

## EMC TEST REPORT

Test Report No. : KES-EM-22T0679-R1  
Date of Issue : Feb. 24, 2023  
Product name : THERMAL CAMERA  
Model/Type No. : TNO-4051T  
Variant Model : TNO-4041T  
Applicant : Hanwha Vision Co., Ltd  
Applicant Address : 6, Pangyo-ro 319Beon-gil, Bundang-gu, Seongnam-si,  
Gyeonggi-do, Republic of 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 : **Supplier's Declaration of Conformity**  
Date of Receipt : Jul. 21, 2022  
Test date : Jul. 22, 2022  
Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by



Kang-Hyeon, Kim  
EMC Test Engineer

Reviewed by



Dong-Hun, Jang  
EMC Technical Manager

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

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## REPORT REVISION HISTORY

| Date          | Test Report No.   | Revision History                                                     |
|---------------|-------------------|----------------------------------------------------------------------|
| Aug. 08, 2022 | KES-EM-22T0679    | Issued                                                               |
| Feb. 24, 2023 | KES-EM-22T0679-R1 | Change the Applicant and manufacturer at the request of the customer |
|               |                   |                                                                      |
|               |                   |                                                                      |
|               |                   |                                                                      |
|               |                   |                                                                      |
|               |                   |                                                                      |
|               |                   |                                                                      |
|               |                   |                                                                      |
|               |                   |                                                                      |

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## 1.0 General Product Description

### Main Specifications of EUT are:

#### Specifications

##### Video

|                |                                                                                |
|----------------|--------------------------------------------------------------------------------|
| Imaging Device | Uncooled micro bolometer                                                       |
| Resolution     | 640x480, 640x360, 320x240                                                      |
| Max. Framerate | H.265/H.264: Max. 30fps/25fps(60Hz/50Hz)<br>MJPEG: Max. 30fps/25fps(60Hz/50Hz) |
| NETD           | <50mK                                                                          |
| Pixel Size     | 17μm                                                                           |
| Video Out      | CVBS: 1.0 Vp-p / 75Ω composite, 720x480(N), 720x576(P) for installation        |

##### Lens

|                           |                            |
|---------------------------|----------------------------|
| Focal Length (Zoom Ratio) | 35mm fixed focal           |
| Max. Aperture Ratio       | F1.0                       |
| Angular Field of View     | H: 17.2° / V: 13° / D: 22° |
| Min. Object Distance      | 36m(118.11ft)              |
| Focus Control             | Fixed                      |

##### Operational

|                             |                                                                                                                                                                                          |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Camera Title                | Displayed up to 85 characters                                                                                                                                                            |
| Digital Image Stabilization | Support(built-in gyro sensor)                                                                                                                                                            |
| Motion Detection            | 8ea, 8point polygonal zones                                                                                                                                                              |
| Privacy Masking             | 32ea, polygonal zones<br>- Color: Grey/Green/Red/Blue/Black/White<br>- Mosaic                                                                                                            |
| Video Rotation              | Flip, Mirror, Hallway view(90°/270°)                                                                                                                                                     |
| Analytics                   | Directional detection, Motion detection, Appear/Disappear, Enter/Exit, Loitering, Tampering, Virtual line, Audio detection, Temperature detection, Sound classification, Shock detection |
| Serial Interface            | RS-485/422(Samsung-T, Pelco-D/P, Panasonic, Bosch, AD, GE, Vicon, Honeywell)                                                                                                             |
| Alarm I/O                   | Input 1ea / Output 2ea                                                                                                                                                                   |
| Alarm Triggers              | Analytics, Network disconnect, Alarm input                                                                                                                                               |
| Alarm Events                | File upload via FTP and e-mail<br>Notification via e-mail<br>SD/SDHC/SDXC or NAS recording at event triggers<br>Alarm output<br>Handover                                                 |
| Audio In                    | Selectable(mic in/line in)<br>Supply voltage: 2.5VDC(4mA), Input impedance: 2K Ohm                                                                                                       |
| Audio Out                   | Line out, Max.output level: 1Vrms                                                                                                                                                        |

##### Network

|                   |                                                                                                                                    |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------|
| Ethernet          | RJ-45(10/100BASE-T)                                                                                                                |
| Video Compression | H.265/H.264: Main/Baseline/High, MJPEG                                                                                             |
| Audio Compression | G.711 u-law /G.726 Selectable<br>G.726(ADPCM) 8KHz, G.711 8KHz<br>G.726: 16Kbps, 24Kbps, 32Kbps, 40Kbps<br>AAC-LC: 48Kbps at 16KHz |
| Smart Codec       | Manual(5ea area), WiseStream II                                                                                                    |
| Bitrate Control   | H.264/H.265: CBR or VBR<br>MJPEG: VBR                                                                                              |

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|                                   |                                                                                                                                                                                                   |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Streaming                         | Unicast(20 users) / Multicast<br>Multiple streaming(Up to 10 profiles)                                                                                                                            |
| Protocol                          | IPv4, IPv6, TCP/IP, UDP/IP, RTP(UDP), RTP(TCP), RTCP, RTSP, NTP, HTTP, HTTPS, SSL/TLS, DHCP, FTP, SMTP, ICMP, IGMP, SNMPv1/v2c/v3(MIB-2), ARP, DNS, DDNS, QoS, PIM-SM, UPnP, Bonjour, LLDP, SRTSP |
| 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)                                             |
| Application Programming Interface | ONVIF Profile S/G/T<br>SUNAPI(HTTP API)<br>Wisenet open platform                                                                                                                                  |

### General

|              |                                                                                                                                                                                                                     |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Web Viewer   | Supported OS: Windows 7, 8.1, 10, Mac OS X 10.10, 10.11, 10.12<br>Recommended Browser: Google Chrome<br>Supported Browser: MS Explorer 11, MS Edge, Mozilla Firefox(Window 64bit only), Apple Safari(Mac OS X only) |
| Edge Storage | Micro SD/SDHC/SDXC 1slot 256GB                                                                                                                                                                                      |
| Memory       | 1024MB RAM, 256MB Flash                                                                                                                                                                                             |

### Environmental & Electrical

|                                  |                                                                                                |
|----------------------------------|------------------------------------------------------------------------------------------------|
| Operating Temperature / Humidity | -40°C ~ +60°C (-40°F ~ +140°F) / Less than 90% RH                                              |
| Storage Temperature / Humidity   | -50°C ~ +60°C (-58°F ~ +140°F) / Less than 90% RH                                              |
| Certification                    | IP66, IK10, NEMA4X                                                                             |
| Input Voltage                    | PoE(IEEE802.3af, Class3), 24VAC, 12VDC                                                         |
| Power Consumption                | PoE: Max. 10W, typical 8.6W<br>12VDC: Max. 9W, typical 7.5W<br>24VAC: Max. 10.5W, typical 8.9W |

### Mechanical

|                             |                                            |
|-----------------------------|--------------------------------------------|
| Color / Material            | White / Aluminum                           |
| RAL Code                    | RAL9003                                    |
| Product Dimensions / Weight | Φ101.97x309mm(4.01x12.17") / 2452g(5.41lb) |

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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.

- ☒ AC 120 V, 60 Hz (AC Adapter Input Power)
- ☒ AC 120 V, 60 Hz (DC Adapter Input Power)
- ☒ AC 120 V, 60 Hz (PoE Adapter Input Power)

## 1.2 Variant Model Differences

Lens size difference.

## 1.3 Device Modifications

Not applicable

## 1.4 Equipment Under Test

| Description    | Model Number | Serial Number | Manufacturer                                | Remarks |
|----------------|--------------|---------------|---------------------------------------------|---------|
| THERMAL CAMERA | TNO-4051T    | -             | HANWHA VISION<br>VIETNAM COMPANY<br>LIMITED | EUT     |

## 1.5 Support Equipments

| Description        | Model Number     | Serial Number     | Manufacturer                                     | Remarks |
|--------------------|------------------|-------------------|--------------------------------------------------|---------|
| AC/AC ADAPTER      | DY-2425AC        | -                 | Daeyou                                           | -       |
| AC/DC ADAPTER      | 2ACB022F         | -                 | Channel Well Technology (Guangzhou) Co., Ltd.    | -       |
| PoE ADAPTER        | MA-INJ-4         | -                 | Changzhou Wujin Hong Guang radio Factory Co.,LTD | -       |
| Notebook           | LG15N54          | 503NZWY038929     | LG Electronics                                   | -       |
| Notebook Adaptor   | PA-1900-14       | OF2R2633487017764 | LITE-ON TECHNOLOGY COPORATION                    | -       |
| Button Alarm       | -                | -                 | -                                                | -       |
| Alarm              | -                | -                 | -                                                | -       |
| Controller         | SPC-1010         | C50E67WG10100F    | SamSung Techwin Co.,Ltd.                         | -       |
| Controller ADAPTER | AD0481-1503000KB | -                 | Shenzhen ABP Technology Co.,Ltd.                 | -       |
| Smartphone         | -                | -                 | APPLE INCORPORATED                               | -       |
| Headset            | K550             | -                 | Britz®                                           | -       |
| Micro SD Card      | -                | -                 | Sandisk                                          | 8 GB    |

## 1.6 External I/O Cabling

### ■ AC Mode

| Start                |             | END                |             | Cable Spec. |        |
|----------------------|-------------|--------------------|-------------|-------------|--------|
| Description          | I/O Port    | Description        | I/O Port    | Length      | Shield |
| NETWORK CAMERA (EUT) | RJ-45 (LAN) | Notebook           | RJ-45 (LAN) | 3.0         | U      |
|                      | Slot        | Micro SD Card      | Slot        | -           | -      |
|                      | Alarm OUT   | Alarm              | Alarm IN    | 3.0         | U      |
|                      | Alarm OUT   |                    | Alarm IN    | 3.0         | U      |
|                      | Alarm IN    | Button Alarm       | Alarm OUT   | 3.0         | U      |
|                      | RS-485      | Controller         | RS-485      | 3.0         | U      |
|                      | Audio IN    | Headset            | Audio OUT   | 1.7         | U      |
|                      | Audio OUT   |                    | Audio IN    | 1.7         | U      |
|                      | 2 Pin       | AC/AC ADAPTER      | 2 Pin       | 1.6         | U      |
| Notebook             | 3.5 mm      | Smartphone         | 3.5 mm      | 0.8         | U      |
|                      | JACK        | Notebook Adaptor   | JACK        | 1.7         | U      |
| Controller           | JACK        | Controller ADAPTER | JACK        | 1.5         | U      |

\* Unshielded=U, Shielded=S



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## ■ DC Mode

| Start                |             | END                |             | Cable Spec. |        |
|----------------------|-------------|--------------------|-------------|-------------|--------|
| Description          | I/O Port    | Description        | I/O Port    | Length      | Shield |
| NETWORK CAMERA (EUT) | RJ-45 (LAN) | Notebook           | RJ-45 (LAN) | 3.0         | U      |
|                      | Slot        | Micro SD Card      | Slot        | -           | -      |
|                      | Alarm OUT   | Alarm              | Alarm IN    | 3.0         | U      |
|                      | Alarm OUT   |                    | Alarm IN    | 3.0         | U      |
|                      | Alarm IN    | Button Alarm       | Alarm OUT   | 3.0         | U      |
|                      | RS-485      | Controller         | RS-485      | 3.0         | U      |
|                      | Audio IN    | Headset            | Audio OUT   | 1.7         | U      |
|                      | Audio OUT   |                    | Audio IN    | 1.7         | U      |
|                      | 2 Pin       | AC/DC ADAPTER      | 2 Pin       | 1.6         | U      |
| Notebook             | 3.5 mm      | Smartphone         | 3.5 mm      | 0.8         | U      |
|                      | JACK        | Notebook Adaptor   | JACK        | 1.7         | U      |
| Controller           | JACK        | Controller ADAPTER | JACK        | 1.5         | U      |

\* Unshielded=U, Shielded=S

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■ PoE Mode

| Start                |             | END                |             | Cable Spec. |        |
|----------------------|-------------|--------------------|-------------|-------------|--------|
| Description          | I/O Port    | Description        | I/O Port    | Length      | Shield |
| NETWORK CAMERA (EUT) | RJ-45 (PoE) | PoE ADAPTER        | RJ-45 (PoE) | 3.0         | U      |
|                      | Slot        | Micro SD Card      | Slot        | -           | -      |
|                      | Alarm OUT   | Alarm              | Alarm IN    | 3.0         | U      |
|                      | Alarm OUT   |                    | Alarm IN    | 3.0         | U      |
|                      | Alarm IN    | Button Alarm       | Alarm OUT   | 3.0         | U      |
|                      | RS-485      | Controller         | RS-485      | 3.0         | U      |
|                      | Audio IN    | Headset            | Audio OUT   | 1.7         | U      |
|                      | Audio OUT   |                    | Audio IN    | 1.7         | U      |
| Notebook             | 3.5 mm      | Smartphone         | 3.5 mm      | 0.8         | U      |
|                      | JACK        | Notebook Adaptor   | JACK        | 1.7         | U      |
|                      | RJ-45 (LAN) | PoE ADAPTER        | RJ-45 (LAN) | 3.0         | U      |
| Controller           | JACK        | Controller ADAPTER | JACK        | 1.5         | U      |

\* Unshielded=U, Shielded=S

## 1.7 EUT Operating Mode(s)

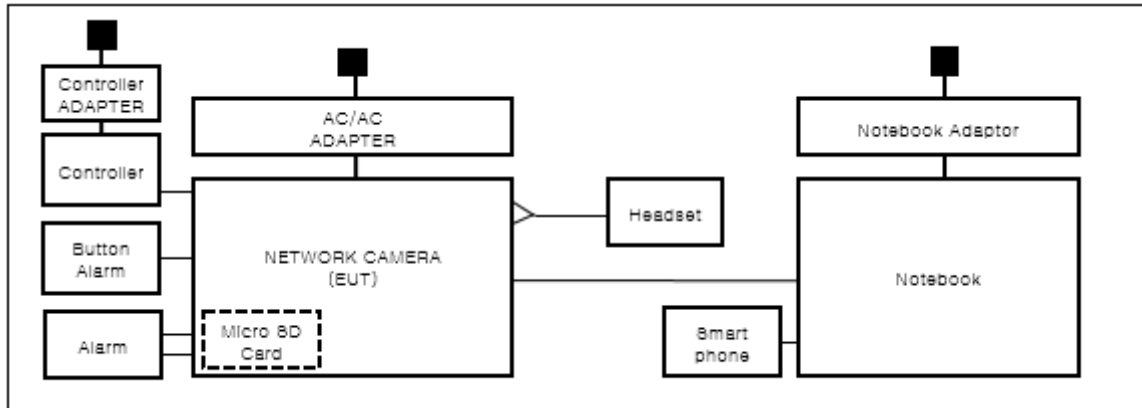
| Test Mode   | operating                                                                                                                                                                                                                                                                                                                                                                                |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AC, DC Mode | 1. Check the camera video output on the laptop<br>2. Check if the network status is operating normally during PING TEST<br>3. Check the output of the 1 kHz tone output from the smartphone and the microphone input from the headset<br>4. Press the button alarm button to check the normal operation of the alarm.<br>5. Checked the files stored in the Micro SD Card after testing. |
| PoE Mode    |                                                                                                                                                                                                                                                                                                                                                                                          |

| EUT Test operating S/W |         |                        |
|------------------------|---------|------------------------|
| Name                   | Version | Manufacture Company    |
| Web Viewer             | -       | Hanwha Vision Co., Ltd |

