# VERIFICATION OF FCC PART 15 COMPLIANCE

***KES hereby verify*** *that the subject product complies with all the electromagnetic emission specified in the FCC Rule Part 15*

| | |
|---|---|
| **Product Description:** | NETWORK CAMERA |
| **Model/Brand Name:** | XNO-6120RN |
| **Variant Model:** | - |
| **FCC Rule Part(s):** | FCC 47CFR Part 15 Subpart B Class A<br>Part 15.107(b) & Part 15.109(b) |
| **FCC Procedure:** | Verification |
| **Applicant Name:** | Hanwha Techwin Co., Ltd. |
| **Applicant Address:** | 1204, Changwon-dareri, Seongsan-gu<br>Changwon-si, Gyeongsangn am-do, Korea. |
| **Manufacturer Name:** | Hanwha Techwin (Tianjin) Co.,Ltd. |
| **Manufacturer Address:** | No.11 Weiliu Rd,Micro-Electronic Industrial Park,TEDA,Tianjin,300385,People's Republic of China |
| **Test Report Reference No.:** | KES-E1-17T0314 |

**NETWORK CAMERA**, Model **XNO-6120RN** has been tested in accordance with the measurement procedures specified in FCC 47CFR Part 15 Subpart B class A and has been shown to be complied with the electromagnetic emission limits specified in FCC Rule Part 15 Subpart B class A. A testing of the sample product has been valid for the sample tested based on the reference test report, KES-E1-17T0314

Date of Issue: 05. 03, 2017

Dong Hun, Jang
Technical Manager
Signature:

**KES.Co., Ltd.**
C-3701, 40, Simin-daero 365beon-gil, Dongan-gu, Anyang-si, Gyeonggi-do,431-716, Korea
Tel: +82-31-425-6200 //Fax: +82-31-424-0450

# EMC TEST REPORT For FCC

| | | |
|---|---|---|
| Test Report No. | : | KES-E1-17T0314 |
| Date of Issue | : | May. 03, 2017 |
| Product name | : | NETWORK CAMERA |
| Model/Type No. | : | XNO-6120RN |
| Variant Model | : | - |
| Applicant | : | Hanwha Techwin Co., Ltd. |
| Applicant Address | : | 1204, Changwon-daero, Seongsan-gu Changwon-si, Gyeongsangnam-do, Korea |
| Manufacturer | : | Hanwha Techwin (Tianjin) Co.,Ltd |
| Manufacturer Address | : | No.11 Weiliu Rd,Micro-Electronic Industrial Park,TEDA,Tianjin,300385,People's Republic of China |
| Equipment authorization | : | ☐ **Declaration of Conformity**<br>☒ **Verification**<br>☐ **Certification** |
| Date of Receipt | : | Apr. 14, 2017 |
| Test date | : | Apr. 29, 2017 |
| Test Results | : | ☒ **In Compliance** ☐ **Not in Compliance** |

*Tested by*

Young Suk, Song
EMC Test Engineer

*Reviewed by*

Dong-Hun, Jang
EMC Technical Manager

# REPORT REVISION HISTORY

| Date | Test Report No. | Revision History |
|---|---|---|
| May. 03, 2017 | KES-E1-17T0314 | Issued |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

# TABLE OF CONTENTS

# 1.0 General Product Description

## Main Specifications of EUT are:

| **Video** | |
|---|---|
| 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 |
| **Lens** | |
| 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 |
| **Operational** | |
| 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 (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 |

| | |
|---|---|
| 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 |
| **Network** | |
| 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, 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-dierctional (2-Way) |
| IP | IPv4, IPv6 |
| Protocol | TCP/IP, UDP/IP, RTP(UDP), RTP(TCP), RTCP,RTSP, NTP, HTTP, HTTPS, SSL/TLS, DHCP, PPPoE, FTP, SMTP, ICMP, IGMP, SNMPv1/v2c/v3(MIB-2), 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 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 Plarform |
| Webpage Language | English, Korean, Chinese, French, Italian, Spanish, German, Japanese, 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 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) |

| | |
|---|---|
| Central Management Software | SmartViewer |
| **Environmental** | |
| 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 |
| **Electrical** | |
| 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 |
| **Mechanical** | |
| Color / Material | DARK GRAY / ALUMINIUM |
| Dimension (WxHxD) | 147.5mm x 368.6mm |
| Weight | 2,175g |

## 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-6120RN | - | Hanwha Techwin (Tianjin) Co.,Ltd. | 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 ㎜ | Speaker | 3.5 ㎜ | 1.6 | U |
| | 3.5 ㎜ | MIC | 3.5 ㎜ | 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 ㎜ | Speaker | 3.5 ㎜ | 1.6 | U |
| | 3.5 ㎜ | MIC | 3.5 ㎜ | 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

## 1.7 EUT Operating Mode(s)

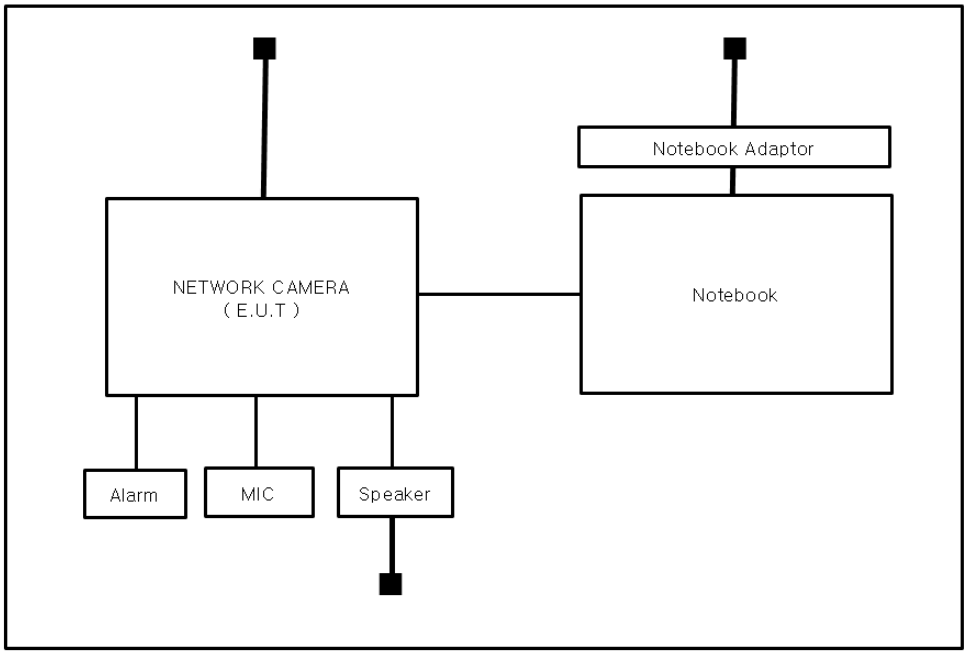
| Test mode | operating |
|---|---|
| AC 24 V Mode | E.U.T Monitoring, Ping test, 1 kHz |
| DC 12 V Mode | E.U.T Monitoring, Ping test |
| PoE Mode | E.U.T Monitoring, Ping test |

| E.U.T Test operating S/W | | |
|---|---|---|
| Name | Version | Manufacture Company |
| - | - | - |

