

**KES Co., Ltd.**

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www.kes.co.kr

Report No.:

KES-EM-22T0715-R1

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EMC TEST REPORT

Test Report No. : KES-EM-22T0715-R1

Date of Issue : Feb. 24, 2023

Product name : LENS MODULE

Model/Type No. : SLA-T2880BA

Variant Model : -

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 : Aug. 11, 2022

Test date : Aug. 13, 2022 ~ Aug. 14, 2022

Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Eun-Gu, Jeon
EMC Test Engineer

Reviewed by

Dong-Hun, Jang
EMC Technical Manager

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

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REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Aug. 23, 2022	KES-EM-22T0715	Issued
Feb. 24, 2023	KES-EM-22T0715-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:

Video	
Imaging Device	1/2.8" 2M CMOS
Resolution	None
Max. Frame Rate	None
NETD	None
Pixel Size	None
Min. Illumination	(TBD) Color: 0.035Lux(F2.0) BW: 0.035Lux(F2.0) * with PNM-9000GB, XNB-6002
Video Out	None
Video Transmission Distance	None
Lens	
Focal Length (Zoom Ratio)	2.8mm fixed
Max. Aperture Ratio	F2.0
Angular Field of View	H : 107.4° V : 62.2° D : 123.0°
Min. Object Distance	0.5m(1.64ft)
Focus Control	Fixed
Lens Type	None
Mount Type	R12 connected with main unit
Optional Lens	None
Pan / Tilt / Rotate	
Pan / Tilt / Rotate Range	None
Pan Range	None
Pan Speed	None
Tilt Range	None
Tilt Speed	None
Rotate Range	None
Sequence	None
Preset Accuracy	None
Operational	
Camera Title	None
Direction Indicator	None
Day & Night	None
Backlight Compensation	None
Wide Dynamic Range	None
Digital Noise Reduction	None
Digital Image Stabilization	None
Defog	None
Motion Detection	None
Privacy Masking	None
Gain Control	None
White Balance	None
LDC	None
Electronic Shutter Speed	None
Digital PTZ	None
Video Rotation	None
Analytics	None
Business Intelligence	None
Serial Interface	None
Alarm I/O	None
Alarm Triggers	None
Alarm Events	None
Audio Streaming	None
Audio In	None
Audio Out	None
IR Viewable Length	None
IR Illuminator (Optional)	None
IR Radiation angle	None
IR LED	None

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IR Wavelength	None
IR Operation	None
Water Removal	None
Auto Tracking	None
Coaxial Protocol	None
Color Palettes	None
Radiometry	
Temperature Detect Range	None
Temperature Accuracy	None
Temperature Detection	None
Additional	None
Network	
Ethernet	None
Video Compression	None
Audio Compression	None
Smart Codec	None
Video Quality Adjustment	None
Bitrate Control	None
Streaming	None
Protocol	None
SIP support (VoIP, Peer-to-peer, SIP/F)	None
Security	None
Application Programming Interface	None
General	
Webpage Language	None
Web Viewer	None
Edge Storage	None
Memory	None
Environmental & Electrical	
Operating Temperature / Humidity	10°C ~ +55°C (+14°F ~ +131°F) / Less than 90% RH
Storage Temperature / Humidity	50°C ~ +60°C (+58°F ~ +140°F) / Less than 90% RH
Certification	None
Input Voltage	None
Power Consumption	None
Mechanical	
Color / Material	Housing : Black / Plastic, Aluminum Lens : Black / Plastic, Aluminum
RAL Code	None
Product Dimensions / Weight	(TBD) Housing : 66.5(W)x46.0(H)x175.0~737.0(D)mm(2.6"x1.8"x6.9~29.0"), 250~1,000g(0.55~2.205lb) Lens : 30(W)x27.9(H)x45(D)mm(1.18"x1.10"x1.77"), 321g(0.71lb) Cable : 8m(26ft)
Compatible Conduit hole / Gangbox	None
Hanging Mount (Dome)	None
Skin Cover	None
Skin Cover (Dome)	None
Weather Cap (Dome)	None
Power Module	None
Backbox	None
Certifications & Standards	
Network	None
EMC	None
Safety	None
Environment	None
Video	None
DORI (EN62676-4 standard)	
Detect (25PPM/ 8PPF)	None
Observe (53PPM/ 19PPF)	None
Recognize (125PPM/ 38PPF)	None
Identify (250PPM/ 76PPF)	None

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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

Not applicable

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
LENS MODULE	SLA-T2880BA	-	HANWHA VISION VIETNAM COMPANY LIMITED	EUT

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
NETWORK CAMERA	PNM-9000QB	-	HANWHA VISION VIETNAM COMPANY LIMITED	-
AC/DC Adapter	2ACB022F	-	Channel Well Technology (Guangzhou) Co., Ltd.	-
Monitor	SMT-2232	C95V67VF900025 B	Weihai Daewoo Electronics Co., Ltd.	-

1.6 External I/O Cabling

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
LENS MODULE (EUT)	RJ-12	NETWORK CAMERA	RJ-12	8.0	S
NETWORK CAMERA	HDMI	Monitor	HDMI	1.6	S
NETWORK CAMERA	DC Jack (2 Pin)	AC/DC Adapter	DC Jack (2 Pin)	0.8	U

