



## EMC TEST REPORT For VCCI

Test Report No. : KES-EM-20T0014-R1  
Date of Issue : Feb. 24, 2023  
Product name : Network Camera  
Model/Type No. : QNB-6002  
Variant Model : -  
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)  
Date of Receipt : Dec. 06, 2019  
Test date : Jan. 01, 2020 ~ Jan. 02, 2020  
Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Min Seong, 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.

**KES Co., Ltd.**

3701, 40, Simin-daero 365beon-gil,  
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea  
Tel: +82-31-425-6200 / Fax: +82-31-424-0450  
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**REPORT REVISION HISTORY**

| Date          | Test Report No.   | Revision History                                                                                                          |
|---------------|-------------------|---------------------------------------------------------------------------------------------------------------------------|
| Jan. 09, 2020 | KES-EM-20T0014    | Issued                                                                                                                    |
| Feb. 24, 2023 | KES-EM-20T0014-R1 | Change the Applicant and manufacturer at the request of the customer,<br>Factory deletion at the request of the customer. |
|               |                   |                                                                                                                           |
|               |                   |                                                                                                                           |
|               |                   |                                                                                                                           |
|               |                   |                                                                                                                           |
|               |                   |                                                                                                                           |
|               |                   |                                                                                                                           |
|               |                   |                                                                                                                           |
|               |                   |                                                                                                                           |

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## 1.0 General Product Description

### Main Specifications of EUT are:

|                             | QNB-6002                                                                   |
|-----------------------------|----------------------------------------------------------------------------|
| <b>Video</b>                |                                                                            |
| Imaging Device              | 1/2.8" 2MP CMOS                                                            |
| Effective Pixels            | 1920(H)x1080(V)                                                            |
| NETD                        | None                                                                       |
| Pixel Size                  | None                                                                       |
| Min. Illumination           | Color: 0.01Lux(F1.2, 1/30sec) (TBD)                                        |
| Video Out                   | CVBS: 1.0 Vp-p / 75Ω composite, 720x480(N),<br>720x576(P) for installation |
| <b>Lens</b>                 |                                                                            |
| Focal Length (Zoom Ratio)   | None                                                                       |
| Max. Aperture Ratio         | None                                                                       |
| Angular Field of View       | None                                                                       |
| Min. Object Distance        | None                                                                       |
| Focus Control               | Manual                                                                     |
| Lens Type                   | Manual/ DC-IRIS                                                            |
| Mount Type                  | C mount, CS mount                                                          |
| Optional Lens               | SLA-M2890DN                                                                |
| <b>Pan / Tilt / Rotate</b>  |                                                                            |
| Pan / Tilt / Rotate Range   | None                                                                       |
| Pan Range                   | None                                                                       |
| Pan Speed                   | None                                                                       |
| Tilt Range                  | None                                                                       |
| Tilt Speed                  | None                                                                       |
| Rotate Range                | None                                                                       |
| Sequence                    | None                                                                       |
| Preset Accuracy             | None                                                                       |
| Azimuth                     | None                                                                       |
| Auto Tracking               | None                                                                       |
| <b>Operational</b>          |                                                                            |
| IR Viewable Length          | None                                                                       |
| Camera Title                | Displayed up to 85 characters                                              |
| Day & Night                 | Auto(ICR)                                                                  |
| Backlight Compensation      | BLC, WDR, SDDR                                                             |
| Wide Dynamic Range          | 120dB                                                                      |
| Digital Noise Reduction     | SSNR                                                                       |
| Digital Image Stabilization | None                                                                       |
| Defog                       | None                                                                       |
| Motion Detection            | 4ea, polygonal zones                                                       |
| Privacy Masking             | 6ea, rectangular zones                                                     |
| Gain Control                | Low/ Middle/ High                                                          |

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Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea  
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|                             |                                                                                                                              |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------|
| White Balance               | ATW/ AWC/ Manual/ Indoor/ Outdoor                                                                                            |
| LDC                         | Support                                                                                                                      |
| Electronic Shutter Speed    | Minimum/ Maximum/ Anti flicker (1/5~1/12,000sec)                                                                             |
| Digital PTZ                 | None                                                                                                                         |
| Video Rotation              | Flip, Mirror, Hallway view(90°/270°)                                                                                         |
| Analytics                   | Defocus detection, Directional detection, Motion detection, Enter/Exit, Tampering, Virtual line                              |
| Business Intelligence       | None                                                                                                                         |
| Serial Interface            | RS-485(Samsung-T, Pelco-D/P, Panasonic, Bosch, AD, GE, Vicon, Honeywell)                                                     |
| Alarm I/O                   | Input 1ea / Output 1ea                                                                                                       |
| 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 |
| Audio In                    | Line-in<br>Supply voltage: 2.5VDC(4mA), Input impedance: 2K Ohm                                                              |
| Audio Out                   | Line-out 1Vrms                                                                                                               |
| IR Illuminator (Optional)   | None                                                                                                                         |
| Wiper                       | None                                                                                                                         |
| Coaxial Protocol            | None                                                                                                                         |
| Video Transmission Distance | None                                                                                                                         |
| <b>Radiometry</b>           |                                                                                                                              |
| Temperature detect range    | None                                                                                                                         |
| Temperature accuracy        | None                                                                                                                         |
| Temperature detection       | None                                                                                                                         |
| Additional                  | None                                                                                                                         |
| <b>Network</b>              |                                                                                                                              |
| Ethernet                    | RJ-45(10/100BASE-T)                                                                                                          |
| Video Compression           | H.265/H.264: Main/Baseline/High, MJPEG                                                                                       |
| Resolution                  | 1920x1080, 1280x1024, 1280x960, 1280x720, 1024x768, 800x600, 800x448, 720x576, 720x480, 640x480, 640x360, 320x240            |
| Max. Framerate              | H.265/H.264: Max. 30fps/25fps(60Hz/50Hz)<br>MJPEG: Max. 15fps/12fps(60Hz/50Hz)                                               |
| Smart Codec                 | WiseStreamII                                                                                                                 |
| Video Quality Adjustment    | H.264/H.265: Target bitrate level control<br>MJPEG: Quality Level control                                                    |

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|                                   |                                                                                                                                                                                                                            |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bitrate Control                   | H.264/H.265: CBR or VBR<br>MJPEG: VBR                                                                                                                                                                                      |
| Streaming                         | Unicast(6 users) / Multicast<br>Multiple streaming (Up to 3 profiles)                                                                                                                                                      |
| Audio Compression                 | G.711 u-law /G.726 Selectable<br>G.726(ADPCM) 8KHz, G.711 8KHz<br>G.726: 16Kbps, 24Kbps, 32Kbps, 40Kbps                                                                                                                    |
| Protocol                          | IPv4, IPv6, TCP/IP, UDP/IP, RTP(UDP), RTP(TCP), RTCP,<br>RTSP, NTP, HTTP, HTTPS, SSL/TLS, DHCP, FTP, SMTP,<br>ICMP, IGMP, SNMPv1/v2c/v3(MIB-2), ARP, DNS, DDNS,<br>QoS, UPnP, Bonjour, LLDP                                |
| 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)<br>Device Certificate(Hanwha Techwin Root CA)                        |
| Edge Storage                      | Micro SD/SDHC/SDXC 1slot 128GB                                                                                                                                                                                             |
| Application Programming Interface | ONVIF Profile S/G/T<br>SUNAPI(HTTP API)<br>Wisenet open platform                                                                                                                                                           |
| Webpage Language                  | English, Korean, Chinese, French, Italian, Spanish,<br>German, Japanese, Russian, Swedish, Portuguese,<br>Czech, Polish, Turkish, Dutch                                                                                    |
| Web Viewer                        | Supported OS: Windows 7, 8.1, 10, Mac OS X 10.12,<br>10.13, 10.14<br>Recommended Browser: Google Chrome<br>Supported Browser: MS Explore11, MS Edge, Mozilla<br>Firefox(Window 64bit only), Apple Safari(Mac OS X<br>only) |
| Memory                            | 1024MB RAM, 256MB Flash                                                                                                                                                                                                    |
| <b>Environmental</b>              |                                                                                                                                                                                                                            |
| Operating Temperature / Humidity  | -10°C ~ +55°C (-14°F ~ +131°F) / Less than 90% RH                                                                                                                                                                          |
| Storage Temperature / Humidity    | -30°C ~ +60°C (-22°F ~ +140°F) / Less than 90% RH                                                                                                                                                                          |
| Certification                     | -                                                                                                                                                                                                                          |
| <b>Electrical</b>                 |                                                                                                                                                                                                                            |
| Input Voltage                     | PoE(IEEE802.3af, Class3), 12VDC                                                                                                                                                                                            |
| Power Consumption                 | PoE: Max 6.4W, Typical 4.6W<br>12VDC: Max 5.8W, Typical 4.1W                                                                                                                                                               |
| <b>Mechanical</b>                 |                                                                                                                                                                                                                            |
| Color / Material                  | Black, Ivory / Plastic                                                                                                                                                                                                     |
| RAL Code                          | None                                                                                                                                                                                                                       |
| Product dimensions / weight       | 73.8(W)x66.6(H)x136.2(D)mm(2.9x2.6x5.4"), 320g(0.71 lb)                                                                                                                                                                    |

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## 1.1 Test Voltage & Frequency

Unless indicated otherwise on the individual data sheet or test results, the test voltage and frequency was as indicated below.

