EXHIBIT A

PETITION FOR DECLARATORY RULING

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

In the Matter of	)	
	)	
ViaSat, Inc.	)	
	)	File No. __________________
Petition for Declaratory Ruling to Access the U.S. Market Using a Non-U.S. Licensed 17/24 GHz Satellite at 115.0º W.L.	)	
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	)	

PETITION FOR DECLARATORY RULING

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PETITION FOR DECLARATORY RULING

ViaSat, Inc. ("ViaSat") files this Petition for Declaratory Ruling ("Petition") seeking to serve the United States with a satellite operating under authority of The Netherlands at 115.0° W.L. (the "VIASAT-RDBS1" satellite), and operating in the 17/24 GHz Broadcasting-Satellite Service ("17/24 GHz Service").[1] Specifically, ViaSat seeks to provide a new generation of broadband services to CONUS, Hawaii and Alaska. This Petition includes the information required by 47 C.F.R. § 25.137 for applicants seeking U.S. market access from non-U.S.-licensed spacecraft.[2] Technical information relating to the spacecraft is provided on Schedule S

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1 *The Establishment of Policies and Service Rules for the Broadcasting-Satellite Service at the 17.7-17.7 GHz Frequency Band and at the 17.7-17.8 GHz Frequency Band Internationally, and at the 24.75-25.25 GHz Frequency Band for Fixed Satellite Services Providing Feeder Links to the Broadcasting-Satellite Service and for the Satellite Services Operating Bi-directionally in the 17.3-17.8 GHz Frequency Band*, Report and Order and Further Notice of Proposed Rulemaking, 22 FCC Rcd 8842 (2007) ("*17/24 GHz Report and Order*").

2 *See* 47 C.F.R. § 25.137. Consistent with the Commission's *2015 Part 25 Reform Order*, this request is styled as a Petition for Declaratory ruling. *See Comprehensive Review of Licensing and Operating Rules for Satellite Services*, Second Report and Order, 30 FCC Rcd 14713, at ¶ 250 (2015) (specifying that "all requests for market access by the space station operator must be submitted through a petition for declaratory ruling") ("*2015 Part*

and in narrative form in the associated Attachment A, Technical Information to Supplement Schedule S (the "Technical Annex").

I. GRANT OF VIASAT'S PETITION WILL SERVE THE PUBLIC INTEREST

ViaSat has previously demonstrated its qualifications as a Commission licensee of spacecraft and earth station networks. ViaSat has a long history and extensive expertise in providing and developing satellite communications technologies for both commercial and military uses, as well as improving the performance and bandwidth efficiency of satellite networks.

Granting this Petition will serve the public interest in several important respects, including by facilitating the provision of innovative satellite-based broadband services to U.S. consumers. ViaSat currently provides satellite-based broadband services using an existing fleet of satellites, including WildBlue-1 at the nominal 111º W.L. orbital location and ViaSat-1 at the nominal 115º W.L. orbital location. Those satellites serve approximately 700,000 residences and small businesses, and what soon will be about 2,000 aircraft, including United Airlines, American Airlines, JetBlue, Virgin American, and the United States government's senior executive service fleet. ViaSat's existing service provides a competitive alternative to terrestrial broadband offerings and makes it possible to enjoy high-speed broadband connections on board aircraft.

A. Services to be Supported

ViaSat seeks authority to provide the "new generation of broadband services" to U.S. consumers that the Commission contemplated when it established the 17/24 GHz Service in

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25 Reform Order"). In its response to Question 17.b of the accompanying FCC Form 312, ViaSat has selected "Letter of Intent to Use Non-U.S. Licensed Satellite to Provide Service in the United States" because the FCC Form 312 has not yet been updated to reflect the direction provided in the *2015 Part 25 Reform Order*.

2007.[3] These advanced broadband services will complement the services that ViaSat currently provides from the same nominal orbital location. Services will be provided on subscription or non-common carrier basis. ViaSat does not intend to provide point-to-multipoint distribution of video programming to consumers in the United States, whether on a subscription or a public basis (*i.e.*, "DBS-like services").[4]

ViaSat has demonstrated its commitment to developing technologies that make efficient use of spectrum, responding to customers' needs for high-quality broadband service offerings. Grant of this Petition will play a vital role in providing innovative broadband services by enabling the use of currently-fallow spectrum at 115º W.L.

II. *DISCO II* SHOWING – SECTION 25.137(A)

On behalf of ViaSat's wholly-owned subsidiary, ViaSat Netherlands B.V., the Radiocommunications Agency of The Netherlands has submitted an ITU coordination request for a 17/24 GHz satellite at 115º W.L.[5] Because this spacecraft will operate under the authority of The Netherlands, and will provide services covered by U.S. commitments under the WTO

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3 *17/24 GHz Report and Order* at ¶¶ 1, 189.

4 *17/24 GHz Report and Order* at ¶¶ 38, 40 & n.115. Because ViaSat is not seeking to provide DBS-like services, it would not be subject to the 17/24 GHz service rules applicable to providers of video programming. *See, e.g.*, 47 C.F.R. § 25.225 (geographic service requirements for space stations used to provide video programming directly to consumers); *id*. at § 25.601 (equal employment opportunities requirements in Part 76 of the Commission's rules applicable to satellite operators providing video programming directly to the public on a subscription basis); *id*. at § 25.701 (requirements regarding channel set asides, political broadcasting, children's programming, and public file requirements applicable to satellite operators distributing or offering video programming directly to consumers or video programming distributors). Although the geographic service requirements in Section 25.225 are not applicable to ViaSat's request, due to limitations of the Schedule S, ViaSat answered in the affirmative the question regarding whether the applicable service area coverage requirements have been met.

