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Via email: ic.spectrumauctions-encheresduspectre.ic@canada.ca

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Re: Canada Gazette Notice No. SLPB-001-17: Consultation on Releasing Millimetre Wave Spectrum to Support 5G

Please find the reply comments of Rogers Communications Canada Inc. (Rogers) in response to *Canada Gazette*, Part I, August 12, 2017, *Consultation on Releasing Millimetre Wave Spectrum to Support 5G* (SLPB-001-17).

Rogers thanks the Department for the opportunity to provide input on this important issue.

Yours very truly,

Howard Slawner
Vice President – Regulatory Telecom
HS/pg

Attach.

Consultation on Releasing Millimetre Wave Spectrum to Support 5G
SLPB-001-17

Reply Comments of
Rogers Communications Canada Inc.
November 10, 2017

Executive Summary

E1. Millimetre wave spectrum will be a critical input for satisfying the growth in demand for mobile broadband services in Canada, and will foster ever greater innovation and competition. Providing access to these high capacity bands will help address Canada's ongoing and increasing demand for mobile data services by providing a key building block for 5th generation ("5G") technology, which is expected to drive higher levels of innovation and productivity throughout the Canadian economy.

E2. Rogers continues to be supportive of Innovation, Science and Economic Development Canada's consultation on releasing millimetre wave ("mmWave") spectrum in the 28 GHz, 37-40 GHz and 64-71 GHz frequency bands to support the deployment of fixed and mobile services ahead of World Radiocommunication Conference 2019 ("WRC-19") and before 5G technology standards are finalized. Maximizing the use of mmWave spectrum for new services using a technologically-neutral approach, while ensuring reasonable protection of incumbent services, will enable greater spectrum utilization and allow Canadian consumers to benefit from wireless innovations. Moving quickly, prior to WRC-19, to create the required regulatory environment to increase and enhance mmWave spectrum availability is vital to supporting the advanced network speeds and capacity that Canadians have come to enjoy and demand and enabling Canadian businesses and entrepreneurs to innovate in all sectors of the economy.

E3. The Department should move forward with its proposals to allow flexible use in the 28 GHz and 37-40 GHz bands, which will allow operators to deploy terrestrial fixed service or fixed or mobile wireless access services based on network needs and market demands. The Department should exclusively license this spectrum, as it will be among the first bands used for 5G services and operators will need to ensure access to interference-free spectrum as they deploy next-generation wireless technologies in unprecedented densities. The 64-71 GHz band should be unlicensed, which will provide nearly twice the amount of spectrum for unlicensed as licensed spectrum, making exclusive licensing in the 28 GHz and 37-40 GHz bands all the more crucial.

E4. Since the regional carriers no longer require special treatment, ISED should refocus its attention on the state of competition more generally, especially between the three national carriers. Rogers requires mmWave spectrum to compete with its primary competitors, Bell and Telus. Since 2008, Bell and Telus combine their spectrum after every auction, along with their local telecommunications wireline assets, allowing them to avoid capital costs and improve speeds. Despite this clear and persistent pattern, the affiliated and associated entities rules and the rules prohibiting collusion continue to permit their independent bidding. Ongoing coordination between bidders should be prevented and the relative strength of the

vertically-integrated regional competitors should be recognized, so that all bidders are treated the same.

E5. The Department should also ensure a level playing field for infrastructure access. 5G wireless technology will result in a large increase in network base stations and the amount of traffic they carry, all of which must be carried back to the carrier's core network. It is essential that the Department ensure that any Federal, Provincial or Municipal accesses, such as rights-of-way, that local telephone companies possess are similarly available to all types of carriers in order to increase competition for the benefit of all Canadian businesses and customers. The Department should also explore other proactive ways to remove or reduce regulatory impediments to network infrastructure deployment in order to promote the rapid rollout of advanced broadband services as network operators heavily invest to bring 5G to Canadians.

Introduction

1. Rogers Communications Canada Inc. ("Rogers") welcomes the opportunity to reply to comments filed by other parties in response to *SLPB-001-17: Consultation on Releasing Millimetre Wave Spectrum to Support 5G* [1] ("the Consultation"), published on Innovation, Science and Economic Development Canada's ("ISED" or "the Department") website on October 6, 2017.

2. Rogers stated its position on all of the issues raised in the Consultation in its comments of September 15, 2017. This reply is limited to comments on proposals made by other parties. Failure to address any specific issue raised by other parties should not be taken by the Department as Rogers' acquiescence with the position.

Rogers' Reply to Comments of Other Parties

4-1: Given the disruptive nature of 5G, will new business models and network applications develop that may require policy and regulatory consideration from ISED? Please describe potential new business models and network applications as well as their benefits to Canadians.

3. After reviewing the comments of all of the parties, Rogers continues to believe that 5G will be an innovative and transformative leap forward in mobile wireless technology that will not only greatly benefit Canadian consumers and businesses directly but also combine new technologies and expanding service models to benefit nearly all parts of the Canadian economy and society. 5G will integrate mobile voice connectivity, data, utilities, health, and entertainment services and the connection of many industrial and transportation systems. These include the envisioned Internet-of-Things ("IoT"), massive machine type communications ("MTC"), vehicle and transportation systems with enhanced, ultra-fast mobile broadband, and ultra-reliable/low-latency ("URLL") communications.

4. Telus sees 5G networks as "a foundation for next generation digital development of vertical industries such as healthcare, transportation, agriculture, manufacturing, automation and smart cities that require extensive facilities-based investment and help drive the highly competitive wireless marketplace."[2] 5G Americas is especially keen on the use of 5G technologies for the IoT and autonomous vehicles.[3] Intel highlights the transformative nature of 5G, which is expected to "diffuse processing

[1] ISED, *SLPB-001-17: Consultation on Releasing Millimetre Wave Spectrum to Support 5G* (*Consultation*); http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf11298.html.
[2] Telus Comments, para 10.
[3] 5G Americas Comments, para 3.

power from the data center to the device—with greater capacity at the edge to support augmented user experiences, rather than capacity concentrated at the core, as computing, networking and storage services move outwards".[4]

5. As Bell states, "There is broad consensus on the essential role of mmWave spectrum for 5G" and that "mmWave has the potential to work in a cost-effective, multi-band, multi-connectivity, high-capacity, and high-coverage environment."[5] Rogers supports efforts by the Department to move quickly to make mmWave spectrum available for 5G but, as Nokia states, "significant efforts should be made to allocate additional spectrum, not only in the millimetre wave bands, but also in low-band (below 3 GHz) and mid-band (3-24 GHz) spectrum ranges. This diversity of spectrum ranges is essential to addressing the diversity of use cases and geographies that will be supported by 5G."[6]

6. Samsung highlights, "Unlike existing commercial mobile services, 5G networks will rely on higher frequencies, wider bandwidths, and higher density deployments."[7] The need to densify network infrastructure deployments using new small cells and related technologies by several orders of magnitudes was also an issue raised by Nokia. They suggest that in light of increased pressure on local governments to review applications for siting, "ISED should consider a national policy framework of best practices that local governments can adopt to speed consideration of siting applications and the ultimate availability of 5G."[8] Rogers is supportive of any role the Department can play in facilitating the rapid deployment of 5G infrastructure.

7. These efforts should also include making any facilities and rights-of-way advantages that local telephone companies possess available to all other competitors in order to increase competition in the provision of 5G services for the benefit of all Canadian businesses and customers. The Department should monitor the Federal Communications Commission ("FCC") wireless and wireline proceedings that are examining the regulatory impediments to network infrastructure investment and deployment, and look to adopt best practices where impediments might be removed or reduced in order to promote the rapid deployment of advanced broadband services in the Canadian context.[9]

8. It is clear that innovation in digital technologies will require support from device makers, infrastructure providers, network operators, and, not least, spectrum regulators. The Department has an important role to ensure that Canada continues to be at the forefront of 5G system development by providing access to the spectrum

[4] Intel Comments, pg 2.
[5] Bell Comments, para 19.
[6] Nokia Comments, pg. 2.
[7] Samsung Comments, pg 2.
[8] Nokia Comments, pg 3.
[9] Rogers Comments, para 99.

bands discussed in this consultation prior to WRC-19. As Shaw states, the Department's objectives should be to establish a regulatory environment that provides facilities-based carriers with "the certainty necessary to invest and innovate while allowing technology the flexibility to evolve."[10] SaskTel and Ericsson also share this need for agility that provides regulatory spectrum certainty and incentivizes investment, especially while 5G technology is still evolving.[11]

9. While the BCBA suggests spectrum aggregation limits and set-asides will be crucial for ensuring that Canadian consumers benefit from the full potential of mmWave bands,[12] the Department should disregard such proposals. One of the key advantages of mmWave spectrum is the ability to provide operators with very wide, contiguous spectrum channels that will facilitate the enhanced mobile broadband ("eMBB") that will provide peak data rates of greater than 10 Gbps with 100 Mbps as average throughput, resulting in 10,000 times more traffic carried on networks.

10. Similarly, Cogeco argues that the Department should set aside spectrum for small or start-up operators and establish licence-exempt spectrum in all of the 28 GHz, 37-40 GHz, and the 64-71 GHz frequency bands, and that the Department can course correct later if the policy fails.[13] The Department tried introducing unsustainable competition in the 2008 AWS-1 auction and it took nearly a decade for the market to correct through consolidation and exit by the small start-up firms, with a number of spectrum bands laying fallow or underutilized as a result. The only beneficiaries are those who obtained spectrum at below market prices and then flipped it for large profits later. Set-asides will only result in subsidies to well-capitalized network operators that do not need financial assistance or provide spectrum to those unable to effectively deploy it or who are pure speculators. Unilaterally establishing licence-exempt spectrum allocations in a smaller market like Canada would almost guarantee portions of the Consultation mmWave spectrum being orphaned and would increase the interference risk to current licensees. The Department should reject such proposals.

