

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: 200 S4c. Celestial Reference Body (Earth, Sun, Moon, etc.): E
 S4b. Total Number of Orbital Planes in Network or System: 1 S4d. Orbit Epoch Date: 1/1/201

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	200	97.3	5646	475	475	0	0	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
1	2	1.8
1	3	3.6
1	4	5.4
1	5	7.2
1	6	9
1	7	10.8
1	8	12.6
1	9	14.4
1	10	16.2
1	11	18
1	12	19.8
1	13	21.6
1	14	23.4
1	15	25.2
1	16	27
1	17	28.8
1	18	30.6
1	19	32.4
1	20	34.2
1	21	36

1	22	37.8
1	23	39.6
1	24	41.4
1	25	43.2
1	26	45
1	27	46.8
1	28	48.6
1	29	50.4
1	30	52.2
1	31	54
1	32	55.8
1	33	57.6
1	34	59.4
1	35	61.2
1	36	63
1	37	64.8
1	38	66.6
1	39	68.4
1	40	70.2
1	41	72
1	42	73.8
1	43	75.6
1	44	77.4
1	45	79.2
1	46	81
1	47	82.8
1	48	84.6
1	49	86.4
1	50	88.2
1	51	90
1	52	91.8
1	53	93.6
1	54	95.4
1	55	97.2
1	56	99
1	57	100.8
1	58	102.6
1	59	104.4
1	60	106.2

1	61	108
1	62	109.8
1	63	111.6
1	64	113.4
1	65	115.2
1	66	117
1	67	118.8
1	68	120.6
1	69	122.4
1	70	124.2
1	71	126
1	72	127.8
1	73	129.6
1	74	131.4
1	75	133.2
1	76	135
1	77	136.8
1	78	138.6
1	79	140.4
1	80	142.2
1	81	144
1	82	145.8
1	83	147.6
1	84	149.4
1	85	151.2
1	86	153
1	87	154.8
1	88	156.6
1	89	158.4
1	90	160.2
1	91	162
1	92	163.8
1	93	165.6
1	94	167.4
1	95	169.2
1	96	171
1	97	172.8
1	98	174.6
1	99	176.4

1	100	178.2
1	101	180
1	102	181.8
1	103	183.6
1	104	185.4
1	105	187.2
1	106	189
1	107	190.8
1	108	192.6
1	109	194.4
1	110	196.2
1	111	198
1	112	199.8
1	113	201.6
1	114	203.4
1	115	205.2
1	116	207
1	117	208.8
1	118	210.6
1	119	212.4
1	120	214.2
1	121	216
1	122	217.8
1	123	219.6
1	124	221.4
1	125	223.2
1	126	225
1	127	226.8
1	128	228.6
1	129	230.4
1	130	232.2
1	131	234
1	132	235.8
1	133	237.6
1	134	239.4
1	135	241.2
1	136	243
1	137	244.8
1	138	246.6

1	139	248.4
1	140	250.2
1	141	252
1	142	253.8
1	143	255.6
1	144	257.4
1	145	259.2
1	146	261
1	147	262.8
1	148	264.6
1	149	266.4
1	150	268.2
1	151	270
1	152	271.8
1	153	273.6
1	154	275.4
1	155	277.2
1	156	279
1	157	280.8
1	158	282.6
1	159	284.4
1	160	286.2
1	161	288
1	162	289.8
1	163	291.6
1	164	293.4
1	165	295.2
1	166	297
1	167	298.8
1	168	300.6
1	169	302.4
1	170	304.2
1	171	306
1	172	307.8
1	173	309.6
1	174	311.4
1	175	313.2
1	176	315
1	177	316.8

1	178	318.6
1	179	320.4
1	180	322.2
1	181	324
1	182	325.8
1	183	327.6
1	184	329.4
1	185	331.2
1	186	333
1	187	334.8
1	188	336.6
1	189	338.4
1	190	340.2
1	191	342
1	192	343.8
1	193	345.6
1	194	347.4
1	195	349.2
1	196	351
1	197	352.8
1	198	354.6
1	199	356.4
1	200	358.2

