

Calculation Method of RF safety Distance:

When the transmitter is operated as a mobile device, the radiating structure must be maintained 40 cm. (15.75inches) or more from the body of the user or nearby persons. The following calculations show that at spacings greater than or equal to 40 cm., the MPE limits for Occupational/Controlled exposure are not exceeded with any antenna up to 17dBi gain.

Per OET Bulletin 65, far-field equations used to predict power density “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’ or conservative prediction”⁽¹⁾. This is the method used here to predict the power density.

The far-field power density S , in mW/ cm² is:

$$S = (P \cdot G) / (4 \cdot \pi \cdot R^2) \quad (\text{Eq. 1})$$

Where:

- P = power input into the antenna in mW
- S = allowable power density in mW/cm²
- G = numeric gain of the antenna relative to an isotropic radiator
- R = distance to center of radiation in cm

Substituting:

- P = 2000 mW
- G = 50 (17 dBi)
- R = 40 cm

Results:

$$S = 4.97 \text{ mW/cm}^2$$

The limit for Maximum Permissible Exposure (MPE) for Occupational/Controlled Exposure in the frequency band 2450 – 2500 MHz is 5.0 mW/cm² (47 CFR 1.1310).

Therefore, the power density, at a spacing of at least 40 cm., is within the limits specified for Occupational/Controlled exposure when the device is used as instructed in the Operator Guide, even when use of the highest allowable gain antenna is assumed. The Operator Guide contains a warning and instructions on limiting RF exposure by instructing the user to install the unit so as to insure the minimum safe distance from the antenna to any human body.

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(1) OET Bulletin 65: Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields, Edition 97-01, August 1997. Page 19.