



## 1 Cover Page

# RF MPE REPORT

**Application No.:** SHEM1907015208CR  
**FCC ID:** 2ADTD-IOM2400  
**IC:** 20199-IOM2400  
**Applicant:** Hangzhou Hikvision Digital Technology Co., Ltd.  
**Address of Applicant:** No.555 Qianmo Road, Binjiang District, Hangzhou 310052, China  
**Manufacturer:** Hangzhou Hikvision Digital Technology Co., Ltd.  
**Address of Manufacturer:** No.555 Qianmo Road, Binjiang District, Hangzhou 310052, China  
**Factory:** 1, Hangzhou Hikvision Technology Co., Ltd.  
2, Hangzhou Hikvision Electronics Co., Ltd.  
3, Chongqing Hikvision technology 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, No. 118, Haikang Road, Area C, Jianqiao Industrial Park, Dadukou District, Chongqing, 401325, China  
**Equipment Under Test (EUT):**  
**EUT Name:** NETWORK CAMERA  
**Model No.:** DS-2CD2421G0-IW  
**Add Model No.:** DS-2CD2421G0-IDW  
**Trade mark:** HIKVISION  
FCC Rules 47 CFR §2.1091  
**Standard(s) :** KDB447498 D01 General RF Exposure Guidance v06  
RSS-102 Issue 5 (March 2015)  
**Date of Receipt:** 2019-07-17  
**Date of Test:** 2019-07-17 to 2019-07-18  
**Date of Issue:** 2019-07-31

|                     |              |
|---------------------|--------------|
| <b>Test Result:</b> | <b>Pass*</b> |
|---------------------|--------------|

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

Parlan Zhan

Parlan 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.



Unless otherwise agreed in writing, this document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Documents.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.  
**Attention:** To check the authenticity of testing / inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: [CN.Doccheck@sgs.com](mailto:CN.Doccheck@sgs.com)

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

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



| Revision Record |             |            |        |
|-----------------|-------------|------------|--------|
| Version         | Description | Date       | Remark |
| 00              | Original    | 2019-07-31 | /      |
|                 |             |            |        |
|                 |             |            |        |

|                             |  |                                |  |  |
|-----------------------------|--|--------------------------------|--|--|
| Authorized for issue<br>by: |  |                                |  |  |
|                             |  | Vincent Zhu                    |  |  |
|                             |  | Vincent Zhu / Project Engineer |  |  |
|                             |  | Parlam Zhan                    |  |  |
|                             |  | Parlam Zhan / Reviewer         |  |  |



## 2 Contents

|                                                        | Page     |
|--------------------------------------------------------|----------|
| <b>1 COVER PAGE.....</b>                               | <b>1</b> |
| <b>2 CONTENTS .....</b>                                | <b>3</b> |
| <b>3 GENERAL INFORMATION.....</b>                      | <b>4</b> |
| 3.1 GENERAL DESCRIPTION OF E.U.T.....                  | 4        |
| 3.2 TECHNICAL SPECIFICATIONS.....                      | 4        |
| 3.3 TEST LOCATION .....                                | 5        |
| 3.4 TEST FACILITY .....                                | 5        |
| <b>4 TEST STANDARDS AND LIMITS .....</b>               | <b>6</b> |
| 4.1 FCC RADIOFREQUENCY RADIATION EXPOSURE LIMITS:..... | 6        |
| 4.2 IC RADIOFREQUENCY RADIATION EXPOSURE LIMITS:.....  | 6        |
| <b>5 MEASUREMENT AND CALCULATION .....</b>             | <b>7</b> |
| 5.1 MAXIMUM TRANSMIT POWER .....                       | 7        |
| 5.2 MPE CALCULATION .....                              | 8        |



### 3 General Information

#### 3.1 General Description of E.U.T.

|               |                   |
|---------------|-------------------|
| Power supply: | DC 12V by adapter |
| Test voltage: | AC 120V 60Hz      |

#### 3.2 Technical Specifications

|                     |                                                                                 |
|---------------------|---------------------------------------------------------------------------------|
| Antenna Gain        | Antenna 1:2.4 dBi; Antenna 2:2.5 dBi                                            |
| Antenna Type        | Antenna 1:Integral antenna, Antenna 2:Ceramic Antenna                           |
| Channel Spacing     | 5MHz                                                                            |
| Modulation Type     | 802.11b: DSSS (CCK, DQPSK, DBPSK)<br>802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK) |
| Number of Channels  | 802.11b/g/n(HT20):11<br>802.11n(HT40):7                                         |
| Operation Frequency | 802.11b/g/n(HT20): 2412MHz to 2462MHz<br>802.11n(HT40): 2422MHz to 2452MHz      |



### 3.3 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd. Shanghai Branch

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.

