

1 Cover Page

RF MPE REPORT

Application No.:	SHEM1812000318CR
FCC ID:	2APV2-CSW2D
IC:	23928-CSW2D
Applicant:	Hangzhou Ezviz Sofeware Co., Ltd.
Address of Applicant:	2-1-10, No.700 Dongliu Road, Binjiang District, Hangzhou, China
Manufacturer:	Hangzhou Ezviz Sofeware Co., Ltd.
Address of Manufacturer:	2-1-10, No.700 Dongliu Road, Binjiang District, Hangzhou, China
Factory:	Hangzhou Hikvision Electronics Co., Ltd.
Address of Factory:	No.299, Qiushi Road, Tonglu Economic Developemnt Zone, Tonglu County, Hangzhou.
Equipment Under Test (EUT):	
EUT Name:	Wire-Free Camera Base Station
Model No.(EUT):	CS-W2D
Trade Mark:	eZVIZ
Standards:	FCC Rules 47 CFR §2.1091 KDB447498 D01 General RF Exposure Guidance v06
Date of Receipt:	2018-12-28
Date of Test:	2019-01-04 to 2019-01-24
Date of Issue:	2019-02-13
Test Result:	Pass*

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

Parlam Zhan

Parlam Zhan
E&E Section 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.



Unless otherwise agreed in writing, this document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Documents.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.
Attention: To check the authenticity of testing/inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: CN.Doccheck@sgs.com

SGS-CSTC Standards Technical Services Co., Ltd.
Testing Center EMC

NO.588 West Jindu Road, Songjiang District, Shanghai, China 201612
中国·上海·松江区金都西路588号 邮编: 201612

t(86-21) 61915666 f(86-21) 61915678 www.sgsgroup.com.cn
t(86-21) 61915666 f(86-21) 61915678 e.sgs.china@sgs.com

Revision Record			
Version	Description	Date	Remark
00	Original	2019-02-13	/

Authorized for issue by:				
		Vincent Zhu		
		Vincent Zhu / Project Engineer		
		Parlam Zhan		
		Parlam Zhan / Reviewer		

2 Contents

	Page
1 COVER PAGE	1
2 CONTENTS.....	3
3 GENERAL INFORMATION.....	4
3.1 GENERAL DESCRIPTION OF E.U.T.	4
3.2 TECHNICAL SPECIFICATIONS.....	4
3.3 TEST LOCATION	5
3.4 TEST FACILITY.....	5
4 TEST STANDARDS AND LIMITS.....	6
4.1 FCC RADIOFREQUENCY RADIATION EXPOSURE LIMITS:	6
4.2 IC RADIOFREQUENCY RADIATION EXPOSURE LIMITS:.....	6
5 MEASUREMENT AND CALCULATION.....	7
5.1 MAXIMUM TRANSMIT POWER	7
5.2 MPE CALCULATION	8

3 General Information

3.1 General Description of E.U.T.

Power supply:	DC 5V by Adapter Adapter: Model:HKC0115020-2B Input:100-240V~50/60Hz,0.5A Output:5V-2A
Test voltage:	AC 120V 60Hz
Cable:	USB Cable 150cm

3.2 Technical Specifications

2.4GHz

Antenna Gain	4 dBi
Antenna Type	Integral Antenna
Channel Spacing	5MHz
Modulation Type	802.11b: DSSS (CCK, DQPSK, DBPSK) 802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Number of Channels	802.11b/g/n(HT20):11 802.11n(HT40):7
Operation Frequency	802.11b/g/n(HT20): 2412MHz to 2462MHz 802.11n(HT40): 2422MHz to 2452MHz

915MHz

Antenna Type	PCB antenna
Channel Spacing	2MHz
Modulation Type	FSK
Number of Channels	10
Operation Frequency	906MHz~924MHz

3.3 Test Location

All tests were performed at:

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

588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China

Tel: +86 21 6191 5666

Fax: +86 21 6191 5678

3.4 Test Facility

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

• **CNAS (No. CNAS L0599)**

CNAS has accredited SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. 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.

• **NVLAP (Certificate No. 201034-0)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. is accredited by the National Voluntary Laboratory Accreditation Program(NVLAP). Certificate No. 201034-0.

• **FCC –Designation Number: CN5033**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been recognized as an accredited testing laboratory.

Designation Number: CN5033. Test Firm Registration Number: 479755.

• **Industry Canada (IC) – IC Assigned Code: 8617A**

The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 8617A-1.

• **VCCI (Member No.: 3061)**

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-13868,C-14336,T-12221,G-10830 respectively.

