# EMC TEST REPORT

| | | |
|---|---|---|
| Test Report No. | : | KES-E1-19T0541 |
| Date of Issue | : | Sep. 06, 2019 |
| Product name | : | NETWORK CAMERA |
| Model/Type No. | : | QNV-6024RM |
| Variant Mode | : | - |
| Applicant | : | Hanwha Techwin Co., Ltd. |
| Applicant Address | : | 6, Pangyo-ro 319 Beon-gil, Bundang-gu, Seongnam-si, Gyeonggi-do, 13488, KOREA |
| Manufacturer | : | 1. HANWHA TECHWIN (TIANJIN) CO.,LTD.<br>2. HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.<br>3. D-TECH CO.,LTD. |
| Manufacturer Address | : | 1. No.11 Weiliu Rd,Micro-Electronic Industrial Park, TEDA,Tianjin, 300385,People's Republic of China<br>2. Lot O-2, Que Vo Industrial Zone extended area, Nam Son commune, Bac Ninh city, Bac Ninh province, Vietnam<br>3. 173-25, Saneop-ro, Gwonseon-gu, Suwon-si, Gyeonggi- do, Korea (Suwon Industrial Complex) |
| Equipment authorization | : | Supplier's Declaration of Conformity |
| Date of Receipt | : | Aug. 29, 2019 |
| Test date | : | Sep. 01, 2019 |
| Test Results | : | ☒ **In Compliance** ☐ **Not in Compliance** |

*Tested by*



Min Seong, Kim
EMC Test Engineer

*Reviewed by*



Dong-Hun, Jang
EMC Technical Manager

This test report is not related to KS Q ISO/IEC 17025 and KOLAS.

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# REPORT REVISION HISTORY

| Date | Test Report No. | Revision History |
|---|---|---|
| Sep. 06, 2019 | KES-E1-19T0541 | Issued |
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# 1.0 General Product Description

## Main Specifications of EUT are:

| | |
|---|---|
| **Video** | |
| Imaging Device | 1/2.8" 2MP CMOS |
| Effective Pixels | 1920(H)x1080(V) |
| NETD | None |
| Pixel Size | None |
| Min. Illumination | Color: 0.1Lux(F2.0, 1/30sec) (TBD)<br>BW: 0Lux(IR LED on) |
| Video Out | CVBS: 1.0 Vp-p / 75Ω composite, 720x480(N), 720x576(P)<br>for installation |
| **Lens** | |
| Focal Length (Zoom Ratio) | 3.6mm fixed focal |
| Max. Aperture Ratio | F2.0 |
| Angular Field of View | H: 94.8° / V: 49.3° / D: 114.3° (TBD) |
| Min. Object Distance | (TBD) |
| **Pan / Tilt / Rotate** | |
| Pan / Tilt / Rotate Range | ±5° / 0°~67° / ±90° |
| **Operational** | |
| IR Viewable Length | 15m(49.21ft) |
| Camera Title | Displayed up to 85 characters |
| Day & Night | Auto(ICR) |
| Backlight Compensation | BLC, WDR, SSDR |
| Wide Dynamic Range | 120dB |
| Digital Noise Reduction | SSNR |
| Digital Image Stabilization | None |
| Defog | None |
| Motion Detection | 4ea, polygonal zones |
| Privacy Masking | 6ea, rectangular zones |
| Gain Control | Low / Middle / High |
| White Balance | ATW / AWC / Manual / Indoor / Outdoor |
| LDC | Support |
| Electronic Shutter Speed | Minimum / Maximum / Anti flicker (1/5~1/12,000sec) |

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| | |
|---|---|
| Digital PTZ | None |
| Video Rotation | Flip, Mirror, Hallway view(90°/270°) |
| Analytics | Defocus detection, Directional detection, Motion detection, Enter/Exit, Tampering, Virtual line |
| Business Intelligence | None |
| Serial Interface | None |
| Alarm I/O | None |
| Alarm Triggers | Analytics, Network disconnect |
| Alarm Events | File upload via FTP and e-mail<br>Notification via e-mail<br>SD/SDHC/SDXC or NAS recording at event triggers |
| Audio In | Selectable(mic in/line in/built-in mic) |
| Audio Out | Line out, Max.output level: 1Vrms |
| **Network** | |
| Ethernet | M12 (10/100BASE-T) |
| Video Compression | H.265/H.264: Main/Baseline/High, MJPEG |
| Resolution | 1920x1080, 1280x960, 1280x720, 800x600, 800x448, 720x576, 720x480, 640x480, 640x360 |
| Max. Framerate | H.265/H.264: Max.60fps/50fps(60Hz/50Hz)<br>MJPEG: Max.30fps/25fps(60Hz/50Hz) |
| Smart Codec | WiseStreamⅡ |
| Video Quality Adjustment | H.264/H.265: Target bitrate level control<br>MJPEG: Quality Level control |
| Bitrate Control | H.264/H.265: CBR or VBR<br>MJPEG: VBR |
| Streaming | Unicast(6 users) / Multicast<br>Multiple streaming (Up to 3 profiles) |
| Audio Compression | G.711 u-law /G.726 Selectable<br>G.726(ADPCM) 8KHz, G.711 8KHz<br>G.726: 16Kbps, 24Kbps, 32Kbps, 40Kbps |
| Protocol | IPv4, IPv6, TCP/IP, UDP/IP, RTP(UDP), RTP(TCP), RTCP, RTSP, NTP, HTTP, HTTPS, SSL/TLS, DHCP, FTP, SMTP, ICMP, IGMP, SNMPv1/v2c/v3(MIB-2), ARP, DNS, DDNS, QoS, UPnP, Bonjour, LLDP |