5 *See* 47 C.F.R. § 25.137(c)(3).

Basic Telecommunications Agreement,[6] the Commission's *DISCO II* framework applies to this Petition.[7]

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, technical requirements, national security, law enforcement, foreign policy and trade concerns.[8] Each of these factors weighs in favor of granting this Petition.

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.[9] The Netherlands 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. Accordingly, the presumption in favor of entry applies to this Petition.

Grant of this Petition will enhance competition in the United States for satellite service by permitting ViaSat to expand its satellite broadband offerings and fostering

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6 ViaSat does not seek authority to provide the type of direct-to-home ("DTH"), direct broadcast satellite ("DBS"), or digital audio radio service ("DARS") that are excluded from the U.S. commitments.

7 *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*").

8 *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).

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

technological innovation. The Commission consistently has relied on these same public interest benefits in granting similar requests.[10]

B. Spectrum Availability

This Petition proposes market access using 17.3-17.7 GHz and 24.75-25.25 GHz frequencies at 115.0º W.L.— a location designated for satellites in the 17/24 GHz Service.[11] The VIASAT-RDBS1 satellite would also be capable of operating at 17.7-17.8 GHz for earth station receive operations outside of the United States, consistent with the Commission's designation of this band segment for international services. ViaSat does not seek market access for 17.7-17.8 GHz.

ViaSat's request for market access using 17.3-17.7 GHz and 24.75-25.25 GHz frequencies at 115.0º W.L. does not conflict with any existing Commission authorization for a satellite network in these bands.[12] As demonstrated in the Technical Annex, operation of the satellite is consistent with the Commission's policies articulated in the *17/24 GHz Report and Order* and the *Space Station Licensing Reform Order* regarding processing of applications for GSO-like spacecraft.[13] As detailed in the following sections, this request also is consistent with Commission spectrum policies.

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

[11] *17/24 GHz Report and Order* at ¶¶ 70, 73, Appendix F.

[12] *See* Public Notice, *Policy Branch Information Actions Taken*, Rept. No. SAT-01220, DA No. 17-218, at 2 (rel. Mar. 8, 2017).

[13] *See 17/24 GHz Report and Order, at* ¶¶ 8, 73; *Amendment of the Commission's Space Station Licensing Rules and Policies*, 18 FCC Rcd 10760, at ¶ 113 (2003).

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

Grant of this Petition is consistent with U.S. national security, law enforcement, and public safety considerations. The satellite's authorization from The Netherlands will be held by ViaSat Netherlands B.V., a 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 – SECTION 25.137(B)

A. Legal Qualifications

ViaSat's legal qualifications are set forth in this Petition and in the attached Form 312. Specifically, the Petition and attached Form 312 demonstrate ViaSat's satisfaction of the applicable requirements for space station applicants set forth in Section 25.114 of the Commission's rules.[14] As noted above, ViaSat holds several Commission licenses, and its legal qualifications are a matter of record before the Commission.

B. Technical Qualifications

The attached Form 312, Schedule S, and Technical Annex (including an orbital debris mitigation showing) include the required Part 25 technical information. As discussed in further detail in the Technical Annex, the station-keeping volume of the satellite does not overlap with other satellites located at the same nominal location. No ground spare is currently planned.

C. Orbital Debris Mitigation

Section 25.137 of the Commission's rules requires market access applicants to provide an orbital debris mitigation showing.[15] In the case of applications seeking U.S. market access via non-U.S.-licensed space stations, the Commission has concluded that this requirement can be satisfied by showing that the satellite system's debris mitigation plans are subject to direct and

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[14] *See* 47 C.F.R. § 25.114.

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

effective regulatory oversight by the satellite system's national licensing authority.[16] The Commission has determined that this requirement may be satisfied by referencing an English language version of the debris mitigation rules or regulations of the national licensing authority and indicating the current status of the national licensing authority's review of its debris mitigation plans.[17]

The VIASAT-RDBS1 satellite will be operated under the authority of The Netherlands, and will be subject to the Netherlands' Space Activities Act,[18] which provides that a license application will be refused where it does not sufficiently ensure safety, protect the environment in outer space, and satisfy related international obligations.[19] Accordingly, as part of the licensing process, ViaSat will submit to The Netherlands information similar to that set forth in Section A.10 of the attached Technical Annex, which describes ViaSat's plan for safe flight as well as ViaSat's strategy for mitigating orbital debris. ViaSat expects that The Netherlands, consistent with its past practice, will evaluate this information with reference to: (i) the Space

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16 *Mitigation of Orbital Debris*, Second Report and Order, 19 FCC Rcd 11567 ¶¶ 94, 95 (2004) ("*Orbital Debris Second Report and Order*").

17 *Id.* at ¶ 95; *Globalstar Licensee LLC, GUSA Licensee LLC, GCL Licensee LLC*, Order, DA 11-520 ¶¶ 30-32 (rel. Mar. 18, 2011) (concluding that French Space Operations law and technical regulations provide for direct and effective regulation of debris mitigation measures by France, resulting in a finding that Globalstar provided adequate orbital debris mitigation showing); O3b Limited, IBFS File No. SES-LIC-20100723-00952, Call Sign E100088, Condition 90045 (granted Sept. 25, 2012) (determining that O3b's request for a waiver of Section 25.283(c) for unvented pressure vessels was unnecessary, finding that O3b is subject to direct and effective regulation by the United Kingdom concerning orbital debris mitigation)*; see also* ViaSat, Inc., IBFS File No. SAT-MOD-20141105-00121, Condition 4 (granted Apr. 15, 2015).

