



# EMC TEST REPORT For FCC

Test Report No. : KES-E1-17T0314-R2  
Date of Issue : Feb. 24, 2023  
Product name : NETWORK CAMERA  
Model/Type No. : XNO-6120R  
Variant Model : -  
Applicant : Hanwha Vision Co., Ltd  
Applicant Address : 6, Pangyo-ro 319 Beon-gil, Bundang-gu, Seongnam-si,  
Gyeonggi-do, 13488, KOREA  
Manufacturer : 1. HANWHA VISION VIETNAM COMPANY LIMITED  
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)  
Equipment authorization : ☐ Declaration of Conformity  
☒ Verification  
☐ Certification  
Date of Receipt : Apr. 14, 2017  
Test date : Apr. 29, 2017  
Test Results : ☒ In Compliance ☐ Not in Compliance

Tested by

Dae Hyun, Kim  
EMC Test Engineer

Reviewed by

Dong-Hun, Jang  
EMC Technical Manager

Tested by Yung Suk, Song  
(Retired person)  
Proxy signature : Dae Hyun, Kim

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

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Report No.:

KES-E1-17T0314-R2

Page (2) of (36)

**REPORT REVISION HISTORY**

| Date          | Test Report No.   | Revision History                                                                 |
|---------------|-------------------|----------------------------------------------------------------------------------|
| May. 03, 2017 | KES-E1-17T0314    | Issued                                                                           |
| May. 28, 2021 | KES-E1-17T0314-R1 | Reissue due to model name modification & Delete Manufacturer on Customer Request |
| Feb. 24, 2023 | KES-E1-17T0314-R2 | Change the Applicant and manufacturer at the request of the customer             |
|               |                   |                                                                                  |
|               |                   |                                                                                  |
|               |                   |                                                                                  |
|               |                   |                                                                                  |
|               |                   |                                                                                  |
|               |                   |                                                                                  |
|               |                   |                                                                                  |

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Report No.:

KES-E1-17T0314-R2

Page (3) of (36)

## TABLE OF CONTENTS

|            |                                                             |    |
|------------|-------------------------------------------------------------|----|
| 1.0        | General Product Description.....                            | 4  |
| 1.1        | Test Voltage & Frequency .....                              | 7  |
| 1.2        | Variant Model Differences .....                             | 7  |
| 1.3        | Device Modifications .....                                  | 7  |
| 1.4        | Equipment Under Test.....                                   | 7  |
| 1.5        | Support Equipments .....                                    | 7  |
| 1.6        | External I/O Cabling .....                                  | 8  |
| 1.7        | EUT Operating Mode(s) .....                                 | 9  |
| 1.8        | Configuration .....                                         | 10 |
| 1.9        | Calibration Details of Equipment Used for Measurement ..... | 12 |
| 1.10       | Test Facility .....                                         | 12 |
| 1.11       | Laboratory Accreditations and Listings .....                | 12 |
| 2.0        | Test Regulations.....                                       | 13 |
| 2.1        | Conducted Emissions at Mains Power Ports .....              | 15 |
| 2.2        | Radiated Electric Field Emissions(Below 1 GHz) .....        | 16 |
| 2.3        | Radiated Electric Field Emissions(Above 1 GHz) .....        | 17 |
| APPENDIX A | – TEST DATA.....                                            | 18 |
|            | Conducted Emissions at Mains Power Ports.....               | 18 |
|            | Radiated Electric Field Emissions(Below 1 GHz) .....        | 20 |
|            | Radiated Electric Field Emissions(Above 1 GHz) .....        | 22 |
|            | Test Setup Photos and Configuration .....                   | 25 |
|            | Conducted Voltage Emissions .....                           | 25 |
|            | Radiated Electric Field Emissions(Below 1 GHz) .....        | 26 |
|            | Radiated Electric Field Emissions(Above 1 GHz) .....        | 27 |
|            | EUT External Photographs .....                              | 28 |
|            | EUT Internal Photographs .....                              | 29 |

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## 1.0 General Product Description

### Main Specifications of EUT are:

|                             |                                                                                                                                                                                                                                                                     |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Video</b>                |                                                                                                                                                                                                                                                                     |
| Imaging Device              | 1/2.8" 2M CMOS                                                                                                                                                                                                                                                      |
| Total Pixels                | 1945(H) x 1109(V) 2.16M                                                                                                                                                                                                                                             |
| Effective Pixels            | 1945(H) x 1097(V) 2.13M                                                                                                                                                                                                                                             |
| Scanning System             | Progressive                                                                                                                                                                                                                                                         |
| Min. Illumination           | Color : 0.03 Lux (1/30sec, F1.6)<br>B/W : 0 Lux (IR LED On)                                                                                                                                                                                                         |
| S / N Ratio                 | 50dB                                                                                                                                                                                                                                                                |
| 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)   | 5.2~62.4mm(Optical 12X)                                                                                                                                                                                                                                             |
| Max. Aperture Ratio         | F1.6 (Wide) ~ F3.0(Tele)                                                                                                                                                                                                                                            |
| Angular Field of View       | W : 54.58(H) X 32.19(V) X 61.40(D)<br>T : 5.30(H) X 3.00(V) X 6.06(D)                                                                                                                                                                                               |
| Min. Object Distance        | 1.5m                                                                                                                                                                                                                                                                |
| Focus Control               | Auto / Manual / One Push                                                                                                                                                                                                                                            |
| Lens Type                   | DC Auto Iris                                                                                                                                                                                                                                                        |
| Mount Type                  | Board-in type                                                                                                                                                                                                                                                       |
| <b>Operational</b>          |                                                                                                                                                                                                                                                                     |
| Viewable Length             | 70m                                                                                                                                                                                                                                                                 |
| Camera Title                | Off / On (Displayed up to 85 characters)<br>- W/W : English/Numeric/Special Characters<br>- China : English/Numeric/Special/Chinese Characters<br>- Common : Multi-line (Max 5), Color<br>(Grey/Green/Red/Blue/Black/White), Transparency, Auto Scale by Resolution |
| Day & Night                 | Auto (ICR) / Color / B/W / External / Schedule                                                                                                                                                                                                                      |
| Backlight Compensation      | Off / BLC / HLC(Masking/Dimming), WDR                                                                                                                                                                                                                               |
| Wide Dynamic Range          | 150dB                                                                                                                                                                                                                                                               |
| Contrast Enhancement        | SSDR (Off / On)                                                                                                                                                                                                                                                     |
| Digital Noise Reduction     | SSNR5 (2D+3D Noise Filter) (Off / On)                                                                                                                                                                                                                               |
| Digital Image Stabilization | Off / On                                                                                                                                                                                                                                                            |
| Defog                       | Auto / Manual / Off                                                                                                                                                                                                                                                 |
| Motion Detection            | Off/ On(8ea, 8point Polygonal zones)                                                                                                                                                                                                                                |
| Privacy Masking             | Off / On (32ea, Rectangle zones)<br>- Color : Grey/Green/Red/Blue/Black/White<br>- Mosaic                                                                                                                                                                           |
| Gain Control                | Off / Low / Middle / High                                                                                                                                                                                                                                           |
| White Balance               | ATW / AWC / Manual / Indoor / Outdoor (included Mercury & Sodium)                                                                                                                                                                                                   |
| Contrast                    | level adjustment                                                                                                                                                                                                                                                    |
| LDC                         | On/Off (5 levels with Min/Max)                                                                                                                                                                                                                                      |
| Electronic Shutter Speed    | Minimum / Maximum / Anti flicker (2 ~ 1/12,000sec)                                                                                                                                                                                                                  |
| Digital PTZ                 | 24X                                                                                                                                                                                                                                                                 |
| Preset                      | 300ea                                                                                                                                                                                                                                                               |
| Rotate Image                | Flip : On/Off<br>Mirror : On/Off<br>Hallway : 90° / 270°                                                                                                                                                                                                            |
| Video&Audio Analytics       | Tampering, Loitering, Directional Detection, Defocus Detection, Fog Detection, Virtual Line, Enter/Exit, Appear / Disappear, Audio Detection, Face Detection, Motion Detection, Sound Classification                                                                |
| Alarm I/O                   | Input 1ea / Output 1ea                                                                                                                                                                                                                                              |
| Alarm Triggers              | Alarm Input, Motion Detection, Video & Audio Analytics, Network Disconnect                                                                                                                                                                                          |

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Report No.:

KES-E1-17T0314-R2

Page (5) of (36)

|                                   |                                                                                                                                                                                                                                                                                                                  |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Alarm events                      | File upload via FTP, E-Mail<br>Notification via E-Mail<br>local storage(SD/SDHC/SDXC) or NAS recording at Event Triggers<br>External output<br>preset                                                                                                                                                            |
| Audio In                          | Selectable (Mic IN/Line IN),<br>Supply voltage: 2.5VDC(4mA), Input impedance: approx. 2K Ohm                                                                                                                                                                                                                     |
| Audio out                         | Line out (3.5mm mono jack), Max output level: 1 Vrms                                                                                                                                                                                                                                                             |
| Pixel Counter                     | support                                                                                                                                                                                                                                                                                                          |
| <b>Network</b>                    |                                                                                                                                                                                                                                                                                                                  |
| Ethernet                          | RJ-45 (10/100BASE-T)                                                                                                                                                                                                                                                                                             |
| Video Compression Format          | H.265/H.264 (MPEG-4 Part 10/AVC) : Main/Baseline/High<br>Motion JPEG                                                                                                                                                                                                                                             |
| Resolution                        | 1920x1080, 1280x1024, 1280x960, 1280x720, 1024x768, 800x600, 800x448,<br>720x576, 720x480, 640x480, 640x360, 320x240                                                                                                                                                                                             |
| Max. Framerate                    | H.264/H.265 : Max 60fps at all resolutions<br>Motion JPEG : Max. 30fps at all resolutions                                                                                                                                                                                                                        |
| Smart Codec                       | Manual Mode (area-based : 5EA)                                                                                                                                                                                                                                                                                   |
| WiseStream II                     | support                                                                                                                                                                                                                                                                                                          |
| Video Quality Adjustment          | H.264/H.265/MJPEG : Target Bitrate Level Control                                                                                                                                                                                                                                                                 |
| Bitrate Control Method            | H.264/H.265 : CBR or VBR<br>Motion JPEG : VBR                                                                                                                                                                                                                                                                    |
| Streaming Capability              | Multiple Streaming (Up to 10 Profiles)                                                                                                                                                                                                                                                                           |
| Audio Compression Format          | 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                                                                                                                                                                            |
| Audio Communication               | Bi-directional (2-Way)                                                                                                                                                                                                                                                                                           |
| IP                                | IPv4, IPv6                                                                                                                                                                                                                                                                                                       |
| Protocol                          | TCP/IP, UDP/IP, RTP(UDP), RTP(TCP), RTCP, RTSP, NTP, HTTP, HTTPS,<br>SSL/TLS, DHCP, PPPoE, FTP, SMTP, ICMP, IGMP, SNMPv1/v2c/v3(MIB-2),<br>ARP, DNS, DDNS, QoS, PIM-SM, UPnP, Bonjour                                                                                                                            |
| 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)                                                                                                                                                           |
| Streaming Method                  | Unicast / Multicast                                                                                                                                                                                                                                                                                              |
| Max. User Access                  | 20 users at Unicast Mode                                                                                                                                                                                                                                                                                         |
| Edge Storage                      | SD/SDHC/SDXC 2slot (up to 512 GB)<br>- Continuous recording(1'st slot to 2'nd slot)<br>- Motion Images recorded in the SD/SDHC/SDXC memory card can be<br>downloaded.<br>NAS(Network Attached Storage)<br>Local PC for Instant Recording                                                                         |
| Application Programming Interface | ONVIF Profile S/G<br>SUNAPI 2.0(HTTP API)<br>Wisenet Open Platform                                                                                                                                                                                                                                               |
| Webpage Language                  | English, Korean, Chinese, French, Italian, Spanish, German, Japanese,<br>Russian, Swedish,, Portuguese, Czech, Polish, Turkish, Dutch, Hungarian, Greek                                                                                                                                                          |
| Web Viewer                        | Supported OS: Windows 7, 8.1, 10, Mac OS X 10.10, 10.11, 10.12<br>Non-plugin Webviewer<br>Supported Browser: Google Chrome 56, MS Edge 39, Mozilla Firefox<br>49(Window 64bit only) , Apple Safari 10 (Mac OS X only)<br>Plug-in Webviewer<br>Supported Browser : MS Explore 11, Apple Safari 10 (Mac OS X only) |

