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To: Whom it May Concern

Subject: Calculated Mobile Station Coupling Losses (MSCL) For FCCID: PWO460013

The following formulas were used to calculate MSCL with a 1.5' foot path loss and a 45 degree polarity mismatch between the inside antenna and the mobile device:

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

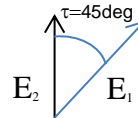
$$\text{Polarity Loss dB} = 10\text{Log}(E_1/E_2)^2 \text{ dB} = P_L \text{ dB}$$

$$P_L \text{ dB} = 10\text{Log}(E_1^2 / (E_1 \sin(45_{\text{deg}}))^2) \text{ dB} = 20\text{Log}(1/\sin(45_{\text{deg}})) \text{ dB} = 3.01 \text{ dB}$$

Where:

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

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



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

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

Uplink Center Frequency MHz	836.5	1880
Path Loss (dB)	24.12	31.15
Polarity Loss (dB)	3	3
Antenna Gain with Coax Loss	-1.7	-0.7
<b>MSCL (dB)</b>	<b>28.82</b>	<b>34.85</b>

Note: Antenna Gain with Coax Loss as measured.

Sincerely

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