Reply Comments of Shaw Communications Inc.

Consultation on Releasing Millimetre Wave Spectrum to Support 5G

***Canada Gazette*, Part I, June 17, 2017, Notice No. SLPB-001-17**

November 10, 2017

I. INTRODUCTION

1. The following constitutes the reply comments of Shaw Communications Inc. ("Shaw") on behalf of itself and its wholly-owned subsidiary, Freedom Mobile Inc. ("Freedom"), to Innovation, Science and Economic Development Canada ("ISED" or "the Department") in connection with the proceeding ("Consultation") initiated by *Consultation on Releasing Millimetre Wave Spectrum to Support 5G,* Notice, No. SLPB-001-17 ("Consultation Document").[1]

2. The Department is initiating this Consultation on releasing millimetre wave ("mmW") spectrum to support 5G at the ideal time. While the development of 5G technology is still in its nascent stages, this technology is expected to enable enhanced/ultra-fast mobile broadband, massive machine type communications, and ultra-reliable low latency communications. These services hold the potential to transform the Canadian economy. Through this Consultation, ISED can lay the groundwork to ensure that Canada maintains its competitive edge in the digital economy.

3. Policymakers around the world continue to take steps to facilitate the development of 5G technologies. In the United States, the Federal Communications Commission ("FCC") adopted its 2016 *Spectrum Frontiers Order* to establish a general framework for 5G operations in the United States in the 28 GHz, 37-40 GHz and 64-71 GHz bands, which are under consideration in this Consultation.[2] The FCC is now working toward making a number of additional bands, not currently under consideration in the instant Consultation, available for 5G operations. Specifically, the FCC is scheduled to vote later this month on releasing spectrum in the 24.25-24.45/24.75-25.25 GHz and 47.2-48.2 GHz bands for flexible wireless use.[3] In addition, the FCC has sought comment on whether to release

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[1] ISED, *Consultation on Releasing Millimetre Wave Spectrum to Support 5G,* Notice, No. SLPB-001-17, at para. 2 (June 2017) ("Consultation Document").

[2] In the *Spectrum Frontiers Order*, the FCC released a Further Notice of Proposed Rulemaking seeking comment on making these additional bands available for 5G. *Use of Spectrum Bands Above 24 GHz For Mobile Radio Services,* Report and Order and Further Notice of Proposed Rulemaking, 31 FCC Rcd 8014 (2016) ("*Spectrum Frontiers Order*")

[3] *See FCC Announces Tentative Agenda for November Open Meeting*, News Release, FCC (rel. Oct. 26, 2017); *see also Use of Spectrum Bands Above 24 GHz For Mobile Radio Services,* Second Report and Order and Second Further Notice of Proposed Rulemaking and Memorandum Opinion and Order, GN Docket No. 14-177, FCC-CIRC1711-02 (rel. Oct. 26, 2017) ("*Draft 2nd Spectrum Frontiers Order*") *available at http://transition.fcc.gov/Daily_Releases/Daily_Business/2017/db1026/DOC-347449A1.pdf*.

spectrum in the 32 GHz, 42 GHZ, 50 GHz, and additional bands above 95 GHz.[4] As noted herein, Shaw encourages the Department to continue making additional bands available for 5G, including in the recently released Spectrum Outlook consultation.[5]

4. As indicated in its Comments, Shaw urges ISED to adopt policies that will promote investment, innovation and competition in Canada's wireless market. Given the foundational importance of the mmW spectrum to the future of mobile connectivity, it is essential that pro-competitive spectrum policies be implemented with respect to these spectrum bands to preserve the potential for long-term, sustainable competition in Canada. Over the last 18 months, Shaw has invested billions of dollars in its network through its acquisition of Wind Mobile, now "Freedom Mobile," and the acquisition of additional 700 MHz and 2500 MHz licences from Quebecor.[6] Through these efforts, Shaw is positioning itself as a strong, new and differentiated competitor to the large incumbent wireless carriers. However, as discussed in its Comments, Shaw continues to face significant barriers as a new competitor. Notably, Shaw lacks the spectrum resources currently held by the wireless incumbents.

5. Consequently, the policies adopted in response to this Consultation will play an integral role in determining whether Shaw and other competitive providers will be able to enter and compete in the provision of 5G services.[7] This consultation lays the groundwork for a follow-up proceeding in which the Department can consider specific issues related to the adoption of appropriate pro-competitive measures for these mmW bands. The Department has the opportunity to pursue measures that will promote competition, such as adopting spectrum block sizes that encourage competition and taking steps to prevent the incumbent wireless providers from foreclosing access to mmW spectrum by new competitors. While the FCC's experience with the *Spectrum Frontiers Order* can be instructive, the Department should tailor its approach to the needs of Canadians and the Canadian economy and the circumstances of our highly concentrated mobile wireless market, which is dominated by the big three incumbents. The Department has the

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[4] *See Draft 2nd Spectrum Frontiers Order* at paras. 2, 10 and n. 34.
[5] ISED, *Consultation on the Spectrum Outlook 2018 to 2022*, Notice, No. SLPB-006-17 (Oct. 2017) ("ISED October Notice").
[6] Comments of Shaw Communications Inc., Consultation on Releasing Millimetre Wave Spectrum to Support 5G, *Canada Gazette*, Part I, June 17, 2017, Notice No. SLPB-001-17, at 2-3 (filed September 15, 2017) ("Shaw Comments"). All Comments referenced were filed for Notice No. SLPB-001-17 on September 15, 2017 unless otherwise noted.
[7] Shaw Comments at 4.

opportunity to create a more competitive wireless market for Canadians and allow new wireless operators to access sufficient spectrum holdings in order to provide a strong and sustainable competitive alternative to the incumbent wireless providers.

6. The record generated in the initial comment round demonstrates support for the majority of Shaw's positions. In areas where there are differing positions, Shaw's approach provides a reasonable compromise for the Canadian market:

- *Pro-competitive measures.* Canadians deserve and need a more competitive wireless marketplace in order for 5G to realize its full transformative potential. Shaw is fully prepared to continue making the investments necessary to drive competition. However, in order to achieve a more competitive wireless marketplace, despite the incumbents' assertions to the contrary, the adoption of pro-competitive measures is necessary to ensure that facilities-based providers other than the incumbents are able to obtain access to the mmW spectrum. If the Department fails to do so, this spectrum will be concentrated in the hands of the incumbents and the existing spectrum concentration barriers will be carried over into the era of 5G, further entrenching the dominance of the incumbents. Additionally, the record of this proceeding supports a future consultation to consider the specific details regarding, and the appropriate type of, pro-competitive measures that will be needed to ensure a competitive 5G wireless market.
- *Moratorium in the 37-40 GHz band.* Commenters express varying views on whether an immediate moratorium should be instituted for new licenses in the 37-40 GHz band. In light of this disagreement, Shaw's proposal to issue an immediate moratorium on new licenses, with an exception for new stations within a grid cell licensee's geographic license area, provides a balanced approach that takes into account many of the concerns expressed on both sides of this issue.
- *Treatment of Existing Licenses.* Commenters overwhelmingly support protections for existing grid cell and site specific First Come First Served ("FCFS") licenses. While there is no unified position regarding the treatment of Tier 3 licensees, Shaw's proposal to convert existing Tier 3 licenses to site-based licenses for each active site within a licensee's service area balances the competing views expressed in the record.