11. Rogers supports comments by Telesat and ViaSat that the Department's policy needs to be sufficiently flexible to allow innovative Canadian satellite services to develop and thrive, and that, as part of the ongoing standards studies, ensure that satellite services are a part of the various 5G discussions.[14] However, to be clear, satellite services will primarily play a complementary role to terrestrial 5G in rural and remote connectivity areas. Intelsat, confusingly, suggests that fixed satellite service providers ("FSS") can be used for 5G services like connected cars.[15]

[10] Shaw Comments, para 32.
[11] SaskTel Comments, para 29; Ericsson Comments, pg 8-9.
[12] BCBC Comments, para 15.
[13] Cogeco Comments, para 30-31.
[14] Telesat Comments, para 22; ViaSat Comments, pg 4.
[15] Intelsat Comments, pg 1.

However, connected cars require mobility and FSS is for *fixed* services. The terrestrial wireless industry will be the key driver for 5G in urban and suburban areas and along major transportation routes, and the Department must not adopt overly restrictive technical or regulatory barriers that hamper the deployment of 5G terrestrial systems. mmWave spectrum should be made available as rapidly as possible using a technologically-neutral approach while ensuring reasonable protection of incumbent services in order to enable greater spectrum utilization and allow Canadian consumers to benefit from wireless innovations.

12. A number of organizations have participated in the proceeding to request a moratorium on all 5G technology, particularly the Consultation mmWave bands, due to perceived health concerns. The Department should reject any such proposal, as Health Canada has already established maximum limits for RF exposure in its document entitled, *Safety Code 6*.[16] All wireless devices used and antennas erected in Canada are required to operate below these maximum limits set out in *Safety Code 6*. Indeed, cellphones and wireless towers are designed to operate within these exposure limits that have been created with substantial built-in safety margins and most devices and towers are already well below *Safety Code 6* levels.

13. Any moratorium on 5G technologies would limit Canadians' access to all the health benefits that 5G may be able to offer, such as enhanced telemedicine (including imaging, diagnostics, data analytics, and treatment), improved transportation safety, the Internet of (Medical) Things, and more. As the Department itself has stated, "The development and deployment of 5G is essential to Canada becoming a global centre for wireless innovation, and will bring Canada to the forefront of digital development and adoption through the creation and strengthening of world-leading wireless infrastructure."[17]

14. Rogers agrees with the majority of industry submissions on the important role that 5G will play in the development of the Internet of Things and in driving innovation, efficiency, and productivity throughout the economy. As Huawei comments:

> Just as the deployment of railways transformed the life of Canadians a hundred years ago by rapidly connecting people and goods nationwide and to markets and services globally, the mobile communications facilities now instantaneously connect Canadians (and Canadian industries) nationwide to their families, their jobs, their markets, their services and their government. Now, instant nationwide connectivity and global

[16] Health Canada, *Safety Code 6*; https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt_formats/pdf/consult/_2014/safety_code_6-code_securite_6/final-finale-eng.pdf
[17] ISED, *Consultation,* para 3.

information flow is not just a convenience; it forms the basis for a functioning economy.[18]

15. Providing timely access to the mmWave spectrum bands in the Consultation will allow the private sector to build business cases for the large capital investments needed to deploy the advanced and extensive infrastructure necessary to enable new services in mmWave bands, including 5G services, to benefit all Canadian consumers and businesses.

5-1: ISED is seeking comments on developing a flexible use licensing model for fixed and mobile services in the 28 GHz and 37-40 GHz frequency bands, and allowing licence-exempt use of the 64-71 GHz frequency band ahead of WRC-19 and before 5G technology standards are finalized.

16. Rogers continues to support the Department's proposal to develop a flexible use licensing model in the 28 GHz and 34-40 GHz frequency bands and allow licence-exempt use of the 64-71 GHz band ahead of WRC-19. As 5G wireless access technologies will operate in both fixed and mobile modes of operation, flexible use is the optimum model for these bands. Flexible licensing will allow network operators to evaluate market conditions and deploy the best-suited technology to meet demand. Bell, Telus, Shaw, SaskTel, Xplornet, the RABC, Huawei, the GSA, Intel, Nokia, and Samsung support this view.[19]

17. Satellite proponents such as ViaSat and the BSO Coalition support flexible use licensing in the 28 GHz and 37-40 GHz bands, as long as it remains technology neutral, while only Intelsat suggests delaying the benefits of 5G to Canadians until after WRC-19.[20] However, the Department should reject any proposal that needlessly delays developing a flexible use licensing model for fixed and mobile services. As the Department itself stated, taking action prior to WRC-19 will promote innovation and early adoption of 5G technology without overly prescriptive requirements.[21]

18. Outside of satellite providers, Cogeco supports the flexible use model but suggests the Department hold off on actually licensing the spectrum until standards take a more definite shape.[22] It is hard to understand how technology neutral, flexible use

[18] Huawei Comments, pg 3.
[19] Bell Comments, para 21; Telus comments, para 14; Shaw Comments, para 34; SaskTel Comments, para 33; Xplornet Comments, pg 3; RABC Comments, para 9 & 14; Huawei Comments, pg 5; GSA Comments, pg 2; Intel Comments, pg 3; Nokia Comments, pg 3; Samsung Comments, pg 4.
[20] BSO Coalition, para 18; ViaSat Comments, pg 4; Intelsat Comments, pg 2.
[21] ISED, *Consultation*, para 14.
[22] Cogeco Comments, para 34.

licensing and licence-exempt usage would in any way "potentially close the door to new operators and new ideas" as Cogeco suggests.[23] Such delay tactics only serve to harm Canadian innovation and early adoption of 5G technology.

19. As Ericsson states, they are one of two developmental licensees helping to "spearhead pre-commercial equipment testing to further understand the characteristics of mmWave spectrum bands" and that access to short-term developmental licences for testing is "extremely important for the research and development initiatives that benefit Canadians and global wireless industry."[24] Ericsson's homegrown innovation shows why Canada should not wait for WRC-19 to begin the 5G licensing process.

20. TeraGo supports not only the development of a flexible use licensing model for the 28GHz and 37-40 GHz frequency bands but urges ISED to give consideration in the near future for the inclusion of the 24.25-27.5GHz bands.[25] Rogers notes that the Department has since launched *Consultation on the Spectrum Outlook 2018 to 2022* ("Spectrum Outlook"), which indicates that this band is currently being considered for potential release in Canada between 2018 and 2022.[26] Rogers supports all efforts by the Department to provide more low, mid, high, microwave, and mmWave spectrum to mobile networks, including for both mobile and fixed services, to meet the insatiable demand by Canadians for advanced mobile services.

21. The BCBA proposes that ISED consider supporting European standards for the Consultation bands if U.S. standards appear to be less attractive due to technological, commercial, or regulatory constraints, especially if the roll-out of – unproven – dynamic frequency allocation database systems progresses slowly.[27] While it is important for the Department to consider the best band plans and global ecosystems that are developing for various spectrum bands, including mmWave spectrum, the Department should be wary about unproven regulatory and licensing models. Exclusive licensing will be crucial to encourage investment in, and provide the interference free availability of mmWave spectrum for early 5G systems. The Department has also proposed allowing licence-exempt use of the 64-71 GHz frequency band, which will increase the already significant amount of non-exclusive spectrum available to operators. Harmonizing spectrum use as much as possible with the U.S. will achieve maximum economic benefits by driving economies of scale for regional equipment ecosystems and reduce costs for Canadian consumers and businesses.

[23] Cogeco Comments, para 34.
[24] Ericsson Comments, pg 11.
[25] TeraGo Comments, para 12 & 15.
[26] ISED, *Consultation on the Spectrum Outlook 2018 to 2022* (Spectrum Outlook), para 116-118; http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf11333.html#s6.3.
[27] BCBA Comments, para 21

6-1: ISED is seeking comments on the changes proposed above to introduce flexible use licensing in the 28 GHz band, including consequential changes to the CTFA domestic footnotes and the policy on this band contained in SP 3-30 GHz, *Revisions to Spectrum Utilization Policies in the 3-30 GHz Frequency Range and Further Consultation*.

22. Rogers notes there is broad support from the mobile industry for the Department's proposal to add C47C footnote to ensure viable deployment of flexible mobile and fixed services in 27.5-28.35 GHz, including from Bell, Telus, Shaw, SaskTel, Xplornet, 5G Americas, Ericsson, Nokia, and Samsung.[28] In addition, TeraGo and the BCBA also support the proposal.[29] For clarity, Rogers still supports flexible use licensing in the 28 GHz band that will allow integrated backhaul, in addition to conventional fixed and mobile access usage, as is being studied in 3GPP.[30]

23. Telesat supports the proposed introduction of flexible licensing in the 28 GHz band, provided adequate measures are taken to enable reasonable siting of 28 GHz earth stations and protection of satellite receivers from harmful interference.[31] ViaSat takes a similar position.[32] Rogers does not necessarily oppose this view but we note Intel's observation that paragraph 32 of the Consultation states that ubiquitous FSS deployment is not allowed, and we agree that an explicit clarification should be added to Modification C47C such that it will more clearly describe the extent to which FSS deployment will be permitted.[33]

24. Intelsat is encouraging ISED not to include the 27.5-28.35 GHz for terrestrial 5G, as it does not have international support as an IMT candidate band.[34] While strictly true that 27.5-28.35 GHz is not up for official IMT consideration at WRC-19, it is not true to say that it does not have international support. Beyond Canada, the U.S., Korea, and Japan are all looking to rapidly deploy on 28 GHz and the band is expected to be one of the pioneer 5G bands and one of the first to be used to launch pre-commercial 5G standards. This highlights the support from a number of countries from ITU Region 2 and ITU Region 1. Further, 3GPP is already developing

[28] Bell Comments, para 23; Telus Comments, para 18; Shaw Comments, para 41; SaskTel Comments, para 38; Xplornet Comments, pg 3; 5G Americas, para 5; Ericsson Comments, pg 14; Nokia Comments, pg 3; Samsung Comments, pg 7.
[29] BCBA Comments, para 22; TeraGo Comments, para 17.
[30] Rogers Comments, para 20.
[31] Telesat Comments, para 29.
[32] ViaSat Comments, pg 4.
[33] Intel Comments, pg 4.
[34] Intelsat Comments, pg 2.

standards around these frequency bands even if the ITU has not, yet, concurred on a global IMT allocation.

