



## EMC TEST REPORT For CE

Test Report No. : KES-EM-20T0508  
Date of Issue : Aug. 05, 2020  
Product name : ANALOG CAMERA  
Model/Type No. : SCO-6025R  
Variant Model : -  
Applicant : Hanwha Techwin Co., Ltd.  
Applicant Address : 6, Pangyo-ro 319Beon-gil, Bundang-gu, Seongnam-si,  
Gyeonggi-do, Republic of Korea  
Manufacturer : 1. HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.  
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 : Jul. 17, 2020  
Test date : Jul. 30, 2020 ~ Jul. 31, 2020  
Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by

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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 No.:  
KES-EM-20T0508  
Page (2) of (56)

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**REPORT REVISION HISTORY**

| Date          | Test Report No. | Revision History |
|---------------|-----------------|------------------|
| Aug. 05, 2020 | KES-EM-20T0508  | Issued           |
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## TABLE OF CONTENTS

|                                                                       |                                                            |    |
|-----------------------------------------------------------------------|------------------------------------------------------------|----|
| 1.0                                                                   | General Product Description .....                          | 4  |
| 1.1                                                                   | Test Voltage & Frequency .....                             | 6  |
| 1.2                                                                   | Variant Model Differences.....                             | 6  |
| 1.3                                                                   | Device Modifications .....                                 | 6  |
| 1.4                                                                   | Equipment Under Test.....                                  | 6  |
| 1.5                                                                   | Support Equipments .....                                   | 6  |
| 1.6                                                                   | External I/O Cabling .....                                 | 7  |
| 1.7                                                                   | EUT Operating Mode(s) .....                                | 7  |
| 1.8                                                                   | Configuration.....                                         | 8  |
| 1.9                                                                   | Remarks when standards applied .....                       | 9  |
| 1.10                                                                  | Calibration Details of Equipment Used for Measurement..... | 9  |
| 1.11                                                                  | Test Facility .....                                        | 9  |
| 1.12                                                                  | Laboratory Accreditations and Listings .....               | 9  |
| 2.0                                                                   | Test Regulations.....                                      | 10 |
| 2.1                                                                   | Conducted Emissions at Mains Power Ports.....              | 12 |
| 2.2                                                                   | Conducted Emissions at Telecommunication Ports .....       | 13 |
| 2.3                                                                   | Radiated Electric Field Emissions(Below 1 GHz) .....       | 14 |
| 2.4                                                                   | Radiated Electric Field Emissions(Above 1 GHz).....        | 15 |
| 2.5                                                                   | Harmonic Current Emissions.....                            | 16 |
| 2.6                                                                   | Voltage Fluctuations and Flicker .....                     | 17 |
| 3.0                                                                   | Criteria for compliance.....                               | 18 |
| 3.1                                                                   | Electrostatic Discharge.....                               | 20 |
| 3.2                                                                   | Radiated Electric Field Immunity .....                     | 23 |
| 3.3                                                                   | Electrical Fast Transients/Bursts .....                    | 26 |
| 3.4                                                                   | Surge Transients .....                                     | 28 |
| 3.5                                                                   | Conducted Disturbance .....                                | 31 |
| 3.6                                                                   | Voltage Dips and Short Interruptions .....                 | 33 |
| APPENDIX A – TEST DATA.....                                           |                                                            | 35 |
| Conducted Emissions at Mains Power Ports.....                         |                                                            | 35 |
| Conducted Emissions at Telecommunication Ports .....                  |                                                            | 37 |
| Radiated Electric Field Emissions(Below 1 GHz) .....                  |                                                            | 38 |
| Radiated Electric Field Emissions(Above 1 GHz).....                   |                                                            | 39 |
| Harmonic Current Emissions and Voltage Fluctuations and Flicker ..... |                                                            | 40 |
| Test Setup Photos and Configuration .....                             |                                                            | 43 |
| Conducted Emissions at Mains Power Ports.....                         |                                                            | 43 |
| Conducted Emissions at Telecommunication Ports .....                  |                                                            | 44 |
| Radiated Electric Field Emissions(Below 1 GHz) .....                  |                                                            | 45 |
| Radiated Electric Field Emissions(Above 1 GHz).....                   |                                                            | 46 |
| Harmonic Current Emissions and Voltage Fluctuations and Flicker ..... |                                                            | 47 |
| Electrostatic Discharge .....                                         |                                                            | 48 |
| Radiated Electric Field Immunity .....                                |                                                            | 48 |
| Electrical Fast Transients/Bursts .....                               |                                                            | 49 |
| Surge Transients.....                                                 |                                                            | 49 |
| Conducted Disturbance.....                                            |                                                            | 50 |
| Voltage Dips and Short Interruptions.....                             |                                                            | 50 |
| EUT External Photographs .....                                        |                                                            | 51 |
| EUT Internal Photographs .....                                        |                                                            | 52 |



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Report No.:  
KES-EM-20T0508  
Page (4) of (56)

## 1.0 General Product Description

### Main Specifications of EUT are:

| Video                       |                                                                                                                                                                               |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Imaging Device              | 1/2.8" 2M CMOS                                                                                                                                                                |
| Total Pixels                | 1,945(H) x 1,109(V) 2.16M pixels                                                                                                                                              |
| Effective Pixels            | 1,945(H) x 1,097(V) 2.13M pixels                                                                                                                                              |
| Scanning System             | Progressive Scan                                                                                                                                                              |
| Min. Illumination           | Color : 0.17Lux (F1.6, 1/30sec)<br>B/W : 0Lux(IR LED on)                                                                                                                      |
| S / N Ratio                 | 52dB (AGC off, Weight on)                                                                                                                                                     |
| Video Output                | BNC(AHD / TVI / CVI / CVBS Selectable)                                                                                                                                        |
| Resolution                  | 1920 x 1080                                                                                                                                                                   |
| Max. Framerate              | 30fps @1080p(N)                                                                                                                                                               |
| Lens Type                   |                                                                                                                                                                               |
| Focal Length (Zoom Ratio)   | 4mm fixed                                                                                                                                                                     |
| Max. Aperture Ratio         | F1.6                                                                                                                                                                          |
| Angular Field of View       | H:87.6 V:46.4 D:104.5                                                                                                                                                         |
| Min. Object Distance        | -                                                                                                                                                                             |
| Focus Control               | Manual                                                                                                                                                                        |
| Lens Type                   | Fixed                                                                                                                                                                         |
| Mount Type                  | Board-in type                                                                                                                                                                 |
| Auto Back Focus(ABF)        | -                                                                                                                                                                             |
| Operational                 |                                                                                                                                                                               |
| On Screen Display           | Multi-language Support(16)<br>English, Japanese, Spanish, French, Portuguese, Korean, German, Italian, Russian, Polish,<br>Czech, Romanian, Serbian, Swedish, Danish, Turkish |
| Camera Title                | Off / On (Displayed 15 characters)                                                                                                                                            |
| Day & Night                 | Auto (ICR) / Color / B/W                                                                                                                                                      |
| Backlight Compensation      | Off / User BLC / HLC / WDR                                                                                                                                                    |
| Wide Dynamic Range          | 120dB                                                                                                                                                                         |
| Contrast Enhancement        | -                                                                                                                                                                             |
| Digital Noise Reduction     | SSNR4 ( Off / On )                                                                                                                                                            |
| Defog                       | AUTO / MANUAL / OFF                                                                                                                                                           |
| Digital Image Stabilization | -                                                                                                                                                                             |
| Motion Detection            | Off / On(4 zones)                                                                                                                                                             |
| Privacy Masking             | Off / On (8 zones rectangle)                                                                                                                                                  |
| Gain Control                | Off / Low / Middle / High / Very High                                                                                                                                         |
| White Balance               | ATW / Outdoor / Indoor(4,500K <sup>o</sup> - 8,500K <sup>o</sup> ) / Manual / AWC (1,800K <sup>o</sup> - 10,500K <sup>o</sup> )                                               |

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Report No.:  
KES-EM-20T0508  
Page (5) of (56)

|                                  |                                                                                                               |
|----------------------------------|---------------------------------------------------------------------------------------------------------------|
| LDC (Lens Distortion Correction) | -                                                                                                             |
| Electronic Shutter Speed         | 1sec~ 1/12,000sec                                                                                             |
| Digital Zoom                     | -                                                                                                             |
| Reverse                          | Off / H-Rev / V-Rev / HV-Rev                                                                                  |
| Profile                          | Basic, Day & Night, Backlight, ITS, Indoor, User                                                              |
| Alarm                            | -                                                                                                             |
| Remote control interface         | Coaxial                                                                                                       |
| Protocol                         | AHD : ACP (AHD Coax Protocol), CVBS : Pelco-C (Coaxitron)<br>CCP (CVI Coax Protocol), TCP (TVI Coax Protocol) |
| Viewable length                  | 30m (TBD)                                                                                                     |
| Video Transmission Distance      | 500m(5C2V Coaxial Cable)                                                                                      |
| <b>Environmental</b>             |                                                                                                               |
| Operating Temperature / Humidity | -30°C ~ +55°C (-22°F ~ +131°F) / Less than 90% RH<br>* Start up should be done at above -10°C                 |
| Ingress Protection               | IP66                                                                                                          |
| Vandal Resistance                | -                                                                                                             |
| <b>Electrical</b>                |                                                                                                               |
| Input Voltage/Current            | 12VDC(±10% )                                                                                                  |
| Power Consumption                | 5.4W                                                                                                          |
| <b>Mechanical</b>                |                                                                                                               |
| Color / Material                 | Dark Gray / Plastic                                                                                           |
| Dimension (WxHxD)                | Ø58.6 x 165.2mm (Without sunshield)                                                                           |
| Weight                           | 208g                                                                                                          |

