



**KES Co., Ltd.**

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Tel: +82-31-425-6200 / Fax: +82-31-424-0450  
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Report No.:

KES-EM-20T0439

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## EMC TEST REPORT For VCCI

Test Report No. : KES-EM-20T0439  
Date of Issue : Jul. 13, 2020  
Product name : NETWORK CAMERA  
Model/Type No. : XNF-9010RV  
Variant Model : -  
Applicant : Hanwha Techwin Co., Ltd.  
Applicant Address : 6, Pangyo-ro 319Beon-gil, Bundang-gu, Seongnam-si,  
Gyeonggi-do, Republic of Korea  
Manufacturer : 1. HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.  
2. D-TECH CO.,LTD.  
Manufacturer Address : 1. Lot O-2, Que Vo Industrial Zone extended area,  
Nam Son commune, Bac Ninh city, Bac Ninh province, Vietnam  
2. 173-25, Saneop-ro, Gwonseon-gu, Suwon-si, Gyeonggi- do,  
Korea (Suwon Industrial Complex)  
Date of Receipt : Jun. 22, 2020  
Test date : Jun. 29, 2020 ~ Jul. 01, 2020  
Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Dae Jung, Choi  
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 |
|---------------|-----------------|------------------|
| Jul. 13, 2020 | KES-EM-20T0439  | Issued           |
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## 1.0 General Product Description

### Main Specifications of EUT are:

|                            |                                                                                                                               |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| maging Device              | 1/2.3" 12M CMOS                                                                                                               |
| Effective Pixels           | 3008(H) x 3008(V)                                                                                                             |
| NETD                       | None                                                                                                                          |
| Pixel Size                 | None                                                                                                                          |
| Min. Illumination          | Color: 0.39 Lux (F2.2, 1/30sec), BW : 0Lux(IR LED on)                                                                         |
| Video Out                  | CVBS : 1.0 Vp-p / 75Ω composite, 720x480(N), 720x576(P), for Installation<br>USB: Micro USB Type B, 1280x720 for installation |
| <b>Lens</b>                |                                                                                                                               |
| Focal Length (Zoom Ratio)  | 1.08mm fixed focal                                                                                                            |
| Max. Aperture Ratio        | F2.2                                                                                                                          |
| Angular Field of View      | H: 187° / V: 187° / D: 187°                                                                                                   |
| Min. Object Distance       | 0.5m(1.64ft)                                                                                                                  |
| Focus Control              | Simple focus                                                                                                                  |
| Lens Type                  | None                                                                                                                          |
| Mount Type                 | None                                                                                                                          |
| Optional Lens              | None                                                                                                                          |
| <b>Pan / Tilt / Rotate</b> |                                                                                                                               |
| Pan / Tilt / Rotate Range  | None                                                                                                                          |
| Pan Range                  | None                                                                                                                          |
| Pan Speed                  | None                                                                                                                          |
| Tilt Range                 | None                                                                                                                          |
| Tilt Speed                 | None                                                                                                                          |
| Rotate Range               | None                                                                                                                          |
| Sequence                   | None                                                                                                                          |
| Preset Accuracy            | None                                                                                                                          |
| Azimuth                    | None                                                                                                                          |
| Auto Tracking              | None                                                                                                                          |
| <b>Operational</b>         |                                                                                                                               |
| IR Viewable Length         | 10m(32.8ft)                                                                                                                   |
| Camera Title               | Displayed up to 85 characters                                                                                                 |
| Day & Night                | Auto(ICR)                                                                                                                     |

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|                             |                                                                                                                                                                     |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Backlight Compensation      | BLC, HLC, WDR, SDDR                                                                                                                                                 |
| Wide Dynamic Range          | 120dB                                                                                                                                                               |
| Digital Noise Reduction     | SSNRV                                                                                                                                                               |
| Digital Image Stabilization | None                                                                                                                                                                |
| Defog                       | None                                                                                                                                                                |
| Motion Detection            | 8ea, 8point polygonal zones                                                                                                                                         |
| Privacy Masking             | 32ea, polygonal zones<br>- Color: Grey/Green/Red/Blue/Black/White<br>- Mosaic                                                                                       |
| Gain Control                | Low / Middle / High                                                                                                                                                 |
| White Balance               | ATW / AWC / Manual / Indoor / Outdoor                                                                                                                               |
| LDC                         | None                                                                                                                                                                |
| Electronic Shutter Speed    | (TBD)Minimum / Maximum / Anti flicker (2~1/12,000sec)                                                                                                               |
| Digital PTZ                 | Support(Preset, Group)                                                                                                                                              |
| Video Rotation              | Flip, Mirror                                                                                                                                                        |
| Analytics                   | Defocus detection, Directional detection, Motion detection, Appear/Disappear, Enter/Exit, Loitering, Tampering, Virtual line, Audio detection, Sound classification |
| Business Intelligence       | People counting, Queue management, Heatmap                                                                                                                          |
| Serial Interface            | None                                                                                                                                                                |
| Alarm I/O                   | 2 configured I/O                                                                                                                                                    |
| 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<br>Alarm output<br>Audio playback                      |
| Audio In                    | Selectable(mic in/line in/built-in mic)<br>Supply voltage: 2.5VDC(4mA), Input impedance: 2K Ohm                                                                     |
| Audio Out                   | Line out, Max. output level: 1Vrms                                                                                                                                  |
| IR Illuminator (Optional)   | None                                                                                                                                                                |
| Wiper                       | None                                                                                                                                                                |
| Coaxial Protocol            | None                                                                                                                                                                |
| Video Transmission Distance | None                                                                                                                                                                |
| <b>Radiometry</b>           |                                                                                                                                                                     |

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|                          |                                                                                                                                                                                                                  |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Temperature detect range | None                                                                                                                                                                                                             |
| Temperature accuracy     | None                                                                                                                                                                                                             |
| Temperature detection    | None                                                                                                                                                                                                             |
| Additional               | None                                                                                                                                                                                                             |
| <b>Network</b>           |                                                                                                                                                                                                                  |
| Ethernet                 | M12 (through RJ45 to M12 cable)                                                                                                                                                                                  |
| Video Compression        | H.265/H.264: Main/Baseline/High, MJPEG                                                                                                                                                                           |
| Resolution               | . Original view(1:1): 3008x3008~480x480<br>. Double panorama(2:1): 3584x1792~640x320<br>. Single panorama(4:1): 3584x896~640x160<br>. Quad view: 3584x2688~640x480<br>. Q1/Q2/Q3/Q4(4:3): 1792x1344~640x480      |
| Max. Framerate           | H.265/H.264:<br>Overview-Max. 30fps/25fps@3008x3008(60Hz/50Hz),<br>Double panorama-Max. 30fps/25fps@3584x1792(60Hz/50Hz)<br>Single panorama-Max. 30fps/25fps@3584x896(60Hz/50Hz)<br>MJPEG: Max. 15fps(60Hz/50Hz) |
| Smart Codec              | Manual(5ea area), 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(20 users) / Multicast<br>Multiple streaming(Up to 10 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<br>AAC-LC: 48Kbps at 16KHz                                                                               |
| Protocol                 | IPv4, IPv6, TCP/IP, UDP/IP, RTP(UDP), RTP(TCP), RTCP, RTSP, NTP, HTTP, HTTPS,<br>SSL/TLS, DHCP, FTP, SMTP, ICMP, IGMP, SNMPv1/v2c/v3(MIB-2), ARP, DNS,<br>DDNS, QoS, UPnP, Bonjour                               |
| Security                 | HTTPS(SSL) Login Authentication<br>Digest Login Authentication<br>IP Address Filtering                                                                                                                           |

