

**FCC §1.1307 (b) (1) & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)****Applicable Standard**

According to 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**

| <b>Limits for General Population/Uncontrolled Exposure</b> |                                      |                                      |                                          |                                 |
|------------------------------------------------------------|--------------------------------------|--------------------------------------|------------------------------------------|---------------------------------|
| <b>Frequency Range (MHz)</b>                               | <b>Electric Field Strength (V/m)</b> | <b>Magnetic Field Strength (A/m)</b> | <b>Power Density (mW/cm<sup>2</sup>)</b> | <b>Averaging Time (Minutes)</b> |
| 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

**Result****Calculated Formulary:**

Predication of MPE limit at a given distance

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

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)

For simultaneously transmit system, the calculated power density should comply with:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

Worst case as below:

| Frequency<br>(MHz) | Antenna Gain |           | Tune up<br>Conducted Power |          | Evaluation<br>Distance<br>(cm) | Power<br>Density<br>(mW/cm <sup>2</sup> ) | MPE Limit<br>(mW/cm <sup>2</sup> ) |
|--------------------|--------------|-----------|----------------------------|----------|--------------------------------|-------------------------------------------|------------------------------------|
|                    | (dBi)        | (numeric) | (dBm)                      | (mW)     |                                |                                           |                                    |
| 2412-2472          | 2.5          | 1.78      | 14.5                       | 28.18    | 60                             | 0.001                                     | 1.00                               |
| 400-470            | 3.5          | 2.24      | 44                         | 25118.86 | 60                             | 1.24                                      | 1.33                               |

Note:

Simultaneous transmitting consideration: DTS and DMR

The ratio= $MPE/limit_{DTS}+MPE/limit_{DMR}=0.001/1.00+1.24/1.33=0.933<1.0$ , simultaneous exposure is not required.

To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 60 cm from nearby persons to antenna.

**Result: Compliance**