



EMC TEST REPORT

Test Report No. : KES-EM-22T0537-R1
Date of Issue : Feb. 24, 2023
Product name : NVR
Model/Type No. : XRP-4210B4
Variant Model : -
Applicant : Hanwha Vision Co., Ltd
Applicant Address : 6, Pangyo-ro 319Beon-gil, Bundang-gu, Seongnam-si,
Gyeonggi-do, Republic of Korea
Manufacturer : 1. HANWHA VISION VIETNAM COMPANY LIMITED
2. D-TECH CO.,LTD.
Manufacturer Address : 1. Lot O-2, Que Vo Industrial Zone extended area,
Nam Son commune, Bac Ninh city, Bac Ninh province, Vietnam
2. 173-25, Saneop-ro, Gwonseon-gu, Suwon-si, Gyeonggi- do,
Korea (Suwon Industrial Complex)
Date of Receipt : Jun. 22, 2022
Test date : Jun. 22, 2022 ~ Jun. 26, 2022
Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Eun Gu, Jeon
EMC Test Engineer

Reviewed by

Dong-Hun, Jang
EMC Technical Manager

This test report is not related to KS Q ISO/IEC 17025 and KOLAS.



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REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Jul. 01, 2022	KES-EM-22T0537	Issued
Feb. 24, 2023	KES-EM-22T0537-R1	Change the Applicant and manufacturer at the request of the customer

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1.0 General Product Description

Main Specifications of EUT are: Specifications

Display

Network camera	Inputs	Max. 72CH (※ If clustering, 132CH)
	Resolution	32MP ~ CIF
	Protocols	Wisenet, ONVIF
Decoding	Local Display	Dual if Full HD monitor Single if UHD monitor
	Multi Screen Display	1/4/9/16/25/36/49/64/72/81/100/121/132/Custom/Auto Mode
	Resolution	1920fps@640x360 (128 division) 2160fps@720p (72 division) 1080fps@1080p (36 division)

Performance

Operating System	Embedded	Windows 10 IoT Enterprise LTSC (SSM preinstalled)
Record	Compression	H.265, H.264, MJPEG, WiseStream(H.264, H.265)
	Recording Bandwidth	Max. 400Mbps
	Resolution	32MP ~ CIF
	Mode	Normal, Schedule (Continuous / Event), Event (Pre / Post), Event Profile, ARB, Dual-Track
	Event Trigger	Video loss, Camera event(Sensor, MD, Passing, Entering, Exiting, Disappearing (Appearing), Tampering, Tracking, Face Detection, Audio Detection, ANPR, Bestshot), AI Event (Face, Appearance, Face mask, Vehicle)
	Event Action	Instant Viewer, Preset, Alarm Out, Pop-up, Sound and E-mail notification
Search & Play	Playback Bandwidth	Max. 150Mbps
	User	Max. 1024 Users (132Ch concurrently)
	Simultaneous playback	Max. 72ch (1080p/720p) ※ If Clustering, 132CH
	Fisheye Dewarping	Console
Storage	Supported HDD	Up to 10TB
	HDD Slot	SATA 16ea (3.5" 16ea Hot Swap - Volume 2ea) Enterprise HDD (6TB,8TB,10TB)
	RAID	1/5/6/10/50
Backup	File backup	AVI, SEC
	Function	Manual Backup, Onetime Schedule Backup, Schedule Backup, Privacy Masking Backup

Network

Protocol	IPv4, IPv6, TCP/IP, UDP/IP, RTP (UDP), RTP (TCP), RTSP, NTP, HTTP, DHCP (Client), SMTP, ICMP, IGMP, ARP, DNS, DDNS, SNMP(Client), HTTPS, ONVIF (Profile-S), SUNAPI(Client)	
DDNS	Wisenet DDNS	
Audio	GUI	72CH(network)
	Web	G.711 u-law(PCM), G723, G726(ADPCM), AAC
	Audio Communication	2-Way
Max Remote Users	1024 (Tested)	
Security	HTTPS(SSL) Login Authentication Digest Login Authentication IP Address Filtering User access log Device Certificate(Hanwha Techwin Root CA)	
Viewer Software	SSM Client, SSM Mobile	

Functions

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Camera Setup	Item	Automatic device IP scanning, Add profile edit, Resolution, Fisheye dewarping mode, Hallway View Setup, Brightness/Contrast, Viewing the device settings(Device webpage), Exporting/Importing devices settings, Updating the device firmware
PTZ	Control	Via GUI, Controller (SPC-2000, SPC-7000)
	Preset	300
Smart phone	Support Model	iOS, Android
	Protocol Support	RTP, RTSP, HTTP, HTTPS, CGI(SUNAPI)
	Control	Live(Multi-Profile Support), Playback
	Max. Remote Users	Max. 1024 Users (132Ch concurrently)
Redundancy	Fallover	Active&Active, Active-Standby
	ARB	Support

Interface

Front	Indicator	LED(Status Indicator) POWER, NETWORK, HDD, RECORD, BACKUP, ALARM
HDD Key Lock		Yes
HDMI		2EA
Audio		USB
Ethernet		Gigabit Ethernet RJ-45 (1000 Base-T) 3ea
USB		4EA(USB 3.0 2ea, USB 2.0 2EA)
Power Inlet		AC 1EA

System

System Control	Mouse, Keyboard
Language	English, French, German, Italian, Spanish, Russian, Turkish, Polish, Dutch, Swedish, Czech, Portuguese, Danish, Rumanian, Serbian, Croatian, Hungarian, Greek, Norwegian, Finnish, Korean, Chinese, Japanese, Thai, Vietnamese

Environmental

CPU	Intel Core i7-8700T
RAM	16GB RAM
OS HDD	M.2 SSD 128Gb
Operating Temperature	+0°C to +40°C(+32°F to +104°F)
Operating Humidity	Less or equal to 80%

Electrical

Power Input	100 ~ 240VAC, 50 ~ 60Hz
Power Consumption	285W Single

Mechanical

Color / Material	Black / Metal
Dimension (WdHbD)	440.0 x 132.0 x 548.1mm (Including Cover: 571.1mm)
Weight	13.30kg (w/o HDD)

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1.1 Test Voltage & Frequency

Unless indicated otherwise on the individual data sheet or test results, the test voltage and frequency was as indicated below.

☒ AC 230 V, 50 Hz

1.2 Variant Model Differences

Not applicable

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
NVR	XRP-4210B4	-	HANWHA VISION VIETNAM COMPANY LIMITED	EUT
Mouse	MOKJUO	-	Primax Electronics Ltd.	MSIP- REM- PMX- MMOKJU O
Keyboard	PKB-650U	20040002525	SHENZHEN TYCHO TECHNOLOGT CO., LIMITED	R-R-DCK- PKB- 650Ua
Mother board	EP16-002995C	-	-	-
CPU	I7-8700T	-	INTEL	-
RAM	M378A1K43EB2- CWE	-	SAMSUNG	8 GB, 2EA
SMPS	DPS-500AB-33C	-	DELTA	-
SSD	TS128GMTS800	H07830-0145	Transcend	128 GB



1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
Camera	LND-6070R	-	HANWHA VISION VIETNAM COMPANY LIMITED	-
Notebook PC	506NZGK000615	-	LG	-
Notebook PC Adapter	OF58U63849302Y60 9	-	LG	-
Monitor	PS321QR	-	MSI COMPUTER (SHENZHEN) CO.,LTD.	-
USB Memory	-	-	Sandisk	16 GB
Ear Phone	-	-	Apple.	-
PoE Adapter	NEXT-POE2403JM	-	EasyNet	-
HDD	SkyHawk	ST2000VX003	SEAGATE	2 TB, KCC- REM- STX- STA013

1.6 External I/O Cabling

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
NVR (EUT)	RJ-45 (1)	PoE Adapter	RJ-45 (LAN)	3.0	U
	RJ-45 (2)	Notebook PC	RJ-45 (LAN)	3.0	U
	USB	Mouse (EUT)	USB	1.1	U
	USB	Keyboard (EUT)	USB	1.2	U
	USB	USB Memory	USB	-	-
	HDMI	Monitor	HDMI	1.5	S
	3.5 mm	Ear Phone	3.5 mm	1.2	U
	SATA	HDD	SATA	0.2	U
Notebook PC	DC Jack	Notebook PC Adapter	DC Jack	1.6	U
PoE Adapter	RJ-45 (PoE)	Camera	RJ-45 (PoE)	3.0	U

* Unshielded=U, Shielded=S

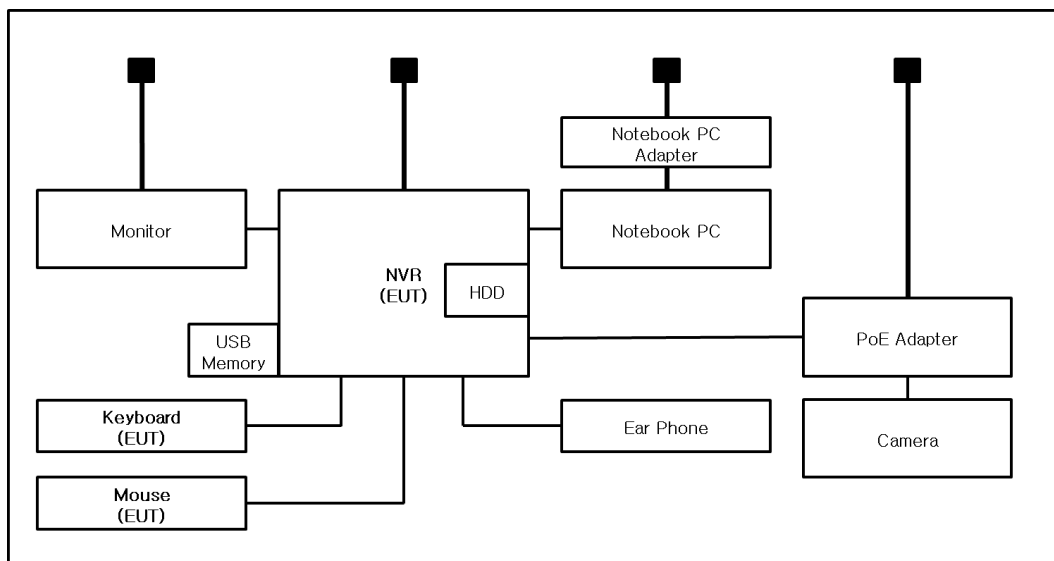
1.7 EUT Operating Mode(s)

Test Mode	operating
Operation Mode	EUT Monitoring, Ping Test after testing, check if the recording is normally done on the HDD and USB Memory

EUT Test operating S/W		
Name	Version	Manufacture Company
Web Viewer	-	Hanwha Vision Co., Ltd

1.8 Configuration

■ AC Main
 □ DC Main



1.9 Remarks when standards applied

N/A

1.10 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less.

