# EMC TEST REPORT

| | | |
|---|---|---|
| Test Report No. | : | KES-E1-18T0354 |
| Date of Issue | : | Jun. 26, 2018 |
| Product name | : | 2M LENS Module |
| Model/Type No. | : | SLA-2M2800Q |
| Variant Mode | : | - |
| Applicant | : | Hanwha Techwin Co., Ltd. |
| Applicant Address | : | 6, Pangyo-ro 319 Beon-gil, Bundang-gu, Seongnam-si, Gyeonggi-do, 13488, KOREA |
| Manufacturer | : | 1. Hanwha Techwin (Tianjin) Co.,Ltd.<br>2. HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.<br>3. D-TECH CO.,LTD. |
| Manufacturer Address | : | 1. No.11 Weiliu Rd,Micro-Electronic Industrial Park, TEDA,Tianjin, 300385,People's Republic of China<br>2. Lot O-2, Que Vo Industrial Zone extended area, Nam Son commune, Bac Ninh city, Bac Ninh province, Vietnam<br>3. 173-25, Saneop-ro, Gwonseon-gu, Suwon-si, Gyeonggi- do, Korea (Suwon Industrial Complex) |
| Equipment authorization | : | **Supply's Declaration of Conformity** |
| Date of Receipt | : | Jun. 12, 2018 |
| Test date | : | Jun. 16, 2018 |
| 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 KOLAS.

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# REPORT REVISION HISTORY

| Date | Test Report No. | Revision History |
|---|---|---|
| Jun. 26, 2018 | KES-E1-18T0354 | Issued |
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# 1.0 General Product Description

## Main Specifications of EUT are:

| | SLA-2M2800Q |
|---|---|
| **Video** | |
| Imaging Device | 1/2.8" 2M CMOS |
| Total Pixels | 1945(H) x 1109(V) 2.16M |
| Effective Pixels | 1945(H) x 1097(V) 2.13M |
| Scanning System | Progressive Scan |
| Min. Illumination | Color : 0.055Lux(F2.0, 1/30sec, 30IRE)<br>B/W : 0.055Lux(F2.0, 1/30sec, 30IRE) |
| S / N Ratio | 50dB |
| Wide Dynamic Range | 150dB |
| Day & Night | Electrical |
| **Lens** | |
| Focal Length (Zoom Ratio) | 2.8mm |
| Max. Aperture Ratio | F2.0 |
| Lens Type | Fixed focal |
| Mount Type | M12 Lens module with main unit |
| **Mechanical** | |
| Color / Material | Black / Plastic |

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## 1.1 Test Voltage & Frequency

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

Voltage ☐ 230 Vac ☒ 120 Vac ☐ 24 Vac ☐ 12 Vdc ☐ PoE

Frequency ☐ 50 Hz ☒ 60 Hz ☐ Hz

## 1.2 Variant Model Differences

Not applicable

## 1.3 Device Modifications

Not applicable

## 1.4 Equipment Under Test

| Description | Model Number | Serial Number | Manufacturer | Remarks |
|---|---|---|---|---|
| 2M LENS Module | SLA-2M2800Q | - | Hanwha Techwin (Tianjin) Co.,Ltd | E.U.T |

## 1.5 Support Equipments

| Description | Model Number | Serial Number | Manufacturer | Remarks |
|---|---|---|---|---|
| Notebook | ProBook4430s | - | HP | - |
| Notebook Adaptor | SeriesPPP0009H | - | CHICONY POWER TECHNOLOGY (SUZHOU) CO.,LTD, | - |
| NETWORK CAMERA | PNM-9000VQ | - | Hanwha Techwin (Tianjin) Co.,Ltd | - |
| 2M LENS Module | SLA-2M2400Q | - | Hanwha Techwin (Tianjin) Co.,Ltd | 1EA |
| 2M LENS Module | SLA-2M3600Q | | Hanwha Techwin (Tianjin) Co.,Ltd | 1EA |
| 2M LENS Module | SLA-2M6000Q | - | Hanwha Techwin (Tianjin) Co.,Ltd | 1EA |
| POE Adaptor | PT-PSE109GBRO-A | PT1817220025 | PROCET | - |

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## 1.6 External I/O Cabling

| Start | | END | | Cable Spec. | |
|---|---|---|---|---|---|
| **Description** | **I/O Port** | **Description** | **I/O Port** | **Length** | **Shield** |
| 2M LENS Module (EUT) | - | NETWORK CAMERA | - | - | - |
| NETWORK CAMERA | - | 2M LENS Module | - | - | - |
| | - | 2M LENS Module | - | - | - |
| | - | 2M LENS Module | - | - | - |
| | RJ-45 | POE Adaptor | RJ-45 | 4.0 | U |
| Notebook | RJ-45 | POE Adaptor | RJ-45 | 4.0 | U |