25. Satellite proponents, including the BSO Coalition and Ciel Satellite, desire that ISED allow airborne and maritime earth stations in motion ("ESIMs") to communicate to GSO Satellites.[35] ViaSat wants ISED to allow all ESIMs on a case-by-case basis and continue to study broader policies and rules to permit access for all services.[36] However, Rogers continues to support the Department's prohibition on the use of land-based ESIMs from communicating with FSS space stations and permit airborne and sea ESIMs only on a case-by-case basis on conditions of no interference, no-protection, and urges the Department to not expand their access. Further, we remain concerned with potential interference from airborne ESIMs, and believe that the Department should supply additional information on these devices prior to adoption of licensing conditions for this band.

26. Rogers' concerns are shared by a number of other submissions. For example, "Intel supports the ISED proposal for use of airborne and maritime ESIMs, with deployment evaluated on a case-by-case basis, and on conditions of not causing interference and not receiving interference protection."[37] The GSA states, "land-based ESIM is particularly problematic due to the high-likelihood of terminals of both services operating in close proximity. It should also be noted that co-channel operation is problematic, even for some sea and airborne ESIM operations."[38] Huawei echoes this view, noting, "the coordination of FSS ESIMs is technically very difficult and we recommend that these not be generally permitted and restricted to geographic areas where there are no FS or flexible use systems."[39]

6-2: ISED is seeking comments on the moratorium for new site-specific fixed service licences as described above.

27. There is very broad support for a moratorium on new site-specific fixed service licences from those who weighed in on the topic, including Bell, Shaw, SaskTel, the RABC, 5G Americas, the BCBA, the BSO Coalition, Ericsson, the GSA, Huawei, Intel, Nokia, Samsung, and TeraGo.[40] As Telus states, "The imposition of such a

[35] BSO Coalition, para 21-23; Ciel Satellie, para 4-5;
[36] ViaSat Comments, pg 4.
[37] Intel Comments, pg 4.
[38] GSA Comments, pg 3.
[39] Huawei Comments, pg 8.
[40] Bell Comments, para 25; Shaw Comments, para 42; SaskTel Comments, para 41; RABC Comments, para 22; 5G Americas Comments, para 6; BCBA Comments, para 23; BSO Coalition Comments, para 24; Ericsson Comments, pg 15; GSA Comments, pg 4; Huawei Comments, pg 6; Intel Comments, pg 5; Nokia Comments, pg 3; Samsung Comments, pg 8; TeraGo Comments, para 19.

moratorium would support the Department's stated goal of supporting 5G innovation by minimizing encumbrance of the band in preparation for imminent flexible use licensing (e.g., not adding further coordination challenges beyond those associated with existing FSS earth stations)."[41]

28. However, Rogers still believes that the Department should continue to issue short-term developmental licenses in the band on a site-by-site basis. This will allow equipment manufacturers, operators, and other interested parties to trial and evaluate the spectrum and future deployment scenarios and costs. Allowing developmental licences during any moratorium will foster innovation, investment and the evolution of wireless networks through the adoption of 5G technology so that Canadian consumers and businesses benefit.[42]

6-3: ISED is seeking comments on its proposal to adopt the band plan (as shown in figure 3 above) in the 28 GHz band.

29. Although there is general support for the proposal,[43] several parties raise concerns with the proposed 28 GHz band plan of two 425 MHz blocks. For instance, Microsoft notes that a 5G data rate can be achieved using less than 425 MHz of spectrum.[44] Cogeco also notes that a two-block band cannot be licensed to more than two operators and recommends the Department assure the band plan can accommodate all operators.[45]

30. Rogers agrees with Shaw's comment that the band be divided into four blocks to promote competition. However, Rogers is concerned that the Shaw proposal for 212.5 MHz channels is inefficient.[46] 3GPP is in the process of standardizing 5G with channel bandwidths of 50, 100, 200, and 400 MHz channels. If an operator were licensed for 212.5 MHz, it would not be possible to use the entire allocation, as 12.5 MHz of the allocation could not be used. Rogers' preferred band plan aggregates this "surplus" spectrum into two 25 MHz reserve bands, which could be used as guard bands until some future application could be developed. Rogers' proposed

[41] Telus Comments, para 22.
[42] Rogers Comments, para 23.
[43] Intel Comments, pg 6; Nokia Comments, pg 4; Samsung Comments, pg 8; Huwaei Comments, pg 6; GSA Comments, pg 4; Ericsson Comments, pg 15; RABC Comments, para 23; 5G Americas Comments, para 7; BCBA Comments, para 24; BSO Coalition Comments, para 25; Telus Comments, para 23; SaskTel Comments, para 42; Xplornet Comments, pg 4; Intelsat Comments, pg 3.
[44] Microsoft Comments, pg 3.
[45] Cogeco Comments, para 38.
[46] Shaw Comments, para 44.

band plan also aligns more closely with the United States band plan, which could help to mitigate cross-border interference when the band goes into service.

31. TeraGo proposes that ISED adopt a band plan similar to 37-38 GHz and divide the 28 GHz band into 4x200MHz blocks in order to enable up to 4 operators to deploy in a service area with capability to provide gigabit services.[47] Such a band plan is very similar to Rogers' proposal, although TeraGo offers no specific recommendations for the unassigned 50 MHz.

32. Bell proposes that the Department delay until 3GPP finalizes standards on bandwidth sizes before finalizing the 28 GHz band plan. While their recommendation that any fractional remainder (e.g. 50 MHz) be packaged as a single licence is less inefficient than the proposed 2x425MHz band plan,[48] two 400 MHz blocks and a single 50 MHz block is unlikely to provide sufficient downstream competition.

33. Based on our review of the alternative proposals for the 28 GHz band, Rogers remains supportive of the proposed frequency range for the band but is convinced that our proposed band plan best sub-divides the band into multiple, smaller blocks that would allow greater competition, more innovation, more services, and greater overall benefits to Canadians.

6-4: A. ISED seeks comments on its proposal to require site-by-site coordination between proposed flexible use terrestrial stations and FSS earth stations in the 28 GHz band when a pre-determined trigger threshold is exceeded.

B. If site-by-site coordination is proposed, what coordination trigger and value would be the most appropriate (e.g. PFD or distance threshold)?

C. ISED is also inviting proposals for specific technical rules on proposed flexible use stations and FSS earth stations (e.g. site shielding) that could facilitate more efficient sharing between terrestrial and earth stations.

34. There is general support of the proposal for site-by-site coordination between proposed flexible use terrestrial stations and FSS earth stations in the 28 GHz band when a pre-determined trigger threshold is exceeded from both satellite and mobile proponents.[49] As Nokia highlights, harmful aggregate interference is unlikely to occur from the mobile operations to satellite operations.[50]

[47] TeraGo Comments, para 22.
[48] Bell Comments, para 27-30.
[49] SaskTel Comments, para 44; BCBA Comments, para 26; RABC Comments, para 25; BSO Comments, para 26; Ericsson Comments, pg 15; GSA Comments, pg 4; Huawei Comments, pg 7; Samsung Comments, pg 9; Telesat Comments, para 34; Telus Comments, para 26; Cogeco Comments, para 40.
[50] Nokia Comments, pg 4

35. Bell believes that site-by-site coordination would be manageable between flexible use terrestrial and FSS users as there are currently only eight satellite earth stations operating across Canada but "that the Department should impose limits on the placement and overall number of future FSS stations in order to minimize the impact to 5G networks."[51] Bell further recommends that the Department should adopt the 3GPP coexistence requirements so as not to create any Canadian-specific technical considerations.[52] Rogers supports Bell's recommendation to adopt 3GPP industry standards, in order to take advantage of economies of scale and not create a very costly "Made in Canada" solution with no strong technical reason to do so.

36. Although a number of satellite proponents offer general support for the Department's proposal, they wish to expand access for satellite services in the band. Ciel Satellite argues that ISED should still consider approving new applications for FSS earth stations close to urban boundaries at existing teleports.[53] Intelsat also wants licensing rules as flexible as possible and not limit or restrict new FSS earth station deployments.[54] Xplornet offers support for the proposal provided that the coordination process recognize an equal balance between satellite and terrestrial users. [55] ViaSat believes that site-by-site coordination without a framework would not achieve equitable access for satellite operators. [56]

37. Rogers agrees that incumbent satellite users, defined as existing earth stations already operating and those whose application were submitted on or before the Consultation launch date (i.e. June 5, 2017), should receive protection. However, the Department should reject calls that would allow for new FSS satellite earth stations to be located in or close to population centres or areas where there is expected to be significant 5G mobile traffic, including event venues, major highways or roadways, mass transit systems, passenger railways, airports, or cruise ship terminals.

38. It must be recognized that although both services are co-primary in the 28 GHz band, they are not equal; rather, terrestrial services have primacy. As the Department itself states in the Consultation, fixed services already are given priority over FSS systems sharing this spectrum and that FSS implementation in the 28 GHz band is limited to applications that would impose minimal constraints upon the deployment of fixed service systems.[57] Further,

> ISED is of the opinion that soft partitioning continues to be an effective approach to sharing spectrum between different services in this band and

[51] Bell Comments, para 32.
[52] Bell Comments, para 34.
[53] Ciel Satellite, para 7.
[54] Intelsat Comments, pg 3.
[55] Xplornet Comments, pg 4.
[56] VisaSat Comments, pg 5.
[57] ISED, *Consultation,* para 20.

> plans to continue facilitating the deployment of earth stations while ***ensuring that minimal constraints are imposed on the future deployment of fixed and mobile services***.[58] [Emphasis added.]