1.11 Test Facility

The measurement facility is located at 473-21, Gayeo-ro, Yeosu-si, Gyeonggi-do, 12658, Korea, Republic of. The sites are constructed in conformance with the requirements of ANSI C63.4a-2017 and CISPR 16-1-4:2019

1.12 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
KOREA	RRA	EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 KR0100
International	KOLAS	EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 KT489
USA	FCC	3 m & 10 m Semi-Anechoic Chamber Conducted test site to perform FCC Part 15/18 measurements.	 KR0100
Canada	ISED	3 m & 10 m Semi-Anechoic Chamber and Conducted test site	 23298
JAPAN	VCCI	EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site)	 C-20136, T-20137, R-20181, G-20176
Europe	TÜV SÜD	EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 CARAT 001633 0004



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

Jun. 23, 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	12, 28, 2022
☒	LISN	ENV216	R & S	101787	12, 27, 2022
☒	LISN	ESH2-Z5	R & S	100450	12, 27, 2022
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	12, 27, 2022

Test Conditions

Temperature: (24,7 ± 0,2) °C

Relative Humidity: (44,8 ± 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

Jun. 23, 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	12, 28, 2022
☒	LISN	ENV216	R & S	101787	12, 27, 2022
☒	LISN	ESH2-Z5	R & S	100450	12, 27, 2022
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	12, 27, 2022
☐	8-WIRE ISN CAT3,5	ENY81	R & S	100174	12, 28, 2022
☒	8-WIRE ISN CAT6	ENY81-CAT6	R & S	101665	12, 28, 2022

Test Conditions

Temperature: (24,7 ± 0,1) °C

Relative Humidity: (44,8 ± 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.
- For Ethernet interfaces, measurements are required at the highest data rate supported by the interface.



2.3 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Jun. 22, 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, 24, 2022
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	12, 08, 2022
☒	ATTENUATOR	8491A	HP	32173	03, 08, 2023

Test Conditions

Temperature: (24,5 ± 0,2) °C
Relative Humidity: (44,3 ± 0,1) % 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.



2.4 Radiated Electric Field Emissions(Above 1 GHz)

Test Date

Jun. 22, 2022

Test Location

SEMI ANECHOIC CHAMBER #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.0	-
☒	EMI TEST RECEIVER	ESR7	R & S	101190	08, 03, 2022
☒	PREAMPLIFIER	8449B	AGILENT	3008A01967	04, 01, 2023
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	03, 03, 2023

Test Conditions

Temperature: (24,6 ± 0,1) °C

Relative Humidity: (44,5 ± 0,1) % R.H.

Frequency Range of Measurement

1 GHz to 6 GHz

Instrument Settings

IF Band Width: 1 MHz

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.



2.5 Harmonic Current Emissions

Test Date

Jun. 23, 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: (24,1 ± 0,2) °C
Relative Humidity: (45,0 ± 0,1) % 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

Jun. 23, 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: (24,1 ± 0,2) °C
Relative Humidity: (45,0 ± 0,1) % 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 $U = 130 \text{ dB}\mu\text{V}$.
For component of CCTV systems, where the status is monitored by observing the TV picture,
then deterioration of the picture is allowed at $U = 140 \text{ dB}\mu\text{V}$, 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 $U = 130 \text{ dB}\mu\text{V}$, 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 $U = 120 \text{ dB}\mu\text{V}$.

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

Jun. 23, 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: (24,8 ± 0,1) °C
Relative Humidity: (44,9 ± 0,1) % R.H.
Atmospheric Pressure: (99,2 ± 0,1) 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

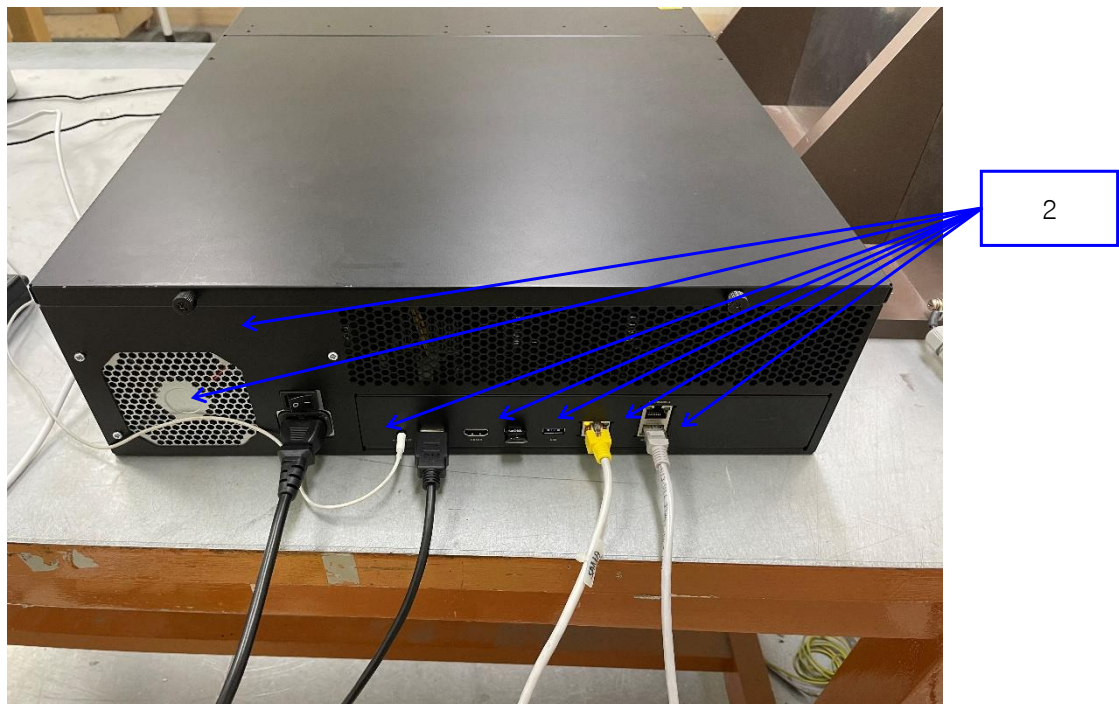
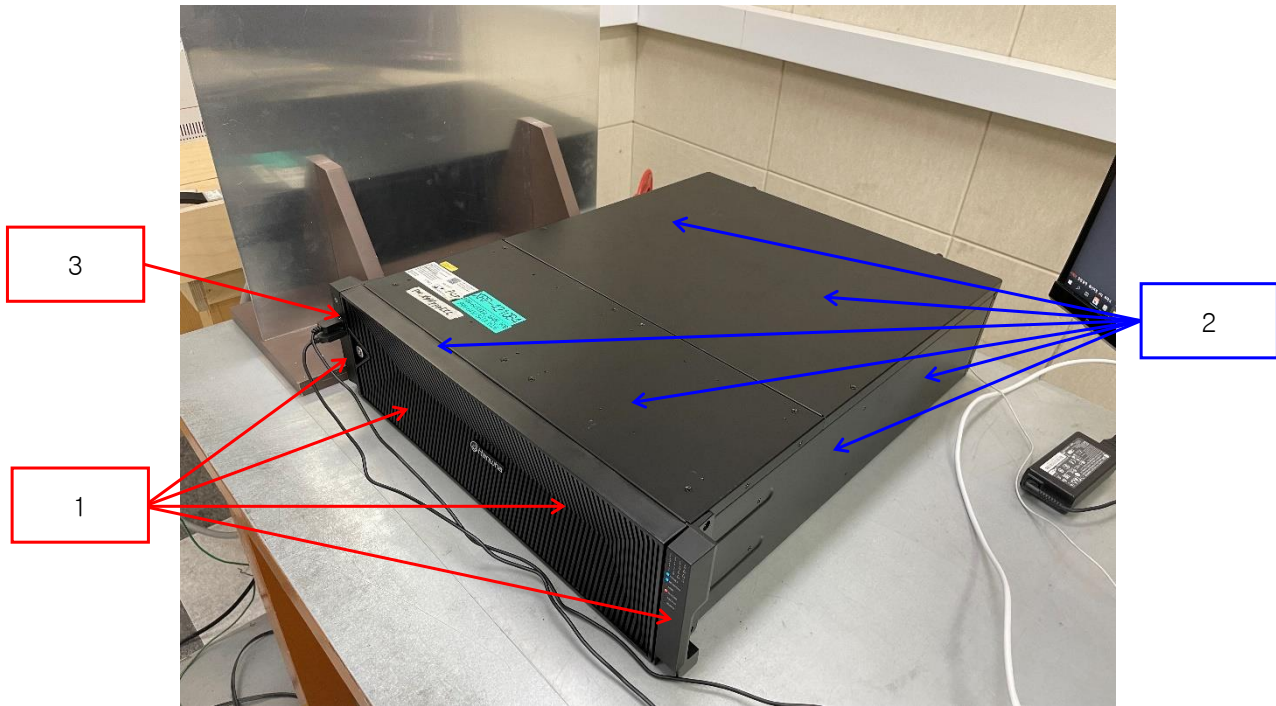
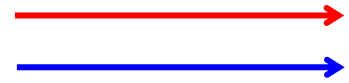
Discharge Voltage:	Contact	Air	HCP	VCP
	☐ 2 kV	☒ 2 kV	☐ 2 kV	☐ 2 kV
	☐ 4 kV	☒ 4 kV	☐ 4 kV	☐ 4 kV
	☒ 6 kV	☐ 6 kV	☒ 6 kV	☒ 6 kV
	☐ 8 kV	☒ 8 kV	☐ 8 kV	☐ 8 kV
	☐ 15 kV	☐ 15 kV	☐ 15 kV	☐ 15 kV