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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 |
|---------------|--------------|---------------|------------------------------------------------|---------|
| ANALOG CAMERA | SCO-6025R    | -             | HANWHA TECHWIN<br>SECURITY VIETNAM<br>CO.,LTD. | EUT     |
| AC/DC Adaptor | DAD 12050DKA | -             | DRM                                            | -       |

## 1.5 Support Equipments

| Description     | Model Number               | Serial Number | Manufacturer                                   | Remarks |
|-----------------|----------------------------|---------------|------------------------------------------------|---------|
| Monitor         | 24M47VQ                    | 702NTQDA3604  | LG                                             | -       |
| Monitor Adaptor | ADS-40FSG-19<br>19025GPG-1 | EAY62768621   | Shenzhen Honor<br>Electronic Co., Ltd.         | -       |
| DVR             | HRD-442                    | -             | HANWHA TECHWIN<br>SECURITY VIETNAM<br>CO.,LTD. | -       |
| DVR Adaptor     | FSP040-RHAN2               | -             | FSP GROUP INC.                                 | -       |

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Report No.:  
KES-EM-20T0508  
Page (7) of (56)

## 1.6 External I/O Cabling

| Start               |          | END         |          | Cable Spec. |        |
|---------------------|----------|-------------|----------|-------------|--------|
| Description         | I/O Port | Description | I/O Port | Length      | Shield |
| ANALOG CAMERA (EUT) | BNC      | DVR         | BNC      | 3.0         | S      |
| Monitor             | HDMI     | DVR         | HDMI     | 1.4         | S      |

\* Unshielded=U, Shielded=S

## 1.7 EUT Operating Mode(s)

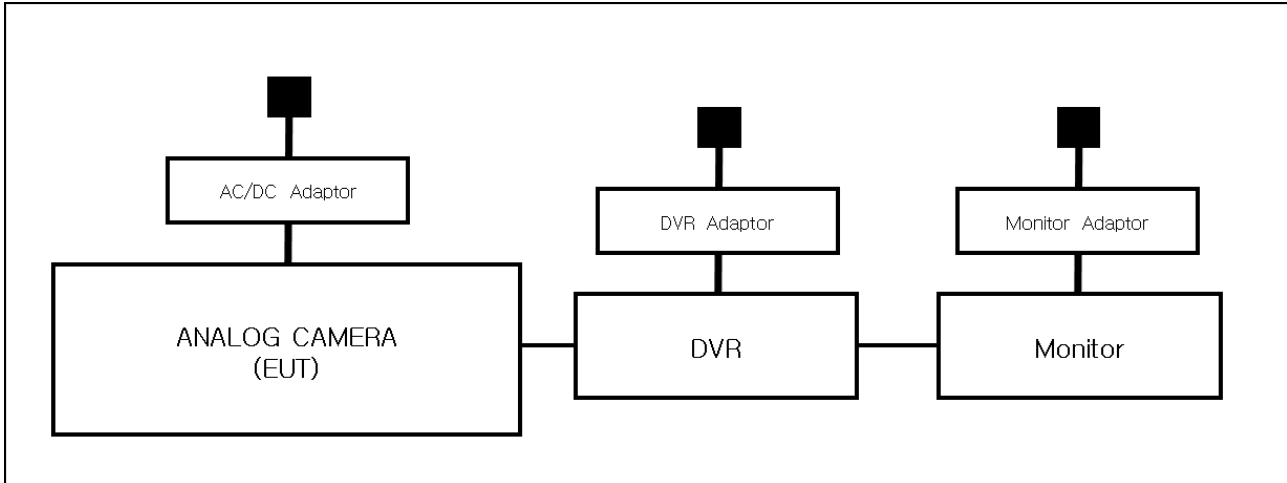
| Test Mode      | operating                    |
|----------------|------------------------------|
| Operation mode | Monitoring EUT Using Monitor |

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

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## 1.8 Configuration

■ AC Main  
 □ DC Main





## 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. 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-Anechoic Chamber ,<br>10 m Open Area and conducted test site)<br>EMS (ESD, RS, EFT/Burst, Surge, CS,<br>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,<br>Magnetic, Dips and interruptions)                                                   | <br>KT489                                 |
| USA           | FCC     | 3 m & 10 m Semi-Anechoic Chamber, 10 m Open Area and 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>23298-1                               |
| 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 | <br>R-20056, C-20036,<br>T-20040, G-20057 |
| Europe        | TÜV SÜD | EMI (3 m & 10 m Semi-Anechoic Chamber , 10 m Open Area and conducted test site)<br>EMS (ESD, RS, EFT/Burst, Surge, CS,<br>Magnetic, Dips and interruptions)                                    | <br>CARAT 001633 0003                     |

## 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 55032:2012/AC:2013

☒ Class A

☐ Class B

☐ EN 55024:2010 +A1:2015

☒ EN 50130-4:2011

☒ EN 61000-3-2:2014

☒ EN 61000-3-3:2013

☐ EN 61326-1:2013



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Report No.:  
KES-EM-20T0508  
Page (11) of (56)

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- |                                                               |                                  |                                  |
|---------------------------------------------------------------|----------------------------------|----------------------------------|
| <input type="checkbox"/> <b>VCCI-CISPR 32:2016</b>            | <input 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 C63.4-2014                      |                                  |                                  |
| <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                      |                                  |                                  |
| <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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Report No.:

KES-EM-20T0508

Page (12) of (56)

## 2.1 Conducted Emissions at Mains Power Ports

**Test Date**

Jul. 30, 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        | 01, 20, 2021 |
| <input checked="" type="checkbox"/> | LISN              | ENV216       | R & S        | 101787        | 01, 02, 2021 |
| <input checked="" type="checkbox"/> | LISN              | ESH2-Z5      | R & S        | 100450        | 01, 02, 2021 |
| <input checked="" type="checkbox"/> | PULSE LIMITER     | ESH3-Z2      | R & S        | 101915        | 01, 02, 2021 |

**Test Conditions**

Temperature: 23,3 °C  
Relative Humidity: 54,0 % 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 Conducted Emissions at Telecommunication 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        | 101783        | 01, 20, 2021 |
| <input type="checkbox"/> | LISN              | ENV216       | R & S        | 101787        | 01, 02, 2021 |
| <input type="checkbox"/> | LISN              | ESH2-Z5      | R & S        | 100450        | 01, 02, 2021 |
| <input type="checkbox"/> | PULSE LIMITER     | ESH3-Z2      | R & S        | 101915        | 01, 02, 2021 |
| <input type="checkbox"/> | 8-WIRE ISN CAT3,5 | ENY81        | R & S        | 100174        | 01, 07, 2021 |
| <input type="checkbox"/> | ISN               | ISN S8       | SCHWARZBECK  | ISN-S8-0019   | 03, 10, 2021 |
| <input type="checkbox"/> | CDN               | CDNS502A     | TESEQ        | 40431         | 01, 02, 2021 |

### 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

Does not apply because no IP is assigned.



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

### Test Date

Jul. 30, 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, 01, 2021 |
| <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, 10, 2021 |

### Test Conditions

Temperature: 23,2 °C  
Relative Humidity: 52,8 % 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

Jul. 30, 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    | 04, 20, 2021 |
| <input type="checkbox"/>            | ATTENUATOR                 | 8491A        | HP               | 35496         | 03, 10, 2021 |
| <input checked="" type="checkbox"/> | DOUBLE RIDGED HORN ANTENNA | SAS-571      | A.H.SYSTEM,INC   | 781           | 03, 11, 2021 |

### Test Conditions

Temperature: 23,1 °C  
Relative Humidity: 53,0 % 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.



## 2.5 Harmonic Current Emissions

### Test Date

Jul. 31, 2020

### Test Location

Electro wave Shieldroom #3

### Test Equipment

| Used                                | Description            | Model Number | Manufacturer | Serial Number | Cal. Due     |
|-------------------------------------|------------------------|--------------|--------------|---------------|--------------|
| <input checked="" type="checkbox"/> | EMI Test S/W           | net.control  | EM TEST      | 2.1.4         | -            |
| <input checked="" type="checkbox"/> | DIGITAL POWER ANALYZER | DPA 500N     | EM TEST      | V1024106759   | 04, 06, 2021 |
| <input checked="" type="checkbox"/> | POWER SOURCE           | ACS 500N6    | EM TEST      | V1024106760   | -            |

### Test Conditions

Temperature: 23,1 °C  
Relative Humidity: 50,9 % R.H.

### Classification of Equipment for Harmonic Current Emissions

- ☒ Class A  
☐ Class B  
☐ Class C(Below 25 W)  
☐ Class C(Above 25 W)  
☐ Class D

### Test Results

The requirements are:

- ☒ PASS  
☐ NOT PASS  
☐ NOT APPLICABLE

### Remarks

See Appendix A for test data.





## 2.6 Voltage Fluctuations and Flicker

### Test Date

Jul. 31, 2020

### Test Location

Electro wave Shieldroom #3

### Test Equipment

| Used                                | Description            | Model Number | Manufacturer | Serial Number | Cal. Due     |
|-------------------------------------|------------------------|--------------|--------------|---------------|--------------|
| <input checked="" type="checkbox"/> | EMI Test S/W           | net.control  | EM TEST      | 2.1.4         | -            |
| <input checked="" type="checkbox"/> | DIGITAL POWER ANALYZER | DPA 500N     | EM TEST      | V1024106759   | 04, 06, 2021 |
| <input checked="" type="checkbox"/> | POWER SOURCE           | ACS 500N6    | EM TEST      | V1024106760   | -            |

### Test Conditions

Temperature: 23,1 °C  
Relative Humidity: 50,9 % R.H.