* Unshielded=U, Shielded=S

## 1.7 EUT Operating Mode(s)

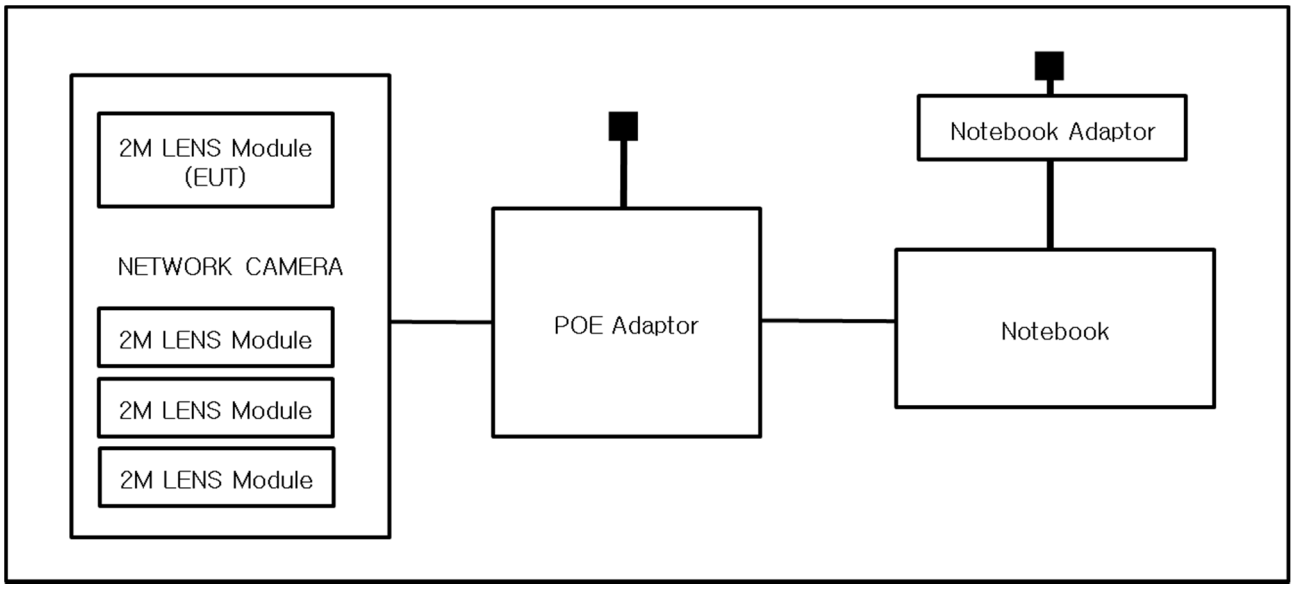
| Test mode | operating |
|---|---|
| POE | EUT Monitoring, Ping Test |

| EUT Test operating S/W | | |
|---|---|---|
| **Name** | **Version** | **Manufacture Company** |
| WebViewer | - | Hanwha Techwin Co., Ltd. |

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## 1.8 Configuration

■ AC Main
□ DC Main




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## 1.9 Remarks when standards applied

N/A

## 1.10 Calibration Details of Equipment Used for Measurement

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

## 1.11 Test Facility

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

## 1.12 Laboratory Accreditations and Listings

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

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# 2.0 Test Regulations

The emissions tests were performed according to following regulations:

☐ **EMC – Directive 2014/30/EU**

☐ EN 61000-6-3:2011

☐ EN 61000-6-1:2007

☐ EN 61000-6-4:2007 +A1:2011

☐ EN 61000-6-2:2005

| | | |
|---|---|---|
| ☐ EN 55011:2007 +A1:2010 | ☐ Group 1<br>☐ Class A | ☐ Group 2<br>☐ Class B |
| ☐ EN 55014-1:2006 +A2:2011 | | |
| ☐ EN 55014-2:1997 +A2:2008 | | |
| ☐ EN 55015:2013 | | |
| ☐ EN 55032:2015 | ☐ Class A | ☐ Class B |
| ☐ EN 55024:2010 | | |
| ☐ EN 50130-4:2011 +A1:2014 | | |
| ☐ EN 61000-3-2:2014 | | |
| ☐ EN 61000-3-3:2013 | | |
| ☐ EN 61326-1:2013 | | |

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| | | |
|---|---|---|
| ☐ **VCCI V-3 / 2015.04** | ☐ Class A | ☐ Class B |
| ☐ **AS/NZS:2013** | ☐ Class A | ☐ Class B |
| ☒ **47 CFR Part 15, Subpart B** | | |
| ☐ CISPR 22:2009 +A1:2010 | ☐ Class A | ☐ Class B |
| ☒ ANSI C63.4-2014 | ☒ Class A | ☐ Class B |
| ☒ **IC Regulation ICES-003 : 2016** | | |
| ☐ CAN/CSA CISPR 22-10 | ☐ Class A | ☐ Class B |
| ☒ ANSI C63.4-2014 | ☒ Class A | ☐ Class B |
| ☐ **RE– Directive 2014/53/EU** | | |
| ☐ EN 301 489-1 V1.9.2 | | |
| ☐ Equipment for fixed use | | |
| ☐ Equipment for vehicular use | | |
| ☐ Equipment for portable use | | |
| ☐ EN 301 489-3 V1.6.1 | | |
| ☐ EN 301 489-17 V2.2.1 | | |
| ☐ EN 60945:2002 | | |

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# 2.1 Conducted Emissions at Mains Power Ports

**Test Date**
Jun. 16, 2018

**Test Location**
Electro wave Shieldroom #3

**Test Equipment**

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

**Test Conditions**
Temperature: 23,2 ℃
Relative Humidity: 49,0 % R.H.

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

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

**Test Results**
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

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

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# 2.2 Radiated Electric Field Emissions(Below 1 ㎓)

**Test Date**
Jun. 16, 2018

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

**Test Equipment**

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

**Test Conditions**
Temperature: 23,0 ℃
Relative Humidity: 55,7 % R.H.

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

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

**Test Results**
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

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

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# 2.3 Radiated Electric Field Emissions(Above 1 ㎓)

