# EMC TEST REPORT

| | | |
|---|---|---|
| Test Report No. | : | KES-E1-18T0623 |
| Date of Issue | : | Nov. 14, 2018 |
| Product name | : | Network Camera |
| Model/Type No. | : | XNV-6081Z |
| Variant Mode | : | - |
| Applicant | : | Hanwha Techwin Co., Ltd. |
| Applicant Address | : | 6, Pangyo-ro 319 Beon-gil, Bundang-gu, Seongnam-si, Gyeonggi-do, 13488, KOREA |
| Manufacturer | : | 1. Hanwha Techwin (Tianjin) Co.,Ltd.<br>2. HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.<br>3. D-TECH CO.,LTD. |
| Manufacturer Address | : | 1. No.11 Weiliu Rd,Micro-Electronic Industrial Park, TEDA,Tianjin, 300385,People's Republic of China<br>2. Lot O-2, Que Vo Industrial Zone extended area, Nam Son commune, Bac Ninh city, Bac Ninh province, Vietnam<br>3. 173-25, Saneop-ro, Gwonseon-gu, Suwon-si, Gyeonggi- do, Korea (Suwon Industrial Complex) |
| Equipment authorization | : | Supply's Declaration of Conformity |
| Date of Receipt | : | Nov. 02, 2018 |
| Test date | : | Nov. 06, 2018 ~ Nov. 07, 2018 |
| Test Results | : | ☒ In Compliance ☐ Not in Compliance |

*Tested by*



Jun Soo, Jung
EMC Test Engineer

*Reviewed by*



Dong-Hun, Jang
EMC Technical Manager

This test report is not related to KOLAS.

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# REPORT REVISION HISTORY

| Date | Test Report No. | Revision History |
|---|---|---|
| Nov. 14, 2018 | KES-E1-18T0623 | Issued |
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# 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 Scan |
| Min. Illumination | Color : 0.015 lux(F1.4, 1./30sec)<br>B/W : 0.0015 Lux (F1.4, 1/30sec) |
| 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 Rati | 2.8~12mm(4.3x) motorized varifocal |
| Max. Aperture Ratio | 1.4(Wide) ~ 3.6(Tele) |
| Angular Field of View | H: 119.5˚, V: 62.8˚, D: 142.1˚<br>H: 27.9˚, V: 15.7˚, D: 32.0˚ |
| Min. Object Distance | 0.5m (1.64ft) |
| Focus Control | Simple focus(Motorized V/F) / Manual, Remote control via network<br>(Manual, Simple focus) |
| Lens Type | DC Auto Iris, P-iris |
| Mount Type | Board-in type |
| **Pan / Tilt / Rotate** | |
| Pan / Tilt / Rotate range | ±175˚ / 0~85˚ / ±175˚ |
| PTR control | Remote adjustment (Max. 200 cycles) |
| **Operational** | |
| 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, WDR |
| Wide Dynamic Range | 150dB |
| Contrast Enhancement | SSDR (Off / On) |
| Digital Noise Reduction | SSNR5 (2D+3D Noise Filter) (Off / On) |
| Digital Image Stabilizatic | Off / On (built-in Gyro Sensor) |
| Defog | Auto / Manual / Off |
| Motion Detection | Off/ On(8ea, 8point Polygonal zones), Handover |
| Privacy Masking | Off / On (32ea, polygonal 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) |
| LDC | On/Off (5 levels with Min/Max) |
| Electronic Shutter Speed | Minimum / Maximum / Anti flicker (2 ~ 1/12,000sec ) |
| Digital PTZ | 24X, Digital PTZ(Preset, Group) |
| Flip / Mirror | Flip : On/Off<br>Mirror : On/Off<br>Hallway view : 90˚/270˚ |
| Analytics | Tampering, Loitering, Directional Detection, Defocus Detection, Fog Detection, Virtual Line, Enter/Exit, Appear / Disappear, Audio Detection, Face Detection, Motion Detection, Digital Auto Tracking, Sound Classification, Audio Playback on event, Shock detection, Heatmap, People counting, Queue management |
| 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 |
| Audio In | Selectable (Mic IN/Line IN),<br>Supply voltage: 2.5VDC(4mA), Input impedance: approx. 2K Ohm |
| Audio out | Line out, Max output level: 1 Vrms |
| Pixel Counter | Support |

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| | |
|---|---|
| **Network** | |
| Ethernet | RJ-45 (10/100BASE-T) |
| Video Compression Form | H.265/H.264 (MPEG-4 Part 10/AVC) : Main/Baseline/High , MJPEG |
| Resolution | 1920x1080, 1280x1024, 1280x960, 1280x720, 1024x768, 800x600, 800x448, 720x576, 720x480, 640x480, 640x360, 320x240 |
| Max. Framerate | H.265/H.264 : Max. 60fps at all resolutions<br>MJPEG : Max. 30fps |
| Smart Codec | Manual Mode (area-based : 5EA) |
| WiseStreamⅡ | Support |
| Video Quality Adjustmer | H.264/H.265 : Target Bitrate Level Control<br>MJPEG : Target Bitrate Level Control |
| Bitrate Control Method | H.264/H.265 : CBR or VBR<br>MJPEG : VBR |
| Streaming Capability | Multiple Streaming (Up to 10 Profiles) |
| Audio Compression Form | 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 8/16/32/48KHz |
| 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 | Micro 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), Local PC for Instant Recording |
| Application Programmin | ONVIF Profile S/G<br>SUNAPI(HTTP API)<br>Open Platform |
| 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, 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 56 (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 So | SmartViewer, SSM |
| **Environmental** | |
| Operating Temperature / Humidity | -50°C ~ +60°C (-58°F ~ +140°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 | Power redundancy<br>12VDC ± 10%, PoE(IEEE802.3af, Class3)<br>24VAC ± 10%(optional) |
| Power Consumption | DC : Max 9.5W, PoE : Max 11W<br>AC : Max 11W(optonal) |
| **Mechanical** | |
| Color / Material | White / Aluminum |
| Dimension (ØxH) | Ø 180 |
| Weight | TBD |

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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 | XNV-6081Z | - | Hanwha Techwin (Tianjin) Co.,Ltd. | EUT |
| AC module | SPC-100AC | - | - | AC 24 V |

## 1.5 Support Equipments

| Description | Model Number | Serial Number | Manufacturer | Remarks |
|---|---|---|---|---|
| POE Adapter | PD-9501GR/AC | - | CHANGZHOU WUJIN HONGGUANG RADIO CO., LTD. | - |
| Notebook | X56K | HN11N5151FJ0045W | HANSUNG | - |
| Notebook Adapter | A12-120P1A | F180271552011758 | CHICONY POWER TECHNOLOGY CO.,LTD. | - |
| Speaker | BR1000A Cuve Black 2 | - | DONGGUAN EDIFIER TECHNOLOGY Co., Ltd | - |
| Mike | MP1000 | - | - | - |
| Gpad | LG-V480 | - | LG | - |
| Alarm button | - | - | - | - |
| Alarm | SIP-1201DD D0 | - | SAMSUNG TECHWIN CO., LTD. | - |
| Micro SD Card | - | - | Transcend | 16 GB |

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## 1.6 External I/O Cabling

■ AC 24 V, 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 | 4.0 | U |
| | 3.5 ㎜ | Speaker | 3.5 ㎜ | 1.6 | U |
| | 3.5 ㎜ | Mike | 3.5 ㎜ | 1.7 | U |
| | 2Pin | Alarm IN | 2Pin | 3.0 | U |
| | 2Pin | Alarm Out | 2Pin | 3.0 | U |
| | Micro SD Card Slot | Micro SD Card | Micro SD Card Slot | - | - |
| Notebook | 3.5 ㎜ | Gpad | 3.5 ㎜ | 1.4 | U |

■ PoE MODE

| Start | | END | | Cable Spec. | |
|---|---|---|---|---|---|
| Description | I/O Port | Description | I/O Port | Length | Shield |
| Network Camera (E.U.T) | RJ-45 | POE Adapter | RJ-45 | 4.0 | U |
| | 3.5 ㎜ | Speaker | 3.5 ㎜ | 1.6 | U |
| | 3.5 ㎜ | Mike | 3.5 ㎜ | 1.7 | U |
| | 2Pin | Alarm IN | 2Pin | 3.0 | U |
| | 2Pin | Alarm Out | 2Pin | 3.0 | U |
| | Micro SD Card Slot | Micro SD Card | Micro SD Card Slot | - | - |
| Notebook | 3.5 ㎜ | Gpad | 3.5 ㎜ | 1.4 | U |
| | RJ-45 | POE Adapter | RJ-45 | 4.0 | U |

* Unshielded=U, Shielded=S

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## 1.7 EUT Operating Mode(s)

| Test mode | operating |
|---|---|
| AC 24 V, DC 12 V, POE | EUT Monitoring, Ping Test |

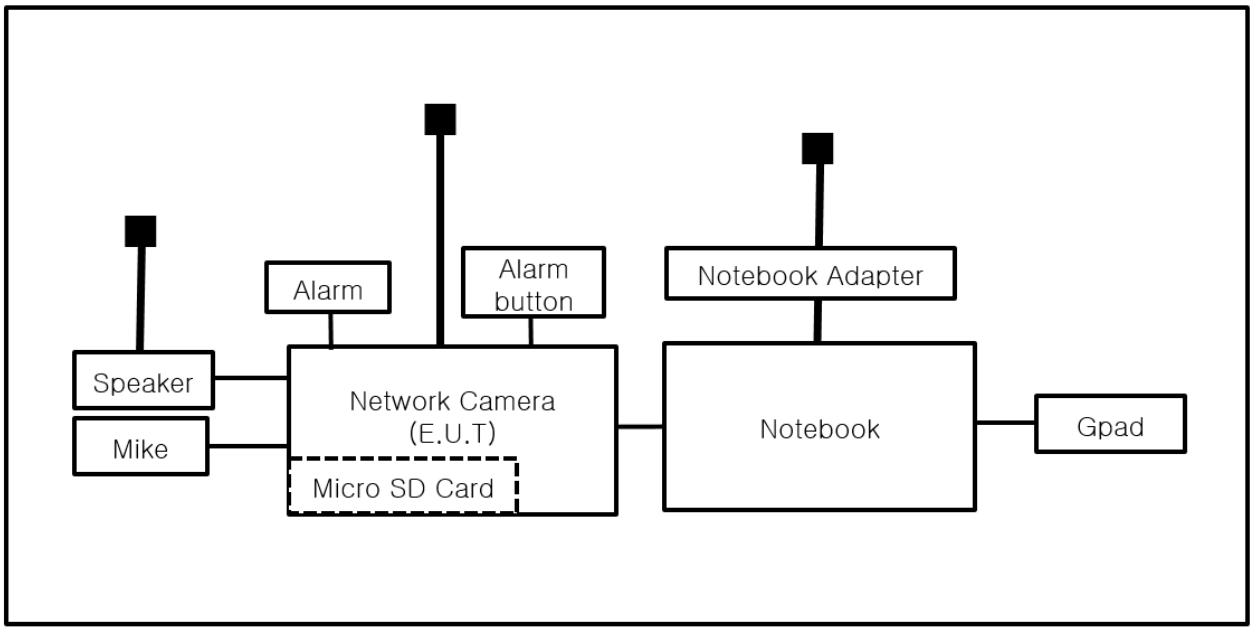
| EUT Test operating S/W | | |
|---|---|---|
| Name | Version | Manufacture Company |
| - | - | - |