Voltage ☐ 230 Vac ☐ 100 Vac ☐ 24 Vac ☒ 12 Vdc ☒ PoE

Frequency ☐ 50 Hz ☐ 60 Hz ☐ Hz

## 1.2 Variant Model Differences

Not applicable

## 1.3 Device Modifications

Not applicable

## 1.4 Equipment Under Test

| Description    | Model Number | Serial Number | Manufacturer                                | Remarks |
|----------------|--------------|---------------|---------------------------------------------|---------|
| Network Camera | QNB-6002     | -             | HANWHA VISION<br>VIETNAM COMPANY<br>LIMITED | EUT     |

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## 1.5 Support Equipments

| Description        | Model Number         | Serial Number  | Manufacturer                                   | Remarks |
|--------------------|----------------------|----------------|------------------------------------------------|---------|
| PoE Adapter        | ANY4805C-LT1         | 10H300002      | ANY ELECTRONICS CO., LTD                       | -       |
| Lens               | -                    | -              | Mega Pixel                                     | -       |
| Notebook           | P95G001              | 8KM8HT2        | Wistron Infocom (Chengdu) Company Limited      | -       |
| Notebook Adapter   | LA65NS2-01           | -              | LITE-ON TECHNOLOGY(CHANG ZHOU)CO.,LTD.         | -       |
| Controller         | SPC-1010             | C50E67WG10100F | SamSung Techwin Co.,Ltd.                       | -       |
| Controller Adapter | RS-AB1000            | -              | Dongguan JinhuaSheng Power Technology Co.,Ltd. | -       |
| Speaker            | BR1000A Cuve Black 2 | -              | DONGGUAN EDIFIER TECHNOLOGY Co., Ltd           | -       |
| MIC                | MP1000               | -              | -                                              | -       |
| Alarm              | SIP-1201DD D0        | -              | SAMSUNG TECHWIN CO., LTD.                      | -       |
| Button Alarm       | -                    | -              | -                                              | -       |
| Smart Phone        | LG-SU760             | 108KPQJ0186212 | LG Electronics                                 | -       |
| Micro SD Card      | -                    | -              | SanDisk                                        | 8 GB    |

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## 1.6 External I/O Cabling

### ■ DC 12 V Mode

| Start                |           | END           |           | Cable Spec. |        |
|----------------------|-----------|---------------|-----------|-------------|--------|
| Description          | I/O Port  | Description   | I/O Port  | Length      | Shield |
| Network Camera (EUT) | IRIS      | Lens          | IRIS      | 0.2         | U      |
|                      | NETWORK   | Notebook      | RJ-45     | 3.0         | U      |
|                      | RS-485    | Controller    | RS-485    | 3.0         | U      |
|                      | Audio Out | Speaker       | 3.5 mm    | 1.4         | U      |
|                      | Audio In  | MIC           | XLR       | 1.4         | U      |
|                      | Alarm Out | Alarm         | Alarm In  | 3.0         | U      |
|                      | Alarm In  | Button Alarm  | Alarm Out | 3.0         | U      |
|                      | SLOT      | Micro SD Card | SLOT      | -           | -      |
| Notebook             | 3.5 mm    | Smart Phone   | 3.5 mm    | 1.0         | U      |

### ■ PoE Mode

| Start                |           | END           |           | Cable Spec. |        |
|----------------------|-----------|---------------|-----------|-------------|--------|
| Description          | I/O Port  | Description   | I/O Port  | Length      | Shield |
| Network Camera (EUT) | IRIS      | Lens          | IRIS      | 0.2         | U      |
|                      | NETWORK   | PoE Adapter   | RJ-45     | 3.0         | U      |
|                      | RS-485    | Controller    | RS-485    | 3.0         | U      |
|                      | Audio Out | Speaker       | 3.5 mm    | 1.4         | U      |
|                      | Audio In  | MIC           | XLR       | 1.4         | U      |
|                      | Alarm Out | Alarm         | Alarm In  | 3.0         | U      |
|                      | Alarm In  | Button Alarm  | Alarm Out | 3.0         | U      |
|                      | SLOT      | Micro SD Card | SLOT      | -           | -      |
| Notebook             | 3.5 mm    | Smart Phone   | 3.5 mm    | 1.0         | U      |
|                      | RJ-45     | PoE Adapter   | RJ-45     | 2.0         | U      |

\* Unshielded=U, Shielded=S

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## 1.7 EUT Operating Mode(s)

| Test mode       | operating                                  |
|-----------------|--------------------------------------------|
| DC 12 V,<br>PoE | Monitoring EUT Using Web Viewer, Ping Test |

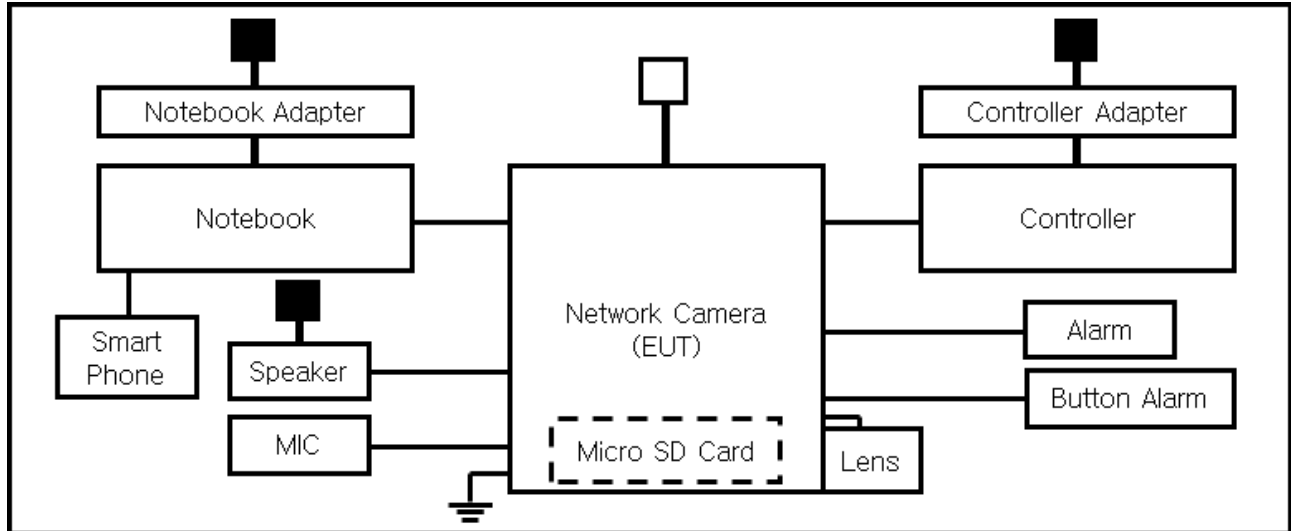
| EUT Test operating S/W |         |                     |
|------------------------|---------|---------------------|
| Name                   | Version | Manufacture Company |
| Web Viewer             | -       | -                   |

