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 BSS-103W		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: 24	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) 864 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)		
24.75	G	25.25	G	R	Feeder Link for Broadcasting Satellite Service in FSS
17.3	G	17.8	G	T	Broadcasting Satellite Service - Video

S3. ORBITAL INFORMATION FOR GEOSTATIONARY SATELLITES ONLY:

a. Nominal Orbital Longitude (Degrees E/W): 103 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):			

FEDERAL COMMUNICATIONS COMMISSION **Page 2: NGSO Orbits**
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:

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

FEDERAL COMMUNICATIONS COMMISSION **Page 3: Service Areas**
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.
AMER	S		CONUS+AK+HI+PR
MEX	S		Mexico
LATAMER	S		South America

FEDERAL COMMUNICATIONS COMMISSION **Page 4: Antenna Beams**
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 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
UL1	R	37	33	0.2		30	N		AMER				900	7.4	-94	20	1
DL1	T	35.5	25.5	0.2		30	N		AMER	1.5	400	60					
DL2	T	36.4	30.4	0.2		30	N		MEX	2.4	400	60					
DL3	T	35.3	29.3	0.2		30	N		LATAMER	1.3	400	60					

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
DL1	T	C	-103		US-PR Transmit.gxt					
UL1	R	C	-103		US Receive.gxt					
DL2	T	C	-103		Mexico Transmit.gxt					
DL3	T	C	-103		S.America Transmit.gx					

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:

(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)
T01	36000	T	17330	R	C
T02	36000	T	17330	L	C
T03	36000	T	17370	R	C
T04	36000	T	17370	L	C
T05	36000	T	17410	R	C
T06	36000	T	17410	L	C
T07	36000	T	17450	R	C
T08	36000	T	17450	L	C
T09	36000	T	17490	R	C
T10	36000	T	17490	L	C
T11	36000	T	17530	R	C
T12	36000	T	17530	L	C
T13	36000	T	17570	R	C
T14	36000	T	17570	L	C
T15	36000	T	17610	R	C
T16	36000	T	17610	L	C
T17	36000	T	17650	R	C
T18	36000	T	17650	L	C
T19	36000	T	17690	R	C
T20	36000	T	17690	L	C
T21	36000	T	17730	R	C
T22	36000	T	17730	L	C
T23	36000	T	17770	R	C
T24	36000	T	17770	L	C
T19A	24000	T	17684	R	C
T20A	24000	T	17684	L	C
R01	36000	R	24780	R	C
R02	36000	R	24780	L	C
R03	36000	R	24820	R	C
R04	36000	R	24820	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
AM01	130	R01	UL1	T01	DL1
AM02	130	R02	UL1	T02	DL1
AM03	130	R03	UL1	T03	DL1
AM04	130	R04	UL1	T04	DL1
AM05	130	R05	UL1	T05	DL1
AM06	130	R06	UL1	T06	DL1
AM07	130	R07	UL1	T07	DL1
AM08	130	R08	UL1	T08	DL1
AM09	130	R09	UL1	T09	DL1
AM10	130	R10	UL1	T10	DL1
AM11	130	R11	UL1	T11	DL1
AM12	130	R12	UL1	T12	DL1
AM13	130	R13	UL1	T13	DL1
AM14	130	R14	UL1	T14	DL1
AM15	130	R15	UL1	T15	DL1
AM16	130	R16	UL1	T16	DL1
AM17	130	R17	UL1	T17	DL1
AM18	130	R18	UL1	T18	DL1
AM19	130	R19A	UL1	T19A	DL1
AM20	130	R20A	UL1	T20A	DL1
MX01	130	R01	UL1	T01	DL2
MX02	130	R02	UL1	T02	DL2
MX03	130	R03	UL1	T03	DL2
MX04	130	R04	UL1	T04	DL2
MX05	130	R05	UL1	T05	DL2
MX06	130	R06	UL1	T06	DL2
MX07	130	R07	UL1	T07	DL2
MX08	130	R08	UL1	T08	DL2
MX09	130	R09	UL1	T09	DL2
MX10	130	R10	UL1	T10	DL2

R05	36000	R	24860	R	C
R06	36000	R	24860	L	C
R07	36000	R	24900	R	C
R08	36000	R	24900	L	C
R09	36000	R	24940	R	C
R10	36000	R	24940	L	C
R11	36000	R	24980	R	C
R12	36000	R	24980	L	C
R13	36000	R	25020	R	C
R14	36000	R	25020	L	C
R15	36000	R	25060	R	C
R16	36000	R	25060	L	C
R17	36000	R	25100	R	C
R18	36000	R	25100	L	C
R19	36000	R	25140	R	C
R20	36000	R	25140	L	C
R21	36000	R	25180	R	C
R22	36000	R	25180	L	C
R23	36000	R	25220	R	C
R24	36000	R	25220	L	C
R19A	24000	R	25134	R	C
R20A	24000	R	25134	L	C
CMD1	1000	R	24751	R	T
CMD2	1000	R	25249	R	T
CMD3	1000	R	25249	L	T
TLM1	1000	T	17301	R	T
TLM2	1000	T	17302	L	T

