FCC 312 Schedule S	FEDERAL COMMUNICATIONS COMMISSION SATELLITE SPACE STATION AUTHORIZATIONS (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-KA1		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): 12 Years	j. Number of transponders offered on a common carrier basis: 0
c. Construction Completion Date:		g. Total Number of Transponders: 56	k. Total Common Carrier Transponder Bandwidth: 0 MHz
d1. Est Launch Date Begin:	d2. Est Launch Date End:	h. Total Transponder Bandwidth (no. transponders x Bandwidth) 7000 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)		
28.35	G	28.6	G	R	Fixed Satellite Service
29.25	G	30	G	R	Fixed Satellite Service
18.3	G	18.8	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): 77.3 W	b. Alternate Orbital Longitude (Degrees E/W):		c. Reason for orbital location selection: The GSO Ka-band spectrum that is the subject of this application is unassigned at the 77 W.L. nominal location. ViaSat proposes to operate this spacecraft at a 0.3 degree offset in order to avoid the risk of an in-orbit collision with the other spacecraft that operate at the 77 W.L. nominal location.
Longitudinal Tolerance or E/W Station-Keeping: d. Toward West: 0.05 Degrees 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 g. Westernmost: h. Easternmost:	
i. Reason for service are selection (Optional):			

FEDERAL COMMUNICATIONS COMMISSION **Page 2: NGSO Orbits**
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 **Page 3: Service Areas**
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	S		CONUS
SA2	S		Visible Earth.

FEDERAL COMMUNICATIONS COMMISSION **Page 4: Antenna Beams**
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
RXR	R	46	42	0.12	0.1	30	N		SA1				520	18.8		30	0.5
RXL	R	46	42	0.12	0.1	30	N		SA1				520	18.8		30	0.5
TXR	T	46	42	0.12	0.1	30	N		SA1	2	79.4	65					
TXL	T	46	42	0.12	0.1	30	N		SA1	2	79.4	65					
OMNI	R	5	0	0.12	0.1	30	N		SA2				1585	-27			
OMNI	T	5	0	0.12	0.1	30	N		SA2	3	12.6	16					

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
RXR	R	C	-77.3		RXR.gxt					
RXL	R	C	-77.3		RXL.gxt					
TXR	T	C	-77.3		TXR.gxt	-118	-118	-118	-118	-118
TXL	T	C	-77.3		TXL.gxt	-118	-118	-118	-118	-118
OMNI	T	C	-77.3			-146	-146	-146	-146	-146

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)
U0001	125000	R	28412.5	R	C
U0002	125000	R	28537.5	R	C
U0003	125000	R	29312.5	R	C
U0004	125000	R	29437.5	R	C
U0005	125000	R	29562.5	R	C
U0006	125000	R	29687.5	R	C
U0007	125000	R	29812.5	R	C
U0008	125000	R	29937.5	R	C
U0009	125000	R	28412.5	L	C
U0010	125000	R	28537.5	L	C
U0011	125000	R	29312.5	L	C
U0012	125000	R	29437.5	L	C
U0013	125000	R	29562.5	L	C
U0014	125000	R	29687.5	L	C
U0015	125000	R	29812.5	L	C
U0016	125000	R	29937.5	L	C
D0001	125000	T	18362.5	L	C
D0002	125000	T	18487.5	L	C
D0003	125000	T	18612.5	L	C
D0004	125000	T	18737.5	L	C
D0005	125000	T	19762.5	L	C
D0006	125000	T	19887.5	L	C
D0007	125000	T	20012.5	L	C
D0008	125000	T	20137.5	L	C
D0009	125000	T	18362.5	R	C
D0010	125000	T	18487.5	R	C
D0011	125000	T	18612.5	R	C
D0012	125000	T	18737.5	R	C
D0013	125000	T	19762.5	R	C
D0014	125000	T	19887.5	R	C