- *Band plans.* Parties overwhelmingly support the Department's proposal for the 37-40 GHz band plan. While parties express a variety of views regarding a band plan for the 28 GHz plan, there is sufficient support for Shaw's position to divide the 28 GHz band into four 212.5 MHz blocks to provide additional access for non-incumbent providers.
- Spectrum Licensing Policies. There is considerable support for exclusive licensing in the 28 GHz and 37.6-40 GHz bands, license-exempt operations in the 64-71 GHz band, geographic service area licensing in licensed bands, and longer license terms in licensed bands. Similarly, there is considerable opposition to the use of a license-exempt dynamic access database at this time.
- *Site-by-site coordination and geographic restrictions.* Commenters support the adoption of site-by-site coordination in both the 28 GHz and 37-40 GHz bands. While FSS satellite operators tend to oppose geographic restrictions for FSS earth station siting, the remaining commenters support such a restriction and many recommend that the Department follow the RABC's forthcoming recommendations.
- *Aggregate emissions limits.* The majority of commenters, including Shaw, find that placing aggregate emissions limits on terrestrial stations in the 28 GHz band is unnecessary.
- *Grandfathering FSS earth station licenses.* Although commenters differ as to what the cutoff date for grandfathering pending FSS earth stations should be, the majority of commenters agree that already-licensed and pending FSS earth stations should be allowed to continue operating under the current conditions of their licences.
- *Releasing spectrum in additional spectrum bands.* A number of parties, including Shaw, support future consultations that consider making additional spectrum bands available to support 5G.

7. Finally, after making fundamental policy decisions, the Department should consider many of the more granular issues raised in this Consultation in greater depth in future consultations. As alluded to above, a future consultation is especially critical for the consideration of specific proposals for pro-competitive measures and technical limits which require further study. We also recommend that the Department continue to pursue releasing additional bands for 5G. The policies that evolve from this and future

consultations must promote a competitive market that enables facilities-based competitors to offer affordable and innovative service to all Canadians and to support the future of Canada's innovation economy.

II. REPLY TO QUESTIONS AND ISSUES RAISED IN THE CONSULTATION DOCUMENT

8. Set out below are Shaw's reply comments to the submissions that were filed by other interested parties in response to the questions posed by the Department in the Consultation Document.

A. ISED MUST TAKE MEASURES TO SUPPORT COMPETITION (QUESTION 9-3)

9. The Department is seeking "preliminary comments" on the adoption of possible measures that could support competition.[8] Given the uncertainty regarding the band-plans, technology standards and international regulatory developments relating to mmW spectrum, including the ongoing proceeding in the U.S., Shaw reiterates that its comments on pro-competitive measures are preliminary and that the Department should conduct a follow-up consultation after making fundamental policy decisions in this Consultation. Follow-up consultations will allow ISED to consider specific issues related to pro-competitive measures in relevant bands, among other things. Despite the preliminary nature of this inquiry, it is clear that Canada's market today requires appropriate regulatory intervention to ensure equitable access to spectrum over the long term.

10. 5G has the potential to bring Canada to the forefront of the global digital economy. However, this potential will only be realized if sustained, vibrant, facilities-based competition takes hold in the 5G wireless market. Such competition will not arise unless the Department adopts appropriate pro-competitive measures. If the Department fails to seize this opportunity, this valuable spectrum will be concentrated in the hands of the incumbents and the existing issue of spectrum concentration will be carried over into the era of 5G, further-entrenching the dominance of the large incumbents.

11. In the sub-sections that follow, Shaw replies to other parties' submissions, with a focus on the following issues: (i) the need for increased competition in the wireless market; (ii)

[8] *See* Consultation Document at Question 9-3.

spectrum concentration as a fundamental barrier to competition; (iii) the risk of foreclosure; (iv) benefits of pro-competitive measures to Canadians and the Canadian economy; (v) the importance of learning from the FCC's experience; and (vi) appropriate block sizes to promote competition.

i. The Need for Increased Competition in the Wireless Market

12. Canadians and the Canadian economy deserve a more dynamic and competitive marketplace. As we highlighted in our initial comments, Canada's mobile wireless market is dominated by the three large national wireless incumbents. This drives current market conditions, including higher prices, less innovative services, less customer responsiveness and fewer choices for Canadians. As 5G emerges and the global economy becomes increasingly reliant on converged digital platforms, sustainable competition in Canada's wireless market is now more important than ever.

13. It is clear from the incumbents' submissions that they do not acknowledge their dominance of the market. Specifically, they fail to acknowledge or rebut recent data confirming this dominance. For example, the Competition Bureau recently confirmed in a February 2017 statement that Canadian mobile markets are highly concentrated and highly susceptible to coordination.[9] The Bureau found significant and sustained price increases in regions without a strong, facilities-based alternative. These findings have been corroborated by the 2016 Nordicity Report[10] and Dr. Eric Emch's White Paper[11] submitted on behalf of Shaw in the CRTC's TNC 2017-259 proceeding.

14. It is clear that the incumbents' goal and incentive is to maintain the static, uncompetitive *status quo* in Canada's wireless market, and to ensure that their existing dominance

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[9] Government of Canada, *Competition Bureau Statement regarding Bell's acquisition of Manitoba Telecom Services*, 15 February 2017, http://www.competitionbureau.gc.ca/eic/site/cb-bc.nsf/eng-/04200.html.

[10] NLG Nordicity Group Ltd., *2016 Price Comparison Study of Telecommunications Services in Canada and Select Foreign Jurisdictions,* pps. 79-83 (Table C.2.1, Table C.2.2, Table C.2.3, Table C.2.4 and Table C.2.5) (prepared for the CRTC) ("Nordicity 2016 Price Comparison Study"), http://www.crtc.gc.ca-/eng/publications/reports/compar/compar2016.pdf. Overall, Nordicity found that new entrants' prices for mobile wireless telecommunications services were lower than the incumbents' by a range of 25% to 36% for service basket Levels 1, 2, 3, 4 and 5. *See* Nordicity 2016 Price Comparison Study at p. 32.

[11] *See* Dr. Eric Emch, Bates White Economic Consulting, *An assessment of wholesale roaming policy in Canada: The relationship between competition, regulation, investment and access* (8 September 2017) (report prepared for Shaw Communications Inc. in the proceeding initiated by Telecom Notice of Consultation CRTC 2017-259, Section III.A.6, Figure 1, based on the Nordicity 2016 Price Comparison Study, pps. 79-83 (Table C.2.1, Table C.2.2, Table C.2.3, Table C.2.4 and Table C.2.5)).

carries over into 5G. Their submissions and positions fail to acknowledge that Canadians deserve a more competitive wireless market.

ii. Spectrum Concentration is a Fundamental Barrier to Competition

15. There are several barriers that are preventing Canada from realizing a more competitive wireless market. One of the most critical barriers is spectrum concentration, as correctly identified by multiple parties to this proceeding.[12] Spectrum remains highly concentrated in the hands of the incumbents. The incumbents continue to control the vast majority of mobile terrestrial spectrum capacity across all bands.[13] New competitors' ability to compete and invest in their networks efficiently is severely constrained by their deficit in the quantity and diversity of their spectrum holdings.

