



**KES Co., Ltd.**

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Report No.:

KES-E1-17T0155-R2

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## EMC TEST REPORT For CE

Test Report No. : KES-E1-17T0155-R2  
Date of Issue : May. 15, 2019  
Product name : CCTV CAMERA  
Model/Type No. : HCV-6070R  
Variant Model : HCV-6070RP  
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  
2. HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.  
3. D-TECH CO.,LTD.  
Manufacturer Address : 1. No.11 Weiliu Rd, Micro-Electronic Industrial Park, TEDA, Tianjin,  
300385, People's Republic of China  
2. Lot O-2, Que Vo Industrial Zone extended area,  
Nam Son commune, Bac Ninh city, Bac Ninh province, Vietnam  
3. 173-25, Saneop-ro, Gwonseon-gu, Suwon-si, Gyeonggi-do,  
Korea (Suwon Industrial Complex)  
Date of Receipt : Feb, 03, 2017  
Test date : Feb, 13, 2017 – Feb, 16, 2017  
Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Jin Bae, Lee  
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                                                                                                                   |
|---------------|-------------------|------------------------------------------------------------------------------------------------------------------------------------|
| Feb. 21, 2017 | KES-E1-17T0155    | Issued                                                                                                                             |
| Oct. 23, 2017 | KES-E1-17T0155-R1 | Standard Revision                                                                                                                  |
| May, 15, 2019 | KES-E1-17T0155-R2 | Changed model name, customer's address, factory addition, variant model addition and application standard due to customer request. |
|               |                   |                                                                                                                                    |
|               |                   |                                                                                                                                    |
|               |                   |                                                                                                                                    |
|               |                   |                                                                                                                                    |
|               |                   |                                                                                                                                    |
|               |                   |                                                                                                                                    |
|               |                   |                                                                                                                                    |

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## 1.0 General Product Description

### Main Specifications of E.U.T 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 : 0.2Lux (F1.4, 50IRE); 0.11Lux (F1.4, 30IRE)<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 25fps @1080p                                                                                                                                                  |
| Pan / Tilt / Rotate              |                                                                                                                                                                            |
| Pan / Tilt / Rotate Range        | 0° ~ 350° / 0° ~ 67° / 0° ~ 355°                                                                                                                                           |
| Lens Type                        |                                                                                                                                                                            |
| Focal Length (Zoom Ratio)        | 2.8 ~ 12mm (4.3x) varifocal                                                                                                                                                |
| Max. Aperture Ratio              | F1.4                                                                                                                                                                       |
| Angular Field of View            | H : 103.6 (wide) ~ 32.4 (tele) / V : 33.7 (wide) ~ 16.4 (tele), D : 121.9 (wide) ~ 37.1 (tele)                                                                             |
| Min. Object Distance             | 0.5m (1.64ft)                                                                                                                                                              |
| Focus Control                    | Manual                                                                                                                                                                     |
| Lens Type                        | DC Auto Iris                                                                                                                                                               |
| Mount Type                       | Board-in type                                                                                                                                                              |
| Auto Back Focus(ABF)             | -                                                                                                                                                                          |
| Operational                      |                                                                                                                                                                            |
| IR LED                           |                                                                                                                                                                            |
| Viewable length                  | 30m (98.43ft)                                                                                                                                                              |
| On Screen Display                | Multi-language Support(16)<br>English, Japanese, Spanish, French, Portuguese, Korean, German, Italian, Russian, Polish, 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                                                                                                                                                       |
| Wide Dynamic Range               | 120dB                                                                                                                                                                      |
| Contrast Enhancement             | -                                                                                                                                                                          |
| Digital Noise Reduction          | SSNR4 ( Off / On )                                                                                                                                                         |
| Defog                            | AUTO / MANUAL / OFF                                                                                                                                                        |
| Digital Image Stabilization      | Not support                                                                                                                                                                |
| Motion Detection                 | Off / On(4 zones)                                                                                                                                                          |
| Privacy Masking                  | Off / On (4zones rectangle)                                                                                                                                                |
| Gain Control                     | Off / Low / Middle / High / Very High                                                                                                                                      |
| White Balance                    | ATW / Outdoor / Indoor / Manual / AWC (1,800K° ~ 10,500K°)                                                                                                                 |
| LDC (Lens Distortion Correction) | Not support                                                                                                                                                                |
| Electronic Shutter Speed         | 1sec~ 1/12,000sec                                                                                                                                                          |
| Digital Zoom                     | Not support                                                                                                                                                                |
| Reverse                          | Off / H-Rev / V-Rev / HV-Rev                                                                                                                                               |
| Profile                          | Basic, Day & Night, Backlight, ITS, Indoor, User                                                                                                                           |
| Intelligent Video Analytics      | Not support                                                                                                                                                                |
| Alarm                            | MD output 1                                                                                                                                                                |
| Remote control interface         | Coaxial                                                                                                                                                                    |

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|                                  |                                                                                               |
|----------------------------------|-----------------------------------------------------------------------------------------------|
| Protocol                         | NTSC/PAL : Pelco-C (Coaxitron)<br>AHD : ACP(AHD Coax Protocol)                                |
| 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                | IK10                                                                                          |
| <b>Electrical</b>                |                                                                                               |
| Input Voltage/Current            | Dual ( 24VAC±10% & 12VDC±10% )                                                                |
| Power Consumption                | Max. 4.2W                                                                                     |
| <b>Mechanical</b>                |                                                                                               |
| Color / Material                 | Ivory / Aluminum                                                                              |
| Dimension (WxHxD)                | 106.1* Φ137mm                                                                                 |
| Weight                           | 716g                                                                                          |

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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 ☐ 220 Vac ☐ 230 Vac ☒ 24 Vac ☒ 12 Vdc ☐ PoE  
Frequency ☐ 50 Hz ☐ 60 Hz ☐ Hz

## 1.2 Variant Model Differences

Add derivative model for vendor management

## 1.3 Device Modifications

Not applicable

## 1.4 Equipment Under Test

| Description | Model Number | Serial Number | Manufacturer                      | Remarks |
|-------------|--------------|---------------|-----------------------------------|---------|
| CCTV CAMERA | HCV-6070R    | -             | Hanwha Techwin (Tianjin) Co.,Ltd. | E.U.T   |

## 1.5 Support Equipments

| Description     | Model Number | Serial Number     | Manufacturer                   | Remarks |
|-----------------|--------------|-------------------|--------------------------------|---------|
| MONITOR         | M1950DM      | 206KCLH81256      | LG Electronics Co., Ltd.       | -       |
| MONITOR Adapter | PA-1650-64   | OE9FA612314103637 | LITE-ON TECHNOLOGY CORPORATION | -       |
| Alarm           | -            | -                 | -                              | -       |



## 1.6 External I/O Cabling

- AC 24 V Mode

| Start                  |          | END         |           | Cable Spec. |        |
|------------------------|----------|-------------|-----------|-------------|--------|
| Description            | I/O Port | Description | I/O Port  | Length      | Shield |
| CCTV CAMERA<br>(E.U.T) | BNC      | MONITOR     | Component | 3.5         | S      |
|                        | 2 Pin    | Alarm       | 2 Pin     | 3.0         | U      |

- DC 12 V Mode

| Start                  |          | END         |           | Cable Spec. |        |
|------------------------|----------|-------------|-----------|-------------|--------|
| Description            | I/O Port | Description | I/O Port  | Length      | Shield |
| CCTV CAMERA<br>(E.U.T) | BNC      | MONITOR     | Component | 3.5         | S      |
|                        | 2 Pin    | Alarm       | 2 Pin     | 3.0         | U      |

\* Unshielded=U, Shielded=S

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## 1.7 E.U.T Operating Mode(s)

| Test mode        | operating        |
|------------------|------------------|
| AC 24 V, DC 12 V | E.U.T Monitoring |

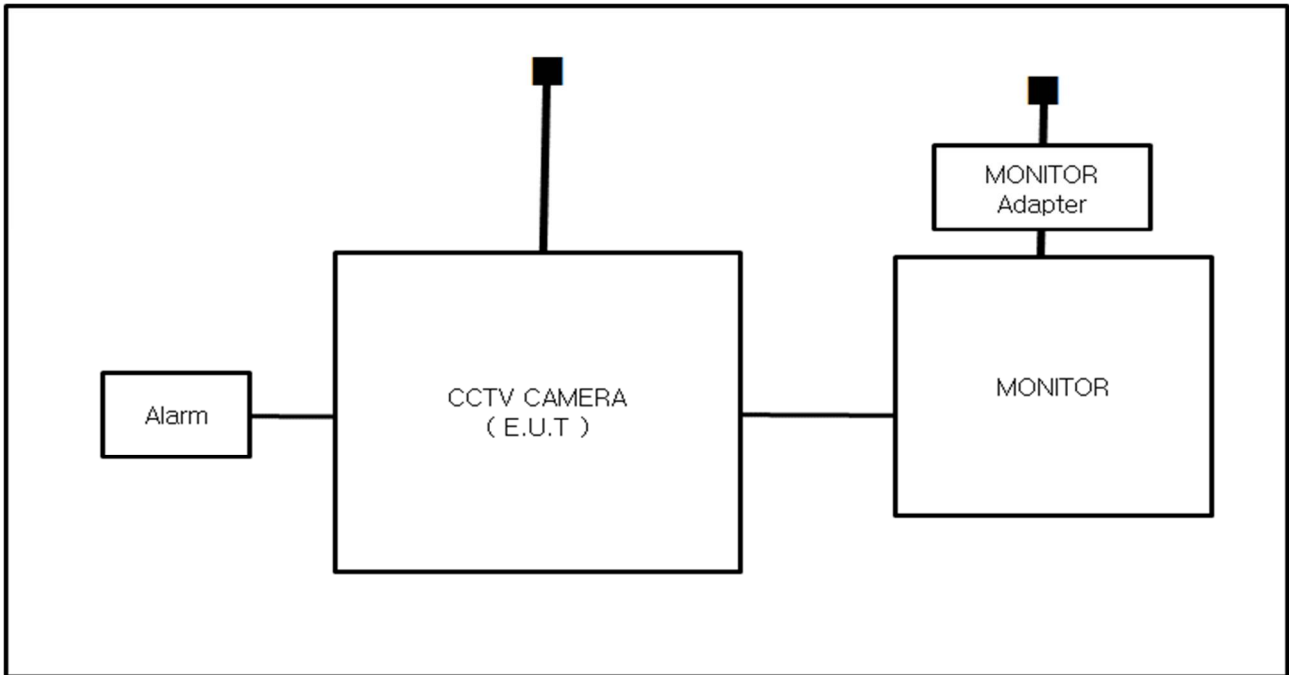
| E.U.T Test operating SW |         |                     |
|-------------------------|---------|---------------------|
| Name                    | Version | Manufacture Company |
| -                       | -       | -                   |

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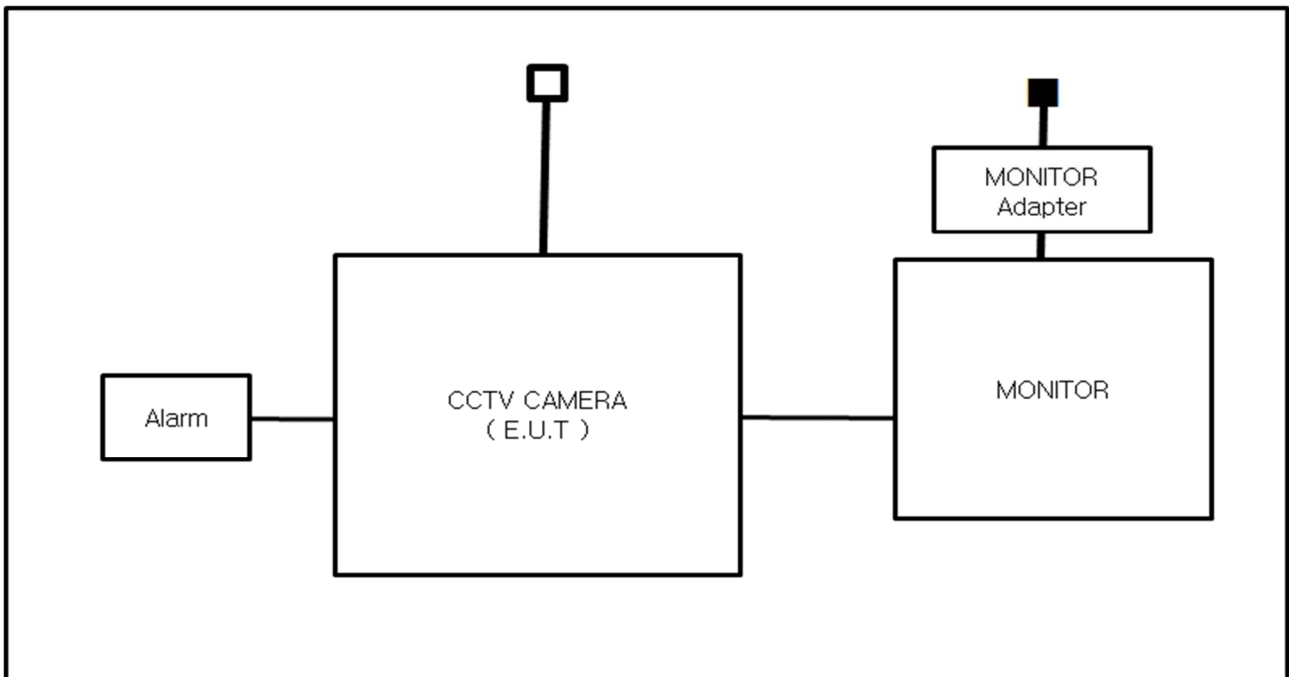
## 1.8 Configuration

■ AC Main  
 □ DC Main

- AC 24 V Mode



- DC 12 V Mode



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## 1.9 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.

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



## 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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- |                                                               |                                  |                                  |
|---------------------------------------------------------------|----------------------------------|----------------------------------|
| <input type="checkbox"/> <b>VCCI V-3 / 2015.04</b>            | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> <b>AS/NZS CISPR22:2009 +A1:2010</b>  | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> <b>47 CFR Part 15, Subpart B</b>     |                                  |                                  |
| <input type="checkbox"/> CISPR 22:2009 +A1:2010               | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> ANSI C63.4-2009                      |                                  |                                  |
| <input type="checkbox"/> <b>IC Regulation ICES-003 : 2016</b> |                                  |                                  |
| <input type="checkbox"/> CAN/CSA CISPR 22-10                  | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> ANSI C63.4-2014                      |                                  |                                  |
| <input type="checkbox"/> <b>RE- Directive 2014/53/EU</b>      |                                  |                                  |
| <input type="checkbox"/> EN 301 489-1 V1.9.2                  |                                  |                                  |
| <input type="checkbox"/> Equipment for fixed use              |                                  |                                  |
| <input type="checkbox"/> Equipment for vehicular use          |                                  |                                  |
| <input type="checkbox"/> Equipment for portable use           |                                  |                                  |
| <input type="checkbox"/> EN 301 489-3 V1.6.1                  |                                  |                                  |
| <input type="checkbox"/> EN 301 489-17 V2.2.1                 |                                  |                                  |
| <input type="checkbox"/> EN 60945:2002                        |                                  |                                  |

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## 2.1 Conducted Emissions at Mains Power Ports

### Test Date

Feb, 14, 2017

### Test Location

Electro wave Shieldroom

### Test Equipment

| Used                                | Description       | Model Number | Manufacturer | Serial Number | Cal. Due     |
|-------------------------------------|-------------------|--------------|--------------|---------------|--------------|
| <input checked="" type="checkbox"/> | EMI Test Receiver | ESR3         | R & S        | 101783        | 05, 03, 2017 |
| <input checked="" type="checkbox"/> | LISN              | ENV216       | R & S        | 101137        | 02, 03, 2018 |
| <input checked="" type="checkbox"/> | LISN              | ENV216       | R & S        | 101786        | 05, 02, 2017 |
| <input checked="" type="checkbox"/> | PULSE LIMITER     | ESH3-Z2      | R & S        | 101914        | 12, 13, 2017 |
| <input checked="" type="checkbox"/> | Shield Room #3    | -            | SEMITEC      | -             | -            |
| <input checked="" type="checkbox"/> | EMI Test S/W      | EMC32        | R & S        | 9.12.00       | -            |

### Test Conditions

Temperature: 22,9 °C  
Relative Humidity: 41,3 %

### Frequency Range of Measurement

150 kHz to 30 MHz

### Instrument Settings

IF Band Width: 9 kHz

### Test Results

The requirements are:

- ☒ PASS  
☐ NOT PASS  
☐ NOT APPLICABLE

### Remarks

See Appendix A for test data.



