

Handset Transmitter Power (dBm)	23
Base Station Height (m)	30
Handset User height: (m)	1.5
Base Station Antenna gain: (dBi)	16.15
Handset Antenna Gain: (dBi)	0
Frequency: (MHz)	1960
Outside Shadowing standard deviation: (dB)	10
Building Penetration Margin: (suburban dB)	10
Building Penetration standard deviation: (dB)	8
Noise Figure = (dB)	5
Noise Floor: (dBm)	-174
kbps bandwidth (dB)	56.0206
SNR (dB)	7
Probability Multiple	1.28
(Noise Floor + Noise Figure + kbps + SNR)	-105.979
Sigma Composite $(Bp^2 + Op^2)^{1/2}$	12.80625
<b>Link Budget (dBm)</b>	<b>-79.5874</b>

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Noise Figure = (dB)	5
Noise Floor: (dBm)	-174
kbps bandwidth (dB)	56.0206
SNR (dB)	7
Area (km^2)	900
Probability Multiple	1.28
(Noise Floor + Noise Figure + kbps + SNR)	-105.979
Sigma Composite $(Bp^2 + Op^2)^{1/2}$	12.80625
<b>Link Budget (dBm)</b>	<b>-79.5874</b>
$L_p \text{ (dB)} = A + B \log_{10} (d) + C$	
Where;	
$A = 46.3 + 33.9 \log_{10} (f_c) - 13.82 \log_{10} (h_b) - a \text{ (hm)}$	
$B = 44.9 - 6.55 \log_{10} (h_b)$	
C= 0 for medium city and suburban areas	
$a \text{ (hm)} = (1.1 \log_{10}(f) - 0.7) \text{hm} - (1.56 \log_{10}(f) - 0.8)$ for suburban areas	
a(hm).	0.046303
A.	137.4474
B.	35.22486
C.	0
$LP = \text{Link Budget} + TxP + G_{bs}$	118.7374
$\log(d) = (LP - A - C) / B$	-0.53116
distance (km)	0.294335
Area of cell (hexagon) = $3 \cdot \text{SQRT}(3)/2 \cdot (d^2)$	0.22508
<b>Cells = Total Area / Area of cell</b>	<b>3998.586</b>

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Handset User height: (m)	1.5
Base Station Antenna gain: (dBi)	16.15
Handset Antenna Gain: (dBi)	0
<b>Frequency: (MHz)</b>	<b>2500</b>
Outside Shadowing standard deviation: (dB)	10
Building Penetration Margin: (suburban dB)	10
Building Penetration standard deviation: (dB)	8
Noise Figure = (dB)	5
Noise Floor: (dBm)	-174
kbps bandwidth (dB)	56.0206
SNR (dB)	7
Area (km^2)	900
Probability Multiple	1.28
(Noise Floor + Noise Figure + kbps + SNR)	-105.979
Sigma Composite $(B_p^2 + O_p^2)^{1/2}$	12.80625
<b>Link Budget (dBm)</b>	<b>-79.5874</b>
$L_p \text{ (dB)} = A + B \log_{10} (d) + C$	
Where;	
$A = 46.3 + 33.9 \log_{10} (f_c) - 13.82 \log_{10} (h_b) - a \text{ (hm)}$	
$B = 44.9 - 6.55 \log_{10} (h_b)$	
C= 0 for medium city and suburban areas	
$a \text{ (hm)} = (1.1 \log_{10}(f) - 0.7) \text{hm} - (1.56 \log_{10}(f) - 0.8) \text{ for suburban areas}$	
a(hm).	0.055815
A.	141.0205
B.	35.22486
C.	0
$LP = \text{Link Budget} + TxP + G_{bs}$	118.7374
$\log(d) = (LP - A - C) / B$	-0.6326
distance (km)	0.233025
Area of cell = $2.598(d^2)$	0.141073
<b>Cells = Total Area / Area of cell</b>	<b>6379.654</b>

