



# TEST REPORT



Report No. : KES-EM252986-R1

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**KES Co., Ltd.**

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Tel : +82-31-425-6200, Fax : +82-31-341-3838

## 1. Client

- Name : Hanwha Vision Co., Ltd.
- Address : 6, Pangyo-ro 319beon-gil, Bundang-gu, Seongnam-si, Gyeonggi-do, Republic of Korea

## 2. Sample Description

- Product item : LED MODULE
- Model name : SPI-BRN0
- Variant model : SPI-BRM0, SPI-BRM1, SPI-BRW0
- Manufacturer etc. : HANWHA VISION VIETNAM COMPANY LIMITED
- Manufacturer address : Lot O-2, Que Vo Industrial Zone Extended Area, Nam Son Ward, Bac Ninh Province, Vietnam
- Manufacturer etc. : D-TECH CO.,LTD.
- Manufacturer address : 173-25, Saneop-ro, Gwonseon-gu, Suwon-si, Gyeonggi-do, Korea (Suwon Industrial Complex)

3. Date of test : 2025. 09. 01. ~ 2025. 09. 01.

4. Location of Test : Permanent Testing Lab

- Address : 473-21, Gayeo-ro, Yeoju-si, Gyeonggi-do, 12658, Republic of Korea

5. Test method used : AS/NZS CISPR 32:2015/AMD1:2020

6. Test result : PASS

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.  
This test report is not related to KOLAS accreditation.

|             |                   |                      |
|-------------|-------------------|----------------------|
| Affirmation | Tested by         | Technical Manager by |
|             | Name : EunGu Jeon | Name : DongHun Jang  |

2025. 10. 22.

**KES Co., Ltd.**

**REPORT REVISION HISTORY**

| Date          | Test Report No. | Revision History                       |
|---------------|-----------------|----------------------------------------|
| 2025. 09. 09. | KES-EM252986    | Issued                                 |
| 2025. 10. 22. | KES-EM252986-R1 | Reissue due to addition of derivatives |

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**Use of uncertainty of measurement for decisions on conformity (decision rule):**

- ☒ No decision rule is specified by the standard, when comparing the measurement result with the applicable limit according to the specification in that standard. The decisions on conformity are made without applying the measurement uncertainty("simple acceptance" decision rule, previously known as "accuracy method").
- ☐ Other (to be specified, for example when required by the standard or client)



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## 1 Laboratory Information

### 1.1 Test Location

| Category         | Details                                                           |
|------------------|-------------------------------------------------------------------|
| Address          | 473-21, Gayeo-ro, Yeosu-si, Gyeonggi-do, 12658, Republic of Korea |
| Telephone Number | 070-4910-6200                                                     |
| Facsimile Number | 031-341-3838                                                      |

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

### 1.2 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 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 0008                     |



## 2 Test Summary

### 2.1 Class and Voltage

| Test Class | Test Voltage    |
|------------|-----------------|
| Class A    | AC 240 V, 50 Hz |

### 2.2 Summary of Test Results

| Test Item                                                                                                                 | Test Standard                  | Test Result | Remark |
|---------------------------------------------------------------------------------------------------------------------------|--------------------------------|-------------|--------|
| Conducted Emissions at Mains Power Ports                                                                                  | AS/NZS CISPR 32:2015/AMD1:2020 | PASS        | -      |
| Conducted Emissions at Telecommunication Ports                                                                            |                                | N/A         | NOTE 1 |
| Radiated Emissions(Below 1 GHz)                                                                                           |                                | PASS        | -      |
| Radiated Emissions(Above 1 GHz)                                                                                           |                                | N/A         | NOTE 2 |
| * N/A: Not Applicable<br><br>(NOTE 1) No signal line ports.<br>(NOTE 2) The maximum operating frequency is below 108 MHz. |                                |             |        |

### 2.3 Remarks when standards applied

N/A

### 2.4 Variant Model Differences

- LED Lens difference for wide angle adjustment

| Model name | Divergence angle |
|------------|------------------|
| SPI-BRN0   | 12°              |
| SPI-BRM0   | 25°              |
| SPI-BRM1   | 43°              |
| SPI-BRW0   | 60°              |

