

**Notice No. SMSE-014-20**  
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***Consultation on the Technical and Policy Framework for Licence-Exempt Use in the 6 GHz Band, Notice No. SMSE-014-20***

**Comments**  
**of**  
**SHAW COMMUNICATIONS INC.**



**January 19, 2021**

## I. INTRODUCTION AND EXECUTIVE SUMMARY

1. The following constitutes the initial comments of Shaw Communications Inc. (“Shaw”) to Innovation, Science and Economic Development Canada (the “Department” or “ISED”) in connection with the proceeding initiated by the *Consultation on the Technical and Policy Framework for Licence-Exempt Use in the 6 GHz Band*, No. SMSE-014-20 (the “Consultation”, with such document the “Consultation Document”).
2. Shaw commends the Department for launching this timely consultation and supports the direction taken in the Consultation Document. Allocating the full 1.2 GHz of spectrum is the correct path for Canada to take, not only for the myriad consumer benefits it offers for Canadians, as we will detail, but also for the capacity of unlicensed spectrum to support Canada’s economic recovery in 2021 and beyond, as well as its importance to the delivery of educational, health and other civic and social services. The Department’s proposals reflect the reality that a significant allocation of unlicensed spectrum is long overdue and that the 6 GHz band is the best opportunity to rectify this.
3. Unlicensed spectrum has always been a critical component of Canada’s connectivity infrastructure and with skyrocketing demands for broadband data, the proliferation of the Internet of Things, and introduction of 5G, its importance is growing. Wi-Fi, which operates using unlicensed spectrum, is a cornerstone of the broadband ecosystem. Wi-Fi is an affordable, cost-effective way for consumers to participate in the digital economy. The COVID-19 pandemic has made the importance of Wi-Fi and widespread access to high quality broadband clearer than ever before. The pandemic has accelerated Canadians’ dependence on broadband to stay connected for work and education and remain informed and entertained. As of June 2020, the daily time consumers spent connected to broadband increased by two and a half hours per day as compared to before the pandemic.<sup>1</sup>
4. Unlicensed technologies will also play a pivotal role in unleashing the next generation of connectivity. The next Wi-Fi standard – Wi-Fi 6 – has arrived, with 802.11ax devices already shipping, including routers and premium phones such as the iPhone 11 and Samsung S20. Wi-Fi 6 will enhance capacity, support higher data rates, allow better management of networks with many users and client devices, enhance power efficiency, and promote more efficient spectral use. Because it can support higher data

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<sup>1</sup>Ericsson, *Ericsson Mobility Report*, June 2020, page 7 (the “June 2020 Ericsson Report”).  
<<https://www.ericsson.com/49da93/assets/local/mobility-report/documents/2020/june2020-ericsson-mobility-report.pdf>>

rates and capacity, Wi-Fi 6 will be critical to the delivery of gigabit broadband speeds to Wi-Fi connected devices. However, as the Chairman of the FCC has stated, “[...] in order to fully take advantage of the benefits of Wi-Fi 6, we need to make more mid-band spectrum available for unlicensed use”.<sup>2</sup> Making the full 6 GHz band available for unlicensed use will facilitate wide channels of 160 MHz and 320 MHz, which will enable Wi-Fi 6 and 7, respectively, and allow unlicensed technologies to continue to evolve alongside licensed mobile technologies.

5. The Department’s proposals will allow Canada to join the U.S. as a leader in unlicensed technology development and use. The FCC decided in April 2020 to make this spectrum available for unlicensed use,<sup>3</sup> and American consumers are already benefiting from a diverse and expanding 6 GHz equipment ecosystem. Harmonization with the U.S. will allow Canada to benefit from this ecosystem and the reduced costs associated with the economies of scale it represents. We should not deprive Canadians of the benefits of these technological advances, nor should we delay them, by, for example, releasing only a portion of the band for unlicensed use at this time. South Korea – another global technology leader – has confirmed that it will follow this path, while other regulators are proceeding with their own consultations on unlicensed use of the band, consistent with the direction taken by the Department in this Consultation.
6. Some parties may suggest that the Department should delay its decision on the upper portion of the band and consider it instead for licensed mobile use. As a new disruptor to Canada’s mobile wireless industry, Shaw generally supports the release of new spectrum for licensed mobile use (subject to the adoption of pro-competitive measures). However, in this case, Shaw questions whether such an approach is in the best interest of consumers. Delaying a decision on the upper portion of the band would limit the benefits of unlicensed use of the full band (including the multiple wide channels it will enable) and take Canada out of step with the U.S. and its emerging robust equipment ecosystem. Furthermore, the path to licensed mobile use in the band is unclear.
7. On the other hand, opening this band for unlicensed use has benefits for licensed mobile services and will support next generations of mobile technology, including 5G. Wi-Fi works in tandem with, and as a necessary complement to, licensed mobile technologies. Strong Wi-Fi facilitates seamless data offloading, and unlicensed technologies such as

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<sup>2</sup> Statement of Ajit Pai, *Unlicensed Use of the 6 GHz Band, Expanding Flexible Use in Mid-Band Spectrum Between 3.7 GHz and 24 GHz*, ET Docket No. 18-295 and GN Docket No. 17-183, April 2020 (the “FCC Chairman Statement”). <<https://docs.fcc.gov/public/attachments/FCC-20-51A2.pdf>>

<sup>3</sup> FCC, *Unlicensed Use of the 6 GHz Band*, April 24, 2020 (the “FCC Report and Order”). <[https://docs.fcc.gov/public/attachments/FCC-20-51A1\\_Rcd.pdf](https://docs.fcc.gov/public/attachments/FCC-20-51A1_Rcd.pdf)>

Licence Assisted Access (“LAA”) and 5G New Radio Unlicensed (“5G NR-U”) enable providers to augment their mobile capacity by coupling their licensed spectrum with less expensive, shared unlicensed spectrum. Allowing these evolving technologies to work together through the release of more unlicensed spectrum will promote the affordability and accessibility of connectivity services, helping to bridge the digital divide in Canada.

8. The Department has stated that its objectives in this proceeding include: (i) promoting choice and affordability of wireless services for consumers and businesses; (ii) encouraging innovation and investment in new technology and services; and, (iii) facilitating deployment and timely availability of wireless broadband internet.<sup>4</sup> At the same time, one of the core mandates of the Department is to manage scarce spectrum resources in the public interest to maximize the economic and social benefits flowing from this resource to Canadians.<sup>5</sup> As we will explain, releasing the 6 GHz band for unlicensed use promotes these objectives and aligns with the Department’s mandate.

## **II. UNLICENSED SPECTRUM IS A CRITICAL INPUT TO OUR CONNECTIVITY INFRASTRUCTURE**

9. Wi-Fi serves as a major enabler of connectivity and technology in the home, at work, and in public spaces.<sup>6</sup> It is both a platform for innovative business models and an essential access technology. It is used to connect a broad variety of devices, including mobile phones, tablets, smart TVs, smart homes, cameras, and speakers. A critical element of the broadband ecosystem, Wi-Fi is an enabling resource that extends broadband networks within and beyond the home. In rural and remote areas, where the business case for wireline expansion is challenging, Wi-Fi presents a simple and cost-effective way to help extend connectivity.
10. However, the scope of unlicensed connectivity technology that is anticipated to leverage 6 GHz spectrum goes far beyond Wi-Fi as traditionally conceived. With the emerging Internet of Things, we will see billions of devices, appliances and gadgets connecting to the internet via unlicensed spectrum in the coming years, which holds huge potential for unprecedented innovation. This unlicensed spectrum will also

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<sup>4</sup> Consultation Document, paragraph 9.