16. Assertions by Bell Mobility[14] and Telus[15] that certain new competitors such as Shaw are well-capitalized are irrelevant and obvious attempts to distract the focus from the significant spectrum disadvantage that new competitors face. The adoption of appropriate pro-competitive measures is needed to ensure that facilities-based providers, other than the incumbent national carriers, are able to obtain access to the frequency bands in this Consultation. As explained by Professor Cramton in his Reply Report in the Department's SLPB-05-17 proceeding,[16] financial constraints of non-incumbents are irrelevant. Pro-competitive measures are needed to correct market failure caused by the dominance of the incumbents and to avoid the foreclosure risk described below. Ensuring that new competitors that are strong and well capitalized can access this spectrum will contribute to more robust, facilities-based competition.

iii. Foreclosure Risk Must be Addressed

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[12] *See, e.g.*, Comments of Québecor Media at 6 ("Quebecor Comments").
[13] For example, as described in our initial comments, in the large urban markets of Toronto, Calgary, Edmonton and Vancouver, Shaw holds a maximum of 80 MHz of spectrum, while Rogers holds close to or more than 200 MHz in each of these markets, and Bell Mobility and Telus together control close to or more than 300 MHz in each.
[14] Comments of Bell Mobility Inc. at 27 ("Bell Mobility Comments").
[15] Comments of Telus Communications Company at 35-36 ("Telus Comments").
[16] Peter Cramton, *The Critical Importance of the Set-aside in the Canadian 600 MHz Auction*, at 4 (report prepared for Shaw Communications Inc. in the proceeding initiated by *Canada Gazette,* Part I, August 19, 2017, Notice No. SLPB-005-17 – *Consultation on a Technical, Policy and Licensing Framework for Spectrum in the 600 MHz Band* (filed October 2, 2017)).

17. As described in our initial comments, because of their significant spectral holdings and their dominant position, the incumbent wireless providers are highly incented to acquire sufficient wwW spectrum to foreclose new competitor access to this valuable spectrum, and thus to the next generation of 5G. Indeed, Bell Mobility has suggested that they should be enabled to acquire large spectrum allocations.[17] Foreclosure risk and the resulting large spectrum allocations in the hands of the incumbents would reinforce the incumbents' dominance.

18. The incumbent providers are highly incented to ensure that their existing spectrum advantage is carried over into the mmW bands, thus entrenching their incumbency and resulting in less competition, higher prices and a less dynamic, innovative wireless environment.

iv. Pro-Competitive Measures Will Benefit Canadians and the Canadian Economy

19. The incumbent carriers also fail to acknowledge the benefits that more competition in the wireless market would deliver to Canadians and the Canadian economy. For example, Bell Mobility[18] and Telus[19] mischaracterize pro-competitive measures as taxpayer-funded subsidies. Similarly, Bell Mobility alleges that pro-competitive measures "stifle innovation" and investment.[20] This ignores the intent and mischaracterizes the effect of pro-competitive measures, which are adopted to promote competition and sufficient choice in the market, leading to more affordable and innovative wireless services that result in billions of dollars' worth of benefits to Canadians and the Canadian economy. Moreover, the adoption of appropriate pro-competitive measures would result in a highly competitive auction process for these bands and substantial auction revenues.

20. Bell Mobility and Telus also suggest that the adoption of pro-competitive measures results in increased costs to the wireless industry[21] and higher prices for set-aside ineligible bidders.[22] They also suggest that such measures lead to cost advantages to

[17] Bell Mobility Comments at 25.
[18] Bell Mobility Comments at 27.
[19] Telus Comments at 35.
[20] Bell Mobility Comments at 28.
[21] Bell Mobility Comments at 26.
[22] Telus Comments at 36.

new competitors like Shaw.[23] These comments ignore the fact that each of the incumbents, either directly or through their predecessors, has previously been gifted free cellular and PCS spectrum, which provided the foundation for their dominant positions. Such comments also do not account for the billions of dollars that new competitors had to lay out up-front merely to enter the market, and the fact that, as a result of their lack of spectrum capacity and diversity, new competitors have faced higher costs of deployment as compared to the incumbents.

21. The incumbents' assertions are misleading and again fail to acknowledge the bigger picture – that Canadians deserve a more competitive wireless market, which cannot be achieved without appropriate pro-competitive measures.

v. ***Canada Must Learn from the U.S. Experience***

22. As stated in our initial comments, while the experience of the United States may inform the Department's considerations in this Consultation generally, we note that the measures adopted by the FCC would not be sufficient to promote competition in Canada and would be harmful to Canadian consumers. Accordingly, it is no surprise that Telus has suggested that the Department should mirror the United States' initially-proposed approach with respect to pro-competitive measures.[24]

23. We note that the FCC Docket has evolved in the time since Shaw filed our initial comments in this Consultation. As alluded to previously, on October 27, 2017, the FCC released its *Draft 2nd Spectrum Frontiers Order,* which contemplates making available 1,700 MHz of additional mmW spectrum in the 24.25-24.45/24.75-25.25 GHz and 47.2-48.2 GHz bands for flexible wireless use. At the same time, the FCC would eliminate the 1,250 MHz pre-auction limit on holdings in the 28 GHz, 37 GHz and 39 GHz bands and replace it with an 1,850 MHz post-auction screen.[25]

24. While Shaw agrees that ISED should consider releasing additional spectrum, including in the 24 GHz and 47 GHz bands, this does not eliminate the need for pro-competitive measures, for the reasons described in the previous sections. If ISED were to follow a similar approach as the FCC, this would lead to the unacceptable result that one or two

[23] Bell Mobility Comments 26.
[24] Telus Comments at 37.
[25] *Draft 2nd Spectrum Frontiers Order,* at paragraph 104.

carriers could monopolize a given band of spectrum and associated device ecosystems, especially given the foreclosure risk described previously. This is exactly what is beginning to develop in the U.S., and the FCC's *Draft 2nd Spectrum Frontiers Order* will only further-exacerbate the foreseeable deleterious consequences of this approach. As explained in our initial comments, Verizon may soon be able to dominate the 28 GHz band (which is expected to be the near-term focus for equipment for 5G) through acquisitions that are currently pending.

25. Accordingly, the FCC's approach to pro-competitive measures cannot be applied in Canada. The result would be that consumers would not enjoy the full potential of 5G. ISED has an opportunity to learn from the U.S. experience and set the stage for a competitive and innovative 5G landscape.

vi. *Appropriate Block Sizes to Promote Competition*

26. As explained in our initial comments and detailed in the following section, the Department should ensure that its band and channelization plan for the 28 GHz band allows for four competitors to gain access to this spectrum. In this regard, we agree with Rogers[26] that smaller blocks allow for greater competition, more innovation, more services and greater overall benefits to consumers.

B. ISED SHOULD BALANCE PROTECTIONS FOR EXISTING TERRESTRIAL SERVICES IN THE 37-40 GHZ BAND WITH THE NEED TO RELEASE SPECTRUM FOR FLEXIBLE USE (QUESTIONS 7-2 AND 7-3)

Question 7-2: The Department Should Adopt a Balanced Approach in Instituting a Moratorium in the 37-40 GHz Band

27. In the Consultation Document, ISED sought comment on whether to impose a moratorium on the issuance of new site licenses in the 38.4-40.0 GHz band at this time.[27] In its initial comments, Shaw urged ISED to impose such a moratorium during the pendency of this Consultation, but to carve out an exception for new stations within an existing grid cell licensee's geographic area. This approach would minimize encumbrances in the band while ensuring that existing operators can continue to meet

[26] Comments of Rogers Communications Canada at 25 ("Rogers Comments").
[27] *See* Consultation Document at Question 7-2.

the needs of customers in their existing geographic service areas.[28] In light of the record developed on this issue, this proposal remains the best method for addressing the competing concerns raised by commenters.

