FCC 312 Schedule S	FEDERAL COMMUNICATIONS COMMISSION SATELLITE SPACE STATION AUTHORIZATIONS (Technical and Operational Description)	Page 1: General, Frequency Bands, and GSO Orbit

S1. GENERAL INFORMATION Complete for all satellite applications.

a. Space Station or Satellite Network Name:		e. Estimated Date of Placement into Service:	i Will the space station(s) operate on a Common Carrier Basis:
ECHOSTAR-121W-KUX		9/30/2009	N
b. Construction Commencement Date:		f. Estimated Lifetime of Satellite(s):	j. Number of transponders offered on a common carrier basis:
9/30/2007		12 Years	0
c. Construction Completion Date:		g. Total Number of Transponders:	k. Total Common Carrier Transponder Bandwidth:
7/31/2009		32	0 MHz
d1. Est Launch Date Begin:	d2. Est Launch Date End:	h. Total Transponder Bandwidth (no. transponders x Bandwidth)	l. Orbit Type: Mark all boxes that apply:
8/31/2009	8/31/2009	864 MHz	☐ **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)		
13.75	G	14.0	G	R	Fixed Satellite Service
11.45	G	11.7	G	R	Direct to Home in the Fixed Fixed Satellite Service
10.95	G	11.2	G	R	Direct to Home in the Fixed Fixed Satellite Service

S3. ORBITAL INFORMATION FOR GEOSTATIONARY SATELLITES ONLY:

a. Nominal Orbital Longitude (Degrees E/W):	b. Alternate Orbital Longitude (Degrees E/W):		c. Reason for orbital location selection:
121 W			This orbital location provides high elevation angles to all of North and Central America including Hawaii, which is very important for satellite services to large numbers of small and inexpensive consumer earth stations, which will be used at Ku-band. The high elevation minimizes the risk of signal blockage due to buildings and foliage, and also minimizes the atmospheric and rain attenuation.
Longitudinal Tolerance or E/W Station-Keeping: d. Toward West: 0.05 Degrees e. Toward East: 0.05 Degrees	f. Inclination Excursion or N/S Station-Keeping Tolerance: 0.05 Degrees	Range of orbital are in which adequate service can be provided (Optional): Degrees E/W g. Westernmost: h. Easternmost:	
i. Reason for service are selection (Optional):			

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S4. ORBITAL INFORMATION FOR NON-GEOSTATIONARY SATELLITES ONLY

S4a. Total Number of Satellites in Network or System:

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

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

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 intital phase angle.

(a) Orbital Plane No.	(b) Satellite Number	(c) Initial Phase Angle (Degrees)

NO NGSO DATA FILED

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SATELLITE SPACE STATION AUTHORIZATIONS
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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.
SA1	S		All visible areas of the Earth.
SA2	S		CONUS, Hawaii, Puerto Rico, Canada, Mexico

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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 Isolation (dB)	(h) Polarization Switchable? (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 Noice Temp (k)	(o) G/T Max. Gain Pt.	(p) Min. Saturation Flux Density (dBW/m2)	Input Attenuator (dB)	
																(q) Max. Value	(r) Step Size
UAL	R	44.4	41.4	0.12	0	30	N		SA1				1000	14.4	-98	15	1
UAR	R	44.4	41.4	0.12	0	30	N		SA1				1000	14.4	-98	15	1
UBR	R	44.4	41.4	0.12	0	30	N		SA1				1000	14.4	-98	15	1
UBL	R	44.4	41.4	0.12	0	30	N		SA1				1000	14.4	-98	15	1
DR	T	30.8	26.8	0.12	0	30	N		SA2	1.8	89.2	50.3					
DL	T	30.8	26.8	0.12	0	30	N		SA2	1.8	89.2	50.3					

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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
UAL	R	C	-121		UAL.gxt					
UAR	R	C	-121		UAR.gxt					
UBR	R	C	-121		UBR.gxt					
UBL	R	C	-121		UBL.gxt					
DR	T	C	-121		DR.gxt	-152.6	-151.6	-150.6	-150.1	-150.1
DL	T	C	-121		DL.gxt	-152.6	-151.6	-150.6	-150.1	-150.1

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S9. SPACE STATION CHANNELS For each frequency channel 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)
U0001	27000	R	13766.5	L	C
U0003	27000	R	13796.5	L	C
U0005	27000	R	13826.5	L	C
U0007	27000	R	13856.5	L	C
U0009	27000	R	13886.5	L	C
U0011	27000	R	13916.5	L	C
U0013	27000	R	13946.5	L	C
U0015	27000	R	13976.5	L	C
U0002	27000	R	13773.5	R	C
U0004	27000	R	13803.5	R	C
U0006	27000	R	13833.5	R	C
U0008	27000	R	13863.5	R	C
U0010	27000	R	13893.5	R	C
U0012	27000	R	13923.5	R	C
U0014	27000	R	13953.5	R	C
U0016	27000	R	13983.5	R	C
U0017	27000	R	13766.5	R	C
U0019	27000	R	13796.5	R	C
U0021	27000	R	13826.5	R	C
U0023	27000	R	13856.5	R	C
U0025	27000	R	13886.5	R	C
U0027	27000	R	13916.5	R	C
U0029	27000	R	13946.5	R	C
U0031	27000	R	13976.5	R	C
U0018	27000	R	13773.5	L	C
U0020	27000	R	13803.5	L	C
U0022	27000	R	13833.5	L	C
U0024	27000	R	13863.5	L	C
U0026	27000	R	13893.5	L	C
U0028	27000	R	13923.5	L	C