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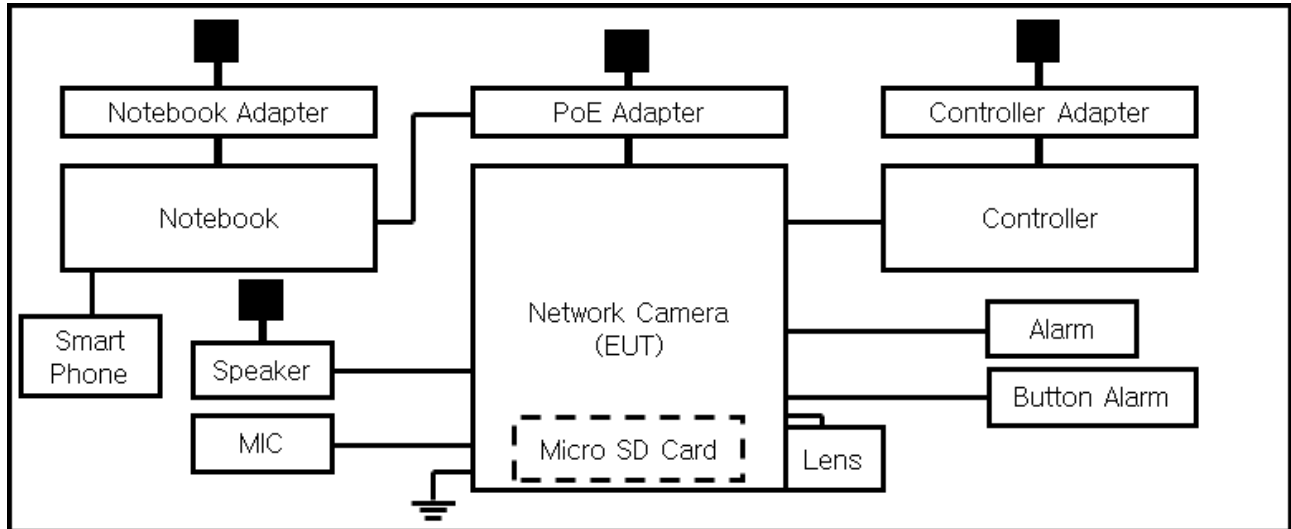
## 1.8 Configuration

■ AC Main  
 □ DC Main

### ■ DC 12 V Mode



### ■ PoE Mode



## 1.9 Remarks when standards applied

The Video Port is for administrators and is excluded from the test.

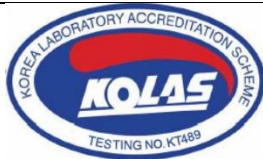
## 1.10 Calibration Details of Equipment Used for Measurement

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:

☐ **EMC – Directive 2014/30/EU**

☐ EN 61000-6-3:2011

☐ EN 61000-6-1:2007

☐ EN 61000-6-4:2007 +A1:2011

☐ EN 61000-6-2:2005

☐ EN 55011:2007 +A1:2010

☐ Group 1  
☐ Class A

☐ Group 2  
☐ Class B

☐ EN 55014-1:2006 +A2:2011

☐ EN 55014-2:1997 +A2:2008

☐ EN 55015:2013

☐ EN 61547 :2009

☐ EN 55032:2015

☐ Class A

☐ Class B

☐ EN 55024:2010 +A1:2015

☐ EN 50130-4:2011 +A1:2014

☐ EN 61000-3-2:2014

☐ EN 61000-3-3:2013

☐ EN 61326-1:2013



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

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## 2.1 Conducted Emissions Mains Power Ports

### Test Date

N/A

### Test Location

Electro wave Shieldroom #6

### Test Equipment

| Used                     | Description       | Model Number | Manufacturer | Serial Number | Cal. Due     |
|--------------------------|-------------------|--------------|--------------|---------------|--------------|
| <input type="checkbox"/> | EMI Test S/W      | EMC32        | R & S        | 9.12.00       | -            |
| <input type="checkbox"/> | EMI TEST RECEIVER | ESR3         | R & S        | 101781        | 04, 22, 2020 |
| <input type="checkbox"/> | LISN              | ENV216       | R & S        | 101787        | 01, 25, 2020 |
| <input type="checkbox"/> | LISN              | ESH2-Z5      | R & S        | 100450        | 04, 22, 2020 |
| <input type="checkbox"/> | PULSE LIMITER     | ESH3-Z2      | R & S        | 101915        | 11, 25, 2020 |

### Test Conditions

Temperature: °C  
Relative Humidity: % 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

It is not tested apply because it is powered by DC.

## 2.2 Conducted Emissions at Telecommunication Ports

**Test Date**

Jan. 01, 2020

**Test Location**

Electro wave Shieldroom #6

**Test Equipment**

| Used                                | Description       | Model Number | Manufacturer | Serial Number | Cal. Due     |
|-------------------------------------|-------------------|--------------|--------------|---------------|--------------|
| <input checked="" type="checkbox"/> | EMI Test S/W      | EMC32        | R & S        | 9.12.00       | -            |
| <input checked="" type="checkbox"/> | EMI TEST RECEIVER | ESR3         | R & S        | 101783        | 04, 22, 2020 |
| <input checked="" type="checkbox"/> | LISN              | ENV216       | R & S        | 101786        | 01, 25, 2020 |
| <input checked="" type="checkbox"/> | LISN              | ENV216       | R & S        | 101137        | 01, 25, 2020 |
| <input type="checkbox"/>            | 8-WIRE ISN CAT3   | CAT3 8158    | SCHWARZBECK  | 8158-0019     | 03, 19, 2020 |
| <input checked="" type="checkbox"/> | 8-WIRE ISN CAT5   | CAT5 8158    | SCHWARZBECK  | 8158-0030     | 03, 19, 2020 |
| <input type="checkbox"/>            | 8-WIRE ISN CAT6   | NTFM 8158    | SCHWARZBECK  | 8158-0029     | 08, 13, 2020 |

**Test Conditions**Temperature: 27,7 °C  
Relative Humidity: 49,7 % 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.



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

### Test Date

Jan. 01, 2020

### Test Location

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

### Test Equipment

| Used                                | Description              | Model Number | Manufacturer     | Serial Number | Cal. Due     |
|-------------------------------------|--------------------------|--------------|------------------|---------------|--------------|
| <input checked="" type="checkbox"/> | EMI Test S/W             | EP5/RE       | TOYO Corporation | 6.0.0         | -            |
| <input checked="" type="checkbox"/> | EMI TEST RECEIVER        | ESU26        | R & S            | 100551        | 04, 09, 2020 |
| <input checked="" type="checkbox"/> | AMPLIFIER                | SCU 01       | R & S            | 100603        | 11, 25, 2020 |
| <input checked="" type="checkbox"/> | TRILOG-BROADBAND ANTENNA | VULB9163     | Schwarzbeck      | 715           | 11, 29, 2020 |
| <input checked="" type="checkbox"/> | ATTENUATOR               | 8491A        | HP               | 32173         | 03, 11, 2020 |

### Test Conditions

Temperature: 28,2 °C  
Relative Humidity: 49,4 % R.H.

### Frequency Range of Measurement

30 MHz to 1 GHz

### Instrument Settings

IF Band Width: 120 kHz

### Test Results

The requirements are:

☒ PASS  
☐ NOT PASS  
☐ NOT APPLICABLE

### Remarks

See Appendix A for test data.



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

### Test Date

Jan. 02, 2020

### Test Location

SEMI ANECHOIC CHAMBER #3

### Test Equipment

| Used                                | Description                | Model Number | Manufacturer     | Serial Number | Cal. Due     |
|-------------------------------------|----------------------------|--------------|------------------|---------------|--------------|
| <input checked="" type="checkbox"/> | EMI Test S/W               | EP5/RE       | TOYO Corporation | 6.0.0         | -            |
| <input checked="" type="checkbox"/> | EMI TEST RECEIVER          | ESR7         | R & S            | 101190        | 08, 06, 2020 |
| <input checked="" type="checkbox"/> | PREAMPLIFIER               | 8449B        | AGILENT          | 3008A01967    | 05, 27, 2020 |
| <input type="checkbox"/>            | ATTENUATOR                 | 8491A        | HP               | 35496         | 03, 11, 2020 |
| <input checked="" type="checkbox"/> | DOUBLE RIDGED HORN ANTENNA | SAS-571      | A.H.SYSTEM,INC   | 781           | 03, 12, 2020 |

### Test Conditions

Temperature: 27,7 °C  
Relative Humidity: 50,1 % R.H.

