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|---|--|---|---|--|
| Prüfbericht-Nr.: <i>Test report no.:</i> | CN22PE8X 001 | Auftrags-Nr.: <i>Order no.:</i> | 168369097 | Seite 1 von 14 <i>Page 1 of 14</i> |
| Kunden-Referenz-Nr.: <i>Client reference no.:</i> | N/A | Auftragsdatum: <i>Order date:</i> | 2022-04-24 | |
| Auftraggeber: <i>Client:</i> | Beijing Roborock Technology Co., Ltd. Floor 6, Suite 6016, 6017, 6018, Building C, Kangjian Baosheng Plaza, No. 8 Heiquan Road, Haidian District, Beijing, P.R.China. | | | |
| Prüfgegenstand: <i>Test item:</i> | Robotic Vacuum Cleaner | | | |
| Bezeichnung / Typ-Nr.: <i>Identification / Type no.:</i> | roborock S7 (Trademark: roborock) | | | |
| Auftrags-Inhalt: <i>Order content:</i> | FCC and IC approval | | | |
| Prüfgrundlage: <i>Test specification:</i> | CFR47 FCC Part 15: Subpart C Section 15.247 CFR47 FCC Part 15: Subpart C Section 15.207 CFR47 FCC Part 15: Subpart C Section 15.209 RSS-Gen Issue 5, Amendment 2, February 2021 RSS-247 Issue 2 February 2017 RSS-102 Issue 5, Amendment 1, February 2, 2021 ANSI C63.10: 2013 | | | |
| Wareneingangsdatum: <i>Date of sample receipt:</i> | 2022-04-18 | Please refer to photo documents | | |
| Prüfmuster-Nr.: <i>Test sample no.:</i> | A003238794-002 A003238794-004 | | | |
| Prüfzeitraum: <i>Testing period:</i> | 2022-04-22 – 2022-04-24 | | | |
| Ort der Prüfung: <i>Place of testing:</i> | TÜV Rheinland (Shenzhen) Co., Ltd. | | | |
| Prüflaboratorium: <i>Testing laboratory:</i> | TÜV Rheinland (Shenzhen) Co., Ltd. | | | |
| Prüfergebnis*: <i>Test result*:</i> | Pass | | | |
| geprüft von: <i>tested by:</i> |  | genehmigt von: <i>authorized by:</i> |  | |
| Datum: <i>Date:</i> 2022-05-16 | Signed by: Chris Chen | Ausstellungsdatum: <i>Issue date:</i> 2022-05-16 | Signed by: Lin Lin | |
| Stellung / Position | Section Manager | Stellung / Position | Reviewer | |
| Sonstiges / Other: | | | | |
| This report based on the previous report CN21GUA5 001 which change a little PCBA & Dust Collection appearance, and adding another alternative battery(Dongguan Poweramp Technology Limited) & Docking station(Beijing Roborock Technology Co.,Ltd.). Due to the changing, retest the RSE & conducted emission, other test data refer original report 2104RSU072-U1. FCC ID: 2AN2O-TSW03 IC: 23317-TSW03 HVIN: roborock S7-BLM6 | | | | |
| Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i> | | Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged:</i> | | |
| * Legende: 1 = sehr gut 2 = gut 3 = befriedigend 4 = ausreichend 5 = mangelhalt P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet Legend: 1 = very good 2 = good 3 = satisfactory 4 = sufficient 5 = poor P(ass) = passed a.m. test specifications(s) F(ail) = failed a.m. test specifications(s) N/A = not applicable N/T = not tested | | | | |
| Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. | | | | |
| <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i> | | | | |

V05

Prüfbericht - Nr.: CN22PE8X 001
Test Report No.:

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Test Summary

5.1.1 RADIATED SPURIOUS EMISSION

RESULT: Pass

5.1.2 CONDUCTED EMISSION ON AC MAINS

RESULT: Pass

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1 General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix A: Photographs of the Test Set-up

Appendix B: Test Results.

2 Test Sites

2.1 Test Facilities

TÜV Rheinland (Shenzhen) Co., Ltd.

No. 362 Huanguan Road Middle, Longhua District, 518110, Shenzhen, P. R. China.