### 2.5 Device Modifications

N/A



### 3 General Product Description

| Division                             |                   | Specificity     |
|--------------------------------------|-------------------|-----------------|
| Internal maximum operating frequency |                   | 120 Hz          |
| Power                                |                   | DC 24 V         |
| Test Power                           |                   | AC 220 V, 60 Hz |
| I/P Port                             |                   | LED DRIVER 1 EA |
| Unused Port                          |                   | N/A             |
| Function                             | Product Features  | LED MODULE      |
|                                      | Wireless Function | N/A             |
| Components                           |                   | EUT 1 EA        |

| Model                            | SPI-BRN0                                             |
|----------------------------------|------------------------------------------------------|
| Electrical Input                 | 24 VDC $\pm$ 10%                                     |
| Max. Power Consumption           | 6.9 W                                                |
| Wavelength                       | 617nm                                                |
| LED Quantity                     | 16EA                                                 |
| Angle                            | FWHM : 12°<br>10-% : 32°                             |
| Operation Temperature / Humidity | -40°C ~ +55°C / 0~95% RH                             |
| Storage Temperature / Humidity   | -40°C ~ +60°C / Less than 95% RH                     |
| Dimension                        | W101.2 x D53.8 x H78.2                               |
| Weight                           | 200g                                                 |
| Ingress level                    | IP66, IP67(camera and front cover must be assembled) |
| Certification                    | FCC, UL, CE, KC,<br>IEC 62471                        |



## 4 EUT Setup and Operation Mode

### 4.1 EUT Configuration

| Product Name           | Model Number | Serial Number | Manufacturer                             | Remarks |
|------------------------|--------------|---------------|------------------------------------------|---------|
| LED MODULE             | SPI-BRN0     | -             | Hanwha Vision Co., Ltd.                  | EUT     |
| BARCODE READER         | TNS-7000M    | -             | Hanwha Vision Co., Ltd.                  | -       |
| Laptop                 | P95G001      | 9JM8HT2       | DELL INC.                                | -       |
| Laptop Adapter         | HA65NM130    | -             | Chicony Power Technology(Suzhou)Co.,Ltd. | -       |
| Micro SD Card          | -            | -             | -                                        | -       |
| Switching Power Supply | LRS-350-24   | -             | MEAN WELL Enterprises Co., Ltd.          | -       |

### 4.2 System Configuration

| Product Name | Model Number | Serial Number | Manufacturer | Remarks |
|--------------|--------------|---------------|--------------|---------|
| -            | -            | -             | -            | -       |



### 4.3 External I/O Cabling

Mode 1

| Start            |               | End                    |               | Cable Spec. |        |
|------------------|---------------|------------------------|---------------|-------------|--------|
| Product Name     | I/O Port      | Product Name           | I/O Port      | Length(m)   | Shield |
| LED MODULE (EUT) | LED DRIVER    | BARCODE READER         | LED DRIVER    | -           | -      |
| BARCODE READER   | 12 Pin        | Switching Power Supply | DC OUT        | 5.0         | U      |
|                  | Micro SD Slot | Micro SD Card          | Micro SD Slot | -           | -      |
|                  | 8 Pin         | Laptop                 | RJ-45         | 2.0         | S      |
| Laptop           | DC Jack       | Laptop Adapter         | Line          | 1.5         | U      |

\* Unshielded=U, Shielded=S

### 4.4 EUT Operating Mode(s)

| Category | Mode      | Operating                                                                                                 |
|----------|-----------|-----------------------------------------------------------------------------------------------------------|
| Mode 1   | Operation | Check the operation of BARCODE READER through the laptop's web viewer and check the LED operation of EUT. |

