

MAXIMUM PERMISSIBLE EXPOSURE FOR SUBPART C 2.4 GHz BAND
ANNOUNCE RADIO

Calculations

Power density at the specific separation:

$$\begin{aligned} S &= PG/(4R^2\pi) \\ S &= (17.42 * 0.16634) / (4 * 1^2 * \pi) \\ S &= 0.23058 \text{ mW/cm}^2 \end{aligned}$$

where

$$\begin{aligned} S &= \text{Maximum power density (mW/cm}^2\text{)} \\ P &= \text{Power input to the antenna (mW) = 12.41 dBm} \\ G &= \text{Numeric power gain of the antenna} \\ R &= \text{distance to the center of the radiation of the antenna (1 cm = limit for MPE)} \end{aligned}$$

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

The power density at both 20 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:

$$\begin{aligned} G &= \text{Log}^{-1}(\text{dBi antenna gain}/10) \\ G &= \text{Log}^{-1}(-7.79 \text{ dBi}/10) \\ G &= 0.16634 \end{aligned}$$