

FCC ID: EHX-WCCOAMPE

Maximum Permissible Exposure (MPE)

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

$$E \text{ (V/m)} = \frac{\sqrt{30 * P * G}}{d} \quad \text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

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

Note: The wifi and BT of the product can not be transmit at the same time.

2. 4G WIFI:

Operation Frequency: WIFI 802.11b/g/n HT20: 2412-2462MHz,

Power density limited: 1mW/ cm²

Antenna Type: PIFA Antenna;

WIFI antenna gain: 3.73dBi;

R=20cm

mW=10^(dBm/10)

antenna gain Numeric=10^(dBi/10)= 10^(3.73/10)=2.36

Channel Freq. (MHz)	modulation	conducted power	Tune-up power	Max		Antenna	Evaluation result at 20cm	Power density Limits
		(dBm)	(dBm)	tune-up power		Gain	Power density(mW/cm ²)	(mW/cm ²)
				(dBm)	(mW)	Numeric		
2412	802.11b	14.3	14±1	15	31.62278	2.36	0.01485	1
2437		14.1	14±1	15	31.62278	2.36	0.01485	1
2462		14.2	14±1	15	31.62278	2.36	0.01485	1
2412	802.11g	13.4	13±1	14	25.11886	2.36	0.01179	1
2437		13.8	13±1	14	25.11886	2.36	0.01179	1
2462		13.6	13±1	14	25.11886	2.36	0.01179	1
2412	802.11n H20	13	13±1	14	25.11886	2.36	0.01179	1
2437		13.4	13±1	14	25.11886	2.36	0.01179	1
2462		13.4	13±1	14	25.11886	2.36	0.01179	1

5G WIFI:

Operation Frequency: 5180-5240MHz for 802.11a/n(HT20)/ac20;

5190-5230MHz for 802.11n(HT40)/ac40;

5210MHz for 802.11 ac80;

5745-5825 MHz for 802.11a/n(HT20)/ac20;

5755-5795 MHz for 802.11a/n(HT40)/ac40;

5775MHz for 802.11 ac80;

Power density limited: 1mW/ cm²

Antenna Type: PIFA Antenna;

WIFI antenna gain: 0.98dBi;

R=20cm

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

antenna gain Numeric=10^{^(dBi/10)}= 10^{^(1/10)}=1.25

5150-5250MHz

Channel Freq. (MHz)	modulation	conducted power	Tune-up power	Max		Antenna	Evaluation result at 20cm	Power density Limits
		(dBm)	(dBm)	tune-up power		Gain	Power density(mW/cm ²)	(mW/cm ²)
				(dBm)	(mW)	Numeric		
5180	802.11a	15.3	15±1	16	39.81072	1.25	0.00990	1
5200		14.9	15±1	16	39.81072	1.25	0.00990	1
5240		14	15±1	16	39.81072	1.25	0.00990	1
5180	802.11n20	14.2	13.5±1	14.5	28.18383	1.25	0.00701	1
5200		13.6	13.5±1	14.5	28.18383	1.25	0.00701	1
5240		12.8	13.5±2	14.5	28.18383	1.25	0.00701	1
5180	802.11ac20	14.1	13.5±3	14.5	28.18383	1.25	0.00701	1
5200		13.7	13.5±4	14.5	28.18383	1.25	0.00701	1
5240		12.7	13.5±5	14.5	28.18383	1.25	0.00701	1
5190	802.11n40	14	13.5±6	14.5	28.18383	1.25	0.00701	1
5230		13	13.5±7	14.5	28.18383	1.25	0.00701	1
5190	802.11ac40	14.1	13.5±8	14.5	28.18383	1.25	0.00701	1
5230		13	13.5±9	14.5	28.18383	1.25	0.00701	1
5210	802.11ac80	13.2	13.5±10	14.5	28.18383	1.25	0.00701	1

5725-5850MHz

Channel Freq. (MHz)	modulation	conducted power	Tune-up power	Max		Antenna	Evaluation result at 20cm	Power density Limits
		(dBm)	(dBm)	tune-up power		Gain	Power density(mW/cm ²)	(mW/cm ²)
				(dBm)	(mW)	Numeric		
5745	802.11a	16.1	16±1	17	50.11872	1.25	0.01246	1
5785		15.9	16±1	17	50.11872	1.25	0.01246	1
5825		15.6	16±1	17	50.11872	1.25	0.01246	1
5745	802.11n20	15.7	15±1	16	39.81072	1.25	0.00990	1
5785		15.4	15±1	16	39.81072	1.25	0.00990	1
5825		15.2	15±1	16	39.81072	1.25	0.00990	1
5745	802.11ac20	15.7	15±1	16	39.81072	1.25	0.00990	1
5785		15.6	15±1	16	39.81072	1.25	0.00990	1
5825		15.4	15±1	16	39.81072	1.25	0.00990	1
5755	802.11n40	14.9	15±1	16	39.81072	1.25	0.00990	1
5795		14.7	15±1	16	39.81072	1.25	0.00990	1
5755	802.11ac40	14.9	15±1	16	39.81072	1.25	0.00990	1
5795		14.7	15±1	16	39.81072	1.25	0.00990	1
5775	802.11ac8	14.4	15±1	16	39.81072	1.25	0.00990	1

BT:

Operation Frequency: BT3.0: 2402MHz~2480MHz

Power density limited: 1mW/ cm²

Antenna Type: PIFA Antenna

Antenna gain: 3.73dBi,

R=20cm

Bluetooth DSS:

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	GFSK	1.02	1±1	2	1.585	3.73	2.36	0.00074	1
2441		0.38	0±1	1	1.259	3.73	2.36	0.00059	1
2480		-0.80	0±1	1	1.259	3.73	2.36	0.00059	1
2402	π/4-DQPSK	1.02	1±1	2	1.585	3.73	2.36	0.00074	1
2441		0.38	0±1	1	1.259	3.73	2.36	0.00059	1
2480		-0.8	0±1	1	1.259	3.73	2.36	0.00059	1
2402	8DPSK	1.46	1±1	2	1.585	3.73	2.36	0.00074	1
2441		0.86	0±1	1	1.259	3.73	2.36	0.00059	1
2480		-0.29	0±1	1	1.259	3.73	2.36	0.00059	1

Bluetooth DTS:

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	GFSK	4.173	3.2±1	4.2	2.630	3.73	2.36	0.00124	1
2440		3.328	3.2±1	4.2	2.630	3.73	2.36	0.00124	1
2480		2.321	3.2±1	4.2	2.630	3.73	2.36	0.00124	1

Conclusion:

For the max result : 0.01246≤ 1.0 for Max Power Density, compliance the RF Exposure.

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Signature:

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