**Test Date**
Jun. 16, 2018

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

**Test Equipment**

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

**Test Conditions**
Temperature: 23,0 ℃
Relative Humidity: 55,8 % R.H.

**Frequency Range of Measurement**
1 ㎓ to 6 ㎓

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

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

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

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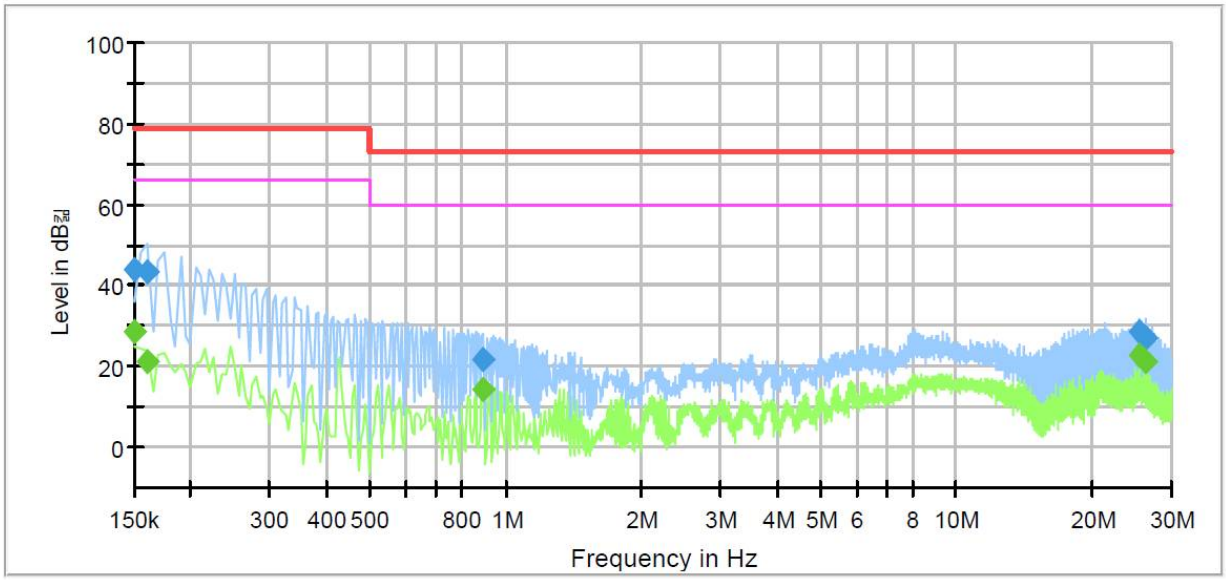
# APPENDIX A – TEST DATA

## Conducted Emissions at Mains Power Ports

HOT LINE

## Common Information

| | |
|---|---|
| Test Description: | Conducted Emission |
| Model No.: | SLA-2M2800Q |
| Mode | FCC |
| Operator Name: | KES |




## Final_Result

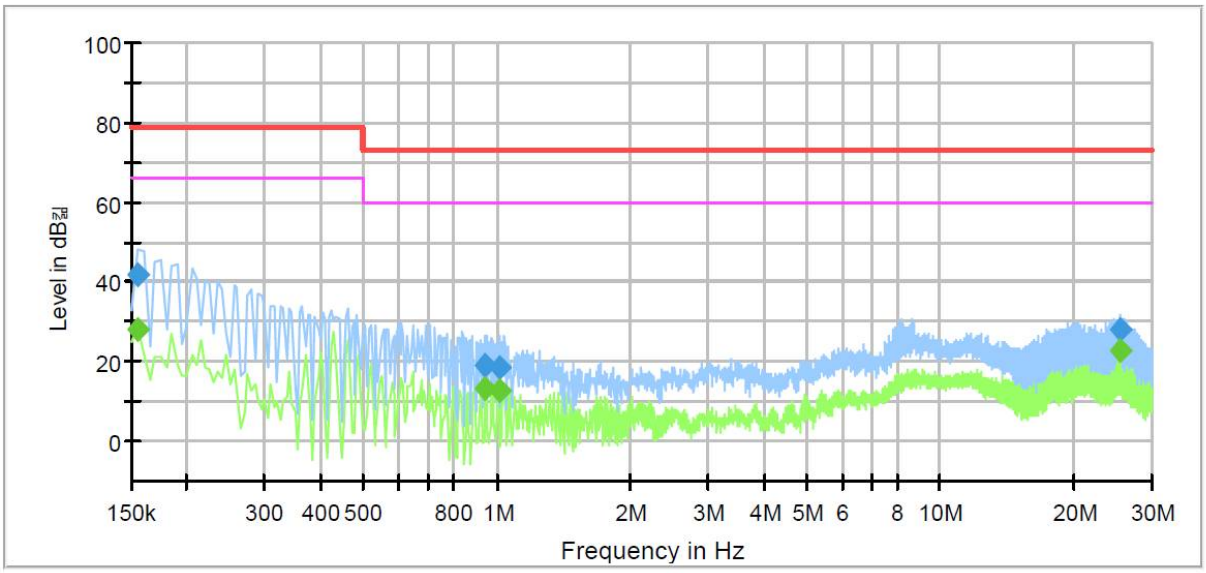
| Frequency (MHz) | QuasiPeak (dBµV) | CAverage (dBµV) | Limit (dBµV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|---|---|---|---|---|---|---|---|---|
| 0.150000 | --- | 28.84 | 66.00 | 37.16 | 1000.0 | 9.000 | L1 | 9.6 |
| 0.150000 | 43.94 | --- | 79.00 | 35.06 | 1000.0 | 9.000 | L1 | 9.6 |
| 0.160000 | --- | 20.97 | 66.00 | 45.03 | 1000.0 | 9.000 | L1 | 9.6 |
| 0.160000 | 43.29 | --- | 79.00 | 35.71 | 1000.0 | 9.000 | L1 | 9.6 |
| 0.890000 | --- | 14.12 | 60.00 | 45.88 | 1000.0 | 9.000 | L1 | 10.0 |
| 0.890000 | 21.64 | --- | 73.00 | 51.36 | 1000.0 | 9.000 | L1 | 10.0 |
| 25.555000 | --- | 22.66 | 60.00 | 37.34 | 1000.0 | 9.000 | L1 | 10.2 |
| 25.555000 | 28.44 | --- | 73.00 | 44.56 | 1000.0 | 9.000 | L1 | 10.2 |
| 26.345000 | --- | 21.20 | 60.00 | 38.80 | 1000.0 | 9.000 | L1 | 10.2 |
| 26.345000 | 27.12 | --- | 73.00 | 45.88 | 1000.0 | 9.000 | L1 | 10.2 |

