# 1 Cover Page

# *RF Exposure Evaluation Report*

| | |
|---|---|
| **Application No.:** | KSEM2108001507CR |
| **FCC ID:** | 2AXVM-HM-TR23 |
| **IC:** | 26572-HMTR23 |
| **Applicant:** | Hangzhou Microimage Software Co., Ltd. |
| **Address of Applicant:** | Room 313, Unit B, Building 2, 399 Danfeng Road, Xixing Subdistrict,Binjiang District, Hangzhou, Zhejiang |
| **Manufacturer:** | Hangzhou Microimage Software Co., Ltd. |
| **Address of Manufacturer:** | Room 313, Unit B, Building 2, 399 Danfeng Road, Xixing Subdistrict,Binjiang District, Hangzhou, Zhejiang |
| **Factory:** | Hangzhou Microimage Intelligent Technology Co., Ltd. |
| **Address of Factory:** | Floor 2, Building A1, 299 Qiushi Road, Tonglu Economic Development Zone, Tonglu County, Hangzhou City, Zhejiang Province |
| **Equipment Under Test (EUT):** | |
| **EUT Name:** | Thermal Image Scope |
| **Model No.:** | HM-TR23-35XG/W-PH35L; HM-TR23-50XG/W-PH50L; HM-TR26-35XG/W-PQ35L; HM-TR26-50XG/W-PQ50L |
| **Trade mark:** | Thermal Image Scope |
| **Standard(s) :** | FCC Rules 47 CFR §2.1093<br>RSS-102 Issue 5 Amendment 1 (February 2, 2021) |
| **Date of Receipt:** | 2021-08-27 |
| **Date of Test:** | 2021-09-18 to 2021-09-25 |
| **Date of Issue:** | 2021-09-26 |
| **Test Result:** | **Pass*** |

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

Eric Lin
EMC Lab Manager

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| Revision Record | | | |
|---|---|---|---|
| **Version** | **Description** | **Date** | **Remark** |
| 00 | Original | 2021-09-26 | / |
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| **Authorized for issue by:** | | | | |
| | | Damon zhou | | |
| | | **Damon Zhou / Project Engineer** | | |
| | | Eric Lin | | |
| | | **Eric Lin / Reviewer** | | |

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# 3 General Information

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

| | |
|---|---|
| Power supply: | DC 3.6V, 3350mAh by rechargeable lithium battery |

## 3.2 Technical Specifications

2.4GHz

| | |
|---|---|
| Antenna Gain: | 1dBi (Provided by the manufacturer) |
| Antenna Type: | PCB Antenna |
| Channel Spacing: | 5MHz |
| Data Rate: | 802.11b: 1/2/5.5/11Mbps,<br>802.11g: 6/9/12/18/24/36/48/54Mbps<br>802.11n: MCS 0 to 7 for HT20MHz; MCS 0 to 7 for HT40MHz |
| 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 |
| Firmware version: | V5.5.28 build 211021 |
| S/N: | C12345678 |

## 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.

# 4 Test Standards and Limits

## 4.1 DUT Antenna Locations

Note 1) The distance between WIFI antenna and handle of the EUT is <5mm.
2) The distance between WIFI antenna and the head of human is 80mm.
3) Only the handle is in contact with human hand in practical use condition.

## 4.2 FCC Radiofrequency radiation exposure limits:

a) The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

[(max power of channel)/(min test separation distance)]*[√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

- f(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm
- The result is rounded to one decimal place for comparison
- 3.0 and 7.5 are referred to as the numeric thresholds

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm, and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm according to 4.1 f) is applied to determine SAR test exclusion.

b) For 100 MHz to 6 GHz and test separation distances > 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following (also illustrated in Appendix B):32

1) {[Power allowed at numeric threshold for 50 mm in step a)] + [(test separation distance – 50 mm) • (f(MHz)/150)]} mW, for 100 MHz to 1500 MHz

2){[Power allowed at numeric threshold for 50 mm in step a)] + [(test separation distance – 50mm) • 10]} mW, for > 1500 MHz and ≤ 6 GHz

The practical use condition for this device is as a limb-worn and head accessories. So the applicable limit are both 10-g and 1-g SAR.

