

Appendix C. 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 0.25 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) = $\frac{E^2}{377}$

E = Electric field (V/m)

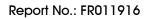
P = Peak RF output power (W)

- **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 peak EUT RF output power, the minimum mobile separation distance, d=0.25m, as well as the gain of the used antenna, the RF power density can be obtained.





1.3. Calculated Result and Limit

1.3.1. For 5GHz Band:

For UNII Band:

Antenna Type : PIFA Antenna

Max Conducted Power for IEEE 11a Ant. A : 16.95 dBm

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
2.00	1.5849	16.9500	49.5450	0.015630	1	Complies

For ISM Band:

Antenna Type : PIFA Antenna

Max Conducted Power for 11a IEEE 802.11n MCS0 40MHz Ant. A + Ant. B : 27.41 dBm

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
2.00	1.5849	27.4149	551.4242	0.173955	1	Complies

1.3.2. For 2.4GHz Band:

Antenna Type : PIFA Antenna

Max Conducted Power for IEEE 802.11n MCS0 20MHz Ant. A + Ant. B: 25.73 dBm

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
2	1.5849	25.7263	373.7924	0.117918	1	Complies



1.3.3. For 5GHz & 2.4GHz Band (Co-Location):

For ISM Band:

Antenna Type : PIFA Antenna

Max Conducted Power for 11a IEEE 802.11n MCS0 40MHz Ant. A + Ant. B : 27.41 dBm

Antenna G (dBi)	ain Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
2.00	1.5849	27.4149	551.4242	0.173955	1	Complies

For 2.4GHz / UNII Band:

Antenna Type : PIFA Antenna

Max Conducted Power for IEEE 802.11n MCS0 20MHz Ant. A + Ant. B : 25.73 dBm

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
2	1.5849	25.7263	373.7924	0.117918	1	Complies

CONCULSION:

Both of the 5GHz and 2.4GHz 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 0.173955 / 1 + 0.078334 / 1 = 0.252329, which isless than "1". This confirmed that the device comply with FCC 1.1310 MPE limit.