## 2.2 Conducted Emissions at Telecommunication Ports

### Test Date

N/A

### Test Location

Electro wave Shieldroom

### Test Equipment

| Used                     | Description             | Model Number | Manufacturer     | Serial Number | Cal. Due     |
|--------------------------|-------------------------|--------------|------------------|---------------|--------------|
| <input type="checkbox"/> | EMI Test Receiver       | ESR3         | R & S            | 101783        | 05, 03, 2017 |
| <input type="checkbox"/> | LISN                    | ENV216       | R & S            | 101137        | 02, 03, 2018 |
| <input type="checkbox"/> | LISN                    | ENV216       | R & S            | 101786        | 05, 02, 2017 |
| <input type="checkbox"/> | 8-Wire ISN CAT3         | CAT3 8158    | Schwarzbeck Mess | 8158-0019     | 04, 01, 2017 |
| <input type="checkbox"/> | 8-Wire ISN CAT5         | CAT5 8158    | Schwarzbeck Mess | 8158-0030     | 04, 01, 2017 |
| <input type="checkbox"/> | 8-Wire ISN CAT6         | NTFM 8158    | Schwarzbeck Mess | 8158-0029     | 08, 11, 2017 |
| <input type="checkbox"/> | PULSE LIMITER           | ESH3-Z2      | R & S            | 101914        | 12, 13, 2017 |
| <input type="checkbox"/> | Electro wave Shieldroom | -            | SEMITEC          | -             | -            |
| <input type="checkbox"/> | EMI Test S/W            | EMC32        | R & S            | 9.12.00       | -            |

### Test Conditions

Temperature: °C

Relative Humidity: %

### 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

N/A Because the E.U.T power is 12 v (dc) power and PoE, limits are not specified.



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

### Test Date

Feb, 14, 2017

### Test Location

☐ Open Area Test Site #1      ☒ Open Area Test Site #2

### Test Equipment

| Used                                | Description          | Model Number | Manufacturer | Serial Number | Cal. Due     |
|-------------------------------------|----------------------|--------------|--------------|---------------|--------------|
| <input checked="" type="checkbox"/> | EMI TEST Receiver    | ESR3         | R & S        | 101781        | 05, 03, 2017 |
| <input checked="" type="checkbox"/> | Trilog-Broadband ANT | VULB 9163    | Schwarzbeck  | 715           | 04, 14, 2018 |
| <input checked="" type="checkbox"/> | Open Area Test Site  | -            | KES          | -             | -            |
| <input checked="" type="checkbox"/> | Antenna Mast         | -            | DAEIL EMC    | -             | -            |
| <input checked="" type="checkbox"/> | Turn Table           | -            | DAEIL EMC    | -             | -            |
| <input checked="" type="checkbox"/> | EMI Test S/W         | -            | -            | -             | -            |

### Test Conditions

Temperature: 5,1 °C  
Relative Humidity: 45,0 %

### 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

Feb, 14, 2017

### Test Location

Semi Anechoic Chamber #2

### Test Equipment

| Used                                | Description                    | Model Number | Manufacturer                  | Serial Number | Cal. Due     |
|-------------------------------------|--------------------------------|--------------|-------------------------------|---------------|--------------|
| <input checked="" type="checkbox"/> | DOUBLE RIDGED HORN ANTENNA     | SAS-571      | A.H.SYSTEM,INC                | 781           | 05, 07, 2017 |
| <input checked="" type="checkbox"/> | EMI Test Receiver              | ESU26        | R & S                         | 100552        | 04, 24, 2017 |
| <input checked="" type="checkbox"/> | Broadband Coaxial Preamplifier | BBV 9718     | Schwarzbeck Mess - Elektronik | 9718-246      | 10, 14, 2017 |
| <input checked="" type="checkbox"/> | Semi Anechoic Chamber #2       | -            | SEMITEC                       | -             | -            |
| <input checked="" type="checkbox"/> | Antenna Mast                   | -            | AUDIX                         | -             | -            |
| <input checked="" type="checkbox"/> | Turn Table                     | -            | AUDIX                         | -             | -            |
| <input checked="" type="checkbox"/> | EMI Test S/W                   | e3           | AUDIX                         | 8.083b        | -            |

### Test Conditions

Temperature: 22,9 °C

Relative Humidity: 41,3 %

### 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

N/A

### Test Location

Electro wave Shieldroom

### Test Equipment

| Used                     | Description            | Model Number | Manufacturer | Serial Number | Cal. Due     |
|--------------------------|------------------------|--------------|--------------|---------------|--------------|
| <input type="checkbox"/> | AC Source              | ACS 500 N    | EM TEST      | V1024106760   | 08, 08, 2017 |
| <input type="checkbox"/> | Digital Power Analyzer | DPA 500 N    | EM TEST      | V1024106759   | 08, 08, 2017 |
| <input type="checkbox"/> | EMI Test S/W           | dpa.control  | EM TEST AG   | 5.4.8.0       | -            |

### Test Conditions

Temperature: °C

Relative Humidity: %

### 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

N/A Because the E.U.T power is less than 75 W, limits are not specified.



## 2.6 Voltage Fluctuations and Flicker

### Test Date

N/A

### Test Location

Electro wave Shieldroom

### Test Equipment

| Used                     | Description            | Model Number | Manufacturer | Serial Number | Cal. Due     |
|--------------------------|------------------------|--------------|--------------|---------------|--------------|
| <input type="checkbox"/> | AC Source              | ACS 500 N    | EM test      | V1024106760   | 08, 08, 2017 |
| <input type="checkbox"/> | Digital Power Analyzer | DPA 500 N    | EM test      | V1024106759   | 08, 08, 2017 |
| <input type="checkbox"/> | EMI Test S/W           | dpa.control  | EM TEST AG   | 5.4.8.0       | -            |

### Test Conditions

Temperature: °C

Relative Humidity: %

### Test Results

The requirements are:

- ☐ PASS  
☐ NOT PASS  
☒ NOT APPLICABLE

### Remarks

N/A Because the E.U.T power is 12 v (dc) power and PoE, limits are not specified.

### 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

Feb, 15, 2017

### Test Location

EMS-ESD: Electro wave Shieldroom

### Test Equipment

| Used                                | Description   | Model Number | Manufacturer | Serial Number | Cal. Due     |
|-------------------------------------|---------------|--------------|--------------|---------------|--------------|
| <input checked="" type="checkbox"/> | ESD SIMULATOR | ESS-2000     | Noise Ken    | ESS05X4620    | 02, 24, 2017 |
| <input checked="" type="checkbox"/> | HCP           | -            | Noise Ken    | -             | -            |
| <input checked="" type="checkbox"/> | VCP           | -            | Noise Ken    | -             | -            |
| <input checked="" type="checkbox"/> | EMS Test S/W  | -            | -            | -             | -            |

### Test Conditions

Temperature: 23,1 °C  
Relative Humidity: 40,6 %  
Atmospheric Pressure: 101,8 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 |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

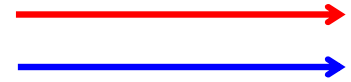
Notes: HCP: Horizontal coupling plane  
VCP: Vertical coupling plane

Required Performance Criteria: ☒ Complied

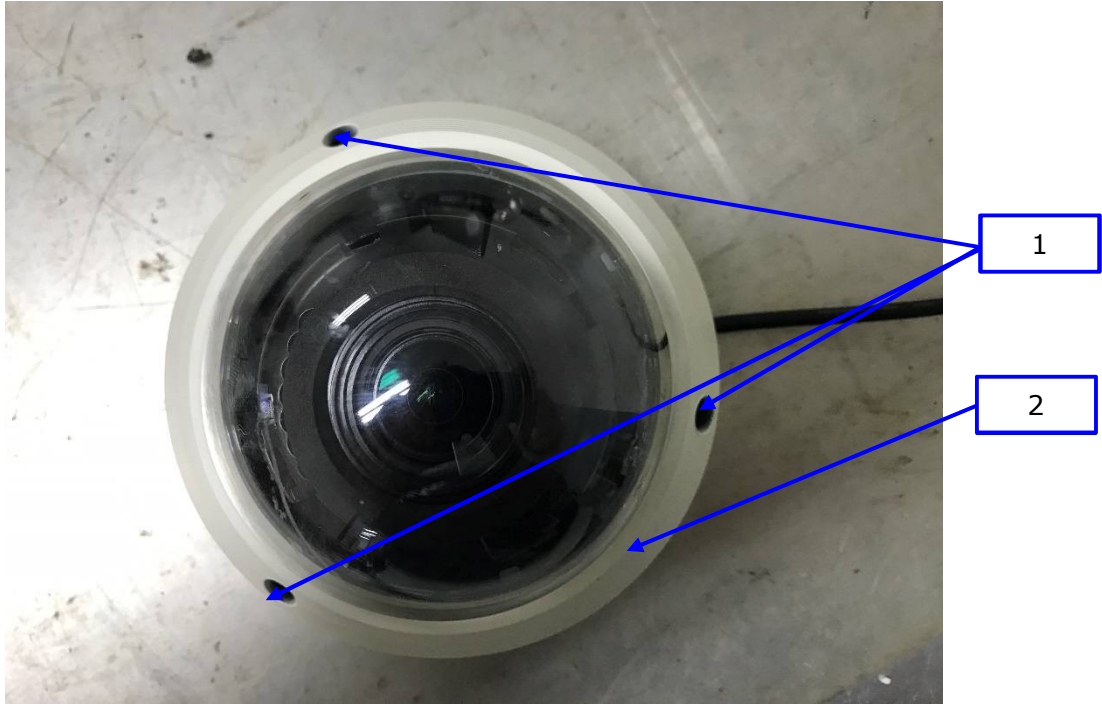
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**Location of Discharge:**

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



- DC 12 V, DC 12 V Mode





## Test Data

### - AC 24 V Mode

#### 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   | Screw      | Contact Discharge | Complied     | -       |
| 2   | Sarface    | Contact Discharge | Complied     | -       |

### - DC 12 V Mode

#### 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   | Screw      | Contact Discharge | Complied     | -       |
| 2   | Sarface    | 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.



## 3.2 Radiated Electric Field Immunity

### Reference Standard

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

### Test Date

Feb, 13, 2017

### Test Location

EMS-RS: ☐ Semi Anechoic Chamber #1 ☒ Semi Anechoic Chamber #2

### Test Equipment

| Used                                | Description                    | Model Number        | Manufacturer | Serial Number                       | Cal. Due     |
|-------------------------------------|--------------------------------|---------------------|--------------|-------------------------------------|--------------|
| <input checked="" type="checkbox"/> | Signal Generator               | ESG-3000A           | HP           | US37040210                          | 11, 01, 2017 |
| <input checked="" type="checkbox"/> | Amplifier                      | ITA0300-200         | Infinitech   | -                                   | 11, 01, 2017 |
| <input checked="" type="checkbox"/> | Amplifier                      | ITA0750-200         | Infinitech   | -                                   | 11, 01, 2017 |
| <input checked="" type="checkbox"/> | Amplifier                      | ITA1500-100         | Infinitech   | -                                   | 11, 01, 2017 |
| <input checked="" type="checkbox"/> | Amplifier                      | ITA2500-100         | Infinitech   | -                                   | 11, 01, 2017 |
| <input checked="" type="checkbox"/> | GPB INTERFACE CONTROL          | SYSTEM CONTROL UNIT | Infinitech   | -                                   | -            |
| <input checked="" type="checkbox"/> | POWER SUPPLY                   | SYSTEM POWER SUPPLY | Infinitech   | -                                   | -            |
| <input checked="" type="checkbox"/> | Power Meter                    | E4419B              | Agilent      | MY45101506                          | 06, 27, 2017 |
| <input checked="" type="checkbox"/> | Average Power Sensor           | E9301A              | Agilent      | -                                   | 06, 27, 2017 |
| <input checked="" type="checkbox"/> | Average Power Sensor           | E9301A              | Agilent      | MY41495698                          | 11, 17, 2017 |
| <input checked="" type="checkbox"/> | Stacked Double Log-Per-Antenna | STPL9128 D          | SCHWARZBECK  | 9128D038                            | -            |
| <input checked="" type="checkbox"/> | Semi Anechoic Chamber #2       | -                   | SEMITEC      | -                                   | -            |
| <input checked="" type="checkbox"/> | EMS Test S/W                   | EMS Test S/W        | KTI_RS2012   | KOREA TECHNOLOGY INSTITUTE CO., LTD | 2.1.1        |



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### Test Conditions

Temperature: 22,6 °C  
Relative Humidity: 40,1 %  
Atmospheric Pressure: 102,0 kPa

### 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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## Test Data

### - AC 24 V Mode

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

### - DC 12 V Mode

| 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.

