

VIA EMAIL

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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”)**

I. Introduction

1. SES S.A. and its affiliates, O3b Limited (“O3b”) and Ciel Satellite Limited Partnership (“Ciel”) (collectively, “SES”) submit these Reply Comments in response to Innovation, Science and Economic Development Canada’s (“ISED”) Consultation on Releasing Millimetre Wave Spectrum to Support 5G, Canada Gazette, June 5, 2017, Notice No. SLPB-001-17 (the “Consultation”).
2. SES urges ISED to resist the urge to view 5G and Fixed-Satellite Services (“FSS”) operations as two distinct policy matters. As one commenter notes, 5G will be deployed through a host of different network platforms, including satellite.¹ Just as FSS plays a central role today in deploying 4G and LTE networks around the world,² FSS will also play a significant role in the deployment of 5G networks.

¹ See Comments of Huawei Technologies Canada Co., Ltd. at 4 (“Huawei Comments”).

² Kendall Russell, *Alphabet’s Project Loon Uses SES Capacity to Reconnect Puerto Rico*, Satellite Today, Oct. 26, 2017 <http://www.satellitetoday.com/telecom/2017/10/26/alphabets-project-loon-uses-ses-capacity-reconnect-puerto-rico/>; Business Wire, *Digicel Pacific and O3b Networks bring 4G/LTE Connectivity to Remote Micronesian Island of Nauru*, Dec. 12, 2016; <http://www.businesswire.com/news/home/20161212006036/en/Digicel-Pacific-O3b-Networks-bring-4GLTE-Connectivity>; Business Wire, *Axesat Launches O3b Services to Deliver High Performance Internet Connectivity to Iquitos, Peru*, Aug. 31, 2016; <http://www.businesswire.com/news/home/20160831006358/en/Axesat-Launches-O3b-Services-Deliver-High-Performance>; Business Wire, *SES inks major capacity deal with Telefonica to connect VIVO mobile*

3. As ISED evaluates potential sharing schemes between terrestrial and FSS services in the 27.5-28.35 GHz band (the “28 GHz band”) and the 37-40 GHz band (the “37 GHz band”) it must be mindful of the role that mmWave FSS operations will play in mobile networks. ISED should avoid policies that overly and unnecessarily restrain FSS deployment either economically or geographically. FSS is a necessary component in fulfilling ISED’s stated goals of facilitating deployment and ensuring the timely availability of 5G services across Canada.³

II. **Soft Partitioning of the 28 and 37 GHz Bands Must Reflect the Realities of Terrestrial mmWave Deployment**

4. As noted in its initial submission to this proceeding, SES supports ISED’s proposal to continue soft partitioning of the 28 GHz band between terrestrial and FSS services.⁴ In particular, the propagation characteristics of mmWave bands should enable efficient mechanisms for protecting terrestrial transmissions while not overly constraining FSS operations. SES and many other commenters⁵ believe that site-by-site coordination will facilitate sharing between terrestrial and FSS services. ISED’s proposal is to permit FSS operators to site earth stations where they will “pose minimal constraints upon the deployment of fixed and mobile service systems”⁶. However, SES urged ISED to retain its discretion as to how best to achieve that result in specific circumstances and for specific earth station sites.
5. Co-existence will be facilitated by the limited terrestrial use cases in the mmWave bands. Terrestrial deployment in the mmWave bands will primarily be

phone users across northern Brazil, Feb. 6;
[2014:http://www.itweb.co.za/index.php?option=com_content&view=article&id=70671](http://www.itweb.co.za/index.php?option=com_content&view=article&id=70671).

³ See *Consultation on Releasing Millimetre Wave Spectrum to Support 5G Notice* (“Notice”), SLPB-001-17 (June 5, 2017) at ¶ 6.

⁴ See Comments of Ciel Satellite Limited Partnership at 2 (filed September 15, 2017) (“Ciel Comments”).

⁵ See Comments of Bell Mobility Inc. at 12 (filed September 15, 2017) (“Bell Comments”); Comments of British Columbia Broadband Association at 4 (filed September 15, 2017) (“BCBA Comments”); Global Mobile Suppliers Association at 4 (filed September 15, 2017); Comments by Samsung Electronics Canada Inc. at 9 (filed September 15, 2017); Comments by SaskTel at 10 (filed September 15, 2017); Comments of Telus Communications Company at 5 (filed September 15, 2017); Comments of Telesat Canada at 6 (filed September 15, 2017); Comments of Xplornet at 4 (filed September 15, 2017) (“Xplornet Comments”).

⁶ Notice at ¶ 25.

