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21 January 2019

Director
Space Services Planning
Innovation, Science and Economic Development Canada
235 Queen Street
Ottawa, ON K1A 0H5

Dear Sir or Madam:

Re: Comments of Ciel Satellite Limited Partnership, SES S.A., and O3b Limited - Consultation on the Utilization of the Bands 18.8-19.3 GHz and 28.6-29.1 GHz, and the Bands 17.3-17.7 GHz, 19.3-19.7 GHz and 29.1-29.25 GHz by the Fixed-Satellite Service, Canada Gazette, Part I, October 25, 2018, Notice No. SMSE-016-18

I. Introduction

1. Ciel Satellite Limited Partnership (“Ciel”) and its affiliates SES S.A. (“SES”) and O3b Limited (“O3b”) (collectively, the “Companies”) hereby submit these comments in response to the *Consultation on the Utilization of the Bands 18.8-19.3 GHz and 28.6-29.1 GHz, and the Bands 17.3-17.7 GHz, 19.3-19.7 GHz and 29.1-29.25 GHz by the Fixed-Satellite Service*, Canada Gazette, Part I, October 25, 2018, Notice No. SMSE-016-18 (the “Consultation”) initiated by Innovation, Science and Economic Development Canada (“ISED” or the “Department”).
2. SES is one of the world’s largest commercial communications satellite operators, with both geostationary orbit (“GSO”) and non-geostationary orbit (“NGSO”)

- satellites providing telecommunications services, and is uniquely positioned to address the matters raised in the Consultation. The SES fleet of more than 50 GSO satellites provide C-, Ku-, and Ka-band video and data services to customers in Canada and around the globe. O3b uses its Ka-band NGSO system to provide low-latency, high throughput capacity to enterprise customers including mobile network operators, ISPs and governments. Many SES GSO satellites and the O3b NGSO satellite constellation have been approved by ISED to provide service in Canada and the capacity on these systems is available for use by Canadian service providers.
3. Moreover, SES is constructing a next generation of Ka-band high-throughput satellites, which will serve the aeronautical, maritime and high-speed data markets in North, Central and South America. Launch of the first of these satellites is anticipated in early 2021, which will operate close to 200 Ka-band user spot beams of varying sizes, all of which must be supported by adequate gateway services. The Companies are currently planning to build some of these gateway facilities in Canada and to make use of the frequency bands that are the subject of the Consultation.
 4. The Companies thank ISED for initiating the Consultation. The development and implementation of a new spectrum utilization policy for use of the frequency bands 18.8-19.3 GHz and 28.6-29.1 GHz by the fixed-satellite service (FSS), as well as the proposed changes to the spectrum utilization policy for use of the frequency bands 17.3-17.7 GHz, 19.3-19.7 GHz and 29.1-29.25 GHz by the FSS Bands (which were requested by the Companies) are both important steps towards achieving the stated policy objectives of the Department. Specifically, they will ensure that valuable spectrum is accessible in a way that maximizes the economic and social benefits for Canadians, while permitting the flexible use of spectrum to the extent possible and supporting the efficient functioning of markets by harmonizing spectrum use with international allocations and standards.

II. FSS use of the bands 18.8-19.3 GHz and 28.6-29.1 GHz

Question 1: ISED is seeking comments on the proposal to give co-primary status to both GSO networks and NGSO systems in the FSS in the bands 18.8-19.3 GHz and 28.6-29.1 GHz.