### 3.3 Electrical Fast Transients/Bursts

#### Reference Standard

EN 61000-4-4:2012

#### Test Date

Feb, 16, 2017

#### Test Location

EMS-EFT: Electro wave Shieldroom

#### Test Equipment

| Used                                | Description               | Model Number | Manufacturer | Serial Number | Cal. Due     |
|-------------------------------------|---------------------------|--------------|--------------|---------------|--------------|
| <input checked="" type="checkbox"/> | ULTRA COMPACT SIMULATOR   | UCS 500 N5   | EM TEST      | V0936105120   | 06, 27, 2017 |
| <input checked="" type="checkbox"/> | MOTOR VARIAC              | MV2616       | EM TEST      | V0936105123   | 06, 27, 2017 |
| <input checked="" type="checkbox"/> | CAPACITIVE COUPLING CLAMP | HFK          | EM TEST      | 070925        | 06, 27, 2017 |
| <input checked="" type="checkbox"/> | EMS Test S/W              | iec.control  | EM TEST      | 5.0.9.0       | -            |

#### Test Conditions

Temperature: 22,7 °C  
Relative Humidity: 39,8 %  
Atmospheric Pressure: 101,3 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 kHz ☒ 100 kHz

Duration of Test Voltage: ☒ ≥ 1 min

Required Performance Criteria: ☒ Complied

## Test Data

### - AC 24 V Mode

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

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

☐ 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       |
| Alarm               | Complied       | Complied       |

### - DC 12 V Mode

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

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

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

| Mode of Application | Observations   |                |
|---------------------|----------------|----------------|
|                     | (+) Burst (kV) | (-) Burst (kV) |
| L1 – L2             | Complied       | Complied       |

☒ Signal ports and telecommunication ports – Coupling Clamp used

| Mode of Application | Observations   |                |
|---------------------|----------------|----------------|
|                     | (+) Burst (kV) | (-) Burst (kV) |
| BNC                 | Complied       | Complied       |
| Alarm               | 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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### 3.4 Surge Transients

**Reference Standard**

EN 61000-4-5:2014

**Test Date**

Feb, 16, 2017

**Test Location**

EMS-Surge: Electro wave Shieldroom

**Test Equipment**

| Used                                | Description             | Model Number | Manufacturer | Serial Number | Cal. Due     |
|-------------------------------------|-------------------------|--------------|--------------|---------------|--------------|
| <input checked="" type="checkbox"/> | ULTRA COMPACT SIMULATOR | UCS 500 N5   | EM TEST      | V0936105120   | 06, 27, 2017 |
| <input checked="" type="checkbox"/> | MOTOR VARIAC            | MV2616       | EM TEST      | V0936105123   | 06, 27, 2017 |
| <input type="checkbox"/>            | CDN                     | CNV 508N1    | EM TEST      | P1551168979   | 04, 27, 2017 |
| <input checked="" type="checkbox"/> | CDN                     | CNV 508T5    | EM TEST      | P1549168422   | 04, 27, 2017 |
| <input checked="" type="checkbox"/> | EMS Test S/W            | iec.control  | EM TEST      | 5.0.9.0       | -            |

**Test Conditions**

Temperature: 22,7 °C  
Relative Humidity: 39,8 %  
Atmospheric Pressure: 101,3 kPa

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### 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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**Test Data**

- AC 24 V Mode

☒ Line to Line – Differential Mode

| Mode of Application | Observations   |                |
|---------------------|----------------|----------------|
|                     | (+) Surge (kV) | (-) Surge (kV) |
| L1 - L2             | Complied       | Complied       |
| L1 - PE             | -              | -              |
| L2 - PE             | -              | -              |

☐ Line to Earth – Common Mode

| Mode of Application | Observations   |                |
|---------------------|----------------|----------------|
|                     | (+) Surge (kV) | (-) Surge (kV) |
| L1-PE               | -              | -              |
| L2-PE               | -              | -              |

**Signal Lines**

☒ Line to Earth – Common Mode

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

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**- DC 12 V Mode**☐ Line to Line – Differential Mode

| Mode of Application | Observations   |                |
|---------------------|----------------|----------------|
|                     | (+) Surge (kV) | (-) Surge (kV) |
| L1 - L2             | -              | -              |
| L1 - PE             | -              | -              |
| L2 - PE             | -              | -              |

☐ Line to Earth – Common Mode

| Mode of Application | Observations   |                |
|---------------------|----------------|----------------|
|                     | (+) Surge (kV) | (-) Surge (kV) |
| L1-PE               | -              | -              |
| L2-PE               | -              | -              |

**Signal Lines**☒ Line to Earth – Common Mode

| Mode of Application | Observations   |                |
|---------------------|----------------|----------------|
|                     | (+) Surge (kV) | (-) Surge (kV) |
| BNC                 | Complied       | Complied       |
| Alarm               | 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.

## 3.5 Conducted Disturbance

### Reference Standard

EN 61000-4-6:2014

### Test Date

Feb, 15, 2017

### Test Location

EMS-CS: Electro wave Shieldroom

### Test Equipment

| Used                                | Description               | Model Number | Manufacturer | Serial Number | Cal. Due     |
|-------------------------------------|---------------------------|--------------|--------------|---------------|--------------|
| <input checked="" type="checkbox"/> | Continuous Wave Generator | CWS 500N1    | EM TEST      | V0936105119   | 08, 08, 2017 |
| <input checked="" type="checkbox"/> | 6 dB Attenuator           | ATT6         | EM TEST      | 1208-34       | 08, 08, 2017 |
| <input checked="" type="checkbox"/> | CDN                       | CDN-M2/M3N   | EM TEST      | 0909-06       | 08, 08, 2017 |
| <input type="checkbox"/>            | CDN                       | CDN-T2-RJ11  | EM TEST      | 0909-07       | 08, 08, 2017 |
| <input type="checkbox"/>            | CDN                       | CDN-T4       | EM TEST      | 0909-08       | 08, 08, 2017 |
| <input type="checkbox"/>            | CDN                       | CDN-T8RJ45   | EM TEST      | 0909-09       | 08, 08, 2017 |
| <input type="checkbox"/>            | CDN                       | CDN-AF2      | EM TEST      | 0909-10       | 08, 08, 2017 |
| <input type="checkbox"/>            | CDN                       | CDN-AF4      | EM TEST      | 0909-11       | 08, 08, 2017 |
| <input checked="" type="checkbox"/> | EM Injection Clamp        | EM 101       | Liithi       | 35943         | 02, 03, 2018 |
| <input checked="" type="checkbox"/> | EMS Test S/W              | icd.control  | EM TEST      | 5.3.7         | -            |

### Test Conditions

Temperature: 23,1 °C  
Relative Humidity: 40,6 %  
Atmospheric Pressure: 101,8 kPa



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### 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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**Test Data**

- AC 24 V Mode

☒ Input a.c. power ports

| Coupling Location<br>(Line Stressed) | Coupling Method                                                            | Observations |
|--------------------------------------|----------------------------------------------------------------------------|--------------|
| L - N                                | CDN ( <input checked="" type="checkbox"/> M2, <input type="checkbox"/> M3) | Complied     |

☐ Input d.c. power ports

| Coupling Location<br>(Line Stressed) | Coupling Method                                                 | Observations |
|--------------------------------------|-----------------------------------------------------------------|--------------|
| -                                    | CDN ( <input type="checkbox"/> M2, <input type="checkbox"/> M3) | -            |

☒ Signal ports and telecommunication ports

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

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**- DC 12 V Mode**☐ Input a.c. power ports

| Coupling Location<br>(Line Stressed) | Coupling Method                                                 | Observations |
|--------------------------------------|-----------------------------------------------------------------|--------------|
| -                                    | CDN ( <input type="checkbox"/> M2, <input type="checkbox"/> M3) | -            |

☒ Input d.c. power ports

| Coupling Location<br>(Line Stressed) | Coupling Method                                                            | Observations |
|--------------------------------------|----------------------------------------------------------------------------|--------------|
| L1 - L2                              | CDN ( <input checked="" type="checkbox"/> M2, <input type="checkbox"/> M3) | Complied     |

☒ Signal ports and telecommunication ports

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



### 3.6 Voltage Dips and Short Interruptions

#### Reference Standard

EN 61000-4-11:2004

#### Test Date

Feb, 16, 2017

#### Test Location

EMS-Voltage dip: Electro wave Shieldroom

#### Test Equipment

| Used                                | Description             | Model Number | Manufacturer | Serial Number | Cal. Due     |
|-------------------------------------|-------------------------|--------------|--------------|---------------|--------------|
| <input checked="" type="checkbox"/> | ULTRA COMPACT SIMULATOR | UCS 500 N5   | EM TEST      | V0936105120   | 06, 27, 2017 |
| <input checked="" type="checkbox"/> | MOTOR VARIAC            | MV2616       | EM TEST      | V0936105123   | 06, 27, 2017 |
| <input checked="" type="checkbox"/> | EMS Test S/W            | iec.control  | EM TEST      | 5.0.9.0       | -            |

#### Test Conditions

Temperature: 22,7 °C  
Relative Humidity: 39,8 %  
Atmospheric Pressure: 101,3 kPa



## Test Specifications & Observations/Remarks

(Test Voltage : 50 Hz)

| <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 /5000 | <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 /5000 | <u>Complied</u> |

- Voltage variations

|                                                 |                                                  |                 |
|-------------------------------------------------|--------------------------------------------------|-----------------|
| <input checked="" type="checkbox"/> Unom + 10 % | <input checked="" type="checkbox"/> 253 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

### Test Results

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

### Remarks

Complied : PASS Required Performance Criteria.

## APPENDIX A – TEST DATA

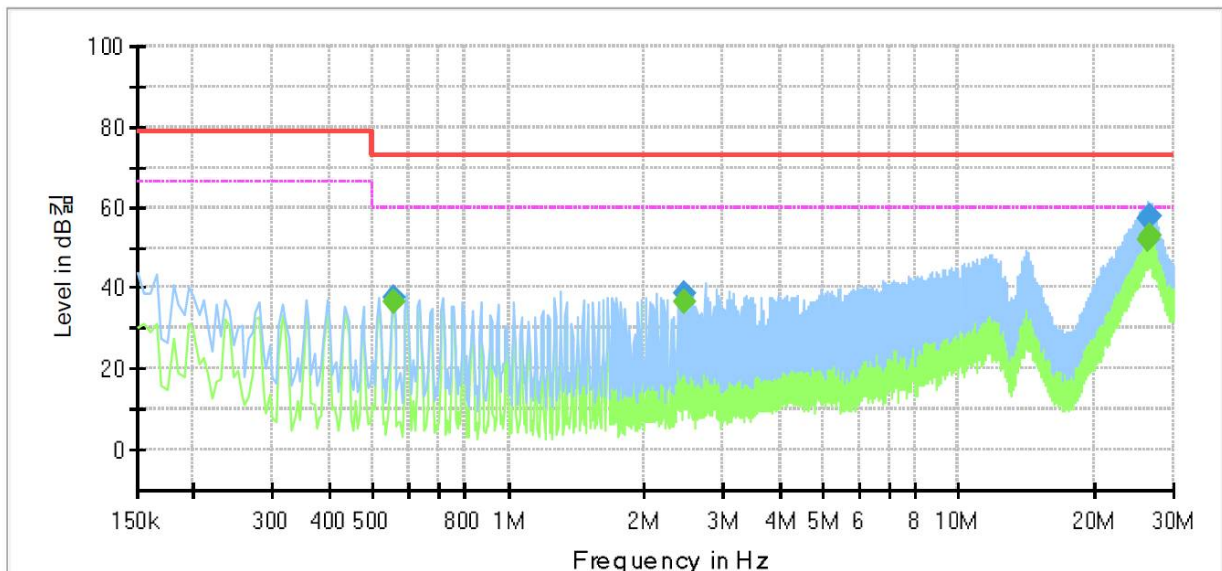
### Conducted Emissions at Mains Power Ports

[HOT]

- AC 24 V Mode

### Common Information

|                   |                    |
|-------------------|--------------------|
| Test Description: | Conducted Emission |
| Model No.:        | HCV-6070RP         |
| Mode              | AC 24 V _ H        |
| Operator Name:    | KES                |



### Final Result

| Frequency (MHz) | QuasiPeak (dBμV) | CAverage (dBμV) | Limit (dBμV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.555000        | ---              | 36.40           | 60.00        | 23.60       | 1000.0          | 9.000           | L1   | 20.5       |
| 0.555000        | 37.82            | ---             | 73.00        | 35.18       | 1000.0          | 9.000           | L1   | 20.5       |
| 2.455000        | ---              | 36.40           | 60.00        | 23.60       | 1000.0          | 9.000           | L1   | 19.8       |
| 2.455000        | 38.60            | ---             | 73.00        | 34.40       | 1000.0          | 9.000           | L1   | 19.8       |
| 26.230000       | ---              | 52.12           | 60.00        | 7.88        | 1000.0          | 9.000           | L1   | 20.3       |
| 26.230000       | 57.33            | ---             | 73.00        | 15.67       | 1000.0          | 9.000           | L1   | 20.3       |
| 26.545000       | ---              | 52.72           | 60.00        | 7.28        | 1000.0          | 9.000           | L1   | 20.3       |
| 26.545000       | 57.64            | ---             | 73.00        | 15.36       | 1000.0          | 9.000           | L1   | 20.3       |

#### ◆ Calculation

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

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

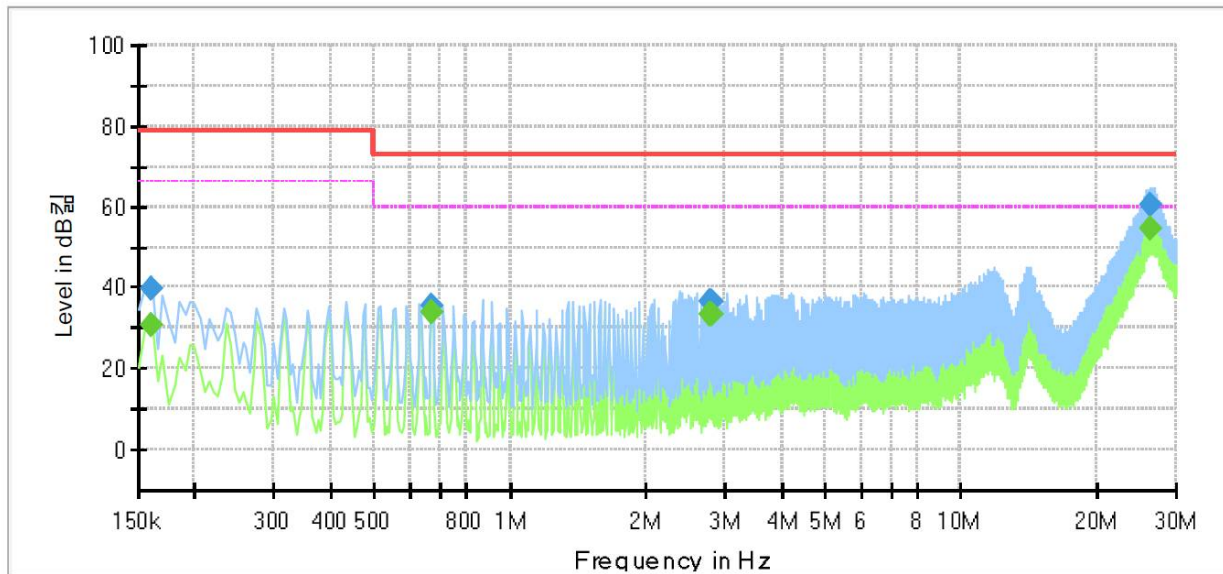
Corr. : Correction values (LISN FACTOR+ Cable Loss)

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[NEUTRAL]

## Common Information

Test Description: Conducted Emission  
 Model No.: HCV-6070RP  
 Mode: AC 24 V \_ N  
 Operator Name: KES



## Final Result

| Frequency (MHz) | QuasiPeak (dBμV) | CAverage (dBμV) | Limit (dBμV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.160000        | ---              | 30.63           | 66.00        | 35.37       | 1000.0          | 9.000           | N    | 21.0       |
| 0.160000        | 39.75            | ---             | 79.00        | 39.25       | 1000.0          | 9.000           | N    | 21.0       |
| 0.670000        | ---              | 33.66           | 60.00        | 26.34       | 1000.0          | 9.000           | N    | 20.4       |
| 0.670000        | 35.34            | ---             | 73.00        | 37.66       | 1000.0          | 9.000           | N    | 20.4       |
| 2.765000        | ---              | 33.59           | 60.00        | 26.41       | 1000.0          | 9.000           | N    | 19.8       |
| 2.765000        | 36.63            | ---             | 73.00        | 36.37       | 1000.0          | 9.000           | N    | 19.8       |
| 2.805000        | ---              | 33.16           | 60.00        | 26.84       | 1000.0          | 9.000           | N    | 19.8       |
| 2.805000        | 36.50            | ---             | 73.00        | 36.50       | 1000.0          | 9.000           | N    | 19.8       |
| 26.450000       | ---              | 54.55           | 60.00        | 5.45        | 1000.0          | 9.000           | N    | 20.3       |
| 26.450000       | 60.25            | ---             | 73.00        | 12.75       | 1000.0          | 9.000           | N    | 20.3       |

### ◆ 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)



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### Conducted Emissions at Telecommunication Ports

[10 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)

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**[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)

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## Radiated Electric Field Emissions(Below 1 GHz)