28. Commenters express a wide range of views regarding the appropriateness of a moratorium. 5G Americas, the BSO Coalition, Samsung and Telus support the imposition of a moratorium on new licenses in the near term.[29] In support of its position, Telus argues that flexible use represents a "higher use of the spectrum" and a moratorium would "minimiz[e] encumbrances of the band."[30]

29. Other commenters oppose a moratorium, especially in the near term. For example, the British Columbia Broadband Association, SaskTel, Bell Mobility, and Rogers, oppose a moratorium before alternative licensing processes have been finalized and the timing of their implementation have been finalized.[31] Rogers notes that it currently uses the 38.4-40.0 GHz band to support fixed wireless backhaul, which helps it compete with "local telephone companies, who have extensive wireline backhaul facilities."[32] TeraGo takes an even more adversarial stance with respect to a moratorium, opposing it "both in the short and medium term."[33] According to TeraGo, "any kind of moratorium on the issuance of new licenses will severely impede TeraGo's ability to service [newly acquired] customers."[34]

30. This discord regarding the appropriateness of a moratorium weighs in favor of Shaw's proposal, which balances the competing concerns raised by commenters. Shaw agrees with Telus that a moratorium during the pendency of this Consultation will help minimize encumbrances in preparation for flexible use licensing and the buildout of mobile networks.[35] At the same time, providing an exception to this moratorium in a grid cell licensee's geographic area is critical for existing operators like Shaw to continue to serve

[28] Shaw Comments at 17.
[29] Comments of 5G Americas at 6 ("5G Americas Comments"); Comments of BSO Coalition at 6 ("BSO Coalition Comments"); Comments of Samsung Electronics Canada Inc. and Samsung Electronics Co. LTD. at 13-14 ("Samsung Comments"); Telus Comments at 12.
[30] Telus Comments at 25.
[31] Comments of British Columbia Broadband Association at 5 ("BCBA Comments"); Comments of SaskTel at 14 ("SaskTel Comments"); Bell Mobility Comments at 16; Rogers Comments at 14.
[32] Rogers Comments at 14.
[33] Comments of TeraGo Networks Inc. at 6 ("TeraGo Comments").
[34] TeraGo Comments at 6.
[35] Telus Comments at 25.

customers and compete in their existing markets. Indeed, Rogers notes that it uses this band to support fixed wireless backhaul, and Shaw uses the band for similar purposes. Specifically, these backhaul facilities are critical to Shaw's network operations in those markets outside of its existing cable footprint. Moreover, as Rogers notes, there is currently no other spectrum allocated for fixed backhaul services between the 23 GHz band and the 70/80 GHz band.[36] An extended moratorium on new licenses within Shaw's existing grid cell areas would therefore significantly constrain the ability of all licensees to continue to offer valuable, innovative, and high-quality wireless experiences in markets where they do not have an existing wireline footprint. Yet, as detailed in Shaw's Comments, allowing the addition of licenses within an existing grid cell licensee's geographic service area will have only minimal impact on future operations by those licensed under whatever regulatory regime is adopted.[37]

31. Consequently, ISED should adopt the balanced proposal offered by Shaw. Specifically, ISED should institute a moratorium on new licenses in the band during the pendency of this Consultation while carving out an exception to this moratorium for new stations within an existing grid cell licensee's geographic license area.

32. In addition, Shaw also supports Rogers' recommendation that ISED consider opening a replacement band to substitute for the eventual loss of the 38.4-40.0 GHz band for fixed backhaul services.[38] 5G networks are expected to require massive backhaul capacity.[39] ISED therefore should ensure that policies are in place to allow for access to spectrum for wireless backhaul. Such policies are critical for new entrants like Shaw to continue to compete in the provision of 5G services in markets where it does not have extensive wireline backhaul facilities.[40]

Question 7-7: Existing Users Should Be Allowed to Continue Operating on a Primary Basis

[36] Rogers Comments at 14.
[37] Shaw Comments at 17-18.
[38] Rogers Comments at 14.
[39] John Naylon, *Why Wireless Backhaul Holds the Key to 5G*, *Wireless Week* (15 March 2016), https://www.wirelessweek.com/article/2016/03/why-wireless-backhaul-holds-key-5g.
[40] Rogers Comments at 14.

33. The Consultation also sought comment on the appropriate treatment of existing licensees in the 38.4-40.0 GHz band.[41] Shaw addresses below the record in response to each of these issues.

34. Treatment of existing grid cell and site-specific FCFS licenses. Commenters overwhelmingly support protecting existing grid cell and site-specific FCFS licenses.[42] In support of protection, the British Columbia Broadband Association argues that "the displacement of existing licensees who are using spectrum will undermine confidence in ISED's licensing programs."[43] Similarly, Xplornet argues that in instances "where there has been significant investment and networks are operational," ISED should grandfather the existing licensees to provide for continued service to Canadian consumers.[44] And TeraGo argues that "it would be neither practical nor in the spirit of supporting economic and social benefits from existing fixed wireless deployments" to make existing licensees secondary.[45]

35. Shaw agrees with these comments. Moreover, as explained in the preceding section, Shaw relies on these licenses to support fixed backhaul facilities, which are critical to Shaw's network operations, particularly in those markets outside of its existing cable footprint. Failing to provide protection for these existing operations could significantly constrain Shaw's ability to continue to offer valuable, innovative, and high-quality wireless experiences in markets that fall outside of its cable footprint.

36. In addition, ISED should give further consideration to Nokia's proposal to convert existing grid cell licenses to flexible use licenses authorized to use 200 MHz.[46] As Nokia

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[41] With respect to existing grid cell and site-specific First Come First Serve ("FCFS") licenses, ISED asked whether such licenses should receive protection from new flexible use licensees or whether such licenses should operate on a secondary basis to flexible use licenses. With respect to existing Tier 3 licenses, ISED asked whether such licenses should be converted either to flexible use or to site-specific licenses, and, if the latter, sought comment on whether such site-specific licenses should be treated with or without protection from new flexible use licensees.

[42] *See* Bell Mobility Comments at 22 (arguing that existing stations should be afforded protection); SaskTel Comments at 17 (same); TeraGo Comments at 8 (same); Comments of Xplornet Communications Inc. at 9 ("Xplornet Comments") (arguing in support of "grandfathering the incumbent FCFS licensees."); *see also* BCBA Comments at 7 (arguing that grid cell licensees operating in areas outside of Canada's six largest metropolitan areas and FCFS site-based licenses should be afforded protection).

[43] BCBA Comments at 7.

[44] Xplornet Comments at 9.

[45] TeraGo Comments at 8.

[46] *See* Comments of Nokia at 6 ("Nokia Comments").

explains, this simplified approach would eliminate the need for coordination requirements and allow existing licensees to continue operations uninterrupted. This proposal will potentially help expedite investment and innovation in 5G networks by spurring development and investment in new network infrastructure by existing licensees.[47]

37. Finally, ISED should reject arguments from Rogers and Telus to make existing grid cell and site-based FCFS licenses secondary in the band. Such an approach would favor the dominant incumbent wireless providers by crippling the existing operations of competitors like Shaw. Consequently, ISED should reject this approach.

