

# ECHOSTAR-6 Link Budgets

Link Parameters		High Power Mode		
		1	2	3
		13 meter Feeder Link E/S	13 meter Feeder Link E/S	13 meter Feeder Link E/S
		Nominal Feeder Link Site	Nominal Feeder Link Site	Nominal Feeder Link Site
		to	to	to
		45 cm Receive-Only	45 cm Receive-Only	45 cm Receive-Only
<b>Modulation Parameters:</b>				
Information Bit Rate per Carrier	(kbps)	27,647	27,647	27,647
FEC Rate		3/4	3/4	3/4
Reed-Solomon Ratio (188/204, None)		188/204	188/204	188/204
Overall Coding Overhead	(%)	44.7%	44.7%	44.7%
Modulation Type (BPSK/QPSK/8PSK/16QAM)		QPSK	QPSK	QPSK
Filter Roll-off Factor ("alpha")	(%)	20	20	20
<b>Link Geometry:</b>				
Satellite Longitude	(°East)	-72.7	-72.7	-72.7
Tx E/S City Location	(name)	Cheyenne	Cheyenne	Cheyenne
Tx E/S Longitude	(°East)	-104.7	-104.7	-104.7
Tx E/S Latitude	(°North)	41.1	41.1	41.1
Tx E/S Range to Satellite	(Km)	38,407	38,407	38,407
Tx E/S Elevation to Satellite	(°)	32.3	32.3	32.3
Tx E/S Altitude	(m)	1876.0	1876.0	1876.0
Rx E/S City Location	(name)	Miami	New York	Los Angeles
Rx E/S Longitude	(°East)	-80.3	-74.0	-118.2
Rx E/S Latitude	(°North)	25.9	40.8	34.0
Rx E/S Range to Satellite	(km)	36,589	37,565	38,804
Rx E/S Elevation to Satellite	(°)	58.6	42.9	27.9
Rx E/S Altitude	(m)	1.0	15.0	33.0
<b>Link (per carrier):</b>				
Carrier Frequency	(MHz)	17,550	17,550	17,550
HPA Power Level (to give required PFD at satellite)	(W)	27.2	27.3	27.3
HPA Power in dBW	(dBW)	14.3	14.4	14.4
Post-HPA Losses	(dB)	2.0	2.0	2.0
Tx E/S Power to Antenna in dBW	(dBW)	12.3	12.4	12.4
Tx E/S Antenna Diameter	(m)	13.0	13.0	13.0
Antenna Efficiency	(%)	65	65	65
Tx E/S Antenna Gain	(dB)	65.7	65.7	65.7
Tx E/S EIRP	(dBW)	78.0	78.1	78.1
E/S Pointing Loss	(dB)	0.1	0.1	0.1
Atmospheric Loss	(dB)	0.36	0.36	0.36
Availability up	(%)	99.9	99.9	99.9
Rain attenuation (ITU-R Rec. P.618-8)	(dB)	2.7	2.7	2.7
Free Space Loss	(dB)	209.0	209.0	209.0