- AC 24 V Mode

| Frequency | Amplitude    | ANT             | ANT. Height | Correction Factor |               | Corrected Amplitude | Applicable Limit | Margin |
|-----------|--------------|-----------------|-------------|-------------------|---------------|---------------------|------------------|--------|
| [MHz]     | [dB $\mu$ V] | Polar.<br>(H/V) | [m]         | ANT.<br>[dB/m]    | Cable<br>[dB] | [dB $\mu$ V/m]      | [dB $\mu$ V/m]   | [dB]   |
| 60.19     | 19.91        | V               | 1.00        | 12.59             | 1.85          | 34.35               | 40.00            | 5.65   |
| 148.57    | 24.72        | V               | 1.26        | 8.17              | 3.01          | 35.90               | 40.00            | 4.10   |
| 149.81    | 20.60        | H               | 3.62        | 8.20              | 3.02          | 31.82               | 40.00            | 8.18   |
| 409.18    | 13.69        | H               | 3.87        | 15.73             | 5.45          | 34.87               | 47.00            | 12.13  |
| 409.86    | 11.30        | V               | 1.88        | 15.74             | 5.46          | 32.50               | 47.00            | 14.50  |
| 557.70    | 9.33         | H               | 4.00        | 18.44             | 6.52          | 34.29               | 47.00            | 12.71  |

\* H : Horizontal, V : Vertical

### ◆ Calculation

Corrected Amplitude [dB $\mu$ V] = Amplitude[dBuV] + Correction Factor [dB]

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

Correction Factor : ANT FACTOR + Cable loss

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**- DC 12 V Mode**

| Frequency | Amplitude | ANT             | ANT. Height | Correction Factor |               | Corrected Amplitude | Applicable Limit | Margin |
|-----------|-----------|-----------------|-------------|-------------------|---------------|---------------------|------------------|--------|
| [MHz]     | [dBμV]    | Polar.<br>(H/V) | [m]         | ANT.<br>[dB/m]    | Cable<br>[dB] | [dBμV/m]            | [dBμV/m]         | [dB]   |
| 48.17     | 13.18     | V               | 1.34        | 13.64             | 1.68          | 28.50               | 40.00            | 11.50  |
| 68.75     | 17.51     | V               | 1.29        | 10.06             | 1.97          | 29.54               | 40.00            | 10.46  |
| 148.58    | 22.64     | V               | 1.00        | 8.17              | 3.01          | 33.82               | 40.00            | 6.18   |
| 149.21    | 20.90     | H               | 3.48        | 8.19              | 3.01          | 32.10               | 40.00            | 7.90   |
| 223.01    | 9.72      | H               | 4.00        | 11.97             | 3.82          | 25.51               | 40.00            | 14.49  |
| 409.23    | 8.51      | H               | 3.61        | 15.73             | 5.46          | 29.70               | 47.00            | 17.30  |

\* H : Horizontal, V : Vertical

**◆ Calculation**

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

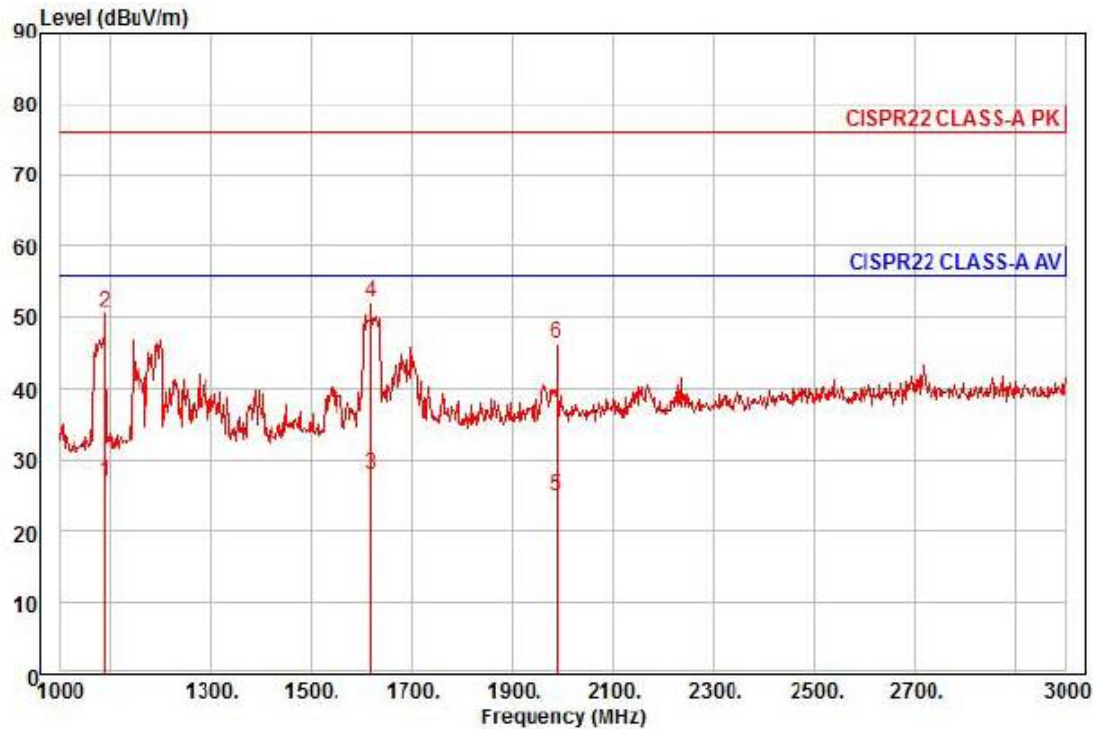
Corrected Amplitude : The Final Value, Amplitude : Reading Value,

Correction Factor : ANT FACTOR + Cable loss



## Radiated Electric Field Emissions(Above 1 GHz)

- AC 24 V Mode



Site : chamber  
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) horizontal  
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto  
Project :  
Model : HCV-6070RP  
Mode : AC 24 V  
Memo :

|      | Read    | Ant   | Cable  | Preamp | TPos   | Limit | Over   |           |                    |
|------|---------|-------|--------|--------|--------|-------|--------|-----------|--------------------|
|      | Freq    | Level | Factor | Loss   | Factor | Line  | Limit  | Pol/Phase | Remark             |
|      | MHz     | dBuV  | dB/m   | dB     | dB     | deg   | dBuV/m | dB        |                    |
| 1    | 1090.00 | 35.85 | 24.27  | 6.78   | 39.87  | 331   | 56.00  | -28.97    | horizontal Average |
| 2    | 1090.00 | 59.63 | 24.27  | 6.78   | 39.87  | 331   | 76.00  | -25.19    | horizontal Peak    |
| 3 av | 1618.00 | 32.56 | 26.36  | 8.36   | 39.23  | 305   | 56.00  | -27.95    | horizontal Average |
| 4 pp | 1618.00 | 56.80 | 26.36  | 8.36   | 39.23  | 305   | 76.00  | -23.71    | horizontal Peak    |
| 5    | 1988.00 | 27.31 | 27.83  | 9.31   | 39.40  | 328   | 56.00  | -30.95    | horizontal Average |
| 6    | 1988.00 | 48.68 | 27.83  | 9.31   | 39.40  | 328   | 76.00  | -29.58    | horizontal Peak    |

### ◆ Calculation

Over Limit [dB] = (Read Level[dBuV] + Ant Factor[dB/m] + Cable Loss [dB] - Preamp Factor [dB]) - Limit Line[dBuV]

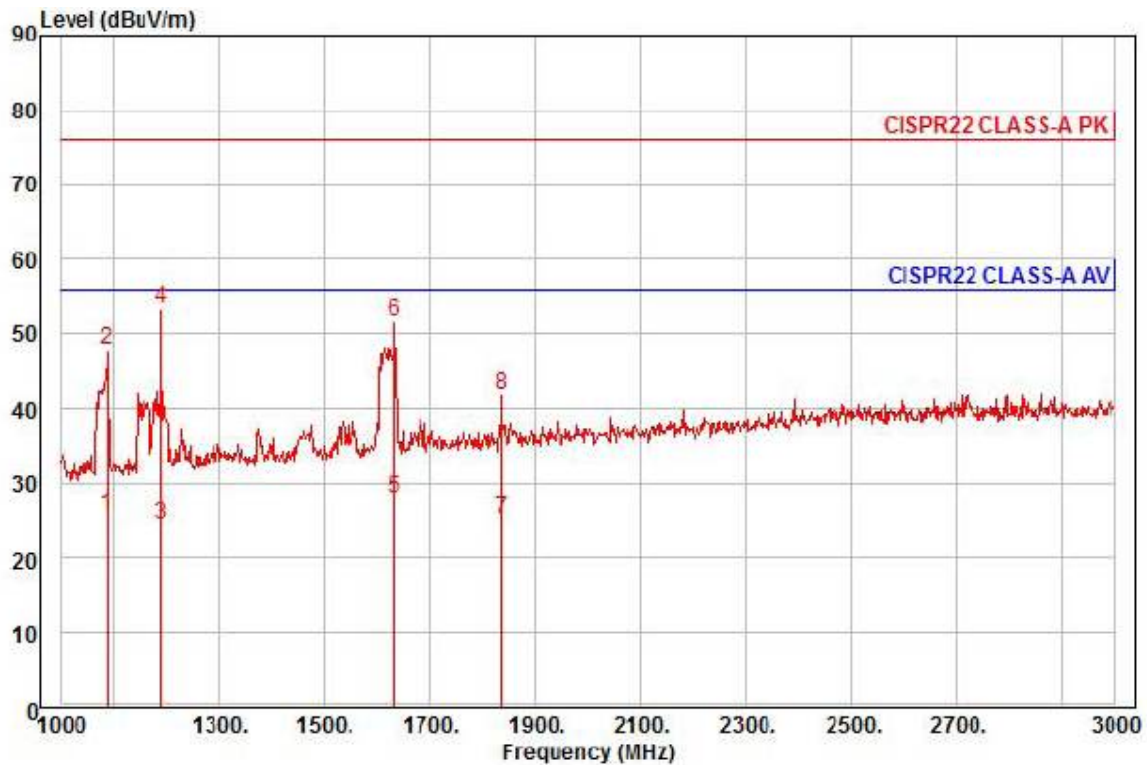
Over Limit : Margin Value, Read Level : Reading Value, Ant Factor : Ant Factor,  
Cable Loss : Cable loss, Preamp Factor : Preamp Factor



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Site : chamber  
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) vertical  
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto  
Project :  
Model : HCV-6070RP  
Mode : AC 24 V  
Memo :

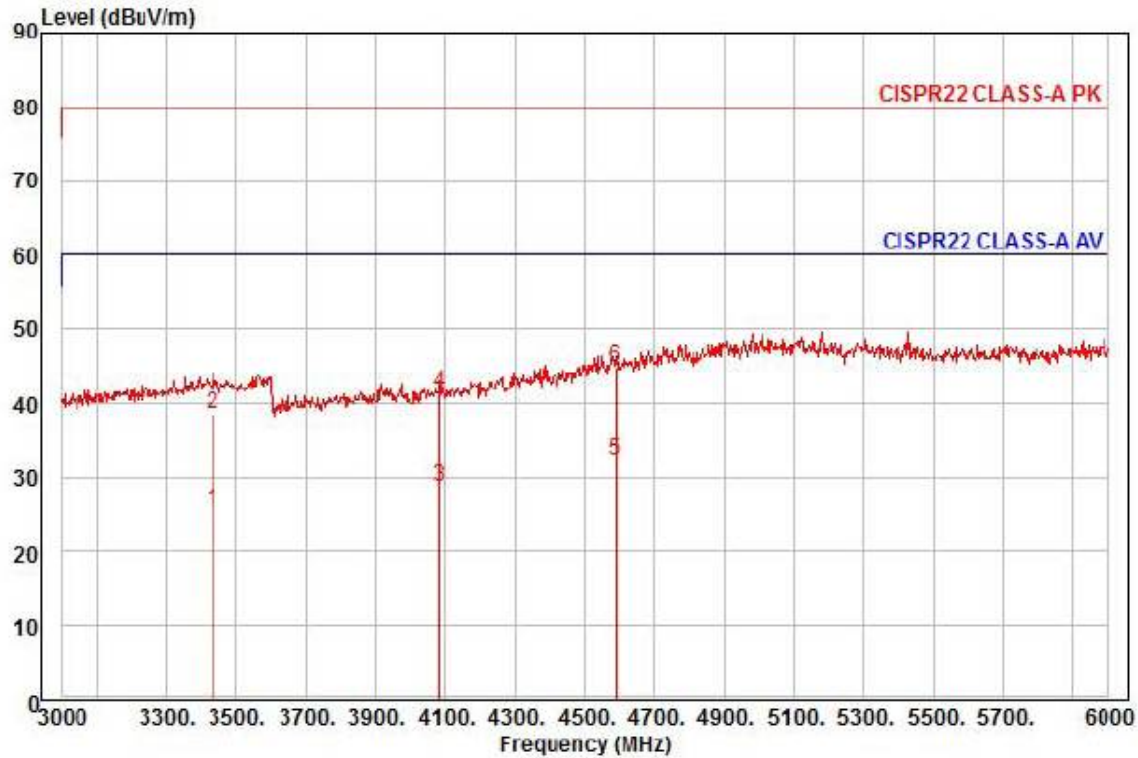
|      | Freq    | Read Level | Ant Factor | Cable Loss | Preamp Factor | TPos | Limit Line | Over Limit | Pol/Phase | Remark  |
|------|---------|------------|------------|------------|---------------|------|------------|------------|-----------|---------|
|      | MHz     | dBuV       | dB/m       | dB         | dB            | deg  | dBuV/m     | dB         |           |         |
| 1    | 1088.00 | 34.67      | 24.26      | 6.77       | 39.88         | 347  | 56.00      | -30.18     | vertical  | Average |
| 2    | 1088.00 | 56.75      | 24.26      | 6.77       | 39.88         | 347  | 76.00      | -28.10     | vertical  | Peak    |
| 3    | 1190.00 | 32.34      | 24.66      | 7.11       | 39.63         | 86   | 56.00      | -31.52     | vertical  | Average |
| 4 pp | 1190.00 | 61.27      | 24.66      | 7.11       | 39.63         | 86   | 76.00      | -22.59     | vertical  | Peak    |
| 5 av | 1632.00 | 32.48      | 26.42      | 8.39       | 39.24         | 5    | 56.00      | -27.95     | vertical  | Average |
| 6    | 1632.00 | 56.15      | 26.42      | 8.39       | 39.24         | 5    | 76.00      | -24.28     | vertical  | Peak    |
| 7    | 1838.00 | 28.47      | 27.24      | 8.92       | 39.33         | 338  | 56.00      | -30.70     | vertical  | Average |
| 8    | 1838.00 | 45.12      | 27.24      | 8.92       | 39.33         | 338  | 76.00      | -34.05     | vertical  | Peak    |

## ◆ Calculation

Over Limit [dB] = (Read Level[dBuV] + Ant Factor[dB/m] + Cable Loss [dB] - Preamp Factor [dB]) - Limit Line[dBuV]

Over Limit : Margin Value, Read Level : Reading Value, Ant Factor : Ant Factor,  
Cable Loss : Cable loss, Preamp Factor : Preamp Factor

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Site : chamber  
 Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) horizontal  
 : RBW:1000.000kHz VBW:1000.000kHz SWT:Auto  
 Project :  
 Model : HCV-6070RP  
 Mode : AC 24 V  
 Memo :

|      | Freq    | Read Level | Ant Factor | Cable Loss | Preamp Factor | TPos | Limit Line | Over Limit | Pol/Phase  | Remark  |
|------|---------|------------|------------|------------|---------------|------|------------|------------|------------|---------|
|      | MHz     | dBuV       | dB/m       | dB         | dB            | deg  | dBuV/m     | dB         |            |         |
| 1    | 3435.00 | 22.74      | 31.06      | 12.51      | 40.78         | 67   | 60.00      | -34.47     | horizontal | Average |
| 2    | 3435.00 | 35.79      | 31.06      | 12.51      | 40.78         | 67   | 80.00      | -41.42     | horizontal | Peak    |
| 3    | 4083.00 | 23.31      | 32.48      | 13.72      | 40.71         | 85   | 60.00      | -31.20     | horizontal | Average |
| 4    | 4083.00 | 36.07      | 32.48      | 13.72      | 40.71         | 85   | 80.00      | -38.44     | horizontal | Peak    |
| 5 pp | 4587.00 | 22.94      | 35.36      | 14.63      | 40.68         | 70   | 60.00      | -27.75     | horizontal | Average |
| 6 pk | 4587.00 | 35.52      | 35.36      | 14.63      | 40.68         | 70   | 80.00      | -35.17     | horizontal | Peak    |

