



EMC TEST REPORT

Test Report No. : KES-EM-21T0155
Date of Issue : Mar 12, 2021
Product Name : DECORDER
Model/Type No. : SPD-151
Variant Model : -
Applicant : Hanwha Techwin Co., Ltd.
Applicant Address : 6, Pangyo-ro 319Beon-gil, Bundang-gu, Seongnam-si,
Gyeonggi-do, Republic of Korea
Manufacturer : 1. HANWHA TECHWIN SECURITY VIETNAM CO.,LTD
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 : Feb 09, 2021
Test Date : Mar 02, 2021 ~ Mar 05, 2021
Test Results : ☒ In Compliance ☐ Not in Compliance

Tested by

Dae Jung, Choi
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.

**KES Co., Ltd.**

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REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Mar 12, 2021	KES-EM-21T0155	Issued

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1.0 General Product Description

Main Specifications of EUT are:

NETWORK		
CPU		Embedded CPU
Operating System		Embedded Linux
Output	HDMI	1ea (up-to 4K)
	VGA	1ea (up-to 1080p)
	CVBS	1ch (BNC 1ea)
	Video-out Format	3840 X 2160@60HZ/30HZ (HDMI1), 2560 X 1440@60HZ/30HZ (HDMI1), 1920 X 1080@60HZ, 1280 X 1024@60H, 1280 X 720@60Hz
External	Ethernet	1ea (10/100/1000BASE-T)
	USB	USB 2.0 2ea
	Audio Out	1 out
	LED	Power, Network
ENVIRONMENTAL		
Operating Temperature		0°C ~ +40C (+32°F ~ +104°F)
Humidity		20% ~ 85% RH
ELECTRICAL		
Power		12V DC, PoE (IEEE802.3af)
Power Consumption		Max. 21.6W (12V DC), Max. 12.95W (PoE)
MECHANICAL		
Color / Material		Dark Gray / Metal
Dimension (WxHxD)		178.0 x 34.0 x 187.8mm (7.01" x 1.34" x 7.39")
Weight		Approx. 0.68Kg (1.50 lb)

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SOFTWARE

Video	Codec	H.265/H.264/MJPEG
	Max. Decoding Performance	16 X 2M (1080P)@30fp, 8MP@30fps
	Max. Decoding Resolution	Up-to 12MP
	Max. Decoding Bandwidth	200Mbps
	Division (/Monitor)	(HDMI) 1/2x2/3x3/4x4/5x5/6x6(32Ch Only) (VGA) 1/2x2/3x3/4x4 (BNC) 1
	Layout	Up-to 20ea/monitor, Sequence support
Merge	Monitor Merge	1x2, 2x1
	Tile Merge	Support
Audio	Codec	G.711/G.726/AAC
Management		Web-Viewer, SSM
Time Setting		NTP / Manual
Export / Import		Configuration Export/Import
Log		Max.20000 (System log, Event log each)
Protocol		Over SUNAPI 2.3

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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.

Voltage ☒ 230 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-151	-	HANWHA TECHWIN SECURITY VIETNAM CO.,LTD	EUT

1.5 System Configuration

Description	Model Number	Serial Number	Manufacturer	Remarks
-	-	-	-	-

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1.6 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
Notebook	ProBook4430s	-	HP	-
Notebook Adaptor	SeriesPPP0009H	-	CHICONY POWER TECHNOLOGY (SUZHOU) CO.,LTD,	-
PoE Adaptor	GS728TPP	-	NETGEAR	-
Adaptor	2ACB022F	-	Channel Well Technology (Guangzhou) Co.,Ltd.	-
USB Memory	-	-	Sandisk	-
Speaker	BR1000A Cuve Black 2	-	DONGGUAN EDIFIER TECHNOLOGY Co., Ltd	-
Smart Phone	LG-SU760	108KPQJ0186212	LG	-
Camera	QND-6070RCH	-	Weihai Daewoo Electronics Co., Ltd.	-
Monitor1	SMT-2232	-	Weihai Daewoo Electronics Co., Ltd.	-
Monitor2	SMT-2232	-	Weihai Daewoo Electronics Co., Ltd.	-
Monitor3	LT23C350	009MHYCH106388P	SAMSUNG ELECTRONIC JAPAN Co., Ltd	-
Monitor3 Adaptor	A4514_DDY	CN07BN44-00593BD07G690189	SAMSUNG ELECTRONIC JAPAN Co., Ltd.	-

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1.7 External I/O Cabling

■ DC Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
DECORDER (EUT)	RJ-45	PoE Adaptor	RJ-45	3.0	U
	3.5 mm	Speaker	3.5 mm	1.7	U
	BNC	Monitor1	BNC	3.0	S
	HDMI	Monitor2	HDMI	1.6	S
	D-sub	Monitor3	D-sub	1.7	S
	USB	USB Memory	USB	-	-
	External ground	Ground	External ground	3.0	U
Notebook	RJ-45	PoE Adaptor	RJ-45	3.0	U
	3.5 mm	Smart Phone	3.5 mm	0.5	U
Camera	RJ-45	PoE Adaptor	RJ-45	3.0	U

* Unshielded=U, Shielded=S



■ PoE Mode

Start		END		Cable Spec.	
Description	I / O Port	Description	I / O Port	Length	Shield
DECORDER (EUT)	RJ-45	PoE Adaptor	RJ-45	3.0	U
	3.5 mm	Speaker	3.5 mm	1.7	U
	BNC	Monitor1	BNC	3.0	S
	HDMI	Monitor2	HDMI	1.6	S
	D-sub	Monitor3	D-sub	1.7	S
	USB	USB Memory	USB	-	-
	External ground	Ground	External ground	3.0	U
Notebook	RJ-45	PoE Adaptor	RJ-45	3.0	U
	3.5 mm	Smart Phone	3.5 mm	0.5	U
Camera	RJ-45	PoE Adaptor	RJ-45	3.0	U

* Unshielded=U, Shielded=S

1.7 EUT Operating Mode(s)

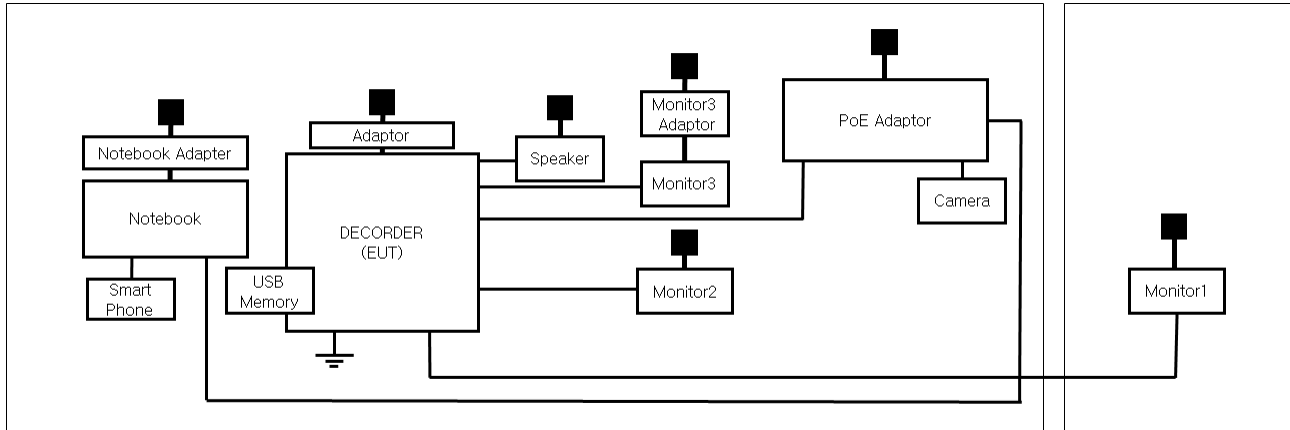
Test mode	operating
DC	Monitoring EUT Using Web Viewer, Ping Test
PoE	Monitoring EUT Using Web Viewer, Ping Test

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

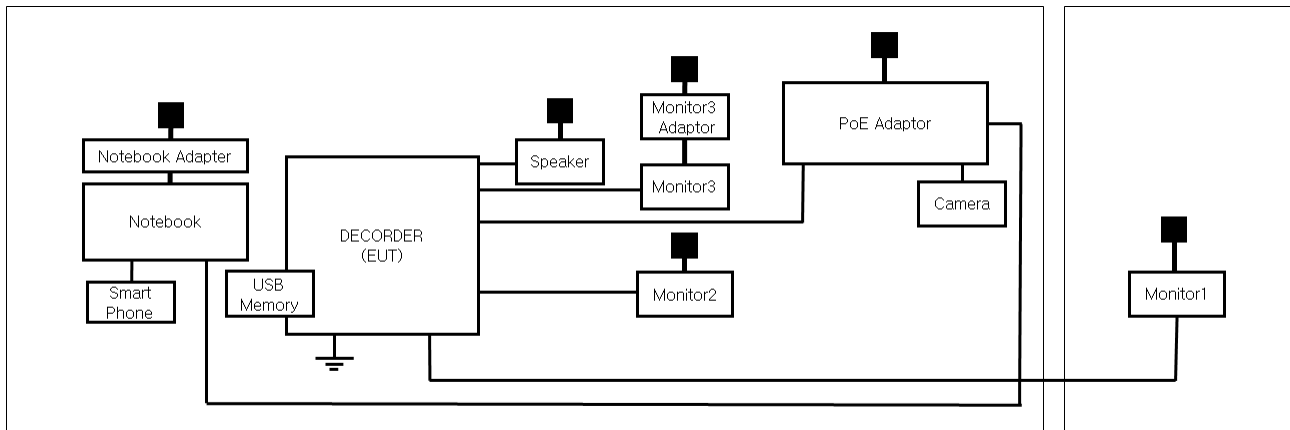
1.8 Configuration

■ AC Main (AC 230 V, 50 Hz)

■ DC Mode



■ PoE Mode



1.9 Remarks When Standards Applied

- Radiated Electric Field Emissions(Below 1 GHz), Radiated Electric Field Emissions(Above 1 GHz)
 , During the Radiated Electric Field Immunity test, peripheral devices were installed outside and tested.

