

**KES Co., Ltd.**

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Report No.:

KES-EM-22T0002-R1

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EMC TEST REPORT For RCM

Test Report No. : KES-EM-22T0002-R1

Date of Issue : Feb. 24, 2023

Product name : LENS MODULE

Model/Type No. : SLA-T2480A

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)

Date of Receipt : Dec. 09, 2021

Test date : Dec. 17, 2021

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

Tested by

Kang Hyeon, 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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REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Jan. 03, 2022	KES-EM-22T0002	Issued
Feb. 24, 2023	KES-EM-22T0002-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" 2MP CMOS
Minimum Illumination	Color: 0.045 Lux (F2.0, 1/30sec)

Lens

Focal Length (Zoom Ratio)	2.4mm fixed focus
Maximum Aperture Ratio	F2.0
Angular Field of View	H: 138 ° , V: 73 ° , D: 165 °
Mount Type	RJ12 connected with main unit
Focus Control	Fixed

Mechanical

Color / Material	Black / Plastic
Product dimensions / weight	Ø24x49.8mm, 318g

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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 240 V, 50 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-T2480A	-	HANWHA VISION VIETNAM COMPANY LIMITED	EUT

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
NETWORK CAMERA	PNM-9000QB	-	HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.	-
LENS MODULE	SLA-T4680A	-	HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.	-
LENS MODULE	SLA-T4680VA	-	HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.	-
PoE Injector	-	-	REPOTEC	-
Monitor	23MA53D	303KKMH9Z019	LG	-
Monitor adapter	PSAB-L205A	EAY62850201	LG Innotek Yantai 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	8.2	S
NETWORK CAMERA	RJ-12	LENS MODULE	RJ-12	8.2	S
	RJ-12	LENS MODULE	RJ-12	8.2	S
	HDMI	Monitor	HDMI	1.5	S
	RJ-45 (PoE)	PoE	RJ-45 (PoE)	1.0	S
Monitor	DC Jack	Monitor adapter	DC Jack	1.4	U

* Unshielded=U, Shielded=S

1.7 EUT Operating Mode(s)

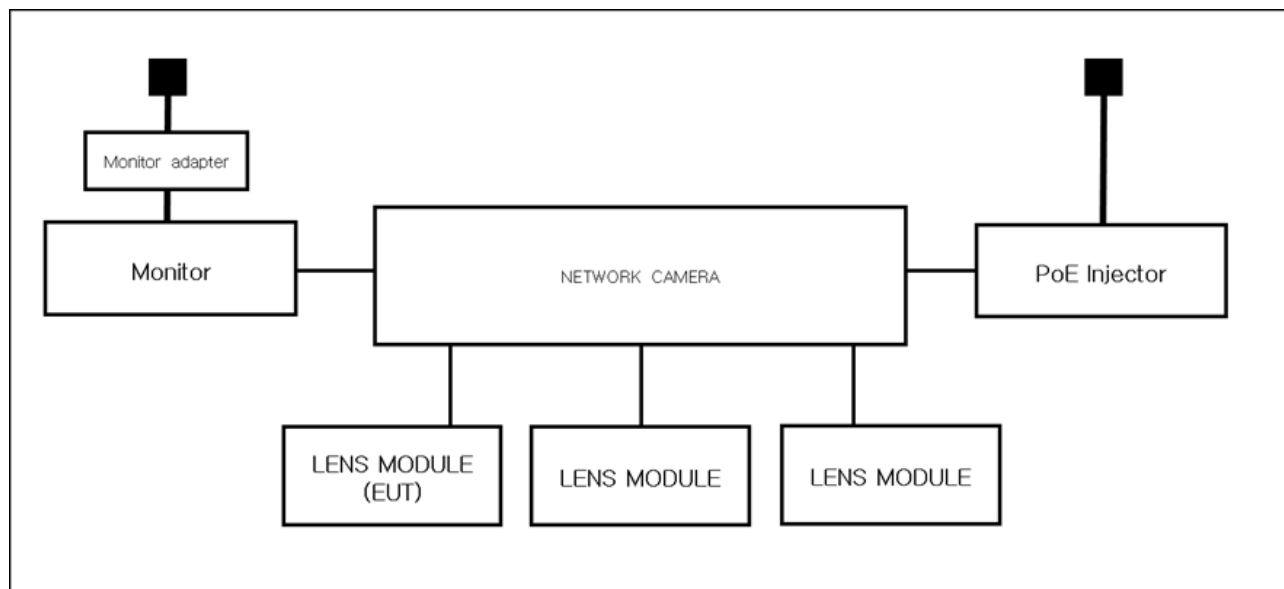
Test Mode	operating
Operation mode	Monitoring EUT