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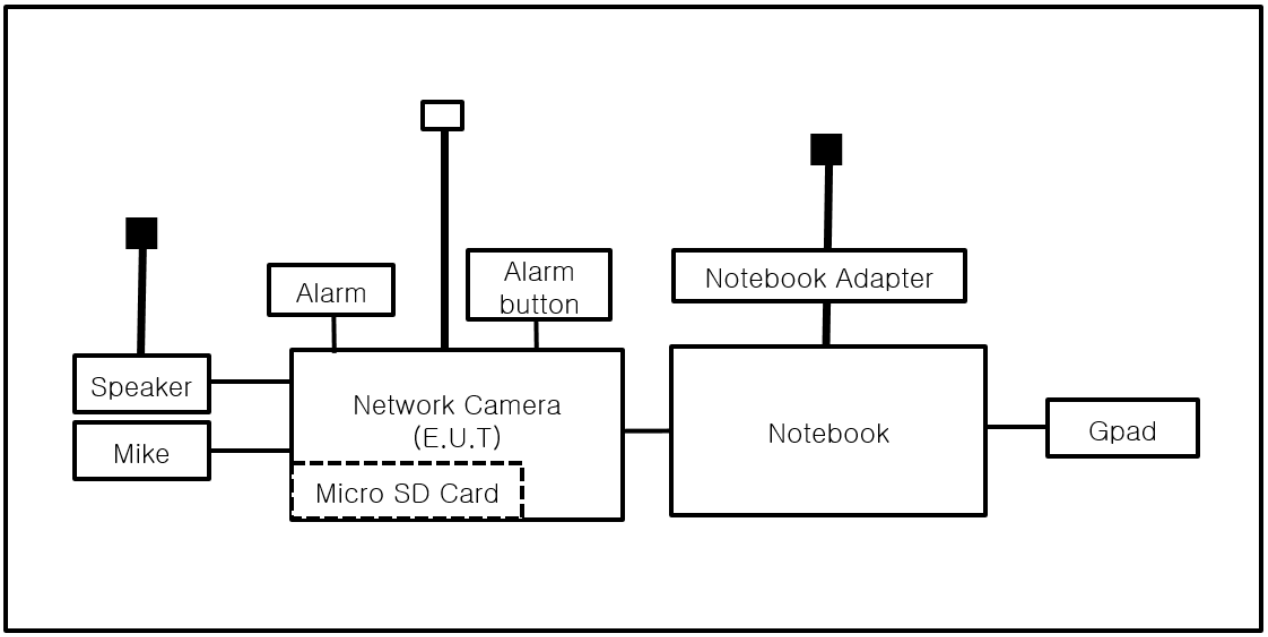
## 1.8 Configuration

■ AC Main
□ DC Main

■ AC 24 V MODE

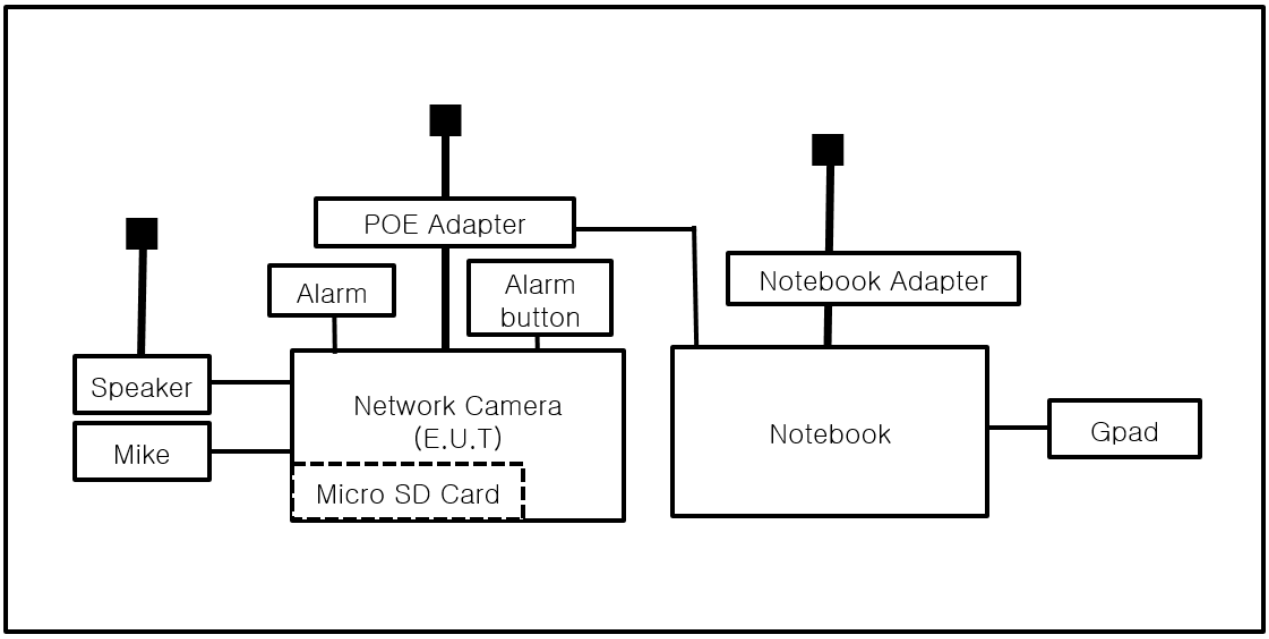



■ DC 12 V MODE




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■ PoE MODE




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## 1.9 Remarks when standards applied

N/A

## 1.10 Calibration Details of Equipment Used for Measurement

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

## 1.11 Test Facility

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

## 1.12 Laboratory Accreditations and Listings

| Country | Agency | Scope of Accreditation | Logo |
|---|---|---|---|
| KOREA | RRA | EMI (3 m & 10 m Semi-Aechoic Chamber , 10 m Open Area and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions) | KR0100 |
| International | KOLAS | EMI (3 m & 10 m Semi-Aechoic Chamber , and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions) | KT489 |
| USA | FCC | 3 m & 10 m Semi-Aechoic Chamber, 10 m Open Area and Conducted test site to perform FCC Part 15/18 measurements. | KR0100 |
| Canada | ISED | 3 m & 10 m Semi-Aechoic Chamber and Conducted test site | 23298-1 |
| JAPAN | VCCI | Mains Ports Conducted Interference Measurement, Telecommunication Ports Conducted Disturbance Measurement and Radiation 10 meter site, Facility for measuring radiated disturbance above 1 GHz | R-4308, C-4798, T-2311, G-914 |
| Europe | TÜ V SÜ D | EMI (3 m & 10 m Semi-Aechoic Chamber , 10 m Open Area and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions) | CARAT 17 07 01633 001 |

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# 2.0 Test Regulations

The emissions tests were performed according to following regulations:

☐ EMC – Directive 2014/30/EU

☐ EN 61000-6-3:2011

☐ EN 61000-6-1:2007

☐ EN 61000-6-4:2007 +A1:2011

☐ EN 61000-6-2:2005

☐ EN 55011:2007 +A1:2010 ☐ Group 1 ☐ Group 2
☐ Class A ☐ Class B

☐ EN 55014-1:2006 +A2:2011

☐ EN 55014-2:1997 +A2:2008

☐ EN 55015:2013

☐ EN 55032:2015 ☐ Class A ☐ Class B

☐ EN 55024:2010

☐ EN 50130-4:2011 +A1:2014

☐ EN 61000-3-2:2014

☐ EN 61000-3-3:2013

☐ EN 61326-1:2013

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|---|---|---|
| ☐ VCCI V-3 / 2015.04 | ☐ Class A | ☐ Class B |
| ☐ AS/NZS:2013 | ☐ Class A | ☐ Class B |
| ☒ 47 CFR Part 15, Subpart B | | |
| ☐ CISPR 22:2009 +A1:2010 | ☐ Class A | ☐ Class B |
| ☒ ANSI C63.4-2014 | ☒ Class A | ☐ Class B |
| ☒ IC Regulation ICES-003 : 2016 | | |
| ☐ CAN/CSA CISPR 22-10 | ☐ Class A | ☐ Class B |
| ☒ ANSI C63.4-2014 | ☒ Class A | ☐ Class B |

☐ RE– Directive 2014/53/EU

☐ EN 301 489-1 V1.9.2

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

☐ EN 301 489-3 V1.6.1

☐ EN 301 489-17 V2.2.1

☐ EN 60945:2002

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## 2.1 Conducted Emissions at Mains Power Ports

### Test Date
Nov. 06, 2018

### Test Location
Electro wave Shieldroom #3

### Test Equipment

| Used | Description | Model Number | Manufacturer | Serial Number | Cal. Due |
|---|---|---|---|---|---|
| ☒ | EMI Test S/W | EMC32 | R & S | 9.12.00 | - |
| ☒ | EMI TEST RECEIVER | ESR3 | R & S | 101783 | 04, 25, 2019 |
| ☒ | LISN | ENV216 | R & S | 101137 | 01, 31, 2019 |
| ☒ | LISN | ENV216 | R & S | 101786 | 04, 25, 2019 |

### Test Conditions
Temperature: 22,9 ℃
Relative Humidity: 52,6 % R.H.

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

### Instrument Settings
IF Band Width: 9 ㎑

### Test Results
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

### Remarks
See Appendix A for test data.

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

### Test Date
Nov. 06, 2018

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

### Test Equipment

| Used | Description | Model Number | Manufacturer | Serial Number | Cal. Due |
|---|---|---|---|---|---|
| ☒ | EMI Test S/W | EP5/RE | TOYO Corporation | 6.0.0 | - |
| ☒ | EMI TEST RECEIVER | ESU26 | R & S | 100551 | 04, 11, 2019 |
| ☒ | AMPLIFIER | SCU 01 | R & S | 100603 | 11, 27, 2018 |
| ☒ | TRILOG-BROADBAND ANTENNA | VULB9163 | Schwarzbeck | 714 | 11, 28, 2018 |

### Test Conditions
Temperature: 20,7 ℃
Relative Humidity: 52,1 % R.H.

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

### Instrument Settings
IF Band Width: 120 ㎑

### Test Results
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

### Remarks
See Appendix A for test data.

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

### Test Date
Nov. 07, 2018

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

### Test Equipment

| Used | Description | Model Number | Manufacturer | Serial Number | Cal. Due |
|---|---|---|---|---|---|
| ☒ | EMI Test S/W | EP5/RE | TOYO Corporation | 6.0.0 | - |
| ☒ | EMI TEST RECEIVER | ESU26 | R & S | 100551 | 04, 11, 2019 |
| ☒ | PREAMPLIFIER | 8449B | AGILENT | 3008A01742 | 01, 11, 2019 |
| ☐ | ATTENUATOR | 8491A | HP | 35496 | 03, 21, 2019 |
| ☒ | HORN ANTENNA | BBHA 9120D | SCHWARZBECK | 9120D-1802 | 09, 04, 2019 |

