

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

In the Matter of)	
)	
Viasat, Inc. Application to Modify)	IBFS File No. SES-MOD-20190212-00172,
Authority to Operate Ka-band Earth)	Call Sign E180006
Station Antennas Mounted on Aircraft)	

RESPONSE OF VIASAT, INC.

Viasat, Inc. (“Viasat”) responds to the comments filed by O3b Limited (“O3b”) regarding Viasat’s request for authority to modify its blanket license authorizing the operation of earth stations mounted on board aircraft using Ka-band frequencies (the “Application”), among other things, to add the 18.8-19.3 GHz and 28.6-29.1 GHz band segments that are designated in the United States for NGSO FSS on a primary basis.

In its comments, O3b disagrees with certain of Viasat’s technical analysis. O3b notes that “Viasat indicates that its Network Management System has been designed with the ability to inhibit emissions for each ESIM based on the separation angle to a given NGSO system.”¹ O3b then “asks that the Commission condition any grant of Viasat’s Application to require use of this capability to protect the O3b system unless and until Viasat successfully completes coordination of its proposed operations with O3b.”²

As an initial matter Viasat has no concerns with O3b’s proposal, which would allow Viasat to operate across the 18.8-19.3 GHz and 28.6-29.1 GHz bands in virtually all circumstances, and without coordination, by simply maintaining a separation angle of 7.6

¹ Comments of O3b Limited, File No. SES-MOD-20190212-00172, Call Sign E180006 (filed Oct. 25, 2019) (“O3b Comments”).

² *Id.* at 4-5.

degrees³ from O3b's system. Viasat is actively engaged in coordination with O3b and believes that the parties will be able to conclude on mutually agreeable terms.

Conditioning the grant of the Application in this manner appears the most expedient way of resolving this matter to the mutual satisfaction of both parties. That said, and for the completeness of the record, Viasat would like to address certain technical matters discussed by O3b, which again need not be resolved by the Commission at this juncture. These are discussed in Annex 1.

For these reasons Viasat respectfully requests that the Commission promptly process and grant the Application with the condition proposed above, until the completion of coordination, to enable the deployment of expanded broadband services to passengers and crew on board aircraft, while still protecting O3b's system.

Respectfully submitted,

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November 7, 2019

³ See Viasat, Inc., Application, File No. SES-MOD-20190212-00172, Call Sign E180006, Attachment 1, at 6 (filed Feb. 12, 2019).

Annex 1

Based on what Viasat believes are conservative assumptions, the analysis in the Application demonstrates that the potential for harm to O3b's planned 70-degree inclined orbiting satellites is almost nonexistent due to the extremely infrequent and fleeting nature of any near in-line events that could exceed an I/N greater than -12.2 dB towards O3b's NGSO system. There is no disagreement that O3b's equatorial system satellites are unaffected by Viasat's proposed earth station operations.

O3b takes issue with Viasat's use of an interference-to-noise ("I/N") ratio that is based on a 6% $\Delta T/T$. This 6% $\Delta T/T$ threshold was established in ITU-R Recommendation S.1432, which addresses "Apportionment of the allowable error performance degradations to fixed-satellite service (FSS) hypothetical reference digital paths arising from *time invariant interference* for systems operating below 30 GHz."⁴ In other words, this threshold is appropriate for identifying a level of interference that would degrade performance in an environment where the exposure to the interference source is constant.

In O3b's case, any potential interference from Viasat's earth station operations would be *time variant* in nature due to the constant movement of the satellites in an NGSO constellation. The geometry between an NGSO spacecraft on one hand, and a GSO satellite and its earth stations on the other, is always changing. As Viasat's analysis shows, the vast majority of the time, the separation angles between the O3b satellites and the Viasat GSO satellite and earth stations are quite large. In the case of O3b's equatorial orbit satellites, the separation angles for earth station operations within the U.S. are never low enough to have a measurable impact. For

⁴ ITU-R Recommendation S.1432-1 (04/2006) (emphasis added).

O3b's planned inclined orbit satellites, the near-inline events with Viasat's GSO operations are very infrequent and of short duration.

Accordingly, ITU-R Recommendation S.1323—which provides guidelines for determining the level of interference that is permissible for short-term interference—is more appropriate for this scenario. That Recommendation provides that NGSO FSS system operators should include (as a guide) in their interference budgets an allocation of 10% for an increase of the time allowance for the bit error rate (or carrier-to-noise ratio) specified in the short-term performance objectives of the desired network and corresponding to the shortest percentage of time (*i.e.*, lowest C/N value) caused by the aggregate emissions from the earth and space stations of all GSO FSS networks.⁵ By comparison, Viasat's proposed operations are expected to account for an exceedance of the 6% $\Delta T/T$ only 0.000116% of the time, which is unlikely to be detectable.

Reasonably, the interference threshold for static exposure to an interference source should be more stringent than the threshold for a dynamic interference source. Thus, Viasat's use of a 6% $\Delta T/T$ in the context of the Application is a conservative proxy for the potential for interference into NGSO FSS network operations, which is by its nature time variant.

As to certain parameters and assumptions in Viasat's analysis,⁶ Viasat notes that it provided detailed antenna patterns for the licensed earth stations (including tables specifying EIRP density values) in connection with its original license application for the earth stations being modified in the Application.⁷ In addition, Viasat has explained the duty cycle and other

⁵ ITU-R Recommendation S.1323-2, recommends 4 (09/2002)

⁶ See O3b Comments at 3-4.

⁷ See Viasat, Inc., File No. SES-LIC-20180123-00055, Call Sign E180006, Exhibits B and D (filed Jan. 23, 2018).

assumptions used in its analysis both in this Application, and in the aeronautical earth station application proceeding that O3b incorporates by reference in its comments.⁸

⁸ See Viasat, Inc. Opposition to O3b Petition, File No. SES-LIC-20190411-00503, Call Sign E190201 (filed Sept. 5, 2019).

CERTIFICATE OF SERVICE

I, Kayla K. Ernst, hereby certify that on this 7th day of November 2019, I served a true copy of the foregoing Comments of Viasat, Inc. via first-class mail upon the following:

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