<sup>5</sup> ISED, *SPFC – Spectrum Policy Framework for Canada*, June 2007, Section 4.3. <<https://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf08776.html#s3>>

<sup>6</sup> Dynamic Spectrum Alliance & Policy Impact Partners, *How to Realise the Full Potential of 6 GHz Spectrum: A White Paper*, October 2020, page 1 (the “DSA White Paper”). <[https://policyimpactpartners.com/wp-content/uploads/2020/11/6-GHz-White-Paper\\_EMEA.pdf](https://policyimpactpartners.com/wp-content/uploads/2020/11/6-GHz-White-Paper_EMEA.pdf)>

support new applications and services related to 8K video, Virtual Reality (“VR”), Augmented Reality (“AR”), gaming, remote office, and cloud computing.

11. In addition, unlicensed technologies support mobile wireless connectivity in two important ways, as we discuss further below:
  - Next-generation Wi-Fi will provide seamless data offloading from 5G, which will enhance 5G performance and affordability; and
  - Technologies like LAA and 5G NR-U allow mobile providers to couple licensed and unlicensed spectrum, augmenting mobile capacity. Notably, 5G NR-U is the first global cellular standard with both licence-assisted and standalone use of unlicensed spectrum.<sup>7</sup>
12. The affordability of Wi-Fi and other unlicensed technologies has at once contributed to their proliferation and made them critical to bridging the digital divide. As the FCC has recognized, unlicensed devices relying on Wi-Fi and other technical standards are “indispensable for providing low-cost connectivity”.<sup>8</sup> Wi-Fi is often the most cost-effective way for users to access the internet, enabling extensive use of internet-based applications and services at a low cost. Indeed, the cost of licensing the necessary intellectual property for cellular 5G is three times that of a Wi-Fi chipset, and an entire 5G modem costs significantly more than a Wi-Fi chipset.<sup>9</sup> Unlicensed spectrum is available to all providers and users, reducing a significant barrier to competition – high spectrum acquisition costs.
13. As alluded to above, the affordability and ease of use of unlicensed technologies such as Wi-Fi make them an important tool for rural service providers. The Consultation Document observes that “[r]ural broadband service providers leverage licence-exempt spectrum to deliver broadband to residential and business customers in rural areas.”<sup>10</sup> We agree with the Department that standard-power access points leveraging the 6 GHz band will supplement access networks using wide area wireless technologies to provide rural broadband. The FCC’s decision was praised by consumer groups for this reason: “Wi-Fi hotspots can play a vital role in bringing broadband to those otherwise

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<sup>7</sup>Qualcomm, *How Does Unlicensed Spectrum With NR-U Transform What 5G Can Do For You?*, June 2020, page 6. <<https://www.qualcomm.com/media/documents/files/presentation-how-nr-u-can-transform-what-5g-can-do-for-you.pdf>>

<sup>8</sup> FCC Fact Sheet and Further Notice of Proposed Rulemaking, *Unlicensed Use of the 6 GHz Band*, April 2, 2020, page 1 (the “FCC FNPRM”). <<https://docs.fcc.gov/public/attachments/DOC-363490A1.pdf>>

<sup>9</sup> DSA White Paper, page 8.

<sup>10</sup> Consultation Document, para 6.

unconnected. Opening the entire 6 GHz band for Wi-Fi 6 deployment will help connect more Americans with faster and better internet at a time where being connected means more than ever. We look forward to working with the FCC on making faster broadband a reality for more consumers in the near future.”<sup>11</sup>

14. Unlicensed technologies have an enormous economic impact. According to a study conducted by Wi-Fi Alliance, in 2018, the economic value provided by Wi-Fi was nearly \$2 trillion, with expected growth to almost \$3.5 trillion by 2023.<sup>12</sup> It has also been estimated that the FCC’s decision to allocate the full band for unlicensed use will generate more than US \$180 billion over the next five years.<sup>13</sup> Unlicensed technologies connect and entertain people. They also support the creation of new technologies, jobs, and entire industries, delivering tangible, economic gains to consumers and businesses.
15. It is clear from the above that Wi-Fi and other technologies that rely on unlicensed spectrum align with each of the guiding policy objectives for this proceeding: they promote choice and affordability, encourage innovation and investment in new technologies and services, and facilitate the deployment of broadband internet, including in rural parts of the country. It follows, therefore, that promoting the use and development of these technologies by making additional, urgently needed spectrum available to them, will also contribute significantly to these policy goals.

### **III. THE CLEAR AND URGENT NEED FOR MORE UNLICENSED SPECTRUM SUPPORTS THE DEPARTMENT’S PROPOSAL TO ALLOW UNLICENSED USE ACROSS THE 6 GHZ BAND**

*Demand is growing exponentially, and current unlicensed bands are overburdened*

16. There is clear evidence that consumers and businesses are choosing Wi-Fi as their preferred way to access the internet. More than half of all global internet traffic begins

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<sup>11</sup> Public Knowledge with Statement Attributed to Bertram Lee, Policy Counsel, *Public Knowledge Applauds FCC for Supporting Deployment of Next-Gen Wi-Fi and 5G*, April 23, 2020 (“Public Knowledge Statement”). <<https://www.publicknowledge.org/press-release/public-knowledge-applauds-fcc-for-supporting-deployment-of-next-gen-wi-fi-and-5g/>>

<sup>12</sup> Wi-Fi Alliance, *Wi-Fi Global Economic Value Reaches \$1.96 trillion in 2018*, October 9, 2018. <<https://www.wi-fi.org/news-events/newsroom/wi-fi-global-economic-value-reaches-196-trillion-in-2018>>

<sup>13</sup> C-Net, *Wi-Fi 6 is the Fastest Standard Yet. Wi-Fi 6E will be Even Better*, September 11, 2020. <<https://www.cnet.com/how-to/wi-fi-6-is-the-fastest-yet-but-wi-fi-6e-will-be-even-better-6-ghz/>>

or ends on Wi-Fi.<sup>14</sup> The evidence also clearly establishes that this massive consumer demand for Wi-Fi is growing. For example:

- Cisco estimates that mobile data traffic will more than double between 2019 and 2022;<sup>15</sup>
- 59% of mobile data traffic will be offloaded to Wi-Fi by 2022;<sup>16</sup>
- Globally, Wi-Fi will carry 51% of total IP traffic by 2022, compared with 29% on wired connections and 20% on mobile connections;<sup>17</sup> and,
- The annual unit shipments of Wi-Fi enabled devices are set to increase from 3.3 billion units in 2019 to more than 4.5 billion by 2024.<sup>18</sup>

17. The COVID-19 pandemic has amplified the importance of Wi-Fi to our economy, as well as our educational and social needs. As of June 2020, the daily time consumers spent connected to broadband increased by two and a half hours per day as compared to before the pandemic.<sup>19</sup>