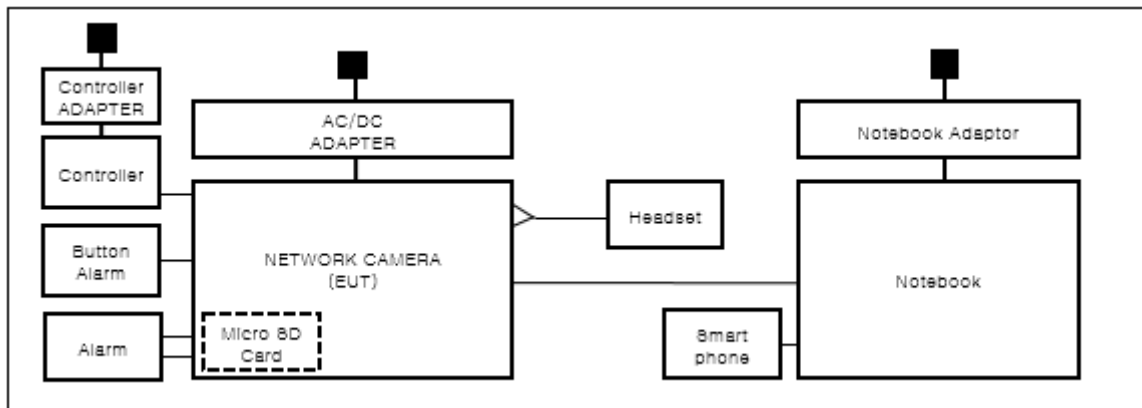
## 1.8 Configuration

■ AC Main  
 □ DC Main

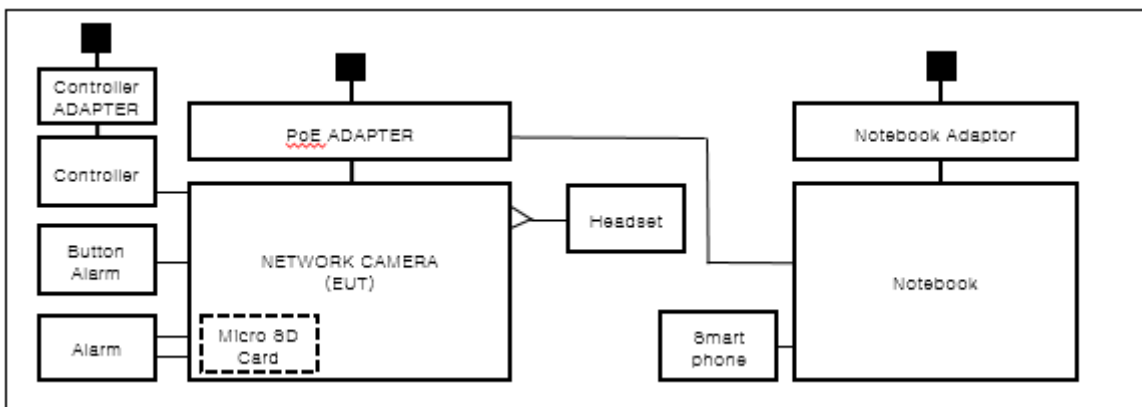
### ■ AC Mode



### ■ DC Mode



### ■ PoE Mode



## 1.9 Remarks when standards applied

N/A

## 1.10 Calibration Details of Equipment Used for Measurement

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

## 1.11 Test Facility

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

## 1.12 Laboratory Accreditations and Listings

| Country       | Agency  | Scope of Accreditation                                                                                                                  | Logo                                                                                                                           |
|---------------|---------|-----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| KOREA         | RRA     | 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 | KOLAS   | 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           | FCC     | 3 m & 10 m Semi-Anechoic Chamber<br>Conducted test site to perform FCC Part 15/18 measurements.                                         | <br>KR0100                                |
| Canada        | ISED    | 3 m & 10 m Semi-Anechoic Chamber and Conducted test site                                                                                | <br>23298                                 |
| JAPAN         | VCCI    | EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site)                                                                          | <br>C-20136, T-20137,<br>R-20181, G-20176 |
| Europe        | TÜV SÜD | 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:

☒ **47 CFR Part 15, Subpart B**

☐ CISPR 22:2009 +A1:2010

☐ Class A

☐ Class B

☒ ANSI C63.4a-2017

☒ Class A

☐ Class B

☒ **IC Regulation ICES-003 Issue 7**

☐ CAN/CSA-CISPR 32:17

☐ Class A

☐ Class B

☒ ANSI C63.4a-2017

☒ Class A

☐ Class B

## 2.1 Conducted Emissions at Mains Power Ports

### Test Date

Jul. 22, 2022

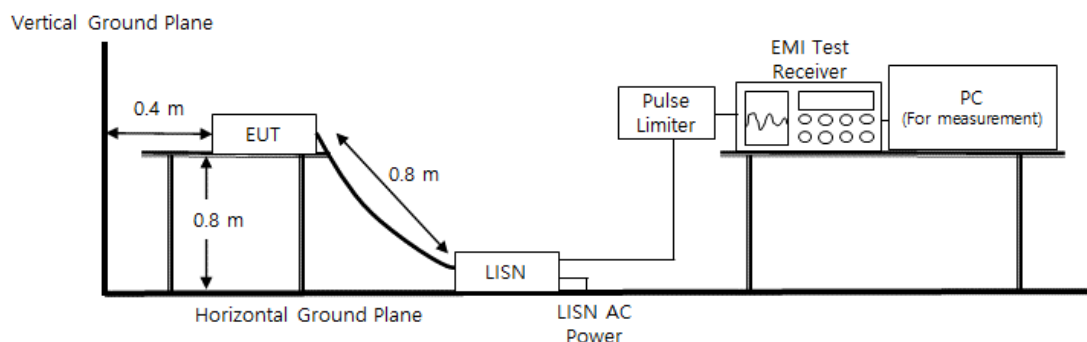
### Test Location

Electro wave Shieldroom #6

### Test Equipment

| Used                                | Description       | Model Number | Manufacturer | Serial Number | Cal. Due     |
|-------------------------------------|-------------------|--------------|--------------|---------------|--------------|
| <input checked="" type="checkbox"/> | EMI Test S/W      | EMC32        | R & S        | 9.12.00       | -            |
| <input checked="" type="checkbox"/> | EMI TEST RECEIVER | ESR3         | R & S        | 101783        | 12, 28, 2022 |
| <input checked="" type="checkbox"/> | LISN              | ENV216       | R & S        | 101787        | 12, 27, 2022 |
| <input checked="" type="checkbox"/> | LISN              | ESH2-Z5      | R & S        | 100450        | 12, 27, 2022 |
| <input checked="" type="checkbox"/> | PULSE LIMITER     | ESH3-Z2      | R & S        | 101915        | 12, 27, 2022 |

### Diagram of test setup





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### Test Conditions

Temperature: (24,3 ± 0,3) °C

Relative Humidity: (44,8 ± 0,3) % R.H.

### Frequency Range of Measurement

150 kHz to 30 MHz

### Instrument Settings

IF Band Width: 9 kHz

### Test Results

The requirements are:

- ☒ PASS
- ☐ NOT PASS
- ☐ NOT APPLICABLE

### Remarks

See Appendix A for test data.

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

### Test Date

Jul. 22, 2022

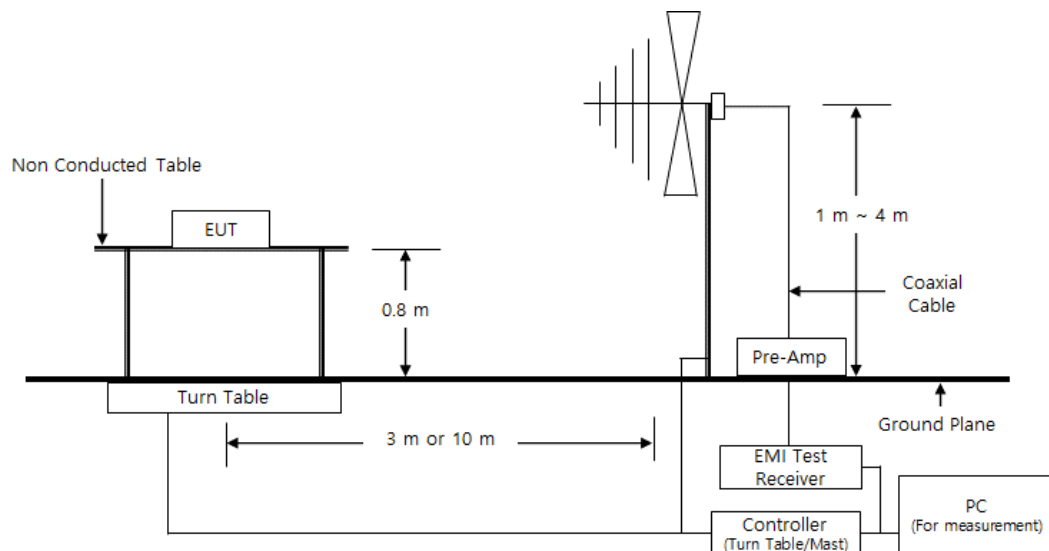
### Test Location

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

### Test Equipment

| Used                                | Description              | Model Number | Manufacturer     | Serial Number | Cal. Due     |
|-------------------------------------|--------------------------|--------------|------------------|---------------|--------------|
| <input checked="" type="checkbox"/> | EMI Test S/W             | EP5/RE       | TOYO Corporation | 6.0.0         | -            |
| <input checked="" type="checkbox"/> | EMI TEST RECEIVER        | ESU26        | R & S            | 100551        | 03, 31, 2023 |
| <input checked="" type="checkbox"/> | AMPLIFIER                | SCU 01       | R & S            | 100603        | 11, 24, 2022 |
| <input checked="" type="checkbox"/> | TRILOG-BROADBAND ANTENNA | VULB9163     | Schwarzbeck      | 715           | 12, 08, 2022 |
| <input checked="" type="checkbox"/> | ATTENUATOR               | 8491A        | HP               | 32173         | 03, 08, 2023 |

### Diagram of test setup







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### Test Conditions

Temperature: (24,8 ± 0,3) °C  
Relative Humidity: (45,3 ± 0,3) % R.H.

### Frequency Range of Measurement

30 MHz to 1 GHz

### Instrument Settings

IF Band Width: 120 kHz

### Test Results

The requirements are:

- ☒ PASS
- ☐ NOT PASS
- ☐ NOT APPLICABLE

### Remarks

See Appendix A for test data.

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

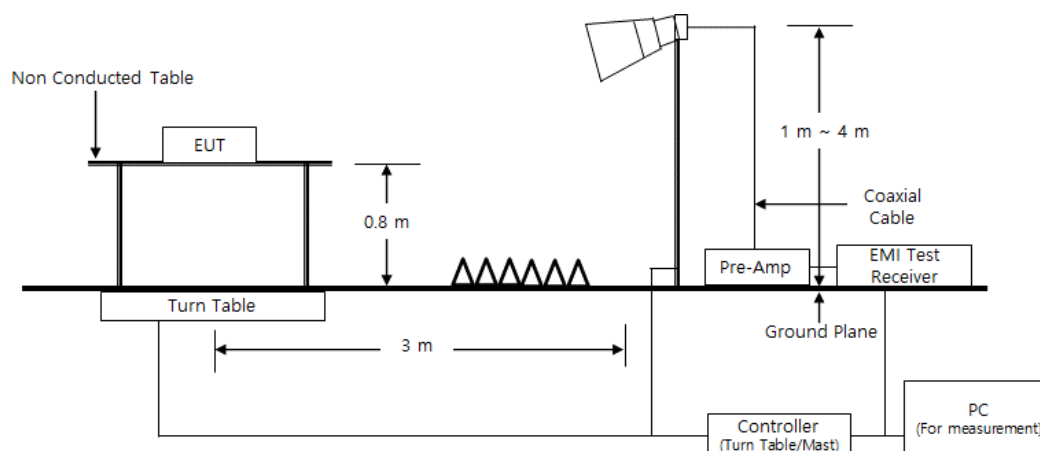
**Test Date**  
 Jul. 22, 2022

**Test Location**  
 SEMI ANECHOIC CHAMBER #5

### Test Equipment

| Used                                | Description       | Model Number | Manufacturer     | Serial Number | Cal. Due     |
|-------------------------------------|-------------------|--------------|------------------|---------------|--------------|
| <input checked="" type="checkbox"/> | EMI Test S/W      | ES10/RE      | TOYO Corporation | 2022.01.000   | -            |
| <input checked="" type="checkbox"/> | EMI TEST RECEIVER | ESU26        | Rohde & Schwarz  | 100552        | 03, 31, 2023 |
| <input checked="" type="checkbox"/> | HORN ANTENNA      | BBHA 9120D   | SCHWARZBECK      | 9120D-1802    | 12, 16, 2022 |
| <input checked="" type="checkbox"/> | PREAMPLIFIER      | 8449B        | HP               | 3008A00538    | 06, 02, 2023 |

### Diagram of test setup





## KES Co., Ltd.

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www.kes.co.kr

Report No.:

KES-EM-22T0679-R1

Page (19) of (50)

### Test Conditions

Temperature: (25,1 ± 0,2) °C

Relative Humidity: (46,2 ± 0,2) % R.H.

### Frequency Range of Measurement

1 GHz to 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.

The Average of the test data is the cispr average result.

