TEST REPORT

KES Co., Ltd.
#3002, #3503, #3701, 40, Simin-daero365beon-gil, Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Republic of Korea
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-BBN0
◯ Variant model	:	SPI-BBM0, SPI-BBM1, SPI-BBW0
◯ 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. 03. ~ 2025. 09. 03.

4. Location of Test : Permanent Testing Lab

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

5. Test method used : FCC 47 CFR Part 15, Subpart B (ANSI C63.4a-2017),
IC ICES-003 Issue 7 (ANSI C63.4a-2017)

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 : SeongMin Jang [장성민]2025/10/22	Name : DongHun Jang [장동훈]2025/10/22

2025. 10. 22

KES Co., Ltd.

REPORT REVISION HISTORY

Date	Test Report No.	Revision History
2025. 09. 09	KES-EM252990	Issued
2025. 10. 22	KES-EM252990-R1	Reissue due to addition of derivative models

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

■ No decision rule is specified by the1 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)

TABLE OF CONTENTS

1 Laboratory Information

1.1 Test Location

Category	Details
Addres	473-21, Gayeo-ro, Yeoju-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, Yeoju-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) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	KR0100
International	**KOLAS**	EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	KT489
USA	**FCC**	3 m & 10 m Semi-Anechoic Chamber Conducted test site to perform FCC Part 15/18 measurements.	KR0100
Canada	**ISED**	3 m & 10 m Semi-Anechoic Chamber and Conducted test site	23298
JAPAN	**VCCI**	EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site)	C-20136, T-20137, R-20181, G-20176
Europe	**TÜV SÜD**	EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	CARAT 001633 0008

2 Test Summary

2.1 Class and Voltage

Test Class	Test Voltage
Class A	AC 120 V, 60 Hz

2.2 Summary of Test Results

Regulation
47 CFR Part 15, Subpart B, ICES-003 Issue 7

Test Item	Test Standard	Test Result	Remark
Conducted Emissions at Mains Power Ports	ANSI C63.4a-2017	PASS	-
Radiated Emissions(Below 1 ㎓)		PASS	-
Radiated Emissions(Above 1 ㎓)		PASS	NOTE 1

* N/A: Not Applicable

(NOTE 1)This test equipment has an internal maximum operating frequency of 108 MHz or less, so it is not applicable.

2.3 Remarks when standards applied

N/A

2.4 Variant Model Differences

Differences in LED Lenses for Wide Angle Adjustment (Basic model : SPI-BBN0 : divergence angle 12°)
SPI-BBM0 : divergence angle 25°
SPI-BBM1 : divergence angle 43°
SPI-BBW0 : divergence angle 60°

2.5 Device Modifications

N/A

3 General Product Description

Division		Specificity
Internal maximum operating frequency		120 Hz
Power	Rated power supply	DC 24 V
	Test Power	AC 120 V, 60 Hz
I/O Ports	User port	LED DRIVER
	Unused/Administrator Port	N/A
function	Product features	LED MODULE
	Wireless function	N/A
Components		Main body
Others		Please refer to the specifications listed below.

Model	SPI-BBN0
Electrical Input	24 VDC ± 10%
Max. Power Consumption	6.9 W
Wavelength	455nm
LED Quantity	16EA
Angle	FWHM : 12° 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, IEC 62471

4 EUT Setup and Operation Mode

4.1 EUT Configuration

Product Name	Model Number	Serial Number	Manufacturer	Remarks
LED MODULE	SPI-BBN0	-	HANWHA VISION VIETNAM CO MPANY LIMITED	EUT
BARCODE READER	TNS-7000M	-	HANWHA VISION VIETNAM CO MPANY LIMITED	-
Power Supply	LRS-350-24	-	MEAN WELL	-
Laptop	NT550XDZ	-	SAMSUNG	-
Laptop Adaptor	A13-040N2A	-	CHICONY POWER TECHNOLOGY (Chongqing) CO., LTD.	-

4.2 System Configuration

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

4.3 External I/O Cabling

Start		End		Cable Spec.	
Product Name	**I/O Port**	**Product Name**	**Product Name**	**I/O Port**	**Product Name**
LED MODULE (EUT)	LED DRIVER	BARCODE READER	LED DRIVER	-	-

