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PREDICTION OF MPE AT A GIVEN DISTANCE

Calculations can be made to predict RF field strength and power density levels around typical RF sources using the general equations (3) and (4) on page 19 of the following FCC document:

“OET Bulletin 65, Edition 97-01 - Evaluating Compliance with FCC Guidelines for Human Exposure to Radio frequency Electromagnetic Fields”.

These equations are generally accurate in the far field of an antenna but will over predict power density in the near field, where they could be used for making a “worst case” prediction.

$$S = PG/4\pi R^2 \quad (3)$$

Where S = power density (in appropriate units, e.g. mW/cm^2)

P = power input to the antenna (in appropriate units e.g. mW)

G = power gain of the antenna in the direction of interest relative to the isotropic radiator

R = distance to the center of radiation of the antenna (appropriate units e.g. cm)

or, $S = \text{EIRP}/4\pi R^2 \quad (4)$

Where EIRP = Equivalent Isotropically radiated power

General Limits:

§1.1310 LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

(B) Limits for General Population/Uncontrolled Exposure

300–1500 MHz: $f/1500 \text{ mW/cm}^2$

1500–100,000 MHz: 1.0 mW/cm^2

MPE WLAN 5470-5725MHz

EIRP: 21.2dBm (131.83mW)

Calculated at distance of 20cm

Power density = $131.83 / (4 \times \pi \times 20^2) = 0.0262 \text{ mW/cm}^2$

Limit:

1mW/cm^2 is the reference level for general public exposure according to the OET Bulletin 65, Edition 97-01 Table 1.

Result: Configuration complies with rules as power density is below MPE limit.

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