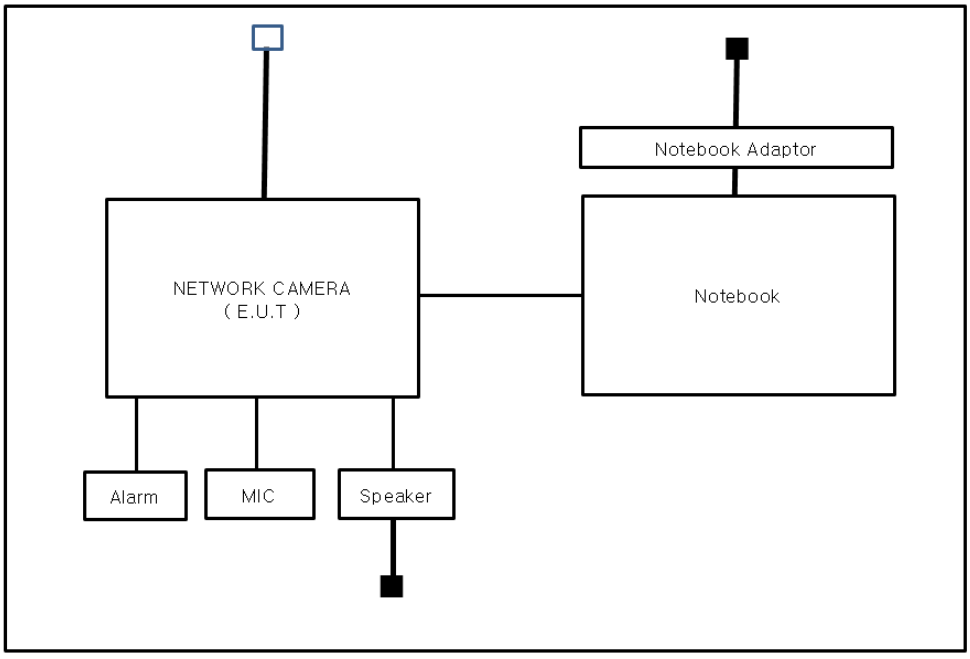
## 1.8 Configuration

■ AC Main
□ DC Main

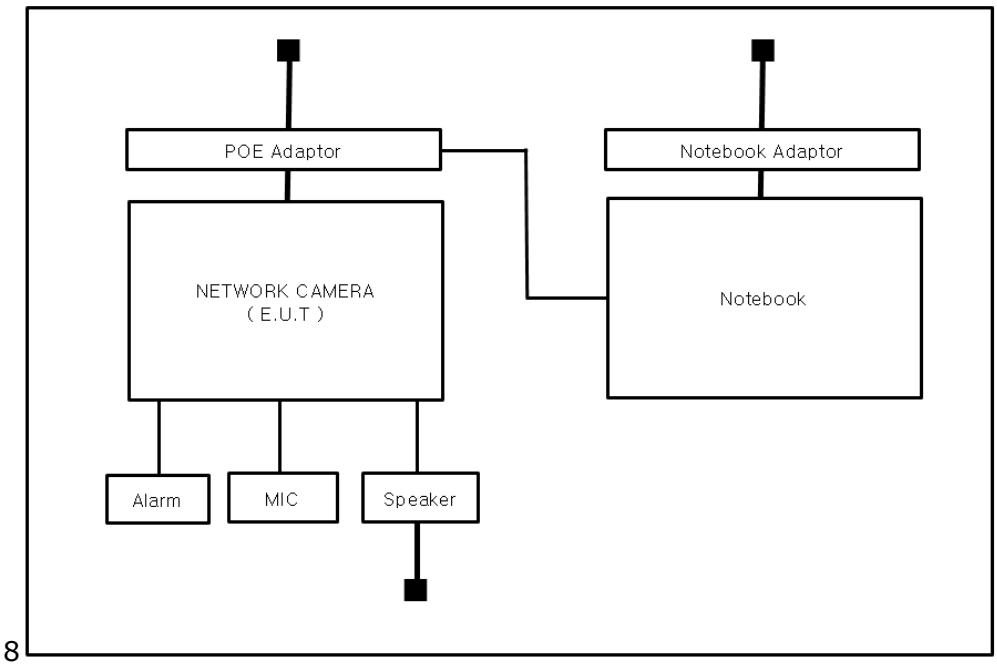
- AC 24 V Mode




- DC 12 V Mode



- PoE Mode



## 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. The sites are constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22.

## 1.11 Laboratory Accreditations and Listings

| Country | Agency | Scope of Accreditation | Logo |
|---|---|---|---|
| USA | **FCC** | 3 & 10 meter Open Area Test Sites and one conducted site to perform FCC Part 15/18 measurements. | |
| JAPAN | **VCCI** | Mains Ports Conducted Interference Measurement, Telecommunication Ports Conducted Disturbance Measurement and Radiation 10 meter site, Facility for measuring radiated disturbance above 1 GHz | R-4308, C-4798, T-2311, G-914 |
| KOREA | **MSIP** | EMI (10 meter Open Area Test Site and two conducted sites)<br>Radio(3 & 10 meter Open Area Test Sites and one conducted site)<br>EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions) | KR0100 |
| Canada | **IC** | 3 & 10 meter Open Area Test Sites and one conducted site | 4769B-1 |
| Europe | **CE** | EMI (10 meter Open Area Test Site and two conducted sites)<br>Radio(3 & 10 meter Open Area Test Sites and one conducted site)<br>EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions) | |
| International | **KOLAS** | EMI (10 meter Open Area Test Site and two conducted sites)<br>Radio(3 & 10 meter Open Area Test Sites and one conducted site)<br>EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions) | KOREA LABORATORY ACCREDITATION SCHEME KOLAS TESTING NO. 489 |

# 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

☐ **VCCI V-3 / 2015.04** ☐ Class A ☐ Class B

☐ **AS/NZS CISPR22:2009 +A1:2010** ☐ Class A ☐ Class B

☒ **47 CFR Part 15, Subpart B**

- ☐ CISPR 22:2009 +A1:2010 ☐ Class A ☐ Class B
- ☒ ANSI C63.4-2014 ☒ Class A ☐ Class B

☐ **IC Regulation ICES-003 : 2016**

- ☐ CAN/CSA CISPR 22-10 ☐ Class A ☐ Class B
- ☐ ANSI C63.4-2014

☐ **RE– Directive 2014/53/EU**

☐ EN 301 489-1 V1.9.2

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

☐ EN 301 489-3 V1.6.1

☐ EN 301 489-17 V2.2.1

☐ EN 60945:2002

# 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 |
|---|---|---|---|---|---|
| ☒ | SHIELD ROOM #6 | - | DYMSTEC | - | - |
| ☒ | EMI Test S/W | EMC32 | R & S | 9.12.00 | - |
| ☒ | EMI TEST RECEIVER | ESR3 | R & S | 101781 | 04, 27, 2018 |
| ☒ | LISN | ENV216 | R & S | 101787 | 01, 11, 2018 |
| ☒ | LISN | ESH2-Z5 | R & S | 100450 | 04, 27, 2018 |
| ☒ | PULSE LIMITER | ESH3-Z2 | R & S | 101915 | 12, 13, 2017 |

**Test Conditions**
Temperature: 21,2 ℃
Relative Humidity: 36,3 %

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

**Instrument Settings**
IF Band Width: 9 ㎑

**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 ㎓)

**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 |
|---|---|---|---|---|---|
| ☒ | OPEN AREA TEST SITE (OATS) #2 | - | KES | - | - |
| ☒ | EMI Test S/W | - | - | - | - |
| ☒ | EMI TEST RECEIVER | ESVS10 | Rohde & Schwarz | 826008/014 | 04, 18, 2018 |
| ☒ | TRILOG-BROADBAND ANTENNA | VULB9163 | Schwarzbeck | 714 | 11, 28, 2018 |
| ☐ | TRILOG-BROADBAND ANTENNA | VULB9163 | Schwarzbeck | 715 | 04, 14, 2018 |

