Narrative
Request for Special Temporary Authority
Call Sign E180006

Viasat, Inc. ("Viasat") hereby requests special temporary authority ("STA") for sixty (60) days to permit the blanket operation of GM40 terminals (collectively, the "Terminals") with the ViaSat-3F3 satellite at 158.55° E.L. Operations pursuant to this STA would be limited to: (i) communications with U.S.-flagged aircraft operating outside of U.S. airspace within the coverage area of ViaSat-3F3 and (ii) the 17.7-18.8 GHz (space-to-Earth), 19.7-20.2 GHz, (space-to-Earth), 28.35-28.6 GHz (Earth-to-space), and 29.5-30 GHz (Earth-to-Space) band segments.

Viasat has concurrently filed an application for modification of its existing earth station license to add ViaSat-3F3 as an authorized point of communication for the Terminals limited to communications with U.S.-flagged aircraft outside of U.S. airspace (the "Application").[1] Operations under the STA would be under the same technical and operational parameters specified in the Application (except that they would be limited to the band segments identified above). Grant of the requested STA would serve the public interest for the same reasons specified in the Application, including by facilitating Viasat's ability to operate its broadband satellite network and provide enhanced services to customers onboard U.S. aircraft.

All operations with ViaSat-3F3 would be consistent with the Commission's regulatory framework for the Ka band and rules applicable to aeronautical earth stations in motion ("ESIMs"). As described in the Application, all communications with ViaSat-3F3 would comport with the technical and operational parameters specified in the Application and would otherwise be consistent with the operational and technical parameters currently authorized for use of the Terminals with other satellites.

Viasat would operate pursuant to the STA on a non-protected, non-harmful interference basis. In the unlikely event of harmful interference caused by Viasat's operations under the STA, Viasat would take steps to eliminate such interference, including termination of transmissions if needed. The U.S. point of contact available 24 hours a day, seven days a week, with authority and ability to cease emissions is:

349 Inverness Drive South
Englewood, CO 80112
Tel: 720-493-7300

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[1] *See* Viasat, Inc., Call Sign E180006, ICFS File No. SES-MOD-20260828-02442 (the "Application"). The supporting materials for the Application are attached hereto for reference.

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

In the Matter of	)	
	)	
Viasat, Inc.	)	
	)	
Application for Modification of Earth Station License to Add Satellite Point of Communication	)	Call Sign E180006

MODIFICATION OF EARTH STATION LICENSE

By this application, Viasat, Inc. ("Viasat") requests that the Commission modify Viasat's existing blanket aeronautical earth station license to permit currently licensed GM40 terminals located on U.S.-flagged aircraft operating outside U.S. airspace (collectively, the "Terminals") to communicate with an additional satellite point of communication. More specifically, Viasat seeks authority to allow the Terminals to conduct fixed-satellite service ("FSS") operations with the ViaSat-3F3 satellite located at 158.55° E.L. in the 17.7 – 20.2 GHz and 27.5 – 30 GHz bands.[1]

To be clear, Viasat is **not** seeking U.S. market access for the ViaSat-3F3 satellite at this time. Nevertheless, Viasat is providing the information typically required in connection with requests for U.S. market access to facilitate expeditious grant of this application. Viasat does not seek authority to modify any other aspect of the Terminals' operations—*i.e.,* except as described in this application, all other information on file in connection with the above-referenced license and operation of the Terminals remains unchanged.

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[1] 47 C.F.R. § 25.228(g)(2) (requiring ESAA terminals on U.S.-registered civil aircraft operating outside of U.S. airspace to be licensed by the Commission). This application seeks to expand the frequency range in which the Terminals are currently authorized to operate. Viasat has previously provided technical analysis covering this full range.

More specifically, this application includes a completed FCC Form 312 (including various schedules), this narrative, and Exhibits A and B thereto (which provide technical and ownership information not otherwise captured by FCC Form 312).[2]

I. GRANT WOULD SERVE THE PUBLIC INTEREST

Grant of this application would serve the public interest by allowing Viasat to more effectively meet growing demand for high-speed, high-capacity broadband access aboard aircraft. Among other things, enabling Viasat to communicate with the ViaSat-3F3 satellite would allow Viasat to increase the overall capacity of its satellite broadband network, thereby supporting the increasing demand for faster broadband speeds, and providing the ability to support service to additional aircraft.

Viasat is a U.S. operator headquartered in Carlsbad, California. Viasat has previously demonstrated its qualifications as a Commission licensee of spacecraft and earth station networks, and its commitment to developing technologies that make the most efficient use of spectrum and responding to customers' needs for greater broadband bandwidth and capacity. Viasat is a leading provider of satellite-based broadband services to consumer, enterprise, and government users, and provides these services with a global satellite network consisting both of satellites owned and operated by Viasat and satellite capacity from third-party operators. Viasat has a long history and extensive expertise in providing and developing satellite communications technologies for both military and commercial uses, as well as innovating by improving the performance and bandwidth efficiency of satellite networks.

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[2] Viasat is providing, in Exhibit B to this narrative, information with respect to Viasat's ownership, officers, and directors even though Viasat is **not** seeking a U.S. space station license or authorization to serve the U.S. market with a non-U.S.-licensed space station.

Additionally, as explained in Exhibit A, operations of the Terminals with the ViaSat-3F3 satellite would be compatible with all relevant co-frequency operations—including adjacent geostationary orbit ("GSO") networks. All Viasat operations using capacity on the satellite would be on a non-common carrier basis.[3]

II. *DISCO II* SHOWING

Viasat seeks to operate with the ViaSat-3F3 satellite for the limited purpose of serving U.S.-flagged aircraft operating outside the United States. As noted above, at this time Viasat is not seeking U.S. market access for this satellite pursuant to Section 25.137 of the Commission's rules. Nevertheless, in order to facilitate the expeditious grant of this application, Viasat is providing detailed information sufficient to satisfy the elements of the Commission's *DISCO II* framework for granting market access to non-U.S.-licensed space stations. Satisfaction of these elements is more than sufficient to justify grant of the limited operations of the Terminals with the ViaSat-3F3 satellite covered by this application.

The ViaSat-3F3 satellite would operate at the 158.55º E.L. orbital location under the authority of the United Kingdom.[4] As such, operations with ViaSat-3F3 would be covered by the Commission's *DISCO II* framework if Viasat were to seek U.S. market access for the satellite.[5] The *DISCO II* analysis includes consideration of a number of factors, such as the effect on competition in the United States, spectrum availability, eligibility requirements,

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[3] *See Amendment to the Commission's Regulatory Policies Governing Domestic Fixed Satellites and Separate International Satellite Systems*, 11 FCC Rcd 2429, at ¶¶ 46-50 (1996).

[4] Specifically, the ViaSat-3F3 satellite would operate under the UK-KA-159E filing with the International Telecommunication Union.

[5] *See Amendment of the Commission's Regulatory Policies to Allow Non- U.S. Licensed Satellites Providing Domestic and International Service in the United States*, 12 FCC Rcd 24094, at ¶¶ 30-49 (1997) ("*DISCO II*").

technical requirements, national security, law enforcement, foreign policy, and trade concerns.[6] Each of these elements would weigh in favor of granting U.S. market access for the ViaSat-3F3 satellite, and therefore also justifies grant of more limited authority to facilitate communications with the Terminals on U.S.-flagged aircraft operating outside the United States.

A. Effect on Competition in the United States

In *DISCO II*, the Commission established a rebuttable presumption that it will further competition in the United States to allow non-U.S. satellites authorized by WTO Members to provide services covered by the U.S. commitments under the WTO Basic Telecommunications Agreement.[7] The United Kingdom is a member of the WTO. Furthermore, Viasat seeks to use the requested spectrum to provide satellite services that are covered by the WTO Basic Telecommunications Agreement.[8] Accordingly, the presumption in favor of entry would apply if Viasat were to seek U.S. market access for the ViaSat-3F3 satellite.

Grant of this application would similarly enhance competition for satellite service by permitting Viasat to expand the available capacity of its satellite broadband network when serving U.S.-flagged aircraft outside the United States. Grant of this application would therefore improve service quality, increase broadband service options, and foster technological innovation—all public interest factors that the Commission consistently has long relied upon in granting more expansive requests for authority.[9]

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6 *See*, *e.g.*, *Telesat Canada, Petition for Declaratory Ruling for Inclusion of Anik F2 on the Permitted Space Station List, Petition for Declaratory Ruling to Serve the U.S. Market Using Ka-band Capacity on Anik F2*, 17 FCC Rcd 25287, at ¶ 6 (2002).

7 *DISCO II* at ¶ 39; *see also* 47 C.F.R. § 25.137(a)(2).

8 Viasat does not seek to provide direct-to-home ("DTH"), direct broadcast satellite ("DBS"), or digital audio radio service ("DARS").

9 *See*, *e.g.*, *Digital Broadband Applications Corp.*, 18 FCC Rcd 9455 (2003); *Pegasus Development Corp.*, 19 FCC Rcd 6080 (2004); *DIRECTV Enterprises, LLC, Request for*

B. Spectrum Availability

Grant of this application is fully consistent with Commission spectrum policies. Viasat would communicate with the ViaSat-3F3 satellite using spectrum in the 17.7-20.2 GHz (space-to-Earth) and 27.5-30.0 GHz (Earth-to-space) band segments.[10] Exhibit A demonstrates that the use of these frequencies when operating the Terminals with the ViaSat-3F3 satellite would be compatible with adjacent systems in the relevant band segments.

C. National Security, Law Enforcement, and Public Safety Matters

Grant of this application is consistent with U.S. national security, law enforcement, and public safety considerations. The satellite's authorization from the United Kingdom is held by Viasat Satellite Holdings Ltd., a direct, wholly owned subsidiary of Viasat. Viasat has a long history of providing satellite communication service to U.S. government and military users.

III. LEGAL AND TECHNICAL INFORMATION

A. Legal Qualifications

Viasat's legal qualifications are set forth in this narrative and in the attached Form 312. Specifically, this narrative and attached Form 312 demonstrate Viasat's satisfaction of the applicable requirements for earth station applicants seeking to communicate with non-U.S.-licensed satellites, including Section 25.114 of the Commission's rules.[11] As noted above, Viasat holds numerous Commission licenses, and its legal qualifications are a matter of record before the Commission.

Special Temporary Authority for the DIRECTV 5 Satellite, 19 FCC Rcd 15529 (2004).

[10] As discussed in Exhibit A, gateway and TT&C operations would rely on facilities located outside the United States. As no U.S. authority is needed in connection with these gateway operations, additional detail is not being provided in this application.

[11] *See* 47 C.F.R. § 25.114.

B. Technical Qualifications

Exhibit A to this application includes technical information with respect to the operation of Terminals with the ViaSat-3F3 satellite. Except as specified in Exhibit A for communications with the ViaSat-3F3 satellite, all operations of the Terminals will be consistent with prior authorizations for operation of the Terminals with other satellites. The Commission has repeatedly authorized Viasat to operate licensed facilities, and its technical qualification are otherwise a matter of public record.

C. Orbital Debris Mitigation

Exhibit A to this application includes an orbital debris mitigation showing of the type required by Sections 25.114(d)(14) and 25.137 of the Commission's rules.[12]

IV. ADDITIONAL INFORMATION

A. Milestone, Bond, and Reporting

Because Viasat is not seeking U.S. market access for the ViaSat-3F3 satellite, the requirements of Section 25.137(d) of the Commission's rules regarding milestones, reporting requirements, and surety bond requirements do not apply to this application.[13] Moreover, even in the case of a request for U.S. market access the bond and milestone requirements would not apply because the ViaSat-3F3 satellite is already in orbit and operating.[14]

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[12] *See id.* §§ 25.114(d)(14), 25.137(b).

[13] For the avoidance of doubt, Viasat intends to comply with all applicable service rules for operation of earth stations in the FSS in portions of the Ka band when communicating with the ViaSat-3F3 satellite. 47 C.F.R. § 25.137(d)(3).

[14] To the extent necessary, Viasat seeks a waiver of these requirements. The fundamental purpose of the bond and milestone requirements are to incentivize rapid deployment and deter warehousing of orbital locations, but these issues are simply not implicated by this application.

B. Ownership Information

Information on the ownership of Viasat is available in the attached Exhibit B.

V. REQUEST FOR WAIVERS

Viasat requests the following limited waivers of the Commission's rules. The Commission may grant a waiver if its rules for good cause shown.[15] Waiver is appropriate if (i) special circumstances warrant a deviation from the general rule, and (ii) such deviation would better serve the public interest than would strict adherence to the general rule.[16] Generally, the Commission may grant a waiver of its rules in a particular case only if the relief requested would not undermine the policy objective of the rule in question, and would otherwise serve the public interest. The following waiver requests satisfy these criteria.[17]

A. Operations in the 17.3-17.8 GHz Band Segment

Viasat requests waivers of the U.S. Table of Frequency Allocations and the Commission's Ka-band band plan[18] to facilitate operations with ViaSat-3F3 in the 17.7-17.8 GHz band segment. Viasat's operations in the 17.7-17.8 GHz band segment would be on a non-conforming, unprotected basis. Moreover: (i) no BSS satellites have been authorized to operate within four degrees in this band segment, and no applications for such authorization are pending

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15 *See* 47 C.F.R. § 1.3.

