EMC TEST REPORT

Test Report No.	:	KES-EM-22T0971
Date of Issue	:	Dec. 08, 2022
Product name	:	Decorder
Model/Type No.	:	SPD-152
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	:	Nov. 23, 2022
Test date	:	Nov. 27, 2022 ~ Dec. 01, 2022
Test Results	:	☒ **In Compliance** ☐ **Not in Compliance**

Tested by

김 세 헌

Se Heon, 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.

REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Dec. 08, 2022	KES-EM-22T0971	Issued

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1.0 General Product Description

Main Specifications of EUT are:

CPU		Embedded CPU
Operating System		Embedded Linux
Video Output	HDMI#1	1EA (up-to 4K), Audio support
	HDMI#2	1EA (up-to 1080p), Audio not support
	VGA	None
	CVBS	None
	Video-out Format	3840 X 2160@30Hz (HDMI#1) 2560 X 1440@30Hz (HDMI#1) 1920 X 1080@60Hz (HDMI#1, HDMI#2) 1280 X 10240@60Hz (HDMI#1, HDMI#2) 1280 X 720@60Hz (HDMI#1, HDMI#2)
External	Ethernet	1EA (10/100/1000BASE-T)
	USB	2EA(USB 2.0)
	Audio Out	None
	LED	Power, Network
Network	Bandwidth	Max. 150Mbps
Environmental		
Operating Temperature		0°C to +40°C (32°F to 104°F)
Operating Humidity		20% ~ 85% RH
Electrical		
Power Input		12VDC, PoE (IEEE802.3af)
Power Consumption		None
Mechanical		
Color / Material		Black / Metal&Plastic
Dimension (WxHxD)		140 x 29.5 x 115.4mm
Weight		260g
Software		
Video	Codec	H.265 / H.264 / MJPEG
	Max. Decoding Performance	8M@60fps, 2M@360fps
	Division (/Monitor)	■ Clone mode (HDMI#1) Max. 64 ■ Expand mode (HDMI#1) Max. 36 (HDMI#2) Max. 25
	Layout	Up to 20, Sequence support
Audio	Codec	G.711 / G.726 / AAC
Merge	Monitor Merge	None
	Tile Merge	None
Management		Local UI, Web-Viewer
Time Setting		NTP/Manual
Export/Import		Configuration Export/Import
Log		Max. 10000 (System log)
Protocol		RTP, RTSP, HTTP, CGI (SUNAPI), ONVIF
Remote Connect		None
Security		IP address filtering, User access Log, 802.1x, Encryption, Device certificate(Hanwha
ETC	P2P	None

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 230 V, 50 Hz ☒ PoE

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-152	-	HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.	EUT
Mouse	MOKJUO	-	Primax Electronics Ltd.	EUT

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
Adapter	FJ-SW1205000	-	Shenzhen Fujia Appliance Co, LTD.	-
PoE Injector 1	MA-INJ-4	-	Changzhou Wujin Hong Guang radio Factory Co.,LTD	-
PoE Injector 2	GS728TPP	-	NETGEAR	-
Notebook	LG15N54	507NZET040180	LG Electronics	-
Notebook Adapter	PA-1900-14	OF4A263348701J247	LITE-ON TECHNOLOGY COPORATION	-
Monitor 1	SMT-2233	ZC6U67VH500194D	Weihai Daewoo Electronics Co., Ltd.	-
Monitor 2	DELL E2222H DVT	8221TCM10D00103X	DELL INC.	-
Camera	LND-6070R	-	HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.	-
Router	IpTIME A2004MU	-	ipTIME	-
Router Adapter	DCP024B121000K	-	ZIONCOM ELECTRONICS (SHENZHEN) LTD.	-
USB Memory	-	-	Sandisk	-

1.6 External I/O Cabling

■ DC Mode

Start		END		Cable Spec.	
Description	**I/O Port**	**Description**	**I/O Port**	**Length**	**Shield**
Decorder (EUT)	DC 12V	Adapter	DC 12V	1.5	U
	HDMI 1	Monitor 1	HDMI 1	1.3	S
	HDMI 2	Monitor 2	HDMI 2	1.2	S
	NETWORK	Router	NETWORK	3.0	U
	USB	Mouse (EUT)	USB	1.4	U
	USB	USB Memory	USB	-	-
	GROUND	GROUND	GROUND	2.0	-
Router	DC Jack	Router Adapter	DC Jack	1.5	U
	RJ-45	Notebook	RJ-45	2.0	U
	RJ-45	PoE Injector 1	RJ-45	2.0	U
Notebook	DC Jack	Notebook Adapter	DC Jack	1.4	U
PoE Injector 1	RJ-45	Camera	RJ-45	1.0	U

* Unshielded=U, Shielded=S

■ PoE Mode

Start		END		Cable Spec.	
Description	**I/O Port**	**Description**	**I/O Port**	**Length**	**Shield**
Decorder (EUT)	NETWORK	PoE Injector 2	NETWORK	3.0	U
	HDMI 1	Monitor 1	HDMI 1	1.3	U
	HDMI 2	Monitor 2	HDMI 2	1.2	-
	USB	Mouse (EUT)	USB	1.4	S
	USB	USB Memory	USB	-	U
	GROUND	GROUND	GROUND	2.0	S
PoE Injector 2	RJ-45	Notebook	RJ-45	2.0	U
	RJ-45	Camera	RJ-45	1.0	U
Notebook	DC Jack	Notebook Adapter	DC Jack	1.4	U

* Unshielded=U, Shielded=S

1.7 EUT Operating Mode(s)

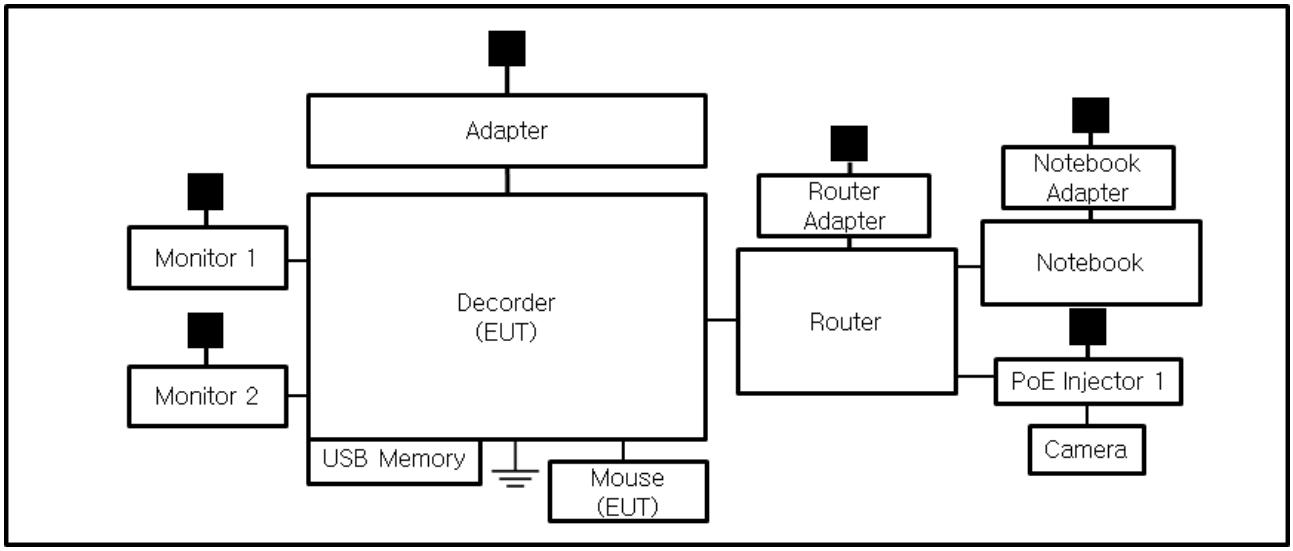
Test Mode	operating
DC, PoE Mode	- Check the image output of the camera on the monitor, and check the normal operation of the network function through the laptop ping test. - After testing, check if the recording is normally done on the USB Memory

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

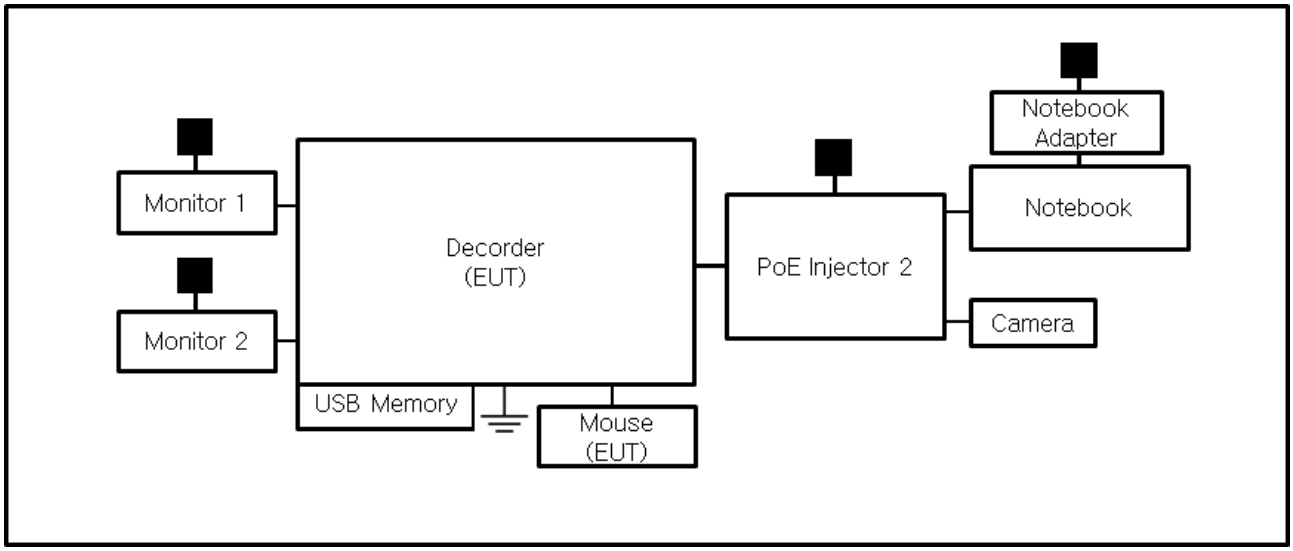
1.8 Configuration

■ AC Main
□ DC Main

■ DC Mode



■ PoE Mode



1.9 Remarks when standards applied

PoE port is considered to be wired network port, so power-related test items are excluded.

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, 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 , 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 55032:2015/A11:2020 ☒ Class A ☐ Class B

☒ EN 50130-4:2011

☒ EN 61000-3-2:2014

☒ EN 61000-3-3:2013

☒ **EMC – Regulations 2016**

☒ EN 55032:2015/A11:2020 ☒ Class A ☐ Class B

☒ EN 50130-4:2011

☒ EN 61000-3-2:2014

☒ EN 61000-3-3:2013

2.1 Conducted Emissions at Mains Power Ports

Test Date
Nov. 29, 2022

Test Location
Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EMC32	R & S	9.12.00	-
☒	EMI TEST RECEIVER	ESR3	R & S	101783	11, 11, 2023
☒	LISN	ENV216	R & S	101787	11, 10, 2023
☒	LISN	ESH2-Z5	R & S	100450	11, 10, 2023
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	11, 10, 2023

Test Conditions
Temperature: (22,8 ± 0,1) ℃
Relative Humidity: (45,9 ± 0,0) % R.H.

Frequency Range of Measurement
150 ㎑ to 30 ㎒

Instrument Settings
IF Band Width: 9 ㎑

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
Nov. 29, 2022

Test Location
Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EMC32	R & S	9.12.00	-
☒	EMI TEST RECEIVER	ESR3	R & S	101783	11, 11, 2023
☒	LISN	ENV216	R & S	101787	11, 10, 2023
☒	LISN	ESH2-Z5	R & S	100450	11, 10, 2023
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	11, 10, 2023
☒	8-WIRE ISN CAT6	NTFM 8158	SCHWARZBECK	8158-0029	03, 09, 2023

Test Conditions
Temperature: (22,9 ± 0,0) ℃
Relative Humidity: (45,9 ± 0,1) % R.H.

Frequency Range of Measurement
150 ㎑ to 30 ㎒

Instrument Settings
IF Band Width: 9 ㎑

Test Results
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks
- See Appendix A for test data.
- For Ethernet interfaces, measurements are required at the highest data rate supported by the interface.

2.3 Radiated Electric Field Emissions(Below 1 ㎓)

Test Date
Nov. 29, 2022

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

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.0	-
☒	EMI TEST RECEIVER	ESU26	R & S	100551	03, 31, 2023
☒	AMPLIFIER	SCU 01	R & S	100603	11, 10, 2023
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	11, 17, 2024
☒	ATTENUATOR	8491A	HP	32173	03, 08, 2023

Test Conditions
Temperature: (22,4 ± 0,1) ℃
Relative Humidity: (46,0 ± 0,1) % R.H.

Frequency Range of Measurement
30 ㎒ to 1 ㎓

Instrument Settings
IF Band Width: 120 ㎑

Test Results
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks
See Appendix A for test data.

2.4 Radiated Electric Field Emissions(Above 1 ㎓)

Test Date
Nov. 28, 2022

Test Location
SEMI ANECHOIC CHAMBER #5

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	ES10/RE	TOYO Corporation	2022.01.000	-
☒	EMI TEST RECEIVER	ESU26	Rohde & Schwarz	100552	03, 31, 2023
☒	HORN ANTENNA	BBHA 9120D	SCHWARZBECK	9120D-1802	11, 08, 2023
☒	PREAMPLIFIER	8449B	HP	3008A00538	06, 02, 2023
☒	ATTENUATOR	8491B	HP	23094	04, 21, 2023

Test Conditions
Temperature: (22,9 ± 0,1) ℃
Relative Humidity: (46,9 ± 0,0) % R.H.

Frequency Range of Measurement
1 ㎓ to 6 ㎓

Instrument Settings
IF Band Width: 1 ㎒

Test Results
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks
- See Appendix A for test data.
- The Average of the test data is the cispr average result.

2.5 Harmonic Current Emissions

Test Date
Dec. 01, 2022

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	04, 06, 2023
☒	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

Test Conditions
Temperature: (22,1 ± 0,0) ℃
Relative Humidity: (46,1 ± 0,0) % 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.

