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FEDERAL COMMUNICATIONS COMMISSION SATELLITE SPACE STATION AUTHORIZATIONS (Technical and Operational Description)

Page 1: General, Frequency Bands, and GSO Orbit

S1. GENE	RAL INFOR	MATION C	omplete fo	or all sate	ellite applic	cations
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Space Station or Satellite Network Name: @CONTACT NGSO	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: 0	k. Total Common Carrier Transponder Bandwidth: MHz
d. Estimated Launch Date:	h. Total Transponder Bandwidth (no. transponders x Bandwidth) 18000 MHz	I. Orbit Type: Mark all boxes that apply: GSO X 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				
Lower Frequency ((_Hz)	Upper Frequency (_Hz)	e. T/R Mode	f. Nature of Service(s): List all that apply to this band
a. Numeric	b. Unit (K/M/G)	c. Numeric	d. Unit (K/M/G)		`,'
29.5	G	30.0	G	R	4 x 125 MHz channels (only for 3 HEO satellites)
28.6	G	29.1	G	R	4 x 125 MHz channels
18.8	G	19.3	G	Т	2 x 250 MHz channels
19.7	G	20.2	G	Т	2 x 250 MHz channels (only for 3 HEO satellites)
3650	М	3700	M	Т	Telemetry- 2 MHz spectrum of this band (TT&C)
6425	М	6525	М	R	Telecommand: 2 MHz spectrum of this band (TT&C)

S3. ORBITAL INFORMATION FOR GEOSTATIONARY SATELLITES ONLY:

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

S4b. Total Number of Orbital Planes in Network or System: 4 S4d. Orbit Epoch Date: 1/1/2000

For each Orbital Plane Provide:

(e) Orbital	(f) No. of	(g) Inclination	(h) Orbital	(i) Apogee (km)	(j) Perigee (km)	(k) Right Ascension	(I) Argument of	Active Ser	rvice Arc Rang	e (Degrees)
Plane No.	Satellites in	Angle (degrees)	Period			of the Ascending	Perigee	(m) Begin	(n) End	(o) Other
	Plane		(Seconds)			Node (Deg.)	(Degrees)	Angle	Angle	
1	1	63.4	43064	39352	1111	0	270	120	250	
2	1	63.4	43064	39352	1111	120	270	120	250	
3	1	63.4	43064	39352	1111	240	270	120	250	
4	4	0.1	86164	35878	35878	0	239	0	360	
4	4	0.1	86164	35878	35878	0	277	0	360	
4	4	0.1	86164	35878	35878	0	30	0	360	
4	4	0.1	86164	35878	35878	0	130	0	360	

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)
1	1	0
2	1	120
3	1	240
4	1	0
4	2	0
4	3	0
4	4	0

Page 2: NGSO Orbits

FCC Form 312 - Schedule S: (Technical and Operational Description)

S6. SERVICE AREA CHARACTERISTICS for each service area provide:

(a) Service Area	(b) Type of Associated Station (Earth or Space)	(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.
1	S	AAA

Page 3: Service Areas

Page 4: Antenna Beams

FCC Form 312 - Schedule S: (Technical and Operational Description)

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

(a)	(b)	Isotropic	Antenna	(e)	(f)	(g) Min.	(h) Polar-	(i) Polarization	(j) Service		Transmit				Receive		
Beam	T/R	Ga	ain	0	Rotational	Cross-	ization	Alignment Rel.	Area ID	(k)	(I) Effective	(m)	(n)	(o) G/T	(p) Min.	Input Attent	uator (dB)
ID	Mode	(c) I can	(d) Edge	Error		Polar Iso-	Switch-	Equatorial		Input	Output	Max.	System	Max.	Saturation	(q) Max.	(r) Step
		(dBi)	(dBi)	(Degrees)	(Degrees)	lation (dB)	able? (Y/N)	Plane (Degrees)		Losses	Power (W)	EIRP			Flux Density	Value	Size
							` '			(dB)		(dBW)	Temp (k)	(db/K)	(dBW/m2)		
KTR	Т	48	45	0.05		30	Υ		1	2	31.6	63					
KRR	R	46.5	43.5	0.05		30	Υ		1				504	19.5	-116.2		
KTB	Т	18.5	15.5	0.1		30	N		1	2	31.6	33.5					
KRB	R	18.5	15.5	0.1		30	N		1				504	-8.5	-116.2		