* Unshielded=U, Shielded=S

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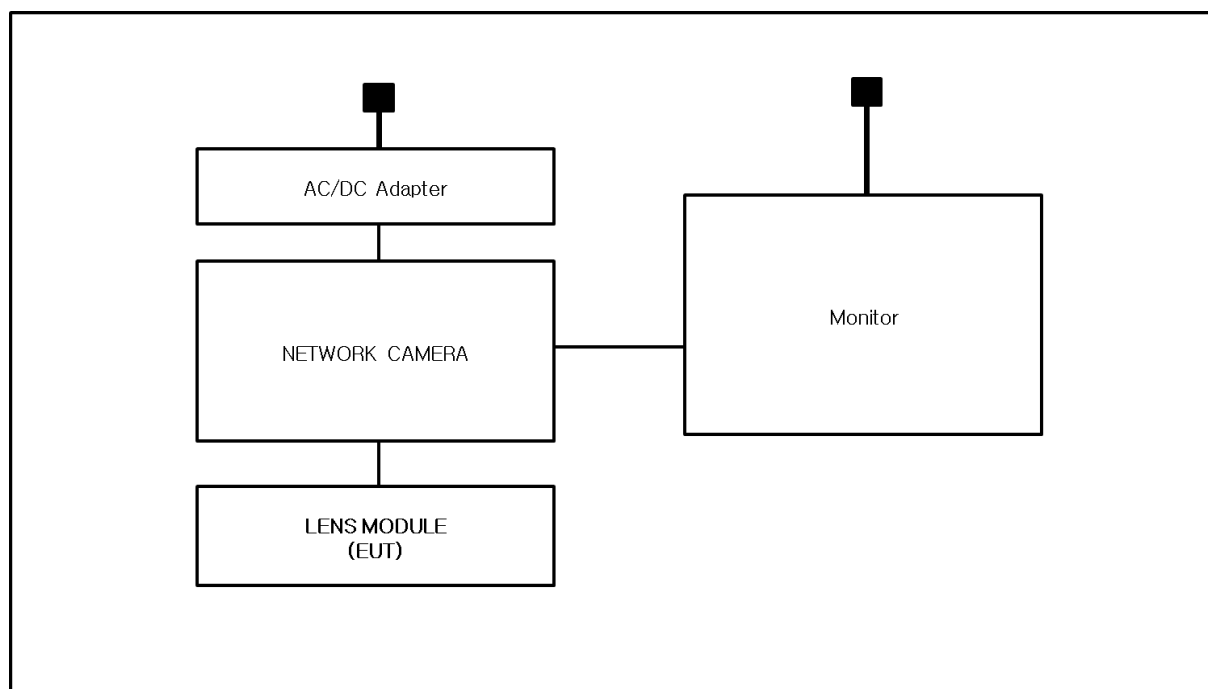
1.7 EUT Operating Mode(s)

Test Mode	operating
Operating	The normal operating state of Monitor was confirmed through EUT.

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

1.8 Configuration

■ AC Main
 □ DC Main



1.9 Remarks when standards applied

N/A

1.10 Calibration Details of Equipment Used for Measurement

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

1.11 Test Facility

The measurement facility is located at 473-21, Gayeo-ro, Yeosu-si, Gyeonggi-do, 12658, Korea, 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) 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 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

Aug. 14, 2022

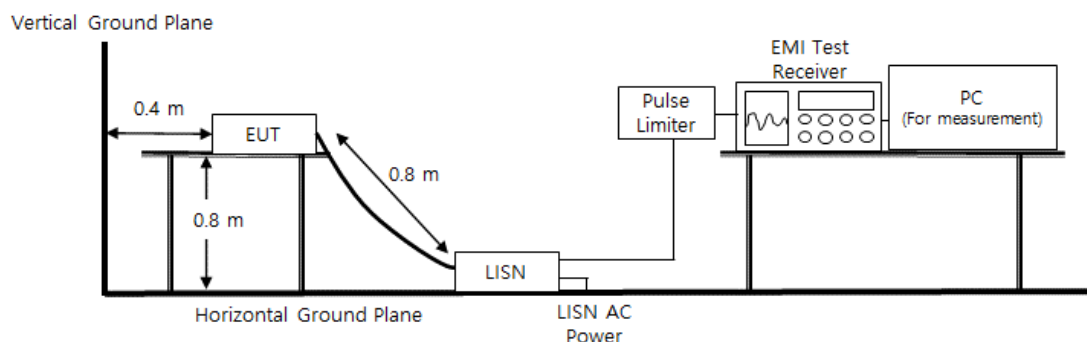
Test Location

Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EMC32	R & S	9.12.00	-
☒	EMI TEST RECEIVER	ESR3	R & S	101783	12, 28, 2022
☒	LISN	ENV216	R & S	101787	12, 27, 2022
☒	LISN	ESH2-Z5	R & S	100450	12, 27, 2022
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	12, 27, 2022

Diagram of test setup





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Test Conditions

Temperature: (24,3 ± 0,1) °C

Relative Humidity: (47,3 ± 0,1) % R.H.

Frequency Range of Measurement

150 kHz to 30 MHz

Instrument Settings

IF Band Width: 9 kHz

Test Results

The requirements are:

- ☒ PASS
- ☐ NOT PASS
- ☐ NOT APPLICABLE

Remarks

See Appendix A for test data.

