VIA EMAIL

November 10, 2017

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Re: Consultation on Releasing Millimetre Wave Spectrum to Support 5G, Canada Gazette, July 15, 2017, Notice No. SLPB-001-17 ("SLPB-001-17")

A. INTRODUCTION

1. These reply comments are submitted to the Department of Innovation, Science & Economic Development Canada (the "Department" or "ISED") in connection with the proceeding initiated by *Consultation on Releasing Millimetre Wave Spectrum to Support 5G*, *Canada Gazette*, 17 June 2017, Notice No. SLPB-001-17 ("SLPB-001-17"), by the coalition of satellite broadband operators composed of Hughes Network Systems, LLC and Hughes Network Systems Canada ULC ("Hughes"); Inmarsat, Inc. ("Inmarsat"); WorldVu Satellites Ltd. d/b/a OneWeb ("OneWeb"); Telesat Canada ("Telesat"); The Boeing Company ("Boeing"); Meridian Global Connection Inc. (dba "Clarke Belt 2.0"); and SES Americom, Inc. ("SES"), Ciel Satellite Limited Partnership ("Ciel") and O3b Limited ("O3b") (referred to herein as the "Coalition" or the "BSOs").

2. The Coalition has reviewed the first round of comments submitted by interested parties in this proceeding on the Department's proposals regarding the release of millimetre wave spectrum to support 5G and will focus these reply comments on the specific issue of spectrum sharing in the 28 GHz and 37-40 GHz frequency bands by the FSS and flexible terrestrial users. Specifically, the Coalition will provide its reply to the comments that were submitted by interested parties on Questions 6-1 to 6-7 of SLPB-001-17 as well as Questions 7-1 to 7-5 of SLPB-001-17. The

Coalition does not intend to address comments that were filed on the licensing framework for spectrum in these bands, including policies and rules that are designed to facilitate competition among flexible use terrestrial licensees. Any failure on the part of the Coalition to address a specific argument or issue raised by an interested party in this proceeding should not be construed as agreement with or acceptance of such argument or issue where to do so would be contrary to the interests of the members of the Coalition.

B. THE SATELLITE SECTOR WILL PLAY AN IMPORTANT ROLE IN THE 5G ECOSYSTEM

3. In its initial comments in this proceeding, the Coalition noted that the 5G ecosystem will not be composed solely of terrestrial service providers and associated equipment manufacturers. The satellite and space industry sector will also play a significant role in the 5G ecosystem, delivering capacity to consumers, businesses and other 5G service providers and offering competitive choices for Canadian users. It is critical, therefore, to ensure that sufficient spectrum is available for all competitive platforms across multiple frequency bands - low, medium and high – in order to ensure that Canadians across the country, no matter where they live, can benefit from the availability of advanced communications services, including those based on 5G technologies.

4. In submitting these reply comments, the members of the Coalition reiterate their initial position in this proceeding that they are not opposed to the development of a flexible use licensing model for fixed and mobile use in the 28 GHz and 37-40 GHz frequency bands, provided that it establishes a technologically and competitively neutral policy and regulatory framework for the release of 5G spectrum which recognizes the role that the satellite and space industries sector plays in the 5G ecosystem and ensures that sufficient spectrum is available for all competitive platforms in these bands, including advanced satellite and terrestrial mobile services

5. In addition, and in order to gain the full benefits of all technologies, the Coalition urges the Department to maintain some spectrum for exclusive FSS use. It is well documented that ubiquitous deployment of FSS user terminals is not possible in the same geographical area as terrestrial services such as the Mobile and Fixed services. Therefore, continued application of Canadian footnotes C16E and C16F, which give priority to the FSS over the FS, in portions of the 19 and 28 GHz bands is essential for continued deployment of the FSS.

6. Similarly, portions of the V-band above 40 GHz and in the 48 GHz band, as per ITU Footnote 5.516B are also required. The Coalition notes in this regard that in a recent draft order, the FCC

in the United States intends to give primary use to the FSS in 40-42 and 48.2-50.2 GHz bands.[1] The Coalition urges the Department to take similar steps in relation to these bands in Canada.

C. REPLY TO COMMENTS ON SPECIFIC QUESTIONS POSED IN SLPB-001-17

28 GHz frequency band (27.5-28.35 GHz)

Question 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.

