

1 Explanation of MSCL

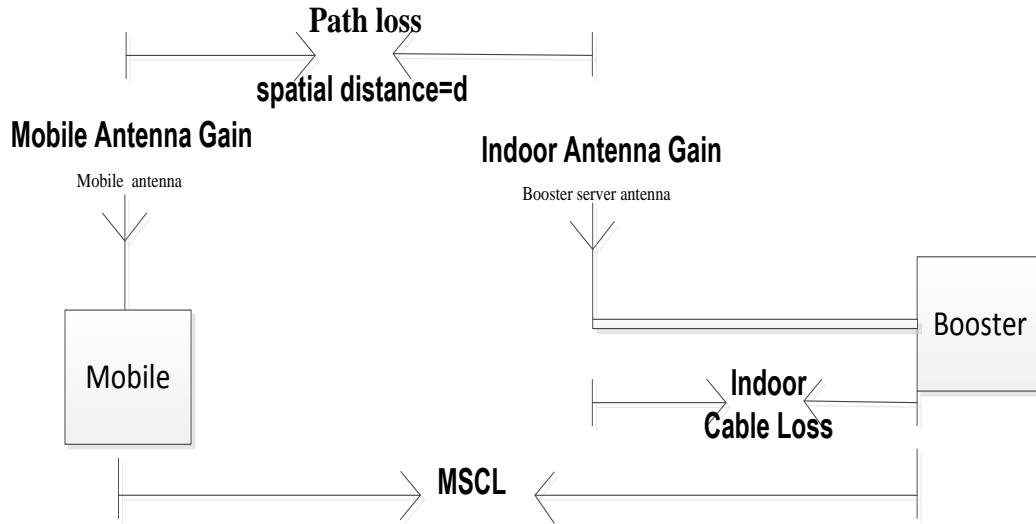


Figure 1

$$\text{MSCL} = \text{Path loss} + \text{Indoor Cable Loss} - \text{Mobile Antenna Gain} - \text{Indoor Antenna Gain} \dots\dots ①$$

1.1 Decibel version of free-space propagation loss equation

$$\text{Path loss (dB)} = 20Lgf + 20Lgd + 32.45 \dots\dots ② \quad \text{or} \quad \text{Path loss (dB)} = 20Lgf + 20LgD - 27.55 \dots\dots ③$$

f (MHz), d (km), D(m) , d=1000D

1.1.1 Operation Frequency

- At PCS (1850-1915MHz) f =1850MHz
- At Cellular (824-849MHz) f =824 MHz
- At AWS (1710-1755MHz) f =1710 MHz
- At LTE(698-716MHz) f =698 MHz
- At LTE(776-787MHz) f =776 MHz

1.1.2 Minimum Separation Distances for MSCL base on FCC new rule D (m)

Minimum Separation Distances for MSCL Calculation or Measurements D(m)	
Indoor server antenna types	Minimum separation distances D (m)
Ceiling Mounted (i.e., Dome-type) Antennas	2.0
Wall Mounted (i.e., Panel or other type) Antennas	1.0 or 2.0*
Table Top Antennas	1.0

* Note:

Wall Mounted (i.e., Panel or other type) Antennas: Alternatively, if a manufacturer clearly specifies a minimum separation distance to consumer devices in the installation manual or other user documentation provided with the booster, a reasonable minimum separation distance could be up to 6 feet (or 2 meters) horizontally removed from the antenna. In this case, the user would be required to ensure this minimum separation distance for all CMRS devices authorized for use with this booster.

1.2 Mobile Antenna Gain

Mobile Antenna Gain=0dBi

1.3 Indoor Cable Loss And Indoor Antenna Gain

Indoor Cable Loss and Indoor Antenna Gain are listed in the separate submitted file of EZ-4G Antenna Kitting .

1.4 Polarity Loss

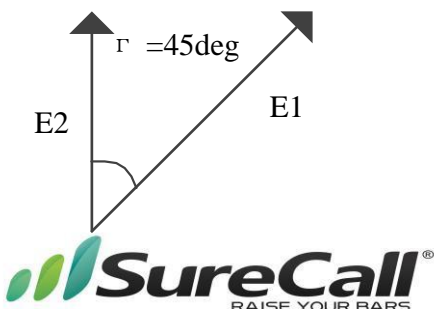
$$\text{Polarity Loss dB} = 10\text{Log} (E1/E2)^2 \text{ dB} = \text{PL dB}$$

$$\text{PL dB} = 10\text{Log} (E1^2 / (E1\text{Sin} (45\text{deg}))^2) \text{ dB} = 20\text{Log} (1/\text{Sin} (45\text{deg})) \text{ dB} = 3.01\text{dB}$$

Where:

E1 = Maximum Possible Magnitude of the Electric Field from the Mobile Device.

E2 = Magnitude of the electric field from the Mobile device with a 45deg polarity mismatch = E1Sin (r).



2 MSCL Calculations

Fixed booster EZ-4G					
Indoor Antenna					
Indoor Antenna	Indoor Antenna Gain				
	At LTE-A and LTE-V (698-787MHz)(dBi)	At 800MHz(dBi)	At 1900MHz(dBi)	At 1700MHz(dBi)	At 2100MHz(dBi)
SC312W	2.5	3	5	4	5
SC249W	7	7	10	10	10
MAX GAIN	7	7	10	10	10
Indoor Cable					
Indoor Cable	Indoor Cable Loss				
	At LTE-A and LTE-V (698-787MHz)(dBi)	At 800MHz(dBi)	At 1900MHz(dBi)	At 1700MHz(dBi)	At 2100MHz(dBi)
SC-RG6 -50 50Feet	3.32	3.75	6.42	6.22	6.68
MIN LOSS	3.32	3.75	6.42	6.22	6.68

Path loss=20Lgf+20LgD-27.55				
Operation Frequency (MHz)	f(MHz)	D(m)	Constant(dB)	Path loss(dB)
PCS(1850-1915)	1850	2	27.55	43.8
Cellular(824-849)	824	2	27.55	36.8
LTE(698-716)	698	2	27.55	35.3
LTE(776-787)	776	2	27.55	36.3
AWS(1710-1755)	1710	2	27.55	43.1

MSCL Calculations of fixed booster EZ-4G					
MSCL					
Band (MHz)	Path loss (dB)	Indoor Antenna Gain (dBi)	Indoor Cable Loss(dB)	Polarity Loss(dB)	MSCL(dB)
PCS(1850-1915)	43.8	10	6.42	3	44.4
Cellular(824-849)	36.8	7	3.75	3	37.1
LTE(698-716)	35.3	7	3.32	3	36.0
LTE(776-787)	36.3	7	3.32	3	37.0
AWS(1710-1755)	43.1	10	6.22	3	43.9





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