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

1.8 Configuration

■ AC Main

□ DC Main





1.9 Remarks when standards applied

- The power test-related conductive interference test (main power port) test is tested simultaneously because the PNM-9000QB was tested by connecting the SLA-T4680VA, SLA-T4680A and SLA-T2480A cameras together.

* SLA-T4680VA, SLA-T4680A and SLA-T2480A products can be verified simultaneously.

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



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2.0 Test Regulations

The emissions tests were performed according to following regulations:

☒ **AS/NZS CISPR32:2015**

☒ Class A

☐ Class B

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2.1 Conducted Emissions at Mains Power Ports

Test Date

Dec. 17, 2021

Test Location

Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EMC32	R & S	9.12.00	-
☒	EMI TEST RECEIVER	ESU26	R & S	100517	08, 05, 2022
☒	LISN	ENV216	R & S	101786	01, 19, 2022
☒	LISN	ENV216	R & S	101137	01, 19, 2022

Test Conditions

Temperature: (22,6 ± 0,3) °C

Relative Humidity: (43,8 ± 0,3) % 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 Conducted Emissions at Telecommunication Ports

Test Date

N/A

Test Location

Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☐	EMI Test S/W	EMC32	R & S	9.12.00	-
☐	EMI TEST RECEIVER	ESU26	R & S	100517	08, 05, 2022
☐	LISN	ENV216	R & S	101786	01, 19, 2022
☐	LISN	ENV216	R & S	101137	01, 19, 2022
☐	8-WIRE ISN CAT3	CAT3 8158	SCHWARZBECK	8158-0019	03, 10, 2022
☐	8-WIRE ISN CAT5	CAT5 8158	SCHWARZBECK	8158-0030	03, 10, 2022
☐	8-WIRE ISN CAT6	NTFM 8158	SCHWARZBECK	8158-0029	03, 10, 2022
☐	CDN	CDNS502A	TESEQ	40431	12, 29, 2021

Test Conditions

Temperature: (±) °C

Relative Humidity: (±) % 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

The RJ-12 port is not tested because it is a normal signal line, not an IP communication.

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2.3 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Dec. 17, 2021

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	04, 01, 2022
☒	AMPLIFIER	SCU 01	R & S	100603	11, 24, 2022
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	12, 08, 2022
☒	ATTENUATOR	8491A	HP	32173	03, 10, 2022

Test Conditions

Temperature: (22,4 ± 0,5) °C

Relative Humidity: (43,5 ± 0,4) % 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

RemarksSee Appendix A for test data.

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2.4 Radiated Electric Field Emissions(Above 1 GHz)

Test Date

Dec. 17, 2021

Test Location

SEMI ANECHOIC CHAMBER #3

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	ESR7	R & S	101190	08, 03, 2022
☒	PREAMPLIFIER	8449B	AGILENT	3008A01967	04, 07, 2022
☐	ATTENUATOR	8491A	HP	35496	03, 10, 2022
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	03, 11, 2022

Test Conditions

Temperature: (22,3 ± 0,4) °C

Relative Humidity: (43,8 ± 0,4) % R.H.

Frequency Range of Measurement

1 GHz to 6 GHz

Instrument Settings

IF Band Width: 1 MHz

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

RemarksSee Appendix A for test data.