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

Required Performance Criteria: ☒ Complied

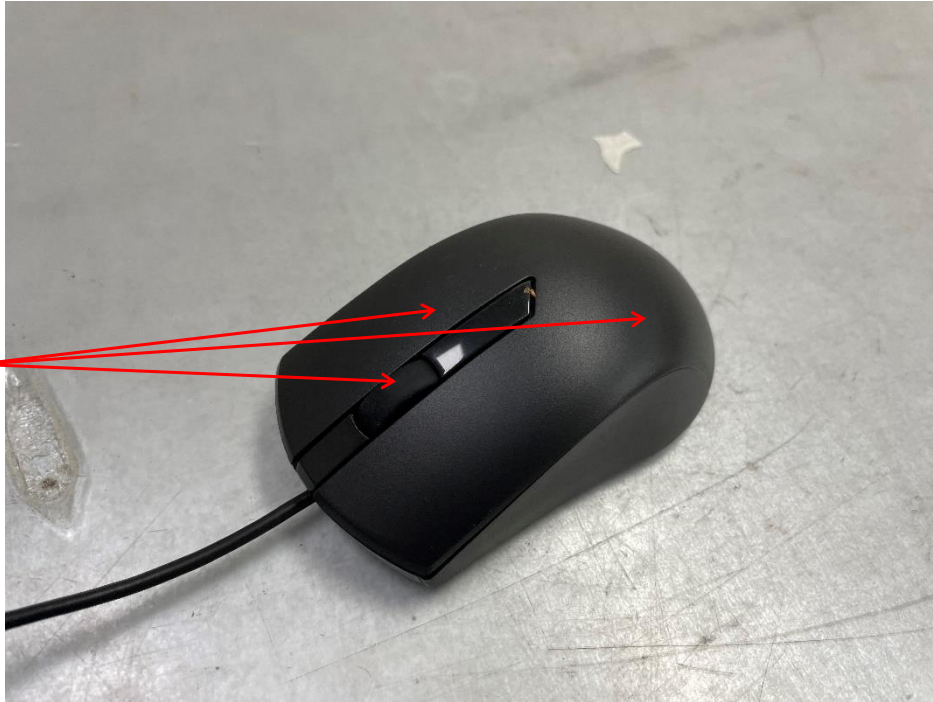
Location of Discharge:

Air
Contact

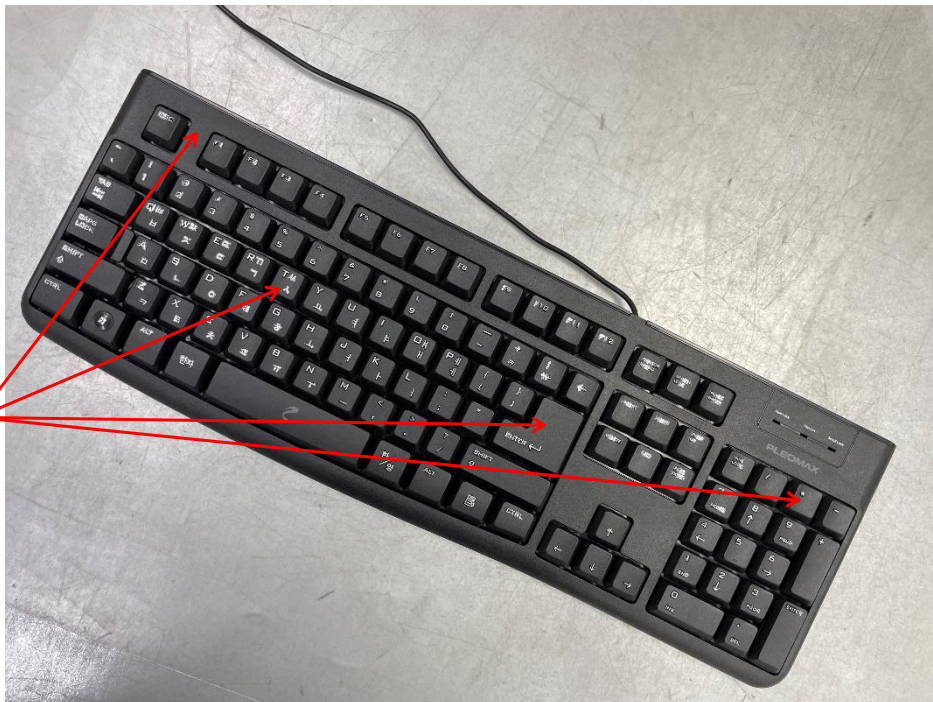


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Test Data

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 1	Air Discharge	Complied	-
2	Enclosure 2	Contact Discharge	Complied	-
3	Port	Air Discharge	Complied	-
4	Mouse Enclosure	Air Discharge	Complied	-
5	Keyboard Enclosure	Air Discharge	Complied	-

Note: "Blank" = Not performed

Observations:

Complied – No degradation of function

Test Results

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

RemarksPASS Required Performance Criteria

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3.2 Radiated Electric Field Immunity

Reference Standard

EN IEC 61000-4-3:2020

Test Date

Jun. 24, 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, 03, 2022
☒	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: (24,8 ± 0,2) °C
Relative Humidity: (44,7 ± 0,2) % R.H.
Atmospheric Pressure: (99,4 ± 0,1) kPa



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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

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Test Data

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

RemarksPASS Required Performance Criteria

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3.3 Electrical Fast Transients/Bursts

Reference Standard

EN 61000-4-4:2012

Test Date

Jun. 26, 2022

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	5.4.8	-
☒	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	12, 03, 2022
☒	MOTOR VARIAC	MV2616	EM TEST	P1552169719	03, 31, 2023
☒	CAPACITIVE COUPLING CLAMP	HFK	EM TEST	P1633183115	12, 03, 2022

Test Conditions

Temperature: (24,6 ± 0,1) °C
Relative Humidity: (44,6 ± 0,1) % R.H.
Atmospheric Pressure: (99,3 ± 0,1) kPa

Test Specifications

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

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

Burst Period: ☒ 300 ms ☐ 2 s

Repetition Rate: ☐ 5 kHz ☒ 100 kHz

Duration of Test Voltage: ☒ ≥ 1 min

Required Performance Criteria: ☒ Complied

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

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

☒ Signal ports and telecommunication ports – Coupling Clamp used

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
RJ-45 (1)	Complied	Complied
RJ-45 (2)	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

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3.4 Surge Transients

Reference Standard

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

Test Date

Jun. 26, 2022

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	5.4.8	-
☒	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	12, 03, 2022
☒	MOTOR VARIAC	MV2616	EM TEST	P1552169719	03, 31, 2023
☐	CDN	CNV 508N1	EM TEST	P1610176296	12, 03, 2022

Test Conditions

Temperature: (24,6 ± 0,2) °C
Relative Humidity: (44,6 ± 0,1) % R.H.
Atmospheric Pressure: (99,3 ± 0,1) kPa

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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

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Test Data

☒ Line to Line – Differential Mode

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

☒ Line to Earth – Common Mode

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

Signal Lines

☒ Line to Earth – Common Mode

Mode of Application	Coupling Method	Observations	
		(+) Surge (kV)	(-) Surge (kV)
RJ-45 (1)	CDN	Complied	Complied
	LINE	Complied	Complied
RJ-45 (2)	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
☐ NOT APPLICABLE

Remarks

PASS Required Performance Criteria



3.5 Conducted Disturbance

Reference Standard

EN 61000-4-6:2014

Test Date

Jun. 24, 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, 24, 2022
☒	ATTENUATOR	ATT 6/80	EM TEST	P1614178148	11, 24, 2022
☒	CDN	CDN M016	TESEQ	43694	11, 24, 2022
☒	CDN	CDN M016	TESEQ	43697	11, 24, 2022
☒	CDN	CDN T8RJ45	EM TEST	0909-09	08, 03, 2022
☐	EM CLAMP	KEMZ 801A	TESEQ	44099	11, 25, 2022

Test Conditions

Temperature: (24,4 ± 0,2) °C
Relative Humidity: (44,5 ± 0,1) % R.H.
Atmospheric Pressure: (99,5 ± 0,1) kPa



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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

☒ PM, 1 Hz (0,5 s ON : 0,5 s OFF)

Frequency step:

☒ 1 % step

Dwell Time:

☐ 1 s

☒ 3 s

Required Performance Criteria: ☒ Complied

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Test Data

☒ 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
RJ-45 (1)	CDN	Complied
RJ-45 (2)	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
Jun. 26, 2022

Test Location
EMS-Voltage dip: 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	03, 31, 2023
☒	MOTOR VARIAC	MV2616	EM TEST	P1552169719	03, 31, 2023

Test Conditions

Temperature: (24,6 ± 0,1) °C
Relative Humidity: (44,6 ± 0,1) % R.H.
Atmospheric Pressure: (99,3 ± 0,1) kPa



Test Specifications & Observations/Remarks

- Voltage Dips and Short Interruptions

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

- Voltage variations

☒ Unom + 10 %	☒ 253.0 V (ac)	<u>Complied</u>
☒ Unom - 15 %	☒ 195.5 V (ac)	<u>Complied</u>

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.

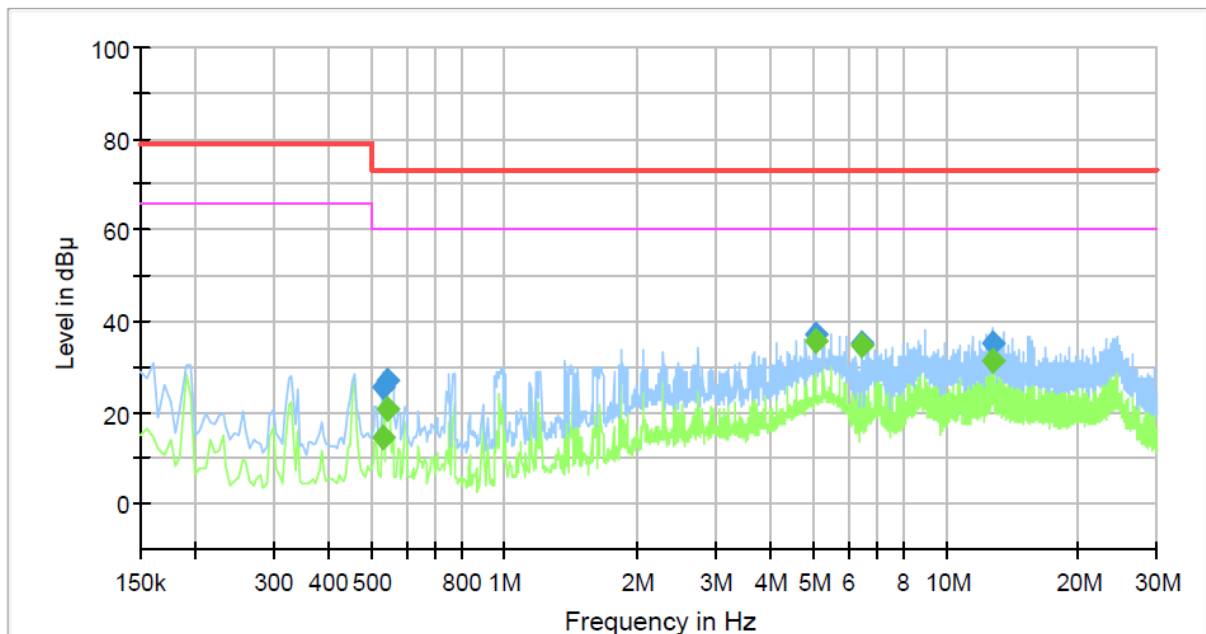
APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