**Test Conditions**
Temperature: 23,0 ℃
Relative Humidity: 29,0 %

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

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

**Test Results**
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

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

# 2.3 Radiated Electric Field Emissions(Above 1 ㎓)

**Test Date**
Apr. 29, 2017

**Test Location**
Semi Anechoic Chamber #1

**Test Equipment**

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

**Test Conditions**
Temperature: 22,3 ℃
Relative Humidity: 38,2 %

**Frequency Range of Measurement**
1 ㎓ to 26.5 ㎓

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

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

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

# APPENDIX A – TEST DATA

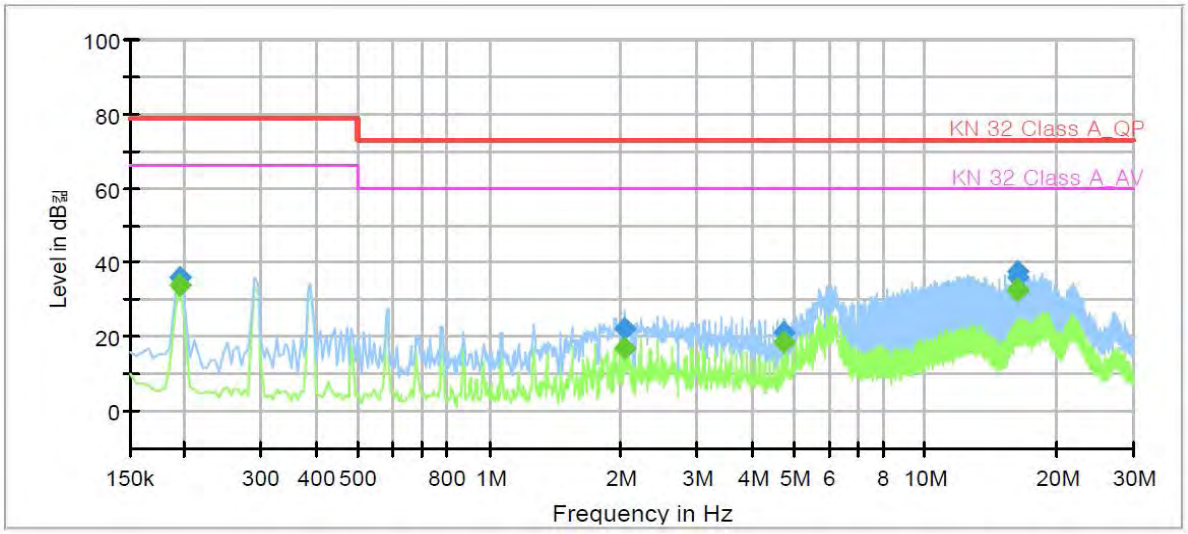
## Conducted Emissions at Mains Power Ports

- 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

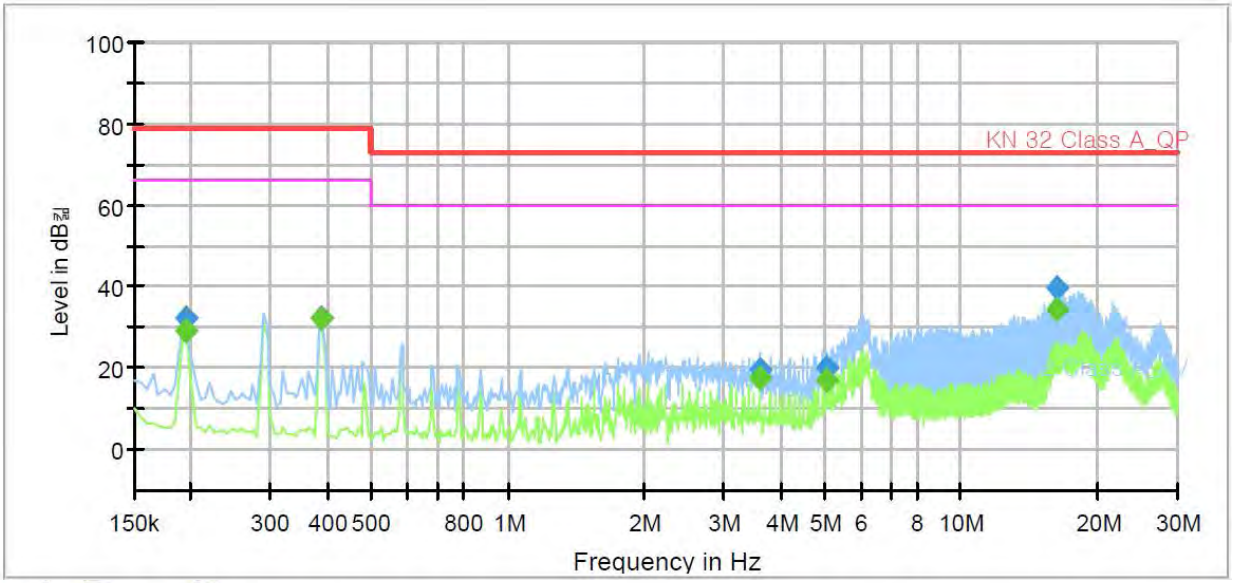
| Frequency (MHz) | QuasiPeak (dBµV) | CAverage (dBµV) | Limit (dBµV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|---|---|---|---|---|---|---|---|---|
| 0.195000 | --- | 33.76 | 66.00 | 32.24 | 1000.0 | 9.000 | L1 | 20.7 |
| 0.195000 | 36.14 | --- | 79.00 | 42.86 | 1000.0 | 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 ㎓)

- AC 24 V Mode

| Frequency | Amplitude | ANT Polar. (H/V) | ANT. Height | Correction Factor | | Corrected Amplitude | Applicable Limit | Margin |
|---|---|---|---|---|---|---|---|---|
| [㎒] | [dBμV] | | [m] | ANT. [dB/m] | Cable [dB] | [dBμV/m] | [dBμV/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 Polar. (H/V) | ANT. Height | Correction Factor | | Corrected Amplitude | Applicable Limit | Margin |
|---|---|---|---|---|---|---|---|---|
| [㎒] | [dBμV] | | [m] | ANT. [dB/m] | Cable [dB] | [dBμV/m] | [dBμV/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

- PoE Mode

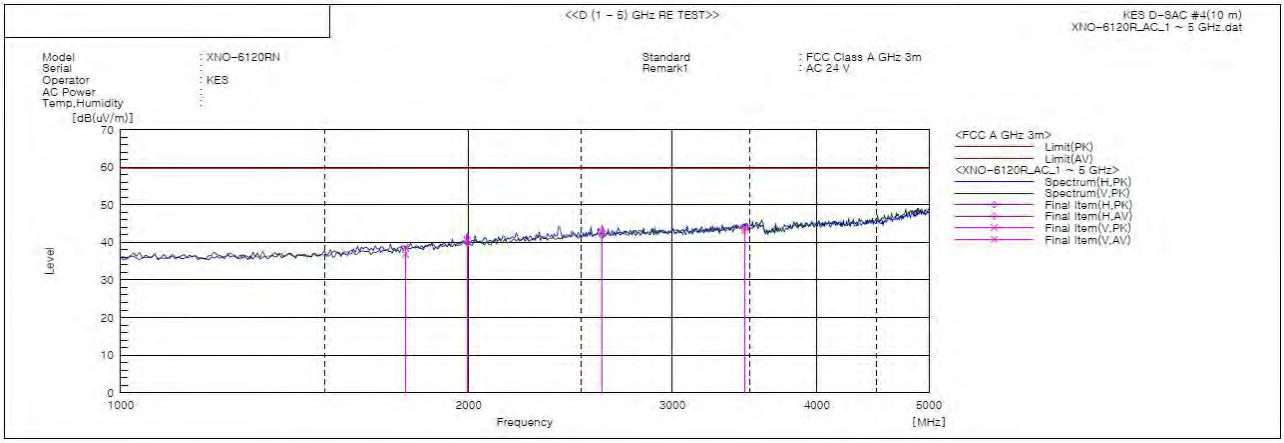
| Frequency | Amplitude | ANT Polar. (H/V) | ANT. Height | Correction Factor | | Corrected Amplitude | Applicable Limit | Margin |
|---|---|---|---|---|---|---|---|---|
| [㎒] | [dBμV] | | [m] | ANT. [dB/m] | Cable [dB] | [dBμV/m] | [dBμV/m] | [dB] |
| 199.71 | 6.50 | V | 2.13 | 11.77 | 3.15 | 21.42 | 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 [㏈uV] = Amplitude[㏈uV] + Correction Factor [㏈]
Corrected Amplitude : The Final Value, Amplitude : Reading Value,
Correction Factor : ANT FACTOR + Cable loss