16 *See WAIT Radio v. FCC*, 418 F.2d 1153 (D.C. Cir. 1969); *Northeast Cellular Tel. Co. v. FCC*, 897 F.2d 1166 (D.C. Cir. 1990).

17 Additionally, the Commission previously authorized operations of the Terminals with other satellites and granted certain waiver requests subject to Viasat complying with certain licensing conditions. *See Viasat, Inc., Call Sign E180006, ICFS File No. SES-MOD-20191216-01737 (granted Dec. 13, 2019).* To the extent necessary, Viasat requests extension of these waivers to operation of the Terminals with ViaSat-3F3 and confirms that all operations of the Terminals with ViaSat-3F3 will be consistent with the conditions of the existing license for the Terminals.

18 47 C.F.R. §§ 2.106 and 25.202.

before the Commission; and (ii) no DBS feeder-link satellites have been authorized to operate within six degrees in this band segment, and no applications for such authorization are pending before the Commission. Accordingly, there is good cause for the requested waivers.

Viasat also requests a waiver of Section 25.264 of the Commission's rules.[19] Section 25.264 is intended to facilitate reverse-band operations in the 17.3-17.8 GHz band segment by mitigating interference into DBS receivers, including by requiring that applicants proposing to use the 17.3-17.8 GHz band segment to submit power flux density calculations at the locations of U.S. DBS space stations. As noted above, no DBS feeder-link satellites have been authorized to operate within six degrees in this band segment, and no applications for such authorization are pending before the Commission. As no DBS operations could be materially impacted by the proposed operations, there is good cause for the requested waivers.

B. Operations in the 19.4-19.6 GHz and 29.1-29.25 GHz Band Segments

Viasat requests waivers of the U.S. Table of Frequency Allocations and the Commission's Ka-band band plan[20] to facilitate operations with ViaSat-3F3 in the 19.4-19.6 GHz and 29.1-29.25 GHz band segments. Under the U.S. Table, use of these band segments is limited to NGSO MSS feeder links[21] and the Ka-band band plan does not make these band segments available for ESIM operations.[22] Viasat's operations in these band segments would be on a non-conforming, unprotected basis. Moreover, as discussed in Exhibit A, the proposed ESIM operations would be geographically separated from Iridium's NGSO MSS feeder-link

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19 47 CFR § 25.264.

20 47 C.F.R. §§ 2.106 and 25.202.

21 *See* 47 C.F.R. § 2.106 n.NG166.

22 *See* 47 C.F.R. § 25.202(a)(10)(ii).

operations, mitigating the potential for any interference into those operations. Accordingly, there is good cause for the requested waivers.

C. Schedule S

To the extent necessary, Viasat requests a limited waiver to allow submission of a completed Schedule S to FCC Form 312 in non-standard fashion given limitations of the Commission's ICFS interface. Specifically, due to unknown technical issues with ICFS, Viasat has been unable to generate a "standard" instance of Schedule S describing the ViaSat-3F3 payload and associate it with this application. Based on previous guidance from the ICFS helpdesk about this issue, Viasat has included a PDF version of the Schedule S information and the GIMS container file as attachments to the application. Grant of this limited waiver to facilitate submission in this fashion would serve the public interest by enabling the Commission to begin processing the application despite the limitations of ICFS, while still providing the Commission with access to all of the information that would have been provided through a "standard" Schedule S submitted through ICFS (consistent with the underlying purpose of Schedule S).

VI. WAIVER PURSUANT TO SECTION 304 OF THE COMMUNICATIONS ACT

In accordance with Section 304 of the Communications Act of 1934, as amended, Viasat hereby waives any claim to the use of any particular frequency or of the electromagnetic spectrum as against the regulatory power of the United States because of the previous use of the same, whether by license or otherwise.

VII. CONCLUSION

For the foregoing reasons, granting Viasat's application to communicate with the ViaSat-3F3 satellite using the Terminals in portions of the Ka band under the authority of the United Kingdom will serve the public interest, convenience, and necessity. Viasat respectfully requests

that the Commission promptly grant this application.

Respectfully submitted,

/s/

Jarrett S. Taubman
VP & Deputy Chief Government Affairs and
Regulatory Officer
Viasat, Inc.
901 K Street NW, Suite 400
Washington, DC 20001

Exhibit A

Supplemental Technical Information

EXHIBIT A

Supplemental Technical Information

A.1 Scope and Purpose

Viasat, Inc. (Viasat) seeks authority to use the ViaSat-3F3 satellite to communicate with U.S.-licensed terminals on aircraft located outside of U.S. territory. These operations will occur in the 17.7 –20.2 GHz band in the space-to-Earth direction and the 27.5-30.0 GHz band in the Earth-to-space direction.[1] The satellite will operate under the authority of the United Kingdom using the UK-KA-159E ITU filing. This Exhibit A, in conjunction with the companion Schedule S, provides the technical characteristics required by §25.114.

A.2 General Description

The ViaSat-3F3 satellite will operate at the 158.55° E.L. orbital location. At this time, Viasat seeks Commission authority to communicate with U.S.-licensed terminals on aircraft located outside of U.S. territory. These operations will occur in the 27.5 –30.0 GHz band (Earth-to-space) and the 17.7–20.2 GHz band (space-to-Earth). All analyses in this Attachment apply to that service area and those bands. For the avoidance of doubt, there will not be any ViaSat-3F3 gateways located in the U.S., and no authority for the operation of gateway links is requested in this application.[2]

The satellite's antenna beam coverage, both transmit and receive, consists of multiple spot beams that collectively can provide service to all parts of the Earth visible from the 158.55° E.L. orbital location. The satellite network uses asymmetric forward and return links. It also uses adaptive coding and modulation to combat rain fades—*i.e.,* the modulation type, amount of

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1 The satellite will be capable of operating in the 27.5 – 31 GHz (Earth-to-space) and the 17.7 – 21.2 GHz (space-to-Earth) bands (the "Ka-bands").

2 For informational purposes, the non-U.S. gateway links operate in the Ka-band under the authority of the United Kingdom and the countries in which the gateway terminals are situated.

coding and/or user data rate will be dynamically varied to meet the link requirements during rain events (in addition to employing uplink power control).

A.3 Frequency and Polarization Plan

The frequency plan for the ViaSat-3F3 satellite is provided in Table A.3-1, indicating channel center frequency, polarization, and bandwidth. The table also shows the connectivity between each uplink and downlink band segment. Circular polarization (including right-hand circular (RHC) and left-hand circular (LHC) polarization) is used on both the uplinks and downlinks with the downlink polarization being orthogonal to the uplink polarization. The satellite employs state-of-the-art full frequency reuse such that each channel is reused multiple times through a combination of polarization and spatial isolation. This satisfies the requirements of §25.210(f).

Table A.3-1. Frequency Plan

Uplink Center Frequency (MHz)	Uplink Polarization	Downlink Center Frequency (MHz)	Downlink Polarization	Bandwidth (MHz)
28750	LHC	18950	RHC	2500
28750	RHC	18950	LHC	2500

Viasat is not seeking Commission authorization to communicate in the 20.2 – 21.2 GHz or 30.0 – 31.0 GHz band segments at this time.

The ViaSat-3F3 network will operate in a manner that adequately protects the following services in the specified band segments while communicating with U.S.-licensed earth stations:

- GSO FSS (Section A.8)
- UMFUS in the 27.5 – 28.35 GHz band segment (Section A.9)
- FS in the 17.7 – 18.3 GHz band segment (Section A.10)
- 17/24 GHz BSS (s-E) and DBS Feeder Links (E-s) in the 17.7 – 17.8 GHz band segment (Section A.11)
- NGSO FSS in the 28.6 – 29.1 GHz and 18.8 – 19.3 GHz band segments (Section A.12)
- NGSO MSS Feeder Links in the 29.1 – 29.5 GHz and 19.3 – 19.7 GHz bands (Section A.13)

A.4 Satellite Antenna Beams and Antenna Gain Contours

The satellite's payload employs multiple spot beams in both the uplink and downlink

directions. There are two types of spot beams: small beams ("A"-type beams) and larger beams ("B"-type beams). For each beam-type, the beams are nominally identical.

In accordance with §25.114(c)(4)(vii), Viasat is providing the predicted antenna gain contours for representative transmit and receive beams of each type, and maps of the isolines formed by combining all the spot beams into composite beams. In both the uplink and downlink directions, the isoline contours depict, on a composite basis across the entire coverage area, the -2 dB relative gain of all spot beams that may be operated within that area. The contour at 4 dB below peak falls entirely beyond the edge of the visible Earth.

The representative transmit and receive antenna beam contours are plotted on an area map at 2 dB intervals down to 10 dB below the peak gain and at 5 dB intervals between 10 dB and 20 dB below the peak gain. The composite and representative beam contours are provided in a GIMS-readable format, as listed in Table A.4-1.

Table A.4-1. Beam Contours

Beam Contour	Beams	Link	Beam Type	Polarization	Contour Type
RXAR	RXAR	Up	A	RHC	Composite
RXAL	RXAL	Up	A	LHC	Composite
TXAR	TXAR	Down	A	RHC	Composite
TXAL	TXAL	Down	A	LHC	Composite
RXBR	RXBR	Up	B	RHC	Composite
RXBL	RXBL	Up	B	LHC	Composite
TXBR	TXBR	Down	B	RHC	Composite
TXBL	TXBL	Down	B	LHC	Composite
RXAR_REP	RXAR	Up	A	RHC	Representative
RXAL_REP	RXAL	Up	A	LHC	Representative
TXAR_REP	TXAR	Down	A	RHC	Representative
TXAL_REP	TXAL	Down	A	LHC	Representative
RXBR_REP	RXBR	Up	B	RHC	Representative
RXBL_REP	RXBL	Up	B	LHC	Representative
TXBR_REP	TXBR	Down	B	RHC	Representative
TXBL_REP	TXBL	Down	B	LHC	Representative

A.5 TT&C Information

TT&C operations will be conducted from outside the US in the conventional Ku-band and are not the subject of this application. For informational purposes, the TT&C center frequencies

available to be used by ViaSat-3F3 are provided in Table A.5-1.

Table A.5-1. TT&C Frequency and Polarization

Usage	Frequency (MHz)	Polarization[3]
Command	14004.5	H or V
	14496.0	H or V
Telemetry	11197.00	H or V
	11198.50	H or V
	11451.00	H or V
	11453.00	H or V

A.6 Cessation of Emissions

All ViaSat-3F3 downlink transmissions can be turned on and off by ground telecommand, thereby causing cessation of emissions from the satellite, as required by §25.207.

A.7 Power Flux Density at the Earth's Surface

Viasat certifies that the proposed space station will not generate power flux-density (PFD) at the Earth's surface in excess of -118 dBW/m^2/MHz at any point in US territory in the 17.7 – 20.2 GHz band segment, and that associated uplink operation of earth stations within the US will not exceed applicable EIRP density envelopes in §25.218(i) unless the non-routine uplink and/or downlink operation is coordinated with operators of authorized co-frequency space stations at assigned locations within six degrees of the orbital location. This satisfies the requirements of §25.140(a)(3)(iii).

Because PFD is dependent on the slant path and hence spreading loss, the maximum EIRP density from the satellite can vary accordingly. For example, for a spreading loss of 162.8 dB (25° elevation angle), the satellite's transmissions would not exceed an EIRP density of 44.8 dBW/MHz.

The -118 dBW/m^2/MHz maximum PFD is compliant with the §25.208(c) limits that apply in the 17.7 – 19.7 GHz band segment and the §25.208(d) limit that applies in the 18.6 – 18.8 GHz

[3] Horizontal (H) polarization or vertical (V) polarization.

band segment.

A.8 Sharing with GSO FSS

No FSS space stations operate on a co-frequency basis within two degrees of the 158.55° E.L. orbital location. It is unlikely that any such operations will commence in the future given Viasat's ITU priority at that location, unless Viasat agrees to accommodate such operations through coordination.

Viasat acknowledges that the FCC has authorized Astranis Projects USA LLC (Astranis) to operate a GSO FSS satellite in the Ka-band at the 157° E.L. orbital location.[4] That grant conditions Astranis's operating authority on compliance with relevant provisions of the ITU Radio Regulations. Viasat notes that the parties are actively engaged in coordination discussions and Viasat has every expectation that these discussions will result in a coordinated arrangement that facilitates the operations of both networks.

There are no other co-frequency FSS satellites authorized by the FCC at two-degree spacing from 158.55° E.L. Consistent with §25.140(a)(3)(vi), Viasat provides an interference analysis demonstrating compatibility with a hypothetical co-frequency space station two degrees away with the same receiving and transmitting characteristics as ViaSat-3F3.

Table A.8-1 provides a summary of the typical transmission parameters used by the ViaSat-3F3 satellite network. These parameters were derived from the link budgets that are provided in Annex 1 and were used in the interference analysis. The interference calculations assume a 1 dB advantage for topocentric-to-geocentric conversion and that all wanted and interfering carriers are co-polarized. Table A.8-2 shows the results in terms of the overall C/I margin, which is positive for all cases.

[4] *See* ICFS File No. SAT-LOA-20260220-00092 (granted Aug. 21, 2026).