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|                                   |                                                                                                                                                                                                                       |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                   | User access log<br>802.1X Authentication(EAP-TLS, EAP-LEAP)<br>Device Certificate(Hanwha Techwin Root CA)                                                                                                             |
| Edge Storage                      | Micro SD/SDHC/SDXC 2slot 2TB                                                                                                                                                                                          |
| Application Programming Interface | ONVIF Profile S/G/T<br>SUNAPI(HTTP API)<br>Wisenet open platform                                                                                                                                                      |
| Webpage Language                  | English, French, German, Spanish, Italian, Chinese, Korean, Russian, Japanese,<br>Swedish, Portuguese, Czech, Polish, Turkish, Dutch, Hungarian, Greek                                                                |
| 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),<br>Apple Safari(Mac OS X only) |
| Memory                            | TBD                                                                                                                                                                                                                   |
| <b>Environmental</b>              |                                                                                                                                                                                                                       |
| Operating Temperature / Humidity  | <b>(TBD)'-40°C ~ +60°C (-40°F ~ +131°F) / Less than 95% RH</b>                                                                                                                                                        |
| Storage Temperature / Humidity    | -50°C ~ +60°C(-58°F ~ +140°F) / Less than 95% RH                                                                                                                                                                      |
| Certification                     | IP66, IK10, NEMA4X<br><b>EN50155 class T3, EN-45545-2</b><br><b>NEPA 130, BSS 7239</b>                                                                                                                                |
| <b>Electrical</b>                 |                                                                                                                                                                                                                       |
| Input Voltage                     | PoE(IEEE802.3af, Class3), 12VDC                                                                                                                                                                                       |
| Power Consumption                 | PoE: Max 12.95W (TBD)<br>12VDC: Max 12W (TBD)                                                                                                                                                                         |
| <b>Mechanical</b>                 |                                                                                                                                                                                                                       |
| Color / Material                  | White / Plastic                                                                                                                                                                                                       |
| RAL Code                          | RAL9003                                                                                                                                                                                                               |
| Product dimensions / weight       | TBD                                                                                                                                                                                                                   |
| Conduit hole                      |                                                                                                                                                                                                                       |
| Hanging mount(Dome)               |                                                                                                                                                                                                                       |
| Skin cover(Dome)                  |                                                                                                                                                                                                                       |
| Weather cap(Dome)                 |                                                                                                                                                                                                                       |
| Power module                      |                                                                                                                                                                                                                       |
| Backbox                           |                                                                                                                                                                                                                       |

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| DORI                      |  |
|---------------------------|--|
| Detect (25PPM/ 8PPF)      |  |
| Observe (63PPM/ 19PPF)    |  |
| Recognize (125PPM/ 38PPF) |  |
| Identify (250PPM/ 76PPF)  |  |

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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 ☒ 100 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 | XNF-9010RV   | -             | HANWHA TECHWIN<br>SECURITY VIETNAM<br>CO.,LTD. | EUT     |

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## 1.5 Support Equipments

| Description      | Model Number         | Serial Number  | Manufacturer                                 | Remarks |
|------------------|----------------------|----------------|----------------------------------------------|---------|
| Notebook         | ProBook4430s         | -              | HP                                           | -       |
| Notebook Adaptor | SeriesPPP0009H       | -              | CHICONY POWER TECHNOLOGY (SUZHOU) CO.,LTD,   | -       |
| Micro SD Card    | -                    | -              | SanDisk                                      | 8 GB    |
| PoE Adaptor      | PT-PSE109GBRO-AH     | PT1850221049   | Dongguan PROCET Network Technology Co.,Ltd   | -       |
| DC Adaptor       | 2ACB022F             | -              | Channel Well Technology (Guangzhou) Co.,Ltd. | -       |
| Alarm1           | -                    | -              | -                                            | -       |
| Alarm2           | -                    | -              | -                                            | -       |
| Speaker          | BR1000A Cuve Black 2 | -              | DONGGUAN EDIFIER TECHNOLOGY Co., Ltd         |         |
| MIC              | MP1000               | -              | -                                            |         |
| Smart Phone      | LG-SU760             | 108KPQJ0186212 | LG                                           | -       |

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## 1.6 External I/O Cabling

### ■ DC Mode

| Start                |           | END           |           | Cable Spec. |        |
|----------------------|-----------|---------------|-----------|-------------|--------|
| Description          | I/O Port  | Description   | I/O Port  | Length      | Shield |
| NETWORK CAMERA (EUT) | RJ-45     | Notebook      | RJ-45     | 3.0         | U      |
|                      | SLOT      | Micro SD Card | SLOT      | -           | -      |
|                      | 3.5 mm    | Speaker       | 3.5 mm    | 1.4         | U      |
|                      | 3.5 mm    | MIC           | 3.5 mm    | 1.6         | U      |
|                      | Alarm in  | Alarm1        | Alarm out | 3.0         | U      |
|                      | Alarm out | Alarm2        | Alarm in  | 3.0         | U      |
| Notebook             | 3.5 mm    | Smart Phone   | 3.5 mm    | 1.0         | U      |

\* Unshielded=U, Shielded=S

### ■ PoE Mode

| Start                |           | END           |           | Cable Spec. |        |
|----------------------|-----------|---------------|-----------|-------------|--------|
| Description          | I/O Port  | Description   | I/O Port  | Length      | Shield |
| NETWORK CAMERA (EUT) | RJ-45     | Notebook      | PoE       | 3.0         | U      |
|                      | SLOT      | Micro SD Card | SLOT      | -           | -      |
|                      | 3.5 mm    | Speaker       | 3.5 mm    | 1.4         | U      |
|                      | 3.5 mm    | MIC           | 3.5 mm    | 1.6         | U      |
|                      | Alarm in  | Alarm1        | Alarm out | 3.0         | U      |
|                      | Alarm out | Alarm2        | Alarm in  | 3.0         | U      |
| Notebook             | 3.5 mm    | Smart Phone   | 3.5 mm    | 1.0         | U      |
|                      | RJ-45     | PoE Adaptor   | RJ-45     | 1.0         | U      |

\* Unshielded=U, Shielded=S



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### 1.7 EUT Operating Mode(s)

| Test mode      | operating                                  |
|----------------|--------------------------------------------|
| Operation mode | Monitoring EUT Using Web Viewer, Ping Test |

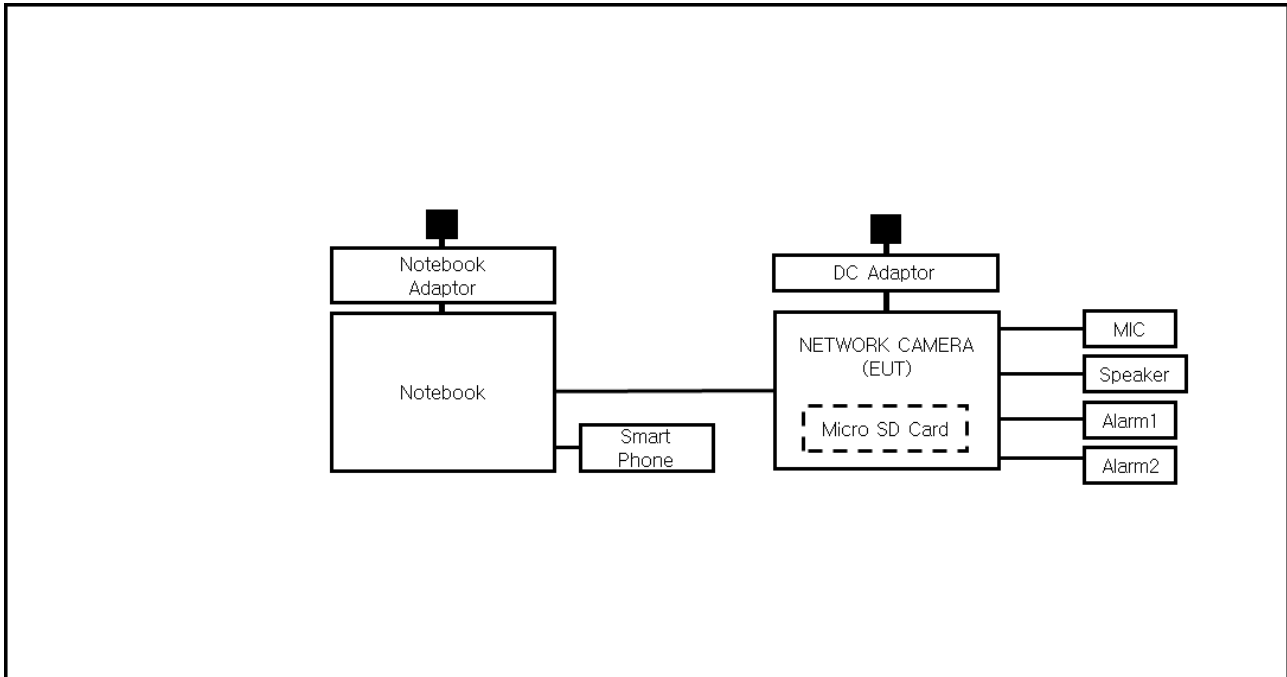
| EUT Test operating S/W |         |                     |
|------------------------|---------|---------------------|
| Name                   | Version | Manufacture Company |
| Web Viewer             | -       | -                   |