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| | |
|---|---|
| Security | HTTPS(SSL) Login Authentication<br>Digest Login Authentication<br>IP Address Filtering<br>User access Log<br>802.1X Authentication(EAP-TLS, EAP-LEAP) |
| Edge Storage | Micro SD/SDHC/SDXC 1slot 128GB |
| Application Programming Interface | ONVIF Profile S/G/T<br>SUNAPI(HTTP API)<br>Wisenet open platform |
| Webpage Language | English, Korean, Chinese, French, Italian, Spanish, German, Japanese, Russian, Swedish, Portuguese, Czech, Polish, Turkish, Dutch |
| Web Viewer | Supported OS: Windows 7, 8.1, 10, Mac OS X 10.12, 10.13, 10.14<br>Recommended Browser: Google Chrome<br>Supported Browser: MS Explore11, MS Edge, Mozilla Firefox(Window 64bit only), Apple Safari(Mac OS X only) |
| Memory | 512MB RAM, 256MB Flash |
| **Environmental** | |
| Operating Temperature / Humidity | -30°C ~ +55°C(-22°F ~ +131°F) / Less than 90% RH |
| Storage Temperature / Humidity | -50°C ~ +60°C(-58°F ~ +140°F) / Less than 90% RH |
| Certification | IP66, IK10, NEMA4X<br>EN55011:2009+A1:2010, EN50581:2012,EN50121-3-2:2015, EN61000-4-2:2009,<br>EN61000-4-3:2006+A2:2010, EN61000-4-4:2012, EN61000-4-5:2014<br>EN61000-4-6:2009, EN50155:2007<br>EN45545-2, NFPA130, BSS7239, E-mark |
| **Electrical** | |
| Input Voltage | PoE(IEEE802.3af, Class3) |
| Power Consumption | PoE: Max 6.70W, typical 5.00W |
| **Mechanical** | |
| Color / Material | Ivory / Aluminum |
| RAL Code | None |
| Product dimensions / weight | 98.9x52.0x100.0mm(3.89x2.05x3.94"), 295g(0.65 lb) |

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## 1.1 Test Voltage & Frequency

Unless indicated otherwise on the individual data sheet or test results, the test voltage and frequency was as indicated below.

Voltage ☐ 230 Vac ☐ 120 Vac ☐ 24 Vac ☐ 12 Vdc ☒ PoE

Frequency ☐ 50 Hz ☐ 60 Hz ☐ Hz

## 1.2 Variant Model Differences

Not applicable

## 1.3 Device Modifications

Not applicable

## 1.4 Equipment Under Test

| Description | Model Number | Serial Number | Manufacturer | Remarks |
|---|---|---|---|---|
| NETWORK CAMERA | QNV-6024RM | - | HANWHA TECHWIN(TIANJIN) CO., LTD | EUT |

## 1.5 Support Equipments

| Description | Model Number | Serial Number | Manufacturer | Remarks |
|---|---|---|---|---|
| PoE Adapter | PT-PSE109GBRO-AH | - | Dongguan PROCET Network Technology Co.,Ltd | - |
| Notebook | NT730U3E | JJRE91CF200065A | Samsung Electronics Co., Ltd. | - |
| Notebook Adapter | PA-1600-66 | AD-6019P | LITEON | - |
| Speaker | BR1000A Cuve Black 2 | - | DONGGUAN EDIFIER TECHNOLOGY Co., Ltd | - |
| MIC | MP1000 | - | - | - |

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## 1.6 External I/O Cabling

| Start | | END | | Cable Spec. | |
|---|---|---|---|---|---|
| Description | I/O Port | Description | I/O Port | Length | Shield |
| NETWORK CAMERA (EUT) | RJ-45 | PoE Adapter | RJ-45 | 3.0 | U |
| | Speaker | Speaker | 3.5 ㎜ | 1.4 | U |
| | MIC | MIC | XLR | 1.4 | U |
| Notebook | RJ-45 | PoE Adapter | RJ-45 | 1.8 | U |

* Unshielded=U, Shielded=S

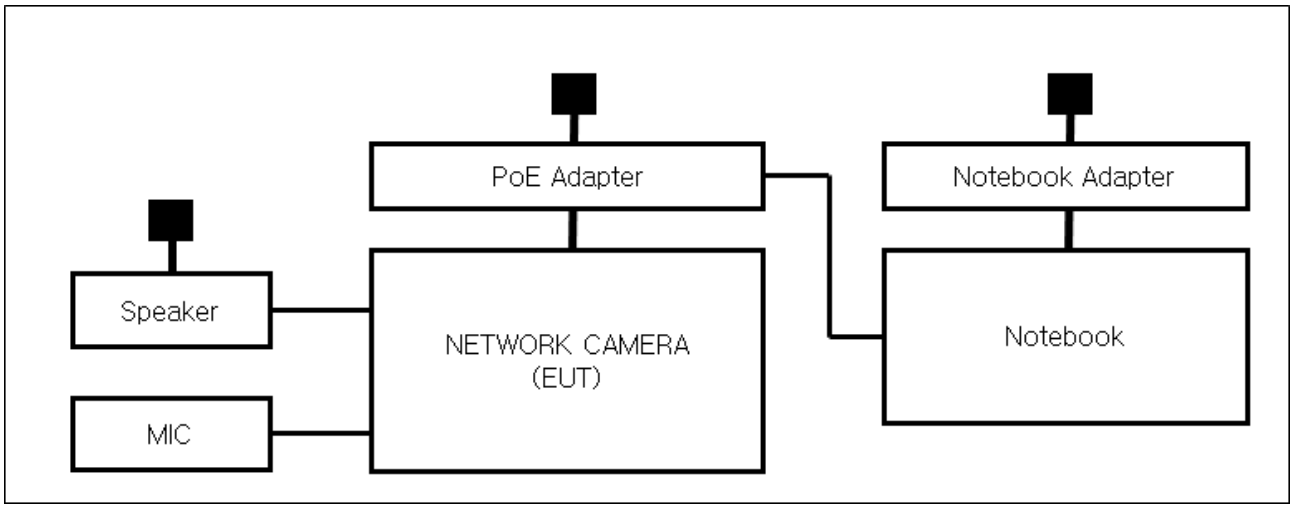
## 1.7 EUT Operating Mode(s)

