RF EXPOSURE REPORT

Report No.: 17070799-FCC-H

Applicant	Roommate Dynamic(Shanghai) Co., Ltd
Product Name	Robotic Vacuum Cleaner
Model No.	RMRV10-BL
Serial No.	RMRV10-XX , RMRV20-XX , RMRV30-XX (X=A-Z)
Test Standard	FCC 2.1091: 2016
Test Date	August 29 to November 13, 2017
Issue Date	November 14, 2017
Test Result	☑ Pass ☐ Fail
Equipment complied with the specification	☑
Equipment did not comply with the specification	☐

Loren Luo	David Huang	
Loren Luo Test Engineer	David Huang Checked By	

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Test result presented in this test report is applicable to the tested sample only

Issued by:

SIEMIC (SHENZHEN-CHINA) LABORATORIES

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Laboratories Introduction

SIEMIC, headquartered in the heart of Silicon Valley, with superior facilities in US and Asia, is one of the leading independent testing and certification facilities providing customers with one-stop shop services for Compliance Testing and Global Certifications.

In addition to testing and certification, SIEMIC provides initial design reviews and compliance management throughout a project. Our extensive experience with China, Asia Pacific, North America, European, and International compliance requirements, assures the fastest, most cost effective way to attain regulatory compliance for the global markets.

Accreditations for Conformity Assessment

Country/Region	Scope
USA	EMC, RF/Wireless, SAR, Telecom
Canada	EMC, RF/Wireless, SAR, Telecom
Taiwan	EMC, RF, Telecom, SAR, Safety
Hong Kong	RF/Wireless, SAR, Telecom
Australia	EMC, RF, Telecom, SAR, Safety
Korea	EMI, EMS, RF, SAR, Telecom, Safety
Japan	EMI, RF/Wireless, SAR, Telecom
Singapore	EMC, RF, SAR, Telecom
Europe	EMC, RF, SAR, Telecom, Safety

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1. Report Revision History

Report No.	Report Version	Description	Issue Date
17070799-FCC-H	NONE	Original	November 14, 2017

2. Customer information

Applicant Name	Roommate Dynamic(Shanghai) Co., Ltd
Applicant Add	No. 8 workshop , 539 Luoshen, Qianzhong Village, Qingcun Town, Fengxian District,Shanghai,China
Manufacturer	Shanghai Jingxin Auto Parts Co., Ltd
Manufacturer Add	No.1 Building, 3333 Fengzhe Road, Fengxian District, Shanghai,China

3. Test site information

Lab performing tests	SIEMIC (Shenzhen-China) LABORATORIES
Lab Address	Zone A, Floor 1, Building 2 Wan Ye Long Technology Park South Side of Zhoushi Road, Bao’ an District, Shenzhen, Guangdong China 518108
FCC Test Site No.	535293
IC Test Site No.	4842E-1
Test Software	Radiated Emission Program-To Shenzhen v2.0

4. Equipment under Test (EUT) Information

Description of EUT:	Robotic Vacuum Cleaner
Main Model:	RMRV10-BL
Serial Model:	RMRV10-XX，RMRV20-XX，RMRV30-XX（X=A-Z）
Equipment Category：	DTS
Antenna Gain:	2dBi
Port:	Power Port
Input Power:	Adapter: Model: MR-2401000 Input: AC100-240V~50/60Hz,0.85A Output: 24V~1.0A Battery: Model: LG18650 Spec: 14.4V, 2600mAh, 37.44Wh Charge limiting voltage: 16.8V
Trade Name：	ROOMMATE
FCC ID:	2ANKN-RMRV10-BL
Type of Modulation:	802.11b/g/n: DSSS, OFDM
RF Operating Frequency (ies):	WIFI:802.11b/g/n(20M): 2412-2462 MHz
Number of Channels:	WIFI :802.11b/g/n(20M): 11CH

5. FCC §2.1091 - Maximum Permissible exposure (MPE)

6.1 Applicable Standard

According to §1.1307(b)(1), 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 of the Commission' s guidelines.

According to §1.1310 and §2.1091 RF exposure is calculated.

Limits for General Population/Uncontrolled Exposure

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (minutes)
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
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

6.2 Test Result

Type	Test mode	CH	Freq (MHz)	Conducted Power (dBm)	Tune Up Power (dBm)
Output power	802.11b	Low	2412	12.12	12±1
		Mid	2437	11.34	12±1
		High	2462	11.40	12±1
	802.11g	Low	2412	10.54	10.5±1
		Mid	2437	10.72	10.5±1
		High	2462	10.61	10.5±1
	802.11n (20M)	Low	2412	10.17	10.5±1
		Mid	2437	10.74	10.5±1
		High	2462	10.09	10.5±1

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

Where: S = power density (in appropriate units, e.g. mW/cm^2)

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 (appropriate units, e.g., cm)

For the antenna manufacturer provide only used limited to ERP/EIRP or radiated spurious emission test. The MPE evaluation as below:

Maximum output power at antenna input terminal: 13(dBm)

Maximum output power at antenna input terminal: 19.953(mW)

Prediction distance: >20 (cm)

Predication frequency: 2412 (MHz) Low frequency

Antenna Gain (typical):2(dBi)

Antenna Gain (typical):1.585 (numeric)

The worst case is power density at predication frequency at 20 cm: 0.006(mW/cm^2)

MPE limit for general population exposure at prediction frequency: 1.0 (mW/cm^2)

0.006(mW/cm^2) < 1.0 (mW/cm^2)

Result: Pass