## Radiated Electric Field Emissions(Above 1 ㎓)

- 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 | |

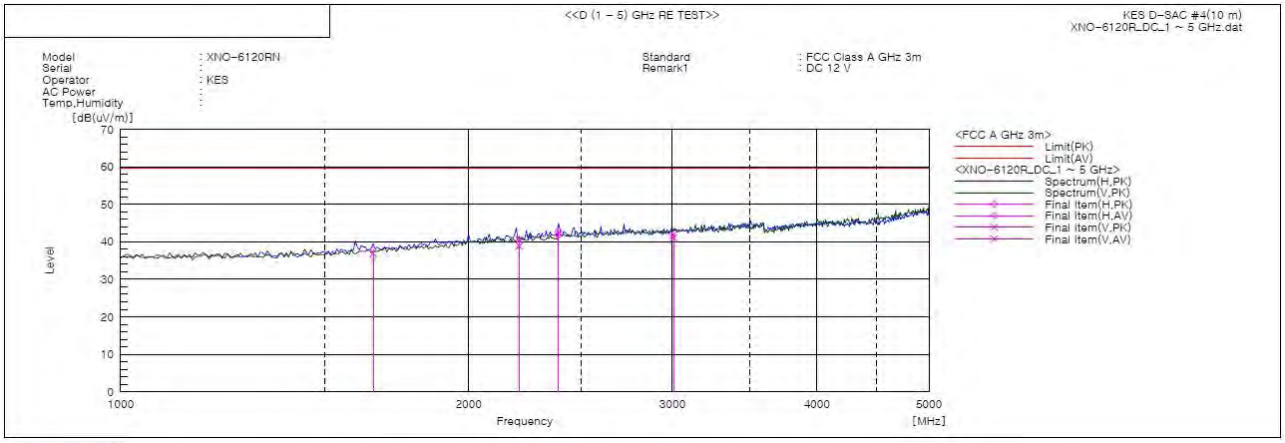
♦ Calculation

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

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

Corrected Amplitude : The Final Value, Amplitude : Reading Value

- 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 | |

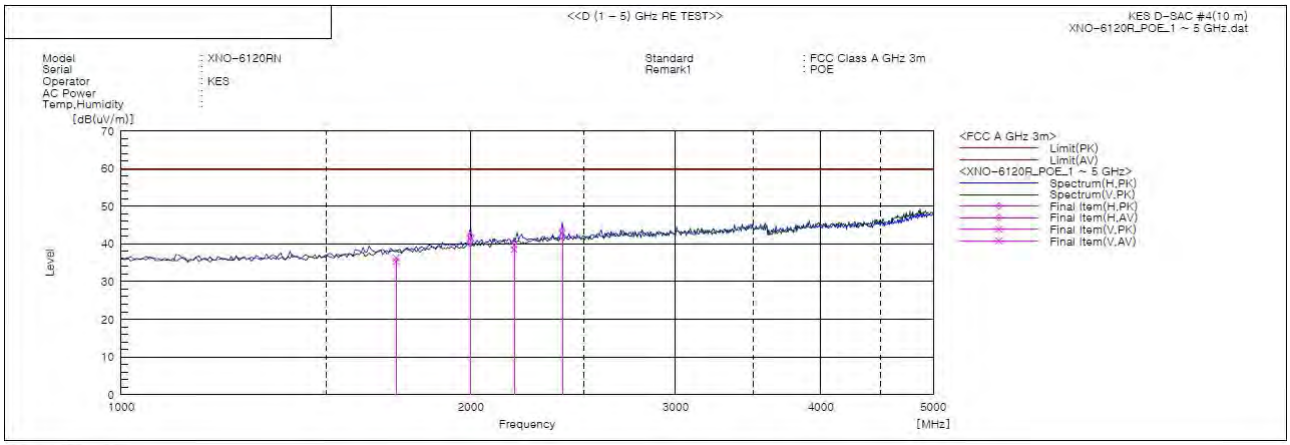
♦ Calculation

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

- 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]

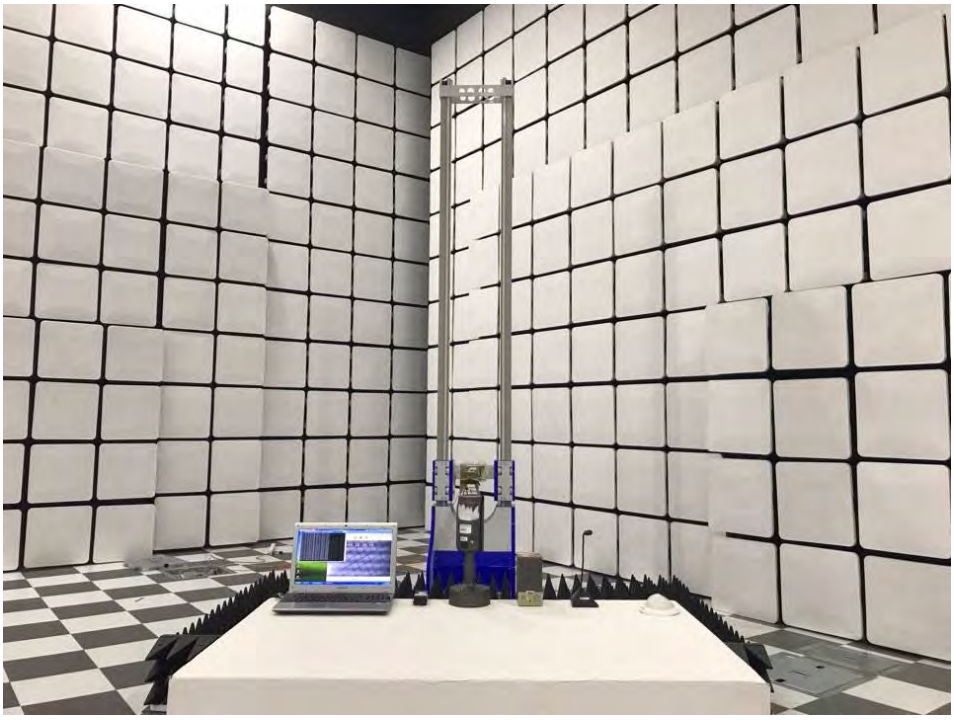
Corrected Amplitude : The Final Value, Amplitude : Reading Value

