malibu
NETWORKS

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Maximum Permissible Exposure Calculation
for the
Malibu Networks AirMAX 240/2400
FCC ID QGQ-AM241

Due to the two different operating configurations of the Malibu system, it is necessary to perform multiple MPE estimates to account for the different configurations. There are two different configurations to consider. (See complete report for a description of the different configurations)

Configuration 1: 19 dBi Panel Antenna with +17 dBm setting
Power reduced on all channels to +17dBm. In order to meet the restricted band emissions requirement with this antenna, the RF power will be set to +17 dBm

Configuration 2: +12 dBi Omni antenna with +20 dBm setting
Due to the lower antenna gain, restricted band emissions can be met with a RF power setting of +20 dBm on all channels

Operating Environment:
The operating environment for the for the radio(s) in all cases is a Fixed, Uncontrolled environment, thus the equipment is classified as FIXED

Fixed, Uncontrolled Environment:
FCC rules limit the power density for uncontrolled exposure to RF devices operation at 2400 MHz to the following level:

1 mW/cm2

Power density is calculated from the following equation:

Exposure (mW/cm^2) = Pout (mW)*Duty Cycle*(Antenna Gain(as a ratio)/(4*PI* Radius^2(cm)))

Solving the above equation for Radius yields:

$$\text{Radius} = \sqrt{\frac{P_{out}(mw)*Duty\ Cycle*Antenna\ Gain_{(ratio)}}{Exposure(mW/cm^2)\ *\ 4\ *\ Pi}}$$

In the calculation s that follow, The highest actual power measured for a given setting is used. These levels are:

+20 dBm Setting: 20.7 dBm = 117.49 mW
+17 dBm Setting: 17.0 dBm = 50.00 mW

2400 MHz MPE Distance Calculation:
Calculating the radius of the sphere around which the power density is at the FCC limit. This radius is the MPE distance.

$$\text{MPE Distance} = \sqrt{\frac{50.0 * 1 * 79.4}{1 * 4 * Pi}} \implies \sqrt{\frac{3970.0}{12.56}} \implies \textbf{17.78 cm}$$

2400 MHz MPE Distance Calculation:
Calculating the radius of the sphere around which the power density is at the FCC limit. This radius is the MPE distance.

$$\text{MPE Distance} = \sqrt{\frac{117.49 * 1 * 15.84}{1 * 4 * Pi}} \implies \sqrt{\frac{1861.04}{12.56}} \implies \textbf{12.22 cm}$$

The following RF Exposure statement will appear near the front of the users manual for both, BASE and CUSTOMER installations:

RF Exposure Requirements
To ensure compliance with FCC RF exposure requirements, this device must be professionally installed outdoors on a permanent structure with an antenna that is separated from all persons by a minimum of two meters.
Using higher gain antennas and types of antennas not covered under the FCC certification of this product is not allowed. Installers of the radio and end users of the system must adhere to instructions provided in the users manual.