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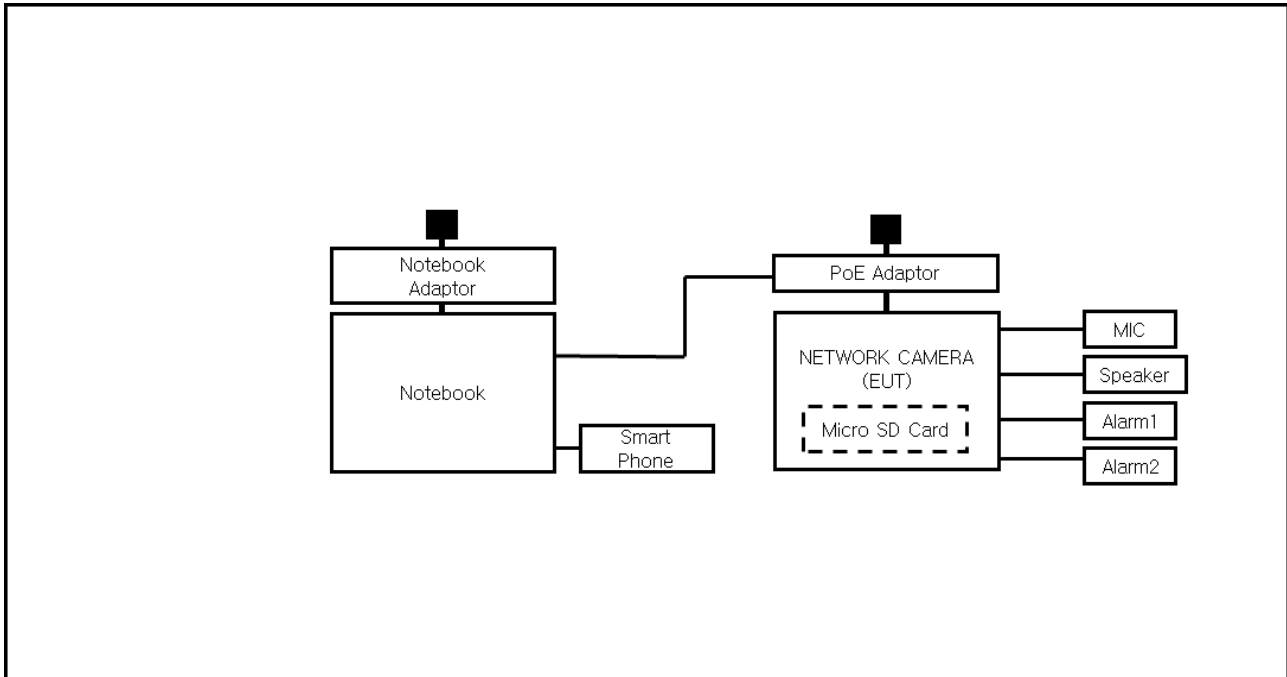
## 1.8 Configuration

■ AC Main  
 □ DC Main

### ■ DC Mode



### ■ PoE Mode



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

## 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  
☐ Class A

☐ Group 2  
☐ Class B

☐ EN 55014-1:2006 +A2:2011

☐ EN 55014-2:1997 +A2:2008

☐ EN 55015:2013

☐ EN 61547 :2009

☐ EN 55032:2015

☐ Class A

☐ Class B

☐ EN 55024:2010 +A1:2015

☐ EN 50130-4:2011 +A1:2014

☐ EN 61000-3-2:2014

☐ EN 61000-3-3:2013

☐ EN 61326-1:2013



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- 
- |                                                               |                                             |                                  |
|---------------------------------------------------------------|---------------------------------------------|----------------------------------|
| <input checked="" type="checkbox"/> <b>VCCI-CISPR 32:2016</b> | <input checked="" type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> <b>AS/NZS CISPR32:2015</b>           | <input type="checkbox"/> Class A            | <input type="checkbox"/> Class B |
| <input type="checkbox"/> <b>47 CFR Part 15, Subpart B</b>     |                                             |                                  |
| <input type="checkbox"/> CISPR 22:2009 +A1:2010               | <input type="checkbox"/> Class A            | <input type="checkbox"/> Class B |
| <input type="checkbox"/> ANSI C63.4-2009                      |                                             |                                  |
| <input type="checkbox"/> <b>IC Regulation ICES-003 : 2016</b> |                                             |                                  |
| <input type="checkbox"/> CAN/CSA CISPR 22-10                  | <input type="checkbox"/> Class A            | <input type="checkbox"/> Class B |
| <input type="checkbox"/> ANSI C63.4-2014                      |                                             |                                  |
| <br><input type="checkbox"/> <b>RE- Directive 2014/53/EU</b>  |                                             |                                  |
| <input type="checkbox"/> EN 301 489-1 V1.9.2                  |                                             |                                  |
| <input type="checkbox"/> Equipment for fixed use              |                                             |                                  |
| <input type="checkbox"/> Equipment for vehicular use          |                                             |                                  |
| <input type="checkbox"/> Equipment for portable use           |                                             |                                  |
| <input type="checkbox"/> EN 301 489-3 V1.6.1                  |                                             |                                  |
| <input type="checkbox"/> EN 301 489-17 V2.2.1                 |                                             |                                  |
| <input type="checkbox"/> EN 60945:2002                        |                                             |                                  |

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## 2.1 Conducted Emissions Mains Power Ports

**Test Date**

Jul. 01, 2020

**Test Location**

Electro wave Shieldroom #6

**Test Equipment**

| Used                                | Description       | Model Number | Manufacturer | Serial Number | Cal. Due     |
|-------------------------------------|-------------------|--------------|--------------|---------------|--------------|
| <input checked="" type="checkbox"/> | EMI Test S/W      | EMC32        | R & S        | 9.12.00       | -            |
| <input checked="" type="checkbox"/> | EMI TEST RECEIVER | ESR3         | R & S        | 101783        | 01, 20, 2021 |
| <input checked="" type="checkbox"/> | LISN              | ENV216       | R & S        | 101787        | 01, 02, 2021 |
| <input checked="" type="checkbox"/> | LISN              | ESH2-Z5      | R & S        | 100450        | 01, 02, 2021 |
| <input checked="" type="checkbox"/> | PULSE LIMITER     | ESH3-Z2      | R & S        | 101915        | 01, 02, 2021 |

**Test Conditions**

Temperature: 23,5 °C  
Relative Humidity: 52,0 % R.H.

**Frequency Range of Measurement**

150 kHz to 30 MHz

**Instrument Settings**

IF Band Width: 9 kHz

**Test Results**

The requirements are:

- ☒ PASS  
☐ NOT PASS  
☐ NOT APPLICABLE

**Remarks**PoE is not tested apply because it is considered to be wired networks ports

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## 2.2 Conducted Emissions at Telecommunication Ports

**Test Date**

Jul. 01, 2020

**Test Location**

Electro wave Shieldroom #6

**Test Equipment**

| Used                                | Description       | Model Number | Manufacturer | Serial Number | Cal. Due     |
|-------------------------------------|-------------------|--------------|--------------|---------------|--------------|
| <input checked="" type="checkbox"/> | EMI Test S/W      | EMC32        | R & S        | 9.12.00       | -            |
| <input checked="" type="checkbox"/> | EMI TEST RECEIVER | ESR3         | R & S        | 101783        | 01, 20, 2021 |
| <input checked="" type="checkbox"/> | LISN              | ENV216       | R & S        | 101787        | 01, 02, 2021 |
| <input checked="" type="checkbox"/> | LISN              | ESH2-Z5      | R & S        | 100450        | 01, 02, 2021 |
| <input checked="" type="checkbox"/> | PULSE LIMITER     | ESH3-Z2      | R & S        | 101915        | 01, 02, 2021 |
| <input checked="" type="checkbox"/> | 8-WIRE ISN CAT3,5 | ENY81        | R & S        | 100174        | 01, 07, 2021 |
| <input type="checkbox"/>            | 8-WIRE ISN CAT6   | ENY81-CAT6   | R & S        | 101665        | 01, 07, 2021 |
| <input type="checkbox"/>            | CDN               | CDNS502A     | TESEQ        | 40431         | 01, 02, 2021 |

**Test Conditions**

Temperature: 23,5 °C  
Relative Humidity: 52,0 % R.H.

