Description of Amendment

ViaSat, Inc. ("ViaSat") hereby amends its pending application to launch and operate a Ka-band fixed satellite service satellite ("VIASAT-89W") at the nominal 89º W.L. orbital location. *See* FCC File No. SAT-LOA-20100217-00029, Call Sign S2809 ("Satellite Application"). Specifically, ViaSat seeks to locate the VIASAT-89W satellite at 88.9º W.L. instead of 89.1º W.L. as proposed in the Satellite Application.

In the Satellite Application, ViaSat proposed an offset of 0.1º in order to avoid a station-keeping volume overlap with a satellite located at 89.0º W.L., and to center the station-keeping box at 89.1º W.L. There is currently a pending satellite application for a Ka-band system to be located at 90.9º W.L.[1] In order to maintain a full two-degree separation from the proposed system at 90.9º W.L., ViaSat amends the Satellite Application to request a different offset. ViaSat now proposes to locate VIASAT-89W at 88.9º W.L.

This amendment provides the relevant technical specifications associated with VIASAT-89W at 88.9º W.L.. The Schedule S and the Attachment A Technical Information to Supplement Schedule S in this amendment are intended to replace those in the Satellite Application. The amendments to the Schedule S and the technical attachment reflect changes to (i) the references to the exact offset, (ii) the maximum pfd levels (including a correction in the calculation of such levels in Table 7-2), (iii) the safe-flight profile analysis, (iv) the satellite beam gain contours (in GXT format), which have been modified to reflect the revised offset, and (v) the description of the compatibility with Intelsat's pending application to operate the GALAXY KA satellite at 89.1º W.L. to reflect the Intelsat's recent amendment to that application.

As a result of this amendment, the references to 89.1º W.L. in the Satellite Application narrative – in the caption and in the introduction on page 1, and in the reference to the requested location on page 3 – are hereby changed to 88.9º W.L. Additionally, since the time the Satellite Application was filed, The Baupost Group, L.L.C. and its affiliates increased their ownership in ViaSat's voting stock to 21.78 percent, and FMR LLC and its affiliates increased their ownership in ViaSat's voting stock to 12.83 percent.[2] All other information and requests provided in the narrative to the Satellite Application remain the same, including information and requests regarding the frequencies proposed, services to be provided, and ViaSat's qualifications and management.

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[1] *See* Hughes Network Systems, LLC, Letter of Intent to Access the U.S. Market Using a Non-U.S. Licensed Ka-Band Geostationary Fixed-Satellite Service Satellite at the 90.9º W.L. Orbital Location, FCC File No. SAT-LOI-20091110-00121, Call Sign S2755.

[2] Beneficial ownership percentages based on SEC Form 13G filings made as of May 28, 2010.

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-89W 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-89W satellite will operate at the nominal 89° W.L. orbital location and will provide Ka-band services to CONUS and parts of South America. As explained in section A.12.3, ViaSat proposes to offset the satellite by 0.1° from 89º W.L. and to center the station-keeping box at 88.9° W.L. Selecting the 88.9° W.L. location also creates a two-degree separation from a proposed Ka-band satellite at 90.9° W.L.

For service to CONUS, the satellite will operate in the 28.1-28.6 GHz band (Earth-to-space) and the 18.3-18.8 GHz band (space-to-Earth). For service to parts of South America, the satellite will operate in the 28.1-28.6 GHz and 29.5-30.0 GHz bands (Earth-to-space) and the 18.3-18.8 GHz and 19.7-20.2 GHz bands (space-to-Earth). The satellite uses both left and right hand circular polarization (LHCP and RHCP) together with beam separation to achieve full frequency re-use at acceptable levels of co- and cross-polarized intra-system interference.

The VIASAT-89W satellite will provide broadband services to small user antennas. As well, a limited number of larger, gateway-type antennas will be employed. The gateway antennas will have the capability of transmitting in any channel of the 28.1-28.6 GHz and 29.5-30.0 GHz bands. Uplink transmissions in the 28.1-28.35 GHz band will be limited to the gateway antennas. Uplink transmissions from the smaller user antennas will be restricted to the 28.35-28.6 GHz and 29.5-30.0 GHz bands.

