



## EMC TEST REPORT

Test Report No. : KES-EM-22T0187-R1  
Date of Issue : Feb. 24, 2023  
Product name : CCTV CAMERA  
Model/Type No. : HCD-6070R  
Variant Model : SCD-6085R, HCD-6080R  
Applicant : Hanwha Vision Co., Ltd  
Applicant Address : 6, Pangyo-ro 319Beon-gil, Bundang-gu, Seongnam-si,  
Gyeonggi-do, Republic of Korea  
Manufacturer : 1. HANWHA VISION VIETNAM COMPANY LIMITED  
2. D-TECH CO.,LTD.  
Manufacturer Address : 1. Lot O-2, Que Vo Industrial Zone extended area,  
Nam Son commune, Bac Ninh city, Bac Ninh province, Vietnam  
2. 173-25, Saneop-ro, Gwonseon-gu, Suwon-si, Gyeonggi- do,  
Korea (Suwon Industrial Complex)  
Equipment authorization : **Supplier's Declaration of Conformity**  
Date of Receipt : Jan. 25, 2022  
Test date : Jan. 27, 2022 ~ Jan. 28, 2022  
Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Dae Soo, Kim  
EMC Test Engineer

Reviewed by

Dong-Hun, Jang  
EMC Technical Manager

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

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**KES Co., Ltd.**

3701, 40, Simin-daero 365beon-gil,  
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea  
Tel: +82-31-425-6200 / Fax: +82-31-424-0450  
www.kes.co.kr

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**REPORT REVISION HISTORY**

| Date          | Test Report No.   | Revision History                                                     |
|---------------|-------------------|----------------------------------------------------------------------|
| Feb. 09, 2022 | KES-EM-22T0187    | Issued                                                               |
| Feb. 24, 2023 | KES-EM-22T0187-R1 | Change the Applicant and manufacturer at the request of the customer |
|               |                   |                                                                      |
|               |                   |                                                                      |
|               |                   |                                                                      |
|               |                   |                                                                      |
|               |                   |                                                                      |
|               |                   |                                                                      |
|               |                   |                                                                      |
|               |                   |                                                                      |

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## 1.0 General Product Description

### Main Specifications of EUT are:

|                             |                                                                                                                                                                            |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Video</b>                |                                                                                                                                                                            |
| 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                                                                                                                                                  |
| <b>Pan / Tilt / Rotate</b>  |                                                                                                                                                                            |
| Pan / Tilt / Rotate Range   | 0° ~ 350° / 0° ~ 67° / 0° ~ 355°                                                                                                                                           |
| <b>Lens Type</b>            |                                                                                                                                                                            |
| Focal Length (Zoom Ratio)   | 2.8 ~ 12mm (4.3x) varifocal                                                                                                                                                |
| Max. Aperture Ratio         | F1.4                                                                                                                                                                       |
| Angular Field of View       | H : 103.8°(Wide) ~ 32.4°(Tele) / V : 53.7°(Wide) ~ 18.4°(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)        | -                                                                                                                                                                          |
| <b>Operational</b>          |                                                                                                                                                                            |
| IR LED                      |                                                                                                                                                                            |
| Viewable length             | 20m (65.62ft)                                                                                                                                                              |
| 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                                                        |
| 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 | -10°C ~ +55°C (+14°F ~ +131°F) / Less than 90% RH              |
| Ingress Protection               | -                                                              |
| Vandal Resistance                | -                                                              |
| <b>Electrical</b>                |                                                                |
| Input Voltage/Current            | Dual ( 24VAC±10% & 12VDC±10% )                                 |
| Power Consumption                | 4.2W                                                           |
| <b>Mechanical</b>                |                                                                |
| Color / Material                 | Ivory / Plastic                                                |
| Dimension (WxHxD)                | 119.8*119.8*98.5mm                                             |
| Weight                           | 360G                                                           |

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## 1.1 Test Voltage & Frequency

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

☒ AC 120 V, 60 Hz

## 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   | HCD-6070R    | -             | HANWHA VISION<br>VIETNAM COMPANY<br>LIMITED | EUT     |
| AC-DC ADAPTOR | DAD12050DKA  | -             | Dream Electronic Co.,                       | EUT     |

## 1.5 Support Equipments

| Description | Model Number         | Serial Number           | Manufacturer                                | Remarks |
|-------------|----------------------|-------------------------|---------------------------------------------|---------|
| AC ADAPTOR  | -                    | -                       | -                                           | -       |
| DVR         | SDH-<br>C85105BFN/UC | 180100045180116<br>0006 | HANWHA VISION<br>VIETNAM COMPANY<br>LIMITED | -       |
| DVR ADAPTOR | PA-1051-0            | L21125029645            | Dongguang Lite Power<br>2nd Planet          | -       |
| ALARM       | SIP-1201DD D0        | -                       | SAMSUNG TECHWIN<br>CO., LTD.                | -       |
| MONITOR     | SMT-2232             | C95V67VF900025<br>B     | Weihai Daewoo<br>Electronics Co., Ltd.      | -       |
| MOUSE       | AA-SM4PCPB           | -                       | Acrox Technologies<br>Co., Ltd.             | -       |



## 1.6 External I/O Cabling

### ■ AC Mode

| Start             |           | END         |          | Cable Spec. |        |
|-------------------|-----------|-------------|----------|-------------|--------|
| Description       | I/O Port  | Description | I/O Port | Length      | Shield |
| CCTV CAMERA (EUT) | AC IN     | AC ADAPTOR  | AC OUT   | 2.0         | U      |
|                   | Alarm OUT | ALARM       | Alarm IN | 3.0         | U      |
|                   | BNC       | DVR         | BNC      | 3.0         | S      |
| DVR               | USB       | MOUSE       | USB      | 1.8         | U      |
|                   | VGA       | MONITOR     | VGA      | 1.6         | S      |

\* Unshielded=U, Shielded=S

### ■ DC Mode

| Start             |           | END                 |          | Cable Spec. |        |
|-------------------|-----------|---------------------|----------|-------------|--------|
| Description       | I/O Port  | Description         | I/O Port | Length      | Shield |
| CCTV CAMERA (EUT) | DC IN     | AC-DC ADAPTOR (EUT) | DC OUT   | 2.0         | U      |
|                   | Alarm OUT | ALARM               | Alarm IN | 3.0         | U      |
|                   | BNC       | DVR                 | BNC      | 3.0         | S      |
| DVR               | USB       | MOUSE               | USB      | 1.8         | U      |
|                   | VGA       | MONITOR             | VGA      | 1.6         | S      |

\* Unshielded=U, Shielded=S

## 1.7 EUT Operating Mode(s)

### ■ AC, DC Mode

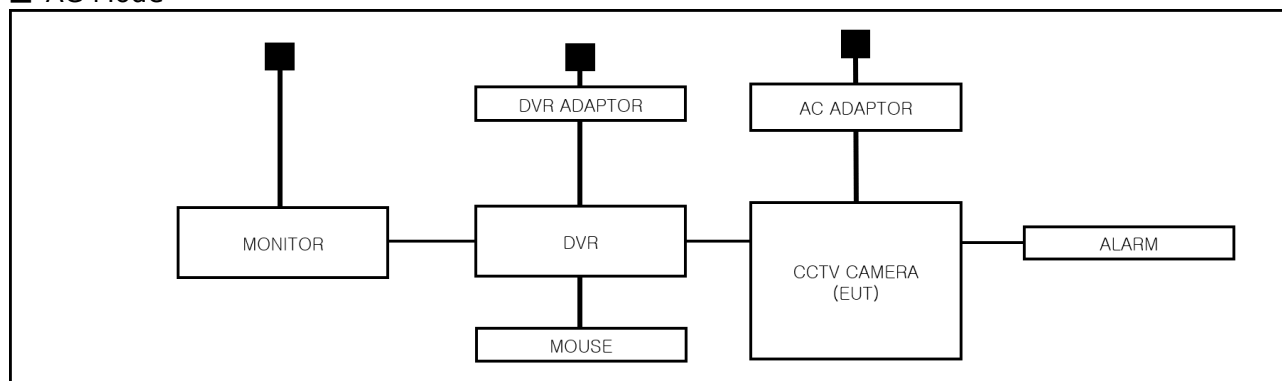
| Test mode | operating                                                                                                               |
|-----------|-------------------------------------------------------------------------------------------------------------------------|
| OP        | The test was performed while checking whether the camera image was normally output on the monitor connected to the DVR. |

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

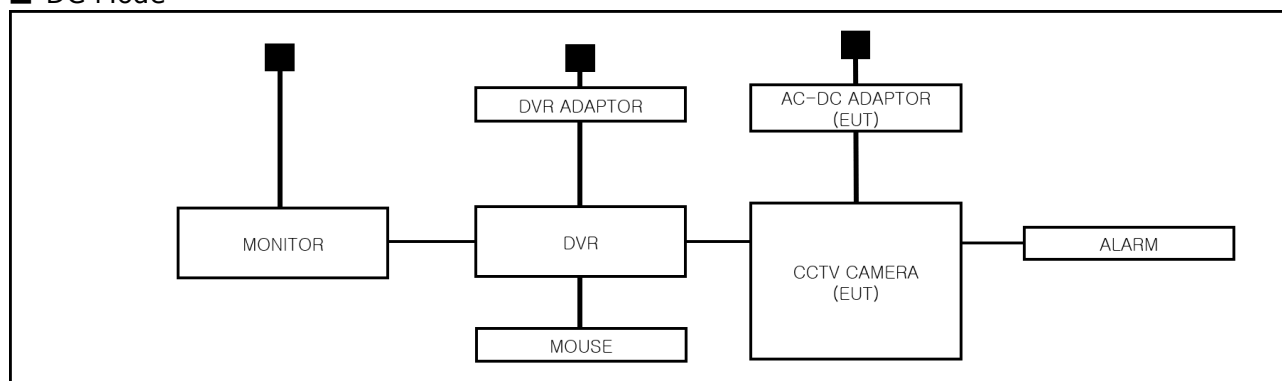
## 1.8 Configuration

■ AC Main  
 □ DC Main

### ■ AC Mode



### ■ DC Mode



## 1.9 Remarks when standards applied

N/A

## 1.10 Calibration Details of Equipment Used for Measurement

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

## 1.11 Test Facility

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

## 1.12 Laboratory Accreditations and Listings

| Country       | Agency  | Scope of Accreditation                                                                                                                  | Logo                                                                                                                           |
|---------------|---------|-----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| KOREA         | RRA     | EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site)<br>EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions) | <br>KR0100                                  |
| International | KOLAS   | EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site)<br>EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions) | <br>KT489                                 |
| USA           | FCC     | 3 m & 10 m Semi-Anechoic Chamber<br>Conducted test site to perform FCC Part 15/18 measurements.                                         | <br>KR0100                                |
| Canada        | ISED    | 3 m & 10 m Semi-Anechoic Chamber and Conducted test site                                                                                | <br>23298                                 |
| JAPAN         | VCCI    | EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site)                                                                          | <br>C-20136, T-20137,<br>R-20181, G-20176 |
| Europe        | TÜV SÜD | EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site)<br>EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions) | <br>CARAT 001633 0004                     |



