

## FCC §15.247(i) & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

### Applicable Standard

According to subpart 15.247 (i) and subpart 1.1307 (b)(1), 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

Limits for Maximum Permissible Exposure (MPE)

| (B) Limits for General Population/Uncontrolled Exposure |                               |                               |                                     |                          |
|---|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| Frequency Range (MHz)                                   | Electric Field Strength (V/m) | Magnetic Field Strength (A/m) | Power Density (mW/cm <sup>2</sup> ) | Averaging Time (minutes) |
| 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                       |
| 1500–100,000  | /                             | /                             | 1.0                                 | 30                       |

f = frequency in MHz \* = Plane-wave equivalent power density

### Test Data

Predication of MPE limit at a given distance

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

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, the power gain factor, is normally **numeric** gain.

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

| Radio Mode | Frequency (MHz) | Antenna Gain |           | Conducted Output Power |         | Evaluation Distance (cm) | Power Density (mW/cm <sup>2</sup> ) | MPE Limit (mW/cm <sup>2</sup> ) |
|------------|-----------------|--------------|-----------|------------------------|---------|--------------------------|-------------------------------------|---------------------------------|
|            |                 | (dBi)        | (numeric) | (dBm)                  | (mW)    |                          |                                     |                                 |
| 802.11b    | 2412            | 2            | 1.5849    | 17.04                  | 50.5824 | 20                       | 0.01595                             | 1.0                             |
| 802.11g    | 2412            | 2            | 1.5849    | 13.69                  | 23.3884 | 20                       | 0.00737                             | 1.0                             |
| 802.11n20  | 2412            | 2            | 1.5849    | 13.66                  | 23.2274 | 20                       | 0.00732                             | 1.0                             |
| 802.11n40  | 2422            | 2            | 1.5849    | 13.71                  | 23.4963 | 20                       | 0.00741                             | 1.0                             |

### Result

Compliance