



EMC TEST REPORT For RCM

Test Report No. : KES-E1-18T0061
Date of Issue : Jan. 09, 2018
Product name : 2M LENS MODULE
Model/Type No. : SLA-2M2800DP
Variant Model : -
Applicant : Hanwha Techwin Co., Ltd.
Applicant Address : 1204, Changwon-daero, Seongsan-gu Changwon-si,
Gyeongsangnam-do, Korea
Manufacturer : Hanwha Techwin (Tianjin) Co., Ltd.
Manufacturer Address : No.11 Weiliu Rd, Micro-Electronic Industrial
Park, TEDA, Tianjin, 300385, People's Republic of China.
Date of Receipt : Dec. 21, 2017
Test date : Jan. 05, 2018 ~ Jan. 06, 2018
Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Young Suk, Song
EMC Test Engineer

Reviewed by

Dong-Hun, Jang
EMC Technical Manager

This test report is not related to KOLAS.

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Test report No.:
KES-E1-18T0061
Page (2) of (27)

REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Jan. 09, 2018	KES-E1-18T0061	Issued

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TABLE OF CONTENTS

1.0	General Product Description.....	4
1.1	Test Voltage & Frequency	5
1.2	Variant Model Differences	5
1.3	Device Modifications	5
1.4	Equipment Under Test.....	5
1.5	Support Equipments	5
1.6	External I/O Cabling	6
1.7	EUT Operating Mode(s)	6
1.8	Configuration	7
1.9	Remarks when standards applied	8
1.10	Calibration Details of Equipment Used for Measurement	8
1.11	Test Facility	8
1.12	Laboratory Accreditations and Listings	8
2.0	Test Regulations.....	9
2.1	Conducted Emissions at Mains Power Ports	11
2.2	Conducted Emissions at Telecommunication Ports.....	12
2.3	Radiated Electric Field Emissions(Below 1 GHz)	13
2.4	Radiated Electric Field Emissions(Above 1 GHz)	14
APPENDIX A	– TEST DATA.....	15
	Conducted Emissions at Mains Power Ports.....	15
	Conducted Emissions at Telecommunication Ports	17
	Radiated Electric Field Emissions(Below 1 GHz)	19
	Radiated Electric Field Emissions(Above 1 GHz)	20
	Test Setup Photos and Configuration	21
	Conducted Voltage Emissions	21
	Conducted Telecommunication Emissions	22
	Radiated Electric Field Emissions(Below 1 GHz)	23
	Radiated Electric Field Emissions(Above 1 GHz)	24
	EUT External Photographs	25
	EUT Internal Photographs	26



1.0 General Product Description

Main Specifications of EUT are:

Video	
Imaging Device	1/2.8" 2M CMOS
Total Pixels	1945(H) x 1109(V) 2.16M
Effective Pixels	1945(H) x 1097(V) 2.13M
Scanning System	Progressive Scan
Min. Illumination	Color : 0.055Lux(F2.0, 1/30sec, 30IRE) B/W : 0.055Lux(F2.0, 1/30sec, 30IRE)
S / N Ratio	50dB
Wide Dynamic Range	150dB
Day & Night	Electrical
Lens	
Focal Length (Zoom Ratio)	2.8mm
Max. Aperture Ratio	F2.0
Angular Field of View	H:107.4°, V:62.2°, D:122.0°
Min. Object Distance	-
Focus Control	-
Lens Type	Fixed focal
Mount Type	M12 Lens module with main unit
Mechanical	
Color / Material	Black / Plastic
Dimension (WxHxD)	Ø35.5 x 27.9mm
Weight	27g



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.

Voltage ☐ 240 Vac ☐ 100 Vac ☐ 24 Vac ☐ 12 Vdc ☒ PoE

Frequency ☐ 50 Hz ☐ 60 Hz ☐ 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
2M LENS MODULE	SLA-2M2800DP	-	Hanwha Techwin (Tianjin) Co.,Ltd	E.U.T

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
PoE Adaptor	GS728TPP	-	NETGEAR, INC.	-
Notebook	NT730U3E	JJRE91CF200065A	Samsung Electronics Co., Ltd.	-
Notebook Adaptor	PA-1600-66	AD-6019P	Li Shin Co., Ltd.	-
Network Camera	PNM-7000VD	-	Hanwha Techwin (Tianjin) Co.,Ltd	-
LENS MODULE	SLA-2M6000D	-	Hanwha Techwin (Tianjin) Co.,Ltd	-