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 C63.4:2014 and CISPR 16-1-4:2012

1.12 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
KOREA	RRA	EMI (3 m & 10 m Semi-Anechoic Chamber , 10 m Open Area 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, 10 m Open Area and 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	Mains Ports Conducted Interference Measurement, Telecommunication Ports Conducted Disturbance Measurement and Radiation 10 meter site, Facility for measuring radiated disturbance above 1 GHz	 R-20056, C-20036, T-20040, G-20057
Europe	TÜV SÜD	EMI (3 m & 10 m Semi-Anechoic Chamber , 10 m Open Area 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:

☒ **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/AC:2013

☐ Class A

☐ Class B

☐ EN 55024:2010 +A1:2015

☐ EN 50130-4:2011

☐ EN 50121-3-2:2016

☒ EN 50121-4:2016

☒ EN 61000-3-2:2014

☒ EN 61000-3-3:2013

☐ EN 61326-1:2013



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-
- | | | |
|---|----------------------------------|----------------------------------|
| ☐ VCCI-CISPR 32:2016 | ☐ Class A | ☐ Class B |
| ☐ AS/NZS CISPR32:2015 | ☐ Class A | ☐ Class B |
| ☐ 47 CFR Part 15, Subpart B | | |
| ☐ CISPR 22:2009 +A1:2010 | ☐ Class A | ☐ Class B |
| ☐ ANSI C63.4-2014 | | |
| ☐ 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 V2.2.3 | | |
| ☐ 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 at Mains Power Ports

Test Date

Mar 02, 2021

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	Jan 15, 2022
☒	LISN	ENV216	R & S	101787	Dec 29, 2021
☒	LISN	ESH2-Z5	R & S	100450	Dec 29, 2021
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	Dec 29, 2021

Test Conditions

Temperature: (23,6 ± 0,1) °C

Relative Humidity: (45,7 ± 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.



2.2 Conducted Emissions at Telecommunication Ports

Test Date

Mar 02, 2021

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	Jan 15, 2022
☒	LISN	ENV216	R & S	101787	Dec 29, 2021
☒	LISN	ESH2-Z5	R & S	100450	Dec 29, 2021
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	Dec 29, 2021
☐	8-WIRE ISN CAT3,5	ENY81	R & S	100174	Dec 30, 2021
☒	8-WIRE ISN CAT6	ENY81-CAT6	R & S	101665	Dec 30, 2021

Test Conditions

Temperature: (23,6 ± 0,1) °C

Relative Humidity: (45,7 ± 0,2) % 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 Impulse Noise (click)

Test Date

N/A

Test Location

Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☐	EMI Test S/W	AFJ Click Meter	AFJ	6.05	-
☐	CLICK METER	CL55C	AFJ INSTRUMENTS	55041222168	Aug 05, 2021
☐	LISN	ENV216	R & S	101787	Dec 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

N/A



2.4 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Mar 02, 2021

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	Apr 01, 2021
☒	AMPLIFIER	SCU 01	R & S	100603	Nov 25, 2021
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	Dec 08, 2022
☒	ATTENUATOR	8491A	HP	32173	Mar 10, 2022

Test Conditions

Temperature: (22,3 ± 0,2) °C

Relative Humidity: (43,0 ± 0,3) % 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.



2.5 Radiated Electric Field Emissions(Above 1 GHz)

Test Date

Mar 02, 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	Aug 05, 2021
☒	PREAMPLIFIER	8449B	AGILENT	3008A01967	Apr 20, 2021
☐	ATTENUATOR	8491A	HP	35496	Mar 10, 2022
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	Mar 11, 2021

Test Conditions

Temperature: (22,8 ± 0,2) °C

Relative Humidity: (41,0 ± 0,2) % 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

Remarks

See Appendix A for test data.



2.6 Harmonic Current Emissions

Test Date

Mar 03, 2021

Test Location

Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	net.control	EM TEST	2.1.4	-
☒	DIGITAL POWER ANALYZER	DPA 500N	EM TEST	V1024106759	Apr 06, 2021
☒	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

Test Conditions

Temperature: (23,7 ± 0,2) °C

Relative Humidity: (47,5 ± 0,2) % R.H.

Classification of Equipment for Harmonic Current Emissions

- ☒ Class A
- ☐ Class B
- ☐ Class C(Below 25 W)
- ☐ Class C(Above 25 W)
- ☐ Class D

Test Results

The requirements are:

- ☒ PASS
- ☐ NOT PASS
- ☐ NOT APPLICABLE

Remarks

See Appendix A for test data.



2.7 Voltage Fluctuations and Flicker

Test Date

Mar 03, 2021

Test Location

Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	net.control	EM TEST	2.1.4	-
☒	DIGITAL POWER ANALYZER	DPA 500N	EM TEST	V1024106759	Apr 06, 2021
☒	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

Test Conditions

Temperature: (23,7 ± 0,2) °C

Relative Humidity: (47,5 ± 0,3) % R.H.

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.

3.0 Criteria for Compliance

Criteria for compliance was based on the following guidelines:

General performance criteria

The general principles (performance criteria) for the evaluation of the immunity test results are the following.

Performance criterion A

The apparatus shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

Performance criterion B

The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

Performance criterion C

Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.



3.1 Electrostatic Discharge

Reference Standard

EN 61000-4-2:2009

Test Date

Mar 05, 2021

Test Location

EMS-ESD: Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	ESD SIMULATOR	ESS-2000	Noise Ken	ESS01Z0454	Feb 01, 2022
☒	HCP	-	KES	-	-
☒	VCP	-	KES	-	-

Test Conditions

Temperature: (23,4 ± 0,1) °C
Relative Humidity: (46,1 ± 0,2) % R.H.
Atmospheric Pressure: 100,7 kPa

Test Specifications

Discharge Factor: ≥ 1 s

Discharge Impedance: 330 ohm / 150 pF

Kind of Discharge: Air, Contact (direct and indirect)

Polarity: Positive and Negative

Number of Discharge: 10 at all locations for Air discharge
10 at all locations for Contact discharge

Discharge Voltage:	Contact	Air	HCP	VCP
	☒ 2 kV	☒ 2 kV	☒ 2 kV	☒ 2 kV
	☒ 4 kV	☒ 4 kV	☒ 4 kV	☒ 4 kV
	☒ 6 kV	☐ 6 kV	☒ 6 kV	☒ 6 kV
	☐ 8 kV	☒ 8 kV	☐ 8 kV	☐ 8 kV
	☐ 15 kV	☐ 15 kV	☐ 15 kV	☐ 15 kV

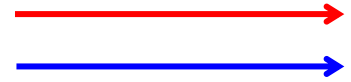
Notes: HCP: Horizontal Coupling Plane

VCP: Vertical Coupling Plane

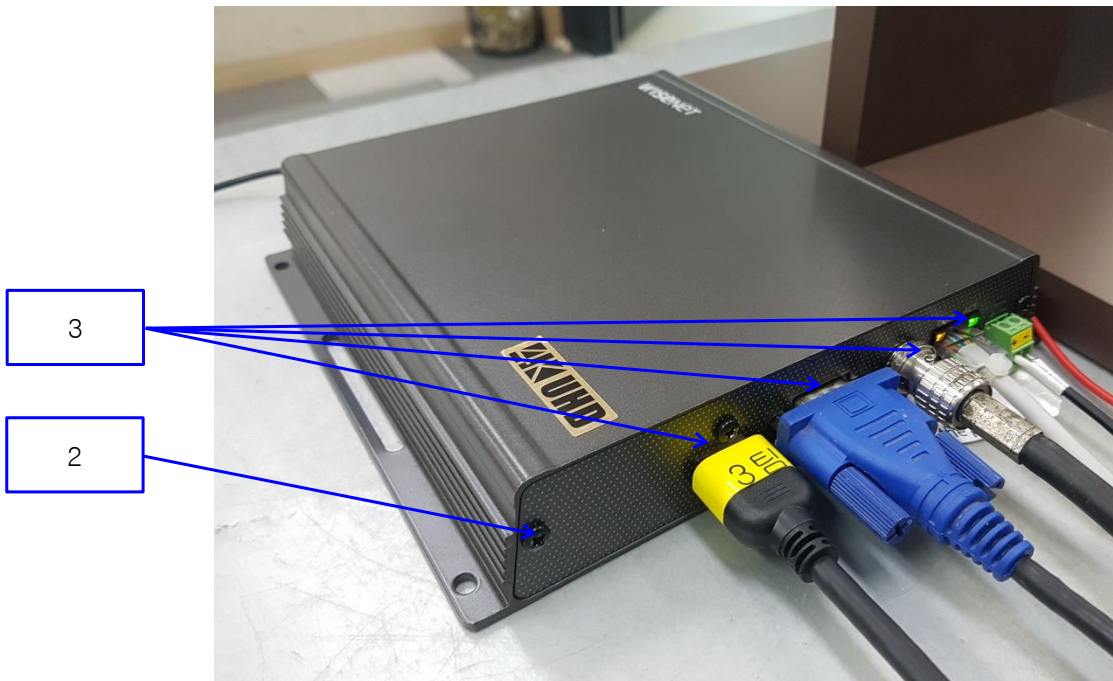
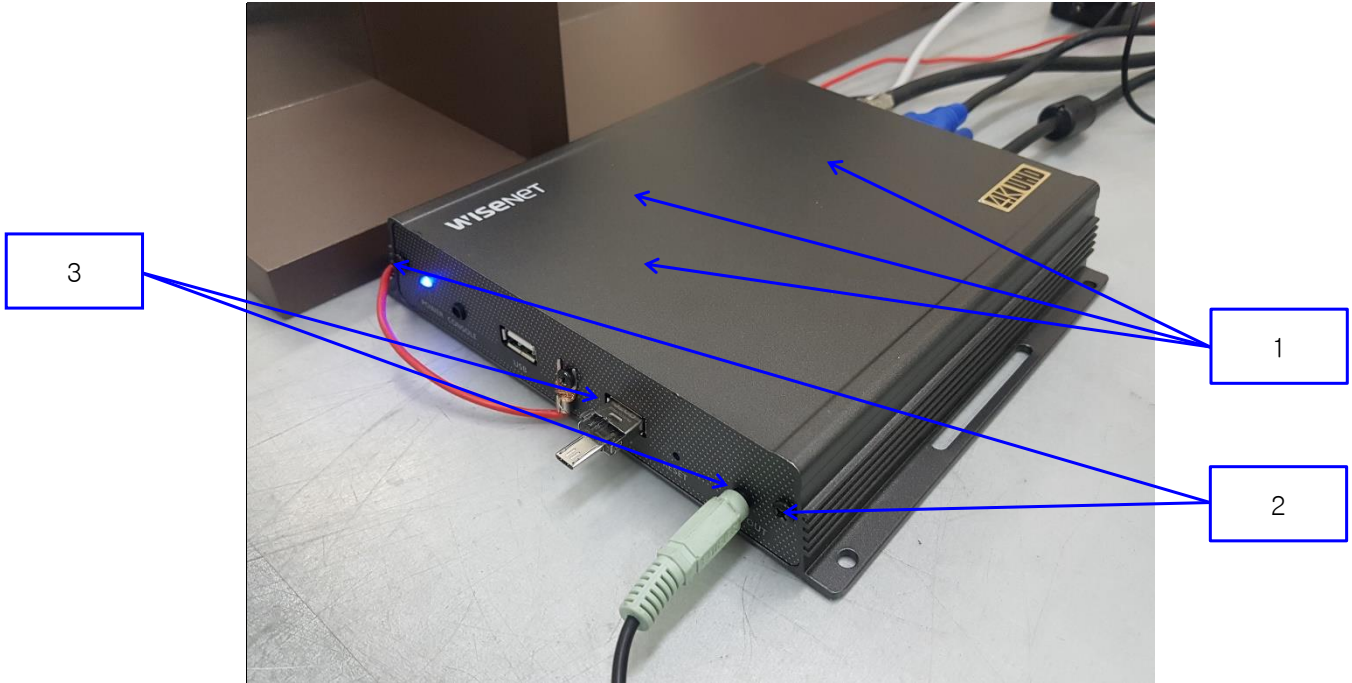
Required Performance Criteria: ☒ B

Location of Discharge:

Air
Contact



■ DC Mode



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■ PoE Mode





Test Data

■ DC Mode

Indirect Discharge

No.	Test Point	Discharge Method	Observations	Remarks
1	HCP Contact	Contact Discharge	A	-
2	VCP Contact	Contact Discharge	A	-

Direct Discharge

No.	Test Point	Discharge Method	Observations	Remarks
1	Enclosure	Contact Discharge	A	-
2	Screw	Contact Discharge	A	-
3	Around the port	Contact Discharge	A	-

Note: "Blank" = Not performed

■ PoE Mode

Indirect Discharge

No.	Test Point	Discharge Method	Observations	Remarks
1	HCP Contact	Contact Discharge	A	-
2	VCP Contact	Contact Discharge	A	-

Direct Discharge

No.	Test Point	Discharge Method	Observations	Remarks
1	Enclosure	Contact Discharge	A	-
2	Screw	Contact Discharge	A	-
3	Around the port	Contact Discharge	A	-

Note: "Blank" = Not performed

Observations:

- A – No response observed from EUT
- B – Unit shuts down then automatically restarts when full voltage is restored.
- C – Unit shuts down then manually restarts when full voltage is restored or Loss of function.