38. Treatment of existing Tier 3 licenses. The record reflects stark divisions regarding the treatment of existing Tier 3 licenses. While a number of parties recommend converting these licenses to flexible use licenses, there remains a lack of consensus regarding how much spectrum such licensees should retain.[48] Additionally, the record also reflects significant disagreement regarding how such converted flexible use licenses would be accommodated in the band plan.[49] Moreover, some commenters oppose the conversion

[47] For example, this proposal would provide opportunities for a diverse set of licensees to innovate in this band. Nine separate entities hold grid cell licenses, including incumbent providers like Rogers and Telus and new market entrants like Freedom Mobile. Moreover, the relative small size of grid cell licenses will help minimize the geographic footprint of the areas in which such licenses authorize operations. In addition, there is precedent for such an approach. Specifically, in the United States, the *2016 Spectrum Frontiers Order* awarded flexible use licenses to both existing Economic Area licensees and existing Rectangular Service Area licensees who held geographic licenses for fixed operations in the 28 GHz band. Rectangular Service Area licensees, like grid cell licensees, had self-defined their service areas prior to the creation of the Economic Area licenses. Under the *Spectrum Frontiers Order*, Rectangular Service Area licensees retained exclusive rights for flexible use operations within their service areas.

[48] For example, Bell Mobility and TeraGo argue that Tier 3 licenses should be converted to flexible use licenses for the same amount of spectrum, but Rogers and SaskTel argue that converted licenses should be for a lesser amount of spectrum than the original spectrum holdings. *See, e.g.*, Bell Mobility Comments at 20 (arguing that converted flexible use licenses should retain the same amount of spectrum as provided by the Tier 3 license); TeraGo Comments at 19-20 (same); Rogers Comments at 19-20 (arguing that Tier 3 licensees should receive flexible use licenses at a reduction of one-third of the licensee's total Tier 3 MHz holdings per service area); SaskTel Comments at 17 (arguing for a reduction in spectrum to 60% of the Tier 3 licensee's spectrum holdings).

[49] Bell Mobility proposes that converted Tier 3 licenses would receive access to blocks as small as 100 MHz. *See* Bell Mobility Comments at 20-21. Alternatively, Rogers proposes that the band accommodate only flexible use licenses for 200 MHz blocks. *See* Rogers Comments at 19-20. TeraGo takes yet another approach, proposing that Tier 3 licensees holding less than 200 MHz of spectrum in a license area would see their license converted to site-specific licenses with operations relocated to a portion of the band reserved specifically for site-specific licenses. *See* TeraGo Comments at 7.

of Tier 3 licenses to flexible use licenses.[50] For example, Telus argues that a total recall of the spectrum would ensure the availability of multiple large and continuous blocks.[51]

39. In light of the fractured positions of commenters, Shaw urges ISED to adopt a compromise approach. Specifically, as advocated by Shaw in its comments, ISED should convert existing Tier 3 licenses to site-based licenses for each active site within a licensee's service area. Each site-based license should receive protection from interference from new flexible use licensees. Such an approach would provide for the continuation of existing operations while allowing for a band plan that is harmonized with that of the United States. Moreover, because it appears that there are few active Tier 3 sites in operation, such an approach is unlikely to significantly encumber the band due to operations of incumbent Tier 3 users.[52]

C. ISED SHOULD ADOPT BAND PLANS FOR THE 28 GHZ BAND AND 37-40 GHZ BAND THAT PROMOTE COMPETITION (QUESTIONS 6-3 AND 7-3)

40. *28 GHz band.* As detailed in our initial comments, the 28 GHz band plan should be divided into four equal blocks of 212.5 MHz each to provide non-incumbent wireless carriers with a greater opportunity to obtain spectrum in the 28 GHz band.[53] Dividing the spectrum into four blocks, instead of two 425 MHz blocks, as ISED proposed and the FCC adopted, will enable smaller Canadian wireless operators to gain access to the spectrum while still aligning the band plan with the overall parameters of the U.S. band plan.

41. Overwhelmingly, the commenters ask the Department to act now to adopt a band plan for the 28 GHz band. Waiting to act on adopting a 28 GHz band plan will only delay Canada's move toward adopting a 5G framework, forcing Canada to fall behind the countries which have already adopted rules for releasing 5G spectrum.[54]

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[50] *See* Telus Comments at 30; Shaw Comments at 22-23.
[51] Telus Comments at 30.
[52] *See* Telus Comments at 30 (noting that Tier 3 license holders Terago, ABC Allen and I-Netlink do not have any fixed sites registered within in their existing Tier 3 license areas according to ISED's Spectrum Management System database).
[53] Shaw Comments at 13-14.
[54] 5G Americas Comments at 4; Comments of Ericsson Canada Inc. at 5-6 ("Ericsson Comments"); Comments of Global Mobile Suppliers Association at 2 ("GSA Comments"); Huawei Technologies Canada Co., Ltd. at 4-5 ("Huawei Comments"); Comments of Intel Corporation at 3 ("Microsoft"); Comments of Microsoft at 2-3 ("Microsoft Comments"); Comments of Radio Advisory Board of Canada at

42. Adopting a band plan with only two 425 MHz blocks disadvantages smaller providers.[55] There are several parties that support dividing ISED's proposed band plan into smaller blocks,[56] while others support the adoption of ISED's proposal and harmonization with the FCC's band plan.[57] In particular, Rogers proposes dividing the spectrum into four Time Division Duplex channels of 200 MHz blocks each, while holding two 25 MHz channels in reserve on either side of the 27.5-28.35 GHz band[58] and Terago recommends dividing the band into four 200 MHz blocks without specifying how exactly the blocks would be divided. While the commenters that advocate for small spectrum blocks divide the spectrum differently than proposed by Shaw, they cite the same policy goal of giving more wireless providers the chance to access 28 GHz spectrum to bring greater competition to Canada. As Rogers notes, "[t]he risk of adopting the U.S. band plan is that a single operator, or two associated operators, will be able to monopolize this key 5G band. This outcome would … jeopardize the successful development of competitive 5G services in Canada."[59] Microsoft, which states that ISED needs to balance the objective of harmonizing the Canadian band plan and the U.S. band plan with the objective of fostering Canadian competition, argues that a 5G data rate can be achieved using less than 425 MHz of spectrum.[60] Finally, Terago argues that adopting smaller spectrum blocks in the 28 GHz band better matches the proposed division of the 37-40 GHz band into 200 MHz blocks of spectrum and will allow up to four operators to deploy in a given area.[61]

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4 ("RABC Comments"); Rogers Comments at 5; Samsung Comments at 5-6; SaskTel Comments at 9; Telus Comments at 4; TeraGo Comments at 4. Only Bell Mobility proposes waiting to adopt a band plan until the 3GPP has released a study on recommended bandwidth size before finalizing this band plan (12). However, the record already establishes that 212.5 MHz blocks provide sufficient bandwidth for a 5G service. Microsoft Comments at 3. Commenters also filed in support of smaller blocks in the *Spectrum Frontiers Order. See Spectrum Frontiers Order*, 31 FCC Rcd at 8041 para. 72. 5G Americas notes that moving forward now is justifiable because the 3GPP study should be complete in 2018. 5G Americas Comments at 4.

[55] Comments of Cogeco Communications Inc. at 11 ("Cogeco Comments"); TeraGo Comments at 5.

[56] Rogers Comments at 8-9; Cogeco Comments at 11 (proposing that the Department divide the 28 GHZ band into smaller blocks to provide access for additional providers but not providing a specific band plan); Microsoft Comments at 3 (noting that 5G operations are possible in bandwidths smaller than 425 MHz); TeraGo Comments at 4 (requesting that ISED adopt a band plan similar to that in the 37-38 GHz band and divide the band into four 200 MHz bands).

[57] 5G Americas Comments at 5; BSO Coalition Comments at 6-7; BCBA Comments at 3; Ericsson Comments at 15; GSA Comments at 4; Huawei Comments at 6; Intel Comments at 5; Nokia Comments at 4; RABC Comments at 8; Samsung Comments at 8; SaskTel Comments at 10; Telus Comments at 12.