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Report No.:  
KES-E1-17T0314-R2  
Page (6) of (36)

|                                  |                                                                                               |
|----------------------------------|-----------------------------------------------------------------------------------------------|
| Central Management Software      | SmartViewer                                                                                   |
| <b>Environmental</b>             |                                                                                               |
| Operating Temperature / Humidity | -40°C ~ +55°C (-40°F ~ +131°F) / Less than 90% RH<br>* Start up should be done at above -35°C |
| Storage Temperature / Humidity   | -50°C ~ +60°C (-58°F ~ +140°F) / Less than 90% RH                                             |
| Ingress Protection               | IP67, IP66, NEMA 4X                                                                           |
| Vandal Resistance                | IK10                                                                                          |
| <b>Electrical</b>                |                                                                                               |
| Input Voltage / Current          | AC24V, DC12V, PoE (IEEE802.3af, Class3)                                                       |
| Power Consumption                | 24V AC : Max 14.5W<br>12V DC : Max 12.5W<br>PoE : Max 12.95W                                  |
| <b>Mechanical</b>                |                                                                                               |
| Color / Material                 | DARK GRAY / ALUMINIUM                                                                         |
| Dimension (WxHxD)                | 147.5mm x 368.6mm                                                                             |
| Weight                           | 2,175g                                                                                        |

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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 | XNO-6120R    | -             | HANWHA VISION VIETNAM COMPANY LIMITED | E.U.T   |

## 1.5 Support Equipments

| Description      | Model Number  | Serial Number   | Manufacturer                   | Remarks |
|------------------|---------------|-----------------|--------------------------------|---------|
| Notebook         | RV518         | HTK991NC600187E | Samsung Electronics Co., Ltd   | -       |
| Notebook Adaptor | ADP-60ZH      | AD-6019R        | DELTA ELECTRONICS, INC.        | -       |
| Speaker          | BR10000A CUVE | -               | BEIJING EDIFIER HI-TECH GROUP. | -       |
| MIC              | CMK-303       | -               | CAMAC                          | -       |
| Alarm            | SIP-1201DD D0 | -               | SAMSUNG TECHWIN CO., LTD.      | -       |
| PoE Adaptor      | PoE36U-1AT-R  | -               | PHIHONG                        | -       |



## 1.6 External I/O Cabling

- AC 24 V Mode, DC 12 V Mode

| Start                  |          | END         |          | Cable Spec. |        |
|------------------------|----------|-------------|----------|-------------|--------|
| Description            | I/O Port | Description | I/O Port | Length      | Shield |
| NETWORK CAMERA (E.U.T) | RJ-45    | Notebook    | RJ-45    | 3.0         | U      |
|                        | 3.5 mm   | Speaker     | 3.5 mm   | 1.6         | U      |
|                        | 3.5 mm   | MIC         | 3.5 mm   | 1.7         | U      |
|                        | 3 Pin    | Alarm       | 3 Pin    | 1.7         | U      |

\* Unshielded = U, Shielded = S

- PoE Mode

| Start                  |             | END         |             | Cable Spec. |        |
|------------------------|-------------|-------------|-------------|-------------|--------|
| Description            | I/O Port    | Description | I/O Port    | Length      | Shield |
| NETWORK CAMERA (E.U.T) | RJ-45(PoE)  | PoE Adaptor | RJ-45(PoE)  | 3.0         | U      |
|                        | RJ-45       | Notebook    | RJ-45       | 3.0         | U      |
|                        | 3.5 mm      | Speaker     | 3.5 mm      | 1.6         | U      |
|                        | 3.5 mm      | MIC         | 3.5 mm      | 1.7         | U      |
|                        | 3 Pin       | Alarm       | 3 Pin       | 1.7         | U      |
| Notebook               | RJ-45(DATA) | PoE Adaptor | RJ-45(DATA) | 3.0         | U      |

\* Unshielded = U, Shielded = S



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Report No.:  
KES-E1-17T0314-R2  
Page (9) of (36)

## 1.7 EUT Operating Mode(s)

| Test mode    | operating                          |
|--------------|------------------------------------|
| AC 24 V Mode | E.U.T Monitoring, Ping test, 1 kHz |
| DC 12 V Mode | E.U.T Monitoring, Ping test        |
| PoE Mode     | E.U.T Monitoring, Ping test        |

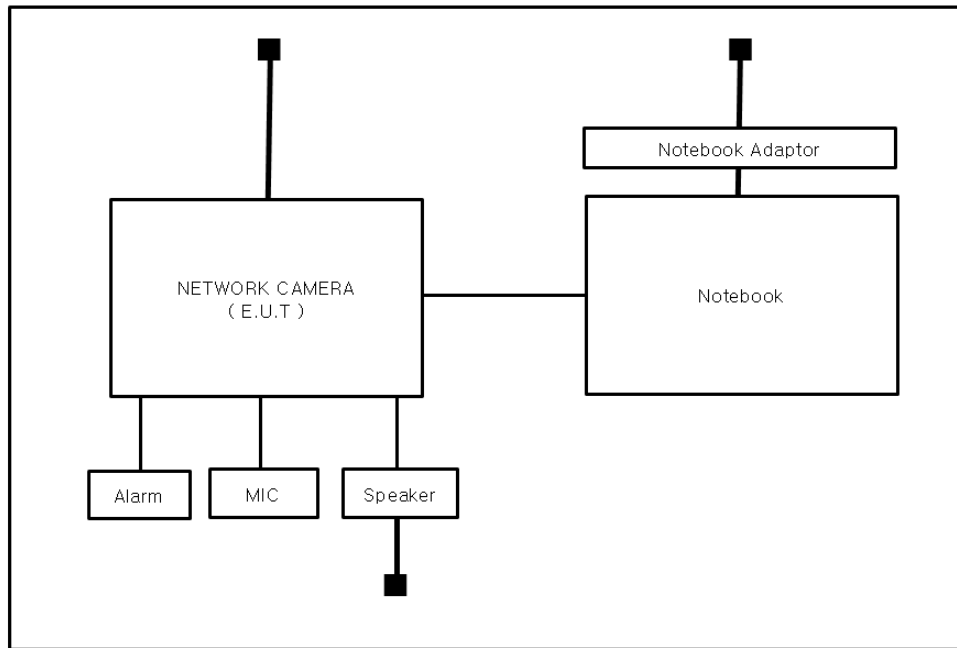
| E.U.T Test operating SW |         |                        |
|-------------------------|---------|------------------------|
| Name                    | Version | Manufacture Company    |
| Web Viewer              | -       | Hanwha Vision Co., Ltd |

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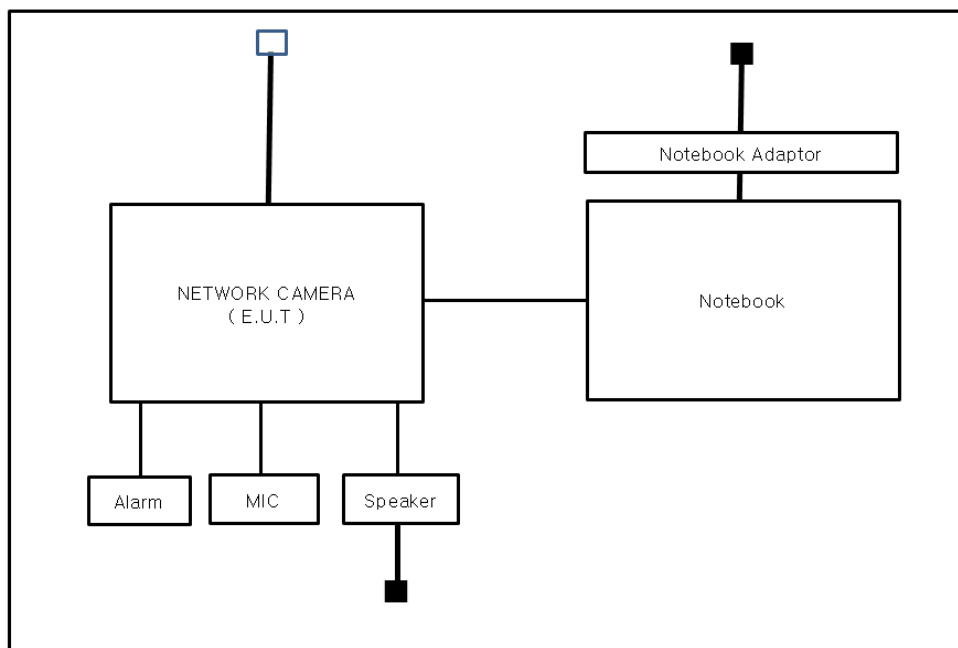
## 1.8 Configuration