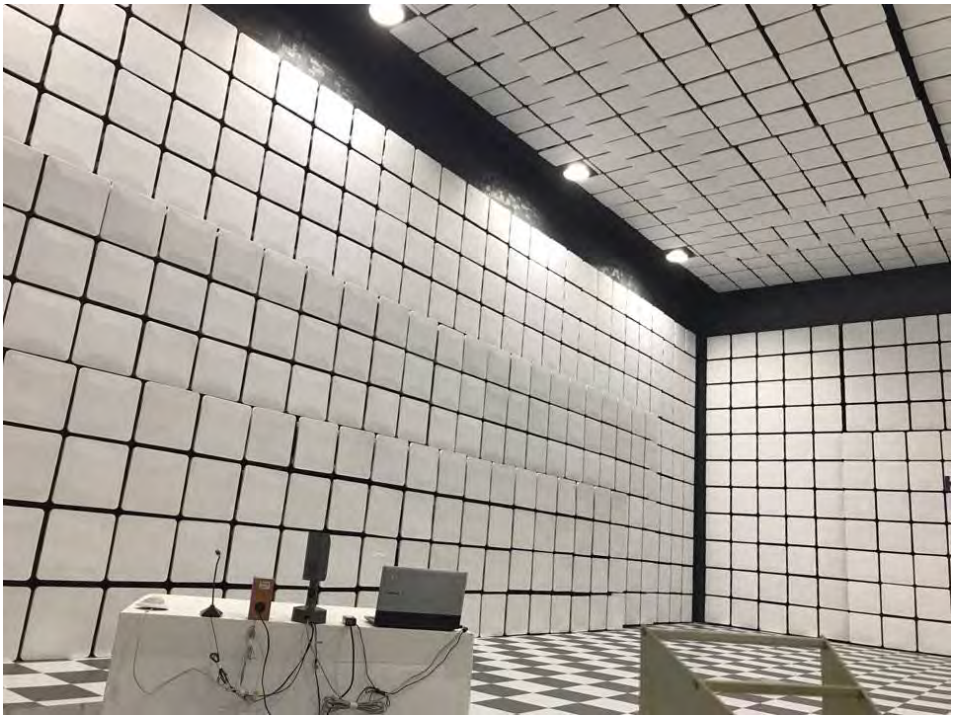
# Test Setup Photos and Configuration

## Conducted Voltage Emissions

## Radiated Electric Field Emissions(Below 1 ㎓)

## Radiated Electric Field Emissions(Above 1 ㎓)





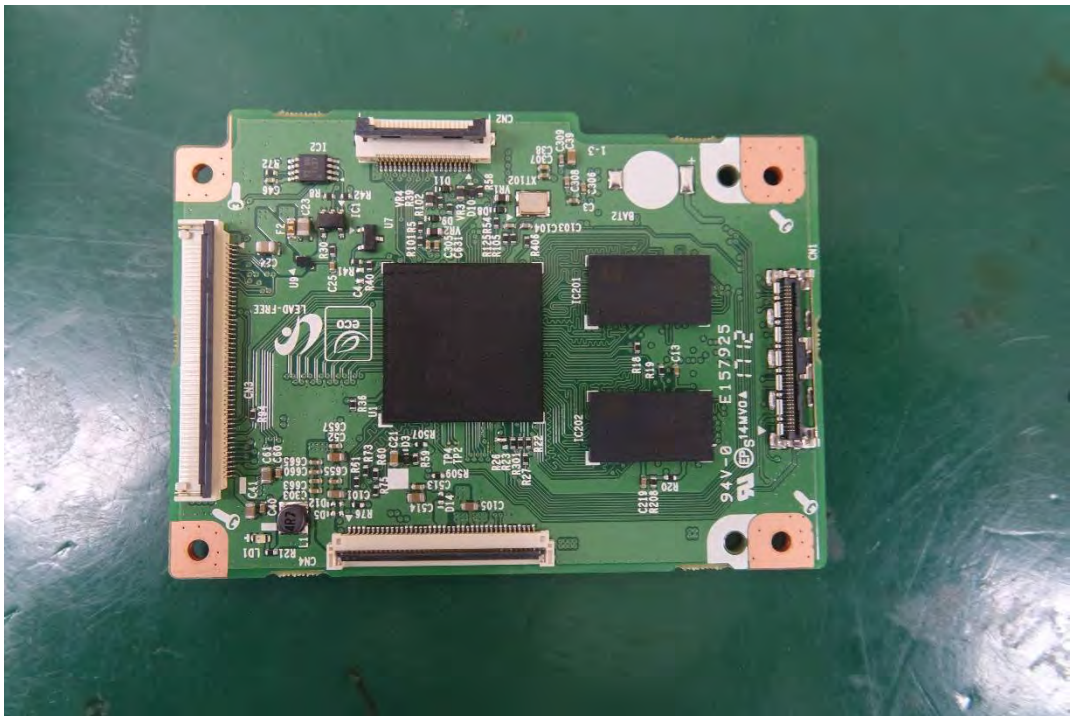
# EUT External Photographs


# EUT Internal Photographs

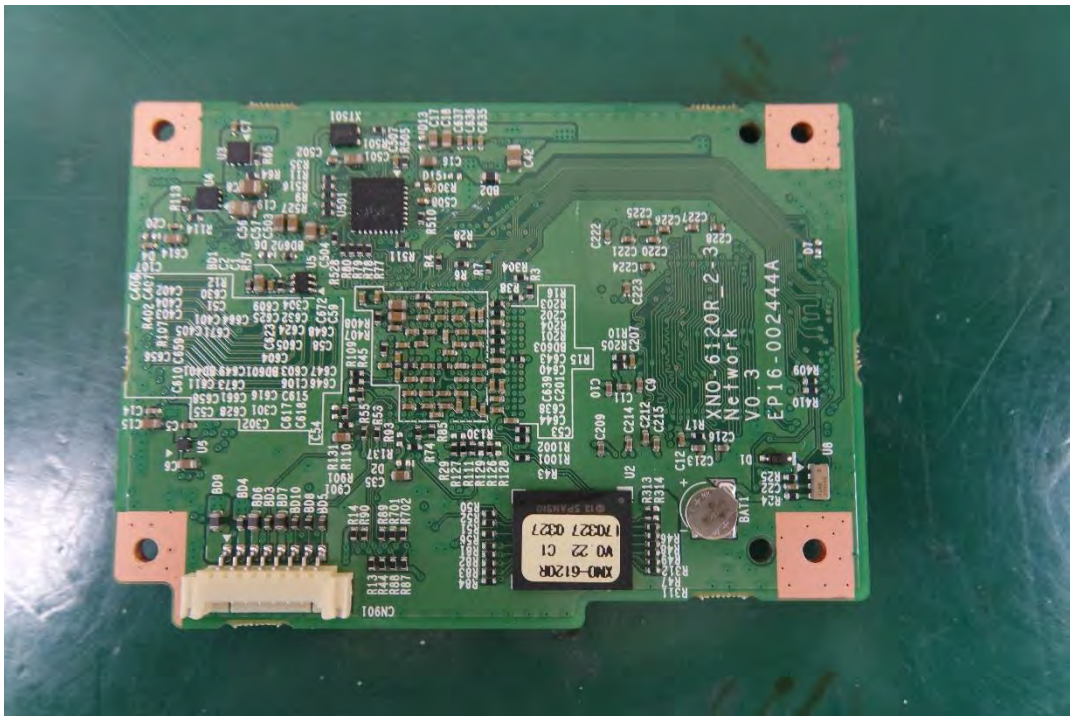
(Internal View)

# EUT Internal View – Main Board

(Top)

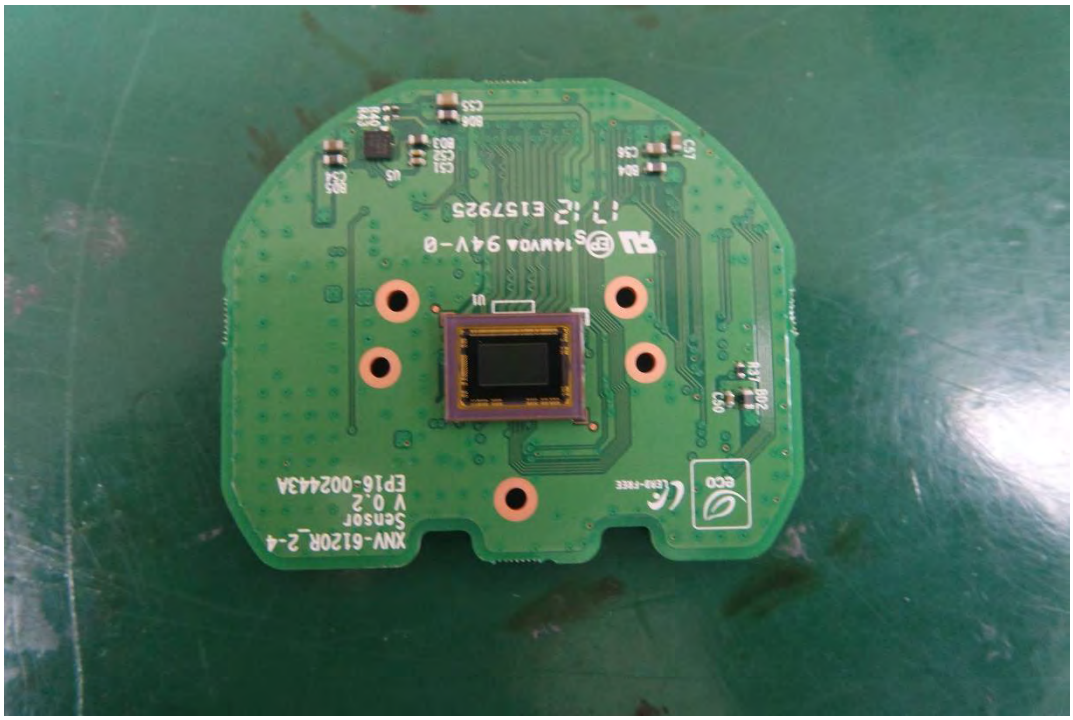


(Bottom)

