



EMC TEST REPORT For IC

Test Report No. : KES-E1-17T0491
Date of Issue : Jul. 28, 2017
Product name : DECORDER
Model/Type No. : SPD-150N
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 : Jul. 07, 2017
Test date : Jul. 21, 2017 – Jul. 23, 2017
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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REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Jul. 28, 2017	KES-E1-17T0491	Issued

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1.0 General Product Description

Main Specifications of EUT are:

H/W	CPU		Embedded CPU
	Operating System		Embedded Linux
	Output	HDMI	1ch (up-to 4K)
		VGA	1ch (DB15 1ea)
		CVBS	1ch, 704x480 (30fps), 704x576 (25fps)
	External	Ethernet	1ea (10/100/1000BASE-T)
		USB	USB 2.0 2ea
		Audio In/Out	1 out
	Environmental	Operating Temperature	+0°C to +40°C(+32°F to +104°F)
		Humidity	20% ~ 85% RH
	Electrical	Power	DC12V, PoE(IEEE802.3af)
		Power Consumption	Max. 8.4W(12VDC), Max. 8.4W(PoE)
	Mechanical	Color / Material	Dark Gray
		Dimension (WxHxD)	178 x 34 x 128mm (7.0" x 1.3" x 5.0")
		Weight	Approx. 0.68Kg
S/W	Video	Codec	H.265/H.264/MJPEG
		Network Performance	200Mbps
		Max. Channel	48@D1
		Max. Decoding Performance	30fps@8MP, up-to 12MP
		Division (/monitor)	Clone mode 1/4/6/8/9/13/16/25/36(32)/2V/3V
			Expand mode (HDMI) 1/4/6/8/9/13/16/25/36(32)/2V/3V (VGA) 1/4/6/8/9/13/16/2V/3V
		Layout	Up-to 20
	Audio	Codec	G.711/G.726/AAC
		Management	Local GUI
	Time Setting		NTP/Manual
	Dynamic DNS		미지원



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 ☐ 230 Vac ☒ 120 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
DECORDER	SPD-150N	-	Hanwha Techwin (Tianjin) Co.,Ltd	E.U.T
AC / DC Adaptor	2ACB022F	-	Channel Well Technology (Guangzhou) Co., Ltd.	-
Mouse	MOEIUOA	-	PRIMAX ELECTRONICS LTD.	-

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
POE Adaptor 1	GS728TPP	-	NETGEAR, INC.	-
MONITOR 1	HSTND-7041-L	6CM6020YQQ	HP Inc.	-
MONITOR 2	E2318HN	-	DELL	-
MONITOR 3	SMT-2232	C95V67VF900015Y	Weihai Daewoo Electronics Co., Ltd.	-
Camera	SND-L6013R	-	Hanwha Techwin (Tianjin) Co.,Ltd.	-
POE Adaptor 2	ANY4805C-LT1	10H300002	ANY ELECTRONICS CO., LTD	-
Speaker	BR10000A CUVE	-	BEIJING EDIFIER HI-TECH GROUP.	-

1.6 External I/O Cabling

- AC / DC Adaptor Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
DECORDER (E.U.T)	D-SUB	MONITOR 1	D-SUB	1.6	S
	HDMI	MONITOR 2	HDMI	1.8	S
	BNC	MONITOR 3	BNC	3.0	S
	RJ-45 (DATA)	POE Adaptor 2	RJ-45 (DATA)	3.0	U
	3.5 mm	Speaker	3.5 mm	1.6	U
	USB	Mouse	USB	1.7	U
Camera	RJ-45 (POE)	POE Adaptor 2	RJ-45 (POE)	3.0	U

- POE Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
DECORDER (E.U.T)	RJ-45 (POE)	POE Adaptor 1	RJ-45 (POE)	3.0	U
	D-SUB	MONITOR 1	D-SUB	1.6	S
	HDMI	MONITOR 2	HDMI	1.8	S
	BNC	MONITOR 3	BNC	3.0	S
	3.5 mm	Speaker	3.5 mm	1.6	U
	USB	Mouse	USB	1.7	U
Camera	RJ-45 (POE)	POE Adaptor 1	RJ-45 (POE)	3.0	U