## 2.0 Test Regulations

The emissions tests were performed according to following regulations:

☒ **47 CFR Part 15, Subpart B**

☐ CISPR 22:2009 +A1:2010

☐ Class A

☐ Class B

☒ ANSI C63.4a-2017

☒ Class A

☐ Class B

☒ **IC Regulation ICES-003 Issue 7**

☐ CAN/CSA-CISPR 32:17

☐ Class A

☐ Class B

☒ ANSI C63.4a-2017

☒ Class A

☐ Class B



## 2.1 Conducted Emissions at Mains Power Ports

### Test Date

Jan. 27, 2022

### Test Location

Electro wave Shieldroom #6

### Test Equipment

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

### Test Conditions

Temperature: (22,9 ± 0,0) °C

Relative Humidity: (42,4 ± 0,0) % R.H.

### Frequency Range of Measurement

150 kHz to 30 MHz

### Instrument Settings

IF Band Width: 9 kHz

### Test Results

The requirements are:

- ☒ PASS  
☐ NOT PASS  
☐ NOT APPLICABLE

### Remarks

See Appendix A for test data.



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

### Test Date

Jan. 27, 2022

### Test Location

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

### Test Equipment

| Used                                | Description              | Model Number | Manufacturer     | Serial Number | Cal. Due     |
|-------------------------------------|--------------------------|--------------|------------------|---------------|--------------|
| <input checked="" type="checkbox"/> | EMI Test S/W             | EP5/RE       | TOYO Corporation | 6.0.0         | -            |
| <input checked="" type="checkbox"/> | EMI TEST RECEIVER        | ESU26        | R & S            | 100551        | 04, 01, 2022 |
| <input checked="" type="checkbox"/> | AMPLIFIER                | SCU 01       | R & S            | 100603        | 11, 24, 2022 |
| <input checked="" type="checkbox"/> | TRILOG-BROADBAND ANTENNA | VULB9163     | Schwarzbeck      | 715           | 12, 08, 2022 |
| <input checked="" type="checkbox"/> | ATTENUATOR               | 8491A        | HP               | 32173         | 03, 10, 2022 |

### Test Conditions

Temperature: (23,0 ± 0,2) °C

Relative Humidity: (43,4 ± 0,0) % R.H.

### Frequency Range of Measurement

30 MHz to 1 GHz

### Instrument Settings

IF Band Width: 120 kHz

### Test Results

The requirements are:

☒ PASS  
☐ NOT PASS  
☐ NOT APPLICABLE

### Remarks

See Appendix A for test data.

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

**Test Date**

Jan. 28, 2022

**Test Location**

SEMI ANECHOIC CHAMBER #5

**Test Equipment**

| Used                                | Description       | Model Number | Manufacturer     | Serial Number | Cal. Due     |
|-------------------------------------|-------------------|--------------|------------------|---------------|--------------|
| <input checked="" type="checkbox"/> | EMI Test S/W      | EP5/RE       | TOYO Corporation | 6.0.120       | -            |
| <input checked="" type="checkbox"/> | EMI TEST RECEIVER | ESU26        | Rohde & Schwarz  | 100552        | 04, 01, 2022 |
| <input checked="" type="checkbox"/> | HORN ANTENNA      | BBHA 9120D   | SCHWARZBECK      | 9120D-1802    | 12, 16, 2022 |
| <input checked="" type="checkbox"/> | PREAMPLIFIER      | 8449B        | HP               | 3008A00538    | 06, 21, 2022 |

**Test Conditions**

Temperature: (22,6 ± 0,2) °C

Relative Humidity: (42,8 ± 0,2) % R.H.

**Frequency Range of Measurement**

1 GHz to 5 GHz

**Instrument Settings**

IF Band Width: 1 MHz

**Test Results**

The requirements are:

☒ PASS☐ NOT PASS☐ NOT APPLICABLE**Remarks**See Appendix A for test data.

## APPENDIX A – TEST DATA

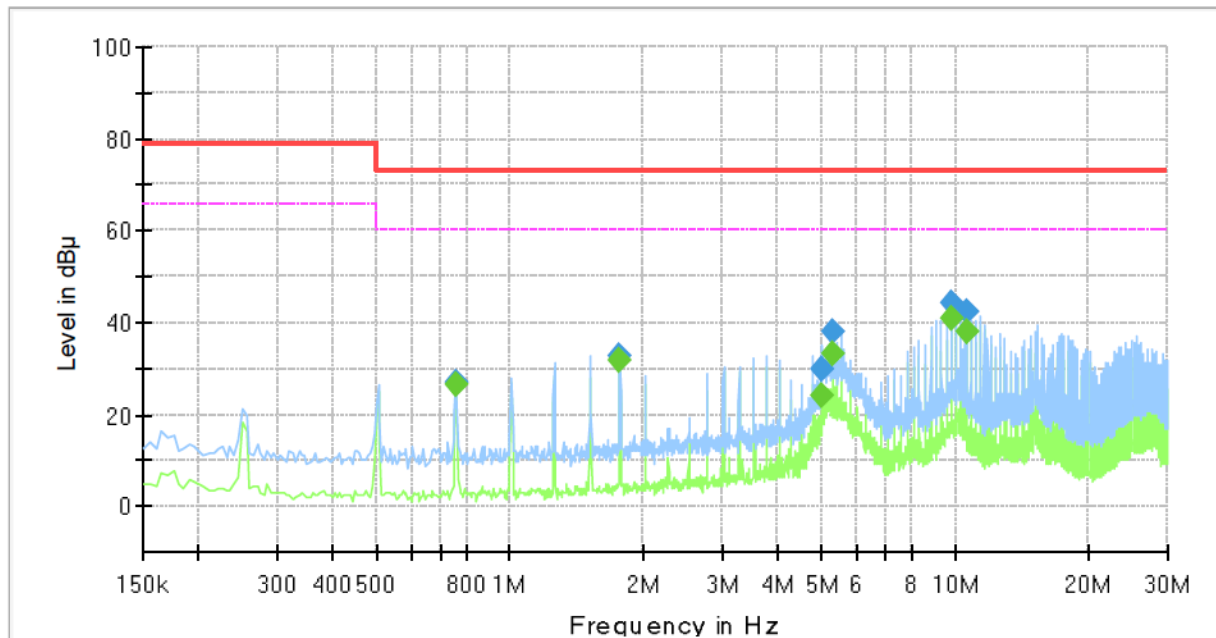
### Conducted Emissions at Mains Power Ports

■ AC Mode

HOT LINE

### Common Information

|                   |                    |
|-------------------|--------------------|
| Test Description: | Conducted Emission |
| Model No.:        | HCD-6070R          |
| Phase:            | H                  |
| Mode:             | AC                 |
| Operator Name:    | KES                |



### Final Result

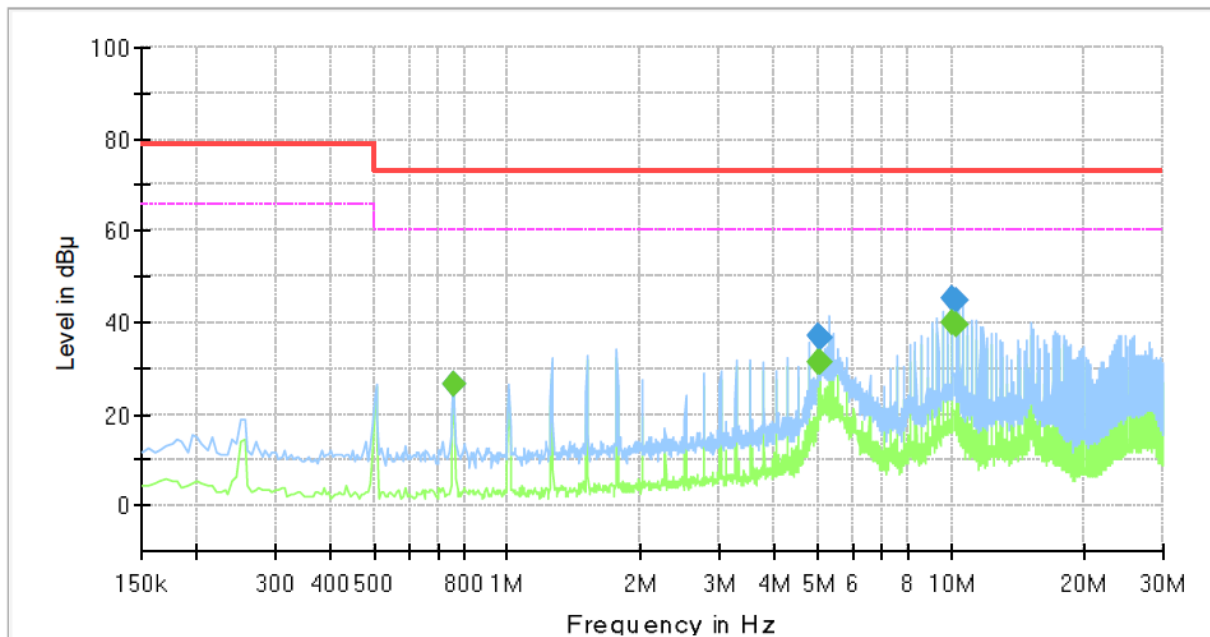
| Frequency (MHz) | QuasiPeak (dBμV) | CAverage (dBμV) | Limit (dBμV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.755000        | 26.76            | ---             | 73.00        | 46.24       | 1000.0          | 9.000           | L1   | 20.0       |
| 0.755000        | ---              | 26.63           | 60.00        | 33.37       | 1000.0          | 9.000           | L1   | 20.0       |
| 1.765000        | 32.91            | ---             | 73.00        | 40.09       | 1000.0          | 9.000           | L1   | 20.3       |
| 1.765000        | ---              | 31.96           | 60.00        | 28.04       | 1000.0          | 9.000           | L1   | 20.3       |
| 5.035000        | 29.74            | ---             | 73.00        | 43.26       | 1000.0          | 9.000           | L1   | 19.7       |
| 5.035000        | ---              | 23.88           | 60.00        | 36.12       | 1000.0          | 9.000           | L1   | 19.7       |
| 5.290000        | 38.06            | ---             | 73.00        | 34.94       | 1000.0          | 9.000           | L1   | 19.6       |
| 5.290000        | ---              | 33.12           | 60.00        | 26.88       | 1000.0          | 9.000           | L1   | 19.6       |
| 9.830000        | ---              | 40.74           | 60.00        | 19.26       | 1000.0          | 9.000           | L1   | 19.9       |
| 9.830000        | 44.44            | ---             | 73.00        | 28.56       | 1000.0          | 9.000           | L1   | 19.9       |
| 10.585000       | ---              | 38.12           | 60.00        | 21.88       | 1000.0          | 9.000           | L1   | 20.0       |
| 10.585000       | 42.20            | ---             | 73.00        | 30.80       | 1000.0          | 9.000           | L1   | 20.0       |