S10. SPACE STATION TRANSPONDERS For each transponder provide:

(a) Transponder ID	(b) Transponder Gain (dB)	Receive Band		Transmit Band	
		(c) Channel No.	(d) Beam ID	(e) Channel No.	(f) Beam ID
T0001	120	U0001	UAL	D0001	DR
T0003	120	U0003	UAL	D0003	DR
T0005	120	U0005	UAL	D0005	DR
T0007	120	U0007	UAL	D0007	DR
T0009	120	U0009	UAL	D0009	DR
T0011	120	U0011	UAL	D0011	DR
T0013	120	U0013	UAL	D0013	DR
T0015	120	U0015	UAL	D0015	DR
T0002	120	U0002	UAR	D0002	DL
T0004	120	U0004	UAR	D0004	DL
T0006	120	U0006	UAR	D0006	DL
T0008	120	U0008	UAR	D0008	DL
T0010	120	U0010	UAR	D0010	DL
T0012	120	U0012	UAR	D0012	DL
T0014	120	U0014	UAR	D0014	DL
T0016	120	U0016	UAR	D0016	DL
T0017	120	U0017	UBR	D0017	DL
T0019	120	U0019	UBR	D0019	DL
T0021	120	U0021	UBR	D0021	DL
T0023	120	U0023	UBR	D0023	DL
T0025	120	U0025	UBR	D0025	DL
T0027	120	U0027	UBR	D0027	DL
T0029	120	U0029	UBR	D0029	DL
T0031	120	U0031	UBR	D0031	DL
T0018	120	U0018	UBL	D0018	DR
T0020	120	U0020	UBL	D0020	DR
T0022	120	U0022	UBL	D0022	DR
T0024	120	U0024	UBL	D0024	DR
T0026	120	U0026	UBL	D0026	DR
T0028	120	U0028	UBL	D0028	DR

U0030	27000	R	13953.5	L	C
U0032	27000	R	13983.5	L	C
D0001	27000	T	10966.5	R	C
D0003	27000	T	10996.5	R	C
D0005	27000	T	11026.5	R	C
D0007	27000	T	11056.5	R	C
D0009	27000	T	11086.5	R	C
D0011	27000	T	11116.5	R	C
D0013	27000	T	11146.5	R	C
D0015	27000	T	11176.5	R	C
D0017	27000	T	11466.5	L	C
D0019	27000	T	11496.5	L	C
D0021	27000	T	11526.5	L	C
D0023	27000	T	11556.5	L	C
D0025	27000	T	11586.5	L	C
D0027	27000	T	11616.5	L	C
D0029	27000	T	11646.5	L	C
D0031	27000	T	11676.5	L	C
D0018	27000	T	11473.5	R	C
D0020	27000	T	11503.5	R	C
D0022	27000	T	11533.5	R	C
D0024	27000	T	11563.5	R	C
D0026	27000	T	11593.5	R	C
D0028	27000	T	11623.5	R	C
D0030	27000	T	11653.5	R	C
D0032	27000	T	11683.5	R	C
D0002	27000	T	10973.5	L	C
D0004	27000	T	11003.5	L	C
D0006	27000	T	11033.5	L	C
D0008	27000	T	11063.5	L	C
D0010	27000	T	11093.5	L	C
D0012	27000	T	11123.5	L	C
D0014	27000	T	11153.5	L	C
D0016	27000	T	11183.5	L	C

T0030	120	U0030	UBL	D0030	DR
T0032	120	U0032	UBL	D0032	DR

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)
D1	27M0G7W	27000	4	33300	0.691		6	18.2

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S12. ANALOG MODULATION PARAMETERS For each analog emission provide:

(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						

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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)			
(a) Start	(b) End	(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/m2/Hz)	(o)Assoc. Stn Rec. G/T (dB/K)
									(j) Min.	(k) Max.	(l) Min.	(m) Max.		
T0001	T0032	D1		1		LB1.doc		62.2	3	18	46.3	50.3	-150.1	17.4

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

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Page 11: Characteristics and Certifications

S15. SPACECRAFT PHYSICAL CHARACTERISTICS:

S15a: Mass of spacecraft without fuel (kg): 2300	Spacecraft Dimensions (meters)	Probability of Survival to End of Life (0.0 - 1.0)
S15b. Mass of fuel and disposables at launch (kg): 2400		
S15c. Mass of spacecraft and fuel at launch (kg): 4700	S15f. Length (m): 44.1	S15i. Payload: 0.87
S15d. Mass of fuel, in orbit, at beginning of life (kg): 1200	S15g. Width (m): 8	S15j. Bus: 0.85
S15e. Deployed Area of Solar Array (square meters): 85.3	S15h. Height (m): 5	S15k. Total: 0.74

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): 9450	(f): 9450	(k): 9450	(p): 9450
Bus (Watts):	(b): 1800	(g): 1000	(l): 1800	(q): 1000
Total (Watts):	(c): 11250	(h): 10450	(m) 11250	(r): 10450
Solar Array (Watts):	(d): 14500	(i): 12571	(n): 12854	(s): 11310
Depth of Battery Discharge (%):	(e) 75 %	(j) %	(o) 75 %	(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.