

FCC 312 Schedule S	FEDERAL COMMUNICATIONS COMMISSION SATELLITE SPACE STATION AUTHORIZATIONS (Technical and Operational Description)	Page 1: General, Frequency Bands, and GSO Orbit
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S1. GENERAL INFORMATION Complete for all satellite applications.

a. Space Station or Satellite Network Name: LEMUR-3		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): 2 Years	j. Number of transponders offered on a common carrier basis:
c. Construction Completion Date:		g. Total Number of Transponders:	k. Total Common Carrier Transponder Bandwidth: MHz
d1. Est Launch Date Begin:	d2. Est Launch Date End:	h. Total Transponder Bandwidth (no. transponders x Bandwidth) 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 operate. 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)		
402.425	M	402.625	M	R	Earth Exploration Satellite Service
2020	M	2025	M	T	Earth Exploration Satellite Service
402.425	M	402.625	M	T	Earth Exploration Satellite Service
8025	M	8400	M	T	Earth Exploration Satellite Service
2025	M	2110	M	R	Earth Exploration Satellite Service
161.9625	M	161.9875	M	R	Earth Exploration Satellite Service
162.0125	M	162.0375	M	R	Earth Exploration Satellite Service
1575.42	M	1575.42	M	R	Earth Exploration Satellite Service
1227.60	M	1227.60	M	R	Earth Exploration Satellite Service

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: 175

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

S4b. Total Number of Orbital Planes in Network or System: 4

S4d. Orbit Epoch Date: 3/1/2016

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	55	98	5820	600	600	0	0	0	360	
2	60	98	5640	500	500	0	0	0	360	
3	40	51.8	5640	500	500	0	0	0	360	
4	20	3	5640	500	500	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	6.5
1	3	13.1
1	4	19.6
1	5	26.2
1	6	32.7
1	7	39.3
1	8	45.8
1	9	52.4
1	10	58.9
1	11	65.5
1	12	72
1	13	78.5
1	14	85.1
1	15	91.6
1	16	98.2
1	17	104.7
1	18	111.3

1	19	117.8
1	20	124.4
1	21	130.9
1	22	137.5
1	23	144
1	24	150.5
1	25	157.1
1	26	163.6
1	27	170.2
1	28	176.7
1	29	183.3
1	30	189.8
1	31	196.4
1	32	202.9
1	33	209.5
1	34	216
1	35	222.5
1	36	229.1
1	37	235.6
1	38	242.2
1	39	248.7
1	40	255.3
1	41	261.8
1	42	268.4
1	43	274.9
1	44	281.5
1	45	288
1	46	294.5
1	47	301.1
1	48	307.6
1	49	314.2
1	50	320.7
1	51	327.3
1	52	333.8
1	53	340.4
1	54	346.9
1	55	353.5
2	1	0
2	2	6

2	3	12
2	4	18
2	5	24
2	6	30
2	7	36
2	8	42
2	9	48
2	10	54
2	11	60
2	12	66
2	13	72
2	14	78
2	15	84
2	16	90
2	17	96
2	18	102
2	19	108
2	20	114
2	21	120
2	22	126
2	23	132
2	24	138
2	25	144
2	26	150
2	27	156
2	28	162
2	29	168
2	30	174
2	31	180
2	32	186
2	33	192
2	34	198
2	35	204
2	36	210
2	37	216
2	38	222
2	39	228
2	40	234
2	41	240

2	42	246
2	43	252
2	44	258
2	45	264
2	46	270
2	47	276
2	48	282
2	49	288
2	50	294
2	51	300
2	52	306
2	53	312
2	54	318
2	55	324
2	56	330
2	57	336
2	58	342
2	59	348
2	60	354
3	1	0
3	2	9
3	3	18
3	4	27
3	5	36
3	6	45
3	7	54
3	8	63
3	9	72
3	10	81
3	11	90
3	12	99
3	13	108
3	14	117
3	15	126
3	16	135
3	17	144
3	18	153
3	19	162
3	20	171

3	21	180
3	22	189
3	23	198
3	24	207
3	25	216
3	26	225
3	27	234
3	28	243
3	29	252
3	30	261
3	31	270
3	32	279
3	33	288
3	34	297
3	35	306
3	36	315
3	37	324
3	38	333
3	39	342
3	40	351
4	1	0
4	2	18
4	3	36
4	4	54
4	5	72
4	6	90
4	7	108
4	8	126
4	9	144
4	10	162
4	11	180
4	12	198
4	13	216
4	14	234
4	15	252
4	16	270
4	17	288
4	18	306
4	19	324

4	20	342
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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.
GLOBAL	E		GLOBAL

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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
UUL	R			1	0.5				GLOBAL				300	-20	-36.5	1	1
UDL	T			1	0.5				GLOBAL			10					
SDL	T			1	0.5				GLOBAL			10					
XDL	T			1	0.5				GLOBAL			10					
SUL	R			1	0.5				GLOBAL					-20	-43	1	1

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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
UUL	R	C		UUL Pattern.pdf						
UDL	T	C		UDL Pattern.pdf		-125	-125	-125	-125	-125
SDL	T	C		SDL Pattern.pdf		-135	-135	-135	-135	-135
XDL	T	C		XDL Pattern.pdf		-150	-150	-150	-150	-150
SUL	R	C		SUL Pattern.pdf						

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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)
UUCH1	200	R	402.525	R	T
UDCH1	200	T	402.525	R	T
SDCH1	5000	T	2022.5	L	C
XDCH1	375000	T	8212.5	R	C
SUCH1	5000	R	2022.5	L	T
GPSL1	20460	R	1575.42	R	C
GPSL2	20460	R	1227.60	R	C
AIS1	25	R	161975	V	C
AIS2	25	R	162025	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
NONE		UUCH1	UUL	XDCH1	XDL
NONE2		SUCH1	SUL	SDCH1	SDL
NONE3		UUCH1	UUL	UDCH1	UDL

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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)
UUCH1	12K5F7D	12.5						
SDCH1	5M00G1D	5000						
XDCH1	375MG1D	375000						
SUCH1	75M0G1D	75000						
UDCH1	12K5F7D	12.5						

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 Componder, 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.							
NONE	NONE	UUCH1									35			
NONE2	NONE2	UDCH1									25			
NONE3	NONE3	SDCH1									25			
NONE	NONE	XDCH1									25			
NONE	NONE	SUCH1									95			

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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): Yes

Remote Control (TT C) Location(s):

S14a: Street Address: 33 Norfolk Street			
S14b. City: San Francisco	S14c. County:	S14d. State/Country CA	S14e. Zip Code: 94103
S14f. Telephone Number: 415-356-3400		S14g. Call Sign of Control Station (if appropriate): NONE	

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**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):	S15i. Payload:
S15d. Mass of fuel, in orbit, at beginning of life (kg): 0	S15g. Width (m):	S15j. Bus:
S15e. Deployed Area of Solar Array (square meters):	S15h. Height (m):	S15k. Total:

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

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.

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