* Unshielded=U, Shielded=S

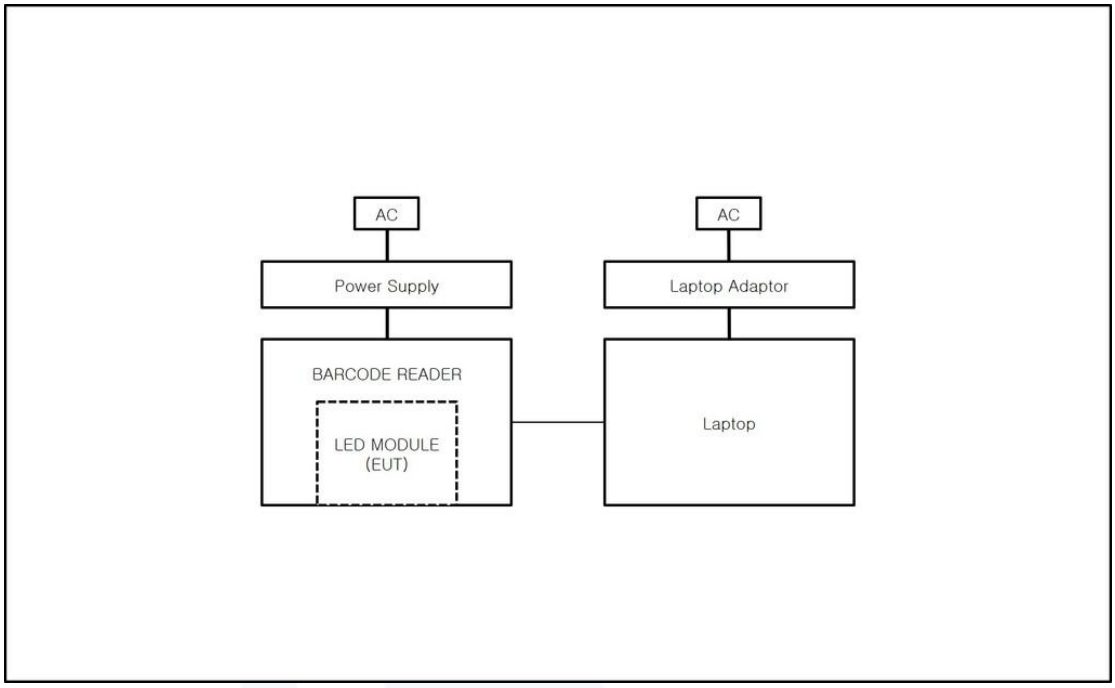
4.4 EUT Operating Mode(s)

Category	Mode	Operating
Mode 1	Operation	The test equipment was connected to the laptop through the BARCODE READER, and proper operation was verified via Web Viewer.

4.5 Test operating S/W

Name	Version	Manufacture Company
-	-	-

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 ㎑ to 30 ㎒. 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 ㎓ at 10 m or 3 m distance and a Peak and Average detector above 1 ㎓ 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 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

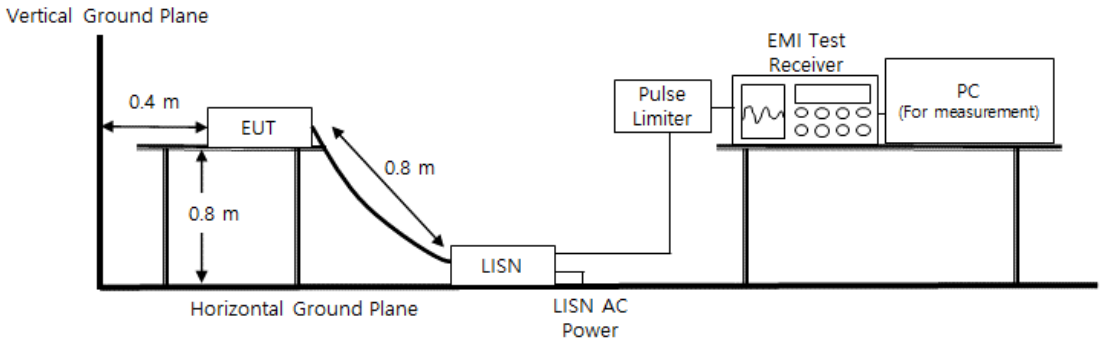
Equipment Name	Model Number	Manufacturer	Serial No.	Cal. Date	Next Cal. Date	Used
SHIELD ROOM #6	-	DYMSTEC	-	-	-	■
EMC32 Measurement Software	EMC32	R&S	9.12.00	-	-	■
EMI TEST RECEIVER	ESR3	Rohde & Schwarz	101783	2024-11-06	2025-11-06	■
LISN	ENV216	Rohde & Schwarz	101786	2025-01-09	2026-01-09	■
ARTIFICIAL 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
(24.6 ~ 24.7) °C	(58.3 ~ 58.3) % R.H.

