## FCC §15.247 (i) \& §1.1307 (b) (1) \& §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 General Population/Uncontrolled Exposure

| Limits for General Population/Uncontrolled Exposure |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Frequency <br> Range <br> $(\mathbf{M H z})$ | Electric Field <br> Strength <br> $(\mathbf{V} / \mathbf{m})$ | Magnetic Field <br> Strength <br> $(\mathbf{A} / \mathbf{m})$ | Power <br> Density <br> $\left(\mathbf{m W} / \mathbf{c m ~}^{2}\right)$ | Averaging <br> Time <br> (Minutes) |
| $0.3-1.34$ | 614 | 1.63 | $*(100)$ | 30 |
| $1.34-30$ | $824 / \mathrm{f}$ | $2.19 / \mathrm{f}$ | $*\left(180 / \mathrm{f}^{2}\right)$ | 30 |
| $30-300$ | 27.5 | 0.073 | 0.2 | 30 |
| $300-1500$ | $/$ | $/$ | $\mathrm{f} / 1500$ | 30 |
| $1500-100,000$ | $/$ | $/$ | 1.0 | 30 |

$\mathrm{f}=$ frequency in MHz

* = Plane-wave equivalent power density


## Result

## Calculated Formulary:

Predication of MPE limit at a given distance

$$
\mathrm{S}=\frac{P G}{4 \pi R^{2}}
$$

$\mathrm{S}=$ power density (in appropriate units, e.g. $\mathrm{mW} / \mathrm{cm}^{2}$ )
$\mathrm{P}=$ 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.
$\mathrm{R}=$ distance to the center of radiation of the antenna (appropriate units, e.g., cm )
For worst case:

| Item | Frequency (MHz) | Antenna Gain |  | Conducted Power |  | Evaluation Distance (cm) | Power <br> Density <br> $\left(\mathrm{mW} / \mathrm{cm}^{2}\right)$ | MPE Limit ( $\mathrm{mW} / \mathrm{cm}^{2}$ ) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | (dBi) | (numeric) | (dBm) | (mW) |  |  |  |
| Onboard Antenna | 2412-2472 | 1.5 | 1.41 | 13.35 | 21.63 | 20 | 0.006 | 1 |
| External Antenna | 2412-2472 | 4.4 | 2.75 | 13.35 | 21.63 | 20 | 0.012 | 1 |

Note: To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 20 cm from nearby persons.

## Result: Compliance