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## APPENDIX A – TEST DATA

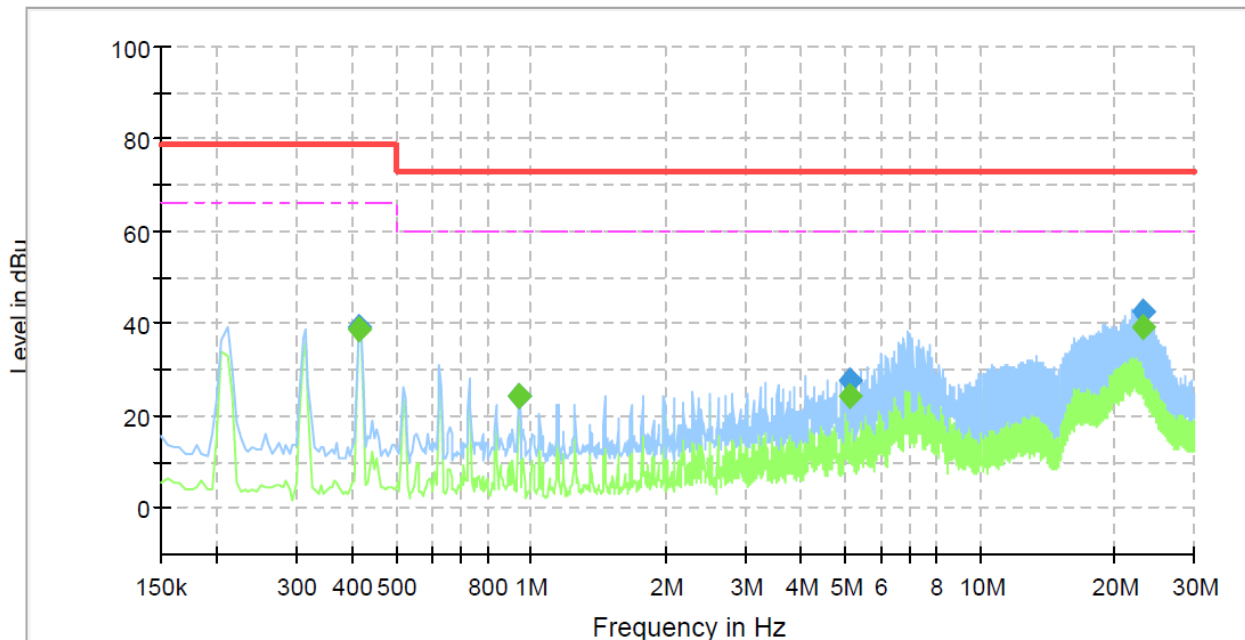
### Conducted Emissions at Mains Power Ports

■ AC Mode

HOT LINE

### Common Information

|                   |                    |
|-------------------|--------------------|
| Test Description: | Conducted Emission |
| Model No.:        | TNO-4051T          |
| Phase:            | L1                 |
| Mode:             | AC                 |
| Operator Name:    | KES                |



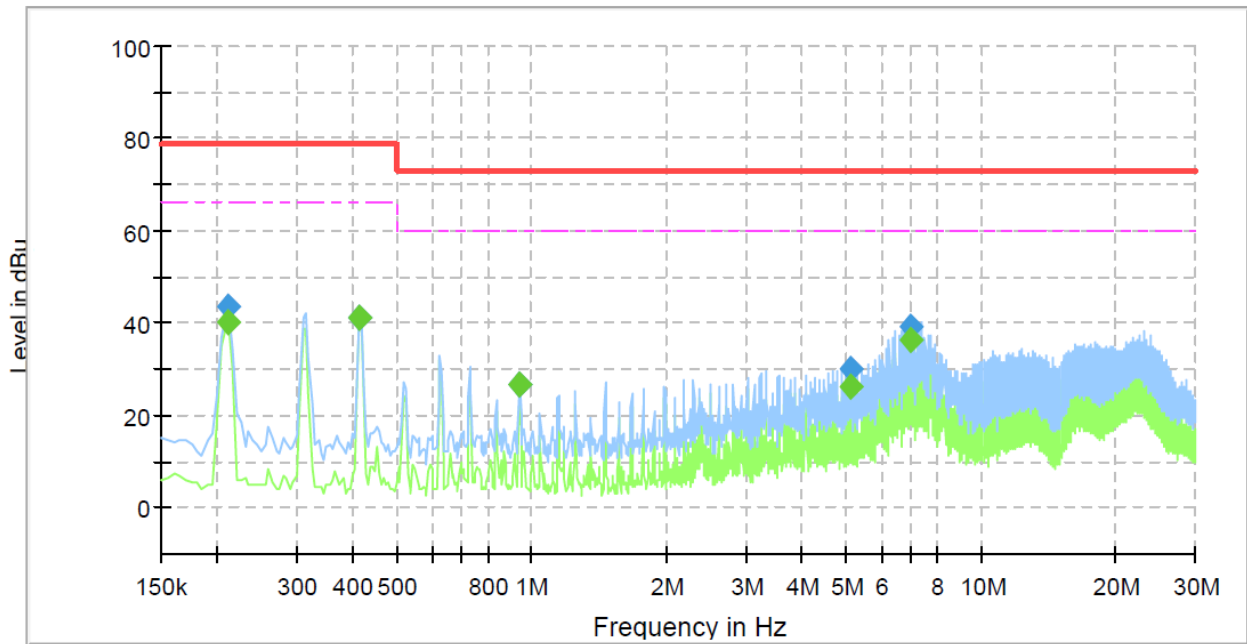
### Final Result

| Frequency (MHz) | QuasiPeak (dBμV) | CAverage (dBμV) | Limit (dBμV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.415000        | ---              | 38.86           | 66.00        | 27.14       | 1000.0          | 9.000           | L1   | 19.6       |
| 0.415000        | 38.98            | ---             | 79.00        | 40.02       | 1000.0          | 9.000           | L1   | 19.6       |
| 0.940000        | ---              | 24.31           | 60.00        | 35.69       | 1000.0          | 9.000           | L1   | 20.1       |
| 0.940000        | 24.33            | ---             | 73.00        | 48.67       | 1000.0          | 9.000           | L1   | 20.1       |
| 5.110000        | ---              | 24.19           | 60.00        | 35.81       | 1000.0          | 9.000           | L1   | 19.6       |
| 5.110000        | 27.78            | ---             | 73.00        | 45.22       | 1000.0          | 9.000           | L1   | 19.6       |
| 23.130000       | ---              | 38.97           | 60.00        | 21.03       | 1000.0          | 9.000           | L1   | 20.1       |
| 23.130000       | 42.56            | ---             | 73.00        | 30.44       | 1000.0          | 9.000           | L1   | 20.1       |

## NEUTRAL LINE

### Common Information

|                   |                    |
|-------------------|--------------------|
| Test Description: | Conducted Emission |
| Model No.:        | TNO-4051T          |
| Phase:            | N                  |
| Mode:             | AC                 |
| Operator Name:    | KES                |



### Final Result

| Frequency (MHz) | QuasiPeak (dBμV) | CAverage (dBμV) | Limit (dBμV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.210000        | ---              | 40.41           | 66.00        | 25.59       | 1000.0          | 9.000           | N    | 19.4       |
| 0.210000        | 43.39            | ---             | 79.00        | 35.61       | 1000.0          | 9.000           | N    | 19.4       |
| 0.415000        | ---              | 40.94           | 66.00        | 25.06       | 1000.0          | 9.000           | N    | 19.6       |
| 0.415000        | 41.07            | ---             | 79.00        | 37.93       | 1000.0          | 9.000           | N    | 19.6       |
| 0.940000        | ---              | 26.85           | 60.00        | 33.15       | 1000.0          | 9.000           | N    | 20.1       |
| 0.940000        | 26.85            | ---             | 73.00        | 46.15       | 1000.0          | 9.000           | N    | 20.1       |
| 5.110000        | ---              | 25.97           | 60.00        | 34.03       | 1000.0          | 9.000           | N    | 19.6       |
| 5.110000        | 29.83            | ---             | 73.00        | 43.17       | 1000.0          | 9.000           | N    | 19.6       |
| 6.990000        | ---              | 36.33           | 60.00        | 23.67       | 1000.0          | 9.000           | N    | 19.5       |
| 6.990000        | 39.01            | ---             | 73.00        | 33.99       | 1000.0          | 9.000           | N    | 19.5       |

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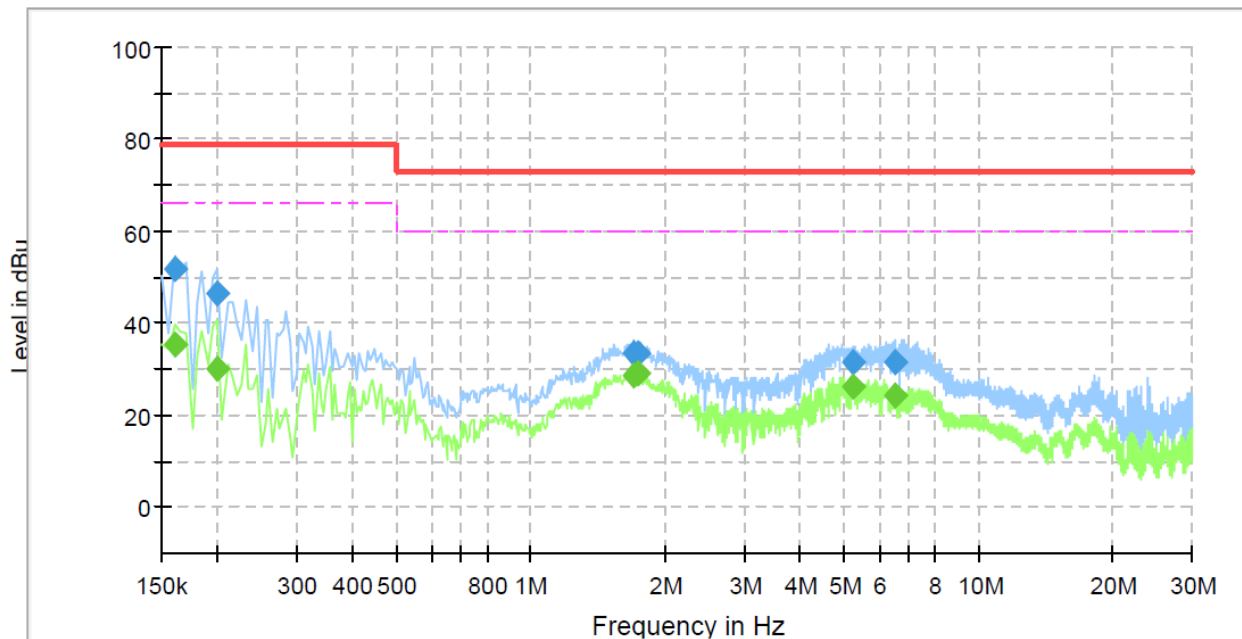
The authenticity of the test report, contact kes@kes.co.kr

# DC Mode

## HOT LINE

### Common Information

|                   |                    |
|-------------------|--------------------|
| Test Description: | Conducted Emission |
| Model No.:        | TNO-4051T          |
| Phase:            | L1                 |
| Mode:             | DC                 |
| Operator Name:    | KES                |



### Final Result

| Frequency (MHz) | QuasiPeak (dBμV) | CAverage (dBμV) | Limit (dBμV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.160000        | ---              | 35.17           | 66.00        | 30.83       | 1000.0          | 9.000           | L1   | 19.4       |
| 0.160000        | 51.60            | ---             | 79.00        | 27.40       | 1000.0          | 9.000           | L1   | 19.4       |
| 0.200000        | ---              | 30.20           | 66.00        | 35.80       | 1000.0          | 9.000           | L1   | 19.4       |
| 0.200000        | 46.33            | ---             | 79.00        | 32.67       | 1000.0          | 9.000           | L1   | 19.4       |
| 1.705000        | ---              | 28.74           | 60.00        | 31.26       | 1000.0          | 9.000           | L1   | 20.3       |
| 1.705000        | 33.24            | ---             | 73.00        | 39.76       | 1000.0          | 9.000           | L1   | 20.3       |
| 1.735000        | ---              | 28.97           | 60.00        | 31.03       | 1000.0          | 9.000           | L1   | 20.3       |
| 1.735000        | 33.29            | ---             | 73.00        | 39.71       | 1000.0          | 9.000           | L1   | 20.3       |
| 5.255000        | ---              | 25.96           | 60.00        | 34.04       | 1000.0          | 9.000           | L1   | 19.6       |
| 5.255000        | 31.40            | ---             | 73.00        | 41.60       | 1000.0          | 9.000           | L1   | 19.6       |
| 6.490000        | ---              | 24.23           | 60.00        | 35.77       | 1000.0          | 9.000           | L1   | 19.5       |
| 6.490000        | 31.33            | ---             | 73.00        | 41.67       | 1000.0          | 9.000           | L1   | 19.5       |

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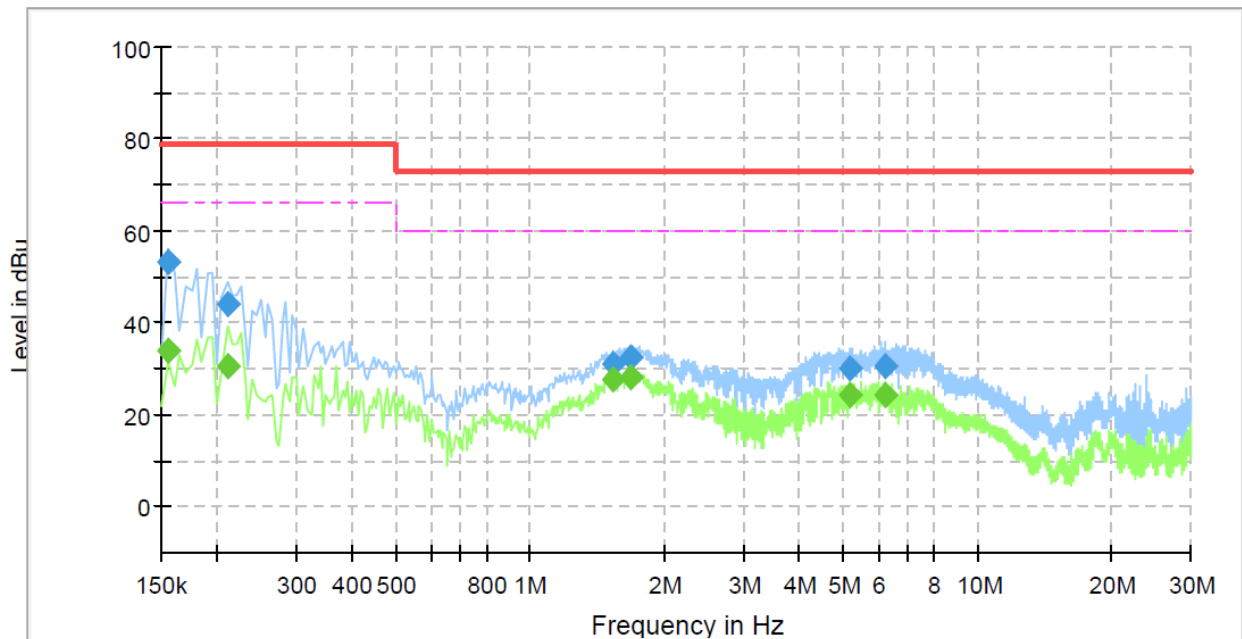
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## NEUTRAL LINE

### Common Information

|                   |                    |
|-------------------|--------------------|
| Test Description: | Conducted Emission |
| Model No.:        | TNO-4051T          |
| Phase:            | N                  |
| Mode:             | DC                 |
| Operator Name:    | KES                |

