

## **FCC §1.1310 & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)**

### **Applicable Standard**

According to 1.1310, 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 Occupational/Controlled Exposure</b> |                                          |                                          |                                              |                                               |
|----------------------------------------------------|------------------------------------------|------------------------------------------|----------------------------------------------|-----------------------------------------------|
| <b>Frequency Range (MHz)</b>                       | <b>Electric Field Strength (E) (V/m)</b> | <b>Magnetic Field Strength (H) (A/m)</b> | <b>Power Density (S) (mW/cm<sup>2</sup>)</b> | <b>Averaging Time  E ,  H  or S (minutes)</b> |
| 0.3- 3.0                                           | 614                                      | 1.63                                     | (100)*                                       | 6                                             |
| 3.0 - 30                                           | 1842/f                                   | 4.89/f                                   | (900/f <sup>2</sup> )*                       | 6                                             |
| 30-300                                             | 61.4                                     | 0.163                                    | 1.0                                          | 6                                             |
| 300-1500                                           | /                                        | /                                        | f/300                                        | 6                                             |
| 1500-100,000                                       | /                                        | /                                        | 5                                            | 6                                             |

f = frequency in MHz;

\* = Plane-wave equivalent power density;

### **MPE Calculation**

**Prediction of power density at the distance of the applicable MPE limit**

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

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

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

### **MPE Results**

| <b>Frequency (MHz)</b> | <b>Antenna Gain</b> |                  | <b>Maximum Average output power including Tune-up Tolerance</b> | <b>Evaluation Distance (cm)</b> | <b>Power Density (mW/cm<sup>2</sup>)</b> | <b>MPE Limit (mW/cm<sup>2</sup>)</b> |
|------------------------|---------------------|------------------|-----------------------------------------------------------------|---------------------------------|------------------------------------------|--------------------------------------|
|                        | <b>(dBi)</b>        | <b>(numeric)</b> | <b>(mW)</b>                                                     |                                 |                                          |                                      |
| 400-470                | 10                  | 10               | 26500                                                           | 150                             | 0.94                                     | 1.0                                  |

Note: the target power is 53 W, the device operation 50% duty cycle(average power 26.5W).

**Result:** The device meet FCC MPE at 150 cm distance