Approved by OMD Control Number 3060-0678
Estimated Burden Hours: 80

| FCC 312<br>Schedule S | FEDERAL COMMUNICATIONS COMMISSION<br>SATELLITE SPACE STATION AUTHORIZATIONS<br>(Technical and Operational Description) | Page 1: General, Frequency Bands, and GSO Orbit |
|---|---|---|

S1. GENERAL INFORMATION Complete for all satellite applications.

| a. Space Station or Satellite Network Name: VIASAT-109W | | e. Estimated Date of Placement into Service: | i Will the space station(s) operate on a Common Carrier Basis: N |
|---|---|---|---|
| b. Construction Commencement Date: | | f. Estimated Lifetime of Satellite(s): 15 Years | j. Number of transponders offered on a common carrier basis: |
| c. Construction Completion Date: | | g. Total Number of Transponders: | k. Total Common Carrier Transponder Bandwidth: MHz |
| d1. Est Launch Date Begin: | d2. Est Launch Date End: | h. Total Transponder Bandwidth (no. transponders x Bandwidth) MHz | l. Orbit Type: Mark all boxes that apply: [X] GSO [ ] NGSO |

S2. OPERATING FREQUENCY BANDS Identify the frequency range and transmit/receive mode for all frequency bands in which this station will oper
Also indicate the nature of service(s) for each frequency band.

| Frequency Band Limits | | | | e. T/R Mode | f. Nature of Service(s): List all that apply to this band |
|---|---|---|---|---|---|
| Lower Frequency (_Hz) | | Upper Frequency (_Hz) | | | |
| a. Numeric | b. Unit (K/M/G) | c. Numeric | d. Unit (K/M/G) | | |
| 28.1 | G | 28.35 | G | R | Fixed Satellite Service |
| 28.35 | G | 28.6 | G | R | Fixed Satellite Service |
| 28.6 | G | 29.1 | G | R | Fixed Satellite Service |
| 29.5 | G | 30 | G | R | Fixed Satellite Service |
| 18.3 | G | 18.8 | G | T | Fixed Satellite Service |
| 18.8 | G | 19.3 | G | T | Fixed Satellite Service |
| 19.7 | G | 20.2 | G | T | Fixed Satellite Service |

S3. ORBITAL INFORMATION FOR GEOSTATIONARY SATELLITES ONLY:

| a. Nominal Orbital Longitude (Degrees E/W): 109.1 W | b. Alternate Orbital Longitude (Degrees E/W): | | c. Reason for orbital location selection: |
|---|---|---|---|
| Longitudinal Tolerance or E/W Station-Keeping:<br>d. Toward West: 0.05 Degrees<br>e. Toward East: 0.05 Degrees | f. Inclination Excursion or N/S Station-Keeping Tolerance: 0.05 Degrees | Range of orbital are in which adequate service can be provided (Optional): Degrees E/W<br>g. Westernmost:<br>h. Easternmost: | |
| i. Reason for service are selection (Optional): | | | |

**FEDERAL COMMUNICATIONS COMMISSION**
**SATELLITE SPACE STATION AUTHORIZATIONS**
**FCC Form 312 - Schedule S: (Technical and Operational Description)**

S4. ORBITAL INFORMATION FOR NON-GEOSTATIONARY SATELLITES ONLY

S4a. Total Number of Satellites in Network or System:

S4b. Total Number of Orbital Planes in Network or System:

S4c. Celestial Reference Body (Earth, Sun, Moon, etc.):

S4d. Orbit Epoch Date:

For each Orbital Plane Provide:

| (e) Orbital Plane No. | (f) No. of Satellites in Plane | (g) Inclination Angle (degrees) | (h) Orbital Period (Seconds) | (i) Apogee (km) | (j) Perigee (km) | (k) Right Ascension of the Ascending Node (Deg.) | (l) Argument of Perigee (Degrees) | Active Service Arc Range (Degrees) | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | (m) Begin Angle | (n) End Angle | (o) Other |

S5. INITIAL SATELLITE PHASE ANGLE For each satellite in each orbital plane, provide the intital phase angle.

| (a) Orbital Plane No. | (b) Satellite Number | (c) Initial Phase Angle (Degrees) |
|---|---|---|

**NO NGSO DATA FILED**

**FEDERAL COMMUNICATIONS COMMISSION**
**SATELLITE SPACE STATION AUTHORIZATIONS**
**FCC Form 312 - Schedule S: (Technical and Operational Description)**