Test Results

- ☒ PASS Required Performance Criteria
- ☐ NOT PASS Required Performance Criteria

Remarks

PASS Required Performance Criteria.



3.2 Radio-frequency Electromagnetic Field

Reference Standard

EN 61000-4-3:2006+A2:2010

Test Date

Mar 03, 2021

Test Location

EMS-RS: ☒ SEMI ANECHOIC CHAMBER #3 ☐ SEMI ANECHOIC CHAMBER #4(10 m)

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	EMC32	R & S	9.12.00	-
☒	SIGNAL GENERATOR	SMB 100A	Rohde & Schwarz	108252	Aug 05, 2021
☒	HIGH POWER DUAL AMP	SSA532	SUNGSAN	SSA532-001	-
☒	POWER METER	E4419B	Agilent	GB40203000	Apr 20, 2021
☒	CW POWER SENSOR	E4412A	Agilent	US38488240	Apr 20, 2021
☒	CW POWER SENSOR	E4412A	Agilent	MY41501662	Apr 20, 2021
☒	STACKED DOUBLE LOG-PER- ANTENNA	STPL9128 E	Schwarzbeck	9128ES-121	-
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM, INC	781	Mar 11, 2021

Test Conditions

Temperature: (21,9 ± 0,3) °C
Relative Humidity: (41,3 ± 0,4) % R.H.
Atmospheric Pressure: 101,3 kPa



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Test Specifications

Antenna Polarization: Horizontal & Vertical unless indicated otherwise

Antenna Distance: ☒ 3 m

Frequency Range: ☒ 80 MHz to 800 MHz [10V/m]
[Field Strength] ☒ 800 MHz to 1 GHz [20 V/m]
☒ 1,4 GHz to 2,0 GHz [10 V/m]
☒ 2,0 GHz to 2,7 GHz [5 V/m]
☒ 5,1 GHz to 6,0 GHz [3 V/m]

Modulation: ☒ AM, 80 %, 1 kHz sine wave
☐ PM, 1 Hz (0,5 s ON : 0,5 s OFF)

Frequency Step: ☒ 1 % step

Dwell Time: ☐ 1 s ☒ 3 s

of Sides Radiated: ☒ 4

Required Performance Criteria: ☒ A

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Test Data

■ DC Mode

Side Exposed	Observations	
	Horizontal	Vertical
Front	A	A
Right	A	A
Back	A	A
Left	A	A

■ PoE Mode

Side Exposed	Observations	
	Horizontal	Vertical
Front	A	A
Right	A	A
Back	A	A
Left	A	A

Note: "Blank" = Not performed

Observations:

- A – No response observed from EUT
- B – Unit shuts down then automatically restarts when full voltage is restored.
- C – Unit shuts down then manually restarts when full voltage is restored or Loss of function.

Test Results

- ☒ PASS Required Performance Criteria
- ☐ NOT PASS Required Performance Criteria

Remarks

PASS Required Performance Criteria.



3.3 Fast Transients

Reference Standard

EN 61000-4-4:2012

Test Date

Mar 05, 2021

Test Location

EMS-EFT: Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	iec.control	EM TEST	5.4.7	-
☒	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	Nov 26, 2021
☒	MOTOR VARIAC	MV2616	EM TEST	P1552169719	Nov 26, 2021
☐	3-PHASE CDN	CNI 503B8	EM TEST	P1622180299	Nov 27, 2021
☒	CAPACITIVE COUPLING CLAMP	HFK	EM TEST	P1633183115	Nov 26, 2021

Test Conditions

Temperature: (23,4 ± 0,2) °C
Relative Humidity: (46,1 ± 0,2) % R.H.
Atmospheric Pressure: 100,7 kPa

Test Specifications

Pulse Amplitude & Polarity:
(Power Lines) ☐ ± 1.0 kV ☒ ± 2.0 kV
☐ ± 4.0 kV

Pulse Amplitude & Polarity:
(Signal Lines) ☐ ± 0.5 kV ☐ ± 1.0 kV
☒ ± 2.0 kV

Pulse Amplitude & Polarity:
(Earth Lines) ☒ ± 1.0 kV

Burst Period: ☒ 300 ms ☐ 2 s

Repetition Rate: ☒ 5 kHz ☐ 100 kHz

Duration of Test Voltage: ☒ ≥ 1 min

Required Performance Criteria: ☒ A

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Test Data**■ DC Mode**☒ Input a.c. power ports – Coupling/Decoupling Network used

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
L	A	A
N	A	A
PE	-	-
L – N	A	A
L – PE	-	-
N – PE	-	-
L – N – PE	-	-

☒ Signal ports and telecommunication ports – Coupling Clamp used

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
RJ-45 (LAN)	A	A
BNC	A	A

☒ Earth ports – Coupling Clamp used

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
Ground	A	A

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■ PoE Mode

☐ Input a.c. power ports – Coupling/Decoupling Network used

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
-	-	-

☒ Signal ports and telecommunication ports – Coupling Clamp used

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
RJ-45 (PoE)	A	A
BNC	A	A

☒ Earth ports – Coupling Clamp used

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
Ground	A	A

Note: "Blank" = Not performed

Observations:

- A – No response observed from EUT
- B – Unit shuts down then automatically restarts when full voltage is restored.
- C – Unit shuts down then manually restarts when full voltage is restored or Loss of function.

Test Results

- ☒ PASS Required Performance Criteria
- ☐ NOT PASS Required Performance Criteria

Remarks

PASS Required Performance Criteria.



3.4 Surges

Reference Standard

EN 61000-4-5:2014

Test Date

Mar 05, 2021

Test Location

EMS-Surge: Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	iec.control	EM TEST	5.4.7	-
☒	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	Nov 26, 2021
☒	MOTOR VARIAC	MV2616	EM TEST	P1552169719	Nov 26, 2021
☐	3-PHASE CDN	CNI 503B8	EM TEST	P1622180299	Nov 26, 2021
☒	CDN	CNV 508N1	EM TEST	P1610176296	Nov 27, 2021
☐	CDN	CNV 504N7.3	EM TEST	P1744207079	Nov 26, 2021

Test Conditions

Temperature: (23,4 ± 0,2) °C
Relative Humidity: (46,1 ± 0,3) % R.H.
Atmospheric Pressure: 100,7 kPa



Test Specifications

AC Power Lines

Source Impedance: 12 ohm for common mode and 2 ohm for differential mode

Surge Amplitude : Common Mode
☐ (2,0) kV
Differential Mode
☒ (1,0) kV

Number of Surges: ☒ 5 surges per angle

Angle: ☒ 0°, 90°, 180°, 270° (input AC power port)

Polarity: ☒ Positive & Negative

Repetition Rate: ☒ 1 surge per min ☐ 1 surge per 30 sec.

Required Performance Criteria: ☒ B

DC Power Lines

Source Impedance: 42 ohm

Surge Amplitude: Common Mode
☐ (2,0) kV
Differential Mode
☐ (1,0) kV

Number of Surges: ☐ 5 Surges

Polarity: ☐ Positive & Negative

Repetition Rate: ☐ 1 surge per min ☐ 1 surge per 30 sec.

Required Performance Criteria: ☐ B

Signal Lines

Source Impedance: 42 ohm

Surge Amplitude: Common Mode
☐ (2,0) kV
Differential Mode
☒ (1,0) kV

Number of Surges: ☒ 5 Surges

Polarity: ☒ Positive & Negative

Repetition Rate: ☒ 1 surge per min ☐ 1 surge per 30 sec.

Required Performance Criteria: ☒ B

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Test Data

☒ DC Mode

☒ Line to Line – Differential Mode

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
L – N	A	A

☐ Line to Earth – Common Mode

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
L – PE	-	-
N – PE	-	-

Signal Lines

☒ Line to Line – Differential Mode

Mode of Application	Coupling Method	Observations	
		(+) Surge (kV)	(-) Surge (kV)
RJ-45 (LAN)	CDN	A	A
	LINE	A	A
BNC	CDN	A	A
	LINE	A	A

☐ Line to Earth – Common Mode

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
-	-	-

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☒ PoE Mode

☐ Line to Line – Differential Mode

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
L – N	-	-

☐ Line to Earth – Common Mode

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
L – PE	-	-
N – PE	-	-

Signal Lines

☒ Line to Line – Differential Mode

Mode of Application	Coupling Method	Observations	
		(+) Surge (kV)	(-) Surge (kV)
RJ-45 (PoE)	CDN	A	A
	LINE	A	A
BNC	CDN	A	A
	LINE	A	A

☐ Line to Earth – Common Mode

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
-	-	-

Note: "Blank" = Not performed

Observations:

- A – No response observed from EUT
- B – Unit shuts down then automatically restarts when full voltage is restored.
- C – Unit shuts down then manually restarts when full voltage is restored or Loss of function.

Test Results

- ☒ PASS Required Performance Criteria
- ☐ NOT PASS Required Performance Criteria
- ☐ NOT APPLICABLE

Remarks

PASS Required Performance Criteria.