18. Despite the critical importance of unlicensed technologies, and the skyrocketing consumer demand, there have been no significant releases of unlicensed spectrum in Canada for over 15 years. The last significant allocation of unlicensed spectrum was in 2005, of 255 MHz in the 5 GHz band.<sup>20</sup>

19. The failure to allocate sufficient spectrum for unlicensed use is contributing to congestion in the current unlicensed bands and creating a bottleneck in the broadband network. As has been observed, “[E]ven the fastest fibre broadband internet service is useless for consumers without the Wi-Fi spectrum needed to connect all of our laptops,

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<sup>14</sup> Wi-Fi Alliance, *Wi-Fi Alliance Delivers Wi-Fi 6E Certification Program*, January 7, 2021. <<https://www.wi-fi.org/news-events/newsroom/wi-fi-alliance-delivers-wi-fi-6e-certification-program>>

<sup>15</sup> Cisco, *Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2017-2022*, February 2019, page 4. <<https://s3.amazonaws.com/media.mediapost.com/uploads/CiscoForecast.pdf>>

<sup>16</sup> *Ibid*, figure 16.

<sup>17</sup> Cisco, *Global Mobile Networks Will Support More Than 12 Billion Mobile Devices and IoT Connections by 2022; Mobile Traffic Approaching Zettabyte Milestone*, February 2019, Figure 4. <<https://newsroom.cisco.com/press-release-content?articleId=1967403>>

<sup>18</sup> Consultation Document, paragraph 10.

<sup>19</sup> June 2020 Ericsson Report, page 7.

<sup>20</sup> Industry Canada, *SP-5150 MHz – Spectrum Utilization Policy for Licence-exempt Wireless Local Area Networks in the 5 GHz Range (Issue 2)*, April 2005. <<https://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf01158.html#c44>>

tablets, smartphones and future smart home devices”.<sup>21</sup> As the pandemic has highlighted, “overloaded Wi-Fi remains a weak link in our internet ecosystem”.<sup>22</sup>

20. The FCC specifically acknowledged unlicensed spectrum scarcity as a motivator for its decision: “[I]n order to fully take advantage of the benefits of Wi-Fi 6, we need to make more mid-band spectrum available for unlicensed use. It’s been a long, long time since we did that – and consumers deserve it.”<sup>23</sup>
21. Prior to the pandemic, the Wi-Fi Alliance conducted a spectrum needs study, which found that future allocations of unlicensed spectrum would need to be assigned with sufficient contiguity such that wide channels of 160 MHz, or perhaps even wider in the future, can be constructed with ease.<sup>24</sup> It also found that between 1.3 and 1.7 GHz of additional spectrum may be required to meet demand by 2025.<sup>25</sup> 6 GHz is the clearest near-term opportunity to allow for a significant allocation of unlicensed spectrum that is necessary to meet the growing demand. Shaw concurs with the Department’s observation that 6 GHz is a “natural fit” to fill this gap.<sup>26</sup>

*Next-generation unlicensed technologies will require wider channels*

22. Next-generation Wi-Fi technology holds tremendous promise for the future of connectivity in Canada. This includes the next evolution in Wi-Fi – the extension of the IEEE 802.11ax Wi-Fi standard to the 6 GHz band, or Wi-Fi 6E. This technology will drastically improve Wi-Fi performance by enabling compatible devices to benefit from greater responsiveness, increased capacity, improved power efficiency and higher data rates – it can support data rates of up to 9.6 Gbps, compared to only 1.3 Gbps for the current standard.<sup>27</sup> As the FCC has stated, “Wi-Fi 6 will be over two-and-a-half times faster than the current standard, and it will offer better performance for connected devices.”<sup>28</sup> Wi-Fi 6E will support a variety of use cases: Wi-Fi calling, smart home devices, automation of city-wide services, health monitoring devices, high density

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<sup>21</sup> Open Technology Institute with Statement Attributed to Michael Calabrese, *OTI Applauds FCC for Opening 6 GHz Band to Support Next-Generation Wi-Fi*, April 23, 2020 (“OTI Statement”).  
<<https://www.newamerica.org/oti/press-releases/oti-applauds-fcc-opening-6-ghz-band-support-next-generation-wi-fi/>>

<sup>22</sup> Public Knowledge Statement.

<sup>23</sup> The FCC Chairman Statement.

<sup>24</sup> Quotient Associates Report to Wi-Fi Alliance, *Wi-Fi Spectrum Needs Study*, February 2017, Section 8.2. Summarized and accessible via: <<https://www.wi-fi.org/news-events/newsroom/additional-unlicensed-spectrum-needed-to-deliver-future-wi-fi-connectivity>>

<sup>25</sup> *Ibid*, Section 8.1.

<sup>26</sup> Consultation Document, paragraph 11.

<sup>27</sup> DSA White Paper, page 7.

<sup>28</sup> The FCC Chairman Statement.



deployments, IOT devices, and more.<sup>29</sup> Notably, Wi-Fi 6E will also unlock significant improvements in AR and VR technology. Currently, AR and VR uses are challenging and typically require tethered cables to achieve the necessary bandwidth.

23. To unleash the full benefits of Wi-Fi 6, Canada must release the full 6 GHz band for unlicensed use. Such a significant release will enable the wide spectrum channels (i.e., at least 160 MHz) that are critical to supporting faster data transmission and seamless 5G offload.<sup>30</sup> Wide channels are “absolutely necessary” in order to “obtain unlicensed 5G-like capabilities”.<sup>31</sup> The FCC has also observed that such wide channels also promotes more “efficient and productive” use of the spectrum.<sup>32</sup>
24. While attention is currently focused Wi-Fi 6, the next generation of Wi-Fi is being developed by the working group that creates Wi-Fi standards. The next Wi-Fi standard, known as 802.11be (or Wi-Fi 7) will introduce many revolutionary improvements to Wi-Fi, including: 320 MHz channel bandwidths, up to 16 spatial streams, and multi-band/multi-channel carrier aggregation. Together these and other improvements promise data rates up to 40 Gbps. An initial version of the 802.11be standard is expected to be released in May 2021 with the final version slated for early 2024.<sup>33</sup> In addition to 802.11be, the IEEE has several other projects in development such as low power IoT applications (802.11ba), 2nd generation positioning (802.11az), and enhanced broadcast services (802.11bc).<sup>34</sup>
25. Given the limited foreseeable opportunities for further unlicensed spectrum releases, the Department should set Canada up for success in future generations of unlicensed connectivity by moving forward with its proposal to release the entire 6 GHz band for unlicensed use.

*Releasing the full band ensures Canada keeps pace with the U.S. and other global counterparts*

26. As the Consultation Document explains, the U.S. has already proceeded to make the full 6 GHz band available for unlicensed use, and American consumers are primed to reap the benefits of this decision. Consumer groups in the U.S. lauded the FCC’s

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<sup>29</sup> DSA White Paper, page 7.

<sup>30</sup> DSA White Paper, page 11.

<sup>31</sup> Statement of FCC Commissioner Michael O’Reilly, *Unlicensed Use of the 6 GHz Band*, April 2020, page 1.  
<<https://docs.fcc.gov/public/attachments/FCC-20-51A3.pdf>>

<sup>32</sup> FCC FNPRM, paragraph 192.