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NEUTRAL LINE

## Common Information

| | |
|---|---|
| Test Description: | Conducted Emission |
| Model No.: | SLA-2M2800Q |
| Mode | FCC |
| Operator Name: | KES |



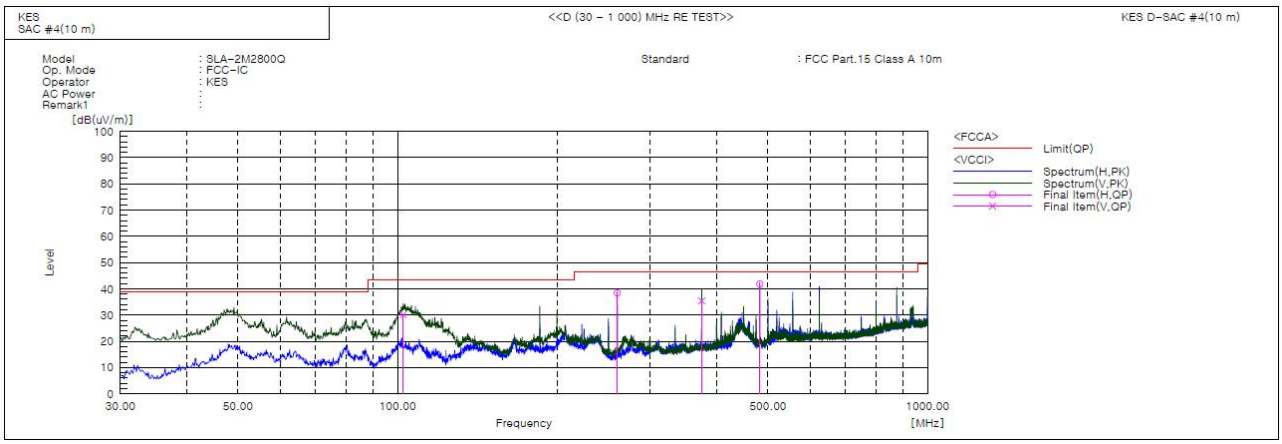

## Final_Result

| Frequency (MHz) | QuasiPeak (dBµV) | CAverage (dBµV) | Limit (dBµV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|---|---|---|---|---|---|---|---|---|
| 0.155000 | --- | 28.06 | 66.00 | 37.94 | 1000.0 | 9.000 | N | 9.6 |
| 0.155000 | 41.77 | --- | 79.00 | 37.23 | 1000.0 | 9.000 | N | 9.6 |
| 0.945000 | --- | 13.35 | 60.00 | 46.65 | 1000.0 | 9.000 | N | 10.0 |
| 0.945000 | 19.13 | --- | 73.00 | 53.87 | 1000.0 | 9.000 | N | 10.0 |
| 1.010000 | --- | 12.92 | 60.00 | 47.08 | 1000.0 | 9.000 | N | 10.0 |
| 1.010000 | 18.60 | --- | 73.00 | 54.40 | 1000.0 | 9.000 | N | 10.0 |
| 25.360000 | --- | 22.64 | 60.00 | 37.36 | 1000.0 | 9.000 | N | 10.2 |
| 25.360000 | 28.20 | --- | 73.00 | 44.80 | 1000.0 | 9.000 | N | 10.2 |

◆ Calculation
QuasiPeak[dBuV] / CAverage [dBuV] = Reading Value[dBuV] + Corr. [dB]
QuasiPeak / CAverage : The Final Value
Reading Value : Not shown in the table.
Corr. : Correction values (LISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

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## Radiated Electric Field Emissions(Below 1 ㎓)