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## NEUTRAL LINE

### Common Information

|                   |                    |
|-------------------|--------------------|
| Test Description: | Conducted Emission |
| Model No.:        | HCD-6070R          |
| Phase:            | N                  |
| Mode:             | AC                 |
| Operator Name:    | KES                |



### Final Result

| Frequency (MHz) | QuasiPeak (dBμV) | CAverage (dBμV) | Limit (dBμV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.755000        | ---              | 26.52           | 60.00        | 33.48       | 1000.0          | 9.000           | N    | 20.0       |
| 0.755000        | 26.66            | ---             | 73.00        | 46.34       | 1000.0          | 9.000           | N    | 20.0       |
| 5.040000        | ---              | 31.50           | 60.00        | 28.50       | 1000.0          | 9.000           | N    | 19.7       |
| 5.040000        | 37.04            | ---             | 73.00        | 35.96       | 1000.0          | 9.000           | N    | 19.7       |
| 5.045000        | ---              | 31.32           | 60.00        | 28.68       | 1000.0          | 9.000           | N    | 19.7       |
| 5.045000        | 36.65            | ---             | 73.00        | 36.35       | 1000.0          | 9.000           | N    | 19.7       |
| 10.085000       | ---              | 40.08           | 60.00        | 19.92       | 1000.0          | 9.000           | N    | 19.9       |
| 10.085000       | 45.28            | ---             | 73.00        | 27.72       | 1000.0          | 9.000           | N    | 19.9       |
| 10.335000       | ---              | 39.41           | 60.00        | 20.59       | 1000.0          | 9.000           | N    | 19.9       |
| 10.335000       | 44.60            | ---             | 73.00        | 28.40       | 1000.0          | 9.000           | N    | 19.9       |

## ■ DC Mode

## HOT LINE

## Common Information

Test Description:

Model No.:

Phase:

Mode:

Operator Name:

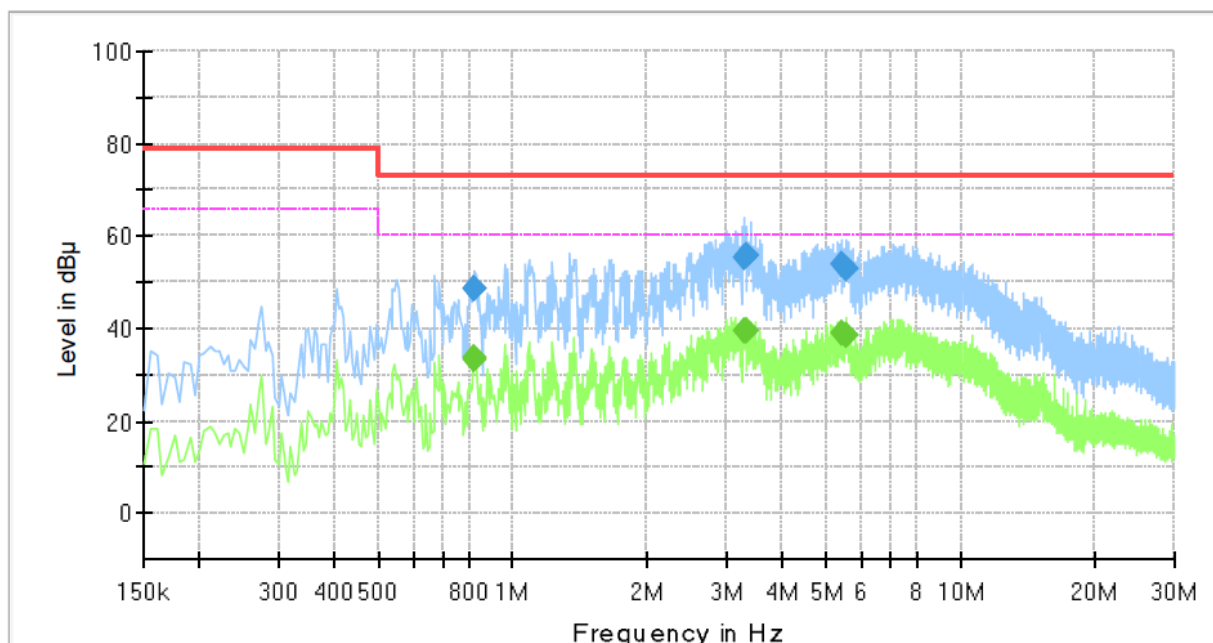
Conducted Emission

HCD-6070R

H

DC

KES



## Final Result

| Frequency (MHz) | QuasiPeak (dBμV) | CAverage (dBμV) | Limit (dBμV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.815000        | ---              | 33.06           | 60.00        | 26.94       | 1000.0          | 9.000           | L1   | 20.0       |
| 0.815000        | 48.39            | ---             | 73.00        | 24.61       | 1000.0          | 9.000           | L1   | 20.0       |
| 0.820000        | ---              | 33.73           | 60.00        | 26.27       | 1000.0          | 9.000           | L1   | 20.0       |
| 0.820000        | 48.47            | ---             | 73.00        | 24.53       | 1000.0          | 9.000           | L1   | 20.0       |
| 3.280000        | ---              | 39.57           | 60.00        | 20.43       | 1000.0          | 9.000           | L1   | 20.1       |
| 3.280000        | 55.51            | ---             | 73.00        | 17.49       | 1000.0          | 9.000           | L1   | 20.1       |
| 3.340000        | ---              | 39.40           | 60.00        | 20.60       | 1000.0          | 9.000           | L1   | 20.1       |
| 3.340000        | 55.58            | ---             | 73.00        | 17.42       | 1000.0          | 9.000           | L1   | 20.1       |
| 5.410000        | ---              | 38.85           | 60.00        | 21.15       | 1000.0          | 9.000           | L1   | 19.6       |
| 5.410000        | 53.78            | ---             | 73.00        | 19.22       | 1000.0          | 9.000           | L1   | 19.6       |
| 5.555000        | ---              | 38.66           | 60.00        | 21.34       | 1000.0          | 9.000           | L1   | 19.6       |
| 5.555000        | 52.72            | ---             | 73.00        | 20.28       | 1000.0          | 9.000           | L1   | 19.6       |

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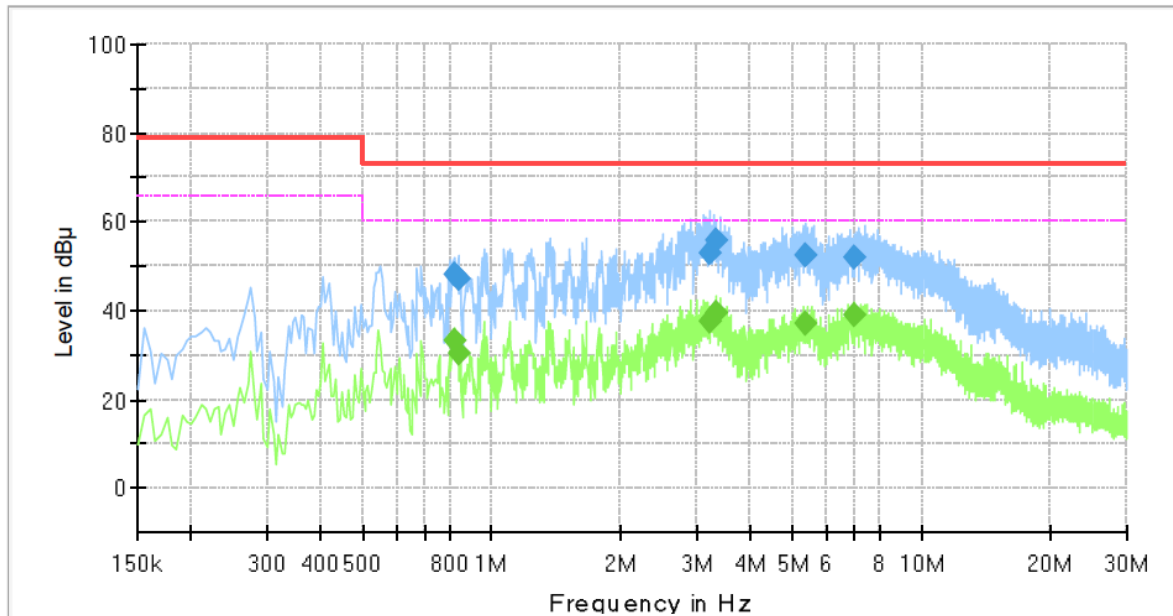
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## NEUTRAL LINE

### Common Information

|                   |                    |
|-------------------|--------------------|
| Test Description: | Conducted Emission |
| Model No.:        | HCD-6070R          |
| Phase:            | N                  |
| Mode:             | DC                 |
| Operator Name:    | KES                |



### Final\_Result

| Frequency (MHz) | QuasiPeak (dBμV) | CAverage (dBμV) | Limit (dBμV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.815000        | ---              | 33.02           | 60.00        | 26.98       | 1000.0          | 9.000           | N    | 20.0       |
| 0.815000        | 48.28            | ---             | 73.00        | 24.72       | 1000.0          | 9.000           | N    | 20.0       |
| 0.835000        | ---              | 30.11           | 60.00        | 29.89       | 1000.0          | 9.000           | N    | 20.1       |
| 0.835000        | 47.35            | ---             | 73.00        | 25.65       | 1000.0          | 9.000           | N    | 20.1       |
| 3.210000        | ---              | 37.50           | 60.00        | 22.50       | 1000.0          | 9.000           | N    | 20.1       |
| 3.210000        | 52.92            | ---             | 73.00        | 20.08       | 1000.0          | 9.000           | N    | 20.1       |
| 3.325000        | ---              | 39.64           | 60.00        | 20.36       | 1000.0          | 9.000           | N    | 20.1       |
| 3.325000        | 55.58            | ---             | 73.00        | 17.42       | 1000.0          | 9.000           | N    | 20.1       |
| 5.380000        | ---              | 37.17           | 60.00        | 22.83       | 1000.0          | 9.000           | N    | 19.6       |
| 5.380000        | 52.22            | ---             | 73.00        | 20.78       | 1000.0          | 9.000           | N    | 19.6       |
| 6.945000        | ---              | 39.17           | 60.00        | 20.83       | 1000.0          | 9.000           | N    | 19.5       |
| 6.945000        | 51.87            | ---             | 73.00        | 21.13       | 1000.0          | 9.000           | N    | 19.5       |

#### ◆ Calculation

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

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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

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## KES Co., Ltd.

