Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
O3B LIMITED	)	Call Sign: S2935
Amendment to Application to Modify U.S. Market Access Grant for the O3b Medium Earth Orbit Satellite System	)	File No. SAT-AMD-20170301-00026

REPLY OF SPACE EXPLORATION HOLDINGS, LLC

Space Exploration Holdings, LLC ("SpaceX") hereby replies to the response filed by O3b Limited ("O3b") in the above referenced proceeding.[1] As SpaceX demonstrated in its opening comments, O3b satellites will cause significant and unnecessary coordination challenges by failing to provide beam-pointing information to prevent pervasive "phantom" in-line events.[2] O3b has also provided insufficient information to determine whether its uplink beams, like those of several other MEO and HEO applicants, will cause significant and pervasive interference to lower-orbit satellites. O3b provides little substantive response to these serious concerns and, instead, maintains that these issues will somehow be resolved in the coordination process. But SpaceX raises these issues precisely because they may distort and frustrate the coordination process if not addressed in the licensing process. And in the case of real-time beam-pointing

1 *See* Response of O3b Limited, SAT-AMD-20170301-00026 (Oct. 11, 2017) ("O3b Response").

2 Comments of Space Exploration Holdings, LLC, SAT-AMD-20170301-00026 (Sept. 25, 2017) ("SpaceX Comments").

information, this data is a prerequisite to effective coordination, because it is necessary for other operators to know when coordination or beam splitting is necessary to prevent interference.

I. O3b's Large Spot Beams Will Cause Numerous Additional In-Line Events Unless O3b Shares Beam-Pointing Information.

Each O3b satellite covers a footprint that could encompass most of both North and South America. Although O3b's individual beams are significantly narrower and may be steered throughout this large footprint, these capabilities do little to ease coordination unless O3b informs other operators where its beams are pointing and where they are not. Otherwise, operators must assume that the satellites are in-line and that interference would occur without band splitting or other measures whenever they are within the O3b footprint and aligned with an O3b satellite. Figures 1 and 2 below illustrate the dramatic impact of O3b's refusal to provide necessary beam-pointing information.

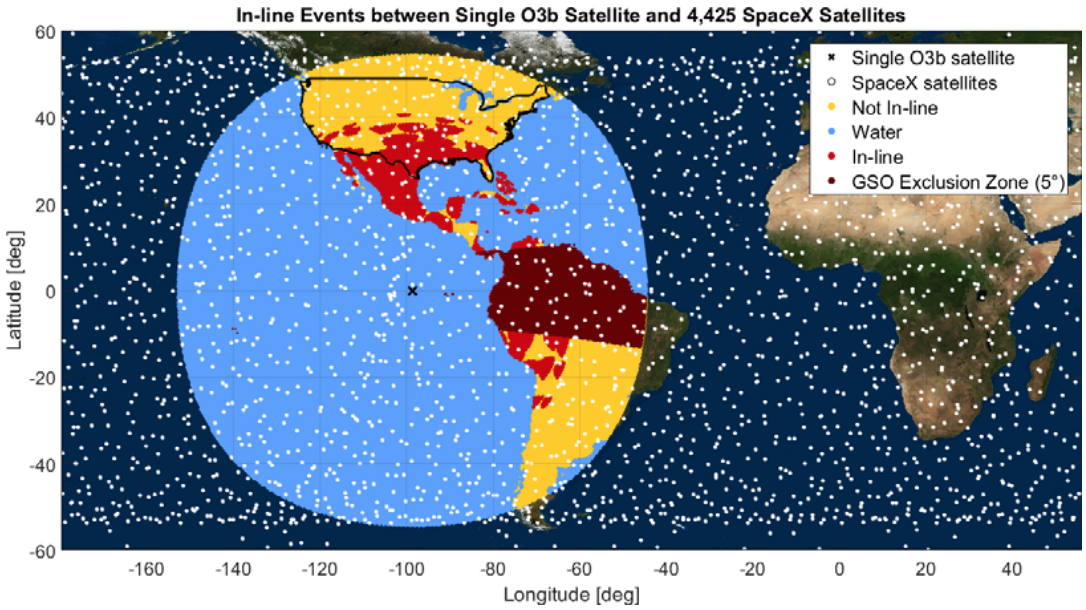

Figure 1. In-Line Events Without Shared Information[3]

[3] These simulations assume that a potential in-line event is defined as the conjunction of two satellites within ten degrees of one another from the perspective of an earth station.

