

**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 13 | | 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: 3 | | 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) 82 MHz | | i. Orbit Type: Mark all boxes that apply: <input checked="" type="checkbox"/> GSO <input type="checkbox"/> 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 | Fixed Satellite Service |
| 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): 109.8 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: | | | | Range of orbital are in which adequate service can be provided (Optional): <u> </u> Degrees <u> </u> E/W | |
| d. Toward West: 0.05 Degrees | e. Toward East: 0.05 Degrees | | 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:

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

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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. |
|---------------------|---|---|---|
| CONUS1 | S | | CONUS |
| LACR1 | S | | Los Angeles, CA+Castle Rock, CO |
| AKHI | S | | Alaska+Hawaii |

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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 Iso- lation (dB) | (h) Polar- ization Switch- able? (Y/N) | (i) Polarization Alignment Rel. Equatorial Plane (Degrees) | (j) Service Area ID | Transmit | | | Receive | | | Input Attenuator (dB) | |
|-------------------|--------------------|---------------------------|-------------------|---------------------------------------|---|---|--|---|------------------------|--------------------------------|--------------------------------------|------------------------------|------------------------------------|---------------------------------------|--|-----------------------|------------------|
| | | | | | | | | | | (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) | (q) Max. Value | (r) Step Size |
| | | (c) Peak (dBi) | (d) Edge (dBi) | | | | | | | | | | | | | | |
| DL_1 | T | 36.4 | 30.4 | 0.2 | | 30 | N | | CONUS1 | 2.7 | 600 | 61.5 | | | | | |
| UL1 | R | 35 | 31 | 0.2 | | 30 | N | | LACR1 | | | | 900 | 5.5 | -93.5 | 20 | 1 |
| DL2 | T | 36 | 30 | 0.2 | | 30 | N | | AKHI | 3 | 56.2 | 50.5 | | | | | |

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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 |
| DL_1 | T | C | -101 | | DPTX_co.gxt | | | | | |
| DL2 | T | C | -101 | | AHTX_co.gxt | | | | | |
| UL1 | R | C | -101 | | DPRX_co.gxt | | | | | |

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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) |
|-----------------------|------------------------------------|--------------------|----------------------------------|-------------------------------------|---|
| R028 | 24000 | R | 17717.66 | L | C |
| R030 | 24000 | R | 17746.82 | L | C |
| R032 | 24000 | R | 17775.98 | L | C |
| RWB1A | 36000 | R | 17724 | L | C |
| RWB1B | 36000 | R | 17770 | L | C |
| RWB2A | 82000 | R | 17746.82 | L | C |
| T028 | 24000 | T | 12617.66 | L | C |
| T030 | 24000 | T | 12646.82 | L | C |
| T032 | 24000 | T | 12675.98 | L | C |
| TWB1A | 36000 | T | 12624 | L | C |
| TWB1B | 36000 | T | 12670 | L | C |
| TWB2A | 82000 | T | 12646.82 | L | C |
| CMD1 | 1000 | R | 17305 | L | T |
| CMD2 | 1000 | R | 17307 | L | T |
| TLM1 | 1000 | T | 12203 | L | T |
| TLM2 | 1000 | T | 12204 | L | T |

| (a) Transponder ID | (b) Transponder Gain (dB) | Receive Band | | Transmit Band | |
|--------------------------|---------------------------------|--------------------|----------------|--------------------|-------------|
| | | (c) Channel No. | (d) Beam ID | (e) Channel No. | (f) Beam ID |
| T0001 | 133.6 | R028 | UL1 | T028 | DL_1 |
| T0002 | 133.6 | R030 | UL1 | T030 | DL_1 |
| T0003 | 133.6 | R032 | UL1 | T032 | DL_1 |
| T0004 | 133.6 | RWB1A | UL1 | TWB1A | DL_1 |
| T0005 | 133.6 | RWB1B | UL1 | TWB1B | DL_1 |
| T0006 | 133.6 | RWB2A | UL1 | TWB2A | DL_1 |
| T0007 | 133.6 | R028 | UL1 | T028 | DL2 |
| T0008 | 133.6 | R030 | UL1 | T030 | DL2 |
| T0009 | 133.6 | R032 | UL1 | T032 | DL2 |
| T0010 | 133.6 | RWB1A | UL1 | TWB1A | DL2 |
| T0011 | 133.6 | RWB1B | UL1 | TWB1B | DL2 |
| T0012 | 133.6 | RWB2A | UL1 | TWB2A | DL2 |
| TLMA | | | | TLM1 | DL_1 |
| TLMB | | | | TLM2 | DL_1 |
| CMDA | | CMD1 | UL1 | | |
| CMDB | | CMD2 | UL1 | | |

