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VIA EMAIL

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Mr. Martin Proulx
Director General
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Dear Mr. Proulx:

Re: Reply Comments of O3b Limited - Consultation on the Licensing Framework for Non-Geostationary Satellite Orbit (NGSO) Systems and Clarification of Application Procedures for All Satellite Licence Applications, Canada Gazette, Part I, March 4, 2017, Notice No. SMSE-009-17, as amended

I. Introduction

1. O3b Limited ("O3b") submits these Reply Comments in response to Innovation, Science and Economic Development Canada's ("ISED") *Consultation on the Licensing Framework for Non-Geostationary Satellite Orbit ("NGSO") Systems and Clarification of Application Procedures for All Satellite Licence Applications* (the "Consultation").
2. O3b encourages ISED to be mindful of its policy objectives in this proceeding, namely to maximize the economic and social benefits that Canadians derive from the use of the radio frequency spectrum resource. O3b believes that the best way to maximize the benefits of the proliferation of NGSO satellite systems for Canadians is to encourage competition and timely

deployment of services in the market. To fulfill its policy goals, ISED should be wary of adopting policies that protect Canadian licensees at the expense of Canadian citizens.

3. O3b agrees with Telesat that ISED should strive to create a level playing field between foreign NGSO systems and Canadian licensed NGSO systems for the benefit of Canadian interests.¹ However, some of Telesat's proposals do not adhere to this principal and, indeed, would raise questions regarding Canada's compliance with its international treaty obligations if certain of its proposals are adopted by the Department. Among these proposals is one that would actually provide Canadian licensees with disproportionate leverage and power to block foreign NGSO licensees from providing service to Canadians. If ISED retains the requirement that foreign-licensed NGSO systems must coordinate with Canadian-licensed systems prior to gaining access to the Canadian market, a single Canadian licensee could prevent or delay any foreign NGSO licensees from entering the Canadian market and providing competitive services to Canadians. Beyond that major defect, Telesat also advocates for an in-line event regulatory regime that would thwart efforts to provide multiple NGSO service options in Canada. O3b recognizes that ISED has an interest in supporting the Canadian satellite and space industries, but ISED must balance this responsibility in a way that allows Canadians to benefit fully from the current NGSO revolution.

II. ISED Should Not Require Foreign Licensed Systems to Complete Coordination Prior to Receiving Approval to Operate in Canada

4. Telesat and a few other parties² propose that ISED retain its requirement that foreign licensed NGSO systems must demonstrate that they can co-exist with existing Canadian licensees before

¹ See Comments of Telesat Canada, Notice No. SMSE-009-17, at iv, 9-10 (filed April 18, 2017) ("Telesat Comments").

² See Comments of GHGSat, Notice No. SMSE-009-17, at 4 (filed April 4, 2017); Comments of Kepler Communications Inc., Notice No. SMSE-009-17, at 11-12 (filed March 10, 2017) ("Kepler Comments"); Comments Planet Labs, Inc., Notice No. SMSE-009-17, at 8 (filed April 13, 2017).

being granted authorization to serve Canada. This proposal disadvantages foreign licensed NGSO systems because it would effectively allow Canadian licensees to decide whether foreign-licensed NGSO systems are granted access to the Canadian market. As noted by other parties,³ by requiring foreign licensees to coordinate with Canadian systems prior to gaining access to the Canadian market, ISED would allow Canadian licensed systems to block foreign licensed satellites from serving the Canadian market by refusing to complete coordination. Canada cannot fully benefit from new and future NGSO constellations if Canadian licensees are allowed to delay or effectively veto a foreign licensed operator's ability to serve Canada.