7. In order to introduce flexible licensing in the 28 GHz band, the Department proposed the following changes in SLPB-001-17 to the Canadian Table of Frequency Allocations ("CTFA"):

> **MOD C47A:** In the frequency band 27.35-~~28.35~~27.5 GHz, use of spectrum for fixed service systems will be given priority over fixed-satellite service systems sharing this spectrum on a co-primary basis. Fixed-satellite service implementation in this band will be limited to applications that will pose minimal constraints upon the deployment of fixed service systems, such as a small number of large antennas for feeder links.
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> **ADD C47C:** In the frequency band 27.5-28.35 GHz, use of spectrum for fixed service systems and mobile service systems will be given priority over fixed-satellite service systems sharing this spectrum on a co-primary basis. Fixed-satellite service implementation in this band will be limited to applications which will pose minimal constraints upon the deployment of fixed service systems and mobile service systems, such as a small number of large antennas for feeder links.[2]

8. Virtually every party that commented on this proposal, including equipment manufacturers such as Ericsson,[3] Nokia[4] and Huawei[5] as well as service providers such as Bell,[6] Rogers[7] and Telus,[8] agreed with the Department's proposed changes to the CTFA as well as its proposal to

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1 See draft FCC, Second Report and Order, Second Further Notice of Proposed Rulemaking, Order on Reconsideration, and Memorandum Opinion and Order, GN Docket No. 14-177, available online at: http://transition.fcc.gov/Daily_Releases/Daily_Business/2017/db1026/DOC-347449A1.pdf

2 SLPB-001-17, para. 25.

3 Ericsson Comments, SLPB-001-17, 15 September 2017, p.14.

4 Nokia Comments, SLPB-001-17, 15 September 2017, p.3.

5 Huawei Comments, SLPB-001-17, 15 September 2017, p.5.

6 Bell Mobility Comments, SLPB-001-17, 15 September 2017, p.3.

7 Rogers Communications Comments, SLPB-001-17, 15 September 2017, para. 20.

8 Telus Comments, SLPB-001-17, 15 September 2017, paras. 18-20.

continue using its soft partitioning approach to the sharing of spectrum in this band by the FSS and flexible use terrestrial users.

9. For its part, the Coalition agreed with the Department's proposals,[9] but it along with the RABC[10] recommended certain additional wording clarifications to footnotes C47A and C47C in order to reflect the fact that the size of an earth station is only one possible factor in assessing the potential for interference. In particular, the Coalition and the RABC both proposed that these footnotes be modified to remove the reference to "large" antennas and clarify that earth stations will continue to be licensed on a site-specific basis. Set out below is the revised wording proposed by the Coalition:

> **MOD C47A:** In the frequency band 27.35-~~28.35~~27.5 GHz, use of spectrum for fixed service systems will be given priority over fixed-satellite service systems sharing this spectrum on a co-primary basis. Fixed-satellite service implementation in this band will be limited to applications that will pose minimal constraints upon the deployment of fixed service systems, such as a small number of ~~**large antennas**~~ **individually coordinated earth stations** ~~**for feeder links**~~.
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> **ADD C47C:** In the frequency band 27.5-28.35 GHz, use of spectrum for fixed service systems and mobile service systems will be given priority over fixed-satellite service systems sharing this spectrum on a co-primary basis. Fixed-satellite service implementation in this band will be limited to applications which will pose minimal constraints upon the deployment of fixed service systems and mobile service systems, such as a small number of ~~**large antennas**~~ **individually coordinated earth stations** ~~**for feeder links**~~.

10. With respect to the continued licensing of ESIMs, most parties to this proceeding agreed with the Department's proposal in SLPB-001-17 to allow airborne and maritime ESIMs to continue to communicate with GSO FSS space stations on a no-protection, non-interference basis.[11] The Coalition agrees with these parties but notes that the Department also authorizes ESIMs to communicate with NGSO FSS space stations. The Coalition is not aware of any reasons why these ESIMs could not also be permitted to continue to communicate with NGSO FSS space

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9 BSO Coalition Comments, SLPB-001-17, 15 September 2017, paras. 21-23.

