

Report No.: SHCR220500089202 Page: 1 of 10

1 Cover Page

Test Result:	Pass*
Date of Issue:	2022-05-26
Date of Test:	2022-05-17 to 2022-05-25
Date of Receipt:	2022-05-05
Standard(s) :	FCC Rules 47 CFR §2.1091 KDB 447498 D04 interim General RF Exposure Guidance v01
Add Model No.:	CS-H8 · CS-H8 (3MP,6mm) · CS-H8 (5MP,4mm) · CS-H8 (5MP,6mm)
Model No.:	CS-H8 (3MP,4mm)
EUT Name:	Smart Home Camera
Equipment Under Test (EU	Г):
Address of Manufacturer:	Room 302,Unit B,Building 2,399 Danfeng Road,Binjiang District,Hangzhou,Zhejiang
Manufacturer:	Hangzhou Ezviz Software Co., Ltd.
Address of Applicant:	Room 302,Unit B,Building 2,399 Danfeng Road,Binjiang District,Hangzhou,Zhejiang
Applicant:	Hangzhou Ezviz Software Co., Ltd.
FCC ID:	2APV2-CSH81H3
Application No.:	SHCR2205000892AT
RF	Exposure Evaluation Report

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

rarlan 2han

Parlam Zhan Laboratory Manager



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Report No.: SHCR220500089202 Page: 2 of 10

Revision Record						
Version	Chapter	Date	Modifier	Remark		
01		2022-05-26		Original		

Authorized for issue by:		
	Michael Nin	
	Micheal_Niu/Project Engineer	
	Parlam zhan	
	Parlam_Zhan/Reviewer	



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Report No.: SHCR220500089202 Page: 3 of 10

2 Contents

			Page
1	CC	DVER PAGE	1
2	CC	ONTENTS	3
3	GE	ENERAL INFORMATION	4
	3.1	GENERAL DESCRIPTION OF E.U.T.	4
	3.2	DETAILS OF E.U.T.	4
	3.3	TEST LOCATION	5
	3.4	TEST FACILITY	5
4	FC	C RADIOFREQUENCY RADIATION EXPOSURE LIMITS	6
	4.1	BLANKET 1 MW BLANKET EXEMPTION	6
	4.2	MPE-BASED EXEMPTION	6
	4.3	SAR-BASED EXEMPTION	7
5	ME	EASUREMENT AND CALCULATION	9
	5.1	MAXIMUM TRANSMIT POWER	9
	5.2	RF EXPOSURE CALCULATION	9



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Report No.: SHCR220500089202 Page: 4 of 10

3 General Information

3.1 General Description of E.U.T.

Power supply: DC 12V,1A,12W Max by Adapter

3.2 Details of E.U.T.

Operation Frequency:	802.11b/g/n(HT20): 2412MHz to 2462MHz
	802.11b: DSSS (CCK, DQPSK, DBPSK);802.11g/n: OFDM (64QAM,
Modulation Type:	
	16QAM, QPSK, BPSK)
Number of Channels:	802.11b/g/n(HT20):11
Channel Spacing:	5MHz
	Antenna 1:PCB antenna,
Antenna Type:	Antenna 2:PCB antenna
	Antenna 1:3.3dBi (Provided by manufacturer)
Antenna Gain:	Antenna 2:3.2dBi (Provided by manufacturer)
	Directional gain:6.26dBi



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Report No.: SHCR220500089202 Page: 5 of 10

3.3 Test Location

All tests were performed at:

Compliance Certification Services (Kunshan) Inc.

No.10 Weiye Rd, Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China.

Tel: +86 512 5735 5888Fax: +86 512 5737 0818

No tests were sub-contracted.

3.4 Test Facility

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

• CNAS (No. CNAS L4354)

CNAS has accredited Compliance Certification Services (Kunshan) Inc. to ISO/IEC 17025:2017 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. 2541.01)

Compliance Certification Services (Kunshan) Inc. is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 2541.01.

• FCC (Designation Number: CN1172)

Compliance Certification Services (Kunshan) Inc. has been recognized as an accredited testing laboratory.

Designation Number: CN1172.

• ISED (CAB identifier: CN0072)

Compliance Certification Services (Kunshan) Inc. has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory.

Company Number: 2324E

• VCCI (Member No.: 1938)

The 3m and 10m Semi-anechoic chamber and Shielded Room of Compliance Certification Services

(Kunshan) Inc. has been registered in accordance with the Regulations for Voluntary Control

Measures with Registration No.: R-20134, R-11600, C-11707, T-11499, G-10216 respectively.



