

1 Cover Page

RF MPE REPORT

Application No.: SHEM2107008154CR
FCC ID: SVNDH-IPC-DB6IX
Applicant: ZHEJIANG DAHUA VISION TECHNOLOGY CO.,LTD.
Address of Applicant: No.1199, Bin'an Road, Binjiang District, Hangzhou, P.R. China
Manufacturer: ZHEJIANG DAHUA VISION TECHNOLOGY CO.,LTD.
Address of Manufacturer: No.1199, Bin'an Road, Binjiang District, Hangzhou, P.R. China
Equipment Under Test (EUT):
EUT Name: Doorbell
Model No.: DH-DB6I
Standard(s) : FCC Rules 47 CFR §2.1091
 KDB447498 D01 General RF Exposure Guidance v06
Date of Receipt: 2021-07-23
Date of Test: 2021-07-26 to 2021-08-18
Date of Issue: 2021-08-19

Test Result:	Pass*
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* 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.



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Revision Record			
Version	Description	Date	Remark
00	Original	2021-08-19	/

Authorized for issue by:			
			
		<hr/> Micheal Niu / Project Engineer	
			
		<hr/> Parlam Zhan / Reviewer	



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Testing Center Electronic Documents

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3 General Information

3.1 General Description of E.U.T.

Power supply:	12-24V=/16-24V~,0.8A DC 3.7V rechargeable Li-ion Battery Battery model:1S1P652023P Rated voltage:3.7V Capacity:0.2Ah Energy:0.74Wh Charging voltage:4.2V
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3.2 Technical Specifications

2.4GHz

Antenna Gain:	Antenna 1:3.42dBi; (Provided by the manufacturer) Antenna 2:3.42dBi; (Provided by the manufacturer) Directional gain: 6.43dBi
Antenna Type:	Antenna 1:PIFA Antenna Antenna 2:PIFA Antenna
Channel Spacing:	5MHz
Modulation Type:	802.11b: DSSS (CCK, DQPSK, DBPSK) 802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Data Rate:	802.11b: 1/2/5.5/11Mbps, 802.11g: 6/9/12/18/24/36/48/54Mbps 802.11n: MCS 0 to 7 for HT20MHz MCS 0 to 7 for HT40MHz
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



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5GHz

Antenna Gain:	Ant 1:2.63dBi; (Provided by the manufacturer) Ant 2:1.31dBi. (Provided by the manufacturer) Directional gain:5.01dBi			
Antenna Type:	PIFA Antenna			
DFS Function:	Slave without Radar detection			
TPC Function:	Not Support			
Operation Frequency:	Band	Mode	Frequency Range(MHz)	Number of channels
	UNII Band I	802.11a/n(HT20)/ac(VHT20)	5180-5240	4
		802.11n(HT40)/ac(VHT40)	5190-5230	2
		802.11ac(VHT80)	5210	1
	UNII Band II-A	802.11a/n(HT20)/ac(VHT20)	5260-5320	4
		802.11n(HT40)/ac(VHT40)	5270-5310	2
		802.11ac(VHT80)	5290	1
	UNII Band II-C	802.11a/n(HT20)/ac(VHT20)	5500-5700	11
		802.11n(HT40)/ac(VHT40)	5510-5670	5
		802.11ac(VHT80)	5530~5610	2
	UNII Band III	802.11a/n(HT20)/ac(VHT20)	5745-5825	5
		802.11n(HT40)/ac(VHT40)	5755-5795	2
802.11ac(VHT80)		5775	1	
Modulation Type:	802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK) 802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)			
Channel Spacing:	802.11a/n(HT20)/ac(VHT20): 20MHz 802.11n(HT40)/ac(VHT40): 40MHz 802.11ac(VHT80): 80MHz			
Data Rate:	802.11a: 6/9/12/18/24/36/48/54Mbps 802.11n: MCS0-15 802.11ac: MCS0-9			



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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 5888 Fax: +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 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 (ISED) Canada as an accredited testing laboratory. CAB Identifier: CN0072.