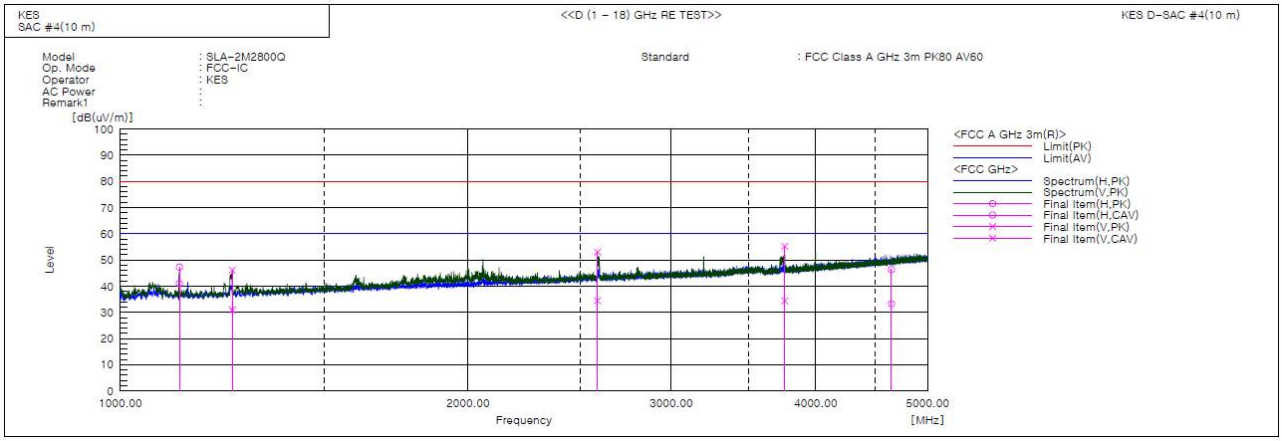

Final Result

| 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 | 102.508 | V | 59.2 | -29.1 | 30.1 | 43.5 | 13.4 | 150.0 | 176.0 | |
| 2 | 259.890 | H | 64.5 | -26.1 | 38.4 | 46.5 | 8.1 | 400.0 | 248.0 | |
| 3 | 374.956 | V | 57.8 | -22.4 | 35.4 | 46.5 | 11.1 | 400.0 | 231.0 | |
| 4 | 482.626 | H | 61.2 | -19.4 | 41.8 | 46.5 | 4.7 | 200.0 | 116.0 | |

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

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## Radiated Electric Field Emissions(Above 1 ㎓)




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 | 1124.930 | H | 53.6 | 47.3 | -6.3 | 47.3 | 41.0 | 80.0 | 60.0 | 32.7 | 19.0 | 177.0 | 208.0 | |
| 2 | 1249.655 | V | 51.2 | 36.0 | -5.1 | 46.1 | 30.9 | 80.0 | 60.0 | 33.9 | 29.1 | 100.0 | 303.0 | |
| 3 | 2589.100 | V | 50.6 | 32.0 | 2.4 | 53.0 | 34.4 | 80.0 | 60.0 | 27.0 | 25.6 | 100.0 | 21.0 | |
| 4 | 3762.055 | V | 48.7 | 27.9 | 6.5 | 55.2 | 34.4 | 80.0 | 60.0 | 24.8 | 25.6 | 172.0 | 233.0 | |
| 5 | 4653.710 | H | 36.1 | 23.1 | 10.2 | 46.3 | 33.3 | 80.0 | 60.0 | 33.7 | 26.7 | 242.0 | 344.0 | |

♦ Calculation

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

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

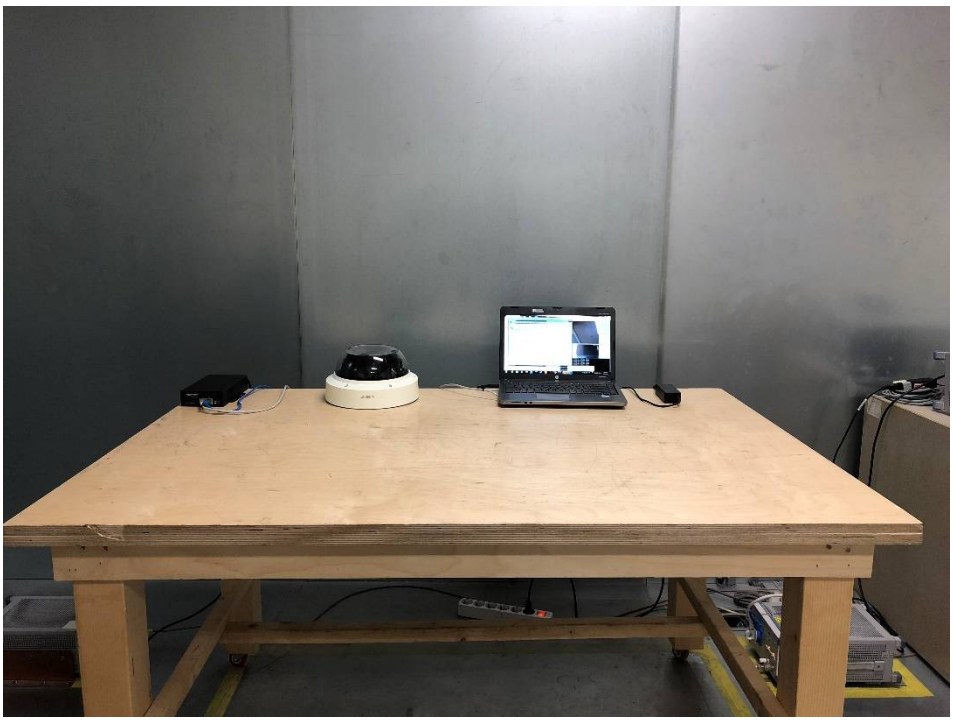
Reading(PK/CAV) : Reading value, Result(PK/CAV) : Reading value + Factor value

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

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# Test Setup Photos and Configuration