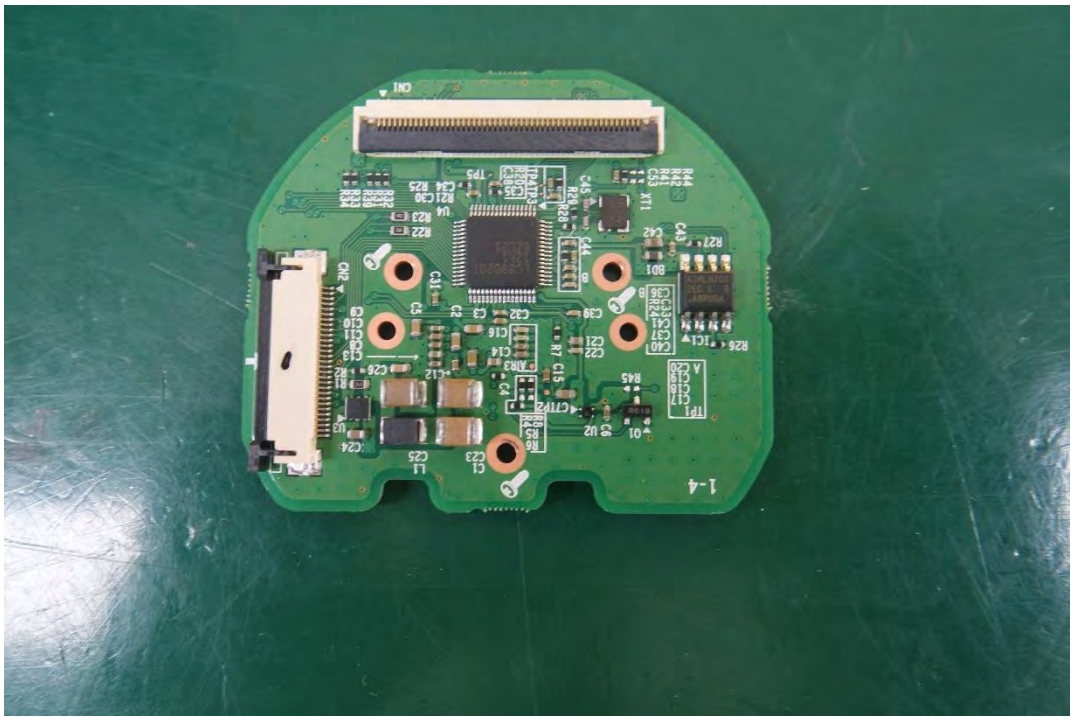


# EUT Internal View – Lens Board

(Top)

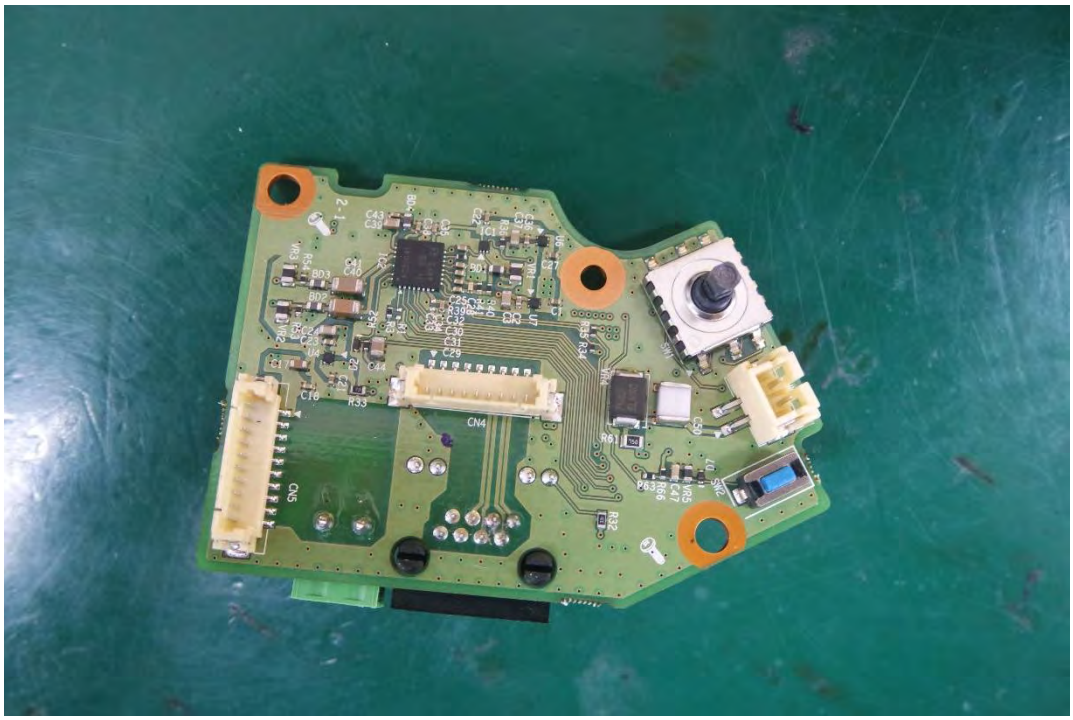


(Bottom)

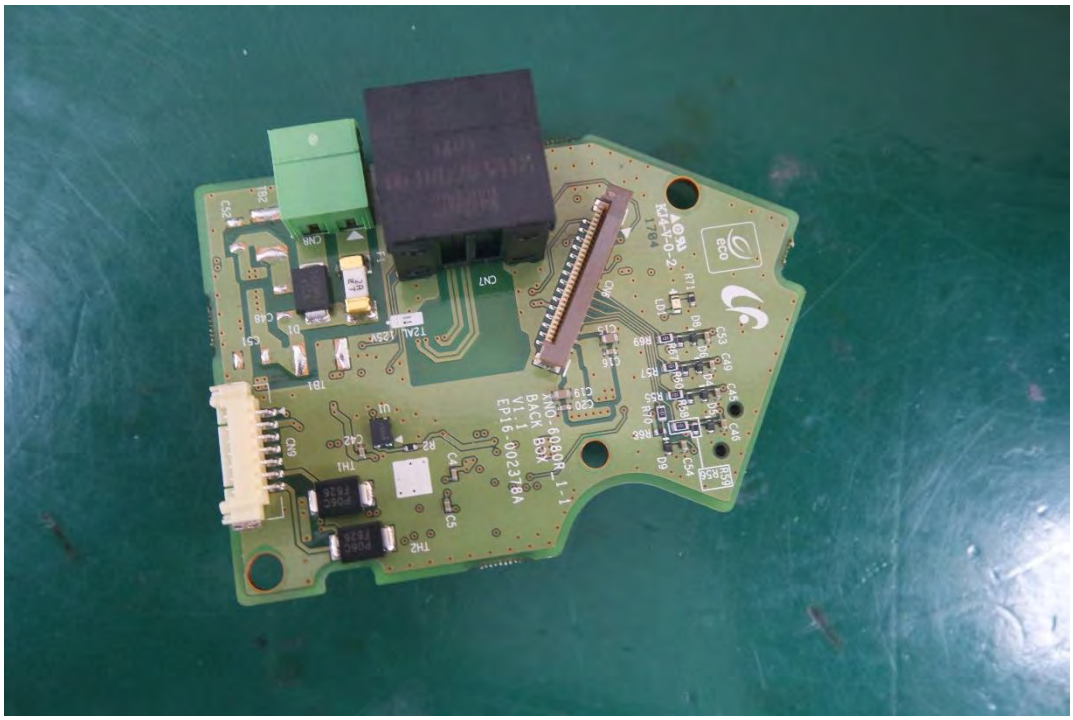


# EUT Internal View – Sub Board 1

(Top)