### Test Conditions
Temperature: 21,2 ℃
Relative Humidity: 52,3 % R.H.

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

### Instrument Settings
IF Band Width: 1 ㎒

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

### Remarks
See Appendix A for test data.

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# APPENDIX A – TEST DATA

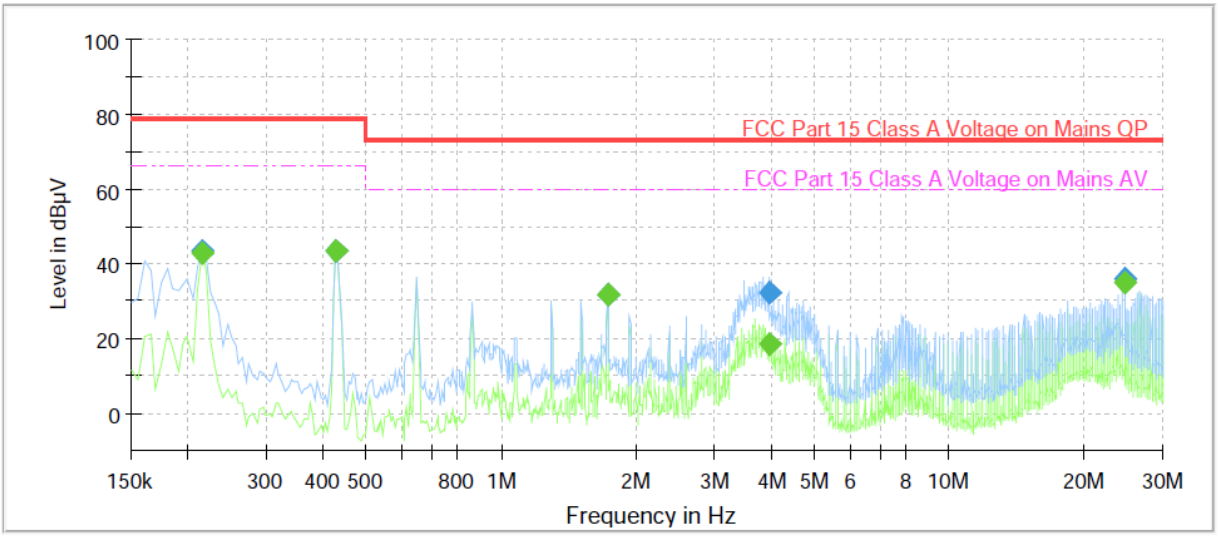
## Conducted Emissions at Mains Power Ports

■ AC 24 V MODE

HOT LINE

## Common Information

| | |
|---|---|
| Test Description: | Conducted Emission |
| Model No.: | XNV-6081Z |
| Mode | AC 24 V_H |
| Operator Name: | KES |




## Final_Result

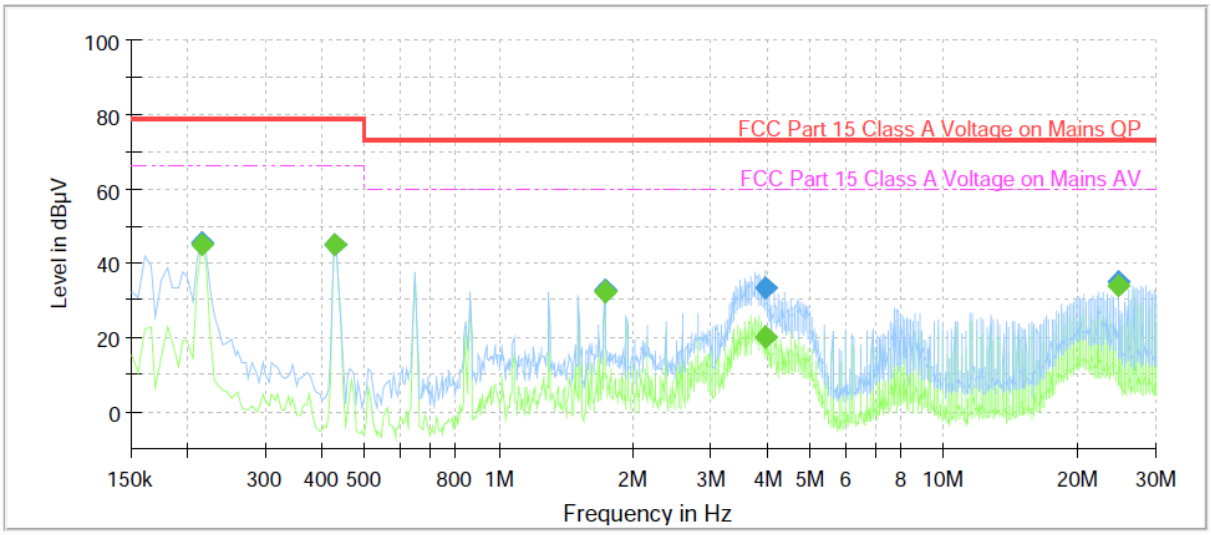
| Frequency (MHz) | QuasiPeak (dBµV) | CAverage (dBµV) | Limit (dBµV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|---|---|---|---|---|---|---|---|---|
| 0.215000 | --- | 42.81 | 66.00 | 23.19 | 1000.0 | 9.000 | L1 | 9.7 |
| 0.215000 | 43.26 | --- | 79.00 | 35.74 | 1000.0 | 9.000 | L1 | 9.7 |
| 0.430000 | --- | 43.18 | 66.00 | 22.82 | 1000.0 | 9.000 | L1 | 9.7 |
| 0.430000 | 43.22 | --- | 79.00 | 35.78 | 1000.0 | 9.000 | L1 | 9.7 |
| 1.725000 | --- | 31.52 | 60.00 | 28.48 | 1000.0 | 9.000 | L1 | 10.1 |
| 1.725000 | 31.82 | --- | 73.00 | 41.18 | 1000.0 | 9.000 | L1 | 10.1 |
| 3.960000 | --- | 18.76 | 60.00 | 41.24 | 1000.0 | 9.000 | L1 | 10.1 |
| 3.960000 | 32.27 | --- | 73.00 | 40.73 | 1000.0 | 9.000 | L1 | 10.1 |
| 24.575000 | --- | 34.87 | 60.00 | 25.13 | 1000.0 | 9.000 | L1 | 10.3 |
| 24.575000 | 35.87 | --- | 73.00 | 37.13 | 1000.0 | 9.000 | L1 | 10.3 |

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NEUTRAL LINE

## Common Information

| | |
|---|---|
| Test Description: | Conducted Emission |
| Model No.: | XNV-6081Z |
| Mode | AC 24 V_N |
| Operator Name: | KES |




## Final_Result

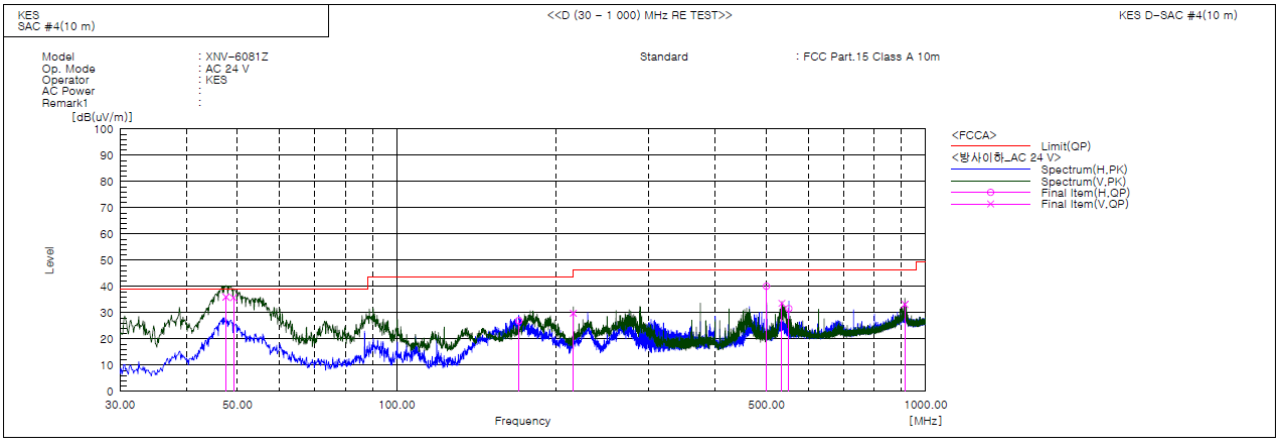
| Frequency (MHz) | QuasiPeak (dBµV) | CAverage (dBµV) | Limit (dBµV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|---|---|---|---|---|---|---|---|---|
| 0.215000 | --- | 45.17 | 66.00 | 20.83 | 1000.0 | 9.000 | N | 9.7 |
| 0.215000 | 45.48 | --- | 79.00 | 33.52 | 1000.0 | 9.000 | N | 9.7 |
| 0.430000 | --- | 45.11 | 66.00 | 20.89 | 1000.0 | 9.000 | N | 9.8 |
| 0.430000 | 45.14 | --- | 79.00 | 33.86 | 1000.0 | 9.000 | N | 9.8 |
| 1.725000 | --- | 32.38 | 60.00 | 27.62 | 1000.0 | 9.000 | N | 10.1 |
| 1.725000 | 32.76 | --- | 73.00 | 40.24 | 1000.0 | 9.000 | N | 10.1 |
| 3.960000 | --- | 20.20 | 60.00 | 39.80 | 1000.0 | 9.000 | N | 10.1 |
| 3.960000 | 33.19 | --- | 73.00 | 39.81 | 1000.0 | 9.000 | N | 10.1 |
| 24.575000 | --- | 34.15 | 60.00 | 25.85 | 1000.0 | 9.000 | N | 10.2 |
| 24.575000 | 35.13 | --- | 73.00 | 37.87 | 1000.0 | 9.000 | N | 10.2 |

◆ 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))

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## Radiated Electric Field Emissions(Below 1 GHz)

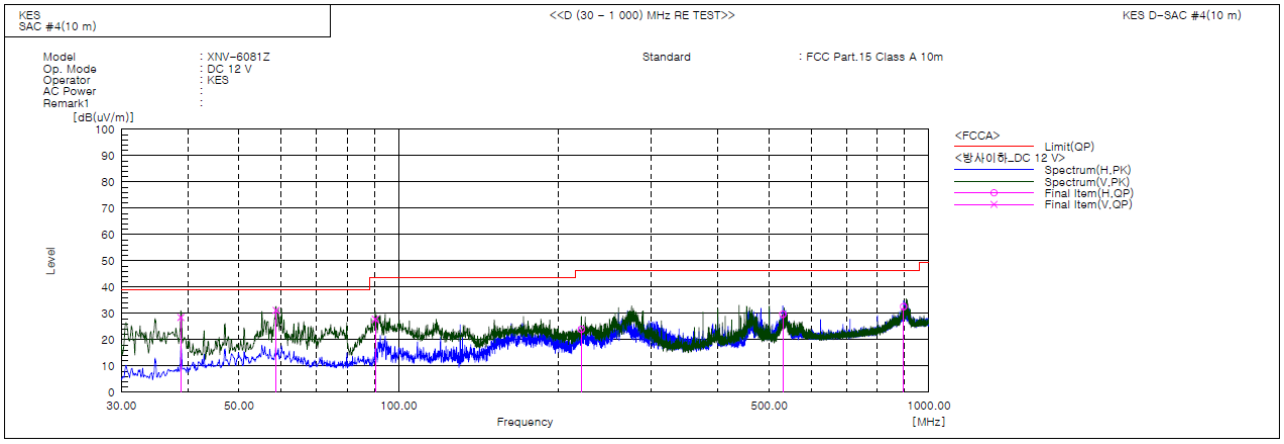
■ AC 24 V MODE




Final Result

| No. | Frequency [MHz] | (P) | Reading QP [dB(uV)] | c.f [dB(1/m)] | Result QP [dB(uV/m)] | Limit QP [dB(uV/m)] | Margin QP [dB] | Height [cm] | Angle [deg] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 47.581 | V | 64.5 | -28.5 | 36.0 | 39.0 | 3.0 | 104.0 | 260.0 | |
| 2 | 49.158 | V | 64.2 | -28.5 | 35.7 | 39.0 | 3.3 | 109.0 | 260.0 | |
| 3 | 170.165 | H | 58.2 | -31.2 | 27.0 | 43.5 | 16.5 | 395.0 | 115.0 | |
| 4 | 215.755 | V | 57.0 | -27.2 | 29.8 | 43.5 | 13.7 | 391.0 | 48.0 | |
| 5 | 499.965 | H | 58.9 | -18.8 | 40.1 | 46.5 | 6.4 | 199.0 | 205.0 | |
| 6 | 534.764 | V | 51.3 | -17.7 | 33.6 | 46.5 | 12.9 | 106.0 | 51.0 | |
| 7 | 551.254 | H | 48.8 | -17.2 | 31.6 | 46.5 | 14.9 | 117.0 | 175.0 | |
| 8 | 913.549 | V | 44.6 | -11.4 | 33.2 | 46.5 | 13.3 | 101.0 | 276.0 | |