### Test Results

The requirements are:

- ☒ PASS  
☐ NOT PASS  
☐ NOT APPLICABLE

### Remarks

See Appendix A for test data.

### 3.0 Criteria for compliance

Criteria for compliance was based on the following guidelines:

EN 50130-4:2011 Alarm systems-Part 4: Electromagnetic compatibility Product family standard: Immunity requirements for components of fire, intruder and social alarm systems

**The variety and the diversity of the apparatus within the scope of this document makes it difficult to define precise criteria for the evaluation of the immunity test results.**

**If as a result of the application of the tests defined in this standard, the apparatus becomes dangerous or unsafe then the apparatus shall be deemed to have failed the test.**

**A functional description and a definition of performance by the manufacture and noted in the test report, based on the following criteria:**

#### **Electrostatic discharge**

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the application of discharge is permissible, providing that is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change.

#### **Radiated electromagnetic fields**

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the application of discharge is permissible, providing which could be interpreted by associated equipment as a change, and no such

Flickering of indicators occurs at a field strength of 3 V/m.

For components of CCTV systems, where the picture is allowed at 10 V/m, providing.

(a) there is no permanent damage or change to EUT

(e.g. no corruption of memory or changes to programmable setting etc.)

(b) at 3 V/m, any deterioration of the picture is so minor that the system could still be used; and

(c) there is no observable deterioration of the picture at 1 V/m.



---

### **Fast transient burst / slow high energy voltage surge**

There shall be no damage, malfunction or change of status due to the conditioning.  
Flickering of an indicator during the application of discharge is permissible, providing  
That there is no residual is permissible, providing that there is no residual change in the EUT or  
any  
change in outputs, which could be interpreted by associated equipment as a change.

### **Conducted RF immunity**

There shall be no damage, malfunction or change of status due to the conditioning.  
Flickering of an indicator during the application of discharge is permissible, providing  
That there is no residual is permissible, providing that there is no residual change in the EUT or  
any  
change in outputs, which could be interpreted by associated equipment as a change,  
and no such flickering of indicators oeuvres at  $U = 130 \text{ dB}\mu\text{V}$ .  
For component of CCTV systems, where the status is monitored by observing the TV picture,  
then deterioration of the picture is allowed at  $U = 140 \text{ dB}\mu\text{V}$ , providing:  
(a) there is no permanent damage or change to the EUT  
(e.g. no corruption of memory or changes to programmable settings etc.)  
(b) at  $U = 130 \text{ dB}\mu\text{V}$ , any deterioration of the picture is so minor that the system could  
still be used; and  
(c) there in no observable deterioration of the picture at  $U = 120 \text{ dB}\mu\text{V}$ .

### **Voltage dip/interruption / Voltage variation**

There shall be no damage, malfunction or change of status due to the conditioning.  
Flickering of an indicator during the conditioning is permissible, providing that there is no  
residual  
change in the EUT or any change in outputs, which could be interpreted by associated  
equipment  
as a change. The EUT shall meet the acceptance criteria for the functional test, after the  
conditioning.

## 3.1 Electrostatic Discharge

### Reference Standard

EN 61000-4-2:2009

### Test Date

Jul. 31, 2020

### Test Location

EMS-ESD: Electro wave Shieldroom #7

### Test Equipment

| Used                                | Description   | Model Number | Manufacturer | Serial Number | Cal. Due     |
|-------------------------------------|---------------|--------------|--------------|---------------|--------------|
| <input checked="" type="checkbox"/> | ESD SIMULATOR | ESS-2000     | Noise Ken    | ESS05X4620    | 01, 28, 2021 |
| <input checked="" type="checkbox"/> | HCP           | -            | KES          | -             | -            |
| <input checked="" type="checkbox"/> | VCP           | -            | Noise Ken    | -             | -            |

### Test Conditions

Temperature: 23,2 °C  
Relative Humidity: 53,8 % R.H.  
Atmospheric Pressure: 99,9 kPa

### Test Specifications

Discharge Factor:  $\geq 1$  s

Discharge Impedance: 330 ohm / 150 pF

Kind of Discharge: Air, Contact (direct and indirect)

Polarity: Positive and Negative

Number of Discharge: 10 at all locations for Air discharge  
10 at all locations for Contact discharge

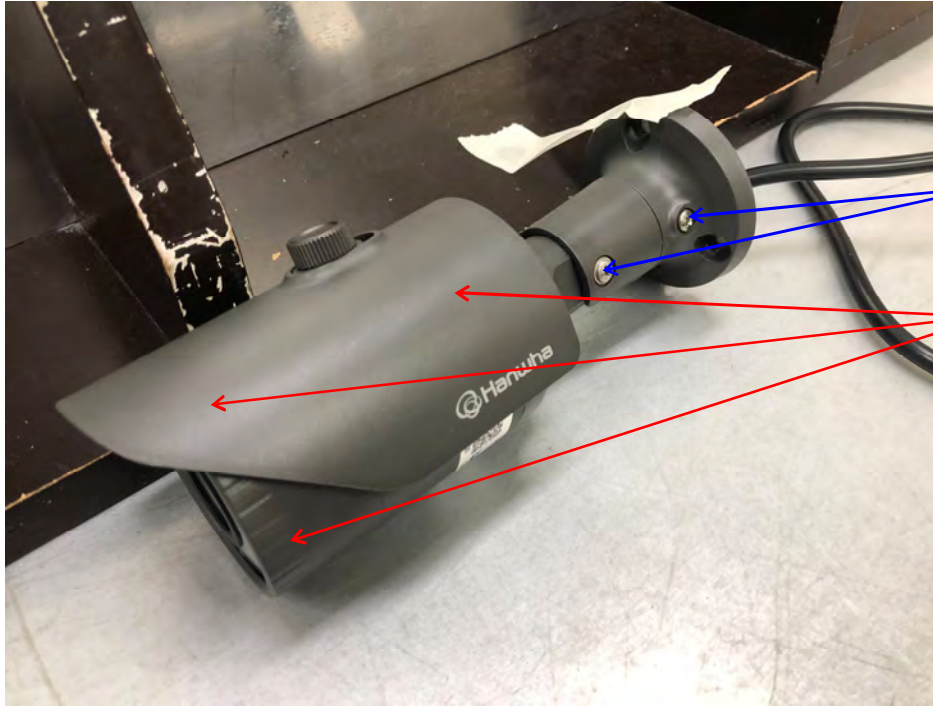
|                    |                                                                                                                                                                                                 |                                                                                                                                                                                                                   |                                                                                                                                                                                             |                                                                                                                                                                                             |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Discharge Voltage: | <b>Contact</b><br><input type="checkbox"/> 2 kV<br><input type="checkbox"/> 4 kV<br><input checked="" type="checkbox"/> 6 kV<br><input type="checkbox"/> 8 kV<br><input type="checkbox"/> 15 kV | <b>Air</b><br><input checked="" type="checkbox"/> 2 kV<br><input checked="" type="checkbox"/> 4 kV<br><input type="checkbox"/> 6 kV<br><input checked="" type="checkbox"/> 8 kV<br><input type="checkbox"/> 15 kV | <b>HCP</b><br><input type="checkbox"/> 2 kV<br><input type="checkbox"/> 4 kV<br><input checked="" type="checkbox"/> 6 kV<br><input type="checkbox"/> 8 kV<br><input type="checkbox"/> 15 kV | <b>VCP</b><br><input type="checkbox"/> 2 kV<br><input type="checkbox"/> 4 kV<br><input checked="" type="checkbox"/> 6 kV<br><input type="checkbox"/> 8 kV<br><input type="checkbox"/> 15 kV |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Notes: HCP: Horizontal coupling plane  
VCP: Vertical coupling plane

Required Performance Criteria: ☒ Complied

**Location of Discharge:**

|         |
|---------|
| Air     |
| Contact |



2

1



3

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Report No.:  
KES-EM-20T0508  
Page (22) of (56)

**Test Data****Indirect Discharge**

| No. | Test Point  | Discharge Method  | Observations | Remarks |
|-----|-------------|-------------------|--------------|---------|
| 1   | HCP Contact | Contact Discharge | Complied     | -       |
| 2   | VCP Contact | Contact Discharge | Complied     | -       |

**Direct Discharge**

| No. | Test Point | Discharge Method  | Observations | Remarks |
|-----|------------|-------------------|--------------|---------|
| 1   | Enclosure  | Air Discharge     | Complied     | -       |
| 2   | Screw      | Contact Discharge | Complied     | -       |
| 3   | Port       | Contact Discharge | Complied     | -       |

Note: "Blank" = Not performed

Observations:

Complied – No degradation of function

**Test Results**

- ☒ PASS Required Performance Criteria  
☐ NOT PASS Required Performance Criteria

**Remarks**

PASS Required Performance Criteria

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## 3.2 Radiated Electric Field Immunity

### Reference Standard

EN 61000-4-3:2006 +A2:2010

### Test Date

Jul. 31, 2020

### Test Location

EMS-RS: ☐ SEMI ANECHOIC CHAMBER #2 ☒ SEMI ANECHOIC CHAMBER #3

### Test Equipment

| Used                                | Description                     | Model Number | Manufacturer    | Serial Number | Cal. Due     |
|-------------------------------------|---------------------------------|--------------|-----------------|---------------|--------------|
| <input checked="" type="checkbox"/> | EMS Test S/W                    | EMC32        | R & S           | 9.12.00       | -            |
| <input checked="" type="checkbox"/> | SIGNAL GENERATOR                | SMB 100A     | Rohde & Schwarz | 108252        | 08, 06, 2020 |
| <input checked="" type="checkbox"/> | HIGH POWER DUAL AMP             | SSA532       | SUNGSAN         | SSA532-001    | -            |
| <input checked="" type="checkbox"/> | POWER METER                     | E4419B       | Agilent         | GB40203000    | 04, 20, 2021 |
| <input checked="" type="checkbox"/> | CW POWER SENSOR                 | E4412A       | Agilent         | US38488240    | 04, 20, 2021 |
| <input checked="" type="checkbox"/> | CW POWER SENSOR                 | E4412A       | Agilent         | MY41501662    | 04, 20, 2021 |
| <input checked="" type="checkbox"/> | STACKED DOUBLE LOG-PER- ANTENNA | STPL9128 E   | Schwarzbeck     | 9128ES-121    | -            |
| <input checked="" type="checkbox"/> | DOUBLE RIDGED HORN ANTENNA      | SAS-571      | A.H.SYSTEM,INC  | 781           | 03, 11, 2021 |

