

FCC 47 CFR MPE
Report

FCC ID:2BWGJ-JYC-M3

RF Exposure Report

FCC 47 CFR MPE

Maximum Permissible Exposure

1. Maximum Permissible Exposure Applicable Standards

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2m normally can be maintained between the user and the device.

1.1. Limits for Maximum Permissible Exposure (MPE)

(a) Limits for Occupational/Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Times E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-10000			5	6

(b) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Times E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-10000			1.0	30

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

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1.2. Maximum Permissible Exposure Calculation Method

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

E = Electric Field (V/m)

P = Peak 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

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$

From the peak 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

2. Conducted Power Result

BLE 1M							
Mode/Type	Frequency	Peak Output Power	Peak Output Power	Max Tune-up Power		Antenna gain	
	(MHz)	(dBm)	(mW)	(dBm)		(dBi)	(Linear)
GFSK	2402	5.05	3.199	5	± 1	2.94	1.968
	2441	6.15	4.121	6	± 1	2.94	1.968
	2480	6.57	4.539	6	± 1	2.94	1.968

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2.4G Wi-Fi							
Mode/Type	Frequency	Peak Output Power	Peak Output Power	Max Tune-up Power		Antenna Gain	
	(MHz)	(dBm)	(mW)	(dBm)		(dBi)	(Linear)
IEEE 802.11b	2412	10.23	10.544	10	± 1	2.94	1.968
	2437	10.48	11.169	10	± 1	2.94	1.968
	2462	11.50	14.125	11	± 1	2.94	1.968
IEEE 802.11g	2412	9.58	9.078	9	± 1	2.94	1.968
	2437	9.88	9.727	9	± 1	2.94	1.968
	2462	10.88	12.246	10	± 1	2.94	1.968
IEEE 802.11n HT20	2412	8.64	7.311	8	± 1	2.94	1.968
	2437	8.93	7.816	8	± 1	2.94	1.968
	2462	10.07	10.162	10	± 1	2.94	1.968
IEEE 802.11n HT40	2412	8.12	6.486	8	± 1	2.94	1.968
	2437	8.26	6.699	8	± 1	2.94	1.968
	2462	8.86	7.691	8	± 1	2.94	1.968

Remark: The Peak Output Power data is derived from the RF test report number mentioned in the title of this document.

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3. Calculated Result and Limit

BLE 1M						
Mode/Type	Max Tune-up Power	Antenna Gain		Power Density	Limited of Power Density	Result
	(dBm)	(dBi)	(Linear)	(S) (mW/cm ²)	(S) (mW/cm ²)	
2.4G Band						
GFSK	7	2.94	1.968	0.00196	1.0	Complies
2.4G Wi-Fi						
Mode/Type	Max Tune-up Power	Antenna Gain		Power Density	Limited of Power Density	Result
	(dBm)	(dBi)	(Linear)	(S) (mW/cm ²)	(S) (mW/cm ²)	
2.4G Band						
IEEE 802.11b	12	2.94	1.968	0.00620	1.0	Complies
IEEE 802.11g	11	2.94	1.968	0.00493	1.0	Complies
IEEE 802.11n HT20	11	2.94	1.968	0.00493	1.0	Complies
IEEE 802.11n HT40	9	2.94	1.968	0.00311	1.0	Complies

Conclusion: So, SAR test is not required

-----End of RF Exposure Evaluation -----