2.6 Voltage Fluctuations and Flicker

Test Date
Dec. 01, 2022

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	04, 06, 2023
☒	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

Test Conditions
Temperature: (22,7 ± 0,8) ℃
Relative Humidity: (45,8 ± 0,7) % 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:
EN 50130-4:2011 Alarm systems-Part 4: Electromagnetic compatibility Product family standard: Immunity requirements for components of fire, intruder and social alarm systems

The variety and the diversity of the apparatus within the scope of this document makes it difficult to define precise criteria for the evaluation of the immunity test results.

If as a result of the application of the tests defined in this standard, the apparatus

becomes dangerous or unsafe then the apparatus shall be deemed to have failed the test.

A functional description and a definition of performance by the manufacture and noted in the test

report, based on the following criteria:

Electrostatic discharge

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the application of discharge is permissible, providing that is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change.

Radiated electromagnetic fields

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the application of discharge is permissible, providing

which could be interpreted by associated equipment as a change, and no such

Flickering of indicators occurs at a field strength of 3 V/m.

For components of CCTV systems, where the picture is allowed at 10 V/m, providing.

(a) there is no permanent damage or change to EUT

(e.g. no corruption of memory or changes to programmable setting etc.)

(b) at 3 V/m, any deterioration of the picture is so minor that the system could still be used; and

(c) there is no observable deterioration of the picture at 1 V/m.

Fast transient burst / slow high energy voltage surge

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the application of discharge is permissible, providing

That there is no residual is permissible, providing that there is no residual change in the EUT or any

change in outputs, which could be interpreted by associated equipment as a change.

Conducted RF immunity

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the application of discharge is permissible, providing

That there is no residual is permissible, providing that there is no residual change in the EUT or any

change in outputs, which could be interpreted by associated equipment as a change,

and no such flickering of indicators oeuvres at U = 130 dBμV.

For component of CCTV systems, where the status is monitored by observing the TV picture,

then deterioration of the picture is allowed at U = 140 dBμV, providing:

(a) there is no permanent damage or change to the EUT

(e.g. no corruption of memory or changes to programmable settings etc.)

(b) at U = 130 dBμV, any deterioration of the picture is so minor that the system could

still be used; and

(c) there in no observable deterioration of the picture at U = 120 dBμV.

Voltage dip/interruption / Voltage variation

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the conditioning is permissible, providing that there is no residual

change in the EUT or any change in outputs, which could be interpreted by associated equipment

as a change. The EUT shall meet the acceptance criteria for the functional test, after the conditioning.

3.1 Electrostatic Discharge

Reference Standard
EN 61000-4-2:2009

Test Date
Dec. 01, 2022

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	02, 24, 2023
☒	HCP	-	KES	-	-
☒	VCP	-	Noise Ken	-	-

Test Conditions
Temperature: (22,7 ± 0,0) ℃
Relative Humidity: (45,6 ± 0,0) % R.H.
Atmospheric Pressure: (101,3 ± 0,0) 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

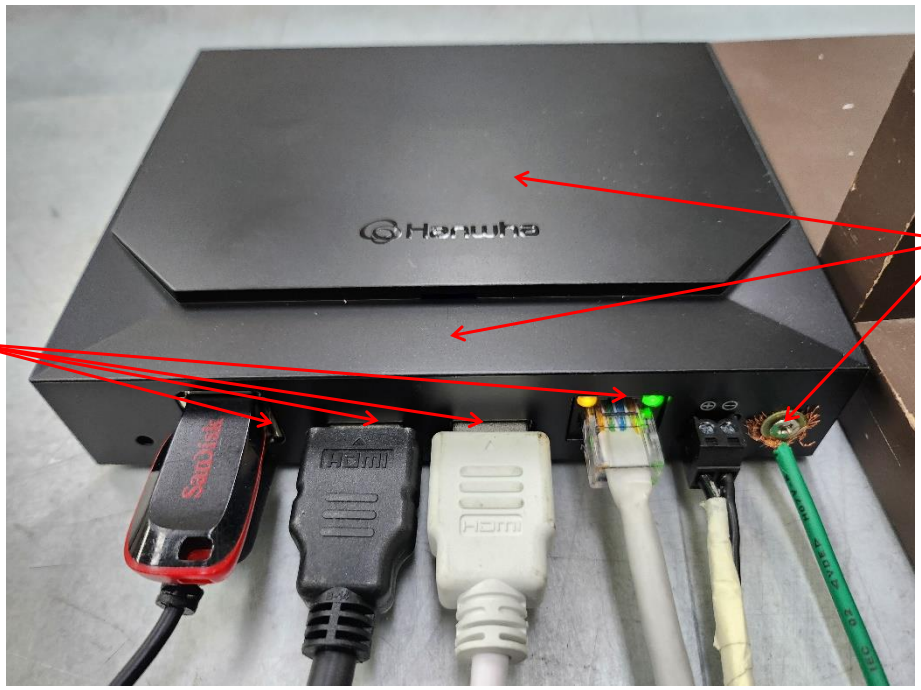
Notes: HCP: Horizontal coupling plane
VCP: Vertical coupling plane

Required Performance Criteria: ☒ Complied

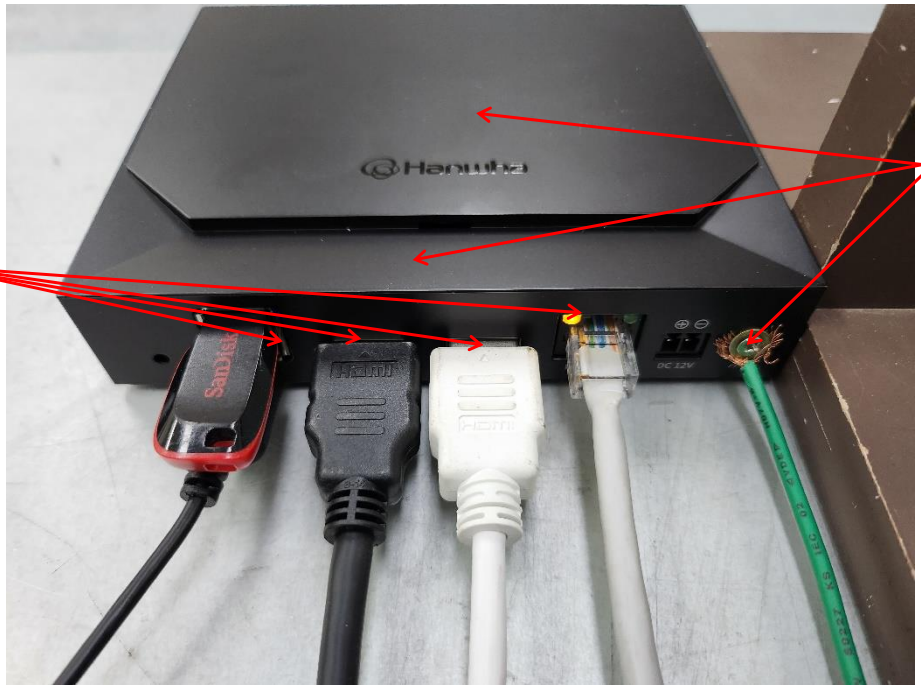
Location of Discharge:

Air →
Contact →

■ DC



■ PoE



■ DC, PoE

Test Data

■ DC Mode

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

Direct Discharge

No.	Test Point	Discharge Method	Observations	Remarks
1	Enclosure, Screw	Contact Discharge	Complied	-
2	Port	Contact Discharge	Complied	-
3	Mouse	Air Discharge	Complied	-

■ PoE Mode

Indirect Discharge

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

Direct Discharge

No.	Test Point	Discharge Method	Observations	Remarks
1	Enclosure, Screw	Contact Discharge	Complied	-
2	Port	Contact Discharge	Complied	-
3	Mouse	Air Discharge	Complied	-

Note: "Blank" = Not performed

Observations:
Complied – No degradation of function

Test Results

☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria

Remarks

PASS Required Performance Criteria

3.2 Radiated Electric Field Immunity

Reference Standard
EN IEC 61000-4-3:2020

Test Date
Nov. 27, 2022

Test Location
EMS-RS: ☐ SEMI ANECHOIC CHAMBER #2 ☒ SEMI ANECHOIC CHAMBER #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	EMC32	R & S	10.10.02	-
☒	SIGNAL GENERATOR	SMB 100A	Rohde & Schwarz	108252	08, 01, 2023
☒	HIGH POWER DUAL AMP	SSA532	SUNGSAN	SSA532-001	-
☒	POWER METER	E4419B	Agilent	GB40203000	03, 31, 2023
☒	AVERAGE POWER SENSOR	E9301A	Agilent	MY52170007	04, 04, 2023
☒	AVERAGE POWER SENSOR	E9301A	Agilent	MY41498669	04, 04, 2023
☒	STACKED DOUBLE LOG-PER- ANTENNA	STPL9128 E	Schwarzbeck	9128ES-121	-
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	03, 03, 2023

Test Conditions

Temperature: (24,4 ± 1,0) ℃
Relative Humidity: (45,9 ± 0,8) % R.H.
Atmospheric Pressure: (100,3 ± 0,0) kPa

Test Specifications

Antenna Polarization: Horizontal & vertical unless indicated otherwise

Antenna Distance: ☒ 3 m

Field Strength: ☐ 1 V/m ☐ 3 V/m
☒ 10 V/m

Frequency Range: ☐ 80 MHz to 1 GHz ☐ 1,4 GHz to 2,7 GHz
☒ 80 MHz to 2,7 GHz

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: ☒ Complied

Test Data

■ DC Mode

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

■ PoE Mode

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

Note: "Blank" = Not performed

Observations:
Complied – No degradation of function

Test Results

☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria

Remarks

PASS Required Performance Criteria

3.3 Electrical Fast Transients/Bursts

Reference Standard
EN 61000-4-4:2012

Test Date
Dec. 01, 2022

Test Location
EMS-EFT: Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	iec.control	AMETEK CTS	7.1.2	-
☒	ULTRA COMPACT SIMULATOR	UCS 500 N5	EM TEST	V0936105120	04, 01, 2023
☒	MOTOR VARIAC	MV2616	EM TEST	V0936105123	04, 01, 2023
☒	CAPACITIVE COUPLING CLAMP	HFK	EM TEST	070925	04, 01, 2023

Test Conditions

Temperature: (22,0 ± 0,1) ℃
Relative Humidity: (46,0 ± 0,2) % R.H.
Atmospheric Pressure: (101,4 ± 0,0) ㎪

Test Specifications

Pulse Amplitude & Polarity: (AC Power Lines)	☐ ± 1.0 ㎸ ☐ ± 4.0 ㎸	☒ ± 2.0 ㎸
Pulse Amplitude & Polarity: (Other supply / Signal Lines)	☐ ± 0.5 ㎸ ☐ ± 2.0 ㎸	☒ ± 1.0 ㎸
Burst Period:	☒ 300 ㎳	☐ 2 s
Repetition Rate:	☐ 5 ㎑	☒ 100 ㎑
Duration of Test Voltage:	☒ ≥ 1 min	
Required Performance Criteria:	☒ Complied	

Test Data

■ DC Mode

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

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

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

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

☒ Signal ports and telecommunication ports – Coupling Clamp used

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

■ PoE Mode

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

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

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

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

☒ Signal ports and telecommunication ports – Coupling Clamp used

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

Note: "Blank" = Not performed
Observations:
Complied – No degradation of function

Test Results

☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria

Remarks

PASS Required Performance Criteria

3.4 Surge Transients

Reference Standard
EN 61000-4-5:2014/A1:2017

Test Date
Nov. 30, 2022 / Dec. 01, 2022

Test Location
EMS-Surge: Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	iec.control	AMETEK CTS	7.1.2	-
☒	ULTRA COMPACT SIMULATOR	UCS 500 N5	EM TEST	V0936105120	04, 01, 2023
☒	MOTOR VARIAC	MV2616	EM TEST	V0936105123	04, 01, 2023

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	5.4.8	-
☒	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	11, 28, 2023
☒	MOTOR VARIAC	MV2616	EM TEST	P1552169719	11, 29, 2023
☒	CDN	CNV 508N1	EM TEST	P1610176296	11, 29, 2023

Test Conditions

Test Date:	Nov. 30, 2022	Dec. 01, 2022
Temperature:	(22,9 ± 0,5) ℃	(22,3 ± 0,2) ℃
Relative Humidity:	(45,5 ± 0,6) % R.H.	(46,0 ± 0,2) % R.H.
Atmospheric Pressure:	(101,3 ± 0,0) kPa	(101,4 ± 0,0) kPa

Test Specifications

AC Power Lines

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

Surge Amplitude : Common Mode
☒ (0,5 / 1,0 / 2,0) kV
Differential Mode
☒ (0,5 / 1,0) kV

Number of Surges: ☒ 5 surges per angle

Angle: ☒ 0°, 90°, 180°, 270° (input a.c. power port)

Polarity: ☒ Positive & Negative

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

Required Performance Criteria: ☒ Complied

Other supply / Signal Lines

Source Impedance: 42 ohm for common Mode
Surge Amplitude: Common Mode
☒ (0,5 / 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: ☒ Complied

Test Data

■ DC Mode

☒ Line to Line – Differential Mode

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

☒ Line to Earth – Common Mode

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

Signal Lines

☒ Line to Earth – Common Mode

Mode of Application	Coupling Method	Observations	
		(+) Surge (㎸)	(-) Surge (㎸)
NETWORK	CDN	Complied	Complied
	LINE	Complied	Complied

■ PoE Mode
☐ Line to Line – Differential Mode

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

☐ Line to Earth – Common Mode

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

Signal Lines

☒ Line to Earth – Common Mode

Mode of Application	Coupling Method	Observations	
		(+) Surge (㎸)	(-) Surge (㎸)
NETWORK	CDN	Complied	Complied
	LINE	Complied	Complied

Note:"Blank" = Not performed
Observations:
Complied – No degradation of function

Test Results

☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria

Remarks

PASS Required Performance Criteria

3.5 Conducted Disturbance

Reference Standard
EN 61000-4-6:2014

Test Date
Nov. 28, 2022

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	5.3.12	-
☒	CONTINUOUS WAVE SIMULATOR	CWS 500N1.4	EM TEST	P1602169880	11, 10, 2023
☒	ATTENUATOR	ATT 6/80	EM TEST	P1614178148	11, 10, 2023
☒	CDN	CDN M016	TESEQ	43694	11, 10, 2023
☒	CDN	CDN M016	TESEQ	43697	11, 10, 2023
☒	CDN	CDN T8RJ45	EM TEST	0909-09	08, 01, 2023
☐	EM CLAMP	KEMZ 801A	TESEQ	44099	11, 14, 2023

