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Report No.: SHEM170400212704
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1 Cover Page

RF MPE REPORT

| | |
|---|--|
| Application No.: | SHEM1704002127CR |
| Applicant: | Apollo Tech USA Inc. |
| FCC ID: | 2AML4-MOCAM720 |
| Equipment Under Test (EUT): | |
| NOTE: The following sample(s) was/were submitted and identified by the client as | |
| Product Name: | Dual Band Wifi Video Camera |
| Model No.(EUT): | MOCAM-720-01 |
| Add Model No.: | MOGA-001 |
| Standards: | FCC Rules 47 CFR §2.1091 KDB447498 D01 General RF Exposure Guidance v06 |
| Date of Receipt: | 2017-04-17 |
| Date of Test: | 2017-06-13 to 2017-06-16 |
| Date of Issue: | 2017-06-16 |
| 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
SGS-CSTC (Shanghai) Co., Ltd.

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 | Chapter | Date | Modifier | Remark |
| 00 | | 2017-06-16 | | Original |
| | | | | |
| | | | | |

| | | | |
|---------------------------------|---|--|-------------|
| Authorized for issue by: | | | |
| Tested By |  | | 2017-06-16 |
| | _____ | | _____ |
| | Vincent Zhu /Project Engineer | | Date |
| Checked By |  | | 2017-06-16 |
| | _____ | | _____ |
| | Parlam Zhan /Reviewer | | Date |

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3 General Information

3.1 Client Information

| | |
|--------------------------|---|
| Applicant: | Apollo Tech USA Inc. |
| Address of Applicant: | Tech USA Inc. 8608 Utica Ave #220 Rancho Cucamonga, CA 91730 |
| Manufacturer: | Apollo Tech USA Inc. |
| Address of Manufacturer: | Tech USA Inc. 8608 Utica Ave #220 Rancho Cucamonga, CA 91730 |
| Factory: | 1. Hangzhou Hikvision Technology Co., Ltd. 2. Hangzhou Hikvision Electronics Co., Ltd. |
| Address of Factory: | 1. No.700, Dongliu Road, Binjiang District, Hangzhou Ctiy,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.

| | |
|----------------------|----------------------------------|
| Product Description: | Fixed product with WiFi function |
| Rated Input: | DC 5V via adapter |
| Test Voltage: | AC 120V 60Hz for adapter |

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3.2 Technical Specifications

| | |
|-----------------------|--|
| Operation Frequency: | 2.4GHz WiFi: 802.11 b/g/n(HT20): 2412MHz~2462MHz 802.11 n(HT40): 2422MHz~2452MHz 5GHz WiFi: 802.11a/n(HT20)/ac(HT20): 5180-5240MHz, 5745MHz-5825MHz 802.11n(HT40)/ac(HT40): 5190-5230MHz, 5755MHz-5795MHz 802.11ac(HT80): 5210MHz, 5775MHz |
| Modulation Technique: | 2.4GHz WiFi: 802.11 b: DSSS(CCK, DQPSK, DBPSK) 802.11 g/n(HT20)/n(HT40): OFDM(64QAM, 16QAM, QPSK, BPSK) 5GHz WiFi: OFDM(256QAM, 64QAM, 16QAM, QPSK, BPSK) Remark: 256QAM for 802.11 ac only |
| Data Rate: | 2.4GHz WiFi: 802.11 b: 1/2/5.5/11Mbps 802.11 g: 6/9/12/18/24/36/48/54Mbps 802.11n(HT20)/n(HT40): MCS0-MCS7 5GHz WiFi: 802.11a: 6/9/12/18/24/36/48/54Mbps 802.11n: MCS0-7 802.11ac: MCS0-9 |
| Number of Channel: | 2.4GHz WiFi: 802.11 b/g/n(HT20): 11 802.11 n(HT40): 7 5GHz WiFi: 802.11 a/n(HT20)/ac(HT20): 9 Channel 36, 40, 44, 48, 149, 153, 157, 161, 165 802.11 n(HT40)/ac(HT40): 4 Channel 38, 46, 151, 159 802.11 ac(HT80): 2 Channel 42, 155 |
| Antenna Type: | Antenna :PIFA Antenna |
| Antenna Gain: | 2.4 dBi for 2.4GHz WiFi 0.4 dBi for 5GHz WiFi |

3.3 Test Location

All tests were performed at:

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

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.

- **FCC – Registration No.: 402683**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered and fully described in a report filed with the Federal Communications Commission (FCC). The acceptance letter from the FCC is maintained in our files. Registration No.: 402683.

