

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

BT:

Operation Frequency: 2402MHz~2480MHz

Power density limited: 1mW/ cm²

Antenna Type: Shrapnel Antenna

Antenna gain: 2.3 dBi;

R=20cm

mW=10^{^(dBm/10)}

antenna gain Numeric=10^{^(dBi/10)}

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result	Power density
		(dBm)		tune-up power		Gain		(mW/cm2)	(mW/cm2)
				(dBm)	(mW)	(dBi)	Numeric		
2402	DH5	3.26	3±1	4	2.512	2.30	1.70	0.0008	1
2441		3.26	3±1	4	2.512	2.30	1.70	0.0008	1
2480		3.11	3±1	4	2.512	2.30	1.70	0.0008	1
2402	2DH5	6.07	6±1	7	5.012	2.30	1.70	0.0017	1
2441		6.18	6±1	7	5.012	2.30	1.70	0.0017	1
2480		6.17	6±1	7	5.012	2.30	1.70	0.0017	1
2402	3DH5	6.17	6±1	7	5.012	2.30	1.70	0.0017	1
2441		6.27	6±1	7	5.012	2.30	1.70	0.0017	1
2480		6.25	6±1	7	5.012	2.30	1.70	0.0017	1

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result	Power density
		(dBm)		tune-up power		Gain		(mW/cm2)	(mW/cm2)
				(dBm)	(mW)	(dBi)	Numeric		
2402	BLE 1M	2.83	3±1	4	2.512	2.30	1.70	0.0008	1
2440		2.84	3±1	4	2.512	2.30	1.70	0.0008	1
2480		2.68	3±1	4	2.512	2.30	1.70	0.0008	1
2402	BLE 2M	2.83	3±1	4	2.512	2.30	1.70	0.0008	1
2440		2.84	3±1	4	2.512	2.30	1.70	0.0008	1
2480		2.69	3±1	4	2.512	2.30	1.70	0.0008	1

WIFI 2.4G/5G:

Operation Frequency: 2412MHz-2462MHz; 5180MHz-5240MHz; 5260MHz~5320MHz;
5500MHz~5700MHz; 5745MHz-5825MHz;

Antenna Type: Shrapnel antenna

Antenna gain:

WIFI ANT1: 2400-2500MHz / 5150-5850 MHz-- 2.3 dBi / 4.9 dBi

WIFI ANT2: 2400-2500MHz / 5150-5850 MHz-- 4.05 dBi / 4.97 dBi

R=20cm

Maximum Single sources

Band	Max Conducted	Antenna	Separation distance (cm)	Evaluation result	Power density Limits	Verdict
	(dBm)	Gain		(mW/cm ²)	(mW/cm ²)	
		(dBi)				
Wi-Fi 2.4G (Ant1)	16.54	2.3	20	0.015231	1	PASS
Wi-Fi 2.4G (Ant2)	16.97	4.05	20	0.025161	1	PASS
Wi-Fi 5.2G (Ant1)	13.779	4.9	20	0.014676	1	PASS
Wi-Fi 5.2G (Ant2)	13.925	4.97	20	0.015425	1	PASS
Wi-Fi 5.3G (Ant1)	13.799	4.9	20	0.014744	1	PASS
Wi-Fi 5.3G (Ant2)	14.094	4.97	20	0.016037	1	PASS
Wi-Fi 5.6G (Ant1)	13.962	4.9	20	0.015308	1	PASS
Wi-Fi 5.6G (Ant2)	14.481	4.97	20	0.017532	1	PASS
Wi-Fi 5.8G (Ant1)	13.802	4.9	20	0.014754	1	PASS
Wi-Fi 5.8G (Ant2)	14.222	4.97	20	0.016517	1	PASS

Note:

1. NO simultaneous transmissions are possible for this device of Wi-Fi 2.4G + BT.
2. NO simultaneous transmissions are possible for this device of Wi-Fi 5G + Wi-Fi 2.4G.
3. It does not support MIMO mode.

Signature:

Date: 2025-04-21



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