Test Conditions

Temperature: (22,7 ± 0,6) ℃
Relative Humidity: (46,4 ± 0,3) % R.H.
Atmospheric Pressure: (100,7 ± 0,0) kPa

Test Specifications

Frequency range:	☒ 150 ㎑ to 100 ㎒	☐ 150 ㎑ to 80 ㎒
Voltage Level:	☐ 1 Vrms ☒ 10 Vrms	☐ 3 Vrms
Modulation:	☒ AM, 80 %, 1 ㎑ sine wave ☒ PM, 1 ㎐ (0,5 s ON : 0,5 s OFF)	
Frequency step:	☒ 1 % step	
Dwell Time:	☐ 1 s	☒ 3 s
Required Performance Criteria:	☒ Complied	

Test Data

■ DC Mode

☒ Input a.c. power ports

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

☐ Input d.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Observations
-	-	-

☒ Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Observations
NETWORK	CDN	Complied

■ PoE Mode

☐ Input a.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Observations
-	-	-

☐ Input d.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Observations
-	-	-

☒ Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Observations
NETWORK	CDN	Complied

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

Observations:
Complied – No degradation of function

Test Results

☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria

Remarks

PASS Required Performance Criteria

3.6 Voltage Dips and Short Interruptions

Reference Standard
EN IEC 61000-4-11:2020

Test Date
Dec. 01, 2022

Test Location
EMS-Voltage dip: Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	iec.control	AMETEK CTS	7.1.2	-
☒	ULTRA COMPACT SIMULATOR	UCS 500 N5	EM TEST	V0936105120	04, 01, 2023
☒	MOTOR VARIAC	MV2616	EM TEST	V0936105123	04, 01, 2023

Test Conditions
Temperature: (22,1 ± 0,0) ℃
Relative Humidity: (46,1 ± 0,0) % R.H.
Atmospheric Pressure: (101,4 ± 0,0) kPa

Test Specifications & Observations/Remarks

■ DC Mode

- Voltage Dips and Short Interruptions

Test Level	Duration [in period/ms (50 ㎐)]	Results
☒ 20 % dip	☒ 250 / 5 000	Complied
☒ 30 % dip	☒ 25 / 500	Complied
☒ 60 % dip	☒ 10 / 200	Complied
☒ 100 % dip	☒ 250 / 5 000	Degradation

- Voltage variations

☒ Unom + 10 %	☒ 253.0 V (ac)	Complied
☒ Unom - 15 %	☒ 195.5 V (ac)	Complied

Observations:
Complied – No degradation of function
Degradation - See "Remarks "

Test Results

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

Remarks

During the test(100%, 250cycle), EUT was turned off but after the test, it was recovered without operator's intervention.

APPENDIX A – TEST DATA

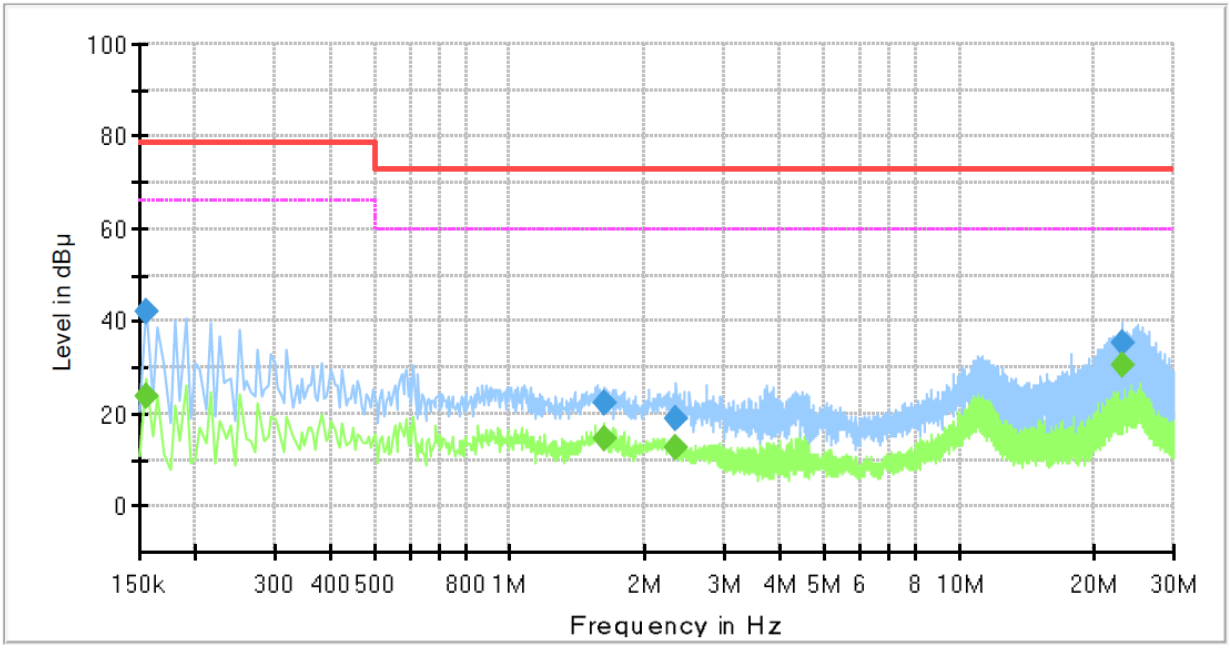
Conducted Emissions at Mains Power Ports

■ DC Mode

[HOT]

Common Information

Test Description:	Conducted Emission
Model No.:	SPD-152
Phase:	L1
Mode:	DC
Operator Name:	KES



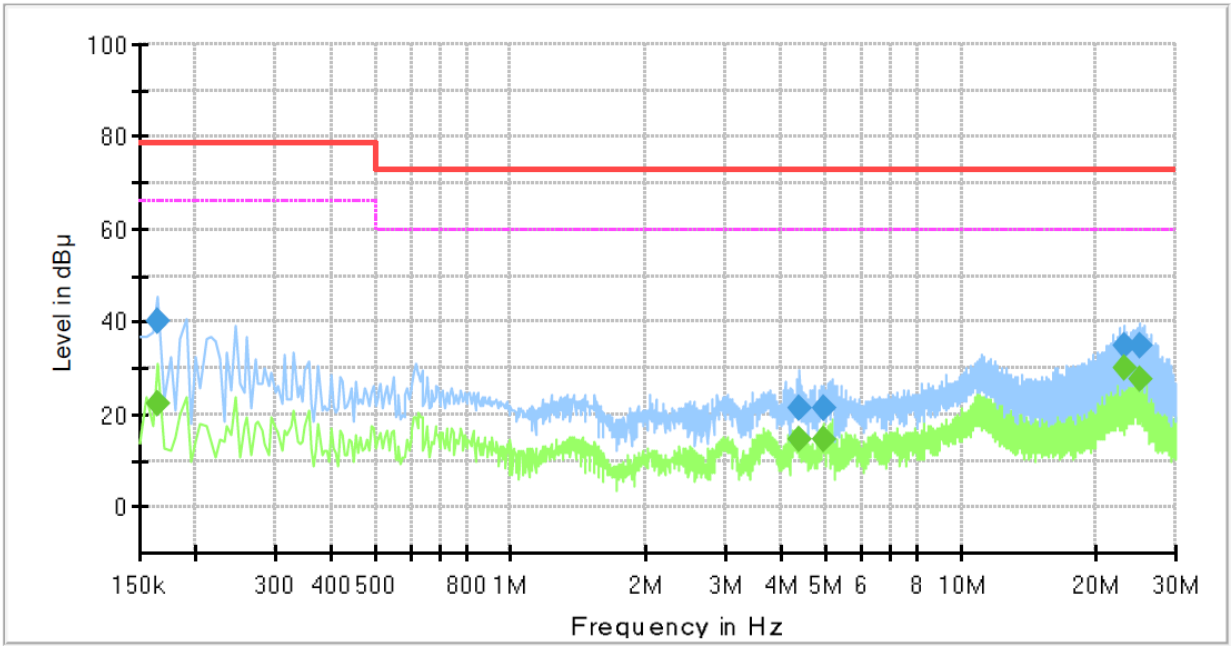
Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.155000	---	23.63	66.00	42.37	1000.0	9.000	L1	19.5
0.155000	42.02	---	79.00	36.98	1000.0	9.000	L1	19.5
1.620000	---	14.74	60.00	45.26	1000.0	9.000	L1	20.3
1.620000	22.10	---	73.00	50.90	1000.0	9.000	L1	20.3
2.350000	---	12.44	60.00	47.56	1000.0	9.000	L1	20.3
2.350000	18.89	---	73.00	54.11	1000.0	9.000	L1	20.3
23.130000	---	30.46	60.00	29.54	1000.0	9.000	L1	20.2
23.130000	35.34	---	73.00	37.66	1000.0	9.000	L1	20.2

[NEUTRAL]

Common Information

Test Description:	Conducted Emission
Model No.:	SPD-152
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)
0.165000	---	22.52	66.00	43.48	1000.0	9.000	N	19.4
0.165000	40.09	---	79.00	38.91	1000.0	9.000	N	19.4
4.360000	---	14.48	60.00	45.52	1000.0	9.000	N	19.8
4.360000	21.16	---	73.00	51.84	1000.0	9.000	N	19.8
4.950000	---	14.82	60.00	45.18	1000.0	9.000	N	19.7
4.950000	21.12	---	73.00	51.88	1000.0	9.000	N	19.7
23.125000	---	29.87	60.00	30.13	1000.0	9.000	N	20.2
23.125000	35.10	---	73.00	37.90	1000.0	9.000	N	20.2
24.960000	---	27.83	60.00	32.17	1000.0	9.000	N	20.2
24.960000	34.75	---	73.00	38.25	1000.0	9.000	N	20.2

♦ 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))

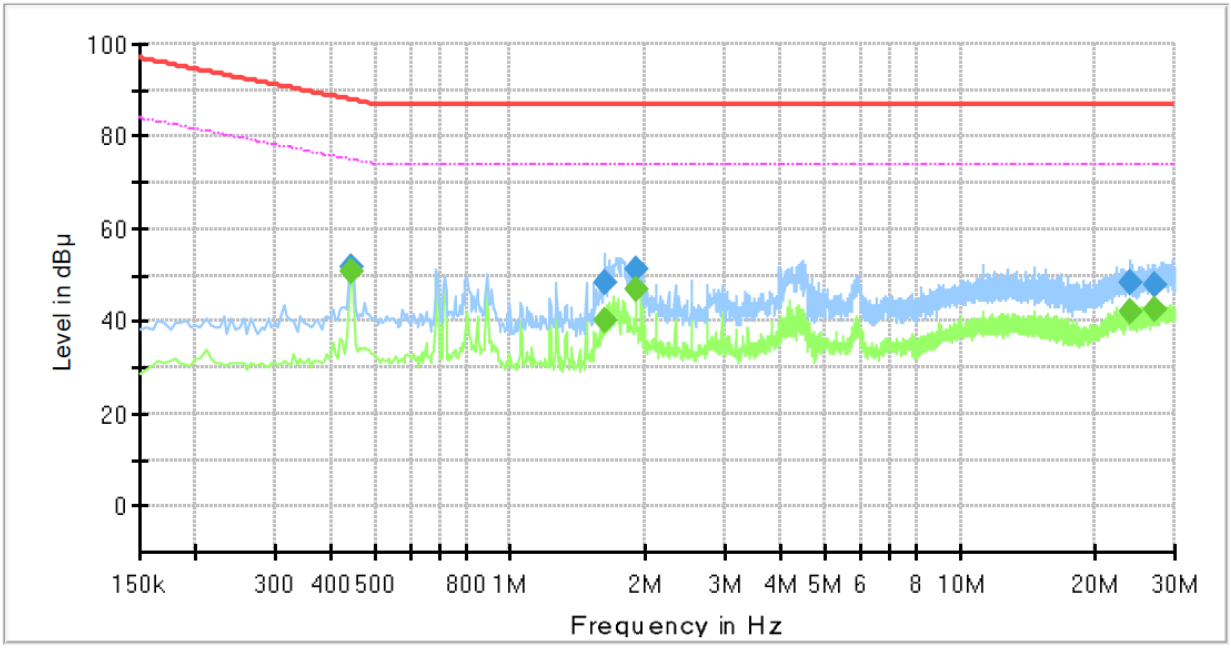
Conducted Emissions at Telecommunication Ports

■ DC Mode

[1 000 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	SPD-152
Mode :	DC
Speed :	1 000 Mbps
Operator Name:	KES



Final_Result

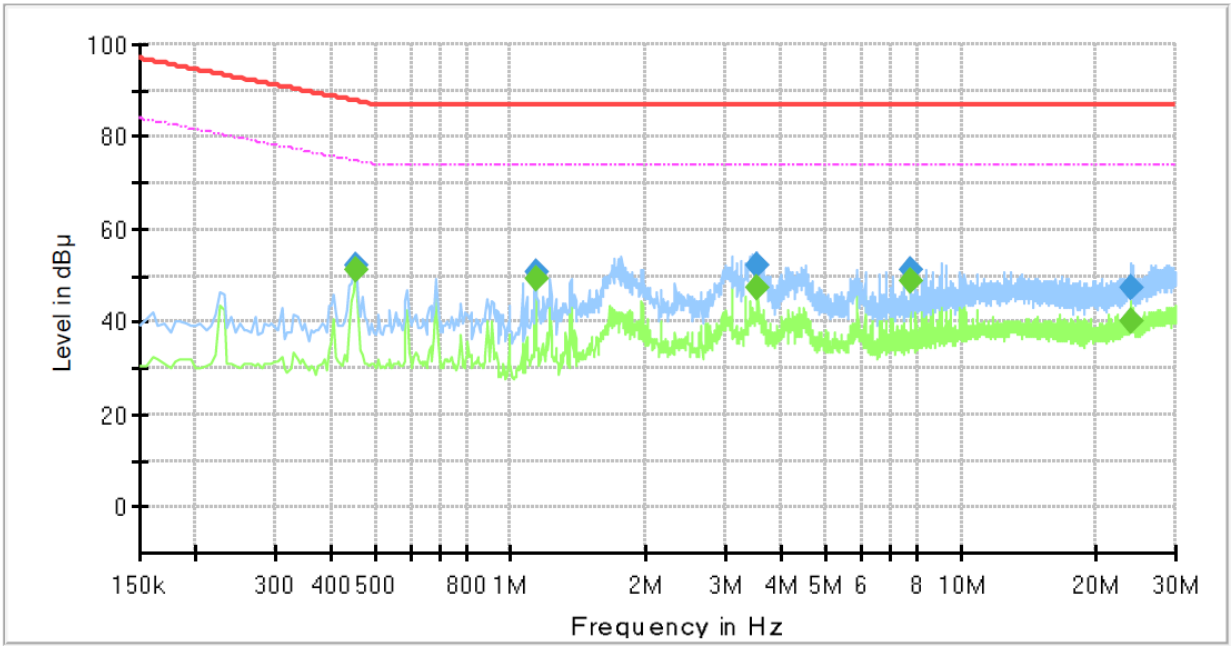
Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.445000	---	50.85	74.97	24.12	1000.0	9.000	Single Line	19.4
0.445000	51.84	---	87.97	36.13	1000.0	9.000	Single Line	19.4
1.625000	---	40.19	74.00	33.81	1000.0	9.000	Single Line	19.8
1.625000	48.30	---	87.00	38.70	1000.0	9.000	Single Line	19.8
1.900000	---	46.86	74.00	27.14	1000.0	9.000	Single Line	19.9
1.900000	51.11	---	87.00	35.89	1000.0	9.000	Single Line	19.9
23.800000	---	42.19	74.00	31.81	1000.0	9.000	Single Line	19.6
23.800000	48.26	---	87.00	38.74	1000.0	9.000	Single Line	19.6
27.155000	---	42.66	74.00	31.34	1000.0	9.000	Single Line	19.7
27.155000	48.03	---	87.00	38.97	1000.0	9.000	Single Line	19.7

