

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: STAR ONE C2		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: 0
c. Construction Completion Date:		g. Total Number of Transponders: 29	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) 1728 MHz	l. 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)		
5925	M	6425	M	R	Fixed Satellite Service
3700	M	4200	M	T	Fixed Satellite Service
14000	M	14500	M	R	Fixed Satellite Service
11700	M	12200	M	T	Fixed Satellite Service

S3. ORBITAL INFORMATION FOR GEOSTATIONARY SATELLITES ONLY:

a. Nominal Orbital Longitude (Degrees E/W): 70 W		b. Alternate Orbital Longitude (Degrees E/W):		c. Reason for orbital location selection: The Brazilian telecommunications authority has authorized Star One to operate the STAR ONE C2 satellite at 70°W.L.
Longitudinal Tolerance or E/W Station-Keeping:		f. Inclination Excursion or N/S Station-Keeping Tolerance: 0.1 Degrees	Range of orbital are in which adequate service can be provided (Optional): <u>Degrees</u> <u>E/W</u>	
d. Toward West: 0.05 Degrees			g. Westernmost:	
e. Toward East: 0.05 Degrees			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)

Page 2: NGSO Orbits

S4. ORBITAL INFORMATION FOR NON-GEOSTATIONARY SATELLITES ONLY

S4a. Total Number of Satellites in Network or System:

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

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

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 initial 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)**

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.
SA1	S		South America, Central America, Mexico, USA
SA2	S		South America, Central America, Mexico, USA
SA3	S		Brazil
SA4	S		Brazil, Argentina, Uruguay, Chile, USA
SA5	S		RG2

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

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
BSC	R	29.7	19.7	0.9	0.02	27	N	0	SA1				617	1.8	-95	18	0.5
BSC	R	29.7	19.7	0.9	0.02	27	N	90	SA1				617	1.8	-95	18	0.5
BSC	T	26.2	16.2	0.9	0.02	27	N	0	SA2	2.9	28.2	40.7					
BSC	T	26.2	16.2	0.9	0.02	27	N	90	SA2	2.9	28.2	40.7					
BKR	R	32.2	24.1	0.9	0.02	28	N	90	SA3				668	4	-93	18	1
MKR	R	32.2	24.2	0.9	0.02	28	N	90	SA4				668	4	-93	18	1
BKT	T	31.6	23.6	0.9	0.02	28	N	0	SA3	2.3	68.9	50					
MKT	T	31.6	23.6	0.9	0.02	28	N	0	SA4	2.3	68.9	50					
GBL	T	19.6	16.6	0.9	0.02	30	N	0	SA5	4	0.088	9					
GBL	T	19.6	16.6	0.9	0.02	30	N	90	SA5	4	0.088	9					

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

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
BSC	R	C	-70		BSCRH.GXT					
BSC	R	C	-70		BSCRV.GXT					
BSC	T	C	-70		BSCTH.GXT	-157	-157	-157	-155	-153
BSC	T	C	-70		BSCTV.GXT	-157	-157	-157	-155	-153
BKR	R	C	-70		BKRV.GXT					
MKR	R	C	-70		MKRV.GXT					
BKT	T	C	-70		BKTH.GXT	-161	-161	-161	-155	-155
MKT	T	C	-70		MKTH.GXT	-154	-154	-153	-150	-148
GBL	T	C	-70		GBLH.GXT	-157	-157	-157	-156	-156
GBL	T	C	-70		GBLV.GXT	-157	-157	-157	-156	-156

