

# Appendix B. Maximum Permissible Exposure



# 1. Maximum Permissible Exposure

## 1.1. Applicable Standard

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 limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2 m normally can be maintained between the user and the device.

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm²)	Averaging Time  E  <sup>2</sup> ,  H  <sup>2</sup> or S (minutes)	
0.3-3.0	614	1.63	(100)*	6	
3.0-30	1842 / f	4.89 / f	(900 / f)*	6	
30-300	61.4	0.163	1.0	6	
300-1500			F/300	6	
1500-100,000			5	6	

(A) Limits for Occupational / Controlled Exposure

(B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm²)	Averaging Time  E  <sup>2</sup> ,  H  <sup>2</sup> or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30

Note: f = frequency in MHz ; \*Plane-wave equivalent power density

### 1.2. MPE Calculation Method

E (V/m) = 
$$\frac{\sqrt{30 \times P \times G}}{d}$$
 Power Density: Pd (W/m<sup>2</sup>) =  $\frac{E^2}{377}$ 

E = Electric field (V/m)

P = Average RF output power (W)

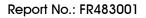
G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$

From the EUT RF output power, the minimum mobile separation distance, d=0.2m, as well as the gain of the used antenna, the RF power density can be obtained.





#### 1.3. Calculated Result and Limit

#### Exposure Environment: General Population / Uncontrolled Exposure

For 5GHz UNII Band:

Antenna Type : Dipole Antenna

Conducted Power for IEEE 802.11ac VHT20: 29.03dBm

Distance (m)	Antenna Gain (dBi)	Antenna Gain (numeric)	The maximum combined Average Output Power		Power Density (S)	Limit of Power	Test Result
			(dBm)	(mW)	(mW/cm <sup>2</sup> )	Density (S) (mW/cm²)	icai keadii
0.2	5.37	3.4435	29.0345	800.6551	0.548777	1	Complies

For 2.4GHz Band:

Antenna Type : Dipole Antenna

Conducted Power for IEEE 802.11g: 26.13 dBm

Distance (m)	Antenna Gain (dBi)	Antenna Gain		m combined utput Power	Power Density (S) (mW/cm²)	Limit of Power Density (S) (mW/cm²)	Test Result
		(numeric)	(dBm)	(mW)			
0.2	4.44	2.7797	26.1301	410.2170	0.226968	1	Complies

#### Conclusion:

Both of the WLAN 2.4GHz Band and WLAN 5GHz Band can transmit simultaneously, the formula of calculated the MPE is:

CPD1 / LPD1 + CPD2 / LPD2 + .....etc. < 1

CPD = Calculation power density

LPD = Limit of power density

Therefore, the worst-case situation is 0.226968 / 1 + 0.548777 / 1 = 0.775745, which is less than "1". This confirmed that the device comply with FCC 1.1310 MPE limit.