1.6 External I/O Cabling

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
2M LENS MODULE (E.U.T)	LENS Out	Network Camera	LENS In	-	-
Network Camera	RJ-45 (PoE)	PoE Adaptor	RJ-45 (PoE)	3.0	U
	LENS In	LENS MODULE	LENS Out	-	-
PoE Adaptor	RJ-45 (Data)	Notebook	RJ-45 (Data)	3.0	U

* Unshielded=U, Shielded=S

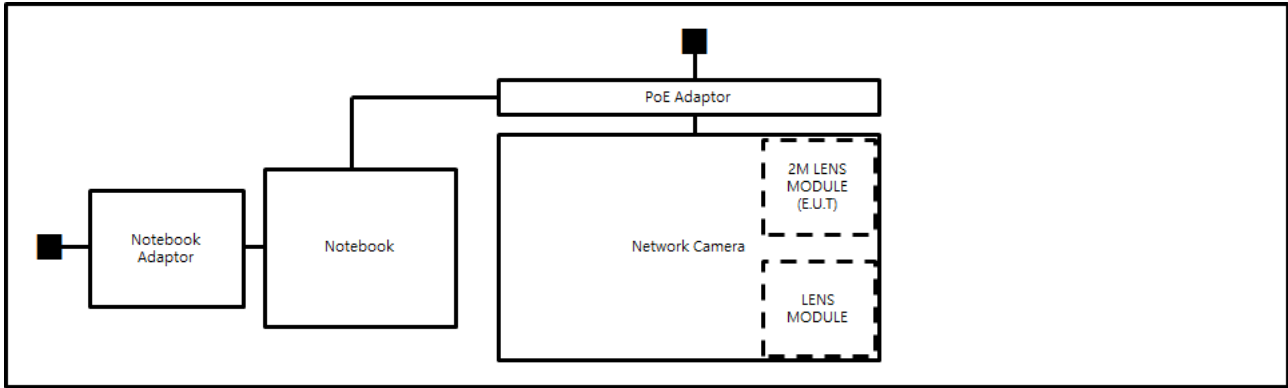
1.7 EUT Operating Mode(s)

Test mode	operating
PoE	E.U.T Monitoring, Ping Test

E.U.T Test operating S/W		
Name	Version	Manufacture Company
Webviewer	-	Hanwha Techwin Co., Ltd.

1.8 Configuration

■ AC Main
□ DC Main



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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. The sites are constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 32.

1.12 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3 & 10 meter Open Area Test Sites and one conducted site to perform FCC Part 15/18 measurements.	
JAPAN	VCCI	Mains Ports Conducted Interference Measurement, Telecommunication Ports Conducted Disturbance Measurement and Radiation 10 meter site, Facility for measuring radiated disturbance above 1 GHz	 R-4308, C-4798, T-2311, G-914
KOREA	MSIP	EMI (10 meter Open Area Test Site and two conducted sites) Radio(3 & 10 meter Open Area Test Sites and one conducted site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 KR0100
Canada	IC	3 & 10 meter Open Area Test Sites and one conducted site	 4769B-1
Europe	CE	EMI (10 meter Open Area Test Site and two conducted sites) Radio(3 & 10 meter Open Area Test Sites and one conducted site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	
International	KOLAS	EMI (10 meter Open Area Test Site and two conducted sites) Radio(3 & 10 meter Open Area Test Sites and one conducted site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	

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2.0 Test Regulations

The emissions tests were performed according to following regulations:

