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Maximum Permissible Exposure calculations

To whom it may concern,

The subject of this document is the Maximum Permissible Exposure (MPE) calculation for the FreeWave Technologies 435-470MHz Licensed Band transceiver.

The MPE distance is calculated for the worst-case of a 100% transmitter duty cycle.

For an isotropic radiator the surface area of a sphere can be used to determine the area over which the transceiver energy is radiated.

$$\text{Surface area of a sphere} = 4 * \pi * \text{radius}^2$$

In the case where there is an antenna gain, the worst-case energy density is increased by the antenna gain. In this case, the exposure level for a controlled environment can be calculated as follows:

$$\text{MPE distance} = ((\text{output power} * \text{duty cycle} * 10 * (\text{antenna gain}/10)) / (4 * \pi * \text{Exposure Limit [mW/cm}^2]))^{1/2}$$

In the case of 7 dBi antenna

$$\begin{aligned} \text{MPE distance} &= ((2000 \text{ mW} * 1 * 5.01) / (4 * 3.14 * 1.5))^{1/2} \\ &= 18.3 \text{ cm} \end{aligned}$$

Sincerely,



Rich Arment
Engineer