

## 1. MAXIMUM PERMISSIBLE EXPOSURE (MPE)

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### Client Information

Applicant: Shenzhen Free Dynamic Development Co., LTD.  
Address of applicant: 402, Kingson Building, No.1 ChuangSheng Road, xili street,  
Nanshan District, shenzhen, China

Manufacturer: Shenzhen Free Dynamic Development Co., LTD.  
Address of manufacturer: 402, Kingson Building, No.1 ChuangSheng Road, xili street,  
Nanshan District, shenzhen, China

General Description of EUT	
Product Name:	Smart Robot Vacuum
Trade Name:	Trifo, Proscenic, Opodee, Toppers
Model No.:	R332
Adding Model(s):	R332W, R332B, R332L, R332Y, R332O, R332G, R332P,
	R332M, NEO S1, NEO S2, NEO S3, Summer P5,
	Summer P6, Summer P7, Parama 650N, Parama 780N,
	Parama 990N, NEO 820S, NEO 800S
Rated Voltage:	DC 14.4V
Battery Capacity:	2000mAh
Power adapter	Model NO: GQ12-190060-AU INPUT: AC100-240V, 50/60Hz, 0.4A OUTPUT: DC19V-600mA
<i>Note: The test data is gathered from a production sample provided by the manufacturer. The appearance of others models listed in the report is different from main-test model R332, but the circuit and the electronic construction do not change, declared by the manufacturer.</i>	

Technical Characteristics of EUT	
Support Standards:	802.11b, 802.11g, 802.11n
Frequency Range:	2412-2462MHz for 802.11b/g/n-HT20 2422-2452MHz for 802.11n-HT40
RF Output Power:	15.44dBm (Conducted)
Type of Modulation:	DBPSK,BPSK,DQPSK,QPSK,16QAM,64QAM
Data Rate:	1-11Mbps, 6-54Mbps, up to 150Mbps
Quantity of Channels:	11 for 802.11b/g/n-HT20 7 for 802.11n-HT40
Channel Separation:	5MHz
Type of Antenna:	PCB Antenna
Antenna Gain:	0dBi

## 1.2 Standard Applicable

According to § 1.1307(b)(1) and KDB 447498 D01 General RF Exposure Guidance v06, system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

### (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 <sup>2</sup> )	Averaging Times   E   <sup>2</sup> ,   H   <sup>2</sup> 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
1500-100000	/	/	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 <sup>2</sup> )	Averaging Times   E   <sup>2</sup> ,   H   <sup>2</sup> 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
1500-100000	/	/	1	30

Note: f = frequency in MHz: \* = Plane-wave equivalents power density

## 1.3 MPE Calculation Method

$$S = (30 * P * G) / (377 * R^2)$$

S = power density (in appropriate units, e.g., mw/cm<sup>2</sup>)

P = power input to the antenna (in appropriate units, e.g., mw)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator,  
the power gain factor is normally numeric gain.

R = distance to the center of radiation of the antenna (in appropriate units, e.g., cm)

## 1.4 MPE Calculation Result

WIFI

Maximum Tune-Up output power: 15.44 (dBm)

Maximum peak output power at antenna input terminal: 34.99(mW)

Prediction distance: >20(cm)

Prediction frequency: 2462 (MHz)

Antenna gain: 0 (dBi)

Directional gain (numeric gain): 1

The worst case is power density at prediction frequency at 20cm: 0.007(mw/cm<sup>2</sup>)

MPE limit for general population exposure at prediction frequency: 1 (mw/cm<sup>2</sup>)

Result: Pass