* Unshielded=U, Shielded=S



1.7 EUT Operating Mode(s)

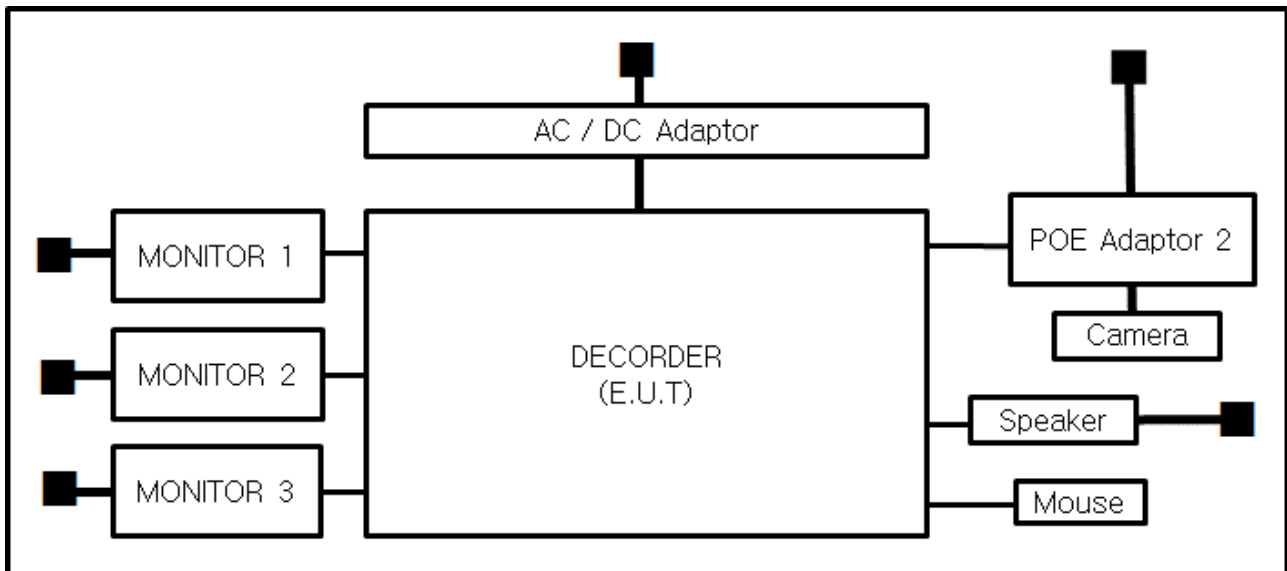
Test mode	operating
AC / DC Adaptor	E.U.T Monitoring
POE	E.U.T Monitoring