- **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-11600, C-11707, T-11499, G-10216 respectively.



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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



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5 Measurement and Calculation

5.1 Maximum transmit power

2.4GHz for FCC

The Power Data is based on the RF Test Report SHEM210700815401-2.4GHz

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	18.59	19.25	NA	72.28	84.14	N/A
11B	2437	18.50	19.09	NA	70.79	81.10	N/A
11B	2462	18.45	18.68	NA	69.98	73.79	N/A
11G	2412	22.22	21.16	NA	166.72	130.62	N/A
11G	2437	22.10	20.97	NA	162.18	125.03	N/A
11G	2462	22.07	20.74	NA	161.06	118.58	N/A
11N20MIMO	2412	19.50	19.71	22.62	89.13	93.54	182.81
11N20MIMO	2437	19.29	19.69	22.50	84.92	93.11	177.83
11N20MIMO	2462	19.24	19.37	22.32	83.95	86.50	170.61
11N40MIMO	2422	19.87	20.15	23.02	97.05	103.51	200.45
11N40MIMO	2437	19.74	20.09	22.93	94.19	102.09	196.34
11N40MIMO	2452	19.81	19.95	22.89	95.72	98.86	194.54



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5GHz for FCC

The Power Data is based on the RF Test Report SHEM210700815402-5GHz

Test Mode	Test Channel	Antenna 1 Power[dBm]	Antenna 2 Power[dBm]	MIMO Power[dBm]	Antenna 1 Power[mW]	Antenna 2 Power[mW]	MIMO Power[mW]
802.11a	5180	11.26	12.81	/	13.37	19.10	NA
	5200	11.23	11.93	/	13.27	15.60	NA
	5240	11.38	11.55	/	13.74	14.29	NA
	5260	11.36	11.19	/	13.68	13.15	NA
	5300	11.16	11.48	/	13.06	14.06	NA
	5320	10.98	11.60	/	12.53	14.45	NA
	5500	12.85	13.68	/	19.28	23.33	NA
	5580	12.57	12.54	/	18.07	17.95	NA
	5700	10.78	11.16	/	11.97	13.06	NA
	5745	10.46	11.06	/	11.12	12.76	NA
	5785	10.87	10.86	/	12.22	12.19	NA
	5825	10.93	11.39	/	12.39	13.77	NA
802.11n(HT20)	5180	12.05	13.06	15.59	16.03	20.23	36.22
	5200	12.39	12.54	15.48	17.34	17.95	35.32
	5240	12.28	11.14	14.76	16.90	13.00	29.92
	5260	12.27	11.29	14.82	16.87	13.46	30.34
	5300	12.11	11.44	14.80	16.26	13.93	30.20
	5320	12.07	11.20	14.67	16.11	13.18	29.31
	5500	11.86	13.51	15.77	15.35	22.44	37.76
	5580	12.37	13.33	15.89	17.26	21.53	38.82
	5700	12.09	11.17	14.66	16.18	13.09	29.24
	5745	11.75	12.04	14.91	14.96	16.00	30.97
	5785	12.17	11.37	14.80	16.48	13.71	30.20
	5825	11.86	12.14	15.01	15.35	16.37	31.70
802.11n(HT40)	5190	13.06	12.54	15.82	20.23	17.95	38.19
	5230	12.91	12.18	15.57	19.54	16.52	36.06
	5270	12.93	11.93	15.47	19.63	15.60	35.24
	5310	12.86	12.30	15.60	19.32	16.98	36.31
	5510	12.23	12.39	15.32	16.71	17.34	34.04
	5550	12.06	9.96	14.15	16.07	9.91	26.00
	5670	11.78	12.40	15.11	15.07	17.38	32.43
	5755	11.99	11.69	14.85	15.81	14.76	30.55
5795	12.61	11.67	15.18	18.24	14.69	32.96	
802.11ac(VHT20)	5180	9.33	9.94	12.66	8.57	9.86	18.45
	5200	9.78	9.85	12.83	9.51	9.66	19.19
	5240	10.14	9.32	12.76	10.33	8.55	18.88