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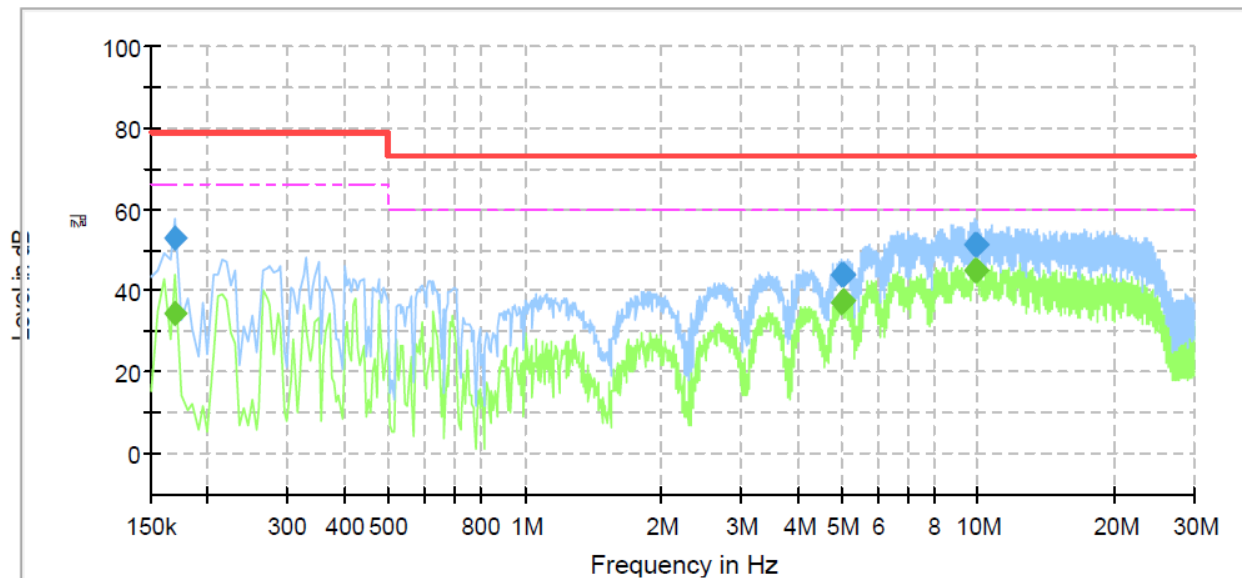
APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

HOT LINE

Common Information

Test Description: Conducted Emission
Model No.: SLA-T2480A
Mode: RCM
Operator Name: KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.170000	---	34.35	66.00	31.65	1000.0	9.000	L1	9.6
0.170000	52.91	---	79.00	26.09	1000.0	9.000	L1	9.6
5.010000	---	37.24	60.00	22.76	1000.0	9.000	L1	9.9
5.010000	43.88	---	73.00	29.12	1000.0	9.000	L1	9.9
5.070000	---	37.41	60.00	22.59	1000.0	9.000	L1	9.9
5.070000	44.18	---	73.00	28.82	1000.0	9.000	L1	9.9
9.845000	---	44.90	60.00	15.10	1000.0	9.000	L1	9.7
9.845000	51.26	---	73.00	21.74	1000.0	9.000	L1	9.7
9.935000	---	44.80	60.00	15.20	1000.0	9.000	L1	9.7
9.935000	51.12	---	73.00	21.88	1000.0	9.000	L1	9.7

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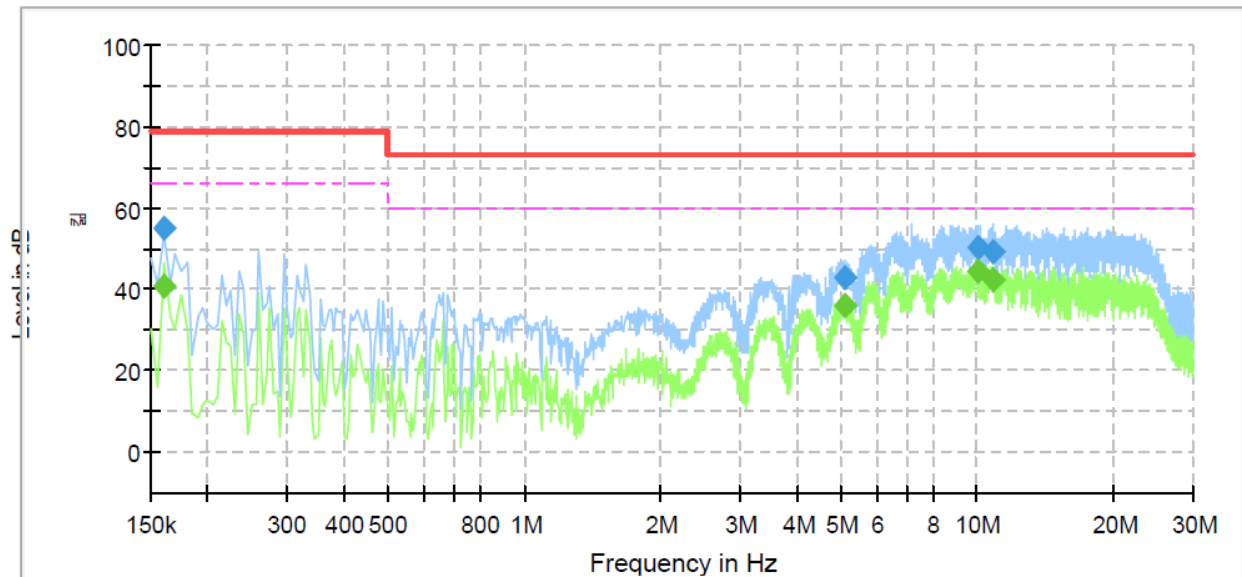
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NEUTRAL LINE