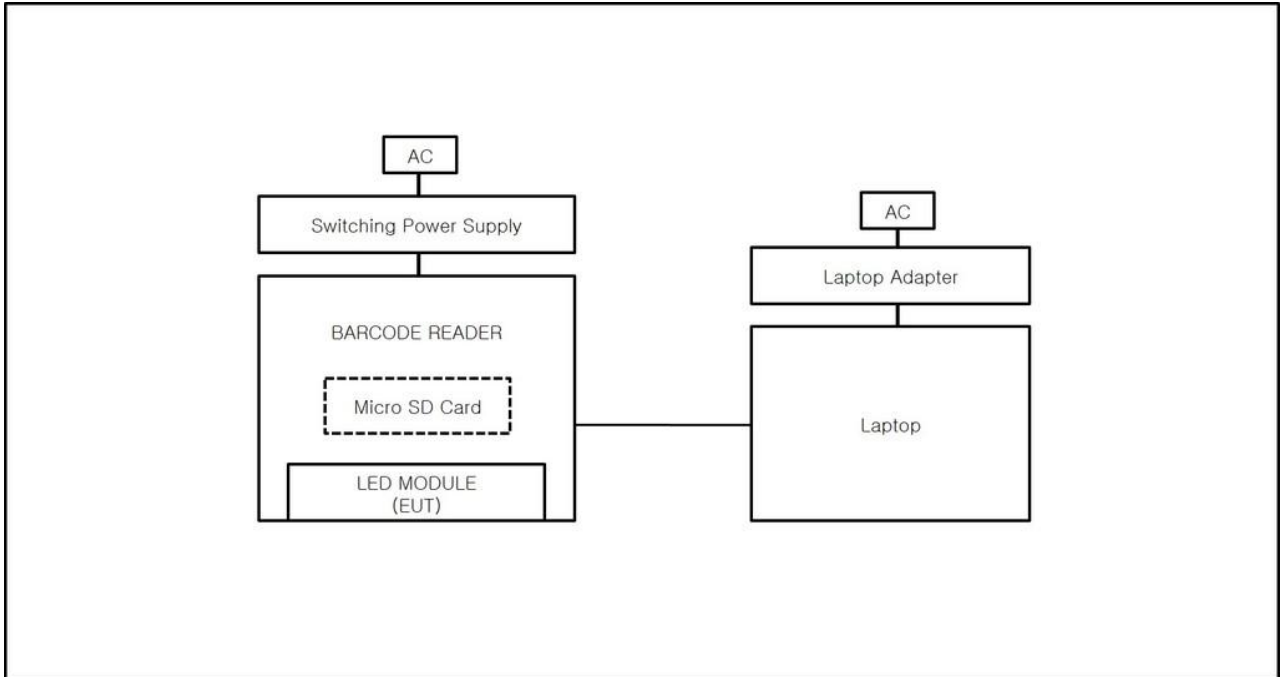
### 4.5 Test operating S/W

| Name       | Version | Manufacture Company     |
|------------|---------|-------------------------|
| Web Viewer | -       | Hanwha Vision Co., Ltd. |





## 4.6 Configuration



Mode 1



## 5 Measurement Procedure

### - Conducted Emissions

The conducted emission levels were measured on each current-carrying line with the spectrum analyzer operating in the CISPR quasi-peak mode (or peak mode if applicable). The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. If the conducted emission exceed the average limit with the instrument set to the quasi-peak mode, the measurements are made in the average mode. The emission spectrum was scanned from 150 kHz to 30 MHz. The highest emission amplitudes relative to the appropriate limits were measured and have been recorded. Quasi-peak readings are distinguished with a "QP".

### - Radiated Electric Field Emissions

The test was done at a SEMI ANECHOIC CHAMBER with quasi-peak detector. The final test data was measured using a Quasi-Peak detector below 1 GHz at 10 m or 3 m distance and a Peak and Average detector above 1 GHz at 3 m distance. Test was proceeded worst case test mode and cable configuration. Measurements were made with the antenna positioned in both the horizontal and vertical planes of polarization. The antenna height was varied from 1 m to 4 m (Radiated Emissions(Below 1 GHz)) and 1 m (Radiated Emissions(Above 1 GHz)) and the EUT was rotated 360° to find the maximum emitting point for each frequency.

