

Table A-9: Next Generation GMR-1 Forward Voice Link Budget

<b>Satellite and Earth Station Information</b>		
Uplink name	Las Vegas, (6.3 m)	Las Vegas, (9.3 m)
Satellite longitude (degrees) (- = West)	-111.10	-111.10
Downlink elevation angle (degrees)	36.10	36.10
<b>Carrier Information</b>		
Frequency reuse pattern	12.00	12.00
Beam pitch (deg)	0.25	0.25
Number of beams	280.00	280.00
Number of carriers per beam	8.80	8.80
Traffic channels per carrier	8.00	8.00
Information rate (kbps)	4.39	4.39
Activity factor	0.40	0.40
Number of simultaneous voice channels per beam	176	176
Information burst rate (kbps) plus overhead	35.10	35.10
Modulation	QPSK	QPSK
FEC code rate	0.75	0.75
Transmission rate (kbps)	46.80	46.80
Noise bandwidth (kHz)	23.40	23.40
Allocated bandwidth per carrier (kHz)	31.25	31.25
Required total C/N with margin (dB)	4.76	4.76
<b>Uplink</b>		
Uplink frequency (GHz)	12.88	12.88
Uplink EIRP (on-axis) (dBW)	42.48	45.68
Uplink atmospheric loss (dB)	0.11	0.11
Rain availability (%)	99.99	99.99
Uplink rain fade (dB)	3.37	3.37
Uplink free space pathloss (dB)	206.05	206.05
Transponder G/T (dBi/K)	15.06	15.06
Uplink C/N (dB)	32.92	36.12
C/I adj-channel	22.00	22.00
C/I Crosspole Isolation (including rain depole) (dB)	23.01	23.01
Composite uplink C/I (dB)	19.47	19.47
<b>Satellite Transponder</b>		
Power control error (dB)-per user	0.50	0.50
Power control error (dB)-per uplink	1.00	1.00
Per carrier output backoff (dB)	36.92	36.92
Expected C/IM in digital carrier bandwidth at satellite (dB)	12.50	12.50
<b>Downlink</b>		
Downlink frequency (GHz)	2.19	2.19
Satellite EIRP per carrier (dBW)	46.43	46.43
Downlink free space pathloss (dB)	190.87	190.87
Downlink atmospheric loss (dB)	0.06	0.06
Average shadowing + fading (dB)	3.00	3.00
Earth station on-axis G/T (dBi/K)	-28.00	-28.00
Polarization loss (dB)	3.00	3.00
Downlink C/N (dB)	6.41	6.41
C/I inter beam (dB)	15.00	15.00
<b>Overall Performance Summary</b>		
Computed uplink or system margin (dB)	0.08	0.08

Downlink margin (dB)	0.11	0.12
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Table A-10: Next Generation GMR-1 Forward Data Link Budget

<b>Satellite and Earth Station Information</b>		
Uplink name	Las Vegas, (6.3 m)	Las Vegas, (9.3 m)
Satellite longitude (degrees) (- = West)	-111.10	-111.10
Downlink elevation angle (degrees)	36.10	36.10
<b>Carrier Information</b>		
Frequency reuse	12.00	12.00
Beam pitch (deg)	0.25	0.25
Number of beams	280.00	280.00
Number of carriers per beam	1.00	1.00
Information burst rate (Kbps) plus overhead	623.99	623.99
Modulation	16-QAM	16-QAM
FEC code rate	0.67	0.67
Transmission rate (kbps)	935.98	935.98
Allocated bandwidth per carrier (kHz)	312.50	312.50
Required total C/N with margin (dB)	9.58	9.58
<b>Uplink</b>		
Uplink frequency (GHz)	12.88	12.88
Uplink EIRP (on-axis) (dBW)	51.93	55.13
Uplink atmospheric loss (dB)	0.11	0.11
Rain availability (%)	99.99	99.99
Uplink rain fade (dB)	3.37	3.37
Uplink free space pathloss (dB)	206.05	206.05
Transponder G/T dBi/K	15.06	15.06
Uplink C/N (dB)	32.36	35.56
C/I adj-channel	22.00	22.00
C/I Crosspole Isolation (including rain depole) (dB)	23.01	23.01
Composite uplink C/I (dB)	19.47	19.47
<b>Satellite Transponder</b>		
Power control error (dB)-per user	0.50	0.50
Power control error (dB)-per uplink	1.00	1.00
Per carrier output backoff (dB)	27.47	27.47
Expected C/IM in digital carrier bandwidth at satellite (dB)	12.50	12.50
<b>Downlink</b>		
Downlink frequency (GHz)	2.19	2.19
Satellite EIRP per carrier (dBW)	72.11	72.11
Downlink free space pathloss (dB)	190.87	190.87
Downlink atmospheric loss (dB)	0.06	0.06
Average fade and head loss (dB)	3.00	3.00
Earth station on-axis G/T (dBi/K)	-28.00	-28.00
Polarization loss (dB)	3.00	3.00
Downlink C/N (dB)	22.09	22.09
C/I inter beam (dB)	15.00	15.00
<b>Overall Performance Summary</b>		
Computed uplink or system margin (dB)	0.16	0.18

Downlink margin (dB)

2.20

2.33