The practical use condition for this device is as a limb accessories. So the applicable limit is

For the hand: $P_{max} \leqslant 7.5 / (\sqrt{f} / D_{min}) = 7.5 / (\sqrt{2.452} / 5) = 23.95mW$

For the head: $D_{min} \geqslant [Pt – (3/\sqrt{f})*d1] / 10 + 50 = [7.85 – (3/(\sqrt{2.452})*50)]/10+50=41.21mm$

## 4.3 IC Radiofrequency radiation exposure limits:

According to RSS-102 section 2.5.1, SAR evaluation is required if the separation distance between the user and/or bystander and the antenna and/or radiating element of the device is less than or equal to 20 cm, except when the device operates at or below the applicable output power level (adjusted for tune-up tolerance) for the specified separation distance defined in Table 1.

**Table 1: SAR evaluation - Exemption limits for routine evaluation based on frequency and separation distance [4, 5]**

| Frequency (MHz) | Exemption Limits (mW) | | | | |
|---|---|---|---|---|---|
| | At separation distance of ≤5 mm | At separation distance of 10 mm | At separation distance of 15 mm | At separation distance of 20 mm | At separation distance of 25 mm |
| ≤300 | 71 mW | 101 mW | 132 mW | 162 mW | 193 mW |
| 450 | 52 mW | 70 mW | 88 mW | 106 mW | 123 mW |
| 835 | 17 mW | 30 mW | 42 mW | 55 mW | 67 mW |
| 1900 | 7 mW | 10 mW | 18 mW | 34 mW | 60 mW |
| 2450 | 4 mW | 7 mW | 15 mW | 30 mW | 52 mW |
| 3500 | 2 mW | 6 mW | 16 mW | 32 mW | 55 mW |
| 5800 | 1 mW | 6 mW | 15 mW | 27 mW | 41 mW |

| Frequency (MHz) | Exemption Limits (mW) | | | | |
|---|---|---|---|---|---|
| | At separation distance of 30 mm | At separation distance of 35 mm | At separation distance of 40 mm | At separation distance of 45 mm | At separation distance of ≥ 50 mm |
| ≤300 | 223 mW | 254 mW | 284 mW | 315 mW | 345 mW |
| 450 | 141 mW | 159 mW | 177 mW | 195 mW | 213 mW |
| 835 | 80 mW | 92 mW | 105 mW | 117 mW | 130 mW |
| 1900 | 99 mW | 153 mW | 225 mW | 316 mW | 431 mW |
| 2450 | 83 mW | 123 mW | 173 mW | 235 mW | 309 mW |
| 3500 | 86 mW | 124 mW | 170 mW | 225 mW | 290 mW |
| 5800 | 56 mW | 71 mW | 85 mW | 97 mW | 106 mW |

The practical use condition for this device is as a limb accessories. So the applicable limit is

For the hand: 4*2.5=10mW

For the head: 309mW

# 5 Measurement and Calculation

## 5.1 Maximum transmit power

The Power Data is based on the RF Test Report KSEM210800150701

2.4GHz

| Test Mode | Test Channel | Ant | Power [dBm] | Power [mW] |
|---|---|---|---|---|
| 11B | 2412 | Ant1 | 8.67 | 7.36 |
| 11B | 2437 | Ant1 | 8.76 | 7.52 |
| 11B | 2462 | Ant1 | 8.61 | 7.26 |
| 11G | 2412 | Ant1 | 8.53 | 7.13 |
| 11G | 2437 | Ant1 | 8.53 | 7.13 |
| 11G | 2462 | Ant1 | 8.16 | 6.55 |
| 11N20SISO | 2412 | Ant1 | 7.82 | 6.05 |
| 11N20SISO | 2437 | Ant1 | 8.93 | 7.82 |
| 11N20SISO | 2462 | Ant1 | 8.45 | 7.00 |
| 11N40SISO | 2422 | Ant1 | 8.43 | 6.97 |
| 11N40SISO | 2437 | Ant1 | 8.94 | 7.83 |
| 11N40SISO | 2452 | Ant1 | 8.95 | 7.85 |

## 5.2 MPE Calculation

The Max Conducted Peak Output Power is 7.85mW. The best case gain of the antenna is 1dBi logarithmic terms convert to numeric result is nearly 1.26

For FCC:

For the hand: P = 7.85mW < 23.95mW

For the head: $D_{min}$= 8mm < 41.21mm

For IC:

E.I.R.P.= P*G = 7.85 * 1.26 = 9.89mW < 10mW < 309mW

So the SAR report is not required.

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