Common Information

Test Description:	Conducted Emission
Model No.:	SLA-T2480A
Mode	RCM
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	---	40.61	66.00	25.39	1000.0	9.000	N	9.5
0.160000	55.24	---	79.00	23.76	1000.0	9.000	N	9.5
5.100000	---	35.99	60.00	24.01	1000.0	9.000	N	9.9
5.100000	42.99	---	73.00	30.01	1000.0	9.000	N	9.9
10.035000	---	44.22	60.00	15.78	1000.0	9.000	N	9.6
10.035000	50.44	---	73.00	22.56	1000.0	9.000	N	9.6
10.805000	---	42.52	60.00	17.48	1000.0	9.000	N	9.6
10.805000	49.26	---	73.00	23.74	1000.0	9.000	N	9.6

◆ 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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**Conducted Emissions at Telecommunication Ports
[1 000 Mbps]**

N/A

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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

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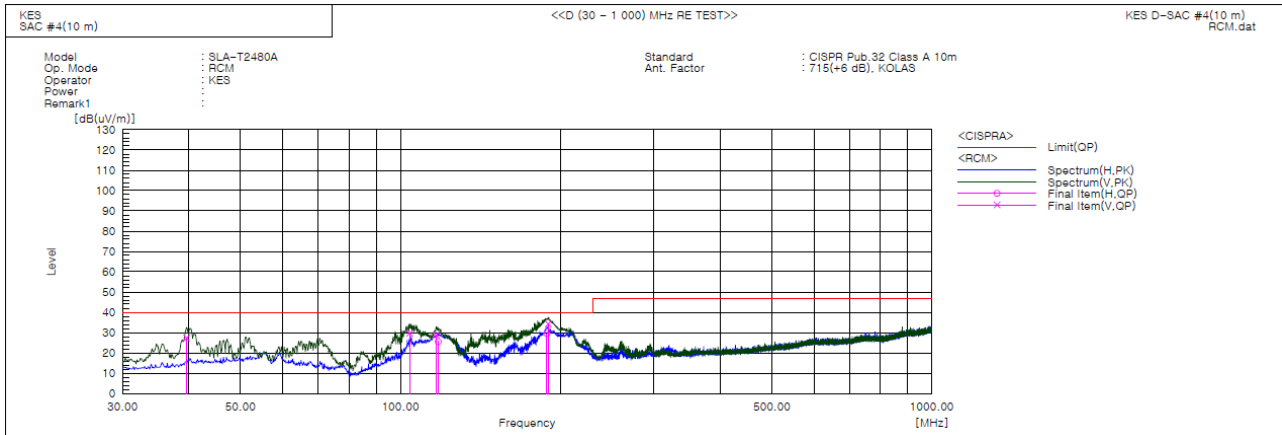
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Radiated Electric Field Emissions(Below 1 GHz)



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	39.579	V	50.0	-22.6	27.4	40.0	12.6	179.0	279.0	
2	104.084	V	52.1	-22.3	29.8	40.0	10.2	100.0	279.0	
3	116.815	V	52.2	-23.3	28.9	40.0	11.1	159.0	116.0	
4	117.785	H	49.1	-23.5	25.6	40.0	14.4	341.0	276.0	
5	188.595	H	51.8	-22.3	29.5	40.0	10.5	328.0	257.0	
6	189.686	V	56.4	-22.1	34.3	40.0	5.7	100.0	34.0	