| Test mode | operating |
|---|---|
| OP | EUT Monitoring, Ping Test |

| EUT Test operating S/W | | |
|---|---|---|
| Name | Version | Manufacture Company |
| Web Viewer | - | - |

## 1.8 Configuration

■ AC Main
□ DC Main




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## 1.9 Remarks when standards applied

N/A

## 1.10 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less.

## 1.11 Test Facility

The measurement facility is located at 473-21 Gayeo-ro, Yeoju-si, Gyeonggi-do, 12658, Korea. The sites are constructed in conformance with the requirements of ANSI C63.4:2014 and CISPR 16-1-4:2012

## 1.12 Laboratory Accreditations and Listings

| Country | Agency | Scope of Accreditation | Logo |
|---|---|---|---|
| KOREA | **RRA** | EMI (3 m & 10 m Semi-Anechoic Chamber , 10 m Open Area and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions) | KR0100 |
| International | **KOLAS** | EMI (3 m & 10 m Semi-Anechoic Chamber , and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions) | KT489 |
| USA | **FCC** | 3 m & 10 m Semi-Anechoic Chamber, 10 m Open Area and Conducted test site to perform FCC Part 15/18 measurements. | KR0100 |
| Canada | **ISED** | 3 m & 10 m Semi-Anechoic Chamber and Conducted test site | 23298-1 |
| JAPAN | **VCCI** | Mains Ports Conducted Interference Measurement, Telecommunication Ports Conducted Disturbance Measurement and Radiation 10 meter site, Facility for measuring radiated disturbance above 1 GHz | R-20056, C-20036, T-20040, G-20057 |
| Europe | **TÜV SÜD** | EMI (3 m & 10 m Semi-Anechoic Chamber , 10 m Open Area and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions) | CARAT 001633 0003 |

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# 2.0 Test Regulations

The emissions tests were performed according to following regulations:

☐ **EMC – Directive 2014/30/EU**

| | | |
|---|---|---|
| ☐ EN 61000-6-3:2011 | | |
| ☐ EN 61000-6-1:2007 | | |
| ☐ EN 61000-6-4:2007 +A1:2011 | | |
| ☐ EN 61000-6-2:2005 | | |
| ☐ EN 55011:2007 +A1:2010 | ☐ Group 1<br>☐ Class A | ☐ Group 2<br>☐ Class B |
| ☐ EN 55014-1:2006 +A2:2011 | | |
| ☐ EN 55014-2:1997 +A2:2008 | | |
| ☐ EN 55015:2013 | | |
| ☐ EN 55032:2015 | ☐ Class A | ☐ Class B |
| ☐ EN 55024:2010 | | |
| ☐ EN 50130-4:2011 +A1:2014 | | |
| ☐ EN 61000-3-2:2014 | | |
| ☐ EN 61000-3-3:2013 | | |
| ☐ EN 61326-1:2013 | | |

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| | | |
|---|---|---|
| ☐ **VCCI-CISPR 32:2016** | ☐ Class A | ☐ Class B |
| ☐ **AS/NZS CISPR32:2015** | ☐ Class A | ☐ Class B |
| ☒ **47 CFR Part 15, Subpart B** | | |
| ☐ CISPR 22:2009 +A1:2010 | ☐ Class A | ☐ Class B |
| ☒ ANSI C63.4-2014 | ☒ Class A | ☐ Class B |
| ☒ **IC Regulation ICES-003 : 2016** | | |
| ☐ CAN/CSA CISPR 22-10 | ☐ Class A | ☐ Class B |
| ☒ ANSI C63.4-2014 | ☒ Class A | ☐ Class B |

☐ **RE– Directive 2014/53/EU**

☐ EN 301 489-1 V1.9.2

- ☐ Equipment for fixed use
- ☐ Equipment for vehicular use
- ☐ Equipment for portable use

☐ EN 301 489-3 V1.6.1

☐ EN 301 489-17 V2.2.1

☐ EN 60945:2002

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# 2.1 Conducted Emissions at Mains Power Ports

### Test Date
N/A

### Test Location
Electro wave Shieldroom

### Test Equipment

| Used | Description | Model Number | Manufacturer | Serial Number | Cal. Due |
|---|---|---|---|---|---|
| ☐ | EMI Test S/W | EMC32 | R & S | 9.12.00 | - |
| ☐ | EMI TEST RECEIVER | ESR3 | R & S | 101781 | 04, 22, 2020 |
| ☐ | LISN | ENV216 | R & S | 101787 | 01, 04, 2020 |
| ☐ | LISN | ESH2-Z5 | R & S | 100450 | 04, 22, 2020 |
| ☐ | PULSE LIMITER | ESH3-Z2 | R & S | 101915 | 11, 26, 2019 |

### Test Conditions
Temperature: ℃
Relative Humidity: % R.H.

### Frequency Range of Measurement
150 ㎑ to 30 ㎒

### Instrument Settings
IF Band Width: 9 ㎑

### Test Results
The requirements are:

☐ PASS
☐ NOT PASS
☒ NOT APPLICABLE

### Remarks
It is not tested apply because it is powered by PoE

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## 2.2 Radiated Electric Field Emissions(Below 1 ㎓)

