# **5. RF EXPOSURE EVALUATION**

## 5.1 MAXIMUM PERMISSIBLE EXPOSURE (MPE)

## 5.1.1 Applicable Standard

FCC §15.247 (i) & §1.1310 & §2.1091

Systems operating under the 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) of this chapter.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

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

According to §1.1310 and §2.1091 RF exposure is calculated.

### 5.1.2 Procedure

Prediction of power density at the distance of the applicable MPE limit  $S = PG/4\pi R^2$  = 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);

### 5.1.3 Calculated Result

Operation Bands	Frequency (MHz)	Antenna Gain		Conducted output power including Tune- up Tolerance		Evaluation Distance (cm)	Power Density (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )
		(dBi)	(numeric)	(dBm)	(mW)			
2.4GHz	2402-2480	3.07	2.028	3.5	2.24	20	0.001	1.0
	2412-2462	3.07	2.028	17	50.12	20	0.020	1.0
5.2GHz	5150-5250	5.15	3.273	15	31.62	20	0.021	1.0
5.8GHz	5725-5850	3.89	2.449	17	50.12	20	0.024	1.0

Note: Non simultaneously transmission in the band 2.4GHz, 5.2GHz or 5.8GHz.

**Result:** The device meets FCC MPE at 20 cm distance.