E.U.T Test operating S/W		
Name	Version	Manufacture Company
-	-	-

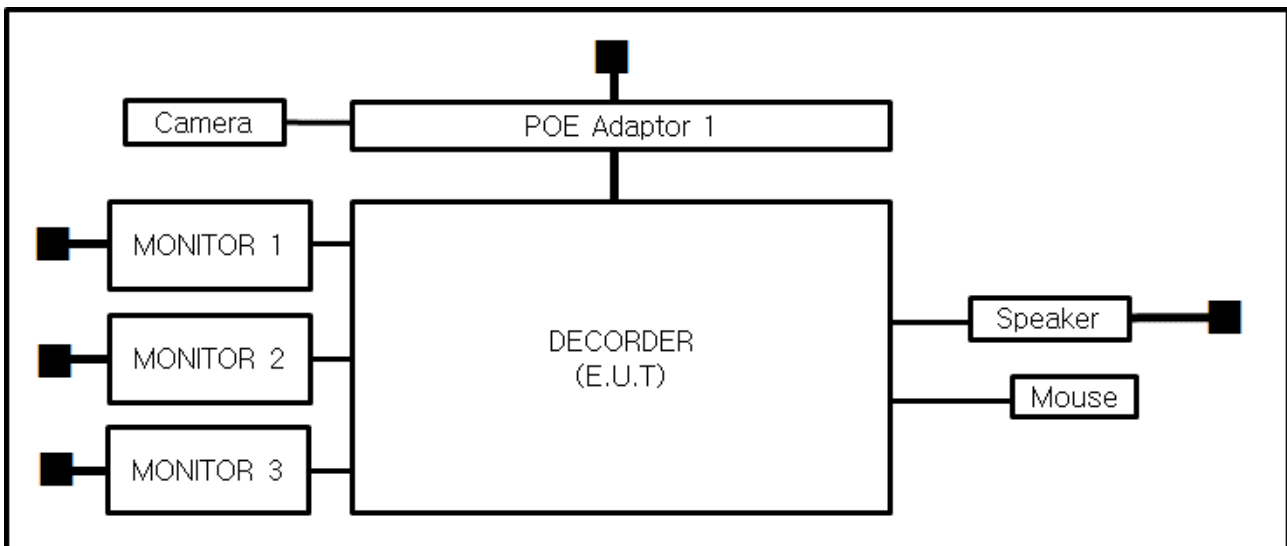
1.8 Configuration

■ AC Main
□ DC Main

- AC / DC Adaptor Mode



- POE Mode



1.9 Remarks when standards applied

- The adaptor is included by the manufacturer.

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, Yeoju-si, Gyeonggi-do, 12658, Korea. The sites are constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22.

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.	 R-4308, C-4798, T-2311, G-914
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)	

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 61547 :2009

☐ EN 55032:2012

☐ Class A

☐ Class B

☐ EN 55024:2010 +A1:2015

☐ EN 50130-4:2011 +A1:2014

☐ EN 61000-3-2:2014

☐ EN 61000-3-3:2013

☐ EN 61326-1:2013



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- | | | |
|--|---|----------------------------------|
| ☐ VCCI V-3 / 2015.04 | ☐ Class A | ☐ Class B |
| ☐ AS/NZS CISPR22:2009 +A1:2010 | ☐ 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 | | |

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2.1 Conducted Emissions Mains Power Ports

Test Date

Jul. 21, 2017

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, 03, 2018
☒	LISN	ENV216	R & S	101786	04, 27, 2018
☒	PULSE LIMITER	ESH3-Z2	R & S	101914	12, 13, 2017

Test Conditions

Temperature: 21,3 °C

Relative Humidity: 44,3. %

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 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Jul. 21, 2017

Test Location

☒ OPEN AREA TEST SITE #2 ☐ SAC #4(10 m)

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	-	-	-	-
☒	EMI TEST RECEIVER	ESVS10	R & S	826008/014	04, 18, 2018
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	714	11, 28, 2018

Test Conditions

Temperature: 31,4 °C

Relative Humidity: 65,0.%

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.



2.3 Radiated Electric Field Emissions(Above 1 GHz)

Test Date

Jul. 23, 2017

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, 08, 2017
☒	PREAMPLIFIER	8449B	AGILENT	3008A01967	05, 31, 2018
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	05, 02, 2019

Test Conditions

Temperature: 23,6 °C

Relative Humidity: 51,9 %

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

Remarks

See Appendix A for test data.