A.3 SPACE STATION TRANSMIT AND RECEIVE CAPABILITY

The VIASAT-89W satellite's beam coverage, for both transmit and receive, will consist of a CONUS beam and a South American beam. Both downlink beams provide a peak downlink EIRP of 61.2 dBW and both uplink beams have a peak G/T of 6.5 dB/K.

A.4 FREQUENCY AND POLARIZATION PLAN

The VIASAT-89W satellite's frequency plan and beam-connectivity is provided in the Schedule S form. There are a total of twenty-four channels, although only sixteen of these can be active at any one time so as to not exceed the available spacecraft power. All channels have a bandwidth of 110 MHz channels.

For the 28.1-28.6 GHz and 18.3-18.8 GHz bands, four transponders are nominally assigned for inter-CONUS traffic and four transponders are nominally assigned for inter-South American traffic, although any of the four CONUS transponders can be switched to downlink to the South American beam and any of the four South American transponders can be switched to downlink to the CONUS beam. For the 29.5-30 GHz and 19.7-20.2 GHz bands, there are eight transponders permanently assigned for inter-South American traffic.

For the 28.1-28.6 GHz and 18.3-18.8 GHz bands, the satellite will employ full frequency re-use through the use of two spatially separated beams: the CONUS and South American beams. Each beam operates in a single polarization and the two beams operate in opposite polarizations from each other. For the 29.5-30 GHz and 19.7-20.2 GHz bands, full frequency re-use is obtained through the use of dual orthogonal polarizations. These satisfy the requirements of §25.210(d) of the Rules.

A.5 SERVICES TO BE PROVIDED

The VIASAT-89W satellite will be capable of providing a variety of FSS services including high capacity, two-way, broadband communications. Representative link budgets, which include details of the transmission characteristics, performance objectives and earth station characteristics, are provided in the associated Schedule S submission. All link budgets assume both the uplink and downlink locations lie on the -3 dB gain contour and with a 35 degree elevation angle between the relevant earth station antenna and the satellite. A rain rate of 58.6 mm/hour has been assumed. All link budgets assume an interference environment of six adjacent satellite networks spaced ±2°, ±4° and ± 6° away from the VIASAT-89W satellite and transmitting at the levels of §25.138. As described in section A.9, the link budgets for the 29.5-30 GHz / 19.7-20.2 GHz bands also take into account worst-case interference levels from the operational and proposed Intelsat satellite networks; both nominally at 89°W.L.

A.6 TT&C CHARACTERISTICS

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

The 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 edges of the 28/18 GHz frequency bands during all phases of the mission. All transmissions will operate in a circular polarization mode.

During transfer orbit and on-station emergencies the TT&C subsystem employs a dual omni-directional antenna configuration. During normal on-station operation, the CONUS beam is used. The TT&C earth station locations have not yet been selected.

A.7 TWO DEGREE COMPATIBILITY

All transmissions of the VIASAT-89W satellite network will not exceed the uplink off-axis EIRP density and downlink PFD levels of §25.138, regardless of whether the frequency band used is subject to §25.138.

A.7.1 Frequency Bands Subject to §25.138

For those frequency bands subject to §25.138, compliance with the Commission's two-degree spacing policy is assured provided:

1) The uplink off-axis EIRP density levels of §25.138(a)(1) of the Rules for blanket licensing are not exceeded;

2) The maximum PFD levels are lower than the PFD values given in §25.138(a)(6) of the Rules.

The clear sky uplink off-axis EIRP density limits of §25.138(a)(1) are equivalent to a maximum uplink input power density of -56.5 dBW/Hz. Table 7-1 compares the uplink input power densities derived from the uplink link budgets (uplink locations moved to the -6 dB contour) that are contained in the Schedule S form with the clear sky limits of §25.138 (a)(1) of the Rules. It can be seen that in all cases the clear sky uplink power limits are met. No authorized uplink transmissions towards the VIASAT-89W satellite will exceed the clear sky uplink off-axis EIRP density limits of §25.138(a)(1). In addition, authorized transmitting earth station antennas will meet the requirements of §25.209(a) and (b).

