

## 6.2. RF EXPOSURE REQUIRMENTS [§ 15.407(f), 1.1310 & 2.1091]

### 6.2.1. Limits

- **FCC 15.407(f):** U-NII devices are subject to the radio frequency radiation exposure requirements specified in Sec. 1.1307(b), Sec. 2.1091 and Sec. 2.1093 of this chapter, as appropriate. All equipment shall be considered to operate in a "general population/uncontrolled" environment. Applications for equipment authorization of devices operating under this section must contain a statement confirming compliance with these requirements for both fundamental emissions and unwanted emissions. Technical information showing the basis for this statement must be submitted to the Commission upon request.
- **FCC 1.1310:-** The criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in 1.1307(b).

**LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)**

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

F = Frequency in MHz

### 6.2.2. Method of Measurements

In order to demonstrate compliance with MPE requirements (see Section 2.1091), the following information is typically needed:

1. Calculation that estimates the minimum separation distance (20 cm or more) between an Antenna Port "A" and persons required to satisfy power density limits defined for free space.

#### Calculation Method of RF Safety Distance:

$$S = PG/4\pi r^2 = EIRP/4\pi r^2$$

Where:

- P: power input to the antenna in mW
- EIRP: Equivalent (effective) isotropic radiated power.
- S: power density mW/cm<sup>2</sup>
- G: numeric gain of antenna relative to isotropic radiator
- r: distance to centre of radiation in cm

$$r = \sqrt{PG/4\pi S}$$

2. Antenna installation and device operating instructions for installers (professional/unskilled users), and the parties responsible for ensuring compliance with the RF exposure requirement
3. Any caution statements and/or warning labels that are necessary in order to comply with the exposure limits
4. Any other RF exposure related issues that may affect MPE compliance

### 6.2.3. Test Data

| Frequency (MHz)  | Highest Conducted Peak Power at the Antenna Terminal (dBm) | Maximum Antenna Gain (dBi) | Maximum Measured Total EIRP (dBm) | Minimum RF Safety Distance r (cm) |
|------------------|------------------------------------------------------------|----------------------------|-----------------------------------|-----------------------------------|
| External Antenna |                                                            |                            |                                   |                                   |
| 5250 – 5350      | 14.7                                                       | 5.0                        | 19.7                              | 3.0                               |
| Internal Antenna |                                                            |                            |                                   |                                   |
| 5250 – 5350      | 14.9                                                       | 4.3                        | 19.17                             | 3.0                               |

**Note:** RF EXPOSURE DISTANCE LIMITS:  $r = (PG/4\pi S)^{1/2} = (EIRP/4\pi S)^{1/2}$   
Limits for General Population/Uncontrolled Exposure:  $S = 1.0 \text{ mW/cm}^2$

| Evaluation of RF Exposure Compliance Requirements                                                                                                                                          |                                                                                                                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| RF Exposure Requirements                                                                                                                                                                   | Compliance with FCC Rules                                                                                      |
| Minimum calculated separation distance between Antenna Port “A” and persons: <b>3.0 cm</b>                                                                                                 | Manufacturer’ instruction for separation distance between Antenna Port “A” and persons required: <b>20 cm.</b> |
| Antenna installation and device operating instructions for installers (professional/unskilled users), and the parties responsible for ensuring compliance with the RF exposure requirement | N/A                                                                                                            |
| Caution statements and/or warning labels that are necessary in order to comply with the exposure limits                                                                                    | Refer to user’s manual for RF Exposure information.                                                            |
| Any other RF exposure related issues that may affect MPE compliance                                                                                                                        | N/A                                                                                                            |