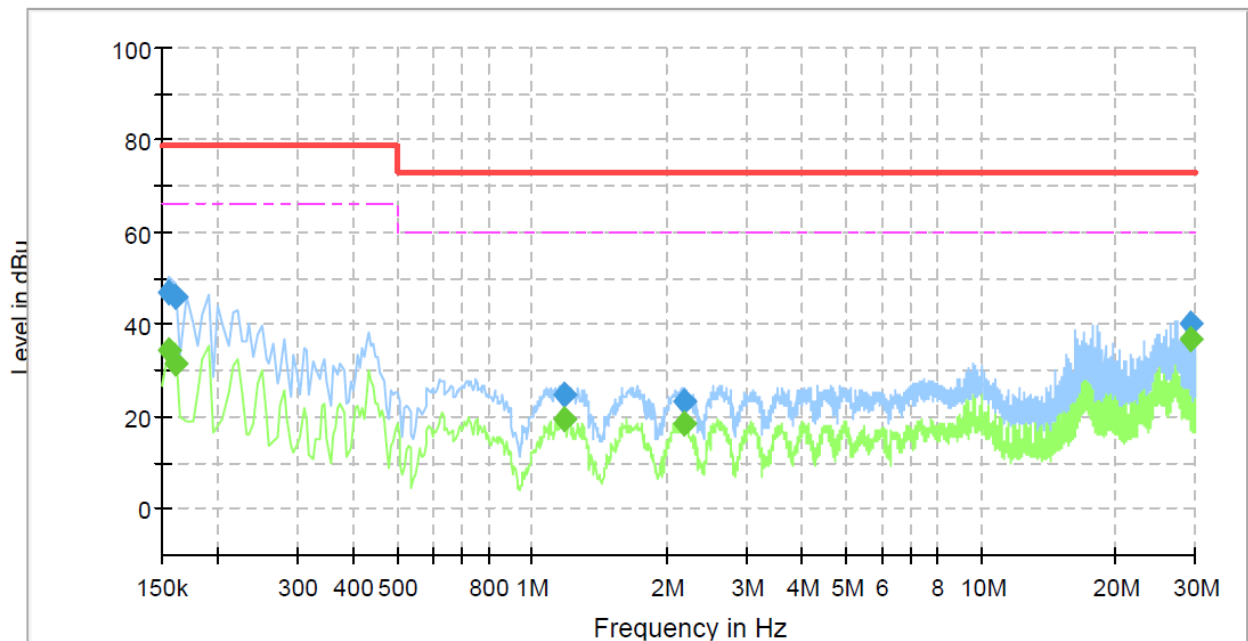


### Final Result

| Frequency (MHz) | QuasiPeak (dBμV) | CAverage (dBμV) | Limit (dBμV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.155000        | ---              | 33.88           | 66.00        | 32.12       | 1000.0          | 9.000           | N    | 19.4       |
| 0.155000        | 53.11            | ---             | 79.00        | 25.89       | 1000.0          | 9.000           | N    | 19.4       |
| 0.210000        | ---              | 30.58           | 66.00        | 35.42       | 1000.0          | 9.000           | N    | 19.4       |
| 0.210000        | 44.24            | ---             | 79.00        | 34.76       | 1000.0          | 9.000           | N    | 19.4       |
| 1.525000        | ---              | 27.65           | 60.00        | 32.35       | 1000.0          | 9.000           | N    | 20.2       |
| 1.525000        | 31.20            | ---             | 73.00        | 41.80       | 1000.0          | 9.000           | N    | 20.2       |
| 1.680000        | ---              | 28.08           | 60.00        | 31.92       | 1000.0          | 9.000           | N    | 20.3       |
| 1.680000        | 32.58            | ---             | 73.00        | 40.42       | 1000.0          | 9.000           | N    | 20.3       |
| 5.210000        | ---              | 24.45           | 60.00        | 35.55       | 1000.0          | 9.000           | N    | 19.6       |
| 5.210000        | 30.18            | ---             | 73.00        | 42.82       | 1000.0          | 9.000           | N    | 19.6       |
| 6.230000        | ---              | 24.22           | 60.00        | 35.78       | 1000.0          | 9.000           | N    | 19.5       |
| 6.230000        | 30.68            | ---             | 73.00        | 42.32       | 1000.0          | 9.000           | N    | 19.5       |

**PoE Mode**
**HOT LINE**
**Common Information**

|                   |                    |
|-------------------|--------------------|
| Test Description: | Conducted Emission |
| Model No.:        | TNO-4051T          |
| Phase:            | L1                 |
| Mode:             | PoE                |
| Operator Name:    | KES                |


**Final Result**

| Frequency (MHz) | QuasiPeak (dBμV) | CAverage (dBμV) | Limit (dBμV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.155000        | ---              | 34.57           | 66.00        | 31.43       | 1000.0          | 9.000           | L1   | 19.4       |
| 0.155000        | 47.03            | ---             | 79.00        | 31.97       | 1000.0          | 9.000           | L1   | 19.4       |
| 0.160000        | ---              | 31.36           | 66.00        | 34.64       | 1000.0          | 9.000           | L1   | 19.4       |
| 0.160000        | 45.74            | ---             | 79.00        | 33.26       | 1000.0          | 9.000           | L1   | 19.4       |
| 1.175000        | ---              | 19.25           | 60.00        | 40.75       | 1000.0          | 9.000           | L1   | 20.1       |
| 1.175000        | 24.70            | ---             | 73.00        | 48.30       | 1000.0          | 9.000           | L1   | 20.1       |
| 2.195000        | ---              | 18.49           | 60.00        | 41.51       | 1000.0          | 9.000           | L1   | 20.3       |
| 2.195000        | 23.16            | ---             | 73.00        | 49.84       | 1000.0          | 9.000           | L1   | 20.3       |
| 29.235000       | ---              | 36.59           | 60.00        | 23.41       | 1000.0          | 9.000           | L1   | 20.3       |
| 29.235000       | 40.13            | ---             | 73.00        | 32.87       | 1000.0          | 9.000           | L1   | 20.3       |

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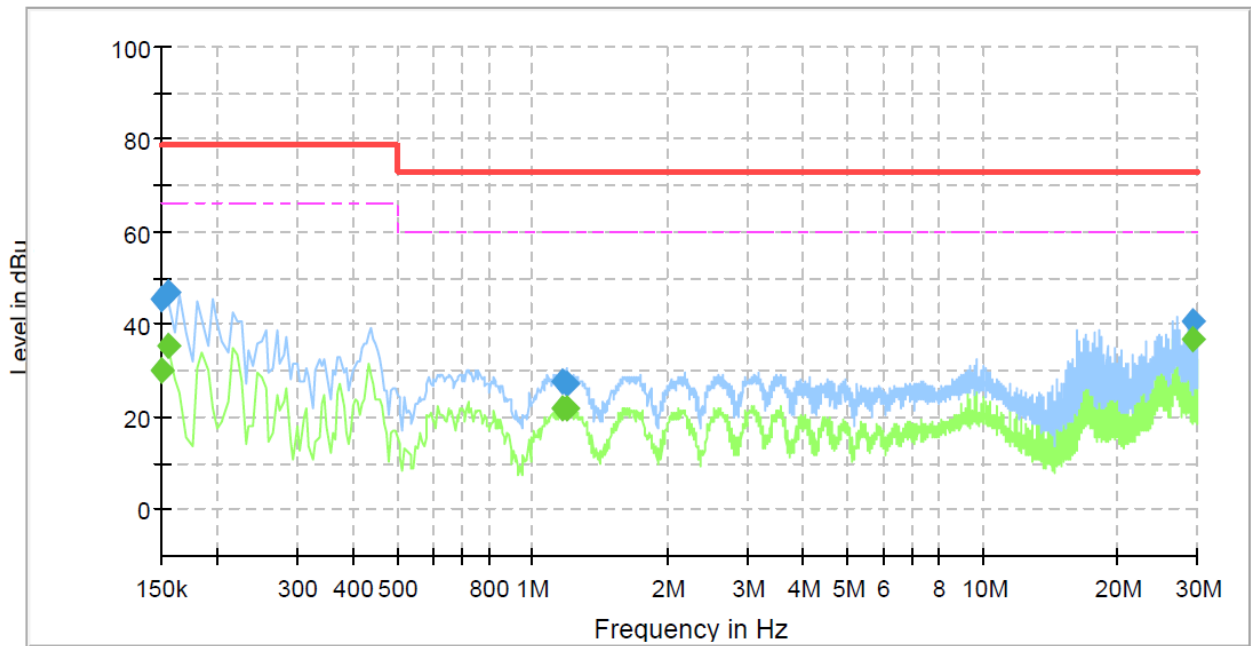
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## NEUTRAL LINE

## Common Information

|                   |                    |
|-------------------|--------------------|
| Test Description: | Conducted Emission |
| Model No.:        | TNO-4051T          |
| Phase:            | N                  |
| Mode:             | PoE                |
| Operator Name:    | KES                |



## Final Result

| Frequency (MHz) | QuasiPeak (dBμV) | CAverage (dBμV) | Limit (dBμV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.150000        | ---              | 30.05           | 66.00        | 35.95       | 1000.0          | 9.000           | N    | 19.4       |
| 0.150000        | 45.29            | ---             | 79.00        | 33.71       | 1000.0          | 9.000           | N    | 19.4       |
| 0.155000        | ---              | 35.48           | 66.00        | 30.52       | 1000.0          | 9.000           | N    | 19.4       |
| 0.155000        | 46.92            | ---             | 79.00        | 32.08       | 1000.0          | 9.000           | N    | 19.4       |
| 1.170000        | ---              | 21.63           | 60.00        | 38.37       | 1000.0          | 9.000           | N    | 20.1       |
| 1.170000        | 27.41            | ---             | 73.00        | 45.59       | 1000.0          | 9.000           | N    | 20.1       |
| 1.195000        | ---              | 21.69           | 60.00        | 38.31       | 1000.0          | 9.000           | N    | 20.1       |
| 1.195000        | 27.39            | ---             | 73.00        | 45.61       | 1000.0          | 9.000           | N    | 20.1       |
| 29.235000       | ---              | 36.94           | 60.00        | 23.06       | 1000.0          | 9.000           | N    | 20.3       |
| 29.235000       | 40.49            | ---             | 73.00        | 32.51       | 1000.0          | 9.000           | N    | 20.3       |

### ◆ Calculation

$$\text{QuasiPeak [dBuV]} / \text{CAverage [dBuV]} = \text{Reading Value [dBuV]} + \text{Corr. [dB]}$$

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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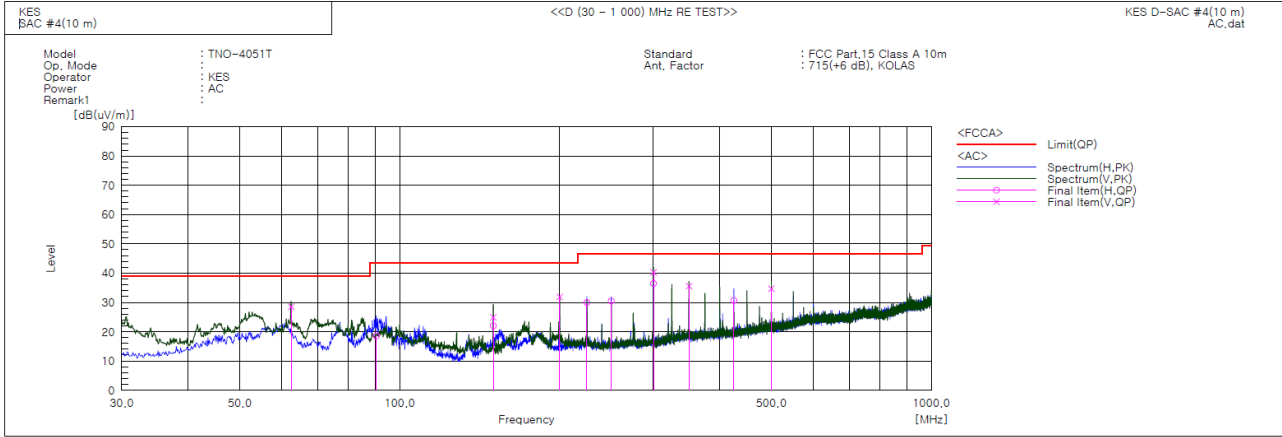
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## Radiated Electric Field Emissions(Below 1 GHz)

### ■ AC Mode

#### - 47 CFR Part 15, Subpart B



#### 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   | 62.495          | V   | 51.0                | -22.5         | 28.5                 | 39.0                | 10.5           | 104.0       | 122.1       |        |
| 2   | 90.383          | H   | 42.6                | -24.1         | 18.5                 | 43.5                | 25.0           | 362.0       | 295.5       |        |
| 3   | 149.906         | V   | 50.2                | -25.3         | 24.9                 | 43.5                | 18.6           | 100.0       | 109.3       |        |
| 4   | 149.916         | H   | 47.3                | -25.3         | 22.0                 | 43.5                | 21.5           | 400.0       | 130.2       |        |
| 5   | 199.993         | V   | 52.9                | -21.0         | 31.9                 | 43.5                | 11.6           | 211.0       | 295.9       |        |
| 6   | 224.970         | H   | 50.2                | -20.2         | 30.0                 | 46.5                | 16.5           | 400.0       | 240.9       |        |
| 7   | 249.948         | H   | 49.8                | -19.3         | 30.5                 | 46.5                | 16.0           | 370.0       | 221.9       |        |
| 8   | 300.019         | V   | 58.3                | -18.0         | 40.3                 | 46.5                | 6.2            | 163.0       | 127.9       |        |
| 9   | 300.024         | H   | 54.5                | -18.0         | 36.5                 | 46.5                | 10.0           | 325.0       | 125.3       |        |
| 10  | 349.979         | V   | 50.9                | -15.3         | 35.6                 | 46.5                | 10.9           | 117.0       | 127.9       |        |
| 11  | 425.033         | H   | 44.4                | -13.7         | 30.7                 | 46.5                | 15.8           | 398.0       | 3.9         |        |
| 12  | 499.965         | V   | 46.2                | -11.5         | 34.7                 | 46.5                | 11.8           | 100.0       | 184.3       |        |