Table 7-1. Demonstration of Compliance with the Uplink Power limits of §25.138 (a)(1)

Uplink Antenna Size (m)	Emission	Maximum Clear Sky Uplink Input Power Density (dBW/Hz)	Clear Sky Uplink Input Power Density Limit of §25.138 (a)(1) (dBW/Hz)	Excess Margin (dB)
7.3	110MG7D	-63.4	-56.5	6.9
0.95	2M75G7D	-56.6	-56.5	0.1
0.95	2M07G7D	-56.65	-56.5	0.15
0.67	1M38G7D	-56.6	-56.5	0.1
0.67	900KG7D	-56.7	-56.5	0.2

The maximum downlink EIRP density and hence the maximum PFD levels that will be transmitted by the VIASAT-89W satellite occurs with the transponder-saturating single-carrier 110 MHz emission. Tables 7-2 and 7-3 show the maximum PFD levels that will be transmitted by the CONUS and South American beam, respectively, and compare those to the PFD levels of §25.138(a)(6). It can be seen that the maximum PFD levels are below those of §25.138(a)(6) for both beams. No downlink transmissions from the VIASAT-89W satellite will exceed the PFD levels of §25.138(a)(6).

Tables 7-2 and 7-3 also serve to demonstrate compliance with the PFD limits of §25.208(c) and §25.208(d).

Table 7-2. Maximum PFD levels for the CONUS beam.

Maximum EIRP (dBW)	61.2						
Occupied Bandwidth (MHz)	93.62						
Elevation Angle (degrees)	0	5	10	15	20	25	Boresight
Beam Contour (dB)	-16.9	-16.9	-17.5	-13.8	-8.7	-5.1	0
Spreading Loss (dB/ m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.3
Maximum PFD (dBW/m^2/MHz)	-138.7	-138.6	-139.1	-135.3	-130.1	-126.4	-120.7
FCC PFD Level (dBW/m^2/MHz)	-118	-118	-118	-118	-118	-118	-118
Margin (dB)	20.7	20.6	21.1	17.3	12.1	8.4	2.7

Table 7-3. Maximum PFD levels for the South American beam (applicable to either downlink band).

Maximum EIRP (dBW)	61.2						
Occupied Bandwidth (MHz)	93.62						
Elevation Angle (degrees)	0	5	10	15	20	25	Boresight
Beam Contour (dB)	-12.4	-11.8	-10.4	-8.3	-6.0	-3.7	0
Spreading Loss (dB/ m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.6
Maximum PFD (dBW/ m^2/MHz)	-134.2	-133.5	-132.0	-129.8	-127.4	-125.0	-121.0
FCC PFD Level (dBW/ m^2/MHz)	-118	-118	-118	-118	-118	-118	-118
Margin (dB)	16.2	15.5	14.0	11.8	9.4	7.0	3.0

A.7.2 Two-Degree Compatibility Demonstration for the 28.1-28.35 GHz Band

In order to demonstrate two-degree compatibility, the uplink transmission parameters of the gateway antennas have been assumed as both the wanted and victim carriers. Since the uplink input power densities for both the wanted and victim carriers are assumed to be identical, the uplink C/I is simply the difference between the on-axis gain and the off-axis gain. The uplink C/I ratio is calculated as follows:

$$(C/I)_{up} = G_{max} - (29-25*\log(\theta))$$

$$= 64.9 - (29-25*\log(2)) = 43.4 \text{ dB}$$

The calculated C/I ratio is quite large and clearly demonstrates two-degree compatibility. Note the above calculation did not take into account any advantage for topocentric-to-geocentric conversion.

A.8 SHARING WITH LMDS AND NGSO FSS IN THE 28.1-28.35 GHZ BAND

The 28.1-28.35 GHz band is allocated to LMDS on a primary basis and it is allocated to the FSS on a secondary basis. §2.105(c)(2) states, in part, that stations of a secondary service:

(i) Shall not cause harmful interference to stations of primary services to which frequencies are already assigned or to which frequencies may be assigned at a later date;

(ii) Cannot claim protection from harmful interference from stations of a primary service to which frequencies are already assigned or may be assigned at a later date;

Regarding §2.105(c)(2)(i), uplinks from gateway earth stations that are located in the Continental United States must be operated in a manner such that they do not cause harmful interference to any current or future licensed LMDS station. Technical compatibility will be accomplished primarily through geographic separation between the gateway antennas and the LMDS stations. Shielding may also be used, if necessary. Regarding §2.105(c)(2)(ii), transmitting LMDS stations cannot cause harmful interference into a gateway since the gateway antenna does not receive transmissions in the 28.1-28.35 GHz band. Harmful interference occurring from the aggregation of transmitting LMDS stations into either of the receive satellite beams of the VIASAT-89W satellite is considered to be unlikely, however ViaSat undertakes to accept this risk and will not seek protection from such interference in the event it occurs.