Table A.8-1. Typical ViaSat-3F3 Network Parameters

Carrier ID	Emission Designator	Bandwidth (MHz)	Tx E/S Gain (dBi)	Uplink EIRP (dBW)	Downlink EIRP (dBW)	Rx E/S Gain (dBi)	C/I Criterion (dB)
1	600MG7D	600	65.0	75.0	70.8	49.3	19.7
2	500MG7D	500	65.0	75.0	70.0	49.3	20.5
3	500MG7D	500	65.0	75.0	70.0	40.7	13.8
4	500MG7D	500	65.0	75.0	70.0	33.7	9.3
5	400MG7D	400	65.0	75.0	69.0	40.7	14.7
6	300MG7D	300	65.0	75.0	67.8	40.7	9.6
7	200MG7D	200	44.3	58.3	63.0	61.4	14.0
8	100MG7D	100	44.3	57.7	60.0	61.4	13.3
9	50M0G7D	50	44.3	57.1	57.0	61.4	11.3
10	12M5G7D	12.5	44.3	55.4	51.0	61.4	11.9
11	6M25G7D	6.25	37.3	39.1	48.0	61.4	9.3

Table A.8-2. Summary of the Overall C/I Margin (dB)

	Interfering Carriers										
Carrier ID	1	2	3	4	5	6	7	8	9	10	11
1	9.0	9.0	9.0	9.0	9.0	8.9	10.7	9.9	8.7	5.8	5.6
2	8.3	8.3	8.3	8.3	8.2	8.2	10.1	9.4	8.3	5.6	5.4
3	6.5	6.5	6.5	6.5	6.4	6.4	9.3	9.1	8.9	8.1	8.0
4	4.0	4.0	4.0	4.0	4.0	3.9	6.9	6.9	6.8	6.6	6.6
5	5.5	5.5	5.5	5.5	5.5	5.5	8.3	8.2	8.0	7.3	7.3
6	10.6	10.6	10.6	10.6	10.6	10.6	13.5	13.4	13.3	12.7	12.7
7	17.5	16.9	16.9	16.9	16.1	15.0	9.8	7.3	5.0	0.6	0.3
8	19.9	19.4	19.4	19.4	18.7	17.7	12.8	10.4	8.1	3.8	3.4
9	23.3	22.9	22.9	22.9	22.3	21.5	17.1	14.7	12.4	8.1	7.8
10	24.6	24.3	24.3	24.3	24.0	23.5	20.5	18.3	16.1	11.9	11.5
11	16.5	16.0	16.0	16.0	15.4	14.6	10.2	7.8	5.5	1.2	0.8

ViaSat- 3F3 will operate in compliance with the limits on downlink EIRP density and PFD specified in §25.140(a)(3) and communicate only with U.S.-licensed terminals on aircraft located outside of U.S. territory operating in conformance with routine uplink parameters specified in §25.212(e) or §25.218.

A.9 Sharing with UMFUS in the 27.5 – 28.35 GHz Band Segment

As noted above, at this time Viasat seeks authority to use the ViaSat-3F3 satellite to communicate with U.S.-licensed terminals on aircraft located outside of U.S. territory. These

terminals will be geographically separated from any UMFUS operations in the 27.5-28.35 GHz band segment and would not pose any risks of interference to those operations.

A.10 Sharing with Fixed Service (FS) in the 17.7 – 18.3 GHz Band Segment

As noted above, at this time Viasat seeks authority to use the ViaSat-3F3 satellite to communicate with U.S.-licensed terminals on aircraft located outside of U.S. territory. These terminals will be geographically separated from any FS operations in the US in the 17.7-18.3 GHz band segment and would not pose any risks of interference to those operations. Further, as discussed in Section A.7, ViaSat-3F3 is compliant with the §25.208(c) limits that apply in the 17.7 – 19.7 GHz band segment and the §25.208(d) limit that applies in the 18.6 – 18.8 GHz band segment. That said, Viasat only seeks authority to operate in this band segment on a non-interference, unprotected basis with respect to the FS in the US.

A.11 Sharing with 17/24 GHz BSS (space-to-Earth) and DBS Feeder Links (Earth-to-space) in the 17.7 – 17.8 GHz Band Segment

Viasat's operations in the 17.7 – 17.8 GHz band segment using U.S.-licensed terminals on aircraft located outside of U.S. territory would be on a non-conforming, unprotected basis. As discussed in the legal narrative, Viasat requests waivers of the U.S. Table and the Commission's Ka-band band plan to facilitate these operations.

The are no 17/24 GHz BSS satellites authorized, or pending authorization, by the Commission to operate in the 17.7 – 17.8 GHz band segment within four-degrees of 158.55° E.L. International use of this frequency band for DBS feeder links is governed by Appendix 30A of the ITU Radio Regulations, and there are no US Appendix 30A Plan assignments or ITU filings within six degrees of 158.55º E.L.

Viasat accepts the risk of interference from a transmitting 17/24 GHz BSS satellite and a transmitting DBS feeder link Earth Station into a receiving ViaSat-3F3 terminal on aircraft located outside of U.S.

A.12 Sharing with NGSO FSS in the 28.6 – 29.1 GHz and 18.8 – 19.3 GHz Band Segments

As noted above, at this time Viasat seeks authority to use the ViaSat-3F3 satellite to communicate with U.S.-licensed terminals on aircraft located outside of U.S. territory. In such areas, Viasat has clear priority in the 18.8 – 19.3 GHz and 28.6 – 29.1 GHz band segments with respect to operations involving its non-U.S.-licensed terminals. As such, any NGSO FSS systems will need to operate on a secondary basis with respect to operations of the ViaSat-3F3 satellite and those terminals outside of the U.S. As a practical matter, those NGSO FSS systems will also need to operate on a secondary basis with respect to operations of Viasat's U.S.-licensed terminals, which will operate in a manner indistinguishable from its non-U.S.-licensed terminals.

That said, Viasat notes that it has successfully coordinated use of these band segments with OneWeb, SpaceX, and Space Norway, and is pursuing coordination with other NGSO systems. Viasat will also operate its earth stations in a manner that would minimize the potential for interference into NGSO FSS operations in the United States.

A.13 NGSO MSS Feeder Links in the 29.1 – 29.5 GHz and 19.3 – 19.7 GHz Band Segments

Viasat would not cause harmful interference to, or seek protection from, NGSO MSS feeder link systems operating in the 19.3 – 19.7 GHz and 29.1 – 29.5 GHz band segments. Iridium, O3b, and Kuiper are currently authorized to operate in the U.S. in all or a portion of these band segments (no other NGSO MSS system is so authorized). The following sections demonstrate that Viasat's proposed operations in the 19.3 – 19.7 GHz and 29.1 – 29.5 GHz band segments would not cause harmful interference to these systems. Similar mitigation techniques could be used to protect any additional NGSO MSS feeder link system authorized to operate in the U.S. Viasat may also complete coordination with additional NGSO MSS systems in lieu of providing a compatibility analysis.

A.13.1 Sharing Analysis of ViaSat-3F3 Network with the Iridium

NGSO System

Several analyses were performed using ITU and/or FCC filed characteristics for the Iridium HIBLEO-2FL2 system, and the ViaSat-3F3 satellite network and associated earth stations. These analyses were run for the Iridium gateway locations within the ViaSat-3F3 coverage area using the protection criteria specified by Iridium as part of coordination discussions. This analysis considers the two Iridium gateway locations within the U.S. portion of the ViaSat-3F3 coverage area: Wahiawa, HI and Fairbanks, AK.

Viasat has worked collaboratively with Iridium during coordination discussions to ensure that the methodology and the various satellite and earth station characteristics for the Iridium system and Viasat network were correctly entered into the Transfinite Visualyse Professional system analysis software and that the simulations were producing the expected results. Each simulation was performed for a 30-day period with a step interval of 1 second. The results showed that in all cases with the specified exclusion zone the Viasat operations could meet the protection criteria specified by Iridium.

The analysis considered seven cases:

- Case 1 considered a Viasat aero and maritime in-motion earth station RHCP uplink near the Wahiawa, HI Iridium gateway while maintaining a minimum 450 km exclusion zone.
- Case 2 considered the Viasat LHCP user downlink beams near the Wahiawa gateway while maintaining a minimum 450 km exclusion zone.
- Case 3 considered a Viasat fixed and in-motion earth station RHCP uplink near the Fairbanks, AK Iridium gateway while maintaining a minimum 400 km exclusion zone.
- Case 4 considered the Viasat LHCP user downlink beams near the Fairbanks, AK gateway while maintaining a minimum 100 km exclusion zone.

Case 1

Viasat in-motion earth station RHCP uplink with minimum 450 km exclusion zone around Wahiawa, HI. Includes 60 cm maritime ESIM and GM40 aeronautical ESIM evaluated at various

symbol rates and maximum EIRP density.

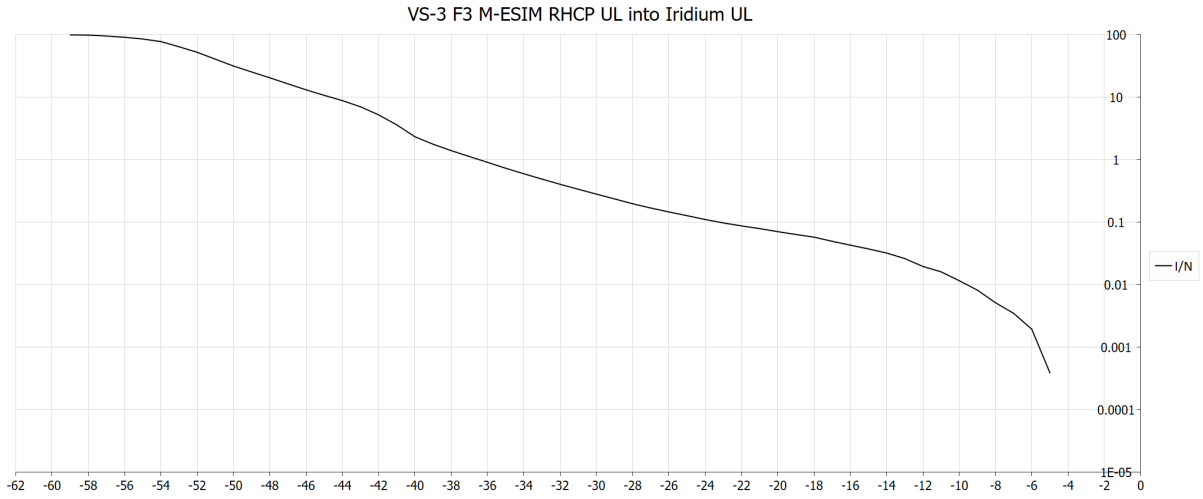

Figure A.13.1-1a, 60 cm M-ESIM with 80 MBd carrier at 58.1 dBW EIRP

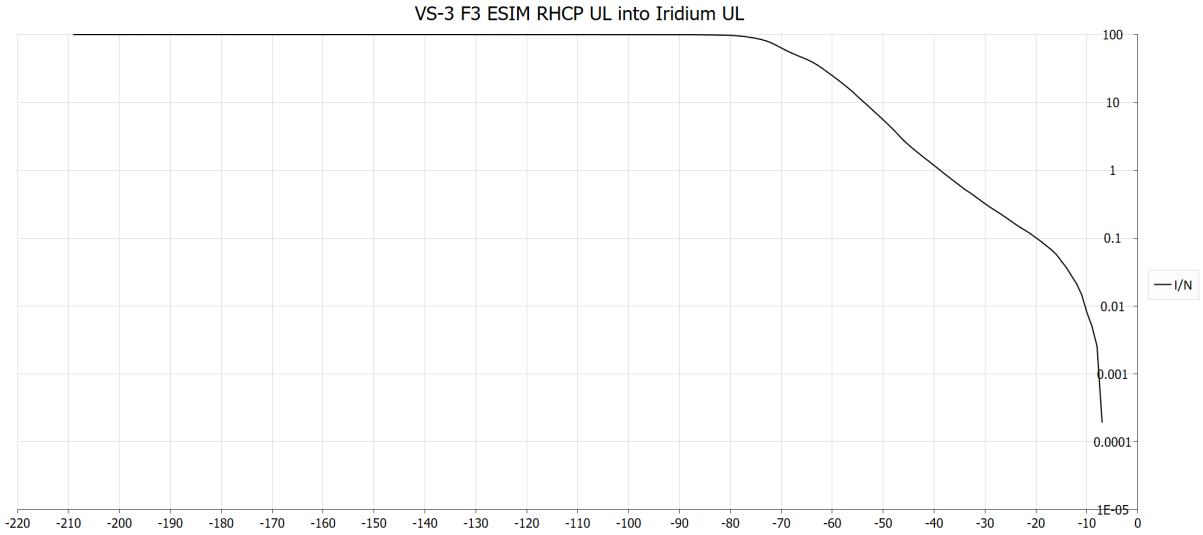

Figure A.13.1-1c, GM40 ESIM with 80 MBd carrier at 55.1 dBW EIRP

Case 2

ViaSat-3F3 at 158.55 E, LHCP 500 MHz User Beam Forward Link downlinks with minimum 400 km beam center separation distance from Wahiawa, HI.