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3.5 Conducted Disturbance

Reference Standard

EN 61000-4-6:2014

Test Date

Mar 04, 2021

Test Location

EMS-CS: Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	icd.control	EM TEST	5.3.11	-
☒	CONTINUOUS WAVE SIMULATOR	CWS 500N1.4	EM TEST	P1602169880	Nov 25, 2021
☒	ATTENUATOR	ATT 6/80	EM TEST	P1614178148	Nov 25, 2021
☒	CDN	CDN M016	TESEQ	43694	Nov 25, 2021
☒	CDN	CDN M016	TESEQ	43697	Nov 25, 2021
☒	CDN	CDN T800	TESEQ	42800	Nov 25, 2021
☒	EM CLAMP	KEMZ 801A	TESEQ	44099	Nov 26, 2021

Test Conditions

Temperature: (23,5 ± 0,3) °C
Relative Humidity: (44,7 ± 0,3) % R.H.
Atmospheric Pressure: 101,1 kPa

Test Specifications

Frequency Range: ☐ 150 kHz to 100 MHz ☒ 150 kHz to 80 MHz

Voltage Level: ☐ 1 Vrms ☐ 3 Vrms
☒ 10 Vrms

Modulation: ☒ AM, 80 %, 1 kHz sine wave

Frequency Step: ☒ 1 % step

Dwell Time: ☐ 1 s ☒ 3 s

Required Performance Criteria: ☒ A

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Test Data

■ DC Mode

☒ Input a.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Observations
L – N	CDN	A

☒ Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Observations
RJ-45 (LAN)	CDN	A
BNC	Clamp	A

☒ Earth ports

Coupling Location (Line Stressed)	Coupling Method	Observations
Ground	Clamp	A

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■ PoE Mode☐ Input a.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Observations
	-	-

☒ Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Observations
RJ-45 (PoE)	CDN	A
BNC	Clamp	A

☒ Earth ports

Coupling Location (Line Stressed)	Coupling Method	Observations
Ground	Clamp	A

Notes: CDN = Coupling Decoupling Network
"blank" = Not performed

Observations:

- A - No response observed from EUT
- B - Unit shuts down then automatically restarts when full voltage is restored.
- C - Unit shuts down then manually restarts when full voltage is restored or Loss of function.

Test Results

- ☒ PASS Required Performance Criteria
- ☐ NOT PASS Required Performance Criteria

Remarks

PASS Required Performance Criteria.



3.6 Power Frequency Magnetic Field Immunity

Reference Standard

EN 61000-4-8:2010

Test Date

Mar 05, 2021

Test Location

EMS-Magnetic: Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	iec.control	EM TEST	5.4.7	-
☒	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	Nov 26, 2021
☒	MOTOR VARIAC	MV2616	EM TEST	P1552169719	Nov 26, 2021
☒	MAGNETIC FIELD COIL	MS 100N	EM TEST	P1536163691	Nov 26, 2021
☒	CURRENT TRANSFORMER	MC 26100 (100 A 교정)	EM TEST	P1550168963	Apr 01, 2021
☒	EMS Test S/W	NET.CONTROL	EM TEST	1.1.3	-
☒	MULTIFUNCTION AC/DC POWER SOURCE	NETWAVE 7-400	EM TEST	P1614178393	Nov 25, 2021
☒	MAGNETICFIELD COIL	INA 703	Teseq AG	3006	Apr 01, 2021

Test Conditions

Temperature: (23,4 ± 0,3) °C
Relative Humidity: (46,1 ± 0,3) % R.H.
Atmospheric Pressure: 100,7 kPa



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Test Specifications

Field Strength(Power Source): ☒ 100 A/m (ac)

☒ 300 A/m (dc)

Frequency (ac): ☒ 16.7 Hz ☒ 50 Hz ☐ 60 Hz

Frequency (dc): ☒ 0 Hz

Required Performance Criteria: ☒ A

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Test Data

☒ DC Mode

☒ Immersion method

Coil orientation	Result
X	A
Y	A
Z	A

☐ Proximity method

Coil orientation	Result
X	-
Y	-
Z	-

☒ PoE Mode

☒ Immersion method

Coil orientation	Result
X	A
Y	A
Z	A

☐ Proximity method

Coil orientation	Result
X	-
Y	-
Z	-

Note: "blank" = Not performed

Observations:

- A – No response observed from EUT
- B – Unit shuts down then automatically restarts when full voltage is restored.
- C – Unit shuts down then manually restarts when full voltage is restored or Loss of function.

Test Results

☒ PASS Required Performance Criteria

☐ NOT PASS Required Performance Criteria

Remarks

PASS Required Performance Criteria.

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APPENDIX A – TEST DATA

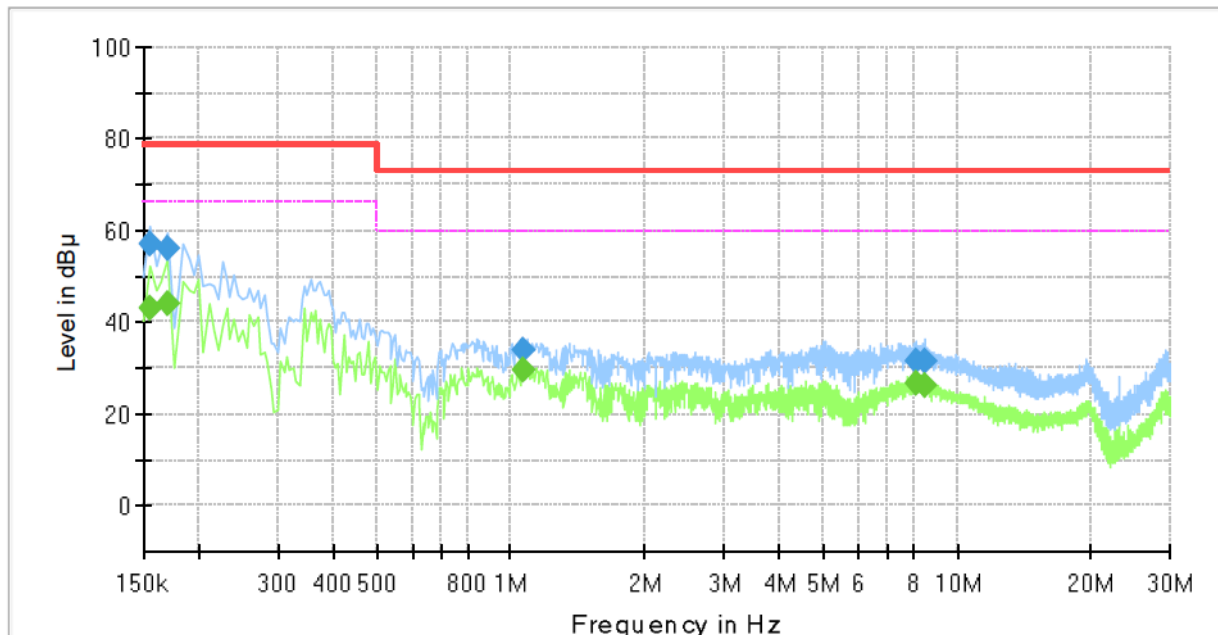
Conducted Emissions at Mains Power Ports

■ DC Mode

[HOT]

Common Information

Test Description:	Conducted Emission
Model No.:	SPD-151
Phase:	L1
Mode:	DC
Operator Name:	KES



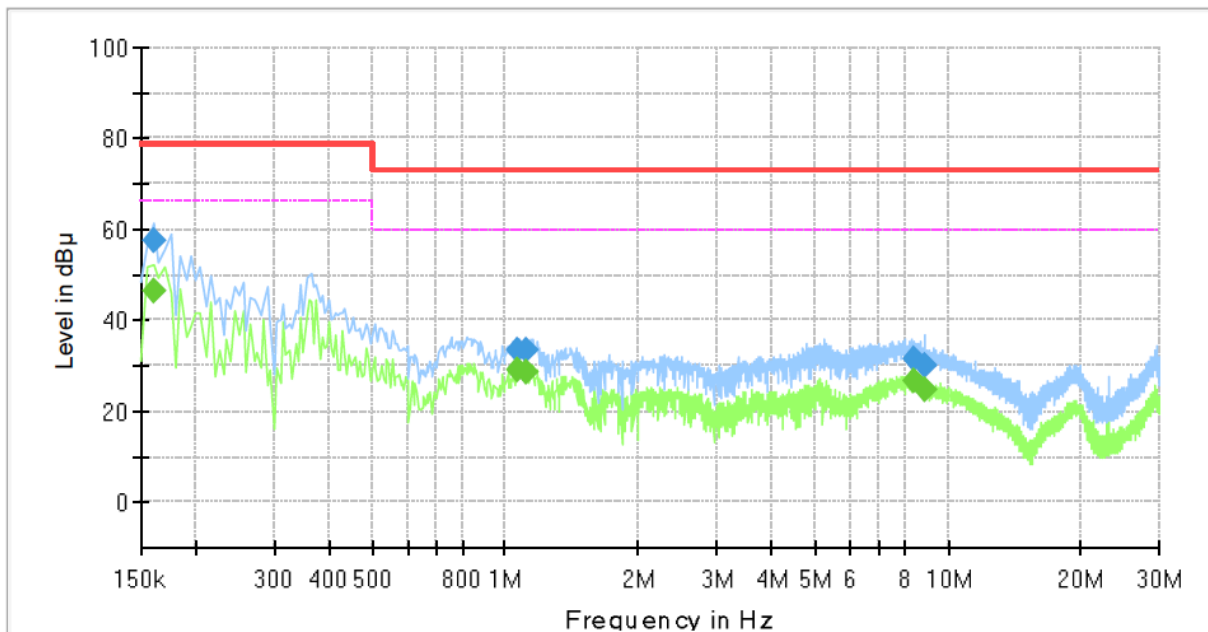
Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.155000	---	42.86	66.00	23.14	1000.0	9.000	L1	19.4
0.155000	57.25	---	79.00	21.75	1000.0	9.000	L1	19.4
0.170000	---	43.93	66.00	22.07	1000.0	9.000	L1	19.4
0.170000	55.88	---	79.00	23.12	1000.0	9.000	L1	19.4
1.065000	---	29.42	60.00	30.58	1000.0	9.000	L1	20.0
1.065000	33.70	---	73.00	39.30	1000.0	9.000	L1	20.0
8.075000	---	26.51	60.00	33.49	1000.0	9.000	L1	19.6
8.075000	31.29	---	73.00	41.71	1000.0	9.000	L1	19.6
8.440000	---	26.30	60.00	33.70	1000.0	9.000	L1	19.7
8.440000	31.26	---	73.00	41.74	1000.0	9.000	L1	19.7

[NEUTRAL]

Common Information

Test Description:	Conducted Emission
Model No.:	SPD-151
Phase:	N
Mode:	DC
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	---	46.37	66.00	19.63	1000.0	9.000	N	19.4
0.160000	57.58	---	79.00	21.42	1000.0	9.000	N	19.4
1.070000	---	29.05	60.00	30.95	1000.0	9.000	N	20.0
1.070000	33.41	---	73.00	39.59	1000.0	9.000	N	20.0
1.115000	---	28.80	60.00	31.20	1000.0	9.000	N	20.0
1.115000	33.30	---	73.00	39.70	1000.0	9.000	N	20.0
8.405000	---	26.54	60.00	33.46	1000.0	9.000	N	19.7
8.405000	31.55	---	73.00	41.45	1000.0	9.000	N	19.7
8.835000	---	24.95	60.00	35.05	1000.0	9.000	N	19.7
8.835000	29.92	---	73.00	43.08	1000.0	9.000	N	19.7