### Test Conditions

Temperature: 23,0 °C  
Relative Humidity: 54,2 % R.H.  
Atmospheric Pressure: 99,8 kPa



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Report No.:  
KES-EM-20T0508  
Page (24) of (56)

### Test Specifications

Antenna Polarization: Horizontal & vertical unless indicated otherwise

Antenna Distance: ☒ 3 m

Field Strength: ☐ 1 V/m ☐ 3 V/m  
☒ 10 V/m

Frequency Range: ☐ 80 MHz to 1 GHz ☐ 1,4 GHz to 2,7 GHz  
☒ 80 MHz to 2,7 GHz

Modulation: ☒ AM, 80 %, 1 kHz sine wave  
☒ PM, 1 Hz (0,5 s ON : 0,5 s OFF)

Frequency step: ☒ 1 % step

Dwell Time: ☐ 1 s ☒ 3 s

# of Sides Radiated: ☒ 4

Required Performance Criteria: ☒ Complied

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Report No.:  
KES-EM-20T0508  
Page (25) of (56)

### Test Data

| Side Exposed | Observations |          |
|--------------|--------------|----------|
|              | Horizontal   | Vertical |
| Front        | Complied     | Complied |
| Right        | Complied     | Complied |
| Back         | Complied     | Complied |
| Left         | Complied     | Complied |

Note: "Blank" = Not performed

Observations:

Complied – No degradation of function

### Test Results

- ☒ PASS Required Performance Criteria  
☐ NOT PASS Required Performance Criteria

### Remarks

PASS Required Performance Criteria

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### 3.3 Electrical Fast Transients/Bursts

#### Reference Standard

EN 61000-4-4:2012

#### Test Date

Jul. 31, 2020

#### Test Location

EMS-EFT: Electro wave Shieldroom #7

#### Test Equipment

| Used                                | Description               | Model Number | Manufacturer | Serial Number | Cal. Due     |
|-------------------------------------|---------------------------|--------------|--------------|---------------|--------------|
| <input checked="" type="checkbox"/> | EMS Test S/W              | iec.control  | EM TEST      | 5.4.7         | -            |
| <input checked="" type="checkbox"/> | ULTRA COMPACT SIMULATOR   | UCS 500N7    | EM TEST      | P1608172950   | 11, 27, 2020 |
| <input checked="" type="checkbox"/> | MOTOR VARIAC              | MV2616       | EM TEST      | P1552169719   | 11, 27, 2020 |
| <input checked="" type="checkbox"/> | CAPACITIVE COUPLING CLAMP | HFK          | EM TEST      | P1633183115   | 11, 27, 2020 |

#### Test Conditions

Temperature: 23,2 °C  
Relative Humidity: 53,8 % R.H.  
Atmospheric Pressure: 99,9 kPa

#### Test Specifications

Pulse Amplitude & Polarity:  
(AC Power Lines) ☐ ± 1.0 kV ☒ ± 2.0 kV  
☐ ± 4.0 kV

Pulse Amplitude & Polarity:  
(Other supply / Signal Lines) ☐ ± 0.5 kV ☒ ± 1.0 kV  
☐ ± 2.0 kV

Burst Period: ☒ 300 ms ☐ 2 s

Repetition Rate: ☐ 5 klz ☒ 100 klz

Duration of Test Voltage: ☒ ≥ 1 min

Required Performance Criteria: ☒ Complied

### Test Data

☒ Input a.c. power ports – Coupling/Decoupling Network used

| Mode of Application | Observations   |                |
|---------------------|----------------|----------------|
|                     | (+) Burst (kV) | (-) Burst (kV) |
| L                   | Complied       | Complied       |
| N                   | Complied       | Complied       |
| PE                  | -              | -              |
| L – N               | Complied       | Complied       |
| L – PE              | -              | -              |
| N – PE              | -              | -              |
| L – N – PE          | -              | -              |

☐ Input d.c. power ports – Coupling/Decoupling Network used

| Mode of Application | Observations   |                |
|---------------------|----------------|----------------|
|                     | (+) Burst (kV) | (-) Burst (kV) |
| -                   | -              | -              |

☒ Signal ports and telecommunication ports – Coupling Clamp used

| Mode of Application | Observations   |                |
|---------------------|----------------|----------------|
|                     | (+) Burst (kV) | (-) Burst (kV) |
| BNC                 | Complied       | Complied       |

Note: “Blank” = Not performed

Observations:

Complied – No degradation of function

### Test Results

☒ PASS Required Performance Criteria

☐ NOT PASS Required Performance Criteria

### Remarks

PASS Required Performance Criteria

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Report No.:  
KES-EM-20T0508  
Page (28) of (56)

### 3.4 Surge Transients

**Reference Standard**

EN 61000-4-5:2014

**Test Date**

Jul. 31, 2020

**Test Location**

EMS-EFT: Electro wave Shieldroom #7

**Test Equipment**

| Used                                | Description             | Model Number | Manufacturer | Serial Number | Cal. Due     |
|-------------------------------------|-------------------------|--------------|--------------|---------------|--------------|
| <input checked="" type="checkbox"/> | EMS Test S/W            | iec.control  | EM TEST      | 5.4.7         | -            |
| <input checked="" type="checkbox"/> | ULTRA COMPACT SIMULATOR | UCS 500N7    | EM TEST      | P1608172950   | 11, 27, 2020 |
| <input checked="" type="checkbox"/> | MOTOR VARIAC            | MV2616       | EM TEST      | P1552169719   | 11, 27, 2020 |

**Test Conditions**

Temperature: 23,2 °C  
Relative Humidity: 53,8 % R.H.  
Atmospheric Pressure: 99,9 kPa

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Report No.:  
KES-EM-20T0508  
Page (29) of (56)

### Test Specifications

#### AC Power Lines

Source Impedance: 12 ohm for common Mode and 2 ohm for differential Mode

Surge Amplitude : Common Mode  
☐ (0,5 / 1,0 / 2,0) kV  
Differential Mode  
☒ (0,5 / 1,0) kV

Number of Surges: ☒ 5 surges per angle

Angle: ☒ 0°, 90°, 180°, 270° (input a.c. power port)

Polarity: ☒ Positive & Negative

Repetition Rate: ☐ 1 surge per min ☒ 1 surge per 30 sec.

Required Performance Criteria: ☒ Complied

#### Other supply / Signal Lines

Source Impedance: 42 ohm for common Mode

Surge Amplitude: Common Mode  
☐ (0,5 / 1,0) kV

Number of Surges: ☐ 5 Surges

Polarity: ☐ Positive & Negative

Repetition Rate: ☐ 1 surge per min ☐ 1 surge per 30 sec.

Required Performance Criteria: ☐ Complied

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Report No.:  
KES-EM-20T0508  
Page (30) of (56)

**Test Data**

☒ Line to Line – Differential Mode

| Mode of Application | Observations   |                |
|---------------------|----------------|----------------|
|                     | (+) Surge (kV) | (-) Surge (kV) |
| L – N               | Complied       | Complied       |

☐ Line to Earth – Common Mode

| Mode of Application | Observations   |                |
|---------------------|----------------|----------------|
|                     | (+) Surge (kV) | (-) Surge (kV) |
| L – PE              | -              | -              |
| N – PE              | -              | -              |

**Signal Lines**

☐ Line to Earth – Common Mode

| Mode of Application | Coupling Method | Observations   |                |
|---------------------|-----------------|----------------|----------------|
|                     |                 | (+) Surge (kV) | (-) Surge (kV) |
| -                   | CDN             | -              | -              |
|                     | LINE            | -              | -              |

Note: "Blank" = Not performed

Observations:

Complied – No degradation of function

**Test Results**

- ☒ PASS Required Performance Criteria  
☐ NOT PASS Required Performance Criteria  
☐ NOT APPLICABLE

**Remarks**

PASS Required Performance Criteria

### 3.5 Conducted Disturbance

#### Reference Standard

EN 61000-4-6:2014

#### Test Date

Jul. 31, 2020

#### Test Location

EMS-CS: Electro wave Shieldroom #3

#### Test Equipment

| Used                                | Description               | Model Number | Manufacturer | Serial Number | Cal. Due     |
|-------------------------------------|---------------------------|--------------|--------------|---------------|--------------|
| <input checked="" type="checkbox"/> | EMS Test S/W              | icd.control  | EM TEST      | 5.3.7         | -            |
| <input checked="" type="checkbox"/> | CONTINUOUS WAVE SIMULATOR | CWS 500N1    | EM TEST      | V0936105119   | 08, 06, 2020 |
| <input checked="" type="checkbox"/> | ATTENUATOR                | ATT6         | EM TEST      | 1208-34       | 08, 06, 2020 |
| <input checked="" type="checkbox"/> | CDN                       | CDN-M2/M3N   | EM TEST      | 0909-06       | 08, 06, 2020 |
| <input type="checkbox"/>            | CDN                       | CDN ST08A    | TESEQ        | 43886         | 11, 25, 2020 |
| <input checked="" type="checkbox"/> | EM INJECTION CLAMP        | EM 101       | Liithi       | 35943         | 01, 20, 2021 |

