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: DIRECTV KU-45W		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: 36	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) 1296 MHz	l. Orbit Type: Mark all boxes that apply: [X] 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)		
10950	M	11200	M	T	Direct to Home in the Fixed Fixed Satellite Service
10950	M	11200	M	T	Fixed Satellite Service
14000	M	14500	M	R	Fixed Satellite Service
11450	M	11700	M	T	Direct to Home in the Fixed Fixed Satellite Service
11450	M	11700	M	T	Fixed Satellite Service
11950	M	12200	M	T	Direct to Home in the Fixed Fixed Satellite Service
11950	M	12200	M	T	Fixed Satellite Service

S3. ORBITAL INFORMATION FOR GEOSTATIONARY SATELLITES ONLY:

a. Nominal Orbital Longitude (Degrees E/W): 45.2 W	b. Alternate Orbital Longitude (Degrees E/W):		c. Reason for orbital location selection:
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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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.
B	S		Brasil

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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. (db/K)	(p) Min. Saturation Flux Density (dBW/m2)	Input Attenuator (dB)	
																(q) Max. Value	(r) Step Size
TXH	T	33.4	27.4	0.1	0.1	30	N	0	B	2.2	91.2	53					
TXV	T	33.4	27.4	0.1	0.1	30	N	90	B	2.2	91.2	53					
R1H	R	39.1	35.1	0.1	0.1	30	N	0	B				1000	9.1	-100	20	1
R1V	R	39.1	35.1	0.1	0.1	30	N	90	B				1000	9.1	-100	20	1
R2H	R	39.2	35.2	0.1	0.1	30	N	0	B				1000	9.2	-100	20	1
R2V	R	39.2	35.2	0.1	0.1	30	N	90	B				1000	9.2	-100	20	1

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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
TXH	T	C	-45.2		RECTV KU-45W TX-H	-178	-178	-178	-178	-178
TXV	T	C	-45.2		RECTV KU-45W TX-V	-178	-178	-178	-178	-178
R1H	R	C	-45.2		ECTV KU-45W UL1-H					
R1V	R	C	-45.2		ECTV KU-45W UL1-V					
R2H	R	C	-45.2		ECTV KU-45W UL2-H					
R2V	R	C	-45.2		ECTV KU-45W UL2-V					

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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)
RX001	36000	R	14020	V	C
RX003	36000	R	14060	V	C
RX005	36000	R	14100	V	C
RX007	36000	R	14140	V	C
RX009	36000	R	14180	V	C
RX011	36000	R	14220	V	C
RX013	36000	R	14260	V	C
RX015	36000	R	14300	V	C
RX017	36000	R	14340	V	C
RX019	36000	R	14380	V	C
RX021	36000	R	14420	V	C
RX023	36000	R	14460	V	C
RX002	36000	R	14020	H	C
RX004	36000	R	14060	H	C
RX006	36000	R	14100	H	C
RX008	36000	R	14140	H	C
RX010	36000	R	14180	H	C
RX012	36000	R	14220	H	C
RX014	36000	R	14260	H	C
RX016	36000	R	14300	H	C
RX018	36000	R	14340	H	C
RX020	36000	R	14380	H	C
RX022	36000	R	14420	H	C
RX024	36000	R	14460	H	C
TX001	36000	T	11470	V	C
TX003	36000	T	11510	V	C
TX005	36000	T	11550	V	C
TX007	36000	T	11590	V	C
TX009	36000	T	11630	V	C
TX011	36000	T	11670	V	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
TP001	120	RX001	R1V	TX001	TXV
TP003	120	RX003	R1V	TX003	TXV
TP005	120	RX005	R1V	TX005	TXV
TP007	120	RX007	R1V	TX007	TXV
TP009	120	RX009	R1V	TX009	TXV
TP011	120	RX011	R1V	TX011	TXV
TP013	120	RX013	R1V	TX013	TXV
TP015	120	RX015	R1V	TX015	TXV
TP017	120	RX017	R1V	TX017	TXV
TP019	120	RX019	R1V	TX019	TXV
TP021	120	RX021	R1V	TX021	TXV
TP023	120	RX023	R1V	TX023	TXV
TP025	120	RX025	R2V	TX025	TXV
TP027	120	RX027	R2V	TX027	TXV
TP029	120	RX029	R2V	TX029	TXV
TP031	120	RX031	R2V	TX031	TXV
TP033	120	RX033	R2V	TX033	TXV
TP035	120	RX035	R2V	TX035	TXV
TP002	120	RX002	R1H	TX002	TXH
TP004	120	RX004	R1H	TX004	TXH
TP006	120	RX006	R1H	TX006	TXH
TP008	120	RX008	R1H	TX008	TXH
TP010	120	RX010	R1H	TX010	TXH
TP012	120	RX012	R1H	TX012	TXH
TP014	120	RX014	R1H	TX014	TXH
TP016	120	RX016	R1H	TX016	TXH
TP018	120	RX018	R1H	TX018	TXH
TP020	120	RX020	R1H	TX020	TXH
TP022	120	RX022	R1H	TX022	TXH
TP024	120	RX024	R1H	TX024	TXH