6.1.4 Diagram of test setup



6.1.5 Test Result

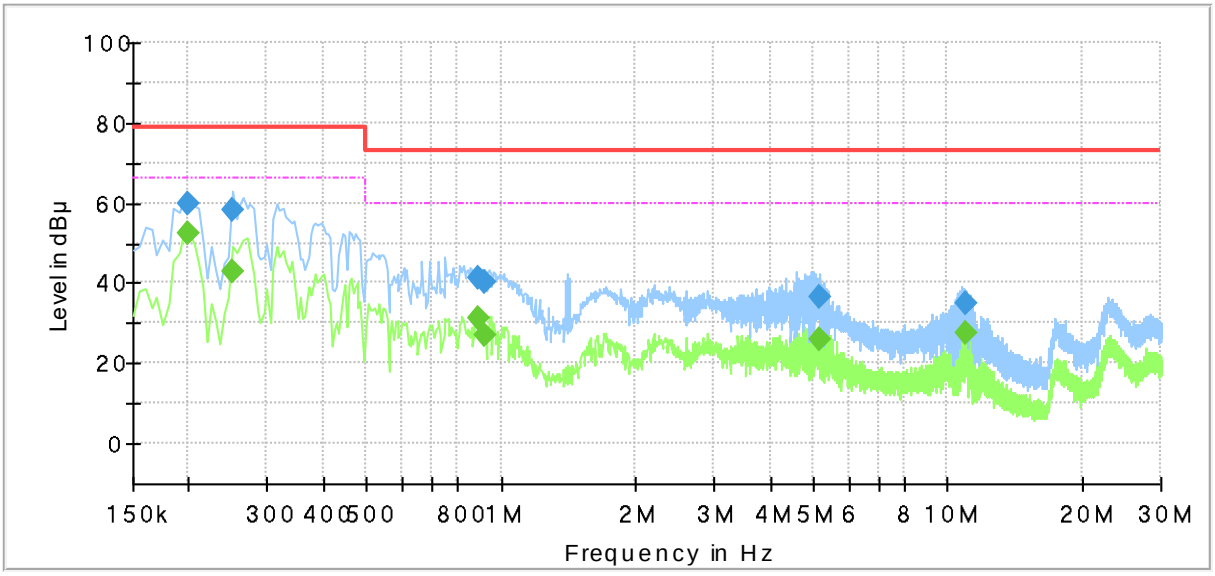
○ Test Date : 2025-09-03

● Test Mode : Mode 1

Test Report

1 / 1

Test Description:	Conducted Emission
Job No.:	KES-EM252990
Phase:	L
Mode:	
Operator Name:	KES



Final_Result

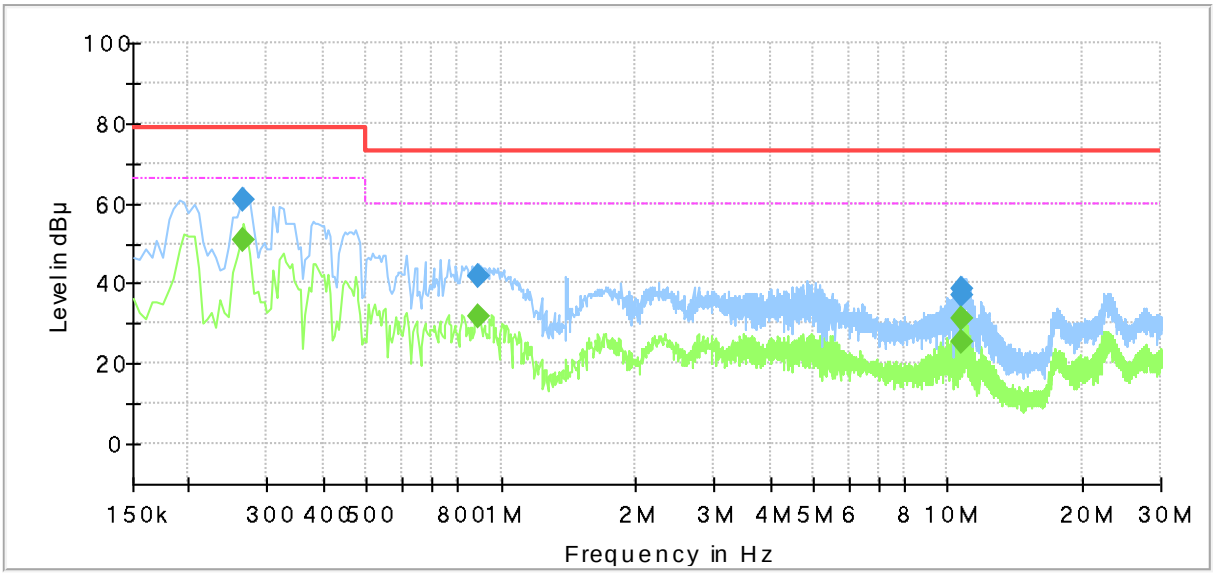
Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.200000	---	52.58	66.00	13.42	1000.0	9.000	L1	19.5
0.200000	59.91	---	79.00	19.09	1000.0	9.000	L1	19.5
0.250000	---	42.74	66.00	23.26	1000.0	9.000	L1	19.5
0.250000	58.05	---	79.00	20.95	1000.0	9.000	L1	19.5
0.890000	---	31.25	60.00	28.75	1000.0	9.000	L1	19.6
0.890000	41.45	---	73.00	31.55	1000.0	9.000	L1	19.6
0.915000	---	27.09	60.00	32.91	1000.0	9.000	L1	19.6
0.915000	40.39	---	73.00	32.61	1000.0	9.000	L1	19.6
5.180000	---	25.89	60.00	34.11	1000.0	9.000	L1	19.9
5.180000	36.60	---	73.00	36.40	1000.0	9.000	L1	19.9
10.955000	---	27.49	60.00	32.51	1000.0	9.000	L1	20.1
10.955000	34.99	---	73.00	38.01	1000.0	9.000	L1	20.1

