

# ECHOSTAR-1 Link Budgets

## Link Parameters

### Modulation Parameters:

|  |        |         |
|--|--------|---------|
| Information Bit Rate per Carrier       | (kbps) | 30,719  |
| FEC Rate                               |        | 5/6     |
| Reed-Solomon Ratio (188/204, None)     |        | 188/204 |
| Overall Coding Overhead                | (%)    | 30.2%   |
| Modulation Type (BPSK/QPSK/8PSK/16QAM) |        | QPSK    |
| Filter Roll-off Factor ("alpha")       | (%)    | 20      |

### Link Geometry:

|                               |          |             |
|-------------------------------|----------|-------------|
| Satellite Longitude           | (°East)  | -77.0       |
| Tx E/S City Location          | (name)   | Gilbert     |
| Tx E/S Longitude              | (°East)  | -111.8      |
| Tx E/S Latitude               | (°North) | 33.4        |
| Tx E/S Range to Satellite     | (Km)     | 38,075      |
| Tx E/S Elevation to Satellite | (°)      | 36.3        |
| Tx E/S Altitude               | (m)      | 300.0       |
| Rx E/S City Location          | (name)   | Mexico City |
| Rx E/S Longitude              | (°East)  | -99.2       |
| Rx E/S Latitude               | (°North) | 19.4        |
| Rx E/S Range to Satellite     | (km)     | 36,725      |
| Rx E/S Elevation to Satellite | (°)      | 56.0        |
| Rx E/S Altitude               | (m)      | 2240.0      |

### Link (per carrier):

|   |       |        |
|---|-------|--------|
| Carrier Frequency                                   | (MHz) | 17,550 |
| HPA Power Level (to give required PFD at satellite) | (W)   | 31.4   |
| HPA Power in dBW                                    | (dBW) | 15.0   |
| Post-HPA Losses                                     | (dB)  | 2.0    |
| Tx E/S Power to Antenna in dBW                      | (dBW) | 13.0   |
| Tx E/S Antenna Diameter                             | (m)   | 13.0   |
| Antenna Efficiency                                  | (%)   | 55     |
| Tx E/S Antenna Gain                                 | (dB)  | 65.0   |
| Tx E/S EIRP   | (dBW) | 77.9   |
| E/S Pointing Loss                                   | (dB)  | 0.1    |
| Atmospheric Loss                                    | (dB)  | 0.34   |
| Availability up                                     | (%)   | 99.9   |