■ PoE Mode

[1 000 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	SPD-152
Mode :	PoE
Speed :	1 000 Mbps
Operator Name:	KES



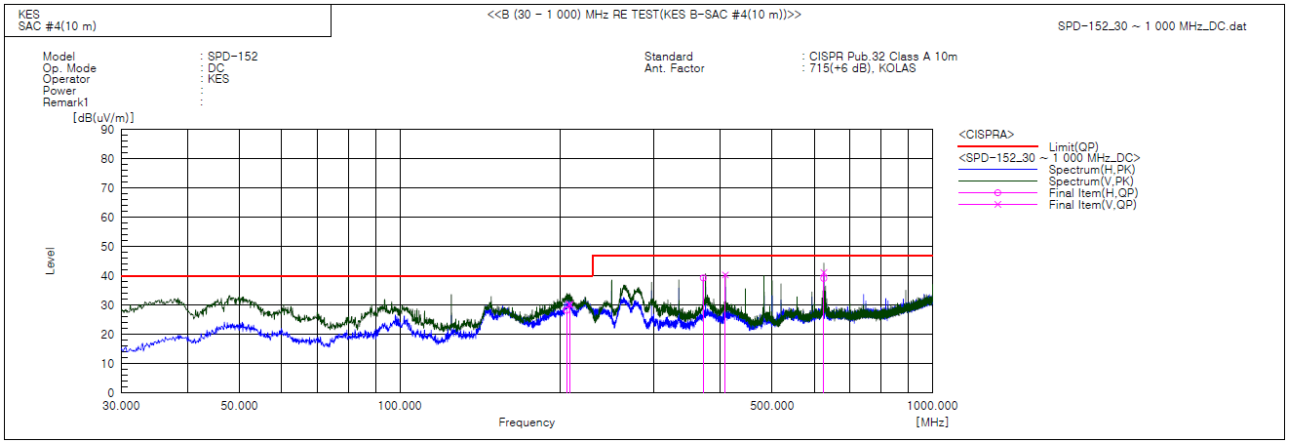
Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.455000	---	51.21	74.78	23.57	1000.0	9.000	Single Line	19.5
0.455000	52.05	---	87.78	35.73	1000.0	9.000	Single Line	19.5
1.135000	---	49.50	74.00	24.50	1000.0	9.000	Single Line	19.7
1.135000	50.76	---	87.00	36.24	1000.0	9.000	Single Line	19.7
3.540000	---	47.19	74.00	26.81	1000.0	9.000	Single Line	19.5
3.540000	52.11	---	87.00	34.89	1000.0	9.000	Single Line	19.5
7.720000	---	48.99	74.00	25.01	1000.0	9.000	Single Line	19.0
7.720000	51.05	---	87.00	35.95	1000.0	9.000	Single Line	19.0
23.790000	---	40.07	74.00	33.93	1000.0	9.000	Single Line	19.6
23.790000	47.23	---	87.00	39.77	1000.0	9.000	Single Line	19.6

♦ 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 (ISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

Radiated Electric Field Emissions(Below 1 ㎓)

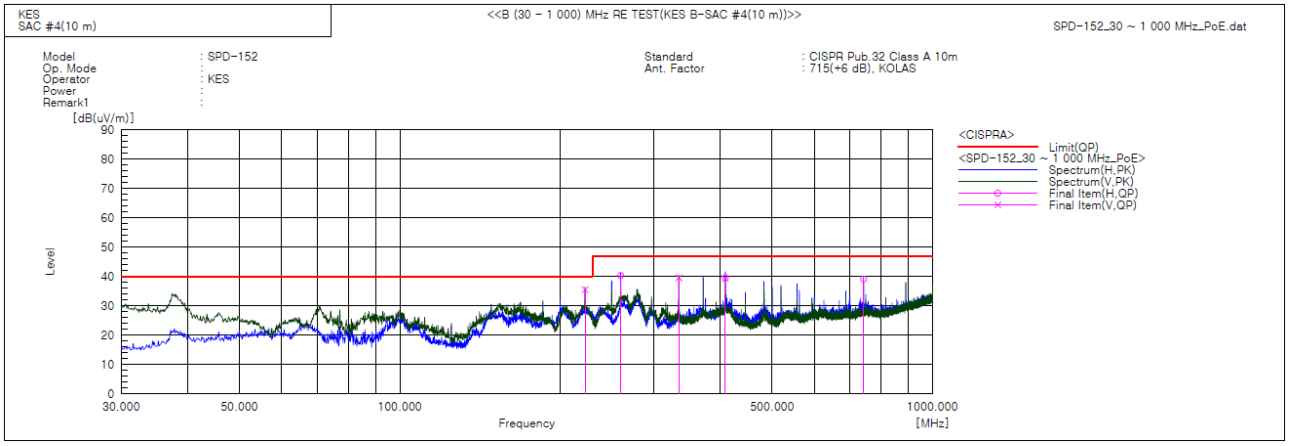
■ DC Mode



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	205.691	H	48.7	-20.5	28.2	40.0	11.8	362.0	17.0	
2	208.238	V	50.5	-20.3	30.2	40.0	9.8	114.0	357.0	
3	371.198	H	53.3	-14.0	39.3	47.0	7.7	357.0	325.0	
4	408.300	V	53.6	-13.3	40.3	47.0	6.7	105.0	197.0	
5	624.974	H	46.7	-7.6	39.1	47.0	7.9	396.0	110.0	
6	625.095	V	48.7	-7.6	41.1	47.0	5.9	129.0	86.0	

■ PoE Mode



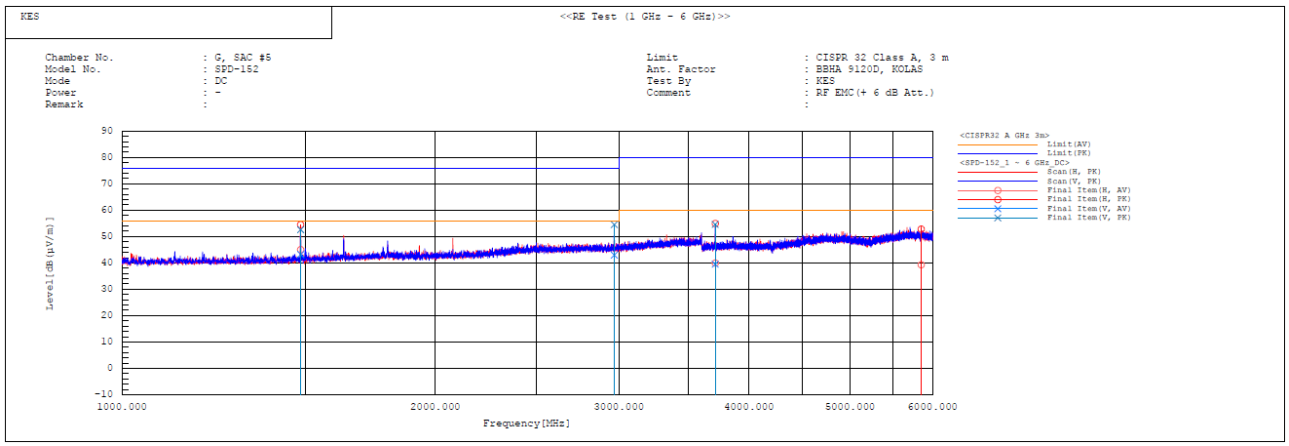
Final Result

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	222.666	V	55.0	-19.5	35.5	40.0	4.5	139.0	30.0	
2	259.890	H	58.9	-18.6	40.3	47.0	6.7	373.0	189.0	
3	334.095	V	55.1	-15.6	39.5	47.0	7.5	127.0	156.0	
4	408.300	V	52.5	-13.3	39.2	47.0	7.8	140.0	187.0	
5	408.300	H	52.9	-13.3	39.6	47.0	7.4	395.0	269.0	
6	742.465	H	45.2	-6.1	39.1	47.0	7.9	370.0	334.0	

♦ Calculation – SEMI ANECHOIC CHAMBER #4(10 m)
Result(QP) [dB(㎶/m)] = (Reading(QP)[dB(㎶)] + c.f[dB(1/m)]
Margin(QP)[dB] = Limit[dB(㎶/m)] - Result(QP) [dB(㎶/m)]
Reading(QP) : Reading value, Result(QP) : Reading value + Factor value
Limit(QP) : Limit value, c.f : (ANT Factor + Cable Loss - Preamp Factor), Margin: Margin value

Radiated Electric Field Emissions(Above 1 ㎓)

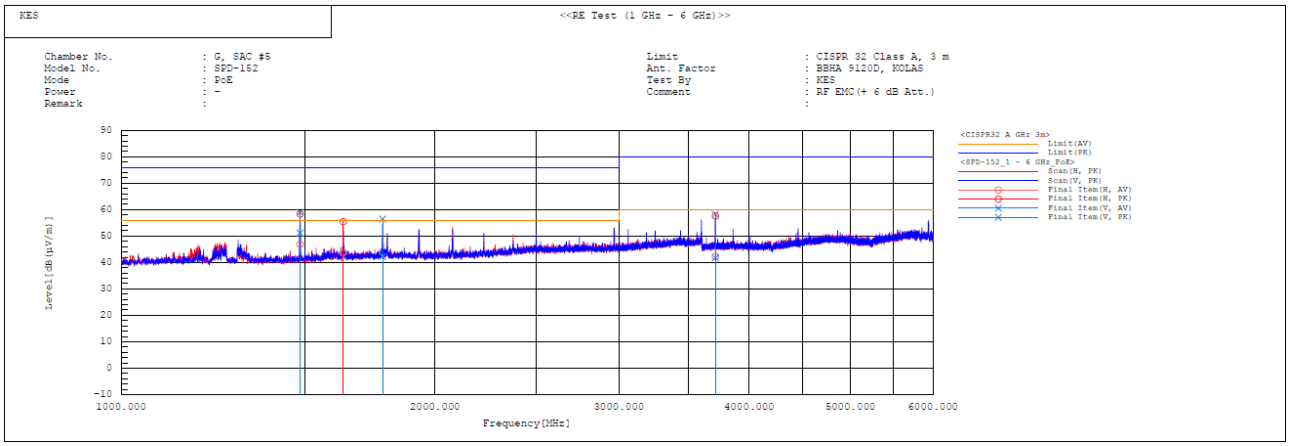
■ DC Mode



Final Result

No.	Frequency [MHz]	Pol	Reading AV [dB(μV)]	Reading PK [dB(μV)]	c.f [dB(1/m)]	Result AV [dB(μV/m)]	Result PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Limit PK [dB(μV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Remark
1	1484.500	H	45.2	54.7	-0.2	45.0	54.5	56.0	76.0	11.0	21.5	100.0	343.1	
2	1484.500	V	43.4	52.8	-0.2	43.2	52.6	56.0	76.0	12.8	23.4	100.0	0.2	
3	2969.500	V	38.1	49.6	4.9	43.0	54.5	56.0	76.0	13.0	21.5	100.0	93.2	
4	3712.000	V	33.3	48.4	6.2	39.5	54.6	60.0	80.0	20.5	25.4	100.0	158.4	
5	3713.000	H	33.7	48.7	6.2	39.9	54.9	60.0	80.0	20.1	25.1	100.0	9.0	
6	5853.000	H	27.1	40.6	12.2	39.3	52.8	60.0	80.0	20.7	27.2	100.0	231.5	

■ PoE Mode



Final Result

No.	Frequency [MHz]	Pol	Reading AV [dB(μV)]	Reading PK [dB(μV)]	c.f [dB(1/m)]	Result AV [dB(μV/m)]	Result PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Limit PK [dB(μV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Remark
1	1484.500	H	47.1	58.5	-0.2	46.9	58.3	56.0	76.0	9.1	17.7	100.0	31.3	
2	1485.000	V	51.3	59.2	-0.2	51.1	59.0	56.0	76.0	4.9	17.0	100.0	16.0	
3	1633.000	H	43.5	55.0	0.4	43.9	55.4	56.0	76.0	12.1	20.6	100.0	22.2	
4	1781.000	V	41.0	55.2	1.2	42.2	56.4	56.0	76.0	13.8	19.6	100.0	29.0	
5	3712.000	H	36.1	51.4	6.2	42.3	57.6	60.0	80.0	17.7	22.4	100.0	16.5	
6	3712.000	V	35.6	52.0	6.2	41.8	58.2	60.0	80.0	18.2	21.8	100.0	0.3	