- in urban locations⁷ and in other areas where concentrated populations will justify the cost of deploying a dense network of small cells.⁸ This concentration of terrestrial deployments will leave plenty of room for earth station siting that will not impede terrestrial deployment, rendering additional restraints on earth station siting unnecessary. As ViaSat notes, FSS systems will deploy different types of earth stations⁹ and some operators may be able to site in urban areas without constraining terrestrial deployment within those environments.
6. Some terrestrial operators argue that ISED ought to place preemptive limits on earth station deployment¹⁰ or impose other cumbersome and potentially unnecessary infrastructure requirements on FSS operators without justification or support. ISED should reject these proposals outright. As many parties have noted, site-by-site coordination should be sufficient to enable co-existence between FSS and terrestrial services.¹¹ Several commenters agree that co-existence can be managed without geographic limitations¹² or mandatory shielding.¹³
 7. To the extent that either shielding or geographic limitations are necessary in a particular circumstance, they should only be deployed as necessary based on site-by-site coordination. SES believes there is no need for ISED to impose limits beyond those articulated in C47C.

III. ISED Should Refrain from Preemptively Limiting ESIMs Operations in the 28 GHz Band

8. ISED should disregard unsubstantiated calls for a prohibition of ESIMs in the 28 GHz band. Huawei recommends that ISED prohibit ESIMs in the 28 GHz band

⁷ See Comments of Rogers Communications Canada Inc. at 11 (filed September 15, 2017) (“Rogers Comments”).

⁸ See Comments of 5G Americas at 6 (filed September 15, 2017) (“5G Americas Comments”).

⁹ See Comments of ViaSat, Inc. at 5 (filed September 15, 2017) (“ViaSat Comments”).

¹⁰ Rogers Comments at 19.

¹¹ Comments of Intelsat at 6 (filed September 15, 2017) (“Intelsat Comments”); Viasat Comments at 6; Xplornet Comments at 5.

¹² Xplornet Comments at 5; Intelsat Comments at 6; ViaSat Comments at 6.

¹³ Xplornet Comments at 7.

due to what they claim is a difficulty in tracking down transient interference.¹⁴ Huawei is mistaken. Licensed ESIMs operations on board ships, airplanes and trains are likely to follow regular and easily trackable itineraries. If the concern about potential interference is justified, ISED can develop minimally burdensome steps to ensure that terrestrial licensees can easily identify sources of interference. However, until the threat of harmful interference from ESIMs is substantiated, ISED should follow ViaSat's proposal and license air-, sea- and land-based ESIMs on a case by case basis.¹⁵

IV. Aggregate Interference Concerns Should Not be Dismissed Without a More Thorough Evaluation of the Potential Consequences

9. SES takes note of ISED's hesitancy to restrain terrestrial 5G deployment over concerns over aggregate interference from terrestrial emissions towards 28 GHz satellites. Many commenters argue that concerns over aggregate interference should be dismissed because terrestrial base stations will pointed towards the ground. Others argue that Canada should simply disregard these concerns because concerns about interference to FSS space stations are inconsequential compared to the benefits of expeditiously deploying terrestrial services. SES urges ISED to assess these arguments with some skepticism.
10. The argument that all terrestrial base stations will point towards the ground is questionable. Equipment manufacturers are already developing applications that require skyward transmissions. ViaSat notes a terrestrial 5G use case where the base station would have to transmit upwards to serve end users located at the top of buildings.¹⁶ Other use cases are developing around drones, which will also require base stations to transmit towards the sky.¹⁷ Terrestrial operators and manufacturers are clearly contemplating use cases that will require base stations

¹⁴ Huawei Comments at 6.

¹⁵ ViaSat Comments at 5.

¹⁶ ViaSat Comments at 6.

¹⁷ Dawn Bushaus, *Attack of the 5G-enabled drones: Getting them off the ground*, TM Forum, April 11, 2017. <https://inform.tmforum.org/features-and-analysis/2017/04/attack-5g-enabled-drones-getting-off-ground/>; The QnQ Team, *Drones + 5G: The sky's the limit*, Qualcomm.com, Nov. 14, 2016. <https://www.qualcomm.com/news/onq/2016/11/14/drones-5g-skys-limit>; Joanna Crews, *Report: Samsung Aims to Help US Military Build 5G Wireless Network*, ExecutiveBiz.com, Nov. 03, 2017. <http://blog.executivebiz.com/2017/11/report-samsung-aims-to-help-us-military-build-5g-wireless-network/>.

to transmit towards the sky. The decisions ISED makes regarding aggregate interference should account for this likelihood.