■ DC 12 V MODE

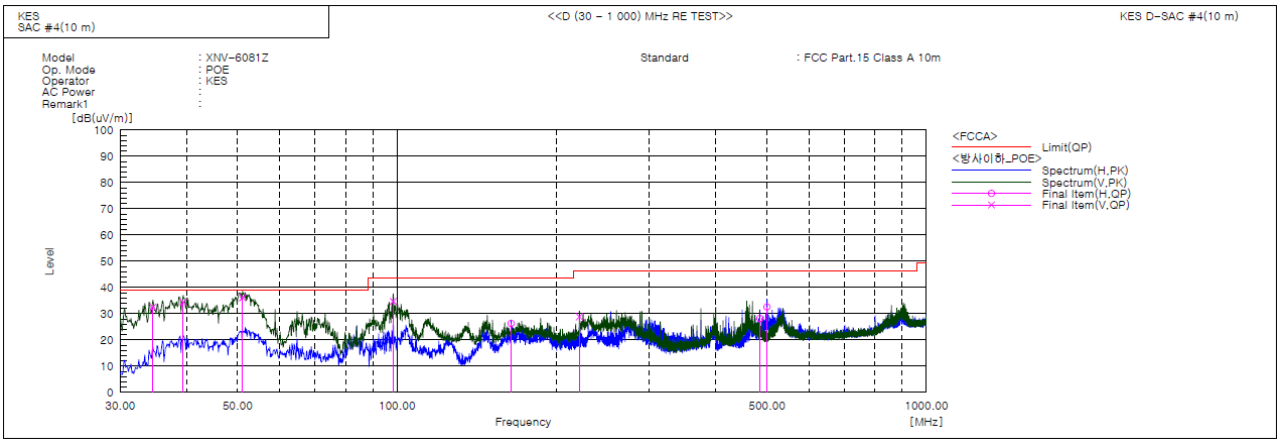



Final Result

| No. | Frequency [MHz] | (P) | Reading QP [dB(uV)] | c.f [dB(1/m)] | Result QP [dB(uV/m)] | Limit QP [dB(uV/m)] | Margin QP [dB] | Height [cm] | Angle [deg] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 38.851 | V | 59.0 | -30.5 | 28.5 | 39.0 | 10.5 | 149.0 | 273.0 | |
| 2 | 58.736 | V | 60.5 | -29.3 | 31.2 | 39.0 | 7.8 | 103.0 | 257.0 | |
| 3 | 90.383 | V | 58.7 | -30.9 | 27.8 | 43.5 | 15.7 | 168.0 | 253.0 | |
| 4 | 221.090 | H | 51.1 | -27.1 | 24.0 | 46.5 | 22.5 | 393.0 | 337.0 | |
| 5 | 530.520 | H | 47.6 | -17.9 | 29.7 | 46.5 | 16.8 | 202.0 | 226.0 | |
| 6 | 895.846 | H | 44.1 | -11.5 | 32.6 | 46.5 | 13.9 | 386.0 | 325.0 | |

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■ PoE MODE




Final Result

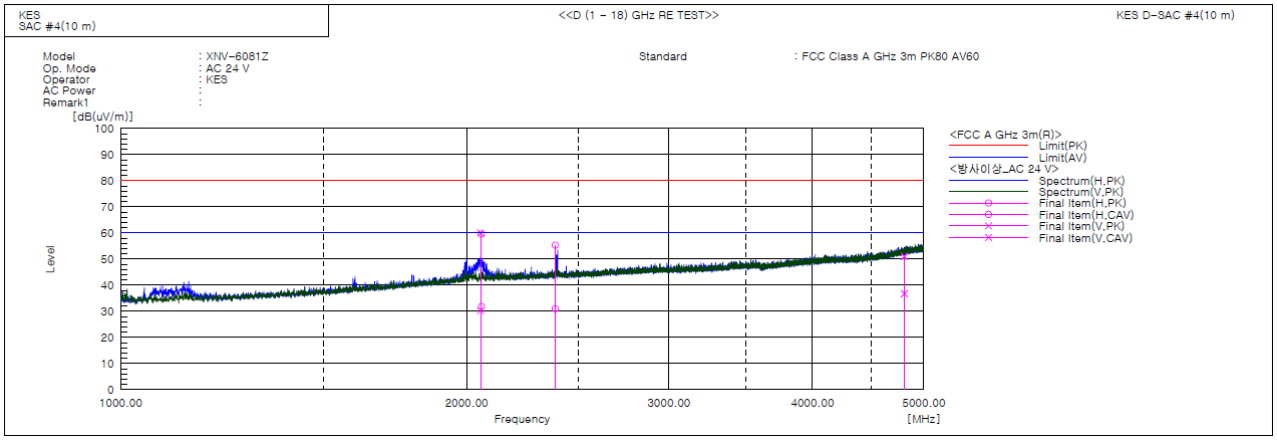
| No. | Frequency [MHz] | (P) | Reading QP [dB(uV)] | c.f [dB(1/m)] | Result QP [dB(uV/m)] | Limit QP [dB(uV/m)] | Margin QP [dB] | Height [cm] | Angle [deg] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 34.608 | V | 64.9 | -32.3 | 32.6 | 39.0 | 6.4 | 105.0 | 237.0 | |
| 2 | 39.458 | V | 64.6 | -30.2 | 34.4 | 39.0 | 4.6 | 117.0 | 197.0 | |
| 3 | 51.098 | V | 64.5 | -28.4 | 36.1 | 39.0 | 2.9 | 156.0 | 238.0 | |
| 4 | 98.385 | V | 63.8 | -29.1 | 34.7 | 43.5 | 8.8 | 134.0 | 87.0 | |
| 5 | 164.345 | H | 57.7 | -31.4 | 26.3 | 43.5 | 17.2 | 395.0 | 87.0 | |
| 6 | 221.090 | V | 55.9 | -27.1 | 28.8 | 46.5 | 17.7 | 101.0 | 332.0 | |
| 7 | 484.566 | H | 47.5 | -19.3 | 28.2 | 46.5 | 18.3 | 186.0 | 241.0 | |
| 8 | 499.965 | H | 51.4 | -18.8 | 32.6 | 46.5 | 13.9 | 209.0 | 58.0 | |

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

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# Radiated Electric Field Emissions(Above 1 GHz)

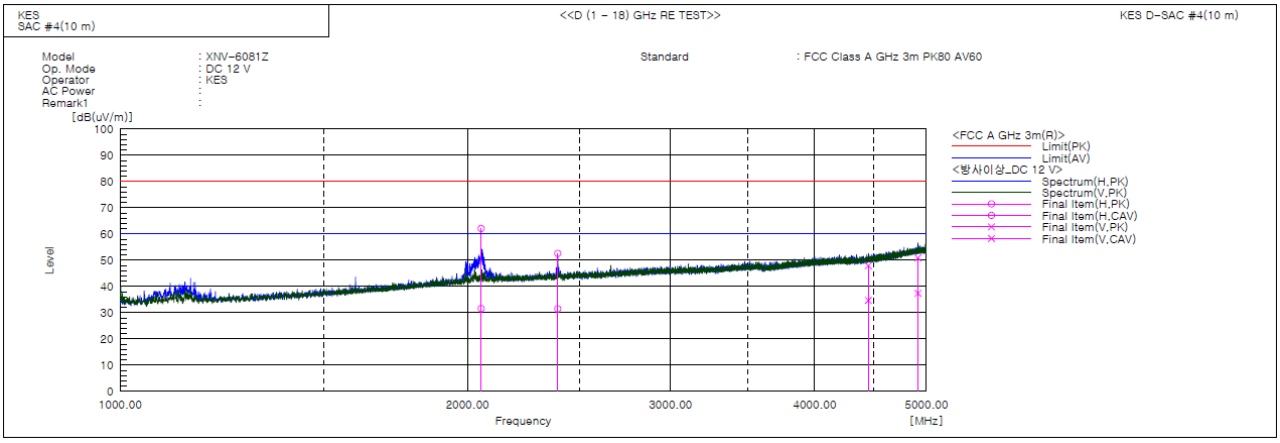
## ■ AC 24 V MODE




Final Result

| No. | Frequency [MHz] | (P) | Reading PK [dB(uV)] | Reading CAV [dB(uV)] | c.f [dB(1/m)] | Result PK [dB(uV/m)] | Result CAV [dB(uV/m)] | Limit PK [dB(uV/m)] | Limit AV [dB(uV/m)] | Margin PK [dB] | Margin CAV [dB] | Height [cm] | Angle [deg] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2056.685 | V | 58.4 | 28.7 | 1.6 | 60.0 | 30.3 | 80.0 | 60.0 | 20.0 | 29.7 | 141.0 | 12.0 | |
| 2 | 2060.685 | H | 58.0 | 30.3 | 1.6 | 59.6 | 31.9 | 80.0 | 60.0 | 20.4 | 28.1 | 287.0 | 357.0 | |
| 3 | 2389.200 | H | 52.1 | 27.8 | 3.2 | 55.3 | 31.0 | 80.0 | 60.0 | 24.7 | 29.0 | 354.0 | 42.0 | |
| 4 | 4809.120 | V | 37.2 | 23.0 | 13.8 | 51.0 | 36.8 | 80.0 | 60.0 | 29.0 | 23.2 | 168.0 | 139.0 | |

## ■ DC 12 V MODE

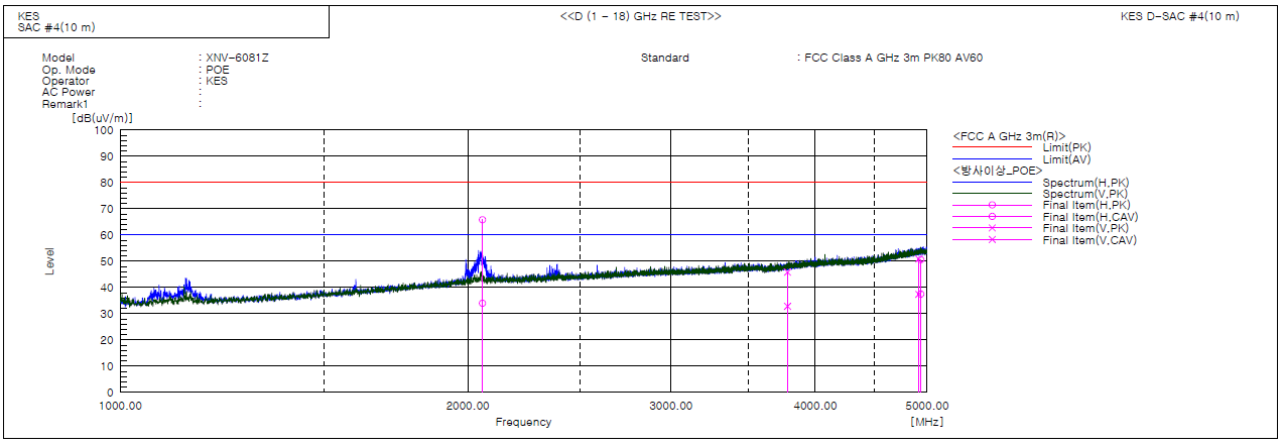



Final Result

| No. | Frequency [MHz] | (P) | Reading PK [dB(uV)] | Reading CAV [dB(uV)] | c.f [dB(1/m)] | Result PK [dB(uV/m)] | Result CAV [dB(uV/m)] | Limit PK [dB(uV/m)] | Limit AV [dB(uV/m)] | Margin PK [dB] | Margin CAV [dB] | Height [cm] | Angle [deg] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2055.895 | H | 60.5 | 30.0 | 1.6 | 62.1 | 31.6 | 80.0 | 60.0 | 17.9 | 28.4 | 278.0 | 331.0 | |
| 2 | 2395.080 | H | 49.4 | 28.3 | 3.2 | 52.6 | 31.5 | 80.0 | 60.0 | 27.4 | 28.5 | 295.0 | 19.0 | |
| 3 | 4453.220 | V | 36.9 | 23.7 | 11.0 | 47.9 | 34.7 | 80.0 | 60.0 | 32.1 | 25.3 | 186.0 | 262.0 | |
| 4 | 4916.855 | V | 36.3 | 22.8 | 14.6 | 50.9 | 37.4 | 80.0 | 60.0 | 29.1 | 22.6 | 159.0 | 350.0 | |