3701, 40, Simin-daero 365beon-gil,  
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea  
Tel: +82-31-425-6200 / Fax: +82-31-424-0450  
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Report No.:

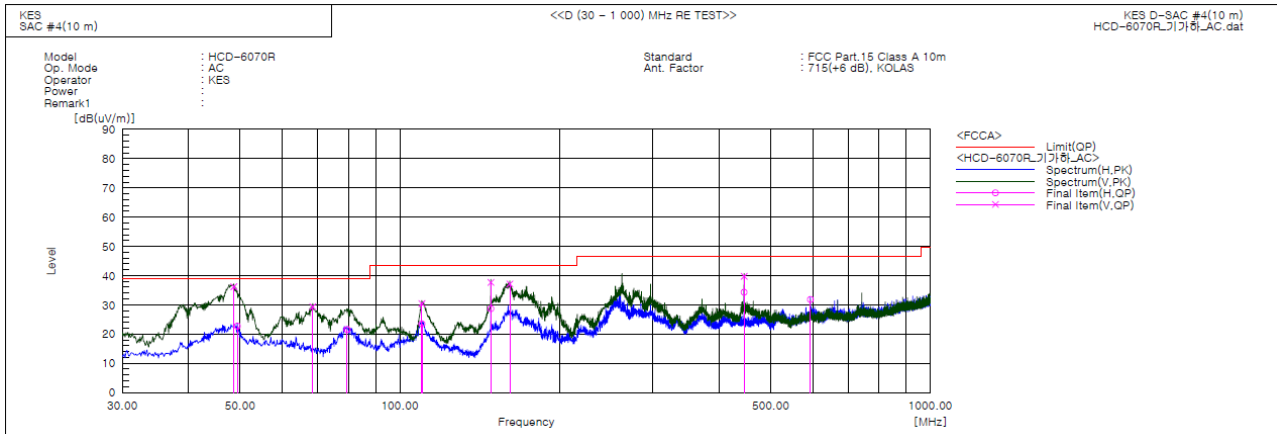
KES-EM-22T0187-R1

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## Radiated Electric Field Emissions(Below 1 GHz)

- 47 CFR Part 15, Subpart B

### ■ AC Mode



### Final Result

| No. | Frequency<br>[MHz] | (P) | Reading<br>QP<br>[dB(uV)] | c.f<br>[dB(1/m)] | Result<br>QP<br>[dB(uV/m)] | Limit<br>QP<br>[dB(uV/m)] | Margin<br>QP<br>[dB] | Height<br>[cm] | Angle<br>[deg] | Remark |
|-----|--------------------|-----|---------------------------|------------------|----------------------------|---------------------------|----------------------|----------------|----------------|--------|
| 1   | 48.673             | V   | 57.1                      | -20.9            | 36.2                       | 39.0                      | 2.8                  | 121.0          | 264.0          |        |
| 2   | 49.400             | H   | 43.6                      | -20.9            | 22.7                       | 39.0                      | 16.3                 | 375.0          | 31.0           |        |
| 3   | 68.558             | V   | 53.6                      | -24.2            | 29.4                       | 39.0                      | 9.6                  | 107.0          | 283.0          |        |
| 4   | 79.591             | H   | 49.1                      | -27.5            | 21.6                       | 39.0                      | 17.4                 | 292.0          | 24.0           |        |
| 5   | 110.025            | V   | 52.6                      | -22.2            | 30.4                       | 43.5                      | 13.1                 | 122.0          | 267.0          |        |
| 6   | 110.146            | H   | 45.7                      | -22.2            | 23.5                       | 43.5                      | 20.0                 | 326.0          | 185.0          |        |
| 7   | 148.461            | V   | 62.9                      | -25.2            | 37.7                       | 43.5                      | 5.8                  | 117.0          | 162.0          |        |
| 8   | 148.461            | H   | 53.9                      | -25.2            | 28.7                       | 43.5                      | 14.8                 | 314.0          | 177.0          |        |
| 9   | 161.193            | V   | 61.7                      | -24.5            | 37.2                       | 43.5                      | 6.3                  | 125.0          | 181.0          |        |
| 10  | 445.524            | H   | 47.3                      | -13.0            | 34.3                       | 46.5                      | 12.2                 | 316.0          | 162.0          |        |
| 11  | 445.524            | V   | 52.8                      | -13.0            | 39.8                       | 46.5                      | 6.7                  | 122.0          | 158.0          |        |
| 12  | 594.055            | H   | 40.2                      | -8.4             | 31.8                       | 46.5                      | 14.7                 | 351.0          | 147.0          |        |

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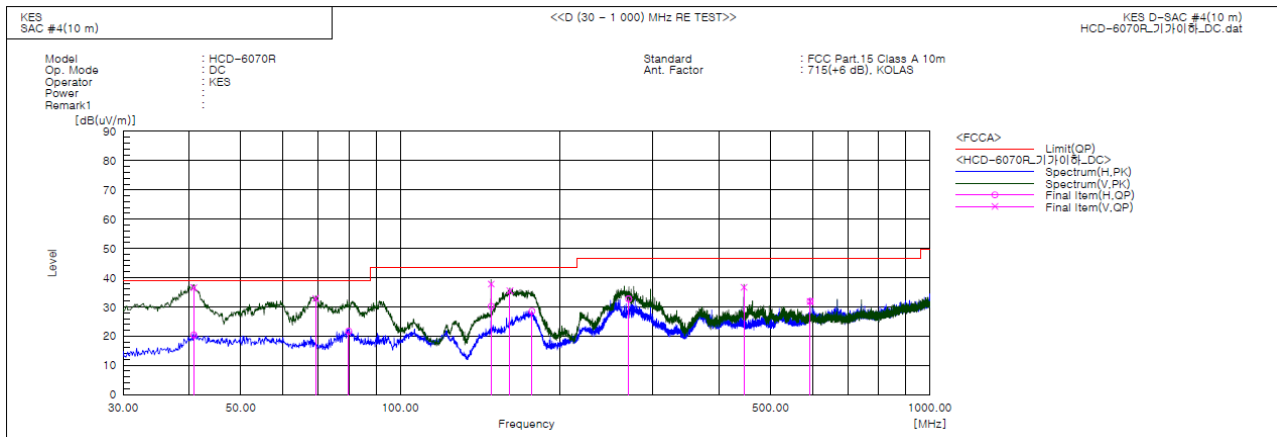
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Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea  
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### DC Mode



### Final Result

| No. | Frequency<br>[MHz] | (P) | Reading<br>QP<br>[dB(uV)] | c.f<br>[dB(1/m)] | Result<br>QP<br>[dB(uV/m)] | Limit<br>QP<br>[dB(uV/m)] | Margin<br>QP<br>[dB] | Height<br>[cm] | Angle<br>[deg] | Remark |
|-----|--------------------|-----|---------------------------|------------------|----------------------------|---------------------------|----------------------|----------------|----------------|--------|
| 1   | 40.791             | V   | 58.7                      | -22.1            | 36.6                       | 39.0                      | 2.4                  | 112.0          | 311.0          |        |
| 2   | 40.791             | H   | 42.5                      | -22.1            | 20.4                       | 39.0                      | 18.6                 | 378.0          | 61.0           |        |
| 3   | 69.285             | V   | 57.4                      | -24.5            | 32.9                       | 39.0                      | 6.1                  | 113.0          | 247.0          |        |
| 4   | 79.955             | H   | 49.2                      | -27.5            | 21.7                       | 39.0                      | 17.3                 | 394.0          | 354.0          |        |
| 5   | 148.461            | V   | 63.0                      | -25.2            | 37.8                       | 43.5                      | 5.7                  | 105.0          | 202.0          |        |
| 6   | 148.461            | H   | 55.4                      | -25.2            | 30.2                       | 43.5                      | 13.3                 | 356.0          | 126.0          |        |
| 7   | 161.071            | V   | 60.0                      | -24.5            | 35.5                       | 43.5                      | 8.0                  | 121.0          | 183.0          |        |
| 8   | 177.319            | H   | 52.1                      | -23.6            | 28.5                       | 43.5                      | 15.0                 | 309.0          | 76.0           |        |
| 9   | 269.833            | H   | 51.4                      | -18.7            | 32.7                       | 46.5                      | 13.8                 | 289.0          | 27.0           |        |
| 10  | 445.524            | V   | 49.7                      | -13.0            | 36.7                       | 46.5                      | 9.8                  | 117.0          | 60.0           |        |
| 11  | 594.055            | H   | 40.3                      | -8.4             | 31.9                       | 46.5                      | 14.6                 | 292.0          | 306.0          |        |
| 12  | 594.055            | V   | 40.2                      | -8.4             | 31.8                       | 46.5                      | 14.7                 | 102.0          | 123.0          |        |

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3701, 40, Simin-daero 365beon-gil,  
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea  
Tel: +82-31-425-6200 / Fax: +82-31-424-0450  
www.kes.co.kr