◆ Calculation

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

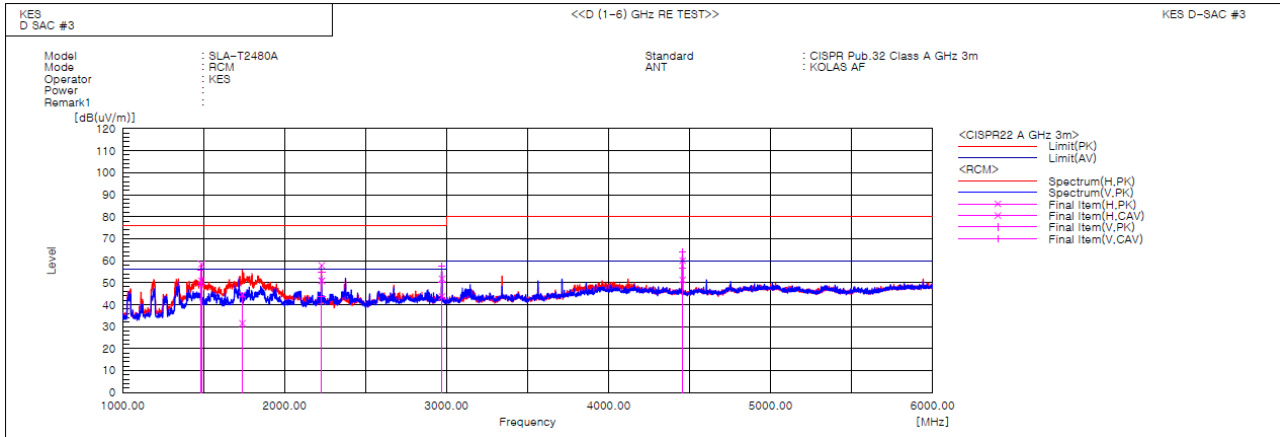
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Radiated Electric Field Emissions(Above 1 GHz)



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	1485.030	V	61.7	55.0	-6.2	55.5	48.8	76.0	56.0	20.5	7.2	100.0	69.1	
2	1485.850	H	64.7	57.0	-6.2	58.5	50.8	76.0	56.0	17.5	5.2	100.0	354.2	
3	1739.150	H	48.3	35.3	-3.8	44.5	31.5	76.0	56.0	31.5	24.5	100.0	50.4	
4	2228.440	V	55.2	44.2	-0.4	54.8	43.8	76.0	56.0	21.2	12.2	100.0	9.8	
5	2228.570	H	58.2	51.2	-0.4	57.8	50.8	76.0	56.0	18.2	5.2	100.0	159.2	
6	2970.960	H	50.2	42.1	1.6	51.8	43.7	76.0	56.0	24.2	12.3	100.0	114.9	
7	2970.960	V	55.7	48.7	1.6	57.3	50.3	76.0	56.0	18.7	5.7	100.0	359.1	
8	4456.780	V	57.1	49.6	6.9	64.0	56.5	80.0	60.0	16.0	3.5	100.0	359.1	
9	4456.850	H	53.1	44.4	6.9	60.0	51.3	80.0	60.0	20.0	8.7	100.0	35.1	