♦ 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

Harmonic Current Emissions and Voltage Fluctuations and Flicker

■ DC Mode

Average harmonic current results

Hn	Ieff [A]	% of Limit	Limit [A]	Result
1	0.042			
2	0.001	0.130	1.080	n/a
3	0.024	1.038	2.300	PASS
4	0.003	0.613	0.430	n/a
5	0.023	2.055	1.140	PASS
6	0.002	0.538	0.300	n/a
7	0.023	3.001	0.770	PASS
8	0.002	0.770	0.230	n/a
9	0.022	5.496	0.400	PASS
10	0.003	1.434	0.184	n/a
11	0.021	6.467	0.330	PASS
12	0.002	1.205	0.153	n/a
13	0.021	9.987	0.210	PASS
14	0.001	1.064	0.131	n/a
15	0.020	13.460	0.150	PASS
16	0.001	1.174	0.115	n/a
17	0.019	14.320	0.132	PASS
18	0.002	1.570	0.102	n/a
19	0.017	14.684	0.118	PASS
20	0.001	1.596	0.092	n/a
21	0.016	9.945	0.161	PASS
22	0.001	1.491	0.084	n/a
23	0.015	10.049	0.147	PASS
24	0.001	1.743	0.077	n/a
25	0.013	9.895	0.135	PASS
26	0.001	1.551	0.071	n/a
27	0.012	9.631	0.125	PASS
28	0.001	1.519	0.066	n/a
29	0.011	9.175	0.116	PASS
30	0.001	1.704	0.061	n/a
31	0.009	8.604	0.109	PASS
32	0.001	1.489	0.058	n/a
33	0.008	7.942	0.102	PASS
34	0.001	1.574	0.054	n/a
35	0.007	6.944	0.096	PASS
36	0.001	1.409	0.051	n/a
37	0.006	6.112	0.091	PASS
38	0.001	1.384	0.048	n/a
39	0.005	5.388	0.087	n/a
40	0.001	1.504	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	Ieff [A]	% of Limit	Limit [A]	Result
1	0.042			
2	0.002	0.109	1.620	n/a
3	0.024	0.695	3.450	PASS
4	0.003	0.498	0.645	n/a
5	0.024	1.379	1.710	PASS
6	0.002	0.422	0.450	n/a
7	0.023	2.016	1.155	PASS
8	0.002	0.596	0.345	n/a
9	0.022	3.719	0.600	PASS
10	0.003	1.118	0.276	n/a
11	0.022	4.384	0.495	PASS
12	0.002	0.941	0.230	n/a
13	0.021	6.703	0.315	PASS
14	0.002	0.828	0.197	n/a
15	0.020	9.067	0.225	PASS
16	0.002	0.909	0.173	n/a
17	0.019	9.628	0.199	PASS
18	0.002	1.218	0.153	n/a
19	0.018	9.878	0.178	PASS
20	0.002	1.240	0.138	n/a
21	0.016	10.034	0.161	PASS
22	0.001	1.144	0.125	n/a
23	0.015	10.130	0.147	PASS
24	0.002	1.328	0.115	n/a
25	0.013	9.973	0.135	PASS
26	0.001	1.193	0.106	n/a
27	0.012	9.711	0.125	PASS
28	0.001	1.217	0.099	n/a
29	0.011	9.272	0.116	PASS
30	0.001	1.327	0.092	n/a
31	0.009	8.693	0.109	PASS
32	0.001	1.183	0.086	n/a
33	0.008	8.034	0.102	PASS
34	0.001	1.226	0.081	n/a
35	0.007	7.255	0.096	PASS
36	0.001	1.081	0.077	n/a
37	0.006	6.286	0.091	PASS
38	0.001	1.109	0.073	n/a
39	0.005	5.698	0.087	n/a
40	0.001	1.127	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.

Test Data - Voltage Fluctuations

Maximum Flicker results

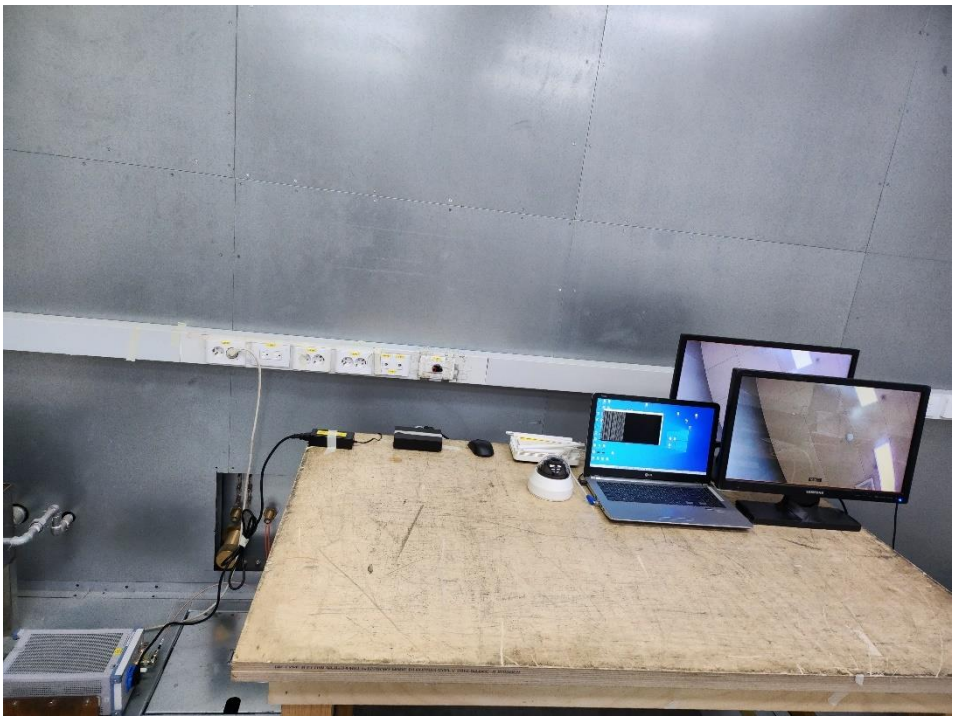
■ DC Mode

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

Test Setup Photos and Configuration

Conducted Emissions at Mains Power Ports

■ DC Mode



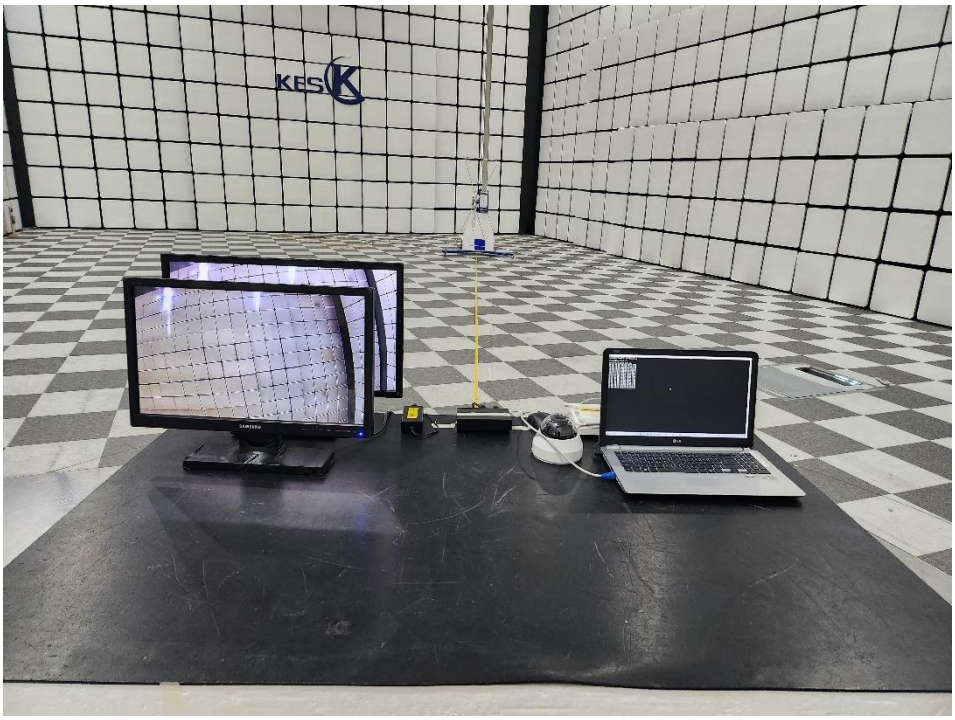
Conducted Emissions at Telecommunication Ports

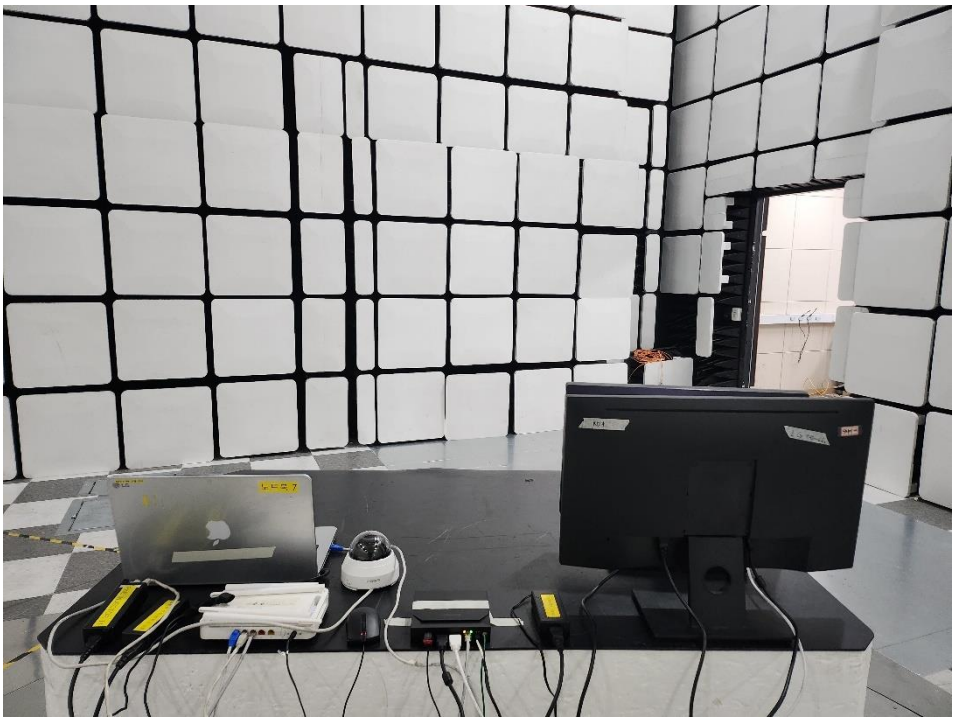
■ DC Mode

■ PoE Mode

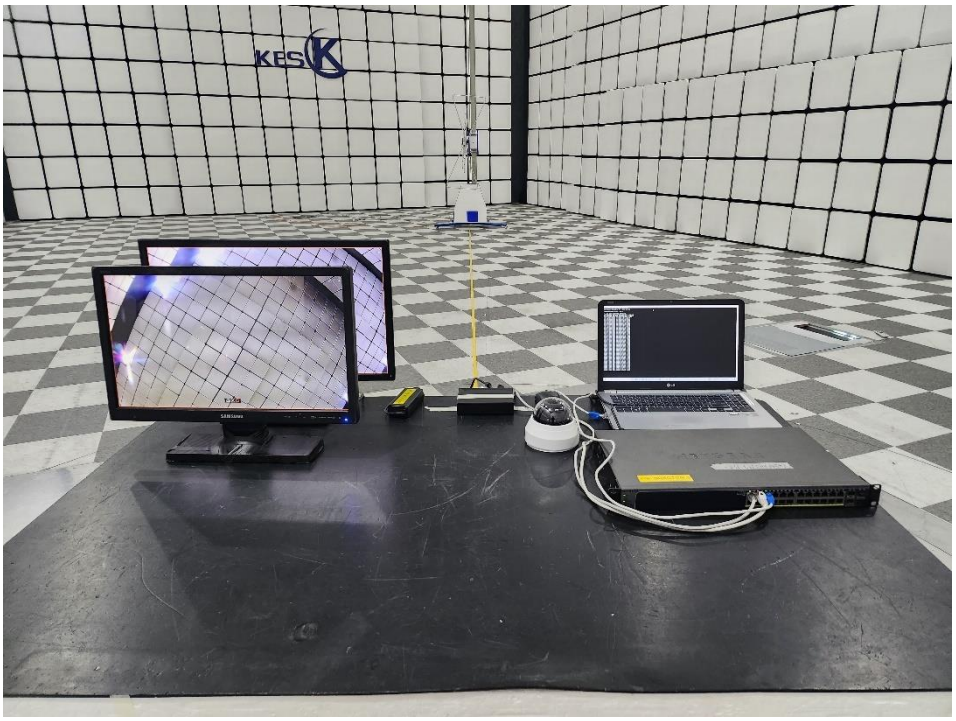
Radiated Electric Field Emissions(Below 1 ㎓)