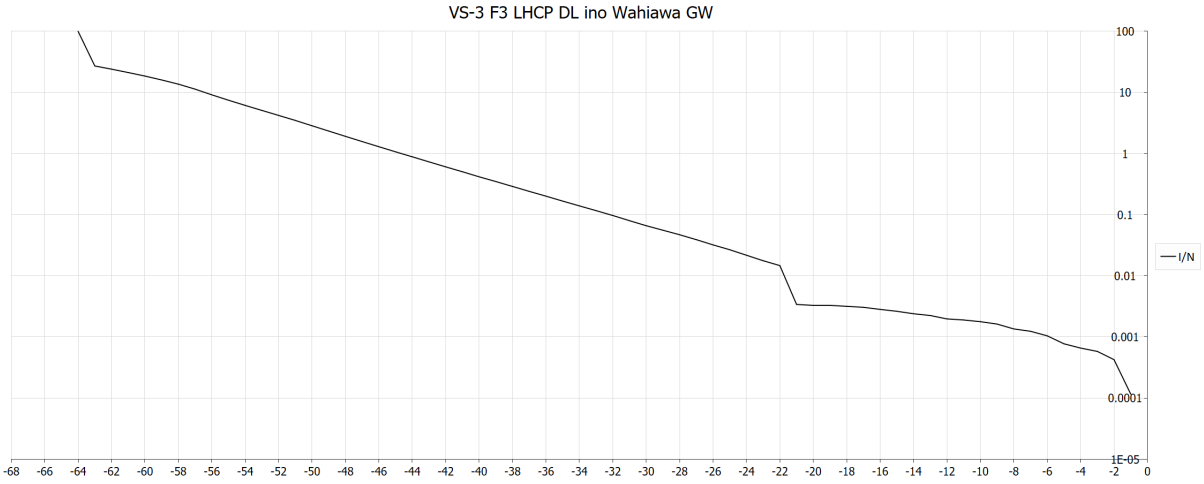

*Figure A.13.1-2, ViaSat-3F3 LHCP 464 MBd carrier downlink at -118 dB(W/(m^2*MHz)) pfd*

Case 3

Viasat in-motion user earth station RHCP uplink with minimum 400 km separation distance from Fairbanks, AK gateway.

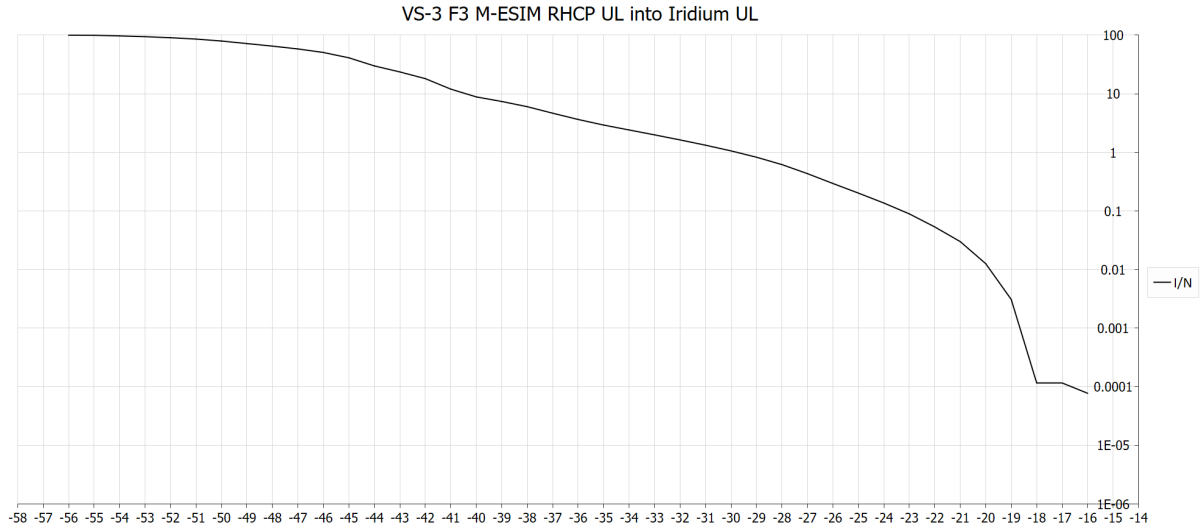

Figure A.13.1-3a, 60 cm M-ESIM with 80 MBd carrier at 58.1 dBW EIRP

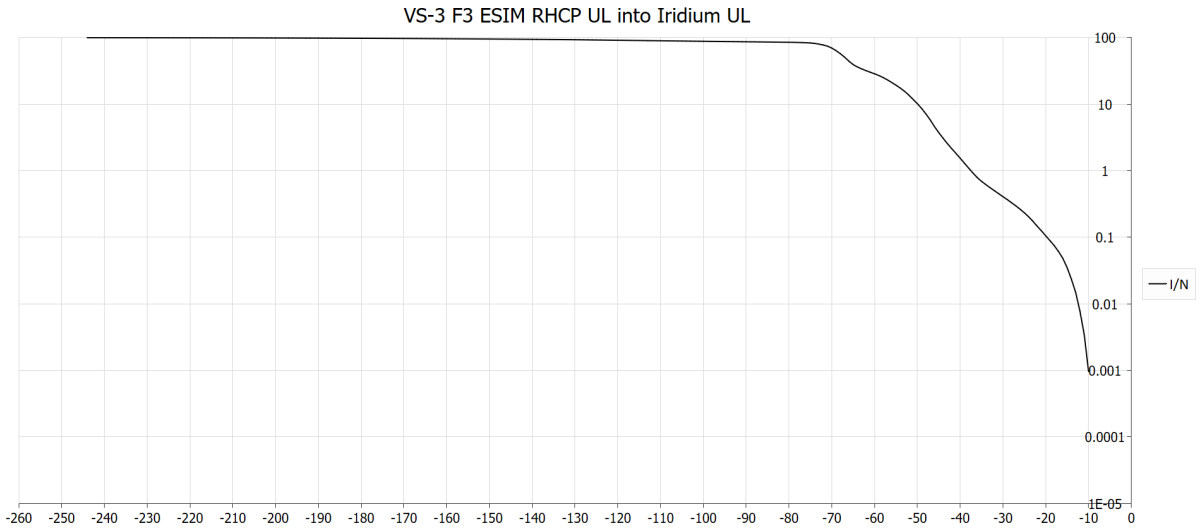

Figure A.13.1-3c, GM40 ESIM with 80 MBd carrier at 55.1 dBW EIRP

Case 4

ViaSat-3F3 at 158.55E LHCP 464 MBd carrier User Beam downlink at -118 dB(W/(m^2*MHz)) pfd with minimum 100 km beam center separation distance from Fairbanks, AK. Note, because the elevation angle to ViaSat-3F3 from the Iridium gateway is ~5° and the minimum operational elevation angle for the Iridium gateway earth station is 8°, in-line events cannot occur and the required separation distance from the *ViaSat-3F3* beam center, and the Iridium gateway is reduced over ***Case 1***.

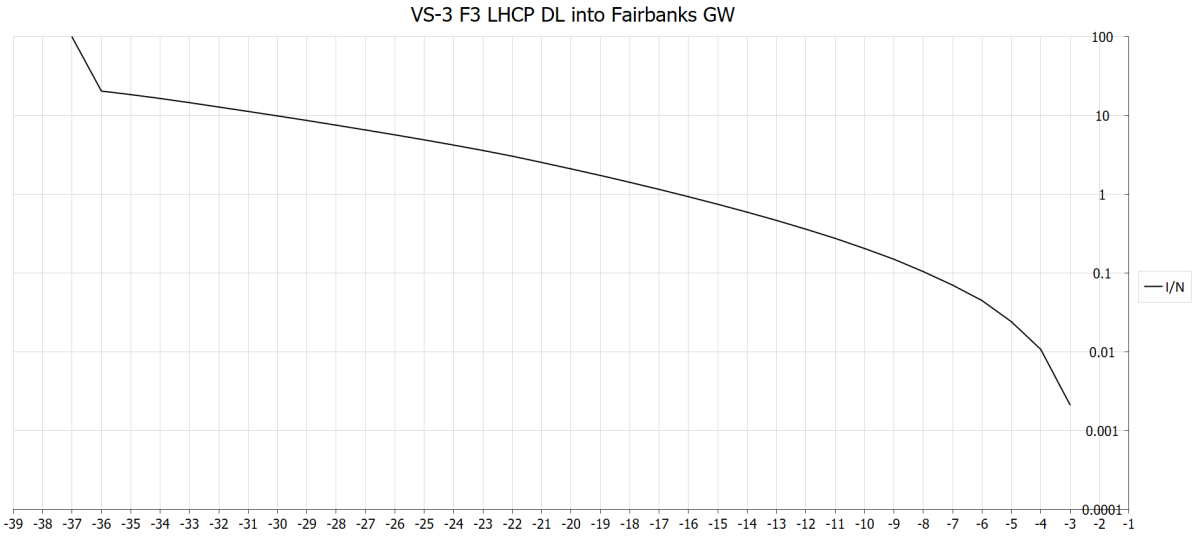

*Figure A.13.1-4, ViaSat-3F3 LHCP 464 MBd carrier downlink at -118 dB(W/(m^2*MHz)) pfd*

A.13.2 Sharing Analysis of ViaSat-3F3 Network with the O3b NGSO System

O3b has an authorization from the Commission for operation of MSS-FL gateways in Haleiwa with the O3b NGSO system in portions of the Ka band. O3b currently operates its NGSO satellites in a non-inclined MEO orbit at an altitude of 8062 km under ITU filings O3B-A and O3B-B. Additionally, O3b has received a grant for an additional 16 MEO satellites to be operated in a 70° inclined orbit with an altitude of 8062 km but which are not yet in service. The inclined orbits are addressed in the O3B-C ITU filing. The only O3b gateway earth station within the ViaSat-3F3 footprint that is within U.S. territory is located at Haleiwa, HI. While this gateway is located approximately 17 km from the Iridium Wahiawa, HI gateway and would similarly be protected by the 450 km exclusion zone that protects the Iridium gateway, the analysis below that Viasat has performed of the separation angles for the O3b gateway antenna between the ViaSat-3F3 satellite and the O3b non-inclined orbit satellites and resulting power levels does not reflect use of any exclusion area for the O3b system. The minimum separation angle was found to be 44.1° which in addition to the exclusion zone above provides ample protection for the O3b system.

Table A.13.2-1 shows the pertinent transmission parameters of the ViaSat-3F3 network and the O3b system.

Table A.13.2-1. Summary of ViaSat-3F3 and O3b parameters

Parameters	ViaSat-3F3	O3b System
Uplink Input Power Density	-56.5 dBW/Hz	-53.4 dBW/Hz
Satellite Rx Antenna Gain	60 dBi	34.5 dBi
Satellite Rx System Noise Temp	650 K	1000 K
Satellite Tx EIRP Density	-15.6 dBW/Hz	-28.32 dBW/Hz
Earth Station Rx System Noise Temperature	224 K	225 K

Table A.13.2-2 shows the interference calculations for the assumed worst-case situation described above. The results show that the O3b system is adequately protected. The calculated ΔT/T values in all cases are small, indicating the technical compatibility of the ViaSat-3F3 satellite network with the O3b network and with an O3b gateway earth station located at Wahiawa, AK. Viasat makes the following additional observations:

- To be conservative, the interference calculation of uplink interference into Viasat uses an O3b uplink input power density of -53.4 dBW/Hz.
- To be conservative, the interference calculation of downlink interference into O3b uses a ViaSat-3F3 downlink EIRP density of -15.6 dBW/Hz, which equates to a downlink pfd of -118 dB(W/(m^2*MHz)).
- The interference analysis does not address the mutual interference environment with respect to O3b operations located outside of the U.S. For non-U.S. locations, Viasat would operate in a manner consistent with Ofcom's rules between U.K. registered satellite operators.

Table A.13.2-2. Interference calculations between ViaSat-3F3 and O3b

Victim network		O3b	ViaSat-3F3
Interfering network		ViaSat-3F3	O3b
Uplink:			
Frequency band	GHz	29.2	29.2
Interfering uplink input power density	dBW/Hz	-56.5	-53.4
Angular separation between interfering E/S and victim satellite	degrees	43.1	43.1
Slant range (Interfering path)	km	8828	38147
Free space path loss (Interfering path)	dB	200.6	213.4
Atmospheric losses	dB	1.2	1.2
Victim satellite receive antenna gain	dBi	34.5	60
Victim Satellite's Antenna Discrimination towards Interfering E/S	dB	0	0
Victim satellite Rx system noise temperature	K	1000	650
No	dBW/Hz	-198.6	-200.5
Io	dBW/Hz	-233.8	-218.0
Io/No	dB	-35.2	-17.5
ΔT/T	%	0.03	1.8
Downlink:			
Frequency band	GHz	19.4	19.4
Interfering satellite downlink EIRP density	dBW/Hz	-15.6	-28.32
Slant range (Interfering path)	km	38147	8828
Free space path loss (Interfering path)	dB	209.8	197.1
Atmospheric losses	dB	1	1
Angular separation between interfering satellite and victim E/S	degrees	43.1	43.1
Interfering Satellite's Antenna Discrimination towards Victim E/S	dB	0	0
Victim Rx earth station system noise temperature	K	225	224
No	dBW/Hz	-205.1	-205.1
Io	dBW/Hz	-236.4	-236.4
Io/No	dB	-31.3	-31.3
ΔT/T	%	0.07	0.07

For the inclined orbit O3b satellites, Viasat created a Visualyse Professional simulation using the satellite characteristics from the Schedule S filing with the FCC. To be conservative, the simulation considered an aeronautical ESIM at an altitude of 10.6 km over the O3b gateway and only included the inclined satellites and did not include any of the equatorial satellites in the time statistics. Additionally, the 400 km exclusion zone protecting the Iridium gateway was also not considered.