S6. SERVICE AREA CHARACTERISTICS for each service area provide:

| (a) Service Area ID | (b) Type of Associated Station (Earth or Space) | (c) Service Area Diagram File Name (GXT File) | (d) Service Area Description. Provide list of geographic areas (state postal codes or ITU 3-ltr codes), satellites or Figure No. of Service Area Diagram. |
|---|---|---|---|
| SA1 | E | | CONUS, Alaska, Hawaii, Puerto Rico and the U.S. Virgin Islands. |
| SA2 | E | | North America |

**FEDERAL COMMUNICATIONS COMMISSION**
**SATELLITE SPACE STATION AUTHORIZATIONS**
**FCC Form 312 - Schedule S: (Technical and Operational Description)**

S7. SPACE STATION ANTENNA BEAM CHARACTERISTICS For each antenna beam provide:

| (a) Beam ID | (b) T/R Mode | Isotropic Antenna Gain | | (e) Pointing Error (Degrees) | (f) Rotational Error (Degrees) | (g) Min. Cross-Polar Isolation (dB) | (h) Polarization Switchable? (Y/N) | (i) Polarization Alignment Rel. Equatorial Plane (Degrees) | (j) Service Area ID | Transmit | | | Receive | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | (c) Peak (dBi) | (d) Edge (dBi) | | | | | | | (k) Input Losses (dB) | (l) Effective Output Power (W) | (m) Max. EIRP (dBW) | (n) System Noice Temp (k) | (o) G/T Max. Gain Pt. (db/K) | (p) Min. Saturation Flux Density (dBW/m2) | Input Attenuator (dB) | |
| | | | | | | | | | | | | | | | | (q) Max. Value | (r) Step Size |
| RXA | R | | | 0.05 | 0.05 | 24 | N | | SA1 | | | | | 30.9 | -105 | | |
| RXAL | R | | | 0.05 | 0.05 | 24 | N | | SA1 | | | | | 30.9 | -105 | | |
| TXAR | T | | | 0.05 | 0.05 | 24 | N | | SA1 | | | 72.7 | | | | | |
| TXAL | T | | | 0.05 | 0.05 | 24 | N | | SA1 | | | 72.7 | | | | | |
| RXB | R | | | 0.05 | 0.05 | 24 | N | | SA1 | | | | | 22.2 | -105 | | |
| RXBL | R | | | 0.05 | 0.05 | 24 | N | | SA1 | | | | | 22.2 | -105 | | |
| TXBR | T | | | 0.05 | 0.05 | 24 | N | | SA1 | | | 64.3 | | | | | |
| TXBL | T | | | 0.05 | 0.05 | 24 | N | | SA1 | | | 64.3 | | | | | |
| DNAT | T | | | 0.05 | 0.05 | 24 | N | 90 | SA2 | | | 33.7 | | | | | |

**FEDERAL COMMUNICATIONS COMMISSION**
**SATELLITE SPACE STATION AUTHORIZATIONS**
**FCC Form 312 - Schedule S: (Technical and Operational Description)**



S8. ANTENNA BEAM DIAGRAMS For each beam pattern provide the reference to the graphic image and numerical data:
Also provide the power flux density levels in each beam that result from the emission with the highest power flux density.

| (a) Beam ID | (b) T/R Mode | (c) Co-or Cross Polar Mode ("C" or" X") | (d) GSO Ref. Orbital Longitude (Deg. E/W) | (e) NGSO Antenna Gain Contour Description (Figure/Table/ Exhibit) | (f) GSO Antenna Gain Contour Data (GXT File) | Max. Power Flux Density (dBW/M2/Hz) At Angle of Arrival above horizontal (for emission with highest PFD) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | (g) 5 Deg | (h) 10 Deg | (i) 15 Deg | (j) 20 Deg | (k) 25 Deg |
| RXA | R | C | -109.1 | | | | | | | |
| RXAL | R | C | -109.1 | | | | | | | |
| RXB | R | C | -109.1 | | | | | | | |
| RXBL | R | C | -109.1 | | | | | | | |
| TXAR | T | C | -109.1 | | | -118 | -118 | -118 | -118 | -118 |
| TXAL | T | C | -109.1 | | | -118 | -118 | -118 | -118 | -118 |
| TXBR | T | C | -109.1 | | | -118 | -118 | -118 | -118 | -118 |
| TXBL | T | C | -109.1 | | | -118 | -118 | -118 | -118 | -118 |
| DNAT | T | C | -109.1 | | | -131.1 | -131.1 | -131.1 | -131.1 | -131.1 |

**FEDERAL COMMUNICATIONS COMMISSION**
**SATELLITE SPACE STATION AUTHORIZATIONS**
**FCC Form 312 - Schedule S: (Technical and Operational Description)**