**Test Date**
Sep. 01, 2019

**Test Location**
☐ OPEN AREA TEST SITE #2 ☒ SEMI ANECHOIC CHAMBER #4(10 m)

**Test Equipment**

| Used | Description | Model Number | Manufacturer | Serial Number | Cal. Due |
|---|---|---|---|---|---|
| ☒ | EMI Test S/W | EP5/RE | TOYO Corporation | 6.0.0 | - |
| ☒ | EMI TEST RECEIVER | ESU26 | R & S | 100551 | 04, 09, 2020 |
| ☒ | AMPLIFIER | SCU 01 | R & S | 100603 | 11, 26, 2019 |
| ☒ | TRILOG-BROADBAND ANTENNA | VULB9163 | Schwarzbeck | 715 | 11, 29, 2020 |
| ☒ | ATTENUATOR | 8491A | HP | 32173 | 03, 11, 2020 |

**Test Conditions**
Temperature: 23,0 ℃
Relative Humidity: 49,0 % R.H.

**Frequency Range of Measurement**
30 ㎒ to 1 ㎓

**Instrument Settings**
IF Band Width: 120 ㎑

**Test Results**
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

**Remarks**
See Appendix A for test data.

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# 2.3 Radiated Electric Field Emissions(Above 1 ㎓)

**Test Date**
Sep. 01, 2019

**Test Location**
SEMI ANECHOIC CHAMBER #4(10 m)

**Test Equipment**

| Used | Description | Model Number | Manufacturer | Serial Number | Cal. Due |
|---|---|---|---|---|---|
| ☒ | EMI Test S/W | EP5/RE | TOYO Corporation | 6.0.0 | - |
| ☒ | EMI TEST RECEIVER | ESU26 | R & S | 100551 | 04, 09, 2020 |
| ☒ | PREAMPLIFIER | 8449B | AGILENT | 3008A01742 | 01, 08, 2020 |
| ☐ | ATTENUATOR | 8491A | HP | 35496 | 03, 11, 2020 |
| ☒ | DOUBLE RIDGED HORN ANTENNA | SAS-571 | A.H.SYSTEM,INC | 781 | 03, 12, 2021 |

**Test Conditions**
Temperature: 23,0 ℃
Relative Humidity: 49,0 % R.H.

**Frequency Range of Measurement**
1 ㎓ to 5 ㎓

**Instrument Settings**
IF Band Width: 1 ㎒

**Test Results**
The requirements are:
☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

**Remarks**
See Appendix A for test data.

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# APPENDIX A – TEST DATA

## Conducted Emissions at Mains Power Ports

HOT LINE

N/A

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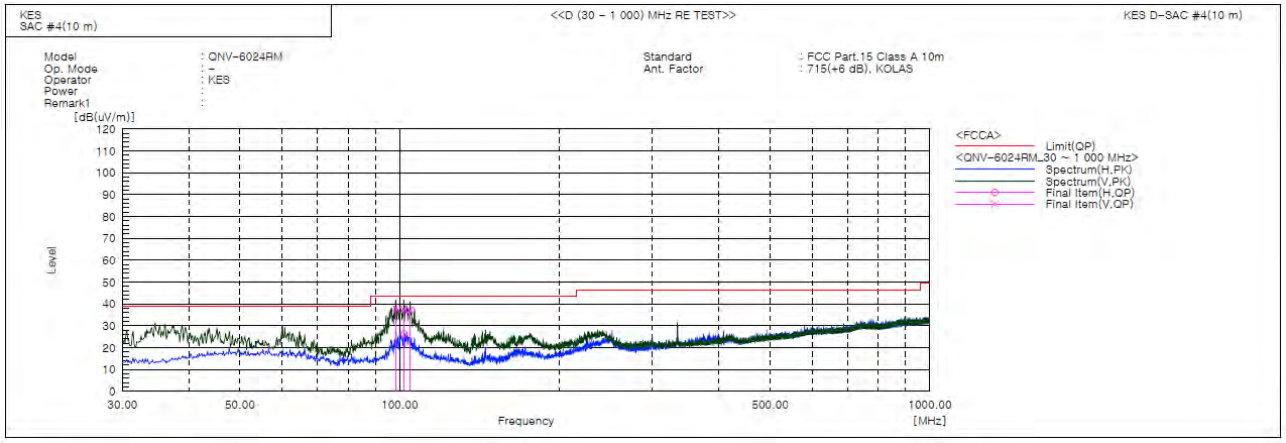
NEUTRAL LINE

N/A

◆ Calculation
QuasiPeak[dBuV] / CAverage [dBuV] = Reading Value[dBuV] + Corr. [dB]
QuasiPeak / CAverage : The Final Value
Reading Value : Not shown in the table.
Corr. : Correction values (LISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

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## Radiated Electric Field Emissions(Below 1 ㎓)



