

Appendix B. Maximum Permissible Exposure

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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 0.25 m normally can be maintained between the user and the device.

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm²)	Averaging Time E ² , H ² 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

(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 ² , H ² 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/m²) = $\frac{E^2}{377}$

 \mathbf{E} = Electric field (V/m)

P = Average RF output power (W)

G = EUT Antenna numeric gain (numeric)

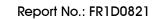
d = Separation distance between radiator and human body (m)

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.

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1.3. Calculated Result and Limit

For 2.4GHz Band:

Antenna Type: Dipole

Max Conducted Power for IEEE 802.11b/g: 13.98dBm

Directional						
Antenna Gain	Antenna Gain	Output Power	Output Power	Power Density	Limit of Power	
(dBi)	(numeric)	(dBm)	(mW)	(S)	Density (S)	Test Result
2.00	1.5849	13.9800	25.0035	0.007888	1	Complies

For 2.4GHz Band:

Antenna Type: Dipole

Max Conducted Power for Bluetooth: 5.00dBm

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S)	Limit of Power Density (S) (mW/cm²)	Test Result
2	1.5849	5.0000	3.1623	0.000998	1	Complies

CONCULSION:

Both of the WLAN 2.4GHz Band and Bluetooth 2.4GHz 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 0.007888 / 0.000998 = 0.008886, which isless than "1". This confirmed that the device comply with FCC 1.1310 MPE limit.

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