### Frequency Range of Measurement

1 GHz to 6 GHz

### Instrument Settings

IF Band Width: 1 MHz

### Test Results

The requirements are:

- ☒ PASS  
☐ NOT PASS  
☐ NOT APPLICABLE

### Remarks

See Appendix A for test data.



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## **APPENDIX A – TEST DATA**

### **Conducted Emissions at Mains Power Ports**

HOT LINE

N/A

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NEUTRAL LINE

N/A

◆ 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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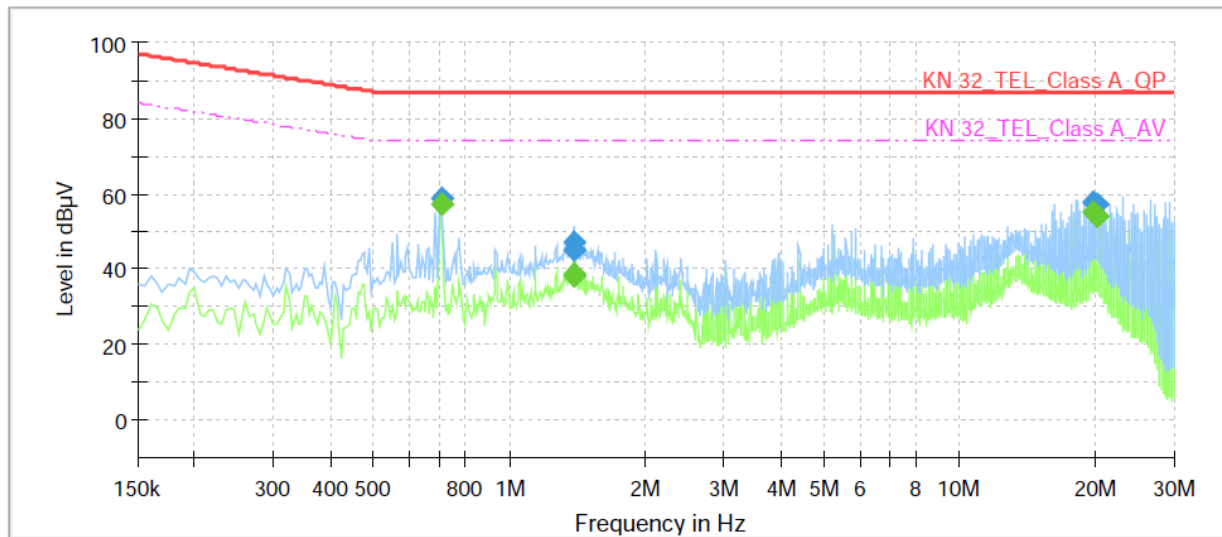
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## Conducted Emissions at Telecommunication Ports

■ DC 12 V Mode  
 [100 Mbps]

### Common Information

Test Description: Telecommunication Emission  
 Model No.: QNB-6002  
 Mode: DC 12 V\_100 Mbps  
 Operator Name: KES



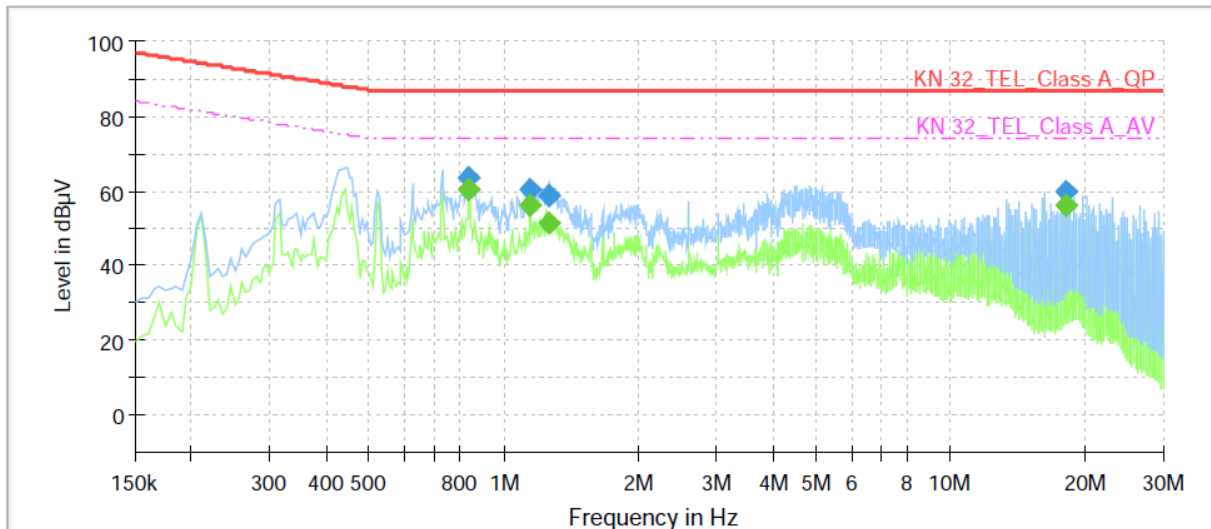
### Final Result

| Frequency (MHz) | QuasiPeak (dBμV) | CAverage (dBμV) | Limit (dBμV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line        | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|-------------|------------|
| 0.705000        | ---              | 57.39           | 74.00        | 16.61       | 1000.0          | 9.000           | Single Line | 11.2       |
| 0.705000        | 58.49            | ---             | 87.00        | 28.51       | 1000.0          | 9.000           | Single Line | 11.2       |
| 1.390000        | ---              | 38.65           | 74.00        | 35.35       | 1000.0          | 9.000           | Single Line | 10.2       |
| 1.390000        | 47.09            | ---             | 87.00        | 39.91       | 1000.0          | 9.000           | Single Line | 10.2       |
| 1.395000        | ---              | 38.29           | 74.00        | 35.71       | 1000.0          | 9.000           | Single Line | 10.2       |
| 1.395000        | 45.19            | ---             | 87.00        | 41.81       | 1000.0          | 9.000           | Single Line | 10.2       |
| 19.710000       | ---              | 55.13           | 74.00        | 18.87       | 1000.0          | 9.000           | Single Line | 10.3       |
| 19.710000       | 57.82            | ---             | 87.00        | 29.18       | 1000.0          | 9.000           | Single Line | 10.3       |
| 20.260000       | ---              | 54.13           | 74.00        | 19.87       | 1000.0          | 9.000           | Single Line | 10.3       |
| 20.260000       | 57.23            | ---             | 87.00        | 29.77       | 1000.0          | 9.000           | Single Line | 10.3       |

■ PoE Mode  
[100 Mbps]

## Common Information

|                   |                            |
|-------------------|----------------------------|
| Test Description: | Telecommunication Emission |
| Model No.:        | QNB-6002                   |
| Mode              | 100 Mbps                   |
| Operator Name:    | KES                        |



## Final Result

| Frequency (MHz) | QuasiPeak (dBμV) | CAverage (dBμV) | Limit (dBμV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line        | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|-------------|------------|
| 0.835000        | ---              | 60.12           | 74.00        | 13.88       | 1000.0          | 9.000           | Single Line | 11.2       |
| 0.835000        | 63.49            | ---             | 87.00        | 23.51       | 1000.0          | 9.000           | Single Line | 11.2       |
| 1.150000        | ---              | 56.07           | 74.00        | 17.93       | 1000.0          | 9.000           | Single Line | 10.7       |
| 1.150000        | 60.45            | ---             | 87.00        | 26.55       | 1000.0          | 9.000           | Single Line | 10.7       |
| 1.260000        | ---              | 51.53           | 74.00        | 22.47       | 1000.0          | 9.000           | Single Line | 10.5       |
| 1.260000        | 58.62            | ---             | 87.00        | 28.38       | 1000.0          | 9.000           | Single Line | 10.5       |
| 18.245000       | ---              | 56.23           | 74.00        | 17.77       | 1000.0          | 9.000           | Single Line | 10.2       |
| 18.245000       | 59.92            | ---             | 87.00        | 27.08       | 1000.0          | 9.000           | Single Line | 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 (ISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))



