

MAXIMUM PERMISSIBLE EXPOSURE FOR SUBPART C 2.4 GHz BAND**Calculations**

Power density at the specific separation:

$$\begin{aligned} S &= PG/(4R^2\pi) \\ S &= (177.47 * 1.64) / (4 * 20^2 * \pi) \\ S &= 0.0579 \text{ mW/cm}^2 \text{ (at 20 cm)} \\ \text{Limit} &= 1 \text{ mW/cm}^2 \end{aligned}$$

where

$$\begin{aligned} S &= \text{Maximum power density (mW/cm}^2\text{)} \\ P &= \text{Power input to the antenna (mW)} = 22.4912 \text{ dBm} \\ G &= \text{Numeric power gain of the antenna} \\ R &= \text{distance to the center of the radiation of the antenna (1 cm = limit for MPE)} \end{aligned}$$

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

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

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

$$\begin{aligned} G &= \text{Log}^{-1} (\text{dB antenna gain}/10) \\ G &= \text{Log}^{-1} (2.15 \text{ dBi}/10) \\ G &= 1.64 \end{aligned}$$