■ AC Main  
 □ DC Main

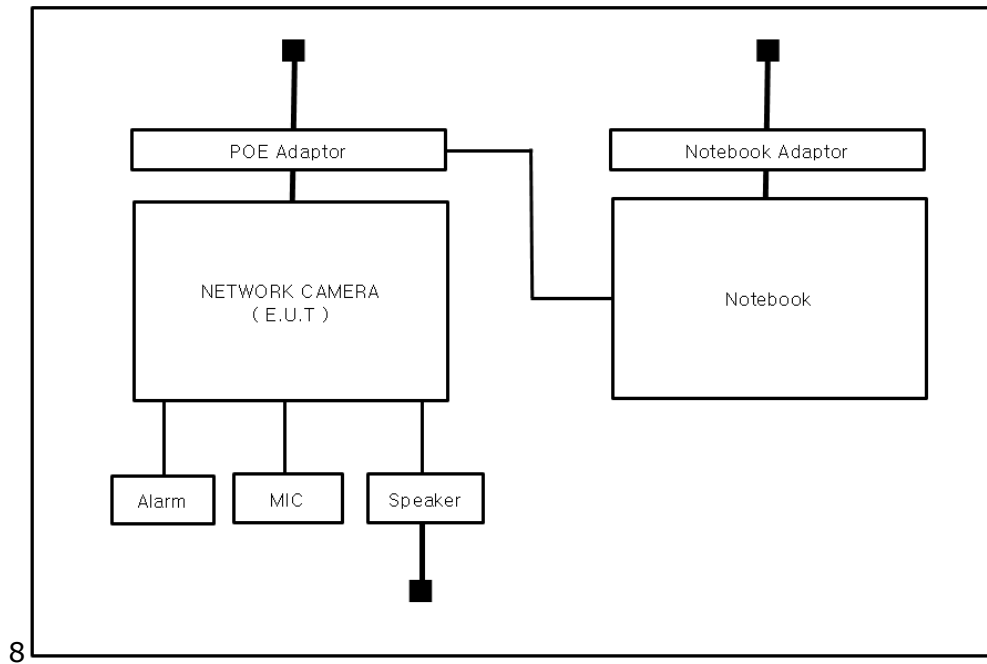
- AC 24 V Mode



- DC 12 V Mode



- PoE Mode



8

## 1.9 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.

## 1.10 Test Facility

The measurement facility is located at 473-21, Gayeo-ro, Yeoju-si, Gyeonggi-do, 12658, Korea, Republic of. The sites are constructed in conformance with the requirements of ANSI C63.4a-2017 and CISPR 16-1-4:2019

## 1.11 Laboratory Accreditations and Listings

| Country       | Agency         | Scope of Accreditation                                                                                                                  | Logo                                                                                                                           |
|---------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| KOREA         | <b>RRA</b>     | EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site)<br>EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions) | <br>KR0100                                  |
| International | <b>KOLAS</b>   | EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site)<br>EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions) | <br>KT489                                  |
| USA           | <b>FCC</b>     | 3 m & 10 m Semi-Anechoic Chamber<br>Conducted test site to perform FCC Part 15/18 measurements.                                         | <br>KR0100                                |
| Canada        | <b>ISED</b>    | 3 m & 10 m Semi-Anechoic Chamber and Conducted test site                                                                                | <br>23298                                 |
| JAPAN         | <b>VCCI</b>    | EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site)                                                                          | <br>C-20136, T-20137,<br>R-20181, G-20176 |
| Europe        | <b>TÜV SÜD</b> | EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site)<br>EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions) | <br>CARAT 001633 0004                     |

## 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 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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Report No.:  
KES-E1-17T0314-R2  
Page (14) of (36)

- |                                                                      |                                             |                                  |
|----------------------------------------------------------------------|---------------------------------------------|----------------------------------|
| <input type="checkbox"/> <b>VCCI V-3 / 2015.04</b>                   | <input type="checkbox"/> Class A            | <input type="checkbox"/> Class B |
| <input type="checkbox"/> <b>AS/NZS CISPR22:2009 +A1:2010</b>         | <input type="checkbox"/> Class A            | <input type="checkbox"/> Class B |
| <input checked="" 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 checked="" type="checkbox"/> ANSI C63.4-2014                  | <input checked="" type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <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                             |                                             |                                  |
| <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 at Mains Power Ports

**Test Date**

Apr. 29, 2017

**Test Location**

Electro wave Shieldroom

**Test Equipment**

| Used                                | Description       | Model Number | Manufacturer | Serial Number | Cal. Due     |
|-------------------------------------|-------------------|--------------|--------------|---------------|--------------|
| <input checked="" type="checkbox"/> | SHIELD ROOM #6    | -            | DYMSTEC      | -             | -            |
| <input checked="" type="checkbox"/> | EMI Test S/W      | EMC32        | R & S        | 9.12.00       | -            |
| <input checked="" type="checkbox"/> | EMI TEST RECEIVER | ESR3         | R & S        | 101781        | 04, 27, 2018 |
| <input checked="" type="checkbox"/> | LISN              | ENV216       | R & S        | 101787        | 01, 11, 2018 |
| <input checked="" type="checkbox"/> | LISN              | ESH2-Z5      | R & S        | 100450        | 04, 27, 2018 |
| <input checked="" type="checkbox"/> | PULSE LIMITER     | ESH3-Z2      | R & S        | 101915        | 12, 13, 2017 |

**Test Conditions**

Temperature: 21,2 °C

Relative Humidity: 36,3 %

**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.



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

### Test Date

Apr. 29, 2017

### Test Location

☐ Open Area Test Site #1      ☒ Open Area Test Site #2

### Test Equipment

| Used                                | Description                   | Model Number | Manufacturer    | Serial Number | Cal. Due     |
|-------------------------------------|-------------------------------|--------------|-----------------|---------------|--------------|
| <input checked="" type="checkbox"/> | OPEN AREA TEST SITE (OATS) #2 | -            | KES             | -             | -            |
| <input checked="" type="checkbox"/> | EMI Test S/W                  | -            | -               | -             | -            |
| <input checked="" type="checkbox"/> | EMI TEST RECEIVER             | ESVS10       | Rohde & Schwarz | 826008/014    | 04, 18, 2018 |
| <input checked="" type="checkbox"/> | TRILOG-BROADBAND ANTENNA      | VULB9163     | Schwarzbeck     | 714           | 11, 28, 2018 |
| <input type="checkbox"/>            | TRILOG-BROADBAND ANTENNA      | VULB9163     | Schwarzbeck     | 715           | 04, 14, 2018 |

### Test Conditions

Temperature: 23,0 °C  
Relative Humidity: 29,0 %

### 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.





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

### Test Date

Apr. 29, 2017

### Test Location

Semi Anechoic Chamber #1

### Test Equipment

| Used                                | Description                | Model Number | Manufacturer     | Serial Number | Cal. Due     |
|-------------------------------------|----------------------------|--------------|------------------|---------------|--------------|
| <input checked="" type="checkbox"/> | SAC #4(10 m)               | -            | DYMSTEC          | -             | -            |
| <input checked="" type="checkbox"/> | EMI Test S/W               | EP5/RE       | TOYO Corporation | 6.0.0         | -            |
| <input checked="" type="checkbox"/> | EMI TEST RECEIVER          | ESU26        | Rohde & Schwarz  | 100551        | 04, 17, 2018 |
| <input checked="" type="checkbox"/> | PREAMPLIFIER               | SCU 18       | Rohde & Schwarz  | 102232        | 06, 29, 2017 |
| <input checked="" type="checkbox"/> | DOUBLE RIDGED HORN ANTENNA | SAS-571      | A.H.SYSTEM,INC   | 414           | 02, 15, 2019 |

### Test Conditions

Temperature: 22,3 °C  
Relative Humidity: 38,2 %

### Frequency Range of Measurement

1 GHz to 26.5 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

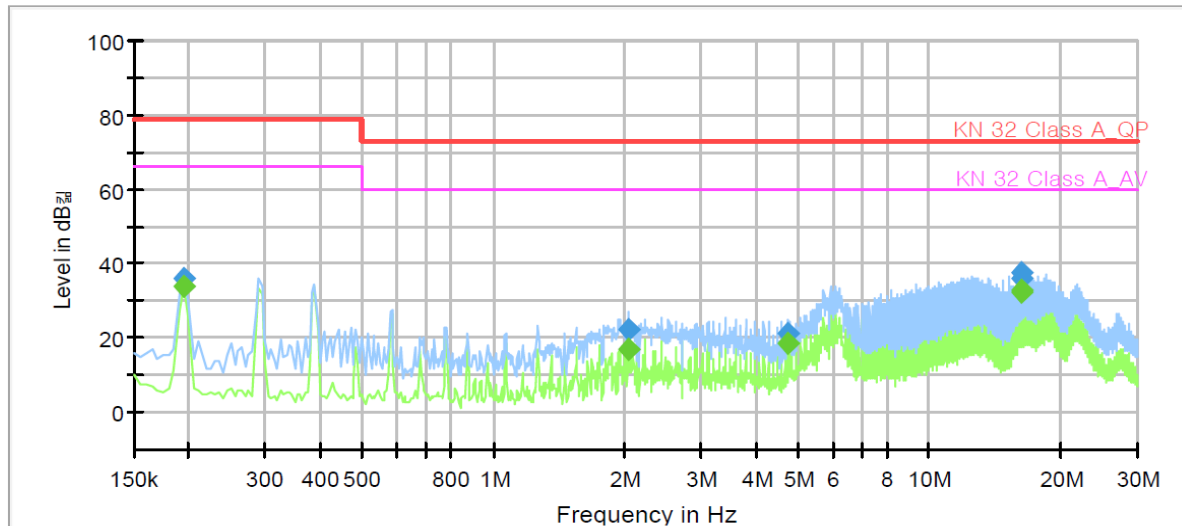
### Conducted Emissions at Mains Power Ports

- AC 24 V Mode

[HOT]

#### Common Information

|                   |                    |
|-------------------|--------------------|
| Test Description: | Conducted Emission |
| Model No.:        | XNO-6120RN         |
| Mode              | AC 24 V_H          |
| Operator Name:    | KES                |



