686-c4c6-7dd0-74027e566d5c>.)

⁹ See Ofcom Shared Access to Spectrum Decision

¹⁰ RSPG Consultation.

Ensuring sufficient license-exempt spectrum is available will be critical for the growth of 5G, as well as for supporting existing, growing demand for radio local access networks (“RLANs”). By 2022, nearly 60 percent of global mobile data traffic is projected to be offloaded onto the fixed network through Wi-Fi or femtocells.¹¹ And, as mobile and Wi-Fi technologies evolve and continue to be integrated to meet wireless and mobile communications needs, demand for license-exempt spectrum will continue to grow. For Facebook, access to license-exempt spectrum will be critically important to the company’s future innovations and enhancements of its apps and other products with more interactive content, retina resolution videos and augmented and virtual reality (AR/VR) as well as artificial intelligence (AI).¹² However, it is estimated that by 2025 there will be a worldwide Wi-Fi spectrum shortfall of up to 1.6 GHz in the mid-frequency range that will limit the performance and availability of broadband.¹³

Therefore, to avoid a Wi-Fi spectrum shortfall, Facebook recommends that the RSPG concludes that license-exempt access to the full 6 GHz band (5925-7125 MHz) would help to accelerate the deployment of 5G networks (by allowing greater offload traffic and performance) as well as help to realize the full potential next generation license-exempt services. The 6 GHz band is uniquely suited to support future growth of Wi-Fi due to both its propagation characteristics and its proximity to existing Wi-Fi deployments in the 5 GHz band. Critically, the full 6 GHz band offers contiguous spectrum blocks to accommodate seven 160 MHz channels, which are required for high-bandwidth applications, such as high-definition video streaming and AR/VR.

Facebook applauds the European Commission Mandate, adopted consistent with the RSPG’s recommendation, directing the CEPT to study feasibility and identify harmonized technical conditions for RLANs in the 5925-6425 MHz band.¹⁴ However, Facebook urges the

¹¹ Cisco, Virtual Networking Index: Global Mobile Data Traffic Update (2017-2022): White Paper, (Feb. 2019) at https://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/white-paper-c11-738429.html#_Toc953332.

¹² See, e.g., Facebook Business, “F8 2018: Augmented Reality Comes to Messenger” (May 1, 2018) <https://www.facebook.com/business/news/f8-2018-augmented-reality-comes-to-messenger>; Facebook for Developers, “AR Studio: Create and Distribute New, Rich AR Experiences with Ease” (May 1, 2018) <https://developers.facebook.com/blog/post/2018/05/01/ar-studio-create-distribute/>.

¹³ Quotient Associates, Wi-Fi Spectrum Needs Study, Final Report to Wi-Fi Alliance (February 2017).

¹⁴ See also ECC Report 302: Sharing and compatibility studies related to Wireless Access Systems in Radio Local Area Networks (WAS/RLAN) in the frequency band 5925-6425 MHz at <https://www.ecodocdb.dk/download/cc03c766-35f8/ECC%20Report%20302.docx>.

RSPG to recommend that the full 6 GHz band be studied for licensed-exempt use. With the upper portion of the band included in the license-exempt designation, an additional four 160 MHz channels would be made available. The United States is currently considering making the full 6 GHz band available for license-exempt access.¹⁵ Moreover, allowing greater access to unlicensed spectrum should spur innovation and investment across the Member States. Last year, the global economic value of Wi-Fi was estimated to be \$1.96 trillion.¹⁶

In addition, as part of its work on spectrum sharing, the RSPG should investigate how lightly licensed coordinated access to spectrum could support technologies and applications like neutral host platforms that could complement 5G. Lightly licensed spectrum will be critical to support faster coverage, especially in high population density areas. With lightly licensed spectrum options, operators could use neutral host platforms to improve coverage. For example, in the UK, as part of Ofcom's spectrum sharing framework, Ofcom allows parties to apply for local spectrum licenses in certain spectrum bands that support mobile technology.¹⁷ This framework allows Ofcom to make spectrum available to facilitate deployment of local networks in different sectors, such as for industrial and enterprise users, and allows for the development innovative wireless technologies on a localized basis throughout the UK. Building on Ofcom's example, the RSPG should consider how designated spectrum could be made available through light licensing that would be used to complement exclusively licensed bands.

In sum, as the RSPG explores new spectrum sharing technologies, Facebook encourages the RSPG to investigate the use of a multi-tier spectrum sharing model. In addition, Facebook recommends that the RSPG consider how spectrum can enhance competition and improve connectivity in rural areas. Moreover, as the RSPG assesses spectrum needs for 5G-capable networks, Facebook encourages the RSPG to conclude that the full 6 GHz band should be license-exempt and that both license-exempt and lightly licensed spectrum are a critical complement to licensed spectrum in 5G-capable networks.

¹⁵ See Federal Communications Commission, Unlicensed Use of the 6 GHz Band et al., Notice of Proposed Rulemaking, ET Docket No. 18-295, FCC 18-147 (rel. Oct. 24, 2018) at <https://docs.fcc.gov/public/attachments/FCC-18-147A1.pdf>. ("6 GHz NPRM").

¹⁶ See The Economic Value of Wi-Fi: A Global View (2018 and 2023): <https://www.wi-fi.org/downloads-registered-guest/Economic%2BValue%2Bof%2BWi-Fi%2B2018.pdf/35675>.

¹⁷ See Ofcom Shared Access to Spectrum Decision.

Respectfully submitted by:

Facebook, Inc.

1 Hacker Way

Menlo Park, CA 94025