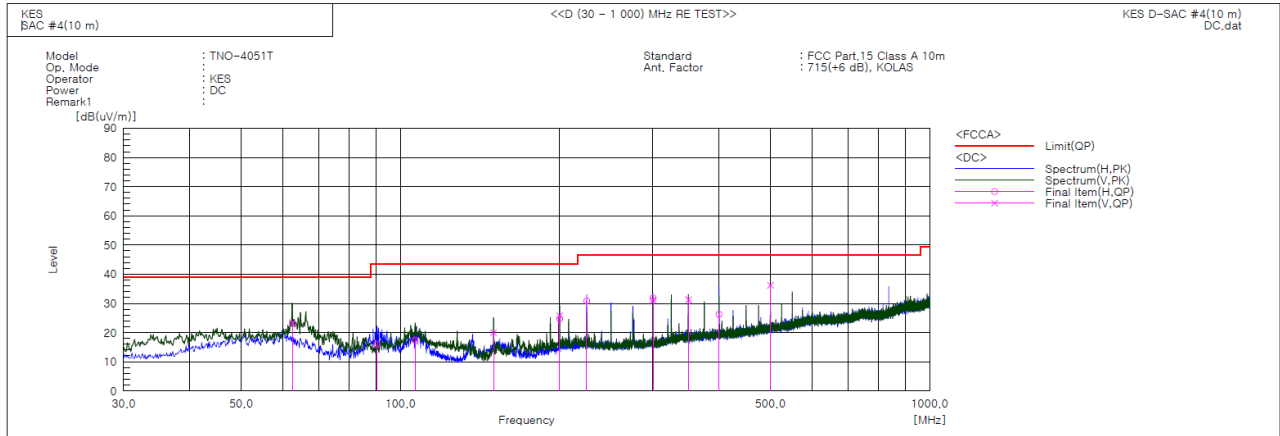
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## DC Mode



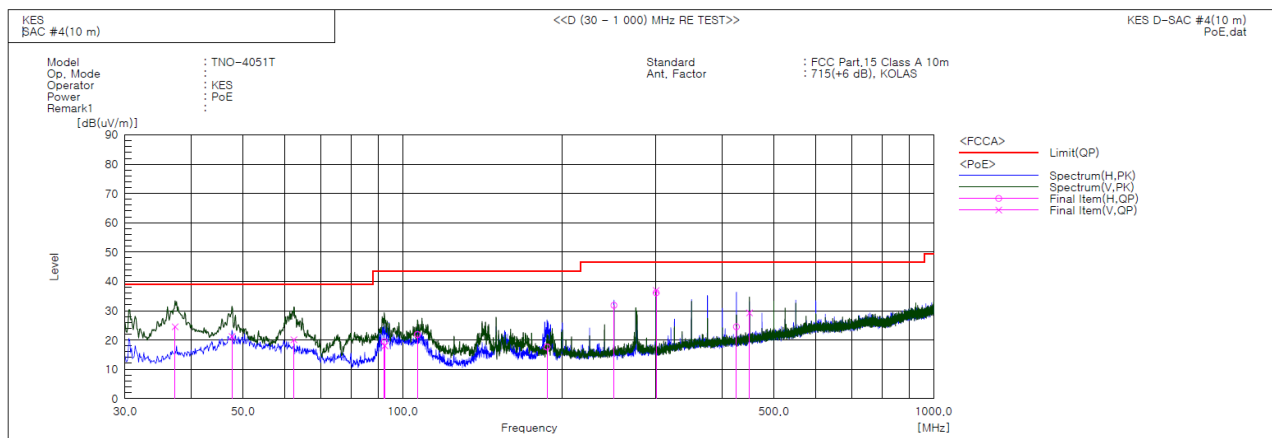
## Final Result

| No. | Frequency<br>[MHz] | (P) | Reading<br>QP<br>[dB(uV)] | c.f<br>[dB(1/m)] | Result<br>QP<br>[dB(uV/m)] | Limit<br>QP<br>[dB(uV/m)] | Margin<br>QP<br>[dB] | Height<br>[cm] | Angle<br>[deg] | Remark |
|-----|--------------------|-----|---------------------------|------------------|----------------------------|---------------------------|----------------------|----------------|----------------|--------|
| 1   | 62.495             | V   | 45.8                      | -22.5            | 23.3                       | 39.0                      | 15.7                 | 114.0          | 324.4          |        |
| 2   | 90.261             | H   | 40.1                      | -24.1            | 16.0                       | 43.5                      | 27.5                 | 309.0          | 31.8           |        |
| 3   | 106.630            | H   | 39.8                      | -22.4            | 17.4                       | 43.5                      | 26.1                 | 400.0          | 325.2          |        |
| 4   | 149.916            | V   | 45.3                      | -25.3            | 20.0                       | 43.5                      | 23.5                 | 147.0          | 161.9          |        |
| 5   | 199.987            | V   | 46.8                      | -21.0            | 25.8                       | 43.5                      | 17.7                 | 100.0          | 52.7           |        |
| 6   | 199.997            | H   | 45.7                      | -21.0            | 24.7                       | 43.5                      | 18.8                 | 390.0          | 2.8            |        |
| 7   | 224.970            | H   | 51.1                      | -20.2            | 30.9                       | 46.5                      | 15.6                 | 391.0          | 68.8           |        |
| 8   | 300.024            | V   | 49.1                      | -18.0            | 31.1                       | 46.5                      | 15.4                 | 108.0          | 252.2          |        |
| 9   | 300.024            | H   | 49.8                      | -18.0            | 31.8                       | 46.5                      | 14.7                 | 326.0          | 51.9           |        |
| 10  | 349.979            | V   | 46.6                      | -15.3            | 31.3                       | 46.5                      | 15.2                 | 100.0          | 252.2          |        |
| 11  | 400.055            | H   | 40.5                      | -14.2            | 26.3                       | 46.5                      | 20.2                 | 400.0          | 325.2          |        |
| 12  | 500.086            | V   | 47.7                      | -11.5            | 36.2                       | 46.5                      | 10.3                 | 100.0          | 89.4           |        |

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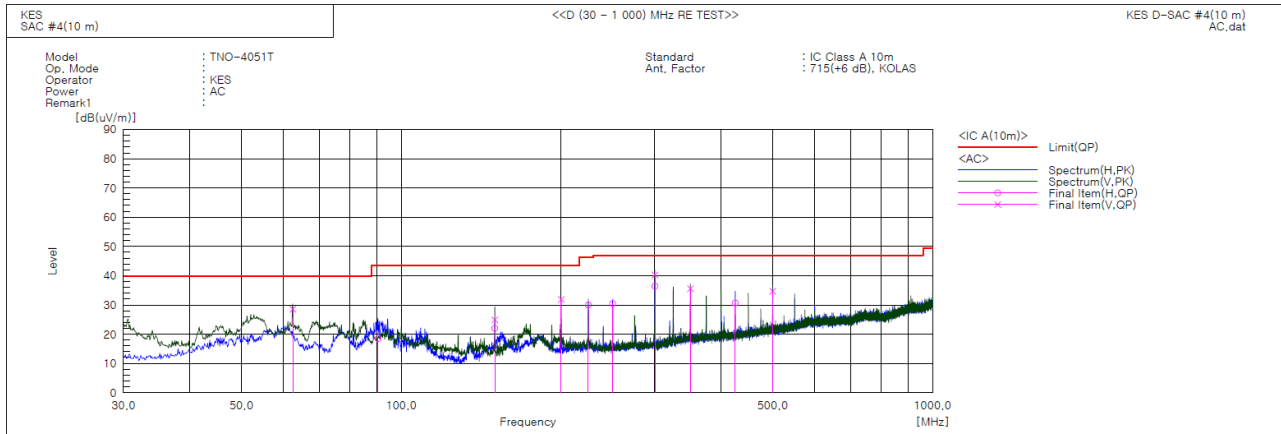
## PoE Mode



## Final Result

| No. | Frequency | (P) | Reading        | c.f       | Result           | Limit            | Margin     | Height | Angle | Remark |
|-----|-----------|-----|----------------|-----------|------------------|------------------|------------|--------|-------|--------|
|     | [MHz]     |     | QP<br>[dB(uV)] | [dB(1/m)] | QP<br>[dB(uV/m)] | QP<br>[dB(uV/m)] | QP<br>[dB] | [cm]   | [deg] |        |
| 1   | 37.275    | V   | 48.5           | -24.0     | 24.5             | 39.0             | 14.5       | 101.0  | 53.9  |        |
| 2   | 47.703    | V   | 42.4           | -21.2     | 21.2             | 39.0             | 17.8       | 177.0  | 109.1 |        |
| 3   | 62.374    | V   | 42.6           | -22.5     | 20.1             | 39.0             | 18.9       | 123.0  | 118.6 |        |
| 4   | 92.323    | H   | 43.2           | -23.8     | 19.4             | 43.5             | 24.1       | 400.0  | 251.7 |        |
| 5   | 92.489    | V   | 41.8           | -23.8     | 18.0             | 43.5             | 25.5       | 115.0  | 109.2 |        |
| 6   | 106.630   | H   | 44.2           | -22.4     | 21.8             | 43.5             | 21.7       | 342.0  | 307.1 |        |
| 7   | 187.019   | H   | 40.2           | -22.6     | 17.6             | 43.5             | 25.9       | 400.0  | 179.9 |        |
| 8   | 249.948   | H   | 51.1           | -19.3     | 31.8             | 46.5             | 14.7       | 400.0  | 124.6 |        |
| 9   | 300.021   | H   | 54.1           | -18.0     | 36.1             | 46.5             | 10.4       | 328.0  | 291.7 |        |
| 10  | 300.024   | V   | 54.9           | -18.0     | 36.9             | 46.5             | 9.6        | 100.0  | 236.4 |        |
| 11  | 425.033   | H   | 38.2           | -13.7     | 24.5             | 46.5             | 22.0       | 372.0  | 309.5 |        |
| 12  | 450.010   | V   | 42.3           | -13.0     | 29.3             | 46.5             | 17.2       | 101.0  | 145.7 |        |

■ AC Mode  
 - IC Regulation ICES-003 Issue 7

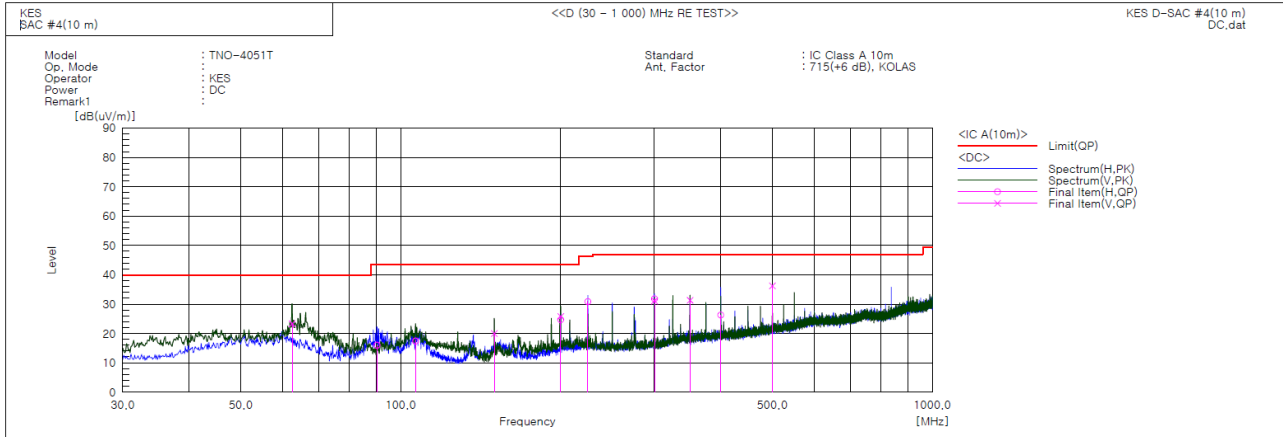


Final Result

| 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   | 62.495          | V   | 51.0                | -22.5         | 28.5                 | 40.0                | 11.5           | 104.0       | 122.1       |        |
| 2   | 90.383          | H   | 42.6                | -24.1         | 18.5                 | 43.5                | 25.0           | 362.0       | 295.5       |        |
| 3   | 149.906         | V   | 50.2                | -25.3         | 24.9                 | 43.5                | 18.6           | 100.0       | 109.3       |        |
| 4   | 149.916         | H   | 47.3                | -25.3         | 22.0                 | 43.5                | 21.5           | 400.0       | 130.2       |        |
| 5   | 199.993         | V   | 52.9                | -21.0         | 31.9                 | 43.5                | 11.6           | 211.0       | 295.9       |        |
| 6   | 224.970         | H   | 50.2                | -20.2         | 30.0                 | 46.4                | 16.4           | 400.0       | 240.9       |        |
| 7   | 249.948         | H   | 49.8                | -19.3         | 30.5                 | 47.0                | 16.5           | 370.0       | 221.9       |        |
| 8   | 300.019         | V   | 58.3                | -18.0         | 40.3                 | 47.0                | 6.7            | 163.0       | 127.9       |        |
| 9   | 300.024         | H   | 54.5                | -18.0         | 36.5                 | 47.0                | 10.5           | 325.0       | 125.3       |        |
| 10  | 349.979         | V   | 50.9                | -15.3         | 35.6                 | 47.0                | 11.4           | 117.0       | 127.9       |        |
| 11  | 425.033         | H   | 44.4                | -13.7         | 30.7                 | 47.0                | 16.3           | 398.0       | 3.9         |        |
| 12  | 499.965         | V   | 46.2                | -11.5         | 34.7                 | 47.0                | 12.3           | 100.0       | 184.3       |        |

