

Appendix B. Maximum Permissible Exposure

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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.

(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 = 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

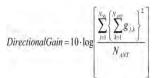
Exposure Environment: General Population / Uncontrolled Exposure

For UNII:

For 5GHz Band 1 and Band 4: Antenna Type : PIFA Antenna

Conducted Power for IEEE 802.11ac MCSO/Nss1 (VHT20): 21.65dBm

Distance (m)	Directional Gain (dBi)			he maximum combined Average Output Power		Limit of Power	Test Result
(11)			(dBm)	(mW)	(mW/cm²)	Density (S) (mW/cm²)	
0.2	8.30	6.7613	21.6520	146.2836	0.196868	1	Complies



Note:

For DTS:

For 2.4GHz Band:

Antenna Type: PIFA Antenna

Conducted Power for IEEE 802.11ac MCSO/Nss1 (VHT20): 22.62 dBm

2.0.0	Directional	Antenna Gain	The maximum combined Average Output Power		Power Density (S)	Limit of Power	Test Result
	Gain (dBi)	(numeric)	(dBm)	(mW)	(mW/cm²)	Density (S) (mW/cm²)	looi koodii
0.2	6.87	4.8644	22.6228	182.9272	0.177116	1	Complies

$$Directional Gain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{col}} \left(\sum_{k=1}^{N_{col}} g_{j,k} \right)^{2}}{N_{ANT}} \right]$$

Note:

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 0.177116/1 + 0.196868/1 = 0.373984, which is less than "1". This confirmed that the device comply with FCC 1.1310 MPE limit.

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