In the Earth-to-space direction the simulation showed good compatibility with worst case I/N of -15.8 dB.

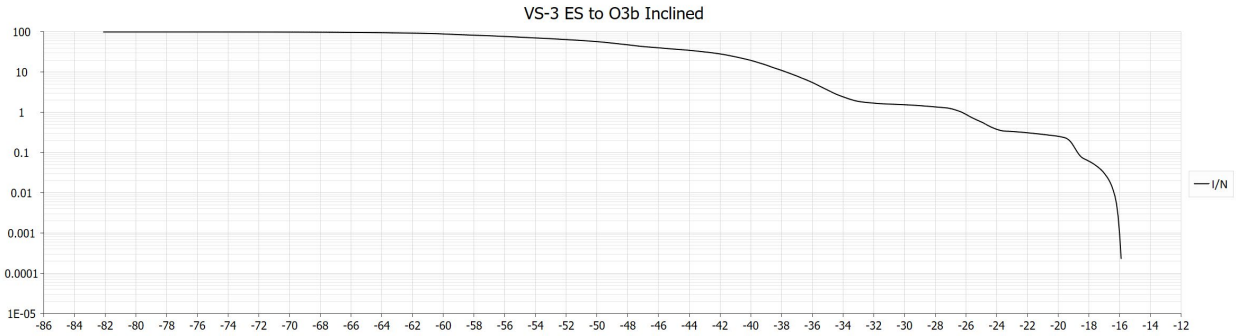

Figure A.13.2-1 ESIM uplink to O3B inclined orbit I/N

For the inclined O3B orbits in the space-to-Earth direction the Visualyse simulation was configured to examine the end-to-start direction of the links, again excluding the equatorial orbits. While the exclusion zone that covers the Iridium Wahiawa, HI gateway would also cover the O3B gateway location, this exclusion zone was not considered in simulation, and the ViaSat-3F3 User beam was placed directly over the O3B gateway. When the exclusion zone is considered, no User downlink beam is placed within 400 km of the O3b gateway ensuring compatibility between the two systems.

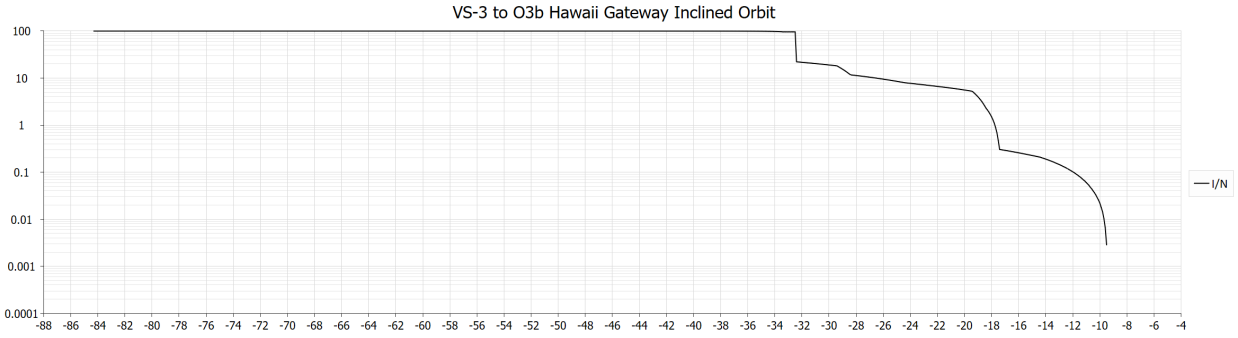

Figure A.13.2-3 ViaSat-3F3 User beam to O3B gateway I/N

A.14 Orbital Debris Mitigation Plan

The ViaSat-3F3 satellite is based on the flight-proven Boeing 702 HP and MP heritage platform. In conjunction with Boeing, Viasat has assessed and limited the amount of debris released in a planned manner during normal operations. The satellite has been designed to not

become a source of debris during launch, drift, or operating mode. All separation and deployment mechanisms, and any other potential source of debris, are expected to be retained by the spacecraft or launch vehicle. ViaSat-3F3 will not engage in any proximity operations.

A.14.1 Large Debris and Operational Space Stations

Viasat has assessed and limited the probability of ViaSat-3F3 becoming a source of debris by collisions with large debris objects and operational space stations. Requirement 4.5-1 of NASA-STD-8719.14B requires that for GSO spacecraft the probability of accidental collision with space objects larger than 10 cm in diameter shall not exceed 0.001 when integrated over 100 years from time of launch. NASA's DAS software shows that ViaSat-3F3 meets this requirement with a value of 0.000158, i.e., is better than the requirement by over a factor of 6.

A.14.2 Small Debris and Meteoroids

Viasat and Boeing have assessed and limited the probability that the space station will become a source of debris by collision with small debris or meteoroids that could cause loss of control and prevent disposal. NASA-STD-8719.14B requires that during the mission of the spacecraft the probability of accidental collision with orbital debris and meteoroids sufficient to prevent compliance with the applicable post-mission disposal maneuver requirements does not exceed 0.01.

The satellite includes redundant TT&C, bus control electronics, and propulsion subsystems to ensure successful end-of-life disposal. The spacecraft TT&C system, vital for orbit raising, is extremely rugged with regard to small debris and meteoroids less than 1 cm, by virtue of its redundancy, shielding, separation of components and physical characteristics. The TT&C subsystem has no single points of failure. Near-omni-directional antenna coverage is provided using a combination of independent bicone and forward/aft pipe antennas. These antenna feeds are extremely rugged and capable of providing adequate coverage even if struck, bent or otherwise damaged by a small or medium sized particle. The command receivers and decoders and telemetry encoders and transmitters are located within a shielded area and totally redundant and physically separated. The Xenon tank, shielded in the spacecraft structure central cylinder, and a redundant pair of thrusters, provide the energy for orbit-raising.

Boeing's high-fidelity assessment, using NASA and ESA tools, calculates that the probability of accidental collision with orbital debris and meteoroids sufficient to prevent compliance with the post-mission disposal maneuver requirements does not exceed 0.01.

A.14.3 Minimizing Accidental Explosions

Viasat and Boeing have assessed and limited the probability, during and after completion of mission operations, of accidental explosions or of release of liquids that will persist in droplet form. Stored energy (chemical, pressure, and kinetic) will be removed or depleted and made safe at the spacecraft's end of life. Valves in the propulsion subsystems will be opened and residual fuel vented, battery charging will be disabled, reaction wheels will be turned off and disabled, and drivers will be turned off and power removed from any redundant squibs and other unfired pyrotechnic valves. Thus, debris generation will not result from the conversion of energy sources on board the spacecraft into energy that fragments the spacecraft.

A.14.4 Safe Flight Profiles

Viasat has taken multiple precautions to ensure safety of flight and sustainability of operations. These include entering into a SSA Sharing Agreement with USSPACECOM and routinely providing ephemeris data to the 18th Space Control Squadron (18 SPSC) to ensure identification of potential collisions. Viasat receives conjunction assessment services from 18 SPSC as well as the Space Data Association (SDA), an organization which aims to enhance safety of flight via sharing of operational data and promotion of best practices across the industry, where it also processes Viasat's ephemeris and incorporates planned maneuver data in their assessments. Additionally, as a participant in the USSF Commercial Integration Cell (CIC), Viasat is privy to additional threats to its spacecraft and their operation.

Viasat has registered ViaSat-3F3 with the 18 SPSC. Viasat maintains accurate track of its spacecraft by conducting hourly ranging sessions from two separate geographic locations. This provides the data to generate precise ephemerides that feed into the SDA and 18 SPSC assessments. Viasat will operate ViaSat-3F3 such that its orbit is maintained within 0.05° of its assigned orbital longitude in the east/west direction, except during end-of-life disposal.

Viasat has assessed the known satellites located at, or reasonably expected to be located

at, the requested 158.55° E.L. orbital location, in addition to those assigned in the vicinity of that location such that the station keeping volumes of the respective satellites might overlap or touch. In doing so, Viasat has reviewed data from Space-Track, the ITU's SpaceExplorer, and the Commission's International Communications Filing System (ICFS). The nearest satellites currently in orbit are listed in Table A13-1. None of them has a station keeping volume that overlaps, or touches, that planned for ViaSat-3F3. Viasat is unaware of any proposed satellites expected to be located within ±0.15° of the 158.55° E.L. location, Astranis at 157.0° E.L. would be the closest.

Table A13-1. Satellites Near 158.55° E.L. Orbit Location

Satellite	Orbit Location	E-W Station Keeping
OPTUS D3	156.1° E.L.	±0.05°
MEV-1	156.1° E.L.	±0.05°
OPTUS-X (ADS-01)	156.4° E.L.	±0.05°
ABS-6	159.0° E.L.	±0.05°
KOREASAT 6	159.9° E.L.	±0.05°

A.14.5 Post-Mission Disposal

At the end of its useful life, and barring catastrophic failure of satellite components, ViaSat-3F3 will be relocated, to an orbit with a perigee altitude of 36,086 km (300 km above GSO). This exceeds the requirement of §25.283 for a minimum disposal orbit perigee altitude of:

36,021 km + (1000·C_R·A/M)

where C_R is the solar radiation pressure coefficient of the spacecraft, and A/M (m^2/kg) is the Area- to-Mass ratio of the spacecraft.

For ViaSat-3F3:

C_R = 1.3

A/M = 0.0229 m^2/kg

Thus, the minimum disposal orbit perigee altitude is:

= 36,021 km + 1000 x C_R x A/m

= 36,021 km + 1000 x 1.3 x 0.0229

= 36,051 km

= 265 km above GSO (35,786 km)

Thus ViaSat-3F3's 300 km above GSO disposal orbit provides an additional margin of 35 km. Disposal will require 1.7 kg of Xenon propellant which will be reserved, taking account of all fuel measurement uncertainties, to perform the final orbit raising maneuver.

Annex 1
Clear Sky Link Budgets

General												
Emission Designator		600MG7D	500MG7D	500MG7D	500MG7D	400MG7D	300MG7D	200MG7D	100MG7D	50M0G7D	12M5G7D	6M25G7D
Carrier Bandwidth	MHz	600	500	500	500	400	300	200	100	50	12.5	6.25
Uplink Frequency	GHz	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3
Downlink Frequency	GHz	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5
Uplink												
Tx E/S Antenna Diameter	m	7.4	7.4	7.4	7.4	7.4	7.4	0.7	0.7	0.7	0.7	0.3
Tx E/S Power to Antenna	W	10.0	10.0	10.0	10.0	10.0	10.0	14.0	13.4	12.8	11.1	1.8
Tx E/S Antenna Gain	dBi	65.0	65.0	65.0	65.0	65.0	65.0	44.3	44.3	44.3	44.3	37.3
Tx E/S EIRP per Carrier	dBW	75.0	75.0	75.0	75.0	75.0	75.0	58.3	57.7	57.1	55.4	39.1
Tx E/S Antenna Pointing Loss	dB	1.2	1.2	1.2	1.2	1.2	1.2	0.5	0.5	0.5	0.5	0.5
Atmospheric and Rain Losses	dB	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Free Space Loss	dB	213.6	213.6	213.6	213.6	213.6	213.6	213.6	213.6	213.6	213.6	213.6
G/T (peak)	dB/K	16.1	16.1	16.1	16.1	22.2	22.2	22.2	22.2	22.2	22.2	22.2
C/I - Intra-system	dB	25.5	25.5	25.5	25.5	25.5	25.5	14.3	14.3	14.3	14.3	14.3
Downlink												
EIRP per Carrier towards Rx E/S	dBW	70.8	70	70	70	69	67.8	63	60	57	51	48
Atmospheric and Rain Losses	dB	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Free Space Loss	dB	210.1	210.1	210.1	210.1	210.1	209.9	209.9	209.9	209.9	209.9	209.9
Rx E/S Antenna Pointing Loss	dB	0.5	0.5	0.5	0.5	0.5	0.5	0.55	0.55	0.55	0.55	0.55
Rx E/S Antenna Diameter	m	1.8	1.8	0.7	0.3	0.7	0.7	7.4	7.4	7.4	7.4	7.4
Rx E/S Antenna Gain	dBi	49.3	49.3	40.7	33.7	40.7	40.7	61.4	61.4	61.4	61.4	61.4
Rx E/S G/T	dB/K	23.3	23.3	14.7	7.7	14.7	14.7	36.6	36.6	36.6	36.6	36.6
System Noise Temp (LNA+Sky)	K	400	400	400	400	400	400	300	300	300	300	300
C/I - Intra-system	dB	18.7	18.7	18.7	18.7	18.7	13.3	13.3	13.3	13.3	13.3	13.3
End-to-End												
C/N - Thermal Uplink	dB	16.6	17.4	17.4	17.4	24.5	25.7	11.5	13.9	16.3	20.6	7.3
C/I Up - ASI	dB	22.7	23.5	16.8	12.3	17.7	12.6	17	16.3	14.3	14.9	12.3
C/N - Thermal Downlink	dB	23.9	23.9	15.3	8.3	15.3	15.5	34.4	34.4	34.4	34.4	34.4
C/I Down - ASI	dB	22.7	23.5	16.8	12.3	17.7	12.6	17	16.3	14.3	14.9	12.3
C/(N+I) - Total Actual	dB	12.8	13.2	9.8	5.2	10.8	7.2	7.1	7.6	7.4	8.0	4.1
C/N - Required	dB	10.3	3.6	-2.8	-0.9	6.2	-1.3	-0.9	6.2	-1.3	3.6	-0.9
Excess Margin	dB	2.5	9.6	12.6	6.1	4.6	8.5	8.0	1.4	8.7	4.4	5.0

CERTIFICATION OF PERSON RESPONSIBLE FOR PREPARING ENGINEERING INFORMATION

I hereby certify that I am the technically qualified person responsible for preparation of the engineering information contained in this application, that I am familiar with Part 25 of the Commission's rules, that I have either prepared or reviewed the engineering information submitted in this application, and that it is complete and accurate to the best of my knowledge and belief.