5. The Companies have had extensive operational and coordination experience as global satellite operators in jurisdictions where GSO networks and NGSO systems have co-primary status in the FSS (identified in the Consultation as “Option 1”) and in jurisdictions where NGSO systems have primary status and GSO networks have secondary status in the FSS (identified in the Consultation as “Option 2”). In the Companies’ experience, both approaches can present advantages and disadvantages (in some cases unique to an administration or region) but either approach can be made to work. However, for the reasons set out below, the Companies would prefer that Option 1, the proposal to give co-primary status to both GSO FSS networks and NGSO FSS systems in the 18.8-19.3 GHz and 28.6-29.1 GHz bands, be adopted in Canada.
6. The approach proposed by the Department in Option 1, giving equal status to GSO networks and NGSO systems in the FSS, would align with ISED’s current practices in the 18.8-19.3 GHz and 28.6-29.1 GHz bands. For the reasons outlined in the Consultation, the Department has historically authorized both GSO networks and NGSO systems in the FSS in the bands 18.8-19.3 GHz and 28.6-29.1 GHz on an equal basis. Maintaining and confirming this practice would have the benefit of offering certainty and business continuity for existing licensees. In addition, as ISED notes in the Consultation, both GSO and NGSO satellite operators are implementing new communications technologies in the FSS bands that will benefit Canadians living in rural and remote areas; confirming the existing equal status of GSO FSS networks and NGSO FSS systems in the bands would potentially stimulate the further development and roll-out of these technologies in Canada.
7. GSO networks and NGSO systems in the FSS in the bands 18.8-19.3 GHz and 28.6-29.1 GHz have coprimary status in the ITU *Radio Regulations*. Coordination is based on ITU date priority. Adoption of the Option 1 approach as suggested by the Department would therefore have the added benefit of harmonizing domestic

Canadian rules with international allocations and standards, as is encouraged by the *Spectrum Policy Framework for Canada*.

8. As noted above, Canada's unique geography makes co-primary sharing between NGSO and GSO satellite systems in the bands 18.8-19.3 GHz and 28.6-29.1 GHz more practical. For example, due to angular separation between the earth station and the current and future O3b equatorial constellations, it is easier for O3b to share frequency bands with GSO operators as its earth stations get further away from the equator. While O3b's future inclined orbit does not enjoy that same advantage, so long as ISED maintains coordination practices that ensure NGSO and GSO operators are on an equal footing, as the Companies detail below, co-primary status should not hinder the ability to deploy or provide service in Canada.
9. The Companies also note that GSO and NGSO operators licensed in Canada have an obligation to coordinate in good faith with other Canadian licensees and with foreign-licensed systems. This obligation is taken very seriously by the Companies, and in our experience, has served to facilitate effective international and Canadian coordination discussions amongst operators.

Question 2: ISED is seeking comments on the proposal to use the original date of authorization for domestic systems for domestic coordination purposes.

10. Although use of the original date of authorization for domestic systems for domestic coordination purposes is a workable approach, the Companies would prefer use of ITU date priority, which would harmonize the Canadian approach with international rules.

Question 3: Is there additional information on coordination practices for GSO networks and NGSO systems in the FSS that should be considered? If so, please explain in detail.

11. At paragraph 41 of the Consultation, the Department notes that GSO networks could implement technical measures such as off-axis e.i.r.p limits to improve the sharing environment in the subject bands to reduce the coordination burden on

NGSO systems and that NGSO systems can implement mitigation measures such as earth-station site diversity and orbital avoidance angles to improve the sharing environment between different NGSO systems.

12. The Companies note that co-existence between GSO networks and NGSO systems can also be improved using time-based frequency avoidance measures, geographic separation of earth stations (to avoid in-line geometry) and/or geographic separation of service areas. In cases where one or both systems are operating gateway or feeder link type operations, careful siting of gateway earth stations and beams may be feasible to achieve successful coordination.

Question 4: ISED seeks comments on its view that, at this time, the existing approach to addressing domestic coordination disputes is sufficient.

13. At paragraph 42 of the Consultation, the Department proposes that ISED would continue to apply the ITU's general coordination practices to domestic coordination, using the domestic authorization date to establish the date of regulatory precedence. As noted above in the response to Question 2, the Companies recommend that the Department adopt the use of ITU date priority rather than the date of domestic authorization for the purposes of domestic coordination, but subject to that caveat, the Companies support continued application by the Department of the existing approach to addressing domestic coordination disputes.

Question 5: ISED is seeking comments on the proposed changes to the CTFA. In providing responses, include supporting arguments for or against the proposed changes.

