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Subject: MSCL Calculations

The following formulas were used to calculate MSCL with a 6' foot path loss and a 45 degree polarity mismatch between the inside antenna and the mobile device:

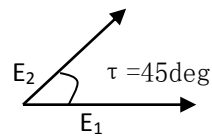
$$\text{Path Loss} = 36.6 + 20\text{Lg} ( F \text{ MHz} ) + 20\text{Lg} ( D_{\text{miles}} ) \text{ dB}$$

$$\text{Polarity Loss} = 10\text{Lg}(E_1/E_2)^2 = 10\text{Lg}((E_1/E_1\sin(45_{\text{deg}}))^2) = 20\text{Lg}((1/\sin(45_{\text{deg}}))) = 3.0 \text{ dB}$$

Where:

$E_1$  = Maximum Possible Magnitude of the Electric Field from the Mobile Device

$E_2$  = Magnitude of the electric field from the Mobil Device with a 45deg polarity mismatch =  $E_1\sin(\tau)$



$$\text{MSCL} = \text{Path Loss} + \text{Polarity Loss} - \text{Antenna Gain with Coax Loss dB}$$

The results of the calculations are shown in the following table :

Uplink Frequency (MHz)	836.5	1880.0
Path Loss (dB)	36.2	43.2
Polarity Loss (dB)	3	3
Maximum Antenna Gain with Coax Loss(dB)*	1.2	2.1
Minimum MSCL (dB)**	38.0	44.1

Note:

\*Maximum allowable Antenna Gain Coax Loss for DL EIRP not exceeding 17dBm eirp

\*\* Minimum MSCL calculated from Maximum allowable Antenna Gain with Coax Loss