**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.
VISEARTH	E		XVE

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 Iso- lation (dB)	(h) Polar- ization Switch- able? (Y/N)	(i) Polarization Alignment Rel. Equatorial Plane (Degrees)	(j) Service Area ID	Transmit			Receive				
										(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														
XDLH	T	12.3	12.3	0.5	0	15	N		WISEART	1	2.9	15.92					
XDL	T	5	-2	0.5	0	9	N		WISEART	1	2.9	9.12					
SUL	R	5	-1	0.5	0	9	N		WISEART				100	-15	0		
UDL	T	2.19	-2	0.5	0	20	N		WISEART	1	0.7	0.19					
UUL	R	2.16	-2.5	0.5	0	20	N		WISEART				100	-17.84			

**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
XDLH	T	C		x-band-helical.pdf		-159.07	-157.13	-155.39	-153.86	-152.53
XDLH	T	X		x-band-helical.pdf						
XDL	T	C		x-band-patch.pdf		-158.88	-156.94	-155.2	-153.67	-152.34
XDL	T	X		x-band-patch.pdf						
SUL	R	C		s-band-patch.pdf						
SUL	R	X		s-band-patch.pdf						
UDL	T	C		nf-monopole-antenna.p		-152.09	-150.16	-148.41	-146.88	-145.55

**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: 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)
XCH1	66830	T	8133	R	C
XCH2	66830	T	8200	R	C
SCH1	1310	R	2056	R	T
UDCH1	60	T	401	H	T
UUCH1	60	R	450	H	T

(a) Transponder ID	(b) Transponder Gain (dB)	Receive Band		Transmit Band	
		(c) Channel No.	(d) Beam ID	(e) Channel No.	(f) Beam ID
NONE	1	SCH1	SUL	XCH1	XDLH

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)
XCH1	66M8G1D	66830	8	120000	0.89	0	11.54	22.84
XCH2	66M8G1D	66830	8	120000	0.89	0	11.54	22.84
SCH1	1M31F1D	1310	2	250	0.5	0	6.81	16.01
UDCH1	60K0F1D	60	2	2.4	0.5	0	0.02	11.32
UUCH1	60K0F1D	60	2	2.4	0.5	0	0.02	11.32

FEDERAL COMMUNICATIONS COMMISSION
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)			
		(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.		

**FEDERAL COMMUNICATIONS COMMISSION
SATELLITE SPACE STATION AUTHORIZATIONS
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): Yes

Remote Control (TT C) Location(s):

S14a: Street Address: 346 9th St			
S14b. City: San Francisco	S14c. County: San Francisco	S14d. State/Country CA	S14e. Zip Code: 94103
S14f. Telephone Number: 415-829-3313		S14g. Call Sign of Control Station (if appropriate): NONE	

**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): 5	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): 5	S15f. Length (m): 0.34	S15i. Payload: 0.8
S15d. Mass of fuel, in orbit, at beginning of life (kg): 0	S15g. Width (m): 0.62	S15j. Bus: 0.9
S15e. Deployed Area of Solar Array (square meters): 0.156	S15h. Height (m): 0.1	S15k. Total: 0.712

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): 13.16	(f): 13.16	(k): 13.16	(p): 13.16
Bus (Watts):	(b): 2.12	(g): 2.12	(l): 2.12	(q): 2.12
Total (Watts):	(c): 15.28	(h): 15.28	(m): 15.28	(r): 15.28
Solar Array (Watts):	(d): 19.1	(i): 19.1	(n): 18.9	(s): 18.9
Depth of Battery Discharge (%):	(e) 30 %	(j) 30 %	(o) 30 %	(t) 30 %

S17. CERTIFICATIONS:

a. Are the power flux density limits of § 25.208 met?	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input checked="" type="checkbox"/> 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?	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input checked="" type="checkbox"/> 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?	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> 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.