39. In regards to which coordination trigger and value would be the most appropriate (e.g. PFD or distance threshold), there is broad support for the use of a PFD trigger and the view that the Department initiate a study to determine the appropriate PFD coordination trigger for FSS and flexible use terrestrial station operators, with some parties specifically recommending RABC investigation.[59] As there is very limited preference for a distance trigger, such as by Xplornet,[60] the Department should move forward with efforts to determine the PFD trigger value.

40. Ericsson highlights that the FCC has set a PFD limit of -77.6 dBm/m^2/MHz at a height of 10m above the ground as the coordination trigger and supports the use of the same PFD limit as the coordination trigger, unless further study indicates otherwise.[61] Telus also appears to support the FCC PFD trigger limit, with Telus' recommendation that the Department require FSS earth station licensees to submit their technical site data including interference contours as part of their approval process, with the information to be published on the Department's website.[62] In their comments, Intelsat also highlights the FCC PFD limit, though they recommend this limit as a starting point rather than as a definitive Canadian level, and propose that terrestrial station locations be made publically available to facilitate earth satellite station site section.[63]

41. Rogers still views a PFD threshold as an appropriate coordination trigger that would minimize unnecessary detailed coordination. Rogers supports the current efforts by an RABC working group to determine the PFD trigger value and endorses using the FCC's PFD limit of -77.6 dBm/m^2/MHz as a starting point.

42. In regards to specific technical rules to facilitate more efficient sharing between terrestrial and earth stations, ViaSat argues that, except grandfathered earth stations, the Department should simply provide guidance on a general deployment environment and allow satellite and terrestrial operators to find ways to meet those reasonable requirements.[64] Mobile proponents such as Bell, Telus, Ericsson, Nokia, and SaskTel, all support the use of site shielding of future earth stations; however they also agree that FSS licensees should be allowed to select the engineering solution that best meets their business case to meet the protection criteria that are

[58] ISED, *Consultation,* para 25.
[59] Rogers Comment's, para 38; SaskTel Comments, para 46; RABC Comments, para 29; BSO Coalition, para 30; Samsung Comments; pg 9; Telesat Comments, para 32; Bell Comments, para 36.
[60] Xplornet Comments, pg 4.
[61] Ericsson Comments, pg 15; Nokia Comments, pg 4.
[62] Telus Comments, para 28.
[63] Intelsat Comments, pg 3.
[64] ViaSat Comments, pg 6.

set by the Department.[65] Telesat, Intelsat, and the RABC also support this position. The BSO Coalition recommends leaving the coordination process to the licensees but notes that there would need to be an escalation process.[66] Rogers agrees that, whenever possible, use of site shielding should be implemented to maximize coexistence of services.

43. While Xplornet believes that grandfathered existing FSS earth stations should not have to adopt shielding and that new terrestrial users of the spectrum can design networks around existing earth stations,[67] such a proposal would deprive some Canadians of the benefits of 5G services if they happen to live near a grandfathered earth station. While 5G operators should mitigate interference to the maximum extent possible using beam forming and other solutions, if these solutions are inadequate then mandated shielding or relocation should be considered for the earth station, especially for earth stations in or near any population centre. Rogers' view is the cost of site shielding or other interference mitigation is small compared to the economic benefits of 5G.

44. Rogers repeats its recommendation that stakeholders (flexible use license holders and FSS earth station operators) collaborate within the RABC, or some other forum, to develop the specific technical rules on sharing.

6-5: A. ISED is seeking comments on whether there should be restrictions on the geographic areas in which new FSS earth stations can be deployed in the 28 GHz band.

B. If geographic restrictions on FSS earth stations are proposed, ISED is inviting detailed proposals on how they could be implemented, and what areas should be targeted.

45. There is wide support amongst mobile proponents for placing restrictions on the geographic areas in which new FSS earth stations can be deployed in the 28 GHz band, with some suggesting that an RABC working group provide guidance.[68] As the RABC notes, the priority of flexible use terrestrial stations over future FSS earth stations in the 28 GHz band is provided in proposed footnotes C47A and C47C, and the GSA and Ericsson strongly support the terrestrial priority view.[69] Similar to

[65] Ericsson Comments, pg 16; Telus Comments, para 30; SaskTel Comments, para 48; RABC Comments, para 32; Intelsat Comments, pg 3; Telesat Comments, para 37; Bell Comments, para 37; Nokia Comments, pg 4.
[66] BSO Coalition Comments, para 31.
[67] Xplornet Comments, pg 4.
[68] Telus Comments, para 35; SaskTel Comments, para 51; BCBA Comments, para 28; Huawei Comments, pg 8; Intel Comments, pg 7; Samsung Comments, pg 10.
[69] RABC Comments, para 33; GSA Comments, pg 5; Ericsson Comments, pg 16.

Rogers' proposals to restrict implementation of new FSS earth stations to locations that are outside major urban areas, Bell recommends that practical deployment of 5G will be concentrated on urban/suburban centres, major highway corridors, rural community hotspots/gathering places, or last mile roadside fixed service and that these areas should be avoided for FSS services.[70]

46. Most satellite proponents are accepting of at least some restrictions. In their comments, Telesat accepts some geographic restrictions but does not believe they should be as strict as the FCC's *Spectrum Frontiers Report & Order*.[71] The BSO Coalition argues that FSS earth station deployment should not be constrained in areas where 28 GHz flexible use systems are not expected to be deployed.[72] Rogers supports earth stations being able to deploy, subject to the restrictions in our Comments.[73]

47. However, the Department should strongly reject the proposals by satellite operators like Intelsat and Xplornet who want no restrictions or FSS site placement and interference mitigation requirements to be considered on a case-by-case basis.[74] ViaSat claims there is no need to limit the growth of FSS earth stations in core urban areas or near major infrastructure, even where 5G may deploy and, further, that even satellite earth stations that have yet to be applied for should be grandfathered under current rules.[75] Proposals such as these would disrupt the deployment and deployment opportunities for 5G services, and limit their associated economic and strategic industrial benefits for Canadians, especially if the satellite systems were located in populated centres.

6-6: ISED is seeking comments on whether it should impose any limits on the aggregate emissions of the terrestrial services. If limits are proposed, ISED is inviting detailed proposals on why they should be implemented, and what the limits should be.

48. Rogers continues to support the Department's proposal to impose no limits on the aggregate power levels produced by terrestrial flexible use systems, as do Bell, Shaw, the BCBA, Ericsson, the GSA, Huawei, Intel, and Samsung, with some noting that the FCC has also not imposed limits.[76] As SaskTel notes, "any interfering

[70] Bell Comments, para 39.
[71] Telesat Comments, para 40.
[72] BSO Coalition Comments, para 32.
[73] Rogers Comments, para 46.
[74] Intelsat Comments, pg 4; Xplornet Comments, pg 5.
[75] VisaSat Comments, pg 6.
[76] Bell Comments, para 41; Shaw Comments, para 50; BCBA Comments, para 34; Ericsson Comments, pg 17; GSA Comments, pg 5; Huawei Comments, pg 8; Intel Comments, pg 7; Samsung Comments, pg 11.

transmissions towards space stations in the 28 GHz band from terrestrial fixed and mobile systems will be inherently limited because of the expected requirement to use dynamic beam forming and very narrow beam widths."[77]

49. While mobile proponents, like Telus, argue no limits need to be imposed as aggregate interference from flexible use terrestrial networks is unlikely to disrupt the operation of current FSS geostationary or non-geostationary systems,[78] some satellite proponents have concerns about potential aggregate interference into satellite receivers from unintended emissions of 5G stations.[79] However, even Xplornet says, "Absent an interference issue, it is not necessary to impose emission limits."[80]

6-7: ISED proposes that all existing FSS earth stations and those in applications pending approval for operation would be permitted to continue to operate under the current conditions of licence as described above. Comments are sought on this proposal.

50. A large number of submissions from both the mobile and satellite industries support the proposal that ISED should grandfather existing FSS earth station operations and those in application, with some explicitly calling for ISED to impose a moratorium on new applications.[81] Ericsson and Bell, similar to Rogers, support the proposal that existing FSS earth stations and those in application (submitted prior to the launch of the Consultation, i.e., prior to June 5, 2017) be excluded from the band sharing mechanisms but note that negotiated business arrangements could be used to allow terrestrial network operators to deploy in a geographic area where there is an existing grandfathered earth station.[82]

51. Telesat suggests that they generally support the Department's proposal to grandfather existing earth stations and those in application under the current rules but also state they want to expand the grandfathering to cover changes, expansions, or new sites.[83] ViaSat wants the proposed grandfather date extended to the Consultation decision and include earth stations associated with satellite networks applied for before the Consultation was issued.[84] The Department should reject all

[77] SaskTel Comments, para 54.
[78] Telus Comments, para 41.
[79] BSO Coalition Comments, para 34; Telesat Comments, para 48; ViaSat Comments, pg 7; Intelsat Comments, pg 4.
[80] Xplornet Comments, pg 6.
[81] Shaw Comments, para 52; SaskTel Comments, par 57; Xplornet Comments, pg 6; BCBA Comments, para 31; BSO Coalition, para 37; Intel Comments, pg 8; Intelsat Comments, pg 4;
[82] Bell Comments, para 45; Ericsson Comments, pg 18.
[83] Telesat Comments, par 51.
[84] ViaSat Comments, pg 7.

such requests, as the Consultation itself provides an effective date for the grandfathering. It is also clear that the Department is proposing grandfathering existing facilities and those in application, not new or expanded facilities. To allow for a continued expansion of satellite earth stations under the current rules would pose a serious risk to the coming 5G fixed and mobile terrestrial deployments and would be counter-productive to the Department's efforts to promote the deployment of 5G services throughout Canada.