#### Final Result

| Frequency (MHz) | QuasiPeak (dBμV) | CAverage (dBμV) | Limit (dBμV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.195000        | ---              | 33.76           | 66.00        | 32.24       | 1000.0          | 9.000           | L1   | 20.7       |
| 0.195000        | 36.14            | ---             | 79.00        | 42.86       | 1000.0          | 9.000           | L1   | 20.7       |
| 2.040000        | ---              | 17.07           | 60.00        | 42.93       | 1000.0          | 9.000           | L1   | 19.8       |
| 2.040000        | 22.18            | ---             | 73.00        | 50.82       | 1000.0          | 9.000           | L1   | 19.8       |
| 4.760000        | ---              | 18.59           | 60.00        | 41.41       | 1000.0          | 9.000           | L1   | 19.7       |
| 4.760000        | 21.31            | ---             | 73.00        | 51.69       | 1000.0          | 9.000           | L1   | 19.7       |
| 16.225000       | ---              | 32.76           | 60.00        | 27.24       | 1000.0          | 9.000           | L1   | 20.2       |
| 16.225000       | 37.51            | ---             | 73.00        | 35.49       | 1000.0          | 9.000           | L1   | 20.2       |
| 16.230000       | ---              | 32.33           | 60.00        | 27.67       | 1000.0          | 9.000           | L1   | 20.2       |
| 16.230000       | 36.06            | ---             | 73.00        | 36.94       | 1000.0          | 9.000           | L1   | 20.2       |

#### ◆ Calculation

QuasiPeak[dBuV] / CAverage [dBuV] = Reading Value[dBuV] + Corr. [dB]

QuasiPeak / CAverage : The Final Value

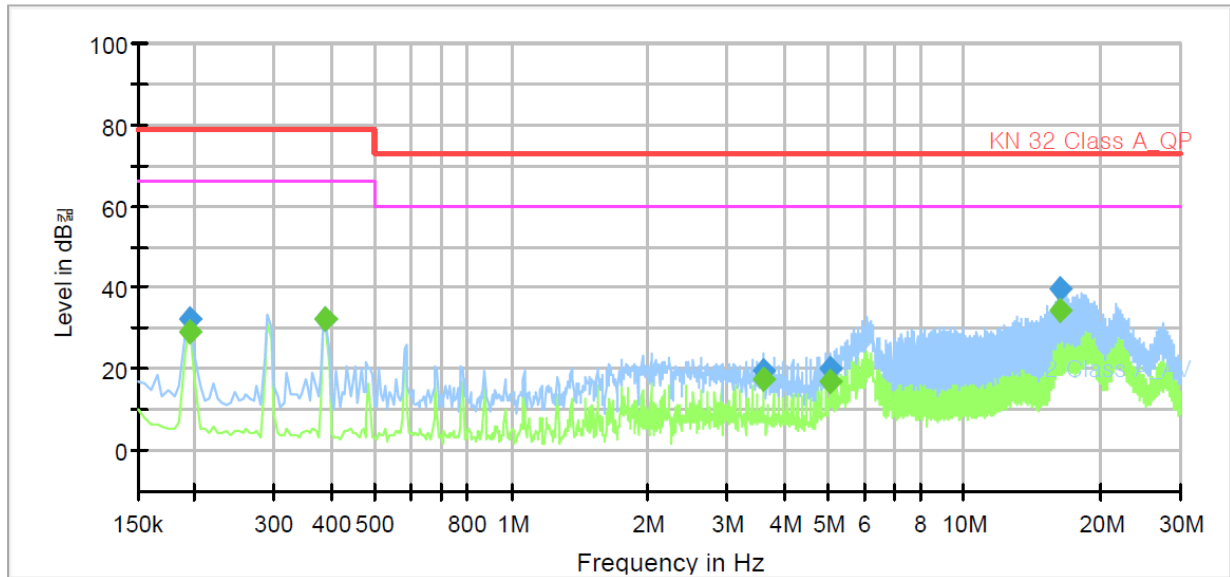
Reading Value : Not shown in the table.

Corr. : Correction values (LISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

## [NEUTRAL]

## Common Information

|                   |                    |
|-------------------|--------------------|
| Test Description: | Conducted Emission |
| Model No.:        | XNO-6120RN         |
| Mode              | AC 24 V_N          |
| Operator Name:    | KES                |



## Final Result

| Frequency (MHz) | QuasiPeak (dBμV) | CAverage (dBμV) | Limit (dBμV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.195000        | ---              | 29.04           | 66.00        | 36.96       | 1000.0          | 9.000           | N    | 20.7       |
| 0.195000        | 32.46            | ---             | 79.00        | 46.54       | 1000.0          | 9.000           | N    | 20.7       |
| 0.390000        | ---              | 32.26           | 66.00        | 33.74       | 1000.0          | 9.000           | N    | 20.6       |
| 0.390000        | 32.38            | ---             | 79.00        | 46.62       | 1000.0          | 9.000           | N    | 20.6       |
| 3.595000        | ---              | 17.34           | 60.00        | 42.66       | 1000.0          | 9.000           | N    | 19.7       |
| 3.595000        | 19.80            | ---             | 73.00        | 53.20       | 1000.0          | 9.000           | N    | 19.7       |
| 5.050000        | ---              | 17.03           | 60.00        | 42.97       | 1000.0          | 9.000           | N    | 19.7       |
| 5.050000        | 20.20            | ---             | 73.00        | 52.80       | 1000.0          | 9.000           | N    | 19.7       |
| 16.225000       | ---              | 34.65           | 60.00        | 25.35       | 1000.0          | 9.000           | N    | 20.2       |
| 16.225000       | 39.46            | ---             | 73.00        | 33.54       | 1000.0          | 9.000           | N    | 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 (LISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))



## Radiated Electric Field Emissions(Below 1 GHz)

- AC 24 V Mode

| Frequency | Amplitude    | ANT             | ANT. Height | Correction Factor |               | Corrected Amplitude | Applicable Limit | Margin |
|-----------|--------------|-----------------|-------------|-------------------|---------------|---------------------|------------------|--------|
| [MHz]     | [dB $\mu$ V] | Polar.<br>(H/V) | [m]         | ANT.<br>[dB/m]    | Cable<br>[dB] | [dB $\mu$ V/m]      | [dB $\mu$ V/m]   | [dB]   |
| 224.95    | 7.10         | H               | 2.30        | 12.15             | 3.42          | 22.67               | 46.40            | 23.73  |
| 250.01    | 13.50        | H               | 1.25        | 12.49             | 3.69          | 29.68               | 46.40            | 16.72  |
| 274.39    | 12.20        | V               | 2.33        | 12.94             | 3.89          | 29.03               | 46.40            | 17.37  |
| 335.59    | 10.30        | H               | 1.96        | 14.20             | 4.20          | 28.70               | 46.40            | 17.70  |
| 350.08    | 9.50         | V               | 2.10        | 14.52             | 4.24          | 28.26               | 46.40            | 18.14  |
| 500.47    | 10.20        | V               | 1.03        | 17.36             | 5.20          | 32.76               | 46.40            | 13.64  |

\* H : Horizontal, V : Vertical

- DC 12 V Mode

| Frequency | Amplitude    | ANT             | ANT. Height | Correction Factor |               | Corrected Amplitude | Applicable Limit | Margin |
|-----------|--------------|-----------------|-------------|-------------------|---------------|---------------------|------------------|--------|
| [MHz]     | [dB $\mu$ V] | Polar.<br>(H/V) | [m]         | ANT.<br>[dB/m]    | Cable<br>[dB] | [dB $\mu$ V/m]      | [dB $\mu$ V/m]   | [dB]   |
| 250.02    | 12.20        | H               | 1.25        | 12.49             | 3.69          | 28.38               | 46.40            | 18.02  |
| 274.49    | 10.20        | H               | 2.31        | 12.95             | 3.89          | 27.04               | 46.40            | 19.36  |
| 299.61    | 8.30         | V               | 1.95        | 13.41             | 4.10          | 25.81               | 46.40            | 20.59  |
| 399.50    | 7.10         | H               | 1.02        | 15.60             | 4.60          | 27.30               | 46.40            | 19.10  |
| 475.52    | 6.20         | V               | 1.00        | 16.92             | 5.16          | 28.28               | 46.40            | 18.12  |

\* H : Horizontal, V : Vertical

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KES-E1-17T0314-R2

Page (21) of (36)

**- PoE Mode**

| Frequency | Amplitude | ANT             | ANT. Height | Correction Factor |               | Corrected Amplitude | Applicable Limit | Margin |
|-----------|-----------|-----------------|-------------|-------------------|---------------|---------------------|------------------|--------|
| [MHz]     | [dBμV]    | Polar.<br>(H/V) | [m]         | ANT.<br>[dB/m]    | Cable<br>[dB] | [dBμV/m]            | [dBμV/m]         | [dB]   |
| 199.71    | 6.50      | V               | 2.13        | 11.77             | 3.15          | 21.42               | 43.50            | 22.08  |
| 250.01    | 13.20     | H               | 2.22        | 12.49             | 3.69          | 29.38               | 46.40            | 17.02  |
| 274.36    | 8.90      | V               | 1.96        | 12.94             | 3.89          | 25.73               | 46.40            | 20.67  |
| 299.59    | 10.30     | H               | 3.02        | 13.41             | 4.10          | 27.81               | 46.40            | 18.59  |
| 399.48    | 7.10      | V               | 1.20        | 15.60             | 4.60          | 27.30               | 46.40            | 19.10  |
| 424.67    | 7.30      | H               | 1.00        | 16.04             | 4.86          | 28.20               | 46.40            | 18.20  |

\* H : Horizontal, V : Vertical

**◆ Calculation**

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

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

Correction Factor : ANT FACTOR + Cable loss

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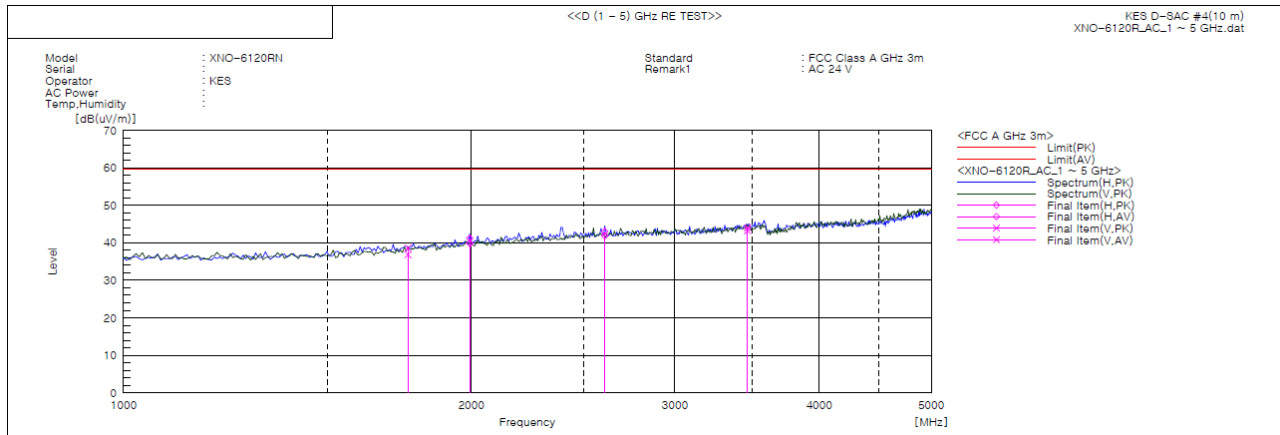
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## Radiated Electric Field Emissions(Above 1 GHz)