[58] Rogers Comments at 8-9.

[59] Rogers Comments at 8.

[60] Microsoft Comments at 3.

[61] TeraGo Comments at 5.

43. Dividing the band into four equal 212.5 MHz blocks is an ideal solution for Canada because it would still harmonize the Canadian band plan with the overall parameters of the U.S. band plan to facilitate cross-border coordination and equipment harmonization while providing new competitors the opportunity to access the 28 GHz band. Four equal blocks of 212.5 MHz would also allow for 200 MHz channels and 12.5 MHz for guard bands, which would simplify interference control between adjacent licence holders. We note that Rogers' proposed band plan also aligns with the FCC's plan which divides the spectrum at 27.925 GHz.[62] However, Shaw's proposed band plan uses the entirety of the 27.5-28.35 GHz band while Rogers' leaves two small, potentially unusable, 25 MHz slivers of spectrum at either end of the band.

44. The 212.5 MHz block size is sufficiently large to attract investment and innovation in the 28 GHz band and would provide more wireless providers the opportunity to access this spectrum in Canada. However, as Shaw noted in its comments, smaller channel sizes are not sufficient alone to provide new competitors with equitable access to spectrum.[63] It is necessary to implement pro-competitive measures to ensure that all facilities based carriers are able to provide 5G offerings. As discussed previously, it is necessary from a procedural perspective for the Department to explore these pro-competitive measures in greater detail in another consultation and ensure that the Department adopts a band plan that facilitates such measures.

45. *37-40 GHz band.* The Department should adopt its proposal to model its band plan in the 37-40 GHz band after the one adopted in the United States. Harmonizing ISED's band plan with the FCC's will allow Canada to create larger ecosystems and economies of scale for equipment that will lower costs and promote competition.[64] Most commenters agree that dividing the 37.6-40 GHz band into 200 MHz channel sizes is appropriate to attract investment and innovation in 5G services and applications.[65] Adopting a band plan with 200 MHz block sizes will enable new operators to enter the market and not restrict spectrum holdings to the incumbent wireless providers.[66] New

[62] Rogers Comments at 8-9.
[63] Shaw Comments at 14.
[64] Shaw Comments at 19. *See also* Bell Mobility Comments at 17; 5G Americas Comments at 6; BSO Coalition Comments at 11; Bell Mobility Comments at 17; BCBA Comments at 5; Cogeco Comments at 12; Ericsson Comments at 18; GSA Comments at 6; Huawei Comments at 9; Intel Comments at 9; Telus Comments at 25-26.
[65] Nokia Comments at 5; Rogers Comments at 15; Samsung Comments at 14; TeraGo Comments at 7.
[66] *See* Cogeco Comments at 12.

competitors will bring competition, innovation, and investment to the Canadian marketplace.[67]

46. The Department should wait to develop a band plan for the 37-37.6 GHz band.[68] Although Canada does not have the same constraint in this band as the United States, which must contend with spectrum sharing between government and commercial operators in this band, ISED should wait for the FCC to address operations in this band so that Canada does not fall out of step with developments in the U.S. Once the FCC has adopted a band plan for the 37-37.6 GHz band, ISED can follow that model "to leverage equipment ecosystem developments in the U.S. and to simplify coordination between terrestrial services along the Canada-U.S. border."[69]

D. SPECTRUM LICENSING POLICIES SHOULD PROMOTE COMPETITION AND INVESTMENT (QUESTIONS 9-1 AND 9-2)

9-1.A: The Department should adopt flexible use licensing in the 28 GHz and 37-40 GHz band and authorize license-exempt use in the 67-71 GHz band

47. Along with the majority of commenters, Shaw supports the adoption of exclusive licensing in the 28 GHz and 37.6-40 GHz bands and license-exempt operations in the 64-71 GHz band.[70] While Starry requests that the Department permit license-exempt access in either of the 28 GHz and 37.6-40 GHz bands,[71] the Department should instead allow license-exempt operations for the 64-71 GHz band only. Allocating 7,000 MHz of licensed-exempt spectrum is sufficient, and the remaining 3,250 MHz of spectrum at issue in this Consultation should be exclusively licensed. This division of spectrum strikes an appropriate balance between licence-exempt and exclusive licence modalities. It is also consistent with what was adopted at the FCC and provides certainty to terrestrial operators who seek to operate in the 28 GHz and 37-40 GHz bands.

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[67] As Shaw noted in its Comments, small spectrum blocks alone are often not sufficient to ensure the benefits of competition are afforded to Canadian consumers and businesses. ISED should add additional pro-competitive measures to ensure that new or smaller market entrants are able to provide 5G offerings. Whether to adopt pro-competitive measures should be addressed through a subsequent consultation once ISED has adopted a band plan. Shaw Comments at 20-21.
[68] Shaw Comments at 21; Intel Comments at 9; Nokia Comments at 5; Rogers Comments at 15; Telus Comments at 5-6; RABC Comments at 14.
[69] RABC Comments at 20-21.
[70] Shaw Comments at 26.
[71] Comments of Starry, Inc. at 4.

9-1.B: In the 28 GHz and 37.6-40 GHz bands, the Department should adopt area licensing based on the service areas for competitive licensing

48. There is considerable support in the record for the adoption of service area licensing.[72] Parties found that geographic service area licenses are more practical because flexible use terrestrial operators could deploy the necessary number of terrestrial stations within a geographic area.[73] In contrast, site-by-site licensing would place an onerous burden on terrestrial operators by requiring them to seek a license for each individual earth station.

49. Shaw also notes that Cogeco recommends the use of smaller licensed service areas (Tier 4 or Partial-Tier-4 areas based on grid cells).[74] In Shaw's view, larger, Tier 2 areas would better-serve the Department's objectives of establishing competitive service offerings for Canadians and making the most advanced technologies available to large parts of the population. In order to achieve a large coverage footprint, operators need spectrum licenses that cover a larger territory. If licenses are allocated in much smaller geographic areas, such as Tier 4 areas, it would lead to fragmented coverage maps, inconsistent service levels and interference control issues along borders. Indeed, fragmented Tier 4 licences may result in customers intermittently exiting from, and returning to, the frequency channels and an overall degradation of the service. As 5G is a mobile technology, it will require larger licensed service areas to ensure consistent levels of service for customers .

9-1.C: A license-exempt dynamic access using data base should not be implemented in any portion of the 28 GHz or 37-40 GHz band

50. Most commenters have argued that the Department should not consider implementing a dynamic access using data base. Generally, commenters find that using a data base is

[72] Shaw Comments at 26; Bell Mobility Comments at 24; BCBA Comments at 8 (suggesting Grid-cell licensing areas outside of populated urban areas); Cogeco Comments at 14 (suggesting grid-cell licensing areas or Tier-4 license areas); GSA Comments at 7; Huawei Comments at 12; Intel Comments at 11 (suggesting Tier-4 license areas); Quebecor Comments at 2; RABC Comments at 20 (arguing that both site-by-site licensing and user-defined license areas would be overly burdensome on the terrestrial operator); Samsung Comments at 17; SaskTel Comments at 19; Telesat Comments at 20; Xplornet Comments at 10 (suggesting Tier-4 license areas).
[73] Bell Mobility Comments at 24; Huawei Comments at 12; SaskTel Comments at 19; Telesat Comments at 20.
[74] Cogeco Comments at 19.

not appropriate[75] and could limit investment in 5G networks.[76] To date, dynamic access using data bases have not yet been successfully deployed. Consequently, even those parties that do not outright oppose a database ask the Department to wait until more feedback has been gathered from users of other dynamic frequency allocation databases before implementing a database in these bands.[77] Accordingly, Shaw believes this approach should not be implemented at this time.