APPENDIX A – TEST DATA

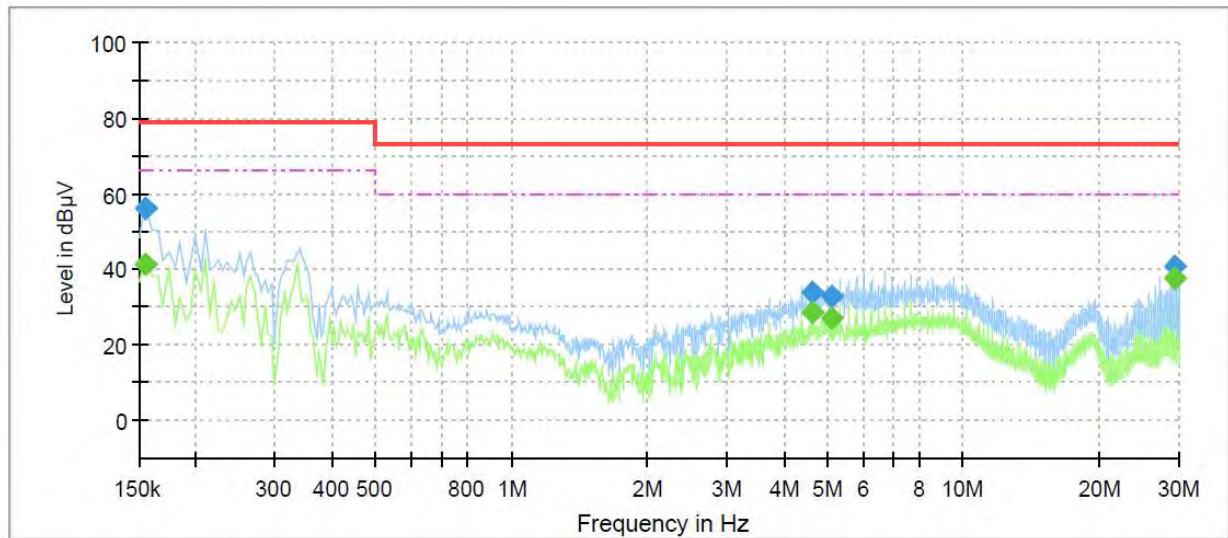
Conducted Emissions at Mains Power Ports

- AC / DC Adaptor Mode

[HOT]

Common Information

Test Description:	Conducted Emission
Model No.:	SPD-150N
Mode	DC_H
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	---	41.23	66.00	24.77	1000.0	9.000	L1	21.0
0.155000	55.88	---	79.00	23.12	1000.0	9.000	L1	21.0
4.640000	---	28.51	60.00	31.49	1000.0	9.000	L1	19.7
4.640000	33.63	---	73.00	39.37	1000.0	9.000	L1	19.7
5.100000	---	26.85	60.00	33.15	1000.0	9.000	L1	19.8
5.100000	32.60	---	73.00	40.40	1000.0	9.000	L1	19.8
29.235000	---	37.68	60.00	22.32	1000.0	9.000	L1	20.3
29.235000	40.56	---	73.00	32.44	1000.0	9.000	L1	20.3

Calculation

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

QuasiPeak / CAverage : The Final Value

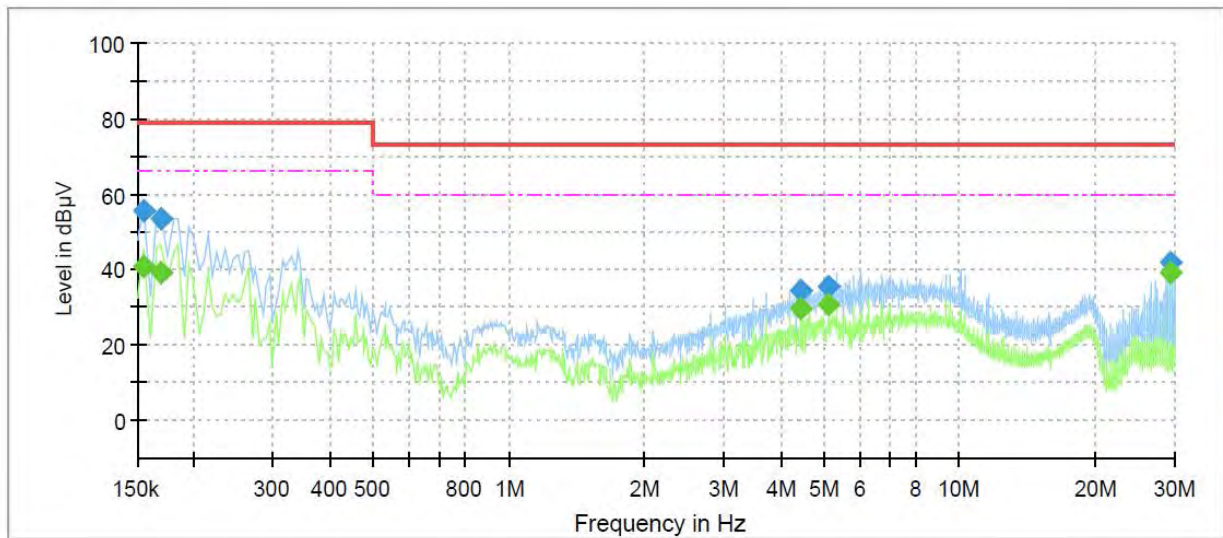
Reading Value : Not shown in the table.