52. The RABC suggests that the single LEO 28 GHz application be processed under the current conditions of licence, while working with the applicant to determine siting(s) that are likely to pose minimal constraints on the deployment of fixed and mobile service systems.[85] Telus recommends that the Department go further and postpone all final approvals of outstanding FSS earth station applications (in both the 28 GHz and 37-40 GHz bands), "in order to ensure that any geographic restriction policy adopted through this consultation process can be given due consideration in the Department's decision."[86] Rogers supports the RABC's proposal course of action in balancing the current rights of the applicant with the spectrum goals of the Department. However, Rogers also agrees with the views of Huawei and Samsung when they suggest that, as interference impacts are not clear at this time, the Department should keep the door open to considering additional measures, including detailed coordination changes for individual stations if needed in the future.[87]

7-1: ISED is seeking comments on the proposal to implement flexible use licensing in the frequency band 37-40 GHz, including the consequential changes to CTFA footnote C51, while continuing to allow for fixed-satellite service (space-to-Earth) in the band.

53. There is large support in the mobile industry for the Department's proposed adoption of a flexible use licensing model that would allow licensees to decide whether to deploy fixed systems, mobile systems or a combination of fixed and mobile systems in the 37-40 GHz band.[88] SaskTel and the RABC are in general support but have minor proposals for additional clarity in the definition.[89]

[85] RABC Comments, para 44.
[86] Telus Comments, para 50.
[87] Samsung Comments, pg 12; Huawei Comments, pg 9.
[88] Bell Comments, para 47; Telus Comments, para 51; Shaw Comments, para 54; Xplornet Comments, pg 6; 5G Americas Comments, para 8; BCBA Comments, para 32; Ericsson Comments, pg 18; GSA Comments, pg 6; Huawei Comments, pg 9; Microsoft Comments, pg 4; Nokia Comments, pg 5; Samsung Comments, pg 13; TeraGo Comments, para 23.
[89] SaskTel Comments, para 59; RABC Comments, para 45.

54. Satellite proponents are also in agreement with ISED's proposals for implementing flexible use licensing while emphasizing FSS will continue to have access to the 37-40 GHz band, with Telesat proposing some specific revisions to the wording.[90] Rogers supports the Department's proposal to continue licensing FSS within the band on a co-primary basis where, as the Department has also proposed, fixed and mobile services will be given priority over FSS.[91] Intel suggests that some of the Consultation language, which states that ubiquitous FSS deployment is not allowed in the band, "should be added explicitly to footnote Modification C51 and should reference more specific numeric limitations in order to avoid conflicting interpretations of the word 'ubiquitous' and its threshold."[92] While specific numeric limitations, in addition to establishing geographic restrictions, is perhaps too prescriptive, Rogers agrees with the underlying intent to ensure that future FSS deployments do not constrain 5G networks by increasing interference risks.

55. To reduce the risk of interference within the Consultation's pioneer 5G mmWave bands, the Department should also reject calls to make any part of the 37-40 GHz band licence-exempt, including 37.0-37.6 GHz.[93] The Consultation is already proposing to make 7 GHz of spectrum available for licence-exempt use, compared to just 3.85 GHz for exclusively licenced use. Taking another 600 MHz away from exclusively licenced use would only further increase the imbalance that already exists, as it alone would be nearly equal to the entire amount of spectrum (648 MHz) available for commercial mobile services today.[94] Licence-exempt usage will also increase the technical challenges and interference risk that must be managed between future flexible use and satellite licensees within the band.

56. For similar reasons, the Department should also reject proposals to allow opportunistic access within the band.[95] As Rogers and a number of other commenters state, incumbent 37-40 GHz fixed service users will either be converted to exclusively licenced flexible use licence holders or (temporary secondary users) will be displaced. As the main purpose of a dynamic access database is to protect incumbents that have variable usage conditions (location, time etc.), the additional costs and complexity associated with dynamic access using database (devices, database etc.) cannot be justified, especially for a Canadian-only technology that would lack any economies-of-scale.

[90] BSO Coalition Comments, para 43; Intelsat Comments, pg 5; Telesat Comments, para 53; ViaSat Comments, pg 8.
[91] ISED, *Consultation,* para 49.
[92] Intel Comments, pg 8.
[93] Wi-Fi Alliance Comments, para 3.2.
[94] ISED, *Spectrum Outlook*, para 11.
[95] DSA Comments, pg 2.

7-2: ISED is seeking comments on whether a moratorium on the issuance of new licences under the *New Licensing Framework for the 24, 28 and 38 GHz Bands and Decision on a Licence Renewal Process for the 24 and 38 GHz Bands* is required at this time.

57. A number of submissions were supportive of ISED's proposed selective moratorium on new licence issuances in the 28 GHz and 38 GHz bands, including the BSO Coalition, Nokia, SaskTel, and Samsung.[96] As Bell states, "given that the 38.4-40 GHz band is presently being used to deliver backhaul for mobile services and for enterprise wireless solutions, we agree that an immediate moratorium on the issuance of new licenses could negatively impact current and future deployment plans for incumbent licensees at this time."[97]

58. TeraGo does not support a moratorium at all and wants to be able to acquire licences in new areas.[98] Conversely, Telus supports an immediate moratorium on all new licences.[99]

59. As an operator with significant deployments of fixed systems in the 38 GHz band, Rogers believes that the Department has struck the right balance between the needs of incumbent fixed service users and ensuring that the spectrum will be available for licensing and usage under the proposed flexible use licences. However, we repeat our recommendation that the Department consider opening a replacement band to substitute for the eventual loss of 38.4-40 GHz spectrum for fixed backhaul services, perhaps prioritizing development of the technical standards to enable the licensing and use of the 32 GHz band as part of the Spectrum Outlook consultation.[100]

60. Some satellite providers, such as ViaSat, do not believe licensing moratoriums should be applied to satellite services.[101] As there are currently no FSS earth stations currently in operation in the 37-40 GHz band and only a single application is being reviewed by the Department, it makes good policy to extend the moratorium to earth stations. While allowing new 38.4-40 GHz fixed service installations on a FCFS, secondary status allows current operators to better manage their networks in the short term, allowing for the establishment of numerous new earth stations would present an immediate and long-term impairment to the deployment of 5G services, harming Canadians unduly.

[96] Bell Comments, para 51; Telus Comments, para 55; 5G Americas Comments, para 8; BSO Coalition Comments, para 44; Nokia Comments, pg 5; Samsung Comments, pg 13.
[97] Bell Comments, para 50.
[98] TeraGo Comments, para 25.
[99] Telus Comments, para 54.
[100] ISED, *Spectrum Outlook*, para 110.
[101] ViaSat Comments, pg 8.

7-3: ISED is seeking comments on the proposal to adopt the band plan as shown in figure 7 for the frequency band 37-40 GHz.

61. There is overwhelming support from both satellite and mobile proponents to adopt the proposed 37-40 GHz band plan.[102] As Shaw notes, "In the 37.6-40 GHz band, 200 MHz channel sizes would provide the optimal balance and provide the appropriate technical characteristics to attract investment and innovation in 5G services and applications."[103]

62. The Dynamic Spectrum Alliance ("DSA") supports the band plan proposal but recommends that ISED allow licensed, license-by-rule, and licence-exempt operations, as well as opportunistic access within the 37.6-40 GHz band.[104] For all reason listed above (interference risks, the unproven technology, the already co-primary nature of the band, the current imbalance between amounts of exclusively licenced and licence-exempt spectrum), the Department should reject such proposals.

63. TeraGo supports the proposed band plan but argues for all current Tier 3 licensees to retain all of their spectrum and, further, if their holdings are non-contiguous, then have it be re-allocated and re-assigned so they hold a full 200 MHz block under the new band plan.[105] As detailed in our response to 7-7, Rogers believes that there should be a one-third reduction, which would treat 38 GHz Tier 3 licensees similar to the way 2500 MHz licence holders were treated when the Department repurposed its use.[106] As the Department itself states, flexible use licences would be expected to be much more valuable and in demand than fixed,[107] and so a one-third reduction is a fair policy both on its own and relative to the Department's own precedent.

[102] Bell Comments, para 52; Telus Comments, para 56; SaskTel Comments, para 63; Xplornet Comments, pg 7; RABC Comments, para 48; 5G Americas, para 10; BCBA Comments, para 35; BSO Comments, para 45; Ericsson Comments, pg 19; GSA Comments, pg 6; Huawei Comments, pg 9; Intel Comments, pg 9; Intelsat Comments, pg 5; Microsoft Comments, pg 4; Nokia Comments, pg 5; Samsung Comments, pg 14.
[103] Shaw Comments, para 65.
[104] DSA Comments, pg 2.
[105] TeraGo Comments, para 28.
[106] Rogers Comments, para 78.
[107] ISED, *Consultation*, para 64.

7-4: A. ISED seeks comments on the proposal to require site-by-site coordination between proposed flexible use terrestrial stations and FSS earth stations in the frequency band 37.5-40 GHz when a pre-determined trigger threshold is exceeded.

B. If site-by-site coordination is proposed, what coordination trigger and value would be the most appropriate (e.g. PFD or distance threshold)?

IS C. ISED is also inviting proposals for specific additional technical rules on flexible use stations and FSS earth stations (e.g. site shielding) that could facilitate more efficient sharing between terrestrial and earth stations.

64. There was broad agreement with the Department's proposal to require site-by-site coordination between proposed flexible use terrestrial stations and FSS earth stations in the frequency band 37.5-40 GHz when a predetermined trigger threshold is exceeded.[108] Bell and the GSA believe that while FSS systems should continue to have access to the band, they support the Department's proposals that terrestrial systems have priority access and that that FSS deployments should not impede 5G deployments – especially in key areas such as urban/suburban centres, major highway corridors, and rural community hotspots/gathering places.[109] Telus has a similar position, in that they support site-by-site coordination, "but only as a recourse to facilitate coexistence between flexible use terrestrial stations and FSS earth stations whose siting is approved under the geographic restriction policy."[110]

65. However, Huawei thinks it premature at this time to require a site-by-site coordination process between flexible use terrestrial stations and FSS earth stations in the 37.5-40 GHz bands, considering that currently there are no existing FSS ground stations in the band.[111] Nokia notes that ISED dismissed the U.S. approach to protecting FSS earth stations without giving any specific reasons, and urges that ISED reconsider the merits of the U.S. approach.[112] Intelsat, however, recommends allowing FSS earth stations to be deployed without a rigorous coordination procedure and instead adopt a first-come first-serve regime, where a terrestrial station would need to coordinate with already operating FSS earth stations and vice-versa.[113]

[108] Xplornet Comments, pg 7. SaskTel Comments, para 64; RABC Comments, para 50; BCBA Comments, para 36; BSO Coalition Comments, para 46; Ericsson Comments, pg 19; Intel Comments, pg 9; Samsung Comments, pg 16; Telesat Comments, para 54.
[109] Bell Comments, para 55; GSA Comments, pg 6.
[110] Telus Comments, par 59.
[111] Huawei Comments, pg 10.
[112] Nokia Comments, pg 5.
[113] Intelsat Comments, pg 5.