◆ 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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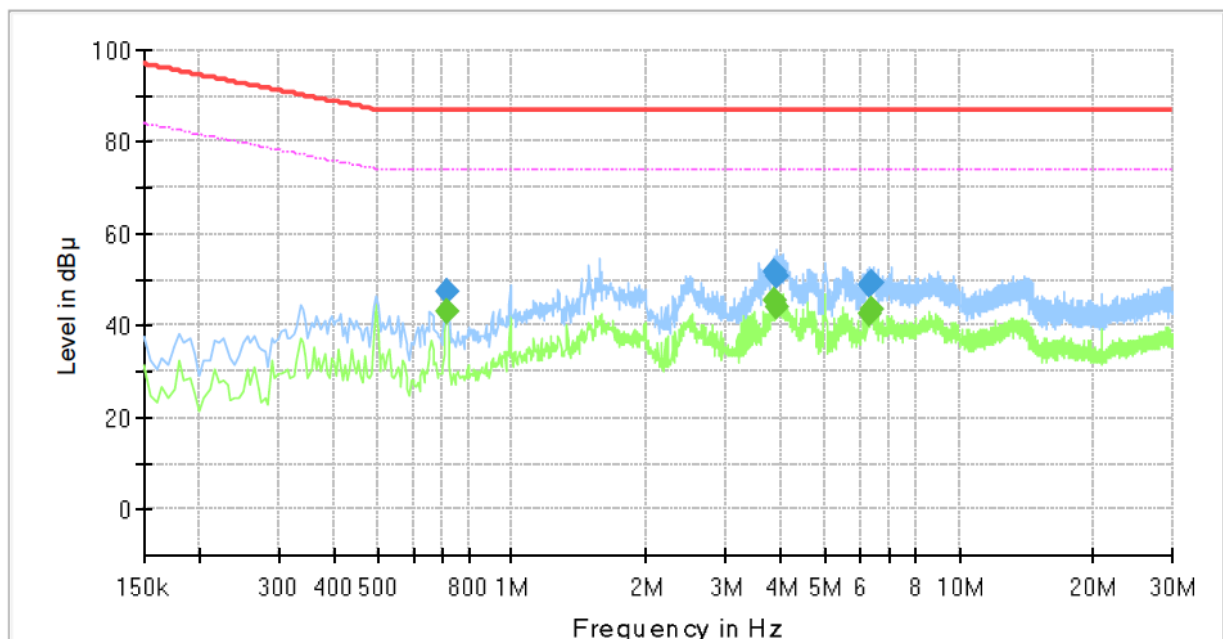
Conducted Emissions at Telecommunication Ports

■ DC Mode

[1 000 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	SPD-151
Mode :	DC
Speed :	1 000 Mbps
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.715000	---	43.31	74.00	30.69	1000.0	9.000	Single Line	19.9
0.715000	47.27	---	87.00	39.73	1000.0	9.000	Single Line	19.9
3.875000	---	45.72	74.00	28.28	1000.0	9.000	Single Line	19.6
3.875000	51.85	---	87.00	35.15	1000.0	9.000	Single Line	19.6
3.905000	---	44.04	74.00	29.96	1000.0	9.000	Single Line	19.6
3.905000	50.95	---	87.00	36.05	1000.0	9.000	Single Line	19.6
6.310000	---	42.81	74.00	31.19	1000.0	9.000	Single Line	19.3
6.310000	48.91	---	87.00	38.09	1000.0	9.000	Single Line	19.3
6.375000	---	43.48	74.00	30.52	1000.0	9.000	Single Line	19.3
6.375000	49.34	---	87.00	37.66	1000.0	9.000	Single Line	19.3

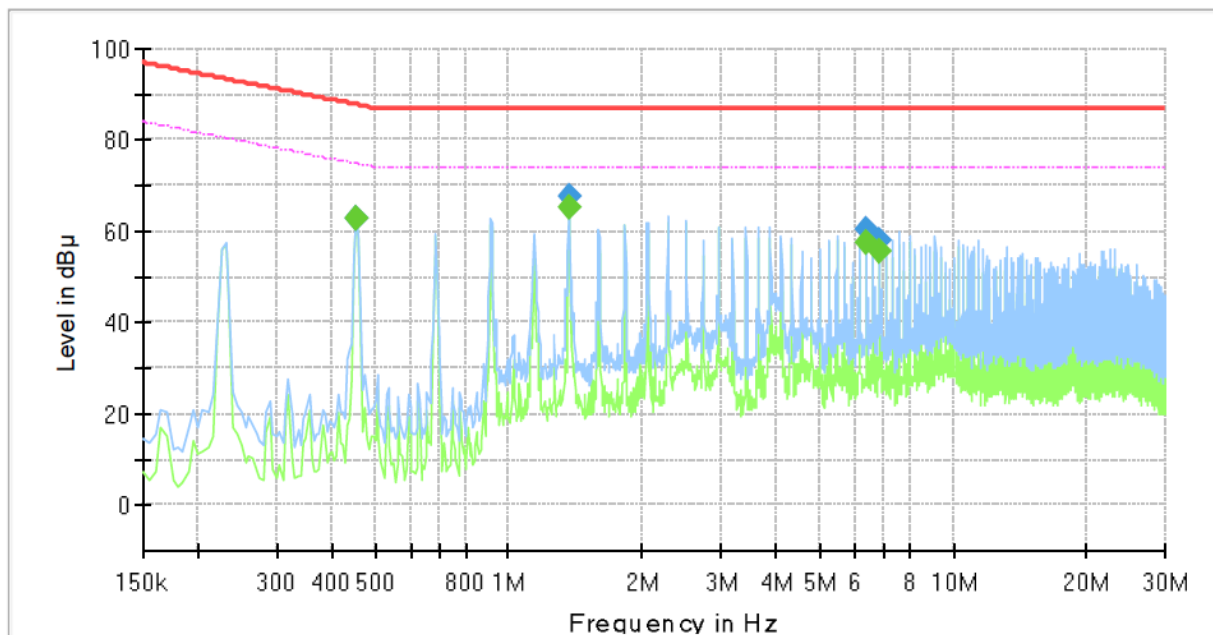
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■ PoE Mode

[1 000 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	SPD-151
Mode :	PoE
Speed :	1 000 Mbps
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.455000	---	62.73	74.78	12.05	1000.0	9.000	Single Line	19.7
0.455000	62.88	---	87.78	24.90	1000.0	9.000	Single Line	19.7
1.370000	---	65.20	74.00	8.80	1000.0	9.000	Single Line	20.0
1.370000	67.57	---	87.00	19.43	1000.0	9.000	Single Line	20.0
6.385000	---	57.59	74.00	16.41	1000.0	9.000	Single Line	19.3
6.385000	60.27	---	87.00	26.73	1000.0	9.000	Single Line	19.3
6.840000	---	55.44	74.00	18.56	1000.0	9.000	Single Line	19.3
6.840000	58.21	---	87.00	28.79	1000.0	9.000	Single Line	19.3

◆ 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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Impulse Noise (click)

N/A

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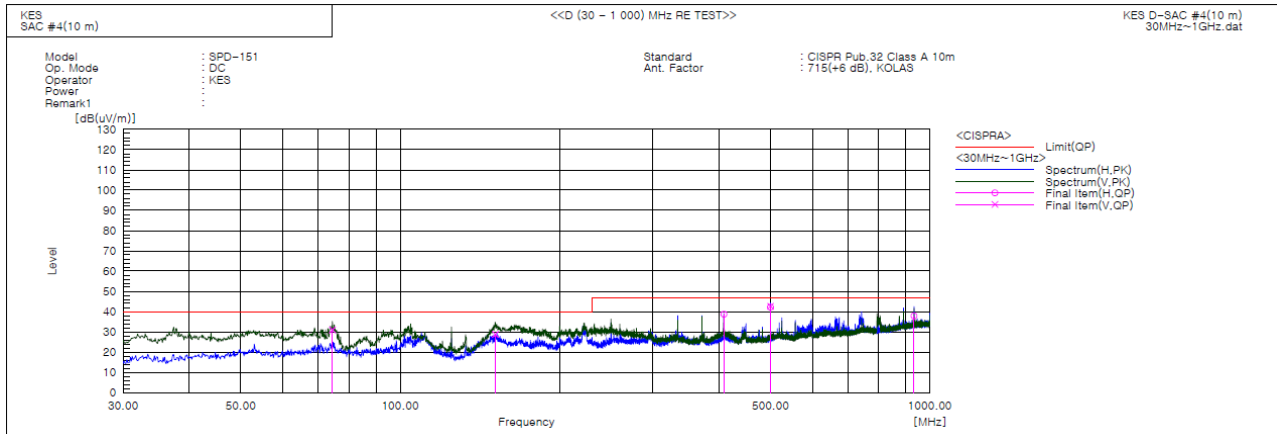
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Radiated Electric Field Emissions(Below 1 GHz)

■ DC Mode



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	74.499	V	57.7	-26.7	31.0	40.0	9.0	178.0	279.0	
2	151.129	V	53.8	-25.0	28.8	40.0	11.2	142.0	149.0	
3	408.300	H	52.8	-14.1	38.7	47.0	8.3	186.0	282.0	
4	500.003	V	54.3	-11.6	42.7	47.0	4.3	267.0	149.0	
5	500.009	H	53.8	-11.6	42.2	47.0	4.8	100.0	250.0	
6	933.070	H	41.6	-3.7	37.9	47.0	9.1	115.0	336.0	

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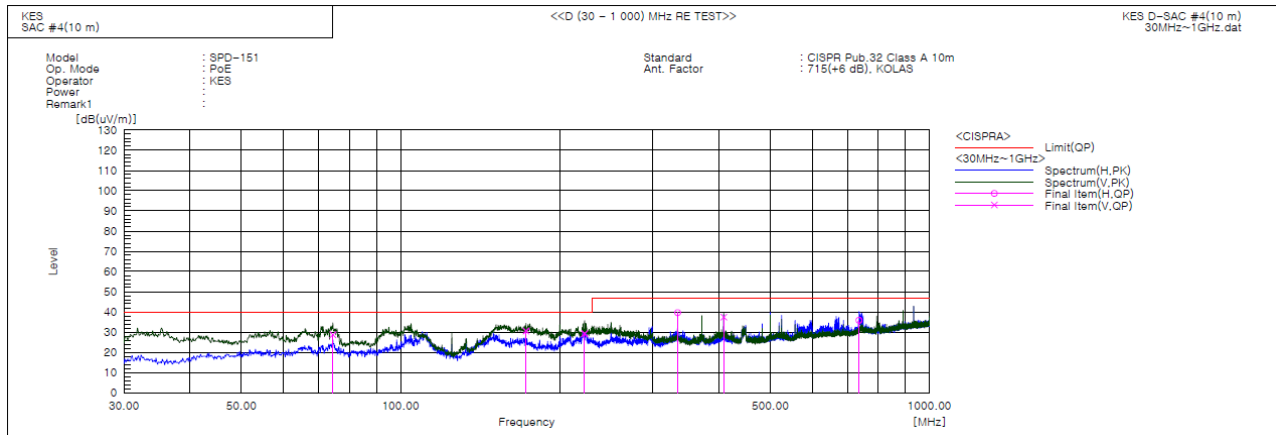


