

ECHOSTAR-5 Link Budgets

| | | Medium Power Mode | | |
|---|----------|--|--|--|
| Link Parameters | | 1 | 2 | 3 |
| | | 13 meter Feeder Link E/S Nominal Feeder Link Site | 13 meter Feeder Link E/S Nominal Feeder Link Site | 13 meter Feeder Link E/S Nominal Feeder Link Site |
| | | to | to | to |
| | | 45 cm Receive-Only | 45 cm Receive-Only | 45 cm Receive-Only |
| Modulation Parameters: | | | | |
| Information Bit Rate per Carrier | (kbps) | 27,647 | 27,647 | 27,647 |
| FEC Rate | | 3/4 | 3/4 | 3/4 |
| Reed-Solomon Ratio (188/204, None) | | 188/204 | 188/204 | 188/204 |
| Overall Coding Overhead | (%) | 44.7% | 44.7% | 44.7% |
| Modulation Type (BPSK/QPSK/8PSK/16QAM) | | QPSK | QPSK | QPSK |
| Filter Roll-off Factor ("alpha") | (%) | 20 | 20 | 20 |
| Link Geometry: | | | | |
| Satellite Longitude | (°East) | -148.0 | -148.0 | -148.0 |
| Tx E/S City Location | (name) | Cheyenne | Cheyenne | Cheyenne |
| Tx E/S Longitude | (°East) | -104.7 | -104.7 | -104.7 |
| Tx E/S Latitude | (°North) | 41.1 | 41.1 | 41.1 |
| Tx E/S Range to Satellite | (Km) | 39,032 | 39,032 | 39,032 |
| Tx E/S Elevation to Satellite | (°) | 25.4 | 25.4 | 25.4 |
| Tx E/S Altitude | (m) | 1876.0 | 1876.0 | 1876.0 |
| Rx E/S City Location | (name) | Houston | Denver | Los Angeles |
| Rx E/S Longitude | (°East) | -95.3 | -105.0 | -118.2 |
| Rx E/S Latitude | (°North) | 29.8 | 39.8 | 34.0 |
| Rx E/S Range to Satellite | (km) | 39,186 | 38,937 | 37,838 |
| Rx E/S Elevation to Satellite | (°) | 23.8 | 26.4 | 39.3 |
| Rx E/S Altitude | (m) | 10.0 | 1631.0 | 33.0 |
| Link (per carrier): | | | | |
| Carrier Frequency | (MHz) | 17,550 | 17,550 | 17,550 |
| HPA Power Level (to give required PFD at satellite) | (W) | 134.0 | 134.0 | 134.0 |
| HPA Power in dBW | (dBW) | 21.3 | 21.3 | 21.3 |
| Post-HPA Losses | (dB) | 2.0 | 2.0 | 2.0 |
| Tx E/S Power to Antenna in dBW | (dBW) | 19.3 | 19.3 | 19.3 |
| Tx E/S Antenna Diameter | (m) | 13.0 | 13.0 | 13.0 |
| Antenna Efficiency | (%) | 65 | 65 | 65 |
| Tx E/S Antenna Gain | (dB) | 65.7 | 65.7 | 65.7 |
| Tx E/S EIRP | (dBW) | 85.0 | 85.0 | 85.0 |
| E/S Pointing Loss | (dB) | 0.1 | 0.1 | 0.1 |
| Atmospheric Loss | (dB) | 0.45 | 0.45 | 0.45 |
| Availability up | (%) | 99.9 | 99.9 | 99.9 |
| Rain attenuation (ITU-R Rec. P.618-8) | (dB) | 3.9 | 3.9 | 3.9 |
| Free Space Loss | (dB) | 209.2 | 209.2 | 209.2 |