



Microtest
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RF EXPOSURE Test Report

Report No.: MTi240910016-01E2

Date of issue: 2024-09-24

Applicant: MuChen International Electronic Commerce Co., Ltd.

Product: Robot Vacuum Cleaner

Model(s): E3

FCC ID: 2BKGK-E3

Shenzhen Microtest Co., Ltd.

<http://www.mtitest.com>

Instructions

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Test Result Certification	
Applicant:	MuChen International Electronic Commerce Co., Ltd.
Address:	080, 03rd floor, Commercial Complex E, Phase I, Nanxiang Wanshang (Wuhu) International Trade City, Wuhu District, China(Anhui) Pilot Free Trade Zone, Anhui, China
Manufacturer:	MuChen International Electronic Commerce Co., Ltd.
Address:	080, 03rd floor, Commercial Complex E, Phase I, Nanxiang Wanshang (Wuhu) International Trade City, Wuhu District, China(Anhui) Pilot Free Trade Zone, Anhui, China
Product description	
Product name:	Robot Vacuum Cleaner
Trademark:	Redkey, Redroad
Model name:	E3
Serial Model:	N/A
Standards:	N/A
Test procedure:	KDB 447498 D01 v06
Date of Test	
Date of test:	2024-09-23 to 2024-09-24
Test result:	Pass

Test Engineer :

James Qin

(James Qin)

Reviewed By :

David. Lee

(David Lee)

Approved By :

Tom Xue

(Tom Xue)



RF EXPOSURE EVALUATION

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

Friis transmission formula: $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2)$

Where

P_d = Power density in mW/cm²

P_{out} = output power to antenna in mW

G = Numeric gain of the antenna relative to isotropic antenna

π = 3.1415926

R = distance between observation point and center of the radiator in cm (20cm)

P_d the limit of MPE, 1mW/cm². If we know the maximum gain of the antenna and total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.



Measurement Result

2.4GWiFi:

Operation Frequency: WIFI 802.11b/g/n HT20: 2412-2462MHz,

Power density limited: 1mW/ cm²

Antenna Type: PCB Antenna;

Antenna gain: 2.61dBi

R=20cm

$mW=10^{(dBm/10)}$

Antenna gain Numeric= $10^{(dBi/10)}=10^{(3.76/10)}=2.38$

2.4GWiFi:

Channel Freq. (MHz)	modulation	conducted power	Tune-up power	Max		Antenna	Evaluation result at 20cm	Power density Limits
		(dBm)	(dBm)	tune-up power		Gain	Power density(mW/cm ²)	(mW/cm ²)
				(dBm)	(mW)	Numeric		
2412	802.11b	16.48	16±1	17	50.119	2.61	0.01819	1
2437		16.40	16±1	17	50.119	2.61	0.01819	1
2462		16.80	16±1	17	50.119	2.61	0.01819	1
2412	802.11g	13.55	13±1	14	25.119	2.61	0.00911	1
2437		13.20	13±1	14	25.119	2.61	0.00911	1
2462		13.74	13±1	14	25.119	2.61	0.00911	1
2412	802.11n H20	13.67	13±1	14	25.119	2.61	0.00911	1
2437		13.31	13±1	14	25.119	2.61	0.00911	1
2462		13.59	13±1	14	25.119	2.61	0.00911	1

Conclusion:

For the max result: $0.01819 \leq 1.0$ SAR, No SAR is required.

----END OF REPORT----