Measurement procedures was In accordance with ANSI C63.4 or CISPR 32.



## 6 Test Item

### 6.1 Conducted Emissions at Mains Power Ports

#### 6.1.1 Test Equipment

| Equipment Name             | Model Number | Manufacturer    | Serial No. | Cal. Date  | Next Cal. Date | Used |
|----------------------------|--------------|-----------------|------------|------------|----------------|------|
| SHIELD ROOM #6             | -            | DYMSTEC         | -          | -          | -              | ■    |
| EMC32 Measurement Software | EMC32        | R&S             | 9.12.00    | -          | -              | ■    |
| EMI TEST RECEIVER          | ESR3         | Rohde & Schwarz | 101783     | 2024-11-06 | 2025-11-06     | ■    |
| LISN                       | ENV216       | Rohde & Schwarz | 101786     | 2025-01-09 | 2026-01-09     | ■    |
| ARTIFICIAL MAINS NETWORK   | ESH2-Z5      | Rohde & Schwarz | 100450     | 2024-11-06 | 2025-11-06     | ■    |
| PULSE LIMITER              | ESH3-Z2      | Rohde & Schwarz | 101915     | 2024-11-06 | 2025-11-06     | ■    |

#### 6.1.2 Test Location : SHIELD ROOM #6

#### 6.1.3 Test Conditions :

| Temperature      | Relative Humidity    |
|------------------|----------------------|
| (26.4 ~ 26.6) °C | (58.3 ~ 58.5) % R.H. |



### 6.1.4 Test Result

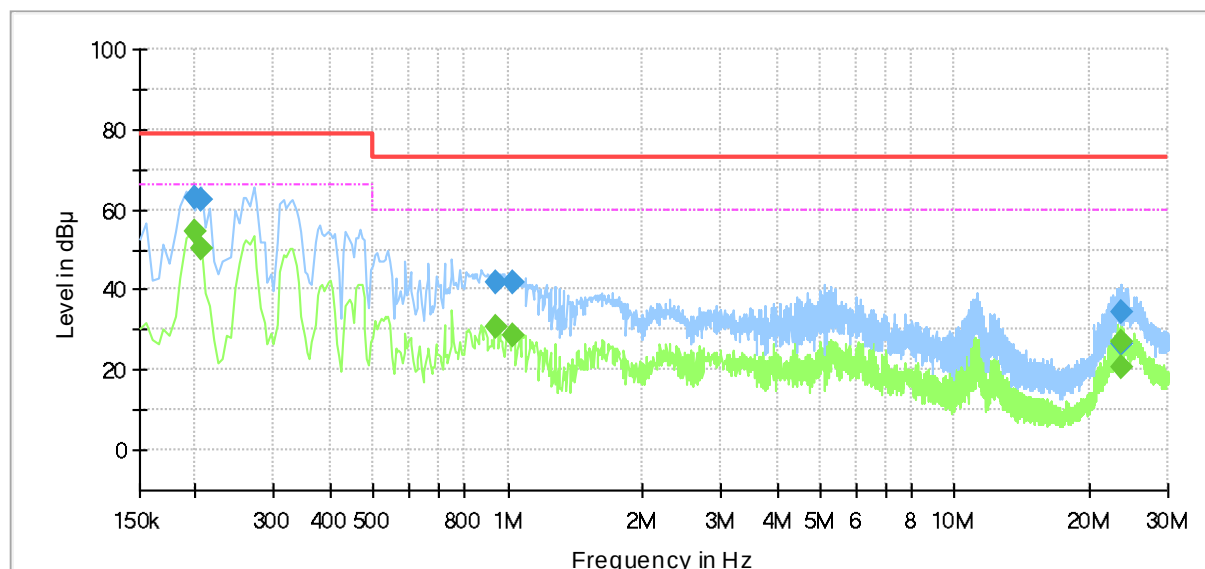
○ Test Date : 2025-09-01

● Test Mode : Mode 1

## Test Report

### Common Information

Test Description: Conducted Emission  
Job No.: KES-EM252986  
Phase: L  
Mode:  
Operator Name: KES



