FCC ID: 2AE8C-SA8

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

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

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

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/ cm^2

Antenna Type: PCB Antenna

antenna gain: 3 dBi;

R=20cm

mW=10^(dBm/10)

antenna gain Numeric=10^(dBi/10)= 10^(3/10)=2

BR+EDR:

Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max tune-up power (dBm)	Max tune-up power (mW)	Antenna Gain (dBi)	Antenna Gain Numeric	Evaluation result (mW/cm2)	Power density Limits (mW/cm2)
2402	DH5	-0.423	-1±1	0	1.000	3.00	2.00	0.0004	1
2441		-1.482	-2±1	-1	0.794	3.00	2.00	0.0003	1
2480		-2.377	-2±1	-1	0.794	3.00	2.00	0.0003	1
2402	2DH5	0.613	0±1	1	1.259	3.00	2.00	0.0005	1
2441		-1.236	-1±1	0	1.000	3.00	2.00	0.0004	1
2480		-1.322	-1±1	0	1.000	3.00	2.00	0.0004	1
2402	3DH5	1.085	1±1	2	1.585	3.00	2.00	0.0006	1
2441		0.082	0±1	1	1.259	3.00	2.00	0.0005	1
2480		-0.832	0±1	1	1.259	3.00	2.00	0.0005	1

BLE:

Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max tune-up power (dBm)	Max tune-up power (mW)	Antenna Gain (dBi)	Antenna Gain Numeric	Evaluation result (mW/cm2)	Power density Limits (mW/cm2)
2402	GFSK	-2.042	-3±1	-2	0.631	3.00	2.00	0.0003	1
2440		-3.030	-3±1	-2	0.631	3.00	2.00	0.0003	1
2480		-3.790	-3±1	-2	0.631	3.00	2.00	0.0003	1

2.4G WIFI:

Operation Frequency: WIFI 2412-2462MHz for 802.11b/g/11n(HT20);
2422-2452MHz for 802.11n(HT40);
Power density limited: 1mW/ cm^2
Antenna Type: PCB Antenna
antenna gain: 3dBi;
R=20cm
mW=10^(dBm/10)
antenna gain Numeric=10^(dBi/10)= 10^(3/10)=2

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result	Power density Limits
		(dBm)		tune-up power		Gain		(mW/cm2)	(mW/cm2)
				(dBm)	(mW)	(dBi)	Numeric		
2412	802.11b	16.46	17±1	18	63.096	3.00	2.00	0.0250	1
2437		16.83	17±1	18	63.096	3.00	2.00	0.0250	1
2462		17.39	17±1	18	63.096	3.00	2.00	0.0250	1
2412	802.11g	17.01	17±1	18	63.096	3.00	2.00	0.0250	1
2437		16.17	17±1	18	63.096	3.00	2.00	0.0250	1
2462		16.39	17±1	18	63.096	3.00	2.00	0.0250	1
2412	802.11n H20	15.69	16±1	17	50.119	3.00	2.00	0.0199	1
2437		16.55	16±1	17	50.119	3.00	2.00	0.0199	1
2462		16.4	16±1	17	50.119	3.00	2.00	0.0199	1
2422	802.11n(HT40)	16.12	16±1	17	50.119	3.00	2.00	0.0199	1
2437		16.75	16±1	17	50.119	3.00	2.00	0.0199	1
2452		16.23	16±1	17	50.119	3.00	2.00	0.0199	1

Conclusion:
For the max result : 0.0250≤ 1mW/ cm^2 for Power density, compliance with RF exposure.

Note: This product does not support WIFI and Bluetooth simultaneous delivery.

Signature:
Date: 2022-02-14

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