

5.4. RF EXPOSURE REQUIREMENTS [§§ 15.247(b)(4), 1.1310 & 2.1091]

5.4.1. Limits

- **FCC 15.247(b)(4):** Systems operating under provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission’s guidelines. See @ 1.1307(b)(1).
- **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 ²)	Average Time (minutes)
(A) Limits for Occupational/Control Exposures				
1500-100,000	...	...	5	6
(B) Limits for General Population/Uncontrolled Exposure				
1500-100,000	...	...	1.0	30

F = Frequency in MHz

5.4.2. 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/cm²
- 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

5.4.3. 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				
2412-2462	22.7	4.0	26.7	6.1
5745-5825	22.6	4.3	26.9	6.2
Internal Antenna				
2412-2462	22.9	5.0	27.1	6.4
5745-5825	21.8	4.3	26.1	5.7

Note: RF EXPOSURE DISTANCE LIMITS: $r = (PG/4IIS)^{1/2} = (EIRP/4IIS)^{1/2}$
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: 6.4 cm	Manufacturer’ instruction for separation distance between Antenna Port “A” and persons required: 20 cm.
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