<sup>33</sup> IEEE, *IEEE P802.11 – Task Group BE (EHT) Meeting Update*, access January 19, 2020.  
<[https://www.ieee802.org/11/Reports/tgbe\\_update.htm](https://www.ieee802.org/11/Reports/tgbe_update.htm)>

<sup>34</sup> IEEE, *IEEE 802.11 – Working Group for WLAN Standards*, accessed January 19, 2020.  
<<https://www.ieee802.org/11/>>

decision to make the 6 GHz band available for unlicensed use, stating that the decision will “accelerate the availability and affordability of next-generation applications and services nationwide”.<sup>35</sup> They also noted that unleashing the full band is “a massive win for [American] consumers, who will soon be able to use next-generation Wi-Fi services to power faster speeds for everything they currently need [...]”<sup>36</sup> and will “help connect more Americans with faster and better internet at a time where being connected means more than ever”.<sup>37</sup> Failing to make this spectrum available for unlicensed use in Canada would hinder Canada’s competitiveness in the global digital economy.

27. Several other regulators internationally are following the FCC’s lead with respect to 6 GHz. South Korea – another global technology leader – has also decided to release the full band for unlicensed use.<sup>38</sup> The same can be said with respect to Chile.<sup>39</sup> Multiple other countries, including Mexico,<sup>40</sup> Brazil,<sup>41</sup> Colombia,<sup>42</sup> and Costa Rica,<sup>43</sup> have proposed allocating the entire band for unlicensed use.
28. These developments have spurred significant momentum with respect to the development and manufacture of 6 GHz equipment and devices. It is forecasted that more than 316 million Wi-Fi 6 devices will enter the market by 2021.<sup>44</sup> With this Consultation, Canada has an opportunity to capitalize on a shared, rapidly developing ecosystem of next-generation unlicensed devices and join the U.S. as a global leader in next-generation Wi-Fi connectivity.

*Releasing only a portion of the band will create challenges and delay the benefits of unlicensed access to Canadians*

29. Some parties may suggest that the Department should delay its decision on the upper portion of the band and instead consider it for future licensed mobile use, depending on the outcome of the 2023 the World Communication Conference (“WRC-23”). As a

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<sup>35</sup> OTI Statement.

<sup>36</sup> OTI Statement.

<sup>37</sup> Public Knowledge Statement.

<sup>38</sup> Consultation Document, Paragraph 20.

<sup>39</sup> Wi-Fi Now, *Republic of Chile becomes first country in South America to adopt 6 GHz Wi-Fi*, November 4, 2020. <<https://wifinowglobal.com/news-and-blog/chile-becomes-first-country-in-south-america-to-adopt-6-ghz-wi-fi/>>

<sup>40</sup> Bnamericas, *IFT launches public consultation on the use of the 6 GHz band in Mexico*, November 6, 2020.

<<https://www.bnamericas.com/en/news/ift-launches-public-consultation-on-the-use-of-the-6-ghz-band-in-mexico>>

<sup>41</sup> Wi-Fi Now, *Brazil takes decisive step towards releasing full 6 GHz band to Wi-Fi*, December 11, 2020. <<https://wifinowglobal.com/news-and-blog/brazil-takes-decisive-step-towards-releasing-full-6-ghz-band-to-wi-fi/>>

<sup>42</sup> C-TeiTel, *Public Consultation in Colombia on free use in the 6 GHz band*, January 12, 2021. <<https://c-teitel.com/public-consultation-in-colombia-on-free-use-in-the-6-ghz-band/>>

<sup>43</sup> *Supra*, note 41.

<sup>44</sup> DSA White Paper, page 1.

regional disruptor in the wireless market, Shaw is generally supportive of ISED allocating spectrum for licensed mobile use, provided such spectrum releases include pro-competitive measures that help to alleviate the Big 3's dominance of mobile spectrum holdings, thereby promoting sustainable competition in wireless.

30. However, in this case, Shaw has reservations about whether such a "wait and see" approach is in the best interests of consumers. Releasing only a portion of the band would delay one of the critical benefits of making this entire band available for unlicensed use – namely, the opportunity to create several 160 MHz channels and 320 MHz channels, which, as discussed above, will be critical for Wi-Fi 6 and future generations of Wi-Fi. As the FCC proceeding has demonstrated, the 6 GHz band is optimum for immediate unlicensed use.
31. On the other hand, the suitability of this band for future licensed mobile use is speculative. Although there is an agenda item at WRC-23 for Region 1 relating to international mobile telecommunications ("IMT") in the upper part of the 6 GHz band, this does not necessarily mean that domestic regulators in that region will pursue a traditional licensing approach. For Region 2, which includes North America, only the 7025-7125 MHz range is under consideration, as part of a global allocation.
32. In any event, even if a portion of the 6 GHz band is identified for IMT in North America, the process of allocating such spectrum for licensed mobile use in Canada will take at least another year if not several years after WRC-23. That would mean that Canadians could wait for another five years to enjoy the benefits of this spectrum through licensed use when there is an opportunity, through unlicensed use, to give them full benefits within a matter of months. In this regard, since licensed mobile technologies operate at significantly higher power than unlicensed technologies, co-existence with incumbent users will be extremely challenging or impracticable. In its rejection of a proposal to reserve the upper portion of the band for licensed mobile use in the U.S., the FCC acknowledged such concerns, commenting that:

Making the entire band available for these unlicensed operations enables use of wide swaths of spectrum, including several 160-megahertz channels as well as 320-megahertz channels, which promotes more efficient and productive use of the spectrum, and would also help create a larger ecosystem in the 5 GHz and 6 GHz bands for U-NII devices. Repurposing large portions of the 6 GHz band for new licensed services would diminish the benefits of such use to the American public. Accordingly, we agree with the unlicensed proponents that we should reject these requests. Similarly, repurposing substantial portions of the band, as CTIA and Ericsson request, would substantially affect existing licensed services in the band. This would be contrary to the Commission's stated goal in this

proceeding to ensure that existing incumbents can continue to thrive in the 6 GHz band. [...] Further, there is no certain or clear path for achieving what CTIA and Ericsson propose, and it would take years.<sup>45</sup>

33. In contrast, co-existence among unlicensed users and incumbent licensees is practicable. Technical studies in the U.S. have found that co-existence between unlicensed users and incumbent licensees in the band can be achieved and that the potential for harmful interference can be mitigated with appropriate measures.<sup>46</sup> As detailed in our responses to the Department's questions below, we support such measures.
34. Allocating more spectrum for unlicensed use will further reduce co-existence concerns. Releasing the full band for unlicensed technologies will spread the associated radio energy across and throughout the entire band. More spectrum available means fewer unlicensed transmitters will be operating on a co-channel basis with an incumbent, which in turn reduces the level of interference.
35. We also note that the Department's proposal to release the entire 6 GHz band for unlicensed use will not undermine the development and deployment of next-generation mobile services in Canada, including 5G. In fact, unlicensed spectrum will play a critical role in supporting this objective. As discussed in detail above, unlicensed technologies support and augment mobile technologies. Strong Wi-Fi is critical to allow seamless offloading of data from mobile networks, and unlicensed technologies such as LAA and 5G NR-U enable providers to couple their licensed spectrum holdings with less expensive, shared unlicensed spectrum, allowing them to offer stronger 5G performance at a lower price.
36. With the imposition of the prudent co-existence mechanisms proposed by the Department, the allocation of this band for unlicensed use is expected to have immediate consumer benefits. Future licence mobile use in the band – which is speculative and at best several years away – does not justify delaying for Canadians the full benefit of unlicensed use.