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

[NEUTRAL]

Common Information

Test Description: Conducted Emission
Model No.: SPD-150N
Mode: DC_N
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	---	40.66	66.00	25.34	1000.0	9.000	N	21.0
0.155000	55.51	---	79.00	23.49	1000.0	9.000	N	21.0
0.170000	---	39.33	66.00	26.67	1000.0	9.000	N	20.9
0.170000	53.22	---	79.00	25.78	1000.0	9.000	N	20.9
4.425000	---	29.91	60.00	30.09	1000.0	9.000	N	19.7
4.425000	34.67	---	73.00	38.33	1000.0	9.000	N	19.7
5.120000	---	30.75	60.00	29.25	1000.0	9.000	N	19.8
5.120000	35.32	---	73.00	37.68	1000.0	9.000	N	19.8
29.235000	---	38.99	60.00	21.01	1000.0	9.000	N	20.3
29.235000	41.58	---	73.00	31.42	1000.0	9.000	N	20.3

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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



Radiated Electric Field Emissions(Below 1 GHz)

- AC / DC Adaptor Mode

Frequency	Amplitude	ANT	ANT. Height	Correction Factor		Corrected Amplitude	Applicable Limit	Margin [dB]
[MHz]	[dB μ V]	Polar. (H/V)	[m]	ANT. [dB/m]	Cable [dB]	[dB μ V/m]	[dB μ V/m]	
102.35	19.20	V	1.02	11.31	2.32	32.83	40.00	7.17
148.62	24.40	V	1.01	7.84	2.78	35.02	40.00	4.98
223.16	14.90	H	3.98	12.12	3.40	30.42	40.00	9.58
299.89	25.60	V	1.00	13.42	4.10	43.12	47.00	3.88
449.86	20.10	H	3.99	16.48	5.11	41.69	47.00	5.31
933.18	12.50	H	4.00	23.51	7.50	43.51	47.00	3.49

* H : Horizontal, V : Vertical

◆ Calculation

Corrected Amplitude [dB μ V] = Amplitude[dBuV] + Correction Factor [dB]

Corrected Amplitude : The Final Value, Amplitude : Reading Value,

Correction Factor : ANT FACTOR + Cable loss



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- POE Mode

Frequency	Amplitude	ANT	ANT. Height	Correction Factor		Corrected Amplitude	Applicable Limit	Margin
[MHz]	[dBμV]	Polar. (H/V)	[m]	ANT. [dB/m]	Cable [dB]	[dBμV/m]	[dBμV/m]	[dB]
44.69	22.50	V	1.00	13.08	1.60	37.18	40.00	2.82
112.42	21.30	V	1.02	9.87	2.41	33.58	40.00	6.42
148.13	18.20	H	3.98	7.82	2.78	28.80	40.00	11.20
148.86	26.40	V	1.01	7.85	2.79	37.04	40.00	2.96
399.85	24.10	H	4.00	15.61	4.60	44.31	47.00	2.69
932.64	13.00	H	3.99	23.49	7.50	43.99	47.00	3.01

* H : Horizontal, V : Vertical

◆ Calculation

Corrected Amplitude [dBμV] = Amplitude[dBuV] + Correction Factor [dB]