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2.2 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Aug. 13, 2022

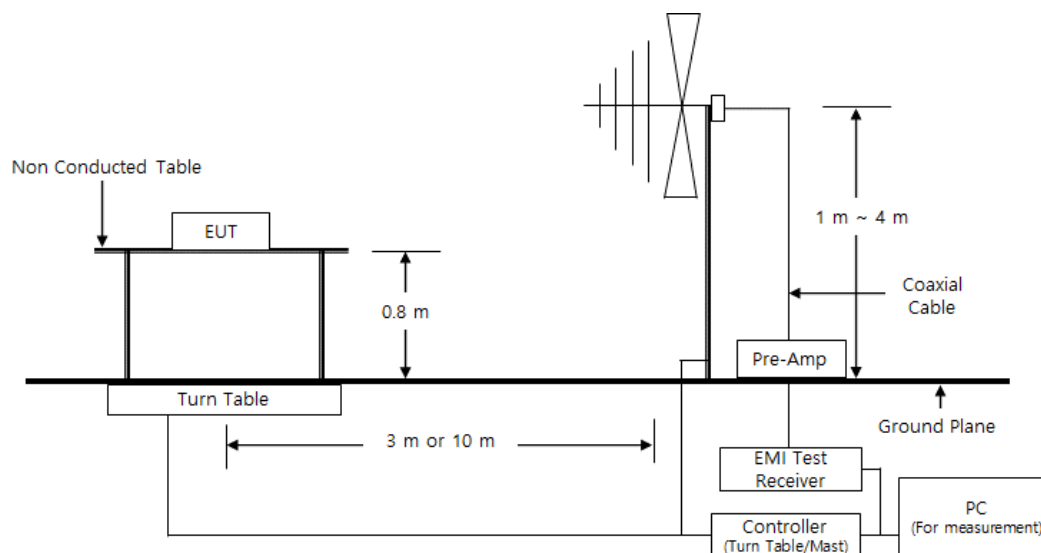
Test Location

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

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.0	-
☒	EMI TEST RECEIVER	ESU26	R & S	100551	03, 31, 2023
☒	AMPLIFIER	SCU 01	R & S	100603	11, 24, 2022
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	12, 08, 2022
☒	ATTENUATOR	8491A	HP	32173	03, 08, 2023

Diagram of test setup





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Test Conditions

Temperature: (24,7 ± 0,1) °C

Relative Humidity: (45,3 ± 0,2) % 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.

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2.3 Radiated Electric Field Emissions(Above 1 GHz)

Test Date

Aug. 13, 2022

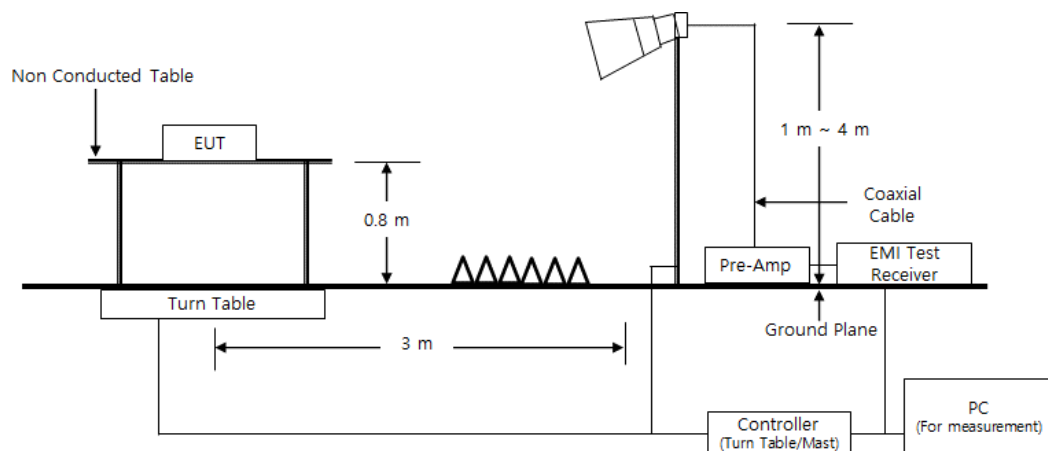
Test Location

SEMI ANECHOIC CHAMBER #4(10 m)

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.0	-
☒	EMI TEST RECEIVER	ESU26	R & S	100551	03, 31, 2023
☒	PREAMPLIFIER	8449B	AGILENT	3008A01742	12, 27, 2022
☒	HORN ANTENNA	BBHA 9120D	SCHWARZBECK	9120D-1802	12, 16, 2022

Diagram of test setup





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Test Conditions

Temperature: (24,8 ± 0,2) °C

Relative Humidity: (45,1 ± 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

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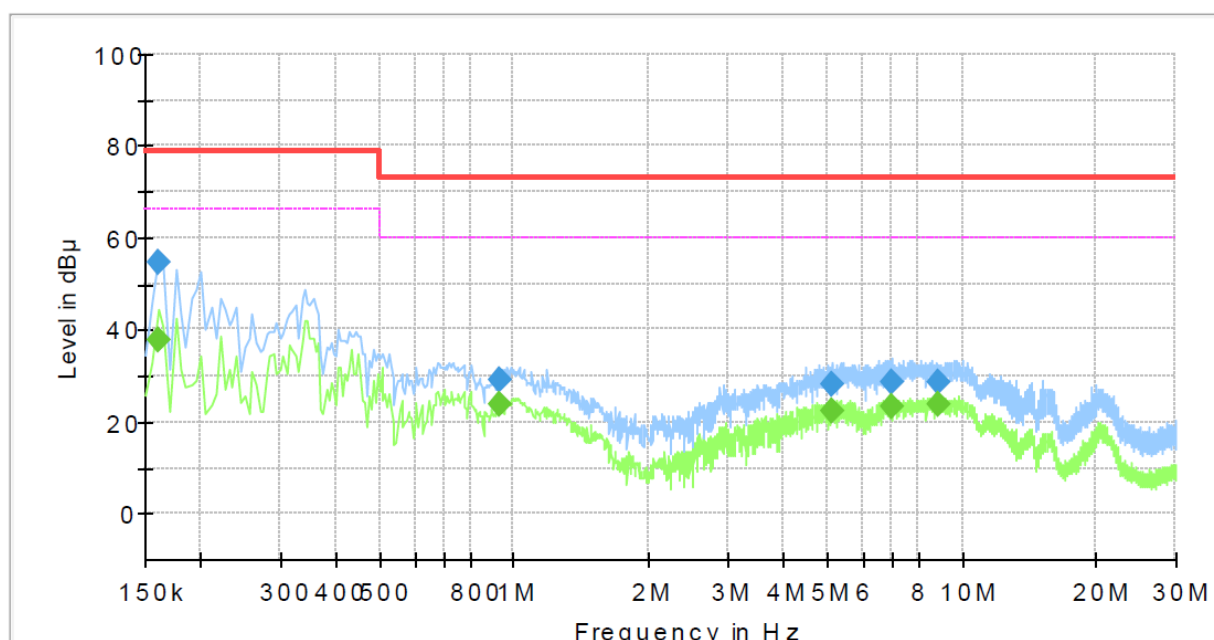
APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