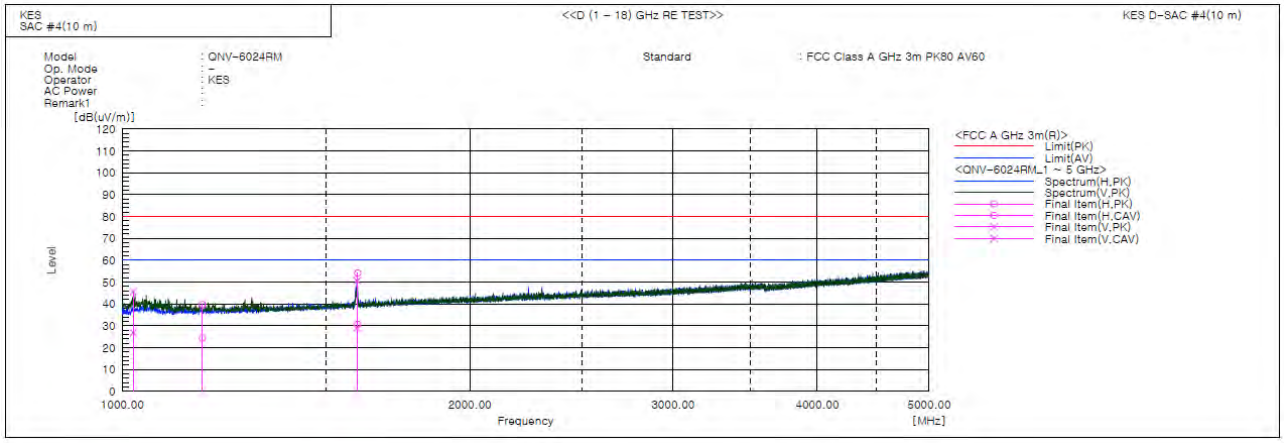

Final Result

| No. | Frequency [MHz] | (P) | Reading QP [dB(uV)] | c.f [dB(1/m)] | Result QP [dB(uV/m)] | Limit QP [dB(uV/m)] | Margin QP [dB] | Height [cm] | Angle [deg] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 98.385 | V | 60.5 | -22.6 | 37.9 | 43.5 | 5.6 | 150.0 | 260.0 | |
| 2 | 101.890 | V | 60.1 | -22.4 | 37.7 | 43.5 | 5.8 | 109.0 | 248.0 | |
| 3 | 101.901 | H | 48.7 | -22.4 | 26.3 | 43.5 | 17.2 | 400.0 | 323.0 | |
| 4 | 104.690 | V | 59.5 | -22.4 | 37.1 | 43.5 | 6.4 | 141.0 | 240.0 | |

♦ Calculation – SAC #4(10 m)
Result(QP) [㏈(㎶/m)] = (Reading(QP)[㏈(㎶)] + c.f[㏈(1/m)]
Margin(QP)[㏈] = Limit[㏈(㎶/m)] - Result(QP) [㏈(㎶/m)]
Reading(QP) : Reading value, Result(QP) : Reading value + Factor value
Limit(QP) : Limit value, c.f : (ANT Factor + Cable Loss - Preamp Factor), Margin: Margin value

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## Radiated Electric Field Emissions(Above 1 GHz)




Final Result

| No. | Frequency [MHz] | (P) | Reading PK [dB(uV)] | Reading CAV [dB(uV)] | c.f [dB(1/m)] | Result PK [dB(uV/m)] | Result CAV [dB(uV/m)] | Limit PK [dB(uV/m)] | Limit AV [dB(uV/m)] | Margin PK [dB] | Margin CAV [dB] | Height [cm] | Angle [deg] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1022.125 | V | 52.3 | 33.5 | -6.7 | 45.6 | 26.8 | 80.0 | 60.0 | 34.4 | 33.2 | 132.0 | 55.0 | |
| 2 | 1173.285 | H | 45.0 | 29.7 | -5.3 | 39.7 | 24.4 | 80.0 | 60.0 | 40.3 | 35.6 | 327.0 | 62.0 | |
| 3 | 1597.280 | V | 52.2 | 30.6 | -1.6 | 50.6 | 29.0 | 80.0 | 60.0 | 29.4 | 31.0 | 100.0 | 258.0 | |
| 4 | 1599.365 | H | 55.7 | 32.3 | -1.6 | 54.1 | 30.7 | 80.0 | 60.0 | 25.9 | 29.3 | 388.0 | 51.0 | |

♦ Calculation

Result(PK/CAV) [dB(μV/m)] = (Reading(PK/CAV)[dB(μV)] + c.f[dB(1/m)]

Margin(PK/CAV)[dB] = Limit[dB(μV/m)] - Result(PK/CAV) [dB(μV/m)]

Reading(PK/CAV) : Reading value, Result(PK/CAV) : Reading value + Factor value

Limit(QP) : Limit value, c.f : (ANT Factor + Cable Loss - Preamp Factor), Margin: Margin value

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# Test Setup Photos and Configuration

