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:

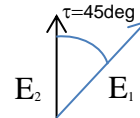Path Loss dB = 36.6 dB + 20Log(F MHz) dB+ 20Log(D_{miles}) dB

Polarity Loss dB = $10Log(E_1/E_2)^2$ dB = $P_{L\ dB}$
P_L dB= $10Log(E_1^2/(E_1Sin(45_{deg}))^2)$ dB = $20Log(1/Sin(45_{deg}))$ dB = 3.01dB
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 = $E_1Sin(\tau)$.

MSCL dB = Path Loss dB + Polarity Loss dB - 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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