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March 8, 2017

To: Whom it May Concern

Subject: Calculated Mobile Station Coupling Losses (MSCL) For FCCID: PWO460021

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:

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

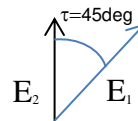
$$\text{Polarity Loss dB} = 10\text{Log}(E_1/E_2)^2 \text{ dB} = P_L \text{ dB}$$

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

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	707-710	782	836.5	1732.5	1880-1882.5
Path Loss (dB)	22.69	23.53	24.12	30.44	31.16
Polarity Loss (dB)	3	3	3	3	3
Antenna Gain with Coax Loss	-5.09	-3.55	-1.65	-1.83	-0.65
MSCL (dB)	30.78	30.08	28.77	35.27	34.81

Note: Antenna Gain with Coax Loss as measured.

Sincerely

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 Senior Electrical Engineer