

## \* RF Exposure

### 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 <sup>2</sup> ] | 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 <sup>2</sup> )              | 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/cm<sup>2</sup>]

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 = 6.68 [mW](= 8.25 dBm)

Antenna gain= 4.70 (= 6.72 [dBi])

|                                               |                                                                                                                                   |
|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| 100 mW, at 20 cm from an antenna 6 [dBi]      | $S = PG/4\pi R^2 = 100 \times 3.98 / (4 \times \pi \times 400) = 0.07918 \text{ [mW/cm}^2\text{]} < 1.0 \text{ [mW/cm}^2\text{]}$ |
| 6.68 mW, at 20 cm from an antenna 6.72 [dBi]  | $S = PG/4\pi R^2 = 0.00625 \text{ [mW/cm}^2\text{]} < 1.0 \text{ [mW/cm}^2\text{]}$                                               |
| 6.68 mW, at 2.5 cm from an antenna 6.72 [dBi] | $S = PG/4\pi R^2 = 0.39986 \text{ [mW/cm}^2\text{]} < 1.0 \text{ [mW/cm}^2\text{]}$                                               |

### 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.