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PoE Mode



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	74.499	V	55.4	-26.7	28.7	40.0	11.3	144.0	219.0	
2	172.590	V	54.4	-23.9	30.5	40.0	9.5	121.0	266.0	
3	222.666	V	49.3	-20.1	29.2	40.0	10.8	137.0	352.0	
4	334.095	H	55.5	-15.9	39.6	47.0	7.4	314.0	351.0	
5	408.300	V	51.5	-14.1	37.4	47.0	9.6	271.0	273.0	
6	735.554	H	42.0	-6.1	35.9	47.0	11.1	100.0	14.0	

◆ 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



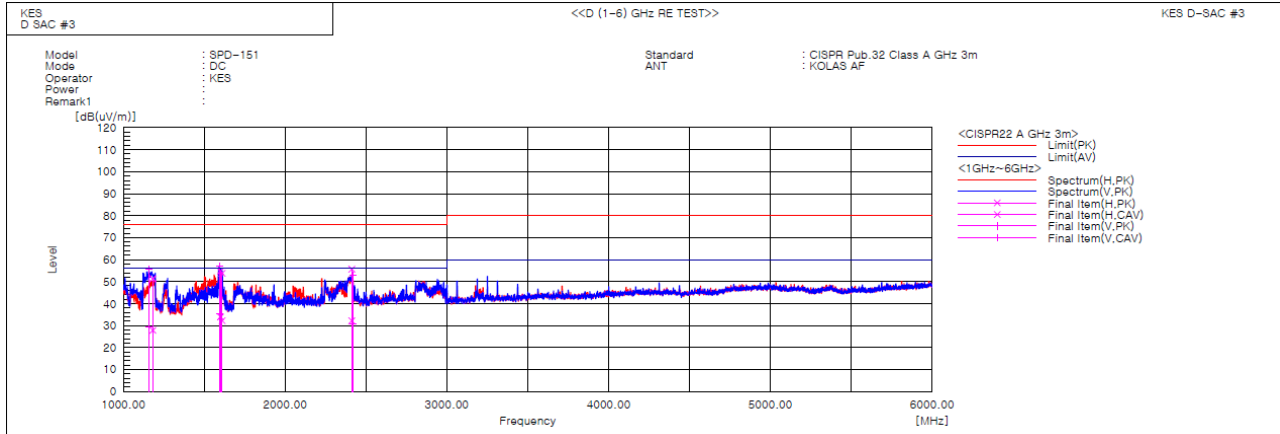
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Radiated Electric Field Emissions(Above 1 GHz)

DC 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	1159.080	V	64.1	37.9	-8.5	55.6	29.4	76.0	56.0	20.4	26.6	100.0	21.0	
2	1181.483	H	59.6	36.1	-8.3	51.3	27.8	76.0	56.0	24.7	28.2	100.0	4.4	
3	1595.829	V	62.5	40.5	-5.4	57.1	35.1	76.0	56.0	18.9	20.9	100.0	7.0	
4	1599.852	H	60.2	39.3	-5.4	54.8	33.9	76.0	56.0	21.2	22.1	100.0	336.9	
5	1610.887	H	59.1	37.5	-5.3	53.8	32.2	76.0	56.0	22.2	23.8	100.0	22.4	
6	2411.970	H	55.6	32.1	0.1	55.7	32.2	76.0	56.0	20.3	23.8	100.0	308.6	
7	2417.639	V	52.6	30.4	0.1	52.7	30.5	76.0	56.0	23.3	25.5	100.0	355.5	

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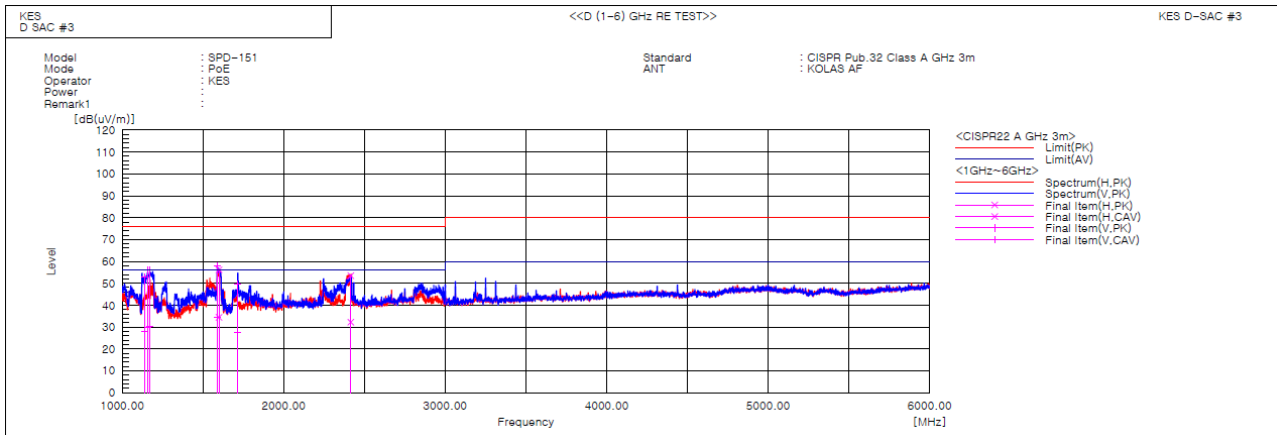


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PoE Mode



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	1137.577	V	61.4	36.7	-8.6	52.8	28.1	76.0	56.0	23.2	27.9	100.0	7.8	
2	1155.401	V	64.4	38.4	-8.5	55.9	29.9	76.0	56.0	20.1	26.1	100.0	20.6	
3	1172.793	V	64.6	38.8	-8.4	56.2	30.4	76.0	56.0	19.8	25.6	100.0	18.5	
4	1589.700	V	63.6	40.1	-5.5	58.1	34.6	76.0	56.0	17.9	21.4	100.0	5.3	
5	1598.520	H	61.6	39.8	-5.4	56.2	34.4	76.0	56.0	19.8	21.6	100.0	335.7	
6	1711.891	V	54.2	32.0	-4.4	49.8	27.6	76.0	56.0	26.2	28.4	100.0	23.5	
7	2414.441	H	53.4	32.1	0.1	53.5	32.2	76.0	56.0	22.5	23.8	100.0	341.4	

◆ Calculation

Over Limit [dB] = (Read Level[dB μ V] + Ant Factor[dB/m] + Cable Loss [dB] - Preamp Factor [dB]) - Limit Line[dB μ V]

Over Limit : Margin, Read Level : Reading value, Ant Factor : ANT Factor,
Cable Loss : Cable loss, Preamp Factor : Preamp Factor

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Harmonic Current Emissions and Voltage Fluctuations and Flicker

■ DC Mode

Average harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	0.038			
2	0.002	0.175	1.080	n/a
3	0.031	1.335	2.300	PASS
4	0.002	0.537	0.430	n/a
5	0.031	2.741	1.140	PASS
6	0.002	0.622	0.300	n/a
7	0.031	4.024	0.770	PASS
8	0.002	0.825	0.230	n/a
9	0.029	7.227	0.400	PASS
10	0.002	1.018	0.184	n/a
11	0.027	8.302	0.330	PASS
12	0.002	1.172	0.153	n/a
13	0.026	12.312	0.210	PASS
14	0.002	1.490	0.131	n/a
15	0.024	15.991	0.150	PASS
16	0.002	1.522	0.115	n/a
17	0.022	16.847	0.132	PASS
18	0.002	1.674	0.102	n/a
19	0.020	17.236	0.118	PASS
20	0.002	1.823	0.092	n/a
21	0.018	11.473	0.161	PASS
22	0.002	1.930	0.084	n/a
23	0.016	11.214	0.147	PASS
24	0.002	2.144	0.077	n/a
25	0.015	10.788	0.135	PASS
26	0.002	2.130	0.071	n/a
27	0.013	10.299	0.125	PASS
28	0.002	2.348	0.066	n/a
29	0.011	9.312	0.116	PASS
30	0.001	2.264	0.061	n/a
31	0.009	8.490	0.109	PASS
32	0.001	2.325	0.058	n/a
33	0.008	7.604	0.102	PASS
34	0.001	2.501	0.054	n/a
35	0.006	6.406	0.096	PASS
36	0.001	2.407	0.051	n/a
37	0.005	5.680	0.091	PASS
38	0.001	2.683	0.048	n/a
39	0.004	4.736	0.087	n/a
40	0.001	2.546	0.046	n/a

Note: Harmonic currents less than 0.6 % of the input current measured under the test conditions, or less than 5 mA, whichever is greater, are disregarded.

* Application of limits for average is 100% except for odd harmonics from 21 to 39, where 150% applies.



Test Data - Harmonics (continued)

Maximum harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	0.038			
2	0.002	0.140	1.620	n/a
3	0.031	0.901	3.450	PASS
4	0.003	0.433	0.645	n/a
5	0.032	1.842	1.710	PASS
6	0.002	0.481	0.450	n/a
7	0.031	2.703	1.155	PASS
8	0.002	0.647	0.345	n/a
9	0.029	4.845	0.600	PASS
10	0.002	0.790	0.276	n/a
11	0.028	5.585	0.495	PASS
12	0.002	0.932	0.230	n/a
13	0.026	8.261	0.315	PASS
14	0.002	1.173	0.197	n/a
15	0.024	10.738	0.225	PASS
16	0.002	1.235	0.173	n/a
17	0.022	11.312	0.199	PASS
18	0.002	1.368	0.153	n/a
19	0.021	11.587	0.178	PASS
20	0.002	1.472	0.138	n/a
21	0.019	11.574	0.161	PASS
22	0.002	1.517	0.125	n/a
23	0.017	11.331	0.147	PASS
24	0.002	1.700	0.115	n/a
25	0.015	10.902	0.135	PASS
26	0.002	1.767	0.106	n/a
27	0.013	10.421	0.125	PASS
28	0.002	1.871	0.099	n/a
29	0.011	9.479	0.116	PASS
30	0.002	1.789	0.092	n/a
31	0.009	8.621	0.109	PASS
32	0.002	1.874	0.086	n/a
33	0.008	7.737	0.102	PASS
34	0.002	1.977	0.081	n/a
35	0.006	6.564	0.096	PASS
36	0.001	1.891	0.077	n/a
37	0.005	5.809	0.091	PASS
38	0.002	2.115	0.073	n/a
39	0.004	4.900	0.087	n/a
40	0.001	1.951	0.069	n/a

Note: Harmonic currents less than 0.6 % of the input current measured under the test conditions, or less than 5 mA, whichever is greater, are disregarded.