TX013	36000	T	11980	V	C
TX015	36000	T	12020	V	C
TX017	36000	T	12060	V	C
TX019	36000	T	12100	V	C
TX021	36000	T	12140	V	C
TX023	36000	T	12180	V	C
TX002	36000	T	11470	H	C
TX004	36000	T	11510	H	C
TX006	36000	T	11550	H	C
TX008	36000	T	11590	H	C
TX010	36000	T	11630	H	C
TX012	36000	T	11670	H	C
TX014	36000	T	11980	H	C
TX016	36000	T	12020	H	C
TX018	36000	T	12060	H	C
TX020	36000	T	12100	H	C
TX022	36000	T	12140	H	C
TX024	36000	T	12180	H	C
CMD1	1300	R	14497	V	T
CMD2	1300	R	14495	H	T
TLM1	106	T	11697	H	T
TLM2	106	T	11695	H	T
TX025	36000	T	10970	V	C
TX027	36000	T	11010	V	C
TX029	36000	T	11050	V	C
TX031	36000	T	11090	V	C
TX033	36000	T	11130	V	C
TX035	36000	T	11170	V	C
TX026	36000	T	10970	H	C
TX028	36000	T	11010	H	C
TX030	36000	T	11050	H	C
TX032	36000	T	11090	H	C
TX034	36000	T	11130	H	C
TX036	36000	T	11170	H	C
RX025	36000	R	14020	V	C
RX027	36000	R	14060	V	C
RX029	36000	R	14100	V	C
RX031	36000	R	14140	V	C
RX033	36000	R	14180	V	C

TP026	120	RX026	R2H	TX026	TXH
TP028	120	RX028	R2H	TX028	TXH
TP030	120	RX030	R2H	TX030	TXH
TP032	120	RX032	R2H	TX032	TXH
TP034	120	RX034	R2H	TX034	TXH
TP036	120	RX036	R2H	TX036	TXH
CMD1		CMD1	R1V		
CMD2		CMD2	R1H		
TLM1				TLM1	TXH
TLM2				TLM2	TXH

RX035	36000	R	14220	V	C
RX026	36000	R	14020	H	C
RX028	36000	R	14060	H	C
RX030	36000	R	14100	H	C
RX032	36000	R	14140	H	C
RX034	36000	R	14180	H	C
RX036	36000	R	14220	H	C

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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)
M01	36M0G7W	36000	4	43560	0.726		5.7	17.9

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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						
CMD	1M30F9D	1300		1									15	27.2
TLM	106KG9D	106		1									14	26.2

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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)			
								(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)
(a) Start	(b) End	(c) Digital (Table S11)	(d) Analog (Table S12)						(j) Min.	(k) Max.	(l) Min.	(m) Max.		
TP001	TP036	M01		1				60.7	5.1	7.9	47	53	-148.9	14
CMD1	CMD2		CMD	1				60.7	11.2	11.2				
TLM1	TLM2		TLM	1									-161.7	36.9

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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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): 3860		
S15c. Mass of spacecraft and fuel at launch (kg): 6160	S15f. Length (m): 42	S15i. Payload: 0.95
S15d. Mass of fuel, in orbit, at beginning of life (kg): 3510	S15g. Width (m): 10.2	S15j. Bus: 0.85
S15e. Deployed Area of Solar Array (square meters): 67	S15h. Height (m): 7.6	S15k. Total: 0.808

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): 8750	(f): 8750	(k): 8750	(p): 8750
Bus (Watts):	(b): 1450	(g): 900	(l): 1400	(q): 700
Total (Watts):	(c): 10200	(h): 9650	(m) 10150	(r): 9450
Solar Array (Watts):	(d): 14750	(i): 13475	(n): 13275	(s): 12127
Depth of Battery Discharge (%):	(e) 70 %	(j) 0 %	(o) 70 %	(t) 0 %

S17. CERTIFICATIONS:

a. Are the power flux density limits of § 25.208 met?:	X	**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**	X	**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?	X	**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.