10 RABC Comments, SLPB-001-17, 15 September 2017, para. 18.

11 See, for example, the following: GSA Comments, SLPB-001-17, 15 September 2017, p. 3; Intel Comments, SLPB-001-17, 15 September 2017, p. 4; Ericsson Comments, SLPB-001-17, p. 14; RABC Comments, SLPB-001-17, para.21; Huawei Comments, SLPB-001-17, p. 5; BSO Coalition Comments, SLPB-001-17, para. 23; ViaSat Comments, SLPB-001-17, 15 September 2017, p. 5; and Telus Comments, SLPB-001-17, para. 21.

stations. Accordingly, the Coalition reiterates its view, and agrees with the comments submitted separately by Ciel Satellite et al,[12] that the Department should also permit airborne and maritime ESIMs to communicate with NGSO FSS space stations in the 28 GHz band on no-protection, non-interference basis just as it proposes to do in relation to ESIMs that communicate with GSO FSS space stations.

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

11. Not all parties that participated in this proceeding commented on this issue; however, of those that did, the vast majority supported the Department's proposal to place a moratorium on the licensing of new fixed service systems in the 28 GHz band.[13]

12. The Coalition continues to support the Department's proposed moratorium on the licensing of new fixed systems in the 28 GHz band. As noted by the Coalition in its initial comments in this proceeding, continued licensing of fixed services in the band could create additional uncertainty prior to auction or other licensing mechanisms for flexible use services, resulting in potentially difficult negotiations between future site-specific fixed-only licensees and new flexible use licensees.[14] In addition, the deployment of fixed links would impact the sharing between flexible use services and other services, such as the FSS.

Question 6-3: ISED is seeking comments on its proposal to adopt the band plan [as shown in figure 3 of SLPB-001-17] in the 28 GHz band.

13. In its initial comments in this proceeding, the Coalition stated that it would not be opposed to the harmonization of the Canadian band with the band plan adopted by the FCC in the United States[15] as depicted in Figure 3 of SLPB-001-17 in the event that the Department decides to authorize flexible use terrestrial systems in this band.[16]

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12 Comments of Ciel Satellite, SES SA and O3b Limited (collectively "Ciel Satellite et al"), SLPB-001-17, 15 September 2017, para. 5.

13 See, for example, the following: 5G Americas Comments, SLPB-001-17, 15 September 2017, para. 6; BCBA Comments, SLPB-001-17, 15 September 2017, para. 23; Bell Mobility Comments, SLPB-001-17, para. 25; GSA Comments, SLPB-001-17, p. 4; Huawei Comments, SLPB-001-17, p. 6; Intel Comments, SLPB-001-17, p. 5; Nokia Comments, SLPB-001-17, p. 3; RABC Comments, SLPB-001-17, para. 22; Samsung Comments, SLPB-001-17, 15 September 2017, pp. 7-8; SaskTel Comments, SLPB-001-17, 15 September 2017, para. 41; Shaw Communications Comments, SLPB-001-17, 15 September 2017, para. 42; and Telus Comments, SLPB-001-17, para. 22.

14 BSO Coalition Comments, SLPB-001-17, para. 24.

15 FCC, *Use of Spectrum Bands Above 24 GHz for Mobile Radio Services*, Report and Order and Further Notice of Proposed Rulemaking, GN Docket No. 14-177, FCC 16-89, released July 14, 2016 (the "Report and Order"), available online at https://apps.fcc.gov/edocs_public/attachmatch/FCC-16-89A1.pdf.

16 *Ibid,* para. 25.

14. Most of the other parties that commented on this issue agreed in principle that the Canadian band plan should be harmonized with that of the US; however, there was disagreement among these parties on the question of spectrum block sizes in the band. Some parties, such as Nokia, Ericsson, Telus and SaskTel supported full harmonization with the US band plan including adoption of the two 425 MHz blocks that are currently reflected in this plan.[17] However, other parties, such as Rogers, Shaw, Cogeco and Microsoft, took the position that the band could be divided up into smaller block sizes with up to four and even six separate blocks.[18]

15. The Coalition does not take a specific position on the number or size of flexible use terrestrial spectrum blocks in the 28 GHz band. In particular, as long as the blocks that are ultimately established by the Department do not undermine the coordination framework that has been recommended by the Coalition in this proceeding, the Coalition does not have a specific view on this issue.

Question 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)?