[HOT]

Common Information

Test Description: Conducted Emission
 Model No.: XRP-4210B4
 Phase: L1
 Mode:
 Operator Name: KES



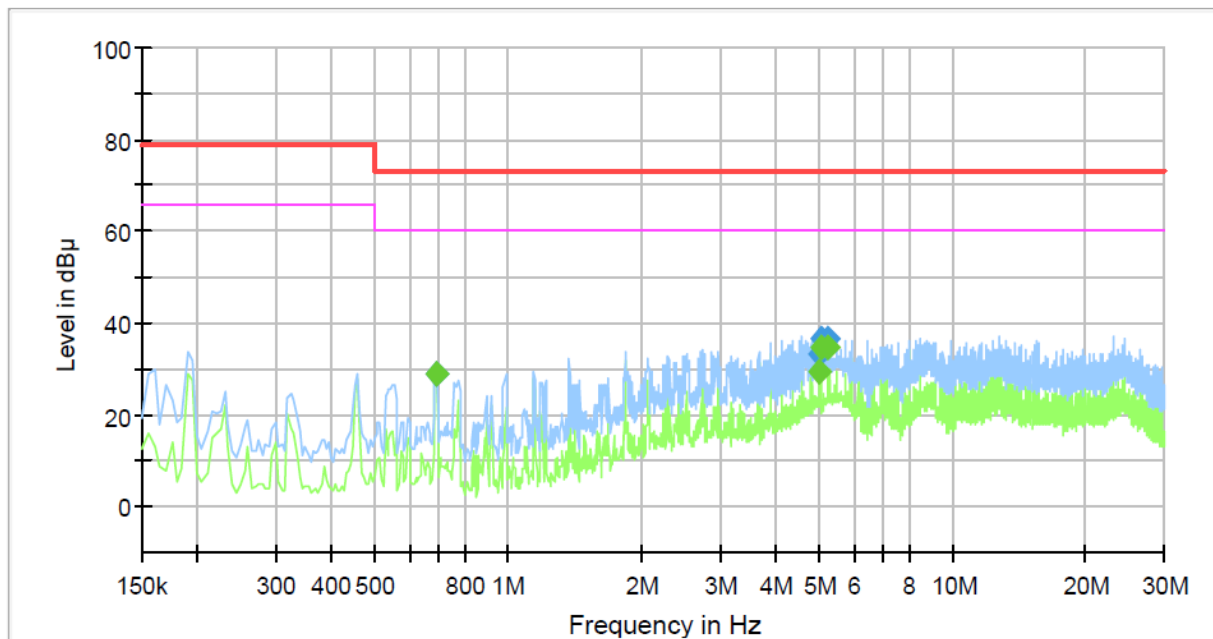
Final_Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.530000	---	14.39	60.00	45.61	1000.0	9.000	L1	19.7
0.530000	25.71	---	73.00	47.29	1000.0	9.000	L1	19.7
0.545000	---	20.63	60.00	39.37	1000.0	9.000	L1	19.8
0.545000	26.88	---	73.00	46.12	1000.0	9.000	L1	19.8
5.045000	---	35.63	60.00	24.37	1000.0	9.000	L1	19.6
5.045000	37.16	---	73.00	35.84	1000.0	9.000	L1	19.6
6.420000	---	34.71	60.00	25.29	1000.0	9.000	L1	19.5
6.420000	35.36	---	73.00	37.64	1000.0	9.000	L1	19.5
12.745000	---	31.33	60.00	28.67	1000.0	9.000	L1	19.9
12.745000	35.01	---	73.00	37.99	1000.0	9.000	L1	19.9

[NEUTRAL]

Common Information

Test Description:	Conducted Emission
Model No.:	XRP-4210B4
Phase:	N
Mode:	
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.690000	---	28.72	60.00	31.28	1000.0	9.000	N	19.9
0.690000	28.88	---	73.00	44.12	1000.0	9.000	N	19.9
5.040000	---	29.21	60.00	30.79	1000.0	9.000	N	19.6
5.040000	33.04	---	73.00	39.96	1000.0	9.000	N	19.6
5.045000	---	34.52	60.00	25.48	1000.0	9.000	N	19.6
5.045000	36.52	---	73.00	36.48	1000.0	9.000	N	19.6
5.275000	---	34.86	60.00	25.14	1000.0	9.000	N	19.6
5.275000	36.80	---	73.00	36.20	1000.0	9.000	N	19.6

◆ Calculation

$$\text{QuasiPeak [dBuV]} / \text{CAverage [dBuV]} = \text{Reading Value [dBuV]} + \text{Corr. [dB]}$$

QuasiPeak / CAverage : The Final Value

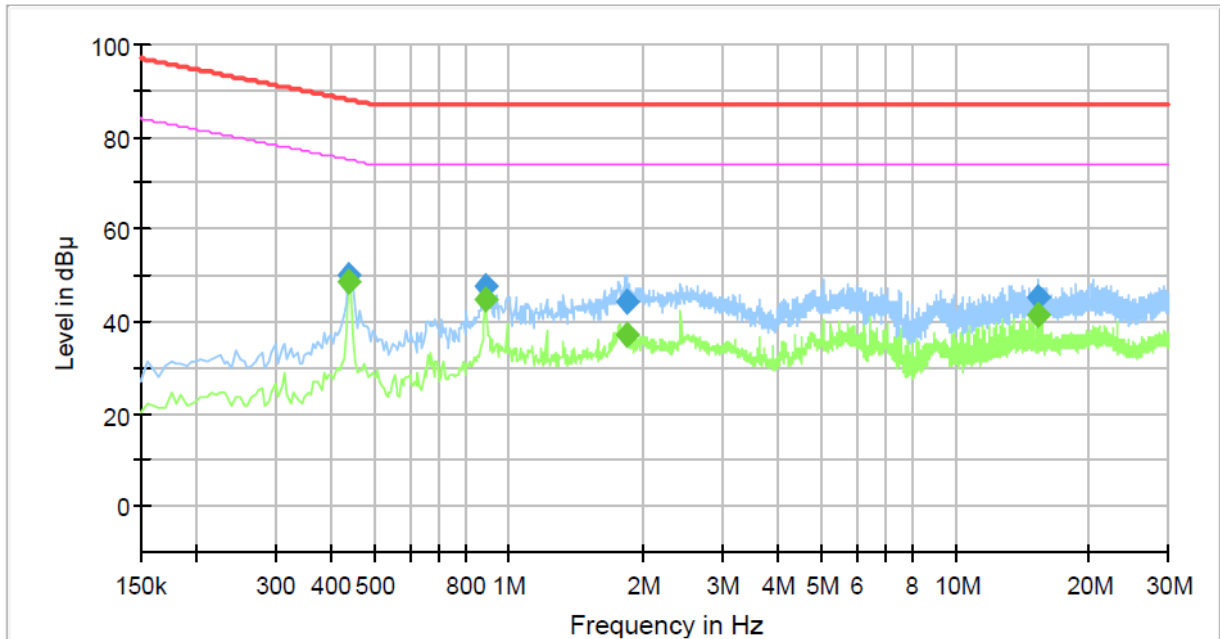
Reading Value : Not shown in the table.

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

Conducted Emissions at Telecommunication Ports [1 000 Mbps]

Common Information

Test Description: Telecommunication Emission
 Model No.: XRP-4210B4
 Mode :
 Speed : 1000 Mbps
 Operator Name: KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.440000	---	48.45	75.06	26.61	1000.0	9.000	Single Line	19.7
0.440000	49.86	---	88.06	38.20	1000.0	9.000	Single Line	19.7
0.885000	---	44.71	74.00	29.29	1000.0	9.000	Single Line	20.0
0.885000	47.43	---	87.00	39.57	1000.0	9.000	Single Line	20.0
1.845000	---	37.24	74.00	36.76	1000.0	9.000	Single Line	20.1
1.845000	44.44	---	87.00	42.56	1000.0	9.000	Single Line	20.1
15.250000	---	41.29	74.00	32.71	1000.0	9.000	Single Line	19.6
15.250000	45.43	---	87.00	41.57	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))



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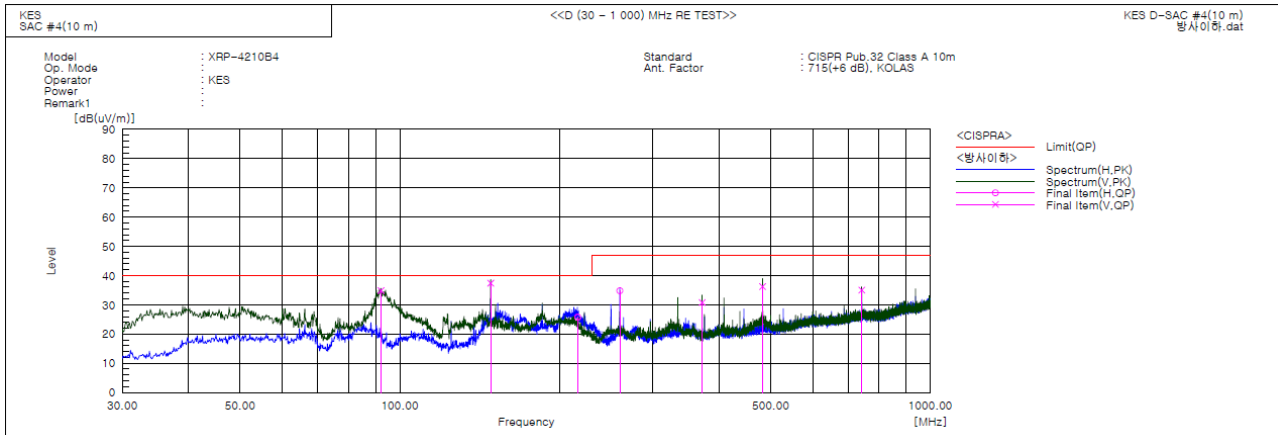
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Radiated Electric Field Emissions(Below 1 GHz)