FCC Registration No.: 694916

IC Registration No.: 25069

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

| Unwanted Emission Testing (TS9975) | | | | |
|---|---------------------|---------------------|-------------------|-------------------|
| Equipment | Manufacturer | Model No. | Serial No. | Cal. Until |
| EMI Test Receiver | R&S | ESR 7 | 102021 | 2022-08-10 |
| Signal Analyzer | R&S | FSV 40 | 101439 | 2022-08-09 |
| System Controller Interface | R&S | SCI-100 | S10010038 | N/A |
| Filterbank | R&S | Wlan | 100759 | 2022-08-09 |
| OSP | R&S | OSP 120 | 102040 | N/A |
| Pre-amplifier | R&S | SCU08F1 | 08320031 | 2022-08-09 |
| Amplifier | R&S | SCU-18F | 180070 | 2022-08-09 |
| Amplifier | R&S | SCU40A | 100475 | 2022-08-09 |
| Trilog Broadband Antenna (30 MHz - 7 GHz) | Schwarzbeck | VULB 9162 | 193 | 2022-08-08 |
| Double-Ridged Antenna (1 -18 GHz) | ETS-LINDGREN | 3117 | 00218717 | 2022-08-08 |
| Wideband Ridged Horn Antenna (18-40 GHz) | Steatite | QMS-00880 | 19067 | 2022-08-08 |
| Active Loop Antenna | Schwarzbeck | FMZB 1513 | 302 | 2022-09-13 |
| Test software | R&S | EMC32 (V10.60.10) | N/A | N/A |
| Control PC | Dell | OptiPlex 7050 | 36NV9P2 | N/A |
| 3m Semi-Anechoic Chamber | Albatross | SAC-3m | APC17151-SAC | 2024-06-22 |
| Conducted Emissions | | | | |
| Equipment | Manufacturer | Model No. | Serial No. | Cal. Until |
| EMI Test Receiver | R&S | ESR3 | 102428 | 2022-08-10 |
| Artificial Mains Network | R&S | ENV216 | 102333 | 2022-08-10 |
| EMC32 test software | R&S | EMC32(Ver.10.50.00) | N/A | N/A |

2.3 Traceability

All measurement equipment calibrations are traceable to NIM (National Institute of Metrology) or where calibration is performed in other countries, to equivalent nationally recognized standards organizations.

2.4 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

2.5 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements as below table.

| Parameter | Uncertainty |
|--|-------------------------------|
| Radio Frequency | $\pm 1 \times 10^{-7}$ |
| RF Power (conducted) | ± 2.5 dB |
| Radiated Emission of Transmitter, valid up to 26.5 GHz | ± 6 dB |
| Radiated Emission of Receiver, valid up to 26.5 GHz | ± 6 dB |
| Conducted Emission, (9kHz to 150kHz)/(150kHz to 30MHz) | ± 3.70 dB / ± 3.30 dB |
| Temperature | ± 1 °C |
| Humidity | ± 5 % |
| Voltage (DC) | ± 1 % |
| Voltage (AC, <10kHz) | ± 2 % |

2.6 Location of Original Data

The original copies of all test data taken during actual testing were at this report and delivered to the applicant. A copy has been retained in the TÜV Rheinland (Shenzhen) file for certification follow-up purposes.

2.7 Status of Facility Used for Testing

The TÜV Rheinland (Shenzhen) Co., Ltd. Test facility located at No. 362 Huanguan Road Middle, Longhua District, 518110, Shenzhen, P. R. China. is listed on the US Federal Communications Commission list of facilities approved to perform measurements.

3 General Product Information

3.1 Product Function and Intended Use

The EUT is a **Robotic Vacuum Cleaner**, which supports Wi-Fi 802.11 b/g/n wireless technology.

For details refer to the User Manual, Technical Description and Circuit Diagram.

3.2 Ratings and System Details

Table 2: Technical Specification of EUT

| General Information of EUT | Value |
|---|--|
| Kind of Equipment: | Robotic Vacuum Cleaner |
| Type Designation: | roborock S7 |
| Trademark: | roborock |
| FCC ID: | 2AN20-TSW03 |
| IC: | 23317-TSW03 |
| HVIN: | roborock S7-BLM6 |
| Operating Voltage: | DC 20V by adapter or DC 14.4V by battery |
| Testing Voltage: | AC 120V, 60Hz or Fully charged battery |
| Docking station : | Model: CDZ20RR Input: 100-240VAC,50-60Hz, 28W Output: 20V DC, 1.2A |
| Battery: | Model: BRR-01-5200A Capacitance: 74.8Wh, 5200mAh Rated Voltage: 14.4V |
| Technical Specification of Wi-Fi 802.11 b/g/n | |
| Operating Frequency: | 2412 - 2462 MHz for 802.11b/g/n(HT20) 2422 - 2452 MHz for 802.11n(HT40) |
| Type of Modulation: | DSSS(DBPSK/DQPSK/CCK) OFDM(BPSK/QPSK/16QAM/64QAM) |
| Data Rate: | 1/2/5.5/11 Mbps for 802.11b 6/9/12/18/24/36/48/54 Mbps for 802.11g MCS0 ~ MCS7 for 802.11n |
| Channel Number: | 11 channels for 802.11b/g/n(HT20) 7 channels for 802.11n(HT40) |
| Channel Separation: | 5 MHz |
| Antenna Type: | PIFA Antenna |
| Max. Antenna Gain: | 3.84 dBi |

