

January 9, 2018

VIA EMAIL (ic.spectrumauctions-encheresduspectre.ic@canada.ca)

Senior Director
Spectrum Licensing and Policy Branch—ISED
235 Queen Street (6th Floor East Tower)
Ottawa, ON K1A 0H5

Dear Senior Director:

RE: Comments on *Consultation on the Spectrum Outlook 2018 to 2022*, SLPB-006-17

Facebook, Inc. (“Facebook”) is pleased to submit these comments in response to the Innovation, Science and Economic Development Canada (“ISED”) consultation on the Spectrum Outlook 2018 to 2022.¹ Facebook strongly supports ISED’s efforts to ensure that Canada is well prepared to meet the spectrum needs of “commercial mobile services, licence-exempt applications, satellite services and wireless backhaul services over the years 2018 to 2022.”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 four billion people—60% of the people on the planet—are still not connected to the Internet. And because the rate of Internet penetration growth has slowed from 14% to under 7% in 2015, Facebook launched its own initiatives to develop new technologies and specifically focus on connecting the unconnected.³ Connecting these people—most of whom live in the developing world—is a complicated effort that requires not just bringing network infrastructure to more people, but involves addressing the regulatory environment.

Spectrum policy is a key part of the regulatory environment that affects both the affordability and availability of the Internet. Improving connectivity in Canada and around the world means pursuing spectrum policy that maximizes the utilization of this limited resource and promotes the expansion of both the capacity and coverage of wireless networks. ISED’s Spectrum Outlook is an opportunity to prepare to achieve these objectives in Canada, while also setting an example for the rest of the world. To this end, Facebook urges ISED to consider the following general principles as it crafts its Spectrum Outlook for the next five years:

¹ *Consultation on the Spectrum Outlook 2018 to 2022*, SLPB-006-17 (October 2017) [https://www.ic.gc.ca/eic/site/smt-gst.nsf/vwapj/Consultation-Outlook-2017-eng.pdf/\\$file/Consultation-Outlook-2017-eng.pdf](https://www.ic.gc.ca/eic/site/smt-gst.nsf/vwapj/Consultation-Outlook-2017-eng.pdf/$file/Consultation-Outlook-2017-eng.pdf). (“Spectrum Outlook Consultation”).

² *Id.* ¶ 1.

³ Internet.org by Facebook, *State of Connectivity 2015—A Report on Global Internet Access* at 6-8 (Feb. 22, 2016).

- *Ensure an abundant supply of spectrum is available.* An abundant supply of spectrum in low (sub 1 GHz), medium (1-12 GHz) and high (above 12 GHz) frequency bands will reduce service provider barriers to entry and increase competition and innovation across a wide range of broadband use cases.
- *Promote flexible use.* Adopt spectrum policy that promotes flexible use of spectrum and sharing across users and platforms, such as mobile, satellite, and new technologies like high-altitude solar aircraft. It will take a mix of technical solutions to bring connectivity to all.
- *Balance licensed and licence-exempt spectrum.* Both licensed and licence-exempt spectrum allocations are critical to the expansion of wireless infrastructure. Ensuring sufficient licence-exempt spectrum is available drives innovation and investment in a range of technologies that can complement and support networks and expand broadband access at low cost.
- *Enhance both the capacity and coverage of networks.* Promote policies that not only enhance network capacity but also expand their coverage to underserved areas and populations.

In light of the above principles, Facebook asks ISED to consider the following three specific proposals as part of its Spectrum Outlook. *First*, as ISED moves forward with the release of millimetre wave spectrum bands, ISED should allow for the possible development of fixed services in these bands, specifically, high altitude platform stations (“HAPS”). HAPS deployed on unmanned solar platforms can be used to bring broadband and 5G services to underserved markets. *Second*, ISED should move forward on its existing proposal to make the 64-71 GHz band licence-exempt. And *third*, ISED should identify additional licence-exempt spectrum to foster innovation and investment in wireless technologies, particularly in the 6 GHz band.

(1) As ISED moves forward to release millimetre wave band spectrum above 24 GHz, it should make these bands available for flexible use, across platforms, including HAPS.

Facebook supports ISED’s efforts to foster innovation and investment in wireless technologies through making additional millimetre wave band spectrum available above 24 GHz for 5G.⁴ As Facebook stated in its comments in the Millimetre Wave Consultation, the 28 GHz, 37-40 GHz bands, and other millimetre wave bands should be made available for flexible use across platforms.⁵ Bringing connectivity to all in Canada and around the world will take a mix of technical solutions across multiple technologies and platforms.

⁴ Spectrum Outlook Consultation ¶ 162 & Tables 6 & 7; see *Consultation on Releasing Millimetre Wave Spectrum to Support 5G*, SLPB-001-17 (June 2017) available at <http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf11298.html> (“Millimetre Wave Consultation”).

⁵ See Comments of Facebook, Inc. (15 Sep. 2017) at <http://www.ic.gc.ca/eic/site/smt->

within the bands and consider licensing schemes that would enable HAPS to be used in the band in support of the 5G ecosystem.

(2) ISED should proceed with its plan to extend a licence-exempt framework to the 64-71 GHz band.

As noted in its comments in the millimetre wave band consultation, Facebook strongly supports making the 64-71 GHz band available for license-exempt use to extend currently harmonized licence-exempt services in the 57-64 GHz band and urges ISED to move forward on this proposal expeditiously.¹⁰ Facebook also applauds ISED's efforts not just to make the 64-71 GHz band license-exempt, but its application of the clear and concise language in Annex J.2.2, which will best serve the new and innovative technologies that are being developed in the band.

