

INM-KA RETURN LINK BUDGET (COMMS. HCP)

General		Unit
User terminal type	-	Typ-60cm
Carrier designator	-	3M16G7W
Data rate (kbps)	(kbps)	1510
Coding rate	-	2/3
Modulation	-	BPSK
Occupied bandwidth	(kHz)	2630.3
Allocated bandwidth	(kHz)	3156.3
Uplink		
Beam		User-Spot (HCP)
Frequency	(GHz)	29.25
User Terminal EIRP	(dBW)	49.2
Antenna tx gain	dBi	43.4
Uplink power	(dBW)	5.8
<i>Uplink p.s.d.</i>	<i>(dBW/Hz)</i>	<i>-58.4</i>
Path loss	(dB)	213.5
Rain loss	(dB)	7.0
Mean Atmospheric loss	(dB)	1.7
Satellite G/T (EOC)	(dB/K)	11.0
Up-path C/No	(dBHz)	66.6
Up-path C/N	(dB)	2.4
Downlink		
Beam		Feeder
Frequency	(GHz)	18
<i>Max pfd per crx @ earth surface (beam peak)</i>	<i>(dBW/m2/1MHz)</i>	<i>-138.8</i>
Beam Peak to Edge of Coverage	(dB)	3.0
<i>Max pfd per crx @ earth surface (EOC)</i>	<i>(dBW/m2/1MHz)</i>	<i>-141.8</i>
Satellite EIRP (EOC)	(dBW)	24.4
Path loss	(dB)	209.3
Rain loss	(dB)	5.6
Mean Atmospheric loss	(dB)	0.7
Earth Station G/T	(dB/K)	42.0
G/T degradation due to rain	(dB)	2.6
Rx terminal Pointing loss	(dB)	0.1
Co-Channel / adj . beam interf. (dn)	(dBHz)	87.2
Down-path C/No	(dBHz)	76.4
Down-path C/N	(dB)	12.2
Total		
Mean satellite C/Imo	(dBHz)	81.4
Mean Overall C/No	(dBHz)	66.0
Total C/I (adjacent satellite interference)	(dB)	16.2
Mean Overall C/N (incl. a.s.i)	(dB)	1.7
Margin		
C/N required	(dB)	1.0
C/N margin	(dB)	0.7

C/I calculations

Orbital separation (interferor 1)	degree	2.0
Worst case topocentric angle (1)	degree	2.09

Uplink C/I

Interferor 1		
Max. uplink p.s.d	(dBW/Hz)	-56.0
Other's sidelobe at 2 deg. sep $X-25\log(t)$		29.0
Tx Sidelobe gain at 2 deg sep	dBi	21.0
Inm-Ka C/I up1	<i>dB</i>	17.0

Downlink C/I

Interferor 1		
Max. ground PFD	(dBW/m ² /MHz)	-121.1
Max. downlink EIRP s.d	(dBW/Hz)	-19.0
Inm Rx sidelobe gain at 2 deg sep	dBi	21.0
Inm-Ka C/I dn1	dB	24.0
Total C/I (adjacent satellite interference)	dB	16.2