**Frequency Range of Measurement**

150 kHz to 30 MHz

**Instrument Settings**

IF Band Width: 9 kHz

**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(Below 1 GHz)

### Test Date

Jun. 29, 2020

### Test Location

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

### Test Equipment

| Used                                | Description              | Model Number | Manufacturer     | Serial Number | Cal. Due     |
|-------------------------------------|--------------------------|--------------|------------------|---------------|--------------|
| <input checked="" type="checkbox"/> | EMI Test S/W             | EP5/RE       | TOYO Corporation | 6.0.0         | -            |
| <input checked="" type="checkbox"/> | EMI TEST RECEIVER        | ESU26        | R & S            | 100551        | 04, 01, 2021 |
| <input checked="" type="checkbox"/> | AMPLIFIER                | SCU 01       | R & S            | 100603        | 11, 25, 2020 |
| <input checked="" type="checkbox"/> | TRILOG-BROADBAND ANTENNA | VULB9163     | Schwarzbeck      | 715           | 11, 29, 2020 |
| <input checked="" type="checkbox"/> | ATTENUATOR               | 8491A        | HP               | 32173         | 03, 10, 2021 |

### Test Conditions

Temperature: 23,2 °C  
Relative Humidity: 51,4 % R.H.

### Frequency Range of Measurement

30 MHz to 1 GHz

### Instrument Settings

IF Band Width: 120 kHz

### Test Results

The requirements are:

☒ PASS  
☐ NOT PASS  
☐ NOT APPLICABLE

### Remarks

See Appendix A for test data.



## 2.4 Radiated Electric Field Emissions(Above 1 GHz)

### Test Date

Jun. 29, 2020

### Test Location

SEMI ANECHOIC CHAMBER #3

### Test Equipment

| Used                                | Description                | Model Number | Manufacturer     | Serial Number | Cal. Due     |
|-------------------------------------|----------------------------|--------------|------------------|---------------|--------------|
| <input checked="" type="checkbox"/> | EMI Test S/W               | EP5/RE       | TOYO Corporation | 6.0.0         | -            |
| <input checked="" type="checkbox"/> | EMI TEST RECEIVER          | ESR7         | R & S            | 101190        | 08, 06, 2020 |
| <input checked="" type="checkbox"/> | PREAMPLIFIER               | 8449B        | AGILENT          | 3008A01967    | 04, 20, 2021 |
| <input type="checkbox"/>            | ATTENUATOR                 | 8491A        | HP               | 35496         | 03, 10, 2021 |
| <input checked="" type="checkbox"/> | DOUBLE RIDGED HORN ANTENNA | SAS-571      | A.H.SYSTEM,INC   | 781           | 03, 11, 2021 |

### Test Conditions

Temperature: 23,6 °C  
Relative Humidity: 50,9 % R.H.

### Frequency Range of Measurement

1 GHz to 6 GHz

### Instrument Settings

IF Band Width: 1 MHz

### Test Results

The requirements are:

- ☒ PASS  
☐ NOT PASS  
☐ NOT APPLICABLE

### Remarks

See Appendix A for test data.

## APPENDIX A – TEST DATA

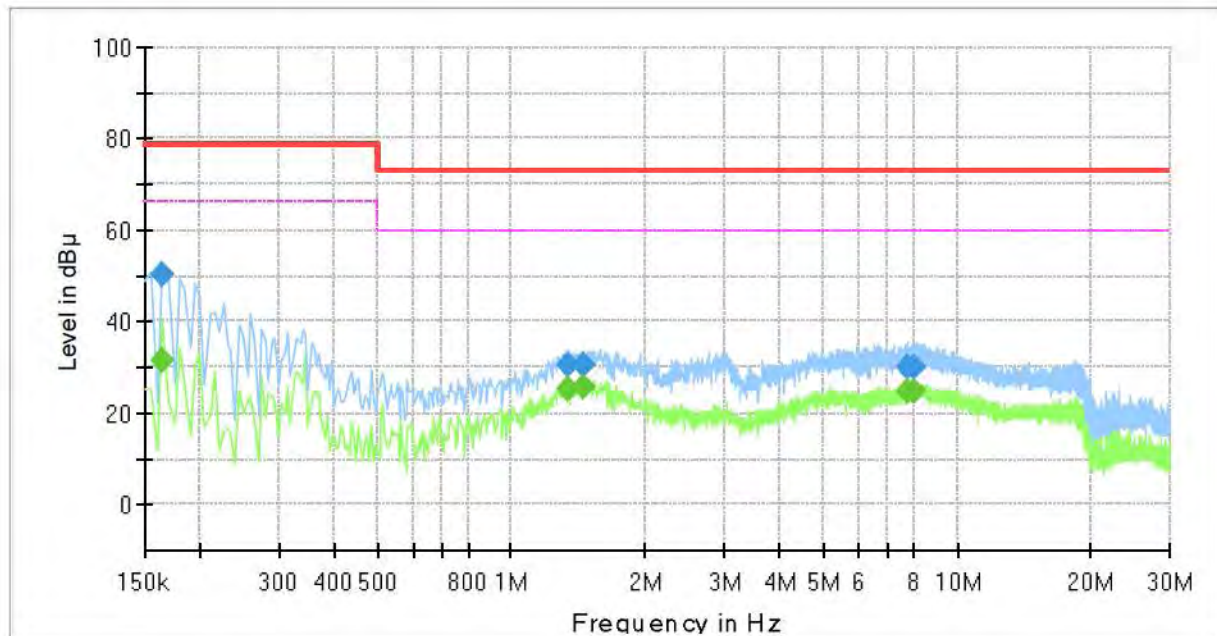
### Conducted Emissions at Mains Power Ports

■ DC Mode

HOT LINE

#### Common Information

|                   |                    |
|-------------------|--------------------|
| Test Description: | Conducted Emission |
| Model No.:        | XNF-9010RV         |
| Phase:            | L1                 |
| Mode:             | DC                 |
| Operator Name:    | KES                |