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■ PoE MODE




Final Result

| No. | Frequency [MHz] | (P) | Reading PK [dB(uV)] | Reading CAV [dB(uV)] | c.f [dB(1/m)] | Result PK [dB(uV/m)] | Result CAV [dB(uV/m)] | Limit PK [dB(uV/m)] | Limit AV [dB(uV/m)] | Margin PK [dB] | Margin CAV [dB] | Height [cm] | Angle [deg] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2059.345 | H | 64.2 | 32.4 | 1.6 | 65.8 | 34.0 | 80.0 | 60.0 | 14.2 | 26.0 | 264.0 | 341.0 | |
| 2 | 3784.510 | V | 37.3 | 24.3 | 8.5 | 45.8 | 32.8 | 80.0 | 60.0 | 34.2 | 27.2 | 137.0 | 3.0 | |
| 3 | 4916.620 | V | 36.2 | 22.8 | 14.6 | 50.8 | 37.4 | 80.0 | 60.0 | 29.2 | 22.6 | 101.0 | 284.0 | |
| 4 | 4937.090 | H | 35.9 | 22.8 | 14.7 | 50.6 | 37.5 | 80.0 | 60.0 | 29.4 | 22.5 | 294.0 | 39.0 | |

♦ Calculation

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

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

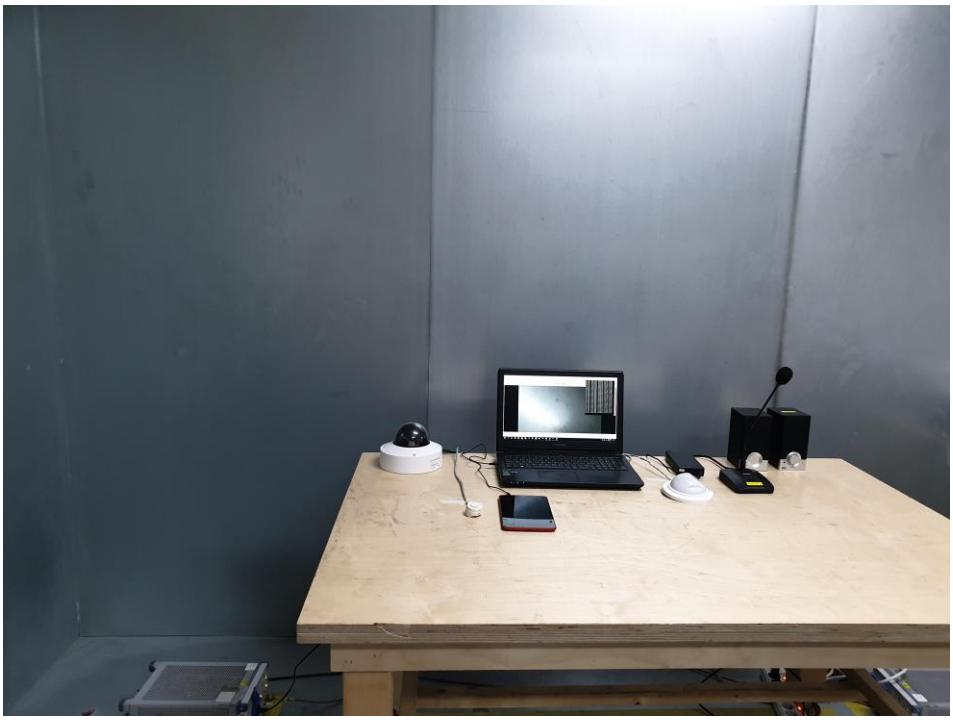
Reading(PK/CAV) : Reading value, Result(PK/CAV) : Reading value + Factor value

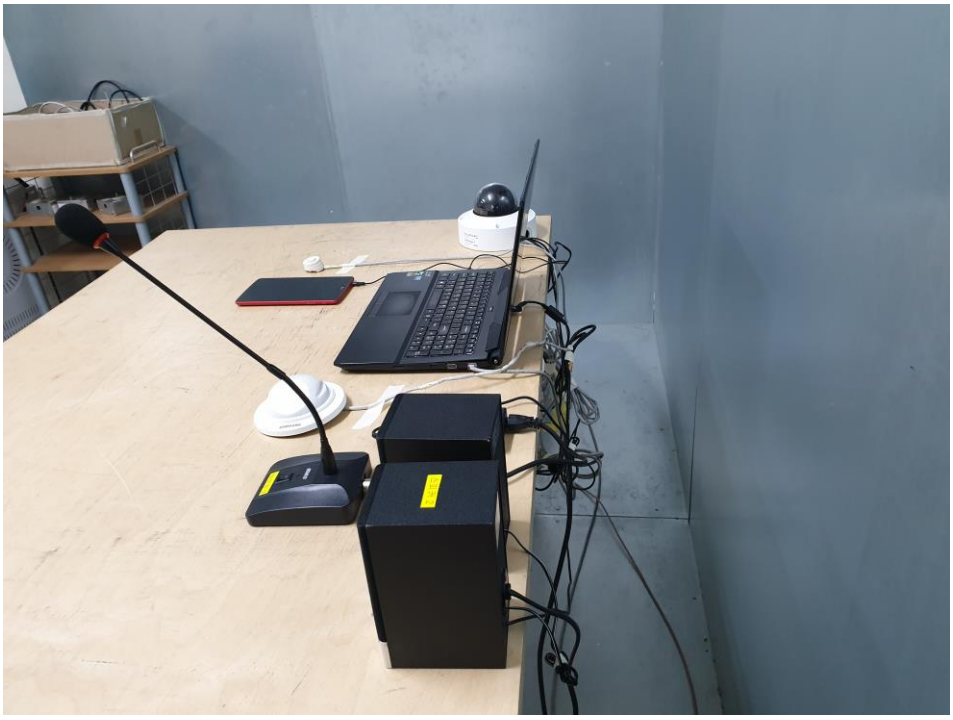
Limit(QP) : Limit value, c.f : (ANT Factor + Cable Loss - Preamp Factor), Margin: Margin value

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# Test Setup Photos and Configuration

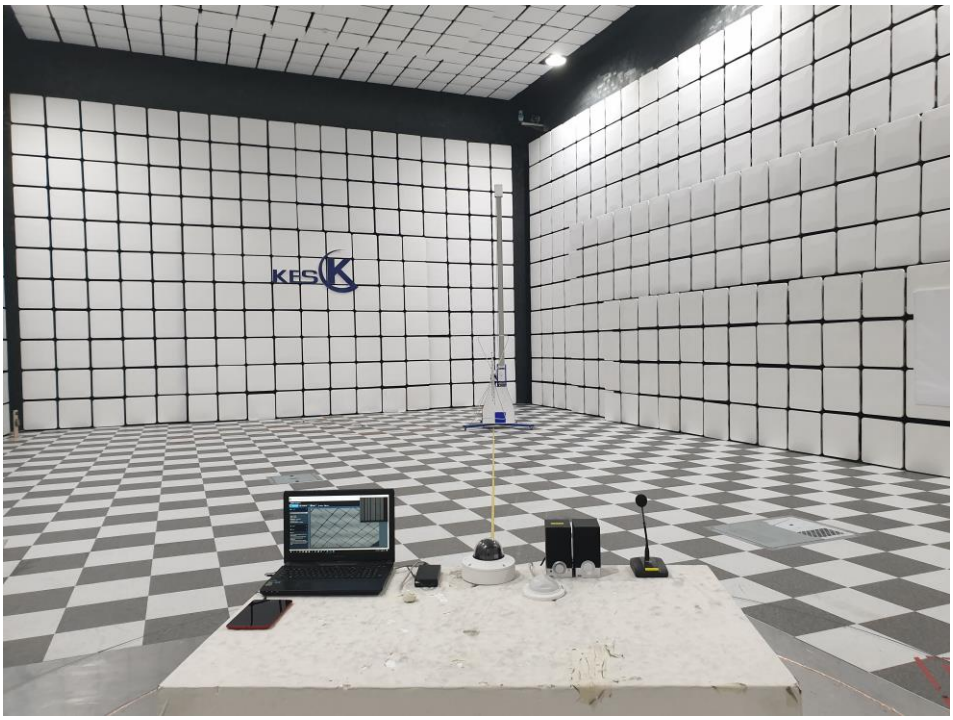
## Conducted Voltage Emissions





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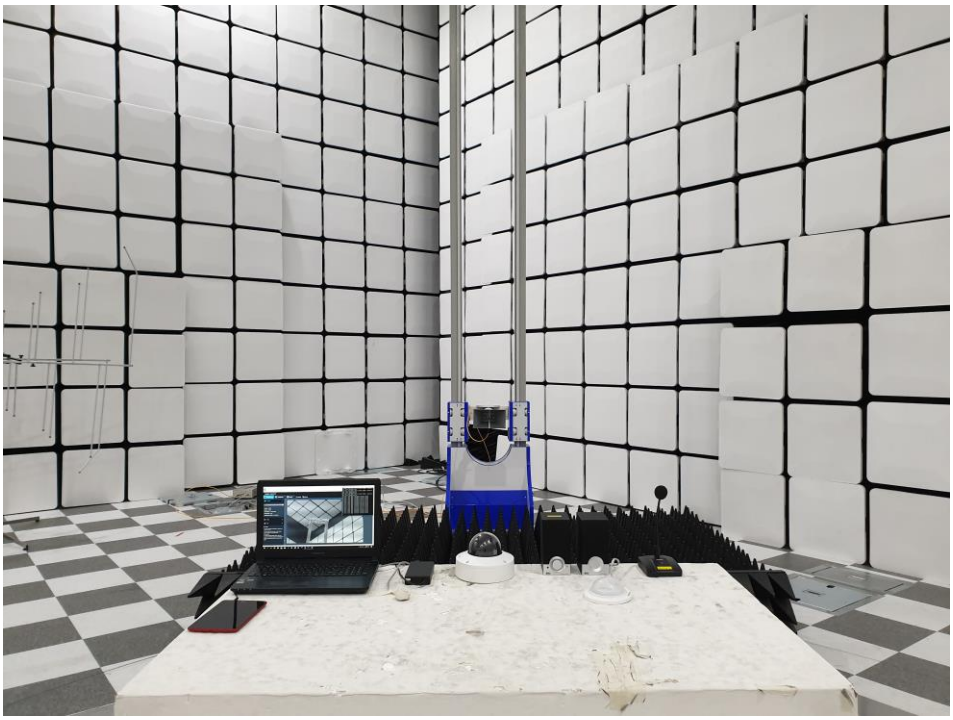
## Radiated Electric Field Emissions(Below 1 GHz)