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Base Station Height (m)	30	30
Handset User height: (m)	1.5	1.5
Base Station Antenna gain: (dBi)	16.15	16.15
Handset Antenna Gain: (dBi)	0	0
<b>Frequency: (MHz)</b>	<b>1960</b>	<b>2500</b>
Outside Shadowing standard deviation: (dB)	10	10
Building Penetration Margin: (suburban dB)	10	10
Building Penetration standard deviation: (dB)	8	8
Noise Figure = (dB)	5	5
Noise Floor: (dBm)	-174	-174
kbps bandwidth (dB)	56.0206	56.0206
SNR (dB)	7	7
Area (km^2)	900	900
<b>Probability Multiple</b>	<b>0.675</b>	<b>0.675</b>
(Noise Floor + Noise Figure + kbps + SNR)	-105.979	-105.979
Sigma Composite $(B_p^2 + O_p^2)^{1/2}$	12.80625	12.80625
<b>Link Budget (dBm)</b>	<b>-87.3352</b>	<b>-87.3352</b>
$L_p \text{ (dB)} = A + B \log_{10} (d) + C$		
Where;		
$A = 46.3 + 33.9 \log_{10} (f_c) - 13.82 \log_{10} (h_b) - a \text{ (hm)}$		
$B = 44.9 - 6.55 \log_{10} (h_b)$		
C= 0 for medium city and suburban areas		
$a \text{ (hm)} = (1.1 \log_{10}(f) - 0.7) h_m - (1.56 \log_{10}(f) - 0.8) \text{ for suburban areas}$		
$a \text{ (hm)}.$	0.046303	0.055815
A.	137.4474	141.0205
B.	35.22486	35.22486
C.	0	0
$LP = \text{Link Budget} + TxP + G_{bs}$	126.4852	126.4852
$\log(d) = (LP - A - C) / B$	-0.31121	-0.41264
distance (km)	0.488421	0.386683
Area of cell = $2.598(d^2)$	0.619766	0.388463
<b>Cells = Total Area / Area of cell</b>	<b>1452.162</b>	<b>2316.824</b>

Handset Transmitter Power (dBm)	23	23	23	23	23	23	23	23
Base Station Height (m)	30	30	30	30	30	30	30	30
Handset User height: (m)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Base Station Antenna gain: (dBi)	16.15	16.15	16.15	16.15	16.15	16.15	16.15	16.15
Handset Antenna Gain: (dBi)	0	0	0	0	0	0	0	0
<b>Frequency: (MHz)</b>	<b>1960</b>	<b>1960</b>	<b>1960</b>	<b>1960</b>	<b>2500</b>	<b>2500</b>	<b>2500</b>	<b>2500</b>
Outside Shadowing standard deviation: (dB)	10	10	10	10	10	10	10	10
Building Penetration Margin: (suburban dB)	10	10	10	10	10	10	10	10
Building Penetration standard deviation: (dB)	8	8	8	8	8	8	8	8
Noise Figure = (dB)	5	5	5	5	5	5	5	5
Noise Floor: (dBm)	-174	-174	-174	-174	-174	-174	-174	-174
kbps	13000	13000	64000	64000	13000	13000	64000	64000
<b>kbps bandwidth (dB)</b>	<b>41.13943</b>	<b>41.13943</b>	<b>48.0618</b>	<b>48.0618</b>	<b>41.13943</b>	<b>41.13943</b>	<b>48.0618</b>	<b>48.0618</b>
SNR (dB)	7	7	7	7	7	7	7	7
Area (km^2)	900	900	900	900	900	900	900	900
<b>Probability Multiple</b>	<b>1.28</b>	<b>0.675</b>	<b>1.28</b>	<b>0.675</b>	<b>1.28</b>	<b>0.675</b>	<b>1.28</b>	<b>0.675</b>
(Noise Floor + Noise Figure + kbps + SNR)	-120.861	-120.861	-113.938	-113.938	-120.861	-120.861	-113.938	-113.938
Sigma Composite (Bp^2 + Op^2)^(1/2)	12.80625	12.80625	12.80625	12.80625	12.80625	12.80625	12.80625	12.80625
<b>Link Budget (dBm)</b>	<b>-94.4686</b>	<b>-102.216</b>	<b>-87.5462</b>	<b>-95.294</b>	<b>-94.4686</b>	<b>-102.216</b>	<b>-87.5462</b>	<b>-95.294</b>
Lp (dB) = A + B log10 (d) + C								
Where;								
A = 46.3+ 33.9 log10 (fc ) – 13.82 log10 (hb ) – a (hm)								
B = 44.9 – 6.55 log 10 (hb )								
C= 0 for medium city and suburban areas								
a(hm) = (1.1log10(f) - 0.7)hm - (1.56log10(f) - 0.8) for suburban areas								
a(hm).	0.046303	0.046303	0.046303	0.046303	0.055815	0.055815	0.055815	0.055815
A.	137.4474	137.4474	137.4474	137.4474	141.0205	141.0205	141.0205	141.0205
B.	35.22486	35.22486	35.22486	35.22486	35.22486	35.22486	35.22486	35.22486
C.	0	0	0	0	0	0	0	0
LP = Link Budget + TxP + G_bs	133.6186	141.3663	126.6962	134.444	133.6186	141.3663	126.6962	134.444
log(d) = (LP - A - C) / B	-0.1087	0.111256	-0.30522	-0.08526	-0.21013	0.009817	-0.40665	-0.1867
distance (km)	0.778582	1.291981	0.495205	0.821745	0.616404	1.022863	0.392054	0.650576
Area of cell = 2.598(d^2)	1.57488	4.336624	0.637102	1.754337	0.987119	2.718152	0.399329	1.099601
<b>Cells = Total Area / Area of cell</b>	<b>571.472</b>	<b>207.5347</b>	<b>1412.647</b>	<b>513.0143</b>	<b>911.744</b>	<b>331.1073</b>	<b>2253.781</b>	<b>818.4789</b>