9-2: Longer license terms should be adopted for the exclusive licenses issued in the 28 GHz and 37.6-40 GHz bands

51. Most parties support long license terms for exclusive licenses in the 28 GHz and 37.6-40 GHz bands. Overwhelmingly, commenters, including Shaw, request that the Department adopt 20-year license terms in order to attract investment and increase regulatory certainty for flexible use terrestrial operators.[78] To promote 5G deployment and provide regulatory certainty to terrestrial operators, the Department should adopt 20-year license terms.

E. COORDINATION AND RELATED ISSUES REGARDING SATELLITE AND OTHER OPERATIONS IN THE 28 GHZ BAND AND THE 37-40 GHZ BAND

Question 6-4: The Department should adopt site-by-site coordination in the 28 GHz band

52. Shaw joins many commenters in encouraging the Department to adopt its proposal to require site-by-site coordination between flexible use terrestrial stations and FSS earth stations in the 28 GHz band.[79] However, if not crafted properly, a site-by-site coordination requirement could be time consuming and inefficient and could introduce added uncertainty and reduce investment in this band. Consequently, the Department should adopt new Canadian Footnote C47C, which does not allow for ubiquitous

[75] GSA Comments at 7; Intel Comments at 12; Quebecor Comments at 2, 4; RABC Comments at 20-21; Rogers Comments at 22; Samsung Comments at 18; Telesat Comments at 20; Telus Comments at 33.
[76] Quebecor Comments at 4; RABC Comments at 20; Telus Comments at 33; Comments of Wi-Fi Alliance at 9 ("Wi-Fi Alliance Comments"); Xplornet Comments at 10.
[77] BCBA Comments at 8; Cogeco Comments at 17-18.
[78] Bell Mobility Comments at 24; Quebecor Comments at 5; Rogers Comments at 23; SaskTel Comments at 19-20; Shaw Comments at 27; Telus Comments at 34; Xplornet Comments at 10. Others requested license terms of 10 years. TeraGo Comments at 9; Nokia Comments at 8; Intel Comments at 13 (suggesting that the 10 year period come with the expectation of renewal). 5G Americas encouraged longer license terms to encourage investment. 5G Americas Comments at 7.
[79] BCBA Comments at 4; GSA Comments at 4; Bell Mobility Comments at 12; Huawei Comments at 7; Intel Comments at 6-7; Nokia Comments at 4; RABC Comments at 9; Samsung Comments at 9-10; SaskTel Comments at 10; Telus Comments at 13; Xplornet Comments at 4.

deployment of FSS earth stations.[80] The Department should also adopt a coordination trigger that avoids unnecessarily imposing the burdens of coordination on terrestrial licensees where there is no meaningful risk of harmful interference present.[81] If these requirements are adopted, a site-by-site coordination requirement could be workable and would avoid any negative impact on investment in the 28 GHz band.

53. The Department should also consider additional studies beyond those cited in the Consultation to explore the proper separation distances between flexible use terrestrial stations and FSS earth stations.[82] Specifically, the Department should consider RABC's proposal to develop Canada-specific geographic limitations that ISED can place on future FSS earth stations operating in the 28 GHz band.[83] By restricting the placement of FSS earth stations, ISED can create a regulatory environment that encourages the broad deployment of 5G operations.[84]

Question 6-5: The Department should adopt restrictions on the geographic areas in which new FSS earth stations can be deployed in the 28 GHz band

54. ISED should adopt restrictions on the geographic areas in which new FSS earth stations can be deployed. As noted above, Shaw supports ISED's proposal to revise CTFA footnote C47A and add footnote C47C, which gives fixed and mobile terrestrial service priority over FSS operations in the 28 GHz band.[85] The Department should consider how flexible use terrestrial services will be deployed in Canada when deciding the geographic parameters for the deployment of FSS earth stations. For example, ISED should require FSS earth stations to be deployed a certain distance from urban areas to prevent interference into new terrestrial operations. Unlike 28 GHz band flexible use terrestrial stations, which are most likely to be located near major population centers, FSS earth stations can be located in relatively remote areas. The geographic restrictions adopted by the FCC and studies filed in the *Spectrum Frontiers* proceeding

[80] Consultation Document at para. 25.
[81] *See* RABC Comments at 9 ("Based on the expected small number of existing and future FSS earth stations, the RABC believes that it is appropriate and manageable to adopt a site-by-site coordination process between proposed flexible use terrestrial stations and existing and future FSS earth stations").
[82] *See* Consultation Document at para. 32 n.14.
[83] RABC Comments at 8.
[84] Consultation Document at para. 32 (noting that preliminary studies submitted to the FCC indicate that flexible use terrestrial stations require a separation distance of between 50 metres and 400 metres from an FSS earth station).
[85] Consultation Document at para. 25.

should be instructive for ISED and can likely be largely applied to the Canadian 5G ecosystem.[86] The Department should also consider the results of RABC's proposed study that will determine geographic restrictions for future FSS earth stations in Canada.[87]

6-6: The Department should not impose any limits on aggregate emissions of the terrestrial services

55. Shaw agrees with ISED's finding[88] and the majority of commenters[89] that aggregate emissions limits for flexible use terrestrial systems are unnecessary because they are unlikely to cause interference to FSS space stations. The terrestrial systems envisioned for the 28 GHz band will employ operational characteristics such as beamforming and power control that will avoid interference to the space station receiver.[90] For its part, the FCC did not adopt aggregate interference standards because it did not find a sufficient risk of interference to satellites.[91] ISED should follow the FCC's conclusion that aggregate interference limits are unnecessary.[92]

6-7: The Department should only grandfather existing FSS earth station licenses and those applications pending as of the date of adoption of the Consultation

56. Consistent with the views of Shaw and the majority of those commenting, the Department should adopt its proposal to allow existing FSS licensees and those

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[86] The FCC adopted permitted interference zones for the deployment of FSS earth stations. If an applicant seeks to deploy a new FSS earth station without being required to coordinate with a flexible use terrestrial licensee, it must comply with a set of conditions, one of which is to show that the permitted interference zone does not infringe upon any major event venue, arterial street, interstate or U.S. highway, urban mass transit route, passenger railroad, or cruise ship port. *Spectrum Frontiers Order*, 31 FCC Rcd at 8036 para. 54.

[87] RABC Comments at 10. *See also* Ericsson Comments at 16; SaskTel Comments at 12 (asking ISED to follow RABC's recommendations).

[88] Consultation Document at para. 39.

[89] Bell Mobility Comments at 14-15; BCBA Comments at 4; Ericsson Comments at 17; GSA Comments at 5; Huawei Comments at 8; Intel Comments at 7; Rogers Comments at 13; RABC Comments at 12-13; Samsung Comments at 11; SaskTel Comments at 13; Telus Comments at 21-23.

[90] *Spectrum Frontiers Order*, 31 FCC Rcd at 8030 para. 38.

[91] *Spectrum Frontiers Order*, 31 FCC Rcd at 8042 para. 69 (noting that it may adjust its position if parties determine that terrestrial operations do interfere with FSS space stations).

