

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

S1. GENERAL INFORMATION Complete for all satellite applications.

a. Space Station or Satellite Network Name: GESN 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 ☒ 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)		
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
47.2	G	47.5	G	R	Gateway beams
47.5	G	47.9	G	R	Gateway and user beams
47.9	G	48.2	G	R	Gateway beams
48.2	G	50.2	G	R	4 x 500 MHz channels
18.8	G	19.3	G	T	2 x 250 MHz channels
19.7	G	20.2	G	T	2 x 250 MHz channels (only for 3 HEO satellites)
37.5	G	40.0	G	T	Gateway/ Hub applications - 5 x 500 MHz channels
40.0	G	42.0	G	T	4 x 500 MHz channels
3650	M	3700	M	T	Telemetry- 2 MHz spectrum of this band (TT&C)
6425	M	6525	M	R	Telecommand: 2 MHz spectrum of this band (TT&C)

S3. ORBITAL INFORMATION FOR GEOSTATIONARY SATELLITES ONLY:

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Page 2: NGSO Orbits

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 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
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	241	0	360	
4	4	0.1	86164	35878	35878	0	271	0	360	
4	4	0.1	86164	35878	35878	0	15	0	360	
4	4	0.1	86164	35878	35878	0	116.5	0	360	

S5. INITIAL SATELLITE PHASE ANGLE For each satellite in each orbital plane, provide the initial 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

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Page 3: Service Areas

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.
1	S		AAA

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Page 4: Antenna Beams

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 Iso- lation (dB)	(h) Polar- ization Switch- able? (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 Noise 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
V3R	T	53	50	0.05		30	Y		1	2	12.6	64					
V4R	T	53	50	0.05		30	Y		1	2	25.2	67					
V5R	R	54.4	51.4	0.05		30	Y		1				520	27.2	-95.3		
KTR	T	48	45	0.05		30	Y		1	2	31.6	63					
KRR	R	46.5	43.5	0.05		30	Y		1				504	19.5	-116.2		
KTB	T	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		

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Page 5: Beam Diagrams

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
V3R	T	C		5Hz Tx Antenna Beam		-140	-130	-120	-120	-120
V3R	T	X		5Hz Tx Antenna Beam						
V4R	T	C		5Hz Tx Antenna Beam		-131	-121	-111	-111	-111
V5R	R	C		5Hz Rx Antenna Beam						
V5R	R	X		5Hz Rx Antenna Beam						
KTR	T	C		0 GHz Tx Antenna Co		-119	-118	-117	-117	-117
KTR	T	X		5Hz Tx Antenna Beam						
KRR	R	C		5Hz Rx Antenna Beam						
KRR	R	X		5Hz Rx Antenna Beam						
KRB	R	C		Beacon Antenna Beam						
KRB	R	X		Beacon Antenna Beam						
KTB	T	C		Beacon Antenna Beam		-119	-119	-118	-118	-118
KTB	T	X		Beacon Antenna Beam						
V4R	T	X		5Hz Tx Antenna Beam						
4	T	C	-119		0 GHz Tx Antenna Co	-121	-121	-121	-120	-120
4	T	X	-119		20 GHz Tx Antenna Xf					
9	T	C	-119		V 40 GHz Tx Antenna	-140	-134	-126	-126	-126
9	T	X	-119		W 40 GHz Tx Antenna					
21	T	C	-119		V 40 GHz Tx Antenna	-124	-120	-117	-117	-117
21	T	X	-119							

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Page 6: Channels and Transponders

S9. SPACE STATION CHANNELS For each frequency channel provide: S10. SPACE STATION TRANSPONDERS For each transponder 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)
K1	125000	R	28662.5	L	C
K1	125000	R	28662.5	R	C
K2	125000	R	28787.5	L	C
K2	125000	R	28787.5	R	C
K3	125000	R	28912.5	L	C
K3	125000	R	28912.5	R	C
K4	110000	R	29037.5	L	C
K4	110000	R	29037.5	R	C
K5	125000	R	29562.5	L	C
K5	125000	R	29562.5	R	C
K6	125000	R	29687.5	L	C
K6	125000	R	29687.5	R	C
K7	125000	R	29812.5	L	C
K7	125000	R	29812.5	R	C
K8	125000	R	29937.5	L	C
K8	125000	R	29937.5	R	C
V1	300000	R	47350	L	C
V1	300000	R	47350	R	C
V2	400000	R	47700	L	C
V2	400000	R	47700	R	C
V3	300000	R	48050	L	C
V3	300000	R	48050	R	C
V4	500000	R	48450	L	C
V4	500000	R	48450	R	C
V5	500000	R	48950	L	C
V5	500000	R	48950	R	C
V6	500000	R	49450	L	C
V6	500000	R	49450	R	C
V7	500000	R	49950	L	C
V7	500000	R	49950	R	C

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

B1	2000	R	29096	R	C
T1	2000	R	29098	R	T
T2	2000	R	6435	H	T
T3	2000	R	6445	H	T
K1T	250000	T	18925	R	C
K1T	250000	T	18925	L	C
K2T	240000	T	19175	L	C
K2T	240000	T	19175	R	C
K3T	250000	T	19825	L	C
K3T	250000	T	19825	R	C
K4T	250000	T	20075	L	C
K4T	250000	T	20075	R	C
V1T	500000	T	37750	L	C
V1T	500000	T	37750	R	C
V2T	500000	T	38250	L	C
V2T	500000	T	38250	R	C
V3T	500000	T	38750	L	C
V3T	500000	T	38750	R	C
V4T	500000	T	39250	L	C
V4T	500000	T	39250	R	C
V5T	500000	T	39750	L	C
V5T	500000	T	39750	R	C
V6T	500000	T	40250	L	C
V6T	500000	T	40250	R	C
V7T	500000	T	40750	L	C
V7T	500000	T	40750	R	C
V8T	500000	T	41250	L	C
V8T	500000	T	41250	R	C
V9T	500000	T	41750	L	C
V9T	500000	T	41750	L	C
B2	2000	T	19296	R	C
T3	2000	T	19298	R	C
T4	2000	T	3660	H	T
T4	2000	T	3670	H	T

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Page 7: Digital Modulation

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
D03	700KG7W	700	4	500	0.4		7.1	19.1
D04	491MG7W	491000	4	706000	0.9		9.3	21.3
D05	175MG7W	175000	4	252000	0.9		9.3	21.3
D06	87M8G7W	87800	4	63000	0.4		7.1	19.1
D07	35M1G7W	35100	4	25000	0.4		7.1	19.1
D08	10K7G7D	10.7	4	5	0.4		4.2	16.2
D09	250MG7W	250000	8	374000	0.75		8.6	20.6
D10	250MG7W	250000	4	224000	0.67		5.4	17.6
D11	250MG7W	250000	4	149000	0.45		4.2	16.4
D12	125MG7W	125000	4	112000	0.67		5.4	17.6
D13	125MG7W	125000	4	74000	0.45		4.2	16.4
D14	500MG7W	500000	8	748000	0.75		8.6	20.8
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

Page 8: Analog Modulation

(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						

Page 9: Typical Emissions

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)			
		(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/m ² /Hz)	(o) Assoc. Stn Rec. G/T (dB/K)
(a) Start	(b) End							(j) Min.	(k) Max.	(l) Min.	(m) Max.		

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Page 10: TT and C

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 Station (if appropriate):	

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**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	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): 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?	☒	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	☐	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?	☒	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.