○ Test Date : 2025-09-03
● Test Mode : Mode 1

Test Report

1 / 1

Test Description: Conducted Emission
Job No.: KES-EM252990
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)
0.265000	---	50.95	66.00	15.05	1000.0	9.000	N	19.5
0.265000	60.71	---	79.00	18.29	1000.0	9.000	N	19.5
0.890000	---	31.88	60.00	28.12	1000.0	9.000	N	19.6
0.890000	42.01	---	73.00	30.99	1000.0	9.000	N	19.6
10.755000	---	31.25	60.00	28.75	1000.0	9.000	N	20.0
10.755000	38.48	---	73.00	34.52	1000.0	9.000	N	20.0
10.770000	---	25.21	60.00	34.79	1000.0	9.000	N	20.0
10.770000	37.12	---	73.00	35.88	1000.0	9.000	N	20.0

6.1.6 Remark

Complies with the test requirements.

6.2 Radiated Emissions(Below 1 ㎓)

6.2.1 Test Equipment

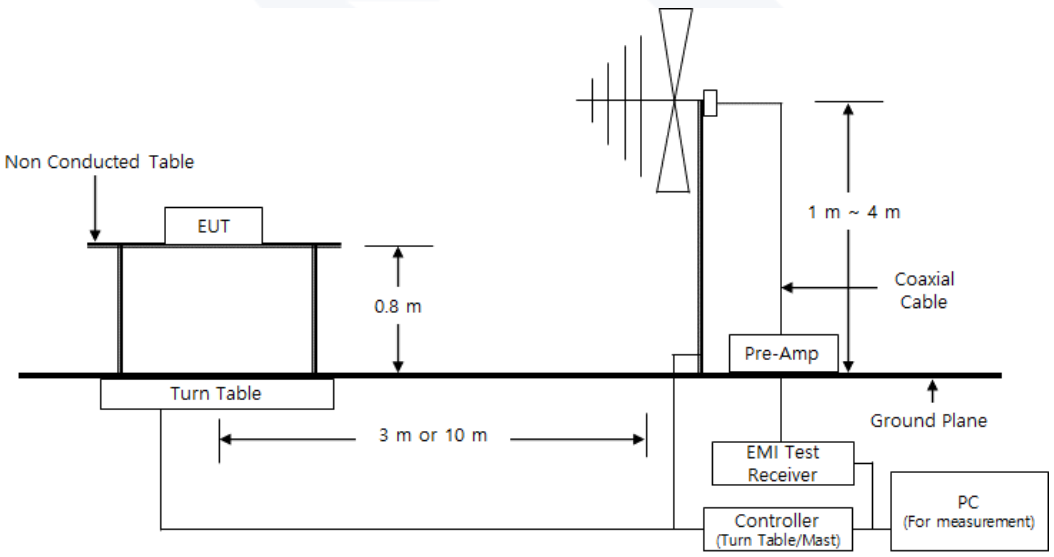
Equipment Name	Model Number	Manufacturer	Serial No.	Cal. Date	Next Cal. Date	Used
SEMI ANECHOIC CHAMBER #4(10 m)	-	DYMSTEC	-	-	-	■
EP5/RE Software	EP5/RE	TOYO	6.0.0	-	-	■
EMI TEST RECEIVER	ESU26	Rohde & Schwarz	100551	2025-02-13	2026-02-13	■
AMPLIFIER	SCU 01	Rohde & Schwarz	100603	2024-11-06	2025-11-06	■
BILOG ANTENNA	VULB 9168	SCHWARZBECK	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
(26.5 ~ 26.7) °C	(53.3 ~ 53.4) % R.H.