Corrected Amplitude : The Final Value, Amplitude : Reading Value,

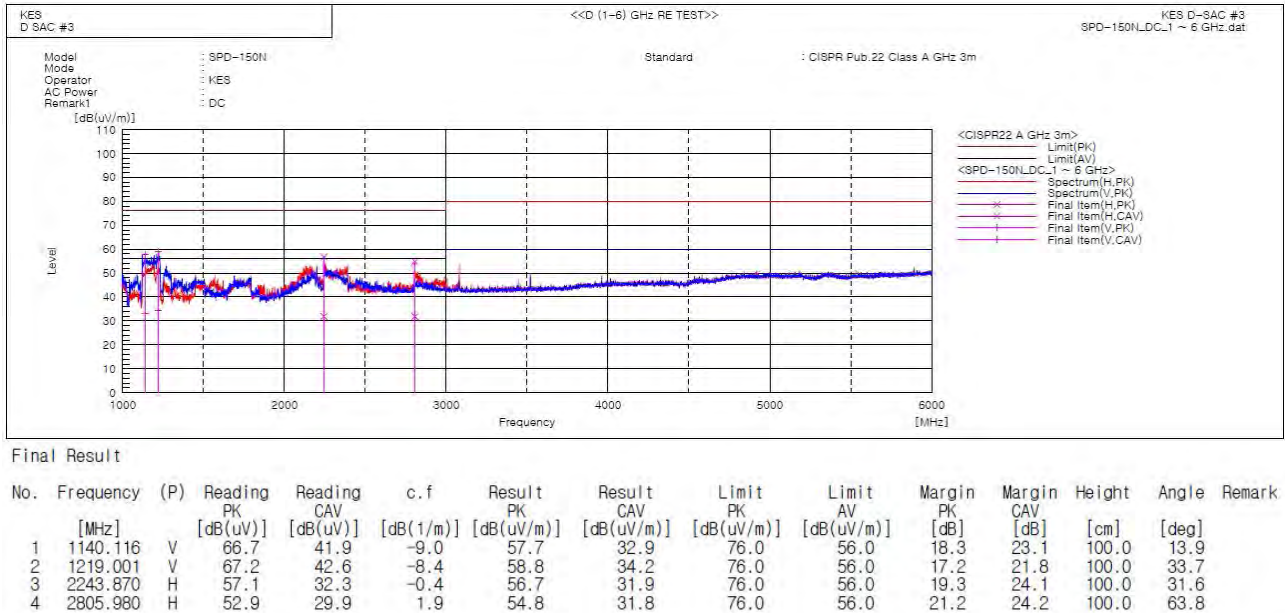
Correction Factor : ANT FACTOR + Cable loss

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Radiated Electric Field Emissions(Above 1 GHz)

- AC / DC Adaptor Mode



◆ 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



KES Co., Ltd.

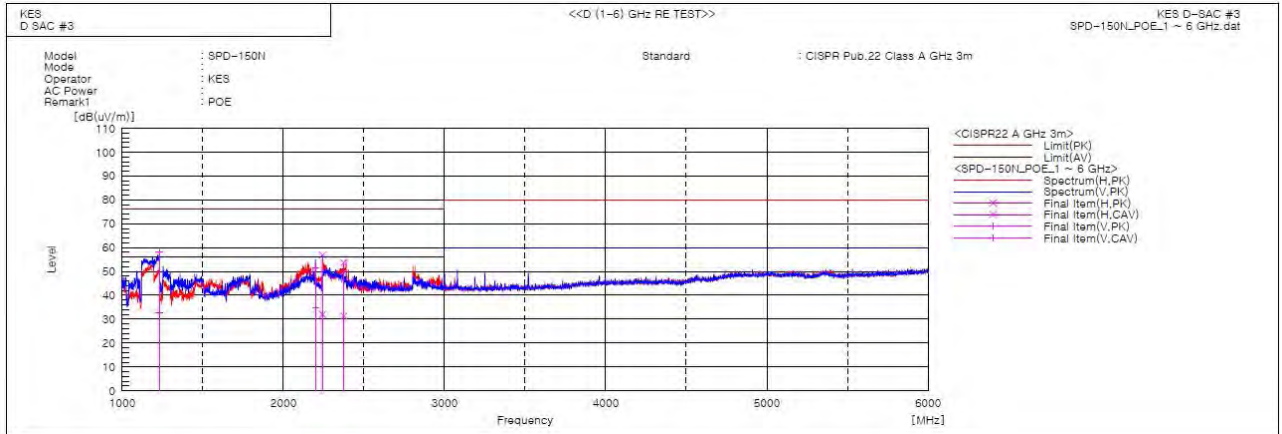
C-3701, Simin-daero 365-40,
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- POE Mode



