

MPE calculation

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.

$$S = PG/4\pi R^2$$

where S = power density (in appropriate units, e.g. mW/cm²)
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 centre of radiation of the antenna (appropriate units e.g. cm)

Or

$$S = EIRP/4\pi R^2$$

where EIRP = equivalent isotropically radiated power

Calculation: ISM band 1 – 2400 MHz – 2483.5 MHz

(Calculated for max. EIRP)

EIRP: 21.51dBm (141.58 mW)

calculated at distance of 20 cm:

$$\text{power density} = 141.58 \text{ mW} / 4 \pi 20^2 = 0.0282 \text{ mW/ cm}^2$$

Calculation: ISM band 2 – 5150 MHz – 5250 MHz

(Calculated for max. EIRP)

EIRP: 13.06dBm (20.23 mW)

calculated at distance of 20 cm:

$$\text{power density} = 20.23 \text{ mW} / 4 \pi 20^2 = 0.00402 \text{ mW/ cm}^2$$

Calculation: ISM band 3 – 5250 MHz – 5350 MHz

(Calculated for max. EIRP)

EIRP: 11.20 dBm (13.18 mW)

calculated at distance of 20 cm:

$$\text{power density} = 13.18 \text{ mW} / 4 \pi 20^2 = 0.00262 \text{ mW/ cm}^2$$

Calculation: ISM band 4 – 5470 MHz – 5725 MHz

(Calculated for max. EIRP)

EIRP: 12.47 dBm (17.66 mW)

calculated at distance of 20 cm:

$$\text{power density} = 17.66 / 4 \pi 20^2 = 0.00351 \text{mW/ cm}^2$$

Calculation: ISM band 5 – 5725 MHz – 5850 MHz

(Calculated for max. EIRP)

EIRP: 12.82 dBm (19.14 mW)

calculated at distance of 20 cm:

$$\text{power density} = 19.14 / 4 \pi 20^2 = 0.00381 \text{mW/ cm}^2$$

Limit:

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