Table 3: RF Channel and Frequency of Wi-Fi 802.11 b/g/n

| RF Channel | 802.11 b/g/n(HT20) | 802.11 n(HT40) |
|------------|--------------------|-----------------|
| | Frequency (MHz) | Frequency (MHz) |
| 01 | 2412 | / |
| 02 | 2417 | / |
| 03 | 2422 | 2422 |
| 04 | 2427 | 2427 |
| 05 | 2432 | 2432 |
| 06 | 2437 | 2437 |
| 07 | 2442 | 2442 |
| 08 | 2447 | 2447 |
| 09 | 2452 | 2452 |
| 10 | 2457 | / |
| 11 | 2462 | / |

Test frequencies are lowest channel: 2412 MHz, middle channel: 2437 MHz and highest channel: 2462 MHz for 802.11b/g/n(HT20)

Test frequencies are lowest channel: 2422 MHz, middle channel: 2437 MHz and highest channel: 2452 MHz for 802.11n(HT40)

3.3 Independent Operation Modes

The basic operation modes are:

- A. On, Wi-Fi transmitting mode
 - 1) Low Channel
 - 2) Middle Channel
 - 3) High Channel
- B. On, Charging and WIFI link mode
- C. Off

3.4 Noise Generating and Noise Suppressing Parts

Refer to Circuit Diagram for further details.

3.5 Submitted Documents

- Application Form
- User Manual
- Operation Description
- FCC/IC Label and Location Info

4 Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

Radio Spectrum: The equipment under test (EUT) was configured at its highest power output in order to measure its highest possible radiation and conducted level. The test modes were adapted accordingly in reference to the instructions for use.

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Test operation refers to test setup in chapter 5. All testing were performed according to the procedures in ANSI C63.10: 2013.

4.3 Special Accessories and Auxiliary Equipment

Table 4: List of Accessories and Auxiliary Equipment

| Description | Manufacturer | Model | S/N |
|-------------|--------------|-------|-----------|
| Laptop | Lenovo | T480 | PF-16A6N8 |

4.4 Countermeasures to Achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Technical Construction File (TCF).

No additional measures were employed to achieve compliance.

4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test (Below 1GHz)