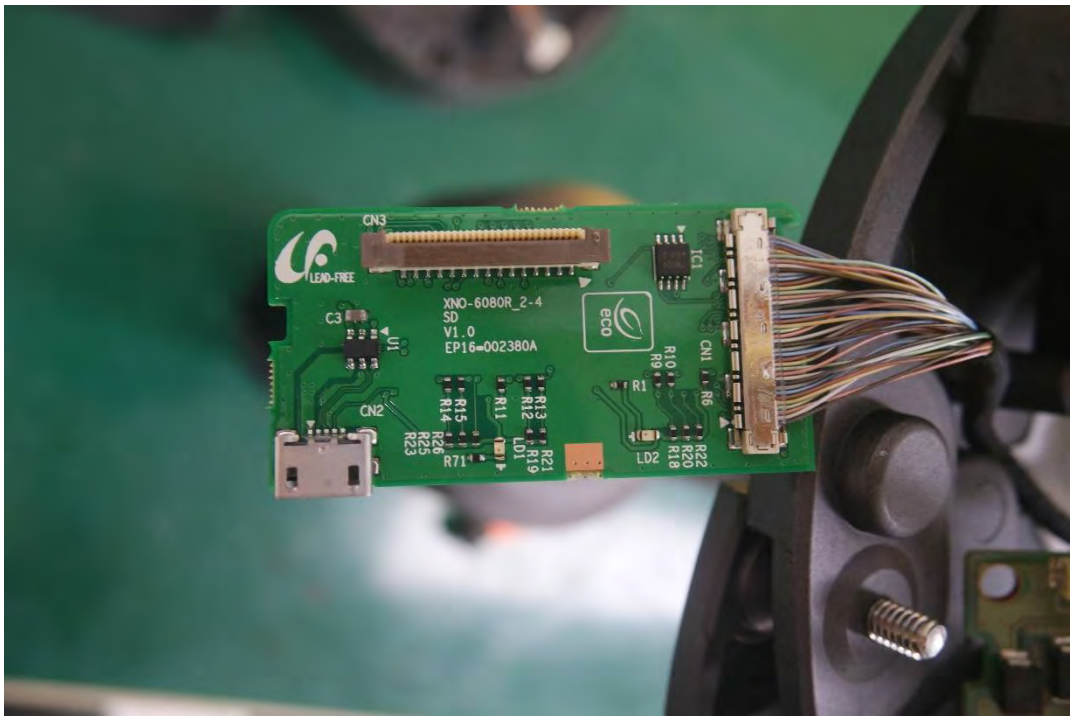


(Bottom)

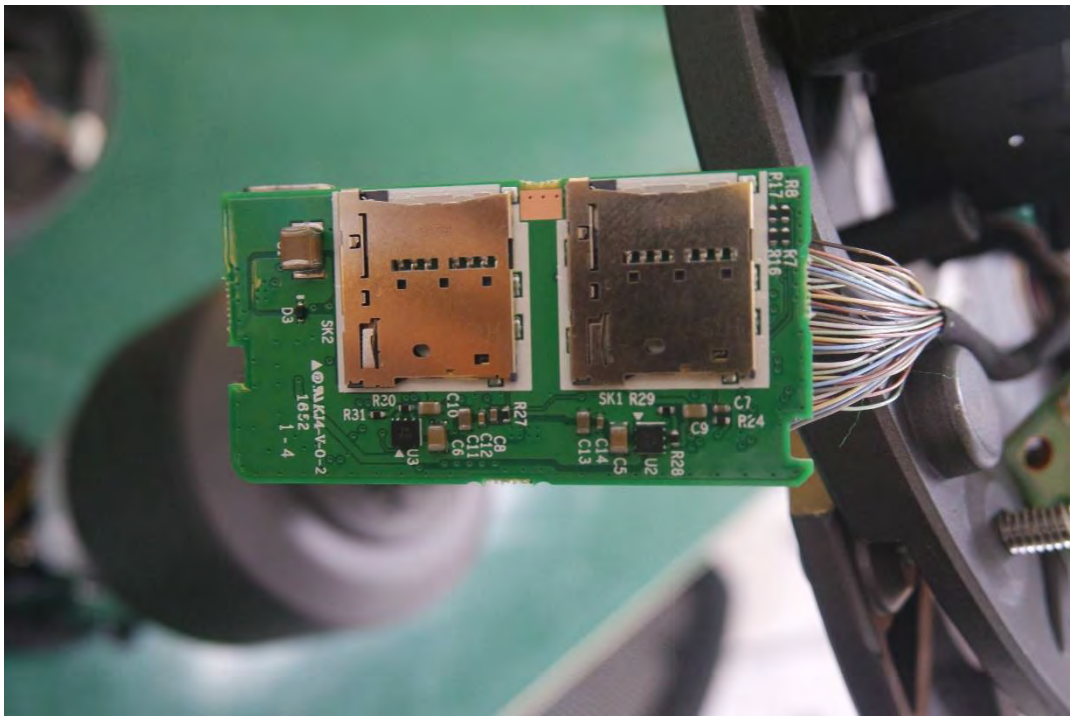


# EUT Internal View – Sub Board 2

(Top)



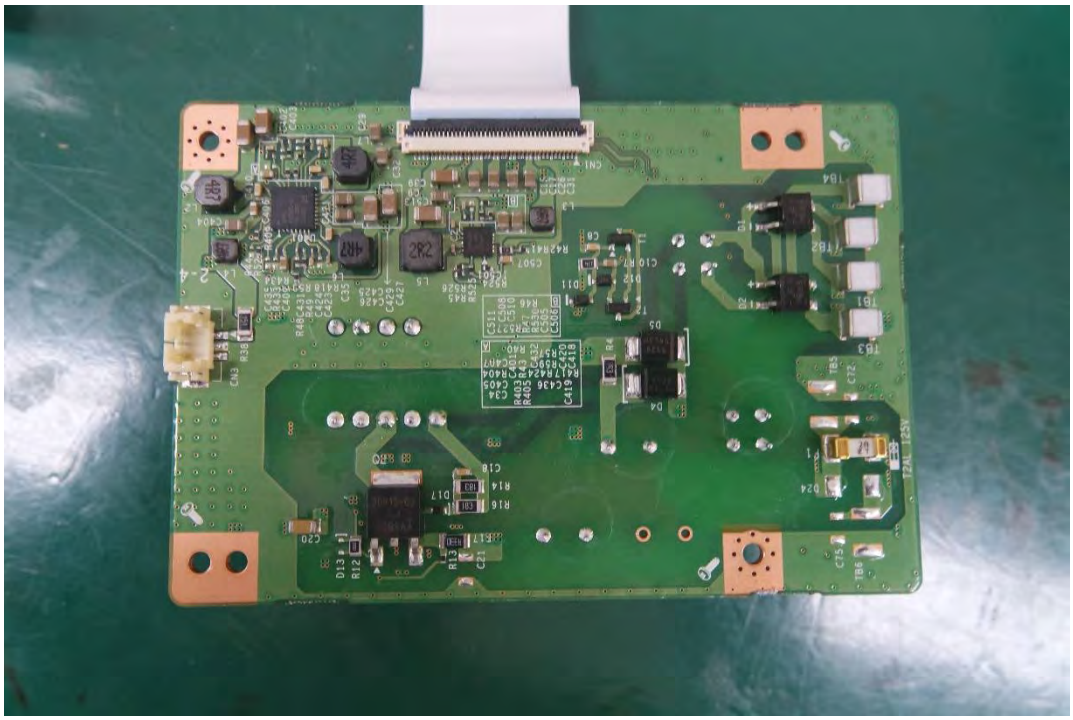

(Bottom)