Page 5: Beam Diagrams

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)	(b)	(c) Co-or	(d) GSO	(e) NGSO Antenna Gain	(f) GSO Antenna		Max. Power F	lux Density (dB	W/M2/Hz)	
Beam	T/R	Cross	Ref.	Contour Description	Gain Contour Data	At Angle of	Arrival above ho	orizontal (for em	ission with higl	nest PFD)
ID	Mode	Polar Mode ("C" or" X")	Orbital Longitude (Deg. E/W)	(Figure/Table/ Exhibit)	(GXT File)	(g) 5 Deg	(h) 10 Deg	(i) 15 Deg	(j) 20 Deg	(k) 25 Deg
V3R	Т	X		GHz Tx Antenna Beam						
V4R	Т	С		Hz Tx Antenna Beam		-131	-121	-111	-111	-111
V5R	R	С		Hz Rx Antenna Beam						
V5R	R	Χ		GHz Rx Antenna Beam						
KTR	Т	С		0 GHz Tx Antenna Co		-119	-118	-117	-117	-117
KTR	Т	Х		GHz Tx Antenna Beam						
KRR	R	С		Hz Rx Antenna Beam						
KRR	R	Х		GHz Rx Antenna Beam						
KRB	R	С		eacon Antenna Beam						
KRB	R	Х		Beacon Antenna Bean						
KTB	Т	С		eacon Antenna Beam-		-119	-119	-118	-118	-118
KTB	Т	Х		eacon Antenna Beam						
V4R	Т	X		GHz Tx Antenna Beam						
4	Т	С	-119		0 GHz Tx Antenna Co	-121	-121	-121	-120	-120
4	Т	Χ	-119		0 GHz Tx Antenna XI					
9	Т	С	-119		V 40 GHz Tx Antenna	-140	-134	-126	-126	-126
9	Т	Х	-119		W 40 GHz Tx Antenna					
21	Т	С	-119		V 40 GHz Tx Antenna	-124	-120	-117	-117	-117
21	T	Х	-119							

Page 6: Channels and Transponders

FCC Form 312 - Schedule S: (Technical and Operational Description)

S9. SPACE STATION CHANNELS For each frequency channel provide: S10. SPACE STATION TRANSPONDERS For each transponder provide:

(a) Channel	(B) Assigned Bandwidth	(c) T/R	(d) Center Frequency	(e) Polarization	(f) TTC or Comm
No.	(kHz)	Mode	(MHz)	(H, V, L, R)	Channel
					(T or C)
K1	125000	R	28662.5	L	С
K1	125000	R	286625	R	С
K2	125000	R	28787.5	L	С
K2	125000	R	28787.5	R	С
K3	125000	R	28912.5	L	С
K3	125000	R	28912.5	R	С
K4	110000	R	29037.5	L	С
K4	110000	R	29037.5	R	С
K5	125000	R	29562.5	L	С
K5	125000	R	29562.5	R	С
K6	125000	R	29687.5	L	С
K6	125000	R	29687.5	R	С
K7	125000	R	29812.5	L	С
K7	125000	R	29812.5	R	С
K8	125000	R	29937.5	L	С
K8	125000	R	29937.5	R	С
B1	2000	R	29096	R	С
T1	2000	R	29098	R	Т
T2	2000	R	6435	Н	Т
T3	2000	R	6445	Н	Τ
K1T	250000	Т	18925	R	С
K1T	250000	Т	18925	L	С
K2T	240000	Т	19175	L	С
K2T	240000	Т	19175	R	С
КЗТ	250000	Т	19825	L	С
K3T	250000	Т	19825	R	С
K4T	250000	Т	20075	L	С
K4T	250000	Т	20075	R	С
B2	2000	Т	19296	R	С
T3	2000	Т	19298	R	С

(a)	(b)	Receive	Band	Transmit Band		
Transponder	Transponder	(c) Channel	(d) Beam	(e) Channel	(f) Beam ID	
ID	Gain (dB)	No.	ID	No.		