☐ **EMC – Directive 2014/30/EU**

☐ EN 61000-6-3:2011

☐ EN 61000-6-1:2007

☐ EN 61000-6-4:2007 +A1:2011

☐ EN 61000-6-2:2005

☐ EN 55011:2007 +A1:2010

☐ Group 1
☐ Class A

☐ Group 2
☐ Class B

☐ EN 55014-1:2006 +A2:2011

☐ EN 55014-2:1997 +A2:2008

☐ EN 55015:2013

☐ EN 55032:2015

☐ Class A

☐ Class B

☐ EN 55024:2010

☐ EN 50130-4:2011 +A1:2014

☐ EN 61000-3-2:2014

☐ EN 61000-3-3:2013

☐ EN 61326-1:2013



☐ **VCCI V-3 / 2015.04**

☐ Class A

☐ Class B

☒ **AS/NZS CISPR32:2013**

☒ Class A

☐ Class B

☐ **47 CFR Part 15, Subpart B**

☐ CISPR 22:2009 +A1:2010

☐ Class A

☐ Class B

☐ ANSI C63.4-2009

☐ **IC Regulation ICES-003 : 2016**

☐ CAN/CSA CISPR 22-10

☐ Class A

☐ Class B

☐ ANSI C63.4-2014

☐ **RE- Directive 2014/53/EU**

☐ EN 301 489-1 V1.9.2

- ☐ Equipment for fixed use
- ☐ Equipment for vehicular use
- ☐ Equipment for portable use

☐ EN 301 489-3 V1.6.1

☐ EN 301 489-17 V2.2.1

☐ EN 60945:2002



2.1 Conducted Emissions at Mains Power Ports

Test Date

N/A

Test Location

Electro wave Shieldroom

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	04, 27, 2018
☐	LISN	ENV216	R & S	101137	02, 13, 2018
☐	LISN	ENV216	R & S	101786	04, 27, 2018
☐	PULSE LIMITER	ESH3-Z2	R & S	101914	11, 27, 2018
☐	LISN	NNBM8124	SCHWARZBECK	8124-1002	08, 07, 2018
☐	LISN	NNBM8124	SCHWARZBECK	8124-1003	08, 07, 2018

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

N/A

2.2 Conducted Emissions at Telecommunication Ports

Test Date

Jan. 05, 2018

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	ESR3	R & S	101783	04, 27, 2018
☒	LISN	ENV216	R & S	101137	02, 03, 2018
☒	LISN	ENV216	R & S	101786	04, 27, 2018
☒	PULSE LIMITER	ESH3-Z2	R & S	101914	11, 27, 2018
☒	8-WIRE ISN CAT3	CAT3 8158	SCHWARZBECK	8158-0019	03, 29, 2018
☒	8-WIRE ISN CAT5	CAT5 8158	SCHWARZBECK	8158-0030	03, 29, 2018
☐	8-WIRE ISN CAT6	NTFM 8158	SCHWARZBECK	8158-0029	08, 10, 2018
☐	ISN	ISN S8	SCHWARZBECK	ISN-S8-0019	05, 12, 2018

Test Conditions

Temperature: 24,1 °C
Relative Humidity: 42,9 % 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.

2.3 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Jan. 05, 2018

Test Location☐ OPEN AREA TEST SITE #2 ☒ 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	04, 18, 2018
☒	AMPLIFIER	SCU 01	R & S	100603	11, 27, 2018
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	716	11, 28, 2018

Test ConditionsTemperature: 23,9 °C
Relative Humidity: 40,8 % 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.

2.4 Radiated Electric Field Emissions(Above 1 GHz)

Test Date

Jan. 06, 2018

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, 07, 2018
☒	PREAMPLIFIER	8449B	AGILENT	3008A01967	05, 31, 2018
☐	ATTENUATOR	8491A	HP	32173	03, 24, 2018
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	05, 02, 2019

Test ConditionsTemperature: 23,9 °C
Relative Humidity: 42,1 % 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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Test report No.:
KES-E1-18T0061
Page (15) of (27)

APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

HOT LINE

N/A

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Test report No.:
KES-E1-18T0061
Page (16) of (27)

NEUTRAL LINE

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 (LISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