◆ Calculation

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

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



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N/A

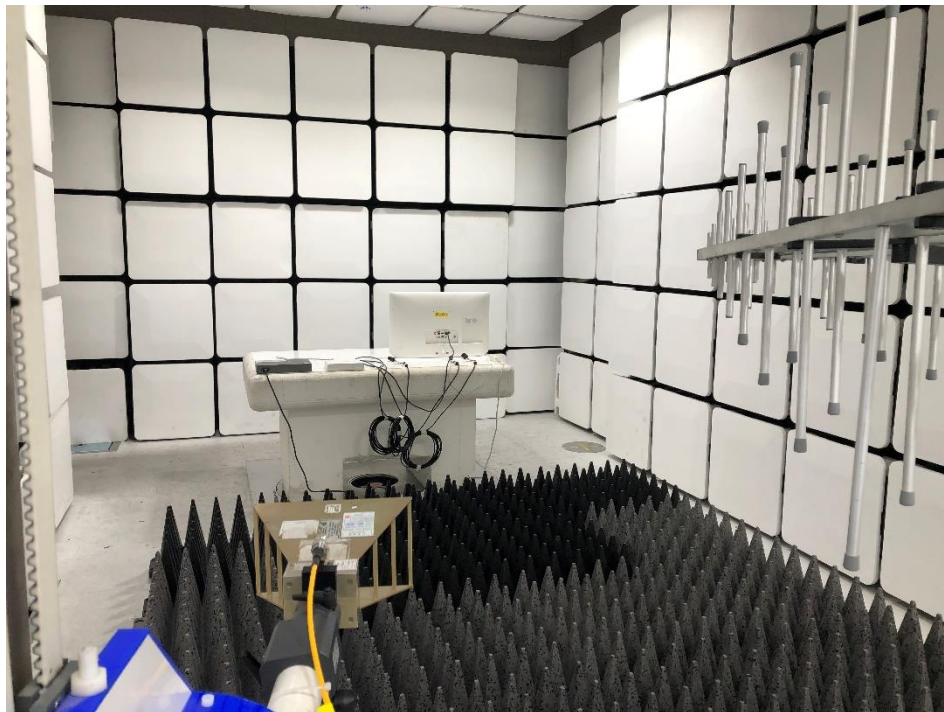
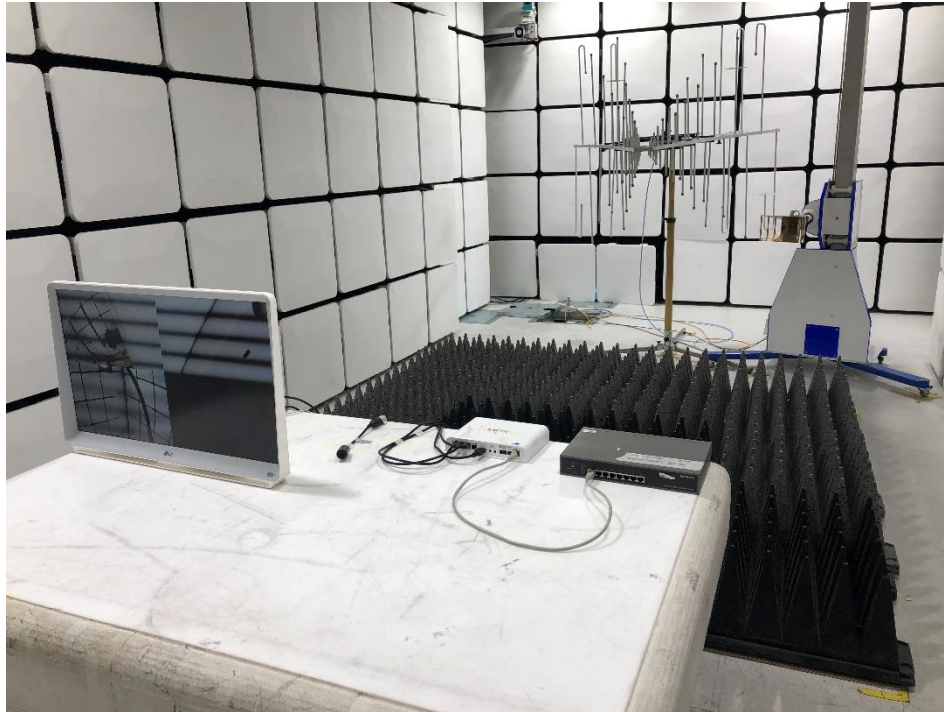
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Radiated Electric Field Emissions(Below 1 GHz)



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Radiated Electric Field Emissions(Above 1 GHz)



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EUT External Photographs

(Top)



