MPE Calculations

Systems operating under the provision of 47 CFR 1.1307(b)(1) shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the FCC guidelines.

The EUT will only be used with a separation of 20 centimeters or greater between the antenna and the body of the user or nearby persons and can therefore be considered a mobile transmitter per 47 CFR 2.1091(b). The MPE calculation for this exposure is shown below.

Using the Wistron NeWeb Triple Band PIFA Antennas:
The peak radiated output power (EIRP) is calculated as follows:

$\quad$ EIRP = P + G
$\quad$ EIRP = 16.60 dBm + 2.84 dBi
$\quad$ EIRP = 19.44 dBm (87.90 mW)

$\quad$ Where
$\quad$ P = Power input to the antenna (mW).
$\quad$ G = Power gain of the antenna (dBi) – worst case

Power density at the specific separation:

$\quad$ $S = PG/(4R^2\Pi)$
$\quad$ $S = (45.71 \times 1.923) / (4 \times 20^2 \times \Pi)$
$\quad$ S = 0.017 mW/cm 2

$\quad$ Where
$\quad$ S = Maximum power density (mW/cm^2)
$\quad$ P = Power input to the antenna (mW).
$\quad$ G = Numeric power gain of the antenna – worst case
$\quad$ R = Distance to the center of the radiation of the antenna (20cm = limit for MPE)

$\quad$ The maximum permissible exposure (MPE) for the general population is 1mW/cm$^{2.}$

$\quad$ The power density at 20cm does not exceed the 1mW/cm 2 limit. Therefore, the exposure condition is compliant with FCC rules.

Estimated safe separation:

$\quad$ $R = \sqrt{PG/4\Pi}$
$\quad$ $R = \sqrt{(45.71 \times 1.923)} / 4\Pi$
$\quad$ R = 2.6 cm

$\quad$ Where
$\quad$ P = Power input to the antenna (mW).
$\quad$ G = Numeric power gain of the antenna – worst case
$\quad$ R = The safe estimated separation that the user must maintain from the antenna (cm)

$\quad$ The numeric gain (G) of the antenna with a gain specified in dB is determined by:
$\quad$ G = Log -1 (dB antenna gain/10)
$\quad$ G = Log -1 (2.84 dBi/10)
$\quad$ G = 1.923