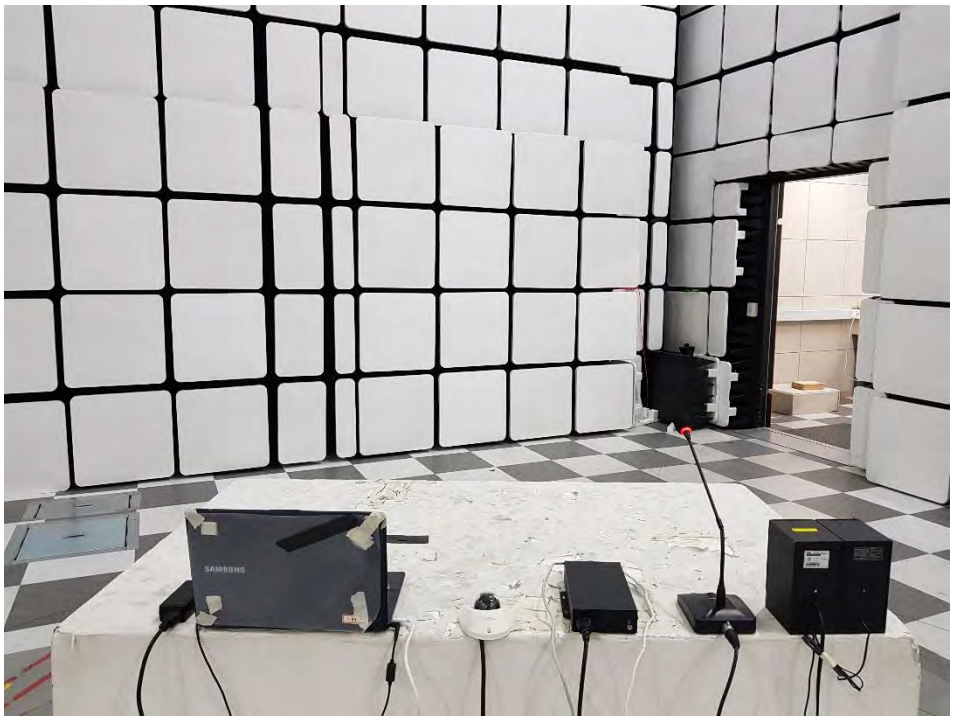
## Conducted Voltage Emissions

N/A

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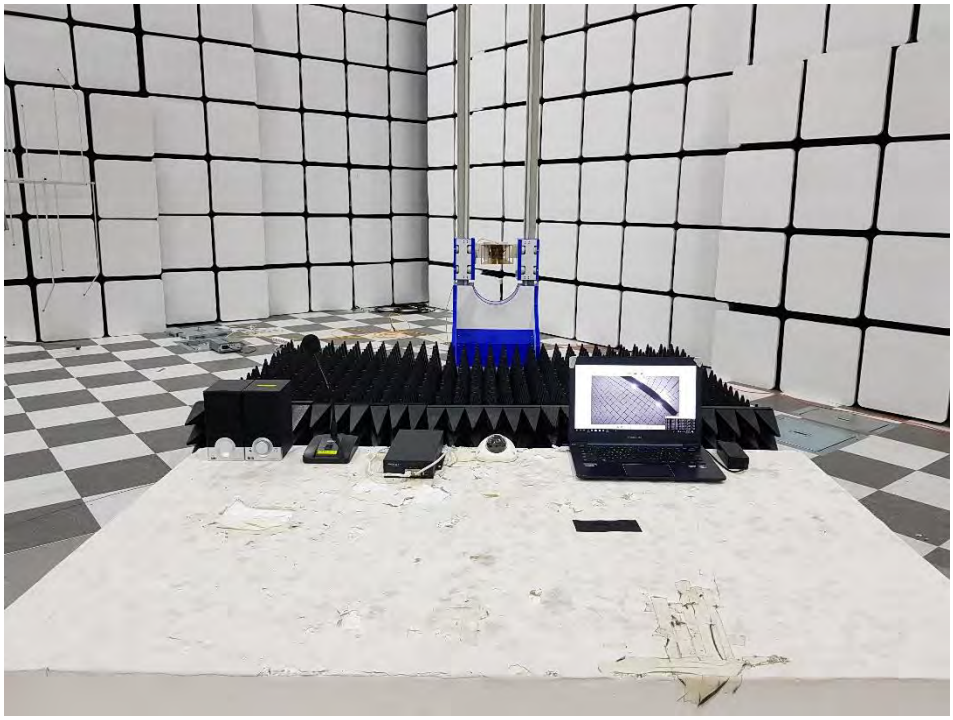
## Radiated Electric Field Emissions(Below 1 ㎓)

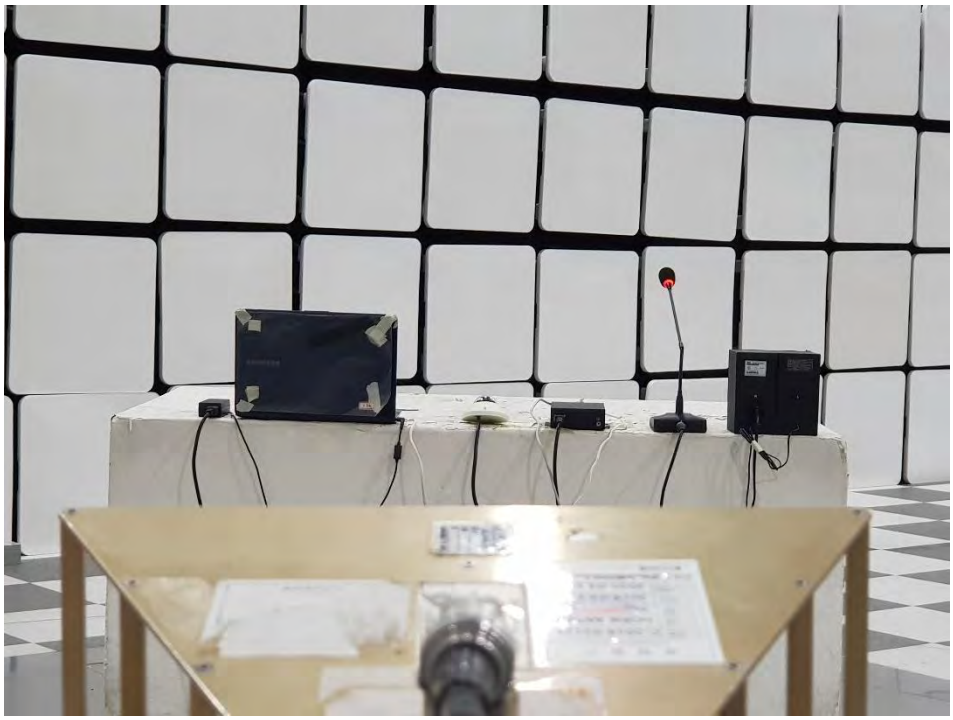




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## Radiated Electric Field Emissions(Above 1 ㎓)