# EUT Internal View – Sub Board 3

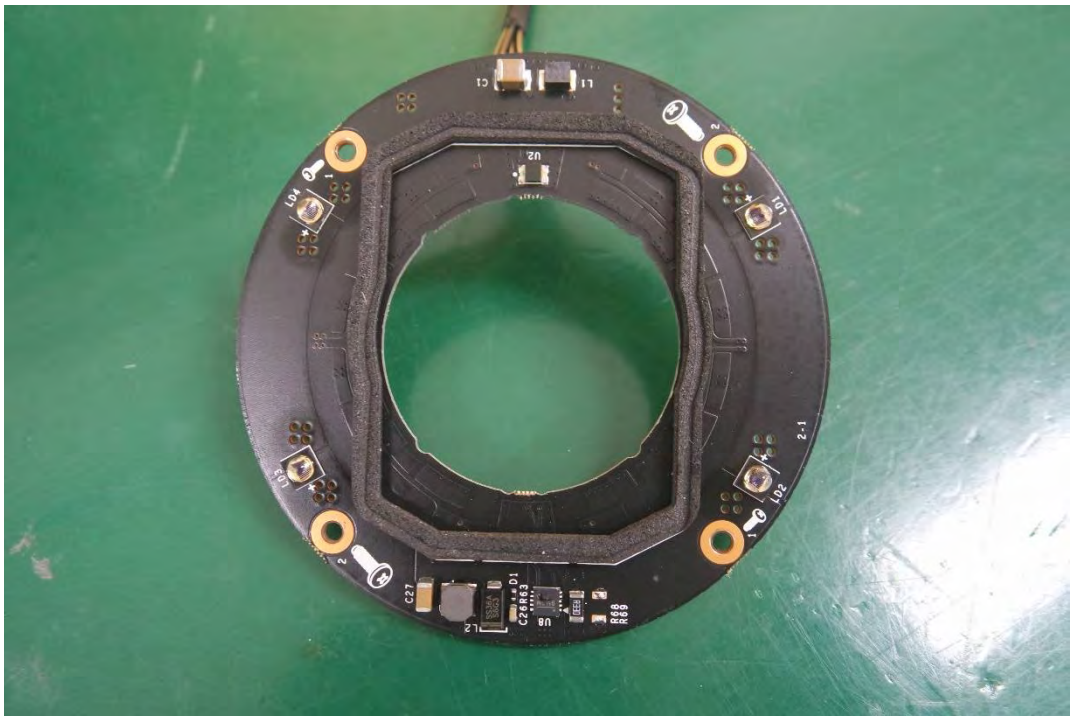
(Top)


(Bottom)

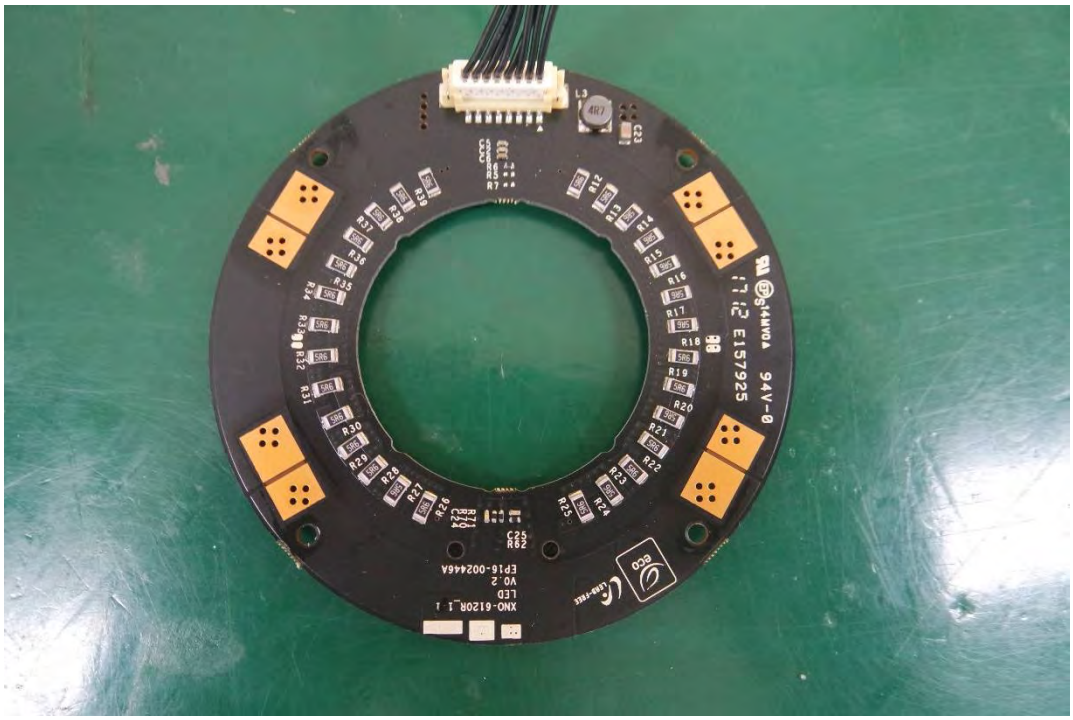


# EUT Internal View – Sub Board 4

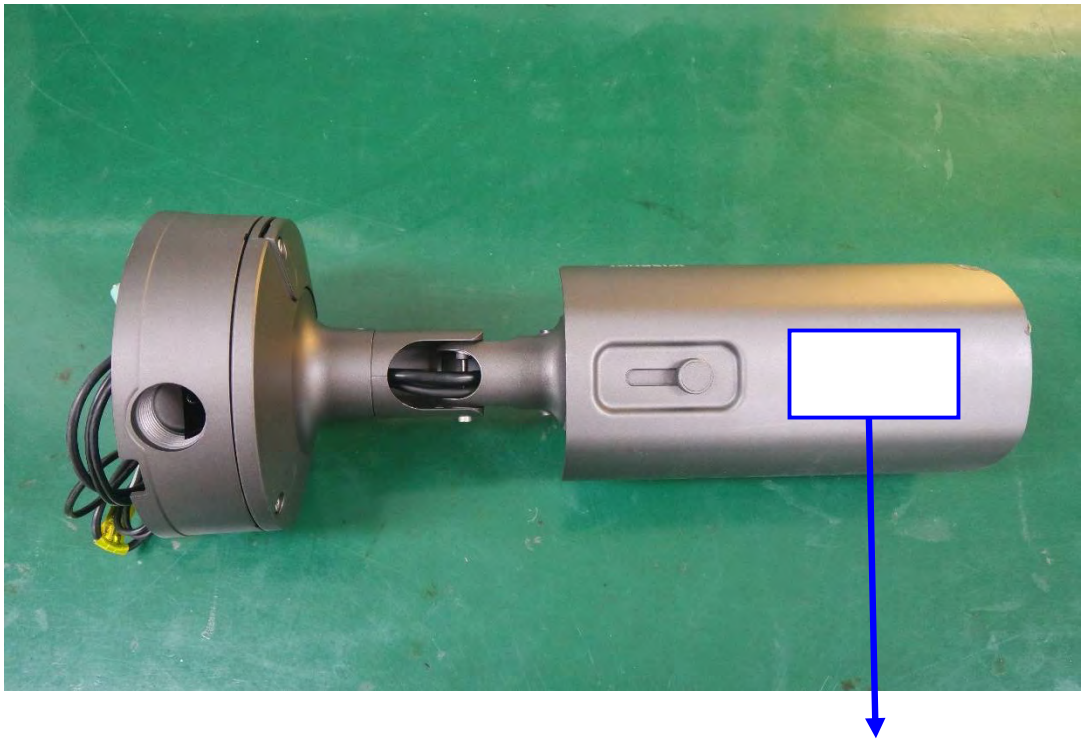
(Top)



(Bottom)



# 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.