[92] While FSS operates on a co-primary basis in Canada, unlike in the U.S. where terrestrial operations have priority, commenters nonetheless overwhelmingly oppose aggregate interference limits. *See*, *e.g.*, Bell Mobility Comments at 14-15 (stating that "the Department must consider preference for 5G or risk falling behind); BCBA Comments at 4; Ericsson Comments at 17; GSA Comments at 5; Huawei Comments at 8; Intel Comments at 7; Rogers Comments at 13; RABC Comments at 12-13; Samsung Comments at 11; SaskTel Comments at 13; Telus Comments at 21-23.

applications that were submitted to the Department as of the date of the Consultation to operate under the current conditions of their licenses.[93] All FSS earth station applications submitted after that date should be subject to the rules adopted as a result of this Consultation and subsequent consultations. ISED should disregard the proposals which seek to allow FSS earth station applicants to apply for and operate under the current rules until the Department adopts rules for flexible use terrestrial operations in the 28 GHz band.[94] Drawing the line proposed by the Department and supported by the record will provide certainty to terrestrial operators to develop their services, maximize their efficient use of the spectrum, and deploy as quickly as possible upon the conclusion of the Consultation.

7-4: The Department should adopt site-by-site coordination in the 37-40 GHz band

57. Shaw supports the adoption of site-by-site coordination between flexible use terrestrial operations and FSS earth stations in the 37-40 GHz band subject to the same parameters Shaw enunciated above.[95] Many others have expressed similar sentiments.[96] To further minimize the impact on the development of 5G, the Department should adopt an appropriate trigger, such as a distance threshold or a PFD limit, that prompts coordination between flexible use terrestrial stations and FSS earth station operators where harmful interference is a realistic outcome, but does not impose the burdens of coordination where no meaningful risk of harmful interference is present. ISED should disregard Intelsat's request that licensing should occur through a first-come, first-served regime which would require a terrestrial operator to coordinate with already operating FSS earth stations. This proposal runs counter to ISED's revision of footnote C51 and would hinder the robust deployment of flexible use terrestrial services

[93] The majority of commenters agree with the Department's proposal. BCBA Comments at 4; Huawei Comments at 9; Intel Comments at 8; RABC Comments at 13; Rogers Comments at 13; Samsung Comments at 12; SaskTel Comments at 13; Xplornet Comments at 5.
[94] BSO Coalition Comments at 9; Comments of Intelsat Corporation at 4; Comments of Telesat Canada at 17 ("Telesat Comments"); Comments of ViaSat at 7 ("ViaSat Comments").
[95] *See supra* Section 6-4. Consultation Document at paras. 57-58.
[96] Many commenters support site-by-site coordination: Ericsson Comments at 19; GSA Comments at 6; Huawei Comments at 10; Intel Comments at 9; RABC Comments at 14-15; Rogers Comments at 16; Samsung Comments at 16; SaskTel Comments at 15; Telus Comments at 26 (asking ISED to adopt this requirement only if the earth station is sited in an area approved under the geographic restriction policy proposed in Telus's response to Question 7-5); ViaSat Comments at 8; Xplornet Comments at 7.

in a band where FSS earth stations will be limited in their deployment in order to not unduly constrain the deployment of terrestrial services.[97]

7-5: Restrictions on the geographic areas in which new FSS earth stations can be deployed in the 37-40 GHz band

58. The Department should restrict the geographic areas in which new FSS earth stations can be deployed in the 37-40 GHz band to areas sufficiently far from urban centers where new FSS earth stations are unlikely to preclude new terrestrial services in the band. Adopting geographic restrictions will provide certainty to flexible use terrestrial service licensees and ensure that FSS earth stations do not unnecessarily hamper the deployment of new and innovative 5G services in those areas where they are likely to serve the greatest number of consumers and provide critical services. As discussed above, ISED should evaluate the studies conducted and the geographic restrictions adopted by the FCC as it adopts geographic restrictions for FSS.[98] The Department should also consider the results of the RABC's study as it sets geographic limitations for FSS earth stations to better tailor its rules to the particulars of the Canadian market.[99]

7-6: The Department should address any band sharing with the space research service (SRS) (space-to-Earth) and mobile-satellite service (MSS) (space-to-Earth) in a future Consultation

59. As noted in the Consultation, there are currently no SRS or MSS operations in the 37-38 GHz and 39.5-40 GHz bands.[100] It is therefore unnecessary to place any restrictions on terrestrial services in the 37-40 GHz band to protect SRS or MSS. In the event that SRS or MSS will be deployed in these bands, the Department should establish technical rules in a future consultation.[101] ISED should make clear that any technical provisions that would be established through this future consultation process will seek to protect the existing investments made by terrestrial operators for 5G.

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[97] Consultation Document at para. 48.
[98] *See supra* Section discussing 6-5.
[99] *Id.*
[100] These bands are allocated on a primary basis to SRS and MSS respectively.
[101] Bell Mobility Comments at 19, BCBA Comments at 6; Intel Comments at 10; Nokia Comments at 6; RABC Comments at 18; Samsung Comments at 17; SaskTel Comments at 16; Telus Comments at 29.

F. ISED SHOULD CONSIDER RELEASING SPECTRUM IN ADDITIONAL BANDS FOR 5G

60. In its Comments, Shaw noted that the FCC has proposed to make available a number of bands that are not included in the Consultation Document. Shaw urged ISED to consider these bands in a future consultation.[102] Other commenters also urge ISED to consider plans for releasing other bands for 5G services.[103] The Department is now engaged in its Spectrum Outlook 2018-2022 Consultation,[104] which considers, among other things, possible additional frequency bands for future release in the Canadian market. Shaw will participate in that consultation.

61. Releasing spectrum in additional bands will ensure that Canada plays a leading role in the development and adoption of 5G technology. By acting now, Canadian wireless providers and innovators can begin to invest and plan for the deployment of 5G networks.

III. CONCLUSION

62. Shaw applauds ISED for initiating this Consultation on releasing mmW spectrum to support 5G. As addressed in Shaw's Comments and reiterated herein, ISED should pursue policies that promote investment, innovation, and competition in the mmW bands to ensure the rapid deployment of a robust and dynamic 5G ecosystem. With these principles as our guide, Canada will play a leading role in today's globalized, digital economy and Canadians will benefit from a truly competitive wireless market.

63. As a new competitor to the Canadian wireless market, Shaw has demonstrated a commitment to investing in the types of world-leading connectivity infrastructure that will lay the foundation for our innovation economy. For this to continue, however, competitive mobile providers like Shaw require a regulatory environment that affords the certainty to invest, the flexibility to innovate, and the opportunity to access mmW

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[102] Shaw Comments at 5. Specifically, these bands are the 24 GHz, 32 GHz, 42 GHz, 47 GHz, 50 GHz, and several other bands from 70 GHz and higher.
[103] *See* Cogeco Comments at 11 (urging ISED to consider releasing other mmW bands like the 24-26 GHz and others that are currently being considered by WRC-19 for 5G); Ericsson Comments at 13 (recommending ISED to consider in future consultations releasing mid-band frequency ranges); Telus Comments at 10 (urging ISED to continue playing a leadership role in the ITU-R WRC-19 process to identify additional mmW spectrum for 5G); TeraGo Comments at 4 (urging ISED to consider in the near future a flexible-use model for the 24.25-27.5 GHz); Wi-Fi Alliance Comments at 3 (recommending ISED to consider other bands such as mid-band frequency ranges for license-exempt 5G use).
[104] ISED October Notice.

spectrum. By taking the actions outlined herein, ISED can begin to create such an environment.

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