### Final\_Result

| Frequency (MHz) | QuasiPeak (dBμV) | CAverage (dBμV) | Limit (dBμV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.200000        | —                | 54.39           | 66.00        | 11.61       | 1000.0          | 9.000           | L1   | 19.5       |
| 0.200000        | 63.14            | —               | 79.00        | 15.86       | 1000.0          | 9.000           | L1   | 19.5       |
| 0.205000        | —                | 50.37           | 66.00        | 15.63       | 1000.0          | 9.000           | L1   | 19.5       |
| 0.205000        | 62.34            | —               | 79.00        | 16.66       | 1000.0          | 9.000           | L1   | 19.5       |
| 0.935000        | —                | 30.74           | 60.00        | 29.26       | 1000.0          | 9.000           | L1   | 19.6       |
| 0.935000        | 42.02            | —               | 73.00        | 30.98       | 1000.0          | 9.000           | L1   | 19.6       |
| 1.025000        | —                | 28.60           | 60.00        | 31.40       | 1000.0          | 9.000           | L1   | 19.6       |
| 1.025000        | 41.97            | —               | 73.00        | 31.03       | 1000.0          | 9.000           | L1   | 19.6       |
| 23.675000       | —                | 20.56           | 60.00        | 39.44       | 1000.0          | 9.000           | L1   | 20.5       |
| 23.675000       | 26.62            | —               | 73.00        | 46.38       | 1000.0          | 9.000           | L1   | 20.5       |
| 23.690000       | —                | 26.95           | 60.00        | 33.05       | 1000.0          | 9.000           | L1   | 20.5       |
| 23.690000       | 34.56            | —               | 73.00        | 38.44       | 1000.0          | 9.000           | L1   | 20.5       |



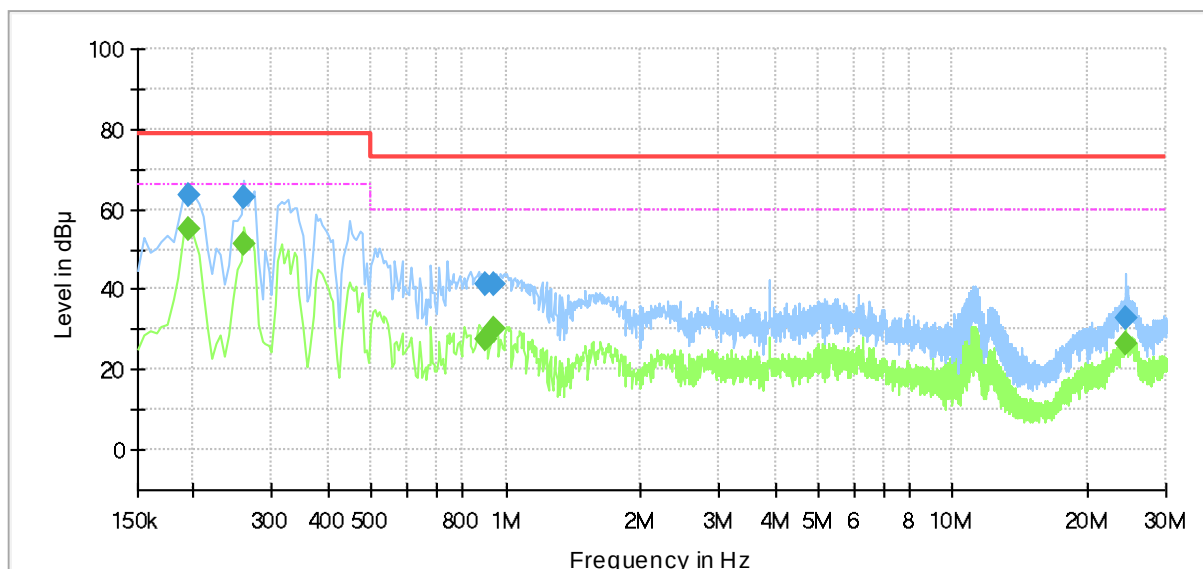
○ Test Date : 2025-09-01

● Test Mode : Mode 1

## Test Report

### Common Information

Test Description: Conducted Emission  
Job No.: KES-EM252986  
Phase: N  
Mode:  
Operator Name: KES