- **Innovation, Science and Economic Development Canada**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

IC Registration No.: 8617A-1. CAB identifier: CN0020.

- **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-13868, C-14336, 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 <sup>2</sup> ) | Averaging time(minutes) |
|---------------|------------------------------------|-------------------------|
| 300MHz~1.5GHz | $f/1500$                           | 30                      |
| 1.5GHz~100GHz | 1.0                                | 30                      |

For 2.4G band, the limit is 1.0 mW/cm<sup>2</sup>

### 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 band, the limit of worse case is 2.68 W



## 5 Measurement and Calculation

### 5.1 Maximum transmit power

The Power Data is based on the RF Test Report SHEM190701520801

| Test Mode | Channel | Antenna 1<br>Power[dBm] | Antenna 2<br>Power[dBm] | MIMO<br>Power[dBm] | Antenna 1<br>Power[mW] | Antenna 2<br>Power[mW] | MIMO<br>Power[mW] |
|-----------|---------|-------------------------|-------------------------|--------------------|------------------------|------------------------|-------------------|
| 11B       | 2412    | 16.46                   | 15.05                   | NA                 | <b>44.26</b>           | 31.99                  | NA                |
| 11B       | 2437    | 16.32                   | 15.37                   | NA                 | 42.85                  | 34.43                  | NA                |
| 11B       | 2462    | 15.57                   | 15.47                   | NA                 | 36.06                  | <b>35.24</b>           | NA                |
| 11G       | 2412    | 15.39                   | 11.08                   | NA                 | 34.59                  | 12.82                  | NA                |
| 11G       | 2437    | 15.26                   | 11.45                   | NA                 | 33.57                  | 13.96                  | NA                |
| 11G       | 2462    | 14.61                   | 11.51                   | NA                 | 28.91                  | 14.16                  | NA                |
| 11N20SISO | 2412    | 14.78                   | 11.91                   | 16.59              | 30.06                  | 15.52                  | <b>45.60</b>      |
| 11N20SISO | 2437    | 14.3                    | 10.39                   | 15.78              | 26.92                  | 10.94                  | 37.84             |
| 11N20SISO | 2462    | 14.1                    | 11.48                   | 15.99              | 25.70                  | 14.06                  | 39.72             |
| 11N40SISO | 2422    | 12.99                   | 9.03                    | 14.46              | 19.91                  | 8.00                   | 27.93             |
| 11N40SISO | 2437    | 12.62                   | 10.21                   | 14.59              | 18.28                  | 10.50                  | 28.77             |
| 11N40SISO | 2452    | 12.4                    | 10.35                   | 14.51              | 17.38                  | 10.84                  | 28.25             |

## 5.2 MPE Calculation

For FCC:

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/cm<sup>2</sup>

For 2.4GHz WiFi SISO mode:

Antenna 1:

The max. antenna gain is: 2.4 dBi

| Max. Conducted Power<br>P(mW) | Gain in Linear Scale<br>G | Operation Distance<br>R(cm) | Power Density<br>(mW/cm <sup>2</sup> ) | Limit<br>(mW/cm <sup>2</sup> ) | Result |
|-------------------------------|---------------------------|-----------------------------|----------------------------------------|--------------------------------|--------|
| 44.26                         | 1.738                     | 20                          | 0.01530                                | 1                              | Pass   |

Antenna 2:

The max. antenna gain is: 2.5 dBi

| Max. Conducted Power<br>P(mW) | Gain in Linear Scale<br>G | Operation Distance<br>R(cm) | Power Density<br>(mW/cm <sup>2</sup> ) | Limit<br>(mW/cm <sup>2</sup> ) | Result |
|-------------------------------|---------------------------|-----------------------------|----------------------------------------|--------------------------------|--------|
| 35.24                         | 1.778                     | 20                          | 0.01247                                | 1                              | Pass   |

For 2.4GHz WiFi MIMO mode:

The max. antenna gain is: 5.46 dBi

| Max. Conducted Power<br>P(mW) | Gain in Linear Scale<br>G | Operation Distance<br>R(cm) | Power Density<br>(mW/cm <sup>2</sup> ) | Limit<br>(mW/cm <sup>2</sup> ) | Result |
|-------------------------------|---------------------------|-----------------------------|----------------------------------------|--------------------------------|--------|
| 45.6                          | 3.516                     | 20                          | 0.03189                                | 1                              | Pass   |

For IC:

For 2.4GHz WiFi SISO mode:

Antenna 1: E.I.R.P. = P\*G = 0.04426×1.738=0.0769W<2.68W

Antenna 2: E.I.R.P. = P\*G = 0.03524×1.778=0.0627W<2.68W

For 2.4GHz WiFi MIMO mode: E.I.R.P. = P\*G = 0.0456×3.516=0.16W<2.68W

So the device is exclusion from SAR test.

**--End of the Report--**