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Report No.: SHCR220500089202 Page: 6 of 10

4 FCC Radiofrequency radiation exposure limits

Test exemptions apply for devices used in general population/uncontrolled exposure environments, according to the SAR-based, or MPE-based exemption thresholds.

4.1 Blanket 1 mW Blanket Exemption

The 1 mW Blanket Exemption of §1.1307(b)(3)(i)(A) applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power of no more than 1 mW, regardless of separation distance.

The 1-mW blanket exemption applies at separation distances less than 0.5 cm, including where there is no separation. This exemption shall not be used in conjunction with other exemption criteria other than those for multiple RF sources in paragraph §1.1307(b)(3)(ii)(A).

The 1-mW exemption is independent of service type and covers the full range of 100 kHz to 100 GHz, but it shall not be used in conjunction with other exemption criteria or in devices with higher-power transmitters operating in the same time-averaging period. Exposure from such higher-power transmitters would invalidate the underlying assumption that exposure from the lower-power transmitter is the only contributor to SAR in the relevant volume of tissue.

4.2 MPE-based Exemption

General frequency and separation-distance dependent MPE-based effective radiated power (ERP) thresholds are in Table B.1 [Table 1 of §1.1307(b)(1)(i)(C)] to support an exemption from further evaluation from 300 kHz through 100 GHz.

RF Source Frequency			Minim	Threshold ERP				
<i>f</i> ∟ MHz		<i>f</i> ⊢ MHz	λ _L / 2π		λ _Η / 2π	W		
0.3	-	1.34	159 m	_	35.6 m	1,920 R ²		
1.34	-	30	35.6 m	_	1.6 m	3,450 R²/f ²		
30	-	300	1.6 m	_	159 mm	3.83 R ²		
300	-	1,500	159 mm	_	31.8 mm	0.0128 R ² f		
1,500	1,500 – 100,000 31.8 mm – 0.5 mm 19.2R ²							
Subscripts L and H are low and high; λ is wavelength.								
From §1.1307((b)(3)(i)(C), modified by a	dding Minimum D	istance	e columns.			

Table B.1—Thresholds For Single RF Sources Subject to Routine Environmental Evaluation

The table applies to any RF source (i.e. single fixed, mobile, and portable transmitters) and specifies power and distance criteria for each of the five frequency ranges used for the MPE limits. These criteria apply at separation distances from any part of the radiating structure of at least $\lambda/2\pi$. The thresholds are based on the general population MPE limits with a single perfect reflection, outside of the reactive near-field, and in the main beam of the radiator.

For mobile devices that are not exempt per Table B.1 [Table 1 of \$1.1307(b)(1)(i)(C)] at distances from 20 cm to 40 cm and in 0.3 GHz to 6 GHz, evaluation of compliance with the exposure limits in \$1.1310 is necessary if the ERP of the device is greater than *ERP*_{20cm} in Formula (B.1) [repeated from \$2.1091(c)(1); also in \$1.1307(b)(1)(i)(B)].





Report No.: SHCR220500089202 Page: 7 of 10

(B.1)

$$P_{\rm th} (\rm mW) = ERP_{20 \,\rm cm} (\rm mW) = \begin{cases} 2040f & 0.3 \,\rm GHz \le f < 1.5 \,\rm GHz \\ 3060 & 1.5 \,\rm GHz \le f \le 6 \,\rm GHz \end{cases}$$

If the ERP is not easily obtained, then the available maximum time-averaged power may be used (i.e., without consideration of ERP only if the physical dimensions of the radiating structure(s) do not exceed the electrical length of $\lambda/4$ or if the antenna gain is less than that of a half-wave dipole.

SAR-based exemptions are constant at separation distances between 20 cm and 40 cm to avoid discontinuities in the threshold when transitioning between SAR-based and MPE-based exemption criteria at 40 cm, considering the importance of reflections.

Limit calculation						
Frequency range	Frequency(MHz)	R(λ/2π)(m)	Threshold ERP(W)			
300~1500MHz	915	0.0522	0.032			
1500~10000MHz	2462	0.0194	0.007			

4.3 SAR-based Exemption

SAR-based thresholds are derived based on frequency, power, and separation distance of the RF source. The formula defines the thresholds in general for either available maximum time-averaged power or maximum time-averaged ERP, whichever is greater.

If the ERP of a device is not easily determined, such as for a portable device with a small form factor, the applicant may use the available maximum time-averaged power exclusively if the device antenna or radiating structure does not exceed an electrical length of $\lambda/4$.

As for devices with antennas of length greater than $\lambda/4$ where the gain is not well defined, but always less than that of a half-wave dipole (length $\lambda/2$), the available maximum time-averaged power generated by the device may be used in place of the maximum time-averaged ERP, where that value is not known.