#### ◆ Calculation

Over Limit [dB] = (Read Level[dBuV] + Ant Factor[dB/m] + Cable Loss [dB] - Preamp Factor [dB]) - Limit Line[dBuV]

Over Limit : Margin Value, Read Level : Reading Value, Ant Factor : Ant Factor,  
 Cable Loss : Cable loss, Preamp Factor : Preamp Factor

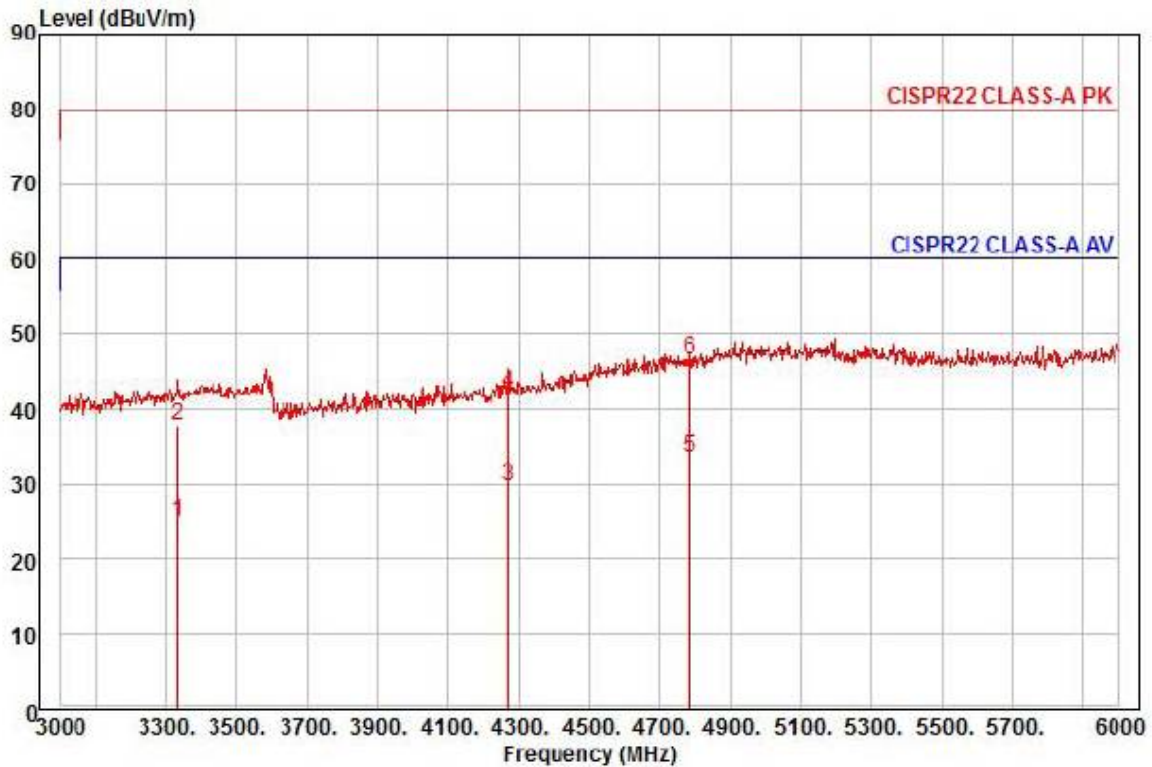
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Site : chamber  
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) vertical  
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto  
Project :  
Model : HCV-6070RP  
Mode : AC 24 V  
Memo :

|      | Freq    | Read Level | Ant Factor | Cable Loss | Preamp Factor | TPos | Limit Line | Over Limit | Pol/Phase | Remark  |
|------|---------|------------|------------|------------|---------------|------|------------|------------|-----------|---------|
|      | MHz     | dBuV       | dB/m       | dB         | dB            | deg  | dBuV/m     | dB         |           |         |
| 1    | 3333.00 | 22.32      | 30.89      | 12.32      | 40.62         | 353  | 60.00      | -35.09     | vertical  | Average |
| 2    | 3333.00 | 35.27      | 30.89      | 12.32      | 40.62         | 353  | 80.00      | -42.14     | vertical  | Peak    |
| 3    | 4272.00 | 22.87      | 33.56      | 14.06      | 40.74         | 162  | 60.00      | -30.25     | vertical  | Average |
| 4    | 4272.00 | 35.41      | 33.56      | 14.06      | 40.74         | 162  | 80.00      | -37.71     | vertical  | Peak    |
| 5 pp | 4782.00 | 22.43      | 36.48      | 15.06      | 40.49         | 131  | 60.00      | -26.52     | vertical  | Average |
| 6 pk | 4782.00 | 35.63      | 36.48      | 15.06      | 40.49         | 131  | 80.00      | -33.32     | vertical  | Peak    |

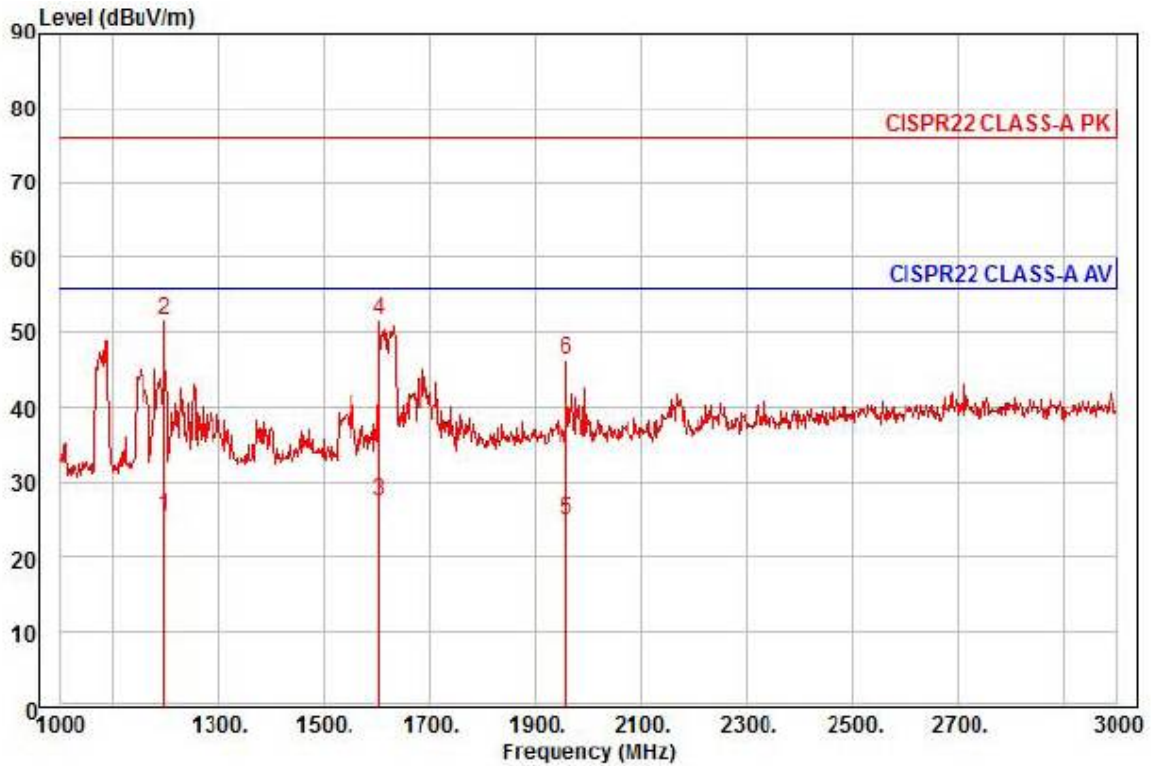
## ◆ Calculation

Over Limit [dB] = (Read Level[dBuV] + Ant Factor[dB/m] + Cable Loss [dB] - Preamp Factor [dB]) - Limit Line[dBuV]

Over Limit : Margin Value, Read Level : Reading Value, Ant Factor : Ant Factor,  
Cable Loss : Cable loss, Preamp Factor : Preamp Factor

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- DC 12 V Mode



Site : chamber  
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) horizontal  
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto  
Project :  
Model : HCV-6070RP  
Mode : DC 12 V  
Memo :

|   |            | Read  | Ant    | Cable | Preamp | TPos | Limit  | Over   |            |         |
|---|------------|-------|--------|-------|--------|------|--------|--------|------------|---------|
|   | Freq       | Level | Factor | Loss  | Factor |      | Line   | Limit  | Pol/Phase  | Remark  |
|   | MHz        | dBuV  | dB/m   | dB    | dB     | deg  | dBuV/m | dB     |            |         |
| 1 | 1198.00    | 33.33 | 24.70  | 7.13  | 39.61  | 333  | 56.00  | -30.45 | horizontal | Average |
| 2 | pp 1198.00 | 59.53 | 24.70  | 7.13  | 39.61  | 333  | 76.00  | -24.25 | horizontal | Peak    |
| 3 | av 1604.00 | 32.04 | 26.31  | 8.32  | 39.23  | 36   | 56.00  | -28.56 | horizontal | Average |
| 4 | 1604.00    | 56.34 | 26.31  | 8.32  | 39.23  | 36   | 76.00  | -24.26 | horizontal | Peak    |
| 5 | 1960.00    | 27.41 | 27.72  | 9.23  | 39.39  | 294  | 56.00  | -31.03 | horizontal | Average |
| 6 | 1960.00    | 48.87 | 27.72  | 9.23  | 39.39  | 294  | 76.00  | -29.57 | horizontal | Peak    |

◆ Calculation

Over Limit [dB] = (Read Level[dBuV] + Ant Factor[dB/m] + Cable Loss [dB] - Preamp Factor [dB]) - Limit Line[dBuV]

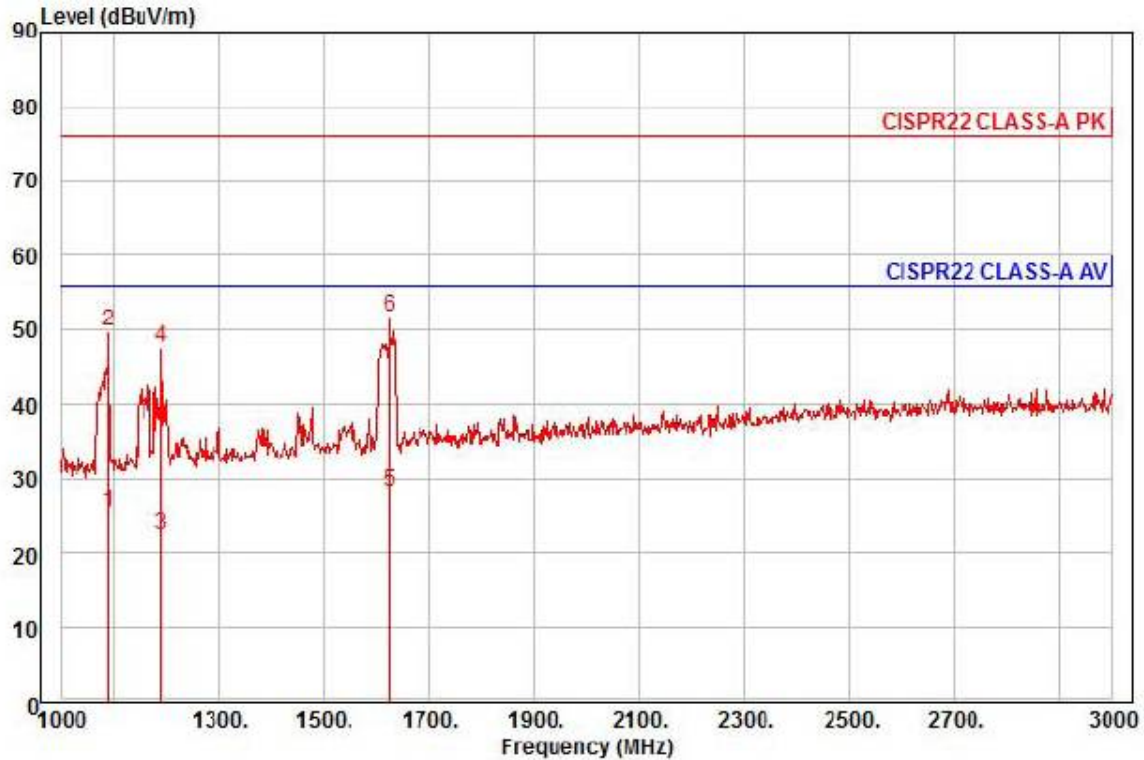
Over Limit : Margin Value, Read Level : Reading Value, Ant Factor : Ant Factor,  
Cable Loss : Cable loss, Preamp Factor : Preamp Factor



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Report No.:  
KES-E1-17T0155-R2  
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Site : chamber  
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) vertical  
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto  
Project :  
Model : HCV-6070RP  
Mode : DC 12 V  
Memo :

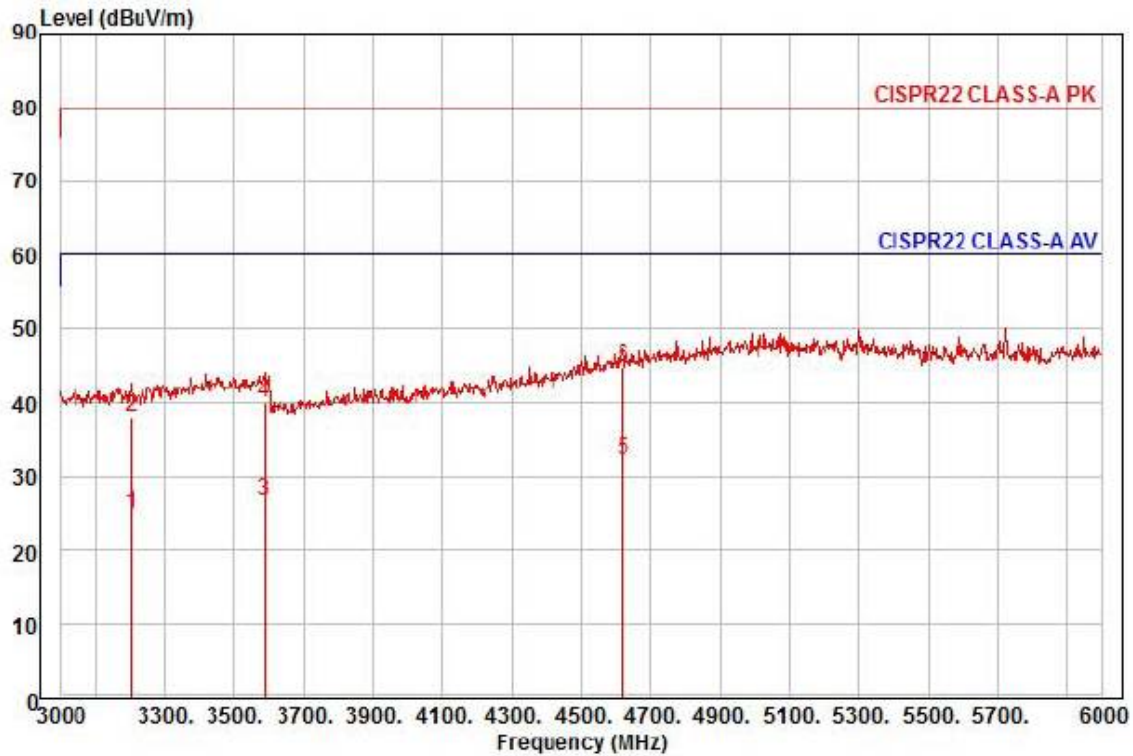
|      | Freq    | Read Level | Ant Factor | Cable Loss | Preamp Factor | TPos | Limit Line | Over Limit | Pol/Phase | Remark  |
|------|---------|------------|------------|------------|---------------|------|------------|------------|-----------|---------|
|      | MHz     | dBuV       | dB/m       | dB         | dB            | deg  | dBuV/m     | dB         |           |         |
| 1    | 1090.00 | 34.37      | 24.27      | 6.78       | 39.87         | 336  | 56.00      | -30.45     | vertical  | Average |
| 2    | 1090.00 | 58.49      | 24.27      | 6.78       | 39.87         | 336  | 76.00      | -26.33     | vertical  | Peak    |
| 3    | 1190.00 | 30.40      | 24.66      | 7.11       | 39.63         | 86   | 56.00      | -33.46     | vertical  | Average |
| 4    | 1190.00 | 55.46      | 24.66      | 7.11       | 39.63         | 86   | 76.00      | -28.40     | vertical  | Peak    |
| 5 av | 1626.00 | 32.56      | 26.40      | 8.38       | 39.24         | 3    | 56.00      | -27.90     | vertical  | Average |
| 6 pp | 1626.00 | 56.31      | 26.40      | 8.38       | 39.24         | 3    | 76.00      | -24.15     | vertical  | Peak    |