#### Test Conditions

Temperature: 23,1 °C  
Relative Humidity: 50,9 % R.H.  
Atmospheric Pressure: 99,9 kPa

#### Test Specifications

Frequency range: ☒ 150 kHz to 100 MHz ☐ 150 kHz to 80 MHz

Voltage Level: ☐ 1 Vrms ☐ 3 Vrms  
☒ 10 Vrms

Modulation: ☒ AM, 80 %, 1 kHz sine wave  
☒ PM, 1 Hz (0,5 s ON : 0,5 s OFF)

Frequency step: ☒ 1 % step

Dwell Time: ☐ 1 s ☒ 3 s

Required Performance Criteria: ☒ Complied

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Report No.:

KES-EM-20T0508

Page (32) of (56)

**Test Data**☒ Input a.c. power ports

| Coupling Location<br>(Line Stressed) | Coupling Method | Observations |
|--------------------------------------|-----------------|--------------|
| L – N                                | CDN             | Complied     |

☐ Input d.c. power ports

| Coupling Location<br>(Line Stressed) | Coupling Method | Observations |
|--------------------------------------|-----------------|--------------|
| -                                    | -               | -            |

☒ Signal ports and telecommunication ports

| Coupling Location<br>(Line Stressed) | Coupling Method | Observations |
|--------------------------------------|-----------------|--------------|
| BNC                                  | Clamp           | Complied     |

Notes: CDN = Coupling Decoupling Network  
"blank" = Not performed

Observations:

Complied – No degradation of function

**Test Results**

- ☒ PASS Required Performance Criteria  
☐ NOT PASS Required Performance Criteria

**Remarks**PASS Required Performance Criteria

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Report No.:

KES-EM-20T0508

Page (33) of (56)

### 3.6 Voltage Dips and Short Interruptions

**Reference Standard**

EN 61000-4-11:2004

**Test Date**

Jul. 31, 2020

**Test Location**

EMS-Voltage dip: Electro wave Shieldroom #7

**Test Equipment**

| Used                                | Description             | Model Number | Manufacturer | Serial Number | Cal. Due     |
|-------------------------------------|-------------------------|--------------|--------------|---------------|--------------|
| <input checked="" type="checkbox"/> | EMS Test S/W            | iec.control  | EM TEST      | 5.4.7         | -            |
| <input checked="" type="checkbox"/> | ULTRA COMPACT SIMULATOR | UCS 500N7    | EM TEST      | P1608172950   | 11, 27, 2020 |
| <input checked="" type="checkbox"/> | MOTOR VARIAC            | MV2616       | EM TEST      | P1552169719   | 11, 27, 2020 |

**Test Conditions**

Temperature: 23,2 °C  
Relative Humidity: 53,8 % R.H.  
Atmospheric Pressure: 99,9 kPa

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Report No.:  
KES-EM-20T0508  
Page (34) of (56)

### Test Specifications & Observations/Remarks

#### - Voltage Dips and Short Interruptions

| <u>Test Level</u>                             | <u>Duration [in period/ms (50 Hz)]</u>          | <u>Results</u>     |
|-----------------------------------------------|-------------------------------------------------|--------------------|
| <input checked="" type="checkbox"/> 20 % dip  | <input checked="" type="checkbox"/> 250 / 5 000 | <u>Complied</u>    |
| <input checked="" type="checkbox"/> 30 % dip  | <input checked="" type="checkbox"/> 25 / 500    | <u>Complied</u>    |
| <input checked="" type="checkbox"/> 60 % dip  | <input checked="" type="checkbox"/> 10 / 200    | <u>Complied</u>    |
| <input checked="" type="checkbox"/> 100 % dip | <input checked="" type="checkbox"/> 250 / 5 000 | <u>Degradation</u> |

#### - Voltage variations

|                                                 |                                                  |                 |
|-------------------------------------------------|--------------------------------------------------|-----------------|
| <input checked="" type="checkbox"/> Unom + 10 % | <input checked="" type="checkbox"/> 253.0 V (ac) | <u>Complied</u> |
| <input checked="" type="checkbox"/> Unom - 15 % | <input checked="" type="checkbox"/> 195.5 V (ac) | <u>Complied</u> |

#### Observations:

Complied – No degradation of function

Degradation - See "Remarks "

### Test Results

- ☒ PASS Required Performance Criteria
- ☐ NOT PASS Required Performance Criteria
- ☐ NOT APPLICABLE

### Remarks

During the test(100%, 250cycle), EUT was turned off but after the test, it was recovered by no operator's intervention.

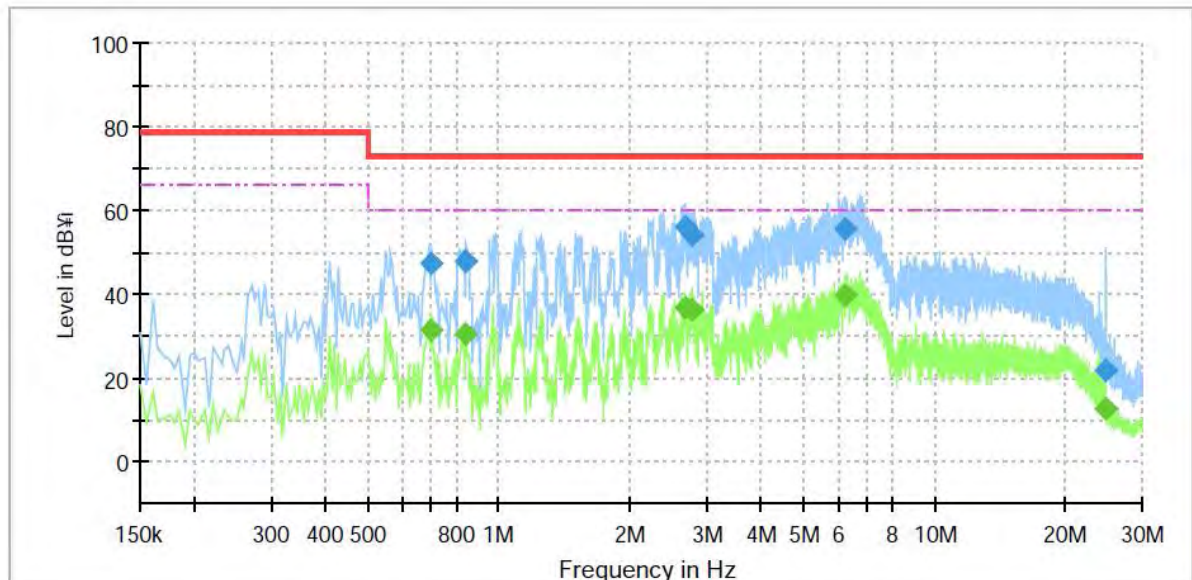
## APPENDIX A – TEST DATA

### Conducted Emissions at Mains Power Ports

[HOT]

#### Common Information

Test Description: Conducted Emission  
 Model No.: SCO-6025R  
 Phase:  
 Mode:  
 Operator Name: KES