11. Moreover, arguments that 5G deployment is simply too important to be slowed down by concerns over harmful interference to domestic and foreign licensed space stations¹⁸ ignores the fact that FSS, especially FSS systems operating in the 28 and 37 GHz bands, will play a critical role in the deployment of 5G services in Canada. ISED is not faced with a question of choosing between 5G and FSS; it is faced with a question of deploying 5G in urban areas versus ensuring that 5G services can be provided nationwide. Given the priorities ISED articulated in the Notice,¹⁹ ISED should act cautiously before putting mmWave FSS operations at risk of receiving aggregate interference from terrestrial transmitters. The end result should assure nationwide availability of FSS for support of and in addition to 5G and other advanced telecommunications services.
12. SES believes that ISED should refrain from making a decision on aggregate interference until there is more information about what terrestrial 5G systems will look like and what use cases will be supported the 28 and 37 GHz bands. An open docket, such as the one the FCC created for this issue,²⁰ would be an ideal way to further develop the record so that ISED can make a more informed decision. As Bell notes, “the stated purpose of this proceeding is the widespread deployment of 5G networks for the benefit of all Canadians”²¹ and the best way for ISED to ensure that this happens is to act in a manner that will enable deployment of 5G services nationwide.

V. SES Seeks Clarity on the Type of Earth Station Siting in Footnote C47C

13. SES understood ISED’s proposed language in footnote C47C regarding feeder links to represent an example of the types of earth stations permitted in the

¹⁸ Bell Comments at 14-15.

¹⁹ To “facilitate deployment and timely availability of services across the country.” *Notice* at ¶ 6.

²⁰ See Federal Communications Commission, *Docket Established for 28 GHz Aggregate Interference Analysis*, GN Docket No. 17-171 (June 21, 2017).

²¹ Bell Comments at 14-15.

band.²² However, some comments seem to indicate an understanding that ISED will only authorize earth stations that qualify as feeder links in the band.²³ SES requests clarification from ISED that feeder links are merely an example of the types of earth stations that are permitted to be licensed in the band. As another example, individually licensed earth stations deployed in reasonably small numbers will pose minimal constraints upon the deployment of fixed service systems and mobile service systems, regardless of the type of service they provide or their antenna size.

14. SES proposes that footnote C47C be amended to read as follows:

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~~ individually coordinated earth stations.

VI. ISED Should Not Allocate the 24.75-25.25 GHz Band to Terrestrial 5G Applications

15. SES believes that ISED should not allocate the 24.75-25.25 GHz band to terrestrial 5G applications.²⁴ This band is currently not allocated for mobile use²⁵ and no other commenters propose its use for terrestrial 5G services. ISED is pursuing policies in this proceeding that will open up substantial swaths of spectrum for terrestrial 5G applications. It is not yet necessary to allocate even more spectrum for such applications, particularly when building out small-cell terrestrial infrastructure may prove to be costly and take a significant amount of time.²⁶ ISED should not yet contemplate allocating new bands without existing terrestrial allocations for terrestrial 5G services.

²² Notice at ¶ 25.

²³ See Comments of Intel Corporation at 9 (filed September 15, 2017).

²⁴ See Comments of TeraGo Networks Inc. at 4 (filed September 14, 2017).

²⁵ *Canadian Table of Frequency Allocations 2014* (last updated January 2015), accessible at <http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf10759.html>.

²⁶ 5G Americas Comments at 6.

VII. ISED Should Not Be Overly Reliant on the FCC's Spectrum Frontiers Proceeding

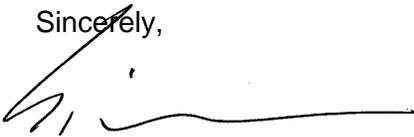
16. SES urges ISED to maintain the position it took in the Notice regarding the Federal Communication Commission's Spectrum Frontiers proceeding for determining how to enable FSS use in terrestrial-priority bands, instead of the position Nokia advocates.²⁷ The U.S. proceeding is not yet finalized and, notably, the FCC's most recent order may provide more balanced conditions for earth station siting in the 28 and 37 GHz bands,²⁸ further undercutting Nokia's argument that the FCC's original sharing scheme should be implemented. While Canada has obvious interests in aligning its spectrum usage policies with the U.S., ISED has already noted that the U.S. framework is not appropriate in the Canadian context.²⁹

VIII. Conclusion

17. SES believes that ISED's proposals are promising for nationwide 5G deployment. However, ISED must not lose sight of the central role that FSS services in the 28 and 37 GHz band will play in the deployment of 5G networks. In order for ISED to achieve its stated policy goals in this proceeding, there must be a meaningful and reliable path for FSS operators to access these bands and to provide the caliber of service necessary to play a role in Canada's 5G future.

All of which is respectfully submitted.

Sincerely,



Scott Gibson
Vice President & General Counsel
Ciel Satellite Limited Partnership

²⁷ See Comments of Nokia at 4 (filed September 15, 2017).

²⁸ See Federal Communications Commission, *Use of Spectrum Bands Above 24 GHz for Mobile Radio Services*, Draft Second Report and Order, Second Further Notice of Proposed Rulemaking, Order on Reconsideration, and Memorandum Opinion and Order, GN Docket No. 14-177 (Oct. 26, 2017).

²⁹ Notice at ¶ 35.