

EchoStar 17/24 GHz Link Budget

| Link Parameters | | Clear Sky (Los Angeles) | Faded D/L (Los Angeles) | Clear Sky (Mexico City) | Faded D/L (Mexico City) |
|---|-----------|----------------------------|----------------------------|----------------------------|----------------------------|
| Link Geometry: | | | | | |
| Tx E/S Range to Satellite (Cheyenne) | (km) | 38,983 | 38,983 | 38,983 | 38,983 |
| Rx E/S Range to Satellite | (km) | 39,610 | 39,610 | 37,592 | 37,592 |
| Uplink: | | | | | |
| Carrier Frequency | (MHz) | 25,000 | 25,000 | 25,000 | 25,000 |
| Tx E/S Antenna Diameter | (m) | 12.0 | 12.0 | 12.0 | 12.0 |
| Max. Tx E/S Power to Antenna | (W) | 5.0 | 5.0 | 5.0 | 5.0 |
| Max. Tx E/S Power Density to Antenna | (dBW/MHz) | -6.6 | -6.6 | -6.6 | -6.6 |
| Tx E/S Antenna Gain | (dB) | 68.2 | 68.2 | 68.2 | 68.2 |
| Tx E/S EIRP per Carrier | (dBW) | 75.2 | 75.2 | 75.2 | 75.2 |
| Atmospheric and Other Losses | (dB) | 0.5 | 0.5 | 0.5 | 0.5 |
| Free Space Loss | (dB) | 212.2 | 212.2 | 212.2 | 212.2 |
| Satellite: | | | | | |
| G/T towards Tx E/S | (dB/K) | 17.2 | 17.2 | 17.2 | 17.2 |
| EIRP per Carrier towards Rx E/S | (dBW) | 53.6 | 53.6 | 53.3 | 53.3 |
| Downlink: | | | | | |
| Carrier Frequency | (MHz) | 17,500 | 17,500 | 17,500 | 17,500 |
| Atmospheric and Other Losses | (dB) | 0.4 | 2.3 | 0.2 | 1.8 |
| Free Space Loss | (dB) | 209.3 | 209.3 | 208.8 | 208.8 |
| Rx E/S Antenna Diameter | (m) | 0.45 | 0.45 | 0.45 | 0.45 |
| Rx E/S Antenna Gain | (dB) | 36.1 | 36.1 | 36.1 | 36.1 |
| Pointing Error | (dB) | 0.5 | 0.5 | 0.5 | 0.5 |
| Rx E/S G/T | (dB/K) | 13.1 | 11.4 | 13.1 | 11.6 |
| System (LNA+Sky) Noise Temperature | (K) | 200 | 298 | 200 | 285 |
| Total Link: | | | | | |
| Bandwidth | (dB-Hz) | 73.6 | 73.6 | 73.6 | 73.6 |
| C/N - Thermal Uplink | (dB) | 34.6 | 34.6 | 34.6 | 34.6 |
| C/N - Thermal Downlink | (dB) | 11.5 | 7.9 | 11.9 | 8.8 |
| C/I - Aggregate uplink ASI | (dB) | 37.5 | 37.5 | 37.5 | 37.5 |
| C/I - Aggregate downlink ASI | (dB) | 19.9 | 19.9 | 14.0 | 14.0 |
| C/I - Other Link Degradations | (dB) | 22.0 | 22.0 | 22.0 | 22.0 |
| C/(N+I) - Total, Actual | (dB) | 10.6 | 7.5 | 9.5 | 7.5 |
| C/(N+I) - Total, Required | (dB) | 7.5 | 7.5 | 7.5 | 7.5 |
| Excess Margin | (dB) | 3.1 | 0.0 | 2.0 | 0.0 |
| Availability | (%) | N/A | 99.55 | N/A | 99.67 |
| Aggregate Interference Assessment: | | | | | |
| (C/N) - no ASI | (dB) | 11.1 | 7.7 | 11.5 | 8.5 |
| Degradation due to aggregate ASI | (dB) | 0.6 | 0.3 | 1.9 | 1.1 |