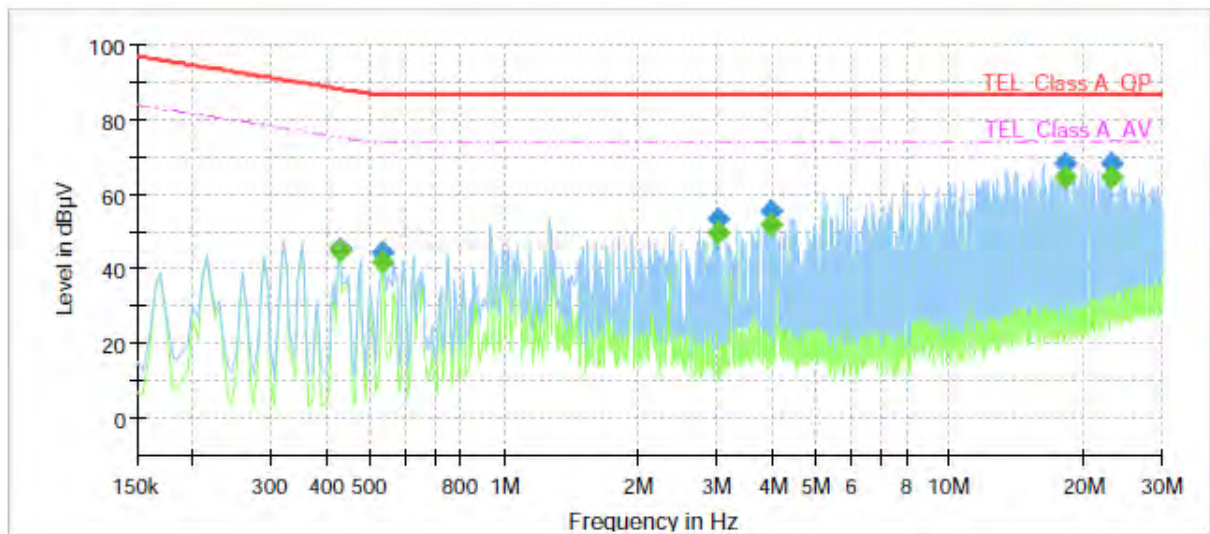
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Conducted Emissions at Telecommunication Ports

[10 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	SLA-2M2800DP
Mode	PoE_10 Mbps
Operator Name:	KES



Final Result

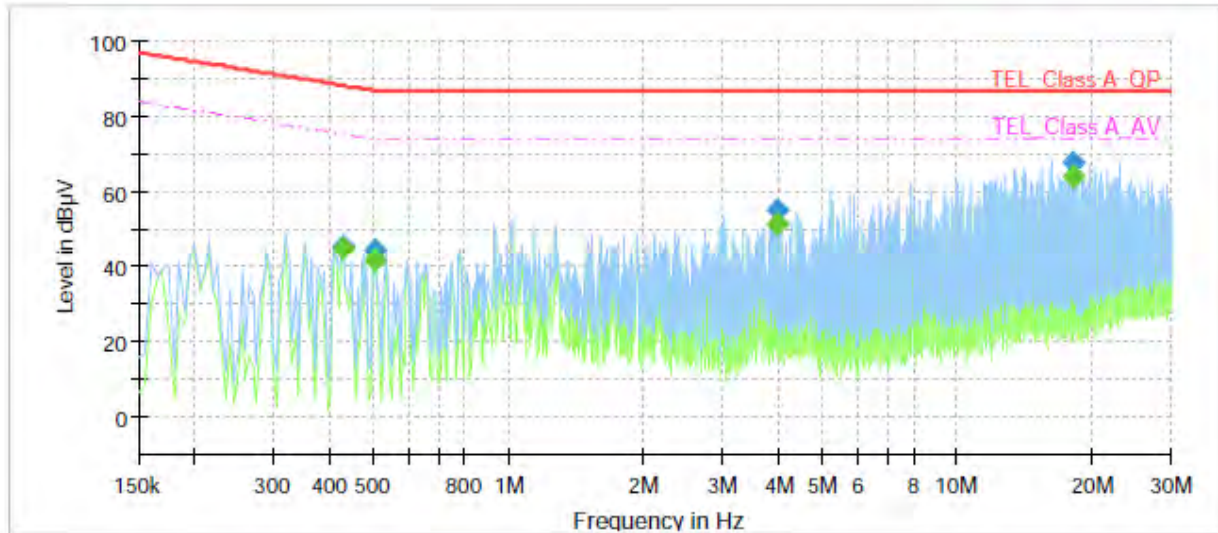
Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.430000	---	45.26	75.25	29.99	1000.0	9.000	Single Line	19.9
0.430000	45.27	---	88.25	42.98	1000.0	9.000	Single Line	19.9
0.535000	---	41.66	74.00	32.34	1000.0	9.000	Single Line	19.9
0.535000	44.47	---	87.00	42.53	1000.0	9.000	Single Line	19.9
3.040000	---	49.88	74.00	24.12	1000.0	9.000	Single Line	20.0
3.040000	53.38	---	87.00	33.62	1000.0	9.000	Single Line	20.0
3.955000	---	51.99	74.00	22.01	1000.0	9.000	Single Line	20.0
3.955000	55.52	---	87.00	31.48	1000.0	9.000	Single Line	20.0
18.245000	---	64.81	74.00	9.19	1000.0	9.000	Single Line	20.0
18.245000	68.40	---	87.00	18.60	1000.0	9.000	Single Line	20.0
23.130000	---	64.60	74.00	9.40	1000.0	9.000	Single Line	19.9
23.130000	68.11	---	87.00	18.89	1000.0	9.000	Single Line	19.9