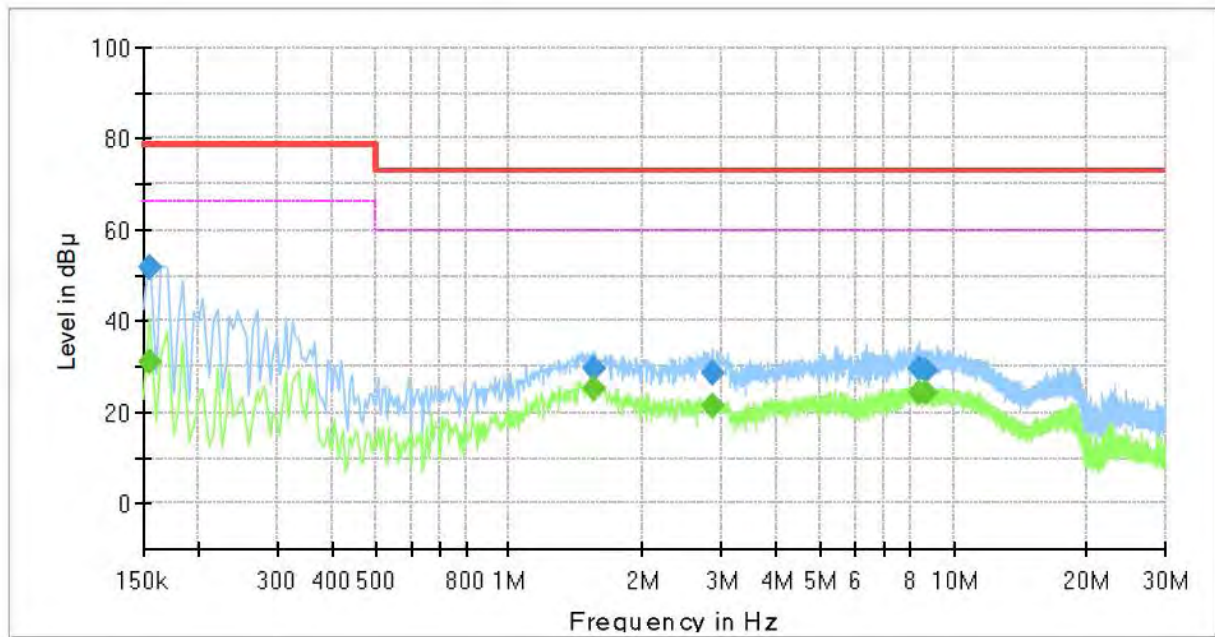
### Final Result

| Frequency (MHz) | QuasiPeak (dBμV) | CAverage (dBμV) | Limit (dBμV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.165000        | ---              | 31.33           | 66.00        | 34.67       | 1000.0          | 9.000           | L1   | 19.5       |
| 0.165000        | 50.11            | ---             | 79.00        | 28.89       | 1000.0          | 9.000           | L1   | 19.5       |
| 1.340000        | ---              | 25.36           | 60.00        | 34.64       | 1000.0          | 9.000           | L1   | 19.7       |
| 1.340000        | 30.32            | ---             | 73.00        | 42.68       | 1000.0          | 9.000           | L1   | 19.7       |
| 1.455000        | ---              | 25.82           | 60.00        | 34.18       | 1000.0          | 9.000           | L1   | 19.7       |
| 1.455000        | 30.53            | ---             | 73.00        | 42.47       | 1000.0          | 9.000           | L1   | 19.7       |
| 7.695000        | ---              | 24.55           | 60.00        | 35.45       | 1000.0          | 9.000           | L1   | 19.9       |
| 7.695000        | 29.88            | ---             | 73.00        | 43.12       | 1000.0          | 9.000           | L1   | 19.9       |
| 8.040000        | ---              | 24.90           | 60.00        | 35.10       | 1000.0          | 9.000           | L1   | 19.9       |
| 8.040000        | 30.27            | ---             | 73.00        | 42.73       | 1000.0          | 9.000           | L1   | 19.9       |

## NEUTRAL LINE

### Common Information

|                   |                    |
|-------------------|--------------------|
| Test Description: | Conducted Emission |
| Model No.:        | XNF-9010RV         |
| Phase:            | N                  |
| Mode:             | DC                 |
| Operator Name:    | KES                |



### Final Result

| Frequency (MHz) | QuasiPeak (dBμV) | CAverage (dBμV) | Limit (dBμV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.155000        | ---              | 30.92           | 66.00        | 35.08       | 1000.0          | 9.000           | N    | 19.5       |
| 0.155000        | 51.73            | ---             | 79.00        | 27.27       | 1000.0          | 9.000           | N    | 19.5       |
| 1.555000        | ---              | 25.01           | 60.00        | 34.99       | 1000.0          | 9.000           | N    | 19.7       |
| 1.555000        | 29.66            | ---             | 73.00        | 43.34       | 1000.0          | 9.000           | N    | 19.7       |
| 2.855000        | ---              | 21.17           | 60.00        | 38.83       | 1000.0          | 9.000           | N    | 19.7       |
| 2.855000        | 28.45            | ---             | 73.00        | 44.55       | 1000.0          | 9.000           | N    | 19.7       |
| 8.395000        | ---              | 24.31           | 60.00        | 35.69       | 1000.0          | 9.000           | N    | 19.9       |
| 8.395000        | 29.55            | ---             | 73.00        | 43.45       | 1000.0          | 9.000           | N    | 19.9       |
| 8.680000        | ---              | 24.04           | 60.00        | 35.96       | 1000.0          | 9.000           | N    | 19.9       |
| 8.680000        | 29.30            | ---             | 73.00        | 43.70       | 1000.0          | 9.000           | N    | 19.9       |

#### ◆ 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))

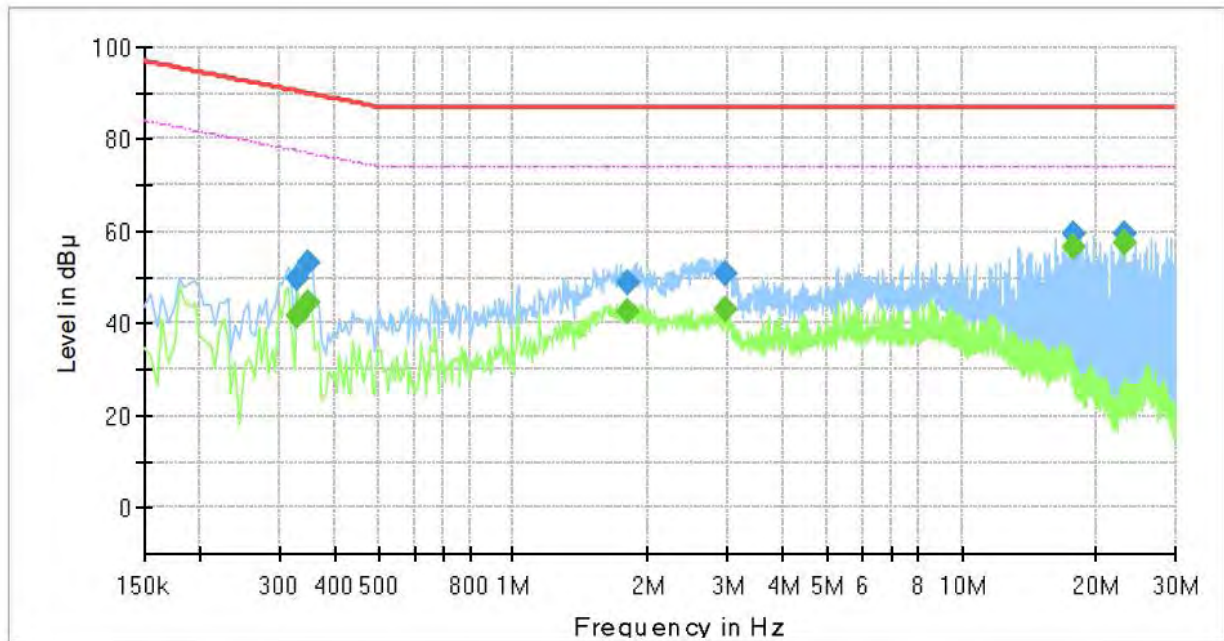
## Conducted Emissions at Telecommunication Ports

■ DC Mode

[100 Mbps]

### Common Information

|                   |                            |
|-------------------|----------------------------|
| Test Description: | Telecommunication Emission |
| Model No.:        | XNF-9010RV                 |
| Mode :            | DC                         |
| Speed :           | 100 Mbps                   |
| Operator Name:    | KES                        |



### Final Result

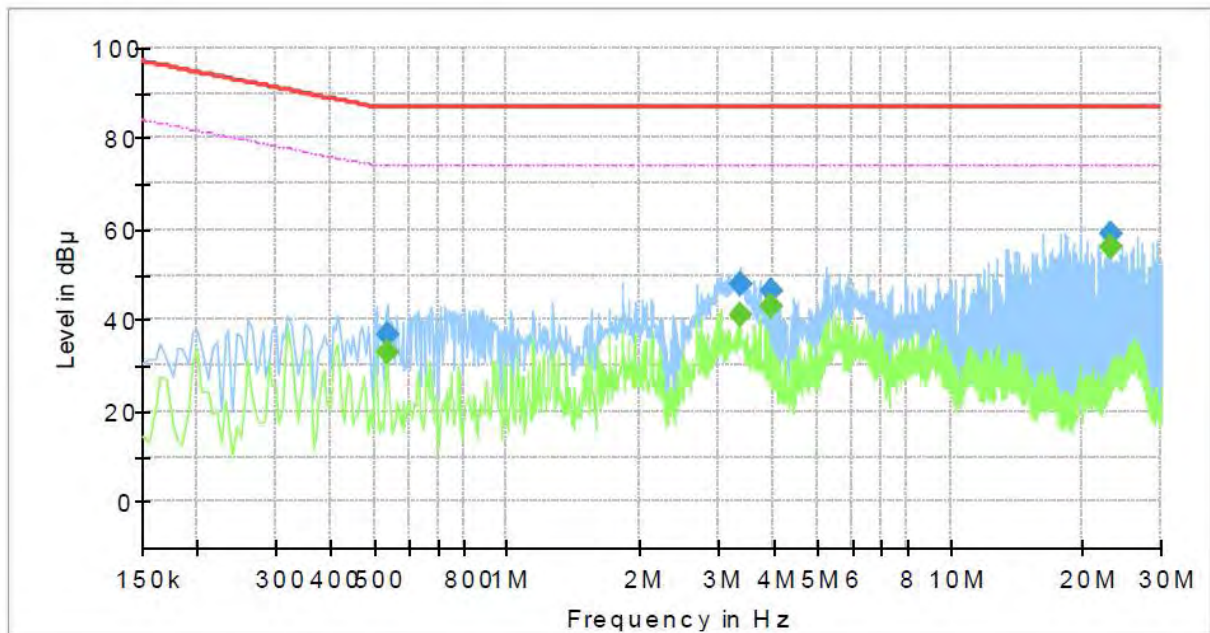
| Frequency (MHz) | QuasiPeak (dBμV) | CAverage (dBμV) | Limit (dBμV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line        | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|-------------|------------|
| 0.330000        | ---              | 41.43           | 77.45        | 36.02       | 1000.0          | 9.000           | Single Line | 19.7       |
| 0.330000        | 49.67            | ---             | 90.45        | 40.78       | 1000.0          | 9.000           | Single Line | 19.7       |
| 0.350000        | ---              | 44.62           | 76.96        | 32.34       | 1000.0          | 9.000           | Single Line | 19.7       |
| 0.350000        | 52.98            | ---             | 89.96        | 36.98       | 1000.0          | 9.000           | Single Line | 19.7       |
| 1.790000        | ---              | 42.57           | 74.00        | 31.43       | 1000.0          | 9.000           | Single Line | 19.5       |
| 1.790000        | 48.80            | ---             | 87.00        | 38.20       | 1000.0          | 9.000           | Single Line | 19.5       |
| 2.985000        | ---              | 42.95           | 74.00        | 31.05       | 1000.0          | 9.000           | Single Line | 19.4       |
| 2.985000        | 51.02            | ---             | 87.00        | 35.98       | 1000.0          | 9.000           | Single Line | 19.4       |
| 17.695000       | ---              | 56.46           | 74.00        | 17.54       | 1000.0          | 9.000           | Single Line | 20.0       |
| 17.695000       | 59.34            | ---             | 87.00        | 27.66       | 1000.0          | 9.000           | Single Line | 20.0       |
| 23.130000       | ---              | 57.42           | 74.00        | 16.58       | 1000.0          | 9.000           | Single Line | 20.2       |
| 23.130000       | 59.65            | ---             | 87.00        | 27.35       | 1000.0          | 9.000           | Single Line | 20.2       |