## ◆ Calculation

Over Limit [dB] = (Read Level[dBuV] + Ant Factor[dB/m] + Cable Loss [dB] - Preamp Factor [dB]) - Limit Line[dBuV]

Over Limit : Margin Value, Read Level : Reading Value, Ant Factor : Ant Factor,  
Cable Loss : Cable loss, Preamp Factor : Preamp Factor

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Site : chamber  
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) horizontal  
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto  
Project :  
Model : HCV-6070RP  
Mode : DC 12 V  
Memo :

|      | Freq    | Read Level | Ant Factor | Cable Loss | Preamp Factor | TPos | Limit Line | Over Limit | Pol/Phase  | Remark  |
|------|---------|------------|------------|------------|---------------|------|------------|------------|------------|---------|
|      | MHz     | dBuV       | dB/m       | dB         | dB            | deg  | dBuV/m     | dB         |            |         |
| 1    | 3201.00 | 22.62      | 30.67      | 12.06      | 40.42         | 311  | 60.00      | -35.07     | horizontal | Average |
| 2    | 3201.00 | 35.80      | 30.67      | 12.06      | 40.42         | 311  | 80.00      | -41.89     | horizontal | Peak    |
| 3    | 3585.00 | 23.37      | 31.31      | 12.78      | 40.85         | 339  | 60.00      | -33.39     | horizontal | Average |
| 4    | 3585.00 | 36.72      | 31.31      | 12.78      | 40.85         | 339  | 80.00      | -40.04     | horizontal | Peak    |
| 5 pp | 4620.00 | 22.67      | 35.55      | 14.70      | 40.65         | 256  | 60.00      | -27.73     | horizontal | Average |
| 6 pk | 4620.00 | 35.35      | 35.55      | 14.70      | 40.65         | 256  | 80.00      | -35.05     | horizontal | Peak    |

◆ Calculation

Over Limit [dB] = (Read Level[dBuV] + Ant Factor[dB/m] + Cable Loss [dB] - Preamp Factor [dB]) - Limit Line[dBuV]

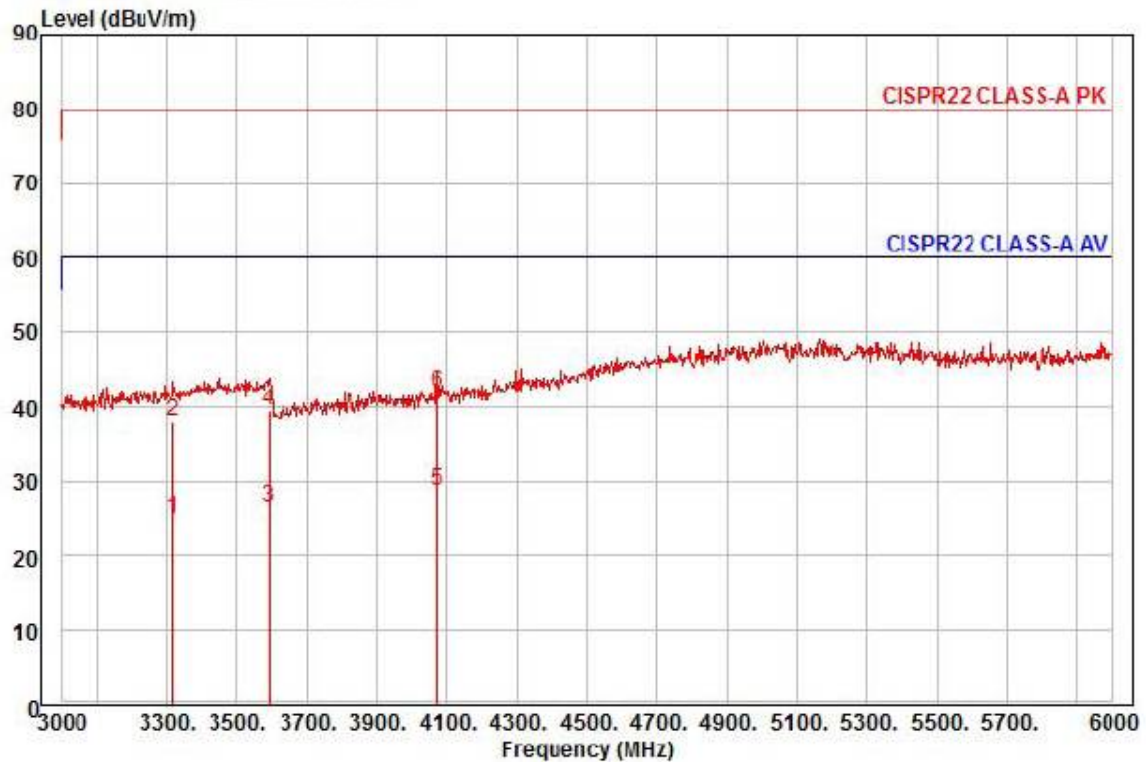
Over Limit : Margin Value, Read Level : Reading Value, Ant Factor : Ant Factor,  
Cable Loss : Cable loss, Preamp Factor : Preamp Factor



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Report No.:  
KES-E1-17T0155-R2  
Page (52) of (77)



Site : chamber  
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) vertical  
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto  
Project :  
Model : HCV-6070RP  
Mode : DC 12 V  
Memo :

|      | Freq    | Read Level | Ant Factor | Cable Loss | Preamp Factor | TPos | Limit Line | Over Limit | Pol/Phase | Remark  |
|------|---------|------------|------------|------------|---------------|------|------------|------------|-----------|---------|
|      | MHz     | dBuV       | dB/m       | dB         | dB            | deg  | dBuV/m     | dB         |           |         |
| 1    | 3318.00 | 22.56      | 30.86      | 12.29      | 40.60         | 56   | 60.00      | -34.89     | vertical  | Average |
| 2    | 3318.00 | 35.46      | 30.86      | 12.29      | 40.60         | 56   | 80.00      | -41.99     | vertical  | Peak    |
| 3    | 3591.00 | 23.27      | 31.32      | 12.79      | 40.85         | 182  | 60.00      | -33.47     | vertical  | Average |
| 4    | 3591.00 | 36.22      | 31.32      | 12.79      | 40.85         | 182  | 80.00      | -40.52     | vertical  | Peak    |
| 5 pp | 4074.00 | 23.35      | 32.43      | 13.70      | 40.71         | 308  | 60.00      | -31.23     | vertical  | Average |
| 6 pk | 4074.00 | 36.55      | 32.43      | 13.70      | 40.71         | 308  | 80.00      | -38.03     | vertical  | Peak    |

## ◆ Calculation

Over Limit [dB] = (Read Level[dBuV] + Ant Factor[dB/m] + Cable Loss [dB] - Preamp Factor [dB]) - Limit Line[dBuV]

Over Limit : Margin Value, Read Level : Reading Value, Ant Factor : Ant Factor,  
Cable Loss : Cable loss, Preamp Factor : Preamp Factor

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Report No.:  
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**Test Data - Voltage Fluctuations****Maximum Flicker results**

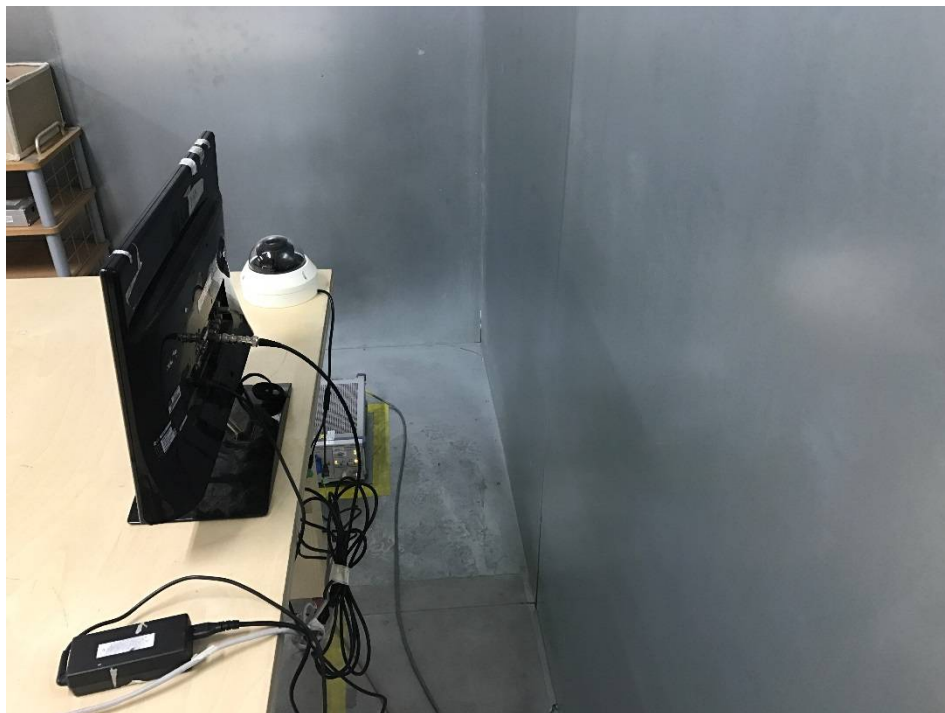
|          | <b>EUT values</b> | <b>Limit</b> | <b>Result</b> |
|----------|-------------------|--------------|---------------|
| Pst      | N/A               |              |               |
| Plt      |                   |              |               |
| dc [%]   |                   |              |               |
| dmax [%] |                   |              |               |
| Tmax [s] |                   |              |               |

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## Test Setup Photos and Configuration

### Conducted Voltage Emissions

- AC 24 V Mode



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---

## Conducted Telecommunication Emissions

N/A

N/A

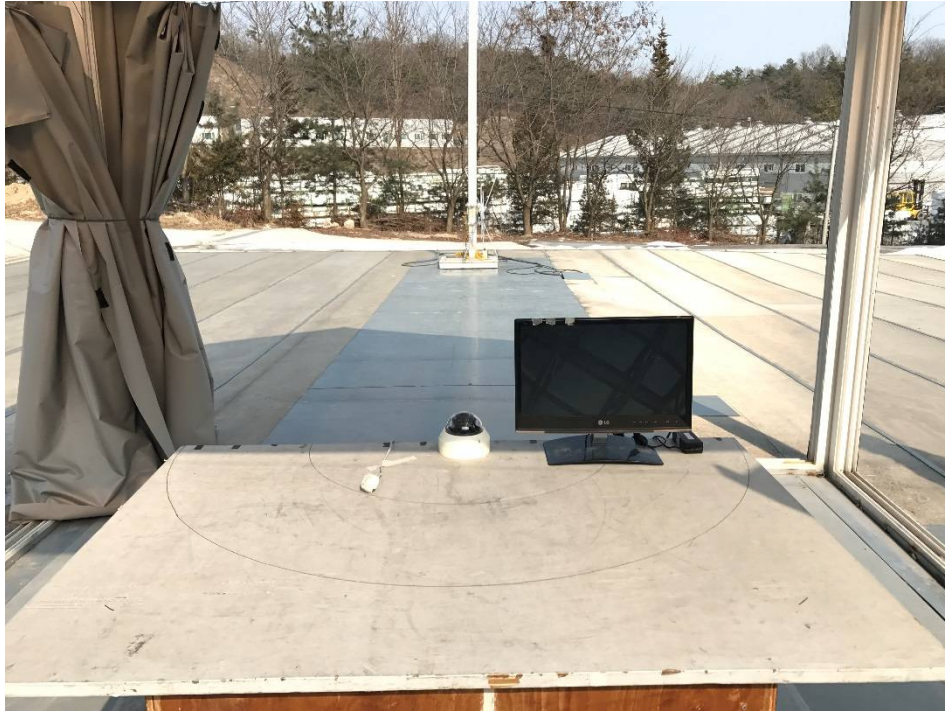
## Radiated Electric Field Emissions(Below 1 GHz)

- AC 24 V Mode



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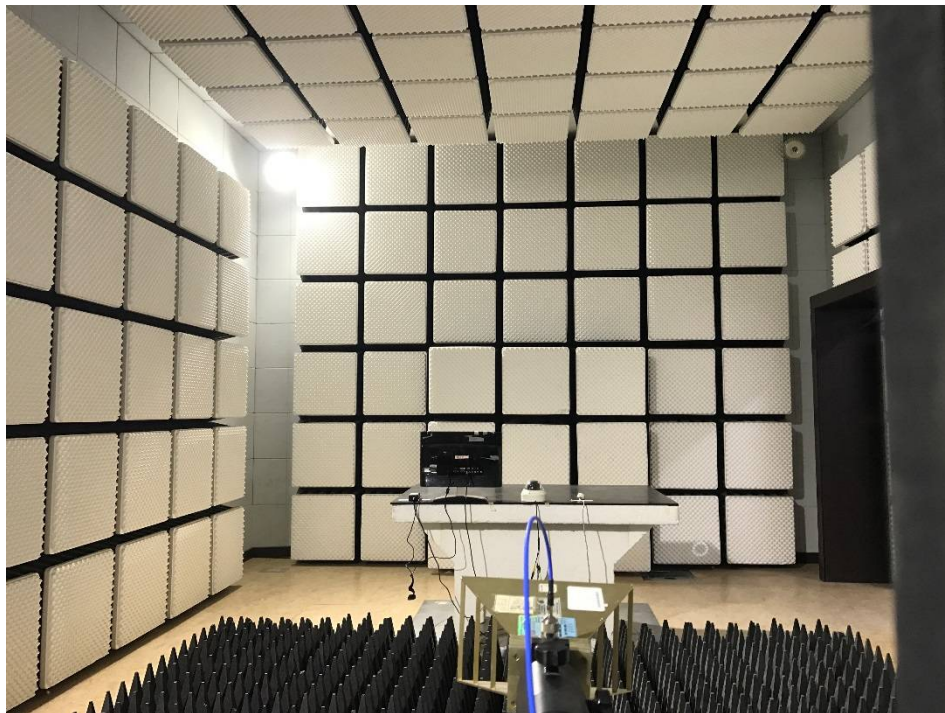
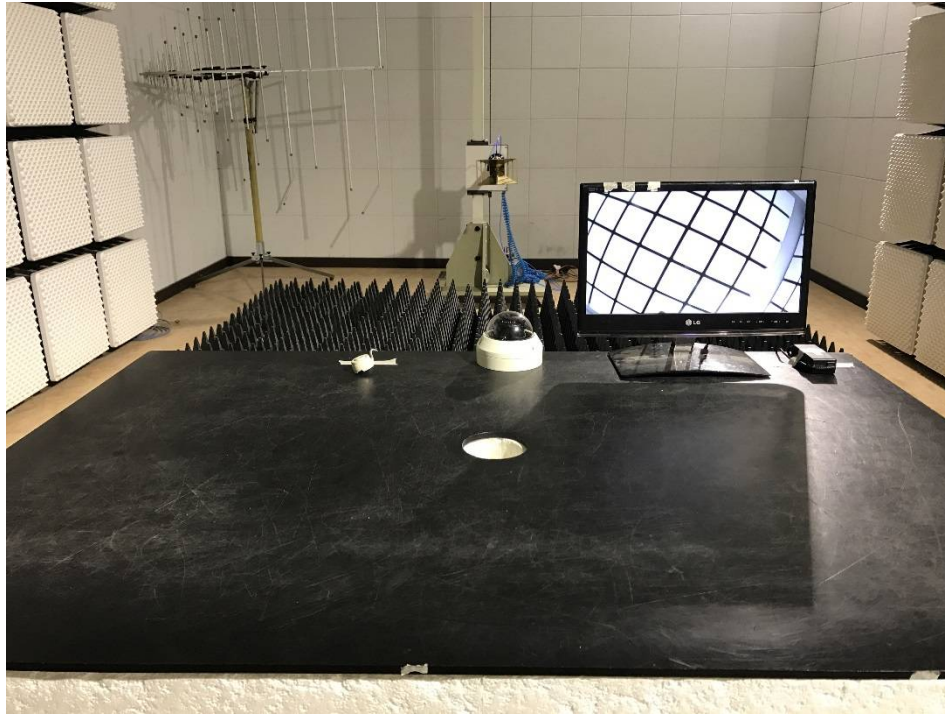
- DC 12 V Mode