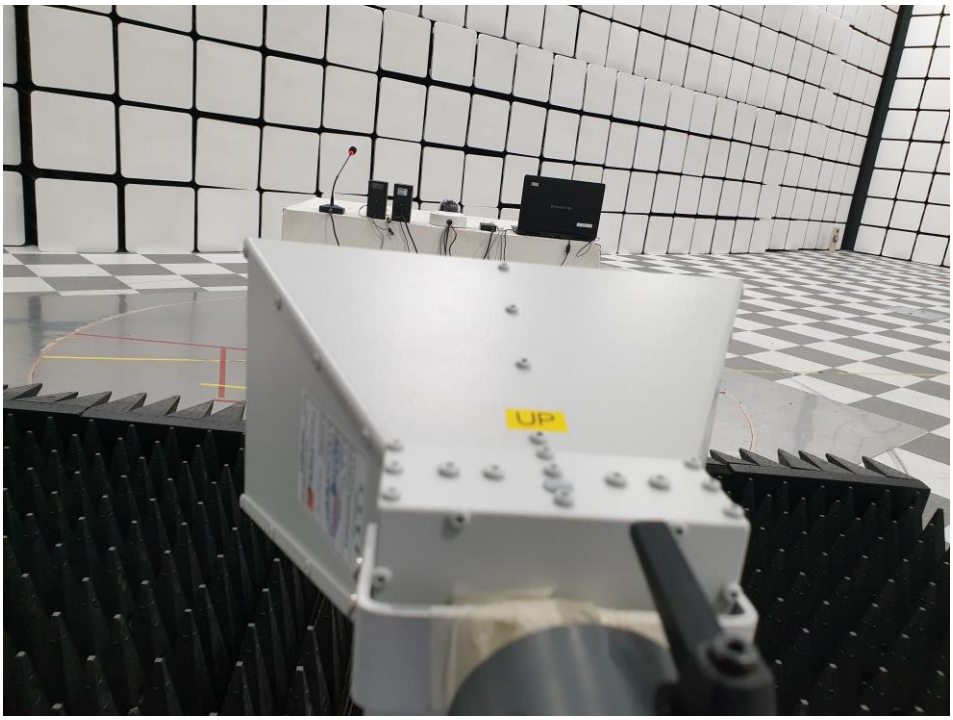




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## Radiated Electric Field Emissions(Above 1 GHz)





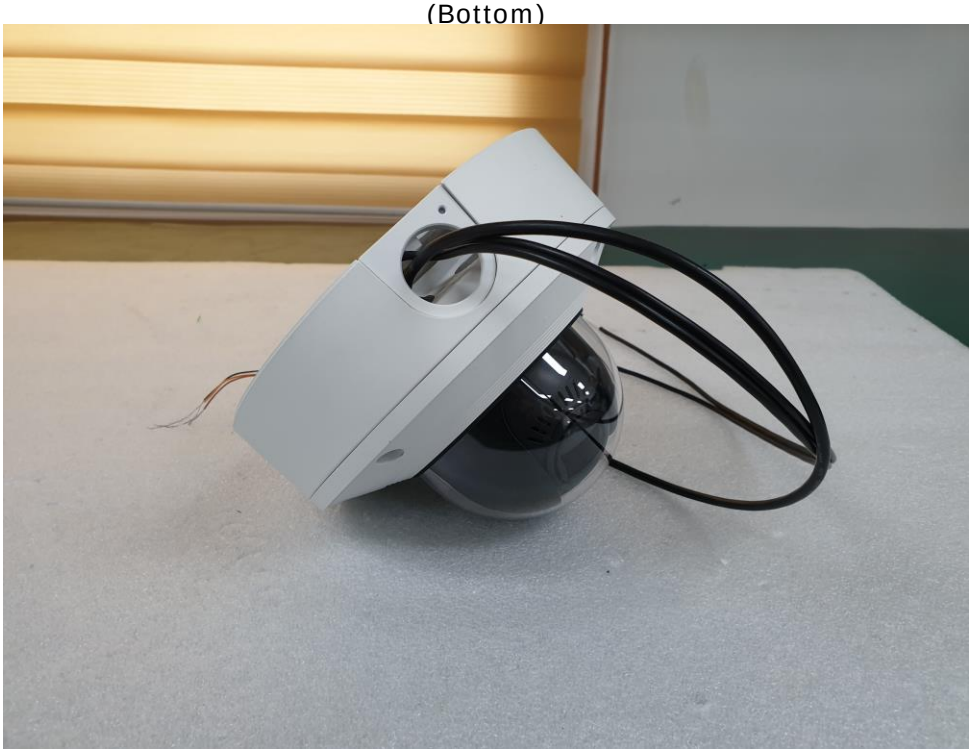

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# EUT External Photographs

(Top)




(Bottom)



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# EUT Internal Photographs

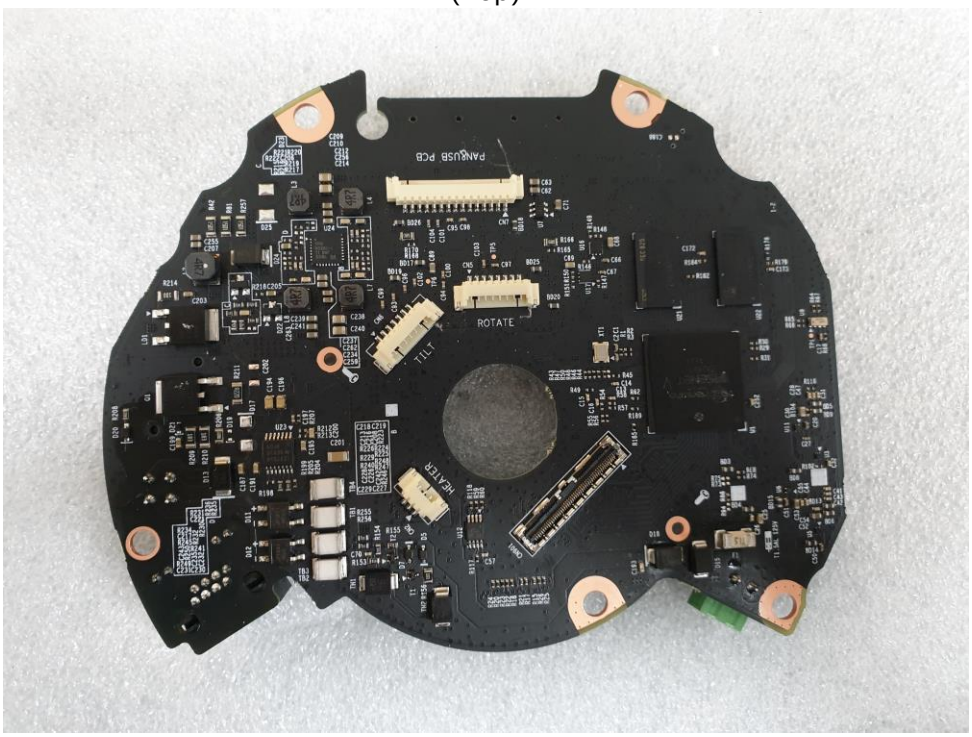
(Internal View)



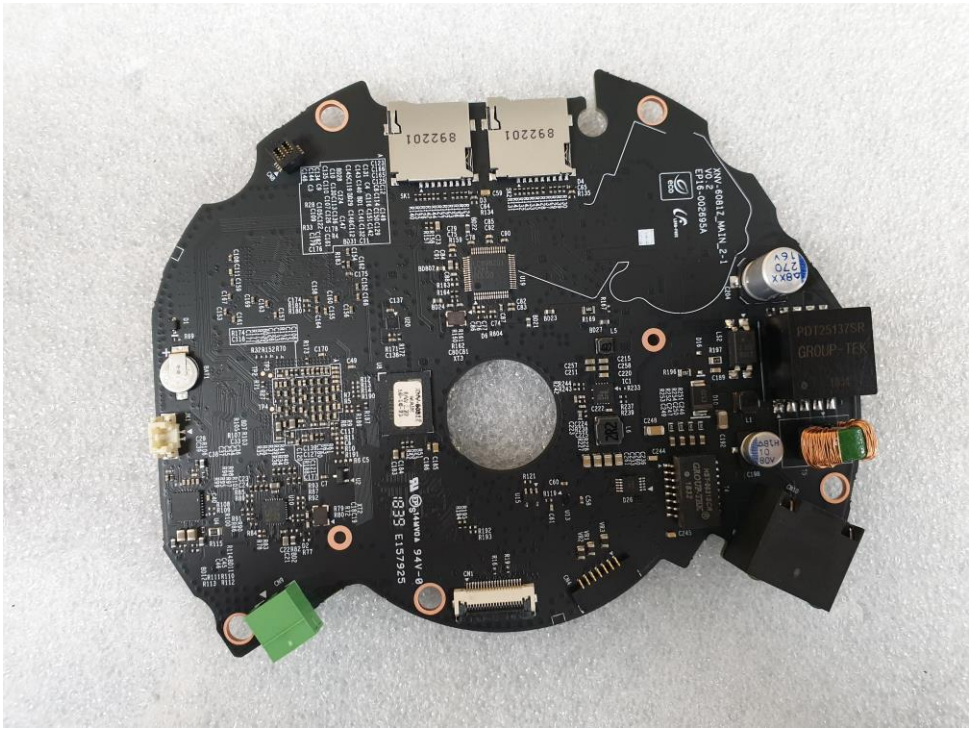
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# EUT Internal View – Main Board

(Top)



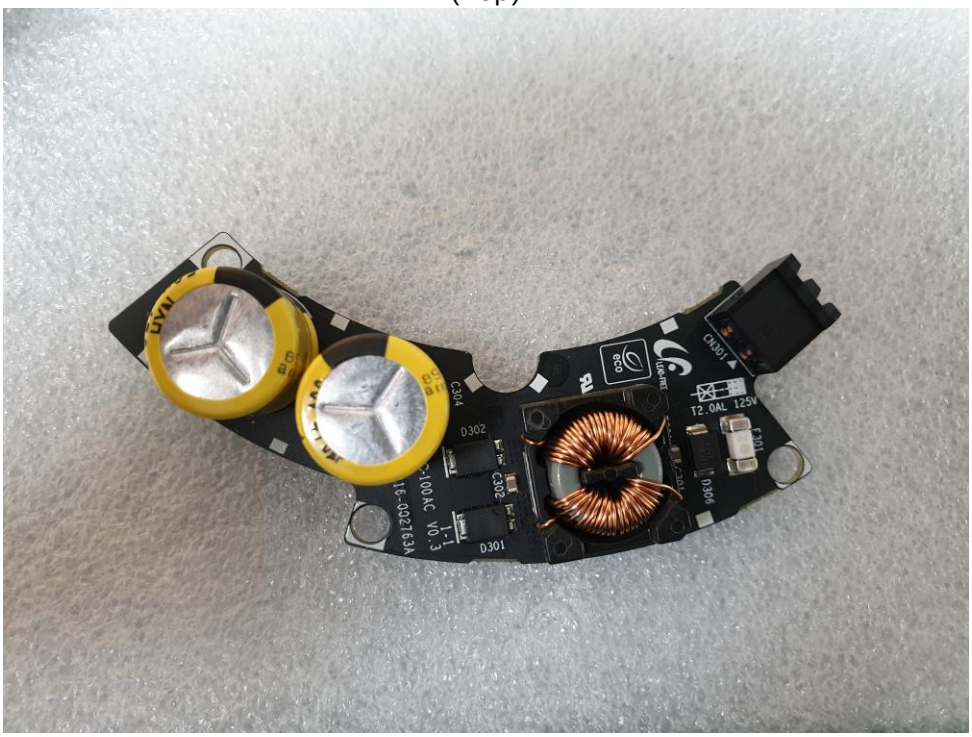

(Bottom)




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# EUT Internal View – AC Module Board

(Top)




(Bottom)




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# EUT Internal View – AC Module

(Top)




(Bottom)



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# EUT Internal View – Board 1

(Top)