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	1230.068	V	66.4	41.0	-8.3	58.1	32.7	76.0	56.0	17.9	23.3	100.0	31.5	
2	2199.490	V	52.0	35.2	-0.6	51.4	34.6	76.0	56.0	24.6	21.4	100.0	10.6	
3	2243.330	H	57.2	32.4	-0.4	56.8	32.0	76.0	56.0	19.2	24.0	100.0	30.0	
4	2375.623	H	53.5	31.2	0.1	53.6	31.3	76.0	56.0	22.4	24.7	100.0	49.3	

◆ 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 Setup Photos and Configuration

Conducted Voltage Emissions



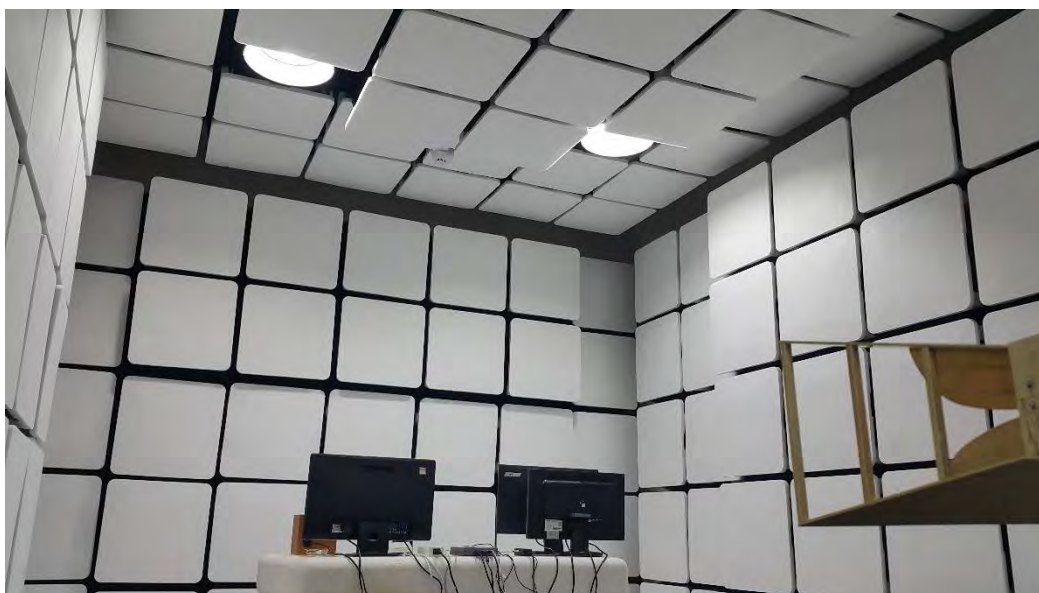
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Radiated Electric Field Emissions(Below 1 GHz)



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Radiated Electric Field Emissions(Above 1 GHz)



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EUT External Photographs

(Top)



(Bottom)



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The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

EUT Internal Photographs

(Internal View)