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# EUT External Photographs

(Top)



(Bottom)




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# EUT Internal Photographs

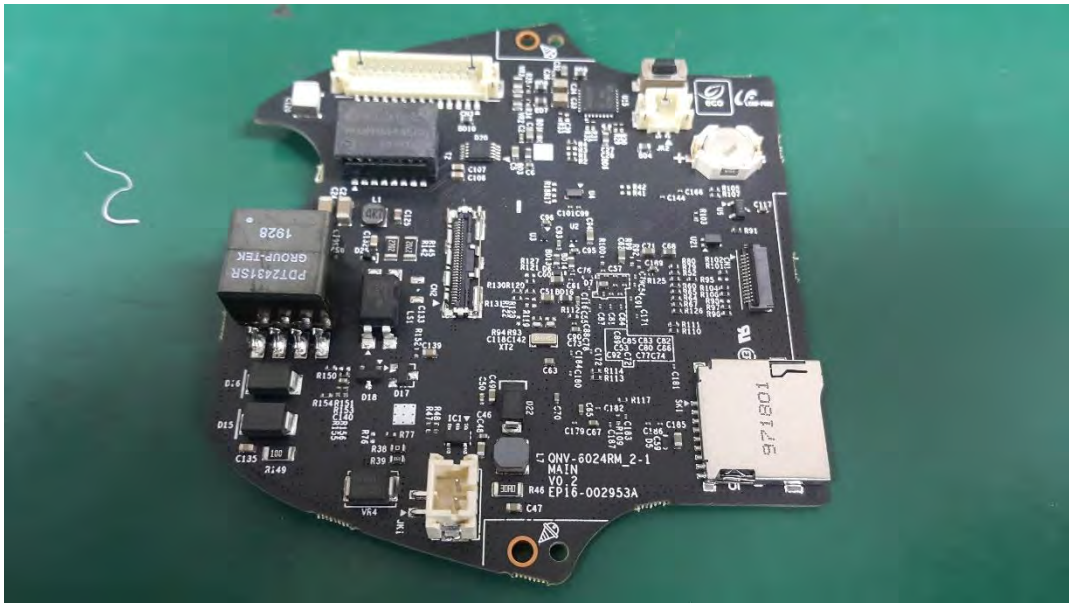
(Internal View)



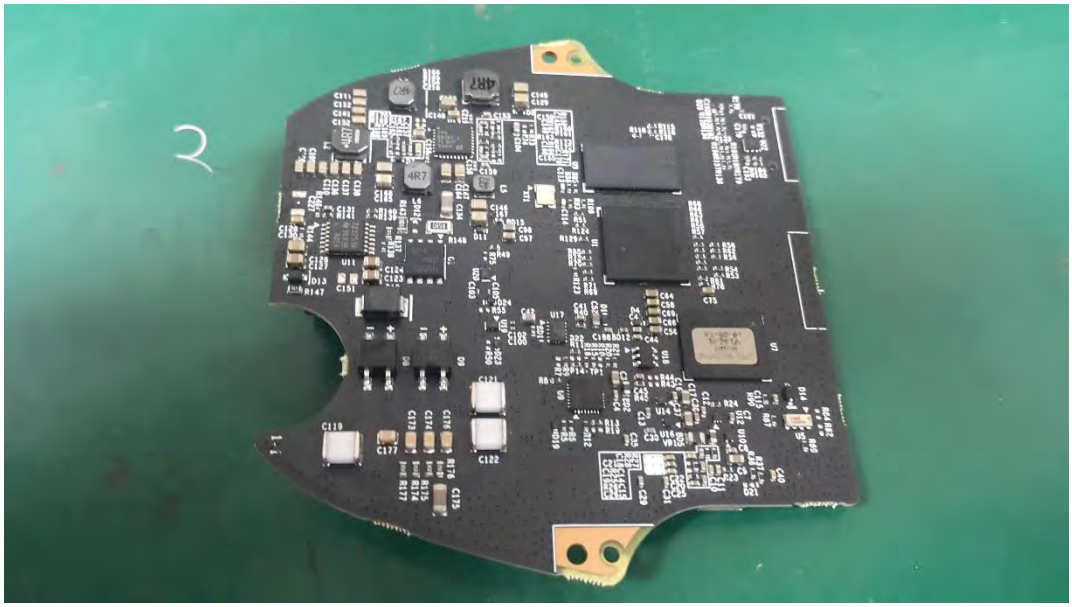
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# EUT Internal View – Main Board

(Top)




(Bottom)



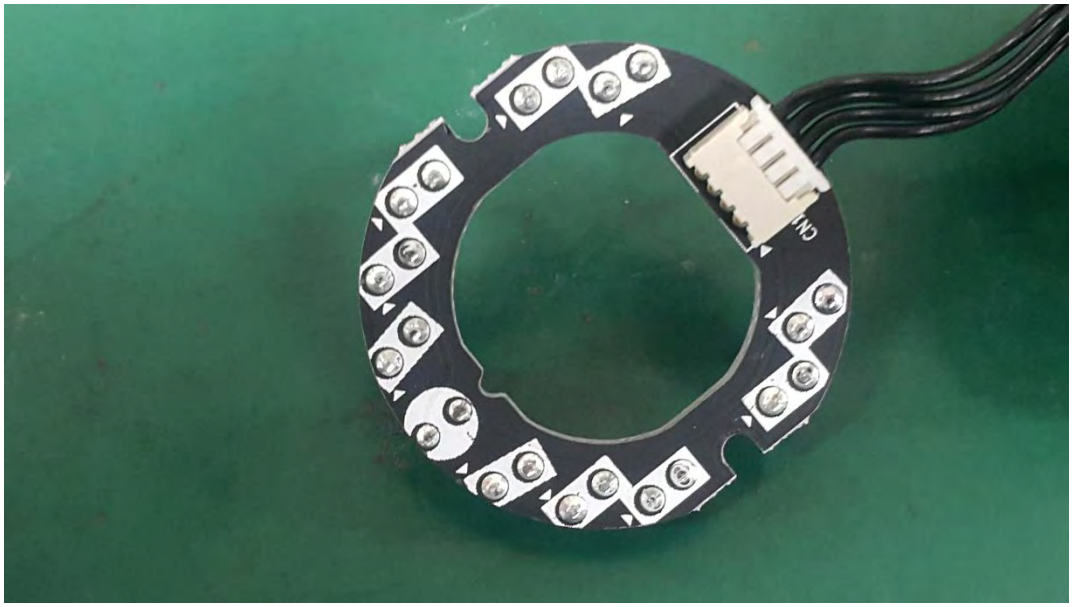
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# EUT Internal View – IR Board

