

**Command carrier link budget (C-band, uplink)**

UPLINK FLUX DENSITY	dBW/m <sup>2</sup>	-80
ISOTROPIC APERTURE	dB-m <sup>2</sup>	-37.6
COUPLER LOSS	dB	-0.3
POLARIZATION LOSS	dB	-0.1
S/C ANTENNA GAIN	dB	3
SCATTERING INTERF. LOSS	dB	-1
CABLE VSWR LOSS	dB	-5.2
CIRCUIT LOSSES	dB	-7
RECEIVED INPUT POWER	dBW	-128.2
REQUIRED INPUT POWER	dBW	-138
MARGIN	dB	9.8

**Budget for C-band Telemetry (Downlink)**

S/C EIRP	dBW	14.3
PATH LOSS	dB	-196.9
RAIN LOSS	dB	-1.1
POLARIZATION LOSS	dB	-0.3
GROUND STATION POINTING LOSS	dB	-0.5
GROUND STATION G/T	dB/K	31
BOLTZMANN CONSTANT	dB-Hz K/W	228.6
CARRIER TO NOISE DENSITY	dB-Hz	75.12
MODULATION LOSS	dB	-4.8
1/BITRATE(4096 BPS, Telemetry)	dB-bps	-36.1
IMPLEMENTATION LOSS	dB	-3
RECEIVED Eb/No	dB	31.22
REQUIRED Eb/No	dB	11.3
Eb/No MARGIN	dB	13.16

**Budget for Ku Telemetry (Downlink)**

S/C EIRP	dBW	12.4
PATH LOSS	dB	-205.8
RAIN LOSS	dB	-7.73
ATMOSPHERIC LOSS	dB	-0.4
POLARIZATION LOSS	dB	-0.1
GROUND STATION POINTING LOSS	dB	-0.1
GROUND STATION G/T	dB/K	38.32
BOLTZMANN CONSTANT	dB-Hz K/W	228.6
CARRIER TO NOISE DENSITY	dB-Hz	65.2
MODULATION LOSS	dB	-10.6
1/BITRATE(4096 BPS, Telemetry)	dB-bps	-36.1
IMPLEMENTATION LOSS	dB	-3
RECEIVED Eb/No	dB	15.48
REQUIRED Eb/No	dB	11.3
Eb/No MARGIN	dB	4.18