

## §1.1307 (b) (1) & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

### Applicable Standard

According to FCC §15.319(i) and §1.1307(b)(1), 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 level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

| Frequency Range (MHz)                                      | Electric Field Strength (V/m) | Magnetic Field Strength (A/m) | Power Density (mW/cm <sup>2</sup> ) | Averaging Time (minute) |
|------------------------------------------------------------|-------------------------------|-------------------------------|-------------------------------------|-------------------------|
| <b>Limits for General Population/Uncontrolled Exposure</b> |                               |                               |                                     |                         |
| 0.3-1.34                                                   | 614                           | 1.63                          | *(100)                              | 30                      |
| 1.34-30                                                    | 842/f                         | 2.19/f                        | *(180/f <sup>2</sup> )              | 30                      |
| 30-300                                                     | 27.5                          | 0.073                         | 0.2                                 | 30                      |
| 300-1500                                                   | /                             | /                             | f/1500                              | 30                      |
| 1500-100,000                                               | /                             | /                             | 1.0                                 | 30                      |

f = frequency in MHz

\* = Plane-wave equivalent power density

### MPE Calculation

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

Where: S = power density (in appropriate units, e.g. mW/cm<sup>2</sup>);

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 an isotropic radiator

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

For worst case:

| Channel | Frequency (MHz) | Antenna Gain |           | Conducted Power |       | Evaluation Distance (cm) | Power Density (mW/cm <sup>2</sup> ) | MPE Limit (mW/cm <sup>2</sup> ) |
|---------|-----------------|--------------|-----------|-----------------|-------|--------------------------|-------------------------------------|---------------------------------|
|         |                 | (dBi)        | (numeric) | (dBm)           | (mW)  |                          |                                     |                                 |
| Low     | 1921.536        | -1.0         | 0.79      | 15.16           | 32.81 | 20                       | 0.0052                              | 1.0                             |

**Result:** The device meets MPE limit at 20 cm distance.