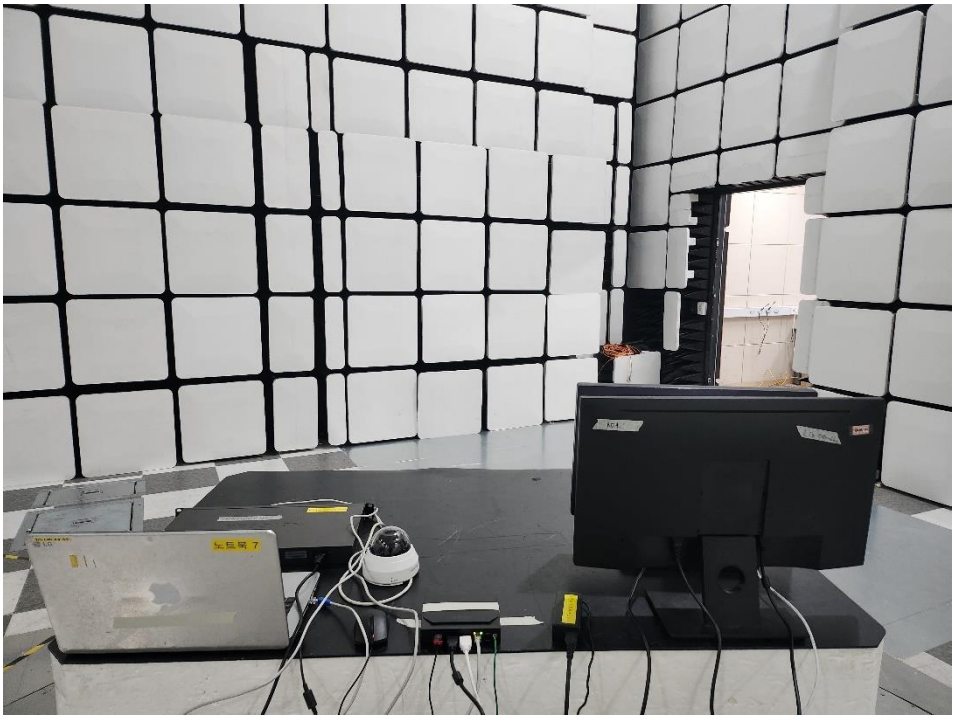
■ DC Mode





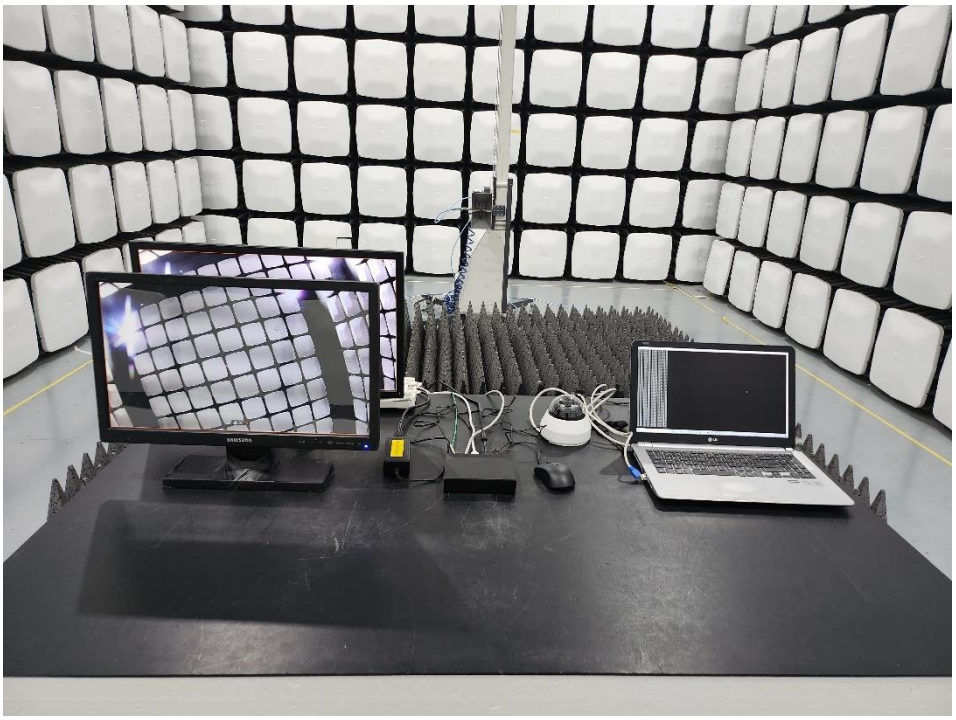
■ PoE Mode

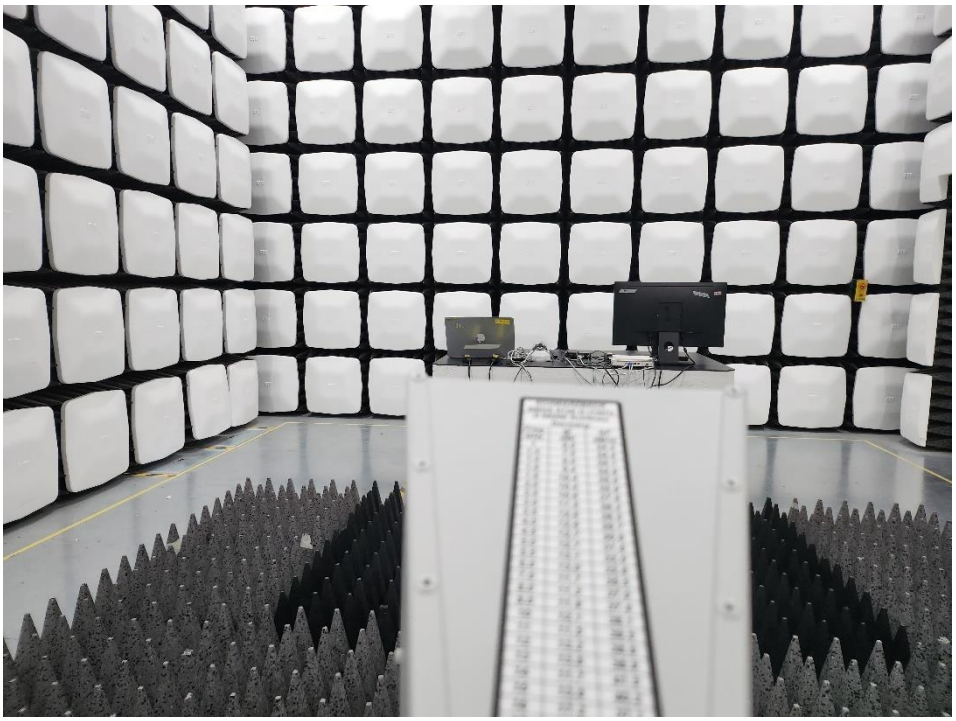




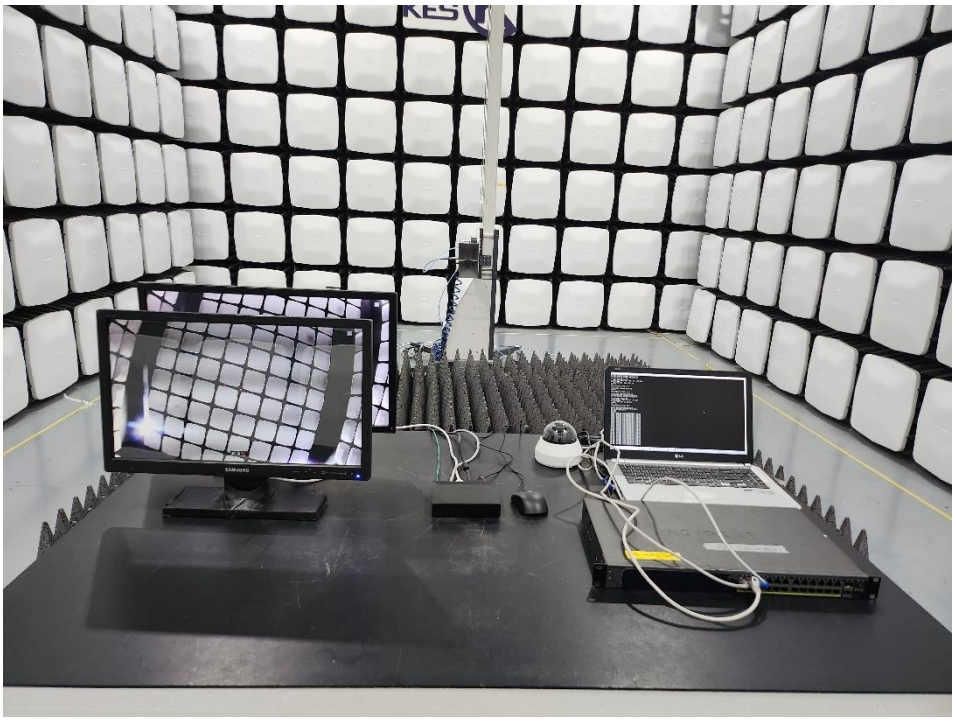
Radiated Electric Field Emissions(Above 1 ㎓)