5. In its comments, Telesat indicated that it supports ISED moving away from the co-existence criteria in favor of adopting an ITU date-priority coordination system.⁴ This system would create a similar problem and give earlier-filed operators an incentive to not coordinate with later-filed operators, leading to inefficient spectrum use. O3b fully supports protection through coordination with earlier-filed satellite systems but disagrees with a policy that overextends the ITU date-priority coordination to allow Canadian licensees to potentially block access of competitive services to Canada.
6. In many scenarios, there are more effective alternatives to relying on ITU date-priority coordination, for example, a baseline technical framework such as two degree spacing that allows geostationary systems to coexist in the absence of coordination by operating at certain default levels. However, given the complexities involved with multiple NGSO systems sharing with diverse system characteristics, such an alternative is not readily available in this case. As a result, O3b believes that the coalition of Canadian satellite operators and industry stakeholders

³ See Comments of Space Exploration Technologies Corp., Notice No. SMSE-009-17, at 8 (filed April 18, 2017) ("SpaceX Comments"); Comments of The Boeing Company, Notice No. SMSE-009-17, at 13 (filed April 18, 2017) ("Boeing Comments").

⁴ Telesat comments at 26.

(the "Coalition") provides a more palatable alternative.⁵ The Coalition proposal includes two key principles to facilitate coordination between Canadian licensees and foreign-licensed systems:

(1) non-Canadian networks should not be required to coordinate with Canadian networks that have a later ITU date priority; and (2) Coordination negotiations must be completed within a 90 day period, after which point either party may refer the matter to ISED for resolution.

7. O3b continues to believe that ISED should eliminate the requirement that foreign-licensed NGSO systems will only be approved for use in Canada if coordination has been completed with Canadian networks. However, if ISED chooses to retain that threshold, the Coalition coordination proposal at least limits the ability of an operator to delay coordination for anti-competitive reasons.

III. Regulatory Solutions for In-line Events

8. O3b believes that in-line events are best resolved through coordination. However, ISED can facilitate coordination by implementing regulatory rules that limit the number of in-line events and provide incentives for operators to complete coordination. O3b outlines some potential solutions below and provides a summary of the proposal it made in a pending proceeding on NGSO systems before U.S. Federal Communications Commission (the "FCC"), in Appendix A.

9. Instead of adopting Telesat's coordination proposal, ISED should apply rules and clear consequences, such as splitting any spectrum for which two operators are unable to coordinate, to encourage operators both foreign and domestic to coordinate in good faith.⁶ This will serve as a necessary backstop that will motivate operators to reach a coordination agreement to avoid band-splitting for their Canadian operations. The FCC's rules in 47 C.F.R. 25.261⁷ for governing

⁵ See Comments of the Coalition, Notice No. SMSE-009-17, at 17 (filed April 18, 2017).

⁶ See SpaceX Comments at 9; Boeing Comments at 12.

⁷ See 47 C.F.R. § 25.261. Available at: https://www.ecfr.gov/cgi-bin/text-idx?SID=11b0b0b31f1169691848ede015a4f9b5&mc=true&node=se47.2.25_1261&rqn=div8.

in-line interference events is an example of a regulation that facilitates good faith coordination while providing a balanced solution should coordination fail. Section 25.261 implements a default procedure for splitting the relevant frequency band(s) during in-line interference events if the operators cannot come to an agreement. O3b encourages ISED to strongly consider adopting an approach like that in the FCC rules to facilitate the deployment of multiple NGSO systems in Canada, as the best means to mitigate incentives for anti-competitive or bad-faith coordination.

10. As other parties have noted in this proceeding⁸ and elsewhere,⁹ it is feasible to determine when spectrum sharing would be needed. For example, O3b has proposed in the FCC NGSO proceeding¹⁰ that in-line events could be facilitated by requiring NGSO operators to make their ephemeris data available to other operators to help identify potential in-line events. The availability of ephemeris data will facilitate transparency during coordination.
11. O3b agrees with Telesat that there is no one-size-fits-all trigger angle for in-line events and instead submits that a trigger angle between two and five degrees would sufficiently reflect the range needed to identify in-line events between NGSO systems depending on frequency band. The two to five-degree range reflects the likely range of an antenna sidelobe main beam operational angle on modern NGSO earth stations operating between 3 – 50 GHz. This range is designed to reflect the innovations in NGSO earth station technology and limit in-line events as much as possible.

