

FEDERAL COMMUNICATIONS COMMISSION
SATELLITE SPACE STATION AUTHORIZATIONS
(Technical and Operational Description)

S1. GENERAL INFORMATION Complete for all satellite applications.

a. Space Station or Satellite Network Name: DIRECTV 1R		e. Estimated Date of Placement into Service: 10/1/1999	i. Will the space station(s) operate on a Common Carrier Basis: N
b. Construction Commencement Date:		f. Estimated Lifetime of Satellite(s): 12 Years	j. Number of transponders offered on a common carrier basis:
c. Construction Completion Date:		g. Total Number of Transponders: 16	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) 384 MHz	i. 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 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)		
17.3	G	17.8	G	R	Feeder Link for Broadcasting Satellite Service in FSS
12.2	G	12.7	G	T	Broadcasting Satellite Service - Video

S3. ORBITAL INFORMATION FOR GEOSTATIONARY SATELLITES ONLY:

a. Nominal Orbital Longitude (Degrees E/W): 72.5 W		b. Alternate Orbital Longitude (Degrees E/W):		c. Reason for orbital location selection:
Longitudinal Tolerance or E/W Station-Keeping:		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:	
d. Toward West: 0.05 Degrees				
e. Toward East: 0.05 Degrees				
i. Reason for service are selection (Optional):				

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

Page 2: NGSO Orbits

S4. ORBITAL INFORMATION FOR NON-GEOSTATIONARY SATELLITES ONLY

S4a. Total Number of Satellites in Network or System:

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

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

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 initial phase angle.

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

NO NGSO DATA FILED

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

Page 3: Service Areas

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.
CONUSRX	S		CONUS
CONUSTX	S		CONUS

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

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
UL	R	34	31	0.08		30	N		CONUSR				794	5	-97	15	1
DL	T	34.7	28.7	0.08		30	N		CONUSTX	1	200	56.7					

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

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
UL	R	C	-72		D1R 72.5 RXCO.gxt					
DL	T	C	-72		D1_72.5_TX_CO.gxt					

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

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)
16R	24000	R	17542.7	L	C
2R	24000	R	17338.58	L	C
18R	24000	R	17571.86	L	C
4R	24000	R	17367.74	L	C
20R	24000	R	17601.02	L	C
6R	24000	R	17396.9	L	C
22R	24000	R	17630.18	L	C
8R	24000	R	17426.06	L	C
24R	24000	R	17659.34	L	C
10R	24000	R	17455.22	L	C
26R	24000	R	17688.5	L	C
12R	24000	R	17484.38	L	C
14R	24000	R	17513.54	L	C
28R	24000	R	17717.66	L	C
30R	24000	R	17746.82	L	C
32R	24000	R	17775.98	L	C
2T	24000	T	12238.58	L	C
4T	24000	T	12267.74	L	C
6T	24000	T	12296.9	L	C
8T	24000	T	12326.06	L	C
10T	24000	T	12355.22	L	C
12T	24000	T	12384.38	L	C
14T	24000	T	12413.54	L	C
16T	24000	T	12442.7	L	C
18T	24000	T	12471.86	L	C
20T	24000	T	12501.02	L	C
22T	24000	T	12530.18	L	C
24T	24000	T	12559.34	L	C
26T	24000	T	12588.5	L	C
28T	24000	T	12617.66	L	C

(a) Transponder ID	(b) Transponder Gain (dB)	Receive Band		Transmit Band	
		(c) Channel No.	(d) Beam ID	(e) Channel No.	(f) Beam ID
2	163	2R	RX	2T	TX1
4	163	4R	RX	4T	TX1
6	163	6R	RX	6T	TX1
8	163	8R	RX	8T	TX1
10	163	10R	RX	10T	TX1
12	163	12R	RX	12T	TX1
14	163	14R	RX	14T	TX1
16	163	16R	RX	16T	TX1
18	163	18R	RX	18T	TX1
20	163	20R	RX	20T	TX1
22	163	22R	RX	22T	TX1
24	163	24R	RX	24T	TX1
26	163	26R	RX	26T	TX1
28	163	28R	RX	28T	TX1
30	163	30R	RX	30T	TX1
32	163	32R	RX	32T	TX1
TLM1				TLM1	TX1
TLM2				TLM2	TX1

30T	24000	T	12646.82	L	C
32T	24000	T	12675.98	L	C
CMD	1000	R	17305	R	T
TLM1	1000	T	12699.25	R	T
TLM2	1000	T	12698.25	L	T

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

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)
DTH1	24M0G7W	24000	4	30320	0.758		7.6	28
DTH2	24M0G7W	24000	4	23600	0.59		5.1	28

Page 8: Analog Modulation

[illegible]

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

Page 9: Typical Emissions

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/m2/Hz)	(o) Assoc. Stn Rec. G/T (dB/K)
(a) Start	(b) End								(j) Min.	(k) Max.	(l) Min.	(m) Max.		
2	32	DTH1		1							50.7	56.7		13
CMD	CMD		CMD	1				65	-2.6	22.4				
TLM1	TLM2		TLM	1							-4	16		39
2	32	DTH2		1							50.7	56.7		13

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

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: 5454 E. Garton Rd			
S14b. City: Castle Rock	S14c. County: Douglas	S14d. State/Country CO	S14e. Zip Code: 80104
S14f. Telephone Number: 303-660-7001		S14g. Call Sign of Control Station (if appropriate): E930191	

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): 1730	Spacecraft Dimensions (meters)	Probability of Survival to End of Life (0.0 - 1.0)
S15b. Mass of fuel and disposables at launch (kg): 1786		
S15c. Mass of spacecraft and fuel at launch (kg): 3516	S15f. Length (m): 26.2	S15i. Payload: 0.93
S15d. Mass of fuel, in orbit, at beginning of life (kg): 526	S15g. Width (m): 2.2	S15j. Bus: 0.89
S15e. Deployed Area of Solar Array (square meters): 43.9	S15h. Height (m): 8.1	S15k. Total: 0.83

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): 5928	(f): 5928	(k): 5928	(p): 5928
Bus (Watts):	(b): 1621	(g): 704	(l): 1552	(q): 908
Total (Watts):	(c): 7549	(h): 6632	(m): 7480	(r): 6836
Solar Array (Watts):	(d): 8653	(i): 7702	(n): 7702	(s): 7031
Depth of Battery Discharge (%):	(e) 70.4 %	(j) 70.4 %	(o) 77.2 %	(t) 77.2 %

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.