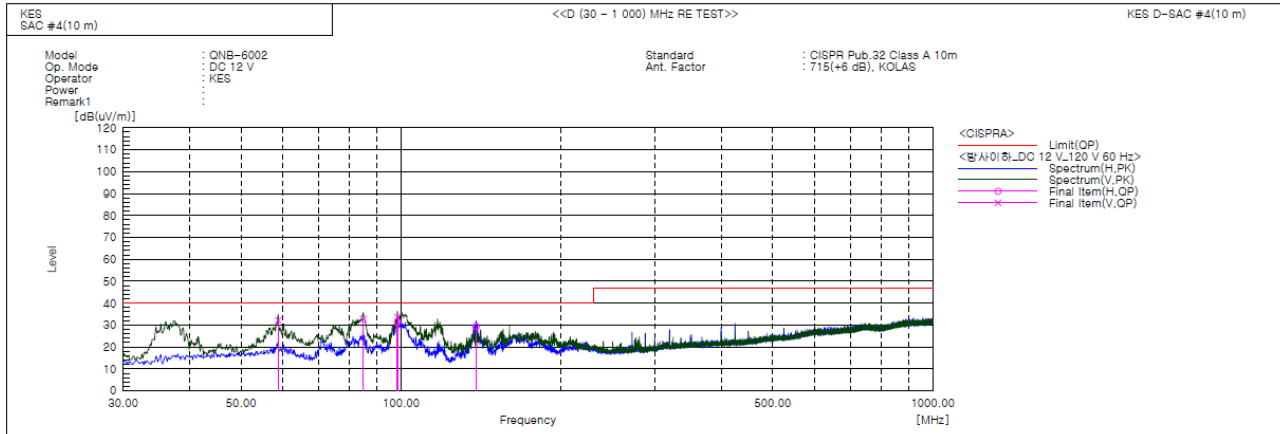
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### Radiated Electric Field Emissions(Below 1 GHz)

#### ■ DC 12 V 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   | 58.736             | V   | 54.3                      | -22.2            | 32.1                       | 40.0                      | 7.9                  | 172.0          | 120.0          |        |
| 2   | 84.926             | V   | 59.0                      | -26.2            | 32.8                       | 40.0                      | 7.2                  | 150.0          | 230.0          |        |
| 3   | 98.385             | H   | 53.7                      | -22.6            | 31.1                       | 40.0                      | 8.9                  | 350.0          | 9.0            |        |
| 4   | 98.430             | V   | 56.1                      | -22.6            | 33.5                       | 40.0                      | 6.5                  | 100.0          | 68.0           |        |
| 5   | 138.398            | H   | 55.5                      | -26.1            | 29.4                       | 40.0                      | 10.6                 | 400.0          | 165.0          |        |

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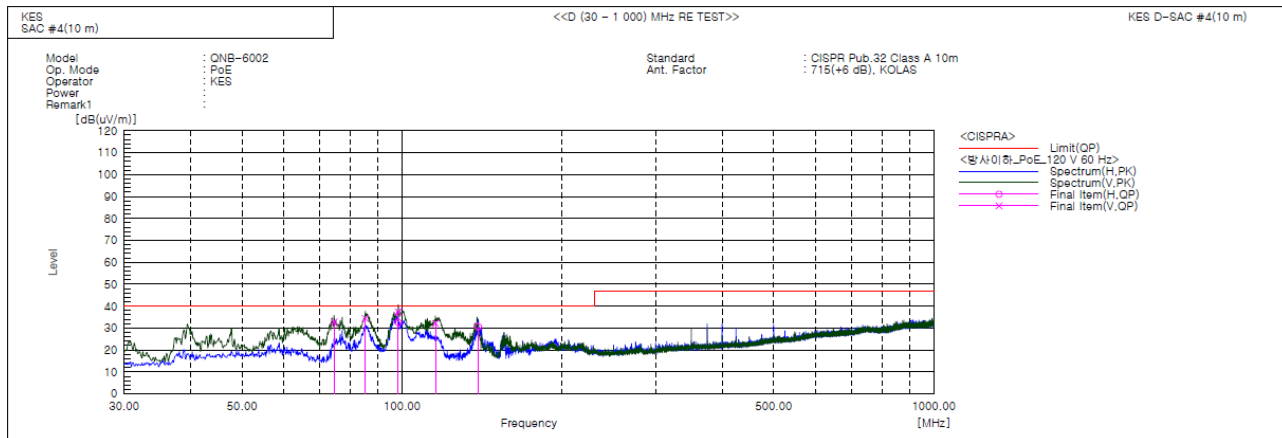


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### PoE Mode



### Final Result

| No. | Frequency (P) | Reading  | c.f       | Result     | Limit      | Margin | Height | Angle | Remark |
|-----|---------------|----------|-----------|------------|------------|--------|--------|-------|--------|
|     | [MHz]         | [dB(uV)] | [dB(1/m)] | [dB(uV/m)] | [dB(uV/m)] | [dB]   | [cm]   | [deg] |        |
| 1   | 74.499        | V 59.3   | -26.5     | 32.8       | 40.0       | 7.2    | 150.0  | 142.0 |        |
| 2   | 85.290        | V 60.5   | -26.1     | 34.4       | 40.0       | 5.6    | 134.0  | 150.0 |        |
| 3   | 98.385        | V 60.0   | -22.6     | 37.4       | 40.0       | 2.6    | 100.0  | 273.0 |        |
| 4   | 98.385        | H 55.1   | -22.6     | 32.5       | 40.0       | 7.5    | 400.0  | 258.0 |        |
| 5   | 115.603       | V 55.3   | -23.2     | 32.1       | 40.0       | 7.9    | 106.0  | 197.0 |        |
| 6   | 139.125       | H 56.7   | -26.1     | 30.6       | 40.0       | 9.4    | 350.0  | 39.0  |        |

### ◆ Calculation

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

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

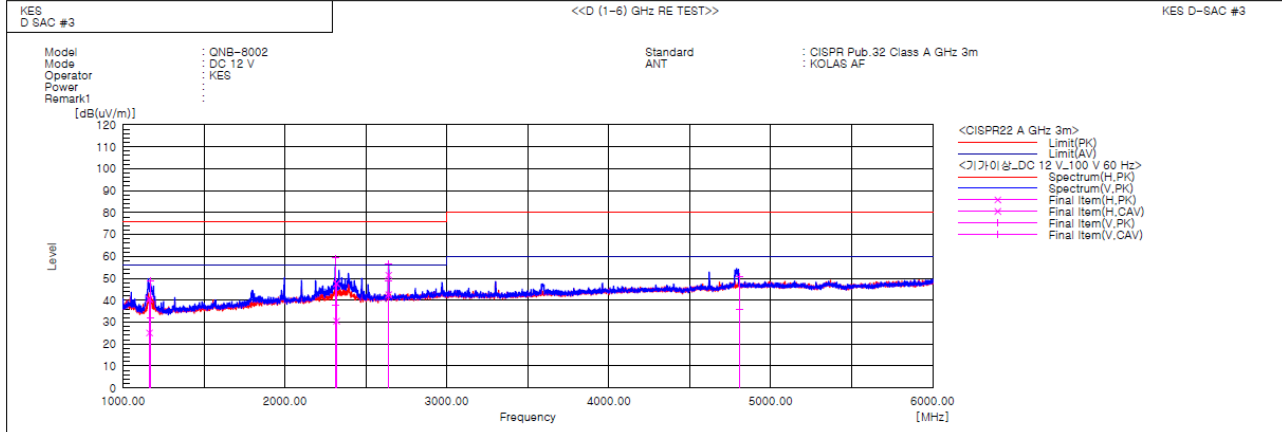
Correction Factor : ANT FACTOR + Cable loss

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## Radiated Electric Field Emissions(Above 1 GHz)

### ■ 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   | 1144.541        | V   | 70.2                | 39.9                 | -8.8          | 61.4                 | 31.1                  | 76.0                | 56.0                | 14.6           | 24.9            | 100.0       | 39.5        |        |
| 2   | 1151.470        | H   | 68.3                | 41.2                 | -8.8          | 59.5                 | 32.4                  | 76.0                | 56.0                | 16.5           | 23.6            | 100.0       | 65.4        |        |
| 3   | 2252.027        | V   | 58.9                | 40.2                 | -1.2          | 57.7                 | 39.0                  | 76.0                | 56.0                | 18.3           | 17.0            | 100.0       | 3.5         |        |
| 4   | 2276.443        | H   | 56.4                | 33.6                 | -1.1          | 55.3                 | 32.5                  | 76.0                | 56.0                | 20.7           | 23.5            | 100.0       | 351.0       |        |
| 5   | 2277.852        | V   | 66.0                | 39.1                 | -1.1          | 64.9                 | 38.0                  | 76.0                | 56.0                | 11.1           | 18.0            | 100.0       | 7.4         |        |
| 6   | 4800.308        | V   | 48.2                | 29.3                 | 7.5           | 55.7                 | 36.8                  | 80.0                | 60.0                | 24.3           | 23.2            | 100.0       | 33.7        |        |
| 7   | 4806.486        | H   | 39.9                | 26.3                 | 7.6           | 47.5                 | 33.9                  | 80.0                | 60.0                | 32.5           | 26.1            | 100.0       | 29.2        |        |