⁸ See Kepler Comments at 7, 9.

⁹ See *In the Matter of Update to Parts 2 and 25 Concerning Non-Geostationary, Fixed-Satellite Service Systems and Related Matters*, Notice of Proposed Rulemaking, 31 FCC Rcd 13651 (Dec. 15, 2016).

¹⁰ For further detail, O3b has provided a summary of its complete in-line interference events proposal from the FCC's NGSO proceeding in an appendix to this filing.

12. ISED can further limit the likelihood of in-line events by implementing limits on NGSO earth station off-axis EIRP levels and downlink PFD limits for NGSO space stations. Such limits ensure that interference outside of the in-line event angle will have a known interference contribution.

IV. Canadian Coverage Requirements

13. Telesat proposes that all NGSO operators, regardless of whether they are licensed by ISED or a regulatory authority outside of Canada, must provide complete coverage of Canada as a condition of providing service in Canada. This proposal would impose an unnecessary and onerous burden on NGSO operators, whether domestic or foreign, that may not be achievable for all constellation designs, even if those constellations are capable of providing needed service to some portions of Canada. O3b asks ISED to consider the still emerging nature of the NGSO broadband industry and to refrain from imposing a nationwide coverage requirement on commercial NGSO operators, particularly foreign-licensed operators whose satellite networks, including their design and coverage characteristics, are subject to the requirements of regulatory authorities in other jurisdictions. Permitting NGSO operators the flexibility to provide service to portions of Canada will facilitate the timely deployment of NGSO services in Canada.
14. Furthermore, as Kepler notes, where “a system is incapable of providing service and a market exists, other operators would likely apply for the spectrum to deploy services.¹¹” Canadians will benefit by having access to competing NGSO services available in a certain locale or region. In areas where those systems cannot provide service, the spectrum is unencumbered, enabling other operators to put the spectrum to use and serve the available customers in those regions.

V. Conclusion

¹¹ Kepler Comments at 5.

15. O3b encourages ISED to implement a truly even playing field for coordination among Canadian licensees and foreign licensees. Such a system cannot exist if Canadian licensees have no incentive to coordinate with foreign licensees. Therefore, O3b urges ISED to heed the suggestions made by itself and other operators to implement regulations to facilitate good faith coordination among all NGSO operators so that Canada can fully appreciate the benefits of the NGSO revolution.

Appendix A

Summary of O3b In-Line Event Proposal

- *O3b proposes an In-Line Event Trigger Angle between two and five degrees.* This range is appropriate because the angle depends on the antenna diameter and on the frequency. For example, the side lobes for a 0.45 meter antenna operating in the 12 GHz band begin at approximately five degrees from the main axis of the beam, while the side lobes of the same 0.45-meter antenna operating in the 18 GHz band begin at 3.5 degrees from the main axis of the beam. O3b is not advocating for adoption of a 0.45-meter antenna diameter but rather explaining the rationale for a trigger separation angle between two and five degrees.
- *O3b proposes requiring NGSO FSS licensees to maintain a website with ephemeris data for each satellite in its constellation.* Making ephemeris data available outside of a coordination negotiation encourages transparency that is essential for determining in-line events. Moreover, sharing ephemeris data through traditional coordination channels will likely be insufficient to protect NGSO FSS operations going forward. The multiple new systems proposed in the Ka-band, many of which include a vast number of satellites per constellation, make access to current, accurate information even more important.
- *O3b supports the application of Section 25.261 spectrum sharing requirements in the absence of coordination.* In the absence of a coordination agreement, band-splitting should apply as a default resolution for in-line events between NGSO FSS systems communicating with earth stations with directional antennas.