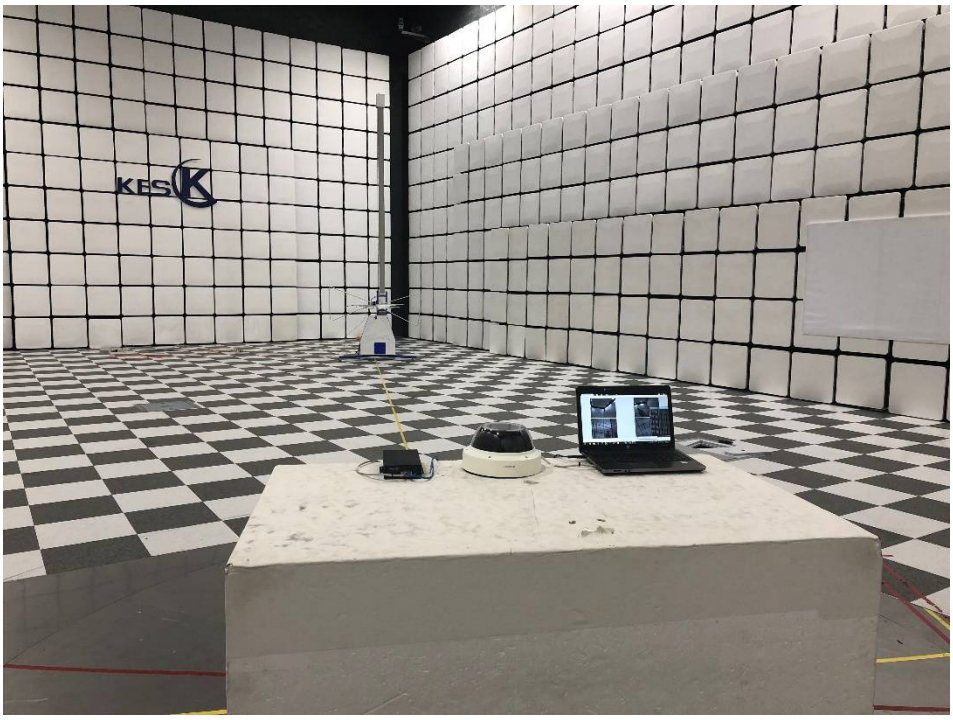
## Conducted Voltage Emissions

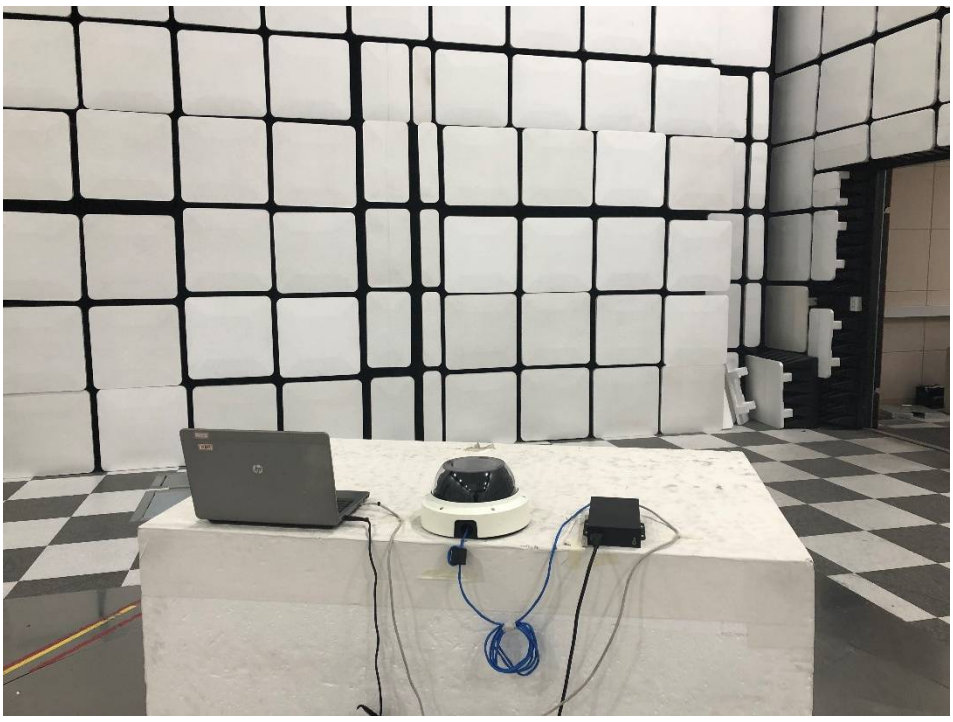




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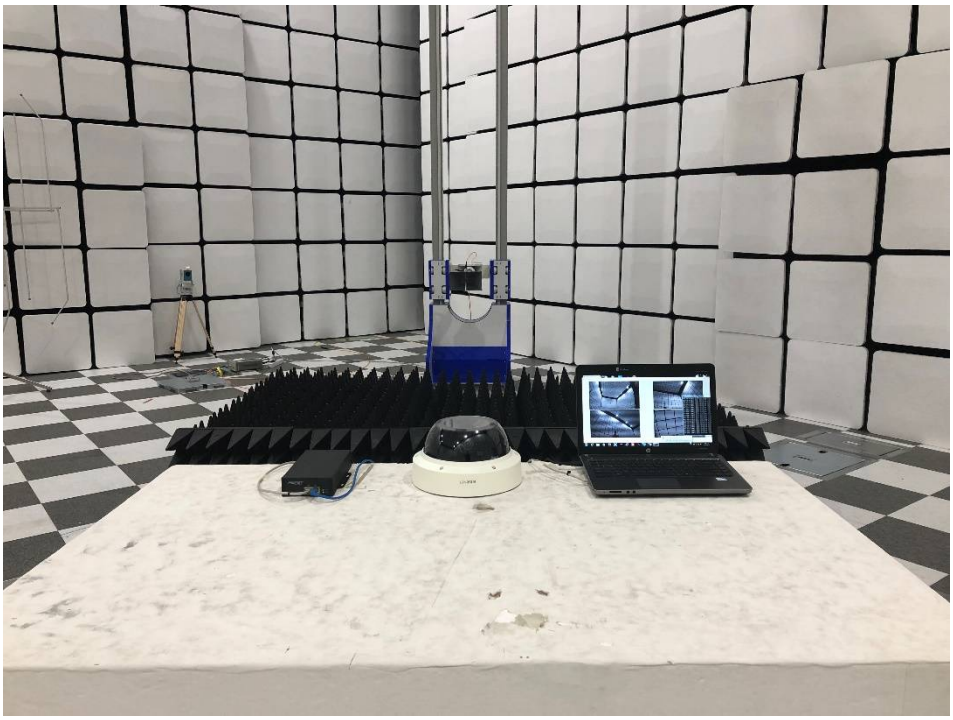
## Radiated Electric Field Emissions(Below 1 ㎓)

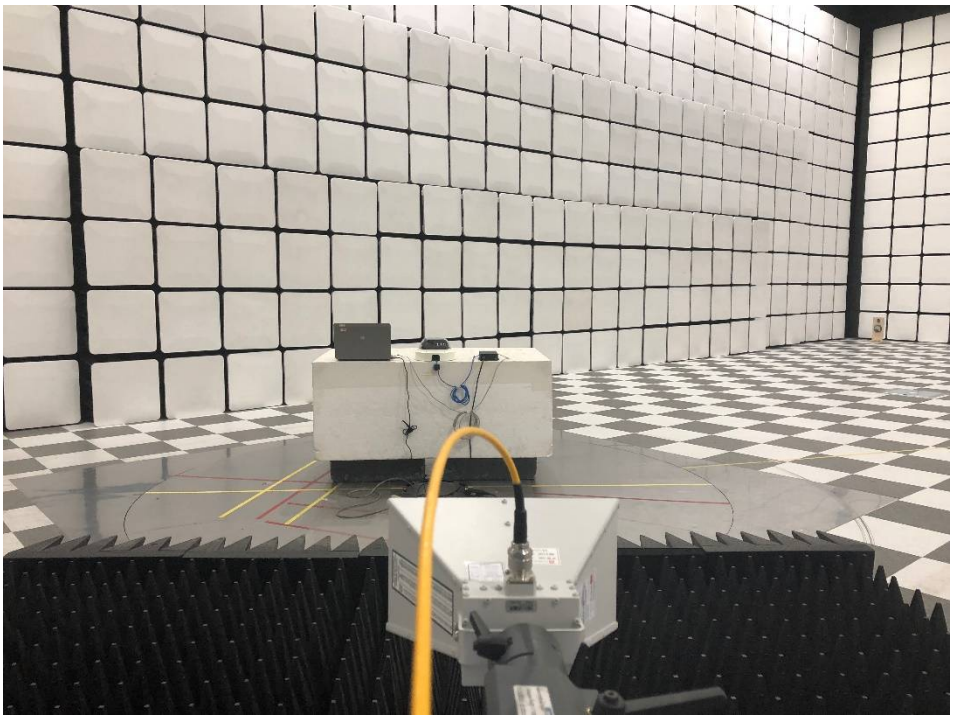




