

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

In the Matter of)	
)	
ViaSat, Inc.)	SAT-PDR-20161115-00120
)	
Application for U.S. Market Access)	

REPLY TO OPPOSITION OF INMARSAT

Inmarsat, Inc. (“Inmarsat”) hereby replies to ViaSat, Inc.’s (“ViaSat”) Opposition to Inmarsat’s Petition to Deny ViaSat’s request to use 27.5-29.1 GHz and 29.5-30.0 GHz Fixed Satellite Service (“FSS”) “uplink” spectrum and 17.8-19.3 GHz and 19.7-20.2 GHz FSS “downlink” spectrum for inter-satellite links.¹

ViaSat requests market access in the 17.8-18.6 GHz and 18.8-20.2 GHz (space-to-Earth); and 27.5-29.1 GHz and 29.5-30.0 GHz (Earth-to-space) frequency bands to provide FSS to end users and seeks to use these same frequency bands for inter-satellite links between the proposed ViaSat medium earth orbit (“MEO”) non-geostationary satellite orbit (“NGSO”) satellites and in-orbit geostationary satellite orbit (“GSO”) satellites.² Inmarsat respectfully requested that the Commission deny ViaSat’s request to use Ka-band spectrum for inter-satellite links as such use is not compliant with the allocations in these bands and ViaSat had not provided adequate demonstration that such use would not adversely affect GSO FSS operations.³

¹ See ViaSat, Petition for Declaratory Ruling Granting Access to the U.S. for a Non-U.S.-Licensed Nongeostationary Orbit Satellite Network, SAT-PDR-20161115-00120 at 5-6 (filed Nov. 15, 2016) (“ViaSat Petition”); Consolidated Opposition and Reply Comments of ViaSat, IBFS File No. SAT-PDR-20161115-00120 (filed July 7, 2017) (“ViaSat Opposition”).

² ViaSat Petition at 5.

³ ViaSat claims that Inmarsat’s Petition to Deny does not satisfy the statutory requirements for such petitions because it is not supported by an affidavit. ViaSat Opposition at

ViaSat's Opposition relies primarily on the inclusion of satellite-to-satellite links in the FSS definition as a basis for arguing that the proposed MEO-to-GSO link is consistent with the U.S. Table of Allocations.⁴ Inmarsat provided comments on this matter in its initial filing.⁵ ViaSat's argument is flawed as, even if the definition of a service covers a certain use, the Commission must still carefully consider technical and regulatory matters to ensure that the proposed use is compatible with other operations. The Commission has consistently adopted technical and regulatory rules, through the rulemaking process, to ensure that licensed operations are compatible and that equitable access exists for others to provide the same service. For example, even in the fundamental case of a GSO FSS satellite communicating with earth stations on land, the Commission adopted technical parameters for such operations alongside a national regulatory regime. Likewise, the Commission is currently undertaking a thorough analysis before adopting rules to permit operation of Earth Stations in Motion in the Ka-band.⁶

ViaSat analogizes its proposed satellite-to-satellite operations in the FSS with the operation of TTAC operations in FSS spectrum. However, ViaSat fails to acknowledge that the FCC's rules contemplate that TTAC will occur within its assigned service link bands.⁷ In

n. 1. Inmarsat's Petition to Deny did not include an affidavit because it did not contain specific allegations of fact required to support the specific relief requested. Nevertheless, Inmarsat provides the affidavit herewith.

⁴ ViaSat Opposition at 3-5.

⁵ Inmarsat, Petition to Deny, SAT-PDR-20161115-00120, at 3-4 (filed June 26, 2017) ("Inmarsat Petition").

⁶ *See Amendment of Parts 2 and 25 of the Commission's Rules to Facilitate the Use of Earth Stations in Motion Communicating with Geostationary Orbit Space Stations in Frequency Bands Allocated to the Fixed Satellite Service*, Notice of Proposed Rulemaking, IB Docket No. 17-95 (May 19, 2017).

⁷ *See* 47 C.F.R. § 25.202(g)(1).

contrast, for inter-satellite links, the Commission has designated separate spectrum for that specific purpose.

ViaSat also argues that its proposed satellite-to-satellite links are consistent with existing FSS allocations in the Ka-band, even though the FSS allocations in both the domestic and international Tables of Allocations do not include a parenthetical satellite-to-satellite direction.⁸ ViaSat's Petition contains no discussion of whether these satellite-to-satellite links will be coordinated with other operators under the ITU Article 9 provisions, as applicable, or if these operations would operate exclusively under ITU No. 4.4. Inmarsat notes that the DREBBELSAT ITU filing made by the Netherlands on behalf of ViaSat contains no inter-satellite link assignments.