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
U01		U0001	RXR		
U02		U0002	RXR		
U03		U0003	RXR		
U04		U0004	RXR		
U05		U0005	RXR		
U06		U0006	RXR		
U07		U0007	RXR		
U08		U0008	RXR		
U09		U0009	RXL		
U10		U0010	RXL		
U11		U0011	RXL		
U12		U0012	RXL		
U13		U0013	RXL		
U14		U0014	RXL		
U15		U0015	RXL		
U16		U0016	RXL		
D01				D0001	TXL
D02				D0002	TXL
D03				D0003	TXL
D04				D0004	TXL
D05				D0005	TXL
D06				D0006	TXL
D07				D0007	TXL
D08				D0008	TXL
D09				D0009	TXR
D10				D0010	TXR
D11				D0011	TXR
D12				D0012	TXR
D13				D0013	TXR
D14				D0014	TXR

D0015	125000	T	20012.5	R	C
D0016	125000	T	20137.5	R	C
CMD1	1000	R	29251	R	T
CMD2	1000	R	29253	R	T
TM1	1000	T	18797	L	T
TM2	1000	T	18799	L	T

D15				D0015	TXR
D16				D0016	TXR
CMD1		CMD1	RXR		
CMD2		CMD2	RXR		
CMD3		CMD1	OMNIR		
CMD4		CMD2	OMNIR		
TM1				TM1	TXL
TM2				TM2	TXL
TM3				TM1	OMNIL
TM4				TM2	OMNIL

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	111KG7W	111	4	128	0.691		6.1	18.3
D2	667KG7W	667	4	768	0.691		6.1	18.3
D3	1M34G7W	1341	4	1544	0.691		6.1	18.3
D4	7M34G7W	7340	4	8448	0.691		6.1	18.3
D5	125MG7W	125000	4	143958	0.691		6.1	18.3

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	1M00F2D	1000		1									10	22.2
A2	1M00G2D	1000		1									9	21.2

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)			
(a) Start	(b) End	(c) Digital (Table S11)	(d) Analog (Table S12)					(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)
									(j) Min.	(k) Max.	(l) Min.	(m) Max.		
U01	U16	D1		961	130	LB1.doc		44.1	-11.2	-7.2				18.8
U01	U16	D2		156	801	LB2.doc		44.1	-4.2	-0.2				18.8
U01	U16	D3		78	1602	LB3.doc		44.1	0	4				18.8
U01	U16	D4		14	8928	LB4.doc		47.2	3	7				18.8
D01	D16	D5		1		LB5.doc					61	65	-118	17.6
CMD1	CMD2		A1	1		CMD1.doc		67	-21.7	-2.7				18.8
CMD3	CMD4		A1	1		CMD2.doc		67	21.3	26.3				-27
TM1	TM2		A2	1		TM1.doc					15.8	19.8	-142.2	44
TM3	TM4		A2	1		TM2.doc					11	16	-146	44

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

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

S15. SPACECRAFT PHYSICAL CHARACTERISTICS:

S15a: Mass of spacecraft without fuel (kg): 3650	Spacecraft Dimensions (meters)	Probability of Survival to End of Life (0.0 - 1.0)
S15b. Mass of fuel and disposables at launch (kg): 2650		
S15c. Mass of spacecraft and fuel at launch (kg): 6300	S15f. Length (m): 43	S15i. Payload: 0.86
S15d. Mass of fuel, in orbit, at beginning of life (kg): 1200	S15g. Width (m): 8	S15j. Bus: 0.89
S15e. Deployed Area of Solar Array (square meters): 84	S15h. Height (m): 6	S15k. Total: 0.76

S16. SPACECRAFT ELECTRICAL CHARACTERISTICS:

Spacecraft Subsystem	Electrical Power (Watts) At Beginning of Life		Electrical Power (Watts) At End of Life	
	At Equinox	At Solstice	At Equinox	At Solstice
Payload (Watts):	(a): 12069	(f): 12069	(k): 12069	(p): 12069
Bus (Watts):	(b): 2250	(g): 1250	(l): 2250	(q): 1250
Total (Watts):	(c): 14319	(h): 13319	(m) 14319	(r): 13319
Solar Array (Watts):	(d): 16430	(i): 14918	(n): 15116	(s): 14508
Depth of Battery Discharge (%):	(e) 73 %	(j) %	(o) 73 %	(t) %

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.