



3301 E. Deseret Drive, St. George, UT 84790
 www.wilsonelectronics.com • info@wilsonelectronics.com
 phone 1-800-204-4104 • fax 1-435-656-2432

July 1, 2024

To: Whom it May Concern

Subject: Calculated Mobile Station Coupling Losses (MSCL)

FCCID: PWO076

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

Distance (feet): 6

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

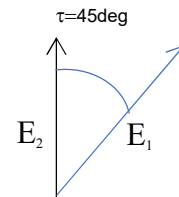
$$\text{Polarity Loss dB} = 10\text{Log}(E_1/E_2)^2 \text{ dB} = P_L \text{ dB}$$

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

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 = $E_1 \sin(t)$.



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

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)	34.72	35.58	36.16	42.49	43.20
Polarity Loss (dB)	3	3	3	3	3
Inside Antenna Gain with Coax Loss (dBi)	-2.43	-1.69	-2.79	-0.33	-1.29
MSCL (dB)	40.15	40.27	41.95	45.82	47.49

Note: Antenna Gain with Coax Loss as measured.

Sincerely

Ilesh Patel
 Senior Engineering Product Manager