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	92.136	V	58.7	-23.8	34.9	40.0	5.1	112.0	216.0	
2	148.360	V	62.7	-25.3	37.4	40.0	2.6	105.0	162.1	
3	216.620	H	46.3	-20.5	25.8	40.0	14.2	389.0	324.1	
4	259.788	H	53.8	-19.0	34.8	47.0	12.2	390.0	161.0	
5	371.386	V	45.7	-14.9	30.8	47.0	16.2	124.0	18.0	
6	482.587	V	48.3	-12.0	36.3	47.0	10.7	143.0	324.8	
7	741.897	V	41.5	-6.4	35.1	47.0	11.9	115.0	79.9	

◆ Calculation - SEMI ANECHOIC CHAMBER #4(10 m)

Result(QP) [dB(μV/m)] = (Reading(QP)[dB(μV)] + c.f[dB(1/m)])

Margin(QP)[dB] = Limit[dB(μV/m)] - Result(QP) [dB(μV/m)]

Reading(QP) : Reading value, Result(QP) : Reading value + Factor value

Limit(QP) : Limit value, c.f : (ANT Factor + Cable Loss - Preamp Factor), Margin: Margin value

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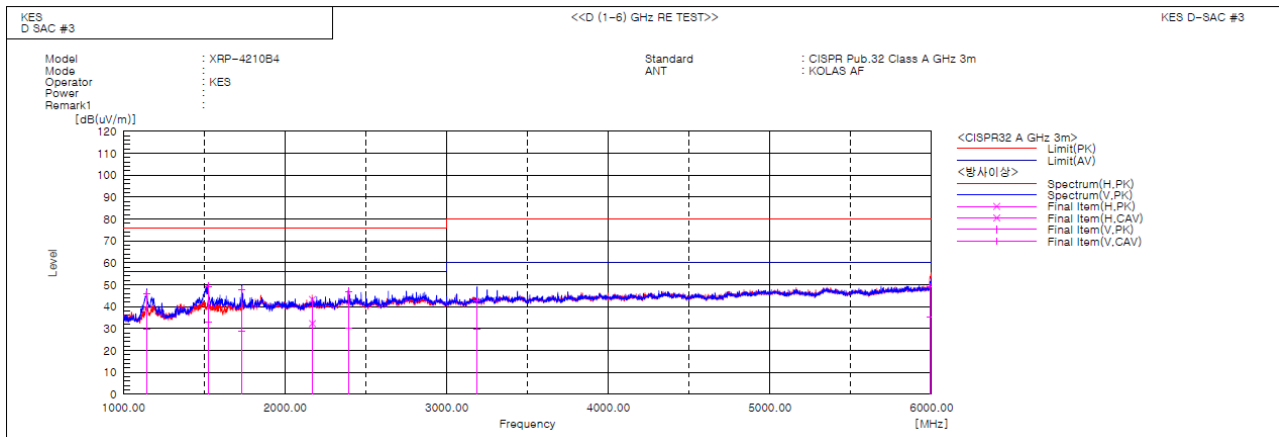
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Radiated Electric Field Emissions(Above 1 GHz)



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB(1/m)]	Result PK [dB(uV/m)]	Result CAV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin CAV [dB]	Height [cm]	Angle [deg]	Remark
1	1145.063	V	54.7	38.4	-8.7	46.0	29.7	76.0	56.0	30.0	26.3	100.0	5.1	
2	1523.623	V	54.9	38.6	-5.6	49.3	33.0	76.0	56.0	26.7	23.0	100.0	340.8	
3	1733.096	V	50.7	32.0	-3.0	47.7	29.0	76.0	56.0	28.3	27.0	100.0	187.8	
4	2168.899	H	43.7	32.7	-0.4	43.3	32.3	76.0	56.0	32.7	23.7	100.0	304.1	
5	2394.110	V	45.8	29.2	1.2	47.0	30.4	76.0	56.0	29.0	25.6	100.0	190.7	
6	3188.964	V	39.6	26.4	3.1	42.7	29.5	80.0	60.0	37.3	30.5	100.0	16.9	
7	5991.030	V	37.7	24.0	11.2	48.9	35.2	80.0	60.0	31.1	24.8	100.0	185.7	

◆ Calculation

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

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

Reading(PK/CAV) : Reading value, Result(PK/CAV) : Reading value + Factor value

Limit(QP) : Limit value, c.f : (ANT Factor + Cable Loss - Preamp Factor), Margin: Margin value

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Harmonic Current Emissions and Voltage Fluctuations and Flicker

Average harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	0.332			
2	0.003	0.308	1.080	n/a
3	0.040	1.731	2.300	PASS
4	0.003	0.615	0.430	n/a
5	0.021	1.862	1.140	PASS
6	0.002	0.748	0.300	n/a
7	0.012	1.622	0.770	PASS
8	0.002	0.819	0.230	n/a
9	0.009	2.249	0.400	PASS
10	0.002	0.992	0.184	n/a
11	0.007	2.204	0.330	PASS
12	0.002	1.120	0.153	n/a
13	0.006	2.820	0.210	PASS
14	0.002	1.360	0.131	n/a
15	0.005	3.577	0.150	PASS
16	0.002	1.628	0.115	n/a
17	0.005	3.788	0.132	PASS
18	0.002	1.860	0.102	n/a
19	0.004	3.701	0.118	n/a
20	0.002	2.192	0.092	n/a
21	0.004	2.274	0.161	n/a
22	0.002	2.540	0.084	n/a
23	0.004	2.562	0.147	n/a
24	0.002	2.917	0.077	n/a
25	0.005	3.602	0.135	n/a
26	0.002	3.325	0.071	n/a
27	0.005	3.712	0.125	n/a
28	0.002	3.688	0.066	n/a
29	0.003	2.976	0.116	n/a
30	0.002	4.016	0.061	n/a
31	0.003	2.634	0.109	n/a
32	0.002	4.344	0.058	n/a
33	0.003	3.016	0.102	n/a
34	0.003	4.666	0.054	n/a
35	0.004	4.015	0.096	n/a
36	0.003	4.960	0.051	n/a
37	0.004	4.884	0.091	n/a
38	0.002	5.074	0.048	n/a
39	0.004	4.795	0.087	n/a
40	0.002	5.245	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	0.494			
2	0.005	0.327	1.620	PASS
3	0.071	2.070	3.450	PASS
4	0.004	0.616	0.645	n/a
5	0.034	1.959	1.710	PASS
6	0.004	0.783	0.450	n/a
7	0.021	1.854	1.155	PASS
8	0.003	0.824	0.345	n/a
9	0.013	2.116	0.600	PASS
10	0.002	0.903	0.276	n/a
11	0.010	1.926	0.495	PASS
12	0.002	0.914	0.230	n/a
13	0.007	2.353	0.315	PASS
14	0.002	1.096	0.197	n/a
15	0.007	2.910	0.225	PASS
16	0.002	1.238	0.173	n/a
17	0.006	2.819	0.199	PASS
18	0.002	1.408	0.153	n/a
19	0.005	2.714	0.178	n/a
20	0.002	1.716	0.138	n/a
21	0.004	2.563	0.161	n/a
22	0.002	1.977	0.125	n/a
23	0.004	2.952	0.147	n/a
24	0.003	2.221	0.115	n/a
25	0.006	4.187	0.135	PASS
26	0.003	2.580	0.106	n/a
27	0.005	4.355	0.125	PASS
28	0.003	2.836	0.099	n/a
29	0.004	3.532	0.116	n/a
30	0.003	3.303	0.092	n/a
31	0.003	2.954	0.109	n/a
32	0.003	3.492	0.086	n/a
33	0.004	3.523	0.102	n/a
34	0.003	3.676	0.081	n/a
35	0.005	4.673	0.096	n/a
36	0.003	4.090	0.077	n/a
37	0.006	6.068	0.091	PASS
38	0.003	4.189	0.073	n/a
39	0.007	7.672	0.087	PASS
40	0.003	4.540	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.

**KES Co., Ltd.**

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www.kes.co.kr

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Test Data - Voltage Fluctuations

Maximum Flicker results

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



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Conducted Emissions at Telecommunication Ports



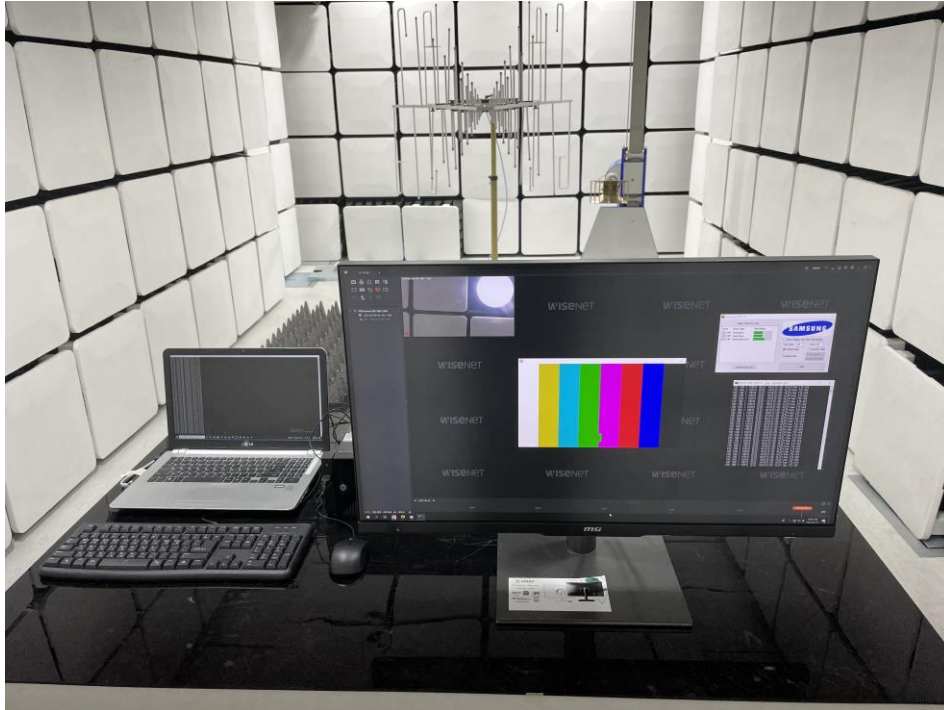
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Radiated Electric Field Emissions(Below 1 GHz)