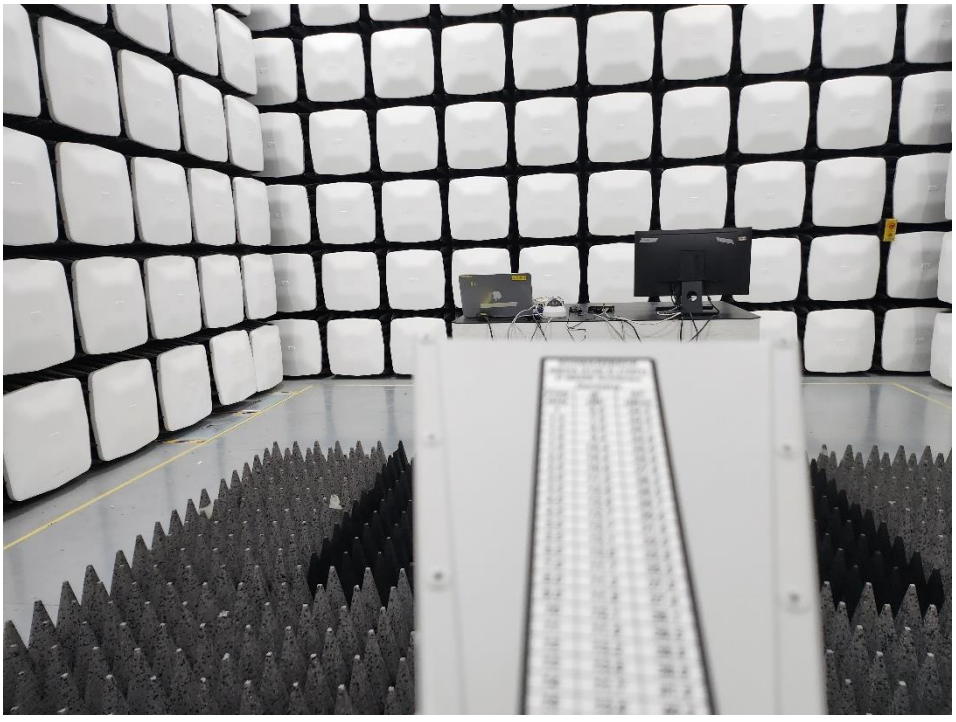
■ DC Mode





■ PoE Mode



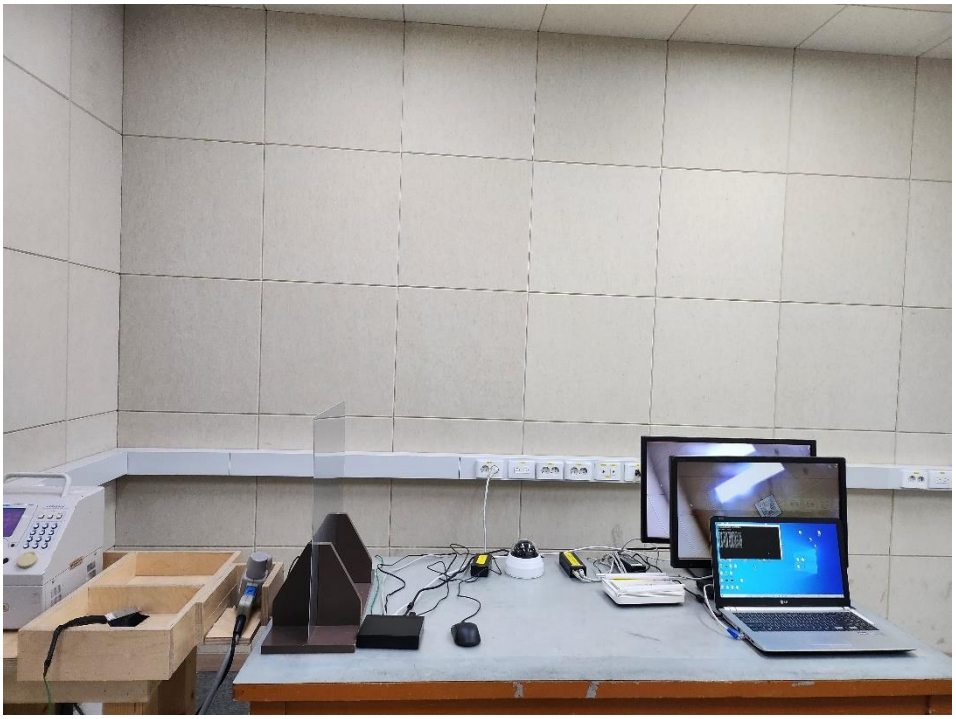


Harmonic Current Emissions and Voltage Fluctuations and Flicker

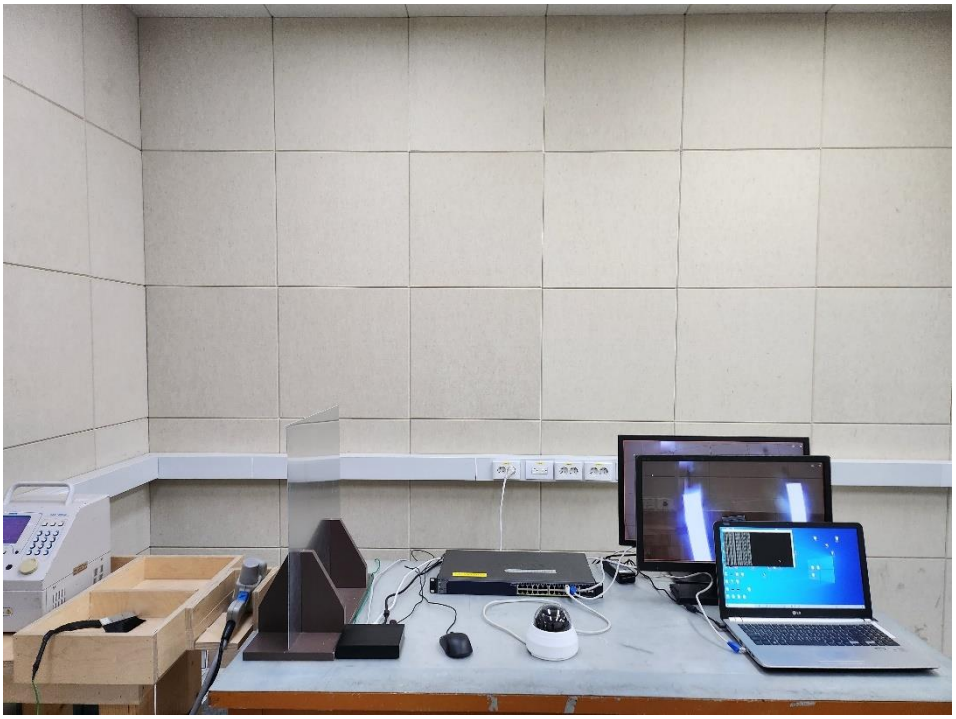
■ DC Mode

Electrostatic Discharge

■ DC Mode

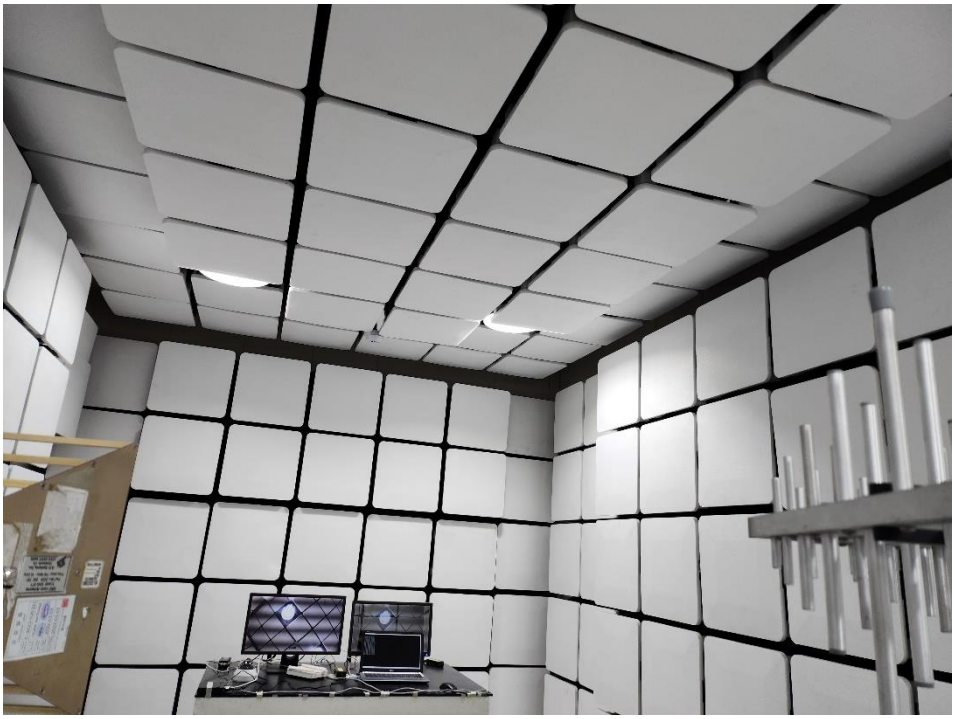


■ PoE Mode

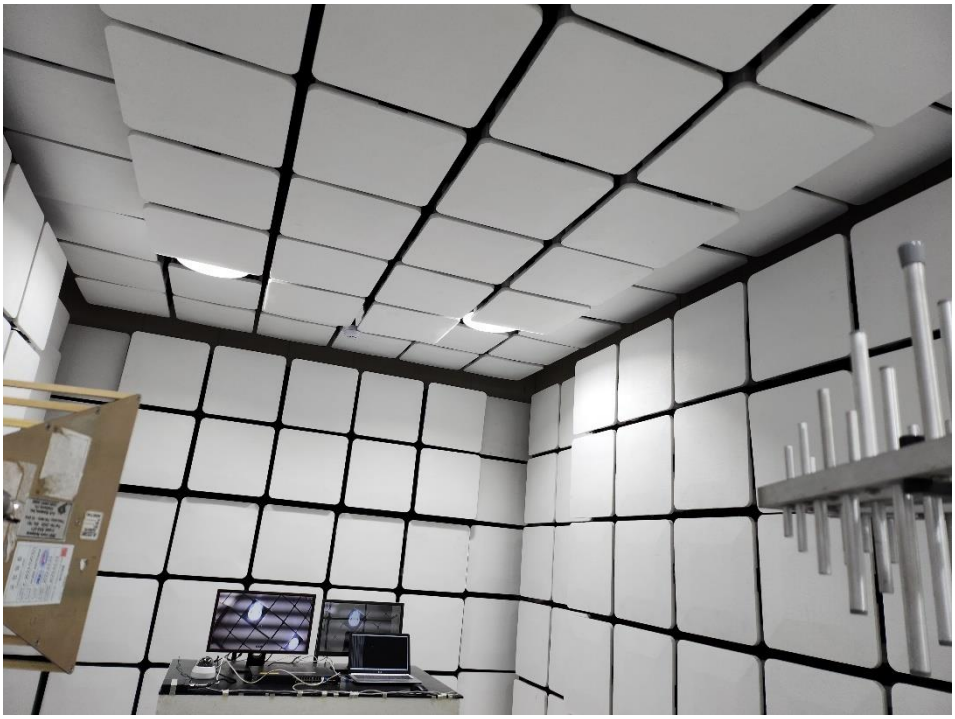


Radiated Electric Field Immunity

■ DC Mode

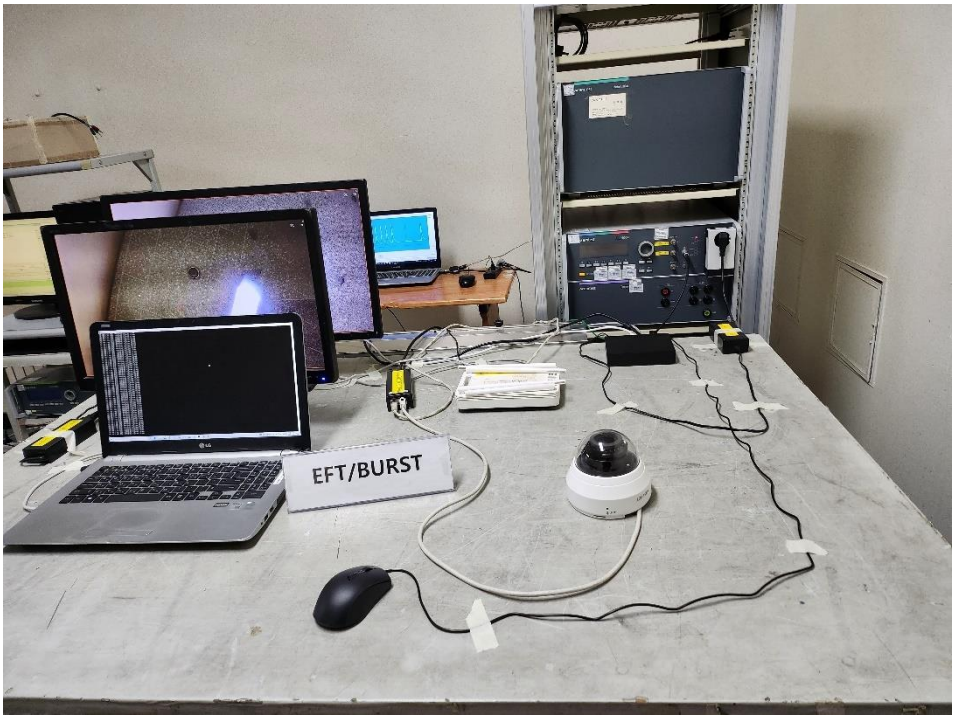


■ PoE Mode



Electrical Fast Transients/Bursts

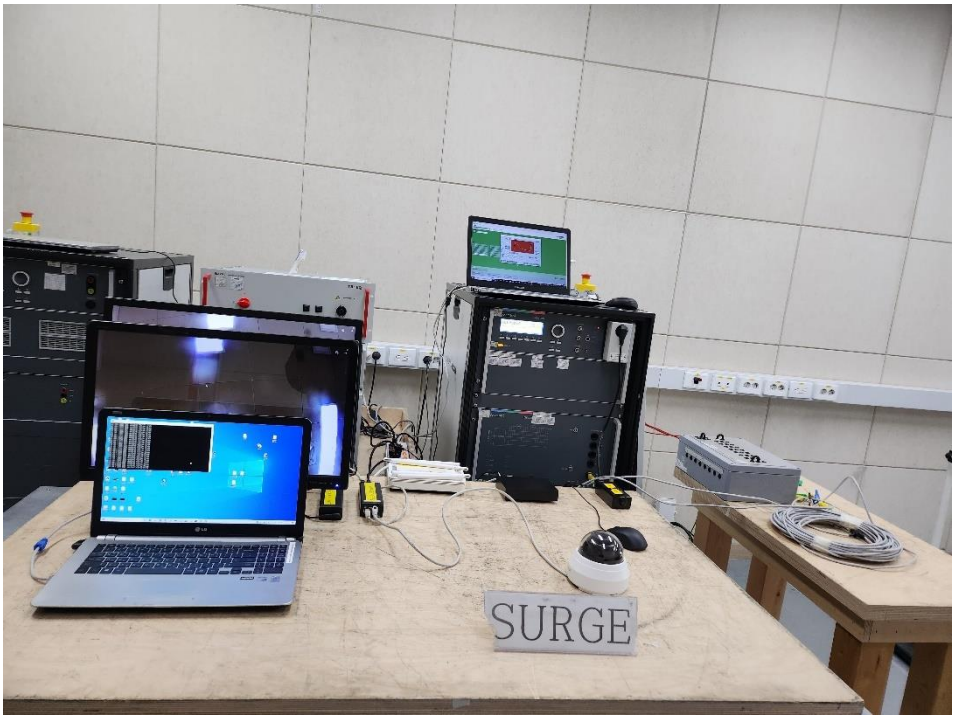
■ DC Mode



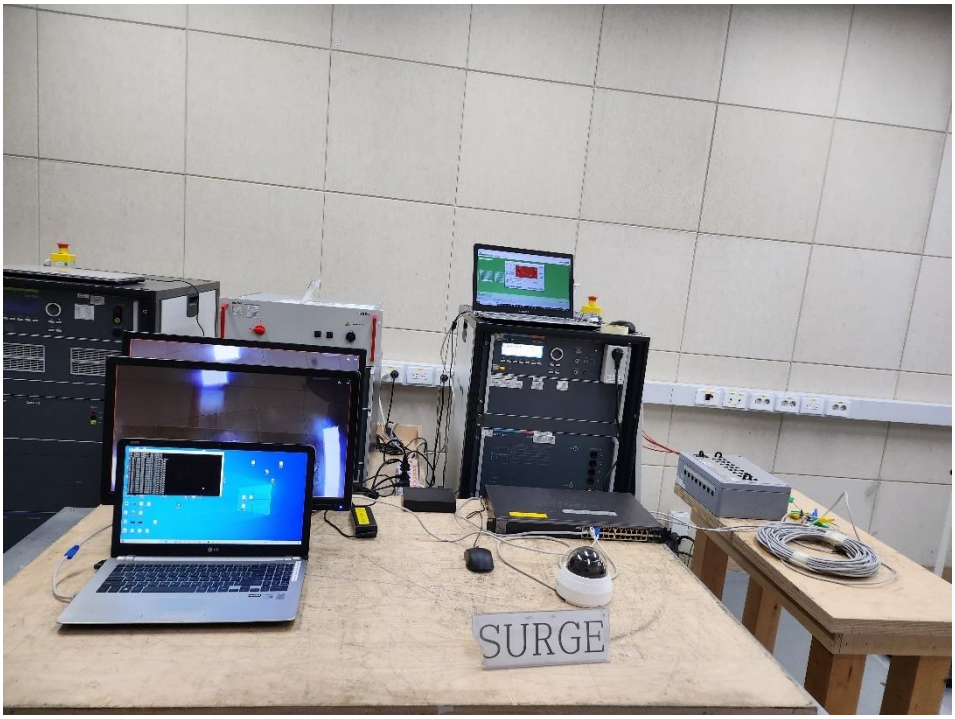
■ PoE Mode

Surge Transients

■ DC Mode

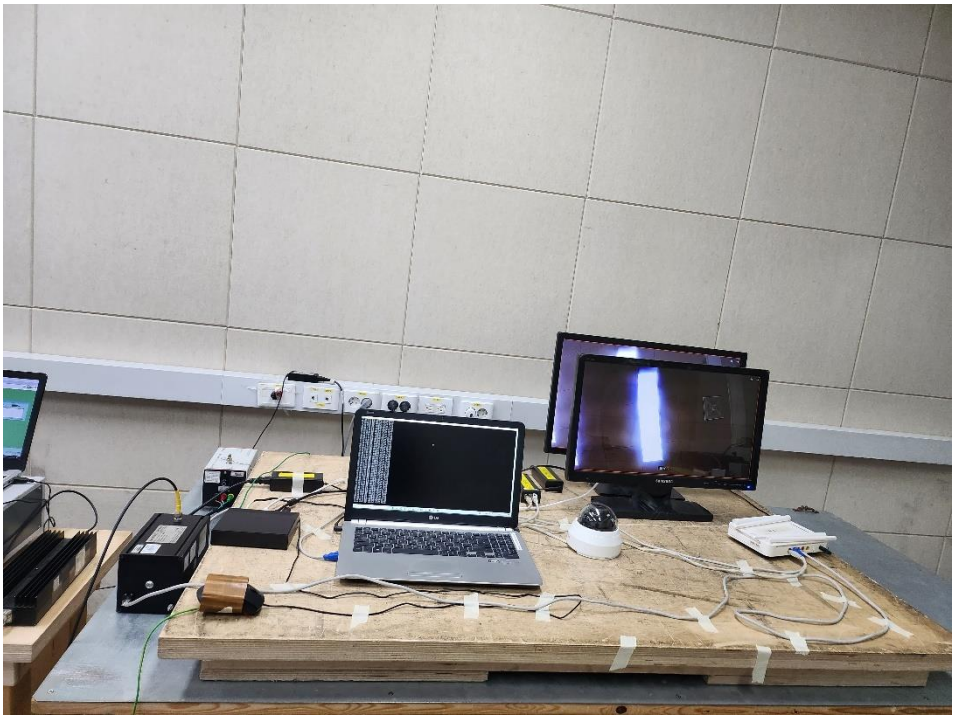


■ PoE Mode