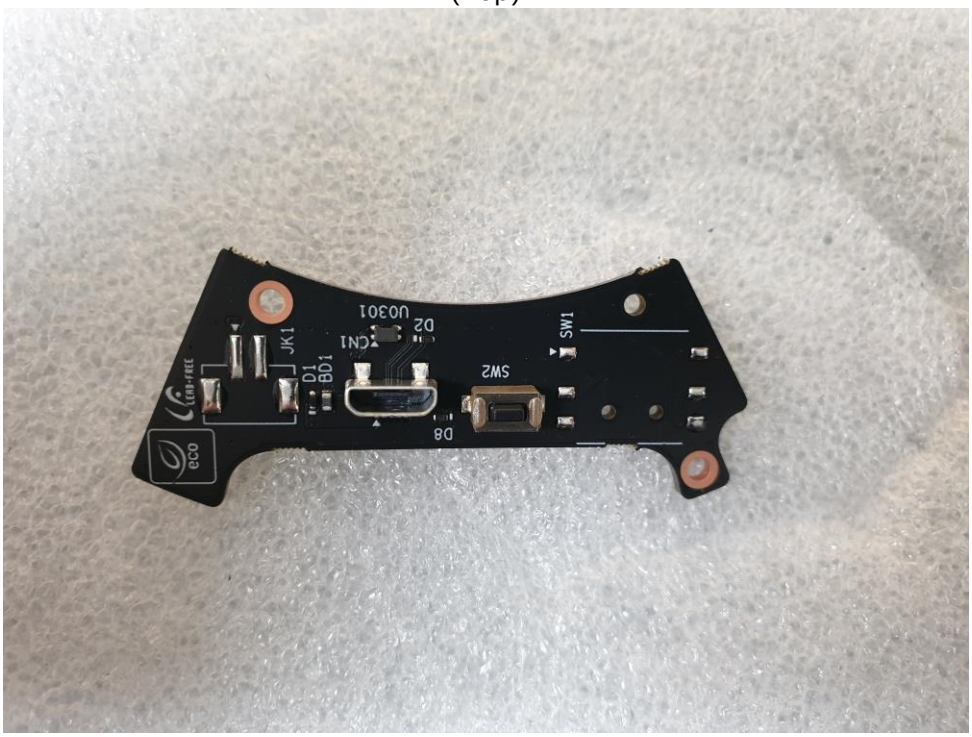
(Bottom)



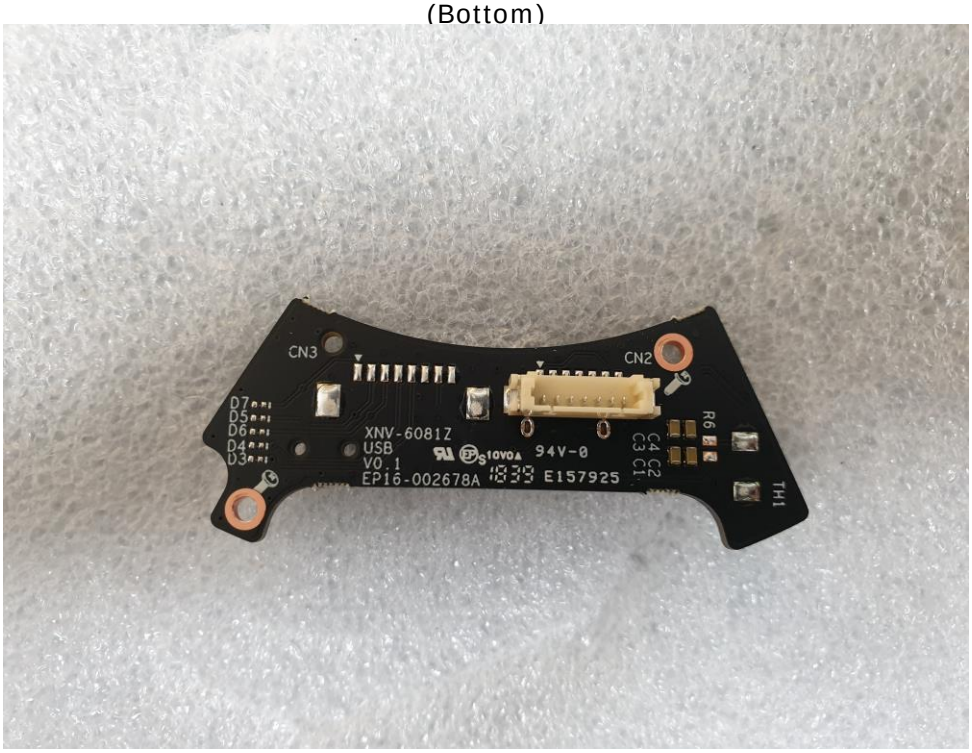

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# EUT Internal View – Board 2

(Top)



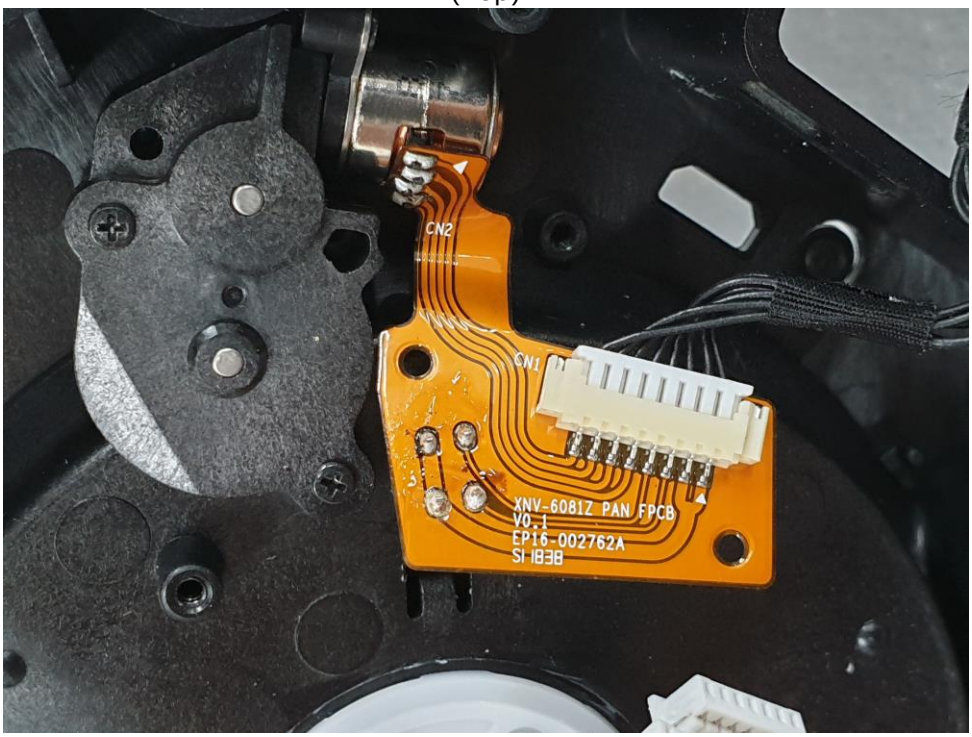

(Bottom)



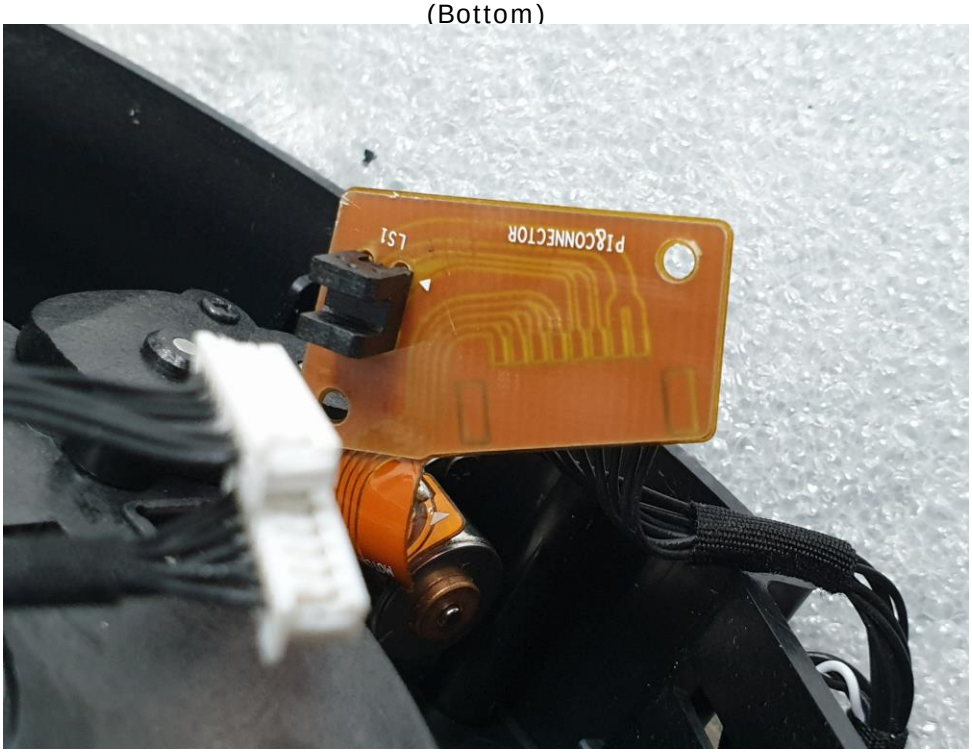

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# EUT Internal View – Board 3

(Top)



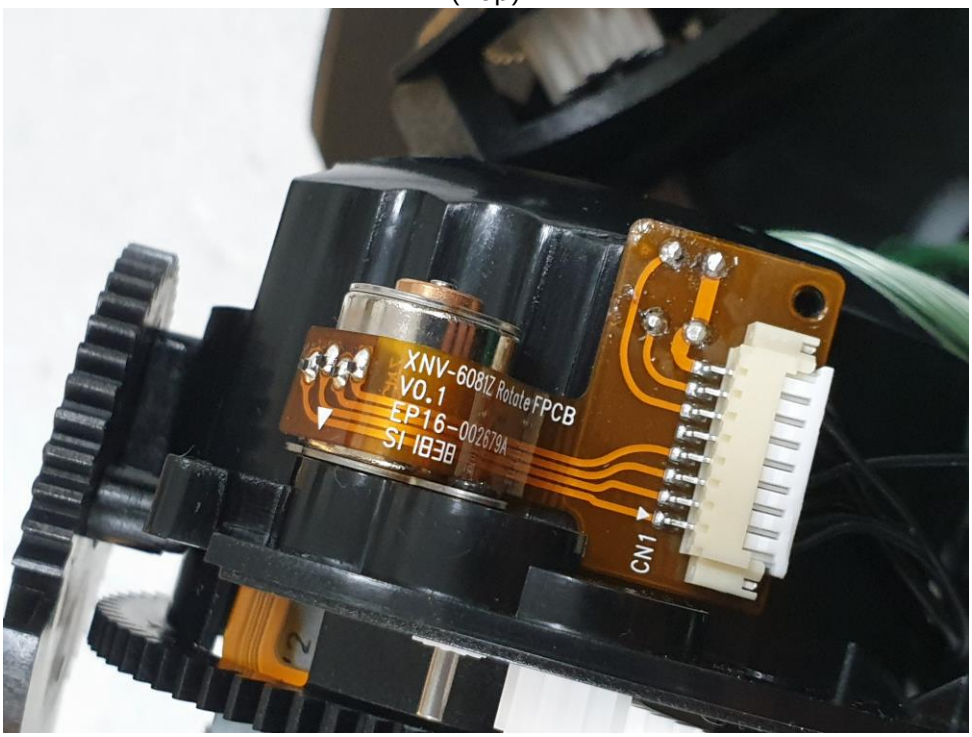

(Bottom)