In addition, the FCC has previously required extensive technical sharing analyses prior to authorizing use of spectrum for inter-satellite links.⁹ ViaSat's Opposition does (belatedly) provide an analysis of the impact of the proposed satellite-to-satellite links to GSO FSS and NGSO FSS constellation.¹⁰ While ViaSat's analysis shows that it must operate its MEO-to-GSO transmissions 3.5 dB lower than for typical VSAT or ESIM transmissions to result in a similar signal to noise ratio,¹¹ ViaSat does not clearly state that it will operate lower than the maximum level specified in Section 25.138(a) of the Commission's rules. A difference of 3.5 dB in the EIRP density is significant, especially with respect to closely spaced satellites.

⁸ The Commission's Ka-band plan does not designate any FSS spectrum for inter-satellite link operations.

⁹ See, e.g. *Teledesic LLC Application for Authority to Construct, Launch, and Operate a Ka-Band Satellite System in the Fixed-Satellite Service*, Order and Authorization, 16 FCC Rcd 2501 (2001); *Motorola, Inc. Application for Authority to Construct, Launch, and Operate a Ka-Band Satellite System in the Fixed-Satellite Service*, Order and Authorization, 16 FCC Rcd 2432 (2001).

¹⁰ ViaSat Opposition Exhibit A.

¹¹ ViaSat Opposition at 6-7, A-2-3.

Furthermore, ViaSat's proposal does not meet the applicable criteria for protection of the GSO space stations from transmissions from NGSO systems as contained in Article 22 of the Radio Regulations. For NGSO transmissions in the bands proposed by ViaSat for satellite-to-satellite links, the appropriate criterion to protect the GSO is the equivalent power-flux density ("EPFD") (up) level of $-162 \text{ dBW/m}^2/40 \text{ kHz}$ contained in Table 22-2 of the Radio Regulations that may not be exceeded for 100% of the time. When the EPFD(up) interference is at the beam peak of the victim satellite receive antenna, this results in a PFD at the GSO of the same level. An earth station transmitting from a ViaSat MEO satellite to a GSO target satellite at the levels specified in 25.138(a) would result in a PFD level of approximately $-149 \text{ dBW/m}^2/40/\text{kHz}$ at a GSO satellite two-degrees away from the target satellite. This is an exceedance of 13 dB over what is required by the Radio Regulations to protect GSO satellite from a NGSO system.

ViaSat also provides no justification of why the proposed MEO-to-GSO satellite transmissions should be allowed to significantly exceed the applicable NGSO EPFD limits in place to protect GSO satellites. It appears that ViaSat would like the transmissions from their NGSO satellites to be subject to transmit levels that apply to GSO FSS Earth stations instead of the levels that apply to NGSO FSS systems. ViaSat itself has raised concerns that the current EPFD limits, which were adopted 20 years ago, may not be sufficient to protect current and future GSO FSS satellites.¹² Introducing new sources of interference from NGSO-satellite-to-GSO-satellite transmissions that significantly exceed the EPFD limits only increases the interference to GSO FSS satellites. Moreover, it is likely that, if allowed, operators of other

¹² See ViaSat Comments, IB Docket No. 16-408 at 11 (filed Feb. 27, 2017).

NGSO systems will also seek to provide NGSO to GSO links, which raises concerns regarding aggregate levels of interference¹³.

In conclusion, unanswered questions on the ViaSat proposal remain, and the Commission should address these issues before authorizing the proposed operation of satellite-to-satellite links in the Ka-band. As Inmarsat stated in its Petition to Deny, the bands where ViaSat proposes to operate satellite-to-satellite links are highly utilized by GSO FSS satellites which stand to be joined soon by a plethora of NGSO FSS satellites.¹⁴ Therefore, any new use of the Ka-band for NGSO-to-GSO links needs to be carefully studied to determine if such use will impact existing services both on a single entry and aggregate basis. A rulemaking must be initiated to consider use of the Ka-band for satellite-to-satellite links to address the technical and regulatory questions regarding such use. Any such rulemaking should also consider similar operations in other spectrum bands where the service definition allows such operations. Until this has been undertaken, the Commission should deny ViaSat's application for inter-satellite links in the Ka-band FSS spectrum.

Respectfully submitted,

/s/ Giselle Creeser

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¹³ Even for a single NGSO system there is the potential for more than one satellite in the constellation to cause interference to one GSO satellite.

¹⁴ Inmarsat Petition at 4.

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July 14, 2017

DECLARATION OF GISELLE CREESER

I, Giselle Creeser, hereby make the following declarations under penalty of perjury.

1. I am the Director, Regulatory of Inmarsat Inc.
2. I have reviewed the Petition to Deny filed on June 26, 2017 and the foregoing Reply to Opposition and certify that, to the best of my knowledge and belief, any factual assertions in these pleadings are truthful and accurate.

/s/ Giselle Creeser
Giselle Creeser

Executed on July 14, 2017

CERTIFICATE OF SERVICE

I hereby certify that on July 14, 2017, I caused a true and correct copy of the foregoing Petition to Deny to be served by first class mail on the following:

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