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

No. 1 Workshop, M-10, Middle section, Science & Technology Park,
Shenzhen, Guangdong, China 518057
Telephone: +86 (0) 755 2601 2053
Fax: +86 (0) 755 2671 0594
Email: ee.shenzhen@sgs.com

RF Exposure Evaluation Report

Application No.:	SZEM1609007562CR (SGS SH No.:SHEM1609005962CR)
Applicant:	Powervision Robot Inc.
Manufacturer:	Powervision Robot Inc.
Factory	Huizhou BYD Electronic Co., Ltd
Product Name:	PowerEgg Base Station
Model No.(EUT):	PEGRS10
Trade Mark:	PowerVision
FCC ID:	2AJTNPEGRS10
Standards:	47 CFR Part 1.1307 (2015)
	47 CFR Part 1.1310 (2015)
Date of Receipt:	2016-09-08
Date of Test:	2016-09-09 to 2016-10-09
Date of Issue:	2016-10-17
Test Result :	**PASS***

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

Authorized Signature:

Jack Zhang
EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.
If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.
The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

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2 Version

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
00		2016-10-17		Original

Authorized for issue by:				
Tested By		Hank yan.		2016-10-09
		(Hank Yan) /Project Engineer		**Date**
Checked By		Eric Fu		2016-10-17
		(Eric Fu) /Reviewer		**Date**

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3 Contents

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4 General Information

4.1 Client Information

Applicant:	Powervision Robot Inc.
Address of Applicant:	1st floor, Building No.33 YUNGU park, No.79 SHUANGYING west road, Technology Park, Changping District, Beijing
Manufacturer:	Powervision Robot Inc.
Address of Manufacturer:	1st floor, Building No.33 YUNGU park, No.79 SHUANGYING west road, Technology Park, Changping District, Beijing
Factory:	Huizhou BYD Electronic Co., Ltd
Address of Factory:	XIangshui River, Economic Development Zone, Daya Bay, Huizhou, Guangdong, 516083,P.R.China

4.2 General Description of EUT

Product Name:	PowerEgg Base Station			
Model No.:	PEGRS10			
Trade Mark:	PowerVision			
Power Supply:	DC 3.7V Li-ion Battery			
For 2.4G				
Operation Frequency:	4MHz Bandwidth mode: 2405MHz to 2475MHz 8MHz Bandwidth mode: 2407MHz to 2469MHz			
Modulation Type:	OFDM			
Number of Channel:	4MHz Bandwidth mode: 71 8MHz Bandwidth mode: 63			
Sample Type:	Portable Device			
Antenna Type:	Dipole Antenna			
Antenna Gain:	3dBi			
For 5.8G				
Operation Frequency:	Band	Mode	Frequency Range(MHz)	Number of channels
	UNII Band III	IEEE 802.11a	5745-5825	5
		IEEE 802.11n 20MHz	5745-5825	5
Type of Modulation:	IEEE 802.11a: OFDM(BPSK/QPSK/16QAM/64QAM) IEEE 802.11n: OFDM(BPSK/QPSK/16QAM/64QAM)			
Channel Numbers:	5 Channel Numbers:			
Sample Type:	Portable Device			
Antenna Type:	Dipole Antenna			
Antenna Gain:	3dBi			

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4.3 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

Telephone: +86 (0) 755 2601 2053 Fax: +86 (0) 755 2671 0594

No tests were sub-contracted.

4.4 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 10m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-823, R-4188, T-1153 and C-2383 respectively.

• FCC – Registration No.: 556682

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 556682.

• Industry Canada (IC)

Two 3m Semi-anechoic chambers and the 10m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1, 4620C-2, 4620C-3.

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4.5 Deviation from Standards

None.

4.6 Abnormalities from Standard Conditions

None.

4.7 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: Pd = (Pout*G)/(4* Pi * R 2)

Where

Pd = power density in mW/cm2

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 id 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.

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4.1.3 EUT RF Exposure Evaluation

For 2.4G:

4MHz Bandwidth mode:

Antenna Gain: 3dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.995 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)	Limit	Result
Middle	2440	27.42	552.08	0.22	1.0	PASS

Note: Refer to report No. SZEM160900756206 for EUT test Max Conducted Peak Output Power value.

The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

8MHz Bandwidth mode:

Antenna Gain: 3dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.995 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)	Limit	Result
Middle	2438	27.70	588.844	0.23	1.0	PASS

Note: Refer to report No. SZEM160900756206 for EUT test Max Conducted Peak Output Power value.

The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

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For 5.8G:

Antenna Gain: 3dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.995 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)	Limit	Result
Lowest	5785	4.51	2.825	0.001	1.0	PASS

Note: Refer to report No. SZEM160900756207 for EUT test Max Conducted Peak Output Power value.

The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

Exposure conditions for simultaneous transmission operations

∑of ratios simultaneous transmitting= 2.4G + Wi-Fi 5G

Ratio of Power Density of Wi-Fi 2.4G at R = 20cm	Ratio of Power Density of Wi-Fi 5G at R = 20cm	Total ratios simultaneous transmitting at R =20cm	Limit	Result
0.23	0.001	0.231	1.0	PASS

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