

FCC ID: 2BC5I-SS011

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

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

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.

BT:

Measurement Result

Operation Frequency: 2402MHz~2480MHz

Power density limited: 1mW/ cm²

Antenna Type: PCB antenna

Antenna gain: 0.5dBi;

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	BLE 1M	3.2	3±1	4	2.512	0.50	1.12	0.0006	1
2440		3.37	3±1	4	2.512	0.50	1.12	0.0006	1
2480		3.11	3±1	4	2.512	0.50	1.12	0.0006	1
2402	BLE 2M	3.2	3±1	4	2.512	0.50	1.12	0.0006	1
2440		3.39	3±1	4	2.512	0.50	1.12	0.0006	1
2480		3.12	3±1	4	2.512	0.50	1.12	0.0006	1

2.4G WIFI:

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

WIFI 802.11n HT40:2422-2452MHz

Power density limited: 1mW/ cm²

Antenna Type: FPCB antenna

Antenna gain: Ant1: 4.83 dBi; Ant2: 3.11 dBi

R=20cm

mW=10^(dBm/10)

antenna gain Numeric=10^(dBi/10)

ANT 1:

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result	Power density
		(dBm)		tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric	(mW/cm2)	(mW/cm2)
2412	802.11b	15.8	16±1	17	50.119	4.83	3.04	0.0303	1
2437		15.74	16±1	17	50.119	4.83	3.04	0.0303	1
2462		15.36	16±1	17	50.119	4.83	3.04	0.0303	1
2412	802.11g	18.15	18±1	19	79.433	4.83	3.04	0.0481	1
2437		18.13	18±1	19	79.433	4.83	3.04	0.0481	1
2462		17.83	18±1	19	79.433	4.83	3.04	0.0481	1
2412	802.11n H20	18.8	18.5±1	19.5	89.125	4.83	3.04	0.0539	1
2437		18.77	18.5±1	19.5	89.125	4.83	3.04	0.0539	1
2462		18.48	18.5±1	19.5	89.125	4.83	3.04	0.0539	1
2422	802.11n(H T40)	18.81	18.5±1	19.5	89.125	4.83	3.04	0.0539	1
2437		18.72	18.5±1	19.5	89.125	4.83	3.04	0.0539	1
2452		18.48	18.5±1	19.5	89.125	4.83	3.04	0.0539	1

ANT 2:

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		
2412	802.11b	17	16.5±1	17.5	56.234	3.11	2.05	0.0229	1
2437		16.79	16.5±1	17.5	56.234	3.11	2.05	0.0229	1
2462		16.41	16.5±1	17.5	56.234	3.11	2.05	0.0229	1
2412	802.11g	18.45	19±1	20	100.000	3.11	2.05	0.0407	1
2437		19.54	19±1	20	100.000	3.11	2.05	0.0407	1
2462		19.19	19±1	20	100.000	3.11	2.05	0.0407	1
2412	802.11n H20	19.63	19.5±1	20	100.000	3.11	2.05	0.0407	1
2437		19.55	19.5±1	20	100.000	3.11	2.05	0.0407	1
2462		19.21	19.5±1	20	100.000	3.11	2.05	0.0407	1
2422	802.11n(H T40)	19.9	19.5±1	20	100.000	3.11	2.05	0.0407	1
2437		19.91	19.5±1	20	100.000	3.11	2.05	0.0407	1
2452		19.84	19.5±1	20	100.000	3.11	2.05	0.0407	1

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 2.4G ANT 1+ Wi-Fi 2.4G ANT 2.

The conclusion should be $0.0539 < 1$ for Max Power Density, Compliance the RF Exposure requirement.

Signature:

Date: 2024-01-03

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