

RF EXPOSURE EVALUATION

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency(RF) Radiation as specified in §1.1307(b)

Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	*900/f ²	6
30-300	61.4	0.163	1.0	6
300-1,500			f/300	6
1,500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	*180/f ²	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			1.0	30

f = frequency in MHz * = Plane-wave equivalent power density

MPE Calculation Method

$$E \text{ (V/m)} = \frac{\sqrt{30 * P * G}}{d}$$

$$\text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

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

$$Pd = \frac{30 * P * G}{377 * D^2}$$

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.

Measurement Result

Operation Frequency:

U-NII-1: 5180-5240MHz for 802.11a/n(HT20)/ac(VHT20); 5190-5230MHz for 802.11n(HT40)/ac(VHT40); 5210MHz for 802.11ac(VHT80);
U-NII-2A: 5260-5320MHz for 802.11a/n(HT20)/ac(VHT20); 5270-5310MHz for 802.11n(HT40)/ac(VHT40); 5290MHz for 802.11ac(VHT80);
U-NII-2C: 5500-5700MHz for 802.11a/n(HT20)/ac(VHT20); 5510-5670MHz for 802.11n(HT40)/ac(VHT40); 5530-5610MHz for 802.11ac(VHT80);
U-NII-3: 5745-5825 MHz for 802.11a/n(HT20)/ac(VHT20); 5755-5795 MHz for 802.11n(HT40)/ac(VHT40); 5775MHz for 802.11ac(VHT80);
BT: 2402-2480MHz;
WLAN 2.4G: 2412-2462MHz for 802.11b/g/n(HT20); 2422-2452MHz for 802.11n(HT40);

Antenna gain:

FPCB Antenna: BT: 2dBi; WLAN 2.4G: 2dBi; WLAN 5G: 2dBi;
R=20cm

Band	Max EIRP Power	Max Conducted Power	Antenna	Separation distance (cm)	Evaluation result	Power density Limits	Verdict
	(dBm)	(dBm)	Gain (dBi)		(mW/cm ²)	(mW/cm ²)	
BT EDR	8.706	6.706	2	20	0.001477	1	PASS
BT LE	3.839	1.839	2	20	0.000482	1	PASS
WLAN 2.4G	16.96	14.96	2	20	0.009879	1	PASS
WLAN 5.2G	12.63	10.63	2	20	0.003645	1	PASS
WLAN 5.3G	10.82	8.82	2	20	0.002403	1	PASS
WLAN 5.6G	12.62	10.62	2	20	0.003637	1	PASS
WLAN 5.8G	12.6	10.6	2	20	0.003620	1	PASS

Note: NO simultaneous transmissions are possible for this device of BT + WLAN 2.4G + WLAN 5G and BT + WLAN 2.4G and WLAN 2.4G + WLAN 5G and BT + WLAN 5G.

Signature:

Date: 2021-12-23



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