MX11	130	R11	UL1	T11	DL2
MX12	130	R12	UL1	T12	DL2
MX13	130	R13	UL1	T13	DL2
MX14	130	R14	UL1	T14	DL2
MX15	130	R15	UL1	T15	DL2
MX16	130	R16	UL1	T16	DL2
MX17	130	R17	UL1	T17	DL2
MX18	130	R18	UL1	T18	DL2
MX19	130	R19	UL1	T19	DL2
MX20	130	R20	UL1	T20	DL2
MX21	130	R21	UL1	T21	DL2
MX22	130	R22	UL1	T22	DL2
MX23	130	R23	UL1	T23	DL2
MX24	130	R24	UL1	T24	DL2
LA01	130	R01	UL1	T01	DL3
LA02	130	R02	UL1	T02	DL3
LA03	130	R03	UL1	T03	DL3
LA04	130	R04	UL1	T04	DL3
LA05	130	R05	UL1	T05	DL3
LA06	130	R06	UL1	T06	DL3
LA07	130	R07	UL1	T07	DL3
LA08	130	R08	UL1	T08	DL3
LA09	130	R09	UL1	T09	DL3
LA10	130	R10	UL1	T10	DL3
LA11	130	R11	UL1	T11	DL3
LA12	130	R12	UL1	T12	DL3
LA13	130	R13	UL1	T13	DL3
LA14	130	R14	UL1	T14	DL3
LA15	130	R15	UL1	T15	DL3
LA16	130	R16	UL1	T16	DL3
LA17	130	R17	UL1	T17	DL3
LA18	130	R18	UL1	T18	DL3
LA19	130	R19	UL1	T19	DL3
LA20	130	R20	UL1	T20	DL3
LA21	130	R21	UL1	T21	DL3
LA22	130	R22	UL1	T22	DL3
LA23	130	R23	UL1	T23	DL3
LA24	130	R24	UL1	T24	DL3
CMDA		CMD1	UL1		

CMDB		CMD2	UL1		
CMDC		CMD3	UL1		
TLMA				TLM1	DL1
TLMB				TLM2	DL1

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)
DTH	36M0G7W	36000	4	34800	0.58		3.8	23
DTH2	36M0G7W	36000	8	74170	0.824		11.5	23
DTH3	36M0G7W	36000	8	52190	0.58		7.7	23
DTH4	24M0G7W	24000	4	30300	0.5		7.6	23

FEDERAL COMMUNICATIONS COMMISSION **Page 8: Analog Modulation**

SATELLITE SPACE STATION AUTHORIZATIONS

FCC Form 312 - Schedule S: (Technical and Operational Description)

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						
TLM	1M00F9D	1000		1									10	23
CMD	1M00F9D	1000		1									10	23

FEDERAL COMMUNICATIONS COMMISSION **Page 9: Typical Emissions**
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)			
(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.		
AM01	AM18	DTH3		1				65.2	7.2	10.5	60	60		17.2
AM19	AM20	DTH4		1				65.2	7.2	10.5	60	60		17.2
MX01	MX24	DTH2		1				65.2	7.2	10.5	60	60	-118	17.2
LA01	LA24	DTH		1				65.2	7.2	10.5	59.8	59.8	-118	20.7
CMDA	CMDC		CMD	1				65.2	-0.7	18.3				
TLMA	TLMB		TLM	1							15	15		40

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): No

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

S15. SPACECRAFT PHYSICAL CHARACTERISTICS:

S15a: Mass of spacecraft without fuel (kg): 3550	Spacecraft Dimensions (meters)	Probability of Survival to End of Life (0.0 - 1.0)
S15b. Mass of fuel and disposables at launch (kg): 2450		
S15c. Mass of spacecraft and fuel at launch (kg): 6000	S15f. Length (m): 48	S15i. Payload: 0.6
S15d. Mass of fuel, in orbit, at beginning of life (kg): 300	S15g. Width (m): 7.5	S15j. Bus: 0.85
S15e. Deployed Area of Solar Array (square meters): 80	S15h. Height (m): 8.5	S15k. Total: 0.51

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): 16000	(f): 16000	(k): 16000	(p): 16000
Bus (Watts):	(b): 1800	(g): 700	(l): 1800	(q): 700
Total (Watts):	(c): 17800	(h): 16700	(m) 17800	(r): 16700
Solar Array (Watts):	(d): 22000	(i): 19650	(n): 18500	(s): 17200
Depth of Battery Discharge (%):	(e) 80 %	(j) 0 %	(o) 80 %	(t) 0 %

S17. CERTIFICATIONS:

a. Are the power flux density limits of § 25.208 met?:		**YES**		**NO**	X	**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.