HOT LINE

Common Information

Test Description: Conducted Emission
 Model No.: SLA-T2880BA
 Phase: L1
 Mode:
 Operator Name: KES



Final Result

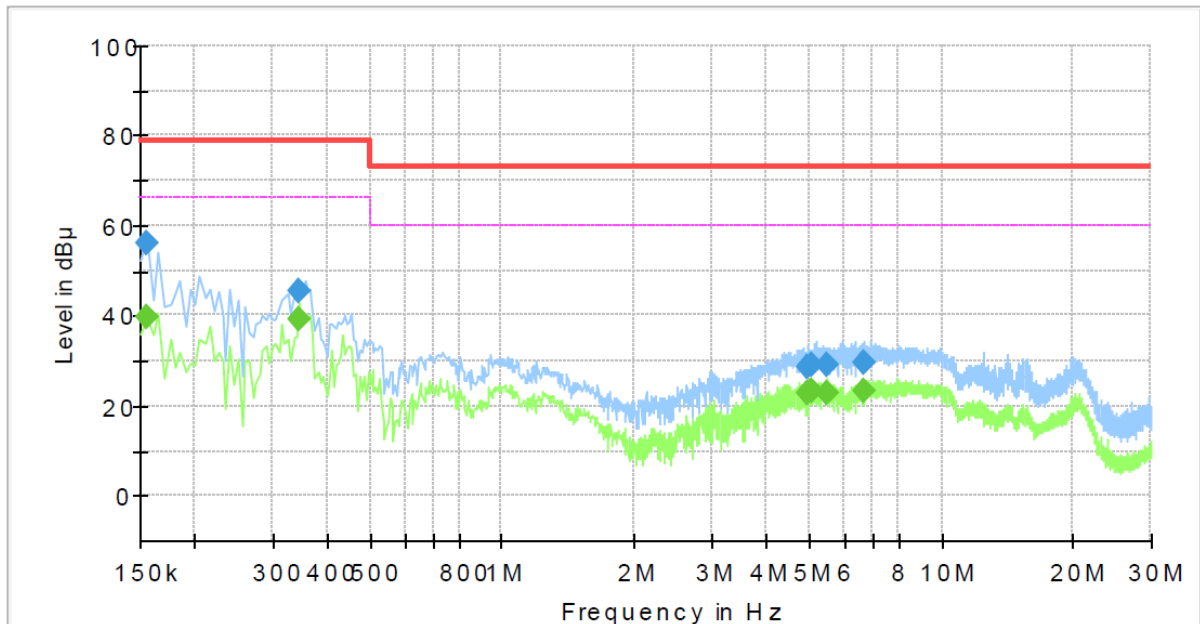
Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.160000	---	37.97	66.00	28.03	1000.0	9.000	L1	19.4
0.160000	54.68	---	79.00	24.32	1000.0	9.000	L1	19.4
0.930000	---	23.79	60.00	36.21	1000.0	9.000	L1	20.1
0.930000	29.13	---	73.00	43.87	1000.0	9.000	L1	20.1
5.120000	---	22.35	60.00	37.65	1000.0	9.000	L1	19.6
5.120000	27.99	---	73.00	45.01	1000.0	9.000	L1	19.6
6.970000	---	23.14	60.00	36.86	1000.0	9.000	L1	19.5
6.970000	28.62	---	73.00	44.38	1000.0	9.000	L1	19.5
8.890000	---	23.58	60.00	36.42	1000.0	9.000	L1	19.7
8.890000	28.73	---	73.00	44.27	1000.0	9.000	L1	19.7

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NEUTRAL LINE

Common Information

Test Description:	Conducted Emission
Model No.:	SLA-T2880BA
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)
0.155000	---	39.78	66.00	26.22	1000.0	9.000	N	19.4
0.155000	56.06	---	79.00	22.94	1000.0	9.000	N	19.4
0.345000	---	39.07	66.00	26.93	1000.0	9.000	N	19.5
0.345000	45.72	---	79.00	33.28	1000.0	9.000	N	19.5
4.950000	---	22.68	60.00	37.32	1000.0	9.000	N	19.6
4.950000	28.82	---	73.00	44.18	1000.0	9.000	N	19.6
5.095000	---	23.23	60.00	36.77	1000.0	9.000	N	19.6
5.095000	29.04	---	73.00	43.96	1000.0	9.000	N	19.6
5.520000	---	22.76	60.00	37.24	1000.0	9.000	N	19.5
5.520000	29.04	---	73.00	43.96	1000.0	9.000	N	19.5
6.635000	---	23.26	60.00	36.74	1000.0	9.000	N	19.5
6.635000	29.48	---	73.00	43.52	1000.0	9.000	N	19.5

