RF Exposure Evaluation Declaration

FCC ID:	2AN2O-TSW02
IC:	23317-TSW02
APPLICANT:	Beijing Roborock Technology Co., Ltd.
Application Type:	Certification
Product:	Robotic Vacuum Cleaner
Model No.:	roborock S7
FCC Rule Part(s):	FCC Part 2.1091
IC Rule Part(s):	RSS-102 Issue 5
Test Date:	September 26 ~ November 16, 2020

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ACCREDITED
TESTING LABORATORY
CERTIFICATE #3628.01

Revision History

Report No.	Version	Description	Issue Date	Note
2009RSU063-U3	Rev. 01	Initial Report	12-08-2020	Valid

1. PRODUCT INFORMATION

1.1. Equipment Description

Product Name	Robotic Vacuum Cleaner
Model No.	roborock S7
HVIN	BL-M8189FS6
FVIN	N/A
Series number	TSSB2S03400143
Wi-Fi Specification	802.11b/g/n
Antenna Delivery	1*TX + 1*RX
Accessories	
Rechargeable Li-ion Battery	Model No.: BRR-2P4S-5200S; BRR-2P4S-5200D Capacitance: 5200mAh Rated Voltage: 14.4V, 74.88Wh

Note：EUT can be shipped with two types of batteries of the same specification. We choose BRR-2P4S-5200S for testing.

2. RF Exposure Evaluation

2.1. Limits for FCC:

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)	Average Time (Minutes)
(A) Limits for Occupational/ Control Exposures				
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/ Uncontrolled Exposures				
300-1500	--	--	f/1500	6
1500-100,000	--	--	1	30

f= Frequency in MHz

Calculation Formula: $Pd = (Pout*G)/(4*pi*r^2)$

Where
Pd = power density in mW/cm^2
Pout = output power to antenna in mW
G = gain of antenna in linear scale
Pi = 3.1416
r = distance between observation point and center of the radiator in cm

Pd is the limit of MPE, $1mW/cm^2$. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

2.2. Limits for IC:

According to RSS-102: Exemption Limits for Routine Evaluation – RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

• below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);

• at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of

the device is equal to or less than 22.48/f0.5 W (adjusted for tune-up tolerance), where f is in MHz;
• at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
• at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1.31 x 10-2 f0.6834 W (adjusted for tune-up tolerance), where f is in MHz;
• at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. was derived.

2.3. Test Result of RF Exposure Evaluation for FCC and IC

Product	Robotic Vacuum Cleaner
Test Item	RF Exposure Evaluation

FCC:

Test Mode	Frequency Band (MHz)	Maximum Average Output Power (dBm)	E.I.R.P Including Tune-up (dBm)	Power Density at R = 20 cm (mW/cm2)	Limit (mW/cm2)
802.11b/g/n	2412 ~ 2462	20.53	24.40	0.0548	1

IC:

Test Mode	Frequency Band (MHz)	Maximum EIRP (dBm)	Tune-up (dBm)	Maximum EIRP (W)	Limit (W)
802.11b/g/n	2412 ~ 2462	24.40	24.40	0.27542	2.6840

CONCLUSION:

The Max Power Density at R (20 cm) =0.0548mW/cm^2 < 1mW/cm^2.

The device is excluded for SAR test and complies with the IC exposure requirements since the maximum conducted peak output power is lower than the SAR test exclusion thresholds.
So the EUT complies with RF Exposure requirement.

The End

Appendix A - EUT Photograph

Refer to “2009RSU063-U1-UE” file.