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## Radiated Electric Field Emissions(Above 1 ㎓)





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# EUT External Photographs

(Top)



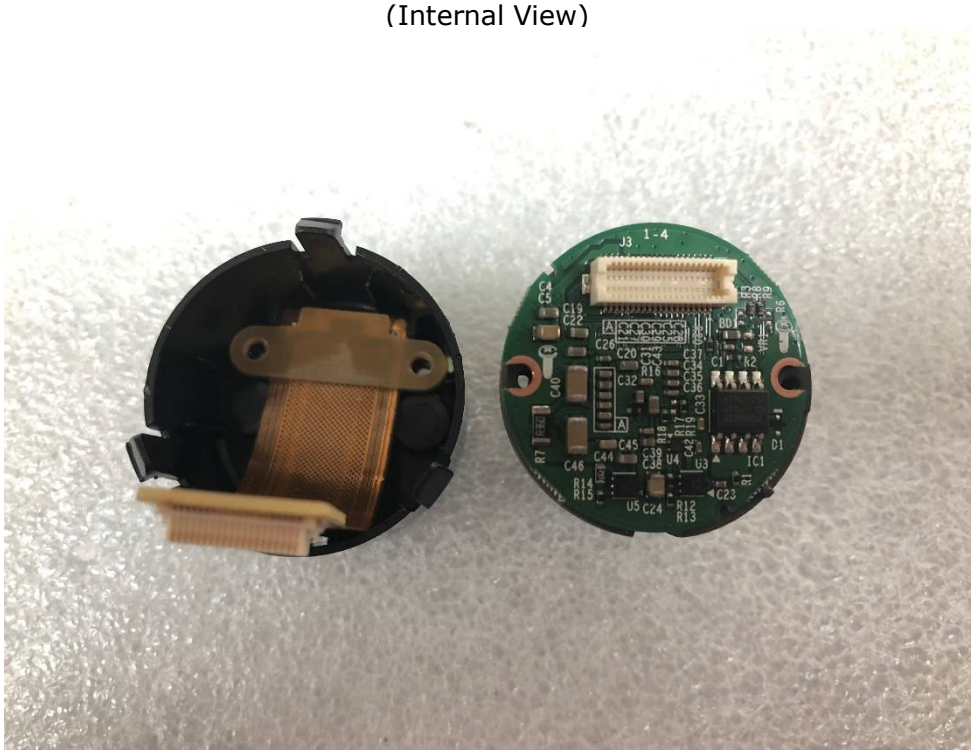

(Bottom)



