



**SGS-CSTC Standards Technical Services
(Shanghai) Co., Ltd.**

588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China
 Telephone: +86 (0) 21 6191 5666
 Fax: +86 (0) 21 6191 5678
 ee.shanghai@sgs.com

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1 Cover Page

RF MPE REPORT

Application No.:	SHEM1802001416CR
Applicant:	THE CHAMBERLAIN GROUP, INC.
FCC ID:	HBW-VIDSA1INT
IC:	2666A-VIDSA1INT
Equipment Under Test (EUT):	
NOTE: The following sample(s) was/were submitted and identified by the client as	
Product Name:	Wi-Fi Security Camera
Model No.(EUT):	MYQ-VIDSA1INT
Standards:	FCC Rules 47 CFR §2.1091 KDB447498 D01 General RF Exposure Guidance v06 RSS-102 Issue 5 (March 2015)
Date of Receipt:	2018-02-28
Date of Test:	2018-03-24 to 2018-05-08
Date of Issue:	2018-05-09
Test Result:	Pass*

* In the configuration tested, the EUT detailed in this report complied with the standards specified above.



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	2018-05-08	/

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



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3 General Information

3.1 Client Information

Applicant:	THE CHAMBERLAIN GROUP, INC.
Address of Applicant:	300 Windsor Drive Oakbrook, Illinois, USA 60523
Manufacturer:	THE CHAMBERLAIN GROUP, INC.
Address of Manufacturer:	300 Windsor Drive Oakbrook, Illinois, USA 60523
Factory:	1. Hangzhou Hikvision Technology Co., Ltd. 2. Hangzhou Hikvision Electronics Co., Ltd.
Address of Factory:	1. No.700, Dongliu Road, Binjiang District, Hangzhou City, Zhejiang, 310052, China 2. No.299, Qiushi Road, Tonglu Economic Development Zone, Tonglu County, Hangzhou, Zhejiang, 310052, China.

3.1 General Description of E.U.T.

Power supply:	DC 5V 1A, 4.5W MAX By Adapter Adapter: Model:ED1-050100UA INPUT:100-240V~,50/60Hz,0.2A OUTPUT:5V 1A
Test voltage:	AC 120V
Cable:	DC Cable 300mm for Adapter

3.2 Technical Specifications

BLE:

Antenna Gain	2.1 dBi
Antenna Type	PCB Antenna
Channel Spacing	2MHz
Modulation Type	GFSK
Number of Channels	40
Operation Frequency	2402MHz to 2480MHz
Power Class	<10mW

2.4G:

Antenna Gain	2.1 dBi
Antenna Type	PCB Antenna
Channel Spacing	5MHz
Modulation Type	802.11b: DSSS (CCK, DQPSK, DBPSK) 802.11g/n(HT20): OFDM (64QAM, 16QAM, QPSK, BPSK)
Number of Channels	802.11b/g/n(HT20):11
Operation Frequency	802.11b/g/n(HT20): 2412MHz to 2462MHz



5G:

Antenna Gain	-4 dBi
Antenna Type	PCB Antenna
DFS Function	Slave without Radar detection
TPC Function	Not Support

3.3 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. E&E Lab

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

Tel: +86 21 6191 5666

Fax: +86 21 6191 5678

No tests were sub-contracted.

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-3868,C-4336,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

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

5 Measurement and Calculation

5.1 Maximum transmit power

The Power Data is based on the RF Test Report SHEM180200141601-BLE

Test mode	Channel	Peak Power (dBm)	Peak Power (mW)
GFSK	2402	3.04	2.01
	2440	3.83	2.42
	2480	2.84	1.92

The Power Data is based on the RF Test Report SHEM180200141602-2.4GHz.

Test mode	Test Frequency (MHz)	Average Power (dBm)	Average Power (mW)
802.11b	2412	13.95	24.83
	2437	14.39	27.48
	2462	14.52	28.31
802.11g	2412	12.26	16.83
	2437	12.49	17.74
	2462	12.49	17.74
802.11 n(HT20)	2412	11.71	14.83
	2437	11.95	15.67
	2462	12.08	16.14

The Power Data is based on the RF Test Report SHEM180200141603-5GHz.

Test Mode	Test Frequency (MHz)	Average Power (dBm)	Average Power (mW)	EIRP (dBm)	EIRP (mW)
11A	5180	14.21	26.36	10.21	10.50
11A	5220	13.35	21.63	9.35	8.61
11A	5240	12.75	18.84	8.75	7.50
11A	5260	11.93	15.60	N/A	N/A
11A	5280	11.99	15.81	N/A	N/A
11A	5320	11.54	14.26	N/A	N/A
11A	5500	9.39	8.69	N/A	N/A
11A	5600	10.57	11.40	N/A	N/A
11A	5700	11.65	14.62	N/A	N/A
11A	5720	11.33	13.58	N/A	N/A
11A	5745	12.29	16.94	N/A	N/A
11A	5785	11.89	15.45	N/A	N/A
11A	5825	11.08	12.82	N/A	N/A
11N20	5180	13.84	24.21	9.84	9.64