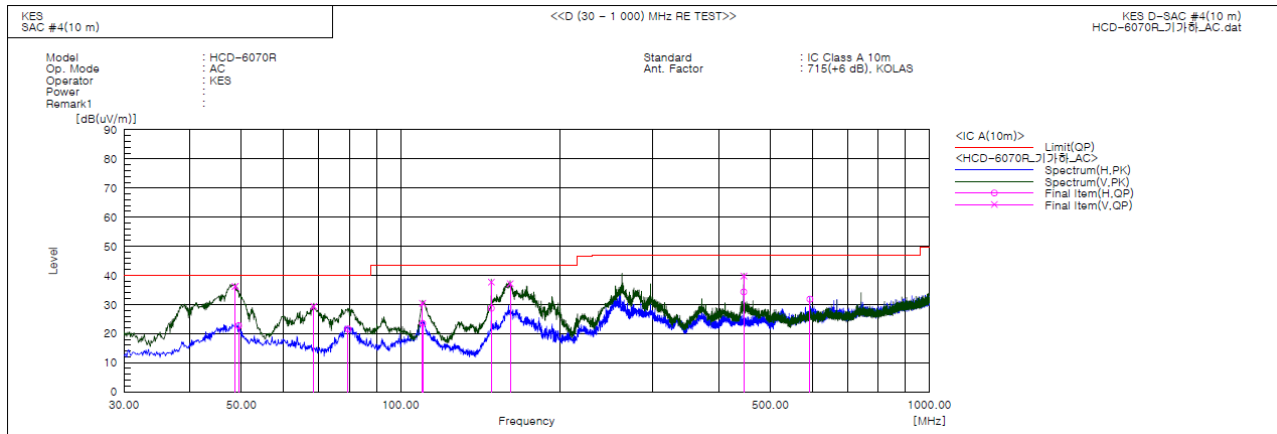
Report No.:

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## - IC Regulation ICES-003 Issue 7

### ■ AC Mode



### Final Result

| No. | Frequency<br>[MHz] | (P) | Reading<br>QP<br>[dB(uV)] | c.f<br>[dB(1/m)] | Result<br>QP<br>[dB(uV/m)] | Limit<br>QP<br>[dB(uV/m)] | Margin<br>QP<br>[dB] | Height<br>[cm] | Angle<br>[deg] | Remark |
|-----|--------------------|-----|---------------------------|------------------|----------------------------|---------------------------|----------------------|----------------|----------------|--------|
| 1   | 48.673             | V   | 57.1                      | -20.9            | 36.2                       | 40.0                      | 3.8                  | 121.0          | 264.0          |        |
| 2   | 49.400             | H   | 43.6                      | -20.9            | 22.7                       | 40.0                      | 17.3                 | 375.0          | 31.0           |        |
| 3   | 68.558             | V   | 53.6                      | -24.2            | 29.4                       | 40.0                      | 10.6                 | 107.0          | 283.0          |        |
| 4   | 79.591             | H   | 49.1                      | -27.5            | 21.6                       | 40.0                      | 18.4                 | 292.0          | 24.0           |        |
| 5   | 110.025            | V   | 52.6                      | -22.2            | 30.4                       | 43.5                      | 13.1                 | 122.0          | 267.0          |        |
| 6   | 110.146            | H   | 45.7                      | -22.2            | 23.5                       | 43.5                      | 20.0                 | 326.0          | 185.0          |        |
| 7   | 148.461            | V   | 62.9                      | -25.2            | 37.7                       | 43.5                      | 5.8                  | 117.0          | 162.0          |        |
| 8   | 148.461            | H   | 53.9                      | -25.2            | 28.7                       | 43.5                      | 14.8                 | 314.0          | 177.0          |        |
| 9   | 161.193            | V   | 61.7                      | -24.5            | 37.2                       | 43.5                      | 6.3                  | 125.0          | 181.0          |        |
| 10  | 445.524            | H   | 47.3                      | -13.0            | 34.3                       | 47.0                      | 12.7                 | 316.0          | 162.0          |        |
| 11  | 445.524            | V   | 52.8                      | -13.0            | 39.8                       | 47.0                      | 7.2                  | 122.0          | 158.0          |        |
| 12  | 594.055            | H   | 40.2                      | -8.4             | 31.8                       | 47.0                      | 15.2                 | 351.0          | 147.0          |        |

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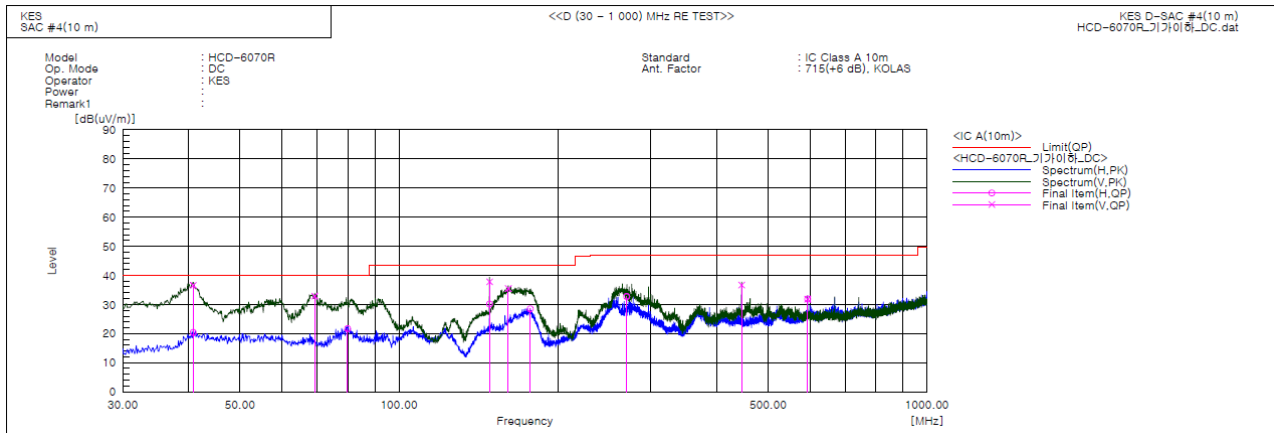
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Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea  
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Report No.:

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### DC Mode



### Final Result

| No. | Frequency [MHz] | (P) | Reading QP [dB(uV)] | c.f [dB(1/m)] | Result QP [dB(uV/m)] | Limit QP [dB(uV/m)] | Margin QP [dB] | Height [cm] | Angle [deg] | Remark |
|-----|-----------------|-----|---------------------|---------------|----------------------|---------------------|----------------|-------------|-------------|--------|
| 1   | 40.791          | V   | 58.7                | -22.1         | 36.6                 | 40.0                | 3.4            | 112.0       | 311.0       |        |
| 2   | 40.791          | H   | 42.5                | -22.1         | 20.4                 | 40.0                | 19.6           | 378.0       | 61.0        |        |
| 3   | 69.285          | V   | 57.4                | -24.5         | 32.9                 | 40.0                | 7.1            | 113.0       | 247.0       |        |
| 4   | 79.955          | H   | 49.2                | -27.5         | 21.7                 | 40.0                | 18.3           | 394.0       | 354.0       |        |
| 5   | 148.461         | V   | 63.0                | -25.2         | 37.8                 | 43.5                | 5.7            | 105.0       | 202.0       |        |
| 6   | 148.461         | H   | 55.4                | -25.2         | 30.2                 | 43.5                | 13.3           | 356.0       | 126.0       |        |
| 7   | 161.071         | V   | 60.0                | -24.5         | 35.5                 | 43.5                | 8.0            | 121.0       | 183.0       |        |
| 8   | 177.319         | H   | 52.1                | -23.6         | 28.5                 | 43.5                | 15.0           | 309.0       | 76.0        |        |
| 9   | 269.833         | H   | 51.4                | -18.7         | 32.7                 | 47.0                | 14.3           | 289.0       | 27.0        |        |
| 10  | 445.524         | V   | 49.7                | -13.0         | 36.7                 | 47.0                | 10.3           | 117.0       | 60.0        |        |
| 11  | 594.055         | H   | 40.3                | -8.4          | 31.9                 | 47.0                | 15.1           | 292.0       | 306.0       |        |
| 12  | 594.055         | V   | 40.2                | -8.4          | 31.8                 | 47.0                | 15.2           | 102.0       | 123.0       |        |

### ◆ Calculation – SAC #4(10 m)

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

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

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

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

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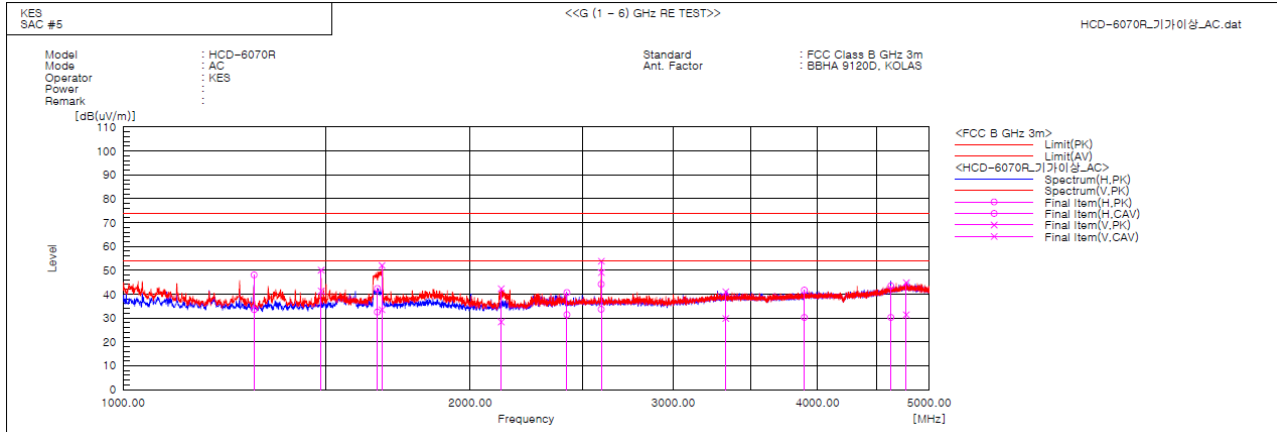
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## Radiated Electric Field Emissions(Above 1 GHz)