ViaSat expects to deploy gateway antennas at various locations within the U.S. and outside the United States as well. The locations have not yet been selected. The gateway locations will be selected such that sufficient geographical separation from existing LMDS stations is achieved. The applications for those earth stations will need to include a technical analysis to demonstrate that the proposed operations will not cause harmful interference into any licensed LMDS station. The earth station licensee will need to take appropriate actions to protect any future licensed LMDS station that has the potential to receive harmful interference from its gateways, including ceasing transmissions if necessary.

Currently there are no operational NGSO systems authorized by the Commission to use the 28.1-28.35 GHz band, nor are there any pending applications before the Commission for use of the 28.1-28.35 GHz band by a NGSO system. Accordingly, there is no requirement to demonstrate technical compatibility with any NGSO system.

A.9 COMPATABILITY WITH OPERATIONAL AND PROPOSED INTELSAT SATELLITE NETWORKS NOMINALLY AT 89°W.L.

Intelsat operates the GALAXY-28 satellite at 89°W.L. The satellite includes a Ka-band payload which is used to provide service to CONUS. The payload has twenty four uplink beams and four downlink beams as shown in Figure 9-1. The Ka-band payload operates in the 29.5-30 GHz and 19.7-20.2 GHz bands only. Intelsat also has a pending application before the Commission seeking authority to operate the GALAXY KA satellite at 89.1°W.L.[1] The proposed GALAXY KA satellite will use the 29.5-30.0 GHz and 19.7-20.2 GHz bands and provide service to North America only, as shown in Figure 9-2. Thus while both the VIASAT-89W satellite and the operational and proposed Intelsat satellites use the same bands, they provide service to different geographic areas (i.e., South America by ViaSat and North America by Intelsat).

In order to demonstrate compatibility of the Intelsat networks causing interference into the VIASAT-89W network for this co-frequency, non-co-coverage situation, the South American link budgets embedded in the associated Schedule S form include worst-case interference calculations from the Intelsat networks. Specifically, the following transmissions associated with the Intelsat North American beams have been assumed as collocated interference sources:

Uplink Input Power Density: -56.5 dBW/Hz into a 6 meter antenna

Downlink EIRP Density: -16.3 dBW/Hz

Note that the above interfering uplink input power density assumption is considered to be an unrealistic situation considering this maximum allowable uplink input power density is normally associated with small transmitting antennas, but it leads to a worst-case interference scenario. As well, the downlink EIRP density is the maximum that can be transmitted by either Intelsat satellite. Finally, 30 dB of spatial isolation was assumed between Intelsat's beams and ViaSat's

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1 *See* IBFS File Nos. SAT–AMD–20100302–00038; SAT-AMD-20100316-0050..

South American beam. The link budgets demonstrate that the VIASAT-89W services can achieve their performance objectives within this assumed interference environment.

ViaSat has successfully coordinated its proposed South American operations with Intelsat and therefore a technical compatibility analysis of the VIASAT-89W satellite network interfering into Intelsat's networks has not been provided herein.

Figure 9-1. GALAXY-28 satellite's Ka-band Beams (uplink beams in red; downlink beams in yellow).