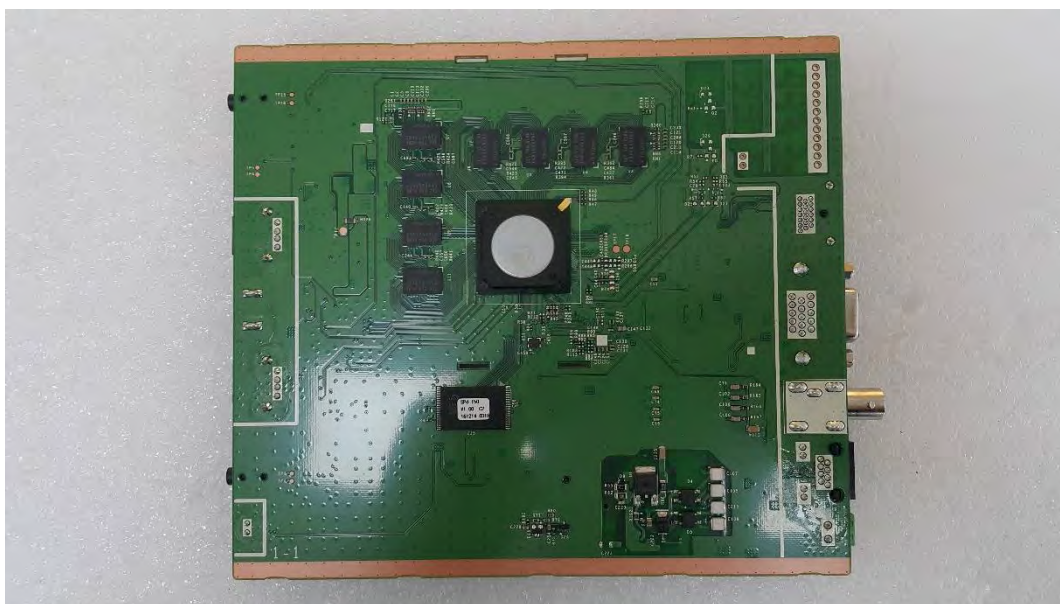
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EUT Internal View – Board

(Top)

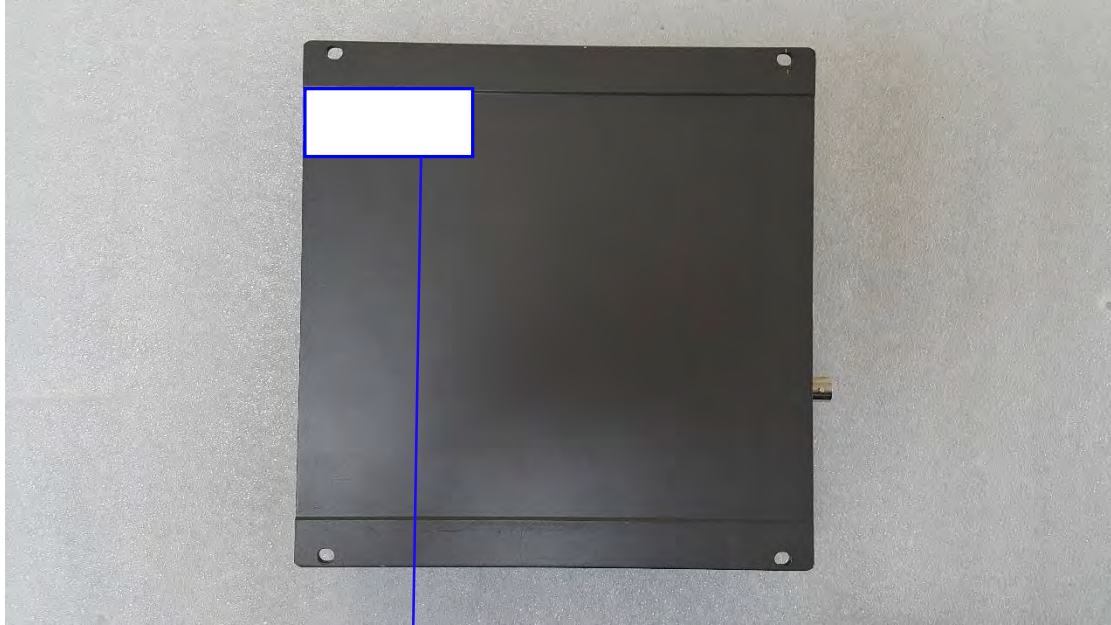


(Bottom)



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Label Photographs



CAN ICES-3 (A)/NMB-3(A)

[LABEL VIEW]