18 *See* United Nations Office for Outer Space Affairs, *Selected Examples of National Laws Governing Space Activities: Netherlands* (translation of Netherlands Space Activities Act of June 13, 2006), *available at* http://www.unoosa.org/oosa/en/ourwork/spacelaw/nationalspacelaw/netherlands/space_activities_actE.html.

19 *Id.* § 6.

Debris Mitigation Guidelines of the United Nations Committee on the Peaceful Uses of Outer Space; (ii) the Space Debris Mitigation Guidelines of the Inter-Agency Space Debris Coordination Committee; (iii) ITU Recommendation ITU-R S.1003; (iv) the European Code of Conduct for Space Debris Mitigation; and (v) applicable ISO Standards. ViaSat submits that the requirements of Sections 25.114(d)(14) and 25.283(c) are therefore satisfied. Should the Commission nevertheless choose to conduct an independent review of ViaSat's safe flight and orbital debris mitigation plans, pertinent information is set forth in Section A.10 of the attached Technical Annex.

IV. ADDITIONAL REQUIREMENTS – SECTION 25.137(D)

A. Milestones and Bond Requirement

ViaSat plans to implement the spacecraft in compliance with the Commission's current milestone and surety bond requirements.[20]

B. Reporting Requirements

ViaSat will comply with all applicable reporting requirements for the spacecraft once this Petition is granted.

C. Ownership Information

ViaSat is a Delaware corporation and a publicly traded company headquartered at 6155 El Camino Real, Carlsbad, California 92009. As a publicly traded company, the stock of ViaSat is widely held. Based on publicly available SEC filings, the following entity and its affiliates beneficially owned 10 percent or more of ViaSat's voting stock as of January 27, 2017:

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20 *See Comprehensive Review of Licensing and Operating Rules for Satellite Services*, IB Docket No. 12-267, Second Report and Order, FCC 15-167 (rel. Dec. 17, 2015).

Beneficial Owner	Citizenship	Voting Percentage
The Baupost Group, L.L.C. 10 St. James Avenue Suite 1700 Boston, MA 02116	Massachusetts	22.85%

No other stockholders are known by ViaSat to hold 10 percent or more of ViaSat's voting stock.

The following are the officers and directors of ViaSat, all of whom can be reached c/o ViaSat, Inc., 6155 El Camino Real, Carlsbad, CA 92009.

Directors

Mark D. Dankberg, Chairman, CEO
Richard A. Baldridge
Frank J. Biondi Jr.
Dr. Robert W. Johnson
B. Allen Lay
Dr. Jeffrey M. Nash
John P. Stenbit
Harvey P. White

Officers/Senior Management

Mark D. Dankberg, Chairman, CEO
Richard A. Baldridge, President, COO
Melinda Del Toro, Senior VP, People & Culture
Bruce Dirks, Senior VP, Treasury & Corporate Development
Shawn Duffy, Senior VP, CFO, CAO
Kevin Harkenrider, Senior VP – Commercial Networks
Keven K. Lippert, Executive VP, General Counsel, Secretary
Mark J. Miller, Executive VP, Chief Technical Officer
Ken Peterman, Senior VP – Government Systems
Douglas Abts, VP Strategy Development, Satellite Services
Robert Blair, VP, Deputy General Counsel

V. 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.

VI. CONCLUSION

For the foregoing reasons, granting ViaSat's Petition seeking to access the United States using a satellite in the 17/24 GHz Service under the authority of The Netherlands will serve the public interest, convenience, and necessity. ViaSat respectfully requests that the Commission promptly grant this Petition.

Respectfully submitted,

/s/

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ATTACHMENT A

Technical Information to Supplement Schedule S

A.1 SCOPE AND PURPOSE

The purpose of this Attachment is to provide the Commission with the technical characteristics of the VIASAT-RDBS1 satellite. This attachment contains the information required by 47 C.F.R. §25.114 and other sections of the FCC's Part 25 rules that cannot be entered into the Schedule S submission.

A.2 GENERAL DESCRIPTION

The VIASAT-RDBS1 satellite will operate at the 115.0° W.L. orbital location and will provide 17/24 GHz BSS services primarily to CONUS, Alaska and Hawaii through its "CONUS+" beam. A second beam will provide service to Mexico. The CONUS+ beam will downlink in the 17.3-17.7 GHz band, while the Mexico beam will downlink in the 17.7-17.8 GHz band. The satellite will be operated under the authority of The Netherlands. ViaSat is not seeking market access to serve the United States at 17.7-17.8 GHz. Technical characteristics of the Mexico beam are provided in this Attachment and Schedule S solely for informational purposes. Uplink transmissions serving both downlink beams will use the 24.75-25.25 GHz band; the lower 400 MHz providing feeder-links to the CONUS+ beam and the upper 100 MHz providing feeder-links to the Mexico beam. Uplink transmissions will occur from the dryer, southwestern region of the U.S. (e.g., outside of Las Vegas) in order to minimize uplink rain fade effects.

The 500 MHz of spectrum on both uplink and downlink will be channelized into 32 channels of 26 MHz nominal bandwidth each. The lower twenty-six channels will be used with the CONUS+ beam, while the upper six channels will be used with the Mexico beam. Dual frequency re-use of both the uplink and downlink spectrum is achieved through the use of orthogonal circular polarizations. There is no frequency offset between cross-polarized channels.