### Final\_Result

| Frequency (MHz) | QuasiPeak (dBμV) | CAverage (dBμV) | Limit (dBμV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.195000        | —                | 55.04           | 66.00        | 10.96       | 1000.0          | 9.000           | N    | 19.5       |
| 0.195000        | 63.71            | —               | 79.00        | 15.29       | 1000.0          | 9.000           | N    | 19.5       |
| 0.260000        | —                | 51.18           | 66.00        | 14.82       | 1000.0          | 9.000           | N    | 19.5       |
| 0.260000        | 62.74            | —               | 79.00        | 16.26       | 1000.0          | 9.000           | N    | 19.5       |
| 0.895000        | —                | 27.32           | 60.00        | 32.68       | 1000.0          | 9.000           | N    | 19.6       |
| 0.895000        | 41.27            | —               | 73.00        | 31.73       | 1000.0          | 9.000           | N    | 19.6       |
| 0.945000        | —                | 30.23           | 60.00        | 29.77       | 1000.0          | 9.000           | N    | 19.6       |
| 0.945000        | 41.39            | —               | 73.00        | 31.61       | 1000.0          | 9.000           | N    | 19.6       |
| 24.310000       | —                | 26.43           | 60.00        | 33.57       | 1000.0          | 9.000           | N    | 20.5       |
| 24.310000       | 32.96            | —               | 73.00        | 40.04       | 1000.0          | 9.000           | N    | 20.5       |

#### 6.1.5 Remark

Complies with the test requirements.



## 6.2 Radiated Emissions(Below 1 GHz)

### 6.2.1 Test Equipment

| Equipment Name                 | Model Number | Manufacturer    | Serial No. | Cal. Date  | Next Cal. Date | Used |
|--------------------------------|--------------|-----------------|------------|------------|----------------|------|
| SEMI ANECHOIC CHAMBER #4(10 m) | -            | DYMSTEC         | -          | -          | -              | ■    |
| EP5/RE Software                | EP5/RE       | TOYO            | 6.0.0      | -          | -              | ■    |
| EMI TEST RECEIVER              | ESU26        | Rohde & Schwarz | 100551     | 2025-02-13 | 2026-02-13     | ■    |
| AMPLIFIER                      | SCU 01       | Rohde & Schwarz | 100603     | 2024-11-06 | 2025-11-06     | ■    |
| BILOG ANTENNA                  | VULB 9168    | SCHWARZBEC K    | 9168-461   | 2024-05-09 | 2026-05-09     | ■    |
| ATTENUATOR                     | 6806.17.A    | HUBER+SUHNER    | -          | 2025-02-13 | 2026-02-13     | ■    |

