

## RF Exposure Evaluation Declaration

**FCC ID:** 2AN2O-TSW06

**IC:** 23317-TSW06

**APPLICANT:** Beijing Roborock Technology Co., Ltd.

**Application Type:** Certification

**Product:** Robotic Vacuum Cleaner

**Model No.:** roborock S7

**Brand Name:** roborock

**FCC Rule Part(s):** FCC Part 2.1091

**IC Rule Part(s):** RSS-102 Issue 5

**Test Date:** May 28, 2021

**Reviewed By:** Sherry Jiang

Sherry Jiang

Robin Wu

Robin Wu



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standards through the calibration of the equipment and evaluated measurement uncertainty herein.

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## Revision History

Report No.	Version	Description	Issue Date	Note
2104RSU072-U8	Rev. 01	Initial Report	06-09-2021	Valid

## 1. PRODUCT INFORMATION

### 1.1. Equipment Description

Product Name	Robotic Vacuum Cleaner
Model No.	roborock S7
Brand Name	roborock
HVIN	roborock S7-FN31
FVIN	N/A
Test Device Label ID	20210506Sample#6
Wi-Fi Specification	802.11b/g/n
Wi-Fi module model No.	3181A-S
Antenna Delivery	1*Tx + 1*Rx
<b>Accessories</b>	
Charging Seat	Model No.: CDZ11RR/ CDZ12RR Rated Power: 28W Rated Input Voltage: 100-240V~50-60Hz Rated Output Voltage: 20V =1.2A
Battery	Model No.: BRR-2P4S-5200S/ BRR-2P4S-5200D Capacitance: 74.88Wh, 5200mAh Rated Voltage: 14.4V

## 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 <sup>2</sup> )	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:  $Pd = (Pout \cdot G) / (4 \cdot \pi \cdot r^2)$

Where

Pd = power density in mW/cm<sup>2</sup>

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<sup>2</sup>. 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  $1.31 \times 10^{-2} f 0.6834$  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/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
802.11b/g/n	2412 ~ 2462	16.11	19.95	0.0179	1

IC:

Test Mode	Frequency Band (MHz)	Maximum EIRP (dBm)	Tune-up (dBm)	Maximum EIRP (W)	Limit (W)
802.11b/g/n	2412 ~ 2462	19.95	19.95	0.09886	2.6840

#### CONCLUSION:

The Max Power Density at R (20 cm) =0.0179mW/cm<sup>2</sup> < 1mW/cm<sup>2</sup>.

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 "2104RSU072-U4-UE" file.