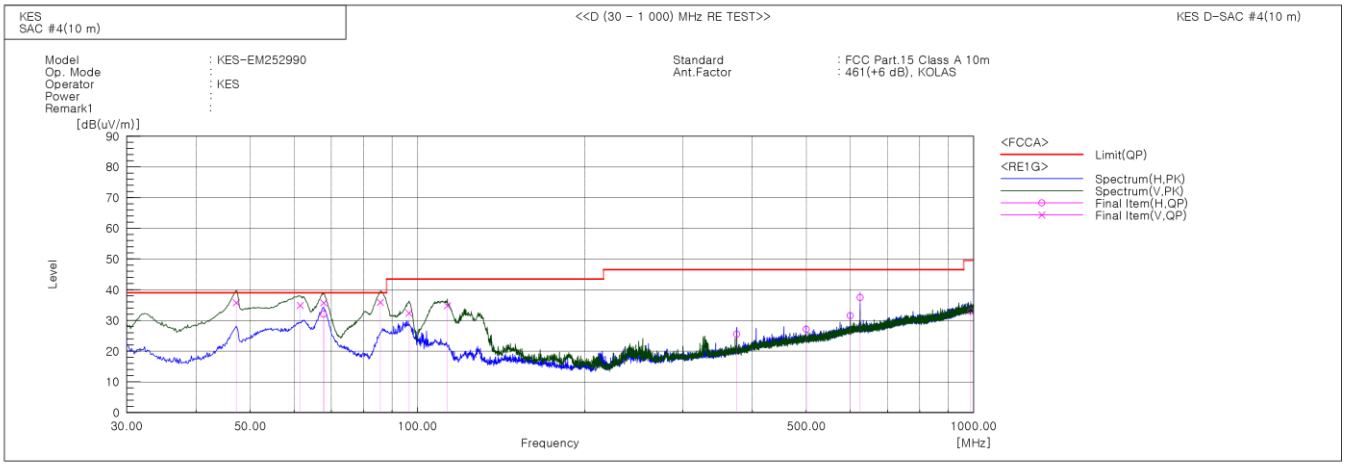
6.2.4 Diafram of test setup



6.2.5 Test Result

○ Test Date : 2025-09-03

● Test Mode : FCC



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	47.218	V	56.9	-21.1	35.8	39.0	3.2	399.0	109.0	
2	61.525	V	56.4	-21.5	34.9	39.0	4.1	102.0	14.0	
3	67.709	H	54.4	-22.3	32.1	39.0	6.9	201.0	20.0	
4	67.830	V	58.0	-22.3	35.7	39.0	3.3	113.0	317.0	
5	85.775	V	62.1	-26.2	35.9	39.0	3.1	101.0	287.0	
6	96.566	V	57.9	-25.5	32.4	43.5	11.1	111.0	250.0	
7	113.178	V	58.0	-23.2	34.8	43.5	8.7	100.0	169.0	
8	374.956	H	40.1	-14.6	25.5	46.5	21.0	224.0	111.0	
9	500.086	H	37.3	-10.2	27.1	46.5	19.4	200.0	141.0	
10	599.996	H	38.6	-7.0	31.6	46.5	14.9	100.0	342.0	
11	624.974	H	44.0	-6.5	37.5	46.5	9.0	199.0	24.0	
12	987.633	H	33.0	0.0	33.0	49.5	16.5	121.0	342.0	