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## DC Mode



## Final Result

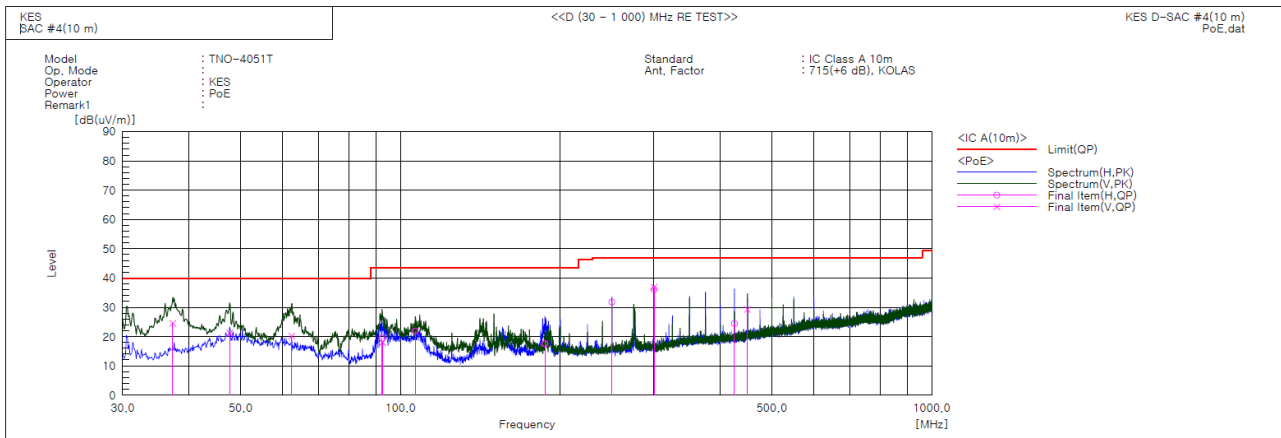
| No. | Frequency [MHz] | (P) | Reading QP [dB(uV)] | c.f [dB(1/m)] | Result QP [dB(uV/m)] | Limit QP [dB(uV/m)] | Margin QP [dB] | Height [cm] | Angle [deg] | Remark |
|-----|-----------------|-----|---------------------|---------------|----------------------|---------------------|----------------|-------------|-------------|--------|
| 1   | 62.495          | V   | 45.8                | -22.5         | 23.3                 | 40.0                | 16.7           | 114.0       | 324.4       |        |
| 2   | 90.261          | H   | 40.1                | -24.1         | 16.0                 | 43.5                | 27.5           | 309.0       | 31.8        |        |
| 3   | 106.630         | H   | 39.8                | -22.4         | 17.4                 | 43.5                | 26.1           | 400.0       | 325.2       |        |
| 4   | 149.916         | V   | 45.3                | -25.3         | 20.0                 | 43.5                | 23.5           | 147.0       | 161.9       |        |
| 5   | 199.987         | V   | 46.8                | -21.0         | 25.8                 | 43.5                | 17.7           | 100.0       | 52.7        |        |
| 6   | 199.997         | H   | 45.7                | -21.0         | 24.7                 | 43.5                | 18.8           | 390.0       | 2.8         |        |
| 7   | 224.970         | H   | 51.1                | -20.2         | 30.9                 | 46.4                | 15.5           | 391.0       | 68.8        |        |
| 8   | 300.024         | V   | 49.1                | -18.0         | 31.1                 | 47.0                | 15.9           | 108.0       | 252.2       |        |
| 9   | 300.024         | H   | 49.8                | -18.0         | 31.8                 | 47.0                | 15.2           | 326.0       | 51.9        |        |
| 10  | 349.979         | V   | 46.6                | -15.3         | 31.3                 | 47.0                | 15.7           | 100.0       | 252.2       |        |
| 11  | 400.055         | H   | 40.5                | -14.2         | 26.3                 | 47.0                | 20.7           | 400.0       | 325.2       |        |
| 12  | 500.086         | V   | 47.7                | -11.5         | 36.2                 | 47.0                | 10.8           | 100.0       | 89.4        |        |

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## ■ PoE Mode



## Final Result

| No. | Frequency<br>[MHz] | (P) | Reading<br>QP<br>[dB(uV)] | c.f<br>[dB(1/m)] | Result<br>QP<br>[dB(uV/m)] | Limit<br>QP<br>[dB(uV/m)] | Margin<br>QP<br>[dB] | Height<br>[cm] | Angle<br>[deg] | Remark |
|-----|--------------------|-----|---------------------------|------------------|----------------------------|---------------------------|----------------------|----------------|----------------|--------|
| 1   | 37.275             | V   | 48.5                      | -24.0            | 24.5                       | 40.0                      | 15.5                 | 101.0          | 53.9           |        |
| 2   | 47.703             | V   | 42.4                      | -21.2            | 21.2                       | 40.0                      | 18.8                 | 177.0          | 109.1          |        |
| 3   | 62.374             | V   | 42.6                      | -22.5            | 20.1                       | 40.0                      | 19.9                 | 123.0          | 118.6          |        |
| 4   | 92.323             | H   | 43.2                      | -23.8            | 19.4                       | 43.5                      | 24.1                 | 400.0          | 251.7          |        |
| 5   | 92.489             | V   | 41.8                      | -23.8            | 18.0                       | 43.5                      | 25.5                 | 115.0          | 109.2          |        |
| 6   | 106.630            | H   | 44.2                      | -22.4            | 21.8                       | 43.5                      | 21.7                 | 342.0          | 307.1          |        |
| 7   | 187.019            | H   | 40.2                      | -22.6            | 17.6                       | 43.5                      | 25.9                 | 400.0          | 179.9          |        |
| 8   | 249.948            | H   | 51.1                      | -19.3            | 31.8                       | 47.0                      | 15.2                 | 400.0          | 124.6          |        |
| 9   | 300.021            | H   | 54.1                      | -18.0            | 36.1                       | 47.0                      | 10.9                 | 328.0          | 291.7          |        |
| 10  | 300.024            | V   | 54.9                      | -18.0            | 36.9                       | 47.0                      | 10.1                 | 100.0          | 236.4          |        |
| 11  | 425.033            | H   | 38.2                      | -13.7            | 24.5                       | 47.0                      | 22.5                 | 372.0          | 309.5          |        |
| 12  | 450.010            | V   | 42.3                      | -13.0            | 29.3                       | 47.0                      | 17.7                 | 101.0          | 145.7          |        |

## ◆ Calculation - SAC #4(10 m)

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

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

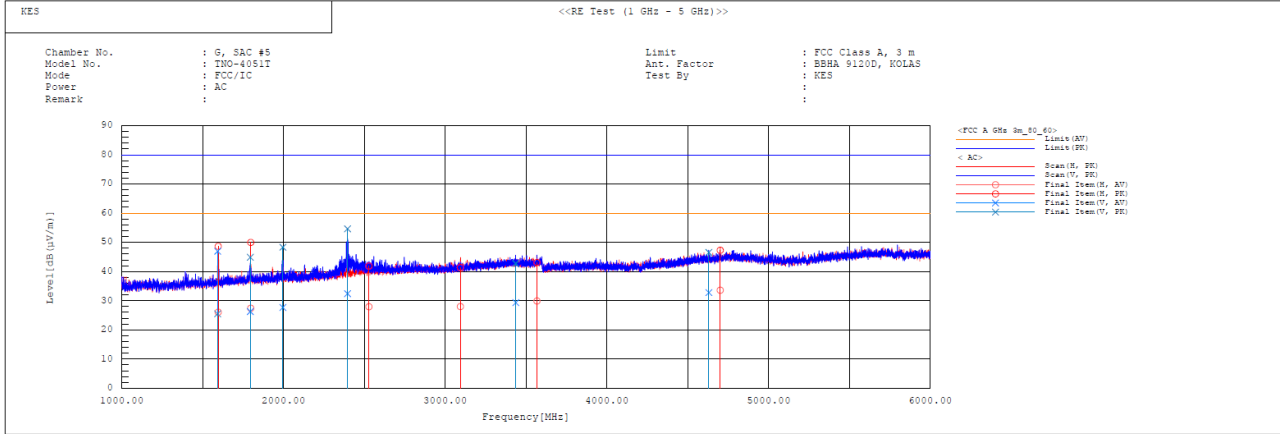
Reading(QP) : Reading value, Result(QP) : Reading value + Factor value

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



## Radiated Electric Field Emissions(Above 1 GHz)

### ■ AC Mode



#### Final Result

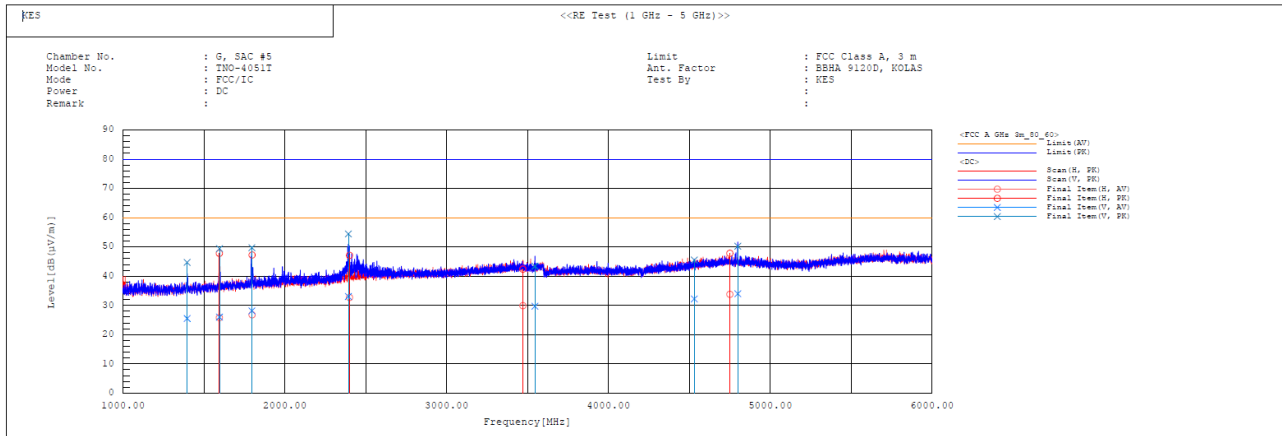
| No. | Frequency [MHz] | Pol | Reading     |             | c.f  | Result        |               | Limit         |               | Margin  |         | Height [cm] | Angle [deg] |
|-----|-----------------|-----|-------------|-------------|------|---------------|---------------|---------------|---------------|---------|---------|-------------|-------------|
|     |                 |     | AV [dB(μV)] | PK [dB(μV)] |      | AV [dB(μV/m)] | PK [dB(μV/m)] | AV [dB(μV/m)] | PK [dB(μV/m)] | AV [dB] | PK [dB] |             |             |
| 1   | 1592.989        | V   | 51.6        | 30.2        | -4.7 | 46.9          | 25.5          | 60.0          | 80.0          | 13.1    | 54.5    | 103.0       | 210.0       |
| 2   | 1595.783        | H   | 30.8        | 53.3        | -4.7 | 26.1          | 48.6          | 60.0          | 80.0          | 33.9    | 31.4    | 369.0       | 298.6       |
| 3   | 1794.710        | V   | 30.0        | 48.6        | -3.7 | 26.3          | 44.9          | 60.0          | 80.0          | 33.7    | 35.1    | 107.0       | 53.3        |
| 4   | 1796.991        | H   | 31.1        | 53.7        | -3.7 | 27.4          | 50.0          | 60.0          | 80.0          | 32.6    | 30.0    | 375.0       | 7.6         |
| 5   | 1996.226        | V   | 30.4        | 51.0        | -2.7 | 27.7          | 48.3          | 60.0          | 80.0          | 32.3    | 31.7    | 100.0       | 91.7        |
| 6   | 2396.362        | V   | 33.9        | 56.1        | -1.5 | 32.4          | 54.6          | 60.0          | 80.0          | 27.6    | 25.4    | 112.0       | 198.2       |
| 7   | 2528.000        | H   | 28.8        | 42.8        | -0.9 | 27.9          | 41.9          | 60.0          | 80.0          | 32.1    | 38.1    | 398.0       | 51.9        |
| 8   | 3094.129        | H   | 26.8        | 40.2        | 1.2  | 28.0          | 41.4          | 60.0          | 80.0          | 32.0    | 38.6    | 400.0       | 295.4       |
| 9   | 3435.720        | V   | 27.5        | 40.9        | 1.8  | 29.3          | 42.7          | 60.0          | 80.0          | 30.7    | 37.3    | 100.0       | 263.4       |
| 10  | 3566.955        | H   | 27.9        | 41.1        | 2.0  | 29.9          | 43.1          | 60.0          | 80.0          | 30.1    | 36.9    | 351.0       | 146.5       |
| 11  | 4629.964        | V   | 27.1        | 40.8        | 5.7  | 32.8          | 46.5          | 60.0          | 80.0          | 27.2    | 33.5    | 100.0       | 108.2       |
| 12  | 4700.702        | H   | 27.5        | 41.2        | 6.1  | 33.6          | 47.3          | 60.0          | 80.0          | 26.4    | 32.7    | 322.0       | 104.8       |

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## DC Mode

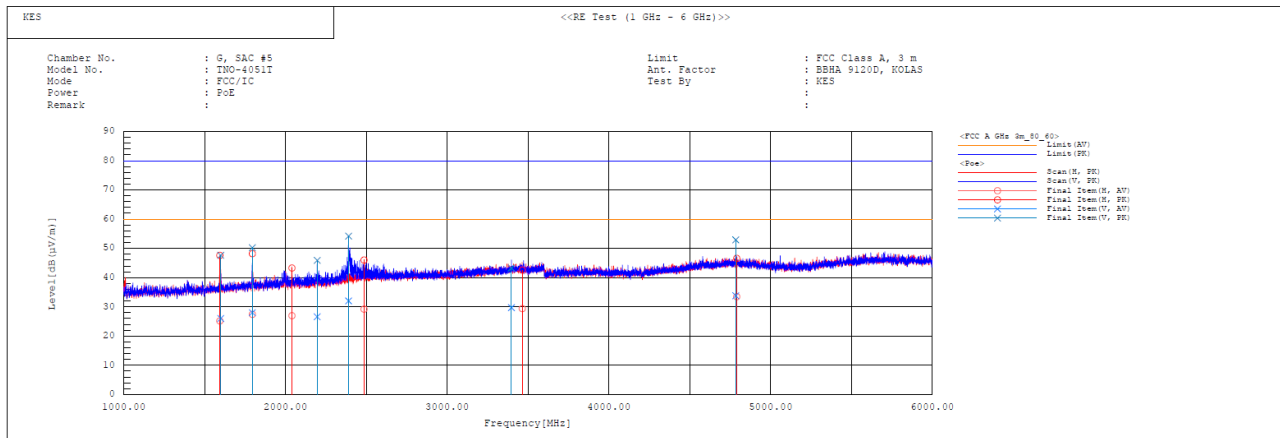


## Final Result

| No. | Frequency [MHz] | Pol | Reading AV [dB (μV)] | Reading PK [dB (μV)] | c.f [dB (1/m)] | Result AV [dB (μV/m)] | Result PK [dB (μV/m)] | Limit AV [dB (μV/m)] | Limit PK [dB (μV/m)] | Margin AV [dB] | Margin PK [dB] | Height [cm] | Angle [deg] |
|-----|-----------------|-----|----------------------|----------------------|----------------|-----------------------|-----------------------|----------------------|----------------------|----------------|----------------|-------------|-------------|
| 1   | 1395.550        | V   | 30.9                 | 50.1                 | -5.4           | 25.5                  | 44.7                  | 60.0                 | 80.0                 | 34.5           | 35.3           | 110.0       | 203.8       |
| 2   | 1594.538        | H   | 30.5                 | 52.5                 | -4.7           | 25.8                  | 47.8                  | 60.0                 | 80.0                 | 34.2           | 32.2           | 385.0       | 359.6       |
| 3   | 1595.740        | V   | 30.7                 | 54.1                 | -4.7           | 26.0                  | 49.4                  | 60.0                 | 80.0                 | 34.0           | 30.6           | 102.0       | 189.1       |
| 4   | 1795.697        | V   | 31.8                 | 53.4                 | -3.7           | 28.1                  | 49.7                  | 60.0                 | 80.0                 | 31.9           | 30.3           | 178.0       | 187.3       |
| 5   | 1796.832        | H   | 30.5                 | 50.9                 | -3.7           | 26.8                  | 47.2                  | 60.0                 | 80.0                 | 33.2           | 32.8           | 368.0       | 359.6       |
| 6   | 2392.271        | V   | 34.5                 | 55.9                 | -1.5           | 33.0                  | 54.4                  | 60.0                 | 80.0                 | 27.0           | 25.6           | 123.0       | 176.8       |
| 7   | 2399.982        | H   | 34.1                 | 48.5                 | -1.4           | 32.7                  | 47.1                  | 60.0                 | 80.0                 | 27.3           | 32.9           | 400.0       | 31.0        |
| 8   | 3470.173        | H   | 28.1                 | 40.6                 | 1.8            | 29.9                  | 42.4                  | 60.0                 | 80.0                 | 30.1           | 37.6           | 361.0       | 139.8       |
| 9   | 3545.374        | V   | 27.8                 | 41.5                 | 1.9            | 29.7                  | 43.4                  | 60.0                 | 80.0                 | 30.3           | 36.6           | 100.0       | 194.7       |
| 10  | 4530.829        | V   | 26.8                 | 40.1                 | 5.4            | 32.2                  | 45.5                  | 60.0                 | 80.0                 | 27.8           | 34.5           | 169.0       | 39.7        |
| 11  | 4750.500        | H   | 27.5                 | 41.5                 | 6.3            | 33.8                  | 47.8                  | 60.0                 | 80.0                 | 26.2           | 32.2           | 309.0       | 89.9        |
| 12  | 4799.024        | V   | 27.5                 | 43.7                 | 6.5            | 34.0                  | 50.2                  | 60.0                 | 80.0                 | 26.0           | 29.8           | 100.0       | 12.1        |



