

EchoStar-5 DBS Link Budget

(8PSK High Power Mode)

Link Parameters		Clear Sky (Los Angeles)	Faded D/L (Los Angeles)	Faded D/L (Chicago)
Link Geometry:				
Tx E/S Range to Satellite (Cheyenne)	(km)	38,068	38,068	38,068
Rx E/S Range to Satellite	(km)	37,148	37,148	38,719
Uplink (per carrier):				
Carrier Frequency	(MHz)	17,500	17,500	17,500
Tx E/S Antenna Diameter	(m)	13.2	13.2	13.2
Tx E/S Power to Antenna	(dBW)	14.5	14.5	14.5
Tx E/S Antenna Gain	(dB)	65.5	65.5	65.5
Tx E/S EIRP per Carrier	(dBW)	80.0	80.0	80.0
Atmospheric and Other Losses	(dB)	0.4	0.4	0.4
Free Space Loss	(dB)	208.9	208.9	208.9
Satellite:				
G/T towards Tx E/S	(dB/K)	3.1	3.1	3.1
Sat'd EIRP	(dBW)	54.8	54.8	54.8
EIRP towards Rx E/S	(dBW)	49.7	49.7	53.0
Downlink (per carrier):				
Carrier Frequency	(MHz)	12,500	12,500	12,500
Atmospheric and Rain Losses	(dB)	0.1	1.8	3.9
Free Space Loss	(dB)	205.8	205.8	206.1
Rx E/S Antenna Diameter	(m)	0.45	0.45	0.45
Antenna Mis-pointing Error	(dB)	0.30	0.30	0.30
Rx E/S Antenna Gain	(dB)	34.0	34.0	34.0
Rx E/S G/T	(dB/K)	12.7	10.7	9.4
System (LNA+Sky) Noise Temp.	(K)	133	214	290
Total Link:				
Noise Bandwidth	(dB-Hz)	73.2	73.2	73.2
(C/N) - Thermal Uplink	(dB)	29.1	29.1	29.1
(C/N) - Thermal Downlink	(dB)	11.7	7.9	7.4
(C/I) - Adjacent Satellite Interference	(dB)	20.9	20.9	23.8
(C/I) - Other Link Degradations	(dB)	22.9	22.9	22.9
(C/N) - Total Actual	(dB)	10.8	7.5	7.2
(C/N) - Total Required	(dB)	7.1	7.1	7.1
Excess Margin	(dB)	3.7	0.4	0.1
Availability	(%)	N/A	99.97	99.93