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[100 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	SLA-2M2800DP
Mode	PoE_100 Mbps
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.430000	---	44.90	75.25	30.35	1000.0	9.000	Single Line	19.4
0.430000	45.47	---	88.25	42.78	1000.0	9.000	Single Line	19.4
0.505000	---	41.58	74.00	32.42	1000.0	9.000	Single Line	19.4
0.505000	44.56	---	87.00	42.44	1000.0	9.000	Single Line	19.4
3.955000	---	51.10	74.00	22.90	1000.0	9.000	Single Line	19.5
3.955000	54.94	---	87.00	32.06	1000.0	9.000	Single Line	19.5
18.245000	---	64.08	74.00	9.92	1000.0	9.000	Single Line	19.5
18.245000	67.84	---	87.00	19.16	1000.0	9.000	Single Line	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 (ISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

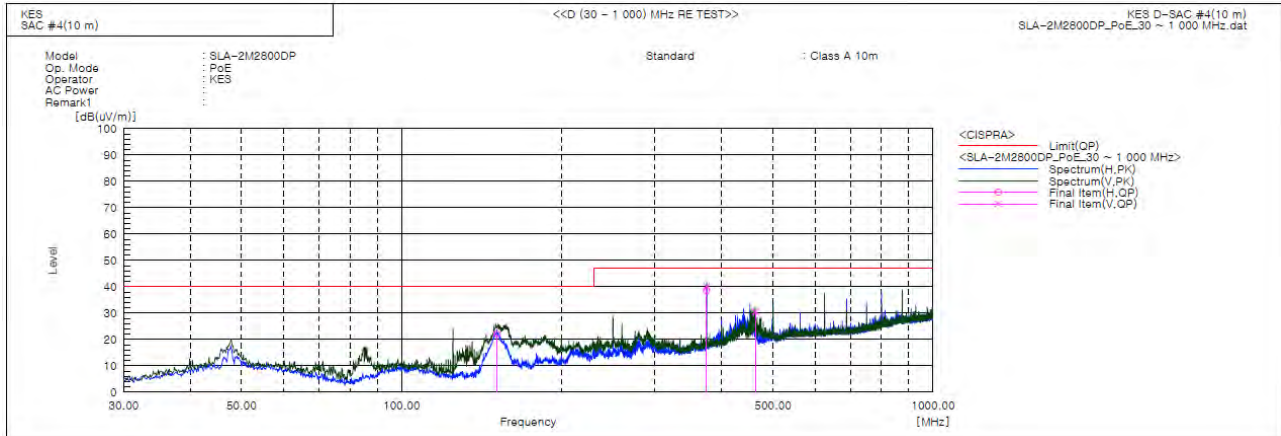


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Test report No.:
KES-E1-18T0061
Page (19) of (27)

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	151.302	H	53.4	-31.4	22.0	40.0	18.0	400.0	160.0	
2	374.893	H	59.9	-21.3	38.6	47.0	8.4	367.0	128.0	
3	375.031	V	61.4	-21.3	40.1	47.0	6.9	100.0	209.0	
4	462.984	V	49.3	-18.8	30.5	47.0	16.5	100.0	237.0	