(Top)



(Bottom)



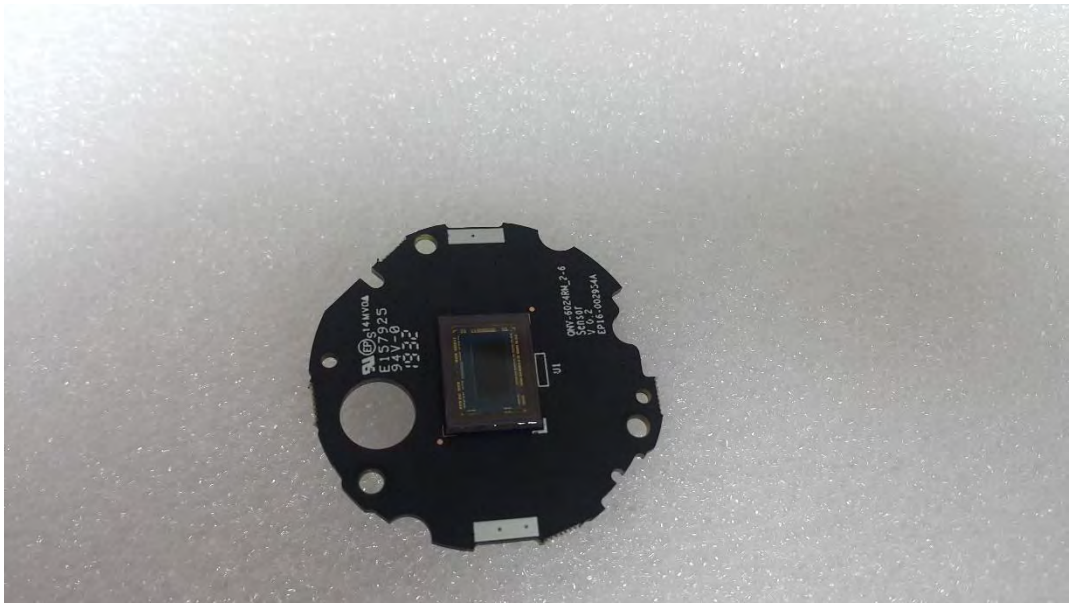
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# EUT Internal View – LENS Board

(Top)

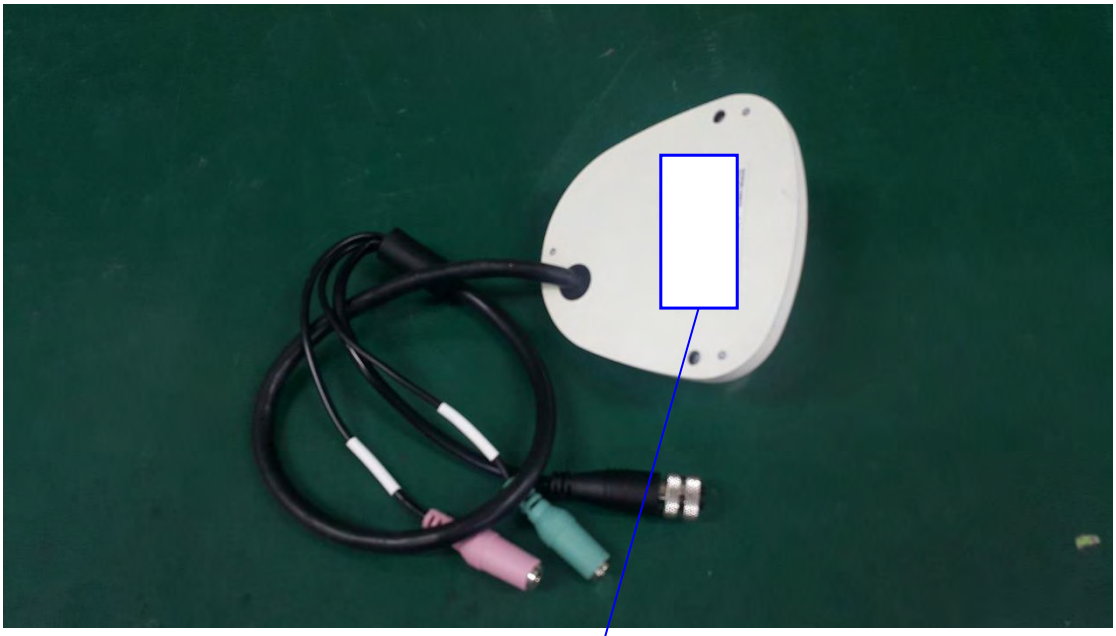


(Bottom)



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# Label Photographs



CAN ICES-3(A) / NMB-3(A)

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.
Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :
(1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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