

MAXIMUM PERMISSIBLE EXPOSURE FOR SUBPART C 2.4 GHz BAND

Calculations

Power density at the specific separation:

$$\begin{aligned}
 S &= PG/(4R^2\pi) \\
 S &= (133.66 * 2.51) / (4 * 20^2 * \pi) \\
 S &= 0.0667249384 \text{ mW/cm}^2 \text{ (at 20 cm)} \\
 \text{Limit} &= 1 \text{ mW/cm}^2
 \end{aligned}$$

where

$$\begin{aligned}
 S &= \text{Maximum power density (mW/cm}^2\text{)} \\
 P &= \text{Power input to the antenna (mW) - 21.26 dBm} \\
 G &= \text{Numeric power gain of the antenna} \\
 R &= \text{distance to the center of the radiation of the antenna (20 cm = limit for MPE)}
 \end{aligned}$$

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

The power density at 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:

$$\begin{aligned}
 G &= \text{Log}^{-1} (\text{dB antenna gain}/10) \\
 G &= \text{Log}^{-1} (4 \text{ dBi}/10) \\
 G &= 2.51
 \end{aligned}$$