* Application of limits for average is 100% except for odd harmonics from 21 to 39, where 150% applies.

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Test Data - Voltage Fluctuations

Maximum Flicker results

■ DC Mode

Flicker Measurements					
	Plt	Max Pst	Max Dc	Max Dmax	Max Tmax
Line 1:	0.028	0.028	0	< 0.2	0
Limits:	0.65	1	3.3	4	0.5
Results:	PASS	PASS	PASS	PASS	PASS

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Test Setup Photos and Configuration

Conducted Emissions at Mains Power Ports

■ DC Mode



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Conducted Emissions at Telecommunication Ports

■ DC Mode



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■ PoE Mode



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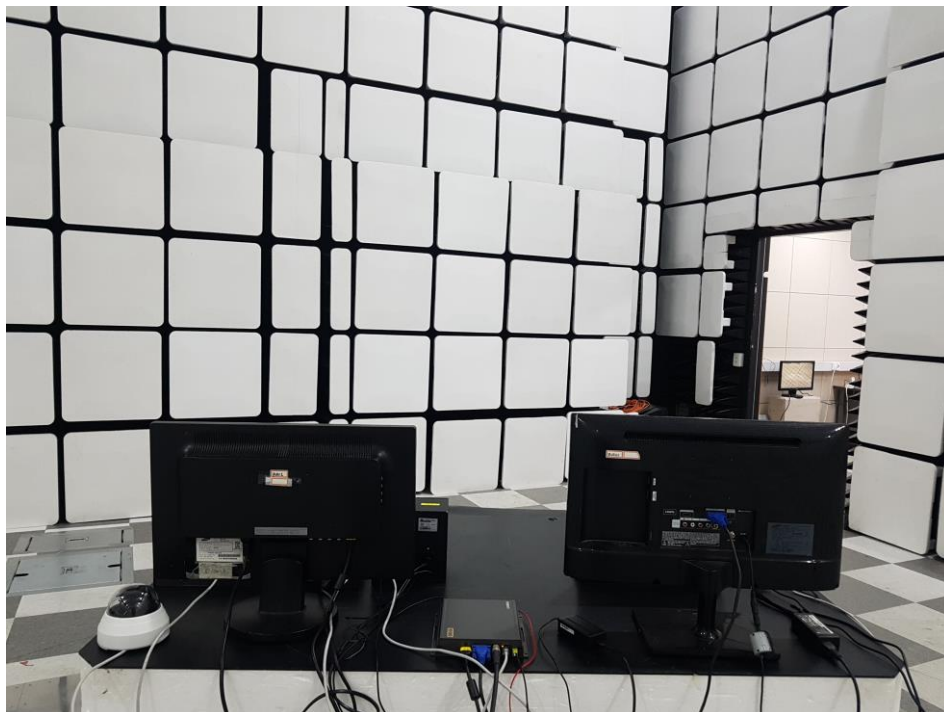
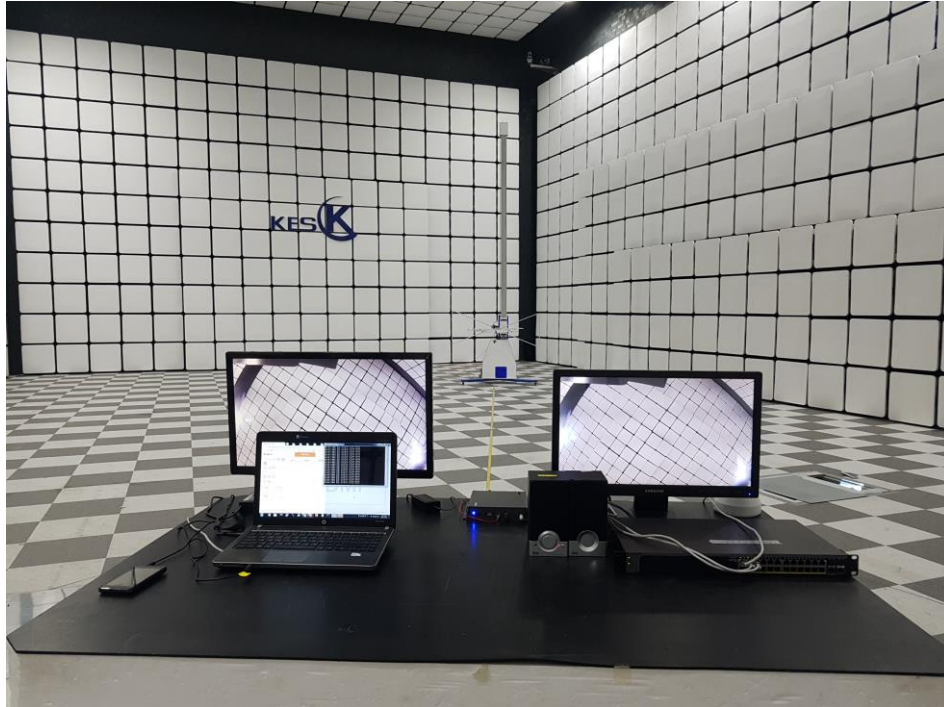
Impulse Noise (click)

N/A

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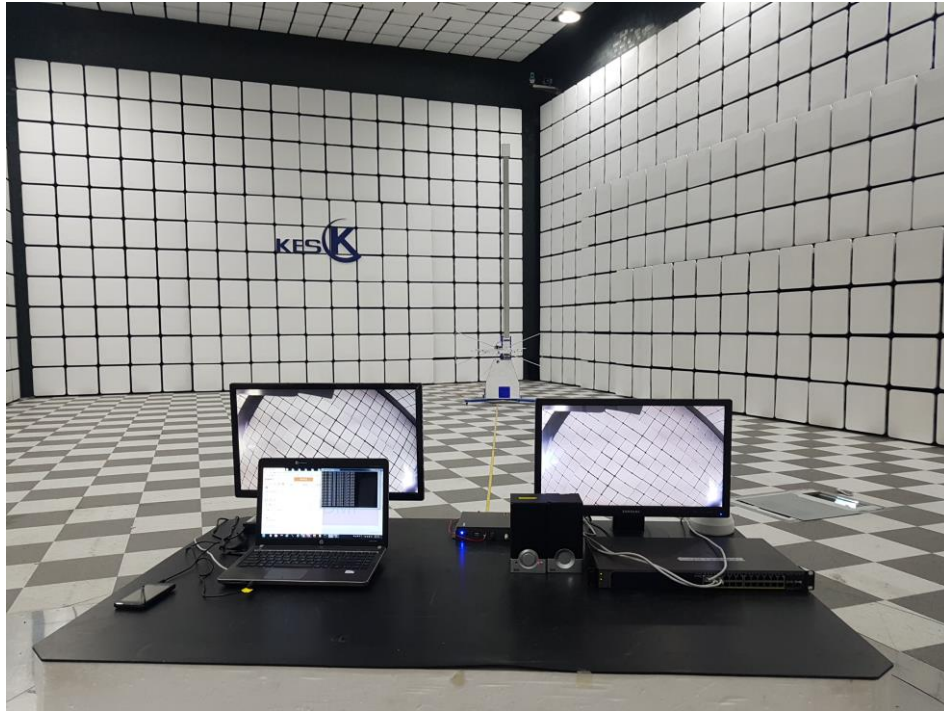
Radiated Electric Field Emissions(Below 1 GHz)

■ DC Mode



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■ PoE Mode



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Radiated Electric Field Emissions(Above 1 GHz)

■ DC Mode



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■ PoE Mode



Harmonic Current Emissions and Voltage Fluctuations and Flicker

■ DC Mode

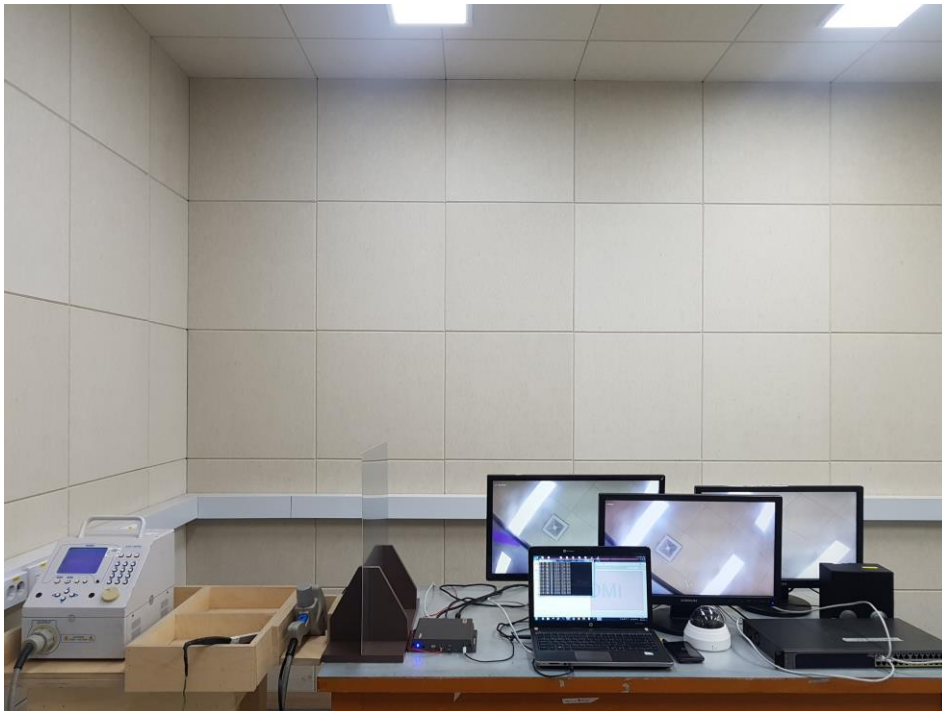


Electrostatic Discharge

■ DC Mode



■ PoE Mode



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Radio-frequency Electromagnetic Field