■ PoE Mode

[1 000 Mbps]

## Common Information

|                   |                            |
|-------------------|----------------------------|
| Test Description: | Telecommunication Emission |
| Model No.:        | XNF-9010RV                 |
| Mode :            | PoE                        |
| Speed :           | 100 Mbps                   |
| Operator Name:    | KES                        |



## Final Result

| Frequency (MHz) | QuasiPeak (dBμV) | CAverage (dBμV) | Limit (dBμV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line        | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|-------------|------------|
| 0.535000        | ---              | 33.07           | 74.00        | 40.93       | 1000.0          | 9.000           | Single Line | 19.6       |
| 0.535000        | 36.93            | ---             | 87.00        | 50.07       | 1000.0          | 9.000           | Single Line | 19.6       |
| 3.350000        | ---              | 41.00           | 74.00        | 33.00       | 1000.0          | 9.000           | Single Line | 19.5       |
| 3.350000        | 47.73            | ---             | 87.00        | 39.27       | 1000.0          | 9.000           | Single Line | 19.5       |
| 3.955000        | ---              | 42.94           | 74.00        | 31.06       | 1000.0          | 9.000           | Single Line | 19.5       |
| 3.955000        | 46.37            | ---             | 87.00        | 40.63       | 1000.0          | 9.000           | Single Line | 19.5       |
| 23.130000       | ---              | 56.31           | 74.00        | 17.69       | 1000.0          | 9.000           | Single Line | 20.2       |
| 23.130000       | 58.95            | ---             | 87.00        | 28.05       | 1000.0          | 9.000           | Single Line | 20.2       |

◆ 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 (ISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))



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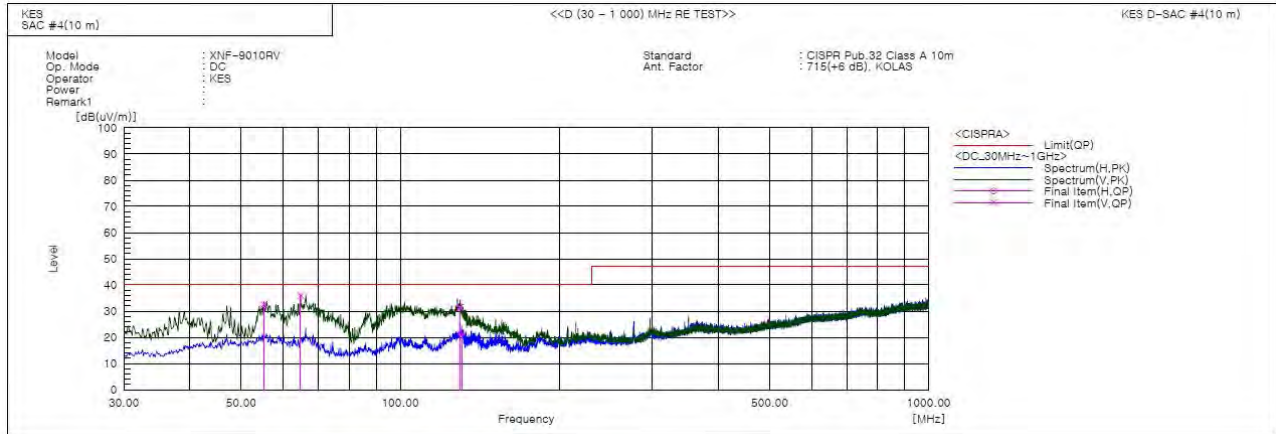
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## Radiated Electric Field Emissions(Below 1 GHz)

### ■ DC Mode



### 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   | 55.220          | V   | 54.5                | -21.9         | 32.6                 | 40.0                | 7.4            | 400.0       | 301.0       |        |
| 2   | 64.799          | V   | 59.6                | -23.6         | 36.0                 | 40.0                | 4.0            | 100.0       | 292.0       |        |
| 3   | 129.789         | V   | 57.1                | -25.6         | 31.5                 | 40.0                | 8.5            | 132.0       | 184.0       |        |
| 4   | 130.759         | H   | 47.5                | -25.7         | 21.8                 | 40.0                | 18.2           | 375.0       | 171.0       |        |

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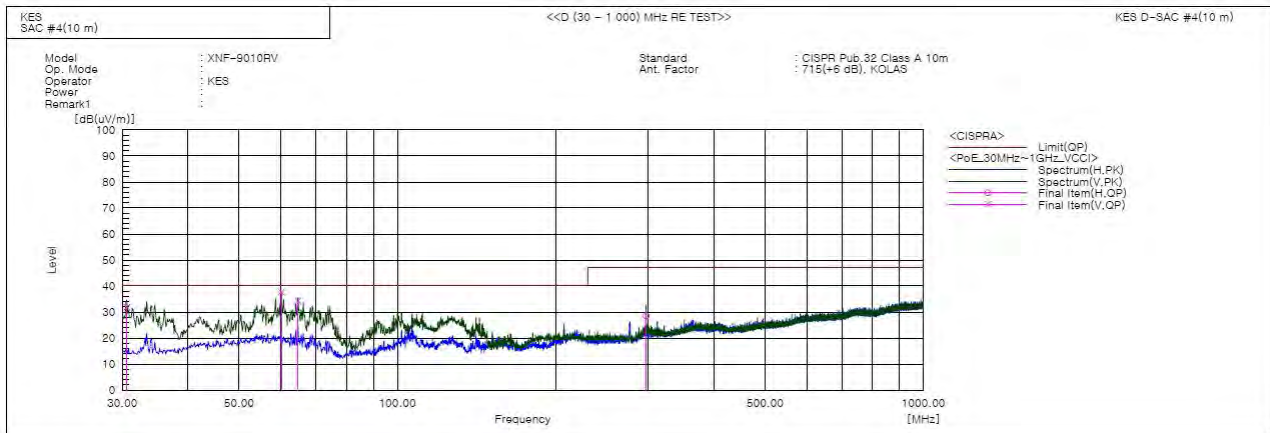