66. Rogers continues to support ISED's proposal to require site-by-site coordination between proposed flexible use terrestrial stations and FSS earth stations in the frequency band 37.5-40 GHz when a pre-determined trigger threshold is exceeded, to ensure optimal coexistence of both co-primary services and fair access to the band for all interested operators. However, while both uses are co-primary, Rogers reiterates its support for the Department's proposal that deployment of fixed service systems and mobile service systems will be given priority over FSS systems in the co-primary sharing of the band.

67. A PFD trigger appears to have the most amount of support in the comments, though many state it is premature at this time to conclusively determine the exact PFD threshold and some recommend that the RABC study the issue.[114] Ericsson and Telus both suggest a PFD limit of -77.6 dBm/m2 /MHz at a height of 10m above the ground as the coordination trigger,[115] and Rogers agrees that this would be an appropriate starting point for any RABC study.

68. While the PFD trigger is the most supported, it is not the only coordination trigger suggested. Xplornet states that coordination triggers could be a combination of PFD, distance, and axis and elevation contours, depending on the radio frequency environment, noting other interference mitigation techniques (such as shielding) could influence predetermined triggers.[116] The BSO Coalition also believes that a "one-size-fits-all" approach, whether coordination distance or PFD value, may not be appropriate and Huawei likewise simply wants a "suitable trigger" to initiate site-by-site coordination.[117] The BCBA supports a distance threshold, as they suggest it would be simpler to implement.[118] Upon review of the submissions, Rogers still believes that having a technical framework that all licensees can rely on will facilitate coordination and that the preferred option remains a PFD trigger.

69. Bell, Telus, SaskTel, the RABC, Telesat, and Huawei have similar views to Rogers that earth station site shielding could be an efficient way to facilitate coordination and allow deployment of a future earth station, while elevation angle restrictions or other measures on new flexible use terrestrial stations could facilitate coordination with an existing FSS earth station. [119] However, some also recommend that it should be a licensees' business decision about which particular engineering solution to choose to use to meet ISED's criteria.

[114] Bell Comments, para 58; SaskTel Comments, para 64; RABC Comments, para 51; ViaSat Comments, pg 8; Telesat Comments, para 55.
[115] Telus Comments, para 61; Ericsson Comments, pg 19.
[116] Xplornet Comments, pg 7.
[117] BSO Coalition Comments, para 47; Huawei Comments, pg 10.
[118] BCBA Comments, para 37.
[119] Bell Comments, para 60; Telus Comments, para 64; SaskTel Comments, para 66; RABC Comments, para 54; Telesat Comments, para 55; Huawei Comments, pg 10; BSO Coalition Comments, para 48.

70. This seems a common argument, as both satellite and terrestrial proponents argue that mandated shielding is not a practical response to interference issues to be imposed on their services.[120] Rogers supports the position that licensees should have flexibility in determining which interference mitigation strategy should be pursued, backstopped by clear interference thresholds set by ISED. As Ericsson suggests, "Experienced system designers and operators will make adjustments where needed, without the need for prescriptive regulations."[121]

71. ViaSat makes the proposal that satellite operators should be able to increase the power limits for space-to-earth transmissions to improve their use of the spectrum.[122] The Department should reject such a proposal, as ViaSat offers no substantive analysis that such a unilateral move will not negatively affect terrestrial users and pose a large risk to the future of 5G systems. As identified numerous times, while both systems have co-primary sharing of the band, the Department has proposed priority of terrestrial systems.

7-5: A. ISED is seeking comments on whether there should be restrictions on the geographic areas in which new FSS earth stations can be deployed in the frequency band 37.5-40 GHz.

B. If geographic restrictions on FSS earth stations are proposed, ISED is inviting detailed proposals on how they could be implemented, and what areas should be targeted?

72. Most terrestrial proponents agree with the Department's proposal that there should be geographic restrictions on new FSS earth stations with some offering guidance around those restrictions, such as new FSS earth stations should be restricted to rural areas in order to minimize any potential conflicts and or restrict the deployment of terrestrial 5G services.[123] The RABC proposes to initiate a study to determine the appropriate restrictions on geographic areas in which future earth stations may be located, and SaskTel and Ericsson explicitly endorse such a study by the RABC.[124]

73. Some satellite proponents argue no geographic restrictions are necessary, while Xplornet tempers this with the position that none are necessary with adequate inter-operator coordination arrangements.[125] The BSO Coalition supports undertaking a

[120] Xplornet Comments, pg 7; BCBA Comments, para 38.
[121] Ericsson Comments, pg 19.
[122] ViaSat Comments, pg 3.
[123] Bell Comments, para 61; Telus Comments, para 66; BCBA Comments, para 39; Ericsson Comments, pg 20; Huawei Comments, pg 11
[124] RABC Comments, par 55; SaskTel Comments, para 67; Ericsson Comments, pg 20.
[125] Xplornet Comments, pg 7; Intelsat Comments, pg 6; ViaSat Comments, pg 9.

study, and Telesat specifically supports a study by the RABC while conceding a "technical study would be required before the specific parameters of any such restrictions could be properly defined and applied."[126]

74. Providing general guidance, Bell and Samsung state that deployment of 5G will be primarily in urban/suburban centres, major highway corridors, rural community hotspots/gathering places, and last mile roadside fixed services, and recommend that ISED place restrictions on FSS earth stations in these areas.[127] Telus has a more specific recommendation arguing for geographic restriction filters and the creation of "protection zones" around FSS earth station sites in the 37.5-40 GHz range.[128] However, upon review of the submissions, Rogers' proposals for specific geographic restrictions for FSS earth stations in the 37.5-40 GHz band appear to be a more defined starting point, which would prohibit (not permitted) FSS earths stations within large urban areas but only restrict them (site shielding required) within medium size and smaller urban areas.[129]

IS 7-6: It is proposed that, should SRS and/or MSS systems be deployed, flexible use licensees in the band 37.6-40 GHz may be subject to technical provisions to facilitate co-existence. Comments are sought. ISED notes that any such technical provisions would be established through a future consultation process.

75. SaskTel, Xplornet, the RABC, Intel, Nokia, Huawei, and Samsung all support ISED's proposal to potentially impose technical provisions or restrictions to protect any future space research service ("SRS") and mobile-satellite service ("MSS") systems implementations in Canada, should such service deployment actually happen.[130] As ViaSat notes, MSS is one possible use case for these bands by satellite services in the future and that any future technical and regulatory framework to allow those types of applications and services to be deployed should have a consultation.[131]

76. However, Bell is of the view that there should be no restrictions placed on the terrestrial services at this point in time, while Ericsson and the BCBA state that any technical provisions imposed in the future should not unduly disrupt incumbent

[126] Telesat Comments, para 58; BSO Coalition Comments, para 49.
[127] Bell Comments, para 62; Samsung Comments, pg 16.
[128] Telus Comments, para 66.
[129] Rogers Comments, para 72.
[130] SaskTel Comments, para 69; Xplornet Comments, pg 9; RABC Comments, para 63; Intel Comments, pg 10; Nokia Comments, pg 6; Samsung Comments, pg 17; Huawei Comments, pg 11.
[131] ViaSat Comments, pg 9.

flexible use terrestrial or FSS stations.[132] Telus suggests that a framework for coordination with geographic restrictions should be considered.[133]

77. Rogers continues to acknowledge that flexible use licensees may be subject to technical provisions in the future, should the government choose to deploy these systems in this band. However, we support the Ericsson and BCBA position and believe the Department should adopt a grandfathering rule for flexible use licensees to prevent disruption of service to users. Further, the adoption of overly conservative technical provisions today may reduce the value of licensed spectrum rights and diminish the investment incentives and certainty associated with those rights, leading to reduced innovation-led growth across all sectors of the Canadian economy.

7-7: ISED is seeking comments on:

A. the options and implications for the treatment of incumbent licensees currently holding Tier 3 licences, the percentage that would apply to option 1 and supporting rationale.

B. the options and implications for the treatment of incumbent licensees currently holding FCFS licences and supporting rationale.

78. Opinion appears divided on which direction to take over the treatment of incumbent Tier 3 licensees, with some arguing no reduction of Tier 3 spectrum licences, others accepting differing levels of reduction, while some suggest that all Tier 3 licences should be converted into site-specific licences.

79. In the first group, Xplornet supports grandfathering of incumbent licensees in cases of substantial investment, while Bell proposes permitting existing Tier 3 licence-holders to deploy 5G on their existing licences,[134] both of which would seem guaranteed to cause fragmentation and all its negative impacts for 5G. The Department should reject both of these proposals.

80. The BCBA supports conversion of Tier 3 fixed service licences to flexible use licences in licence areas that are outside of Canada's six largest metropolitan areas, with no reduction in spectrum quantity and no increase in licence fee.[135] However, this would still result in a large and unfair windfall for rural providers and should be

[132] Bell Comments, para 63; BCBA Comments, para 41; Ericsson Comments, pg 21.
[133] Telus Comments, para 69.
[134] Xplornet Comments, pg 9; Bell Comments, para 65.
[135] BCBA Comments, para 46.

rejected by the Department as self-serving for BCBA members that are Tier 3 licensees.