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<sup>45</sup> FCC Report and Order, paragraph 205.

<sup>46</sup> For example, see FCC Report and Order, paragraph 113. The FCC refers to technical studies, including the CableLabs study, which the FCC considered the "most significant": CableLabs, Dec 20, 2019 *Ex Parte*; CableLabs Jan 17, 2020 *Ex Parte*.

<[https://ecfsapi.fcc.gov/file/101171404403806/20200115\\_6GHz\\_further%20analysis\\_final.pdf](https://ecfsapi.fcc.gov/file/101171404403806/20200115_6GHz_further%20analysis_final.pdf)>; see also:  
<[https://ecfsapi.fcc.gov/file/1030939460443/20200309\\_6%20GHz%20ex%20parte\\_final.pdf](https://ecfsapi.fcc.gov/file/1030939460443/20200309_6%20GHz%20ex%20parte_final.pdf)>

#### IV. RESPONSES TO SPECIFIC QUESTIONS RAISED

**Q1** - ISED is seeking comments on the timelines for the availability of:

- a) low-power equipment ecosystems, both Wi-Fi 6E and 5G NR-U
- b) standard-power equipment ecosystems, both Wi-Fi 6E and 5G NR-U, under the control of an AFC
- c) AFC

37. With respect to low-power equipment ecosystems and Wi-Fi 6E, there is clear evidence of robust and rapidly expanding device ecosystems:

- In January 2020, the Wi-Fi Alliance announced Wi-Fi 6E certification as part of Wi-Fi CERTIFIED 6, which offers the features and capabilities of Wi-Fi 6, extended to the 6 GHz band.<sup>47</sup>
- In February 2020, Broadcom announced the world's first Wi-Fi 6E chip for mobile devices.<sup>48</sup> The chipset supports 160 MHz channels and offers speeds over 2 Gbps and has just received FCC approval.<sup>49</sup>
- Qualcomm announced its first chipsets with support for Wi-Fi- 6E for phones and routers in May 2020. The chipset for routers started shipping immediately and the one for phones started in mid-2020.<sup>50</sup>
- In October 2020, Qualcomm also announced two new Wi-Fi 6E chipsets for mesh networking in time for new products to ship in early 2021. Mesh networking provides a dedicated 6 GHz backchannel for the routers to communicate to home gateways without interference.<sup>51</sup>

<sup>47</sup> Wi-Fi Alliance, *Wi-Fi Alliance Delivers Wi-Fi 6E Certification Program*, January 7, 2021. <<https://www.wi-fi.org/news-events/newsroom/wi-fi-alliance-delivers-wi-fi-6e-certification-program>>; see also: <<https://www.wi-fi.org/news-events/newsroom/wi-fi-alliance-brings-wi-fi-6-into-6-ghz>>

<sup>48</sup> Broadcom, *Broadcom Announces World's First Wi-Fi 6E Chip for Mobile Devices*, February 12, 2020. <<https://www.broadcom.com/company/news/product-releases/52926>>

<sup>49</sup> *Ibid.*

<sup>50</sup> Qualcomm, *Qualcomm Answers Surging Connectivity Demand with Comprehensive New Portfolio of Wi-Fi 6E Networking Platforms*, May 28, 2020. <<https://www.qualcomm.com/news/releases/2020/05/28/qualcomm-answers-surging-connectivity-demand-comprehensive-new-portfolio-wi>>

<sup>51</sup> Qualcomm, *Qualcomm Unveils Immersive Home Platform for Next-Generation Mesh Wi-Fi Networks*, October 27, 2020. <<https://www.qualcomm.com/news/releases/2020/10/27/qualcomm-unveils-immersive-home-platform-next-generation-mesh-wi-fi>>

- Qualcomm announced in December 2020 that the new Snapdragon 888 5G mobile chipset will include Wi-Fi 6E capability. The platform now supports 160 MHz channels in the 6 GHz band and data rates of up to 3.6 Gbps, which are ideal for low-latency VR.<sup>52</sup>
  - Likewise, Celeno announced in early 2020 that it would be adding Wi-Fi 6E support to its router chipsets with samples available in Q2 of 2020.<sup>53</sup>
  - Intel started shipping a Wi-Fi 6E adapter for laptops and desktop computers in November 2020.<sup>54</sup>
  - According to several sources, the Samsung Galaxy S21 smartphone which is scheduled for release in January 2021 will be equipped with Wi-Fi 6E.<sup>55</sup>
  - On January 8<sup>th</sup>, 2021, ASUS' first Wi-Fi 6E router hit the market;<sup>56</sup> other manufacturers are expecting release of Wi-Fi 6E compatible products in early to mid-2021.
38. Wi-Fi Alliance members are demonstrating their readiness to move quickly into the band, with initial forecasts that more than 316 million Wi-Fi 6E devices will enter the market in 2021.<sup>57</sup>
39. With respect to low-power 5G NR-U, in July 2020, the 3GPP finalized Release 16, which includes specifications for 5G NR-U operation in both non-standalone and

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<sup>52</sup> Qualcomm, *Qualcomm Redefines Premium with the Flagship Snapdragon 888 5G Mobile Platform*, December 2, 2020. <<https://www.qualcomm.com/news/releases/2020/12/02/qualcomm-redefines-premium-flagship-snapdragon-888-5g-mobile-platform>>

<sup>53</sup> Celeno, *Celeno Adds Wi-Fi 6E to CL8000 Series Supporting 6 GHz Spectrum Band*, January 7, 2020. <<https://www.celeno.com/media-room/press-releases/celeno-adds-wi-fi-6e-to-its-cl8000-product-series-supporting-the-new-6ghz-spectrum-band>>

<sup>54</sup> Intel, *Product Brief: Intel Wi-Fi 6E AX210 (Gig+) Module*, accessed January 18, 2020. <<https://www.intel.com/content/www/us/en/products/docs/wireless/wi-fi-6e-ax201-module-brief.html>>

<sup>55</sup> Android Police, *Exclusive: Specs and features of Samsung's Galaxy S21 smartphones*, November 14, 2020. <<https://www.androidpolice.com/2020/11/14/exclusive-specs-and-features-of-samsungs-galaxy-s21-smartphones/>>

<sup>56</sup> DongKnows Tech, *ASUS' ROG Rapture GT-AXE11000 Preview*, January 8, 2021. <<https://dongknows.com/asus-rog-rapture-gt-axe11000-wi-fi-6e-router-review/#more-28380>>

<sup>57</sup> Wi-Fi Alliance, *Wi-Fi Alliance Delivers More Value from Wi-Fi in 6 Ghz: Industry coalesces on secure and interoperable Wi-Fi 6E*, April 23, 2020. <[14](https://www.globenewswire.com/news-release/2020/04/23/2021130/0/en/Wi-Fi-Alliance-delivers-more-value-from-Wi-Fi-in-6-GHz.html#:~:text=6%20GHz%20will%20pave%20the,Wi%2DFi%20devices%20and%20networks.&text=Wi%2DFi%20Alliance%20members%20are,enter%20the%20market%20in%202021.></a>></p></div><div data-bbox=)

standalone modes in the 6 GHz band. Although Qualcomm has been a major proponent of 5G NR-U, there have been no announcements to date on the availability of supporting chipsets. As such, we do not expect products to be available until 2022 or later.