In the 60 GHz band, new services have developed ranging from outdoor wireless links that extend the reach of fiber networks to personal networking technologies based on the WiGig standards 802.11ad and 802.11ay that deliver multi-Gigabit speeds between devices. And more is yet to come. The huge demand for network capacity is driving investment in 60 GHz licence-exempt technologies for wireless backhaul and other uses, particularly as the technology is evolving to allow for non-line-of-sight applications. For example, last year, Facebook announced its Terragraph project, a low-cost high-throughput (multi-Gigabit) multi-node mesh wireless network for dense urban topologies that could provide fiber-like reliability for access and backhaul at a lower upfront cost.¹¹

Extending licence-exempt access to additional adjacent bands such as the 64-71 GHz band would increase such opportunities. In fact, the latest IEEE 802.11-2016 standard defines six 2160 MHz channels including three that require access to spectrum in the 64-71 GHz band.¹² For these reasons, ISED should expeditiously move forward on its proposal to extend licence-exempt access to the 64-71 GHz band.

¹⁰ Comments of Facebook, Inc. (15 Sep. 2017) at [http://www.ic.gc.ca/eic/site/smt-gst.nsf/vwapj/SLPB-001-17-comments-received-Facebook.PDF/\\$file/SLPB-001-17-comments-received-Facebook.PDF](http://www.ic.gc.ca/eic/site/smt-gst.nsf/vwapj/SLPB-001-17-comments-received-Facebook.PDF/$file/SLPB-001-17-comments-received-Facebook.PDF).

¹¹ Introducing Facebook's new terrestrial connectivity systems—Terragraph and Project Aries, <https://code.facebook.com/posts/1072680049445290/introducing-facebook-s-new-terrestrial-connectivity-systems-terragraph-and-project-aries/>.

¹² Table E-1, US Operating Class 34 and/or Table E-4, Global Operating Class 180.

(3) ISED should identify additional mid-frequency band licence-exempt spectrum, such as the 6 GHz band. (Q-5, Q-7)

Facebook agrees with ISED’s assessment that there will be a growing demand for spectrum in the licence-exempt bands due to “the growth of Wi-Fi devices seeking higher speeds and performance, and the potential volume of IoT devices.”¹³ Already, in 2016, 60 percent of global mobile data traffic was offloaded onto the fixed network through WiFi or femtocells.¹⁴ And, as ISED notes, it is “expected that there will be a continued convergence and integration of commercial mobile and Wi-Fi technologies as they both evolve to meet wireless and mobile communications needs.”¹⁵ Ensuring sufficient licence-exempt spectrum is available will be critical for the growth of 5G as well as supporting existing, growing demand for Wi-Fi. Accordingly, Facebook urges ISED to address this growing pressure on licence-exempt spectrum bands by identifying additional mid-band spectrum for licence-exempt use.

As a next step, ISED should begin a consultation on the allocation of the 6 GHz band (5925-7125 MHz) for licence-exempt use. Allocating additional mid-band spectrum for licence-exempt use is critical. High-frequency millimetre wave band spectrum, such as the 64-71 GHz band, which ISED has proposed to allocate for licence-exempt use, has propagation and penetration characteristics that are suitable for WiGig-based technologies. But millimetre wave bands are not adequate substitutes for longer-range, mid-band frequencies. Instead, the propagation characteristics of the 6 GHz band and its proximity to the 5 GHz band make it well-suited to meet the needs of Wi-Fi and support 5G networks. The next generation of Wi-Fi, IEEE 802.11ax is currently under development and could support 6 GHz operations.¹⁶ Economies of scale in equipment development are possible as the United States and Europe have already initiated proceedings to explore the possibility of licence-exempt operations in the 6 GHz band.¹⁷

¹³ Spectrum Outlook Consultation ¶ 56.

¹⁴ Cisco, VNI Global Fixed and Mobile Internet Traffic Forecast, (Feb. 2017) <https://www.cisco.com/c/en/us/solutions/service-provider/visual-networking-index-vni/index.html>.

¹⁵ Spectrum Outlook Consultation ¶ 53.

¹⁶ See Rich Kennedy, Abstract, IEEE P802.11 Wireless LANS; P802.11ax PAR Modification (July 12, 2017), <https://mentor.ieee.org/802.11/dcn/17/11-17-0913-02-00ax-parmodification-to-support-6-ghz-band.docx>.

¹⁷ In August 2017, the Federal Communications Commission issued a Notice of Inquiry on a range of mid-band spectrum issues including how spectrum in the 5925 to 7125 MHz or 6 GHz band should be licensed. See *Expanding Flexible Use in Mid-Band Spectrum between 3.7 and 24 GHz*, Notice of Inquiry, FCC 17-104 (rel. Aug. 3, 2017), at https://apps.fcc.gov/edocs_public/attachmatch/FCC-17-104A1_Rcd.pdf. In February 2017, the CEPT ECC issued a document that considered the potential of the 6 GHz band (5925 MHz to

Canada should follow suit and take the opportunity in this Spectrum Outlook to initiate a consultation on the 6 GHz band. In addition to addressing growing demand for licence-exempt spectrum, allocating the 6 GHz band for licence-exempt use would create opportunities to spur additional innovation and investment in wireless technologies in Canada.

Respectfully submitted by:

/s/ Christopher Weasler
Christopher Weasler
Facebook, Inc.
1 Hacker Way
Menlo Park, CA 94025

6700 MHz) to offer spectrum opportunities to accommodate WAS/RLAN and suggested that the issue should be studied by December 2018. *See Proposed studies on Wireless Access Systems including Radio Local Areas networks in 6 GHz band*, Doc. ECC(17)012R(2), (Feb. 22, 2017).