- AC 24 V Mode



Final Result

| No. | Frequency [MHz] | (P) | Reading PK [dB(uV)] | Reading AV [dB(uV)] | c.f [dB(1/m)] | Result PK [dB(uV/m)] | Result AV [dB(uV/m)] | Limit PK [dB(uV/m)] | Limit AV [dB(uV/m)] | Margin PK [dB] | Margin AV [dB] | Height [cm] | Angle [deg] | Remark |
|-----|-----------------|-----|---------------------|---------------------|---------------|----------------------|----------------------|---------------------|---------------------|----------------|----------------|-------------|-------------|--------|
| 1   | 2608.974        | H   | 45.4                | 44.2                | -2.4          | 43.0                 | 41.8                 | 79.5                | 59.5                | 36.5           | 17.7           | 400.0       | 261.0       |        |
| 2   | 1993.590        | H   | 46.2                | 44.8                | -5.0          | 41.2                 | 39.8                 | 79.5                | 59.5                | 38.3           | 19.7           | 400.0       | 214.0       |        |
| 3   | 1762.821        | V   | 46.1                | 44.3                | -7.5          | 38.6                 | 36.8                 | 79.5                | 59.5                | 40.9           | 22.7           | 100.0       | 311.0       |        |
| 4   | 3467.949        | V   | 44.3                | 43.5                | -0.3          | 44.0                 | 43.2                 | 79.5                | 59.5                | 35.5           | 16.3           | 100.0       | 182.0       |        |

### ◆ Calculation

Correction Factor [dB] = Ant Factor[dB/m] + Cable Loss [dB] - Preamp Factor [dB]

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

Corrected Amplitude : The Final Value, Amplitude : Reading Value

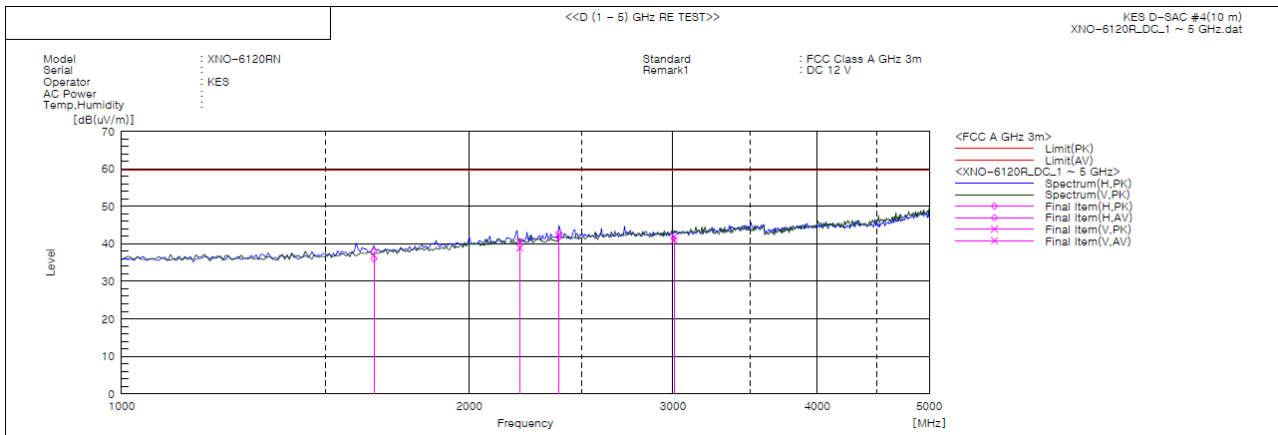


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KES-E1-17T0314-R2  
Page (23) of (36)

## - DC 12 V Mode



### Final Result

| No. | Frequency [MHz] | (P) | Reading PK [dB(uV)] | Reading AV [dB(uV)] | c.f [dB(1/m)] | Result PK [dB(uV/m)] | Result AV [dB(uV/m)] | Limit PK [dB(uV/m)] | Limit AV [dB(uV/m)] | Margin PK [dB] | Margin AV [dB] | Height [cm] | Angle [deg] | Remark |
|-----|-----------------|-----|---------------------|---------------------|---------------|----------------------|----------------------|---------------------|---------------------|----------------|----------------|-------------|-------------|--------|
| 1   | 2391.026        | H   | 46.0                | 44.9                | -3.1          | 42.9                 | 41.8                 | 79.5                | 59.5                | 36.6           | 17.7           | 100.0       | 321.0       |        |
| 2   | 1653.846        | H   | 46.1                | 44.2                | -8.2          | 37.9                 | 36.0                 | 79.5                | 59.5                | 41.6           | 23.5           | 100.0       | 192.0       |        |
| 3   | 2211.539        | V   | 44.8                | 43.2                | -4.3          | 40.5                 | 38.9                 | 79.5                | 59.5                | 39.0           | 20.6           | 400.0       | 336.0       |        |
| 4   | 3006.410        | V   | 43.0                | 42.1                | -1.1          | 41.9                 | 41.0                 | 79.5                | 59.5                | 37.6           | 18.5           | 100.0       | 253.0       |        |

### ◆ Calculation

Correction Factor [dB] = Ant Factor[dB/m] + Cable Loss [dB] - Preamp Factor [dB]

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

Corrected Amplitude : The Final Value, Amplitude : Reading Value

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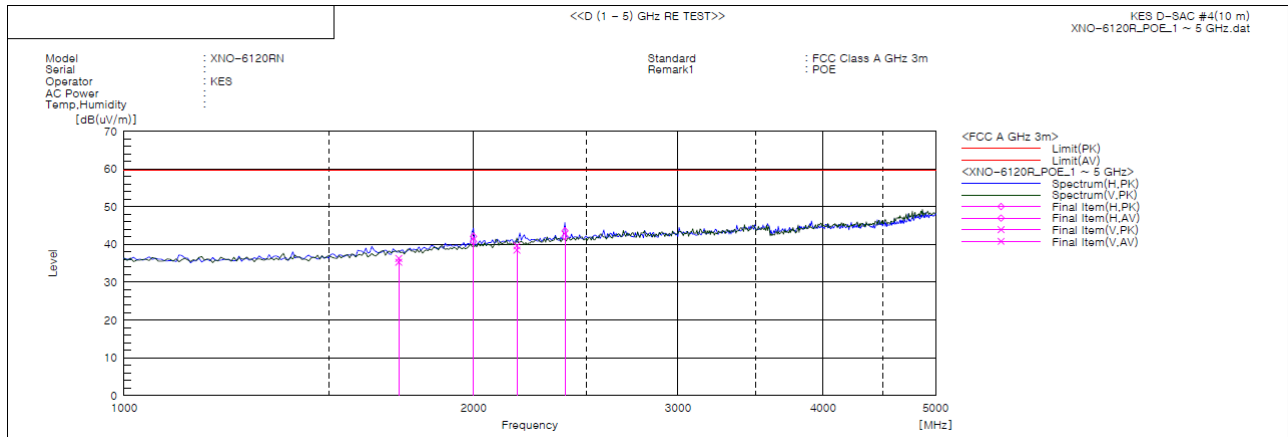
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Page (24) of (36)

### - PoE Mode



#### Final Result

| No. | Frequency [MHz] | (P) | Reading PK [dB(uV)] | Reading AV [dB(uV)] | c.f [dB(1/m)] | Result PK [dB(uV/m)] | Result AV [dB(uV/m)] | Limit PK [dB(uV/m)] | Limit AV [dB(uV/m)] | Margin PK [dB] | Margin AV [dB] | Height [cm] | Angle [deg] | Remark |
|-----|-----------------|-----|---------------------|---------------------|---------------|----------------------|----------------------|---------------------|---------------------|----------------|----------------|-------------|-------------|--------|
| 1   | 2000.000        | H   | 47.1                | 45.8                | -5.0          | 42.1                 | 40.8                 | 79.5                | 59.5                | 37.4           | 18.7           | 100.0       | 41.0        |        |
| 2   | 2397.436        | H   | 46.7                | 45.2                | -3.1          | 43.6                 | 42.1                 | 79.5                | 59.5                | 35.9           | 17.4           | 100.0       | 343.0       |        |
| 3   | 1724.359        | V   | 44.1                | 43.1                | -7.8          | 36.3                 | 35.3                 | 79.5                | 59.5                | 43.2           | 24.2           | 400.0       | 282.0       |        |
| 4   | 2179.487        | V   | 44.0                | 42.9                | -4.4          | 39.6                 | 38.5                 | 79.5                | 59.5                | 39.9           | 21.0           | 400.0       | 149.0       |        |

#### ◆ Calculation

Correction Factor [dB] = Ant Factor[dB/m] + Cable Loss [dB] - Preamp Factor [dB]

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

Corrected Amplitude : The Final Value, Amplitude : Reading Value

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## Test Setup Photos and Configuration

