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Mobile Power Density Calculation for FCC ID: QTZAM1200ABG Utilizing Internal Antennas

The Airespace Access Point (AP) is an IEE802.11 A / B /G radio. The access point operates on the 2.4 GHz ISM band and the 5GHz UNII band. This exposure calculation assumes that transmitters are transmitting on 802.11 A and B (or G) at the same time and that the field strengths are additive. Note that the access point cannot transmit B and G at the same time. Thus, the higher power 'B' power level is used in these calculations.

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 mW/cm^2

Power density is calculated from the following equation

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

Where:
Radius = 20 cm
Duty Cycle = assumed to be 100% to yield a worst case result.

2.4GHz ISM Band MPE distance Calculation
Using the highest power measured on the 2.4 GHz ISM band (Actual power into the antenna after the FET switch).
MAX Pout: 20.9 dBm (123.03 mW) MAX Ant Gain 7.8 dBi (6.02x)
EIRP: 28.7 dBm (741.31 mW EIRP)

5 GHz UNII Band MPE distance Calculation
Using the highest power measured on the 5 GHz UNII / ISM band (Actual power into the antenna after the power divider).
MAX Pout: 16.5 dBm (44.6 mW) MAX Ant Gain 10.4 dBi (10.96x)
EIRP: 26.9 dBm (489.77mW EIRP)

Total EIRP: Assuming the worst case, an in-phase addition of the two signals at the peak of the antenna patterns, yields:

741.31mW + 489.77 = 1231.07 mW TOTAL combined EIRP

Calculating power density at a distance of 20 cm yields:

$$\text{Power Density} = \frac{1231.07 * 1}{4 * \text{Pi} * 20^2} \Rightarrow \frac{1231.07}{5026.54} \Rightarrow .2449 \text{ mw/cm}^2$$

$$\text{Delta} = \text{specification} - \text{result}$$
$$1 \text{ mW/cm}^2 - .2449 \text{ mw/cm}^2 = .755 \text{ mw/cm}^2$$
$$= -6.11 \text{ dB}$$