40. With respect to the AFC, this equipment is expected to be released in 2021 or 2022. It is possible that this timeline will be even more imminent – once the FCC specifies a framework for AFC systems, this will spur interested parties to move quickly to begin development.

**Q2** - ISED is seeking comments on its proposals to allow licence-exempt RLAN use in the 5925-7125 MHz band.

**Q3** - ISED is seeking comments on the proposed footnote Cxx and the changes to the CTFA as shown in table 2.

41. Please refer to Shaw's comments in Sections II-III above. As discussed, Shaw supports the Department's proposal to allow unlicensed use across the 5925-7125 MHz band.
42. Shaw also supports the proposed changes to the footnote shown in Table 2 of the Consultation Document.

**Q4** - ISED is seeking comments on the proposed rules for standard-power RLANs:

- a. indoor and outdoor operation would be permitted
- b. RLAN access points would only be permitted to operate under the control of an AFC system in the 5925-6875 MHz frequency range
- c. maximum permitted e.i.r.p. would be 36 dBm
- d. maximum permitted power spectral density would be limited to 23 dBm/MHz
- e. use of a vertical elevation mask, with a maximum e.i.r.p. of 125 mW at elevation angles above 30 degrees over the horizon, would be required

**Q5** - ISED is seeking comments on allowing access to the additional 100 MHz of spectrum in the 6425-6525 MHz sub-band for standard-power operation.

**Q6** - ISED is seeking comments on the equipment availability of standard-power RLANs in the 6425- 6525 MHz band and the impact on the development of AFC systems for Canada due to a potential lack of international harmonization for that sub-band.

In providing comments, respondents are requested to include supporting arguments and rationale and take the Canadian context into consideration in their response.

43. Shaw agrees with the Department's proposals regarding standard power radio local area network devices ("RLANs"). Standard power operations can be deployed anywhere as part of hotspot networks, including to support rural broadband deployments and to facilitate capacity upgrades.<sup>58</sup>
44. We also support the proposed power levels and mitigation measures. As detailed above, harmonizing our approach with the U.S. will give Canadians the benefit of a shared ecosystem with the U.S. and the economies of scale it provides. There is no compelling reason for Canada to deviate from the U.S. approach. Although Shaw appreciates the importance of examining the Canadian context to identify areas of material difference that might warrant a distinct approach, there are no such issues with respect to the 6 GHz band. Notably, the incumbent users of the band are the same as in the U.S., except for in the 6425-6525 MHz range, which has allowed ISED to extend its standard power proposals, as discussed below.
45. Furthermore, as discussed in the Consultation Document, the Department's technical experts have conducted their own detailed technical analysis on the co-existence of RLANs with existing users, including with respect to standard power operations,<sup>59</sup> in addition to reviewing and analyzing the studies submitted to the FCC. As was observed by consumer groups in the U.S. following the FCC's decision on 6 GHz, these were comprehensive technical assessments:

We recognize that in every spectrum fight, incumbents may feel as if they have been wronged. However, the career staff and the FCC engineers the Commissioners rely on to make the right call have a longstanding reputation of understanding and evaluating interference claims. Interference decisions are technical — not political — and the FCC has taken an appropriately cautious approach. Public Knowledge has a long history of fighting to protect critical network services, and we would not support this item if we believed it put vital services at risk.<sup>60</sup>

46. Based on our own review of the studies submitted to the FCC, Shaw is confident that the co-existence measures proposed by the Department, which appropriately align with the FCC rules, are sufficient to protect incumbent users of the band in Canada as well, including Shaw's own FSS and fixed operations. In our view, the Canadian context

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<sup>58</sup> FCC Report and Order, paragraph 3.

<sup>59</sup> Consultation Document, paragraph 49.

<sup>60</sup> Public Knowledge with Statement Attributed to Bertram Lee, Policy Counsel, *Public Knowledge Applauds FCC for Supporting Deployment of Next-Gen Wi-Fi and 5G*, April 23, 2020 ("Public Knowledge Statement").  
<<https://www.publicknowledge.org/press-release/public-knowledge-applauds-fcc-for-supporting-deployment-of-next-gen-wi-fi-and-5g/>>



does not justify a significant deviation from the rules implemented in the U.S., beyond what the Department has already proposed.

47. With respect to the protection of FSS users, in particular, Shaw agrees with the Department's assessment that the proposed vertical elevation mask is more than sufficient to protect against harmful interference from standard power devices operating outdoors, even when taking into consideration the distinct geographical context – which, some may argue would require modifications to the U.S. approach. In Shaw's view, such concerns should be offset by another pertinent contextual difference: the significantly lower population density in Canada. Additionally, a recent study demonstrates that RLAN operations in 6 GHz will not cause harmful interference to FSS users, even without the vertical elevation mask adopted by the FCC.<sup>61</sup> In fact, the device e.i.r.p. used in the study simulations exceeded the 125mW elevation mask limit by up to 9 dB 28.7% of the time for all outdoor access points (“APs”) and 53.2% of the time for High Power APs.
48. We further note that, as in the U.S., the Department's proposals are generally consistent with, or are even more conservative than, the Department's existing rules for unlicensed operations in the adjacent 5 GHz band, which also houses incumbent FSS users. For example, the Department proposes the same vertical elevation mask – 125 mW and a 30-degree elevation angle – as was adopted by the Department for high power outdoor devices (“HPODs”) operating in the 5150-5250 MHz band,<sup>62</sup> while RLANs in the 5725-5825 MHz range do not require a vertical elevation mask. Similarly, the proposed e.i.r.p. of 36 dBm is consistent with these other bands.
49. Shaw supports the proposal to allow access to the 6425-6525 MHz band for standard power RLAN operation. Unlike the U.S., which did not make that range available for standard power use, Canada does not have Broadcast Auxiliary Service and Cable Television Relay Service incumbents in the band.<sup>63</sup> As the Department describes, this “presents an opportunity” for Canada to make more spectrum available for standard power.<sup>64</sup> Not only will opening this band for unlicensed use increase the overall amount of spectrum that is available, it will also enable contiguity, which will be important for the implementation of wider channels required to support higher speeds and improved

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<sup>61</sup> RFK Engineering, *Frequency Sharing for Radio Local Area Networks in the 6 GHz Band*, January 2018. <<https://ecfsapi.fcc.gov/file/10126878417951/6%20USC%20Ex%20Parte%20Final.pdf>>

<sup>62</sup> ISED, *Decision on the Technical and Policy Framework for Radio Local Area Network Devices Operating in the 5150-5250 MHz Frequency Band*, Table A.1. <<https://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf11294.html>>

<sup>63</sup> Consultation Document, Figure 4.