◆ 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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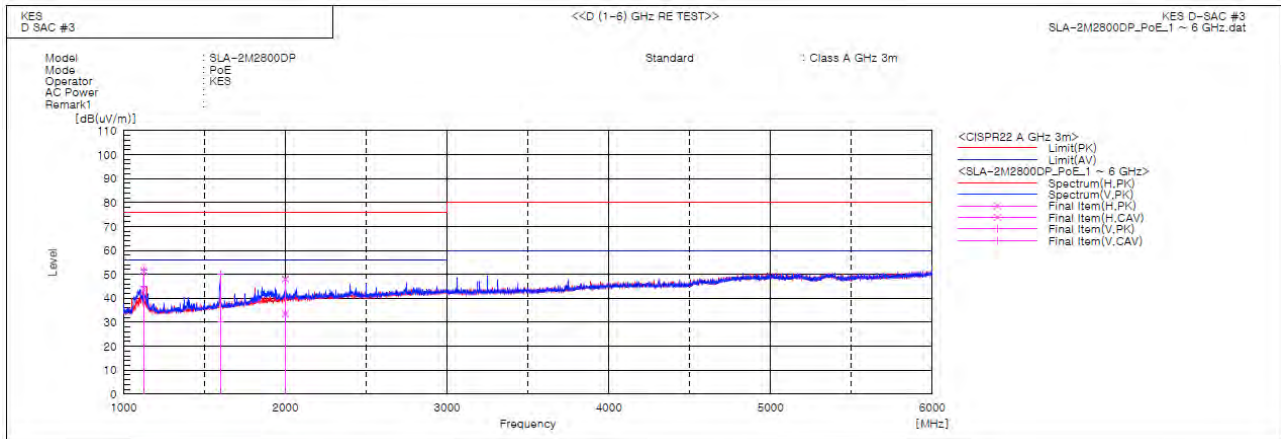


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Test report No.:
KES-E1-18T0061
Page (20) of (27)

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	1124.850	H	60.6	52.8	-9.1	51.5	43.7	76.0	56.0	24.5	12.3	101.0	28.0	
2	1125.060	V	61.0	54.3	-9.1	51.9	45.2	76.0	56.0	24.1	10.8	101.0	349.4	
3	1600.010	V	55.1	35.6	-5.2	49.9	30.4	76.0	56.0	26.1	25.6	101.0	349.3	
4	1999.900	H	49.7	35.2	-1.7	48.0	33.5	76.0	56.0	28.0	22.5	101.0	172.6	

◆ 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 report No.:
KES-E1-18T0061
Page (21) of (27)