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

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)
CU001	72000	R	5905	H	C
CU002	36000	R	5965	H	C
CU003	72000	R	5965	V	C
CU004	36000	R	6005	H	C
CU005	36000	R	6025	V	C
CU006	72000	R	6065	H	C
CU007	36000	R	6065	V	C
CU008	36000	R	6125	H	C
CU009	72000	R	6125	V	C
CU010	36000	R	6165	H	C
CU011	36000	R	6185	V	C
CU012	36000	R	6205	H	C
CU013	36000	R	6225	V	C
CU014	36000	R	6245	H	C
CU015	72000	R	6285	V	C
CU016	72000	R	6305	H	C
CU017	72000	R	6365	V	C
CU018	72000	R	6385	H	C
CD001	72000	T	3680	V	C
CD002	36000	T	3740	V	C
CD003	72000	T	3740	H	C
CD004	36000	T	3780	V	C
CD005	36000	T	3800	H	C
CD006	72000	T	3840	V	C
CD007	36000	T	3840	H	C
CD008	36000	T	3900	V	C
CD009	72000	T	3900	H	C
CD010	36000	T	3940	V	C
CD011	36000	T	3960	H	C
CD012	36000	T	3980	V	C

(a) Transponder ID	(b) Transponder Gain (dB)	Receive Band		Transmit Band	
		(c) Channel No.	(d) Beam ID	(e) Channel No.	(f) Beam ID
TC001	120	CU001	BSCRH	CD001	BSCTV
TC002	120	CU002	BSCRH	CD002	BSCTV
TC003	120	CU004	BSCRH	CD004	BSCTV
TC004	120	CU006	BSCRH	CD006	BSCTV
TC005	120	CU008	BSCRH	CD008	BSCTV
TC006	120	CU010	BSCRH	CD010	BSCTV
TC007	120	CU012	BSCRH	CD012	BSCTV
TC008	120	CU014	BSCRH	CD014	BSCTV
TC009	120	CU016	BSCRH	CD016	BSCTV
TC010	120	CU018	BSCRH	CD018	BSCTV
TC011	120	CU003	BSCRH	CD003	BSCTH
TC012	120	CU005	BSCRH	CD005	BSCTH
TC013	120	CU007	BSCRH	CD007	BSCTH
TC014	120	CU009	BSCRH	CD009	BSCTH
TC015	120	CU011	BSCRH	CD011	BSCTH
TC016	120	CU013	BSCRH	CD013	BSCTH
TC017	120	CU015	BSCRH	CD015	BSCTH
TC018	120	CU017	BSCRH	CD017	BSCTH
TK001	137.5	KU001	MKRV	KD001	MKTH
TK002	137.5	KU002	MKRV	KD002	MKTH
TK003	137.5	KU001	BKRV	KD001	MKTH
TK004	137.5	KU002	BKRV	KD002	MKTH
TK005	137.5	KU001	MKRV	KD001	BKTH
TK006	137.5	KU002	MKRV	KD002	BKTH
CM01		CMD01	BSCRH		
CM02		CMD02	BSCRH		
TM01				TLM01	BSCTH
TM02				TLM02	BSCTH
BN01				BN01	GBLV
BN02				BN02	GBLV

CD013	36000	T	4000	H	C
CD014	36000	T	4020	V	C
CD015	72000	T	4060	H	C
CD016	72000	T	4080	V	C
CD017	72000	T	4140	H	C
CD018	72000	T	4160	V	C
KU001	72000	R	14220	V	C
KU002	72000	R	14460	V	C
KD001	72000	T	11920	H	C
KD002	72000	T	12160	H	C
CMD01	820	R	6423.6	V	T
CMD02	820	R	6424.4	V	T
TLM01	200	T	4199	H	T
TLM02	200	T	4199.8	H	T
BN01	25	T	11701	H	T
BN02	25	T	12199	V	T

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

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	36M0G7W	36000	4	48400	0.806		7.8	20
D02	17M9G7W	17900	8	34368	0.768		12.4	24.6
D03	5M50G7W	5500	8	8448	0.614		9.4	21.6
D04	1M64G7W	1640	4	2048	0.75		8.5	20.7
D05	614KG7W	614	4	512	0.5		5.7	17.9
D06	5K80G7W	5.8	4	4.8	0.5		5.7	17.9

Page 8: Analog Modulation

[illegible]

