

FCC 47 CFR MPE REPORT

Shenzhen Arnagar Technology Co., Ltd

ROBOT VACUUM CLEANER

Model Number: S8 PRO, S8

FCC ID: 2AZFM-L2550

Prepared for:	Shenzhen Arnagar Technology Co., Ltd
	701, Block G, Huafeng Baoan Zhigu Technology Park, No. 4 Yintian
	Road, Xixiang Street, Baoan District, Shenzhen, Guangdong China
Prepared By:	EST Technology Co., Ltd.
	Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China
Tel: 86-769-83081888-808	

Report Number:	ESTE-R2104044
Date of Test:	Mar. 24~Apr. 09, 2021
Date of Report:	Apr. 12, 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

Antenna 0

Mode	Frequency (MHz)	Peak output power (dBm)	Peak output power (mW)	Target power (dBm)	Antenna gain	
					(dBi)	(Linear)
IEEE 802.11b	2412	18.32	67.92	18 ± 2	4	2.512
	2437	18.05	63.826	18 ± 2	4	2.512
	2462	18.14	65.163	18 ± 2	4	2.512
IEEE 802.11g	2412	16.90	48.978	16 ± 2	4	2.512
	2437	16.54	45.082	16 ± 2	4	2.512
	2462	16.45	44.157	16 ± 2	4	2.512
IEEE 802.11n HT20	2412	17.04	50.582	17 ± 2	4	2.512
	2437	16.65	46.238	16 ± 2	4	2.512
	2462	16.93	49.317	16 ± 2	4	2.512
IEEE 802.11n HT40	2422	17.92	61.944	17 ± 2	4	2.512
	2437	17.49	56.105	17 ± 2	4	2.512
	2452	17.00	50.119	17 ± 2	4	2.512

3. Calculated Result and Limit

Antenna 0

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	4	2.512	0.0500	1	Complies
IEEE 802.11g	18	4	2.512	0.0315	1	Complies
IEEE 802.11n HT20	19	4	2.512	0.0397	1	Complies
IEEE 802.11n HT40	19	4	2.512	0.0397	1	Complies

End of Test Report