NOISE BUDGET REFERENCE CALCULATION

	Uplink	Downlink
Beam	EUR	USA

Carrier parameters

	D1	D2	D3	D4	D5	D6	D7
Data Rate (Mbps)	0.064	0.384	1.544	2.048	9.216	45	69.64
FEC	0.682	0.682	0.875	0.682	0.75	0.75	0.795
Modulation	QPSK	QPSK	QPSK	QPSK	QPSK	QPSK	QPSK
C/(N+I) - Total Required (dB)	7.4	7.4	10.8	7.4	9.9	5.6	8.7

Uplink parameters

	D1	D2	D3	D4	D5	D6	D7
Uplink Frequency (MHz)	14250	14250	14250	14250	14250	14250	14250
Tx antenna Input power (dBW)	0.48	8.29	13.25	15.55	21.67	28.56	30.22
Input power density (dBW/Hz)	-47	-47	-47	-47	-47	-47	-47
Tx Antenna Diameter (Metres)	4.50	1.80	1.20	2.40	2.40	4.50	7.00
Tx Antenna Efficiency	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Tx Antenna Gain (dB)	54.7	46.7	43.2	49.2	49.2	54.7	58.5
Mispointing loss (dB)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Atmospheric loss (dB)	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Uplink Path loss (dB)	207.9	207.9	207.9	207.9	207.9	207.9	207.9
Uplink Rain Attenuation (dB)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max. Satellite antenna G/T (dB/K)	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Edge of coverage EUR (dB)	6.0	6.0	6.0	6.0	6.0	6.0	6.0

$(C/I)_{Up\text{-}Intrasystem}$ (dB)	30.0	30.0	30.0	30.0	30.0	30.0	30.0
(C/I)Up-ASI (dB)	32.2	24.2	20.7	26.7	26.7	32.2	36.0
$(C/N)_{Uplink\ Thermal}$ (dB)	29.5	21.6	18.1	24.1	24.1	29.5	33.4
$C/(N_{thermal}+N_{ASI}+N_{intrasystem})$ (dB)	25.7	19.3	16.0	21.5	21.5	25.7	27.7

Downlink parameters

	D1	D2	D3	D4	D5	D6	D7
Downlink Frequency (MHz)	12000	12000	12000	12000	12000	12000	12000
Beam peak EIRP density (dBW/Hz)	-26	-26	-26	-26	-26	-26	-26
Downlink EIRP/Carrier (dBW)	21.48	29.29	34.25	36.55	42.67	49.56	51.22
Edge of coverage USA (dB)	3.0	6.0	6.0	6.0	6.0	3.0	6.0
Downlink EIRP/Carrier at EOC (dBW)	18.48	23.29	28.25	30.55	36.67	46.56	45.22
Rx E/S Antenna Diameter (Metres)	0.90	1.80	4.50	1.80	2.40	0.90	1.80
Rx Antenna Efficiency	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Rx Antenna Gain (dB)	39.2	45.2	53.2	45.2	47.7	39.2	45.2
Rx System Noise temp (K)	110.0	110.0	110.0	110.0	110.0	110.0	110.0
Rx E/S G/T (dB/K)	18.8	24.8	32.8	24.8	27.3	18.8	24.8
Antenna mispointing error (dB)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Atmospheric loss (dB)	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Downlink Path loss (dB)	206.4	206.4	206.4	206.4	206.4	206.4	206.4
Downlink Rain Attenuation (dB)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
$(C/I)_{Dn\ Intra\text{-}system}$ (dB)	30.0	30.0	30.0	30.0	30.0	30.0	30.0
(C/I)Down-ASI (dB)	16.9	22.9	30.9	22.9	25.4	16.9	22.9
$(C/N)_{Downlink\ Thermal}$ (dB)	11.1	14.2	22.1	14.2	16.7	11.2	14.2
$C/(N_{thermal}+N_{ASI}+N_{intrasystem})$ (dB)	10.1	13.5	21.0	13.5	15.9	10.1	13.5

End-to-End

	D1	D2	D3	D4	D5	D6	D7
(C/N+I) - Total Actual (dB)	9.9	12.5	14.8	12.9	14.9	10.0	13.4
(C/N+I) - Total Required(dB)	7.4	7.4	10.8	7.4	9.9	5.6	8.7
Margin (dB)	2.5	5.1	4.0	5.5	5.0	4.4	4.7