### Conducted Voltage Emissions



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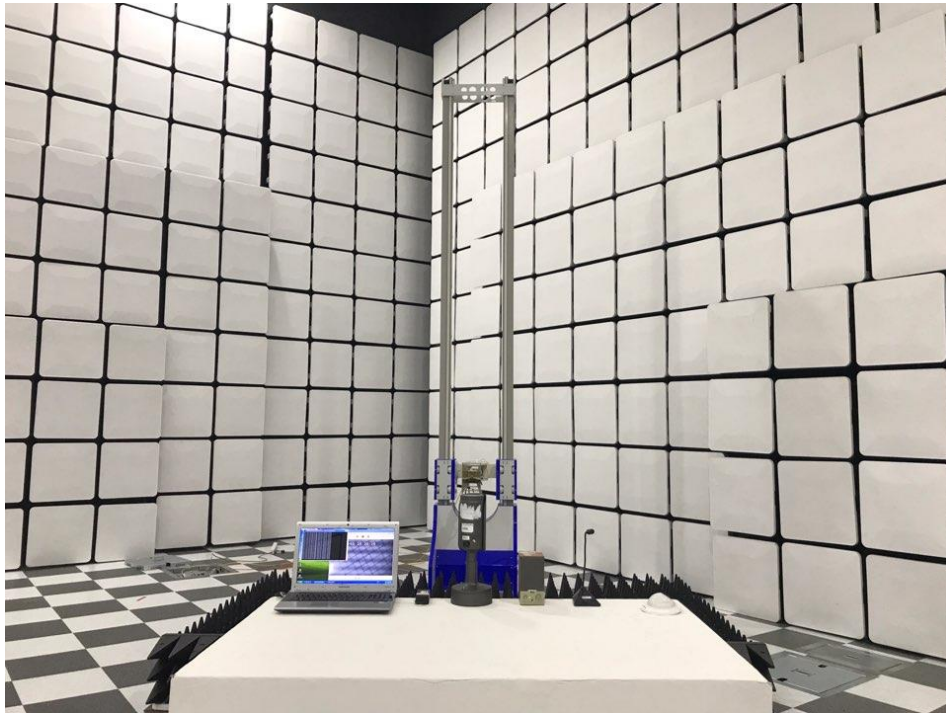
## Radiated Electric Field Emissions(Below 1 GHz)



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## Radiated Electric Field Emissions(Above 1 GHz)



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## EUT External Photographs



## EUT Internal Photographs

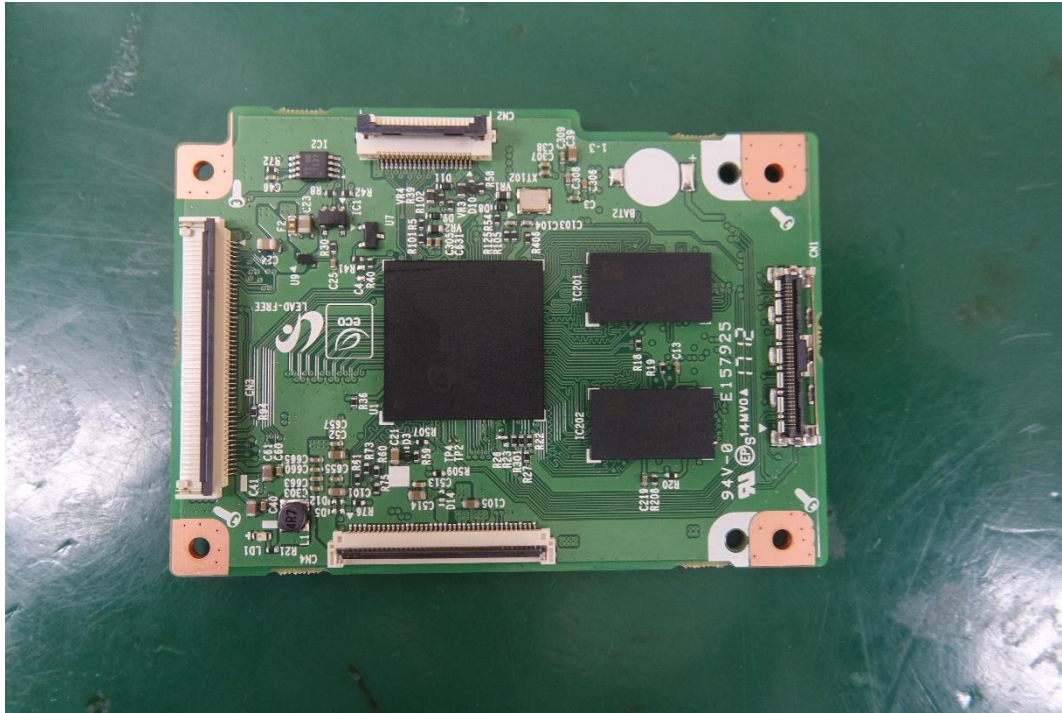
(Internal View)



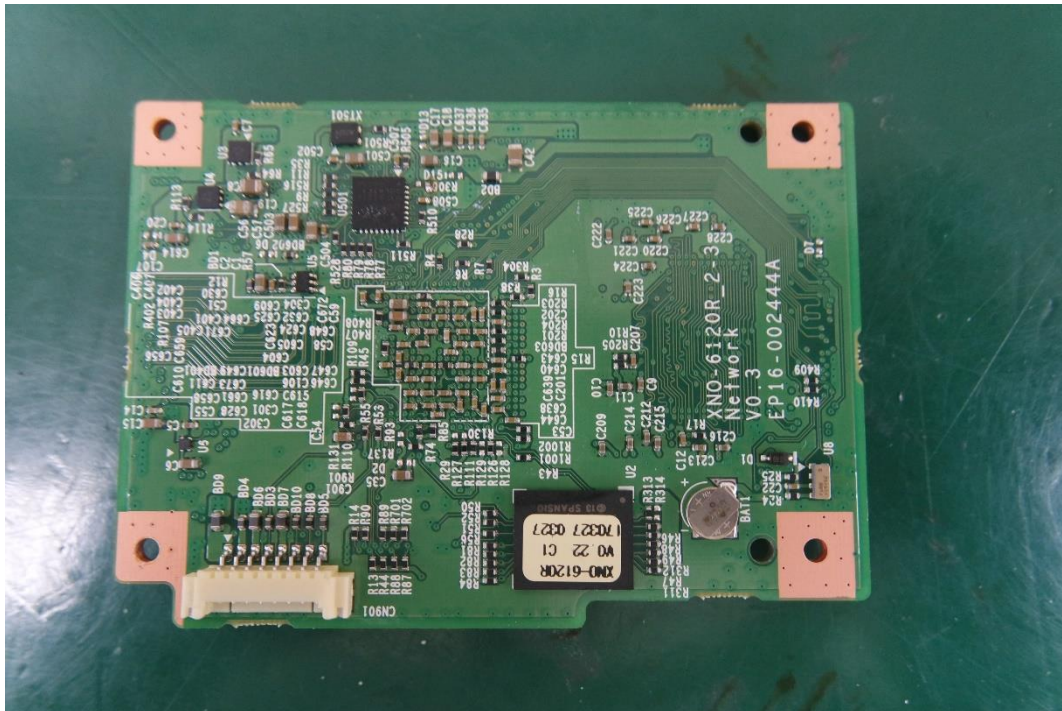


## EUT Internal View – Main Board

(Top)



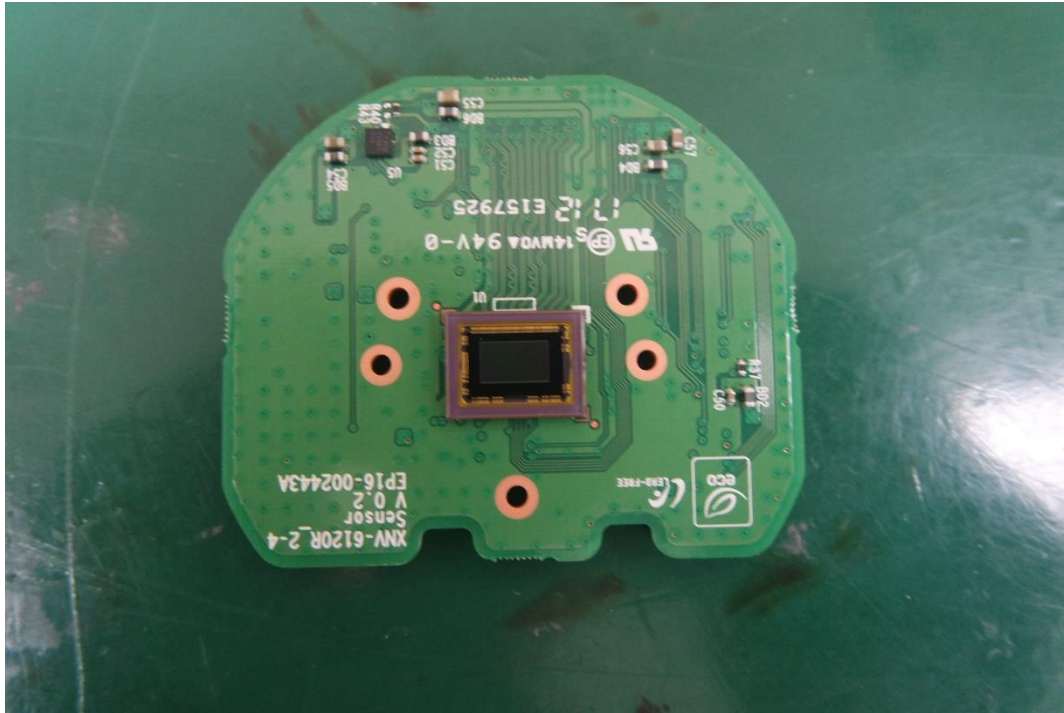
(Bottom)



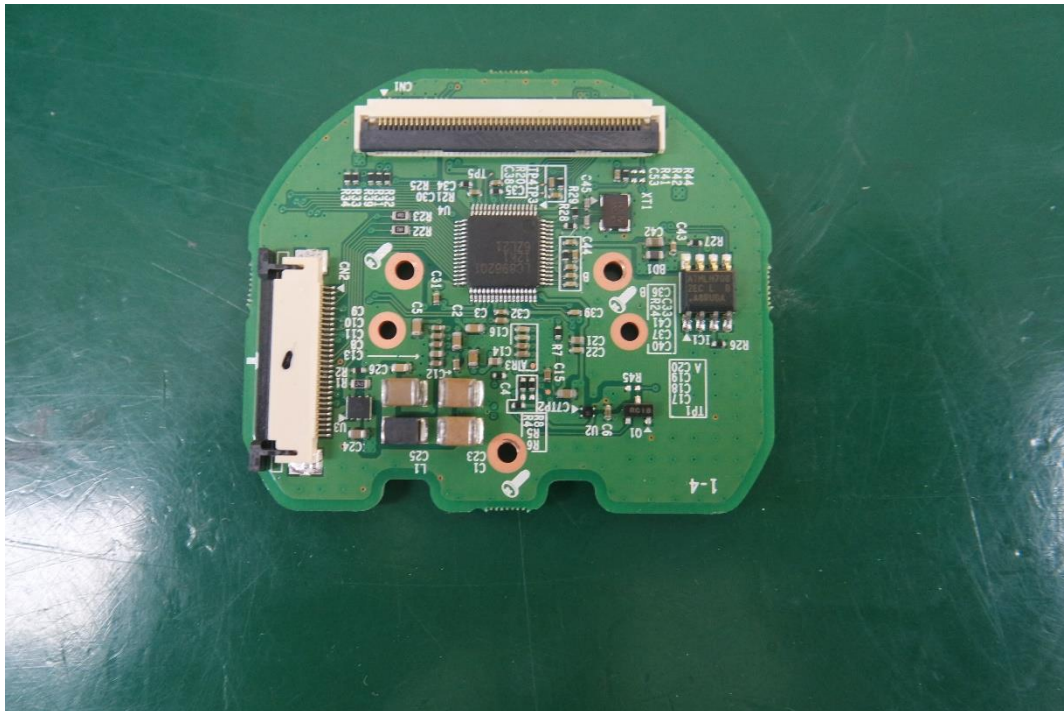
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## EUT Internal View – Lens Board

