

# 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)	38,290	38,290	38,290	38,290
Rx E/S Range to Satellite	(km)	37,555	37,555	38,638	38,638
<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)	-6.9	-6.9	-6.9	-6.9
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)	212.1	212.1	212.1	212.1
<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)	56.4	56.4	53.0	53.0
<b>Downlink:</b>					
Carrier Frequency	(MHz)	17,500	17,500	17,500	17,500
Atmospheric and Other Losses	(dB)	0.2	4.4	0.2	1.8
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	10.4	13.1	11.6
System (LNA+Sky) Noise Temperature	(K)	200	373	200	284
<b>Total Link:</b>					
Bandwidth	(dB-Hz)	73.60	73.60	73.60	73.60
C/N - Thermal Uplink	(dB)	27.6	27.6	27.6	27.6
C/N - Thermal Downlink	(dB)	15.0	8.1	11.4	8.2
C/I - Aggregate uplink ASI	(dB)	37.3	37.3	37.3	37.3
C/I - Aggregate downlink ASI	(dB)	20.1	20.1	19.5	19.5
C/I - Other Link Degradations	(dB)	20.0	20.0	20.0	20.0
C/(N+I) - Total, Actual	(dB)	12.7	7.5	10.2	7.6
C/(N+I) - Total, Required	(dB)	7.5	7.5	7.5	7.5
Excess Margin	(dB)	5.2	0.0	2.7	0.1
Availability	(%)	N/A	99.85	N/A	99.75
<b>Aggregate Interference Assessment:</b>					
(C/N) - no ASI	(dB)	13.6	7.8	10.7	7.9
Degradation due to aggregate ASI	(dB)	0.9	0.2	0.5	0.3