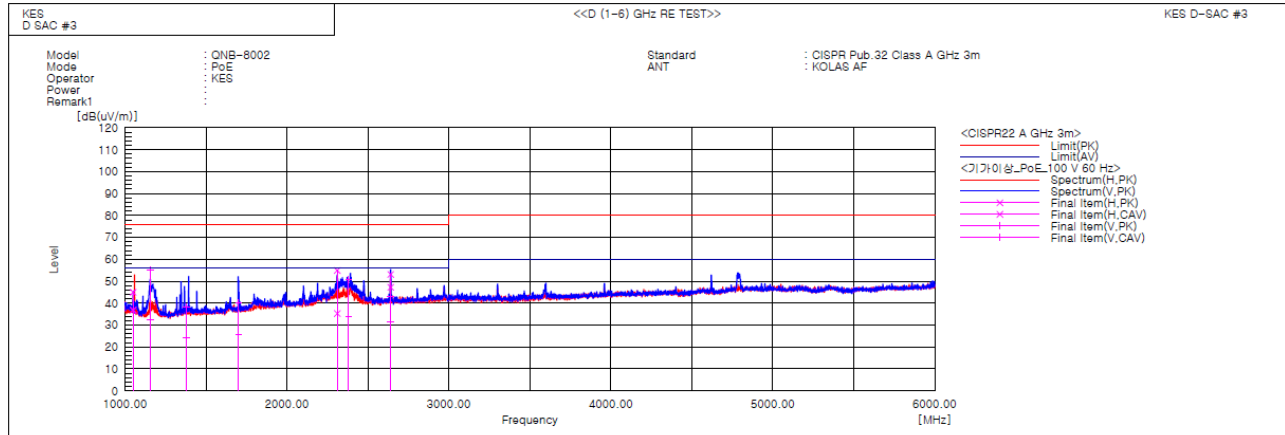


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### PoE Mode



#### 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   | 1150.891        | V   | 76.6                | 49.4                 | -8.8          | 67.8                 | 40.6                  | 76.0                | 56.0                | 8.2            | 15.4            | 100.0       | 352.9       |        |
| 2   | 1151.488        | V   | 74.9                | 49.1                 | -8.8          | 66.1                 | 40.3                  | 76.0                | 56.0                | 9.9            | 15.7            | 100.0       | 356.9       |        |
| 3   | 1158.387        | H   | 55.7                | 35.0                 | -8.8          | 46.9                 | 26.2                  | 76.0                | 56.0                | 29.1           | 29.8            | 100.0       | 180.2       |        |
| 4   | 2214.513        | H   | 50.6                | 32.8                 | -1.3          | 49.3                 | 31.5                  | 76.0                | 56.0                | 26.7           | 24.5            | 100.0       | 65.0        |        |
| 5   | 2227.715        | V   | 56.7                | 38.8                 | -1.3          | 55.4                 | 37.5                  | 76.0                | 56.0                | 20.6           | 18.5            | 100.0       | 15.1        |        |
| 6   | 2313.645        | V   | 50.6                | 33.9                 | -1.0          | 49.6                 | 32.9                  | 76.0                | 56.0                | 26.4           | 23.1            | 100.0       | 348.0       |        |
| 7   | 2795.231        | V   | 43.8                | 29.6                 | 0.7           | 44.5                 | 30.3                  | 76.0                | 56.0                | 31.5           | 25.7            | 100.0       | 35.4        |        |

### Calculation

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

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

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

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

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## **Test Setup Photos and Configuration**

### **Conducted Emissions at Mains Power Ports**

N/A

N/A

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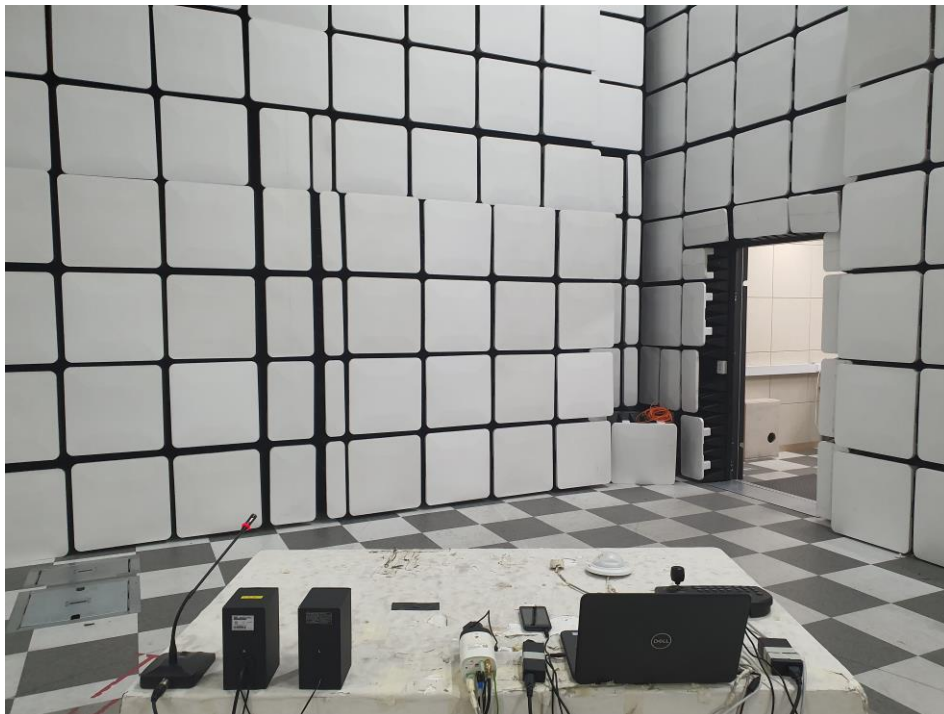
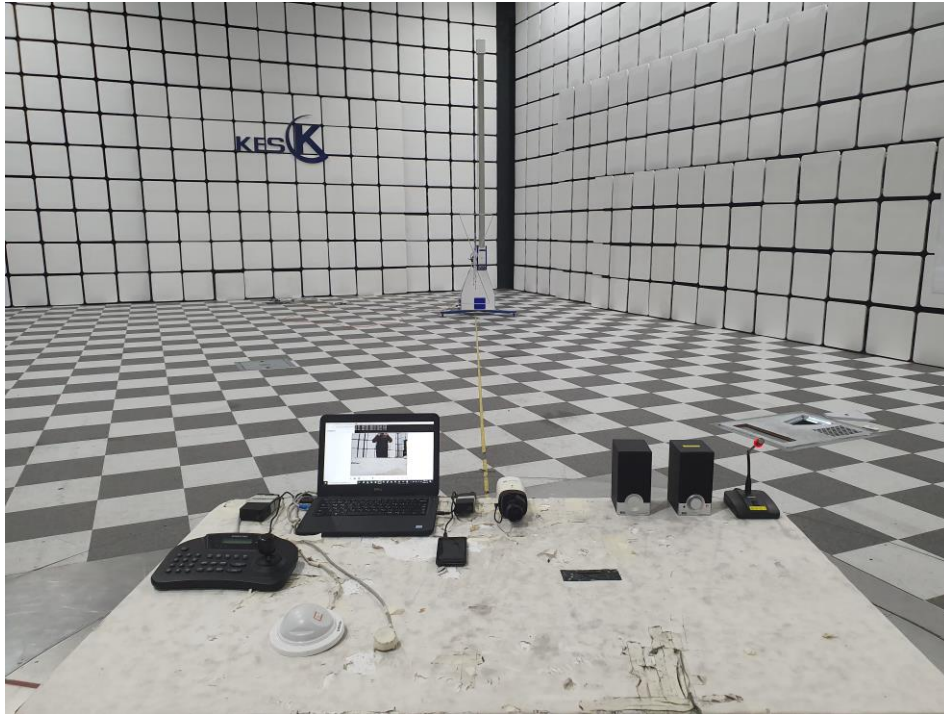
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## Conducted Emissions at Telecommunication Ports



