

5.9 RF Exposure

5.9.1 Regulation

According to §15.247(i), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. See § 1.1307(b)(1) of this Chapter.

Limits for Maximum Permissible Exposure: RF exposure is calculated.

| Frequency Range | Electric Field Strength [V/m] | Magnetic Field Strength [A/m] | Power Density [mW/cm ²] | Averaging Time [minute] |
|-------------------------------------------------------|-------------------------------|-------------------------------|-------------------------------------|-------------------------|
| Limits for General Population / Uncontrolled Exposure | | | | |
| 0.3 ~ 1.34 | 614 | 1.63 | *(100) | 30 |
| 1.34 ~ 30 | 824 /f | 2.19/f | *(180/f ²) | 30 |
| 30 ~ 300 | 27.5 | 0.073 | 0.2 | 30 |
| 300 ~ 1500 | / | / | f/1500 | 30 |
| 1500 ~ 15000 | / | / | 1.0 | 30 |

f=frequency in MHz, *= plane-wave equivalent power density

MPE (Maximum Permissible Exposure) Prediction

Predication of MPE limit at a given distance: Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2 \quad (\Rightarrow R = \sqrt{PG/4\pi S})$$

S=power density [mW/cm²]

P=Power input to antenna [mW]

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

R= distance to the center of radiation of the antenna [cm]

| | |
|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| EUT: Maximum peak output power = 2.37[mW](= 3.74 dBm) Antenna gain=2.239(= 3.5 [dBi]) | |
| 100 mW, at 20 cm from an antenna 6[dBi] | $S = PG/4\pi R^2 = 100 \times 3.98 / (4 \times \pi \times 400) = 0.0792 \text{ [mW/cm}^2\text{]} < 1.0 \text{ [mW/cm}^2\text{]}$ |
| 2.37 mW, at 20 cm from an antenna 2.239 [dBi] | $S = PG/4\pi R^2 = 0.00105 \text{ [mW/cm}^2\text{]} < 1.0 \text{ [mW/cm}^2\text{]}$ |
| 2.37 mW, at 2.5 cm from an antenna 2.239 [dBi] | $S = PG/4\pi R^2 = 0.06744 \text{ [mW/cm}^2\text{]} < 1.0 \text{ [mW/cm}^2\text{]}$ |

5.9.2 RF Exposure Compliance Issue

The information should be included in the user's manual:

This appliance and its antenna must not be co-located or operation in conjunction with any other antenna or transmitter. A minimum separation distance of 20 cm must be maintained between the antenna and the person for this appliance to satisfy the RF exposure requirements.