



Report No.: SZEM190701683802

Page: 1 of 7

RF Exposure Evaluation Report

Application No.: SZEM1907016838CR
Applicant: Powervision Robot Inc.
Address of Applicant: Building NO.33 YUNGU park, No.79 SHUANGYING west road, Technology Park, Changping District, Beijing, 102299, China
Manufacturer: Powervision Robot Inc.
Address of Manufacturer: Building NO.33 YUNGU park, No.79 SHUANGYING west road, Technology Park, Changping District, Beijing, 102299, China
Factory: XAVI(SUZHOU)TECHNOLOGIES CO., LTD
Address of Factory: No. 108, Huang Road, Wu Jiang Economy Development Zone, Jiangsu, P.R. China
Equipment Under Test (EUT):
Product Name: 2.4G WIFI modular
Model No.: DL01
Trade mark: Powervision
FCC ID: 2AJTNDL01
Standards: 47 CFR Part 1.1310
47 CFR Part 2.1091
Date of Receipt: 2019-07-29
Date of Test: 2019-08-07 to 2019-08-13
Date of Issue: 2019-08-15

| | |
|----------------------|--------------|
| Test Result : | PASS* |
|----------------------|--------------|

* In the configuration tested, the EUT complied with the standards specified above.

Keny Xu

Keny Xu
EMC Laboratory Manager




SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch EMC Laboratory

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2 Version

| Revision Record | | | | |
|-----------------|---------|------------|----------|----------|
| Version | Chapter | Date | Modifier | Remark |
| 01 | | 2019-08-15 | | Original |
| | | | | |
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|--------------------------|--|---|--|--|
| Authorized for issue by: | | | | |
| | |  | | |
| | | Calvin Weng /Project Engineer | | |
| | |  | | |
| | | Eric Fu /Reviewer | | |



SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch Inspection & Testing Services Laboratory

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3 Contents

| | Page |
|---|------|
| 1 COVER PAGE | 1 |
| 2 VERSION | 2 |
| 3 CONTENTS | 3 |
| 4 GENERAL INFORMATION | 4 |
| 4.1 GENERAL DESCRIPTION OF EUT | 4 |
| 4.2 TEST LOCATION | 5 |
| 4.3 TEST FACILITY | 5 |
| 4.4 DEVIATION FROM STANDARDS | 5 |
| 4.5 ABNORMALITIES FROM STANDARD CONDITIONS | 5 |
| 4.6 OTHER INFORMATION REQUESTED BY THE CUSTOMER | 5 |
| 5 RF EXPOSURE EVALUATION | 6 |
| 5.1 RF EXPOSURE COMPLIANCE REQUIREMENT | 6 |
| 5.1.1 Limits | 6 |
| 5.1.2 Test Procedure | 6 |
| 5.1.3 EUT RF Exposure Evaluation | 7 |





4 General Information

4.1 General Description of EUT

| | |
|----------------------|---|
| Power Supply: | RF module: DC3.3V from Debug board Debug board: DC12V from DC source |
| Operation Frequency: | 802.11b/g/n(HT20): 2412MHz to 2462MHz |
| Modulation Type: | 802.11b: DSSS (CCK, DQPSK, DBPSK) 802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK) |
| Number of Channels: | 802.11b/g/n(HT20):11 |
| Channel Spacing: | 5MHz |
| Antenna Type: | dipole antenna |
| Antenna Gain: | 3dBi for each antenna |



4.2 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China. 518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

4.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 3816.01.

- **VCCI**

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

- **FCC –Designation Number: CN1178**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

- **Innovation, Science and Economic Development Canada**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

4.4 Deviation from Standards

None

4.5 Abnormalities from Standard Conditions

None

4.6 Other Information Requested by the Customer

None.



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5 RF Exposure Evaluation

5.1 RF Exposure Compliance Requirement

5.1.1 Limits

According to FCC Part1.1310: 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 part1.1307(b)

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

| Frequency range (MHz) | Electric field strength (V/m) | Magnetic field strength (A/m) | Power density (mW/cm ²) | Averaging time (minutes) |
|--|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| (A) Limits for Occupational/Controlled Exposures | | | | |
| 0.3–3.0 | 614 | 1.63 | *(100) | 6 |
| 3.0–30 | 1842/f | 4.89/f | *(900/f ²) | 6 |
| 30–300 | 61.4 | 0.163 | 1.0 | 6 |
| 300–1500 | | | f/300 | 6 |
| 1500–100,000 | | | 5 | 6 |
| (B) Limits for General Population/Uncontrolled Exposure | | | | |
| 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

Friis Formula

Friis transmission formula: $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2)$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

R = distance between observation point and center of the radiator in cm

P_d is the limit of MPE, 1 mW/cm². 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.

5.1.2 Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.





5.1.3 EUT RF Exposure Evaluation

Antenna Gain: 3dBi for each antenna, 6.01 for 802.11n simultaneously Tx mode

Output Power Into Antenna & RF Exposure Evaluation Distance:

| Channel | Frequency (MHz) | Max Conducted Average Output Power (dBm) | Output Power to Antenna (mW) | Power Density at R = 20 cm (mW/cm ²) | Limit (mW/cm ²) | Result |
|---------|--------------------|--|------------------------------------|--|--------------------------------|--------|
| Middle | 2437 | 27.58 | 572.80 | 0.455 | 1.0 | PASS |

| Channel | Frequency (MHz) | Max tune up Power (dBm) | Output Power to Antenna (mW) | Power Density at R = 20 cm (mW/cm ²) | Limit (mW/cm ²) | Result |
|---------|--------------------|----------------------------|------------------------------------|--|--------------------------------|--------|
| Middle | 2437 | 28.00 | 630.96 | 0.501 | 1.0 | PASS |

Note: Refer to report No. SZEM190701683801 for EUT test Max Conducted Average Output Power value.
The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

- End of the Report -