S9. SPACE STATION CHANNELS For each frequency channel provide:

| (a) Channel No. | (B) Assigned Bandwidth (kHz) | (c) T/R Mode | (d) Center Frequency (MHz) | (e) Polarization (H, V, L, R) | (f) TTC or Comm Channel (T or C) |
|---|---|---|---|---|---|
| UL01 | 500000 | R | 28350 | R | C |
| UL02 | 500000 | R | 28350 | L | C |
| UL03 | 500000 | R | 28850 | R | C |
| UL04 | 500000 | R | 28850 | L | C |
| UL05 | 500000 | R | 29750 | R | C |
| UL06 | 500000 | R | 29750 | L | C |
| DL01 | 500000 | T | 18550 | L | C |
| DL02 | 500000 | T | 18550 | R | C |
| DL03 | 500000 | T | 19050 | L | C |
| DL04 | 500000 | T | 19050 | R | C |
| DL05 | 500000 | T | 19950 | L | C |
| DL06 | 500000 | T | 19950 | R | C |
| DNAT1 | 7500 | T | 18796 | V | T |
| DNAT2 | 1 | T | 18796 | V | T |

S10. SPACE STATION TRANSPONDERS For each transponder provide:

| (a) Transponder ID | (b) Transponder Gain (dB) | Receive Band | | Transmit Band | |
|---|---|---|---|---|---|
| | | (c) Channel No. | (d) Beam ID | (e) Channel No. | (f) Beam ID |
| T001 | | UL01 | RXAR | | |
| T002 | | UL02 | RXAL | | |
| T003 | | UL03 | RXAR | | |
| T004 | | UL04 | RXAL | | |
| T005 | | UL05 | RXAR | | |
| T006 | | UL06 | RXAL | | |
| T007 | | UL01 | RXBR | | |
| T008 | | UL02 | RXBL | | |
| T009 | | UL03 | RXBR | | |
| T010 | | UL04 | RXBL | | |
| T011 | | UL05 | RXBR | | |
| T012 | | UL06 | RXBL | | |
| T013 | | | | DL01 | TXAL |
| T014 | | | | DL02 | TXAR |
| T015 | | | | DL03 | TXAL |
| T016 | | | | DL04 | TXAR |
| T017 | | | | DL05 | TXAL |
| T018 | | | | DL06 | TXAR |
| T019 | | | | DL01 | TXBL |
| T020 | | | | DL02 | TXBR |
| T021 | | | | DL03 | TXBL |
| T022 | | | | DL04 | TXBR |
| T023 | | | | DL05 | TXBL |
| T024 | | | | DL06 | TXBR |
| DNAT1 | | | | DNAT1 | DNAT |
| DNAT2 | | | | DNAT2 | DNAT |

**FEDERAL COMMUNICATIONS COMMISSION**
**SATELLITE SPACE STATION AUTHORIZATIONS**
**FCC Form 312 - Schedule S: (Technical and Operational Description)**



S11. DIGITAL MODULATION PARAMETERS For each digital emission provide:

| (a) Digital Mod. ID | (b) Emission Designator | (c) Assigned Bandwidth (kHz) | (d) No. of Phases | (e)Uncoded Data Rate (kbps) | (f) FEC Error Correction Coding Rate | (g) CDMA Processing Gain (dB) | (h) Total C/N Performance Objective (dB) | (i) Single Entry C/I Objective (dB) |
|---|---|---|---|---|---|---|---|---|
| D1 | 500MG7D | 500000 | | | | | | |
| D2 | 6M25G7D | 6250 | | | | | | |
| D3 | 3M13G7D | 3125 | | | | | | |
| D4 | 1M57G7D | 1562.5 | | | | | | |
| D5 | 782KG7D | 781.25 | | | | | | |
| D6 | 3M88G7D | 3874 | | | | | | |

**FEDERAL COMMUNICATIONS COMMISSION** **Page 8: Analog Modulation**
**SATELLITE SPACE STATION AUTHORIZATIONS**
**FCC Form 312 - Schedule S: (Technical and Operational Description)**

S12. ANALOG MODULATION PARAMETERS For each analog emission provide:

| (a) Analog Mod. ID | (b) Emission Designator | (c) Assigned Bandwidth (kHz) | (d) Signal Type | (e) Channels per Carrier | Multi-channel Telephony | | | | (j) Video Standard NTSC, PAL, etc. | (k) Video Noise-Weighting (dB) | (l) Video and SCPC/FM Modulation Index | (m) SCPC/FM Compander, Preemphasis, and Noise Weighting (dB) | (n) Total C/N Performance Objective (dB) | (o) Single Entry C/I Objective (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | (f) Ave. Companded Talker Level (dBm0) | (g) Bottom Baseband Freq. (MHz) | (h) Top Baseband Freq. (MHz) | (i) RMS Modulation Index | | | | | | |
| A1 | 7M50G2D | 7500 | | | | | | | | | | | | |
| A2 | 1K00N0N | 1 | | | | | | | | | | | | |