All 32 active communications transponders will use combined TWTAs (2 x 150 Watts each) giving a total saturated RF power per transponder of 300 Watts. This produces peak EIRP levels of 60.3 dBW in both the CONUS+ beam and the Mexico beam after taking account of line losses. The EIRP over the service area of the CONUS+ beam varies to account for different rain attenuation characteristics and to comply with the PFD limits of 47 C.F.R. §25.208(w).

Spacecraft TT&C functions will take place at the lower edges of the 17/24 GHz frequency bands for all mission phases. On-station TT&C operations will be conducted from the USA. TT&C sites have not yet been selected, but are anticipated to be located in southwestern U.S.

A.3 FREQUENCY AND POLARIZATION PLAN

The satellite's frequency plan is provided in the associated Schedule S form. A fixed translation frequency of 7450 MHz is used between all uplink and downlink channels.

Circular polarization is used on both the uplink and downlink with the downlink polarization being orthogonal to the uplink polarization. Full frequency re-use is achieved through the use of dual orthogonal polarizations. This satisfies the requirements of §25.210(f) of the FCC's Part 25 rules (the "Rules"). In accordance with §25.210(i) of the Rules, the minimum cross-polarization isolation will be 25 dB.

A.4 PREDICTED SPACE STATION ANTENNA GAIN CONTOURS

The VIASAT-RDBS1 satellite's antenna gain contours for the receive and transmit beams are provided in GXT format and embedded in the associated Schedule S submission. The beams used for TT&C operations have gain contours that vary by less than 8 dB below peak across the surface of the visible Earth. Therefore, gain contours for these beams (beams CMD and TLM) have not been included in the associated Schedule S form.

A.5 TT&C INFORMATION

The information provided in this section complements that provided in the associated Schedule S submission.

The VIASAT-RDBS1 satellite's TT&C sub-system provides for communications during pre-launch, transfer orbit and on-station operations, as well as during spacecraft emergencies. The TT&C sub-system will operate at the lower edges of the 17/24 GHz bands for all phases of the mission.

During transfer orbit and on-station emergencies the TT&C signals will be received and transmitted by the satellite using a combination of antennas on the satellite that create a near omni-directional gain pattern. During normal on-station operation the TT&C signals will be received and transmitted via an Earth-coverage horn antenna on the Earth (+Z) face of the spacecraft. A summary of the TT&C subsystem characteristics is given in Table A.5-1.

Table A.5-1: TT&C Performance Characteristics

Command/Ranging Frequencies (All mission phases)	24,751 MHz 24,753 MHz
Uplink Flux Density	Between -80 and -60 dBW/m^2
Satellite Receive Antenna Types	Pseudo-omni antenna during transfer orbit and on-station emergencies; Earth coverage horn antenna during normal on-station operations.
Polarization of Satellite Receive Antennas	RHCP for pseudo-omni antenna; RHCP for Earth-coverage horn antenna.
Telemetry/Ranging Frequencies (All mission phases)	17,301 MHz 17,303 MHz
Satellite Transmit Antenna Types	Pseudo-omni antenna during transfer orbit and on-station emergencies; Earth coverage horn antenna during normal on-station operations.
Polarization of Satellite Transmit Antennas	RHCP for pseudo-omni antenna; RHCP for Earth-coverage horn antenna.
Maximum Downlink EIRP	15 dBW (pseudo-omni antenna); 25 dBW (Earth-coverage horn antenna).

A.6 CESSATION OF EMISSIONS

All downlink transmissions can be turned on and off by ground telecommand, thereby causing cessation of emissions from the satellite, as required by § 25.207 of the FCC's rules.

A.7 LINK BUDGETS

Four representative link budgets are shown in Tables A.7-1 through A.7-4; two for the CONUS+ beam and two for the Mexico beam. For each beam, two representative modulation schemes have been used: 1) QPSK modulation with 3/4 FEC rate and 2) 8PSK modulation with 3/4 FEC rate; both with an occupied bandwidth of 25.8 MHz. For all link budgets, uplink transmissions are assumed to occur from an earth station located near Las Vegas, NV.

For the CONUS+ beam, the link budgets show both clear sky and rain-faded links to two specific receive earth station locations (New York and Los Angeles). For the Mexico beam, the link budgets assume the receive location is located in Mexico City. For all link budgets, the effect of any uplink rain fade is assumed to be minimized due to the combination of the feeder link earth station's uplink power control capability and the satellite's automatic level control function.

As demonstrated in Section A.8, the downlink power flux density on the Earth's surface will not exceed the valued specified in §25.208(w). In addition, the associated feeder-link earth station transmissions will not exceed the EIRP density limits in §25.223. Because VIASAT-RDBS1 will be located at the precise location identified in the four-degree grid, satisfaction of these criteria demonstrates compliance with §25.140(b) of the Rules. The link budgets also serve to demonstrate that the satellite network would be compatible with a hypothetical co-frequency spacecraft four degrees away that is in compliance with the technical rules for 17/24 GHz spacecraft with the same receiving and transmitting characteristics as the VIASAT-RDBS1 satellite, consistent with §25.140(b) of the Rules. The assumed interference environment used in the development of the link budgets is described in detail in section A.8.

Table A.7-1. CONUS+ Beam; QPSK Modulation.

