

FCC 47 CFR MPE REPORT

Qingdao TAB Robot Technology Co., Ltd.

Robot Vacuum Cleaner

Model Number: TG50 Pro

FCC ID: 2AWMAGC140098

Prepared for:	Qingdao TAB Robot Technology Co., Ltd.
	Room 703, No. 1 Haier Rd. Haier Information Park, Qingdao, China
Prepared By:	EST Technology Co., Ltd.
	Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China
Tel: 86-769-83081888-808	

Report Number:	ESTE-R2110076
Date of Test:	Sep. 23~Oct. 15, 2021
Date of Report:	Oct. 18, 2021

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

Mode	Frequency (MHz)	Peak output power (dBm)	Peak output power (mW)	Target power (dBm)	Antenna gain	
					(dBi)	(Linear)
IEEE 802.11 b	2412	15.75	37.5837	15 ± 1	1	1.259
	2437	15.29	33.8065	15 ± 1	1	1.259
	2462	15.15	32.7341	15 ± 1	1	1.259
IEEE 802.11 g	2412	19.32	85.5067	19 ± 1	1	1.259
	2437	19.53	89.7429	19 ± 1	1	1.259
	2462	19.37	86.4968	19 ± 1	1	1.259
IEEE 802.11 n HT20	2412	19.02	79.7995	19 ± 1	1	1.259
	2437	19.25	84.1395	19 ± 1	1	1.259
	2462	19.68	92.8966	19 ± 1	1	1.259
IEEE 802.11 n HT40	2422	18.75	74.9894	18 ± 1	1	1.259
	2437	18.80	75.8578	18 ± 1	1	1.259
	2452	18.76	75.1623	18 ± 1	1	1.259

3. Calculated Result and Limit

Mode	Target power (dBm)	Antenna gain		Power Density (S) (mW/cm ²)	Limited of Power Density (S) (mW/cm ²)	Test Result
		(dBi)	(Linear)			
IEEE 802.11 b	16	1	1.259	0.0100	1	Complies
IEEE 802.11 g	20	1	1.259	0.0250	1	Complies
IEEE 802.11 n HT20	20	1	1.259	0.0250	1	Complies
IEEE 802.11 n HT40	19	1	1.259	0.0199	1	Complies

End of Test Report