<sup>64</sup> Consultation Document, paragraph 53.

Wi-Fi performance. Up to six 160 MHz channels can be supported across the contiguous 5925-6875 MHz sub-band.

50. With respect to equipment availability of standard power devices in the 6425-6525 MHz frequency range, based on our discussions with chipset and equipment manufacturers, standard power equipment manufactured for the U.S. and other international markets should be able to operate within this band with appropriate firmware revisions. We do not anticipate any concerns with implementing/extending AFC systems in Canada to cover this band. Cross border coordination could be addressed within the applicable RSS and SRSP documents (e.g., through the use of exclusion zones).

**Q7** - ISED is seeking comments on the proposed rules for low-power indoor-only RLANs:

- a. operation would be permitted indoor only across the 5925-7125 MHz band
- b. the use of a contention-based protocol (e.g. listen-before-talk) would be required
- c. maximum permitted e.i.r.p. would be 30 dBm
- d. maximum permitted power spectral density would be limited to 5 dBm/MHz

In providing comments, respondents are requested to include supporting arguments and rationale and take the Canadian context into consideration in their response.

51. Please refer to Section II-III above in which we discuss the urgent need for the Department to release the entire 6 GHz band for unlicensed use.
52. Subject to our comments below regarding power spectral density, Shaw supports the Department's proposals regarding indoor low-power RLANs. Low-power operations will be ideal for in-home connectivity and use for the smartphones, tablets, laptops, and IoT devices that Canadians rely on in their day-to-day lives.<sup>65</sup>
53. With respect to the proposed mitigation measures and power limits, there is no compelling reason to deviate from the U.S approach. For the reasons detailed in the body of this submission, harmonization with the U.S. is critical in light of the associated consumer benefits. Although Shaw appreciates the importance of examining the Canadian context to identify areas of material difference that might warrant a distinct approach, there are no such issues with respect to the 6 GHz band.
54. Permitting these low-power operations will enable the deployment of Wi-Fi 6 and 6E on several 160 MHz channels across the entire band, as well as future generations

<sup>65</sup> FCC Report and Order, paragraph 3.

requiring even wider channels. Restricting such devices to indoor use and low power levels will neutralize the threat of harmful interference to incumbent operations.<sup>66</sup> As the FCC stated, the signals transmitted by these unlicensed devices will be significantly attenuated when passing through walls of buildings.<sup>67</sup> Additionally, there are many technical restrictions that can be placed on the manufacture of these devices to ensure they are only used indoors. These include certification with an integrated antenna, prohibition of weatherized enclosures and battery-powered operation, and warning labels.

55. We further agree that a contention-based protocol would be appropriate. Studies conducted in the U.S. determined that adopting such a requirement would be an effective means of providing assurance that incumbent operations will not be harmed and Shaw sees no reason to believe that these analyses would differ materially in Canada.<sup>68</sup>
56. Shaw also supports a maximum e.i.r.p. of 30 dBm but recommends that the Department consider increasing the maximum power spectral density from 5 dBm/MHz to 8 dBm/MHz, as outlined in the FCC's FNPRM.<sup>69</sup> As the FCC correctly stated, an 8 dBm/MHz PSD limit "would be useful for many indoor devices that require high data rate transmissions."<sup>70</sup> The key differences between a 5 dBm/MHz and 8 dBm/MHz PSD limit are (1) coverage area, (2) throughput in the covered area, and (3) a tendency to force traffic onto the widest channels when narrower channels are sufficient. A PSD limit of 5 dBm/MHz rather than 8 dBm/MHz limits coverage range by 31-43% and throughput by 53-63%, on average.<sup>71</sup> According to studies and the FCC's own analysis, making this change will enhance Wi-Fi performance without increasing the risk of harmful interference to incumbent services.
57. As observed above, the Department's technical experts have conducted detailed technical analysis on the co-existence of RLANs with existing users, including with respect to low power operations.<sup>72</sup> This is on top of the extensive analysis that was

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<sup>66</sup> FCC Report and Order, paragraph 97.

<sup>67</sup> FCC Report and Order, paragraph 100.

<sup>68</sup> FCC Report and Order, paragraph 101 and footnote 255.

<sup>69</sup> FCC FNPRM, paragraph 230.

<sup>70</sup> *Ibid.*

<sup>71</sup> *Supra*, note 46.

<sup>72</sup> Consultation Document, paragraph 49.

relied on by the FCC in its decision regarding the band, including the CableLabs studies.<sup>73</sup>

**Q8** - ISED is seeking comments on the proposed rules to allow very low-power RLAN devices:

- a. operation would be permitted indoors and outdoors across the frequency range 5925-7125 MHz band
- b. the use of a contention-based protocol (e.g. listen-before-talk) would be required
- c. maximum permitted e.i.r.p. would be 14 dBm
- d. maximum permitted power spectral density would be limited to -8 dBm/MHz

In providing comments, respondents are requested to include supporting arguments and rationale and take the Canadian context into consideration in their response.

58. Shaw strongly supports the Department’s proposals for very low power devices indoors and outdoors. More spectrum for these devices will enhance their coverage, capacity and efficiency and will enable significant innovative uses cases, including, as the Department describes, mobile augmented reality, in-vehicle entertainment and personal healthcare applications.<sup>74</sup> Given their prolonged battery life, lower cost and compact size, very low power devices are likely to give rise to other innovative use cases.
59. The FCC observed that permitting very low power operations would facilitate “a new and innovative generation of personal area network technologies with low latency, high capacity, and all-day battery life”<sup>75</sup> and can “usher in new ways [for people to] work, play and live by enabling applications that can provide large quantifies of information in near real-time.”<sup>76</sup> The use cases facilitated by such devices will create significant economic benefits, including increases in GDP.<sup>77</sup>
60. The Department’s proposed mitigation measures are consistent with the FCC’s proposals in its FNPRM.<sup>78</sup> As above, there is no compelling reason to deviate from the U.S. approach. The Department should monitor developments in the U.S. In the event

<sup>73</sup> *Supra*, note 46.

<sup>74</sup> Consultation Document, paragraph 62.

<sup>75</sup> Statement of Ajit Pai, *Unlicensed Use of the 6 GHz Band, Expanding Flexible Use in Mid-Band Spectrum Between 3.7 GHz and 24 GHz*, ET Docket No. 18-295 and GN Docket No. 17-183, April 2020. <<https://docs.fcc.gov/public/attachments/FCC-20-51A2.pdf>>

<sup>76</sup> FCC FNPRM, paragraph 235.

<sup>77</sup> Raul Katz, Ph.D., *Assessing the Economic Value of Unlicensed Use in the 5.9 and 6 GHz Bands*, April 2020, paragraphs 41 and 41. <<http://wififorward.org/wp-content/uploads/2020/04/5.9-6.0-FINAL-for-distribution.pdf>>

<sup>78</sup> FCC FNPRM, paragraph 224.

that the FCC adopts less conservative power levels, the Department should follow suit to ensure ongoing harmonization. In particular, given the very remote possibility of interference concerns, the FCC may determine that PSD of -8 dBm/MHz is too conservative.