/s/
Mark A. Sturza
President
3C Systems Company

10 September 2026

Schedule B

Form 312 - Schedule B - Technical and Operational Description

Submit Schedule | Edit Schedule | Form 312

There are currently no errors.

Please review the below details and click Submit when you are ready.

Site(s) Information

Site Identifier	M40	GM40
Contact Name	Steven C. Hemple	Steven C. Hemple
Phone Number	760-681-9337	760-681-9337
Area of Operation		
1) If the proposed antenna(s) operate in the Fixed Satellite Service (FS...	No	No
2) If the proposed antenna(s) do not operate in the Fixed Satellite Ser...	N/A	N/A
3) Is Frequency Coordination required?	No	No
4) Is coordination with another country required?	No	No
5) Is FAA notification required?	No	No
Is facility operated by remote control?	Yes	Yes

Remote Control

Call Sign	Phone Number	Street	City	County	Zip Code	State	Country
	720-493-7300	349 Inverness Drive So...	Englewood	Arapahoe	80112	CO	United States of America
	720-493-7300	349 Inverness Drive So...	Englewood	Arapahoe	80112	CO	United States of America

Antenna(s)

Antenna ID	Manufacturer	Model	Antenna Size	Minor Axes (meters)	Major Axes (meters)	Total Input Power at Antenna Flange for All Carriers (Watts)	Total EIRP for All Carriers (dBW)

Site Id: M40 (1 item)							
M40	Viasat, Inc.	M-40	0.397 meters	0.1575 meters	0.7874 meters	4 Watts	43.5 dBW

Site Id: GM40 (1 item)							
GM40	Viasat, Inc.	GM-40	0.397 meters	0.158 meters	0.787 meters	31.6 Watts	55.5 dBW

Frequency Band(s)

Frequency Lower (MHz)	Frequency Upper (MHz)	Direction of Transmission	Gain	At	Polarization	Polarization	Polarization	Polarization Other
Site Id: M40 - Antenna Id: M40 (8 items)								
18800 MHz	19300 MHz	Space-to-Earth	33.47 dBi	18.8 GHz	Right and Left Hand ...	-- None --	-- None --	
28350 MHz	28600 MHz	Earth-to-Space	37 dBi	28.35 GHz	Right and Left Hand ...	-- None --	-- None --	
17700 MHz	18300 MHz	Space-to-Earth	33.3 dBi	18.3 GHz	Right and Left Hand ...	-- None --	-- None --	
18300 MHz	18800 MHz	Space-to-Earth	33.47 dBi	18.8 GHz	Right and Left Hand ...	-- None --	-- None --	
28600 MHz	29100 MHz	Earth-to-Space	37.25 dBi	29.1 GHz	Right and Left Hand ...	-- None --	-- None --	
29500 MHz	30000 MHz	Earth-to-Space	37.5 dBi	30 GHz	Right and Left Hand ...	-- None --	-- None --	
19700 MHz	20200 MHz	Space-to-Earth	34 dBi	20.2 GHz	Right and Left Hand ...	-- None --	-- None --	
28100 MHz	28350 MHz	Earth-to-Space	37 dBi	28.35 GHz	Right and Left Hand ...	-- None --	-- None --	
Site Id: GM40 - Antenna Id: GM40 (10 items)								
19300 MHz	19700 MHz	Space-to-Earth	36.1 dBi	19.7 GHz	Right and Left Hand ...	-- None --	-- None --	
29100 MHz	29500 MHz	Earth-to-Space	40.3 dBi	29.1 GHz	Right and Left Hand ...	-- None --	-- None --	
18800 MHz	19300 MHz	Space-to-Earth	36 dBi	18.8 GHz	Right and Left Hand ...	-- None --	-- None --	
28600 MHz	29100 MHz	Earth-to-Space	40.3 dBi	29.1 GHz	Right and Left Hand ...	-- None --	-- None --	
17700 MHz	18300 MHz	Space-to-Earth	35.7 dBi	17.7 GHz	Right and Left Hand ...	-- None --	-- None --	
18300 MHz	18800 MHz	Space-to-Earth	36 dBi	18.8 GHz	Right and Left Hand ...	-- None --	-- None --	
27500 MHz	28350 MHz	Earth-to-Space	40.1 dBi	28.35 GHz	Right and Left Hand ...	-- None --	-- None --	
28350 MHz	28600 MHz	Earth-to-Space	40.1 dBi	28.35 GHz	Right and Left Hand ...	-- None --	-- None --	
19700 MHz	20200 MHz	Space-to-Earth	36.6 dBi	19.7 GHz	Right and Left Hand ...	-- None --	-- None --	
29500 MHz	30000 MHz	Earth-to-Space	40.5 dBi	30 GHz	Right and Left Hand ...	-- None --	-- None --	

Operating Particulars(s)

Emission Designator	Maximum EIRP per Carrier (dBW)	Maximum EIRP Density per Carrier (dBW/4kHz)	Modulation and Services	Status

Site Id: M40 - Antenna Id: M40 - 18800MHz - 19300MHz (1 item)				
417MG7D			416.6 MBd M-ary PSK Digital Data	Granted
Site Id: M40 - Antenna Id: M40 - 28350MHz - 28600MHz (3 items)				
20M0G7D	43.5 dBW	6.5 dBW/4kHz	20.0 MBd PSK, Digital Carrier	Granted
10M0G7D	43.5 dBW	9.5 dBW/4kHz	10.0 MBd PSK, Digital Carrier	Granted
5M00G7D	43.5 dBW	12.5 dBW/4kHz	5.0 MBd PSK, Digital Carrier	Granted
Site Id: M40 - Antenna Id: M40 - 17700MHz - 18300MHz (1 item)				
500MG7D			500 MBd M-ary PSK Digital Data	Granted
Site Id: M40 - Antenna Id: M40 - 18300MHz - 18800MHz (1 item)				
417MG7D			417 MBd PSK, Digital Data	Granted
Site Id: M40 - Antenna Id: M40 - 28600MHz - 29100MHz (3 items)				
20M0G7D	43.5 dBW	6.5 dBW/4kHz	20.0 MBd PSK, Digital Carrier	Granted
10M0G7D	43.5 dBW	9.5 dBW/4kHz	10.0 MBd PSK, Digital Carrier	Granted
5M00G7D	43.5 dBW	12.5 dBW/4kHz	5.0 MBd PSK, Digital Carrier	Granted
Site Id: M40 - Antenna Id: M40 - 29500MHz - 30000MHz (3 items)				
10M0G7D	43.5 dBW	9.5 dBW/4kHz	10.0 MBd PSK, Digital Carrier	Granted
20M0G7D	43.5 dBW	6.5 dBW/4kHz	20.0 MBd PSK, Digital Carrier	Granted
5M00G7D	43.5 dBW	12.5 dBW/4kHz	5.0 MBd PSK, Digital Carrier	Granted
Site Id: M40 - Antenna Id: M40 - 19700MHz - 20200MHz (1 item)				
417MG7D			417 MBd PSK, Digital Data	Granted
Site Id: M40 - Antenna Id: M40 - 28100MHz - 28350MHz (3 items)				
10M0G7D	43.5 dBW	9.5 dBW/4kHz	10.0 MBd PSK, Digital Carrier	Granted
20M0G7D	43.5 dBW	6.5 dBW/4kHz	20.0 MBd PSK, Digital Carrier	Granted
5M00G7D	43.5 dBW	12.5 dBW/4kHz	5.0 MBd PSK, Digital Carrier	Granted
Site Id: GM40 - Antenna Id: GM40 - 19300MHz - 19700MHz (1 item)				
320MG7D			320 MBd PSK, Digital Carrier	Requested
Site Id: GM40 - Antenna Id: GM40 - 29100MHz - 29500MHz (3 items)				
320MG7D	55.5 dBW	6.46 dBW/4kHz	320 MBd PSK, Digital Carrier	Requested
160MG7D	55.5 dBW	9.47 dBW/4kHz	160 MBd PSK, Digital Carrier	Requested
80M0G7D	55.5 dBW	12.48 dBW/4kHz	80 MBd PSK, Digital Carrier	Requested
Site Id: GM40 - Antenna Id: GM40 - 18800MHz - 19300MHz (1 item)				
417MG7D			416.6 MBd M-ary PSK Digital Data	Granted

Site Id: GM40 - Antenna Id: GM40 - 28600MHz - 29100MHz (3 items)				
160MG7D	55.5 dBW	9.47 dBW/4kHz	160 MBd PSK, Digital Carrier	Granted
320MG7D	55.5 dBW	6.46 dBW/4kHz	320 MBd PSK, Digital Carrier	Granted
80M0G7D	55.5 dBW	12.48 dBW/4kHz	80 MBd PSK, Digital Carrier	Granted
Site Id: GM40 - Antenna Id: GM40 - 17700MHz - 18300MHz (1 item)				
500MG7D			500 MBd M-ary PSK Digital Data	Granted
Site Id: GM40 - Antenna Id: GM40 - 18300MHz - 18800MHz (1 item)				
417MG7D			417 MBd PSK, Digital Data	Granted
Site Id: GM40 - Antenna Id: GM40 - 27500MHz - 28350MHz (3 items)				
160MG7D	55.5 dBW	9.47 dBW/4kHz	160 MBd PSK, Digital Carrier	Granted
320MG7D	55.5 dBW	6.46 dBW/4kHz	320 MBd PSK, Digital Carrier	Granted
80M0G7D	55.5 dBW	12.48 dBW/4kHz	80 MBd PSK, Digital Carrier	Granted
Site Id: GM40 - Antenna Id: GM40 - 28350MHz - 28600MHz (2 items)				
160MG7D	55.5 dBW	9.47 dBW/4kHz	160 MBd PSK, Digital Carrier	Granted
80M0G7D	55.5 dBW	12.48 dBW/4kHz	80 MBd PSK, Digital Carrier	Granted
Site Id: GM40 - Antenna Id: GM40 - 19700MHz - 20200MHz (1 item)				
417MG7D			417 MBd PSK, Digital Data	Granted
Site Id: GM40 - Antenna Id: GM40 - 29500MHz - 30000MHz (3 items)				
320MG7D	55.5 dBW	6.46 dBW/4kHz	320 MBd PSK, Digital Carrier	Granted
160MG7D	55.5 dBW	9.47 dBW/4kHz	160 MBd PSK, Digital Carrier	Granted
80M0G7D	55.5 dBW	12.48 dBW/4kHz	80 MBd PSK, Digital Carrier	Granted

Point(s) of Communication)

Satellite	Common Name	ITU Name	Orbit Location	Country	Destination Points
Site Id: M40 (2 items)					
VIASAT-2 (S2902) | VIASAT-2 (S2...	VIASAT-2 (S2902)	VIASAT-2 (S2902)	69.9 W.L.	-- None --	
null | q | null	VIASAT-3F3	UK-KA-159E	158.55E	United Kingdom	
Site Id: GM40 (2 items)					
VIASAT-2 (S2902) | VIASAT-2 (S2...	VIASAT-2 (S2902)	VIASAT-2 (S2902)	69.9 W.L.	-- None --	
null | q | null	VIASAT-3F3	UK-KA-159E	158.55E	United Kingdom	

Satellite Coordination

Satellite Orbit Type	Range of Satellite Arc Eastern Limit	Range of Satellite Arc Eastern Limit Hemisphere	Range of Satellite Arc Western Limit	Range of Satellite Arc Western Limit Hemisphere	Antenna Elevation Angle Eastern Limit	Antenna Elevation Angle Western Limit	Earth Station Azimuth Angle Eastern Limit	Earth Station Azimuth Angle Western Limit	Maximum EIRP Density toward the Horizon (dBW/4KHz)