16. In its initial comments in this proceeding, the Coalition expressed its support for the Department's proposal to require site-by-site coordination between flexible use terrestrial stations and future FSS earth stations, based on some pre-determined coordination threshold.[19]

17. Virtually every other party that commented on this issue, including the terrestrial carriers Bell, Rogers, Telus, SaskTel, and Xplornet, agreed that site-by-site coordination between flexible use terrestrial stations and future FSS earth stations makes the most sense based on a predetermined coordination trigger.[20]

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17 See Telus Comments, SLPB-001-17, para. 25; SaskTel Comments, SLPB-001-17, para. 42; and Ericsson Comments, SLPB-001-17, p. 15.

18 See Rogers Comments, SLPB-001-17, paras. 24-32; Shaw Comments, SLPB-001-17, paras. 43-47, Cogeco Comments, SLPB-001-17, 15 September 2017, para. 38; and Microsoft Comments, SLPB-001-17, p. 3.

19 BSO Coalition Comments, SLPB-001-17, para. 26.

20 See, for example: Bell Comments, SLPB-001-17, paras. 32-34 ; Rogers Comments, SLPB-001-17, para. 36; Telus Comments, SLPB-001-17, para. 26; SaskTel Comments, SLPB-001-17, para. 44; and Xplornet Comments, SLPB-001-17, p. 4.

18. In terms of a threshold trigger for coordination, some parties to this proceeding recommended straight adoption of the PFD coordination trigger that was established by the FCC in its Report and Order of -77.6 dBm/m^2/MHz at a height of 10m above the ground.[21]

19. Other parties, including the RABC, SaskTel, Rogers, Telesat, and the Coalition, took a more pragmatic approach and have proposed further study of this issue, noting among other things that the FCC's Report and Order is being reconsidered.[22]

20. The Coalition continues to believe that further study of this issue is warranted. To this end, individual members of the Coalition would be pleased to participate in any studies that are initiated to consider an appropriate coordination trigger in the 28 GHz band in Canada.

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.

21. Most parties to this proceeding, including the major equipment manufacturers, FSS operators and potential flexible use terrestrial providers noted that there are many ways to reduce interference caused by transmitting earth stations into flexible use stations and, because of this, site shielding should not be mandated by the Department.[23] Instead, it should be left to future earth station licence applicants to determine the most effective means by which to minimize interference. As noted by the RABC, "*the decision to implement site shielding as a means to effect successful coordination should rest with the licence applicant because in some cases it may be more cost effective for the earth station applicant to employ other means to reduce interference and successfully coordinate*."[24]

22. Accordingly, the Coalition reiterates its view that the Department should refrain from regulating the specific technical solutions that are adopted to mitigate interference and, instead, leave it up to the coordination process between licensees to determine the most appropriate measures to improve sharing and to mitigate interference.

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21 See, for example: Ericsson Comments, SLPB-001-17, p. 15; GSA Comments, SLPB-001-17, p. 4; Nokia Comments Comments, SLPB-001-17, p. 4; and Samsung Comments, SLPB-001-17, p. 10.

22 See, for example: RABC Comments, SLPB-001-17, para. 36; Rogers Comments, SLPB-001-17, para. 39; BSO Coalition Comments, SLPB-001-1, para. 30; SaskTel Comments, SLPB-001-17, para. 47; and Telesat Comments, SLPB-001-17, para. 36.

23 See for example: Ericsson Comments, SLPB-001-17, p. 16; Bell Mobility Comments, SLPB-001-17, para. 38; Intelsat Comments, SLPB-001-17, p. 4; BSO Coalition Comments, para. 31; and ViaSat Comments, SLPB-001-17, p. 6.

24 RABC Comments, SLPB-001-17, para. 32.

Question 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.

23. Most parties to this proceeding, including the major equipment manufacturers and potential flexible use service providers, acknowledged that 5G networks in the 28 GHz band do not lend themselves to large scale deployments and, accordingly, will most likely be deployed in densely populated areas, followed by medium to smaller cities.[25] However, because of the limited propagation characteristics of the spectrum, most of these deployments, particularly outside densely populated areas, are likely to be indoors.[26]

24. In these circumstances, interference from transmitting FSS earth stations is not likely to be an issue and, therefore, the Department should give serious consideration as to whether it is truly necessary to place restrictions on the geographic areas in which new FSS earth stations can be deployed.