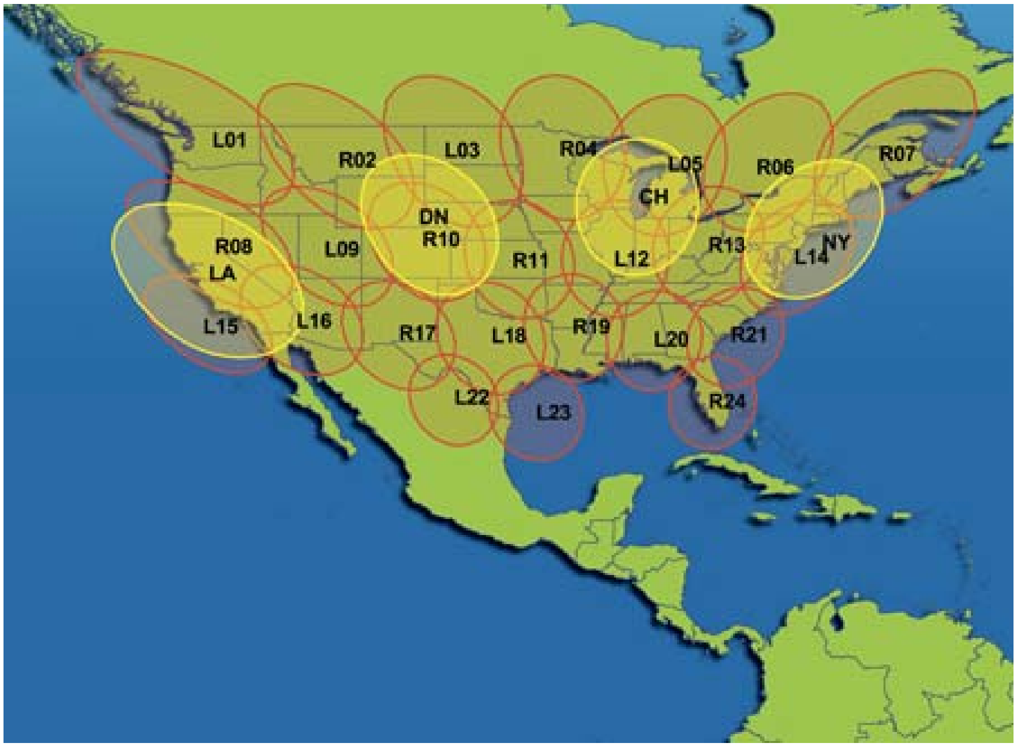
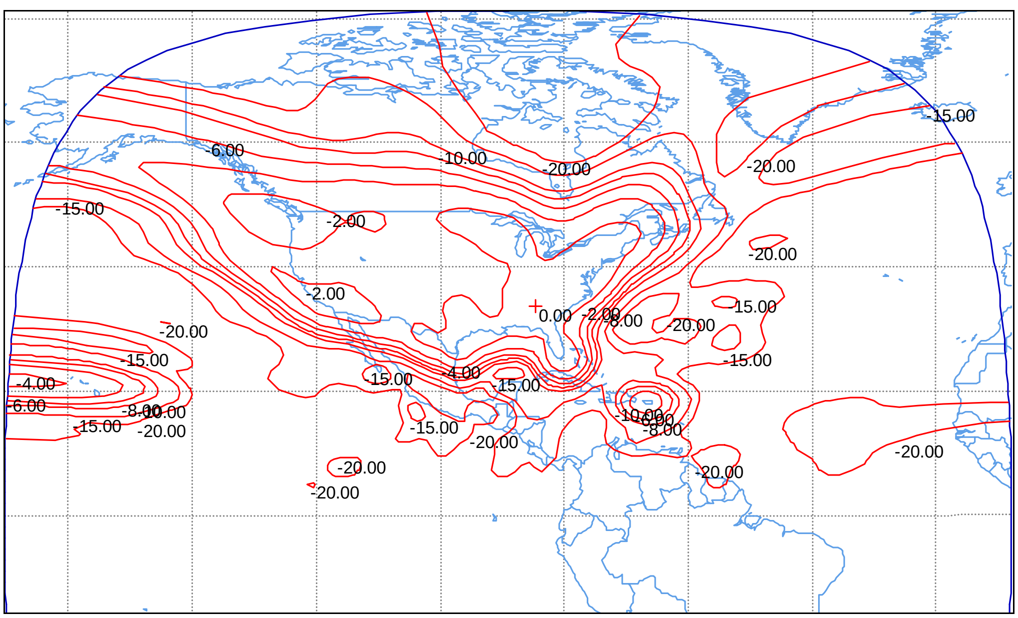


Figure 9-2. GALAXY KA satellite's North American Beam (uplink and downlink).