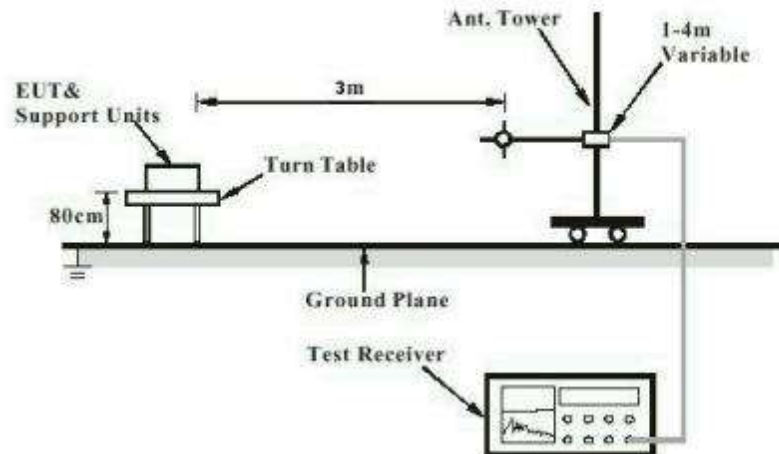


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

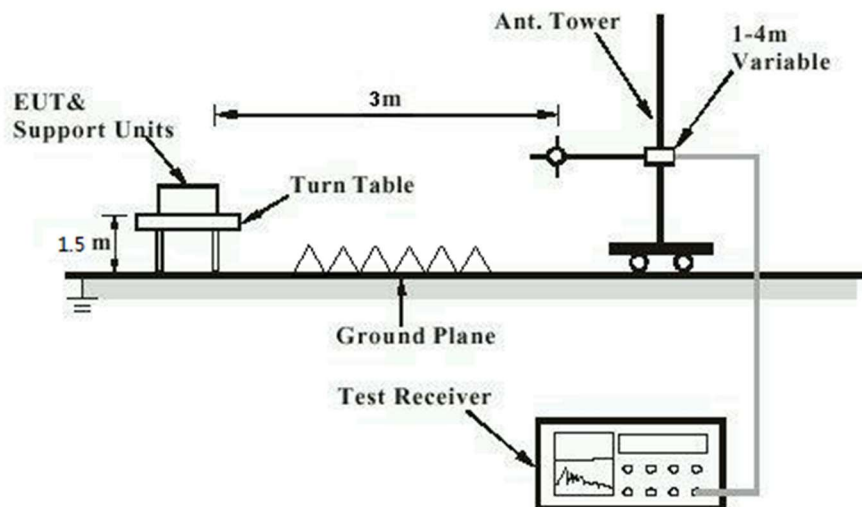


Diagram of Measurement Configuration for Mains Conduction Measurement

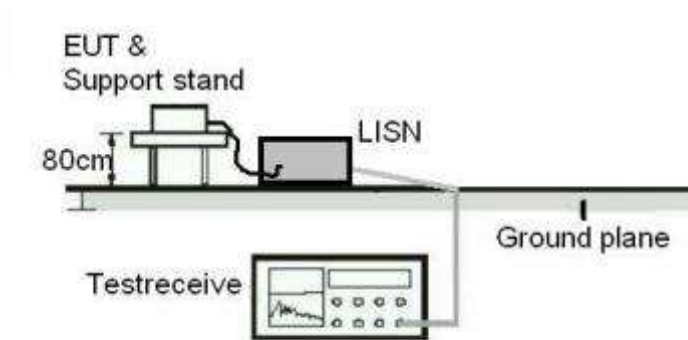
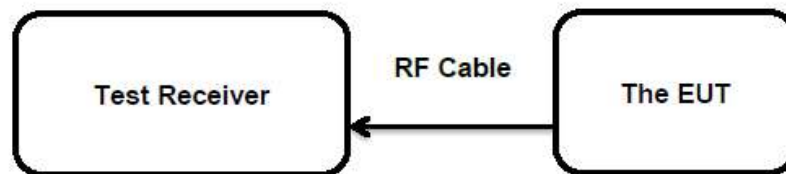


Diagram of Measurement Configuration for Conducted Transmitter Measurement



5 Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Radiated Spurious Emission

RESULT:

Pass

Test Specification

| | |
|-------------------|---|
| Test standard | : FCC Part 15.247(d) & FCC Part 15.205 RSS-247 Clause 3.3 & 5.5 |
| Basic standard | : ANSI C63.10: 2013 |
| Limits | : Refer to 15.209(a) of FCC part 15.247(d) RSS-Gen Table 4 & Table 5 |
| Kind of test site | : 3m Semi-anechoic Chamber |

Test Setup

| | |
|----------------------|-------------------------|
| Date of testing | : 2022-04-22 |
| Input voltage | : Fully charged battery |
| Operation mode | : A |
| Test channel | : Low / Middle / High |
| Ambient temperature | : Refer to test result |
| Relative humidity | : Refer to test result |
| Atmospheric pressure | : 101 kPa |

Remark:

Testing was carried out within frequency range 9kHz to the tenth harmonics. Only the worst case spurious emissions configuration of the each mode were reported.

For the measurement records, refer to the appendix B.

5.1.2 Conducted Emission on AC Mains

RESULT:**Pass****Test Specification**

| | | |
|-------------------|---|--|
| Test standard | : | FCC Part 15.207(a) RSS-Gen Clause 8.8 |
| Basic standard | : | ANSI C63.10: 2013 |
| Frequency range | : | 0.15 – 30MHz |
| Limits | : | FCC Part 15.207(a) RSS-Gen Table 4 |
| Kind of test site | : | Shielded Room |

Test Setup

| | | |
|----------------------|---|---------------|
| Date of testing | : | 2022-04-24 |
| Input voltage | : | AC 120V, 60Hz |
| Operation mode | : | B |
| Earthing | : | Not connected |
| Ambient temperature | : | 24 °C |
| Relative humidity | : | 53 % |
| Atmospheric pressure | : | 101 kPa |

For the measurement records, refer to the appendix B.

6 Photographs of the Test Set-Up

For photographs of the test set-up, refer to the appendix A.

---END---