25. In SLPB-001-17, the Department noted that the FCC had adopted geographic limitations on the areas where FSS earth stations can be deployed but expressed the view that the FCC's approach "*is not appropriate in the Canadian context*" because, among other things, it may unnecessarily rule out the use of teleport locations that are deployed near fiber links that are located near urban boundaries.[27]

26. Having reviewed the comments of other interested parties in this proceeding, including those who have recommended outright adoption of the FCC's rules as well as those who have proposed even more complex or prohibitive restrictions,[28] the members of the Coalition continue to question the need for geographic limitations on the siting of FSS earth stations in the 28 GHz band in the Canadian context. Indeed, even the FCC appears to be poised to adopt a more relaxed set of restrictions.[29]

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[25] See, for example: 5G Americas Comments, SLPB-001-17, para. 5; Samsung Comments, SLPB-001-17, p. 3; Bell Comments, SLPB-001-17, para. 39; Rogers Comments, SLPB-001-17, para. 43; Telus Comments, SLPB-001-17, para. 13; SaskTel Comments, SLPB-001-17, para. 15; and RABC Comments, SLPB-001-17, para. 6.

[26] See, for example, ISED, SLPB-001-17, para. 37; Ericsson Comments, SLPB-001-17, p. 17; and Telus Comments, SLPB-001-17, para. 41.

[27] ISED, SLPB-001-17, para 35.

[28] See Rogers Comments, SLPB-001-17, paras. 42-46 and Telus Comments, SLPB-001-17, paras. 34-40.

[29] FCC, *supra,* note 1.

27. In light of these considerations, the members of the Coalition agree with the RABC, Bell Mobility, Ericsson, SaskTel, and Telesat that further technical study is warranted before the specific parameters of any geographic restrictions in Canada are established.[30] This study should consider metrics that are suited to the deployment of services in Canada.

Question 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.

28. In their initial comments in this proceeding, the members of the Coalition expressed their concerns about potential aggregate interference into satellite receivers from unintended emissions of 5G stations (both base stations and user terminals) towards the sky.

29. Not all parties to this proceeding commented on this issue, however, some took the position that it was not necessary to impose limits on the aggregate emissions of terrestrial services because, among other things, 5G base stations are expected to be deployed with an antenna downtilt, while mobile stations will rely on adaptive power control algorithms which will help to reduce the possibility for interference.[31] These parties also noted that the short wavelength properties of mmW bands will enable high-band 5G systems to rely on extremely narrow beamforming and beamtracking techniques that will optimize transmissions from base stations to mobile stations, thereby reducing interference in the space direction.[32]

30. In contrast to this position, several satellite operators, including Telesat, Intelsat, ViaSat and the members of the Coalition noted that 5G uses could generate interference into satellite receivers operating in the 27.5-28.35 GHz band as well as interference into satellite receivers operating in the adjacent 28.35-28.6 GHz band.[33] Under certain deployment scenarios, this could threaten the ability of satellite operators to close satellite service links in the presence of excessive interference. As noted by Intelsat in its comments in this proceeding, *"[A]t this point it cannot be predicted how many terrestrial base stations and mobile stations will be deployed in any of the candidate bands. There could be the situation that the number of terrestrial operations reaches a level that would create harmful interference to satellite receivers in the aggregate*."[34]

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30 See: RABC Comments, SLPB-001-17, para. 26; Bell Mobility Comments, SLPB-001-17, para. 40; Ericsson Comments, SLPB-001-17, p. 16; SaskTel Comments, SLPB-001-17, para. 53; and Telesat Comments, SLPB-001-17, para. 43.

31 See, for example: Samsung Comments, SLPB-001-17, pp. 11-12 and Rogers Comments, SLPB-001-17, para. 48.

32 *Ibid.*

33 See: Telesat Comments, SLPB-001-17, paras. 46-49; Intelsat Comments, SLPB-001-17, p. 4; ViaSat Comments, SLPB-001-17, p. 7and BSO Coalition Comments, SLPB-001-17, paras. 34-36.

34 Intelsat Comments, SLPB-001-17, p. 4.

31. The Coalition notes that studies carried out in the United States and in the ITU show that 5G systems will operate with highly directional antennas pointed with negative pitch towards the ground. This being the case, it would not be a significant limitation to impose an emission mask in the form of EIRP density as a function of elevation angle on individual 5G stations. Although such a mask will not ensure that aggregate emissions will not raise the noise in FSS satellite receivers, it will significantly reduce the probability of harmful interference into the satellites.