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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) |
|---------------------|-------------------------|------------------------------|-------------------|------------------------------|--------------------------------------|-------------------------------|--|-------------------------------------|
| DTH | 24M0G7W | 24000 | 4 | 40000 | 0.48 | | 7.6 | 28 |
| DTH2 | 36M0G7W | 36000 | 4 | 60000 | 0.48 | | 7.6 | 28 |
| DTH3 | 82M0G7W | 82000 | 4 | 136700 | 0.48 | | 7.6 | 28 |

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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 | | | | | | |
| TLM | 1M00F9D | 1000 | | 1 | | | | | | | | | 7.6 | 28 |
| CMD | 1M00F9D | 1000 | | 1 | | | | | | | | | 7.6 | 28 |

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S13. TYPICAL EMISSIONS For each planned type of emission provide:

| Associated Transponder ID Range (a) Start (b) End | | 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) (j) Min. (k) Max. | | EIRP (dBW) (l) Min. (m) Max. | | (n) Max. Power Flux Density (dBW/m ² /Hz) | (o) Assoc. Stn Rec. G/T (dB/K) |
| T0001 | T0006 | DTH | | 1 | | | | 64.2 | 12.8 | 21.8 | 52 | 58 | | 4.9 |
| T0001 | T0006 | DTH2 | | 1 | | | | 64.2 | 14.6 | 23.6 | 53.8 | 59.8 | | 4.9 |
| T0001 | T0006 | DTH3 | | 1 | | | | 64.2 | 18.1 | 27.1 | 55.5 | 61.5 | | 4.9 |
| T0007 | T0012 | DTH | | 1 | | | | 64.2 | 12.8 | 21.8 | 41 | 47 | | 13 |
| T0007 | T0012 | DTH2 | | 1 | | | | 64.2 | 14.6 | 23.6 | 42.8 | 48.8 | | 13 |
| T0007 | T0012 | DTH3 | | 1 | | | | 64.2 | 18.1 | 27.1 | 44.5 | 50.5 | | 13 |
| TLMA | TLMB | | TLM | 1 | | | | | | | 12 | 18.3 | | 40 |
| CMDA | CMDB | | CMD | 1 | | | | 64.2 | -3.6 | 48.4 | | | | |

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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): No

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S15. SPACECRAFT PHYSICAL CHARACTERISTICS:

| | | |
|--|-----------------------------------|---|
| S15a. Mass of spacecraft without fuel (kg): 1480 | Spacecraft Dimensions (meters) | Probability of Survival to End of Life (0.0 - 1.0) |
| S15b. Mass of fuel and disposables at launch (kg): 2230 | | |
| S15c. Mass of spacecraft and fuel at launch (kg): 3710 | S15f. Length (m): 31.3 | S15i. Payload: 0.8845 |
| S15d. Mass of fuel, in orbit, at beginning of life (kg): 2060 | S15g. Width (m): 8.7 | S15j. Bus: 0.9115 |
| S15e. Deployed Area of Solar Array (square meters): 60.6 | S15h. Height (m): 6.2 | S15k. Total: 0.8062 |

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): 5958 | (f): 5958 | (k): 5800 | (p): 5800 |
| Bus (Watts): | (b): 1864 | (g): 955 | (l): 1900 | (q): 900 |
| Total (Watts): | (c): 7833 | (h): 6913 | (m): 7700 | (r): 6700 |
| Solar Array (Watts): | (d): 9340 | (i): 8379 | (n): 8400 | (s): 7659 |
| Depth of Battery Discharge (%): | (e) 74 % | (j) 0 % | (o) 72 % | (t) 0 % |

S17. CERTIFICATIONS:

| | | | |
|--|---|-----------------------------|---|
| a. Are the power flux density limits of § 25.208 met? | <input checked="" type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> 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? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input checked="" type="checkbox"/> 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? | <input checked="" type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> 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.