◆ Calculation

$$\text{QuasiPeak [dBuV]} / \text{CAverage [dBuV]} = \text{Reading Value [dBuV]} + \text{Corr. [dB]}$$

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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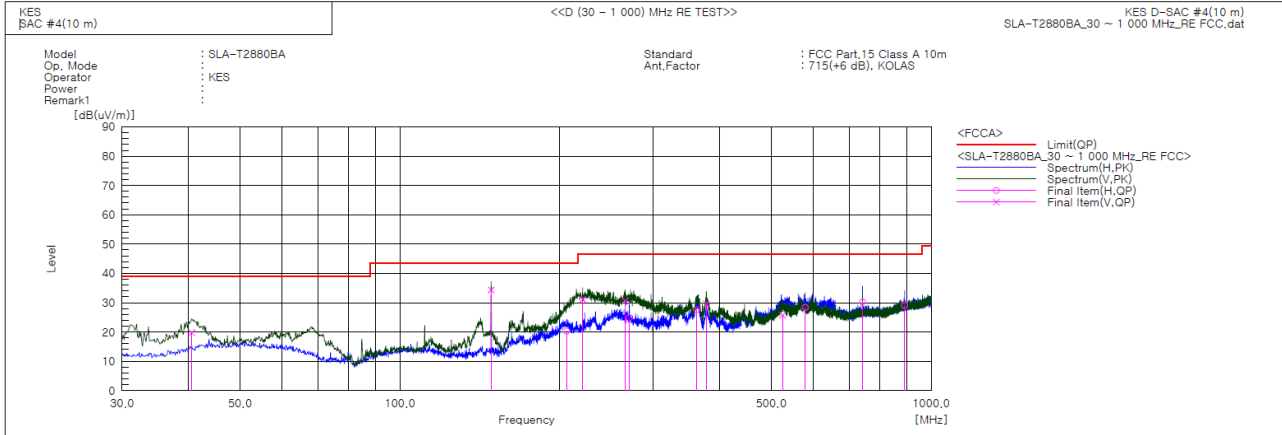
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Radiated Electric Field Emissions(Below 1 GHz)

- 47 CFR Part 15, Subpart B



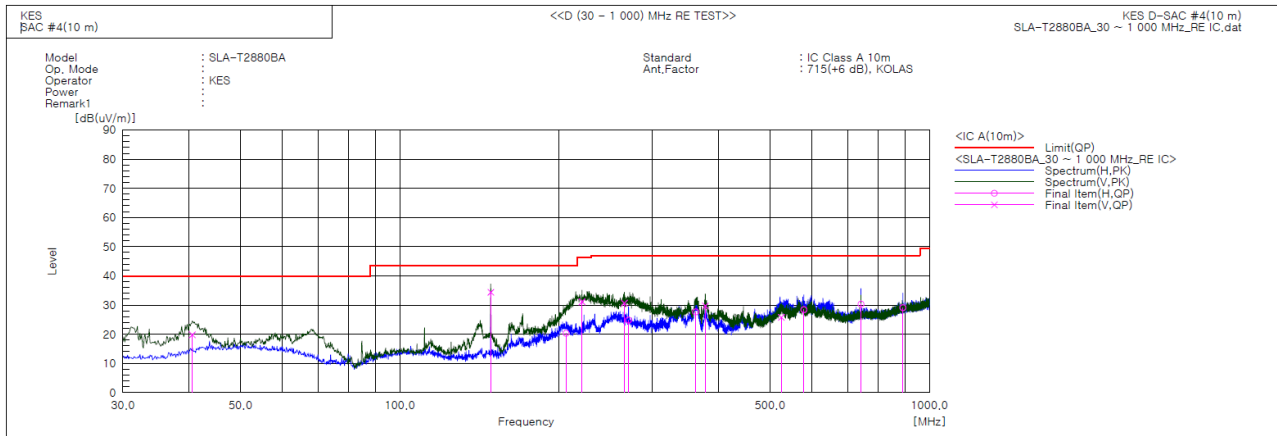
Final Result

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	40.549	V	42.1	-22.3	19.8	39.0	19.2	107.0	295.0	
2	148.461	V	59.7	-25.3	34.4	43.5	9.1	111.0	277.0	
3	206.055	H	41.1	-20.8	20.3	43.5	23.2	389.0	194.0	
4	220.726	V	51.5	-20.4	31.1	46.5	15.4	144.0	173.0	
5	265.225	V	49.5	-18.9	30.6	46.5	15.9	103.0	187.0	
6	270.318	H	43.6	-18.8	24.8	46.5	21.7	338.0	79.0	
7	361.861	H	42.7	-15.1	27.6	46.5	18.9	396.0	12.0	
8	377.381	V	44.4	-14.7	29.7	46.5	16.8	141.0	187.0	
9	525.332	V	36.8	-11.0	25.8	46.5	20.7	109.0	38.0	
10	579.531	H	37.4	-9.0	28.4	46.5	18.1	379.0	320.0	
11	742.465	H	36.7	-6.4	30.3	46.5	16.2	392.0	42.0	
12	891.118	H	33.2	-4.1	29.1	46.5	17.4	373.0	280.0	

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- IC Regulation ICES-003 Issue 7