11N20	5220	12.90	19.50	8.9	7.76
11N20	5240	12.36	17.22	8.36	6.85
11N20	5260	11.48	14.06	N/A	N/A
11N20	5280	11.54	14.26	N/A	N/A
11N20	5320	11.16	13.06	N/A	N/A
11N20	5500	9.07	8.07	N/A	N/A
11N20	5600	10.17	10.40	N/A	N/A
11N20	5700	11.34	13.61	N/A	N/A
11N20	5720	10.98	12.53	N/A	N/A
11N20	5745	11.61	14.49	N/A	N/A
11N20	5785	11.11	12.91	N/A	N/A
11N20	5825	10.13	10.30	N/A	N/A
11N40	5190	12.68	18.54	8.68	7.38
11N40	5230	11.10	12.88	7.1	5.13
11N40	5270	10.75	11.89	N/A	N/A
11N40	5310	10.41	10.99	N/A	N/A
11N40	5510	7.94	6.22	N/A	N/A
11N40	5590	8.99	7.93	N/A	N/A
11N40	5670	10.08	10.19	N/A	N/A
11N40	5710	10.01	10.02	N/A	N/A
11N40	5755	10.57	11.40	N/A	N/A
11N40	5795	10.36	10.86	N/A	N/A
11AC20	5180	13.33	21.53	9.33	8.57
11AC20	5220	12.57	18.07	8.57	7.19
11AC20	5240	11.84	15.28	7.84	6.08
11AC20	5260	11.16	13.06	N/A	N/A
11AC20	5280	10.97	12.50	N/A	N/A
11AC20	5320	10.60	11.48	N/A	N/A
11AC20	5500	8.54	7.14	N/A	N/A
11AC20	5600	9.64	9.20	N/A	N/A
11AC20	5700	10.89	12.27	N/A	N/A
11AC20	5720	10.70	11.75	N/A	N/A
11AC20	5745	11.18	13.12	N/A	N/A
11AC20	5785	10.79	11.99	N/A	N/A
11AC20	5825	9.79	9.53	N/A	N/A

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11AC40	5190	12.92	19.59	8.92	7.80
11AC40	5230	11.54	14.26	7.54	5.68
11AC40	5270	11.14	13.00	N/A	N/A
11AC40	5310	10.43	11.04	N/A	N/A
11AC40	5510	8.16	6.55	N/A	N/A
11AC40	5590	8.87	7.71	N/A	N/A
11AC40	5670	10.41	10.99	N/A	N/A
11AC40	5710	10.31	10.74	N/A	N/A
11AC40	5755	10.77	11.94	N/A	N/A
11AC40	5795	10.55	11.35	N/A	N/A
11AC80	5210	11.60	14.45	7.6	5.75
11AC80	5290	11.10	12.88	N/A	N/A
11AC80	5530	7.87	6.12	N/A	N/A
11AC80	5610	8.36	6.85	N/A	N/A
11AC80	5690	9.64	9.20	N/A	N/A
11AC80	5775	10.32	10.76	N/A	N/A

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5.2 MPE Calculation

For BLE & 2.4G: The best case gain of the antenna is 2.1dBi. 2.1dB logarithmic terms convert to numeric result is nearly 1.62.

For 5G: The best case gain of the antenna is -4dBi. -4dB logarithmic terms convert to numeric result is nearly 0.40.

For BLE:

The Max Conducted Output Power is 3.83dBm (2.42 mW)

For 2.4GHz WiFi:

The Max Conducted average Output Power is 14.52dBm (28.31 mW)

For 5GHz WiFi:

The Max Conducted average Output Power is 14.21dBm (26.36 mW)

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 BLE:

$$S = \frac{PG}{4R^2\pi} = \frac{2.42 \times 1.62}{4 \times 400 \times 3.14} = 0.0008 \text{ mW/cm}^2$$

For 2.4GHz WiFi:

$$S = \frac{PG}{4R^2\pi} = \frac{28.31 \times 1.62}{4 \times 400 \times 3.14} = 0.0091 \text{ mW/cm}^2$$

For 5GHz WiFi:

$$S = \frac{PG}{4R^2\pi} = \frac{26.36}{4 \times 400 \times 3.14} = 0.0052 \text{ mW/cm}^2$$



BLE and 2.4GHz WiFi modules can simultaneous transmitting, so the maximum rate of MPE is

$$\frac{0.0008}{1.0} + \frac{0.0091}{1.0} = 0.0099 \leq 1.0.$$

BLE and 5GHz WiFi modules can simultaneous transmitting, so the maximum rate of MPE is

$$\frac{0.0008}{1.0} + \frac{0.0052}{1.0} = 0.006 \leq 1.0.$$

according to the KDB447498 section 7.2 determine the device is exclusion from SAR test.

For IC:

For BLE:

$$E.I.R.P. = P * G = 0.00242 \times 1.62 = 0.004W < 2.68W$$

For 2.4GHz WiFi:

$$E.I.R.P. = P * G = 0.02831 \times 1.62 = 0.046W < 2.68W$$

For 5GHz WiFi:

$$E.I.R.P. = P * G = 0.02636W < 4.5W$$

BLE and 2.4GHz WiFi modules can simultaneous transmitting, so the maximum rate of MPE is

$$\frac{0.004}{2.68} + \frac{0.046}{2.68} = 0.0187 \leq 1.0.$$

BLE and 5GHz WiFi modules can simultaneous transmitting, so the maximum rate of MPE is

$$\frac{0.004}{2.68} + \frac{0.026}{4.53} = 0.0072 \leq 1.0.$$

So, the device is exclusion from SAR test.

--End of the Report--