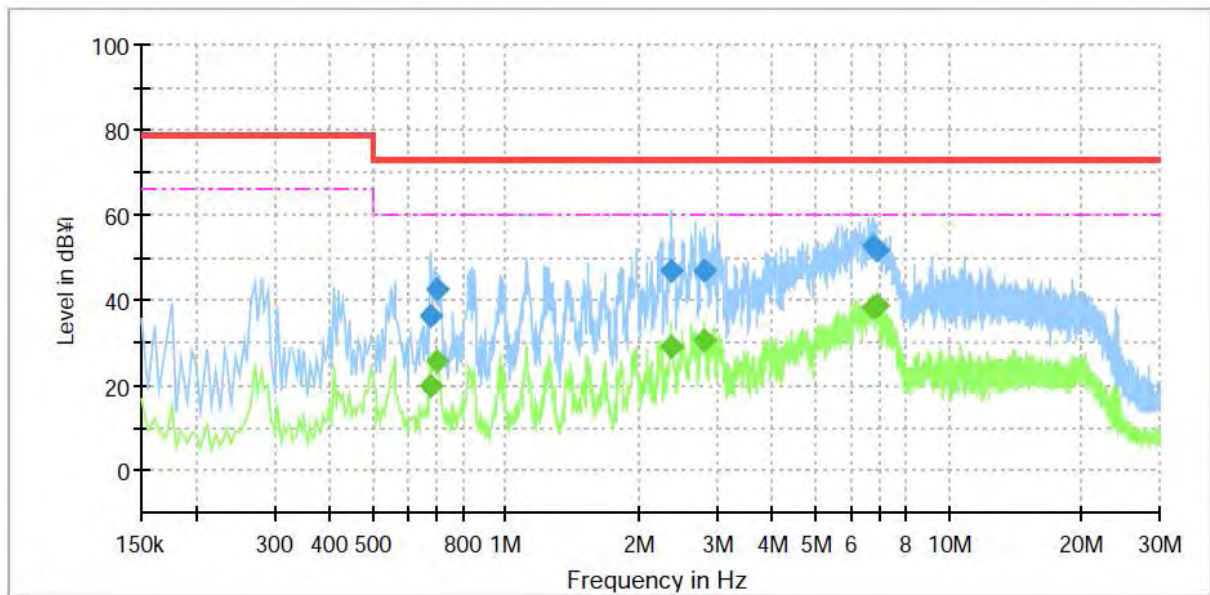
#### Final Result

| Frequency (MHz) | QuasiPeak (dBμV) | CAverage (dBμV) | Limit (dBμV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.700000        | ---              | 31.62           | 60.00        | 28.38       | 1000.0          | 9.000           | L1   | 19.6       |
| 0.700000        | 47.18            | ---             | 73.00        | 25.82       | 1000.0          | 9.000           | L1   | 19.6       |
| 0.840000        | ---              | 30.74           | 60.00        | 29.26       | 1000.0          | 9.000           | L1   | 19.6       |
| 0.840000        | 47.90            | ---             | 73.00        | 25.10       | 1000.0          | 9.000           | L1   | 19.6       |
| 2.675000        | ---              | 36.64           | 60.00        | 23.36       | 1000.0          | 9.000           | L1   | 19.7       |
| 2.675000        | 55.93            | ---             | 73.00        | 17.07       | 1000.0          | 9.000           | L1   | 19.7       |
| 2.780000        | ---              | 36.44           | 60.00        | 23.56       | 1000.0          | 9.000           | L1   | 19.7       |
| 2.780000        | 54.31            | ---             | 73.00        | 18.69       | 1000.0          | 9.000           | L1   | 19.7       |
| 6.240000        | ---              | 39.91           | 60.00        | 20.09       | 1000.0          | 9.000           | L1   | 19.8       |
| 6.240000        | 55.76            | ---             | 73.00        | 17.24       | 1000.0          | 9.000           | L1   | 19.8       |
| 24.715000       | ---              | 12.79           | 60.00        | 47.21       | 1000.0          | 9.000           | L1   | 20.3       |
| 24.715000       | 22.03            | ---             | 73.00        | 50.97       | 1000.0          | 9.000           | L1   | 20.3       |

**[NEUTRAL]**

## Common Information

Test Description: Conducted Emission  
 Model No.: SCO-6025R  
 Phase:  
 Mode:  
 Operator Name: KES



## Final Result

| Frequency (MHz) | QuasiPeak (dBμV) | CAverage (dBμV) | Limit (dBμV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.675000        | ---              | 19.88           | 60.00        | 40.12       | 1000.0          | 9.000           | N    | 19.6       |
| 0.675000        | 36.15            | ---             | 73.00        | 36.85       | 1000.0          | 9.000           | N    | 19.6       |
| 0.700000        | ---              | 25.92           | 60.00        | 34.08       | 1000.0          | 9.000           | N    | 19.6       |
| 0.700000        | 42.46            | ---             | 73.00        | 30.54       | 1000.0          | 9.000           | N    | 19.6       |
| 2.370000        | ---              | 29.26           | 60.00        | 30.74       | 1000.0          | 9.000           | N    | 19.7       |
| 2.370000        | 47.03            | ---             | 73.00        | 25.97       | 1000.0          | 9.000           | N    | 19.7       |
| 2.800000        | ---              | 30.53           | 60.00        | 29.47       | 1000.0          | 9.000           | N    | 19.7       |
| 2.800000        | 47.04            | ---             | 73.00        | 25.96       | 1000.0          | 9.000           | N    | 19.7       |
| 6.710000        | ---              | 38.19           | 60.00        | 21.81       | 1000.0          | 9.000           | N    | 19.8       |
| 6.710000        | 52.74            | ---             | 73.00        | 20.26       | 1000.0          | 9.000           | N    | 19.8       |
| 6.880000        | ---              | 38.61           | 60.00        | 21.39       | 1000.0          | 9.000           | N    | 19.8       |
| 6.880000        | 51.97            | ---             | 73.00        | 21.03       | 1000.0          | 9.000           | N    | 19.8       |

### ◆ 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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KES-EM-20T0508  
Page (37) of (56)

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**Conducted Emissions at Telecommunication Ports**

**[100 Mbps]**

N/A

◆ Calculation

QuasiPeak[dBuV] / CAverage [dBuV] = Reading Value[dBuV] + Corr. [dB]

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

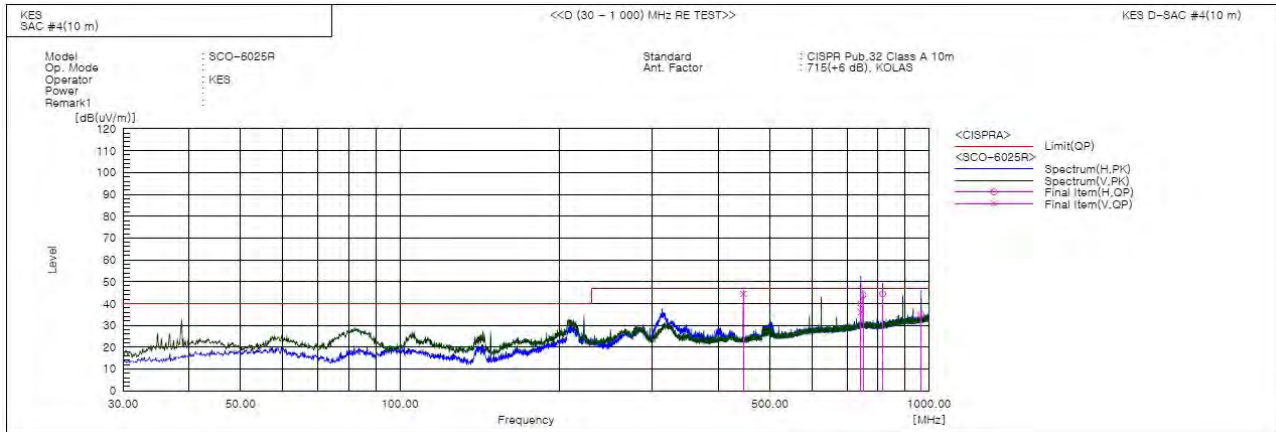
Corr. : Correction values (ISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

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## Radiated Electric Field Emissions(Below 1 GHz)



### 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   | 445.524            | V   | 59.2                      | -14.7            | 44.5                       | 47.0                      | 2.5                  | 132.0          | 183.0          |        |
| 2   | 742.586            | H   | 47.3                      | -7.4             | 39.9                       | 47.0                      | 7.1                  | 319.0          | 57.0           |        |
| 3   | 742.586            | V   | 43.5                      | -7.4             | 36.1                       | 47.0                      | 10.9                 | 107.0          | 178.0          |        |
| 4   | 749.983            | H   | 51.4                      | -7.4             | 44.0                       | 47.0                      | 3.0                  | 336.0          | 54.0           |        |
| 5   | 816.791            | H   | 52.1                      | -7.7             | 44.4                       | 47.0                      | 2.6                  | 400.0          | 315.0          |        |
| 6   | 965.323            | H   | 40.2                      | -5.3             | 34.9                       | 47.0                      | 12.1                 | 254.0          | 300.0          |        |

### ◆ Calculation – SEMI ANECHOIC CHAMBER #4(10 m)

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

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



## KES Co., Ltd.

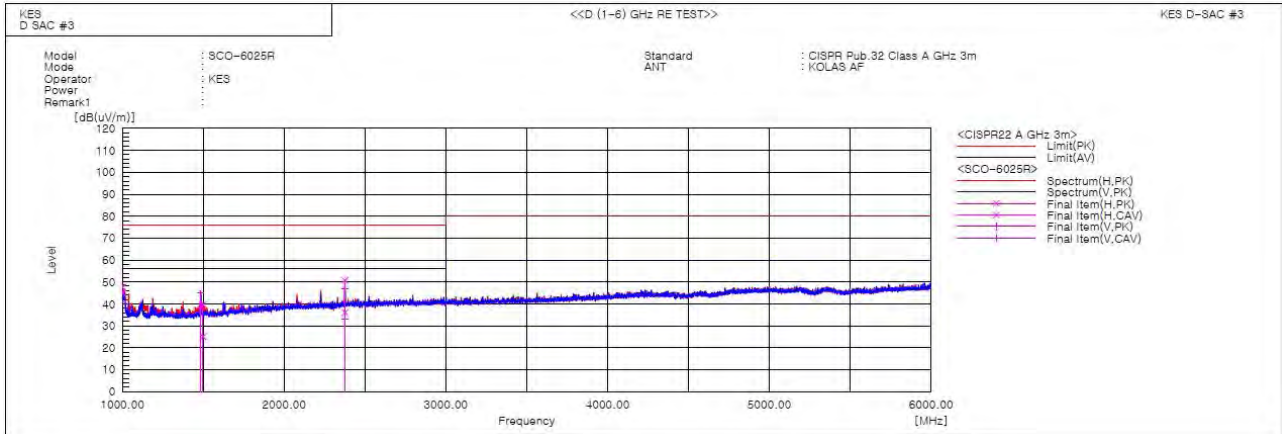
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Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea  
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Report No.:

KES-EM-20T0508

Page (39) of (56)

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



#### 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   | 1000.000        | H   | 57.0                | 54.5                 | -9.5          | 47.5                 | 45.0                  | 76.0                | 56.0                | 28.5           | 11.0            | 100.0       | 328.1       |        |
| 2   | 1000.183        | V   | 58.2                | 50.2                 | -9.5          | 48.7                 | 40.7                  | 76.0                | 56.0                | 27.3           | 15.3            | 100.0       | 29.0        |        |
| 3   | 1497.208        | H   | 46.3                | 31.5                 | -6.5          | 39.8                 | 25.0                  | 76.0                | 56.0                | 36.2           | 31.0            | 100.0       | 323.5       |        |
| 4   | 1485.120        | V   | 51.4                | 44.5                 | -6.6          | 44.8                 | 37.9                  | 76.0                | 56.0                | 31.2           | 18.1            | 100.0       | 31.3        |        |
| 5   | 2376.250        | H   | 51.3                | 36.6                 | -0.5          | 50.8                 | 36.1                  | 76.0                | 56.0                | 25.2           | 19.9            | 100.0       | 58.3        |        |
| 6   | 2375.990        | V   | 47.6                | 33.6                 | -0.5          | 47.1                 | 33.1                  | 76.0                | 56.0                | 28.9           | 22.9            | 100.0       | 356.9       |        |