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	40.549	V	42.1	-22.3	19.8	40.0	20.2	107.0	295.0	
2	148.461	V	59.7	-25.3	34.4	43.5	9.1	111.0	277.0	
3	206.055	H	41.1	-20.8	20.3	43.5	23.2	389.0	194.0	
4	220.726	V	51.5	-20.4	31.1	46.4	15.3	144.0	173.0	
5	265.225	V	49.5	-18.9	30.6	47.0	16.4	103.0	187.0	
6	270.318	H	43.6	-18.8	24.8	47.0	22.2	338.0	79.0	
7	361.861	H	42.7	-15.1	27.6	47.0	19.4	396.0	12.0	
8	377.381	V	44.4	-14.7	29.7	47.0	17.3	141.0	187.0	
9	525.332	V	36.8	-11.0	25.8	47.0	21.2	109.0	38.0	
10	579.531	H	37.4	-9.0	28.4	47.0	18.6	379.0	320.0	
11	742.465	H	36.7	-6.4	30.3	47.0	16.7	392.0	42.0	
12	891.118	H	33.2	-4.1	29.1	47.0	17.9	373.0	280.0	

◆ Calculation - SAC #4(10 m)

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

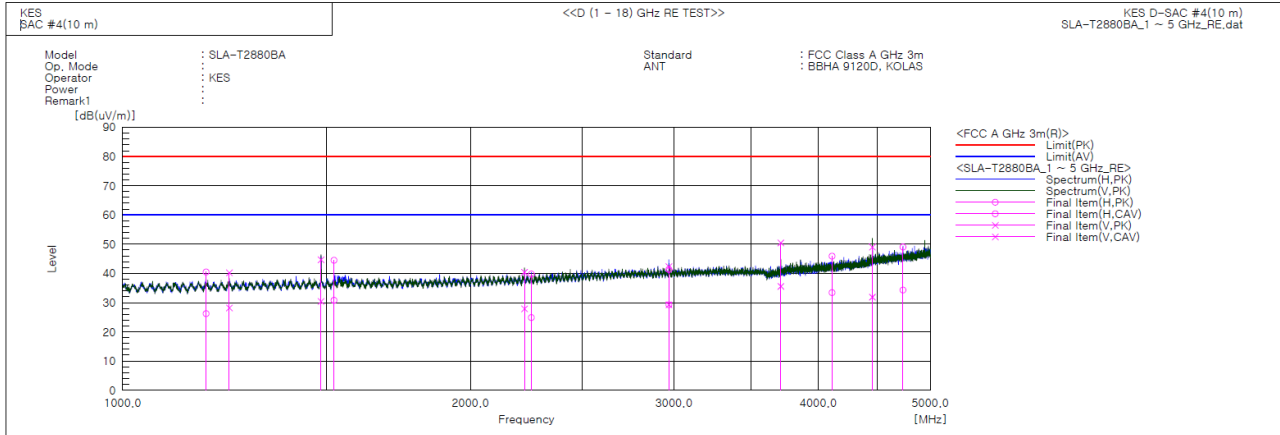
Margin(QP)[dB] = Limit[dB(μ V/m)] - Result(QP) [dB(μ V/m)]

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



Radiated Electric Field Emissions(Above 1 GHz)



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB(1/m)]	Result PK [dB(uV/m)]	Result CAV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin CAV [dB]	Height [cm]	Angle [deg]	Remark
1	1180.514	H	45.5	31.2	-5.0	40.5	26.2	80.0	60.0	39.5	33.8	398.0	146.0	
2	1236.521	V	44.9	32.9	-4.7	40.2	28.2	80.0	60.0	39.8	31.8	112.0	189.0	
3	1484.552	V	48.1	33.8	-3.4	44.7	30.4	80.0	60.0	35.3	29.6	126.0	300.0	
4	1523.326	H	47.7	34.0	-3.2	44.5	30.8	80.0	60.0	35.5	29.2	352.0	153.0	
5	2227.348	V	40.6	28.1	-0.2	40.4	27.9	80.0	60.0	39.6	32.1	121.0	308.0	
6	2257.358	H	39.8	24.9	0.0	39.8	24.9	80.0	60.0	40.2	35.1	344.0	127.0	
7	2970.319	V	39.1	26.1	3.2	42.3	29.3	80.0	60.0	37.7	30.7	109.0	152.0	
8	2970.353	H	38.2	26.1	3.2	41.4	29.3	80.0	60.0	38.6	30.7	394.0	164.0	
9	3712.724	V	45.1	30.2	5.4	50.5	35.6	80.0	60.0	29.5	24.4	161.0	107.0	
10	4110.518	H	38.1	25.6	7.8	45.9	33.4	80.0	60.0	34.1	26.6	399.0	228.0	
11	4455.294	V	39.1	22.0	9.9	49.0	31.9	80.0	60.0	31.0	28.1	100.0	111.0	
12	4735.084	H	37.4	22.7	11.6	49.0	34.3	80.0	60.0	31.0	25.7	366.0	52.0	