81. In the second grouping, TeraGo, the largest Tier 3 licence holder in the band, supports the option to convert existing Tier 3 fixed service licences to flexible use licences with the only reduction consisting of truncation to the new block size of 200 MHz.[136] SaskTel supports a modified Option 1, where existing Tier 3 fixed spectrum licences in the 38 GHz band be converted to Tier 4 based flexible use spectrum licences with a 60% reduction, where systems have actively been deployed.[137]

82. In the third group, Shaw opposes the proposal to convert Tier 3 fixed service licences to flexible use licences for a lesser amount of spectrum in the new band plan due to their concern about a compromised band plan for future flexible use licensees, as well as unfairly benefiting TeraGo, who holds 25 of 28 licences.[138] Telus has concerns about whether all the Tier 3 licensees are in compliance with deployment requirements.[139] As such, both support ISED's Option 2, and issuing site-specific licences for sites currently in operation at the end of the licence term.

83. Upon review, Rogers believes its proposal to provide incumbent licensees currently holding fixed service Tier 3 licences in the 38 GHz band with new flexible use licences, at a reduction of one-third of their total MHz holdings per service area as the fairest option, and the one that has the most precedent.[140] The Department should issue the new licences rounded down to the nearest whole 200 MHz block and, where Tier 3 38 GHz fixed licensees holdings in a single licence area would be reduced below 200 MHz, licences should be converted from Tier 3 service areas to site-based FCFS licences upon renewal.

84. In the case of incumbent licensees currently holding FCFS licences, SaskTel supports Option 1 that allows existing FCFS licensees in the 38 GHz band to continue to operate and to be protected from interference from new flexible use licensees.[141] TeraGo also supports this option and believes future flexible use licensees should be responsible for developing equipment that will be deployable around existing/legacy licensees.[142] The BCBA also supports the continued operation of grid-cell licensees with protection from interference from new flexible use licensees, in areas that are outside of Canada's six largest metropolitan areas.[143]

[136] TeraGo Comments, para 31.
[137] SaskTel Comments, para 70.
[138] Shaw Comments, para 71-72.
[139] Telus Comments, para 73.
[140] Rogers Comments, para 78.
[141] SaskTel Comments, para 74; Xplornet Comments, pg 9; BCBA Comments, para 48.
[142] TeraGo Comments, para 36.
[143] BCBA Comments, para 46-47.

85. The Department should reject these proposals as either transparently self-serving or as likely to result in either costly Canadian-only technical solutions or limiting the ability of all Canadians to benefit from future 5G services. As the largest current holder of 38 GHz FCFS licences in Canada, Rogers supports the Option 2 approach to allow 38 GHz FCFS licensees to continue operating on a secondary basis to new flexible use licences We view this as the fairest trade-off to incumbent fixed service licensees and future flexible use licensees. Bell and Shaw also generally support Option 2, which would allow FCFS licensees to continue operating on a secondary basis to flexible use licences until displaced by new flexible use systems.[144]

86. Telus supports Option 2 with a one year "rural" displacement notice but believes that the displacement notice should start on "urban" Tier 4s, which they define as 61 of 172 Tier 4 service areas, with the conclusion of the auction.[145] However, Rogers still recommends that outside of the six largest urban areas, a notification period of two years should apply. This would provide a more reasonable period for incumbent FCFS 38 GHz licensees to plan and execute their transition out of the band. This balances the ability for incumbent users to continue operating until 5G systems are deployed in their specific area and the reality that 5G services are most likely to be deployed first in the largest markets.

8-1: ISED is seeking comments on its proposal to designate the band 64-71 GHz for licence-exempt operations on a no-protection, no-interference basis.

87. There is broad general support for ISED's proposal to designate the 64-71 GHz band for licence-exempt operation from variety of submissions, including satellite, MNOs, mobile manufacturers, and unlicensed advocates.[146] Rogers continues to support this proposal, as it will create a single, contiguous 14 GHz band that should support a number of future 5G services and allow traditional facilities-based operators to offload traffic from networks operating in licensed spectrum. It will also provide a large amount of spectrum for innovation by non-traditional providers ensuring they have access to spectrum. Additionally, this action will align the band with the United States to ensure that Canadians can take advantage of an anticipated ecosystem of devices and economies of scale.

[144] Bell Comments, para 76; Shaw Comments, para 74;
[145] Telus Comments, para 76.
[146] Bell Comments, para 79; Telus Comments, para 78; Shaw Comments, para 79; SaskTel Comments, para 76; RABC Comments, para 64; BCBA Comments, para 50; DSA Comments, pg 3; Facebook Comments, pg 2; Huawei Comments, pg 11; IEEE LAN/MAN Standards Committee Comments, pg 3; Intel Comments, pg 10; Microsoft Comments, pg 5; Starry Inc, Comments, pg 5; TeraGo Comments, para 37; ViaSat Comments, pg 9; Wi-Fi Alliance Comments, para 4.1.

88. Cogeco supports the proposal to release the 64-71 GHz frequency band as licence-exempt spectrum but appears to want licensed spectrum users precluded from the licence-exempt spectrum.[147] The Department should reject Cogeco's views, as the amount of spectrum in just the 64-71 GHz band alone is so large that it dwarfs the total amount of licensed spectrum available in Canada. According to the Spectrum Outlook consultation, there is only 648 MHz of licensed mobile spectrum available at present with prospects for more spectrum in the future limited.[148] Compare this to the 7 GHz of spectrum that will potentially become available in the 64-71 GHz band, adding to the substantially larger amount of licence-exempt spectrum available vis-à-vis exclusively licenced spectrum. As the IEEE highlights in their submission, the band shows considerable promise for a wide range of services and applications outside of mobile access for many industries.[149]

89. Ericsson and Nokia believe that the band should be designated as exclusively licenced instead of licence-exempted spectrum because the former provides regulatory certainty and much improved quality of services, instead of best effort.[150] Xplornet does not support making 64-71 GHz licence-exempt and proposes, at minimum, to lightly license the band similar to the WBS 3650 MHz band. The Department should reject these proposals as the risks associated with licence-exempt operations can be mitigated through careful policy setting and spectrum management. The key is to establish rules that ensure that the band is used fairly and in a manner that allows all Canadians to enjoy the benefits. Rogers trusts that ISED and Canadian stakeholders can develop policies and spectrum management rules that will make it possible to utilize this band efficiently and productively.

9-1: ISED is seeking comments on:

A. Whether flexible use access in these bands should be exclusively licenced or licence-exempt.

B. If a licencing approach is proposed, which types of licences (radio licences, spectrum licences with user-defined licence areas, spectrum licences with service areas for competitive licensing, or others) are expected to best lend themselves to licensing flexible use in the 28 GHz and 37-40 GHz frequency bands in order to support a variety of 5G technologies, applications and business cases?

[147] Cogeco Comments, para 42-43.
[148] ISED, *Spectrum Outlook*, para 11.
[149] IEEE Comments, pg 2-3.
[150] Ericsson Comments, pg 21; Nokia Comments, pg 7.

C. Whether a licence-exempt dynamic access using data base should be implemented in all, or portions of the 28 GHz, 37-40 GHz, particularly in the band 37-37.6 GHz.

90. There is overwhelming support for ISED to exclusively license the 28 GHz and 37-40 GHz bands.[151] As Bell notes, "licence exempt spectrum cannot possibly deliver the high level products and services that Canadians expect of their operators."[152] Rogers continues to view exclusively licenced spectrum bands as key inputs in current networks and will create a more certain investment and spectral environment, which will be crucial as operators roll out 5G infrastructure and overcome any engineering challenges that would result from the unprecedented densities and usage of mmWave spectrum.

91. Cogeco recommends that a part of the 28 GHz and of the 37-40 GHz frequency bands be made available to users on a licence-exempt basis, while the Wi-Fi Alliance supports broad licence-exempt use.[153] As pioneer bands for 5G connectivity, the Department should reject these proposals and should provide exclusive licences for the 28 GHz and 37-40 GHz bands in order to minimize the potential for interference to the next generation of communications infrastructure that Canadian consumers and businesses will rely on.

92. Beyond facilitating investment in and orderly deployment of new 5G technology, exclusively licenced spectrum will also facilitate coordination between new flexible use licensees, incumbent terrestrial fixed service, and fixed service satellite operators. Licence-exempt use risks creating a chaotic spectral environment for incumbent FSS licensees, FCFS fixed users still operating on a secondary basis, and new flexible use operators, to the detriment of all – including all of their respective customers. Further, the Department is already proposing in this consultation to designate 7 GHz of spectrum (64-71 GHz) as licence-exempt, compared to the proposal to open less than 4 GHz (27.5-28.35 GHz and 37-40 GHz) of exclusively licenced flexible use spectrum – or, in other words, is making nearly double the amount of spectrum available for licence-exempt use.

93. Similarly to exclusively licenced spectrum, there is broad consensus from mobile and satellite proponents to license the 28 GHz and 37-40 GHz frequency bands

[151] Telus Comments, para 79; Quebecor Comments, para 7; Shaw Comments, 85; SaskTel Comments, para 77; Xplornet Comments, pg 9; RABC Comments, para 66; 5G Americas, para 11; BSO Coalition, para 53; Ericsson Comments, pg 21; GSA Comments, pg 7; Huawei Comments, pg 12; Intel Comments, pg 11; Microsoft Comments, pg 5; Samsung Comments, pg 18; Telesat Comments, para 59; TeraGo Comments, para 38.
[152] Bell Comments, para 80.
[153] Cogeco Comments, para 48; Wi-Fi Alliance, para 5.1.

using service area licensing.[154] The BCBA, however, desire grid-cell licensing areas or radio licences outside of urban areas and, further, believe these bands should be licensed through a first-come first-served licence process.[155] Cogeco also prefers grid cell licensing but agrees to a fallback position of Tier 4 service areas.[156]

94. The RABC provides a strong explanation for why service area licensing is most appropriate, when they state:

> As the coverage area of a flexible use terrestrial station in the subject bands will be relatively small, a very large number of terrestrial stations will be required to fulfil the customers' expectations for the service. Given this high density of deployment, the RABC notes that a flexible use terrestrial licensing model based on service areas rather than site-by-site licensing would be more suitable in minimizing the administrative burden. It would be highly inefficient to have to individually licence every small cell with a radio licence. Similarly, spectrum licences with user-defined licence areas (i.e., grid cells) would be slightly less taxing but would still be overly cumbersome and neither of these approaches would be suitable for an auction of 5G mmWave spectrum. Only the Department's service areas for competitive licensing would be appropriate from an administrative perspective and an assignment perspective.[157]

95. The BCBA's proposal to use grid or radio licences outside of urban population centres would also negatively impact the deployment of 5G systems along transportation networks and should be rejected.