#### ◆ Calculation

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

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

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

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

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## Harmonic Current Emissions and Voltage Fluctuations and Flicker

### Average harmonic current results

| Hn | I <sub>eff</sub> [A] | % of Limit | Limit [A] | Result |
|----|----------------------|------------|-----------|--------|
| 1  | 0.010                |            |           |        |
| 2  | 0.001                | 0.091      | 1.080     | n/a    |
| 3  | 0.008                | 0.355      | 2.300     | PASS   |
| 4  | 0.001                | 0.318      | 0.430     | n/a    |
| 5  | 0.008                | 0.705      | 1.140     | PASS   |
| 6  | 0.001                | 0.444      | 0.300     | n/a    |
| 7  | 0.008                | 0.982      | 0.770     | PASS   |
| 8  | 0.001                | 0.482      | 0.230     | n/a    |
| 9  | 0.007                | 1.814      | 0.400     | PASS   |
| 10 | 0.001                | 0.784      | 0.184     | n/a    |
| 11 | 0.007                | 2.101      | 0.330     | PASS   |
| 12 | 0.001                | 0.689      | 0.153     | n/a    |
| 13 | 0.007                | 3.126      | 0.210     | PASS   |
| 14 | 0.001                | 0.790      | 0.131     | n/a    |
| 15 | 0.006                | 4.075      | 0.150     | PASS   |
| 16 | 0.001                | 0.870      | 0.115     | n/a    |
| 17 | 0.006                | 4.219      | 0.132     | PASS   |
| 18 | 0.001                | 0.987      | 0.102     | n/a    |
| 19 | 0.005                | 4.284      | 0.118     | PASS   |
| 20 | 0.001                | 1.383      | 0.092     | n/a    |
| 21 | 0.004                | 2.778      | 0.161     | n/a    |
| 22 | 0.001                | 1.141      | 0.084     | n/a    |
| 23 | 0.004                | 2.648      | 0.147     | n/a    |
| 24 | 0.001                | 1.553      | 0.077     | n/a    |
| 25 | 0.003                | 2.514      | 0.135     | n/a    |
| 26 | 0.001                | 1.476      | 0.071     | n/a    |
| 27 | 0.003                | 2.253      | 0.125     | n/a    |
| 28 | 0.001                | 1.390      | 0.066     | n/a    |
| 29 | 0.002                | 2.053      | 0.116     | n/a    |
| 30 | 0.001                | 1.483      | 0.061     | n/a    |
| 31 | 0.002                | 1.671      | 0.109     | n/a    |
| 32 | 0.001                | 1.586      | 0.058     | n/a    |
| 33 | 0.001                | 1.437      | 0.102     | n/a    |
| 34 | 0.001                | 1.963      | 0.054     | n/a    |
| 35 | 0.001                | 1.204      | 0.096     | n/a    |
| 36 | 0.001                | 1.795      | 0.051     | n/a    |
| 37 | 0.001                | 1.090      | 0.091     | n/a    |
| 38 | 0.001                | 1.913      | 0.048     | n/a    |
| 39 | 0.001                | 1.226      | 0.087     | n/a    |
| 40 | 0.001                | 2.033      | 0.046     | n/a    |

Note: Harmonic currents less than 0.6 % of the input current measured under the test conditions, or less than 5 mA, whichever is greater, are disregarded.

\* Application of limits for average is 100% except for odd harmonics from 21 to 39, where 150% applies.





Test Data - Harmonics (continued)

**Maximum harmonic current results**

| Hn | I <sub>eff</sub> [A] | % of Limit | Limit [A] | Result |
|----|----------------------|------------|-----------|--------|
| 1  | 0.010                |            |           |        |
| 2  | 0.001                | 0.088      | 1.620     | n/a    |
| 3  | 0.008                | 0.244      | 3.450     | PASS   |
| 4  | 0.002                | 0.233      | 0.645     | n/a    |
| 5  | 0.008                | 0.484      | 1.710     | PASS   |
| 6  | 0.001                | 0.328      | 0.450     | n/a    |
| 7  | 0.008                | 0.676      | 1.155     | PASS   |
| 8  | 0.001                | 0.347      | 0.345     | n/a    |
| 9  | 0.007                | 1.235      | 0.600     | PASS   |
| 10 | 0.002                | 0.579      | 0.276     | n/a    |
| 11 | 0.007                | 1.446      | 0.495     | PASS   |
| 12 | 0.001                | 0.509      | 0.230     | n/a    |
| 13 | 0.007                | 2.134      | 0.315     | PASS   |
| 14 | 0.001                | 0.579      | 0.197     | n/a    |
| 15 | 0.006                | 2.781      | 0.225     | PASS   |
| 16 | 0.001                | 0.640      | 0.173     | n/a    |
| 17 | 0.006                | 2.874      | 0.199     | PASS   |
| 18 | 0.001                | 0.770      | 0.153     | n/a    |
| 19 | 0.005                | 2.953      | 0.178     | PASS   |
| 20 | 0.001                | 1.019      | 0.138     | n/a    |
| 21 | 0.005                | 2.859      | 0.161     | n/a    |
| 22 | 0.001                | 0.832      | 0.125     | n/a    |
| 23 | 0.004                | 2.749      | 0.147     | n/a    |
| 24 | 0.001                | 1.128      | 0.115     | n/a    |
| 25 | 0.004                | 2.635      | 0.135     | n/a    |
| 26 | 0.001                | 1.112      | 0.106     | n/a    |
| 27 | 0.003                | 2.373      | 0.125     | n/a    |
| 28 | 0.001                | 1.030      | 0.099     | n/a    |
| 29 | 0.003                | 2.186      | 0.116     | n/a    |
| 30 | 0.001                | 1.100      | 0.092     | n/a    |
| 31 | 0.002                | 1.853      | 0.109     | n/a    |
| 32 | 0.001                | 1.203      | 0.086     | n/a    |
| 33 | 0.002                | 1.605      | 0.102     | n/a    |
| 34 | 0.001                | 1.458      | 0.081     | n/a    |
| 35 | 0.001                | 1.327      | 0.096     | n/a    |
| 36 | 0.001                | 1.334      | 0.077     | n/a    |
| 37 | 0.001                | 1.236      | 0.091     | n/a    |
| 38 | 0.001                | 1.429      | 0.073     | n/a    |
| 39 | 0.001                | 1.337      | 0.087     | n/a    |
| 40 | 0.001                | 1.504      | 0.069     | n/a    |

Note: Harmonic currents less than 0.6 % of the input current measured under the test conditions, or less than 5 mA, whichever is greater, are disregarded.

\* Application of limits for average is 100% except for odd harmonics from 21 to 39, where 150% applies.

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Page (42) of (56)

Test Data - Voltage Fluctuations

## Maximum Flicker results

| Flicker Measurements |       |         |        |          |          |
|----------------------|-------|---------|--------|----------|----------|
|                      | Plt   | Max Pst | Max Dc | Max Dmax | Max Tmax |
| Line 1:              | 0.028 | 0.028   | 0      | < 0.2    | 0        |
| Limits:              | 0.65  | 1       | 3.3    | 4        | 0.5      |
| Results:             | PASS  | PASS    | PASS   | PASS     | PASS     |

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## Test Setup Photos and Configuration

### Conducted Emissions at Mains Power Ports



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Page (44) of (56)

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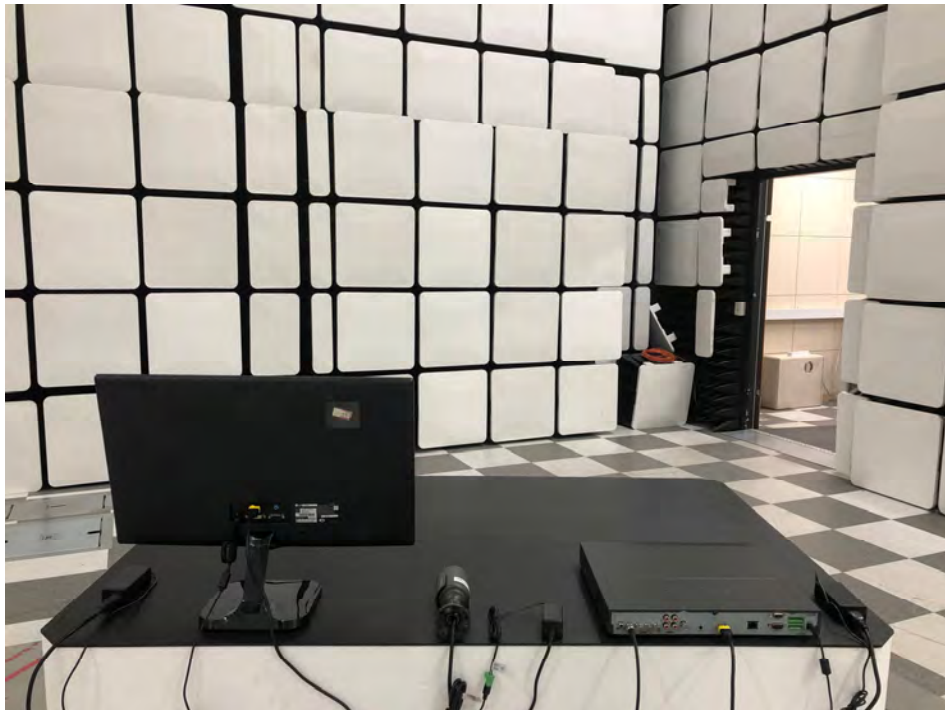
### Conducted Emissions at Telecommunication Ports