6.2.2 Test Location : SEMI ANECHOIC CHAMBER #4(10 m) Measurement Distance : □ 3 m, ■ 10 m

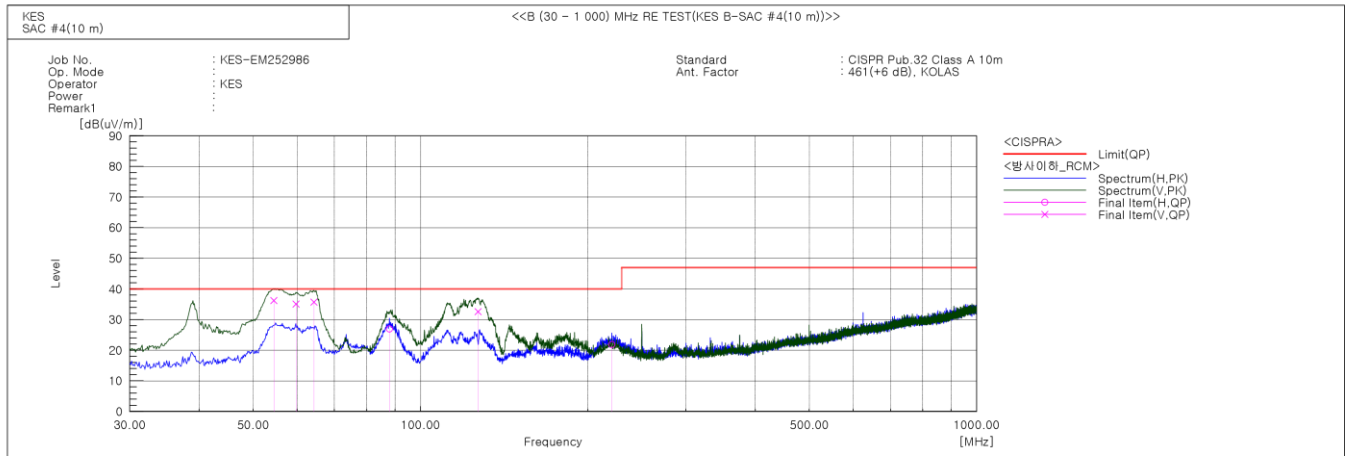
### 6.2.3 Test Conditions :

| Temperature      | Relative Humidity    |
|------------------|----------------------|
| (26.2 ~ 26.4) °C | (56.0 ~ 56.2) % R.H. |



## 6.2.4 Test Result

- Test Date : 2025-09-01
- Test Mode : Mode 1



### Final Result

| No. | Frequency [MHz] | (P) | Reading QP [dB(uV)] | c.f [dB(1/m)] | Result QP [dB(uV/m)] | Limit QP [dB(uV/m)] | Margin QP [dB] | Height [cm] | Angle [deg] | Remark |
|-----|-----------------|-----|---------------------|---------------|----------------------|---------------------|----------------|-------------|-------------|--------|
| 1   | 54.493          | V   | 57.2                | -21.0         | 36.2                 | 40.0                | 3.8            | 141.0       | 220.0       |        |
| 2   | 59.706          | V   | 56.5                | -21.4         | 35.1                 | 40.0                | 4.9            | 155.0       | 213.0       |        |
| 3   | 64.314          | V   | 57.5                | -21.8         | 35.7                 | 40.0                | 4.3            | 100.0       | 354.0       |        |
| 4   | 87.958          | H   | 53.1                | -26.2         | 26.9                 | 40.0                | 13.1           | 335.0       | 133.0       |        |
| 5   | 126.879         | V   | 54.2                | -21.6         | 32.6                 | 40.0                | 7.4            | 111.0       | 277.0       |        |
| 6   | 220.848         | H   | 43.1                | -21.3         | 21.8                 | 40.0                | 18.2           | 319.0       | 175.0       |        |

※ The data is the result measured by the detector in Quasi-Peak mode on the Peak graph.

## 6.2.5 Remark

Complies with the test requirements.



