

1 Cover Page

RF MPE REPORT

Application No.: SHCR2201000082AT
FCC ID: 2AVYF-DB61
IC: 25954-DB61
Applicant: Hangzhou Huacheng Network Technology Co.,Ltd.
Address of Applicant: No.2930, Nanhuan Road, Binjiang District, Hangzhou, China
Manufacturer: Hangzhou Huacheng Network Technology Co.,Ltd.
Address of Manufacturer: No.2930, Nanhuan Road, Binjiang District, Hangzhou, China
Equipment Under Test (EUT):
EUT Name: Video Doorbell
Model No.: DB61i-W-D4
Add Model No.: DB61i,DB61i-W-D4-imou,DB61i-W-D4N-imou,DB61I-USA,DB61I-CAN,DB61iXX-XXXX,DB61iXX-XXX-XXXX,DB61iXX-XX-XXX-XXXX,DB61iXX-XX-XXX-XXXX-XXXX (X can be "0-9", "a-z", "A-Z" or blank)
Standard(s) : FCC Rules 47 CFR §2.1091
KDB447498 D01 General RF Exposure Guidance v06
RSS-102 Issue 5 Amendment 1 (February 2, 2021)
Date of Receipt: 2021-12-19
Date of Test: 2021-12-21 to 2022-01-31
Date of Issue: 2022-02-14

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



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t(86-21) 61915666 f(86-21) 61915678 www.sgsgroup.com.cn
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For IC Model No.:

DB61i-W-D4,DB61i,DB61i-W-D4-imou,DB61i-W-D4N-CAN-imou,DB61i-USA,DB61i-CAN



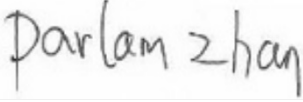
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Revision Record			
Version	Description	Date	Remark
00	Original	2022-02-14	/

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



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3 General Information

3.1 General Description of E.U.T.

Power supply:	AC16V-24V or DC12V-24V, 1A, AC/DC wire-powered or DC5V 2A by USB port DC 3.7V Rechargeable Lithium ion Battery Battery Model: 1S1P 652023P Rate Voltage: 3.7V Charging Limit Voltage: 4.2V Rated Capacity: 0.2Ah/0.74Wh
Serial Number:	8A007AAYAZ6503A
Firmware Version:	20211110

3.2 Technical Specifications

2.4G

Antenna Gain:	Ant 1: 1.58dBi (Provided by the manufacturer) Ant 2: 3.42dBi (Provided by the manufacturer) Directional Gain: 5.56dBi
Antenna Type:	PCB 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



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

5G

Operation Frequency:	Band	Mode	Frequency Range(MHz)	Number 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			
Antenna Gain:	Ant 1: 2.99dBi (Provided by the manufacturer) Ant 2: 2.83dBi (Provided by the manufacturer) Directional Gain:5.92dBi			
Antenna Type:	Antenna 1: PCB Antenna; Antenna 2: PCB Antenna			

Remark: For frequencies falling between 5150-5250 and 5600-5650MHz will not be used in Canada.



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Testing Center E100, Songjiang District, Shanghai, China

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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 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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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

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 2.4G device, the limit of worse case is 2.68 W

For 5G device, the limit of worse case is 4.53W



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5 Measurement and Calculation

5.1 Maximum transmit power

The Power Data is based on the RF Test Report SHCR220100008201-2.4GHz

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	17.73	18.00	NA	59.29	63.10	N/A
11B	2437	17.69	17.92	NA	58.75	61.94	N/A
11B	2462	17.65	17.92	NA	58.21	61.94	N/A
11G	2412	17.05	17.11	NA	50.70	51.40	N/A
11G	2437	17.02	17.09	NA	50.35	51.17	N/A
11G	2462	17.01	17.06	NA	50.23	50.82	N/A
HT20	2412	16.28	16.03	19.17	42.46	40.09	82.60
HT20	2437	16.07	16.07	19.08	40.46	40.46	80.91
HT20	2462	15.98	16.10	19.05	39.63	40.74	80.35
HT40	2422	15.11	15.13	18.13	32.43	32.58	65.01
HT40	2437	16.41	15.42	18.95	43.75	34.83	78.52
HT40	2452	15.14	15.16	18.16	32.66	32.81	65.46



5GHz for FCC:

The Power Data is based on the RF Test Report SHCR220100008202-5GHz

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]
11A	5180	14.85	14.53	/	30.55	28.38	/
	5200	14.24	14.20	/	26.55	26.30	/
	5240	14.27	14.30	/	26.73	26.92	/
	5260	14.69	14.49	/	29.44	28.12	/
	5300	14.63	14.51	/	29.04	28.25	/
	5320	14.51	14.38	/	28.25	27.42	/
	5500	14.36	14.33	/	27.29	27.10	/
	5580	13.91	13.91	/	24.60	24.60	/
	5700	13.72	13.63	/	23.55	23.07	/
	5745	14.41	14.39	/	27.61	27.48	/
	5785	14.47	14.45	/	27.99	27.86	/
	5825	14.83	14.76	/	30.41	29.92	/
11N20	5180	11.82	11.78	14.81	15.21	15.07	30.27
	5200	11.47	11.35	14.42	14.03	13.65	27.67
	5240	11.51	11.28	14.41	14.16	13.43	27.61
	5260	11.48	11.25	14.38	14.06	13.34	27.42
	5300	11.06	11.43	14.26	12.76	13.90	26.67
	5320	11.27	11.30	14.30	13.40	13.49	26.92
	5500	11.62	11.59	14.62	14.52	14.42	28.97
	5580	11.61	11.61	14.62	14.49	14.49	28.97
	5700	11.43	11.38	14.42	13.90	13.74	27.67
	5745	11.61	11.61	14.62	14.49	14.49	28.97
	5785	11.39	11.39	14.40	13.77	13.77	27.54
	5825	11.53	11.49	14.52	14.22	14.09	28.31
11N40	5190	11.71	11.73	14.73	14.83	14.89	29.72
	5230	11.76	11.83	14.81	15.00	15.24	30.27
	5270	11.80	11.75	14.79	15.14	14.96	30.13
	5310	11.40	11.23	14.33	13.80	13.27	27.10
	5510	11.45	11.46	14.47	13.96	14.00	27.99
	5550	11.52	11.51	14.53	14.19	14.16	28.38
	5670	11.42	11.42	14.43	13.87	13.87	27.73
	5755	11.44	11.16	14.31	13.93	13.06	26.98
11AC20	5795	11.82	11.23	14.55	15.21	13.27	28.51
	5180	11.46	10.66	14.09	14.00	11.64	25.64
	5200	11.48	10.70	14.12	14.06	11.75	25.82
	5240	11.45	10.83	14.16	13.96	12.11	26.06
	5260	11.35	12.06	14.73	13.65	16.07	29.72
	5300	11.18	11.74	14.48	13.12	14.93	28.05
	5320	11.79	11.17	14.50	15.10	13.09	28.18
	5500	11.47	12.03	14.77	14.03	15.96	29.99
	5580	11.05	11.02	14.05	12.74	12.65	25.41
	5700	11.26	11.24	14.26	13.37	13.30	26.67
	5745	11.94	11.46	14.72	15.63	14.00	29.65
	5785	11.54	11.52	14.54	14.26	14.19	28.44
	5825	11.84	11.82	14.84	15.28	15.21	30.48



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11AC40	5190	11.04	11.42	14.24	12.71	13.87	26.55
	5230	11.23	11.93	14.60	13.27	15.60	28.84
	5270	11.46	11.39	14.44	14.00	13.77	27.80
	5310	11.36	11.34	14.36	13.68	13.61	27.29
	5510	11.83	11.83	14.84	15.24	15.24	30.48
	5550	11.49	11.53	14.52	14.09	14.22	28.31
	5670	11.35	11.36	14.37	13.65	13.68	27.35
	5755	11.29	11.62	14.47	13.46	14.52	27.99
	5795	11.36	11.65	14.52	13.68	14.62	28.31
11AC80	5210	11.69	11.77	14.74	14.76	15.03	29.79
	5290	11.14	11.73	14.46	13.00	14.89	27.93
	5530	11.81	11.79	14.81	15.17	15.10	30.27
	5610	11.59	11.49	14.55	14.42	14.09	28.51
	5775	11.24	11.53	14.40	13.30	14.22	27.54



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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 FCC:

For 2.4G WiFi - Antenna1:

The max. antenna gain is		1.58	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
59.29	1.439	20	0.01697	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
63.1	2.198	20	0.02759	1	Pass

In MIMO mode:

Two antennas can transmit simultaneously and they are correlated.

The max. antenna gain is		5.56	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
82.6	3.597	20	0.05912	1	Pass



For 5G WiFi - Antenna1:

The max. antenna gain is		2.99	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
30.55	1.991	20	0.01210	1	Pass

For 5G WiFi - Antenna2:

The max. antenna gain is		2.83	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
29.92	1.919	20	0.01142	1	Pass

In MIMO mode:

Two antennas can transmit simultaneously and they are correlated.

The max. antenna gain is		5.92	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
30.48	3.908	20	0.02370	1	Pass

The 2.4GHz WiFi and 5GHz WiFi can transmit simultaneously, but the maximum rate of MPE is $0.05912 / 1 + 0.02370 / 1 = 0.08282 \leq 1$. According to the KDB447498 section 7.2 determine the device is exclusion from SAR test

For IC:

For 2.4GHz WiFi SISO mode:

Antenna 1: $E.I.R.P. = P \cdot G = 0.05929 \times 2.723 = 0.161W < 2.68W$

Antenna 2: $E.I.R.P. = P \cdot G = 0.06310 \times 2.931 = 0.138W < 2.68W$

For 2.4GHz WiFi MIMO mode: $E.I.R.P. = P \cdot G = 0.08260 \times 5.728 = 0.473W < 2.68W$

For 5GHz WiFi SISO mode:

Antenna 1: $E.I.R.P. = P \cdot G = 0.03041 \times 3.097 = 0.094W < 4.53W$

Antenna 2: $E.I.R.P. = P \cdot G = 0.02992 \times 4.797 = 0.146W < 4.53W$

For 5GHz WiFi MIMO mode: $E.I.R.P. = P \cdot G = 0.03048 \times 3.945 = 0.120W < 4.53W$

The 2.4GHz WiFi and 5GHz WiFi can transmit simultaneously, but the maximum rate of MPE is $0.473 / 2.68 + 0.146 / 4.53 = 0.2087 \leq 1$. So the device is exclusion from SAR test.

--End of the Report--



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SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.
Testing Center (China)

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