96. Instead, the Department should issue service area spectrum licences through a competitive licensing process, as this would be best suited for licensing flexible use spectrum in the 28 GHz and 37-40 GHz frequency bands. With weaker propagation characteristics than high, mid or low band spectrum, the Department should license mmWave flexible-use spectrum on a Tier 4 basis. Radio licences that would require an individual licence for each individual small cell or even at a grid cell level would simply be an enormous administrative and engineering burden for both the Department and network operators and slow the deployment of 5G services.

[154] Bell Comments, para 81; Telus Comments, para 80; Quebecor Comments, para 10; Shaw Comments, para 86; SaskTel Comments, para 78; Xplornet Comments, pg 10; BSO Coalition Comments, para 53; GSA Comments, pg 7; Huawei Comments, pg 12; Samsung Comments, pg 18; Telesat Comments, para 60; TeraGo Comments, para 40.
[155] BCBA Comments, para 53-54.
[156] Cogeco Comments, para 50-52.
[157] RABC Comments, para 69.

97. There is widespread opposition to dynamic access from mobile, satellite, and licence-exempt proponents.[158] As representative of the mobile industry views on this topic, Quebecor comments:

> Comme nous l'avons souligné plus haut, l'utilisation exclusive et sans entrave du spectre sous licence est la pierre d'assise sur laquelle repose la capacité des fournisseurs de services sans fil mobiles d'offrir à leurs clientèles des services de grande qualité et de haute capacité. C'est en fait une des principales raisons pour lesquelles les fournisseurs acceptent de prendre la décision commerciale d'acquérir (la plupart du temps) à fort prix des fréquences de spectre.
>
> Or, ouvrir la porte à l'accès dynamique dans l'ensemble des bandes de 28 GHz et de 37 à 40 GHz rendrait incertaine la valeur réelle des fréquences de ces bandes, avec comme double résultat quasi assuré une réduction marquée des investissements dans les réseaux et un ralentissement des déploiements de la technologie 5G au Canada.[159]

98. While the mobile industry has commented in numerous recent ISED consultations on the unproven nature of dynamic access database systems within mobile exclusive bands, the satellite proponent BSO Coalition highlights that the technical challenges would be even greater to try and manage multiple uses in the band (e.g., fixed, mobile, FSS, SRS and MSS).[160] Licence-exempt proponent Wi-Fi Alliance states, "Requiring dynamic access systems and databases can increase the cost and complexity of these devices, making them difficult to market for consumer and even most commercial uses. If ISED hopes to make maximum use of licence-exempt spectrum, it should do so using device-based contention mechanisms alone."[161]

99. As such, the Department should reject calls by Microsoft, Starry, and the DSA to implement any type of opportunistic dynamic access in any of the Consultation bands. [162] Even, Cogeco, who calls dynamic access databases an "interesting concept", notes "it remains an untested concept and the details and reliability of the system remain unknown," while the BCBA state the Department should not implement opportunistic systems until more international information and experience

[158] Bell Comments, para 82; Telus Comments, para 81; Quebecor Comments, para 11; Shaw Comments, para 87; SaskTel Comments, para 84; Xplornet Comments, pg 10; RABC Comments, para 71; 5G Americas, para 12; BSO Coalition Comments, para 54; GSA Comments, pg 7; Huawei Comments, pg 12; Intel Comments, pg 12; Samsung Comments, pg 18; Telesat Comments, para 61; TeraGo Comments, para 41; Wi-Fi Alliance, para 5.1.
[159] Quebecor, para 12-13.
[160] BSO Coaction, para 55.
[161] Wi-Fi Alliance, para 5.1.
[162] Microsoft Comments, pg 6; Starry Inc, Comments, pg 3-4; DSA Comments, pg 2.

has been gathered.[163] The additional costs and complexity associated with dynamic access systems (devices, database etc.) are not justified at this time.

9-2: If an exclusive licensing approach is implemented, preliminary comments are sought on the benefits and risks related to longer licence terms for these frequency bands.

100. Bell, Telus, Quebecor, Shaw, SaskTel, and Xplornet join Rogers in calling for the Department to issue exclusive licences with terms of at least 20 years and a high expectation of renewal as the most effective way to encourage investment, innovation, and widespread deployment.[164] This approach provides licensees with a greater degree of certainty with respect to the ongoing viability of their operations, for network planning purposes, and in order to secure additional funding for their substantial ongoing investments. As equipment and even standards for 5G are still under development, a longer planning and investment horizon will benefit Canadians both today and into the future.

101. Cogeco does not support longer licence terms if the Department issues licences with Tier 4 or larger service areas.[165] The BCBA want annual licences with a very high expectation of renewal if deployed, if radio licensing is used; if spectrum licences are used, the BCBA proposes three to five year licence terms.[166] The Department should reject these proposals for shorter terms – especially radio licences – as they would unduly increase the burden on both operators and the Department for those with large scale deployments, providing 5G service to large number of Canadians. A 20-year licence term will more effectively allow Canadian operators the ability to build business cases for the large capital investments needed to deploy the advanced and extensive infrastructure necessary to enable new services in mmWave bands.

9-3: If an exclusive licensing approach is proposed, ISED is seeking preliminary comments on possible measures that could support competition in light of the current conditions in the Canadian wireless service market and anticipated development and deployment of 5G services if flexible use licensing is developed through a spectrum licensing model.

[163] Cogeco Comments, para 59; BCBA Comments, para 56.
[164] Bell Comments, para 83; Telus Comments, para 83; Quebecor Comments, para 15; Shaw Comments, para 88; SaskTel Comments, para 85; Xplornet Comments, pg 10.
[165] Cogeco Comments, para 62.
[166] BCBA Comments, para 57-58

102. Bell and Telus argue that spectrum set-asides and/or tight spectrum caps prevent larger spectrum allocations from being available to network operators, and as a result, there is a risk that Canada will not realize the full potential of new 5G network technology.[167] SaskTel argues that the spectrum should be awarded through the use of an open and transparent auction process, with a level playing field for all bidders, and that pro-competitive measures are not necessary or even appropriate in a competitive marketplace with four strong players.[168] Rogers supports these views but continues to recommend that the Department carefully evaluate and take all the necessary steps to ensure any affiliated and associated entities rules promote a fair and efficient outcome for all bidders in any licensing process. The Department must integrate its policies and auction rules regarding collusion and affiliated and associated entities within a single framework to ensure that unintended consequences do not benefit one or more bidders in auctions.

103. Quebecor and Shaw both support competition policies that will benefit the AWS-1 entrants.[169] Xplornet and TeraGo similarly recommend spectrum caps and set-asides that guarantee spectrum at low prices for smaller players and new entrants.[170] The Department has been focused on competition between national carriers and regional carriers for the last decade, resulting in both unsustainable entry and unnecessary significant financial subsidies to well-capitalized telecommunication conglomerates. However, it must be careful not to neglect policies that maintain downstream competition between the national carriers. Existing auction rules allow Bell and Telus to plan and develop their joint network (the “Belus network”), including with spectrum to be auctioned. Therefore, the Department should take all steps necessary to ensure that the rules do not provide Bell and Telus with an unfair advantage for bidding on 5G spectrum, including the Consultation mmWave bands or the 600 MHz band.

104. Rogers supports calls to create band plans in all frequency ranges, including mmWave spectrum, with sufficient blocks of spectrum available for multiple providers to compete in auctions. Band plans that divide frequency ranges into multiple, smaller blocks that can still be aggregated allows for greater competition, more innovation, more services, and greater overall benefits to Canadians while still permitting wide, contiguous channels. Such actions will help prevent Bell and Telus from being able to leverage both of their balance sheets to prevent the only other national network operator (Rogers) or the regional providers from being able to acquire vital 5G spectrum.

[167] Bell Comments, para 86; Telus Comments, para 83.
[168] SaskTel Comments, para 93.
[169] Quebecor Comments, para 26; Shaw Comments, para 102; Xplornet Comments, pg 11.
[170] Xplornet Comments, pg, 11; TeraGo Comments, para 44.

105. Cogeco and the BCBA argue for smaller licensed service areas, including grid cell licence areas or radio licences, low or no-cost spectrum for rural providers, or limiting existing network operators' access to both exclusively licenced and licence-exempt spectrum.[171] The Department should reject these ideas as bad for competition, in that they will increase interference risk and the administrative burden on operators, provide an unfair cost advantage, or keep spectrum out of the hands of network providers that are most capable of making the large-scale investments required for wide scale 5G connectivity.

106. However, Rogers supports the concept that 5G competitiveness will require more than just the access to new spectrum in low, mid, high, microwave, and mmWave bands. In addition, access to (wireline) local connectivity is critical to 5G deployments. The other key to 5G deployments in urban areas is access to real estate (municipal and private sector) for new micro sites (poles, lamp posts, street furniture, etc.). The Department should ensure that any facilities and rights-of-way held by local telephone companies are made available to all other competitors in order to increase competition in the provision of 5G services in both rural and urban areas for the benefit of all Canadian businesses and customers.

107. Rogers thanks the Department for the opportunity to share its views and participate in this consultation process.

[171] Cogeco Comments, para 64; BCBA Comments, para 59-62.