T4	2000	Т	3660	Н	T
T4	2000	Т	3670	Н	Τ

Page 7: Digital Modulation

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)
D01	7M00G7W	700	4	10100	0.9		9.3	21.3
D02	3M50G7W	3500	4	2520	0.4		7.1	19.1
D08	10K7G7D	10.7	4	5	0.4		4.2	16.2
D12	125MG7W	125000	4	112000	0.67		5.4	17.6
D13	125MG7W	125000	4	74000	0.45		4.2	16.4
D15	334KG7D	334	4	200	0.4		4.2	16.4
D16	2M00G7D	2000	2	1000	1		15	27
D17	1M00G7D	1000	2	500	1		15	27
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Page 8: Analog Modulation

FCC Form 312 - Schedule S: (Technical and Operational Description)

S12. ANALOG MODULATION PARAMETERS For each analog emission provide:

(a)	(b) Emission	(c)	(d) Signal	(e)	Multi-channel Telephony			(j) Video	(k) Video	(I) Video	(m) SCPC/FM	(n) Total C/N	(o) Single	
Analo Mod.		Assigned Bandwidth (kHz)	Туре	Channels per Carrier	(f) Ave. Companded Talker Level (dBm0)	(g) Bottom Baseband Freq. (MHz)		(i) RMS Modulation Index	Standard NTSC, PAL, etc.	- 3 - 3	and SCPC/FM Modulation Index	Compander, Preemphasis, and Noise Weighting (dB)	Performance Objective (dB)	Entry C/I Objective (dB)

Page 9: Typical Emissions

FCC Form 312 - Schedule S: (Technical and Operational Description)

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

Associated Modulation ID Transponder ID Range (a) Digital (d) Angles		lation ID	(e) Carriers	()	(3)	(h) Energy	Receive Ba	and (Assoc. T	ransmit Stn)	Tra	nsmit Band	(This Space Stat	tion)	
(a) Start	(b) End	(c) Digital (Table S11)	(d) Analog (Table S12)	per Spacing Reference (Table No.)		Dispersal Bandwidth (kHz)	(i)Assoc. Stn. Max.	Assoc. Station Transmit Power (dBW)		EIRP (dBW)		Power Flux	(o)Assoc. Stn Rec. G/T	
		511)					, ,	Antenna Gain (dBi)	(j) Min.	(k) Max.	(I) Min.	(m) Max.	Density (dBW/m2/Hz)	(dB/K)

FCC Form 312 - Schedule S: (Technical and Operational Description)

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): No

Remote Control (TT C) Location(s):

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

Page 10: TT and C

FCC Form 312 - Schedule S: (Technical and Operational Description)

Page 11: Characteristics and Certifications

S15. SPACECRAFT PHYSICAL CHARACTERISTICS:

S15a: Mass of spacecraft without fuel (kg): 2508	Spacecraft Dimensions (meters)	Probability of Survival to End of Life (0.0 - 1.0)
S15b. Mass of fuel and disposables at launch (kg): 0		
S15c. Mass of spacecraft and fuel at launch (kg): 3154	S15f. Length (m): 4.8	S15i. Payload: 0.78
S15d. Mass of fuel, in orbit, at beginning of life (kg): 646	S15g. Width (m): 2.5	S15j. Bus: 0.93
S15e. Deployed Area of Solar Array (square meters): 38	S15h. Height (m): 2.5	S15k. Total: 0.72

S16. SPACECRAFT ELECTRICAL CHARACTERISTICS:

Spacecraft Subsystem		ver (Watts) At ng of Life	Electrical Power (Watts) A End of Life					
	At Equinox	At Solstice	At Equinox	At Solstice				
Payload (Watts):	^{(a):} 8600	^{(f):} 8170	^{(k):} 7050	^{(p):} 6696				
Bus (Watts):	^{(b):} 2100	^{(g):} 2000	^{(l):} 1720	^{(q):} 1639				
Total (Watts):	^{(c):} 10700	^{(h):} 10170	^(m) 8770	^{(r):} 8335				
Solar Array (Watts):	^{(d):} 11200	^{(i):} 10670	^{(n):} 9180	^{(s):} 8745				
Depth of Battery Discharge (%):	^(e) 70 %	^(j) 70 %	^(o) 70 %	^(t) 70 %				

S17. CERTIFICATIONS:

a. Are the power flux density limits of § 25.208 met?:	Χ	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?	Χ	YES		NO		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.