◆ Calculation

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

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

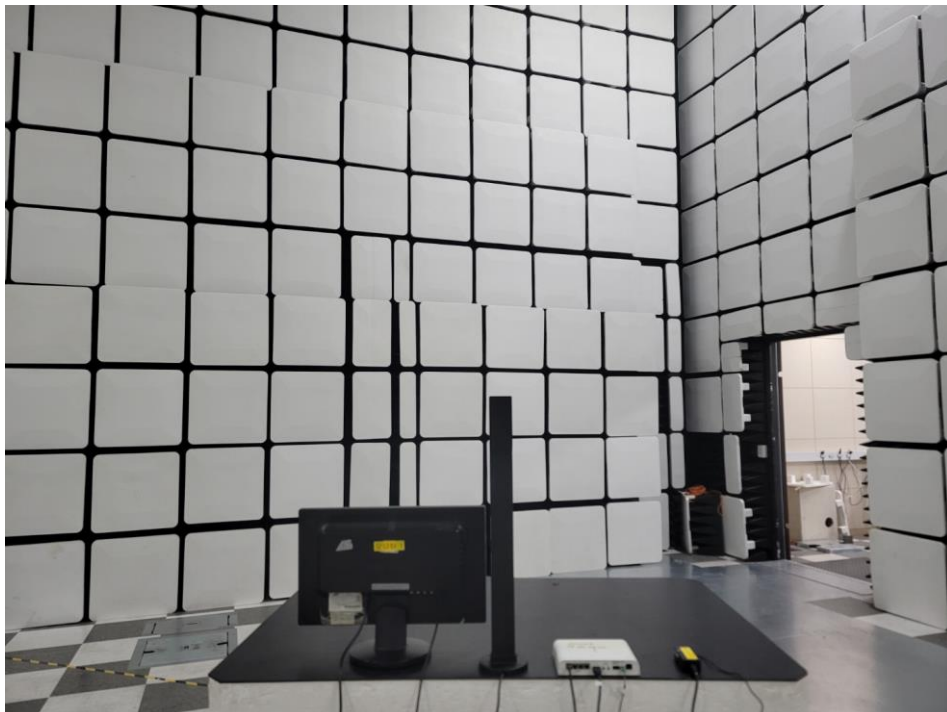
Test Setup Photos and Configuration

Conducted Emissions at Mains Power Ports



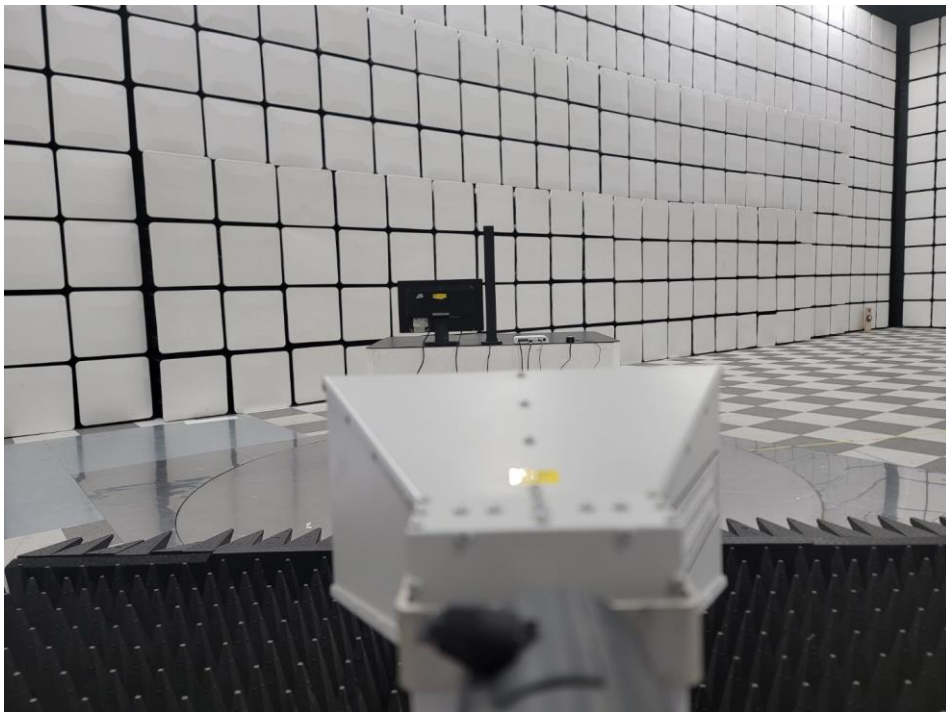
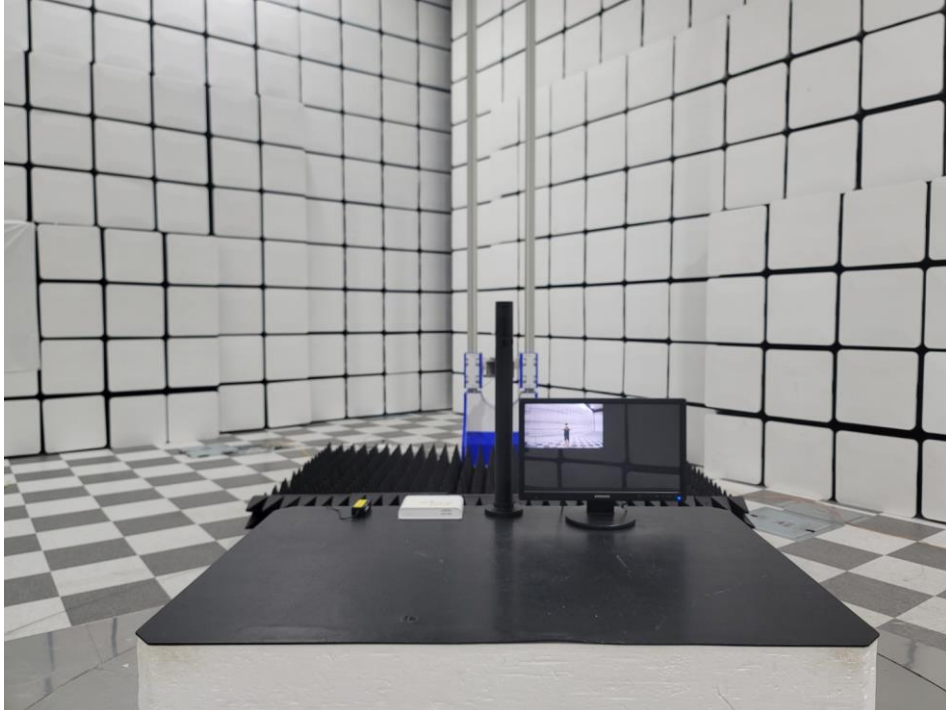
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Radiated Electric Field Emissions(Below 1 GHz)



