

# ECHOSTAR-2 Link Budgets

Link Parameters			
	1	2	3
	13 meter Feeder Link E/S Nominal Feeder Link Site	13 meter Feeder Link E/S Nominal Feeder Link Site	13 meter Feeder Link E/S Nominal Feeder Link Site
	to 45 cm Receive-Only	to 45 cm Receive-Only	to 55 cm Receive-Only
<b>Modulation Parameters:</b>			
Information Bit Rate per Carrier (kbps)	30,719	30,719	30,719
FEC Rate	5/6	5/6	5/6
Reed-Solomon Ratio (188/204, None)	188/204	188/204	188/204
Overall Coding Overhead (%)	30.2%	30.2%	30.2%
Modulation Type (BPSK/QPSK/8PSK/16QAM)	QPSK	QPSK	QPSK
Filter Roll-off Factor ("alpha") (%)	20	20	20
<b>Link Geometry:</b>			
Satellite Longitude (°East)	-77.15	-77.15	-77.15
Tx E/S City Location (name)	Gilbert	Gilbert	Gilbert
Tx E/S Longitude (°East)	-111.8	-111.8	-111.8
Tx E/S Latitude (°North)	33.4	33.4	33.4
Tx E/S Range to Satellite (Km)	38,066	38,066	38,066
Tx E/S Elevation to Satellite (°)	36.4	36.4	36.4
Tx E/S Altitude (m)	300.0	300.0	300.0
Rx E/S City Location (name)	Miami	Houston	Denver
Rx E/S Longitude (°East)	-80.3	-95.3	-105.0
Rx E/S Latitude (°North)	25.9	29.8	39.8
Rx E/S Range to Satellite (km)	36,541	37,084	38,116
Rx E/S Elevation to Satellite (°)	59.6	49.9	35.8
Rx E/S Altitude (m)	1.0	10.0	1631.0
<b>Link (per carrier):</b>			
Carrier Frequency (MHz)	17,550	17,550	17,550
HPA Power Level (to give required PFD at satellite) (W)	31.9	31.9	31.9
HPA Power in dBW (dBW)	15.0	15.0	15.0
Post-HPA Losses (dB)	2.0	2.0	2.0
Tx E/S Power to Antenna in dBW (dBW)	13.0	13.0	13.0
Tx E/S Antenna Diameter (m)	13.0	13.0	13.0
Antenna Efficiency (%)	55	55	55
Tx E/S Antenna Gain (dB)	65.0	65.0	65.0
Tx E/S EIRP (dBW)	78.0	78.0	78.0
E/S Pointing Loss (dB)	0.1	0.1	0.1
Atmospheric Loss (dB)	0.41	0.41	0.41
Availability up (%)	99.9	99.9	99.9
Rain attenuation (dB)	2.7	2.7	2.7