14. ISED proposes in the Consultation to update the status of the fixed service in the bands in the *Canadian Table of Frequency Allocations* (the "CFTA") to reflect existing policy, and to modify footnotes C16E and C16F consistent with the Option 1 proposal to designate GSO and NGSO FSS as co-primary in the bands 18.8-19.3 GHz and 28.6-29.1 GHz.
15. The Companies support the proposed revisions to the CTFA as described at paragraph 50 of the Consultation.

III. Changes to the spectrum utilization policy for the use of the bands 17.3-17.7 GHz, 19.3-19.7 GHz and 29.1-29.25 GHz

Question 6: ISED is seeking comments on the above proposed changes to the CTFA. In providing responses, include supporting arguments for or against the proposed changes.

16. As noted at paragraph 52 of the Consultation, the changes proposed by the Department to the spectrum utilization policy for the use of the bands 17.3-17.7 GHz, 19.3-19.7 GHz and 29.1-29.25 GHz have arisen as the result of a request made by Ciel. The Companies thank ISED for its consideration of this request.

17.3-17.7 GHz

17. At paragraph 64 of the Consultation, the Department has proposed to allow use of the 17.3-17.7 GHz band by the FSS (space-to-Earth) as requested by Ciel and to add a new footnote C43A. The proposed text of the new footnote is:

ADD C43A Assignments to stations in the broadcasting-satellite service in the frequency band 17.3-17.7 GHz may also be used for transmissions in the fixed-satellite service (space-to-Earth), provided that such transmissions do not cause more interference, or require more protection from interference, than the broadcasting-satellite service transmissions operating in conformity with the Radio Regulations. The use of these assignments by the fixed-satellite service (space-to-Earth) is limited to low density deployments of earth stations communicating with geostationary satellite systems.

18. The Companies have some concerns about the use of the phrase “low density deployments of earth stations” in the proposed new footnote C43A. This phrase does not appear elsewhere in the CTFA and is not otherwise commonly-used or well-understood regulatory terminology. The Companies suggest an alternate formulation of the footnote using language more consistent with similar limitations expressed in the CTFA:

ADD C43A Assignments to stations in the broadcasting-satellite service in the frequency band 17.3-17.7 GHz may also be used for transmissions in the fixed-satellite service (space-to-Earth), provided that such transmissions do not cause more interference, or require more protection from interference, than the broadcasting-satellite service transmissions operating in conformity with the Radio Regulations. The use of these assignments by the fixed-satellite service (space-to-Earth) is limited to ~~low density deployments of earth stations communicating with geostationary satellite systems.~~ uses that would not unduly constrain feeder link use in the Earth-to-space direction, such as gateway applications in the fixed-satellite service.

19. The Companies believe that this alternative formulation of proposed new footnote C43A provides a more accurate description of the intended limitation and would be more easily understood by users. At the same time, the alternative formulation would allow ISED and the industry some flexibility in identifying other uses that could be accommodated.
20. The Companies also note that the 17.3-17.7 GHz BSS allocation is not extensively used in Canada at the present time, and that the limited services currently authorized in Canada would not be constrained by the FSS use contemplated in the Consultation. Furthermore, the contemplated use would be less constraining on the BSS feeder link allocation in the band than the existing BSS, which is intended for the ubiquitous deployment of receiving earth stations. The shared use that is contemplated in the Consultation would increase spectrum efficiency in a band that is not only underutilized but which can tolerate greater sharing.

19.3-19.7 GHz and 29.1-29.25 GHz

21. At paragraph 62 of the Consultation, ISED has indicated that it is of the view that the 19.3-19.7 GHz and 29.1-29.25 GHz bands could be used for GSO FSS

gateways and feeder links without constraining other services in the bands. The Companies agree with and support the Department's conclusion.