## 7 Test Setup Photos and EUT Photographs

### 7.1 Test Setup Photos

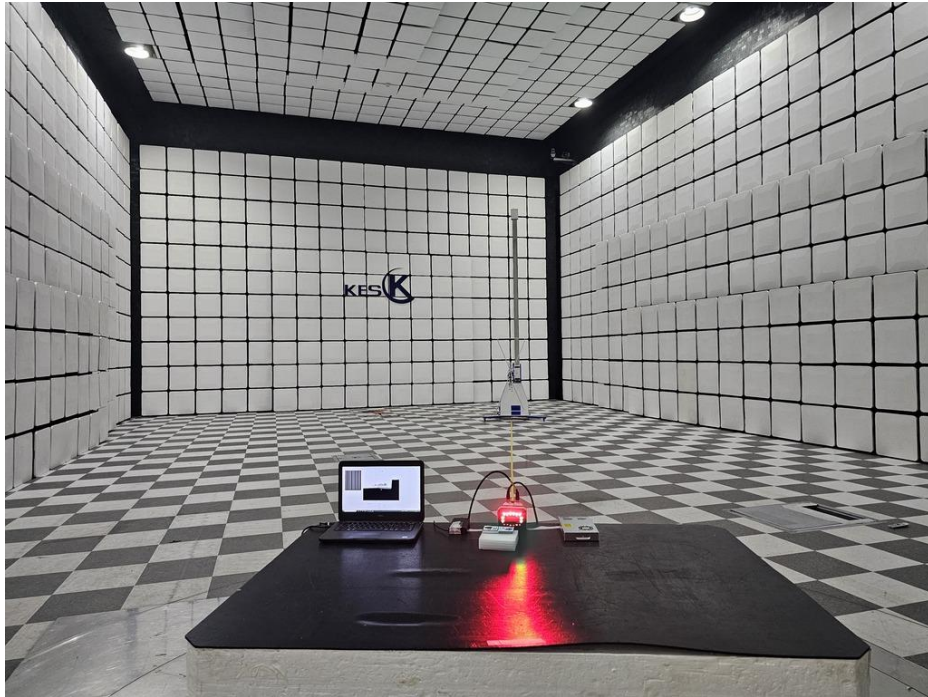


<Conducted Emissions at Mains Power Ports - Front>



<Conducted Emissions at Mains Power Ports - Rear>





<Radiated Emissions(Below 1 GHz) - Front>



<Radiated Emissions(Below 1 GHz) - Rear>



## 7.2 EUT Photographs



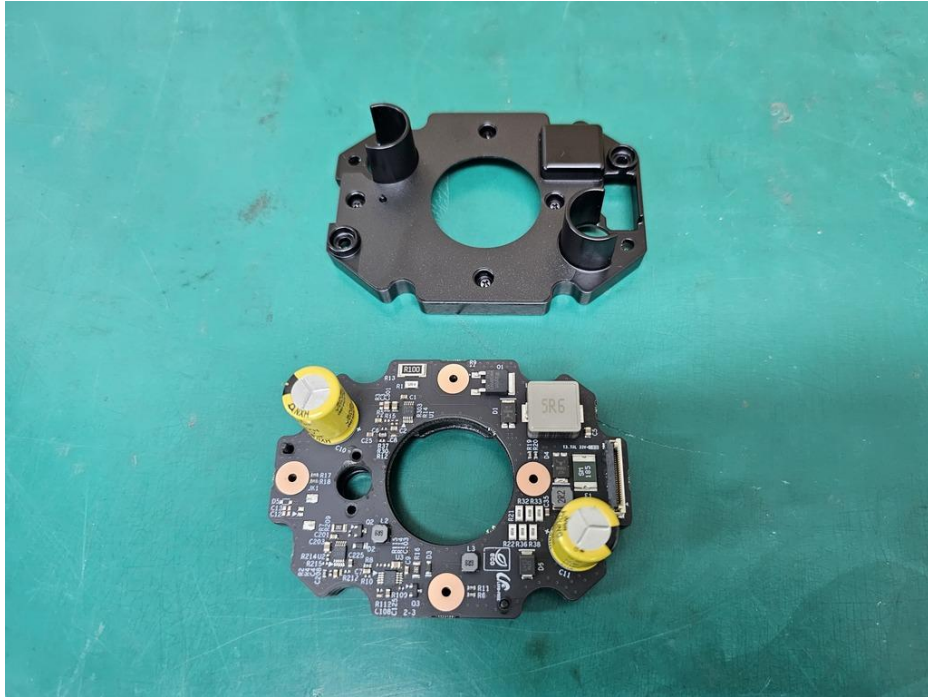
<EUT External Photographs - Top>



<EUT External Photographs - Bottom>



<Port>



<EUT Internal Photographs>





### 7.3 Label



Name : Hanwha Vision Co., Ltd.  
Product item : LED MODULE  
Model name : SPI-BRN0

The End.