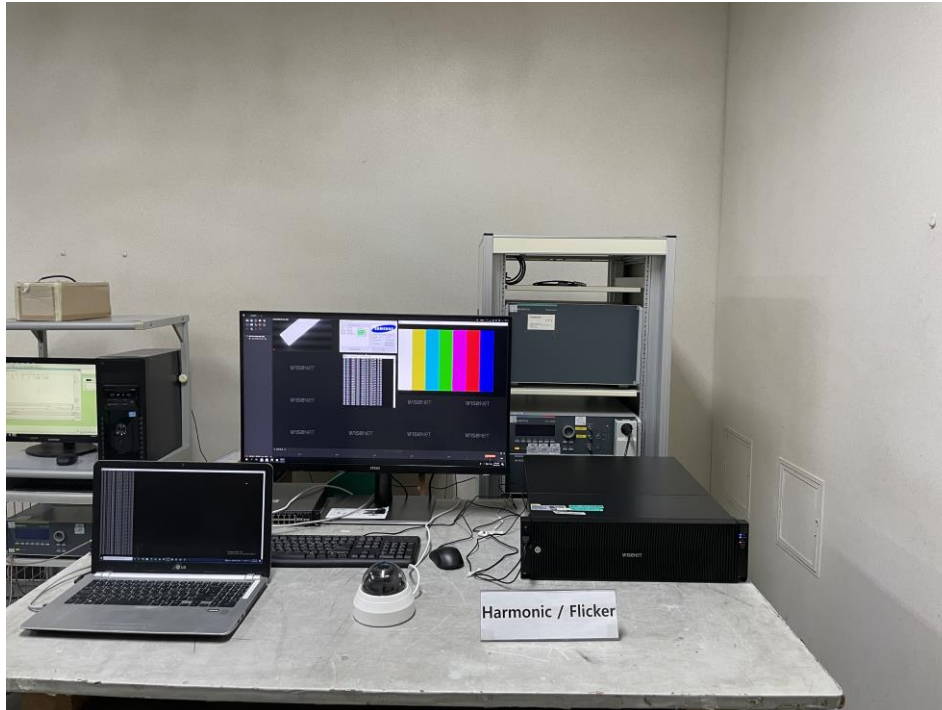
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Radiated Electric Field Emissions(Above 1 GHz)



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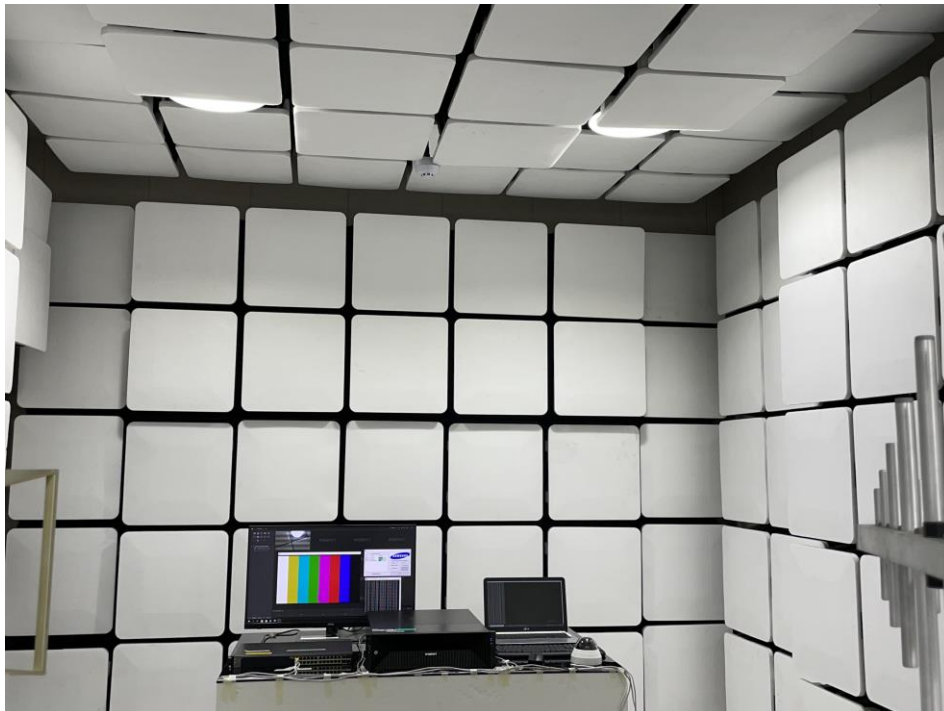
Harmonic Current Emissions and Voltage Fluctuations and Flicker



Electrostatic Discharge



Radiated Electric Field Immunity

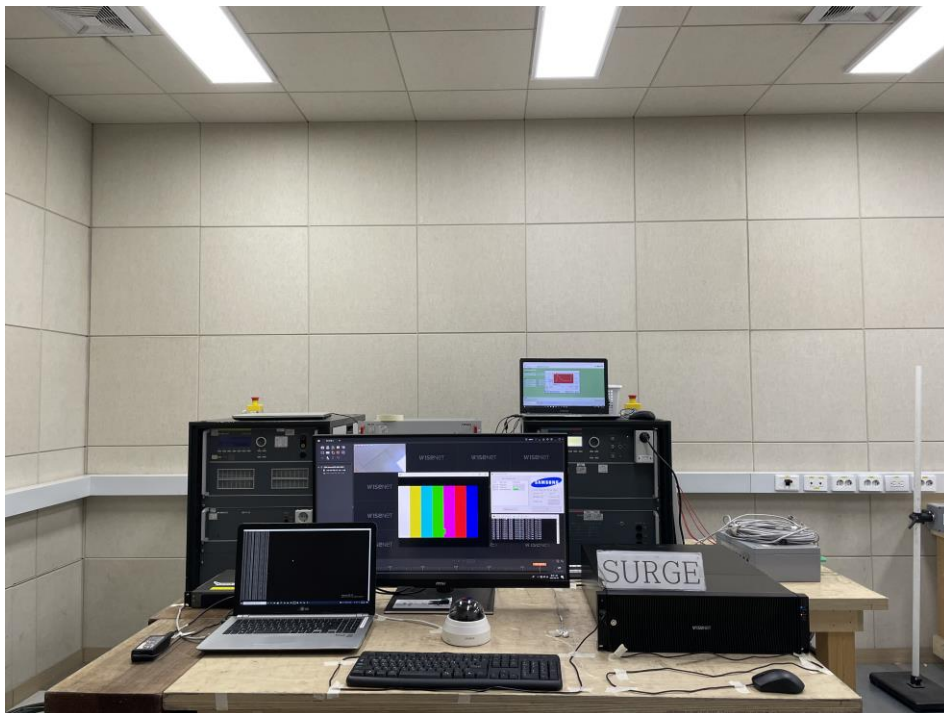


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Electrical Fast Transients/Bursts



Surge Transients

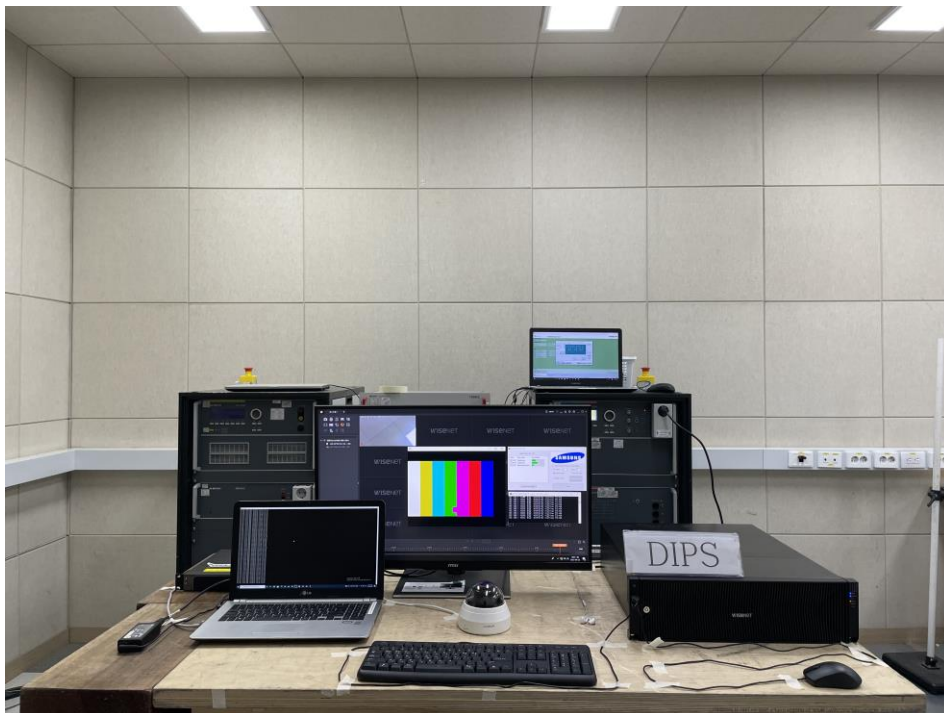


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Conducted Disturbance



Voltage Dips and Short Interruptions



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EUT External Photographs

(Top)



(Bottom)



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EUT Internal Photographs

(Internal View)

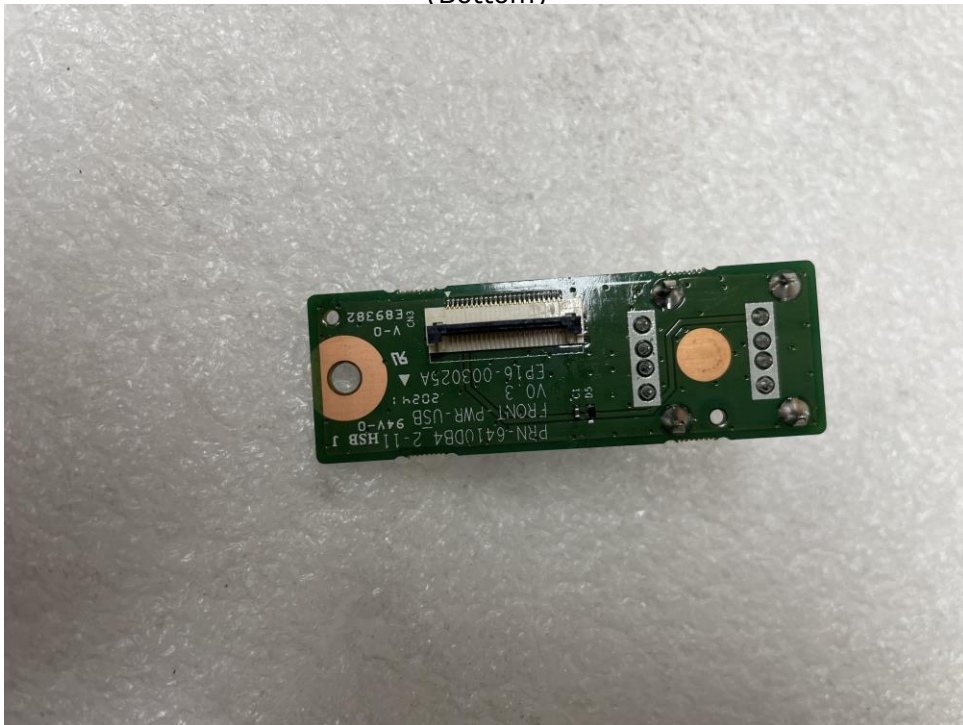


EUT Internal View – Board 1

(Top)



