

Mobile Power Density Calculation
for
FCC ID:RUT1200W
IC: 1737G-1200W

The Access Point (AP) is an IEE802.11 A / B / G radio. The access point operates on the 2.4 GHz and 5 GHz ISM bands.

Operating Environment:

The operating environment for the for the radio in all cases is a fixed, uncontrolled environment, however, the devices are classified as being "Mobile", Therefore the exposure at 20 cm is calculated.

Fixed, Uncontrolled Environment:

The FCC limit for the power density for uncontrolled exposure to RF devices operation at 2.4GHz and 5GHz at a distance of 20 cm is:

$$1 \text{ mW/cm}^2$$

Power density is calculated from the following equation

$$\text{Exposure (mW/cm}^2\text{)} = \frac{\text{EIRP (mW)} * \text{Duty Cycle}}{4 * \text{PI} * \text{Radius}^2 \text{ (cm)}}$$

Where:

Radius = 20 cm

Duty Cycle = assumed to be 100% to yield a worst case result.

The maximum allowed external antenna gain on 2.4 GHz is 6.8dBi

The maximum allowed external antenna gain on 5 GHz is 7.4dBi

2.4GHz ISM Band MPE distance Calculation

Using the highest power measured on the 2.4 GHz ISM band.

MAX Pout: 18.97dBm (78.89 mW)

MAX Ant Gain 7.8 dBi (6.02x)

EIRP: 26.77 dBm (475.33 mW EIRP)

5GHz Band MPE distance Calculation

Using the highest power measured on the 5 GHz band.

MAX Pout: 17.81 dBm (60.39 mW)

MAX Ant Gain 10.4 dBi (10.96x)

EIRP: 28.3 dBm (662.21 mW EIRP)

Total EIRP (mw)

$$475.33 + 662.21 = 1137.55$$

Calculating power density at a distance of 20 cm yields:

$$\text{Power Density} = \frac{1137.55 * 1}{4 * \text{Pi} * 20^2} \Rightarrow \frac{1137.55}{5026.54} \Rightarrow .2263 \text{ mw/cm}^2$$

$$\begin{aligned} \text{Delta} &= \text{specification} - \text{result} \\ 1 \text{ mW/cm}^2 - .2263 \text{ mw/cm}^2 &= .7736 \text{ mw/cm}^2 \\ &= -6.453 \text{ dB below limit} \end{aligned}$$