## PoE Mode



## Final Result

| No. | Frequency [MHz] | Pol | Reading AV [dB (μV)] | Reading PK [dB (μV)] | c.f [dB (1/m)] | Result AV [dB (μV/m)] | Result PK [dB (μV/m)] | Limit AV [dB (μV/m)] | Limit PK [dB (μV/m)] | Margin AV [dB] | Margin PK [dB] | Height [cm] | Angle [deg] |
|-----|-----------------|-----|----------------------|----------------------|----------------|-----------------------|-----------------------|----------------------|----------------------|----------------|----------------|-------------|-------------|
| 1   | 1594.034        | H   | 29.9                 | 52.3                 | -4.7           | 25.2                  | 47.6                  | 60.0                 | 80.0                 | 34.8           | 32.4           | 400.0       | 294.5       |
| 2   | 1599.631        | V   | 30.7                 | 52.3                 | -4.7           | 26.0                  | 47.6                  | 60.0                 | 80.0                 | 34.0           | 32.4           | 100.0       | 217.3       |
| 3   | 1794.483        | H   | 31.1                 | 51.9                 | -3.7           | 27.4                  | 48.2                  | 60.0                 | 80.0                 | 32.6           | 31.8           | 397.0       | 276.7       |
| 4   | 1794.628        | V   | 31.7                 | 53.9                 | -3.7           | 28.0                  | 50.2                  | 60.0                 | 80.0                 | 32.0           | 29.8           | 104.0       | 183.1       |
| 5   | 2039.917        | H   | 29.6                 | 45.9                 | -2.6           | 27.0                  | 43.3                  | 60.0                 | 80.0                 | 33.0           | 36.7           | 369.0       | 160.1       |
| 6   | 2196.075        | V   | 28.8                 | 48.1                 | -2.2           | 26.6                  | 45.9                  | 60.0                 | 80.0                 | 33.4           | 34.1           | 102.0       | 223.3       |
| 7   | 2389.878        | V   | 33.5                 | 55.7                 | -1.5           | 32.0                  | 54.2                  | 60.0                 | 80.0                 | 28.0           | 25.8           | 117.0       | 190.6       |
| 8   | 2485.361        | H   | 30.3                 | 47.1                 | -1.1           | 29.2                  | 46.0                  | 60.0                 | 80.0                 | 30.8           | 34.0           | 341.0       | 173.0       |
| 9   | 3397.557        | V   | 27.9                 | 41.5                 | 1.8            | 29.7                  | 43.3                  | 60.0                 | 80.0                 | 30.3           | 36.7           | 100.0       | 271.9       |
| 10  | 3463.755        | H   | 27.6                 | 40.8                 | 1.8            | 29.4                  | 42.6                  | 60.0                 | 80.0                 | 30.6           | 37.4           | 400.0       | 89.0        |
| 11  | 4784.000        | V   | 27.4                 | 46.5                 | 6.4            | 33.8                  | 52.9                  | 60.0                 | 80.0                 | 26.2           | 27.1           | 100.0       | 331.0       |
| 12  | 4790.419        | H   | 27.1                 | 40.2                 | 6.4            | 33.5                  | 46.6                  | 60.0                 | 80.0                 | 26.5           | 33.4           | 325.0       | 173.0       |

## 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

## Test Setup Photos and Configuration

### Conducted Emissions at Mains Power Ports

■ DC Mode



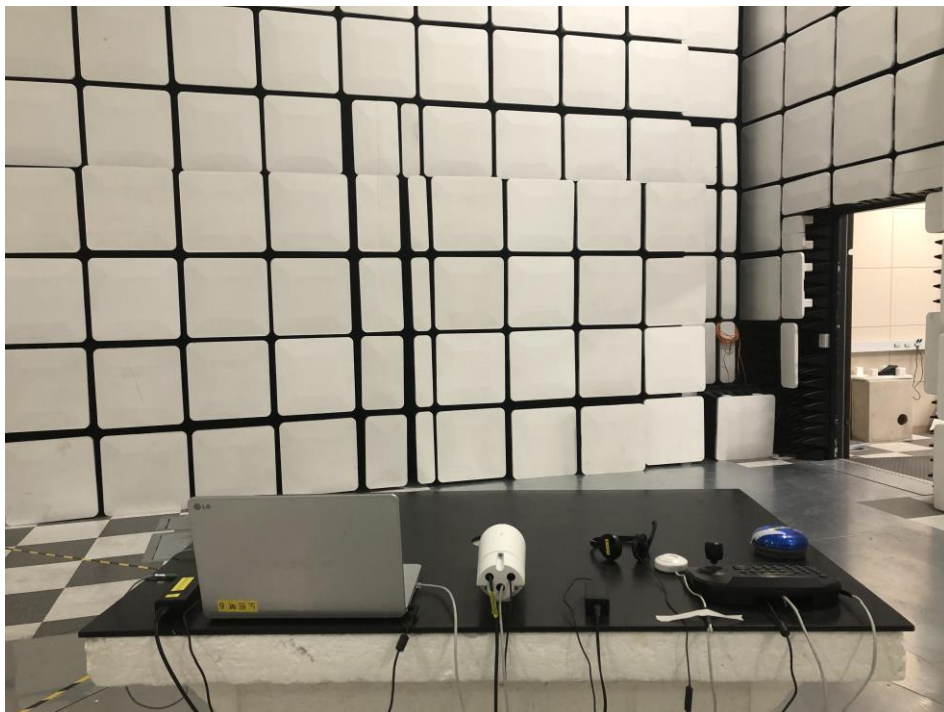
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**■ PoE Mode**



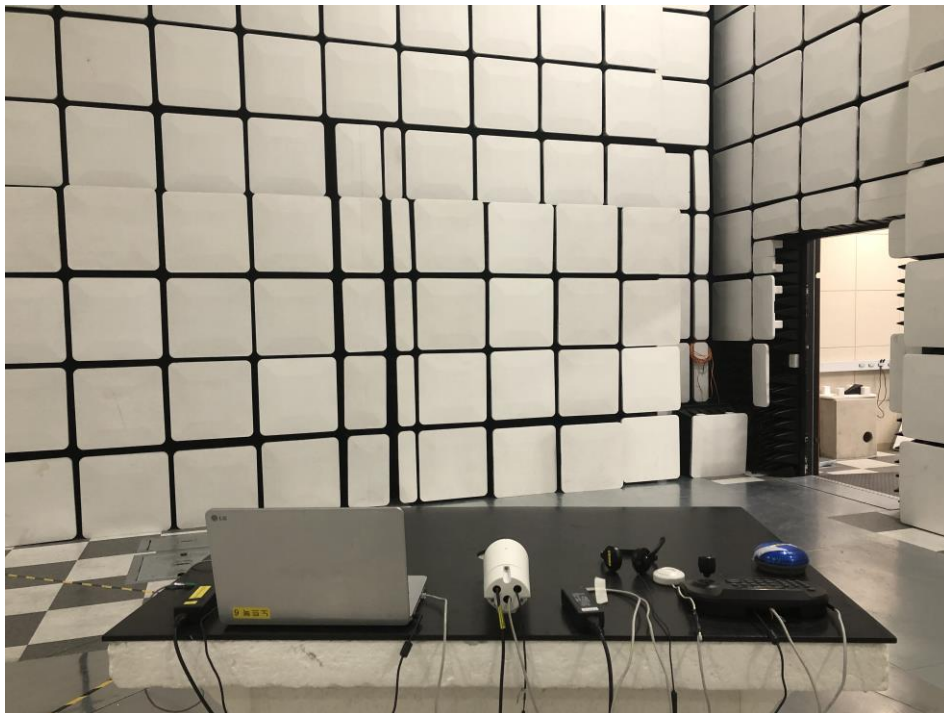
## Radiated Electric Field Emissions(Below 1 GHz)

### ■ DC Mode



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## ■ PoE Mode

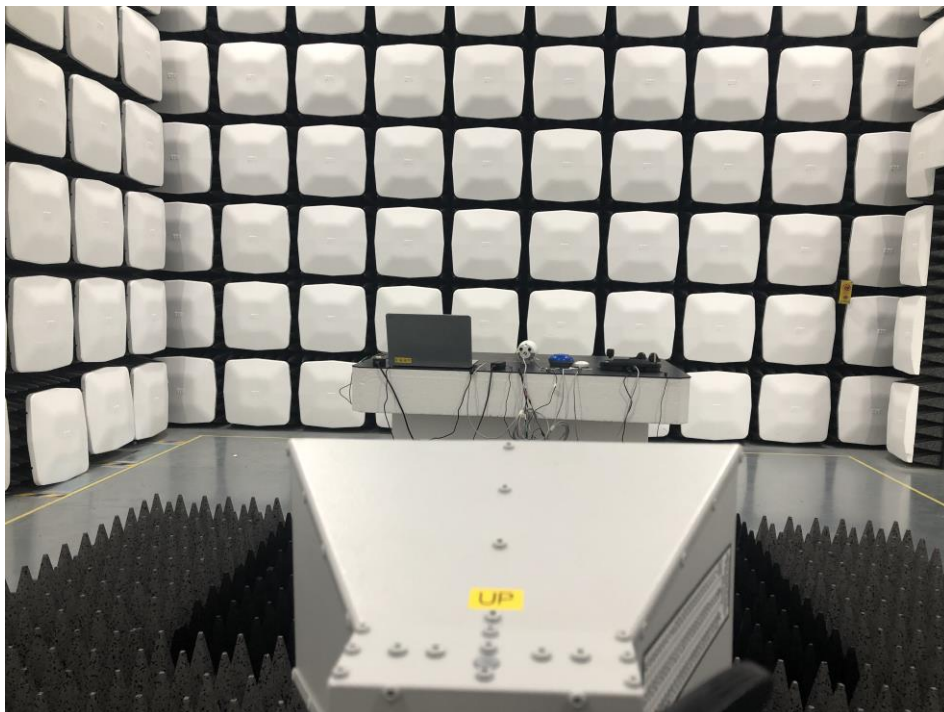
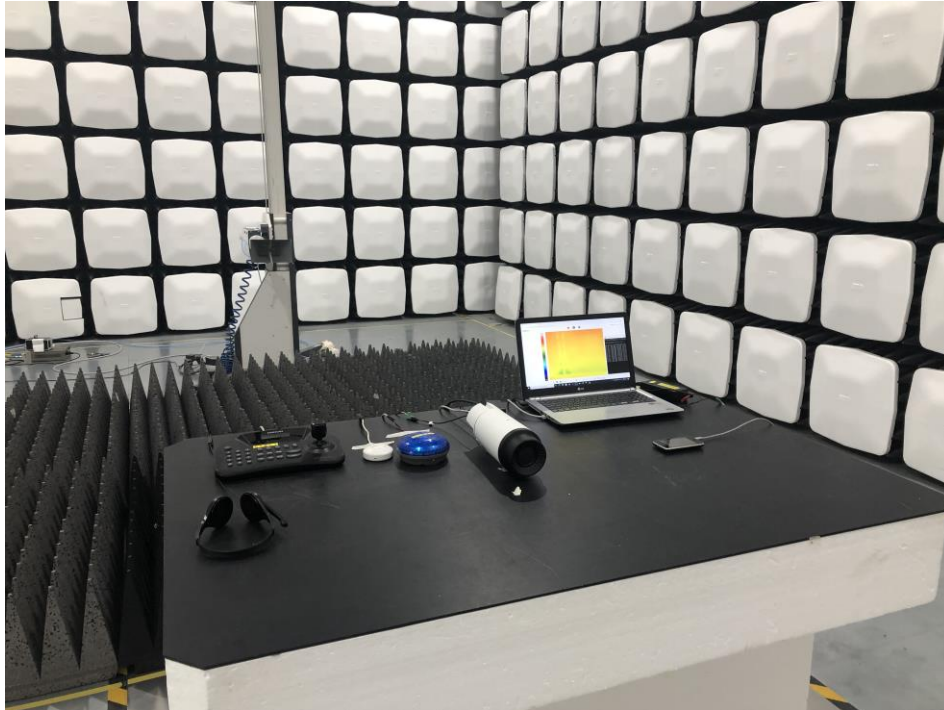