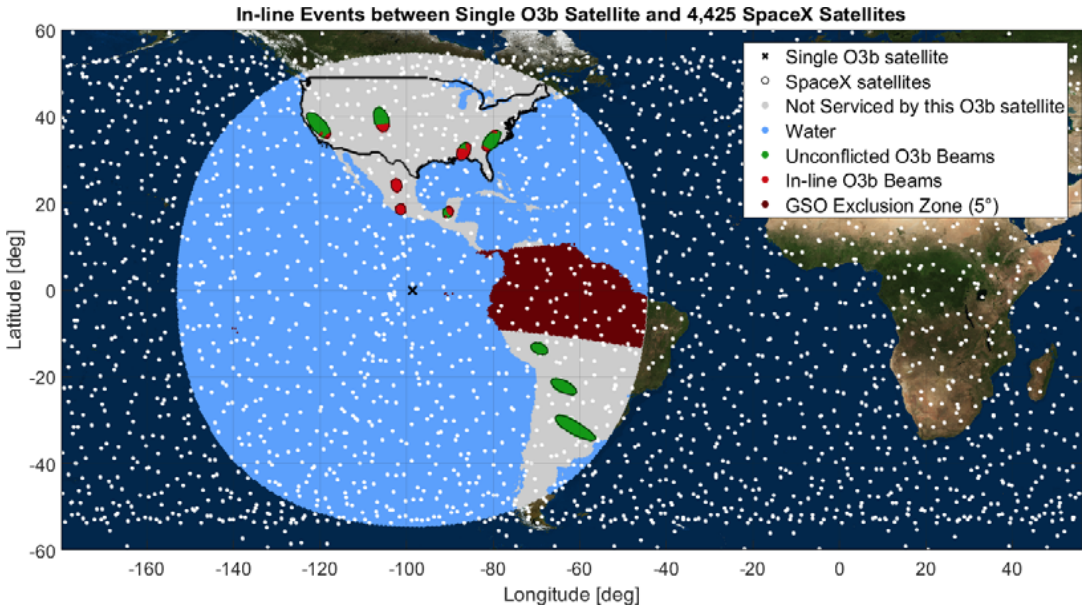

Figure 2. In-Line Events with Shared Information

As an initial matter, O3b claims that these ubiquitous in-line events are caused by the large number of SpaceX satellites, and not its own footprint. It simultaneously, however, claims that SpaceX can mitigate these in-line events through satellite diversity, which is possible due to its significant number of satellites.[4] Only one of these assertions can be correct—the latter. SpaceX's system is designed to mitigate in-line interference through satellite diversity, and is designed so that its ability to do so increases as the number of satellites in the system expands.

However, SpaceX's ability to mitigate in-line events does not relieve O3b of its own responsibility to design and operate its system in an efficient manner. Requiring SpaceX to use satellite diversity and SpaceX's other advanced sharing capabilities to avoid phantom in-line events is a grossly inefficient use of scarce spectral resources, especially when the remedy is as simple as sharing the needed beam-pointing information.

[4] O3b Response at 2.

The Commission should disregard O3b's conclusory and unsupported assertion that this information is not necessary for effective coordination. SpaceX has robustly demonstrated that it is necessary, if this coordination process is to have any chance of yielding an efficient outcome. And although O3b objects that this information is commercially sensitive, SpaceX has already proposed an effective means of addressing this concern: beam-pointing data can be shared with other operators by way of a third-party clearinghouse which will aggregate and ensure the confidentiality of any proprietary beam-pointing data.[5]

II. O3b Should Provide the Information Necessary to Confirm That Its Uplink Beams Will Not Cause Unacceptable Interference.

SpaceX has offered detailed analyses that demonstrate the significant interference risk of high-EIRP uplink beams of HEO and MEO systems to LEO operations.[6] But as SpaceX highlighted in its comments on the O3b system, O3b has failed to provide the necessary information to effectively determine whether these concerns apply to the O3b system. SpaceX is heartened by O3b's assertions that its system is sufficiently flexible to resolve any such interference concerns, and that any potential issues can be addressed through the coordination process.[7] The Commission should require O3b to submit the necessary information to access these assertions—as many other operators have done—so the interference risk can be more accurately assessed before the system is licensed. To the extent that O3b's uplink beams are of similar EIRP-levels to other operators, however, O3b should also be asked to explain how the significant levels of interference that SpaceX has identified, at any angular separation, can

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5 *See* Letter from William Wiltshire, Counsel to SpaceX, to Marlene H. Dortch, Secretary, FCC, IB Docket No. 16-408, Attachment at 09 (filed Sept. 15, 2017).

6 *See, e.g.*, SpaceX Comments at 2-5.

7 O3b Response at 2-3.

meaningfully be addressed through the coordination process, through any remedy other than band splitting.

Respectfully submitted,

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CERTIFICATE OF SERVICE

I hereby certify that, on this 23rd day of October, 2017, a copy of the foregoing Reply was served by U.S. mail upon:

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