N/A

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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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## Harmonic Current Emissions and Voltage Fluctuations and Flicker



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## Electrostatic Discharge



## Radiated Electric Field Immunity



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## Electrical Fast Transients/Bursts

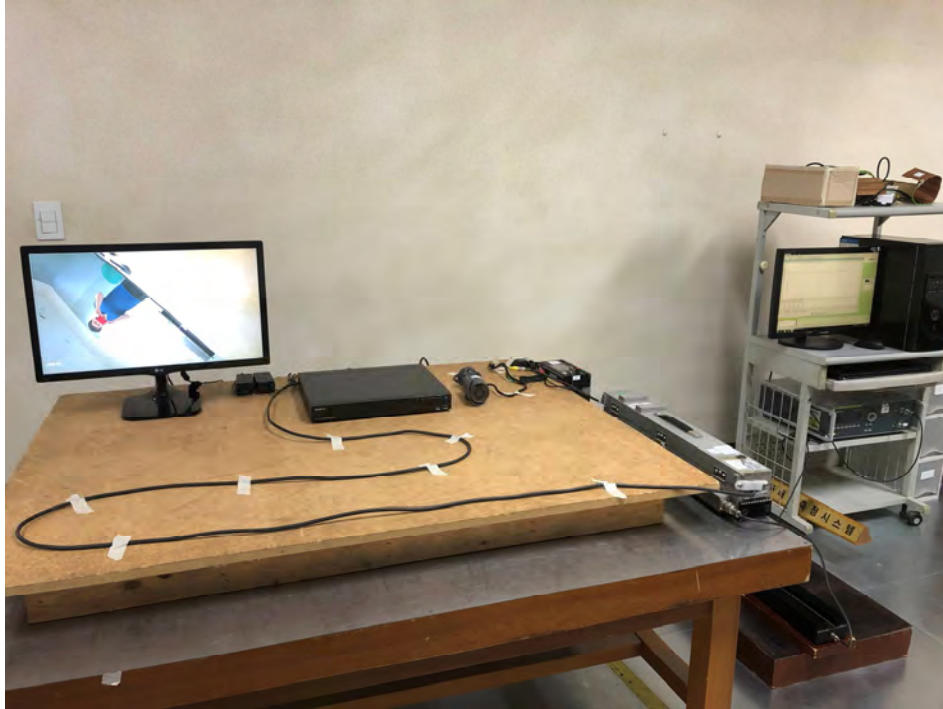


## Surge Transients



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## Conducted Disturbance



## Voltage Dips and Short Interruptions



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## EUT External Photographs

(Top)



(Bottom)



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## EUT Internal Photographs

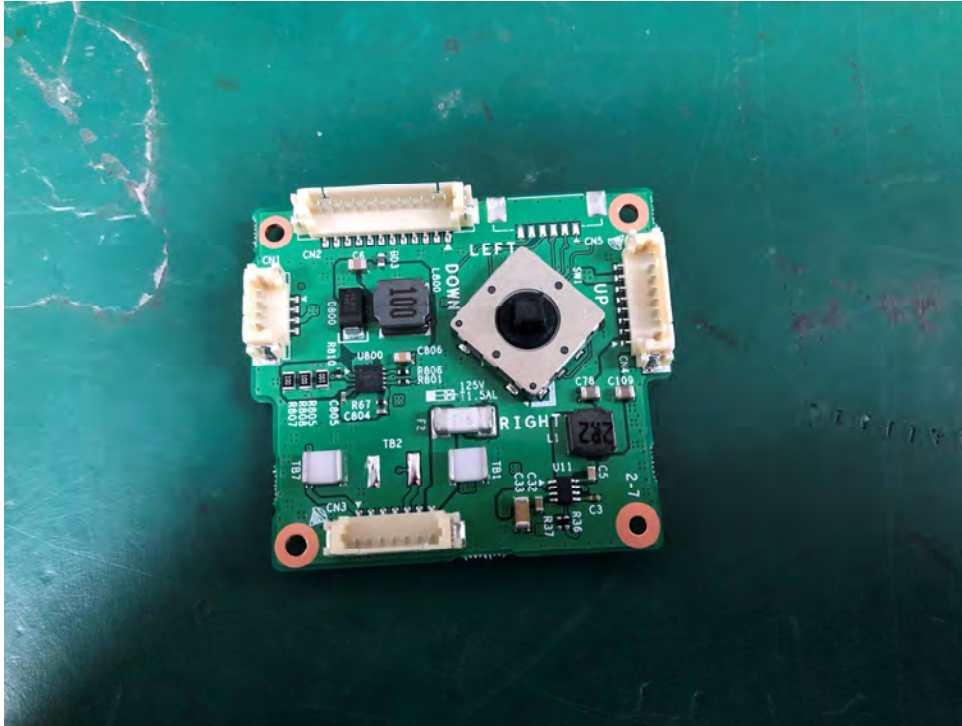
(Internal View)



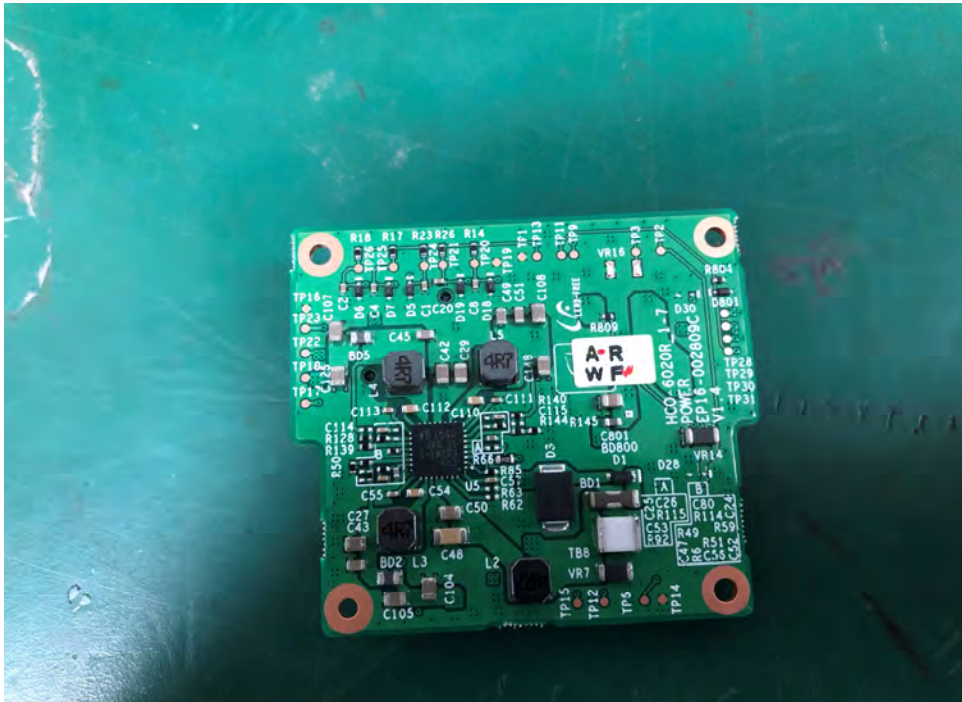
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## EUT Internal View – Board 1

(Top)



(Bottom)

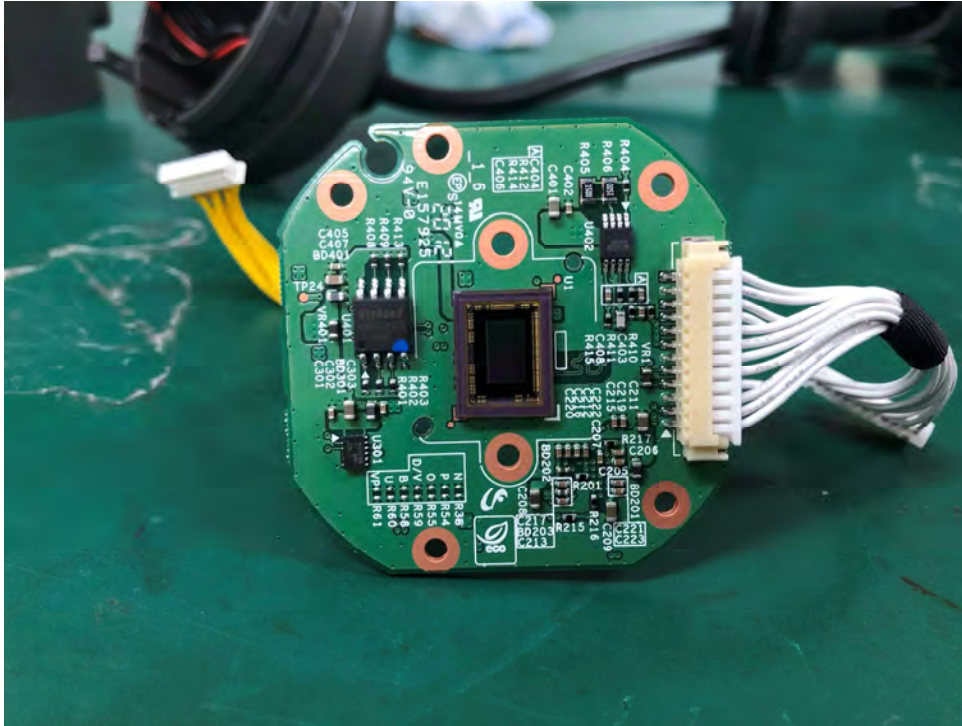


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## EUT Internal View – Board 2

(Top)



(Bottom)



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## EUT Internal View – Board 3

(Top)



(Bottom)



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## Label and Location



### **ANALOG CAMERA**

Model No : SCO-6025R

Manufacturer : HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.

Made in Vietnam