(Bottom)



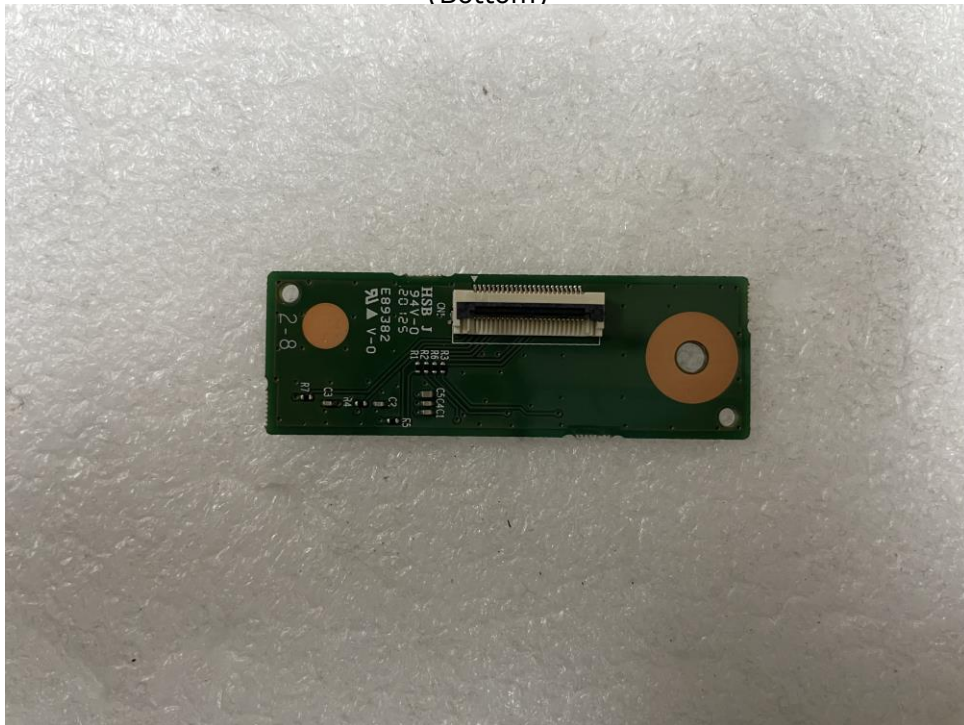
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EUT Internal View – Board 2

(Top)



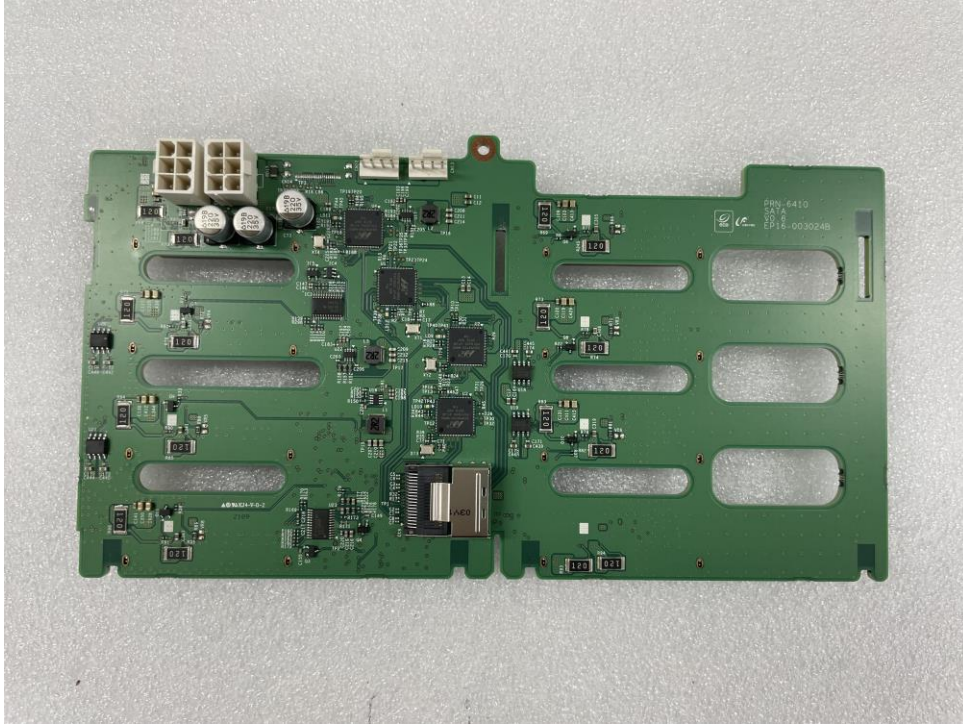
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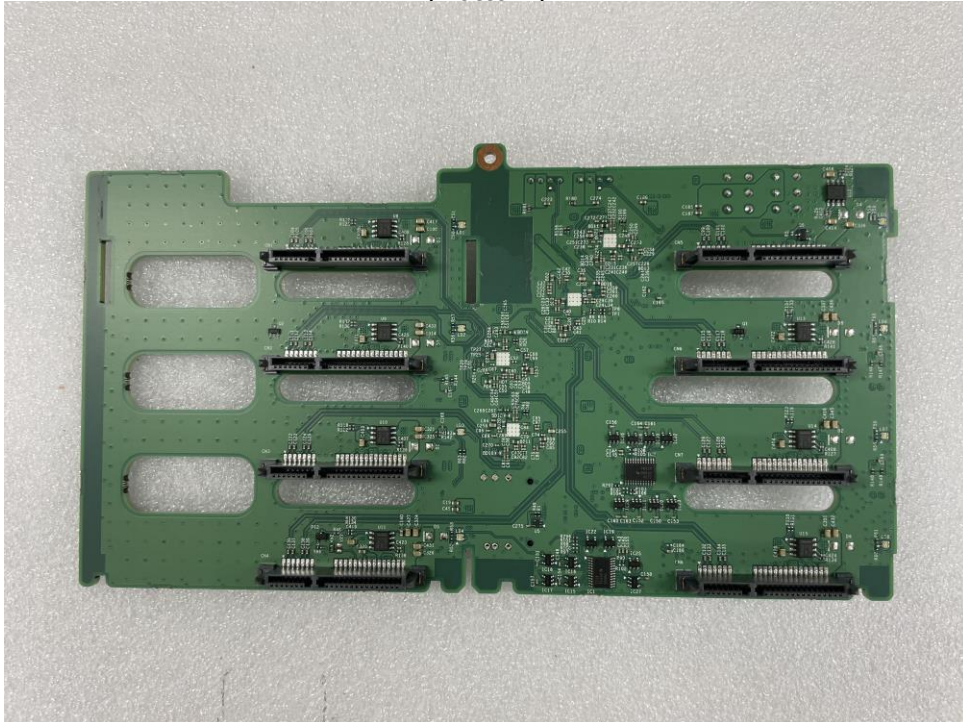
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EUT Internal View – Board 3

(Top)



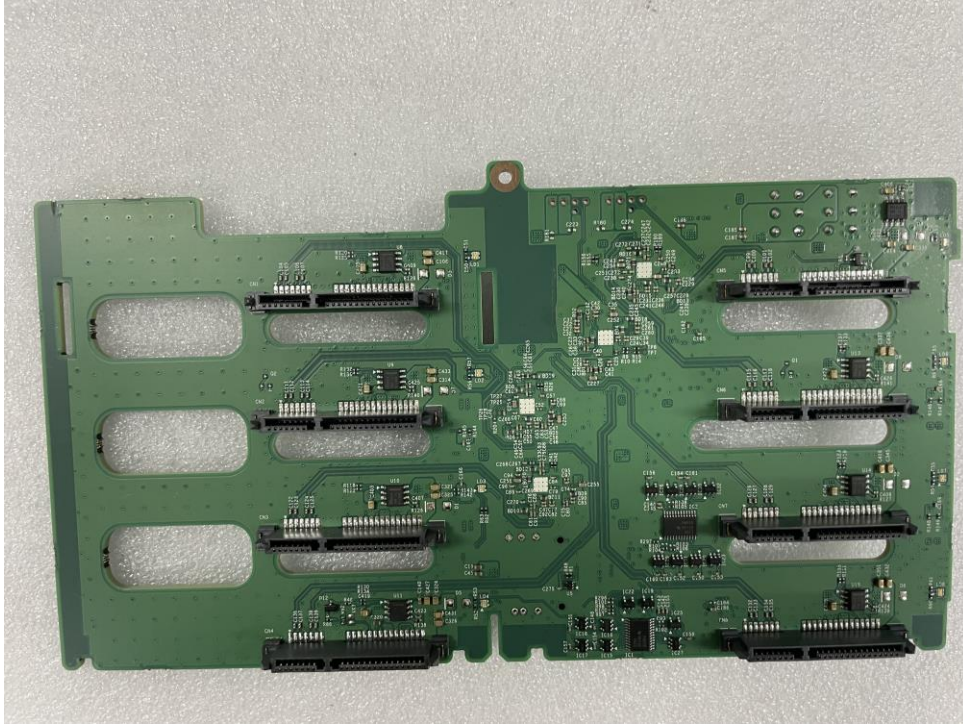
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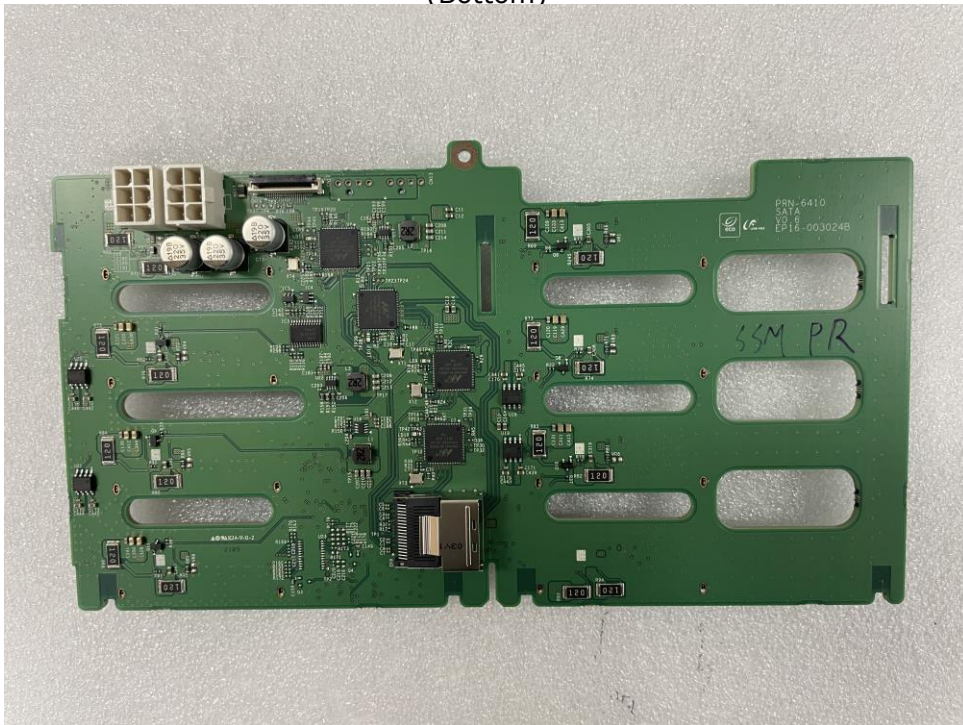
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EUT Internal View – Board 4