Site Id: M40 - Antenna Id: M40 - 18800MHz - 19300MHz (1 item)									
Geostationary	69.9	W	69.9	W	6	8	254	111	-4.5
Site Id: M40 - Antenna Id: M40 - 28350MHz - 28600MHz (1 item)									
Geostationary	69.9	W	69.9	W	6	8	254	111	-4.5
Site Id: M40 - Antenna Id: M40 - 17700MHz - 18300MHz (1 item)									
Geostationary	69.9	W	69.9	W	6	8	254	111	-4.5
Site Id: M40 - Antenna Id: M40 - 18300MHz - 18800MHz (1 item)									
Geostationary	69.9	W	69.9	W	6	8	254	111	-4.5
Site Id: M40 - Antenna Id: M40 - 28600MHz - 29100MHz (1 item)									
Geostationary	69.9	W	69.9	W	6	8	254	111	-4.5
Site Id: M40 - Antenna Id: M40 - 29500MHz - 30000MHz (1 item)									
Geostationary	69.9	W	69.9	W	6	8	254	111	-4.5
Site Id: M40 - Antenna Id: M40 - 19700MHz - 20200MHz (1 item)									
Geostationary	69.9	W	69.9	W	6	8	254	111	0
Site Id: M40 - Antenna Id: M40 - 28100MHz - 28350MHz (1 item)									
Geostationary	69.9	W	69.9	W	6	8	254	111	-4.5
Site Id: GM40 - Antenna Id: GM40 - 19300MHz - 19700MHz (1 item)									
Geostationary	158.55	E	158.55	E	5	5	180	180	-4.5
Site Id: GM40 - Antenna Id: GM40 - 29100MHz - 29500MHz (1 item)									
Geostationary	158.55	E	158.55	E	5	5	180	180	-4.5
Site Id: GM40 - Antenna Id: GM40 - 18800MHz - 19300MHz (2 items)									
Geostationary	158.55	E	158.55	E	5	5	180	180	-4.5
Geostationary	69.9	W	69.9	W	6	8	254	111	-4.5
Site Id: GM40 - Antenna Id: GM40 - 28600MHz - 29100MHz (2 items)									
Geostationary	158.55	E	158.55	E	5	5	180	180	-4.5
Geostationary	69.9	W	69.9	W	6	8	254	111	-4.5
Site Id: GM40 - Antenna Id: GM40 - 17700MHz - 18300MHz (2 items)									
Geostationary	158.55	E	158.55	E	5	5	180	180	-4.5
Geostationary	69.9	W	69.9	W	6	8	254	111	-4.5
Site Id: GM40 - Antenna Id: GM40 - 18300MHz - 18800MHz (2 items)									
Geostationary	158.55	E	158.55	E	5	5	180	180	-4.5
Geostationary	69.6	W	69.9	W	6	8	254	111	-4.5

Site Id: GM40 - Antenna Id: GM40 - 27500MHz - 28350MHz (2 items)									
Geostationary	158.55	E	158.55	E	5	5	180	180	-4.5
Geostationary	69.9	W	69.9	W	6	8	254	111	-4.5
Site Id: GM40 - Antenna Id: GM40 - 28350MHz - 28600MHz (2 items)									
Geostationary	158.55	E	158.55	E	5	5	180	180	-4.5
Geostationary	69.9	W	69.9	W	6	8	254	111	-4.5
Site Id: GM40 - Antenna Id: GM40 - 19700MHz - 20200MHz (2 items)									
Geostationary	158.55	E	158.55	E	5	5	180	180	0
Geostationary	69.9	W	69.9	W	6	8	254	111	0
Site Id: GM40 - Antenna Id: GM40 - 29500MHz - 30000MHz (2 items)									
Geostationary	158.55	E	158.55	E	5	5	180	180	-4.5
Geostationary	69.9	W	69.9	W	6	8	254	111	-4.5

Attachments

Download PDF

SATELLITE SPACE STATION AUTHORIZATIONS
FCC Form 312 - Schedule S: (Technical and Operational Description)
FOR OFFICIAL USE ONLY

Approved by OMB No. 3060-0678
Estimated time per response: 4-80 hours
Edition date: October 2020

File Number: **SES-MOD-20260828-02442**

Call Sign:

S1. Satellite Information

a. Space Station or Satellite Network Name	b. Orbit Type	c. Estimated Operational Lifetime of Space Station(s) From Date of Launch (yrs)	d. Will the space station(s) operate on a Common Carrier basis?	e. Application Description
VIASAT-3F3	Geostationary (GSO)		No	

S2. Operating Frequency Bands

a. Type of Service	b. If a. is Other, provide a service description	c. Satellite Frequency Band (MHz)	d. Satellite Frequency (Lower Band Edge) (MHz)	e. Satellite Frequency (Upper Band Edge) (MHz)	f. Direction of Transmission	g. Non Conforming Indicator
FSS		17700 - 20200	17700	20200	Space-to-Earth (Transmit)	No
FSS		27500 - 30000	27500	30000	Earth-to-Space (Receive)	No

S3. GSO Orbital Information

a. Orbital Longitude (°)	b. Hemisphere of Orbital Longitude (E/W)	c. East/West Station-Keeping Range: Toward East (°)	d. East/West Station-Keeping Range: Toward West (°)	e. North/South Station-Keeping Range: Toward North (°)	f. North/South Station-Keeping Range: Toward South (°)	g. Maximum Orbital Eccentricity	h. Antenna Axis Attitude Accuracy: Roll (°)	i. Antenna Axis Attitude Accuracy: Pitch (°)	j. Antenna Axis Attitude Accuracy: Yaw (°)
158.55	East	0.05	0.05	0.1	0.1		0.1	0.1	0.1

S4. Earth-to-Space (Receive) Beams

a. Beam ID:	**RXBR**	n. Beam Peak Flux Density at Command Threshold (dBW/m²):	
b. Beam Frequency (Lower Band Edge) (MHz):	**27500**	o. Peak Isotropic Antenna Gain (dBi):	
c. Beam Frequency (Upper Band Edge) (MHz):	**30000**	p. Isotropic Antenna Gain at 3 dB Beamwidth (dBi):	
d. Polarization:	**RHCP**	q. Antenna Pointing Error (°):	**0.05**
e. Can the space station vary the channel bandwidth with on-board processing?:	**No**	r. Antenna Rotational Error (°):	**0.05**
f. Is this a command beam? (Check box if Yes):	**No**	s. Will a GIMS container file containing all antenna contour data be provided?:	**Yes**
g. Is the beam shapeable? (Check box if Yes):	**No**	t. Under what rules will the associated antenna contours be submitted?:	**25.114(c)(4)(vii) (GSO)**
h. Is the beam steerable? (Check box if Yes):	**Yes**	u. Provide a list of each orbital plane in which this antenna beam is used.:	
i. Is the beam fed into transponders? (Check box if Yes):	**Yes**	v. Are all space stations in the NGSO constellation identical?:	
j. Maximum G/T (dB/K):	**22.2**	w. What information will be provided with the predicted antenna gain contours?:	**Isoline Map (25.114(c)(4)(vii)(C))**
k. Minimum G/T (dB/K):			
l. Maximum Saturation Flux Density (dBW/m²):	**-85**		
m. Minimum Saturation Flux Density (dBW/m²):	**-105**		

x. Receive Channels

(i) Channel ID	(ii) Channel Bandwidth (MHz)	(iii) Center Frequency (MHz)	(iv) Channel Frequency (Lower Band Edge) (MHz)	(v) Channel Frequency (Upper Band Edge) (MHz)	(vi) Channel Type	(vii) Point of Communication
UL04	400	29300	29100	29500	Service Link	
UL01	850	27925	27500	28350	Service Link	
UL02	250	28475	28350	28600	Service Link	
UL03	500	28850	28600	29100	Service Link	
UL05	500	29750	29500	30000	Service Link	

a. Beam ID:	**RXAR**	n. Beam Peak Flux Density at Command Threshold (dBW/m²):	
b. Beam Frequency (Lower Band Edge) (MHz):	**27500**	o. Peak Isotropic Antenna Gain (dBi):	
c. Beam Frequency (Upper Band Edge) (MHz):	**30000**	p. Isotropic Antenna Gain at 3 dB Beamwidth (dBi):	
d. Polarization:	**RHCP**	q. Antenna Pointing Error (°):	**0.05**
e. Can the space station vary the channel bandwidth with on-board processing?:	**No**	r. Antenna Rotational Error (°):	**0.05**
f. Is this a command beam? (Check box if Yes):	**No**	s. Will a GIMS container file containing all antenna contour data be provided?:	**Yes**
g. Is the beam shapeable? (Check box if Yes):	**No**	t. Under what rules will the associated antenna contours be submitted?:	**25.114(c)(4)(vii) (GSO)**
h. Is the beam steerable? (Check box if Yes):	**Yes**	u. Provide a list of each orbital plane in which this antenna beam is used.:	
i. Is the beam fed into transponders? (Check box if Yes):	**Yes**	v. Are all space stations in the NGSO constellation identical?:	
j. Maximum G/T (dB/K):	**30.9**	w. What information will be provided with the predicted antenna gain contours?:	**Isoline Map (25.114(c)(4)(vii)(C))**
k. Minimum G/T (dB/K):			
l. Maximum Saturation Flux Density (dBW/m²):	**-85**		
m. Minimum Saturation Flux Density (dBW/m²):	**-105**		

x. Receive Channels

(i) Channel ID	(ii) Channel Bandwidth (MHz)	(iii) Center Frequency (MHz)	(iv) Channel Frequency (Lower Band Edge) (MHz)	(v) Channel Frequency (Upper Band Edge) (MHz)	(vi) Channel Type	(vii) Point of Communication
UL01	850	27925	27500	28350	Service Link	
UL02	250	28475	28350	28600	Service Link	
UL04	400	29300	29100	29500	Service Link	
UL03	500	28850	28600	29100	Service Link	
UL05	500	29750	29500	30000	Service Link	

a. Beam ID:	**RXAL**	n. Beam Peak Flux Density at Command Threshold (dBW/m²):	
b. Beam Frequency (Lower Band Edge) (MHz):	**27500**	o. Peak Isotropic Antenna Gain (dBi):	
c. Beam Frequency (Upper Band Edge) (MHz):	**30000**	p. Isotropic Antenna Gain at 3 dB Beamwidth (dBi):	
d. Polarization:	**LHCP**	q. Antenna Pointing Error (°):	**0.05**
e. Can the space station vary the channel bandwidth with on-board processing?:	**No**	r. Antenna Rotational Error (°):	**0.05**
f. Is this a command beam? (Check box if Yes):	**No**	s. Will a GIMS container file containing all antenna contour data be provided?:	**Yes**
g. Is the beam shapeable? (Check box if Yes):	**No**	t. Under what rules will the associated antenna contours be submitted?:	**25.114(c)(4)(vii) (GSO)**
h. Is the beam steerable? (Check box if Yes):	**Yes**	u. Provide a list of each orbital plane in which this antenna beam is used.:	
i. Is the beam fed into transponders? (Check box if Yes):	**Yes**	v. Are all space stations in the NGSO constellation identical?:	
j. Maximum G/T (dB/K):	**30.9**	w. What information will be provided with the predicted antenna gain contours?:	**Isoline Map (25.114(c)(4)(vii)(C))**
k. Minimum G/T (dB/K):			
l. Maximum Saturation Flux Density (dBW/m²):	**-85**		
m. Minimum Saturation Flux Density (dBW/m²):	**-105**		

x. Receive Channels						
(i) Channel ID	**(ii) Channel Bandwidth (MHz)**	**(iii) Center Frequency (MHz)**	**(iv) Channel Frequency (Lower Band Edge) (MHz)**	**(v) Channel Frequency (Upper Band Edge) (MHz)**	**(vi) Channel Type**	**(vii) Point of Communication**
UL01	850	27925	27500	28350	Service Link	
UL02	250	28475	28350	28600	Service Link	
UL03	500	28850	28600	29100	Service Link	
UL04	400	29300	29100	29500	Service Link	
UL05	500	29750	29500	30000	Service Link	

a. Beam ID:	**RXBL**	n. Beam Peak Flux Density at Command Threshold (dBW/m²):	
b. Beam Frequency (Lower Band Edge) (MHz):	**27500**	o. Peak Isotropic Antenna Gain (dBi):	
c. Beam Frequency (Upper Band Edge) (MHz):	**30000**	p. Isotropic Antenna Gain at 3 dB Beamwidth (dBi):	
d. Polarization:	**LHCP**	q. Antenna Pointing Error (°):	**0.05**
e. Can the space station vary the channel bandwidth with on-board processing?:	**No**	r. Antenna Rotational Error (°):	**0.05**
f. Is this a command beam? (Check box if Yes):	**No**	s. Will a GIMS container file containing all antenna contour data be provided?:	**Yes**
g. Is the beam shapeable? (Check box if Yes):	**No**	t. Under what rules will the associated antenna contours be submitted?:	**25.114(c)(4)(vii) (GSO)**
h. Is the beam steerable? (Check box if Yes):	**Yes**	u. Provide a list of each orbital plane in which this antenna beam is used.:	
i. Is the beam fed into transponders? (Check box if Yes):	**Yes**	v. Are all space stations in the NGSO constellation identical?:	
j. Maximum G/T (dB/K):	**22.2**	w. What information will be provided with the predicted antenna gain contours?:	**Isoline Map (25.114(c)(4)(vii)(C))**
k. Minimum G/T (dB/K):			
l. Maximum Saturation Flux Density (dBW/m²):	**-85**		
m. Minimum Saturation Flux Density (dBW/m²):	**-105**		

x. Receive Channels						
(i) Channel ID	**(ii) Channel Bandwidth (MHz)**	**(iii) Center Frequency (MHz)**	**(iv) Channel Frequency (Lower Band Edge) (MHz)**	**(v) Channel Frequency (Upper Band Edge) (MHz)**	**(vi) Channel Type**	**(vii) Point of Communication**
UL04	400	29300	29100	29500	Service Link	
UL01	850	27925	27500	28350	Service Link	
UL02	250	28475	28350	28600	Service Link	
UL03	500	28850	28600	29100	Service Link	
UL05	500	29750	29500	30000	Service Link	