61. The potential for interference concerns associated with very low power devices is extremely remote. A majority of such devices will be utilized indoors, where, as noted in our response to Question 7, the risk of interference to incumbent operations is very remote due to signal attenuation. The Department should, however, consider measures to ensure that out-of-band emissions (OOBE) from very low power devices operating inside moving vehicles do not cause harmful interference to Dedicated Short Range Communications (DSRC) and/or Cellular Vehicle-to-Anything (C-V2X) receivers operating in the adjacent 5.9 GHz band.

**Q9** - ISED is seeking comments on potential business models for AFC administrators to operate their AFC systems in Canada.

**Q10** - ISED is seeking comments on its proposal to permit the approval of multiple, third party AFC systems, taking into account the potential for the development of a sustainable market for AFC systems in Canada.

**Q11** - ISED is seeking comments on potential exit strategies if the AFC administrator decides to cease operation in Canada. In providing comments, respondents are requested to include supporting arguments and rationale.

62. Allowing the market to determine the appropriate AFC business models will encourage the development of a strong and competitive AFC ecosystem in which rates will be held in check. Allowing more than one entity would also allow a wider range of innovative offerings at lower prices. For example, device manufacturers or trade associations could potentially fund an AFC system as a value-added service for its customers or members. AFC implementation should be flexible to allow for difference use cases while including rules established by the Department through the applicable RSS that are designed to protect incumbent users.
63. The Department should implement rules to ensure continuity of AFC services in the event that an AFC administrator ceases operations in Canada. Such rules should facilitate the seamless migration of equipment to a new AFC.

**Q12** - ISED is seeking comments on adopting an AFC system model that is harmonized to the maximum extent possible with the AFC system model being implemented in the U.S. and other international markets.

In providing comments, respondents are requested to include supporting arguments and rationale and take the Canadian context into consideration in their response.

64. Harmonization with the U.S. would be prudent as it would allow Canada to benefit from economies of scale and lower costs. In addition, harmonizing with the AFC model being developed in the U.S. would simplify cross-border frequency coordination. The Department could aim to harmonize to the extent feasible while allowing flexibility, innovation, and competition in Canada.

**Q13** - ISED is seeking comments on the implementation considerations for the operation of an AFC system, specifically:

- a. information required from licensed users
- b. interference protection criteria for computation of exclusion zones
- c. information required from standard-power APs
- d. frequency of AFC update of licensee information
- e. security and privacy requirements

**Q14** - ISED is seeking comments on any additional considerations, limits or general concerns that should be taken into account in setting detailed standards and procedures for AFC operation.

In providing comments, respondents are requested to include supporting arguments and rationale and take the Canadian context into consideration in their response.

65. As Shaw is not an AFC provider, we have limited comments on these issues at this time. Shaw reserves the right to provide further comments in the reply phase.
66. The technical information for site-based licenses contained in the Department's Spectrum Management System (SMS) should be sufficient for an AFC system to define exclusion zones for protecting incumbent licensed services. The information used by the AFC, however, must be accurate and up to date. As such, licensees should be responsible for maintaining the accuracy of their technical data in the SMS database in a timely manner. Licensees failing to do so should not be eligible for protection against licence-exempt use. We also note that technical data for Public Safety and Military sites

are not contained in the SMS database for security reasons. Therefore, alternative arrangements must be made for making this information available to AFC systems.

67. Shaw agrees that interference protection criteria for computing exclusion zones should be harmonized with the U.S., wherever possible. An obvious exception is the 6425-6525 MHz band, where protection criteria may be required near the border to protect TV pick-up services operating in the U.S.
68. The information required from a standard-power AP to calculate exclusion zones include its geographic location and antenna height above ground level. All standard-power APs should be required to automatically establish their geographic coordinates (e.g., via GNSS), where possible. In areas where GNSS is not available (e.g., inside buildings), an external geo-location source may be used or the coordinates may be entered by the installer or operator of the device. Antenna height above ground may be provided by the AP or manually an installer or operator.
69. As proposed, AFC licence information should be updated once every 24 hours at a minimum, which is consistent with the rules for White Space Database Specifications.<sup>79</sup> Rechecking the licence information once per day is an appropriate interval because the SMS is updated daily. It also ensures that the addition of any new licensed sites or changes to existing licensed sites are taken into consideration in a timely manner when calculating exclusion zones. Similarly, APs should contact an AFC at least once every 24 hours to obtain the latest list of available frequencies and associated maximum power levels. As with the White Space Database Specification, rules should also be established for when an AFC is unable to access the SMS database.
70. The Department should require that communications between the Standard Power APs and AFC systems and between AFC systems and the SMS database are secure to prevent interception and alteration. The privacy of RLAN and licensed site data, particularly Public Safety and Military sites, should also be a key requirement of the AFC system.
71. The Department should also consider rules and operating procedures for facilitating cross-border operations. Specifically, the Department should work with the FCC to develop processes for exchanging information on fixed sites and methods for providing that information to AFC operators for incorporation into their systems.

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<sup>79</sup> ISED, *DBS-01 – White Space Database Specifications*, July 2020. <<http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf10928.html>>

72. Shaw recommends that the Department adopt a simple centralized model for AFC systems, similar to the model used for White Space Database Systems. This will reduce design complexity and facilitate oversight by the Department. Conversely, allowing both centralized and decentralized architectures could complicate the operation of AFC systems and devices, potentially delaying deployments in the band.

**Q15** - ISED is seeking comments on its proposal to require AFC systems to protect the following types of licensed stations from standard-power APs:

- a. fixed microwave stations
- b. fixed point-to-point television auxiliary stations
- c. radio astronomy stations

In providing comments, respondents are requested to include supporting arguments and rationale.

73. Shaw supports the proposal to require AFC systems to protect the above licensed stations from standard power APs. This AFC approach will ensure protection of these users from standard power use in the band.
74. An AFC combined with technical and operational rules will protect fixed microwave stations, fixed point-to-point television auxiliary stations, and radio astronomy stations from the potential of harmful interference from licence-exempt standard-power operations in the proposed 5925-6875 MHz frequency range. The use of automated systems to control access are not new. As noted in the Consultation, the Department has previously used this approach to protect television broadcast services from licence-exempt white spaces devices. The U.S. has also adopted automated systems for TV white space devices, Citizens Broadband Radio Service and, as already noted, the 6 GHz band.

**Q16** - ISED is seeking comments on the sample agreement related to the designation and operation of an AFC system in Canada.

**Q17** - ISED is seeking comments on the proposed approach to incremental implementation of an AFC system in Canada.

**Q18** - ISED is seeking comments on the objective to maximize the potential for synergies, where possible, in defining the technical and administrative requirements for the respective databases addressing different bands under different technical regimes.



75. As Shaw is not an AFC provider, we have limited comments on the sample agreement at this time. Shaw reserves the right to provide further comments in the reply phase.
76. Shaw has no objections to allowing incremental implementation of AFC systems provided they meet or exceed ISED's AFC requirements. Indeed, allowing incremental implementation could facilitate the delivery of innovative and cost-effective AFC systems in Canada.
77. Given their similarities, ISED should consider aligning the technical and administrative requirements and procedures for the AFC and White Space Database systems, where possible. This has the potential to accelerate the development and deployment of AFC systems, reduce costs (both for the ISED and system administrators), and stimulate innovation.