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### ■ PoE Mode



### Final Result

| No. | Frequency<br>[MHz] | (P) | Reading<br>QP<br>[dB(uV)] | c.f<br>[dB(1/m)] | Result<br>QP<br>[dB(uV/m)] | Limit<br>QP<br>[dB(uV/m)] | Margin<br>QP<br>[dB] | Height<br>[cm] | Angle<br>[deg] | Remark |
|-----|--------------------|-----|---------------------------|------------------|----------------------------|---------------------------|----------------------|----------------|----------------|--------|
| 1   | 30.606             | V   | 57.1                      | -25.2            | 31.9                       | 40.0                      | 8.1                  | 107.0          | 251.0          |        |
| 2   | 60.191             | V   | 60.3                      | -22.6            | 37.7                       | 40.0                      | 2.3                  | 132.0          | 278.0          |        |
| 3   | 64.678             | V   | 57.9                      | -23.6            | 34.3                       | 40.0                      | 5.7                  | 324.0          | 123.0          |        |
| 4   | 296.993            | H   | 47.5                      | -18.9            | 28.6                       | 47.0                      | 18.4                 | 374.0          | 172.0          |        |

### ◆ Calculation

Corrected Amplitude [dBuV] = Amplitude[dBuV] + Correction Factor [dB]

Corrected Amplitude : The Final Value, Amplitude : Reading Value,

Correction Factor : ANT FACTOR + Cable loss

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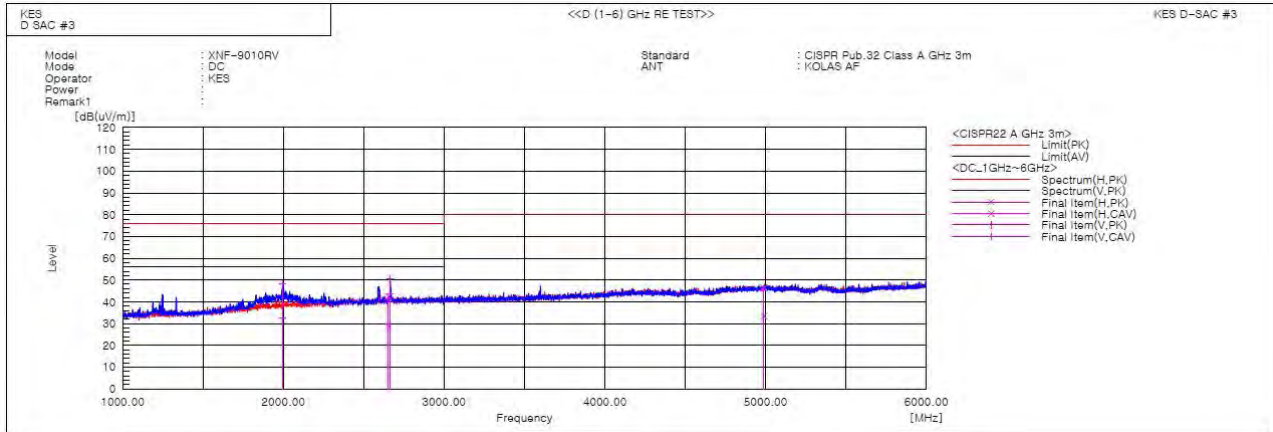
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## Radiated Electric Field Emissions(Above 1 GHz)

### ■ DC Mode



### 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   | 1993.671        | V   | 50.4                | 34.8                 | -2.0          | 48.4                 | 32.8                  | 76.0                | 56.0                | 27.6           | 23.2            | 100.0       | 359.4       |        |
| 2   | 2653.003        | H   | 41.9                | 28.2                 | 0.5           | 42.4                 | 28.7                  | 76.0                | 56.0                | 33.6           | 27.3            | 100.0       | 31.9        |        |
| 3   | 2665.870        | V   | 49.8                | 42.8                 | 0.6           | 50.4                 | 43.4                  | 76.0                | 56.0                | 25.6           | 12.6            | 100.0       | 0.5         |        |
| 4   | 4988.961        | H   | 37.9                | 24.9                 | 8.5           | 46.4                 | 33.4                  | 80.0                | 60.0                | 33.6           | 26.6            | 100.0       | 264.8       |        |

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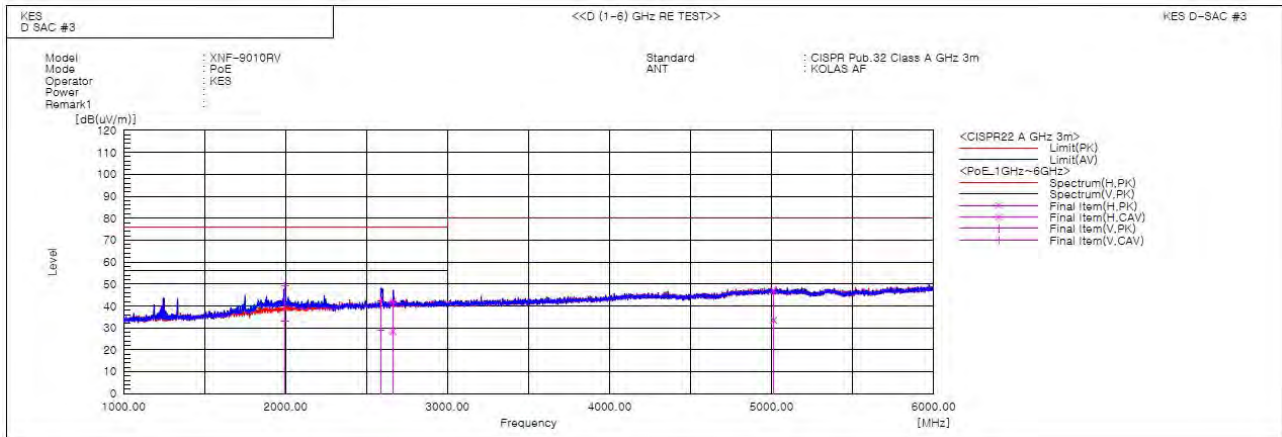


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### ■ PoE Mode



#### 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   | 1997.509        | V   | 51.2                | 35.0                 | -2.0          | 49.2                 | 33.0                  | 76.0                | 56.0                | 26.8           | 23.0            | 100.0       | 25.7        |        |
| 2   | 2586.311        | V   | 41.9                | 28.4                 | 0.4           | 42.3                 | 28.8                  | 76.0                | 56.0                | 33.7           | 27.2            | 100.0       | 308.1       |        |
| 3   | 2661.761        | H   | 41.5                | 27.8                 | 0.6           | 42.1                 | 28.4                  | 76.0                | 56.0                | 33.9           | 27.6            | 100.0       | 349.6       |        |
| 4   | 5012.923        | H   | 38.4                | 24.9                 | 8.6           | 47.0                 | 33.5                  | 80.0                | 60.0                | 33.0           | 26.5            | 100.0       | 206.3       |        |

#### ◆ Calculation

Result(PK/CAV) [dB( $\mu$ V/m)] = (Reading(PK/CAV)[dB( $\mu$ V)] + c.f[dB(1/m)])

Margin(PK/CAV)[dB] = Limit[dB( $\mu$ V/m)] - Result(PK/CAV) [dB( $\mu$ V/m)]

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

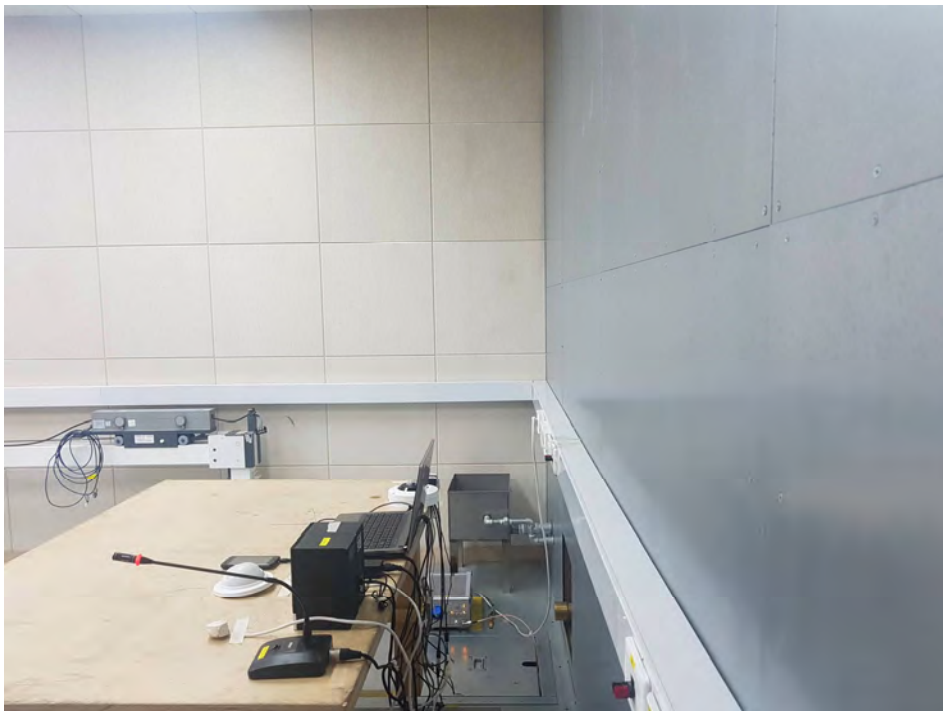
Limit(QP) : Limit value, c.f : (ANT Factor + Cable Loss - Preamp Factor), Margin: Margin value