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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)



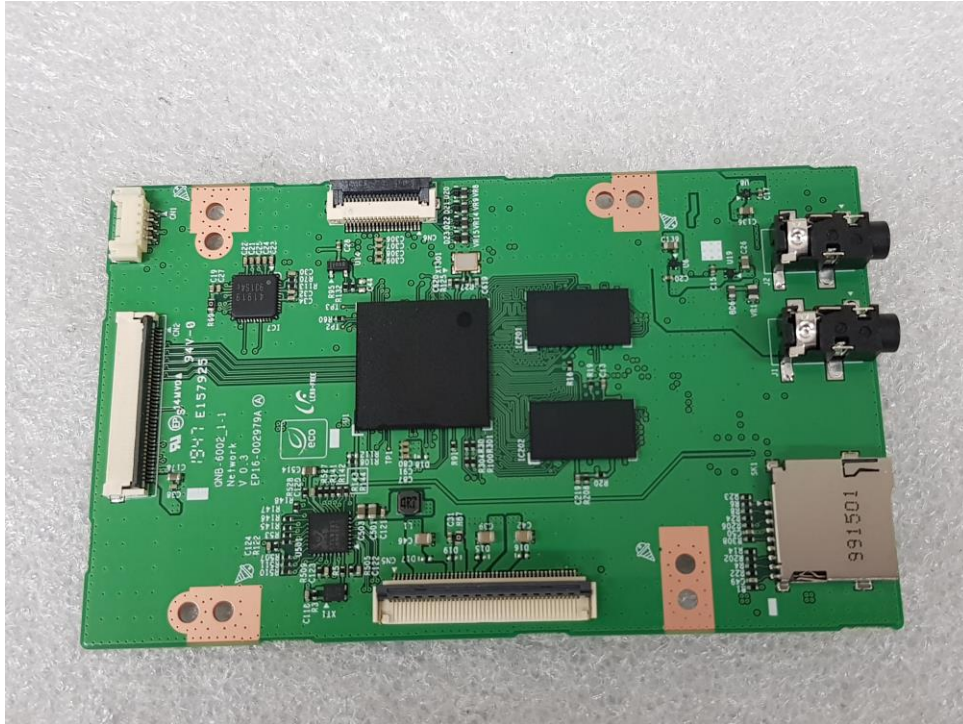
## **EUT Internal Photographs**

(Internal View)

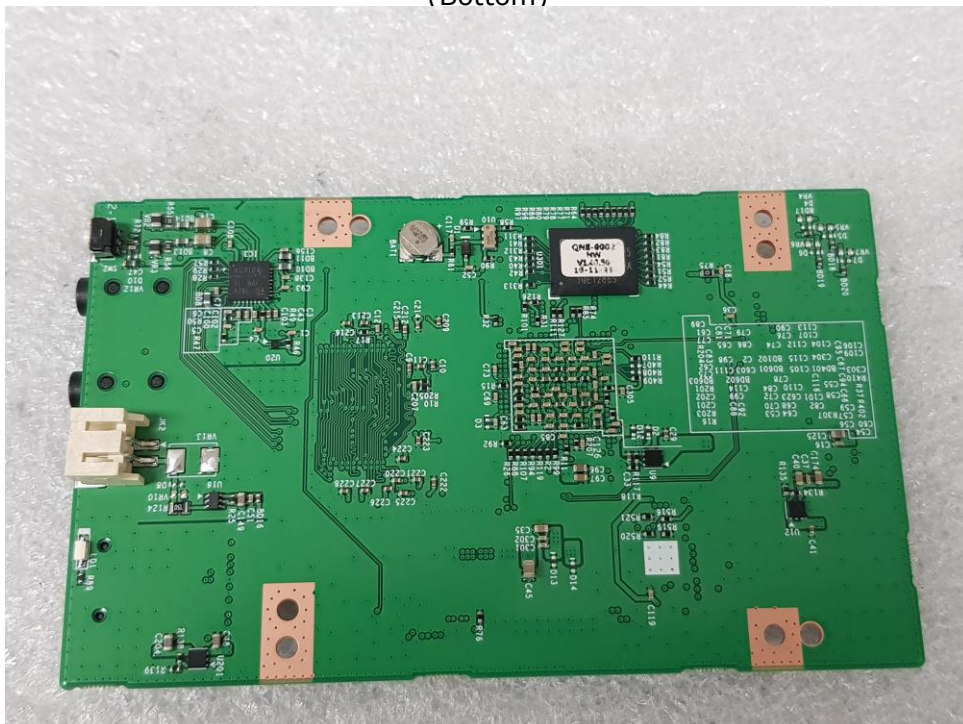


## EUT Internal View – Network Board

(Top)



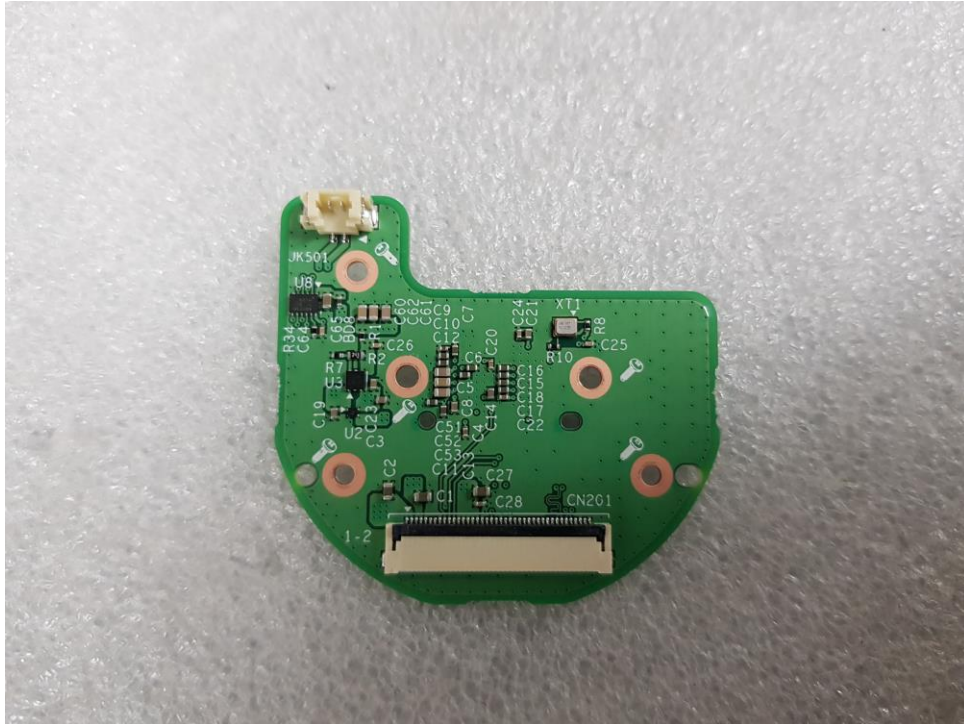
(Bottom)