Link Parameters		Clear Sky (New York)	Faded D/L (New York)	Clear Sky (Los Angeles)	Faded D/L (Los Angeles)
Link Geometry:					
Tx E/S Range to Satellite	(km)	37,154	37,154	37,154	37,154
Rx E/S Range to Satellite	(km)	38,864	38,864	37,050	37,050
Uplink:					
Carrier Frequency	(MHz)	25,000	25,000	25,000	25,000
Tx E/S Antenna Diameter	(m)	9.0	9.0	9.0	9.0
Tx E/S Power to Antenna	(W)	4.8	4.8	4.8	4.8
Tx E/S Power Density to Antenna	(dBW/MHz)	-6.5	-6.5	-6.5	-6.5
Tx E/S Antenna Gain	(dB)	65.6	65.6	65.6	65.6
Tx E/S EIRP per Carrier	(dBW)	72.4	72.4	72.4	72.4
Atmospheric and Other Losses	(dB)	0.5	0.5	0.5	0.5
Free Space Loss	(dB)	211.8	211.8	211.8	211.8
Satellite:					
G/T towards Tx E/S	(dB/K)	9.6	9.6	9.6	9.6
EIRP per Carrier towards Rx E/S	(dBW)	55.3	55.3	53.3	53.3
Downlink:					
Carrier Frequency	(MHz)	17,500	17,500	17,500	17,500
Atmospheric and Other Losses	(dB)	0.3	6.5	0.2	4.7
Free Space Loss	(dB)	209.1	209.1	208.7	208.7
Rx E/S Antenna Diameter	(m)	0.45	0.45	0.45	0.45
Rx E/S Antenna Gain	(dB)	36.1	36.1	36.1	36.1
Pointing Error	(dB)	0.3	0.3	0.3	0.3
Rx E/S G/T	(dB/K)	13.1	10.0	13.1	10.3
System (LNA+Sky) Noise Temp.	(K)	200	412	200	379
Total Link:					
Bandwidth	(dB-Hz)	73.3	73.3	73.3	73.3
C/N - Thermal Uplink	(dB)	25.0	25.0	25.0	25.0
C/N - Thermal Downlink	(dB)	14.0	4.7	12.5	5.2
C/I - Aggregate uplink ASI	(dB)	35.4	35.4	35.4	35.4
C/I - Aggregate downlink ASI	(dB)	19.2	19.2	20.6	20.6
C/I - Other Link Degradations	(dB)	22.0	22.0	22.0	22.0
C/(N+I) - Total, Aggregate Interference	(dB)	12.1	4.4	11.3	5.0
C/(N+I) - Total, Required	(dB)	4.4	4.4	4.4	4.4
Excess Margin	(dB)	7.7	0.0	6.9	0.6
Availability	(%)	N/A	99.90	N/A	99.98

Table A.7-2. CONUS+ Beam; 8PSK Modulation.

Link Parameters		Clear Sky (New York)	Faded D/L (New York)	Clear Sky (Los Angeles)	Faded D/L (Los Angeles)
Link Geometry:					
Tx E/S Range to Satellite	(km)	37,154	37,154	37,154	37,154
Rx E/S Range to Satellite	(km)	38,864	38,864	37,050	37,050
Uplink:					
Carrier Frequency	(MHz)	25,000	25,000	25,000	25,000
Tx E/S Antenna Diameter	(m)	9.0	9.0	9.0	9.0
Tx E/S Power to Antenna	(W)	4.8	4.8	4.8	4.8
Tx E/S Power Density to Antenna	(dBW/MHz)	-6.5	-6.5	-6.5	-6.5
Tx E/S Antenna Gain	(dB)	65.6	65.6	65.6	65.6
Tx E/S EIRP per Carrier	(dBW)	72.4	72.4	72.4	72.4
Atmospheric and Other Losses	(dB)	0.5	0.5	0.5	0.5
Free Space Loss	(dB)	211.8	211.8	211.8	211.8
Satellite:					
G/T towards Tx E/S	(dB/K)	9.6	9.6	9.6	9.6
EIRP per Carrier towards Rx E/S	(dBW)	55.3	55.3	53.3	53.3
Downlink:					
Carrier Frequency	(MHz)	17,500	17,500	17,500	17,500
Atmospheric and Other Losses	(dB)	0.3	3.0	0.2	2.0
Free Space Loss	(dB)	209.1	209.1	208.7	208.7
Rx E/S Antenna Diameter	(m)	0.45	0.45	0.45	0.45
Rx E/S Antenna Gain	(dB)	36.1	36.1	36.1	36.1
Pointing Error	(dB)	0.3	0.3	0.3	0.3
Rx E/S G/T	(dB/K)	13.1	10.9	13.1	11.4
System (LNA+Sky) Noise Temp.	(K)	200	330	200	294
Total Link:					
Bandwidth	(dB-Hz)	73.3	73.3	73.3	73.3
C/N - Thermal Uplink	(dB)	25.0	25.0	25.0	25.0
C/N - Thermal Downlink	(dB)	14.0	9.1	12.5	9.1
C/I - Aggregate uplink ASI	(dB)	35.4	35.4	35.4	35.4
C/I - Aggregate downlink ASI	(dB)	19.2	19.2	20.6	20.6
C/I - Other Link Degradations	(dB)	22.0	22.0	22.0	22.0
C/(N+I) - Total, Aggregate Interference	(dB)	12.1	8.4	11.3	8.5
C/(N+I) - Total, Required	(dB)	8.4	8.4	8.4	8.4
Excess Margin	(dB)	3.7	0.0	2.9	0.1
Availability	(%)	N/A	99.54	N/A	99.88

Table A.7-3. Mexico Beam; QPSK Modulation.