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

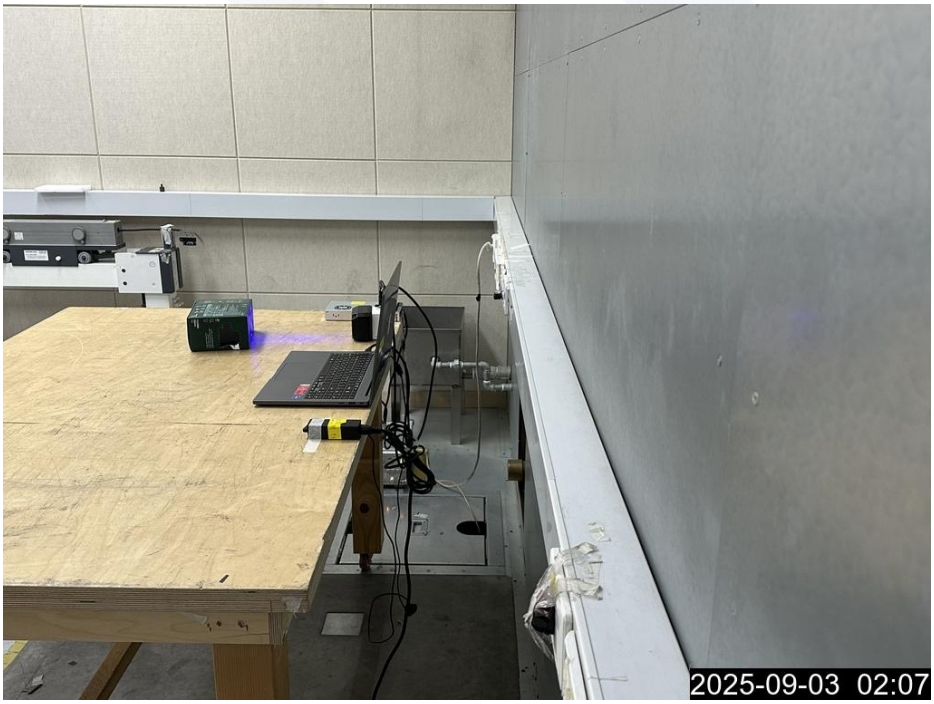
6.2.6 Remark

Complies with the test requirements.

