ECHOSTAR-1 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	to	to
		45 cm Receive-Only	45 cm Receive-Only	50 cm Receive-Only
odulation Parameters:				
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
nk Geometry:				
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
link (per carrier):				
Carrier Frequency	(MHz)	17,550	17,550	17,550
HPA Power Level (to give required PFD at satellite)	(W)	31.9	32.1	32.1
HPA Power in dBW	(dBW)	15.0	15.1	15.1
Post-HPA Losses	(dB)	2.0	2.0	2.0
Tx E/S Power to Antenna in dBW	(dBW)	13.0	13.1	13.1
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