Simplified link budget for GSM system

		Downlink	unit
Transmitter characteristics	Transmitter power	20	W
		43.0103	dBm
	TX antenna gain	17.42531	dBi
	TX cable loss	-4	dB
	TX Body loss	0	dB
	Combiner loss	-4	dB
	Transmitter EIRP	**52.43561**	**dBm**
Receiver characteristics	RX antenna gain	0	dBi
	RX sensitivity	102	dBm
	RX Cable loss	0	dB
	RX Body loss	-2	dB
	Diversity gain	0	dB
	Total receiver gain	**100**	**dB**
	System gain	**152.4356**	**dB**
Margins	Coverage probability (cell edge)	0.9	
	Shadow fading std deviation	6	dB
	Shadow Fading Margin	7.5	dB
	Indoor penetration loss	0	dB
	Total margin	**7.5**	**dB**
	Allowed propagation loss	**144.9356**	**dB**

Shadow Fading Margin (cell edge approach)	Given coverage probability on cell
	Shadow fading standard deviation
	1-P
	Closest 1-P in table
	Argument (inverse of Q)
	Shadow fading margin

Antenna Gain	Horizontal 3dB beam width
	Horizontal gain
	Number of dipoles
	Vertical gain (dBd)
	Vertical gain (dBi)
	Total antenna gain

Range (Okumura-Hata path loss model)	
	Carrier frequency
	BS antenna height
	MS antenna height

	Parameter A
	Parameter B
	Parameter C
	MS antenna gain function (large city)
	Path loss exponent
	Path loss constant
	Downlink range
	Uplink range
	Cell range

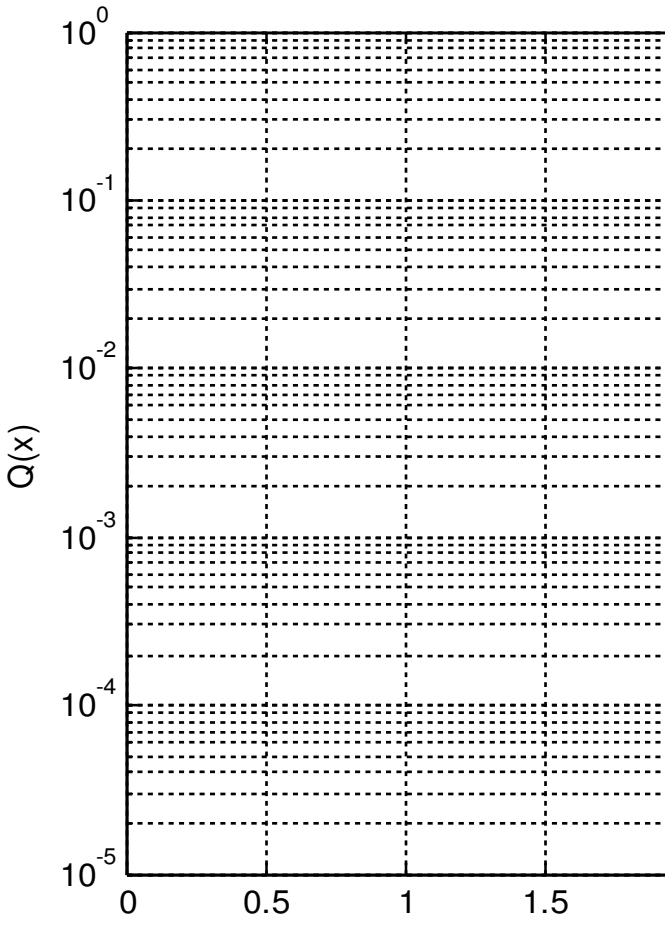
Uplink	unit	
2	W	
33.0103	dBm	
0	dBi	Note: Gain computed below
0	dB	
-2	dB	
0	dB	
31.0103	**dBm**	
17.42531	dBi	
104	dBm	
-4	dB	
0	dB	
3	dB	
120.4253	**dB**	
151.4356	**dB**	
0.9		Note: Usually we use cell coverge probability
6	dB	
7.5	dB	Note: Margin computed below
0	dB	
7.5	**dB**	
143.9356	**dB**	

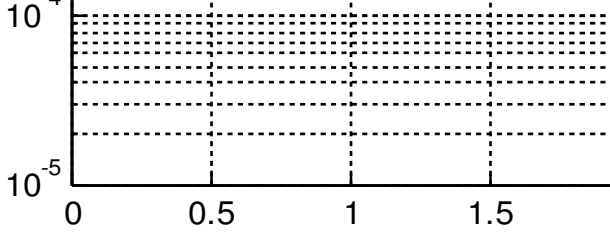
l edge (P)	0.9	
n	6	dB
	0.1	
	0.1	
	1.25	
	7.5	**dB**

