Ecovacs Home Service Robotics Co., Ltd.

MPE ASSESSMENT REPORT

Report Type:
FCC Part §2.1091 and §1.1307(b) assessment report

Model:
DEX54, DDX45

REPORT NUMBER:
2411B2087SHA-003

ISSUE DATE:
December 18, 2024

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TEST REPORT

Report no.: 2411B2087SHA-003

Applicant:	**Ecovacs Home Service Robotics Co., Ltd.** **No.518 Songwei Road,Wusongjiang industry Park, Guoxiang Street, Wuzhong District, Suzhou, Jiangsu, China.**
Manufacturer:	**Ecovacs Home Service Robotics Co., Ltd.** **No.518 Songwei Road,Wusongjiang industry Park, Guoxiang Street, Wuzhong District, Suzhou, Jiangsu, China.**
Factory 1:	**Ecovacs Robotics Co., Ltd.** **No.518 Songwei Road, Wusongjiang industry Park, Guoxiang Street, Wuzhong District, Suzhou, Jiangsu, China**
Factory 2:	**Ecovacs Home Service Robotics Co., Ltd.** **No.518 Songwei Road, Wusongjiang industry Park, Guoxiang Street, Wuzhong District, Suzhou, Jiangsu, China.**
FCC ID:	**2A64B-DEX54**

SUMMARY:

The equipment complies with the requirements according to the following standard(s) or Specification:
KDB447498 D01 General RF Exposure Guidance v06 FCC Part2.1091, FCC Part1.1307(b)

PREPARED BY:	**REVIEWED BY:**
Project Engineer Eric Li	Reviewer Wakeyou Wang

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Revision History

Report No.	Version	Description	Issued Date
2411B2087SHA-003	Rev. 01	Initial issue of report	December 18, 2024

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TEST REPORT

1 GENERAL INFORMATION

1.1 Description of Equipment Under Test (EUT)

Product name:	Floor Cleaning Robot
Type/Model:	DEX54, DDX45
Description of EUT:	The EUT is a Floor Cleaning Robot, it supports Bluetooth and WIFI functions, there are two models, they are the same except DDX45 has no AI camera, the PCB board is also changed accordingly. We tested DEX54 and DDX45 and listed the worst results in this report.
Rating:	DC20V, 2A
Brand Name:	ECOVACS ROBOTICS, ECOVACS,
EUT type:	☐ Table top ☒ Floor standing
Software Version:	/
Hardware Version:	/
Sample Identification No.:	A241128-016-002
Sample received date:	2024.11.28
Date of test:	2024.11.28~2024.12.15

1.2 Technical Specification

Frequency Band:	2400MHz ~ 2483.5MHz
Support Standards:	IEEE 802.11b, IEEE 802.11g, IEEE 802.11n-HT20, IEEE 802.11n-HT40
Type of Modulation:	IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM (64-QAM, 16-QAM, QPSK, BPSK) IEEE 802.11n-HT20: OFDM (64-QAM, 16-QAM, QPSK, BPSK) IEEE 802.11n-HT40: OFDM (64-QAM, 16-QAM, QPSK, BPSK)
Channel Number:	11 Channels for 802.11b, 802.11g and 802.11n(HT20) 7 Channels for 802.11n(HT40)
Channel Separation:	5 MHz
Antenna:	FPC Antenna, gain is 3.39dBi

Frequency Band:	2402MHz to 2480MHz
Support Standards:	Bluetooth Low Energy
Type of Modulation:	GFSK
Channel Number:	40
Data Rate	1Mbps
Channel Separation:	2MHz
Antenna Information:	FPC Antenna, gain is 3.39dBi

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1.3 Description of Test Facility

Name:	Intertek Testing Services (Shanghai FTZ) Co., Ltd.
Address:	Building 86, No. 1198 Qinzhou Road(North), Shanghai 200233, P.R. China
Telephone:	86 21 61278200
Telefax:	86 21 54262353

The test facility is recognized, certified, or accredited by these organizations:	CNAS Accreditation Lab Registration No. CNAS L21189
	FCC Accredited Lab Designation Number: CN0175
	IC Registration Lab CAB identifier.: CN0014
	VCCI Registration Lab Member No: 3598 (Registration No.: R-14243, G-10845, C-14723, T-12252)
	A2LA Accreditation Lab Certificate Number: 3309.02

2 MPE Assessment

Test result: Pass

2.1 MPE Assessment Limit

Mobile device exposure for standalone operations:

Frequency range	E-field strength (V/m)	H-field strength (A/m)	B-field (uT)	Equivalent plane wave power density S_{eq} (W/m^2)
0-1 Hz	-	$3,2 \times 10^4$	4×10^4	-
1-8 Hz	10 000	$3,2 \times 10^4/f^2$	$4 \times 10^4/f^2$	-
8-25 Hz	10 000	4 000/f	5 000/f	-
0,025-0,8 kHz	250/f	4/f	5/f	-
0,8-3 kHz	250/f	5	6,25	-
3-150 kHz	87	5	6,25	-
0,15-1 MHz	87	0,73/f	0,92/f	-
1-10 MHz	$87/f^{1/2}$	0,73/f	0,92/f	-
10-400 MHz	28	0,073	0,092	2
400-2 000 MHz	$1,375\ f^{1/2}$	$0,0037\ f^{1/2}$	$0,0046\ f^{1/2}$	f/200
2-300 GHz	61	0,16	0,20	10

Mobile device exposure for simultaneous transmission operations: **the sum of the MPE ratios for all simultaneously transmitting antennas incorporated in a host device is ≤ 1.0**

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2.2 Assessment Results

Power density (S) is calculated according to the formula:

$S = PG / (4\pi R^2)$

Where S = power density in mW/cm^2

P = Radiated transmit power in mW

G = numeric gain of transmit antenna

R = distance (cm)

As we can see from the test report 2411B2087SHA-001, 2411B2087SHA-002:

The calculations in the table below use the highest gain of antenna for client EUT. These calculations represent worst case in terms of the exposure levels.

Mode	Frequency band	Max Power	Antenna Gain	R	S	Limits
	(MHz)	dBm	dBi	(cm)	(mW/cm2)	(mW/cm2)
WIFI	2412-2462	16.31	3.39	20	0.0186	1
BLE	2402-2480	4.11	3.39	20	0.0011	1

Note: 1 mW/cm2 from 1.310 Table 1

This device exposure for simultaneous transmission operations: the sum of the MPE ratios for all simultaneously transmitting antennas incorporated in a host device is 0.0186/1+0.0011/1=0.0197≤ 1.0, therefore, the MPE requirement is deemed to be satisfied without test.

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Appendix I

Definition below must be outlined in the User Manual:

To satisfy FCC RF exposure requirements, a separation distance of 20 cm or more should be maintained between the antenna of this device and persons during device operation.
To ensure compliance, operations at closer than this distance is not recommended.

********** END **********