22. In terms of proposed implementation, the approach suggested in the Consultation is to modify footnotes C46A and C48 by adding the phrase "low density deployments of earth stations communicating with geostationary satellite systems" to the existing footnote language. As noted above, the phrase "low density deployments of earth stations" is not commonly-used regulatory terminology and the Companies are concerned about the future interpretation of the phrase.
23. The Companies suggest that the intent of the Department may be more effectively achieved by different means, namely through the suppression of footnotes C46A and C48, and the modification of footnotes C16D and C16G as shown below:

C16D (CAN-18) MOD In the frequency bands 17.8-18.3 GHz and 19.3-19.7 GHz, the use of these bands by the fixed service has priority over the use by the fixed-satellite service. Use of these bands by the fixed-satellite service (space-to-Earth) shall be limited to applications that pose minimal constraints on the deployment of fixed services. Examples of such applications in the frequency band 19.3-19.7 GHz would be the use of a small number of feeder link stations of the non-geostationary satellite systems in the mobile-satellite service and the use of a small number of gateway stations of the geostationary fixed-satellite service, taking into account existing and potential service areas for ubiquitous deployment of fixed service systems. Earth stations that comply with these requirements ~~will~~ shall be coordinated with fixed service systems. ~~and may be granted radio authorization on a case-by-case basis.~~

C16G (CAN-18) MOD In the frequency band 29.1-29.25 GHz, the use of this band by the fixed service has priority over the use by the fixed-satellite service. Use of this band

by the fixed-satellite service (Earth-to-space) shall be limited to applications that pose minimal constraints on the deployment of fixed services. ~~An~~ Examples of such ~~an~~ applications would be the use of a small number of ~~large aperture earth stations~~ feeder link stations of the non-geostationary satellite systems in the mobile-satellite service and the use of a small number of gateway stations of the geostationary fixed-satellite service, taking into account existing and potential service areas for ubiquitous deployment of fixed service systems. Earth stations that comply with these requirements shall be coordinated with fixed service systems.

SUP Suppress Footnotes C46A and C48

24. The formulations suggested above could also potentially allow accommodation of aeronautical user terminals in the downlink direction, as such use would not constrain deployment of fixed service systems. Similarly, maritime terminals separated by a certain distance from the coast would not constrain deployment of fixed service systems. In the uplink direction, aeronautical or maritime earth stations could also be accommodated, as long as power flux density limitations are met to protect terrestrial services, consistent with provisions contained in the draft *Conference Preparatory Meeting* text under WRC-19 agenda item 1.5.¹ With respect to NGSO MSS feeder link operations in these bands at limited earth station sites, satellite system coordination could also address aeronautical or maritime usage by GSO systems.

IV. Conclusion

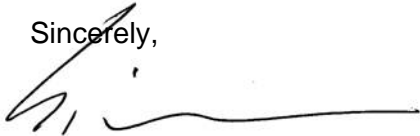
25. The Companies appreciate the opportunity to provide comments to the Consultation. The proposed new spectrum utilization policy for use of the frequency bands 18.8-19.3 GHz and 28.6-29.1 GHz by the fixed-satellite service

¹ See the draft Conference Preparatory Meeting Report to WRC-19 dated 17 September 2018 (available at <https://www.itu.int/md/R15-CPM19.02-C-0001/en>), at page 371. Provision 1.1 of Part I of ANNEX 2 to the draft new RESOLUTION [A15] (WRC-19) provides a distance from the low-water mark of an administration within which maritime earth stations would need to coordinate, and Provision 1.1 Option 1 of Part 2 of the same Annex provides a power-flux density mask for aeronautical earth stations to protect terrestrial stations. This Report will be finalized at the Conference Preparatory Meeting in February 2019.

(FSS), and the proposed changes to the spectrum utilization policy for the use of the frequency bands 17.3-17.7 GHz, 19.3-19.7 GHz and 29.1-29.25 GHz by the FSS Bands, will both benefit Canadians through maximizing the efficient use of spectrum in Canada.

26. All of which is respectfully submitted.

Sincerely,

A handwritten signature in black ink, appearing to read 'S. Gibson', with a long horizontal flourish extending to the right.

Scott Gibson
Vice President & General Counsel
Ciel Satellite Limited Partnership