Test Setup Photos and Configuration

Conducted Voltage Emissions

N/A

N/A

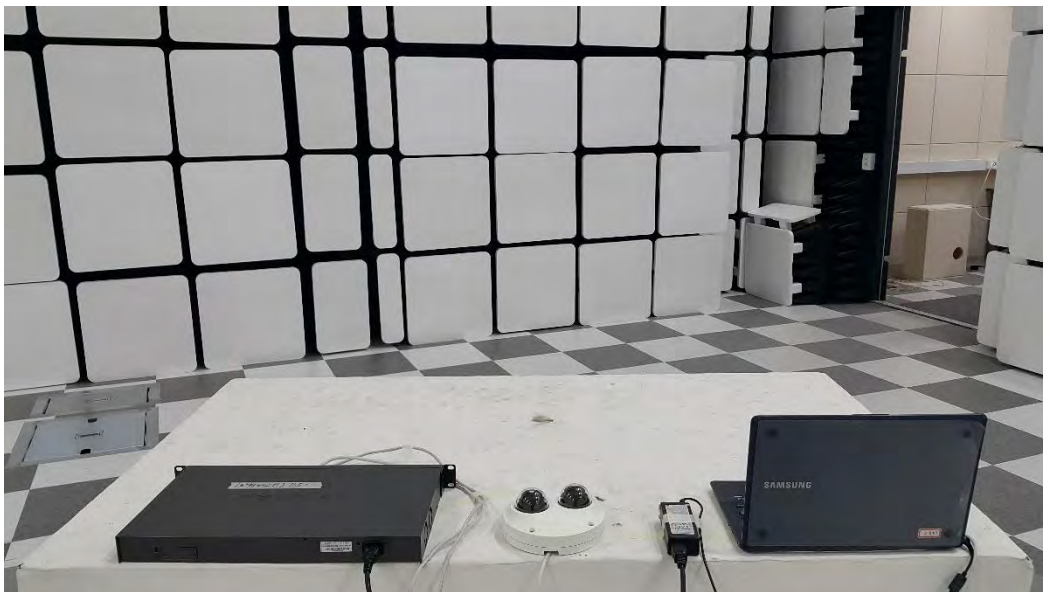
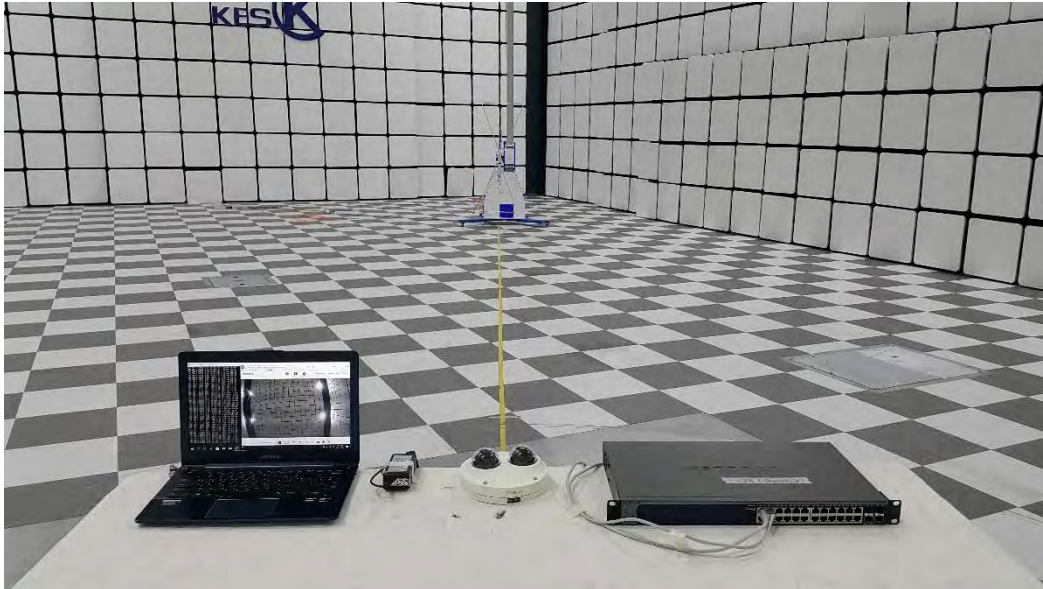
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Conducted Telecommunication Emissions



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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)



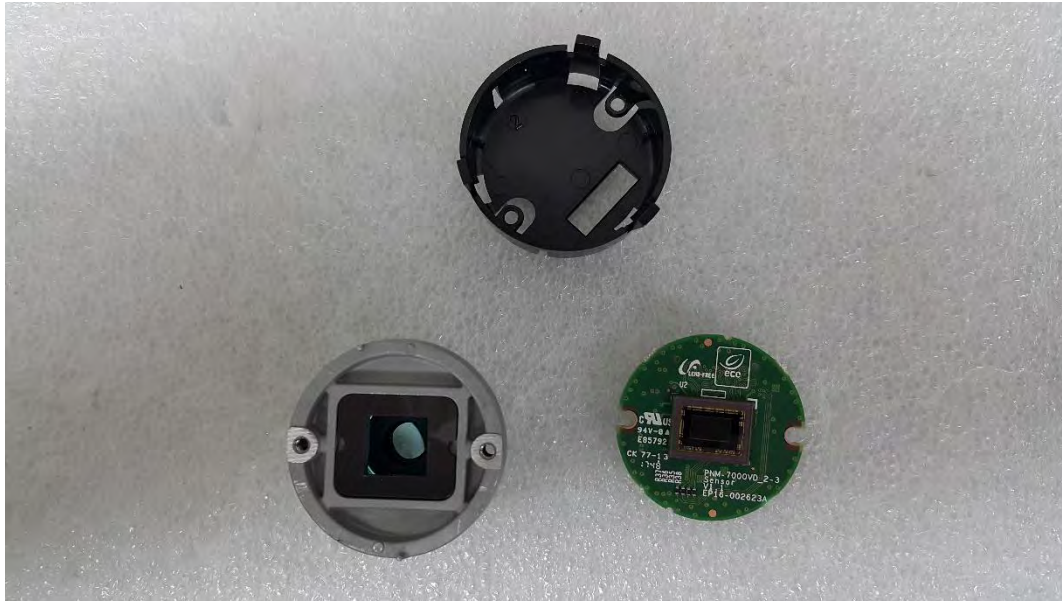
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EUT Internal Photographs