32. As noted by the RABC, unlike the situation in the United States, the FSS operates on a co-primary basis in Canada with the fixed service. Given these considerations, the Coalition believes that Canada should take a leadership role in relation to this issue. To this end, and as a starting point, the Coalition believes that it is possible to develop a simple solution to address this issue, based on EIRP emission masks applied to individual flexible use stations, or a combination or maximum transmit power density and antenna patterns, combined with pointing restrictions.

33. Although further study will be required, the Coalition believes that the development of a simple solution to the aggregate interference problem is easily achievable. Accordingly, the Coalition encourages all parties, once again, to come together to examine this issue through a joint study.

Question 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 in SLPB-001-17]. Comments are sought on this proposal.

34. Virtually all parties that commented on this issue supported the Department's proposal that all existing FSS earth stations as well as those that are reflected in applications that are pending approval for operation would be permitted to continue to operate under their current conditions of licence.[35]

35. The only party that seemingly disagreed with the Department's proposal was Telus, which took the position that existing FSS earth stations be required to engage in commercially negotiated interference mitigation solutions if the interference contours of their stations conflict with a unique and unduly restrictive set of geographic limitations proposed by Telus in its response to Question 6-5 of SLPB-001-17.[36] Telus also proposes that the Department postpone the issuance of final approvals for any outstanding FSS earth station applications in order to ensure

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[35] See, for example: Bell Comments, SLPB-001-17, para. 49; Ericsson Comments, SLPB-001-17, pp. 17-18; Intel Comments, SLPB-001-17, p. 8; Intelsat Comments, SLPB-001-17, p. 4; RABC Comments, SLPB-001-17, paras. 42-44; Rogers Comments, SLPB-001-17, para. 49;Telesat Comments, SLPB-001-17, paras. 50-51; ViaSat Comments, SLPB-001-17, pp. 7-8 ; and Xplornet Comments, SLPB-001-17, p. 6.

[36] Telus Comments, SLPB-001-17, paras. 41-44.

that any geographic restriction policy adopted through this consultation process can be given due consideration in the Department's assessment of the earth station application.[37]

36. The Coalition submits that the Department should reject these proposals. Leaving aside the fact that Telus is entirely alone in this proceeding in advancing these proposals, there is simply no need for them to be adopted.

37. Many parties to this proceeding, as well as the Department itself, have noted that the number of FSS earth stations that will operate either now or in the future in the 28 GHz band will be extremely limited. There is no evidence at this point in time to suggest that these earth stations will create unacceptable levels of interference into flexible use terrestrial systems as suggested by Telus. Therefore, any adoption of Telus' proposed restrictions would do nothing other than to stymie the development of FSS networks and services in Canada – a country which has worked hard to develop a reputation as a leader in the satellite and space services sectors.

38. In SLPB-001-17, the Department has proposed that new earth station facilities that are not the subject of a pending application before the Department will be subject to the sharing mechanism that will be developed as a result of this consultation.[38] In the view of the Coalition, this approach strikes an appropriate balance between the existing FSS licensees and any yet-to-be licensed flexible use terrestrial operators. Accordingly, there is no need to adopt the proposals advocated by Telus on the treatment to be accorded to existing earth station facilities and pending earth station applications.

Frequency Band 37-40 GHz

Question *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.*

39. Similar to its proposals for the 28 GHz band, the Department is also proposing to make the frequency band 37-40 GHz available for flexible use terrestrial services while at the same time maintaining co-primary status for FSS applications that "*pose minimal constraints upon the deployment of fixed service systems in the band*", as currently reflected in footnote C51 of the CTFA.[39] As noted by the Department in SLPB-001-17, the Department "*recognizes the need for*

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37 *Ibid.*

38 ISED, SLPB-001-17, para. 39.

39 *Ibid*, para. 48.

the FSS to continue having access to the band" and, thus, it has proposed the development of a sharing mechanism *"to accommodate these services… in collaboration with stakeholders.*"[40]

40. The Department has also proposed certain consequential changes to footnote C51 to reflect these proposals as follows:

> **MOD C51 (CAN-17)** The frequency band ~~38.6~~37.5-40 GHz is being licensed for applications in the fixed and mobile services, which will be given priority over fixed-satellite service systems sharing this frequency band ~~spectrum~~ on a co-primary basis. Fixed-satellite service implementation in this frequency band ~~spectrum~~ will be limited to applications that will pose minimal constraints upon the deployment of fixed and mobile service systems, such as a small number of large antennas for feeder links.[41]

41. Virtually all parties that commented on this issue agreed with the Department's proposals relating to the 37-40 GHz band, including its proposal to develop a sharing mechanism between the FSS and flexible use terrestrial services.[42]

42. However, some parties, such as the RABC, Telesat and ViaSat, noted that footnote C51 should be further clarified in order to reflect the fact that earth station diameters and uses are changing along with changes in technology. For example, Telesat noted that in a LEO constellation, the distinction between feeder links and user links may not be relevant: "*[P]rovided that the FSS earth stations are few in number, and individually licensed, there should be no practical difference*." [43] Telesat therefore suggested that the words "large" and "for feeder links" should be removed from the revised footnote C51.

43. The Coalition supports these amendments and further agrees with Telesat[44] that the reference to feeder links could be removed from the last sentence of the footnote. Specifically, the Coalition proposes the following changes to footnote C51

> MOD C51 (CAN-17) The frequency band 37.5-40 GHz is being licensed for applications in the fixed and mobile services, which will be given priority over fixed-satellite service systems sharing this frequency band on a co-primary

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40 *Ibid.*

41 *Ibid*, para. 49.

42 See, for example: Bell Comments, SLPB-001-17, paras. 46-48; Rogers Comments, SLPB-001-17, para. 50; SaskTel Comments, SLPB-001-17, paras. 56-57; RABC Comments, SLPB-001-17, paras. 45-47; Ericsson Comments, SLPB-001-17, p. 18; Huawei Comments, SLPB-001-17, p. 9; and Microsoft Comments, SLPB-001-17, p. 4.

43 Telesat Comments, SLPB-001-17, para. 53.

44 Telesat Comments, SLPB-001-17, para. 51.

> basis. Fixed-satellite service implementation in this frequency band will be limited to applications that will pose minimal constraints upon the deployment of fixed and mobile service systems, such as a small number of ~~**large antennas**~~ **individually coordinated earth stations** ~~**for feeder links**~~.

44. In addition to the foregoing, the Coalition reiterates its support for the Department's proposal to develop a sharing mechanism in collaboration with stakeholders that will ensure that the FSS has ongoing access to the 37-40 GHz band.

Question 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.

45. In it is initial comments in this proceeding, the Coalition indicated that it was not opposed to a moratorium on the issuance of new fixed service licences that would be issued pursuant to the framework established in *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*.

46. Having reviewed the comments of other parties on this issue, which reveals that there is a divergence of views on the subject of a moratorium,[45] the Coalition does not take any further positions on this issue at this time other than to reiterate its view that it is not opposed to a moratorium on the issuance of new licences in the 38 GHz band.

Question 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.

47. All parties that commented on this issue agreed with the Department's proposal to harmonize the Canadian band with the band plan adopted by the FCC in the United States as depicted in Figure 7 of SLPB-001-17.[46]

48. For its part, the Coalition reiterates its view that, if the Department concludes that a new band plan should be adopted for the 37-40 GHz band as a result of this proceeding, it would not be opposed to the harmonization of Canada's band plan with that of the United States.

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[45] See, for example: 5G Americas Comments, SLPB-001-17, para. 9; Shaw Comments, SLPB-001-17, paras. 56-59; SaskTel Comments, SLPB-001-17, paras. 60-62; and Telus Comments, SLPB-001-17, paras. 54-55.

[46] See, for example: BCBA Comments, SLPB-001-17, para. 35; RABC Comments; SLPB-001-17, para. 48; Bell Comments, SLPB-001-17, para. 52; Rogers Comments, SLPB-001-17, para. 55; Ericsson Comments, SLPB-001-17, p. 18; Huawei Comments, SLPB-001-17, p. 9; Microsoft Comments, SLPB-001-17, p. 4; Nokia Comments, SLPB-001-17, p. 5; Shaw Comments, SLPB-001-17, para. 64; and SaskTel Comments, SLPB-001-17, para. 63.

Question 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)?