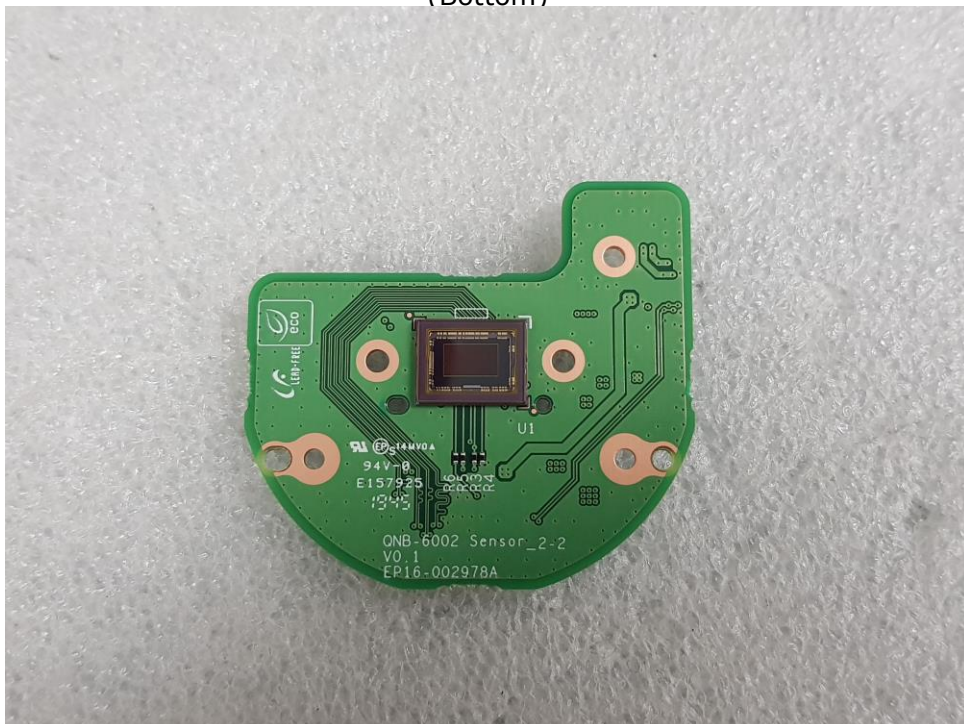
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## EUT Internal View – SENSOR Board

(Top)



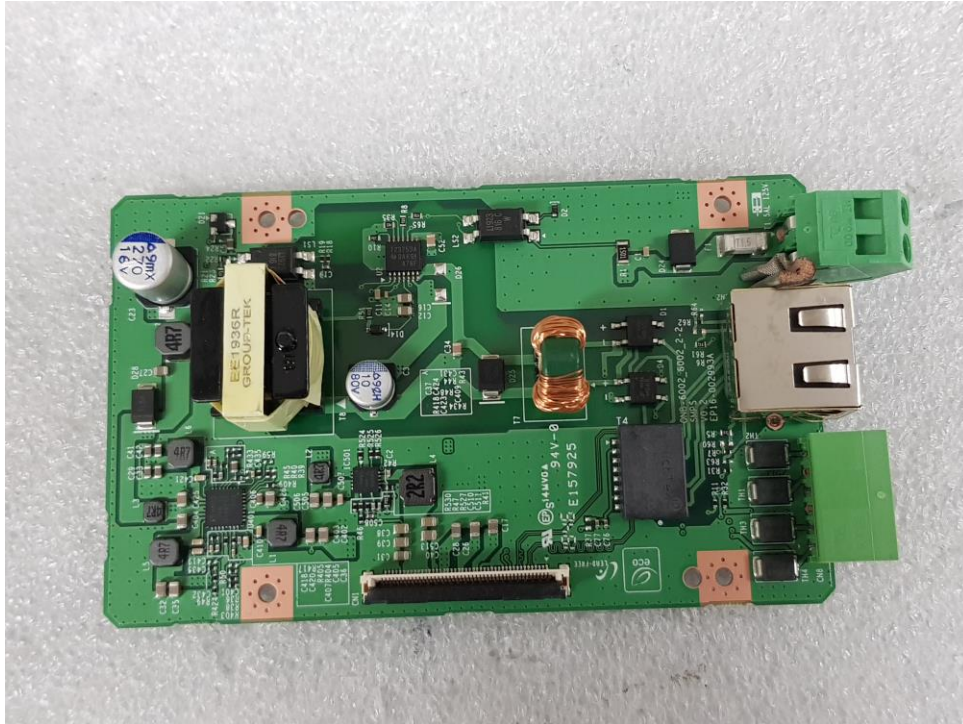
(Bottom)



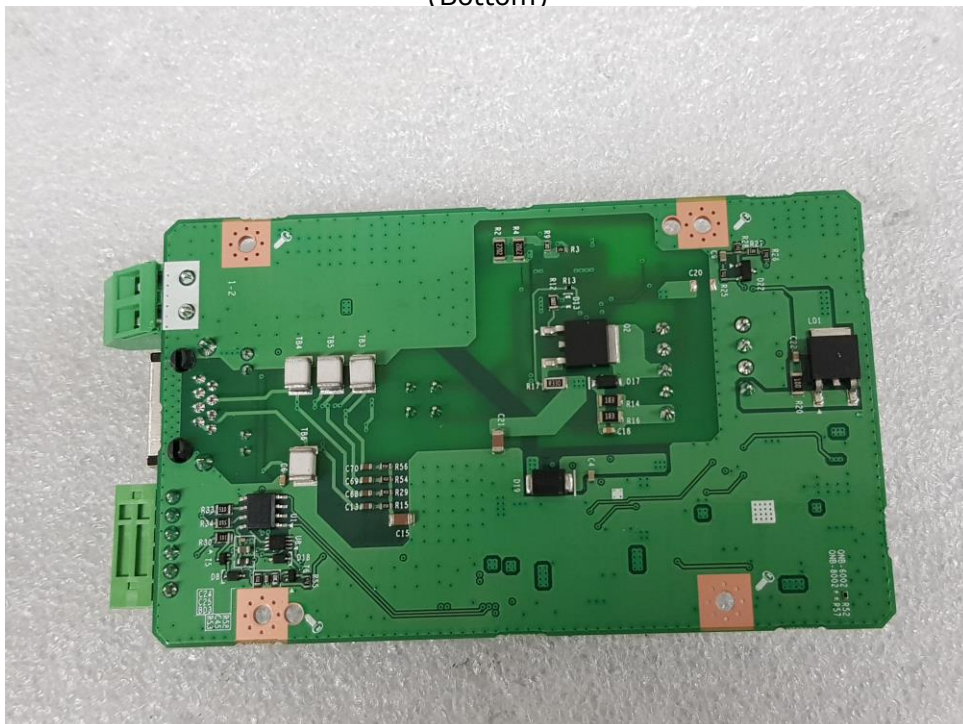
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## EUT Internal View – SMPS Board

(Top)

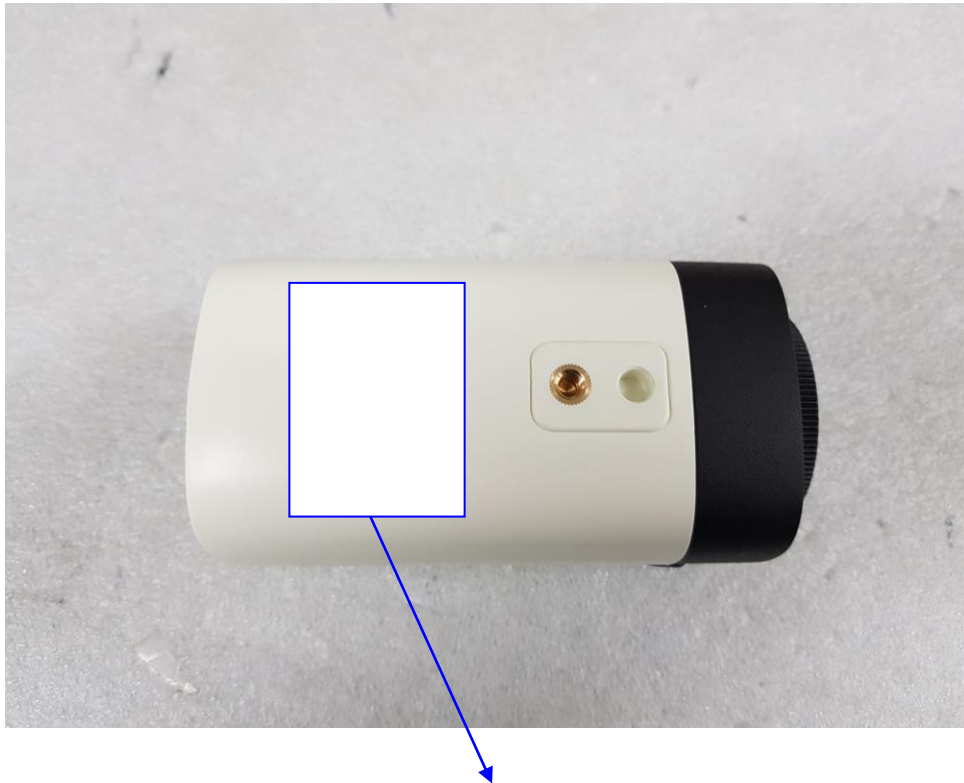


(Bottom)



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## Label Photographs



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VCCI-A