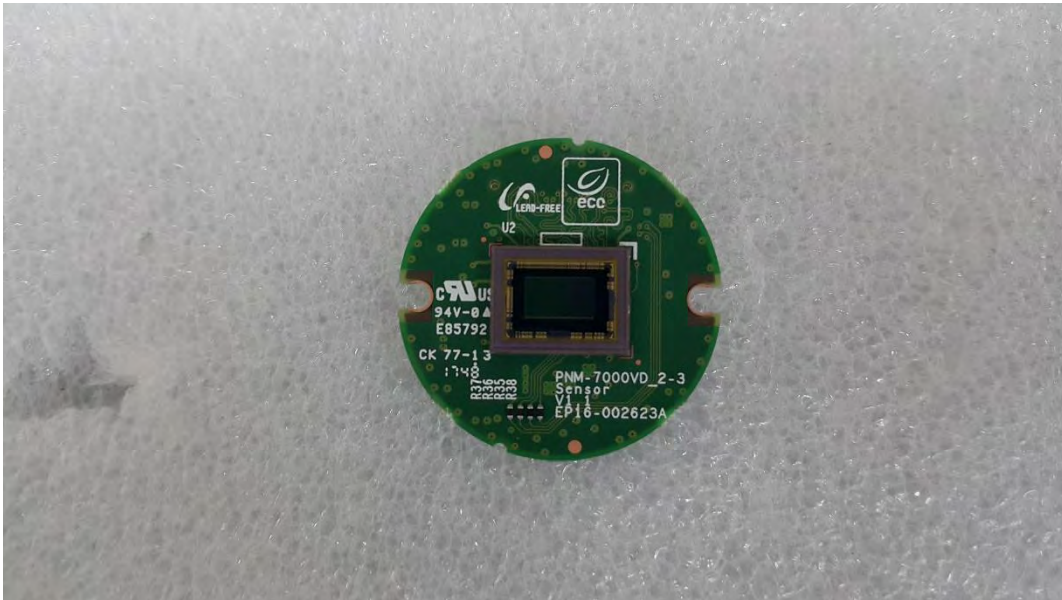
(Internal View)



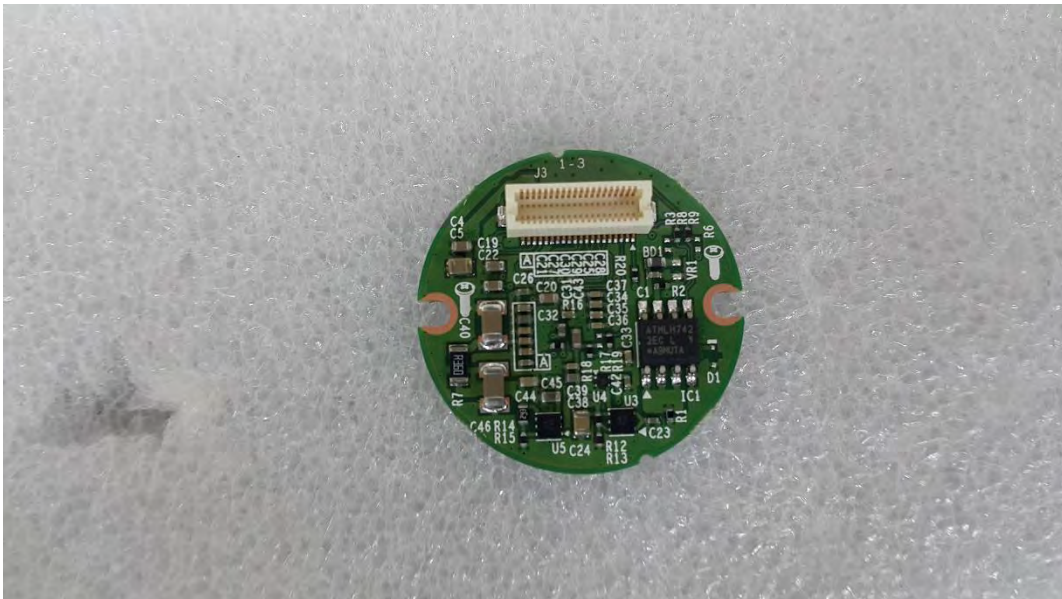
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EUT Internal View – CCD board

(Top)



(Bottom)



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