

MAXIMUM PERMISSABLE EXPOSURE FOR SUBPART C 2.4GHz BAND

Calculations:

Power density at the specific separation:

$$\begin{aligned} S &= PG/(4R^2\pi) \\ S &= (142.89*1.995)/(4*20^2*\pi) \\ S &= .05790 \text{ mW/cm}^2 \end{aligned}$$

Where

$$\begin{aligned} S &= \text{Maximum power density (mW/cm}^2\text{)} \\ P &= \text{Power input to the antenna (mW) – 21.55 dBm} \\ G &= \text{Numeric power gain of the antenna} \\ R &= \text{Distance to the center of the radiation of the antenna (20 cm = limit for MPE)} \end{aligned}$$

The maximum permissible exposure (MPE) for the general population is 1 mW/cm².

The power density at 20 cm does not exceed the 1 mW/cm². Therefore the exposure condition is compliant with FCC rules.

The numeric gain of the antenna with a gain specified in dB is determined by:

$$\begin{aligned} G &= \text{Log}^{-1}(\text{dBi antenna gain}/10) \\ G &= \text{Log}^{-1}(3 \text{ dBi}/10) \\ G &= 1.995 \end{aligned}$$