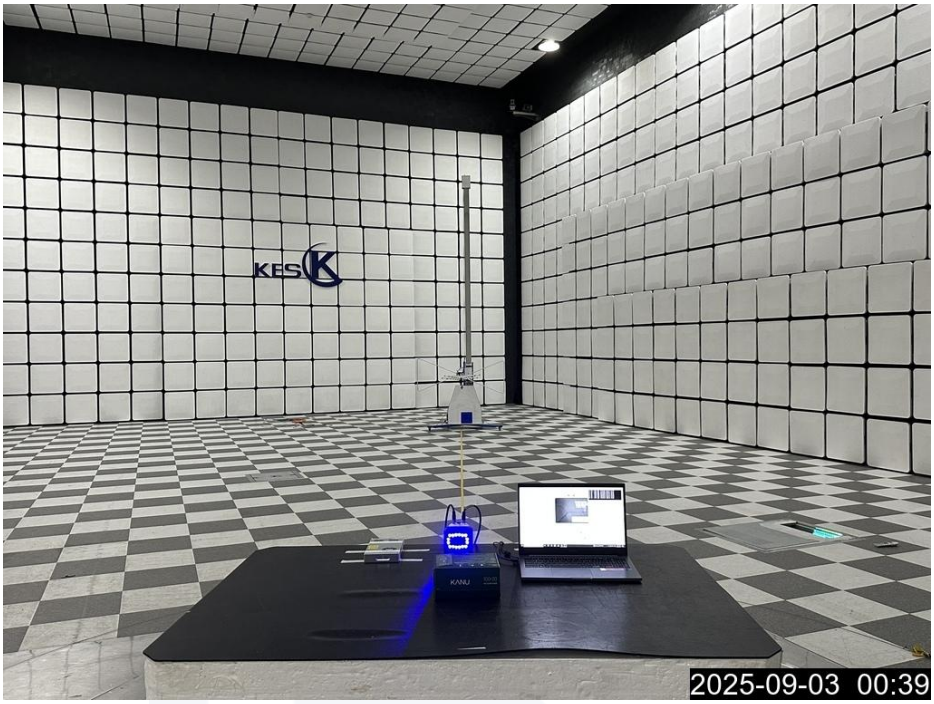
7 Test Setup Photos and EUT Photographs

7.1 Test Setup Photos

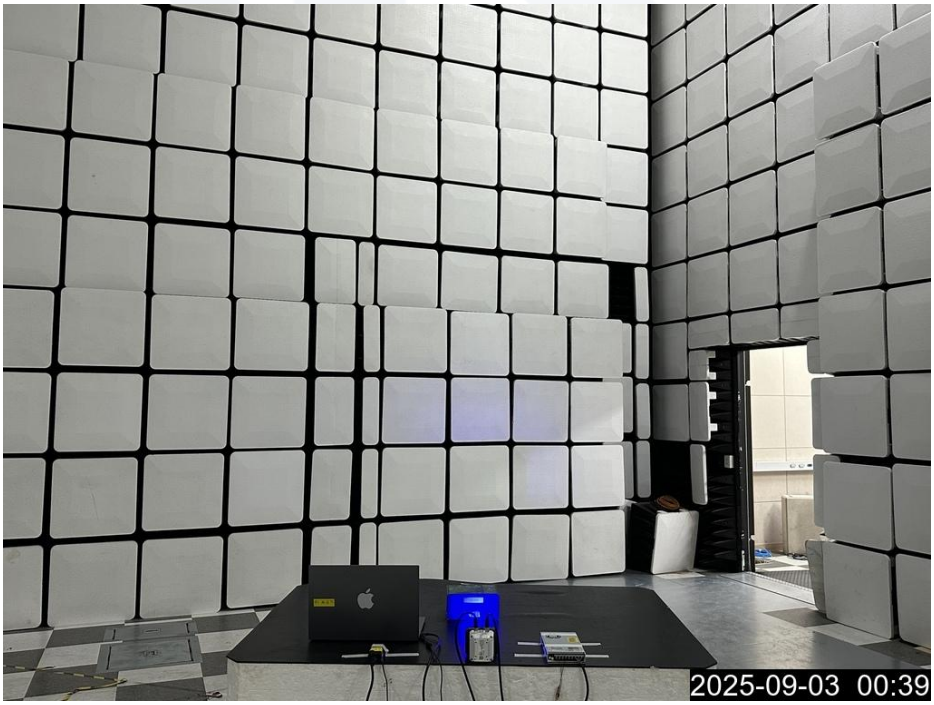
<Conducted Emissions at Mains Power Ports - Front>



