

**5.8. RF EXPOSURE REQUIRMENTS [§§ 15.247(i), 1.1310 & 2.1091]**

**5.8.1. Limits**

§ 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> )	Averaging time (minutes)
<b>(A) Limits for Occupational/Controlled Exposures</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
<b>(B) Limits for General Population/Uncontrolled Exposure</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

Note 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

Note 2: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

### 5.8.2. Method of Measurements

#### Calculation Method of Power Density/RF Safety Distance:

$$S = \frac{PG}{4\pi \cdot r^2} = \frac{EIRP}{4\pi \cdot r^2}$$

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

$$r = \sqrt{\frac{PG}{4\pi \cdot S}} = \sqrt{\frac{EIRP}{4\pi \cdot S}}$$

FCC radio frequency exposure limits may be exceeded at distances closer than r cm from the antenna of this device.

### 5.8.3. RF Evaluation for Mobile Applications

Maximum RF Power conducted, <b>P<sub>conducted</sub>[W]:</b>	0.25
Maximum Antenna Gain, <b>G[dBi]:</b>	3
Maximum EIRP, <b>P<sub>EIRP</sub>[W]:</b>	0.5
MPE Limit for General Population/Uncontrolled Exposure, <b>S<sub>uncontrolled</sub>[mW/cm<sup>2</sup>]</b>	0.35
Min Calculated RF Safety Distance for General Population/Uncontrolled Exposure, <b>r<sub>safety_uncontrolled</sub>[cm]</b>	11
Min Required RF Safety Distance for General Population/Uncontrolled Exposure, <b>r<sub>safety_uncontrolled</sub>[cm]</b>	<b>20cm</b> , since calculated value is below 20cm

### 5.8.4. RF Evaluation for Portable Applications

For portable applications, refer to SAR test report for portable host products with the module integrated.