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

Page 9: Typical Emissions

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)				
		(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.			
TC001	TC018	D01		500	9	C1 LB.doc		39.2	-11.8	-5.2	-7.5	-3.5	-167	24.1	
TC001	TC018	D01		500	9	C2 LB.doc		47.2	-12.8	-6.2	0	4	-159	16.2	
TC001	TC018	D02		48	750	C3 LB.doc		39.2	8.2	14.8	13	17	-167	24.1	
TC001	TC018	D02		48	750	C4 LB.doc		47.2	7.7	14.3	20	24	-160	16.2	
TC001	TC018	D03		18	1975	C5 LB.doc		45.2	7.7	14.3	18	22	-166	26.6	
TC001	TC018	D03		13	1975	C6 LB.doc		49.7	6.2	12.8	21.5	25.5	-162	22.2	
TC001	TC018	D04		5	6875	C7 LB.doc		51.6	6.8	13.4	23.5	27.5	-166	28.6	
TC001	TC018	D05		2	18000	C8 LB.doc		53.2	12.2	18.8	29	33	-165	30.1	
TC001	TC018	D06		1		C9 LB.doc		53.2	16.7	23.3	36.7	40.7	-161	20.6	
TC001	TC018		A01	2	18000	C10 LB.doc		49.7	15.2	21.8	33	36	-153	24.1	
TC001	TC018		A02	1		C11 LB.doc		51.6	18.3	24.9	37.7	40.7	-148	16.2	
TK001	TK006	D01		500	9	K1 LB.doc		43.1	-7.6	-1.1	2.5	6.5	-157	29	
TK001	TK006	D01		500	9	K2 LB.doc		52.6	-9.1	-2.6	11	15	-148	19.4	
TK001	TK006	D02		48	750	K3 LB.doc		46.6	8.9	15.4	22.5	26.5	-157	30.9	
TK001	TK006	D02		48	750	K4 LB.doc		54.5	4.5	11	26	30	-154	22.9	
TK001	TK006	D03		18	1975	K5 LB.doc		49.1	12.4	18.9	28.5	32.5	-155	33.4	
TK001	TK006	D03		13	1975	K6 LB.doc		57	4.5	11	31	35	-153	25.4	
TK001	TK006	D04		5	6875	K7 LB.doc		57	6.5	13	33	37	-156	33.4	
TK001	TK006	D05		2	18000	K8 LB.doc		59	9	15.5	37	41	-155	35.3	
TK001	TK006	D06		1		K9 LB.doc		59	15.5	22	46	50	-151	22.9	
TK001	TK006		A01	2	18000	K10 LB.doc		57	11	17.5	42	45	-140	27.4	
TK001	TK006		A02	1		K11 LB.doc		57	17.5	24	46	49	-140	21.4	
CM01	CM02		A03	1		CMD LB.doc		53.2	10.8	15.8					
TM01	TM02		A04	1		TLM LB.doc					11	18	-148	27.9	
BN01	BN02		A05	1		BCN LB.doc					6	9	-153	29.4	

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

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): Yes

**FEDERAL COMMUNICATIONS COMMISSION
SATELLITE SPACE STATION AUTHORIZATIONS
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): 1812	Spacecraft Dimensions (meters)	Probability of Survival to End of Life (0.0 - 1.0)
S15b. Mass of fuel and disposables at launch (kg): 2286		
S15c. Mass of spacecraft and fuel at launch (kg): 4098	S15f. Length (m): 37	S15i. Payload: 0.72
S15d. Mass of fuel, in orbit, at beginning of life (kg): 1200	S15g. Width (m): 7.5	S15j. Bus: 0.83
S15e. Deployed Area of Solar Array (square meters): 65	S15h. Height (m): 6.1	S15k. Total: 0.6

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): 5830	(f): 5830	(k): 5830	(p): 5830
Bus (Watts):	(b): 1696	(g): 769	(l): 1696	(q): 769
Total (Watts):	(c): 7526	(h): 6599	(m): 7526	(r): 6599
Solar Array (Watts):	(d): 10420	(i): 9330	(n): 8250	(s): 7580
Depth of Battery Discharge (%):	(e) 75 %	(j) 75 %	(o) 75 %	(t) 75 %

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.