<Conducted Emissions at Mains Power Ports - Rear>

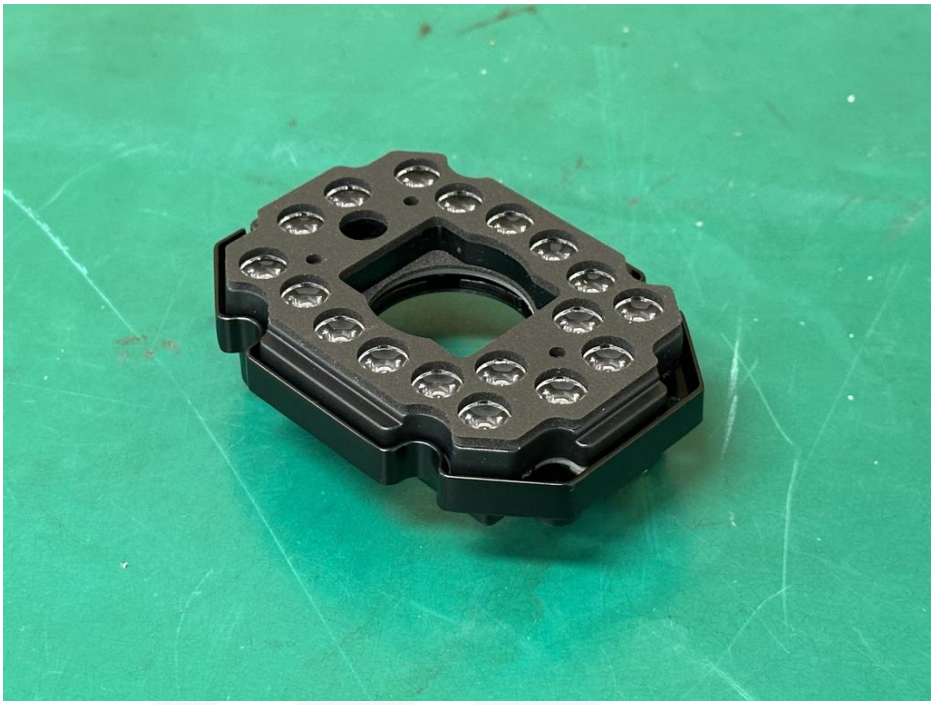


<Radiated Emissions(Below 1 ㎓) - Front>

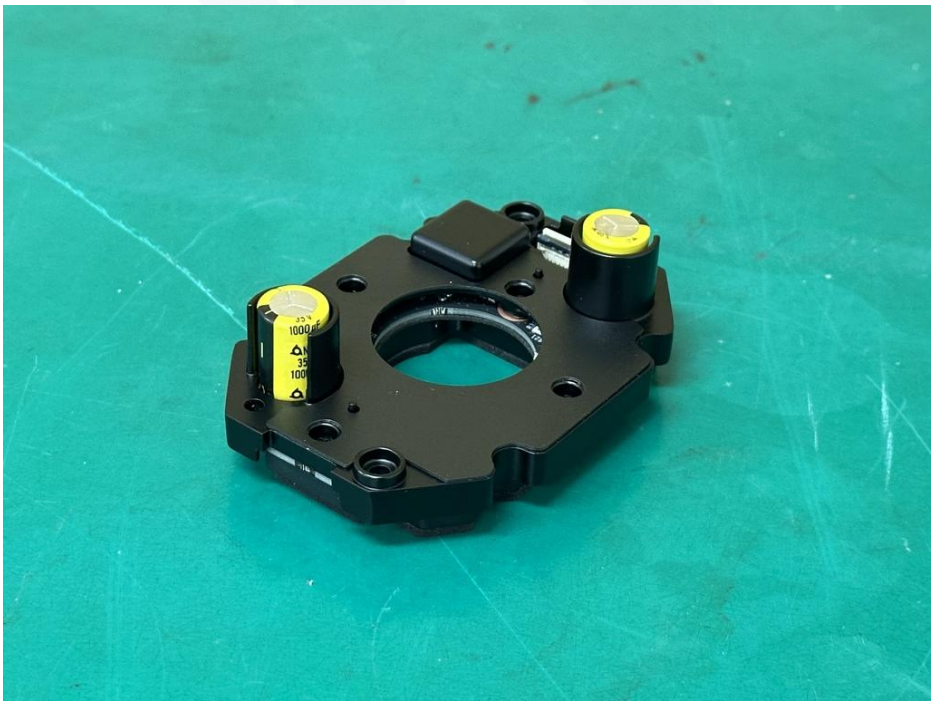


<Radiated Emissions(Below 1 ㎓) - Rear>

7.2 EUT Photographs

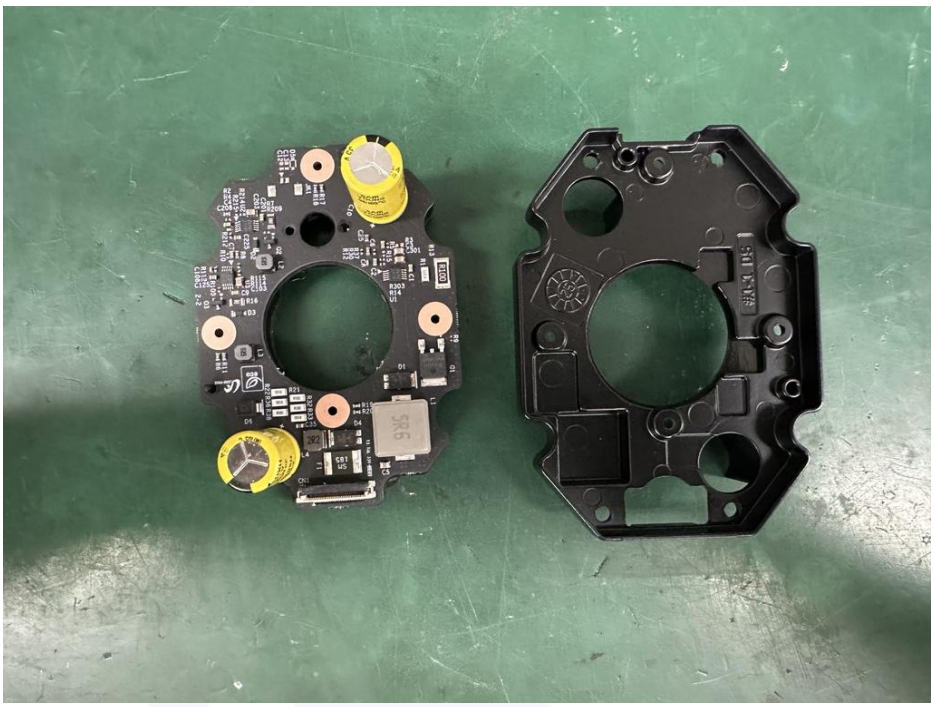


<EUT External Photographs - Top>



<EUT External Photographs - Bottom>

<Port>



<EUT Internal Photographs>

7.3 Label

	Name	: Hanwha Vision Co., Ltd.
	Product item	: LED MODULE
	Model name	: SPI-BBN0
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.		

The above label is only an example. The specific format is left to the manufacturer to decide, as long as the label includes the required information, in accordance with ICES-Gen. The requirements specified in ICES-Gen shall apply. An example ISED compliance label, to be placed on each unit of an equipment model (or in the user manual, if allowed), is given below:

The End.