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	5260	9.79	9.20	12.52	9.53	8.32	17.86
	5300	10.11	9.27	12.72	10.26	8.45	18.71
	5320	9.68	9.41	12.56	9.29	8.73	18.03
	5500	9.80	9.50	12.66	9.55	8.91	18.45
	5580	9.23	9.93	12.60	8.38	9.84	18.20
	5700	8.08	9.11	11.64	6.43	8.15	14.59
	5745	9.47	9.19	12.34	8.85	8.30	17.14
	5785	9.89	8.66	12.33	9.75	7.35	17.10
	5825	9.60	9.01	12.33	9.12	7.96	17.10
802.11ac(VHT40)	5190	9.79	10.37	13.10	9.53	10.89	20.42
	5230	10.20	9.95	13.09	10.47	9.89	20.37
	5270	9.83	9.72	12.79	9.62	9.38	19.01
	5310	9.75	9.77	12.77	9.44	9.48	18.92
	5510	9.95	10.05	13.01	9.89	10.12	20.00
	5550	9.64	9.77	12.72	9.20	9.48	18.71
	5670	10.12	9.39	12.78	10.28	8.69	18.97
	5755	9.23	9.04	12.15	8.38	8.02	16.41
	5795	9.50	9.21	12.37	8.91	8.34	17.26
802.11ac(VHT80)	5210	9.87	9.57	12.73	9.71	9.06	18.75
	5290	10.13	9.15	12.68	10.30	8.22	18.54
	5530	10.60	10.01	13.33	11.48	10.02	21.53
	5610	10.12	10.41	13.28	10.28	10.99	21.28
	5775	9.45	8.37	11.95	8.81	6.87	15.67



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5.2 MPE Calculation

According to the formula $S=P/4\pi R^2$, we can calculate S which is MPE.

Note:

- 1) P (mW)
- 2) R = distance to the center of radiation of antenna (in meter) = 20cm
- 3) MPE limit = 1mW/cm²

For 2.4G WiFi –Antenna1:

The max. antenna gain is 3.42 dBi

Max. Conducted Power P(mW)	Gain in Linear Scale G	Operation Distance R(cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Result
166.72	2.198	20	0.07290	1	Pass

For 2.4G WiFi –Antenna2:

The max. antenna gain is 3.42 dBi

Max. Conducted Power P(mW)	Gain in Linear Scale G	Operation Distance R(cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Result
130.62	2.198	20	0.05711	1	Pass

In MIMO mode:

The max. antenna gain is 6.43 dBi

Max. Conducted Power P(mW)	Gain in Linear Scale G	Operation Distance R(cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Result
200.45	4.395	20	0.17528	1	Pass



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For 5G WiFi-Antenna1:

The max. antenna gain is 2.63 dBi

Max. Conducted Power P(mW)	Gain in Linear Scale G	Operation Distance R(cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Result
20.23	1.832	20	0.00737	1	Pass

For 5G WiFi-Antenna2:

The max. antenna gain is 1.31 dBi

Max. Conducted Power P(mW)	Gain in Linear Scale G	Operation Distance R(cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Result
23.33	1.352	20	0.00628	1	Pass

In MIMO mode:

The max. antenna gain is 5.01 dBi

Max. Conducted Power P(mW)	Gain in Linear Scale G	Operation Distance R(cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Result
38.82	3.170	20	0.02448	1	Pass

2.4G WiFi and 5G WiFi modules can simultaneous transmitting, so the maximum rate of MPE is $0.17528/1.0+0.02448/1.0=0.20 \leq 1.0$. according to the KDB447498 section 7.2 determine the device is exclusion from SAR test

--End of the Report--



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