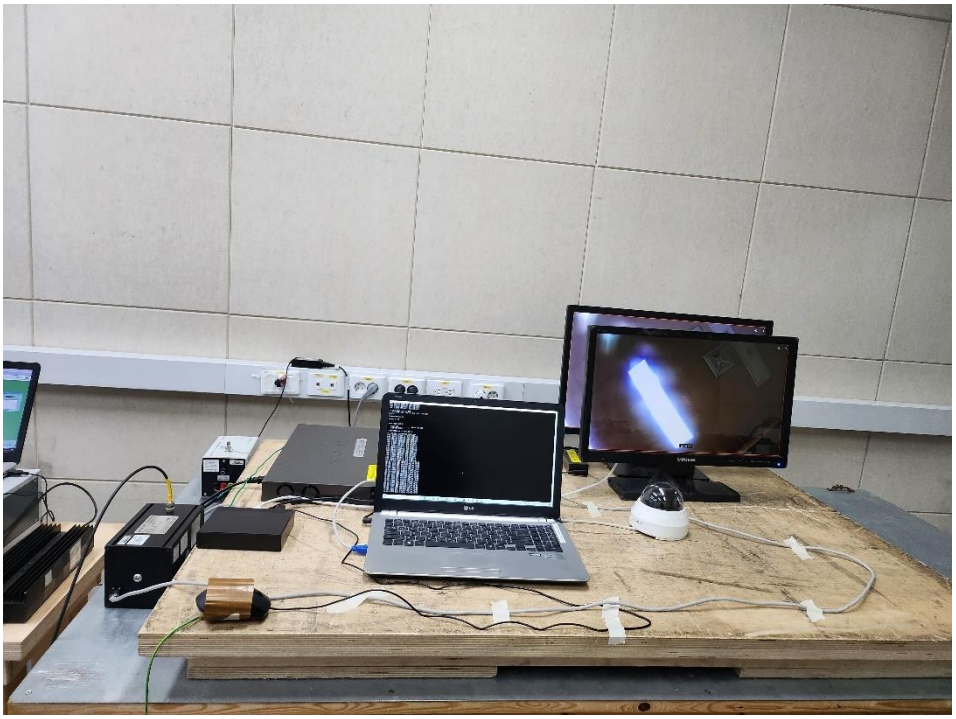


Conducted Disturbance

■ DC Mode

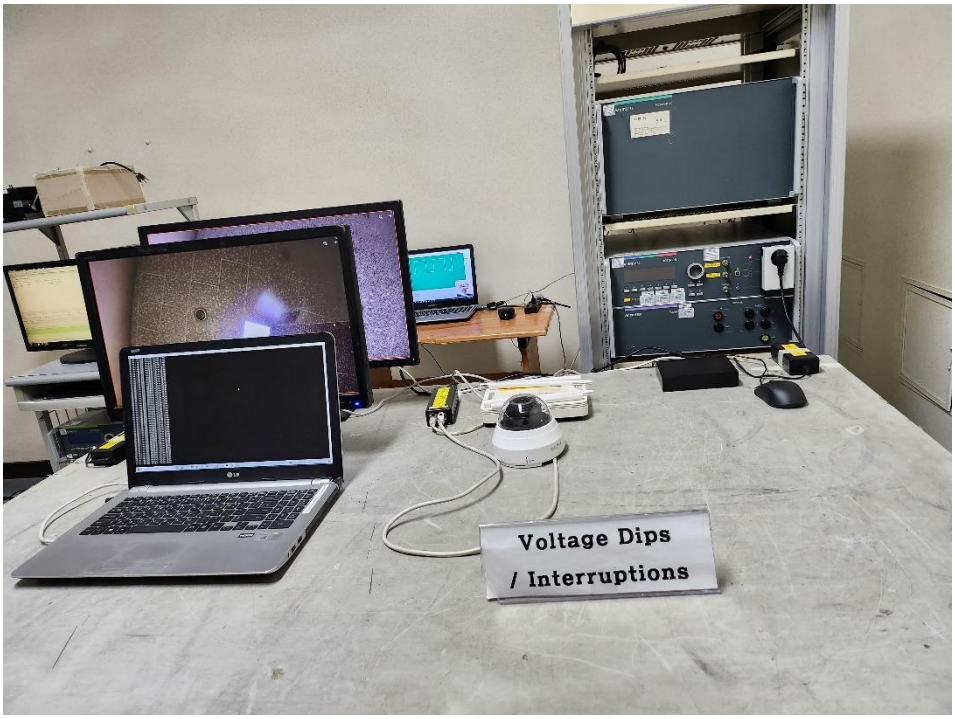


■ PoE Mode



Voltage Dips and Short Interruptions

■ DC Mode



EUT External Photographs

(Top)

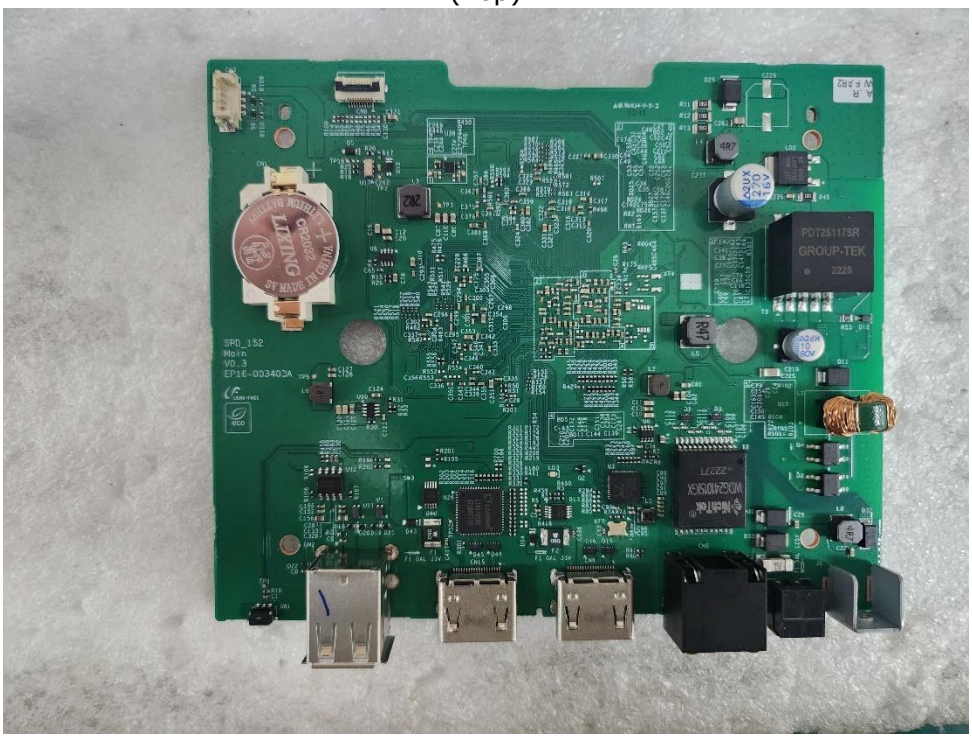
(Bottom)

EUT Internal Photographs

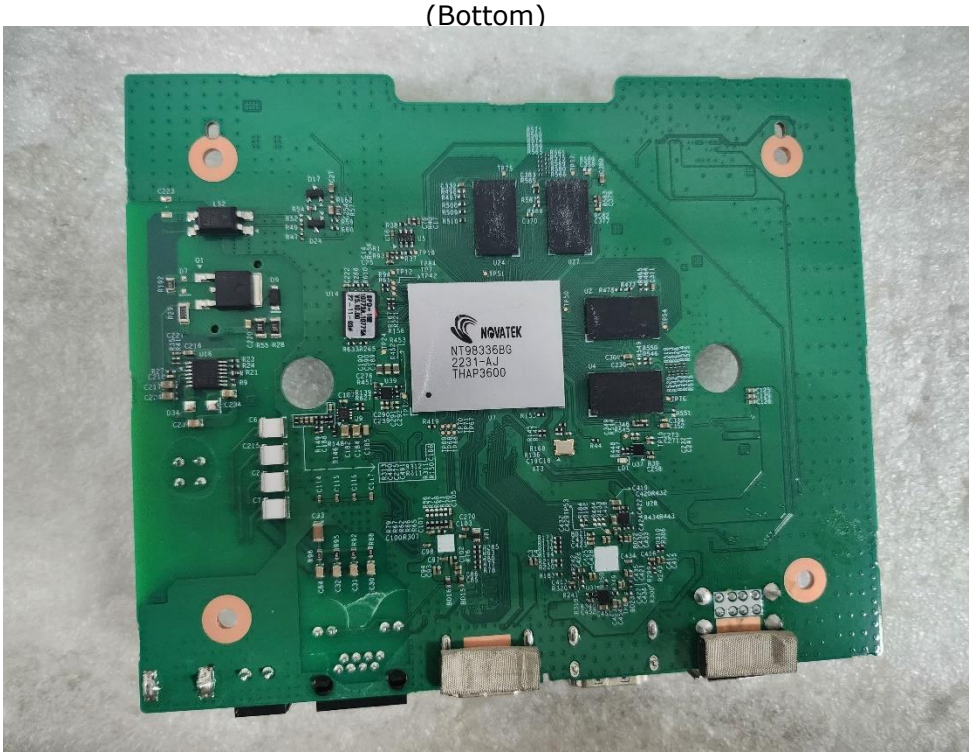
(Internal View)

EUT Internal View – Board

(Top)

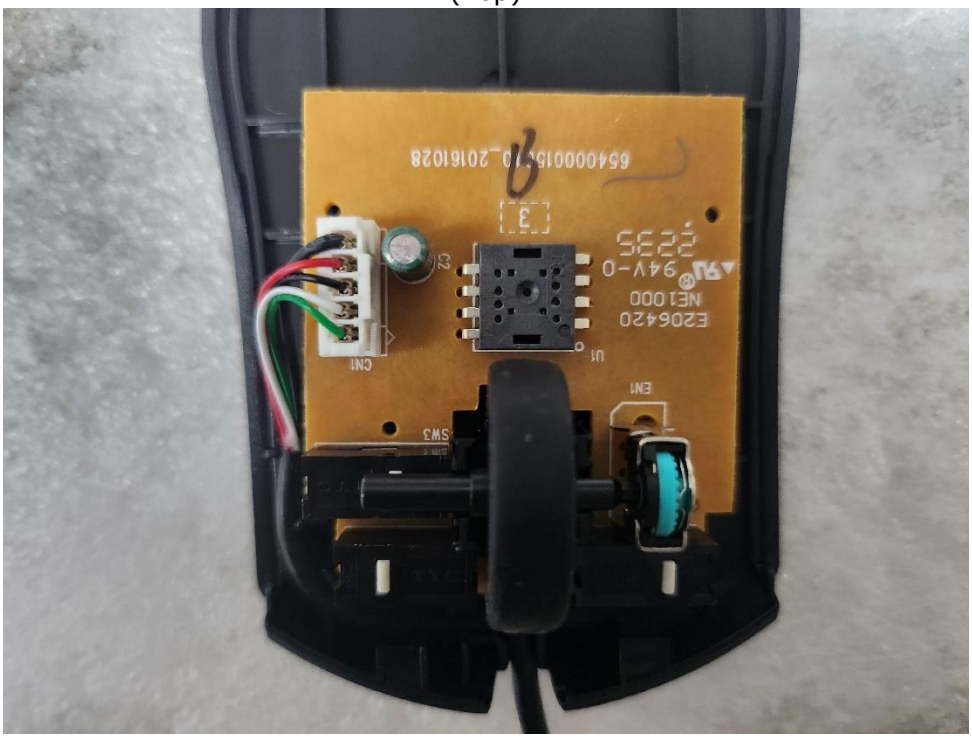


(Bottom)

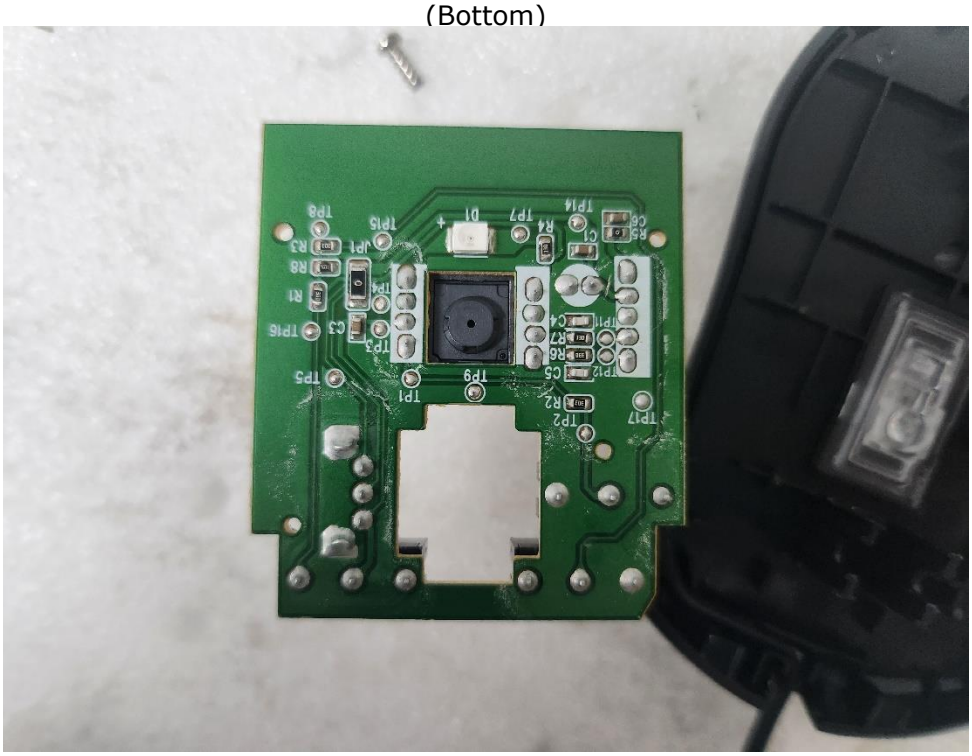


EUT Internal View – Mouse Board

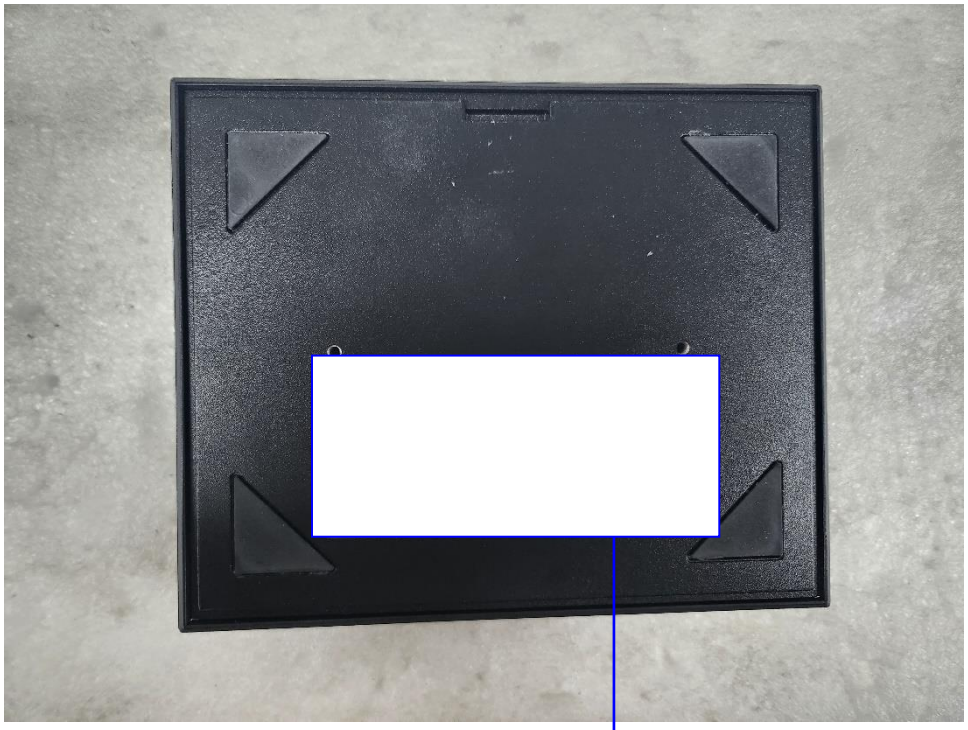
(Top)



(Bottom)



Label and Location



Decorder

Model No : SPD-152

Manufacturer : HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.

Made in Vietnam