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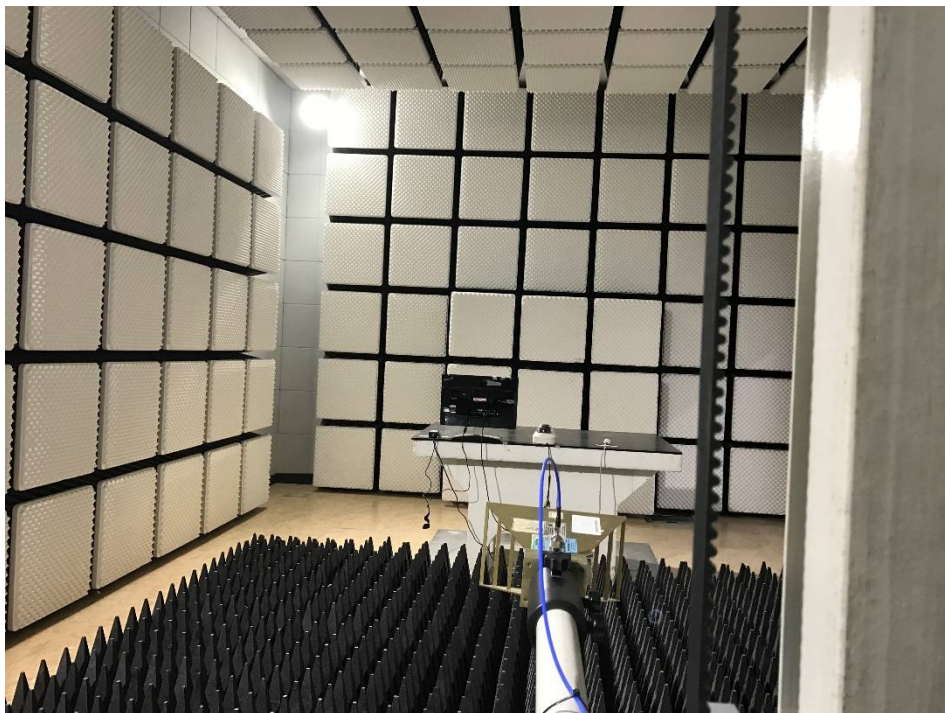
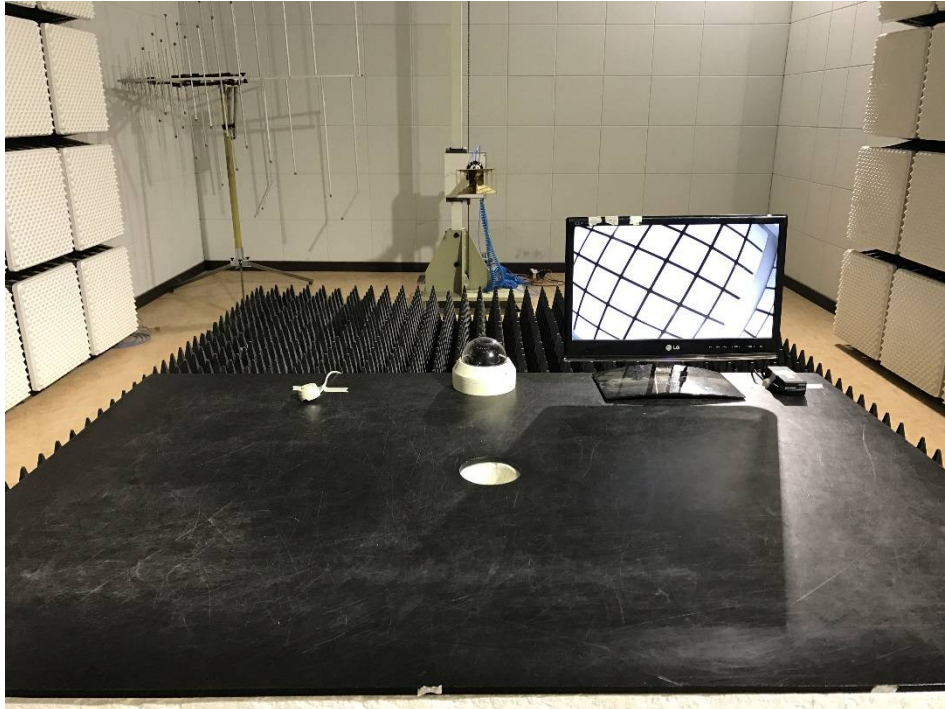
## **Radiated Electric Field Emissions(Above 1 GHz)**

- AC 24 V Mode



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- DC 12 V Mode



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## **Harmonic Current Emissions and Voltage Fluctuations and Flicker**

N/A

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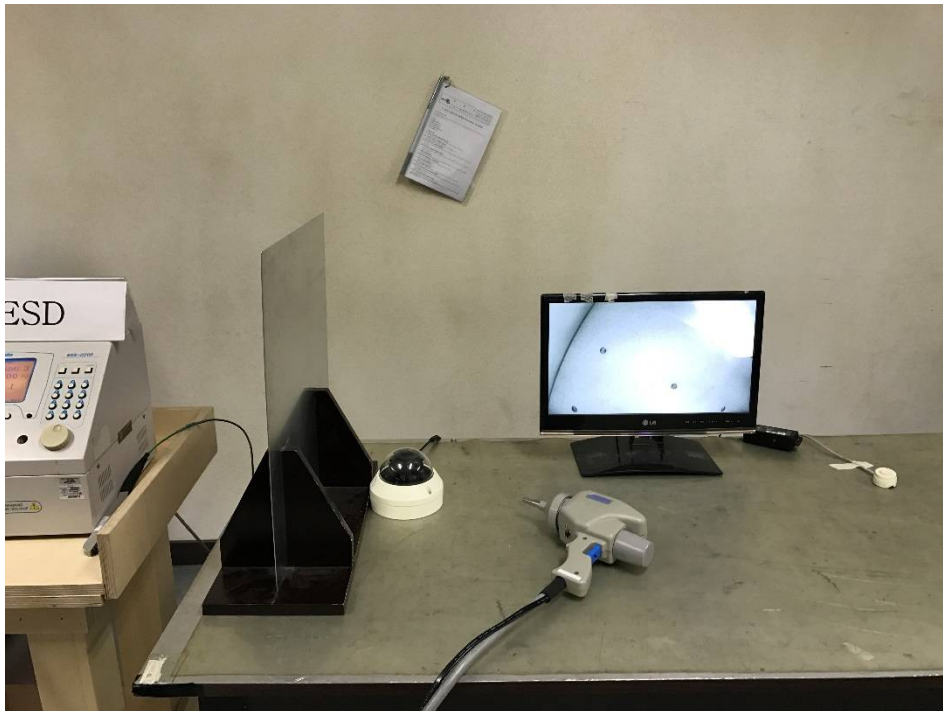
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## Electrostatic Discharge

- AC 24 V Mode



- DC 12 V Mode



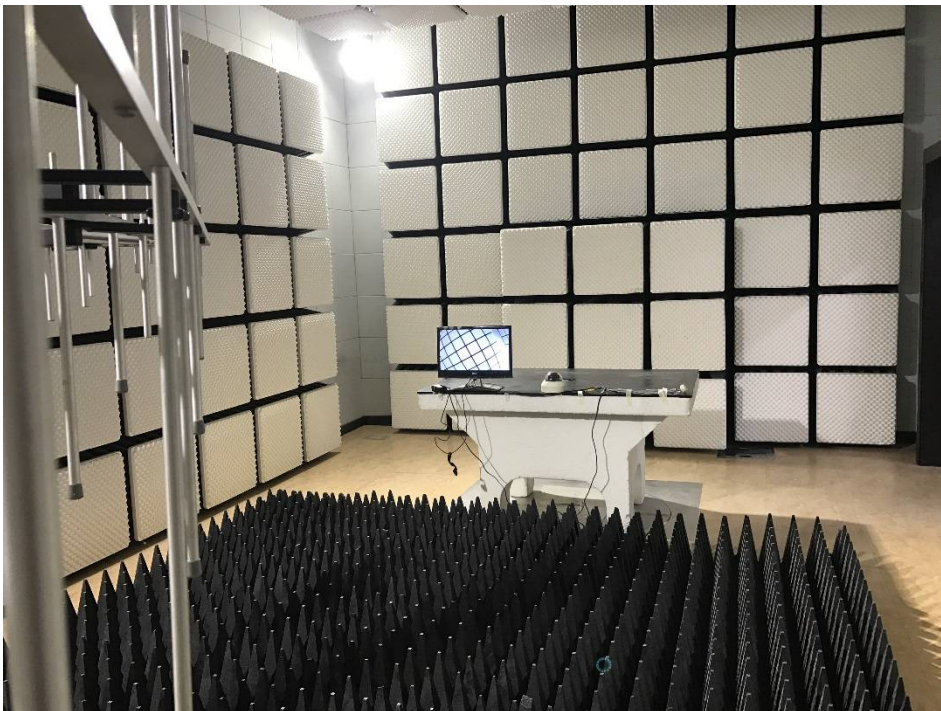
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## Radiated Electric Field Immunity

- AC 24 V Mode



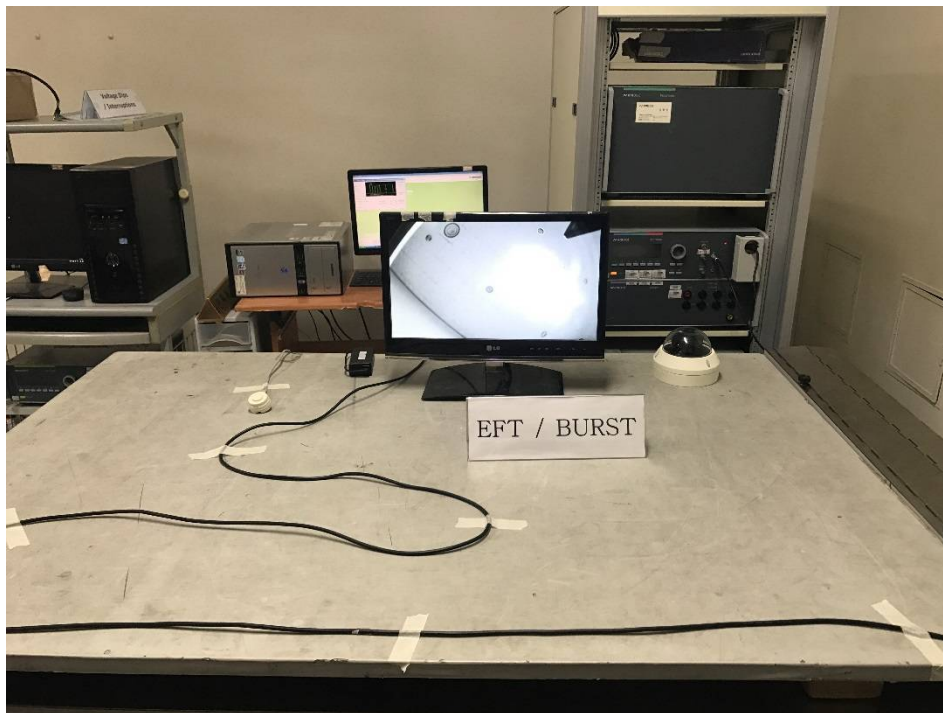
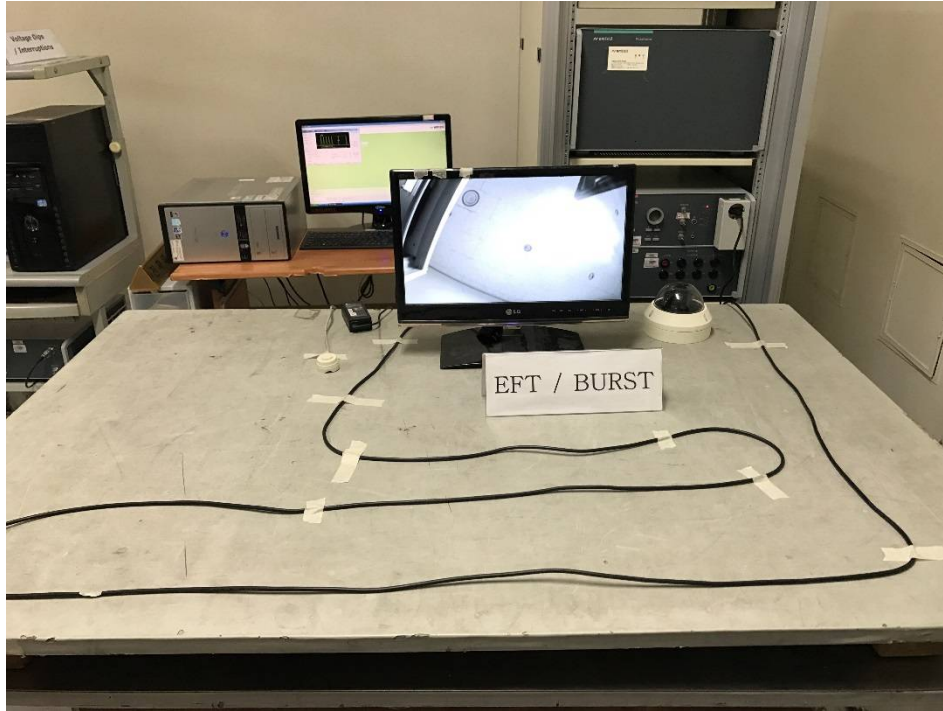
- DC 12 V Mode



