

EchoStar 17/24 GHz Link Budget

| Link Parameters | | Clear Sky (New York) | Faded D/L (New York) | Clear Sky (Los Angeles) | Faded D/L (Los Angeles) |
|---|-----------|-------------------------|-------------------------|----------------------------|----------------------------|
| Link Geometry: | | | | | |
| Tx E/S Range to Satellite (Cheyenne) | (km) | 38,158 | 38,158 | 38,158 | 38,158 |
| Rx E/S Range to Satellite | (km) | 37,568 | 37,568 | 38,436 | 38,436 |
| 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) | 4.7 | 4.7 | 4.7 | 4.7 |
| Max. Tx E/S Power Density to Antenna | (dBW/MHz) | -6.5 | -6.5 | -6.5 | -6.5 |
| Tx E/S Antenna Gain | (dB) | 68.2 | 68.2 | 68.2 | 68.2 |
| Tx E/S EIRP per Carrier | (dBW) | 74.9 | 74.9 | 74.9 | 74.9 |
| Atmospheric and Other Losses | (dB) | 0.5 | 0.5 | 0.5 | 0.5 |
| Free Space Loss | (dB) | 212.0 | 212.0 | 212.0 | 212.0 |
| Satellite: | | | | | |
| G/T towards Tx E/S | (dB/K) | 10.3 | 10.3 | 10.3 | 10.3 |
| EIRP per Carrier towards Rx E/S | (dBW) | 57.0 | 57.0 | 53.5 | 53.5 |
| Downlink: | | | | | |
| Carrier Frequency | (MHz) | 17,500 | 17,500 | 17,500 | 17,500 |
| Atmospheric and Other Losses | (dB) | 0.2 | 7.7 | 0.2 | 4.4 |
| Free Space Loss | (dB) | 208.8 | 208.8 | 209.0 | 209.0 |
| 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 | 9.8 | 13.1 | 10.4 |
| System (LNA+Sky) Noise Temp. | (K) | 200 | 428 | 200 | 371 |
| Total Link: | | | | | |
| Bandwidth | (dB-Hz) | 73.20 | 73.20 | 73.20 | 73.20 |
| C/N - Thermal Uplink | (dB) | 28.0 | 28.0 | 28.0 | 28.0 |
| C/N - Thermal Downlink | (dB) | 16.0 | 5.2 | 12.3 | 5.4 |
| C/I - Aggregate uplink ASI | (dB) | 37.8 | 37.8 | 37.8 | 37.8 |
| C/I - Aggregate downlink ASI | (dB) | 21.1 | 21.1 | 20.4 | 20.4 |
| C/I - Other Link Degradations | (dB) | 20.0 | 20.0 | 20.0 | 20.0 |
| C/(N+I) - Total, Actual | (dB) | 13.5 | 4.9 | 11.0 | 5.1 |
| C/(N+I) - Total, Required | (dB) | 4.8 | 4.8 | 4.8 | 4.8 |
| Excess Margin | (dB) | 8.7 | 0.1 | 6.2 | 0.3 |
| Availability | (%) | N/A | 99.95 | N/A | 99.96 |
| Aggregate Interference Assessment: | | | | | |
| (C/N) - no ASI | (dB) | 14.4 | 5.0 | 11.5 | 5.2 |
| Degradation due to aggregate ASI | (dB) | 0.8 | 0.1 | 0.5 | 0.1 |