4 Test Standards and Limits

4.1 FCC Radiofrequency radiation exposure limits:

According to §1.1310, the limit for general population/uncontrolled exposures

Frequency	Power density(mW/cm ²)	Averaging time(minutes)
300MHz~1.5GHz	$f/1500$	30
1.5GHz~100GHz	1.0	30

For 915MHz band, the limit of worse case is 0.604 mW/cm²

For 2.4G and 5G band, the limit is 1.0 mW/cm²

4.2 IC Radiofrequency radiation exposure limits:

According to RSS-102 section 2.5.2, 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 $4.49/f^{0.5}$ 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).

For 915MHz band, the limit of worse case is 1.37 W

For 2.4G band, the limit of worse case is 2.68 W

5 Measurement and Calculation

5.1 Maximum transmit power

The Power Data is based on the RF Test Report SHEM181200031801 & SHEM SHEM181200031802

2.4G WiFi

Test Mode	Channel	Antenna 0 Power[dBm]	Antenna 1 Power[dBm]	MIMO Power[dBm]	Antenna 0 Power[mW]	Antenna 1 Power[mW]	MIMO Power[mW]
11B	2412	12.85	14.67	NA	19.28	29.31	NA
11B	2437	13.94	15.57	NA	24.77	36.06	NA
11B	2462	13.90	15.79	NA	24.55	37.93	NA
11G	2412	13.30	14.90	NA	21.38	30.90	NA
11G	2437	13.72	15.72	NA	23.55	37.33	NA
11G	2462	14.05	15.96	NA	25.41	39.45	NA
11N20MIMO	2412	13.08	14.83	17.05	20.32	30.41	50.70
11N20MIMO	2437	14.04	14.08	17.07	25.35	25.59	50.93
11N20MIMO	2462	14.04	15.59	17.89	25.35	36.22	61.52
11N40MIMO	2422	11.27	12.59	14.99	13.40	18.16	31.55
11N40MIMO	2437	11.78	12.94	15.41	15.07	19.68	34.75
11N40MIMO	2452	12.17	12.92	15.57	16.48	19.59	36.06

915MHz

Frequency (MHz)	Level (dBuV/m)	Detector	Output Power (dBm)	Output Power (mW)
906	91.89	Peak	-3.41	0.46
	94.96	Peak	-0.34	0.92
	90.97	Average	-4.33	0.37
914	95.24	Peak	-0.06	0.99
	90.04	Average	-5.26	0.30
	94.57	Peak	-0.73	0.85
	89.94	Average	-5.36	0.29
924	94.42	Peak	-0.88	0.82
	91.3	Average	-4.00	0.40
	96.70	Peak	1.40	1.38
	92.15	Average	-3.15	0.48

5.2 MPE Calculation

For FCC:

According to the formula $S = \frac{PG}{4R^2\pi}$, we can calculate S which is MPE.

Note:

- 1) P (Watts) = Power Input to antenna = $10^{\frac{dBm}{10}} / 1000$
- 2) G (Antenna gain in numeric) = $10^{\text{(Antenna gain in dBi / 10)}}$
- 3) R = distance to the center of radiation of antenna (in meter) = 20cm
- 4) MPE limit = 1mW/cm²

For 2.4GHz WiFi:

The best case gain of the antenna is 4dBi. 4dB logarithmic terms convert to numeric result is nearly 2.51. The Max Conducted Peak Output Power is 39.45mW (0.03945W);

$$\text{WiFi: } S = \frac{PG}{4R^2\pi} = \frac{39.45 \times 2.51}{4 \times 400 \times 3.14} = 0.02 \text{ mW/cm}^2$$

For MIMO

The best case gain of the antenna is 7.01dBi. 7.01dB logarithmic terms convert to numeric result is nearly 5.02. The Max Conducted Peak Output Power is 61.52mW (0.06152W)

$$S = \frac{PG}{4R^2\pi} = \frac{61.52 \times 5.02}{4 \times 400 \times 3.14} = 0.06 \text{ mW/cm}^2$$

For 915MHz: The Max E.I.R.P is 0.48mW (0.00048W).

$$S = \frac{PG}{4R^2\pi} = 0.48 / (4 \times 400 \times 3.14) = 0.0001 \text{ mW/cm}^2$$

915MHz and WiFi modules can simultaneous transmitting, so the maximum rate of MPE is $(0.06/1) + (0.0001/0.604) = 0.06 < 1.0$. according to the KDB447498 section 7.2 determine the device is exclusion from SAR test.

For IC:

For 2.4GHz WiFi: E.I.R.P.= $P \times G = 0.03945 \times 2.51 = 0.099\text{W}$

For MIMO: E.I.R.P.= $P \times G = 0.06152 \times 5.02 = 0.31\text{W}$

For 915MHz: E.I.R.P.= 0.00048W

915MHz and 2.4GHz WiFi modules can simultaneous transmitting, so the maximum rate of MPE is $(0.31/2.68) + (0.00048/1.37) = 0.12 < 1.0$.

So the device is exclusion from SAR test.

--End of the Report--