Link Parameters		Clear Sky (Mexico City)	Faded D/L (Mexico City)
Link Geometry:			
Tx E/S Range to Satellite	(km)	37,154	37,154
Rx E/S Range to Satellite	(km)	36,471	36,471
Uplink:			
Carrier Frequency	(MHz)	25,000	25,000
Tx E/S Antenna Diameter	(m)	9.0	9.0
Tx E/S Power to Antenna	(W)	4.8	4.8
Tx E/S Power Density to Antenna	(dBW/MHz)	-6.5	-6.5
Tx E/S Antenna Gain	(dB)	65.6	65.6
Tx E/S EIRP per Carrier	(dBW)	72.4	72.4
Atmospheric and Other Losses	(dB)	0.5	0.5
Free Space Loss	(dB)	211.8	211.8
Satellite:			
G/T towards Tx E/S	(dB/K)	9.6	9.6
EIRP per Carrier towards Rx E/S	(dBW)	57.3	57.3
Downlink:			
Carrier Frequency	(MHz)	17,500	17,500
Atmospheric and Other Losses	(dB)	0.1	7.3
Free Space Loss	(dB)	208.5	208.5
Rx E/S Antenna Diameter	(m)	0.45	0.45
Rx E/S Antenna Gain	(dB)	36.1	36.1
Pointing Error	(dB)	0.3	0.3
Rx E/S G/T	(dB/K)	13.1	9.8
System (LNA+Sky) Noise Temp.	(K)	200	423
Total Link:			
Bandwidth	(dB-Hz)	73.3	73.3
C/N - Thermal Uplink	(dB)	25.0	25.0
C/N - Thermal Downlink	(dB)	16.7	6.3
C/I - Aggregate uplink ASI	(dB)	35.4	35.4
C/I - Aggregate downlink ASI	(dB)	18.8	18.8
C/I - Other Link Degradations	(dB)	22.0	22.0
C/(N+I) - Total, Aggregate Interference	(dB)	13.5	5.9
C/(N+I) - Total, Required	(dB)	4.4	4.4
Excess Margin	(dB)	9.1	1.5
Availability	(%)	N/A	99.99

Table A.7-4. Mexico Beam; 8PSK Modulation.

Link Parameters		Clear Sky (Mexico City)	Faded D/L (Mexico City)
Link Geometry:			
Tx E/S Range to Satellite	(km)	37,154	37,154
Rx E/S Range to Satellite	(km)	36,767	36,767
Uplink:			
Carrier Frequency	(MHz)	25,000	25,000
Tx E/S Antenna Diameter	(m)	9.0	9.0
Tx E/S Power to Antenna	(W)	4.8	4.8
Tx E/S Power Density to Antenna	(dBW/MHz)	-6.5	-6.5
Tx E/S Antenna Gain	(dB)	65.6	65.6
Tx E/S EIRP per Carrier	(dBW)	72.4	72.4
Atmospheric and Other Losses	(dB)	0.5	0.5
Free Space Loss	(dB)	211.8	211.8
Satellite:			
G/T towards Tx E/S	(dB/K)	9.6	9.6
EIRP per Carrier towards Rx E/S	(dBW)	57.3	57.3
Downlink:			
Carrier Frequency	(MHz)	17,500	17,500
Atmospheric and Other Losses	(dB)	0.1	4.3
Free Space Loss	(dB)	208.6	208.6
Rx E/S Antenna Diameter	(m)	0.45	0.45
Rx E/S Antenna Gain	(dB)	36.1	36.1
Pointing Error	(dB)	0.3	0.3
Rx E/S G/T	(dB/K)	13.1	10.4
System (LNA+Sky) Noise Temp.	(K)	200	370
Total Link:			
Bandwidth	(dB-Hz)	73.3	73.3
C/N - Thermal Uplink	(dB)	25.0	25.0
C/N - Thermal Downlink	(dB)	16.7	9.8
C/I - Aggregate uplink ASI	(dB)	35.4	35.4
C/I - Aggregate downlink ASI	(dB)	18.7	18.7
C/I - Other Link Degradations	(dB)	22.0	22.0
C/(N+I) - Total, Aggregate Interference	(dB)	13.5	8.9
C/(N+I) - Total, Required	(dB)	8.4	8.4
Excess Margin	(dB)	5.1	0.5
Availability	(%)	N/A	99.96

A.8 FOUR DEGREE COMPATIBILITY

There are no Commission-licensed, or proposed, 17/24 GHz BSS space stations within four degrees of the 115° W.L. orbital location.

The demonstration of four-degree compatibility is housed in the link budgets contained in Tables A.7-1 through A.7-4. The link budgets show the end-to-end link performance taking into account the assumed interference environment, which is described below.

All link budgets assume pairs of interfering adjacent satellites nominally located at 4° and 8° from the requested orbital location[1] and transmitting digital carriers. The adjacent networks are assumed to be transmitting with an uplink input power density of -56.5 dBW/Hz. The interfering downlink EIRP density assumed is dependent on the receive location. For the New York link budget, each adjacent satellite is assumed to be transmitting so as to cause a PFD level of -118 dBW/m^2/MHz at the victim receive antenna, consistent with §25.208(w)(2), whereas for the Los Angeles link budget, the assumed interfering PFD level at the victim receive antenna is -121 dBW/m^2/MHz, consistent with §25.208(w)(3). For the Mexico beam link budget, the adjacent satellites are assumed to be transmitting so as to cause a PFD level of -115 dBW/m^2/MHz at the victim receive antenna, consistent with §25.208(w)(4). Finally, it is assumed that all wanted and interfering earth station antennas have a sidelobe pattern of 29-25 log(θ).

Tables A.7-1 through A.7-4 demonstrate that the proposed services can successfully operate given the assumed interference environment and with reasonably high link availabilities. As discussed above in Section A.7, with the assumption that the adjacent satellites have similar technical characteristics to the VIASAT-RDBS1 satellite, the link budgets also serve to show that the interference into the adjacent satellite networks is also acceptable.