- **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-2221, G-830 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 |

5 Measurement and Calculation

5.1 Maximum transmit power

The Power Data is based on the RF Test Report SHEM170400212702 & SHEM170400212703

| Test Mode | Channel | Power(dBm) | Power(mW) |
|-----------|---------|------------|---------------|
| 11B | 2412 | 20.89 | 122.74 |
| 11B | 2437 | 21.16 | 130.62 |
| 11B | 2462 | 20.74 | 118.58 |
| 11G | 2412 | 22.45 | 175.79 |
| 11G | 2437 | 22.99 | 199.07 |
| 11G | 2462 | 22.24 | 167.49 |
| 11N20SISO | 2412 | 22.66 | 184.50 |
| 11N20SISO | 2437 | 23.19 | 208.45 |
| 11N20SISO | 2462 | 22.47 | 176.60 |
| 11N40SISO | 2422 | 23.14 | 206.06 |
| 11N40SISO | 2437 | 22.98 | 198.61 |
| 11N40SISO | 2452 | 22.61 | 182.39 |

| Test Mode | Test Channel | Level [dBm] | 10log(1/x) Factor [dB] | Power [dBm] | Power [mW] |
|-----------|--------------|-------------|------------------------|-------------|------------|
| 11A | 5180 | 13.52 | 0.320310371213077 | 13.84 | 24.21 |
| 11A | 5220 | 11.36 | 0.320310371213077 | 11.68 | 14.72 |
| 11A | 5240 | 11.1 | 0.320310371213077 | 11.42 | 13.87 |
| 11A | 5745 | 9.19 | 0.320310371213077 | 8.69 | 7.40 |
| 11A | 5785 | 9.45 | 0.320310371213077 | 8.74 | 7.48 |
| 11A | 5825 | 8.3 | 0.320310371213077 | 9.92 | 9.82 |
| 11AC20 | 5180 | 12.71 | 2.43059763953276 | 15.14 | 32.66 |
| 11AC20 | 5220 | 11.9 | 2.43059763953276 | 14.33 | 27.10 |
| 11AC20 | 5240 | 11.02 | 2.43059763953276 | 13.45 | 22.13 |
| 11AC20 | 5745 | 8.99 | 2.39728339457937 | 11.33 | 13.58 |
| 11AC20 | 5785 | 9.09 | 2.39728339457937 | 10.44 | 11.07 |
| 11AC20 | 5825 | 7.92 | 2.43059763953276 | 10.14 | 10.33 |
| 11AC40 | 5190 | 11.96 | 3.49304020239389 | 15.45 | 35.08 |
| 11AC40 | 5230 | 10.8 | 3.49304020239389 | 14.29 | 26.85 |
| 11AC40 | 5755 | 9.12 | 3.42466112442014 | 12.48 | 17.70 |
| 11AC40 | 5795 | 9.15 | 3.49304020239389 | 12.42 | 17.46 |
| 11N20 | 5180 | 12.97 | 2.21848749616356 | 15.19 | 33.04 |
| 11N20 | 5220 | 11.06 | 2.24608028303388 | 13.31 | 21.43 |
| 11N20 | 5240 | 10.6 | 2.21848749616356 | 12.82 | 19.14 |
| 11N20 | 5745 | 8.44 | 2.21848749616356 | 12.22 | 16.67 |
| 11N20 | 5785 | 8.67 | 2.21848749616356 | 11.13 | 12.97 |
| 11N20 | 5825 | 7.43 | 2.21848749616356 | 11.19 | 13.15 |
| 11N40 | 5190 | 11.8 | 3.23306390375133 | 15.03 | 31.84 |
| 11N40 | 5230 | 10.85 | 3.23306390375133 | 14.08 | 25.59 |
| 11N40 | 5755 | 8.88 | 3.29383113599674 | 13.9 | 24.55 |
| 11N40 | 5795 | 8.82 | 3.23306390375133 | 13.97 | 24.95 |
| 11AC80 | 5210 | 11.96 | 4.51242171426296 | 16.47 | 44.36 |
| 11AC80 | 5775 | 8.95 | 4.51242171426296 | 14 | 25.12 |

5.2 MPE Calculation

The Max Conducted Peak Output Power is 23.19dBm (208.45mW);

The best case gain of the antenna is 2.4dBi. 2.4dB logarithmic terms convert to numeric result is nearly 1.74.

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) = $10^{(Antenna\ gain\ in\ dBi / 10)}$

3) R = distance to the center of radiation of antenna (in meter) = 20cm

4) MPE limit = 1mW/cm²

$$S = \frac{PG}{4R^2\pi} = \frac{208.45 \times 1.74}{4 \times 400 \times 3.14} = 0.07219 \text{ mW/cm}^2$$

The 2.4GHz and the 5GHz modules can't simultaneous transmitting, according to the KDB447498 section 7.1 determine the device is exclusion from SAR test.

6 EUT Constructional Details

Refer to the < External Photos > & < Internal Photos >.

--End of the Report--