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Radiated Electric Field Emissions(Above 1 GHz)



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EUT External Photographs

(Top)



(Bottom)



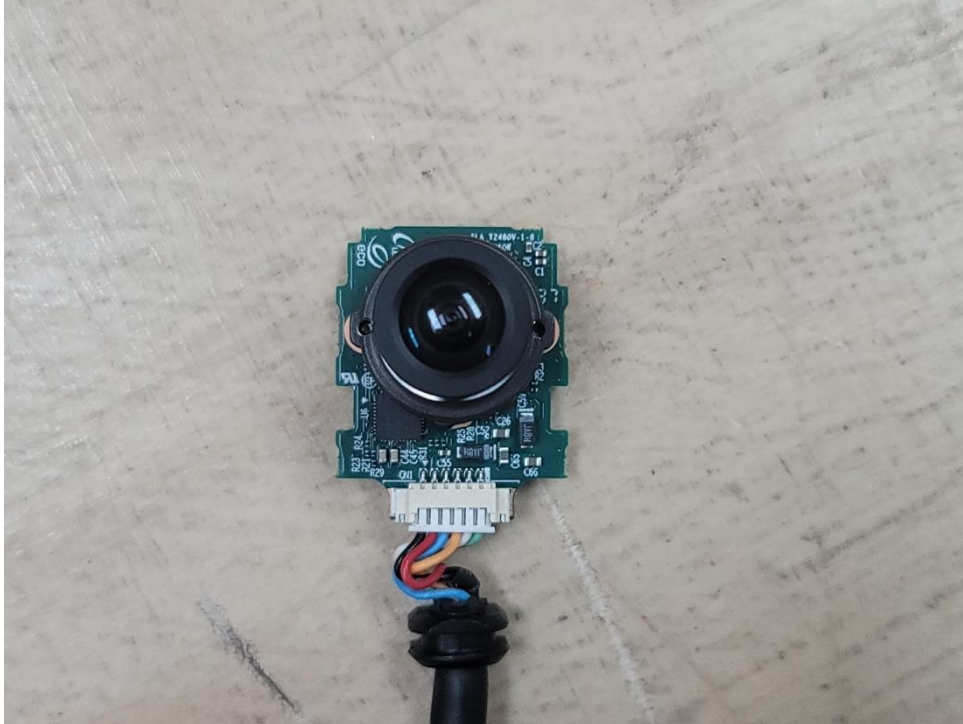
EUT Internal Photographs

(Internal View)

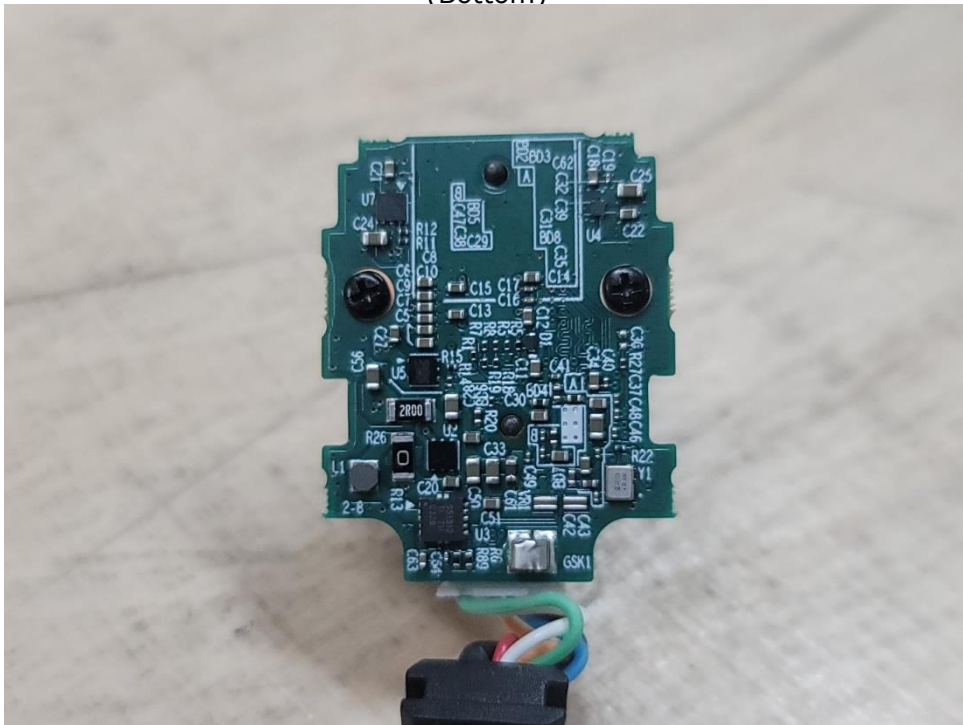


EUT Internal View – Board

(Top)



(Bottom)



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EUT Internal View – Camera

(Top)



(Bottom)



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CAN ICES-003(A) / NMB-003(A)

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.