1-P(=Q)	Argument
0.5	0
0.4	0.25
0.3	0.5
0.22	0.75
0.17	1
0.1	1.25
0.07	1.5
0.04	1.75
0.023	2
0.01	2.25

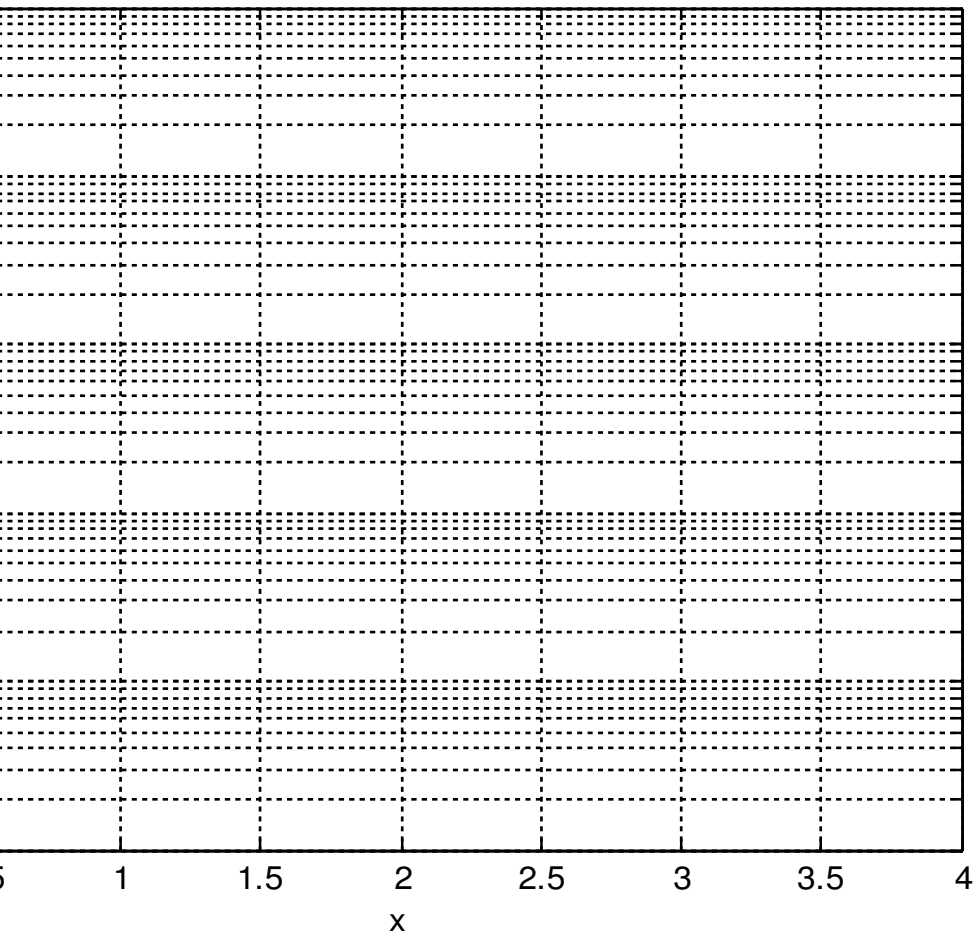
65	degrees
7.493795	dB
6	
7.781513	dBd
9.931513	dBi
17.42531	**dBi**

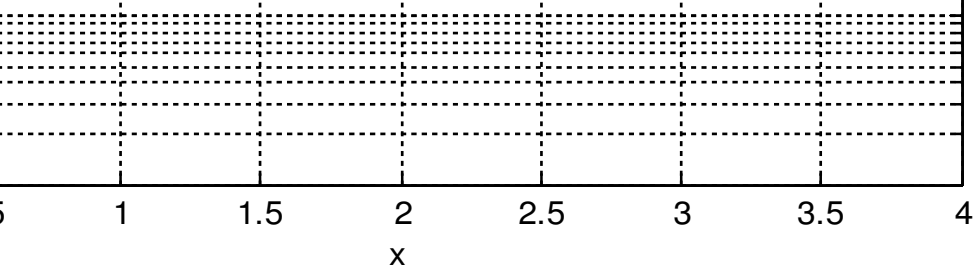
	Unit
1800	MHz
25	m
1.5	m





46.3	
33.9	
44.9	
-0.000919	
3.574349	
137.3351	dB
1.631697	km
1.529898	km
1.529898	**km**


5
1
1.5
2
2.5
3
3.5
4
x


5
1
1.5
2
2.5
3
3.5
4
x