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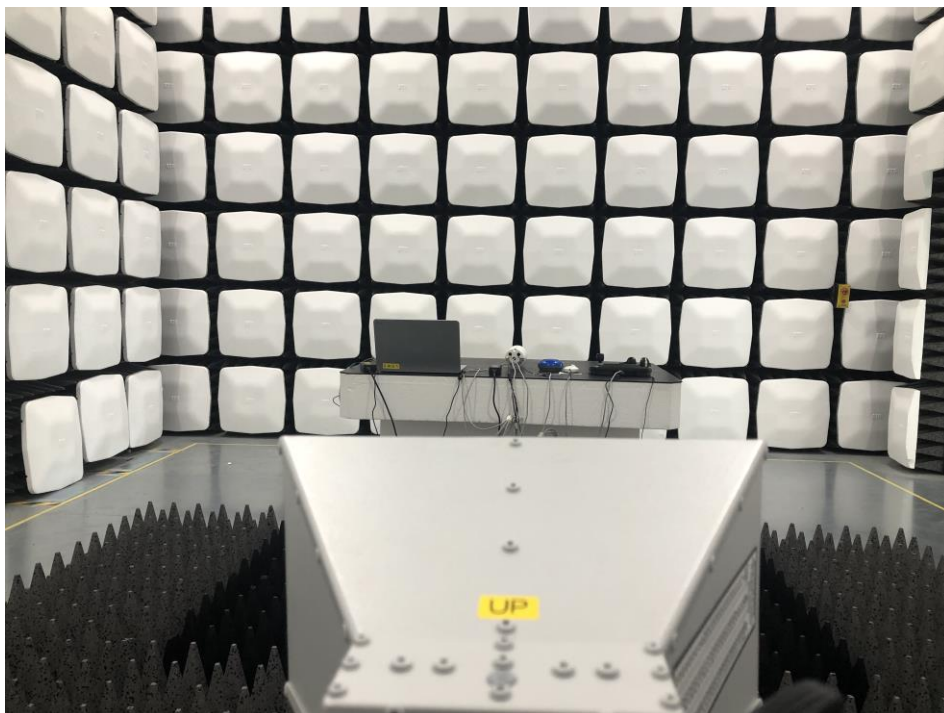
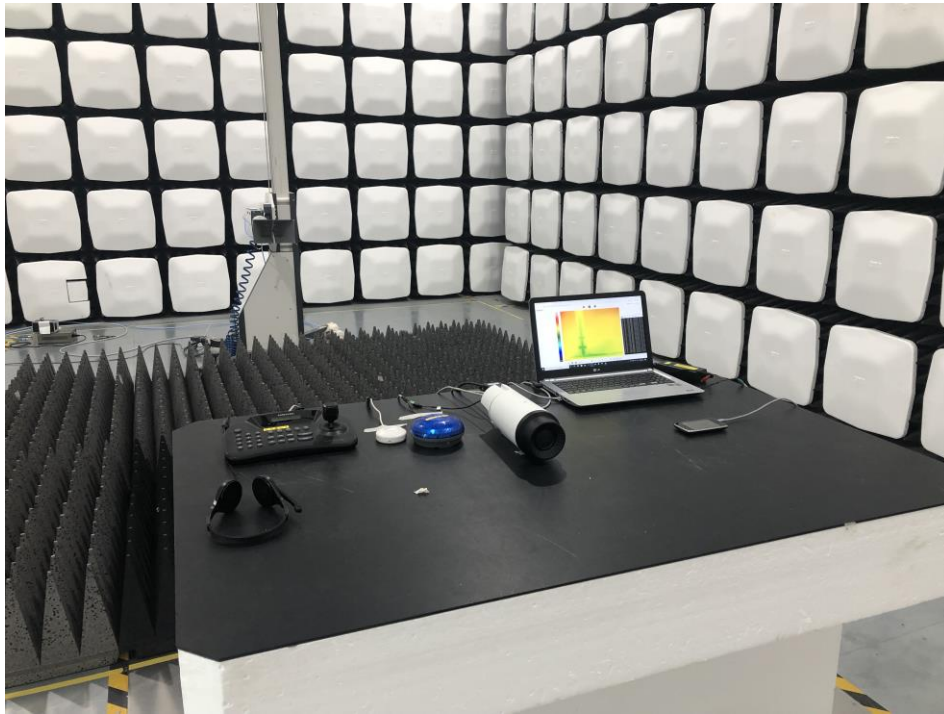
## Radiated Electric Field Emissions(Above 1 GHz)

### ■ DC Mode



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■ PoE Mode



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**EUT External Photographs**

(Top)



(Bottom)



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**EUT Internal Photographs**

(Internal View)

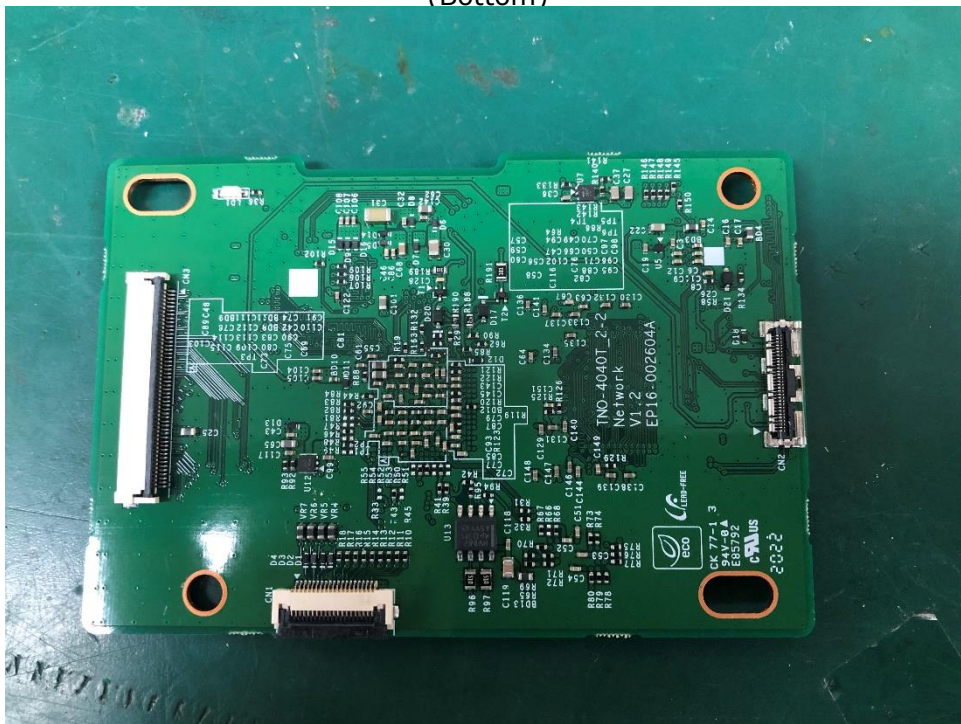


## EUT Internal View – Board 1

(Top)



(Bottom)



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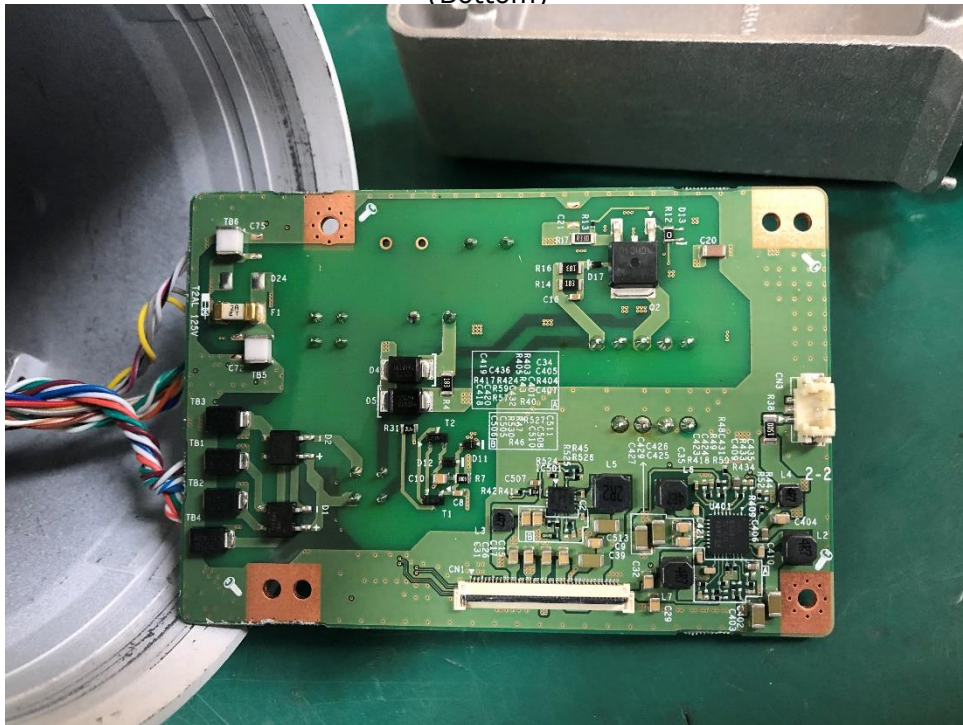


## EUT Internal View – Board 2

(Top)



(Bottom)



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## EUT Internal View – Board 3

(Top)



(Bottom)

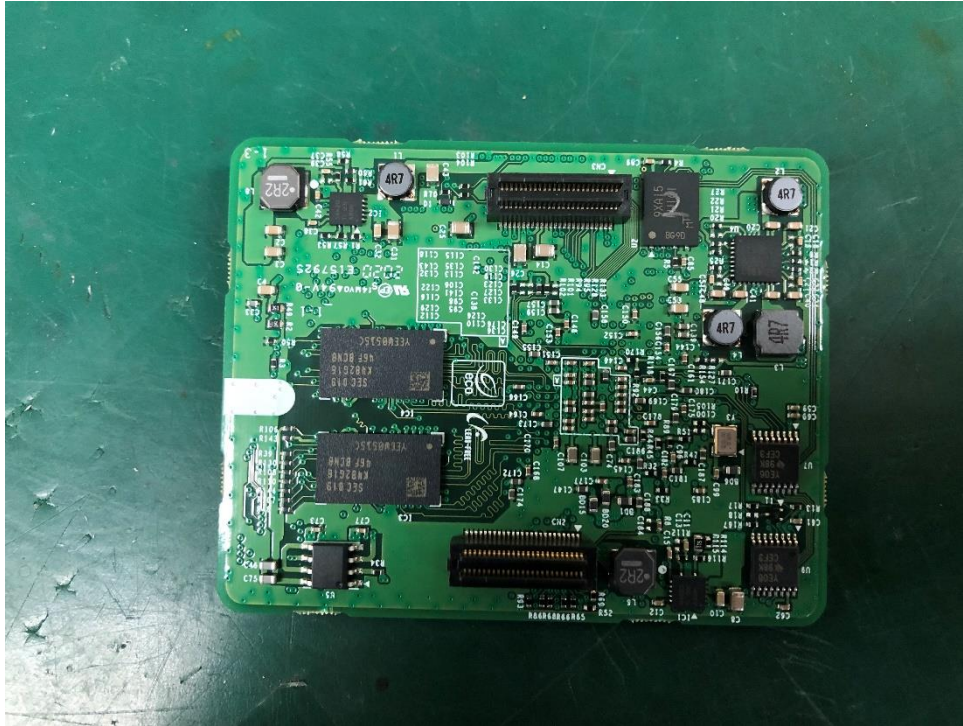


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## EUT Internal View –Board 4

(Top)



(Bottom)



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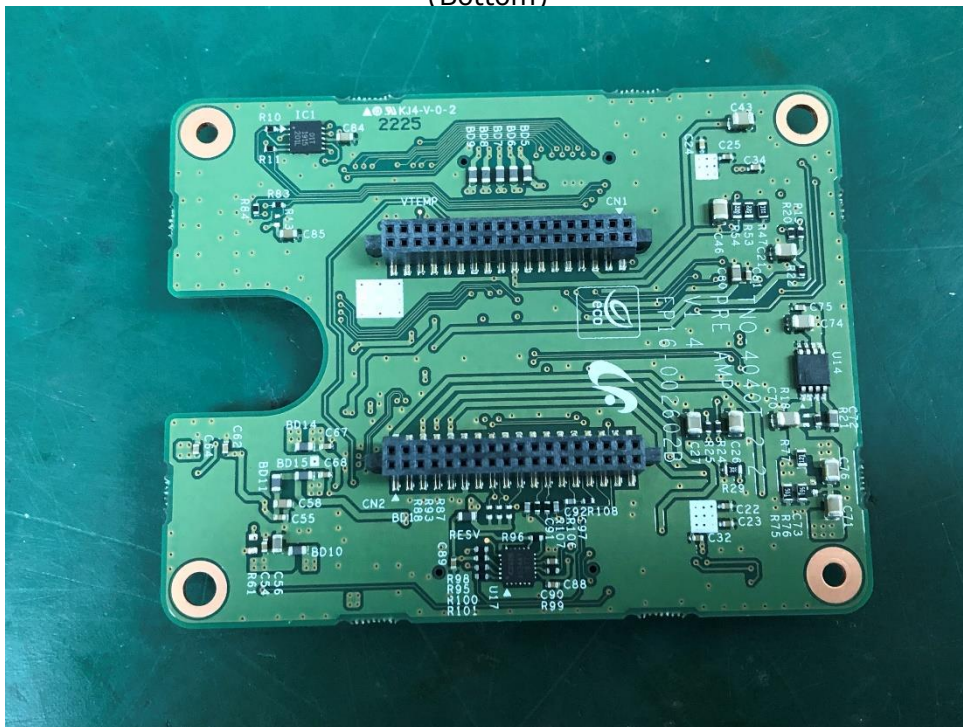


## EUT Internal View – Board 5

(Top)



(Bottom)

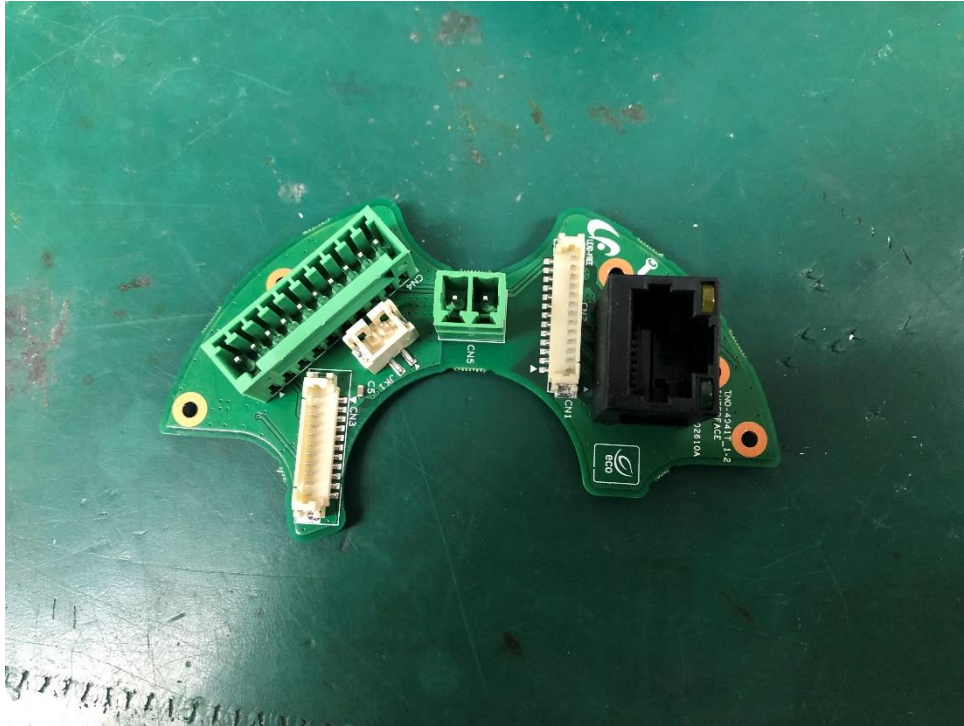


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**EUT Internal View – Board 6**

(Top)



(Bottom)



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## EUT Internal View – Lens

(Top)



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## Label Photographs

### FCC Label



Hanwha Vision Co., Ltd

TNO-4051T

### IC Label

### CAN ICES-003(A) / NMB-003(A)

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.