(Top)



(Bottom)



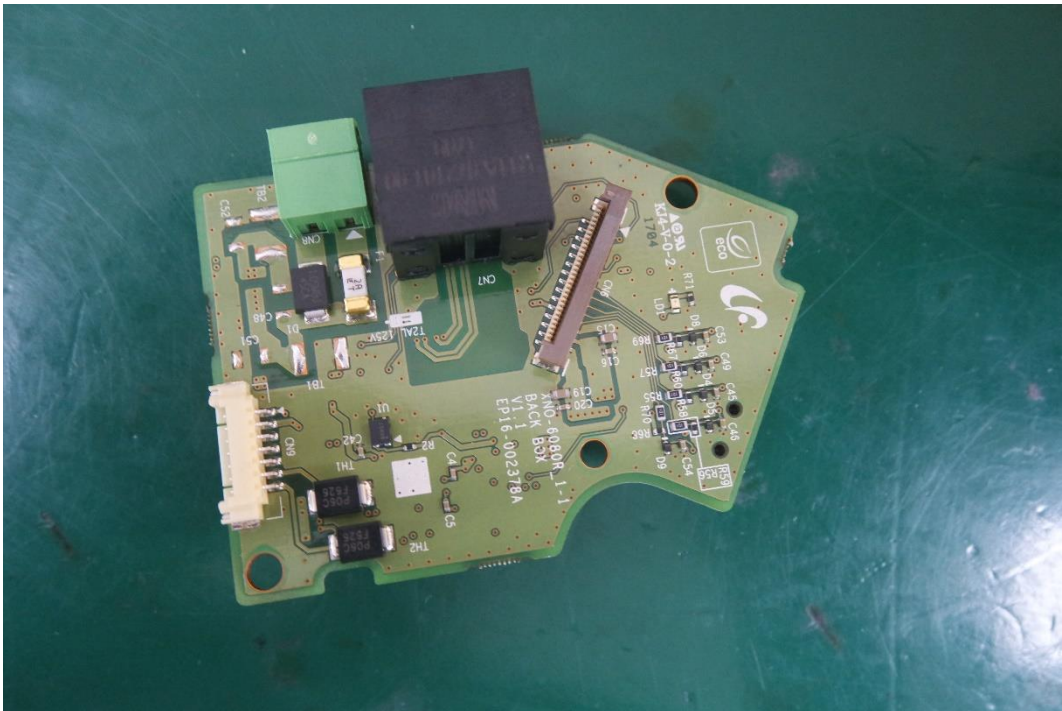


## EUT Internal View – Sub Board 1

(Top)



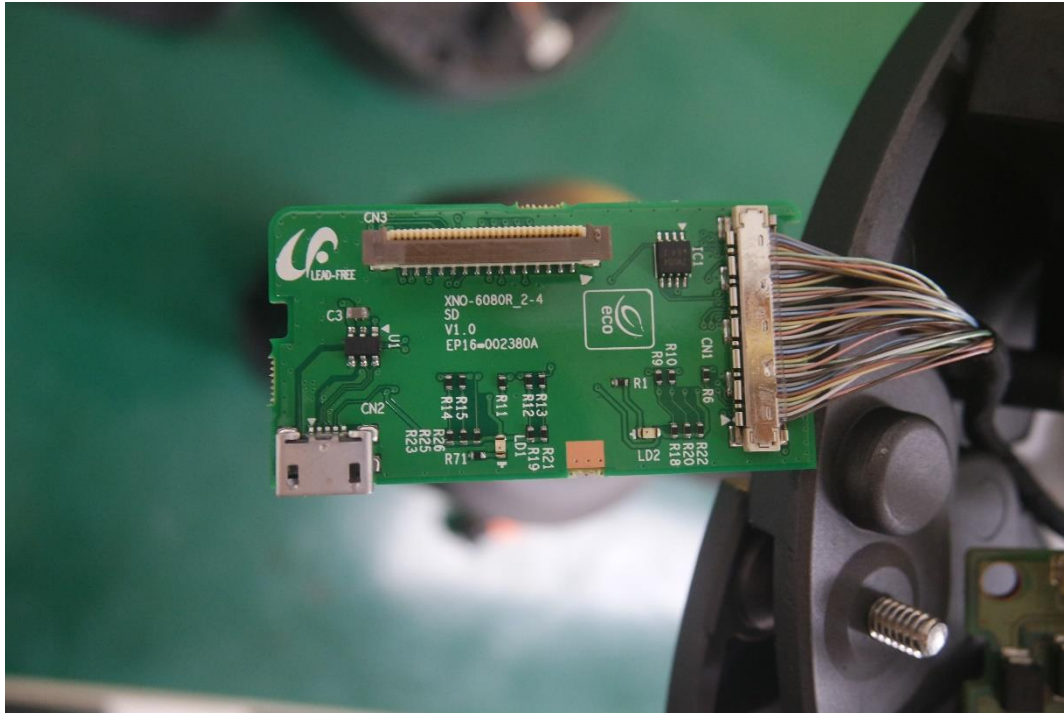
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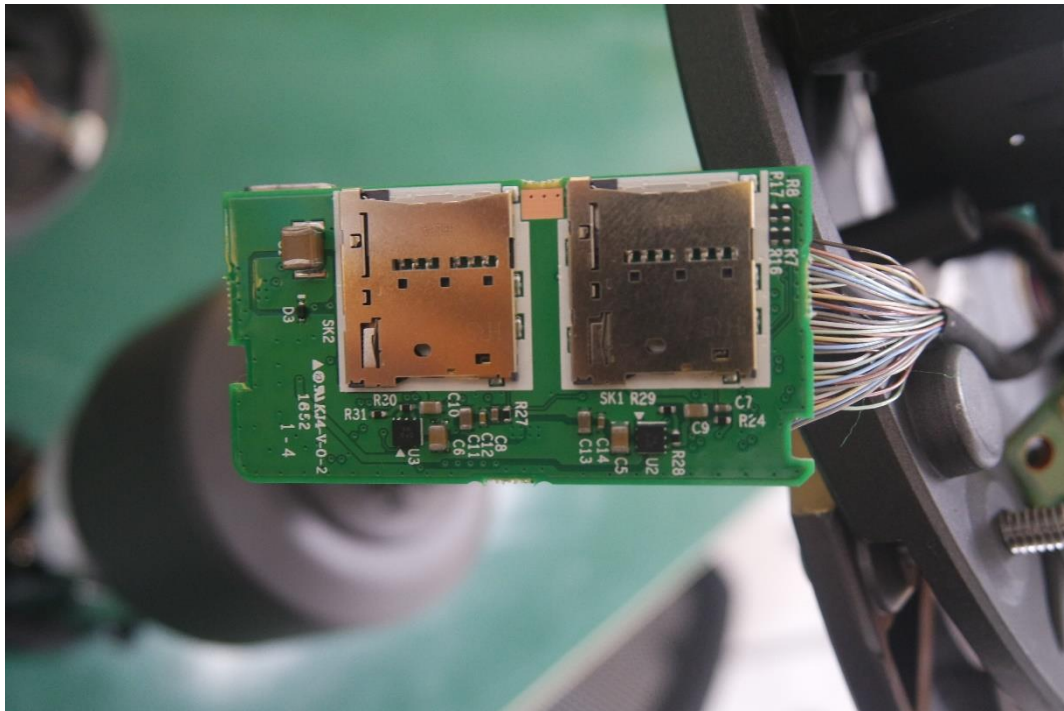


## EUT Internal View – Sub Board 2

(Top)



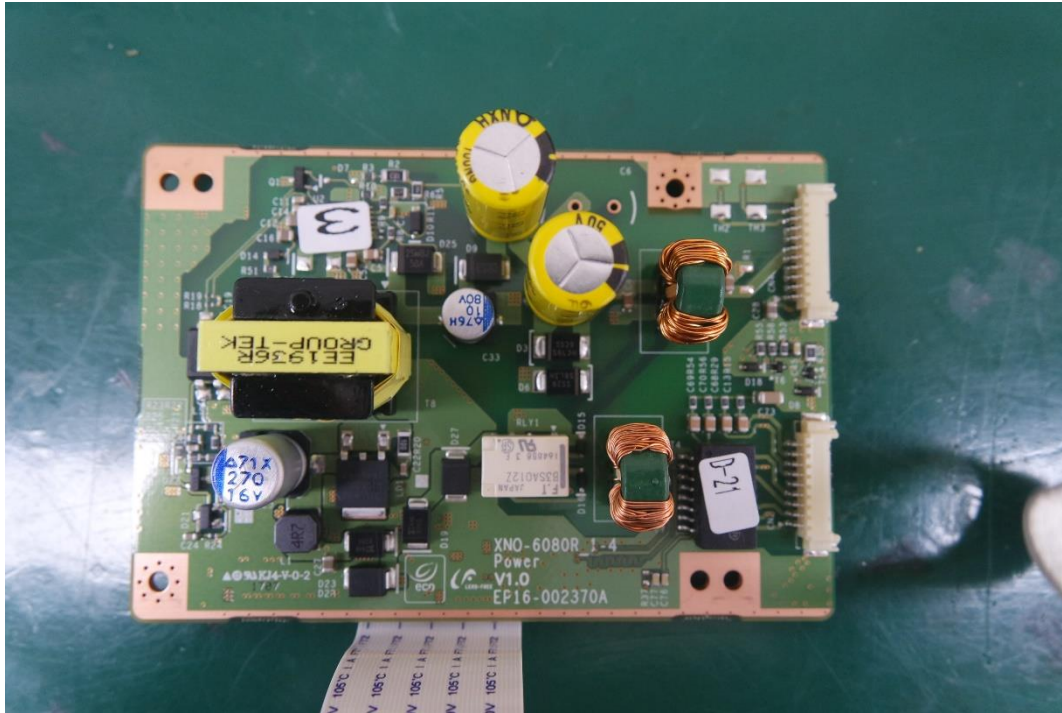
(Bottom)