A.10 SPACECRAFT LIFETIME AND RELIABILITY

The spacecraft manufacturer for the VIASAT-89W satellite has not yet been selected. The payload design of the satellite has been based around the expected characteristics of the 3-axis stabilized spacecraft available from the three major U.S. suppliers (Boeing, Lockheed Martin and Loral).

The VIASAT-89W satellite will be designed for a 15 year lifetime. The spacecraft reliability will be consistent with current manufacturing standards in place for the major suppliers of space hardware. Bus reliability will be greater than 0.8 with an overall spacecraft reliability to EOL of greater than 0.75. TWTA and receiver sparing will be consistent with documented failure rates which allow attaining the overall spacecraft reliability numbers stated above.

ViaSat will provide the Commission with full and precise spacecraft physical and electrical characteristics when the satellite manufacturer has been selected and the satellite fully designed. Estimates of these characteristics are included in the Schedule S form.

A.11 PREDICTED RECEIVER AND TRANSMITTER CHANNEL FILTER RESPONSE CHARACTERISTICS

The predicted receiver and transmitter frequency responses of the 110 MHz channels, as measured between the receive antenna input and transmit antenna, are shown in Table 11-1 below. In addition, the frequency tolerances of §25.202(e) and the out-of-band emission limits of §25.202(f) (1), (2) and (3) will be met.

Table 11-1: Predicted Channel Receiver and Transmitter Frequency Responses

	Attenuation Relative to Peak Level (dB)		
Offset from Channel Center Frequency (MHz)	Receive Section	Transmit Section	Total
±18	0.10	0.12	0.22
±28	0.15	0.29	0.44
±38	0.20	0.59	0.79
±49	0.30	0.96	1.26
±55	0.80	2.54	3.34
±67	15.3	10.2	25.5
±78	30.3	25.2	55.5
±92	35.3	25.2	60.5

A.12 ORBITAL DEBRIS MITIGATION PLAN

The spacecraft manufacturer for the VIASAT-89W 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. During this process, some changes to the Orbital Debris Mitigation Plan may occur and ViaSat will provide the Commission with updated information, as appropriate.

A.12.1 Spacecraft Hardware Design

Although the VIASAT-89W satellite has not been completely 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-89W 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-89W satellite will carry a rugged propulsion system capable of withstanding collision with small debris.

A.12.2 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.12.3 Safe Flight Profiles

In considering current and planned satellites that may have a station-keeping volume that overlaps the VIASAT-89W 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, non-USA networks for which a request for coordination has been published by the ITU within ±0.15° of 88.9° W.L. have also been reviewed.

Intelsat operates the C-/Ku-/Ka-band GALAXY-28 satellite at 89° W.L. with an east-west station-keeping tolerance of ±0.05°. There are no pending applications before the Commission within ±0.15° of 88.9° W.L. With respect to published ITU filings, there are two Papua New Guinea ("PNG") networks at 89°W.L. ViaSat can find no evidence that these PNG networks are being progressed towards launch.

Based on the preceding, ViaSat seeks to locate the VIASAT-89W satellite at 88.9° W.L. in order to eliminate the possibility of any station-keeping volume overlap with the GALAXY-28 satellite. ViaSat therefore concludes that physical coordination of the VIASAT-89W satellite with another party is not required at the present time.

A.12.4 Post-Mission Disposal

At the end of the operational life of the VIASAT-89W satellite, ViaSat will maneuver the satellite to a disposal orbit with a minimum perigee of 300 km above the normal GSO operational orbit. The post-mission disposal orbit altitude is based on the following calculation, according to §25.283:

Total Solar Pressure Area "A" = 96 m^2

"M" = Dry Mass of Satellite = 3350 kg

"C_R" = Solar Pressure Radiation Coefficient = 2 (worst case)

Therefore the Minimum Disposal Orbit Perigee Altitude is calculated as:

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

= 36,021 km + 1000 x 2 x 96/3350

= 36,078.3 km

= 292.3 km above GSO (35,786 km)

To provide adequate margin, the disposal orbit will be increased to 300 km. This will require approximately 14.8 kg of propellant, taking account of all fuel measurement uncertainties, which will be allocated and reserved in order to perform the final orbit raising maneuver.

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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