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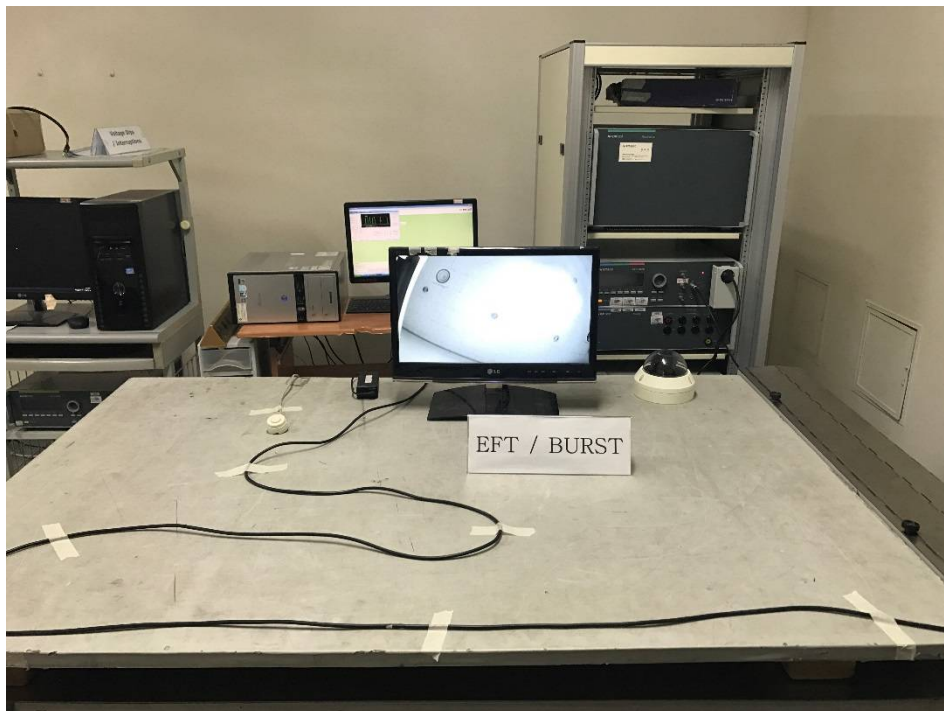
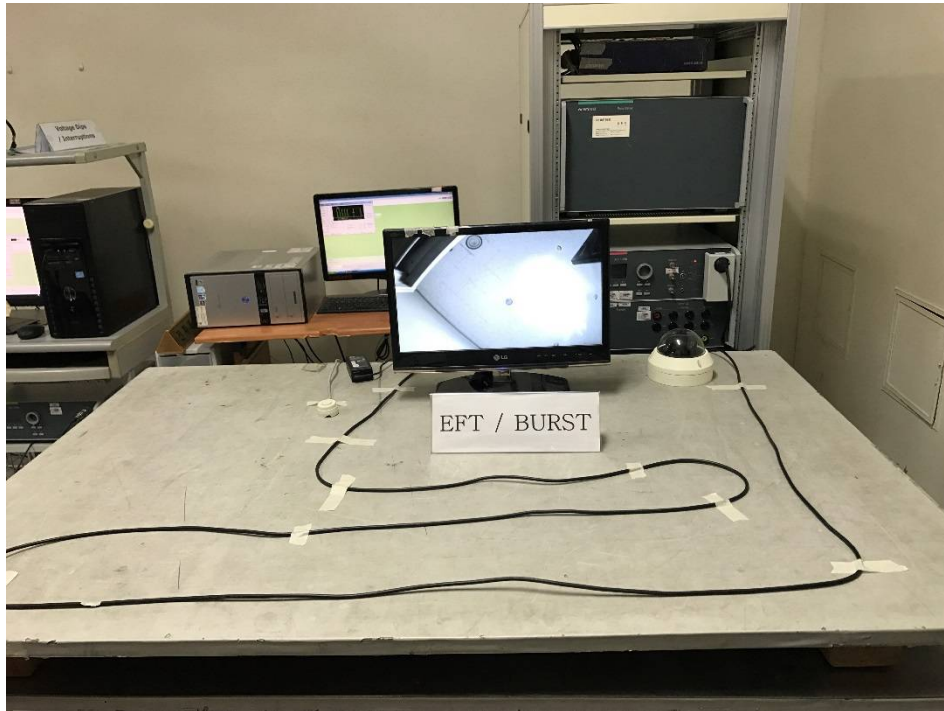
## Electrical Fast Transients/Bursts

- AC 24 V Mode



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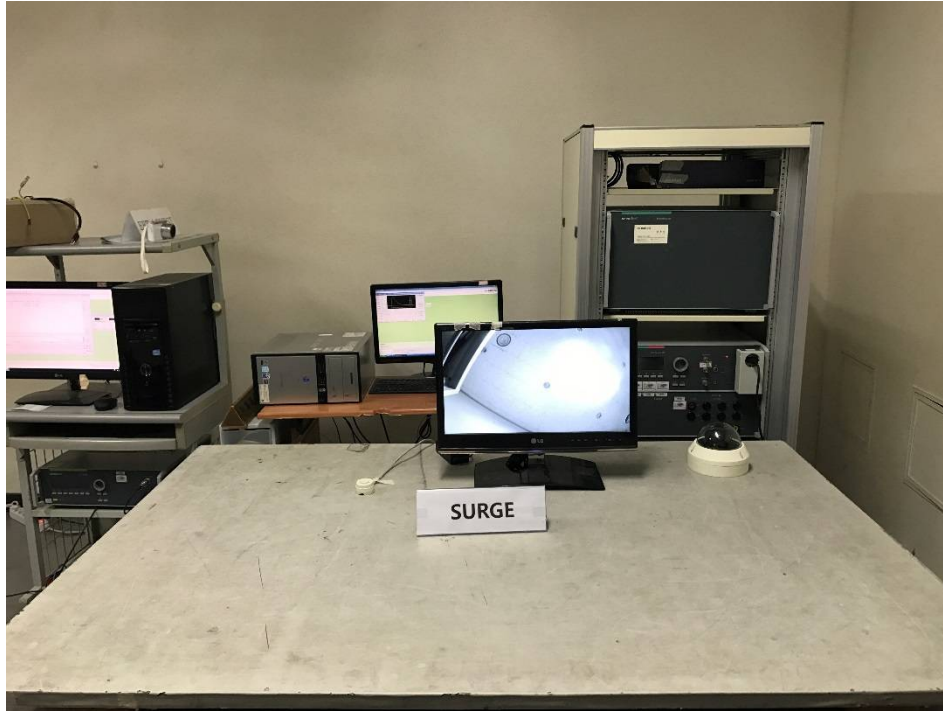
- DC 12 V Mode



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## Surge Transients

- AC 24 V Mode



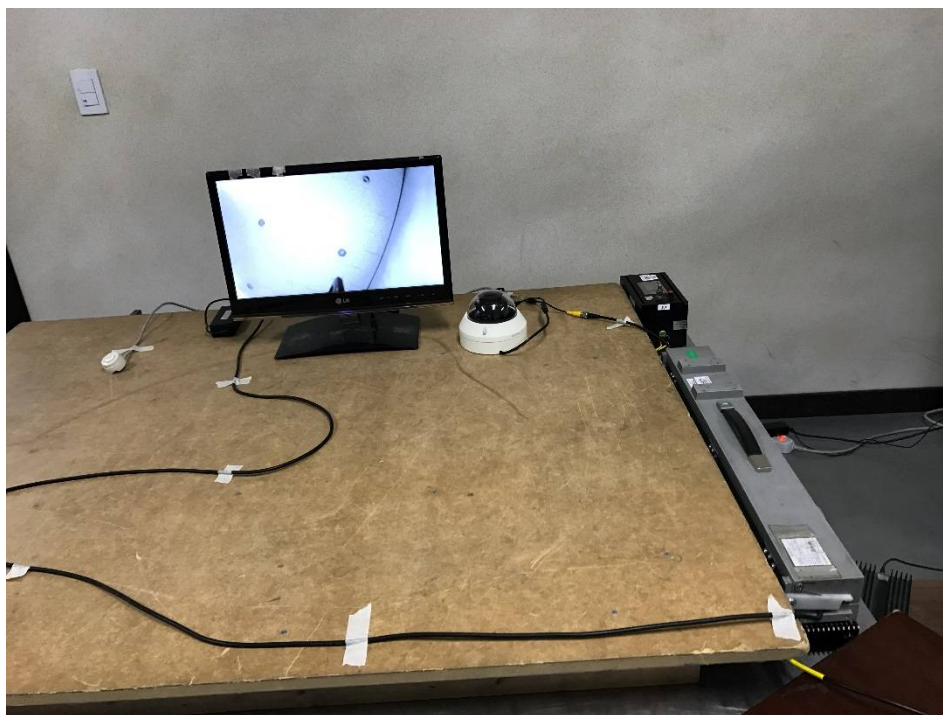
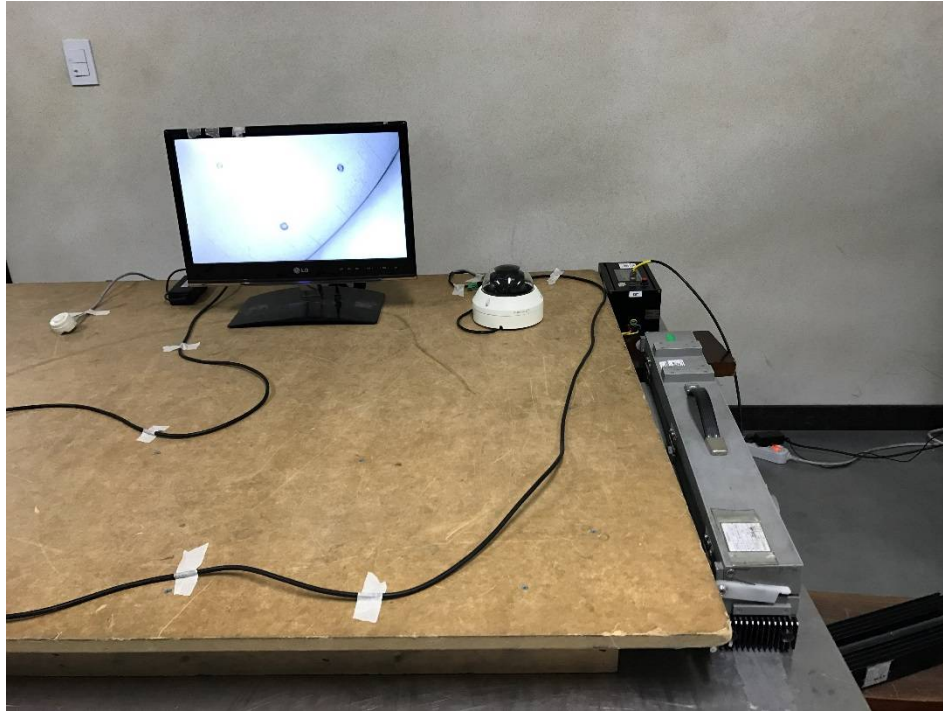
- DC 12 V Mode



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## Conducted Disturbance

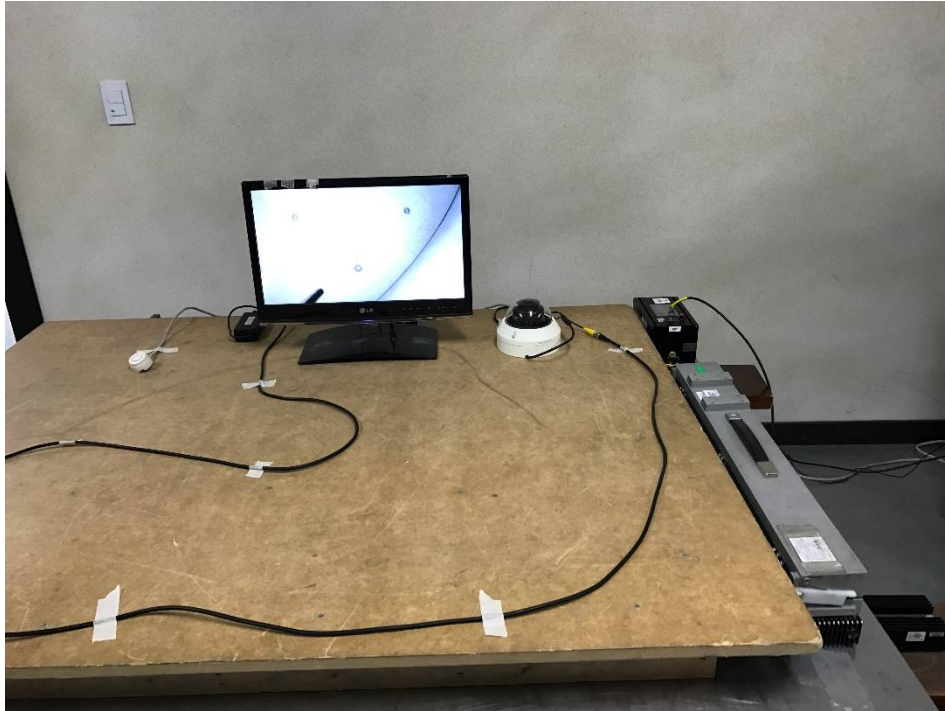
- AC 24 V Mode



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- DC 12 V Mode



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## Voltage Dips and Short Interruptions

- AC 24 V Mode



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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)



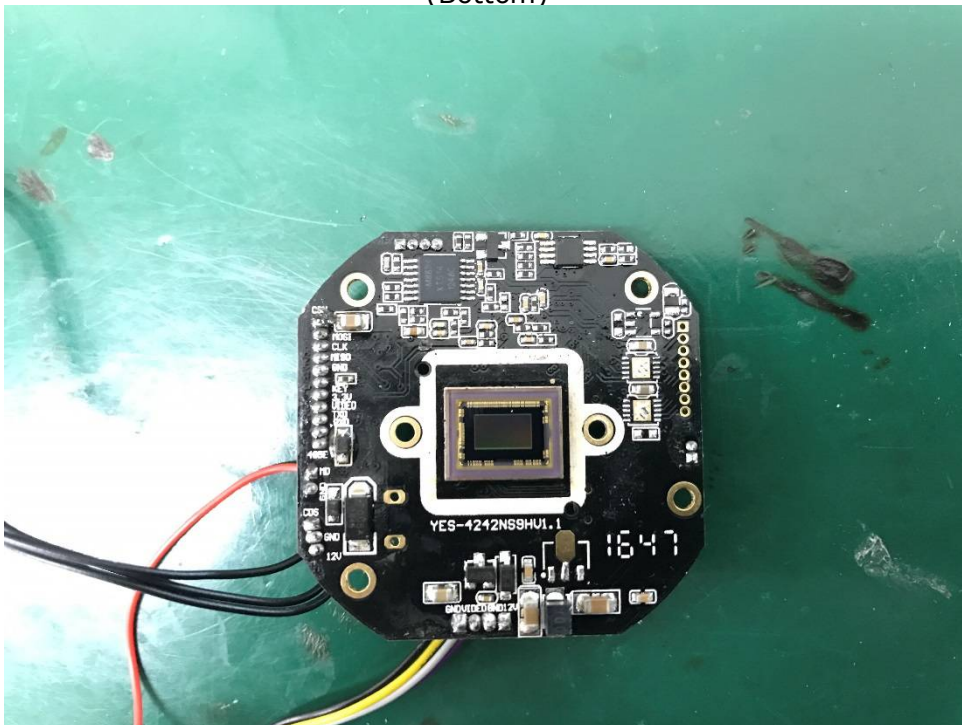
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## EUT Internal View – Board 2

(Top)



(Bottom)



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## EUT Internal View – Board 3

(Top)



(Bottom)



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## EUT Internal View –Board 4

(Top)



(Bottom)



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## Label and Location



### **NETWORK CAMERA**

Model No : HCV-6070R

Manufacturer : Hanwha Techwin (Tianjin) Co.,Ltd.

Made in China