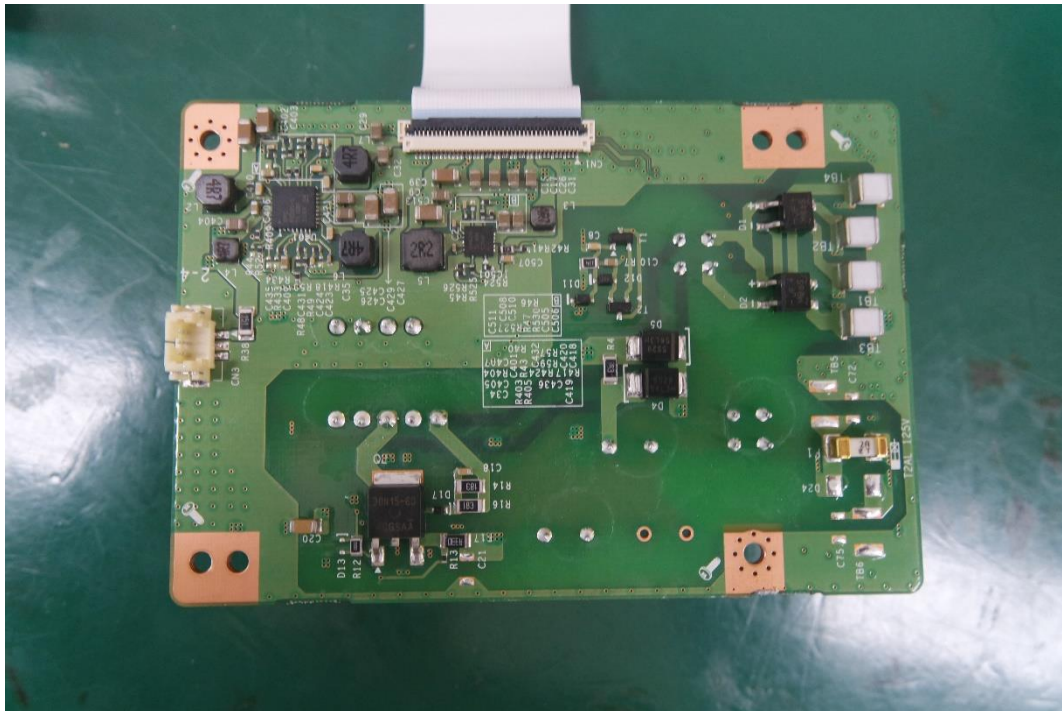
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## EUT Internal View – Sub Board 3

(Top)



(Bottom)

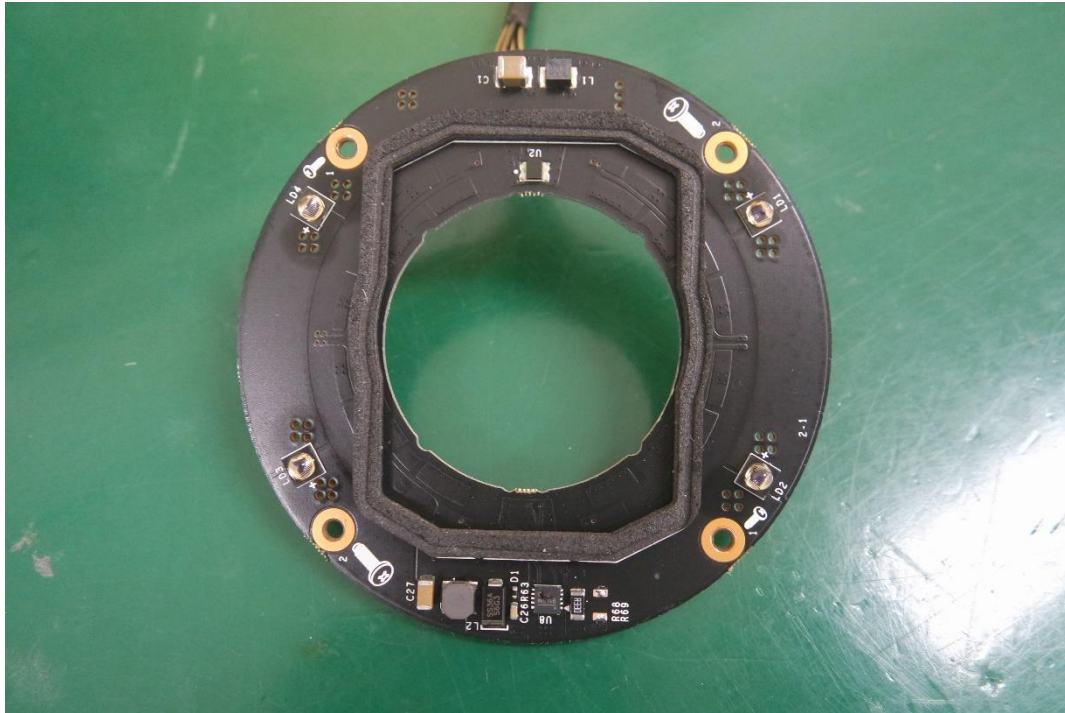


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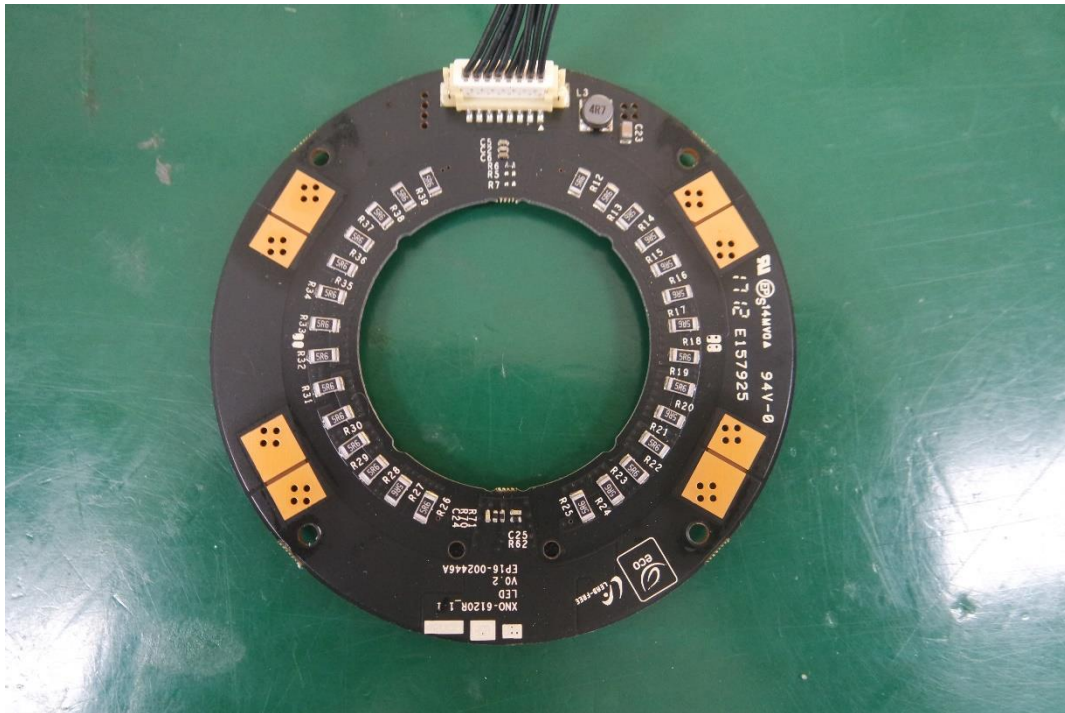


## EUT Internal View – Sub Board 4

(Top)

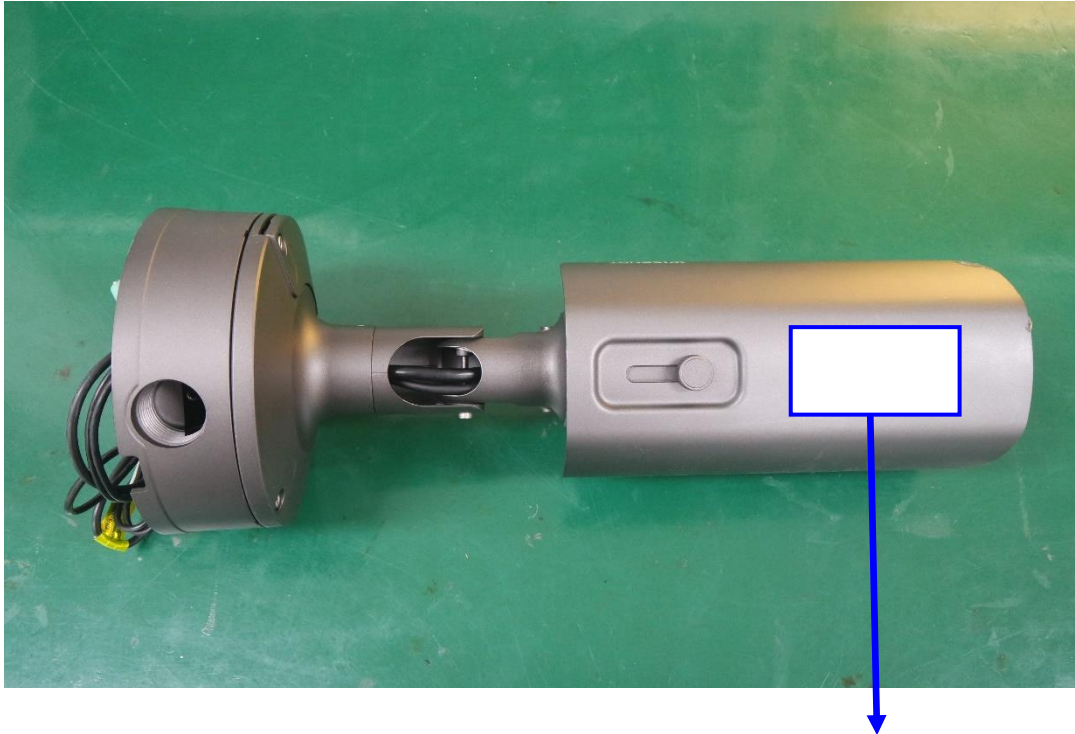


(Bottom)



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## Label Photographs



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