The separation distance is the smallest distance from any part of the antenna or radiating structure for all persons, during operation at the applicable ERP. In the case of mobile or portable devices, the separation distance is from the outer housing of the device where it is closest to the antenna.

The SAR-based exemption formula of \$1.1307(b)(3)(i)(B), repeated here as Formula (B.2), applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power or effective radiated power (ERP), whichever is greater, of less than or equal to the threshold P_{th} (mW).

This method shall only be used at separation distances from 0.5 cm to 40 cm and at frequencies from 0.3 GHz to 6 GHz (inclusive). P_{th} is given by Formula (B.2).

$$P_{\rm th} (\rm mW) = \begin{cases} ERP_{20 \rm \ cm} (d/20 \rm \ cm)^x & d \le 20 \rm \ cm \\ \\ ERP_{20 \rm \ cm} & 20 \rm \ cm < d \le 40 \rm \ cm \end{cases}$$
(B.2)

where

$$x = -\log_{10}\left(\frac{60}{ERP_{20}\operatorname{cm}\sqrt{f}}\right)$$

and f is in GHz, d is the separation distance (cm), and ERP_{20cm} is per Formula (B.1).





Report No.: SHCR220500089202 Page: 8 of 10

Example values shown in Table B.2 are for illustration only.

Frequency					Distand	ce(mm)				
(MHz)	5	10	15	20	25	30	35	40	45	50
300	39	65	88	110	129	148	166	184	201	217
450	22	44	67	89	112	135	158	180	203	226
835	9	25	44	66	90	116	145	175	207	240
1900	3	12	26	44	66	92	122	157	195	236
2450	3	10	22	38	59	83	111	143	179	219
3600	2	8	18	32	49	71	96	125	158	195
5800	1	6	14	25	40	58	80	106	136	169

Table B.2—Example Power Thresholds (mW)

Limit calculation						
Frequency range(GHz) Frequency(GHz) X Distance(cm) Pth (mW)						
0.3~1.5	0.915	1.474	20	1866.600		
1.5~6	2.462	1.903	20	3060.000		



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5 Measurement and Calculation

5.1 Maximum transmit power

The Power Data is based on the RF Test Report SHCR220500089201.

Test Mode	Channel	Antenna 1 Power[dBm]	Antenna 2 Power[dBm]	MIMO Power[dBm]	Antenna 1 Power[mW]	Antenna 2 Power[mW]	MIMO Power[mW]
11B	2412	15.17	14.69	NA	32.89	29.44	N/A
11B	2437	15.34	14.62	NA	34.20	28.97	N/A
11B	2462	15.34	14.45	NA	34.20	27.86	N/A
11G	2412	14.61	14.22	NA	28.91	26.42	N/A
11G	2437	14.67	14.07	NA	29.31	25.53	N/A
11G	2462	14.64	13.80	NA	29.11	23.99	N/A
11N20SISO	2412	11.25	10.75	14.02	13.34	11.89	25.23
11N20SISO	2437	11.30	10.70	14.02	13.49	11.75	25.23
11N20SISO	2462	11.24	10.40	13.85	13.30	10.96	24.27

5.2 RF Exposure Calculation Antenna1:

The Max Conducted Peak Output Power is 34.20mW. The best case gain of the antenna is 3.3dBi.

3.3dBi logarithmic terms convert to numeric result is nearly 2.138

According to the formula. calculate the EIRP test result:

EIRP= P x G = 34.20 mW x 2.138 = 73.120mW

Antenna2:

The Max Conducted Peak Output Power is 29.44mW. The best case gain of the antenna is 3.2dBi.

0dBi logarithmic terms convert to numeric result is nearly 2.089.

According to the formula. calculate the EIRP test result:

EIRP= P x G =29.44 mW x 2.089 =61.500mW

In MIMO mode:

The Max Conducted Peak Output Power is 25.23mW. The best case gain of the antenna is 6.26dBi.

0dBi logarithmic terms convert to numeric result is nearly 4.227.

According to the formula. calculate the EIRP test result:

EIRP= P x G = 25.23 mW x 4.227 = 106.247mW



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Remark: we used the maximum power between the conducted power and ERP/EIRP to perform RF exposure exemption evaluation.

	Evaluation method	Exempt Limit(mW)	Verdict
	Blanket 1 mW Blanket Exemption	1mW	N/A
	MPE-based Exemption(ERP)	7mW(ERP) (2.4GHz Band)	N/A
\boxtimes	SAR-based Exemption(Pth)	3060mW(ERP) (1.5GHz~6GHz)	Yes

So, the device is to qualify for SAR test exemption, the exemption report is in lieu of the SAR report.

--End of the Report--



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