■ DC Mode



■ PoE Mode



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Fast Transients

■ DC Mode



■ PoE Mode



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Surges

■ DC Mode



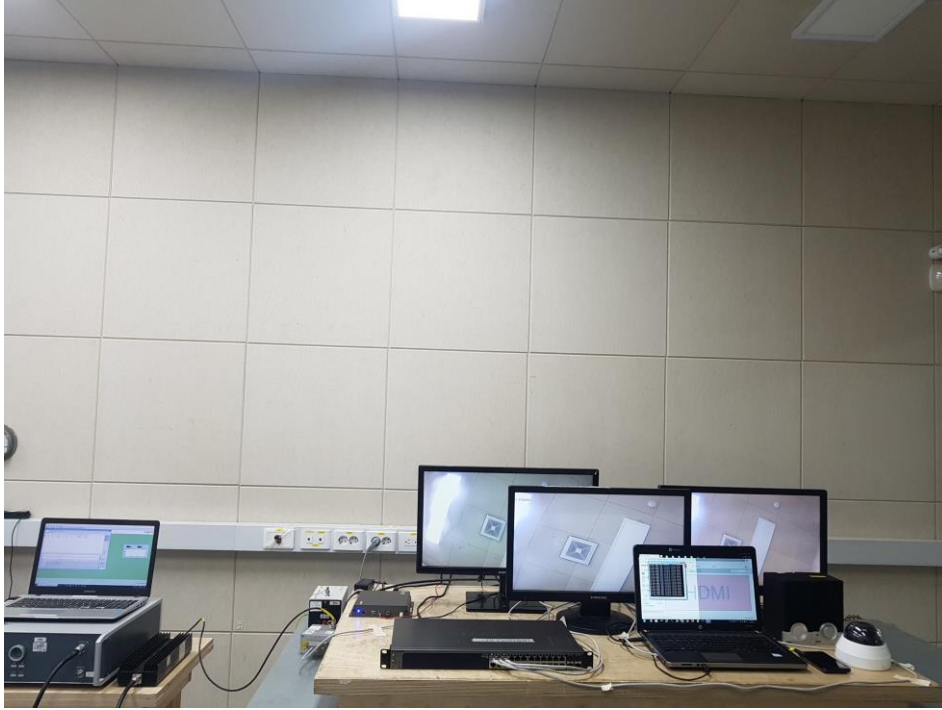
■ PoE Mode



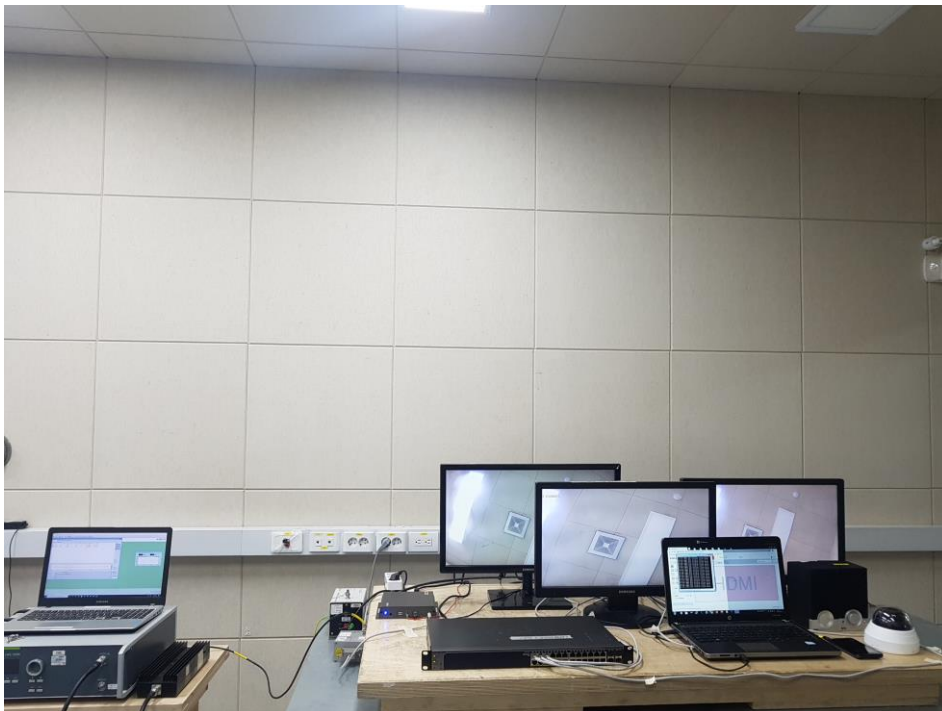
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Conducted Disturbance

■ DC Mode



■ PoE Mode



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Power Frequency Magnetic Field Immunity

■ DC Mode

16.7 Hz (AC), 100 A/m



50 Hz (AC), 100 A/m



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0 Hz (DC), 300 A/m



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■ PoE Mode

16.7 Hz (AC), 100 A/m



50 Hz (AC), 100 A/m



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0 Hz (DC), 300 A/m



EUT External Photographs

(Top)



(Bottom)



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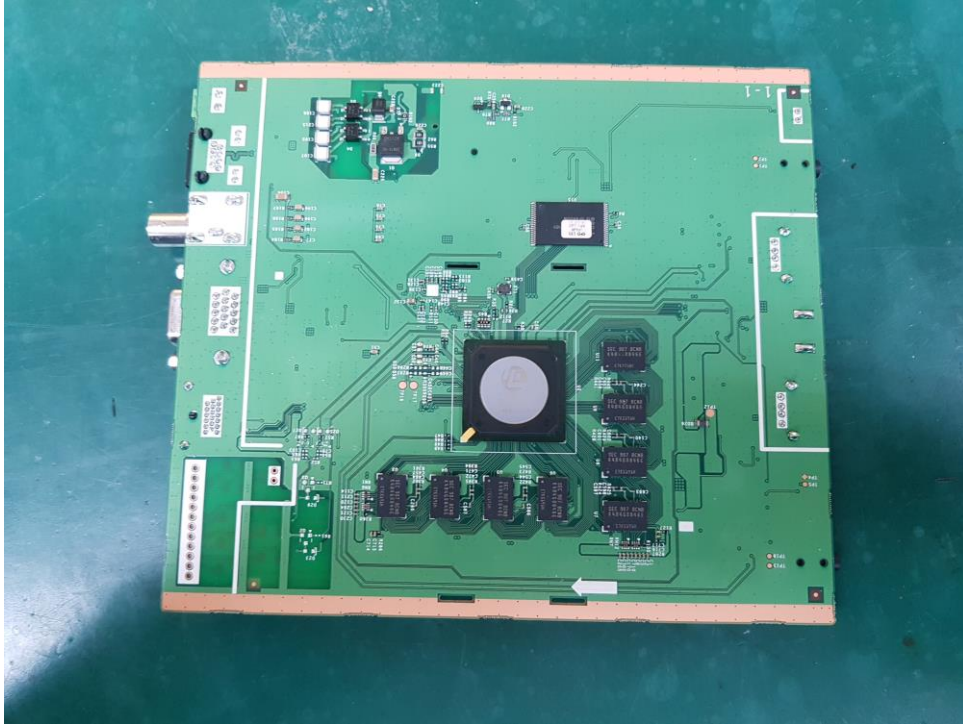
EUT Internal Photographs



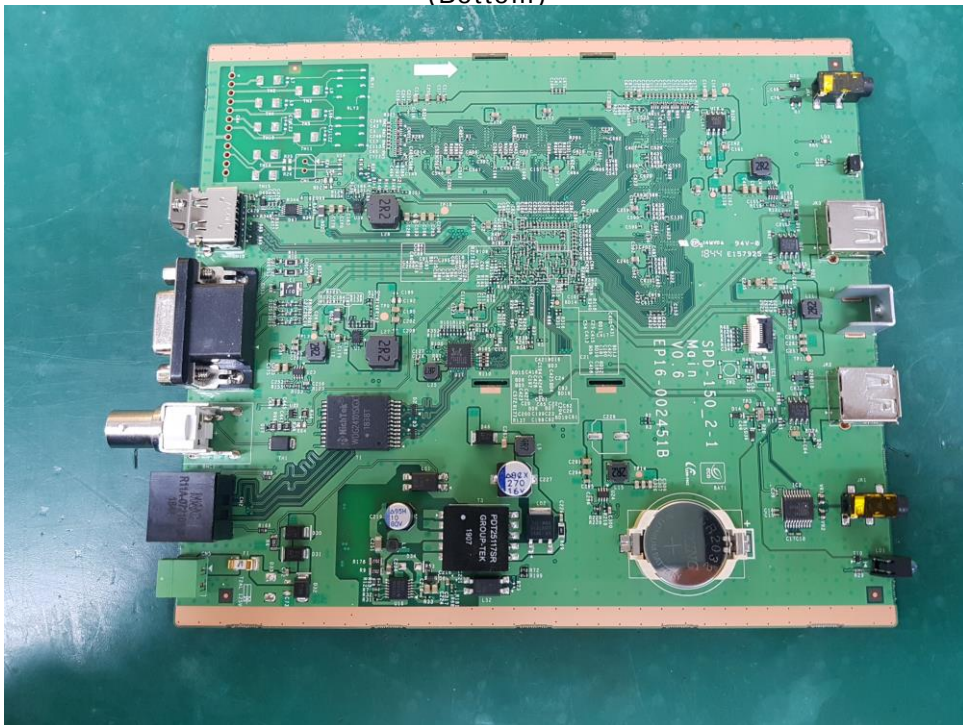
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EUT Internal View – Board

(Top)

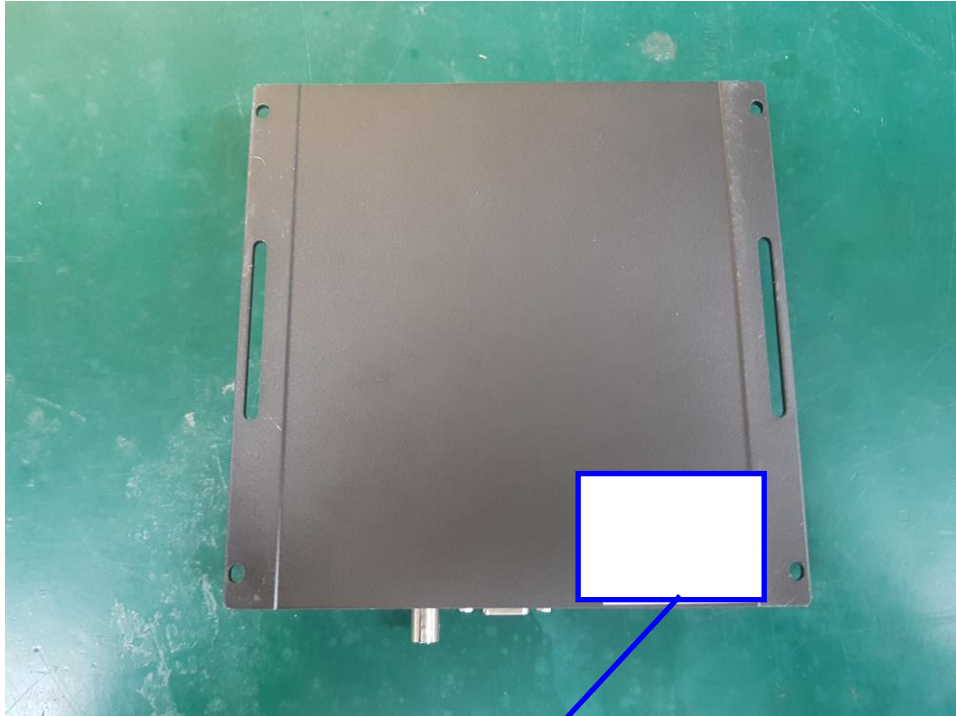


(Bottom)



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Label and Location



DECORDER

Model No : SPD-151

Manufacturer : HANWHA TECHWIN SECURITY VIETNAM CO.,LTD

Made in Vietnam