### ■ AC Mode



### Final Result

| No. | Frequency [MHz] | (P) | Reading PK [dB(uV)] | Reading CAV [dB(uV)] | c.f [dB(1/m)] | Result PK [dB(uV/m)] | Result CAV [dB(uV/m)] | Limit PK [dB(uV/m)] | Limit AV [dB(uV/m)] | Margin PK [dB] | Margin CAV [dB] | Height [cm] | Angle [deg] | Remark |
|-----|-----------------|-----|---------------------|----------------------|---------------|----------------------|-----------------------|---------------------|---------------------|----------------|-----------------|-------------|-------------|--------|
| 1   | 1298.750        | H   | 54.5                | 39.9                 | -6.4          | 48.1                 | 33.5                  | 74.0                | 54.0                | 25.9           | 20.5            | 134.0       | 307.1       |        |
| 2   | 1485.000        | V   | 55.5                | 46.8                 | -5.4          | 50.1                 | 41.4                  | 74.0                | 54.0                | 23.9           | 12.6            | 115.0       | 157.2       |        |
| 3   | 1661.252        | H   | 47.1                | 37.2                 | -4.7          | 42.4                 | 32.5                  | 74.0                | 54.0                | 31.6           | 21.5            | 221.0       | 284.0       |        |
| 4   | 1676.875        | V   | 56.6                | 38.1                 | -4.6          | 52.0                 | 33.5                  | 74.0                | 54.0                | 22.0           | 20.5            | 101.0       | 235.1       |        |
| 5   | 2126.875        | V   | 45.4                | 31.5                 | -3.1          | 42.3                 | 28.4                  | 74.0                | 54.0                | 31.7           | 25.6            | 107.0       | 151.5       |        |
| 6   | 2425.384        | H   | 42.6                | 33.3                 | -1.9          | 40.7                 | 31.4                  | 74.0                | 54.0                | 33.3           | 22.6            | 116.0       | 77.0        |        |
| 7   | 2597.513        | H   | 45.3                | 34.8                 | -1.1          | 44.2                 | 33.7                  | 74.0                | 54.0                | 29.8           | 20.3            | 191.0       | 102.4       |        |
| 8   | 2598.125        | V   | 54.9                | 50.2                 | -1.1          | 53.8                 | 49.1                  | 74.0                | 54.0                | 20.2           | 4.9             | 102.0       | 198.6       |        |
| 9   | 3330.625        | V   | 40.5                | 29.3                 | 0.6           | 41.1                 | 29.9                  | 74.0                | 54.0                | 32.9           | 24.1            | 157.0       | 330.8       |        |
| 10  | 3896.250        | H   | 40.0                | 28.6                 | 1.7           | 41.7                 | 30.3                  | 74.0                | 54.0                | 32.3           | 23.7            | 100.0       | 23.8        |        |
| 11  | 4631.257        | H   | 39.0                | 25.8                 | 4.5           | 43.5                 | 30.3                  | 74.0                | 54.0                | 30.5           | 23.7            | 243.0       | 247.0       |        |
| 12  | 4776.250        | V   | 39.7                | 26.3                 | 5.1           | 44.8                 | 31.4                  | 74.0                | 54.0                | 29.2           | 22.6            | 105.0       | 54.8        |        |

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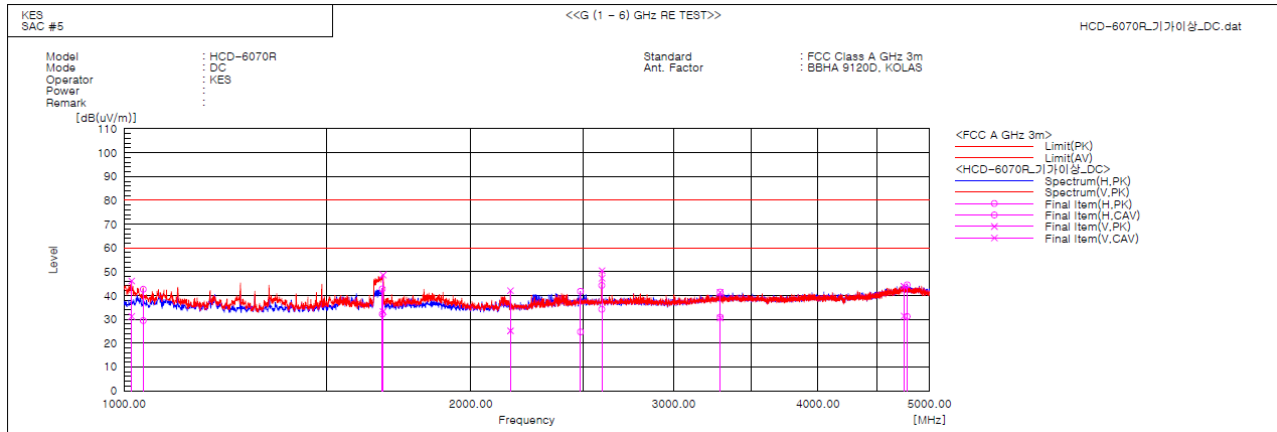
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### DC Mode



#### Final Result

| No. | Frequency [MHz] | (P) | Reading PK [dB(μV)] | Reading CAV [dB(μV)] | c.f [dB(1/m)] | Result PK [dB(μV/m)] | Result CAV [dB(μV/m)] | Limit PK [dB(μV/m)] | Limit AV [dB(μV/m)] | Margin PK [dB] | Margin CAV [dB] | Height [cm] | Angle [deg] | Remark |
|-----|-----------------|-----|---------------------|----------------------|---------------|----------------------|-----------------------|---------------------|---------------------|----------------|-----------------|-------------|-------------|--------|
| 1   | 1015.341        | V   | 54.1                | 39.3                 | -8.0          | 46.1                 | 31.3                  | 80.0                | 60.0                | 33.9           | 28.7            | 117.0       | 208.1       |        |
| 2   | 1039.378        | H   | 50.4                | 37.3                 | -7.8          | 42.6                 | 29.5                  | 80.0                | 60.0                | 37.4           | 30.5            | 291.0       | 3.5         |        |
| 3   | 1675.627        | H   | 47.4                | 36.8                 | -4.6          | 42.8                 | 32.2                  | 80.0                | 60.0                | 37.2           | 27.8            | 221.0       | 266.0       |        |
| 4   | 1678.122        | V   | 53.2                | 37.9                 | -4.6          | 48.6                 | 33.3                  | 80.0                | 60.0                | 31.4           | 26.7            | 135.0       | 234.0       |        |
| 5   | 2164.363        | V   | 45.1                | 28.2                 | -3.0          | 42.1                 | 25.2                  | 80.0                | 60.0                | 37.9           | 34.8            | 119.0       | 253.7       |        |
| 6   | 2489.382        | H   | 43.4                | 26.3                 | -1.6          | 41.8                 | 24.7                  | 80.0                | 60.0                | 38.2           | 35.3            | 348.0       | 43.7        |        |
| 7   | 2597.406        | H   | 45.4                | 35.3                 | -1.1          | 44.3                 | 34.2                  | 80.0                | 60.0                | 35.7           | 25.8            | 99.7        | 116.0       |        |
| 8   | 2598.128        | V   | 51.6                | 48.4                 | -1.1          | 50.5                 | 47.3                  | 80.0                | 60.0                | 29.5           | 12.7            | 149.7       | 102.0       |        |
| 9   | 3290.624        | V   | 40.8                | 30.0                 | 0.6           | 41.4                 | 30.6                  | 80.0                | 60.0                | 38.6           | 29.4            | 125.0       | 49.7        |        |
| 10  | 3290.629        | H   | 40.9                | 30.3                 | 0.6           | 41.5                 | 30.9                  | 80.0                | 60.0                | 38.5           | 29.1            | 366.0       | 67.4        |        |
| 11  | 4751.873        | V   | 38.9                | 26.4                 | 5.0           | 43.9                 | 31.4                  | 80.0                | 60.0                | 36.1           | 28.6            | 393.0       | 44.2        |        |
| 12  | 4780.629        | H   | 39.4                | 26.1                 | 5.1           | 44.5                 | 31.2                  | 80.0                | 60.0                | 35.5           | 28.8            | 225.0       | 193.6       |        |

### Calculation

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

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

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

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

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## Test Setup Photos and Configuration

### Conducted Emissions at Mains Power Ports

#### ■ AC Mode



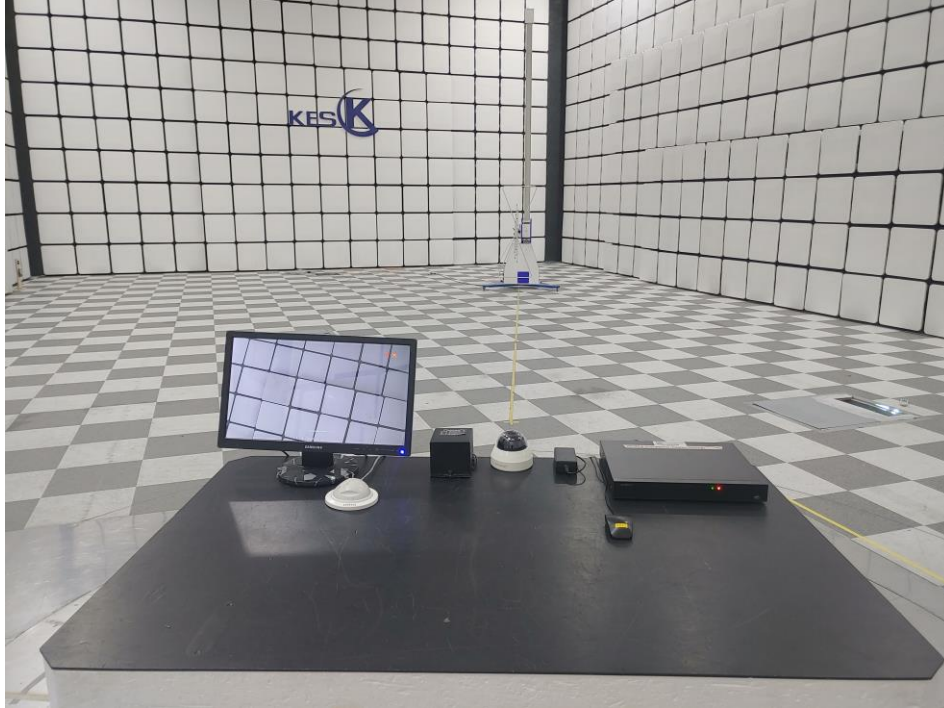
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## ■ DC Mode



