

FCC 47 CFR MPE REPORT

Hui Zhou Gaoshengda Technology Co.,LTD

WIFI&BT Module

Model Number: WT25M2501

FCC ID: 2AC23-WT251

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Report Number:	ESTE-R2012116
Date of Test:	Nov. 27~Dec. 16, 2020
Date of Report:	Dec. 17, 2020

Maximum Permissible Exposure

1. 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

1.2. MPE 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

Antenna	Mode	Frequency (MHz)	Peak output power (dBm)	Peak output power (mW)	Target power (dBm)
BT	8-DPSK	2480	10.49	11.194	10 ± 2
1	IEEE 802.11b	2462	18.86	76.913	18 ± 2
1	IEEE 802.11g	2412	22.81	190.985	22 ± 2
1	IEEE 802.11n HT20	2437	22.58	181.134	22 ± 2
1	IEEE 802.11n HT40	2422	23.08	203.236	23 ± 2
1	IEEE 802.11a	5240	18.14	65.163	18 ± 2
1	IEEE 802.11n HT20	5240	18.06	63.973	18 ± 2
1	IEEE 802.11n HT40	5230	18.23	66.527	18 ± 2
2	IEEE 802.11b	2412	18.65	73.282	18 ± 2
2	IEEE 802.11g	2462	22.68	185.353	22 ± 2
2	IEEE 802.11n HT20	2462	22.98	198.609	22 ± 2
2	IEEE 802.11n HT40	2422	23.05	201.837	23 ± 2
2	IEEE 802.11a	5240	17.92	61.944	17 ± 2
2	IEEE 802.11n HT20	5180	18.31	67.764	18 ± 2
2	IEEE 802.11n HT40	5230	18.12	64.863	18 ± 2

3. Calculated Result and Limit

BT Antenna

Mode	Target power (dBm)	Antenna gain		Power Density (S) (mW/cm ²)	Limited of Power Density (S) (mW/cm ²)	Test Result
		(dBi)	(Linear)			
2.4G Band						
8-DPSK	12	-4.6	0.347	0.00109	1	Compiles

WiFi Antenna 1

Mode	Target power (dBm)	Antenna gain		Power Density (S) (mW/cm ²)	Limited of Power Density (S) (mW/cm ²)	Test Result
		(dBi)	(Linear)			
2.4G Band						
IEEE 802.11b	20	2.5	1.778	0.03538	1	Compiles
IEEE 802.11g	24	2.5	1.778	0.08886	1	Compiles
IEEE 802.11n HT20	24	2.5	1.778	0.08886	1	Compiles
IEEE 802.11n HT40	25	2.5	1.778	0.11187	1	Compiles
5G Band						
IEEE 802.11a	20	4.3	2.692	0.05355	1	Compiles
IEEE 802.11n HT20	20	4.3	2.692	0.05355	1	Compiles
IEEE 802.11n HT40	20	4.3	2.692	0.05355	1	Compiles

WiFi Antenna 2

Mode	Target power (dBm)	Antenna gain		Power Density (S) (mW/cm ²)	Limited of Power Density (S) (mW/cm ²)	Test Result
		(dBi)	(Linear)			
2.4G Band						
IEEE 802.11b	20	2.5	1.778	0.03538	1	Compiles
IEEE 802.11g	24	2.5	1.778	0.08886	1	Compiles
IEEE 802.11n HT20	24	2.5	1.778	0.08886	1	Compiles
IEEE 802.11n HT40	25	2.5	1.778	0.11187	1	Compiles
5G Band						
IEEE 802.11a	19	4.3	2.692	0.04253	1	Compiles
IEEE 802.11n HT20	20	4.3	2.692	0.05355	1	Compiles
IEEE 802.11n HT40	20	4.3	2.692	0.05355	1	Compiles

WiFi Antenna 1+2

Mode	Power Density (S) (mW/cm ²) Antenna 1	Power Density (S) (mW/cm ²) Antenna 2	Power Density (S) (mW/cm ²) Total	Limited of Power Density (S) (mW/cm ²)	Test Result
2.4G Band					
IEEE 802.11n HT20	0.08886	0.08886	0.17772	1	Compiles
IEEE 802.11n HT40	0.11187	0.11187	0.22374	1	Compiles
5G Band					
IEEE 802.11n HT20	0.05355	0.05355	0.10710	1	Compiles
IEEE 802.11n HT40	0.05355	0.05355	0.10710	1	Compiles

BT Antenna +WiFi Antenna 1+2

Power Density (S) (mW/cm ²) Bluetooth	Power Density (S) (mW/cm ²) 2.4G WiFi	Power Density (S) (mW/cm ²) 5G WiFi	Power Density (S) (mW/cm ²) Total	Limited of Power Density (S) (mW/cm ²)	Test Result
0.00109	0.22374	0.10710	0.43193	1	Compiles

End of Test Report