**FEDERAL COMMUNICATIONS COMMISSION** **Page 9: Typical Emissions**
**SATELLITE SPACE STATION AUTHORIZATIONS**
**FCC Form 312 - Schedule S: (Technical and Operational Description)**

S13. TYPICAL EMISSIONS For each planned type of emission provide:

| Associated Transponder ID Range | | Modulation ID | | (e) Carriers per Transponder | (f) Carrier Spacing (kHz) | (g)Noise Budget Reference (Table No.) | (h) Energy Dispersal Bandwidth (kHz) | Receive Band (Assoc. Transmit Stn) | | | Transmit Band (This Space Station) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | (i)Assoc. Stn. Max. Antenna Gain (dBi) | Assoc. Station Transmit Power (dBW) | | EIRP (dBW) | | (n) Max. Power Flux Density (dBW/m2/Hz) | (o)Assoc. Stn Rec. G/T (dB/K) |
| (a) Start | (b) End | (c) Digital (Table S11) | (d) Analog (Table S12) | | | | | | (j) Min. | (k) Max. | (l) Min. | (m) Max. | | |
| T001 | T024 | D1 | | | | LB1.doc | | | | | | 69.7 | | |
| T001 | T024 | D1 | | | | LB2.doc | | | | | | 69.7 | | |
| T001 | T024 | D1 | | | | LB3.doc | | | | | | 69.7 | | |
| T001 | T024 | D1 | | | | LB4.doc | | | | | | 69.7 | | |
| T001 | T024 | D2 | | | | LB5.doc | | | | | | 50.7 | | |
| T001 | T024 | D3 | | | | LB6.doc | | | | | | 47.6 | | |
| T001 | T024 | D4 | | | | LB7.doc | | | | | | 44.6 | | |
| T001 | T024 | D5 | | | | LB8.doc | | | | | | 41.6 | | |
| T001 | T024 | D6 | | | | LB9.doc | | | | | | 48.6 | | |
| DNAT1 | DNAT1 | | A1 | | | | | | | | | 33.7 | | |
| DNAT2 | DNAT2 | | A2 | | | | | | | | | 31 | | |

S14. Is the space station(s) controlled and monitored remotely? If Yes, provide the location and telephone number of the TT and C control point(s): Yes

**Remote Control (TT C) Location(s):**

| S14a: Street Address: | | | |
|---|---|---|---|
| S14b. City: | S14c. County: | S14d. State/Country | S14e. Zip Code: |
| S14f. Telephone Number: | S14g. Call Sign of Control Station (if appropriate): | | |

S15. SPACECRAFT PHYSICAL CHARACTERISTICS:

S16. SPACECRAFT ELECTRICAL CHARACTERISTICS:

S17. CERTIFICATIONS:

| | | | |
|---|---|---|---|
| a. Are the power flux density limits of § 25.208 met?: | [X] **YES** | [ ] **NO** | [ ] **N/A** |
| b. Are the appropriate service area coverage requirements of § 25.143(b)(ii) and (iii), or § 25.145(c)(1) and (2) met? | [ ] **YES** | [ ] **NO** | [X] **N/A** |
| c. Are the frequency tolerances of § 25.202(e) and the out-of-band emission limits of § 25.202(f)(1), (2) and (3) met? | [X] **YES** | [ ] **NO** | [ ] **N/A** |

**In addition to the information required in this Form, the space station applicant is required to provide all the information specified in Section 25.114 of the Commission's rules, 47 C.F.R § 25.114.**

**FCC NOTICE REQUIRED BY THE PAPERWORK REDUCTION ACT**

The public reporting estimate for this collection of information includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the required data, and completing and reviewing the collection of information. If you have any comments on this burden estimate, or how we can improve the collection and reduce the burden it causes you, please write to the Federal Communications Commission, AMD-PERM, Paperwork Reduction Project (3060-0678), Washington, DC 20554. We will also accept your comments regarding the Paperwork Reduction Act aspects of this collection via the Internet if you send them to PERM@fcc.gov. PLEASE DO NOT SEND COMPLETED FORMS TO THIS ADDRESS.

Remember - You are not required to respond to a collection of information sponsored by the Federal government, and the government may not conduct or sponsor this collection, unless it displays a currently valid OMB control number or if we fail to provide you with this notice. This collection has been assigned an OMB control number of 3060-0678.

**THE FOREGOING NOTICE IS REQUIRED BY THE PAPERWORK REDUCTION ACT OF 1995, PUBLIC LAW 104-13, OCTOBER 1, 1995, 44 U.S.C. SECTION 3507.**