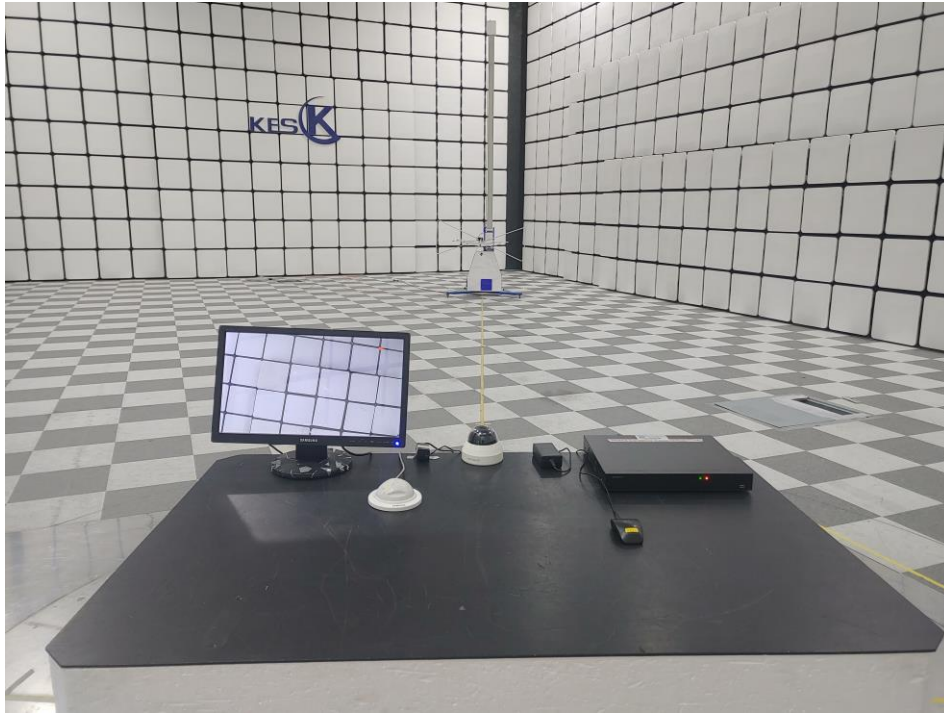
## Radiated Electric Field Emissions(Below 1 GHz)

### ■ AC Mode



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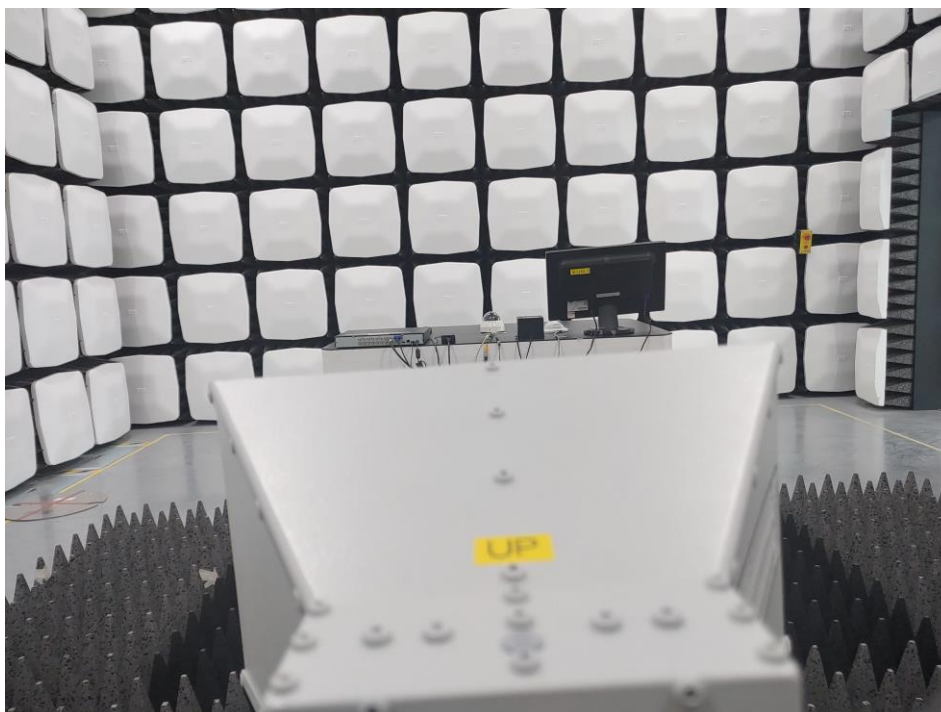
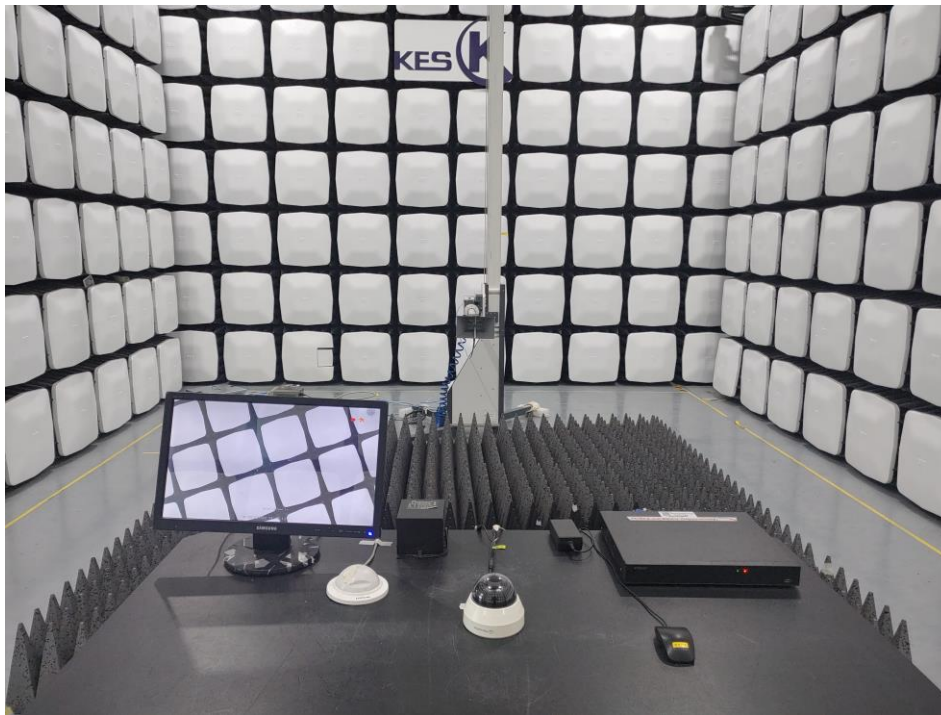
■ DC Mode



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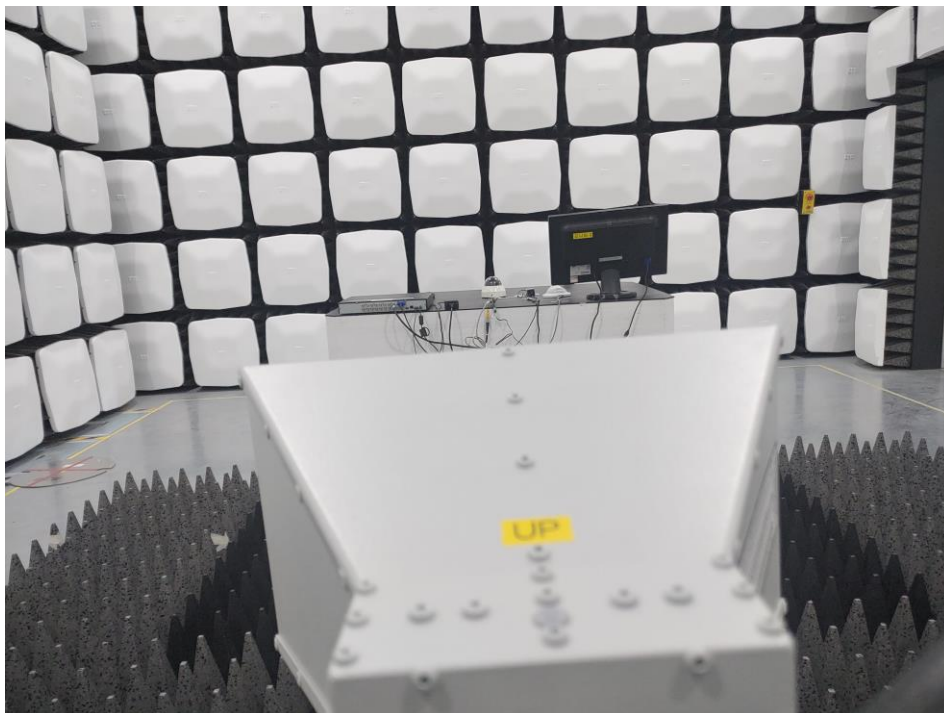
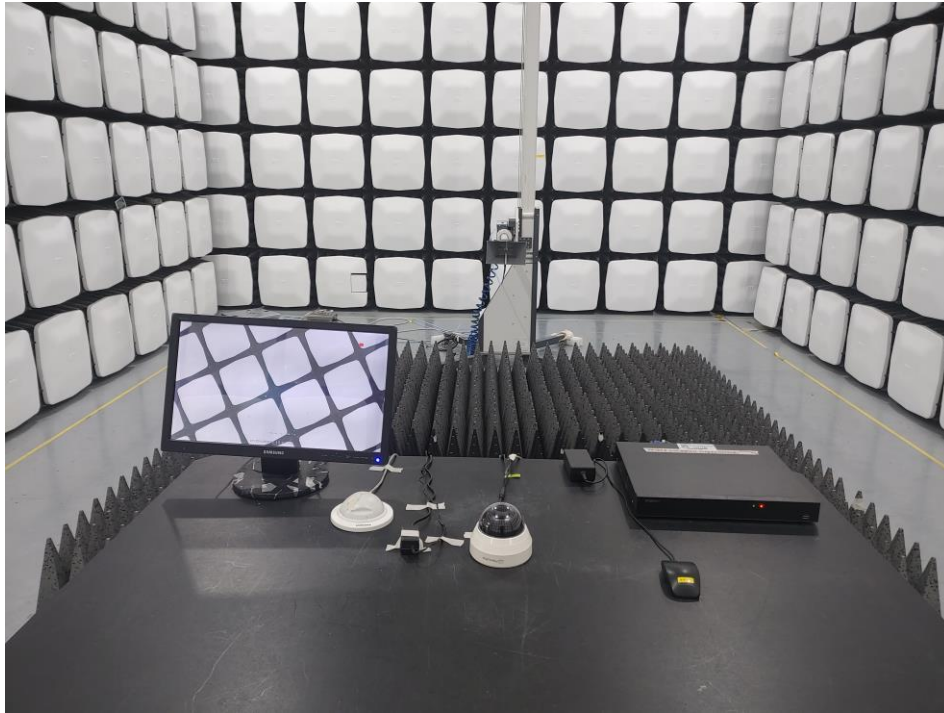
## Radiated Electric Field Emissions(Above 1 GHz)