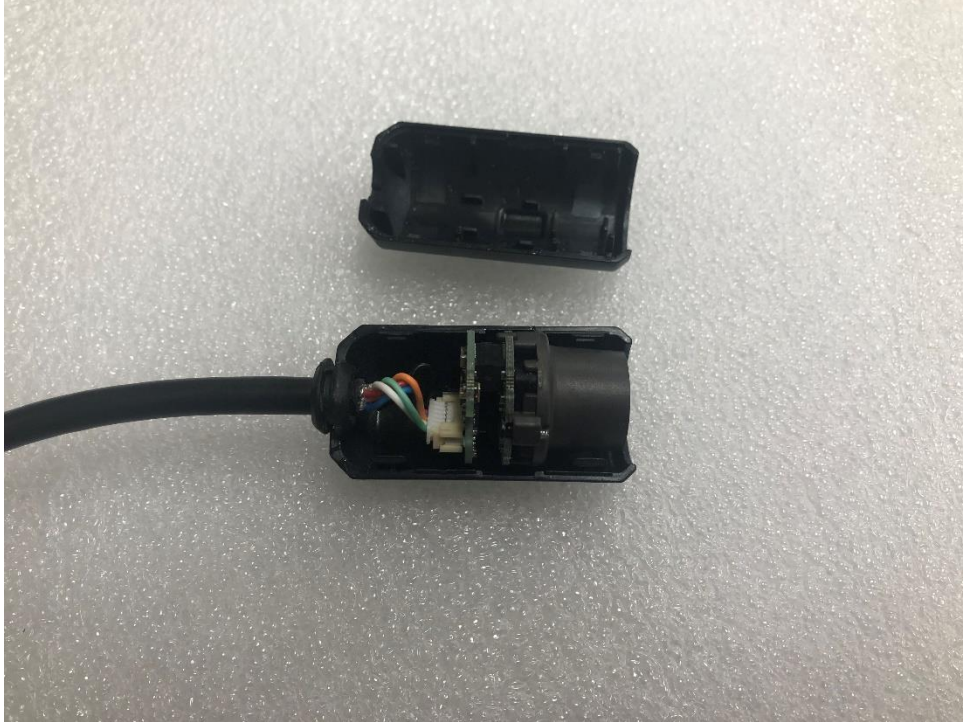
(Bottom)



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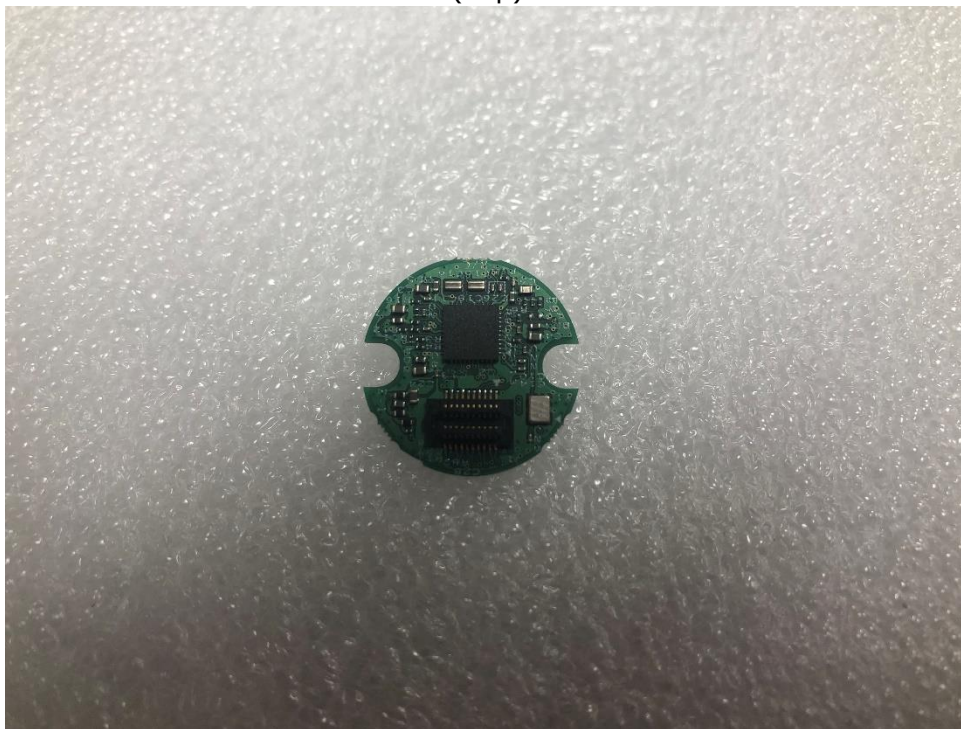
EUT Internal Photographs

(Internal View)



EUT Internal View – Board 1

(Top)