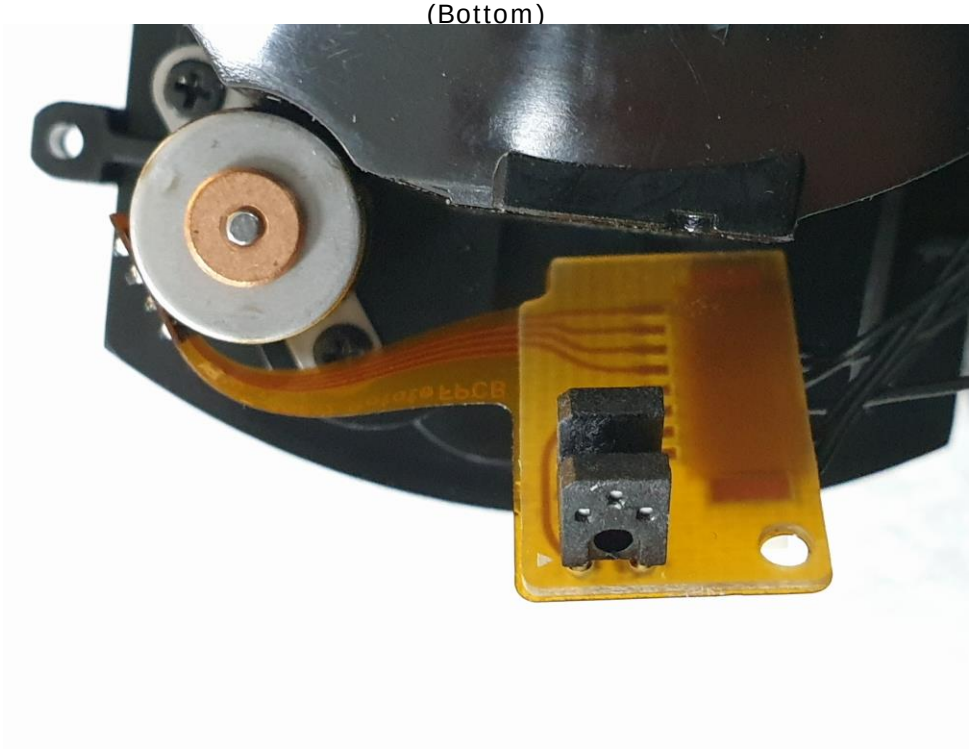

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# EUT Internal View – Board 4

(Top)



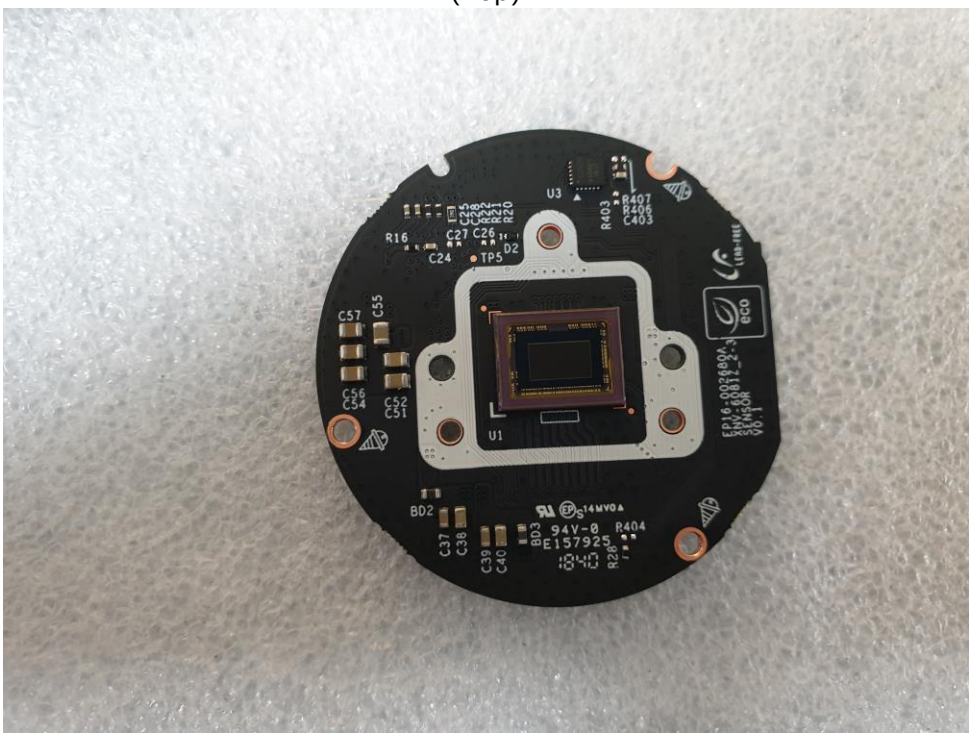

(Bottom)



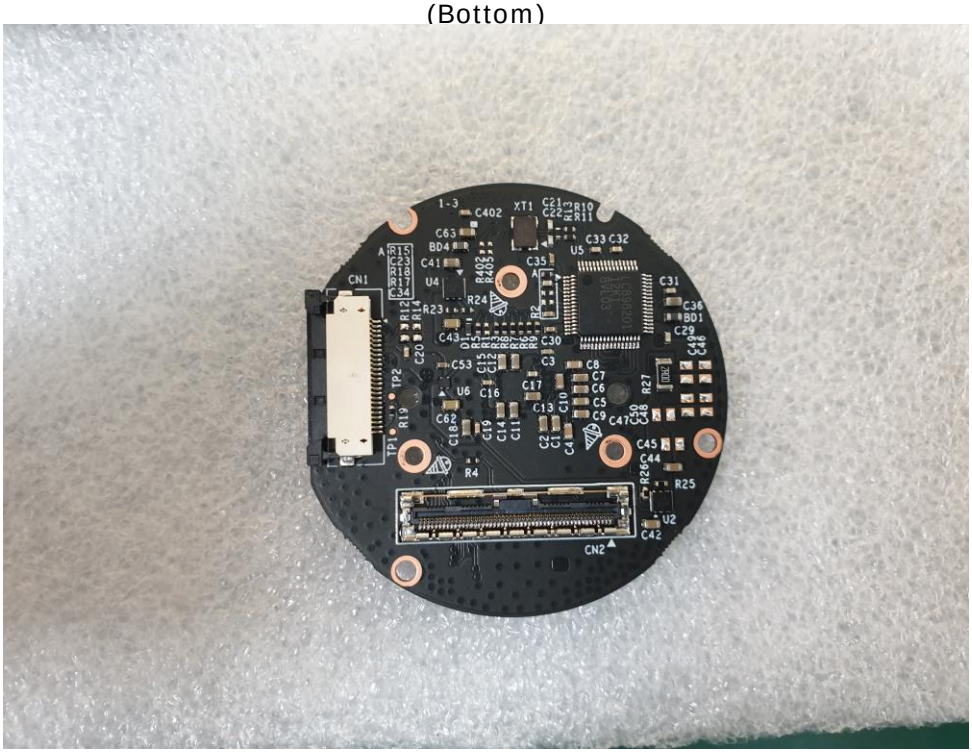
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The authenticity of the test report, contact shchoi@kes.co.kr

# EUT Internal View – Camera Board

(Top)



(Bottom)



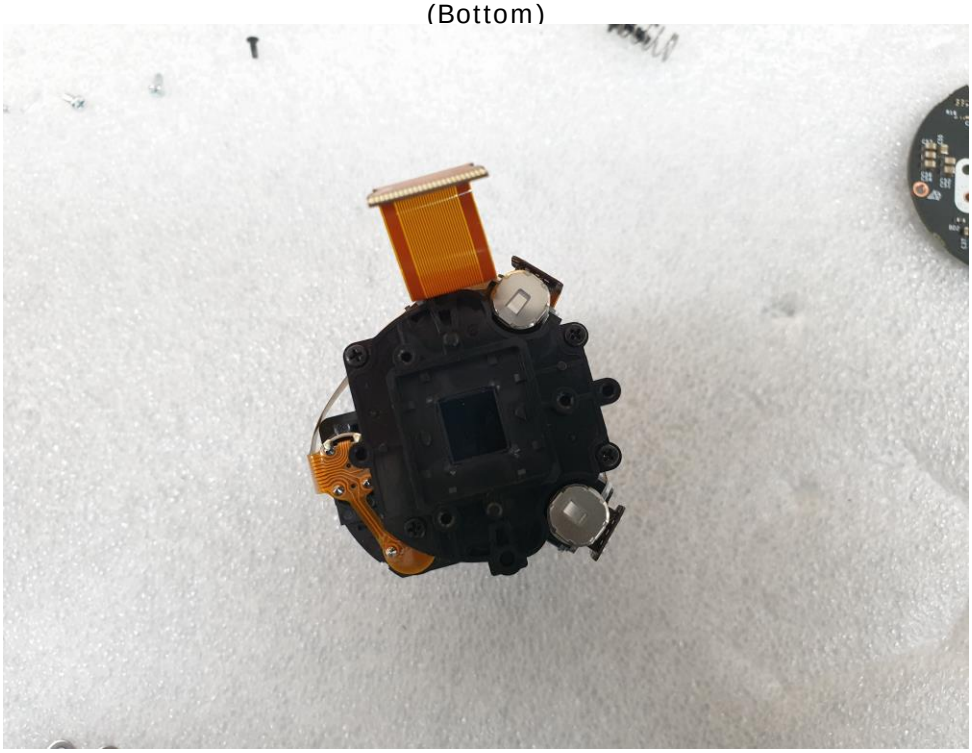
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# EUT Internal View – Camera

(Top)

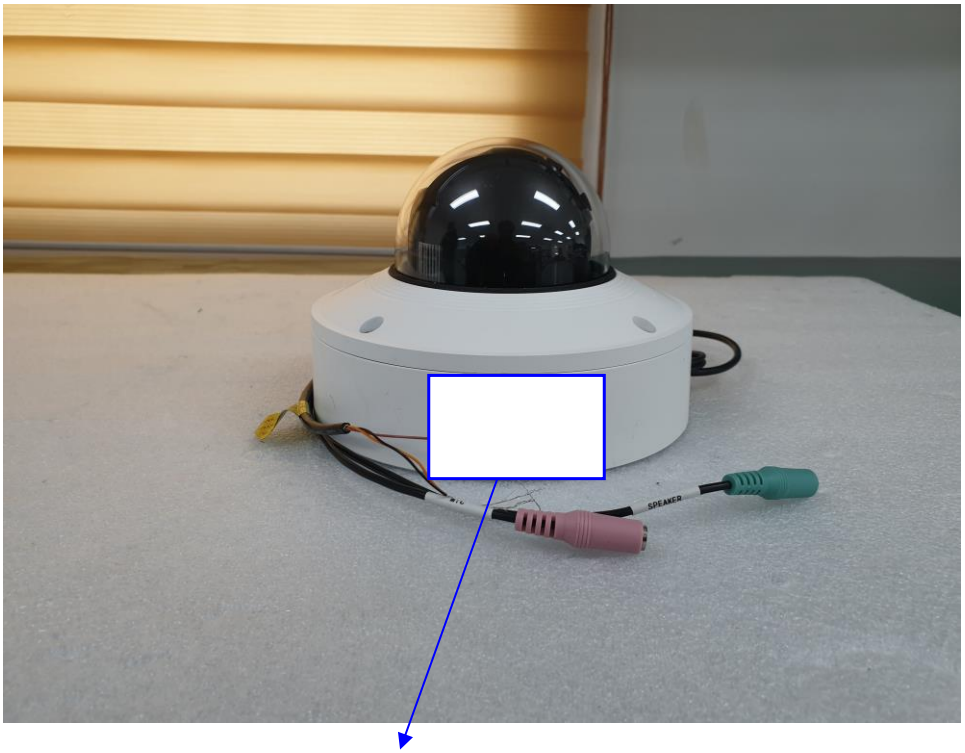


(Bottom)



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# Label Photographs



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

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

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

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