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

49. Most parties that commented on this issue, including the Coalition, agreed with the Department's proposal to require site-by-site coordination between flexible use terrestrial stations and FSS earth stations.[47] There was also support for the adoption of a PFD or distance-based coordination trigger mechanism; although some parties, such as Bell, Rogers and Huawei, argued that it was premature to develop such a mechanism at this time given that there are currently no FSS earth station deployments in Canada in the 37-40 GHz band.

50. Despite this view, there was broad agreement among commenters that further study is required with all parties, including the RABC, expressing support for the development of a study to determine the appropriate coordination trigger between the FSS and flexible use terrestrial stations.[48] The members of the Coalition reiterate their support for such a study and intend to participate in this initiative.

51. With respect to the adoption of specific technical rules that could facilitate more efficient sharing between terrestrial and earth stations, most parties agreed that this matter is best left to the parties that are the subject of the coordination. As noted by the RABC, "*earth station site shielding could in some cases be an efficient way to facilitate coordination and allow deployment of a future earth station. Similarly, elevation angle restrictions or other measures on new flexible use terrestrial stations could facilitate coordination with an existing FSS earth station. However, the decision to implement such measures as a means to effect successful coordination should rest with the operators involved and not be mandated*."[49]

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47 See, for example: BCBA Comments, SLPB-001-17, para. 36; GSA Comments; SLPB-001-17, p. 6; RABC Comments, SLPB-001-17, para. 50; Ericsson Comments, SLPB-001-17, p. 19; SaskTel Comments, SLPB-001-17, para. 64; Rogers Comments, SLPB-001-17, para. 63; Telus Comments, SLPB-001-17, para. 59; and Xplornet Comments, SLPB-001-17, p. 7.

48 RABC Comments, SLPB-001-17, para. 54; Ericsson Comments, SLPB-001-17, p. 20; Telesat Comments, SLPB-001-17, para. 56; and SBO Coalition Comments, SLPB-001-17, para. 48.

49 RABC Comments, SLPB-001-17, para. 54.

Question 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?

52. In SLPB-001-17, the Department noted that the FCC had adopted geographic limitations on the areas where FSS earth stations can be deployed in the 37-40 GHz band, but expressed the view, once again, that the FCC's approach "*is not appropriate in the Canadian context.*"[50] However, it did indicate that it may "*consider using other methods to facilitate flexible use systems deployment in core urban areas*"[51] and, to this end, it invited interested parties to comment on whether there should be any geographic restrictions on the areas where FSS earth stations can be deployed in this band and, if so, what form should those restrictions take.

53. Most parties that commented on this issue recommended that a study be initiated to consider whether geographic restrictions should be placed on FSS earth station. Although Rogers and Telus also included proposals for specific geographic restrictions in their submissions,[52] other parties noted that further study was warranted, especially since the roles are reversed in the case of the 37-40 GHz band because, unlike the 28 GHz band, flexible use transmitters could interfere into receive FSS earth stations in the 37-40 GHz band. As noted by the RABC *"[A]lthough the interferer and victim in the 37-40 GHz band differ from those in the 28 GHz band, the RABC believes that similar issues need to be addressed in both bands. Therefore, the RABC suggests that the study recommended in response to Question 6-5B include both the 28 GHz and 37-40 GHz bands*."[53]

54. Similar to its reply comments to Question 6-5 above, the Coalition believes that there would be merit for the Department to undertake studies with the various stakeholders to define appropriate FSS earth station siting restrictions in the 37 GHz band which take into account the particular geography and population distribution in Canada. The Coalition therefore reiterates its support for the development of such a study.

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50 SLPB-001-17, para 60.

51 *Ibid*.

52 See Rogers Comments, SLPB-001-17, paras. 68-72 and Telus Comments, SLPB-001-17, paras. 66-67.

53 RABC Comments, SLPB-001-17, para. 59.

C. CONCLUSION

55. The Coalition thanks the Department for the opportunity to participate in this proceeding and looks forward to the Department's determinations on the use of millimetre wave spectrum to support 5G.

56. Until then, the Coalition reiterates the willingness of its members to work with the Department and industry stakeholders to study and establish practical and efficient technical rules that will facilitate the coexistence of both the FSS and flexible terrestrial users in the bands under consideration in this proceeding.

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All of which is respectfully submitted by the BSO members of the Coalition this 10th day of November 2017.