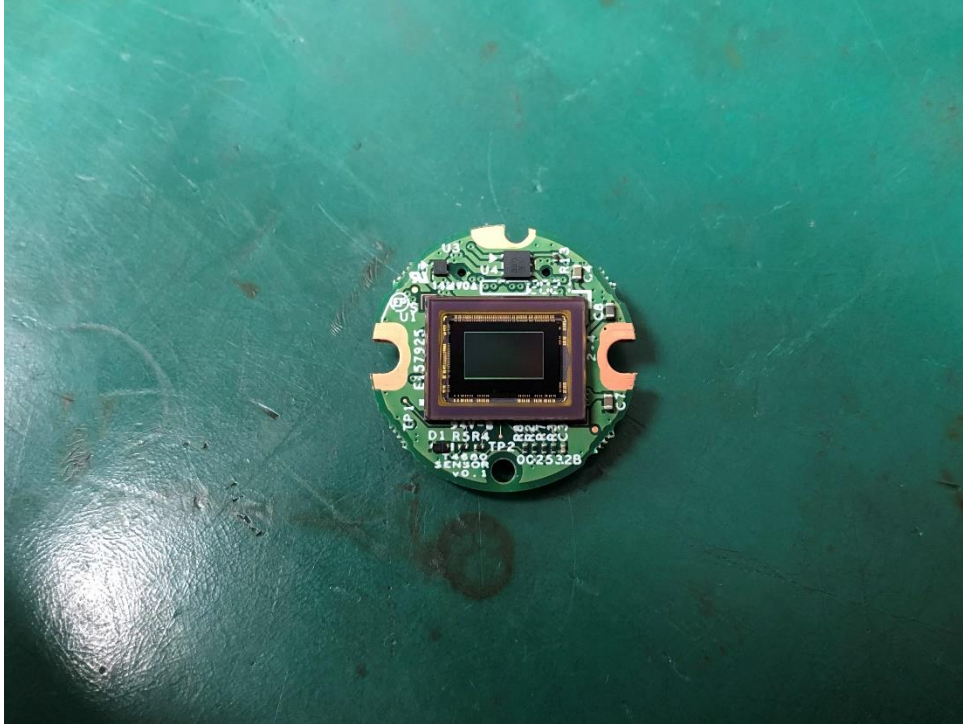
(Bottom)



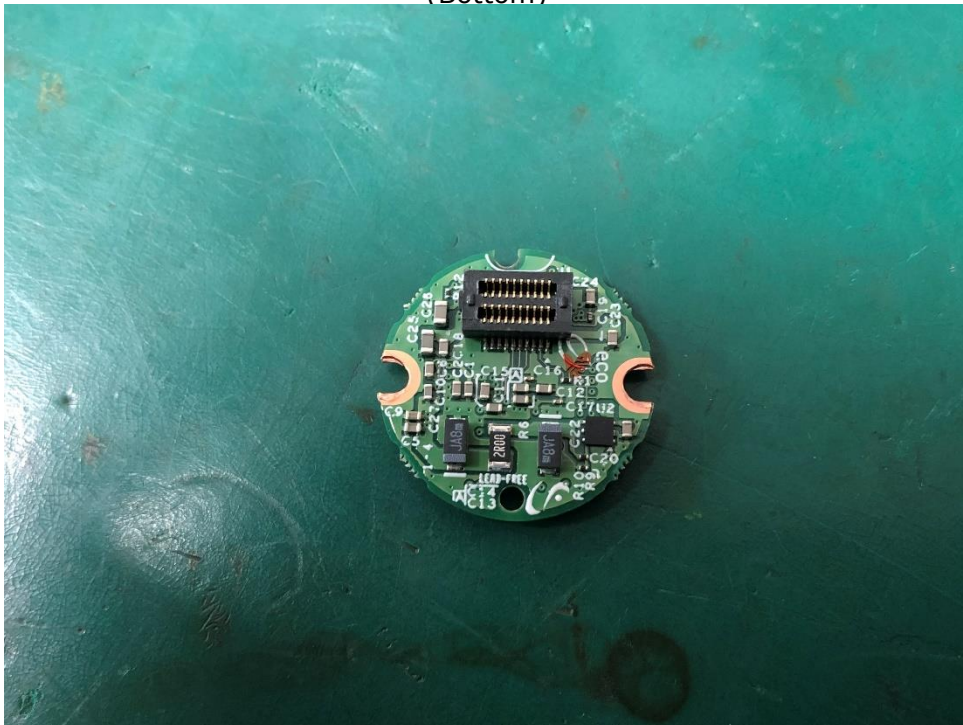
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EUT Internal View – Board 2

(Top)



(Bottom)



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