S5. Space-to-Earth (Transmit) Beams

a. Beam ID:	**TXBR**	n. Beam Peak Flux Density at Command Threshold (dBW/m²):	
b. Beam Frequency (Lower Band Edge) (MHz):	**17700**	o. Peak Isotropic Antenna Gain (dBi):	
c. Beam Frequency (Upper Band Edge) (MHz):	**20200**	p. Isotropic Antenna Gain at 3 dB Beamwidth (dBi):	
d. Polarization:	**RHCP**	q. Antenna Pointing Error (°):	**0.05**
e. Can the space station vary the channel bandwidth with on-board processing?:	**No**	r. Antenna Rotational Error (°):	**0.05**
f. Is this a command beam? (Check box if Yes):	**No**	s. Will a GIMS container file containing all antenna contour data be provided?:	**Yes**
g. Is the beam shapeable? (Check box if Yes):	**No**	t. Under what rules will the associated antenna contours be submitted?:	**25.114(c)(4)(vii) (GSO)**
h. Is the beam steerable? (Check box if Yes):	**Yes**	u. Provide a list of each orbital plane in which this antenna beam is used.:	
i. Is the beam fed into transponders? (Check box if Yes):	**Yes**	v. Are all space stations in the NGSO constellation identical?:	

j. Maximum Transmit EIRP Density (dBW/Ref BW):	**-22.7**	w. What information will be provided with the predicted antenna gain contours?:	**Isoline Map (25.114(c)(4)(vii)(C))**
k. Maximum Transmit EIRP (dBW):	**69.3**		

x. Transmit Channels

(i) Channel ID	(ii) Channel Bandwidth (MHz)	(iii) Center Frequency (MHz)	(iv) Channel Frequency (Lower Band Edge) (MHz)	(v) Channel Frequency (Upper Band Edge) (MHz)	(vi) Channel Type	(vii) Point of Communication
DL01	600	18000	17700	18300	Service Link	
DL05	500	19950	19700	20200	Service Link	
DL02	500	18550	18300	18800	Service Link	
DL03	500	19050	18800	19300	Service Link	
DL04	400	19500	19300	19700	Service Link	

y. Max. Power-Flux Densities

			Angles of Arrival PFD						Geographic Region PFD				
(i) Beam Sub-Frequency (Lower Band Edge) (MHz)	(ii) Beam Sub-Frequency (Upper Band Edge) (MHz)	(iii) Reference Bandwidth (BW)	(iv) 0-2° (dBW/m²/BW)	(v) 2-5° (dBW/m²/BW)	(vi) 5-15° (dBW/m²/BW)	(vii) 15-20° (dBW/m²/BW)	(viii) 20-25° (dBW/m²/BW)	(ix) 25-90° (dBW/m²/BW)	(x) Southeastern Region (dBW/m²/BW)	(xi) Northeastern Region (dBW/m²/BW)	(xii) Western Region (dBW/m²/BW)	(xiii) Other Region (dBW/m²/BW)	(xiv) Energy Dispersal Bandwidth (kHz)
		1 MHz	-118	-118	-118	-118	-118	-118					

a. Beam ID:	**TXBL**	n. Beam Peak Flux Density at Command Threshold (dBW/m²):	
b. Beam Frequency (Lower Band Edge) (MHz):	**17700**	o. Peak Isotropic Antenna Gain (dBi):	
c. Beam Frequency (Upper Band Edge) (MHz):	**20200**	p. Isotropic Antenna Gain at 3 dB Beamwidth (dBi):	
d. Polarization:	**LHCP**	q. Antenna Pointing Error (°):	**0.05**
e. Can the space station vary the channel bandwidth with on-board processing?:	**No**	r. Antenna Rotational Error (°):	**0.05**
f. Is this a command beam? (Check box if Yes):	**No**	s. Will a GIMS container file containing all antenna contour data be provided?:	**Yes**
g. Is the beam shapeable? (Check box if Yes):	**No**	t. Under what rules will the associated antenna contours be submitted?:	**25.114(c)(4)(vii) (GSO)**
h. Is the beam steerable? (Check box if Yes):	**Yes**	u. Provide a list of each orbital plane in which this antenna beam is used.:	
i. Is the beam fed into transponders? (Check box if Yes):	**Yes**	v. Are all space stations in the NGSO constellation identical?:	
j. Maximum Transmit EIRP Density (dBW/Ref BW):	**-22.7**	w. What information will be provided with the predicted antenna gain contours?:	**Isoline Map (25.114(c)(4)(vii)(C))**
k. Maximum Transmit EIRP (dBW):	**69.3**		

x. Transmit Channels

(i) Channel ID	(ii) Channel Bandwidth (MHz)	(iii) Center Frequency (MHz)	(iv) Channel Frequency (Lower Band Edge) (MHz)	(v) Channel Frequency (Upper Band Edge) (MHz)	(vi) Channel Type	(vii) Point of Communication
DL03	500	19050	18800	19300	Service Link	
DL02	500	18550	18300	18800	Service Link	
DL01	600	18000	17700	18300	Service Link	
DL04	400	19500	19300	19700	Service Link	
DL05	500	19950	19700	20200	Service Link	

y. Max. Power-Flux Densities

			Angles of Arrival PFD						Geographic Region PFD				
(i) Beam Sub-Frequency (Lower Band Edge) (MHz)	(ii) Beam Sub-Frequency (Upper Band Edge) (MHz)	(iii) Reference Bandwidth (BW)	(iv) 0-2° (dBW/m²/BW)	(v) 2-5° (dBW/m²/BW)	(vi) 5-15° (dBW/m²/BW)	(vii) 15-20° (dBW/m²/BW)	(viii) 20-25° (dBW/m²/BW)	(ix) 25-90° (dBW/m²/BW)	(x) Southeastern Region (dBW/m²/BW)	(xi) Northeastern Region (dBW/m²/BW)	(xii) Western Region (dBW/m²/BW)	(xiii) Other Region (dBW/m²/BW)	(xiv) Energy Dispersal Bandwidth (kHz)
		1 MHz	-118	-118	-118	-118	-118	-118					

a. Beam ID:	**TXAR**	n. Beam Peak Flux Density at Command Threshold (dBW/m²):	
b. Beam Frequency (Lower Band Edge) (MHz):	**17700**	o. Peak Isotropic Antenna Gain (dBi):	
c. Beam Frequency (Upper Band Edge) (MHz):	**20200**	p. Isotropic Antenna Gain at 3 dB Beamwidth (dBi):	
d. Polarization:	**RHCP**	q. Antenna Pointing Error (°):	**0.05**
e. Can the space station vary the channel bandwidth with on-board processing?:	**No**	r. Antenna Rotational Error (°):	**0.05**
f. Is this a command beam? (Check box if Yes):	**No**	s. Will a GIMS container file containing all antenna contour data be provided?:	**Yes**
g. Is the beam shapeable? (Check box if Yes):	**No**	t. Under what rules will the associated antenna contours be submitted?:	**25.114(c)(4)(vii) (GSO)**
h. Is the beam steerable? (Check box if Yes):	**Yes**	u. Provide a list of each orbital plane in which this antenna beam is used.:	
i. Is the beam fed into transponders? (Check box if Yes):	**Yes**	v. Are all space stations in the NGSO constellation identical?:	
j. Maximum Transmit EIRP Density (dBW/Ref BW):	**-14.3**	w. What information will be provided with the predicted antenna gain contours?:	**Isoline Map (25.114(c)(4)(vii)(C))**
k. Maximum Transmit EIRP (dBW):	**77.7**		

x. Transmit Channels

(i) Channel ID	(ii) Channel Bandwidth (MHz)	(iii) Center Frequency (MHz)	(iv) Channel Frequency (Lower Band Edge) (MHz)	(v) Channel Frequency (Upper Band Edge) (MHz)	(vi) Channel Type	(vii) Point of Communication
DL01	600	18000	17700	18300	Service Link	
DL03	500	19050	18800	19300	Service Link	
DL02	500	18550	18300	18800	TT&C	
DL04	400	19500	19300	19700	Service Link	
DL05	500	19950	19700	20200	Service Link	

y. Max. Power-Flux Densities

			Angles of Arrival PFD						Geographic Region PFD				
(i) Beam Sub-Frequency (Lower Band Edge) (MHz)	(ii) Beam Sub-Frequency (Upper Band Edge) (MHz)	(iii) Reference Bandwidth (BW)	(iv) 0-2° (dBW/m²/BW)	(v) 2-5° (dBW/m²/BW)	(vi) 5-15° (dBW/m²/BW)	(vii) 15-20° (dBW/m²/BW)	(viii) 20-25° (dBW/m²/BW)	(ix) 25-90° (dBW/m²/BW)	(x) Southeastern Region (dBW/m²/BW)	(xi) Northeastern Region (dBW/m²/BW)	(xii) Western Region (dBW/m²/BW)	(xiii) Other Region (dBW/m²/BW)	(xiv) Energy Dispersal Bandwidth (kHz)
		1 MHz	-118	-118	-118	-118	-118	-118					

a. Beam ID:	**TXAL**	n. Beam Peak Flux Density at Command Threshold (dBW/m²):	
b. Beam Frequency (Lower Band Edge) (MHz):	**17700**	o. Peak Isotropic Antenna Gain (dBi):	
c. Beam Frequency (Upper Band Edge) (MHz):	**20200**	p. Isotropic Antenna Gain at 3 dB Beamwidth (dBi):	
d. Polarization:	**LHCP**	q. Antenna Pointing Error (°):	**0.05**
e. Can the space station vary the channel bandwidth with on-board processing?:	**No**	r. Antenna Rotational Error (°):	**0.05**
f. Is this a command beam? (Check box if Yes):	**No**	s. Will a GIMS container file containing all antenna contour data be provided?:	**Yes**
g. Is the beam shapeable? (Check box if Yes):	**No**	t. Under what rules will the associated antenna contours be submitted?:	**25.114(c)(4)(vii) (GSO)**
h. Is the beam steerable? (Check box if Yes):	**Yes**	u. Provide a list of each orbital plane in which this antenna beam is used.:	
i. Is the beam fed into transponders? (Check box if Yes):	**Yes**	v. Are all space stations in the NGSO constellation identical?:	
j. Maximum Transmit EIRP Density (dBW/Ref BW):	**-14.3**	w. What information will be provided with the predicted antenna gain contours?:	**Isoline Map (25.114(c)(4)(vii)(C))**
k. Maximum Transmit EIRP (dBW):	**77.7**		

x. Transmit Channels

(i) Channel ID	(ii) Channel Bandwidth (MHz)	(iii) Center Frequency (MHz)	(iv) Channel Frequency (Lower Band Edge) (MHz)	(v) Channel Frequency (Upper Band Edge) (MHz)	(vi) Channel Type	(vii) Point of Communication
DL01	600	18000	17700	18300	Service Link	
DL03	500	19050	18800	19300	Service Link	
DL05	500	19950	19700	20200	Service Link	

DL02	500	18550	18300	18800	Service Link	
DL04	400	19500	19300	19700	Service Link	

y. Max. Power-Flux Densities

			Angles of Arrival PFD						Geographic Region PFD				
(i) Beam Sub-Frequency (Lower Band Edge) (MHz)	**(ii) Beam Sub-Frequency (Upper Band Edge) (MHz)**	**(iii) Reference Bandwidth (BW)**	**(iv) 0-2° (dBW/m²/BW)**	**(v) 2-5° (dBW/m²/BW)**	**(vi) 5-15° (dBW/m²/BW)**	**(vii) 15-20° (dBW/m²/BW)**	**(viii) 20-25° (dBW/m²/BW)**	**(ix) 25-90° (dBW/m²/BW)**	**(x) Southeastern Region (dBW/m²/BW)**	**(xi) Northeastern Region (dBW/m²/BW)**	**(xii) Western Region (dBW/m²/BW)**	**(xiii) Other Region (dBW/m²/BW)**	**(xiv) Energy Dispersal Bandwidth (kHz)**
		1 MHz	-118	-118	-118	-118	-118	-118					

S6. Space-to-Space (Receive) Beams

S7. Space-to-Space (Transmit) Beams

S8. Attachments

Beam ID	Direction of Transmission	(i) Document Type	(ii) If Document Type is "Other", provide short description	(iii) File Name
		GIMS Container File		