

# 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)
<b>Link Geometry:</b>					
Tx E/S Range to Satellite (Cheyenne)	(km)	38,121	38,121	38,121	38,121
Rx E/S Range to Satellite	(km)	37,575	37,575	38,371	38,371
<b>Uplink:</b>					
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
<b>Satellite:</b>					
G/T towards Tx E/S	(dB/K)	10.3	10.3	10.3	10.3
EIRP per Carrier towards Rx E/S	(dBW)	56.9	56.9	53.8	53.8
<b>Downlink:</b>					
Carrier Frequency	(MHz)	17,500	17,500	17,500	17,500
Atmospheric and Other Losses	(dB)	0.2	7.7	0.2	4.9
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	10.3
System (LNA+Sky) Noise Temp.	(K)	200	428	200	384
<b>Total Link:</b>					
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)	15.9	5.1	12.6	5.1
C/I - Aggregate uplink ASI	(dB)	37.8	37.8	37.8	37.8
C/I - Aggregate downlink ASI	(dB)	21.0	21.0	20.8	20.8
C/I - Other Link Degradations	(dB)	20.0	20.0	20.0	20.0
C/(N+I) - Total, Actual	(dB)	13.4	4.8	11.3	4.8
C/(N+I) - Total, Required	(dB)	4.8	4.8	4.8	4.8
Excess Margin	(dB)	8.6	0.0	6.5	0.0
Availability	(%)	N/A	99.95	N/A	99.97
<b>Aggregate Interference Assessment:</b>					
(C/N) - no ASI	(dB)	14.3	4.9	11.8	4.9
Degradation due to aggregate ASI	(dB)	0.8	0.1	0.5	0.1