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## Test Setup Photos and Configuration

### Conducted Emissions at Mains Power Ports

#### ■ DC Mode



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## Conducted Emissions at Telecommunication Ports

### ■ DC Mode



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**■ PoE Mode**

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## Radiated Electric Field Emissions(Below 1 GHz)

### ■ DC Mode



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## Radiated Electric Field Emissions(Above 1 GHz)

### ■ DC Mode



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## ■ PoE Mode



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## EUT External Photographs

(Top)



(Bottom)



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## EUT Internal Photographs

(Internal View)



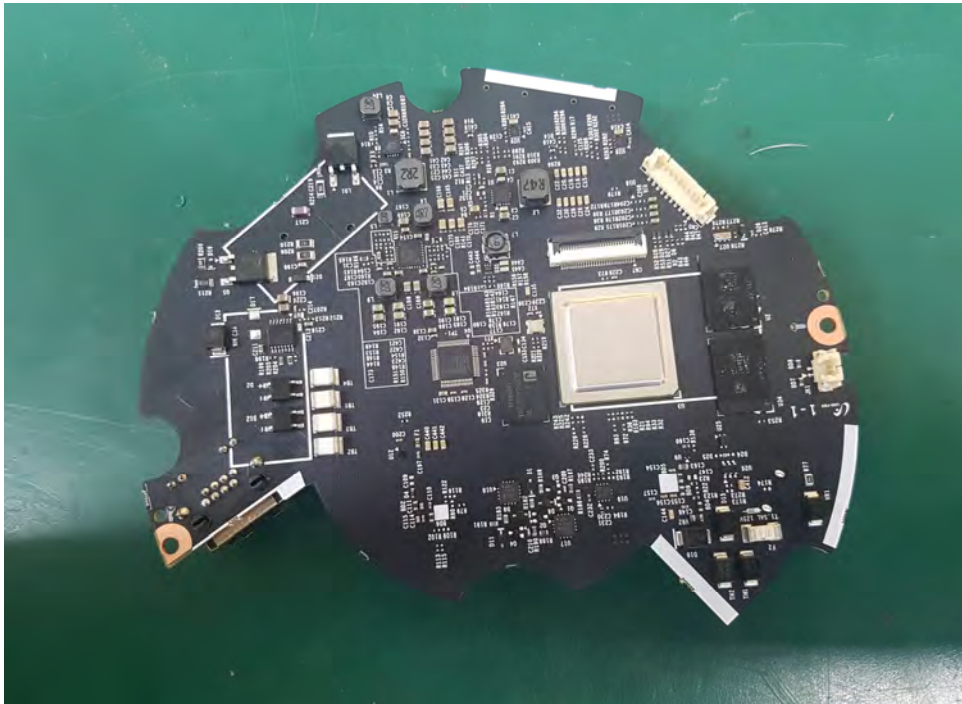
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## EUT Internal View – Main Board

(Top)



(Bottom)



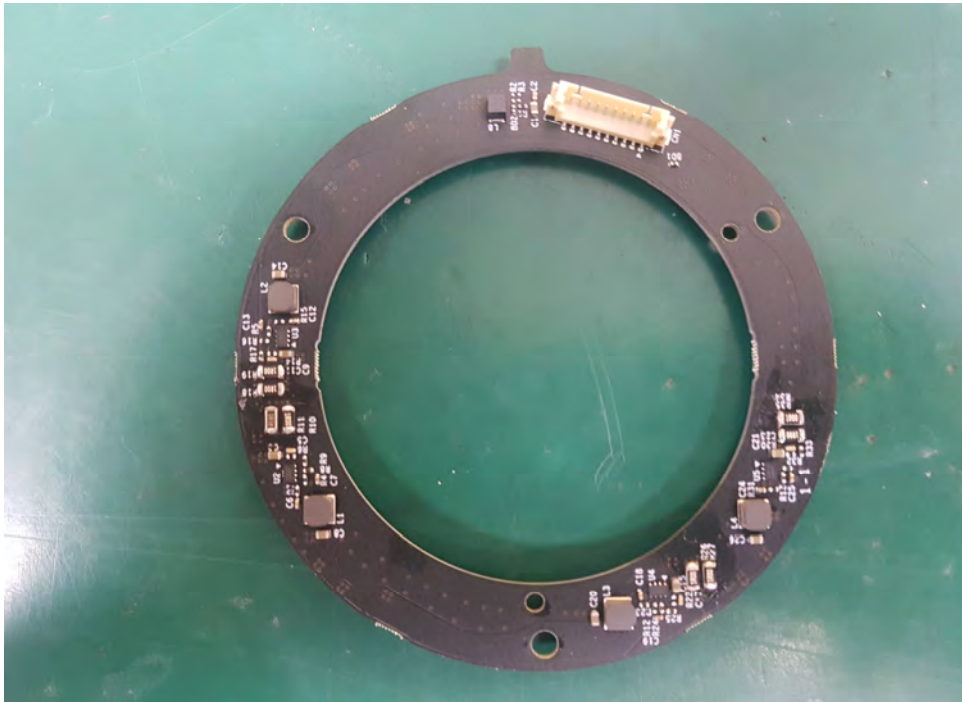
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## EUT Internal View – SUB Board

(Top)



(Bottom)



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## EUT Internal View – Camera Board

(Top)

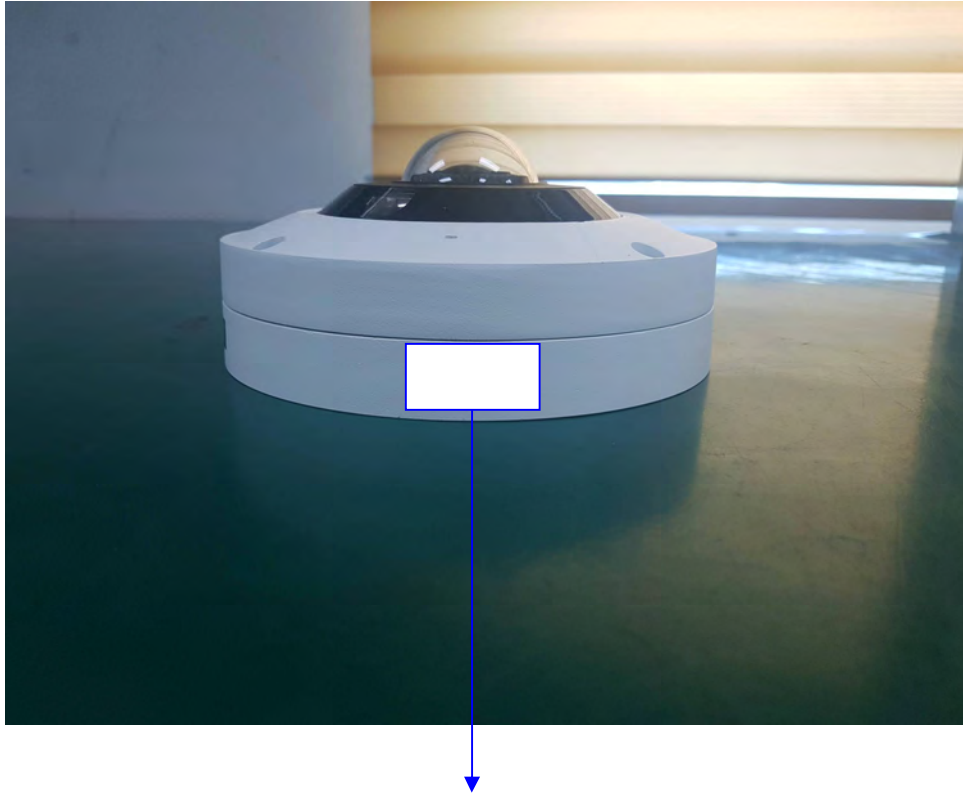


(Bottom)



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## Label Photographs



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VCCI-A