### ■ AC Mode



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## ■ DC Mode



## EUT External Photographs

(Top)



(Bottom)



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## EUT Internal Photographs

(Internal View)



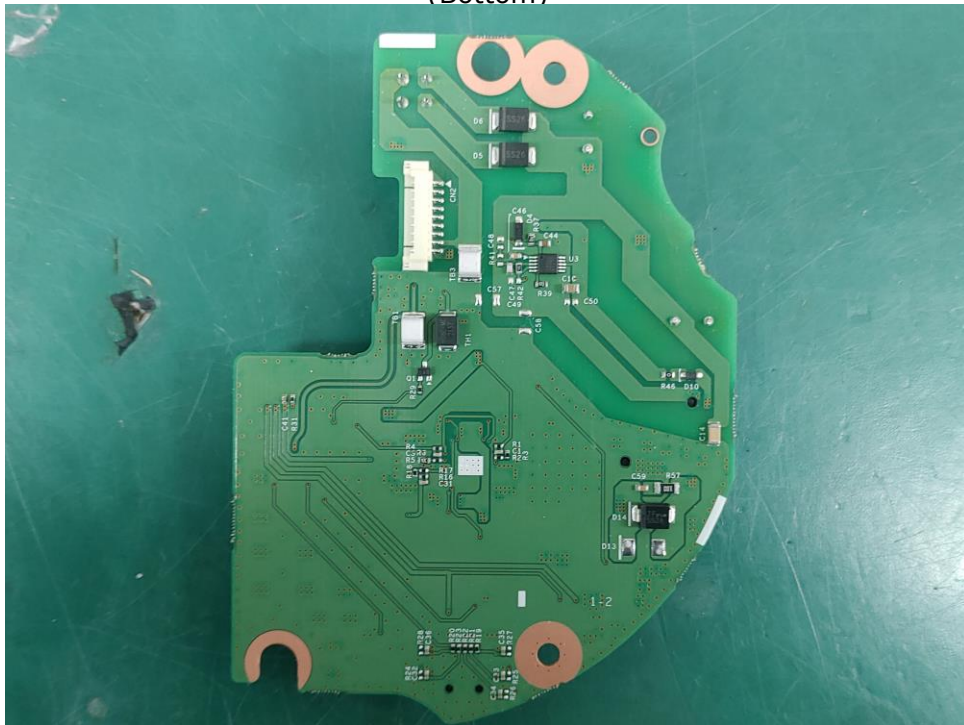
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## EUT Internal View – Board 1

(Top)



(Bottom)



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## EUT Internal View – Board 2

(Top)



(Bottom)



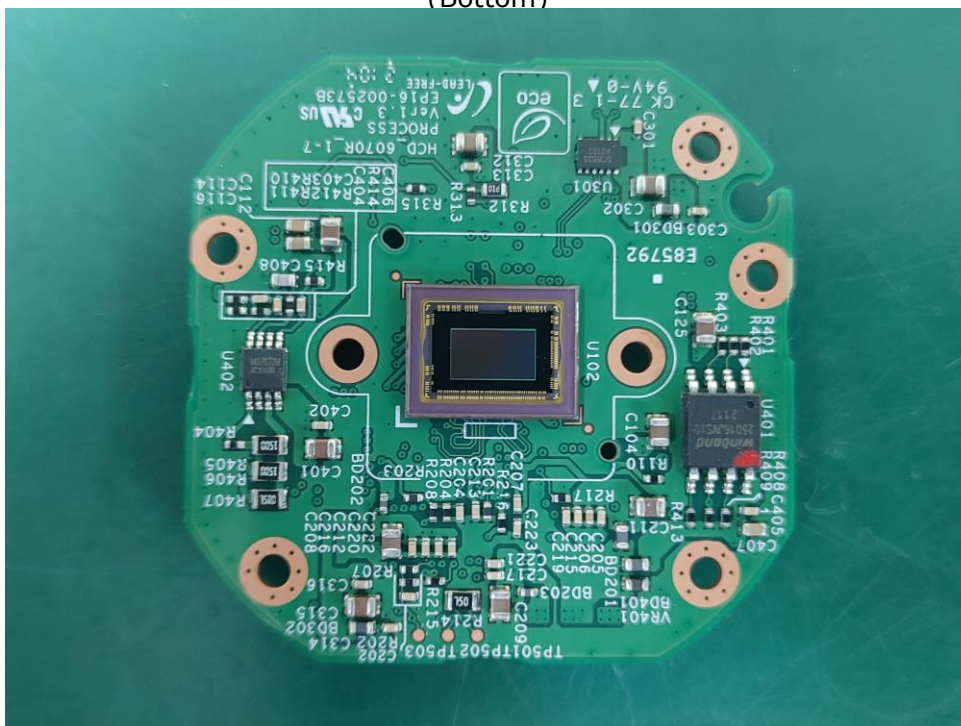
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## EUT Internal View – Board 3

(Top)



(Bottom)



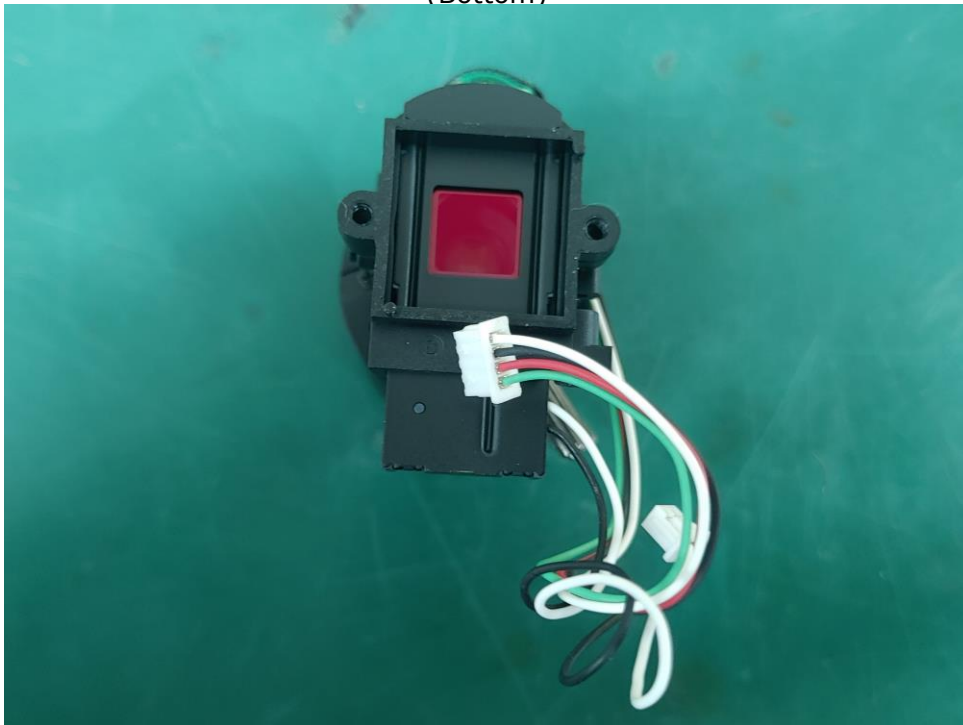
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## EUT Internal View – Lens

(Top)

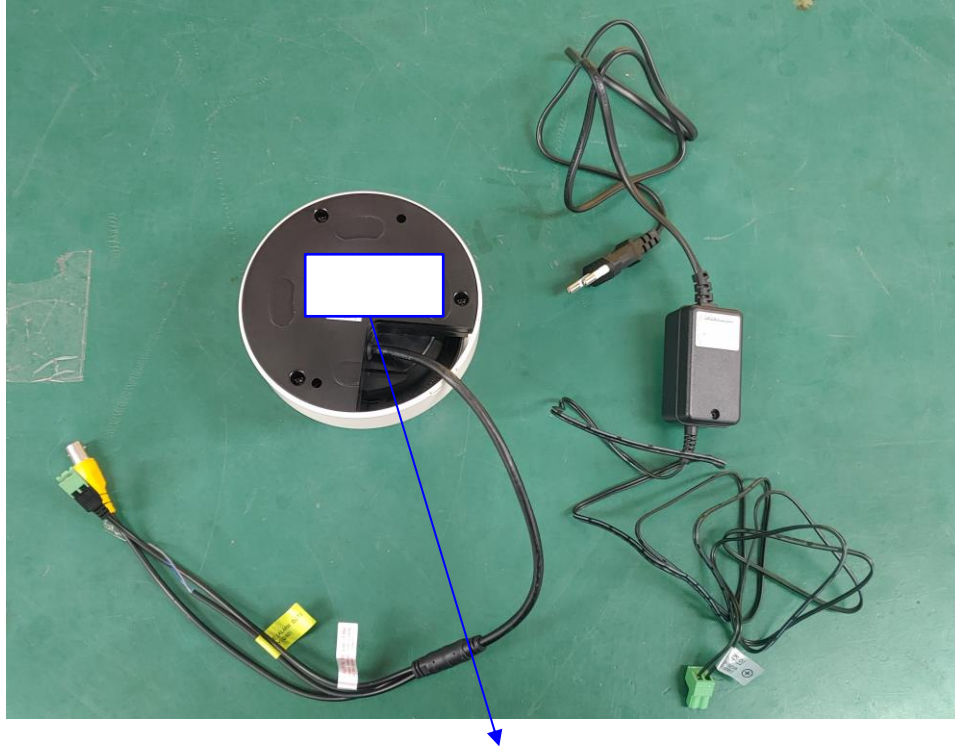


(Bottom)



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## Label Photographs



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

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

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :  
(1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.