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# EUT Internal Photographs

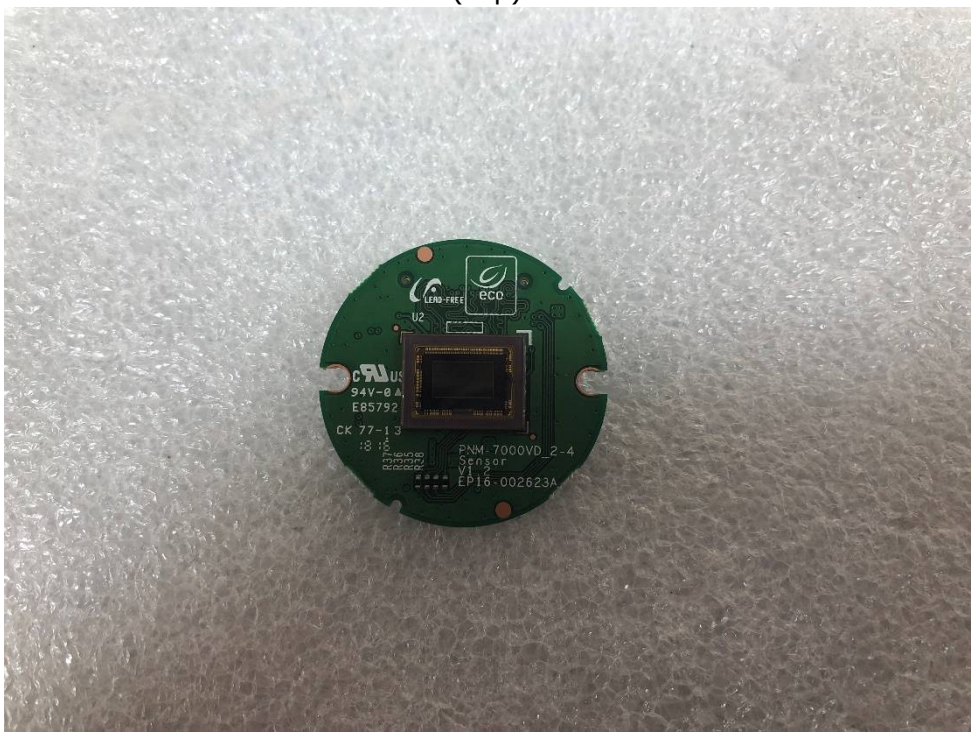
(Internal View)



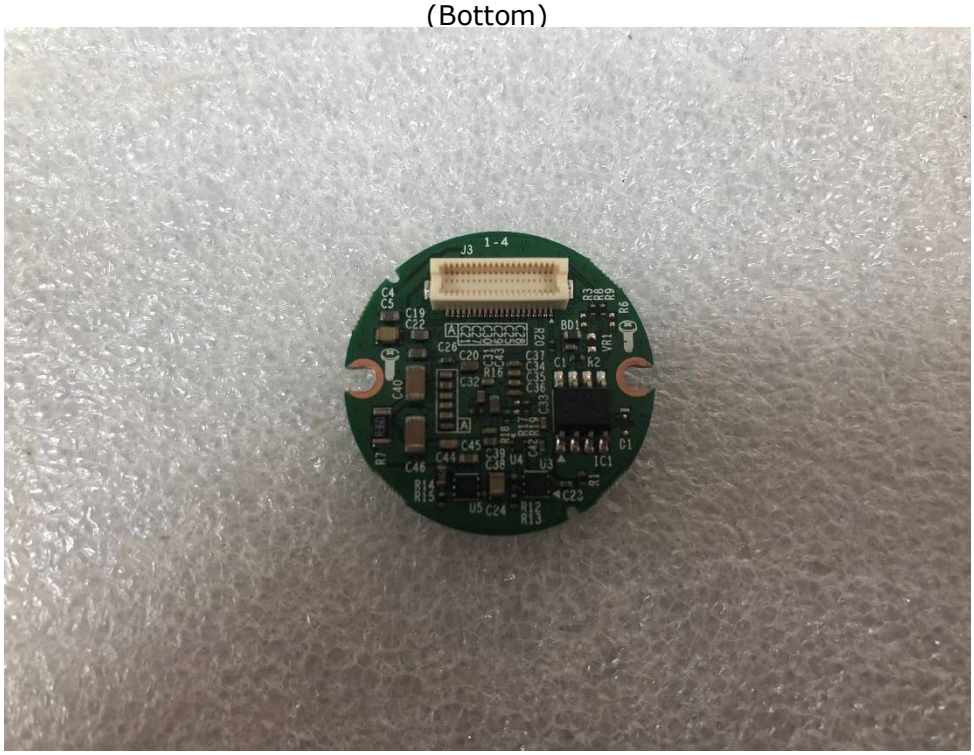

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# EUT Internal View – Board 1

(Top)




(Bottom)




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# Label Photographs



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

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

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