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[1] To account for station-keeping tolerances, the actual geocentric orbital separations used in the interference calculations were 3.9° and 7.9°.

A.9 PFD ANALYSES

A.9.1 CONUS+ Beam (17.3-17.7 GHz Band)

The maximum operational PFD level that the CONUS+ beam will transmit is -115.54 dBW/m^2/MHz. This occurs in the southeast portion of CONUS. Figure A.9-1 shows the geographic location of the maximum PFD occurrence, as well as the CONUS+ beam's -118 dBW/m^2/MHz, -121 dBW/m^2/MHz and -124 dBW/m^2/MHz PFD contours. The diagram demonstrates that the CONUS+ beam is in compliance with §25.208(w) since:

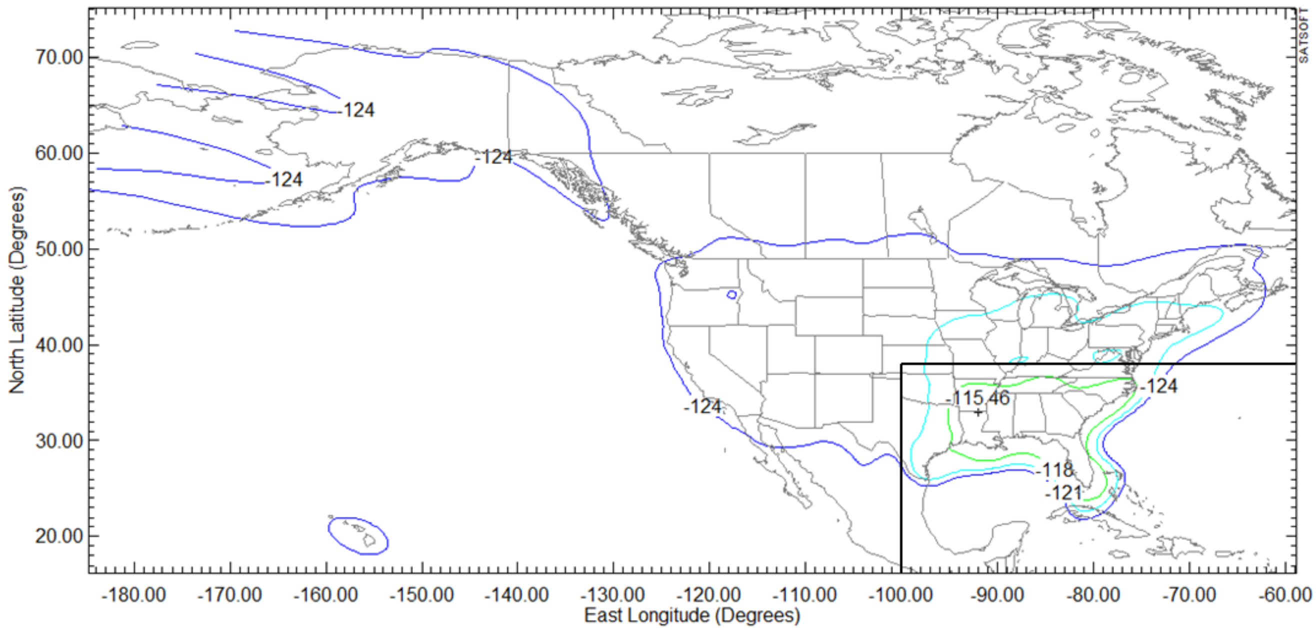
- No PFD levels occurring within the region defined by §25.208(w)(1) exceed the -115 dBW/m^2/MHz limit;

- No PFD levels occurring within the region defined by §25.208(w)(2) exceed the -118 dBW/m^2/MHz limit;

- No PFD levels occurring within the region defined by §25.208(w)(3) exceed the -121 dBW/m^2/MHz limit;

- No PFD levels occurring within the region defined by §25.208(w)(4) exceed the -115 dBW/m^2/MHz limit.

Figure A.9-1: PFD Levels of the CONUS+ Beam



A.9.2 Mexico Beam (17.7-17.8 GHz Band)

The Mexico beam transmits in the 17.7-17.8 GHz band.

§25.208(c) contains Power Flux Density (“PFD”) limits that apply in the 17.7-17.8 GHz band. The PFD limits of §25.208(c) are as follows:

- -115 dB(W/m^2) in any 1 MHz band for angles of arrival between 0 and 5 degrees above the horizontal plane;
- -115+(δ-5)/2 dB(W/m^2) in any 1 MHz band for angles of arrival δ (in degrees) between 5 and 25 degrees above the horizontal plane; and
- -105 dB(W/m^2) in any 1 MHz band for angles of arrival between 25 and 90 degrees above the horizontal plane.

The maximum downlink EIRP density that the Mexico beam is capable of producing is 47.0 dBW/MHz. The shortest distance from the satellite to the Earth is 35,786 km (i.e., at the equator), which corresponds to a spreading loss of 162.06 dB. Therefore, the maximum possible PFD at the Earth’s surface could not exceed -115.06 dBW/m^2/MHz (i.e., 47-162.06), which is less than the most stringent §25.208(c) PFD limit of -115 dBW/m^2 that applies at elevation angles of 5° and below. Accordingly, compliance with the PFD limits of §25.208(c) for the Mexico beam is assured at all angles of arrival.

A.10 ORBITAL DEBRIS MITIGATION PLAN

The spacecraft manufacturer for the VIASAT-RDBS1 satellite has not yet been selected and therefore ViaSat’s Orbital Debris Mitigation Plan is necessarily forward looking. ViaSat will incorporate the material objectives of §25.114(d)(14) of the Commission’s Rules into the design of the satellite through the satellite’s Technical Specifications, Statement of Work and Test Plans. The Statement of Work will include provisions to review orbital debris mitigation as part of the preliminary design review (“PDR”) and the critical design review (“CDR”) and to incorporate its requirements, as appropriate, into its Test Plan, including a formal Failure Mode Verification Analysis (“FMVA”) for orbital debris mitigation involving particularly the TT&C,

propulsion and energy systems. Any updates to the Orbital Debris Mitigation Plan will be reflected in any modification application needed to conform the satellite to the spacecraft manufacturing contract.

A.10.1 Spacecraft Hardware Design

Although the VIASAT-RDBS1 satellite has not been fully designed, ViaSat does not expect that the satellite will undergo any release of debris during its operation. Furthermore, all separation and deployment mechanisms, and any other potential source of debris are expected to be retained by the spacecraft or launch vehicle.

ViaSat will assess and limit the probability of the satellite becoming a source of debris by collisions with small debris or meteoroids of less than one centimeter in diameter that could cause loss of control and prevent post-mission disposal. ViaSat will take steps to limit the effects of such collisions through shielding, the placement of components, and the use of redundant systems. ViaSat will incorporate a rugged TT&C system with regard to meteoroids smaller than 1 cm through redundancy, shielding, separation of components and physical characteristics. The VIASAT-RDBS1 satellite will include two near omni-directional antennas mounted on opposite sides of the spacecraft. These antennas will be extremely rugged and capable of providing adequate coverage even if struck, bent or otherwise damaged by a small or medium sized particle. ViaSat plans to locate the command receivers and decoders and telemetry encoders and transmitters within a shielded area and provide redundancy and physical separation for each component. The VIASAT-RDBS1 satellite will carry a rugged propulsion system capable of withstanding collision with small debris.

A.10.2 Minimizing Accidental Explosions

ViaSat and its spacecraft manufacturer will assess and limit the probability of accidental explosions during and after completion of mission operations. The satellite will be designed to ensure that debris generation will not result from the conversion of energy sources on board the satellite into energy that fragments the satellite. The propulsion subsystem pressure vessels will be designed with high safety margins. Bipropellant mixing is prevented by the use of valves that prevent backwards flow in propellant lines and pressurization lines. All pressures, including those of the batteries, will be monitored by telemetry. At end-of-life and once the satellite has been placed into its final disposal orbit, ViaSat will remove all stored energy from the spacecraft by depleting any residual fuel, leaving all fuel line valves open, venting the pressure vessels and the batteries will be left in a permanent state of discharge.

A.10.3 Safe Flight Profiles

In considering current and planned satellites that may have a station-keeping volume that overlaps the VIASAT-RDBS1 satellite, ViaSat has reviewed the lists of FCC licensed satellite networks, as well as those that are currently under consideration by the FCC. In addition, networks for which a request for coordination has been published by the ITU within ±0.15° of 115.0° W.L. have also been reviewed.

Based on these reviews, there are two operational satellites within ±0.15° from 115.0° W.L: Eutelsat's EUTELSAT 115 WEST B satellite operated nominally at 114.9° and ViaSat's VIASAT-1 satellite operated nominally at 115.1° WL. Both of these satellites operate with an east-west station-keeping of ±0.05°.

There are no pending applications before the Commission for a satellite to be located at an orbital location in the immediate vicinity of 115° W.L. With respect to ITU networks, ViaSat is not aware of any satellite with an overlapping station-keeping volume with the VIASAT-RDBS1 satellite that is the subject of an ITU filing and that is either in orbit or progressing towards launch.

Based on the preceding, ViaSat seeks to locate the VIASAT-RDBS1 satellite at 115.0° W.L. and operated with an east-west station-keeping tolerance of ±0.05°. This eliminates the possibility of any station-keeping volume overlap with the operational Eutelsat and ViaSat satellites. ViaSat concludes there is no requirement to physically coordinate the VIASAT-RDBS1 satellite with another satellite operator at the present time.

A.10.4 Post-Mission Disposal

At the end of the operational life of the VIASAT-RDBS1 satellite, ViaSat will maneuver the satellite to a disposal orbit with a minimum perigee of 300 km above the normal GSO operational orbit. This proposed disposal orbit altitude exceeds the minimum required by §25.283, which is calculated below.

The input data required for the calculation is as follows:

Total Solar Pressure Area "A" = 91 m^2

"M" = Dry Mass of Satellite = 3346 kg

"C_R" = Solar Pressure Radiation Coefficient = 1.5

Using the formula given in §25.283, the Minimum Disposal Orbit Perigee Altitude is calculated as follows:

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

= 36,021 km + 1000 x 1.5 x 91/3346

= 36,062 km

= 276 km above GSO (35,786 km)

Thus, the designed disposal orbit of 300 km above GSO exceeds the required minimum by a margin of 24 km. Maneuvering the satellite to the disposal orbit will require 15 kg of propellant, and this quantity of fuel, taking account of all fuel measurement uncertainties, will be reserved to perform the final orbit raising maneuvers.

A.11 SECTION 25.264 PREDICTIVE GAIN INFORMATION

In accordance with §25.264(a)(6), predictive gain information need not be submitted until 60 days after completion of critical design review for the space station, and is not provided in this application. Calculations of PFD levels with respect to locations of prior-filed U.S. DBS space stations based on such predicted gain data also need not be submitted until that time.

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 pleading, 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 pleading, and that it is complete and accurate to the best of my knowledge and belief.

/s/

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