(Top)



(Bottom)



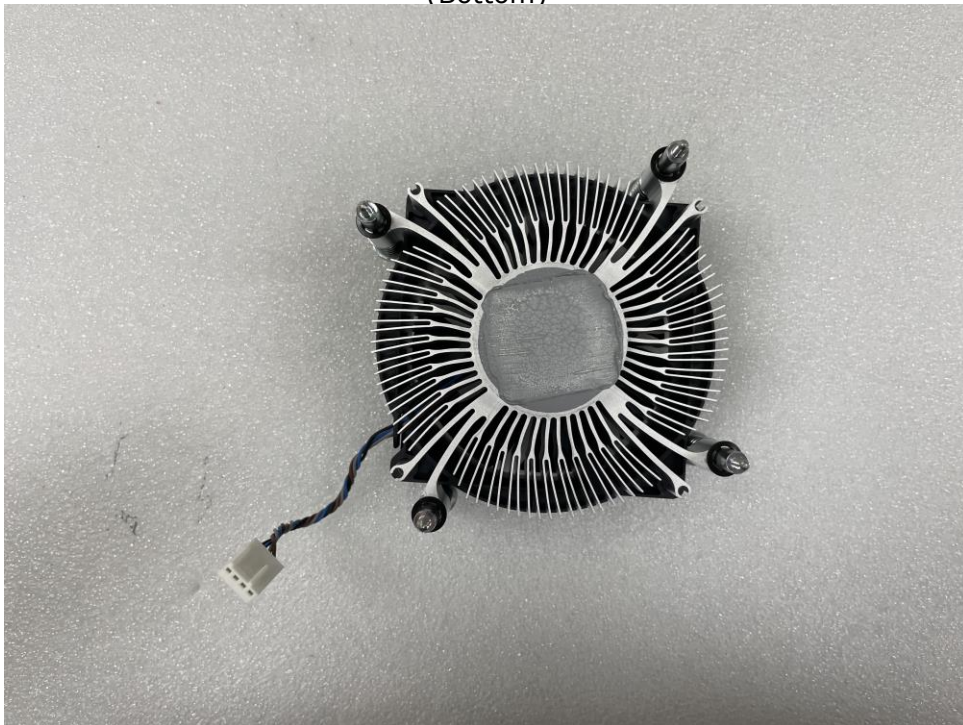
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EUT Internal View – Cooler

(Top)



(Bottom)



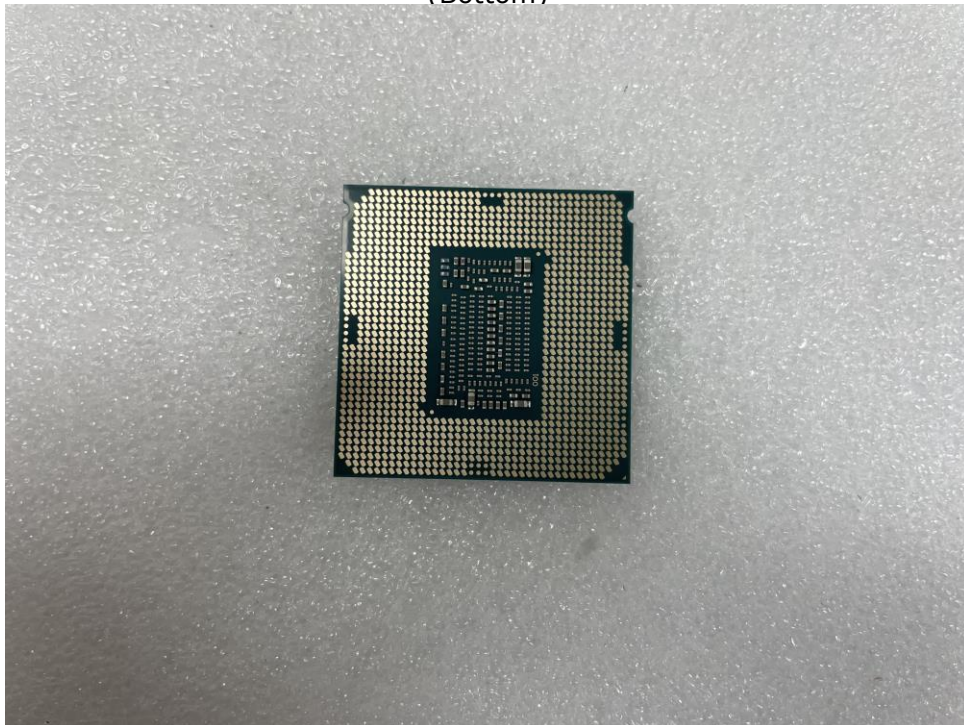
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EUT Internal View – CPU

(Top)



(Bottom)



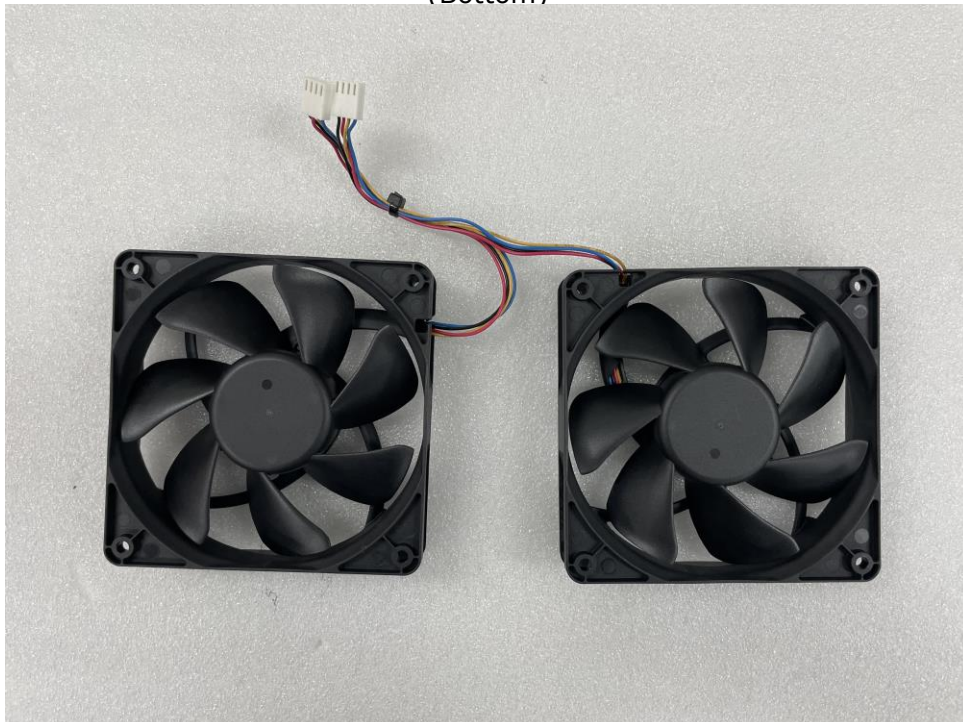
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EUT Internal View – FAN

(Top)



(Bottom)



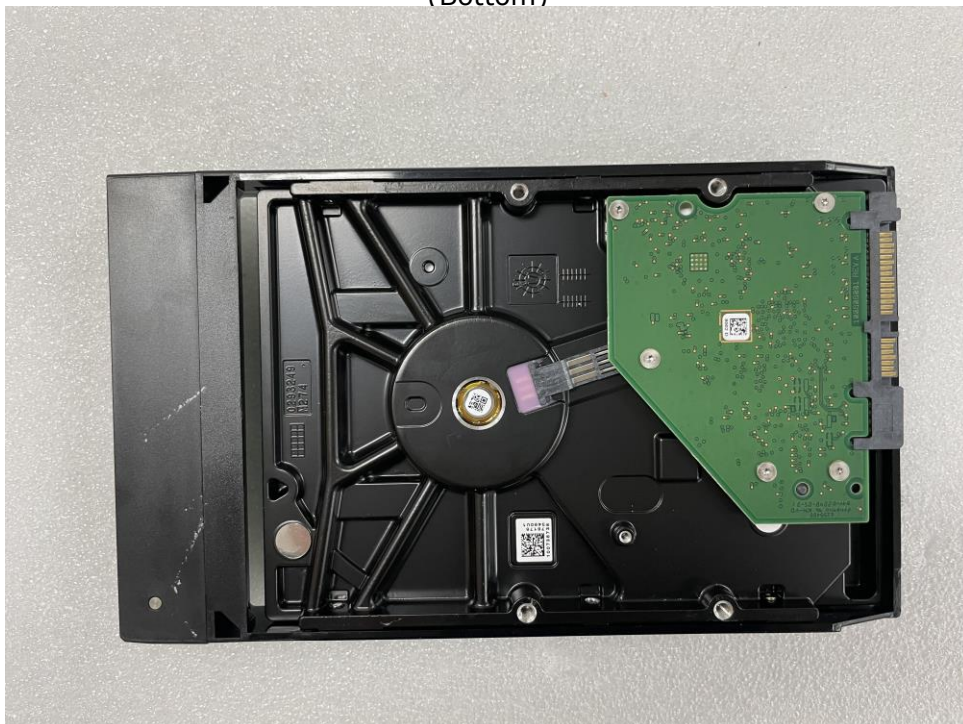
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EUT Internal View – HDD

(Top)



(Bottom)



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EUT Internal View – SMPS

(Top)



EUT Internal View – SSD

(Top)



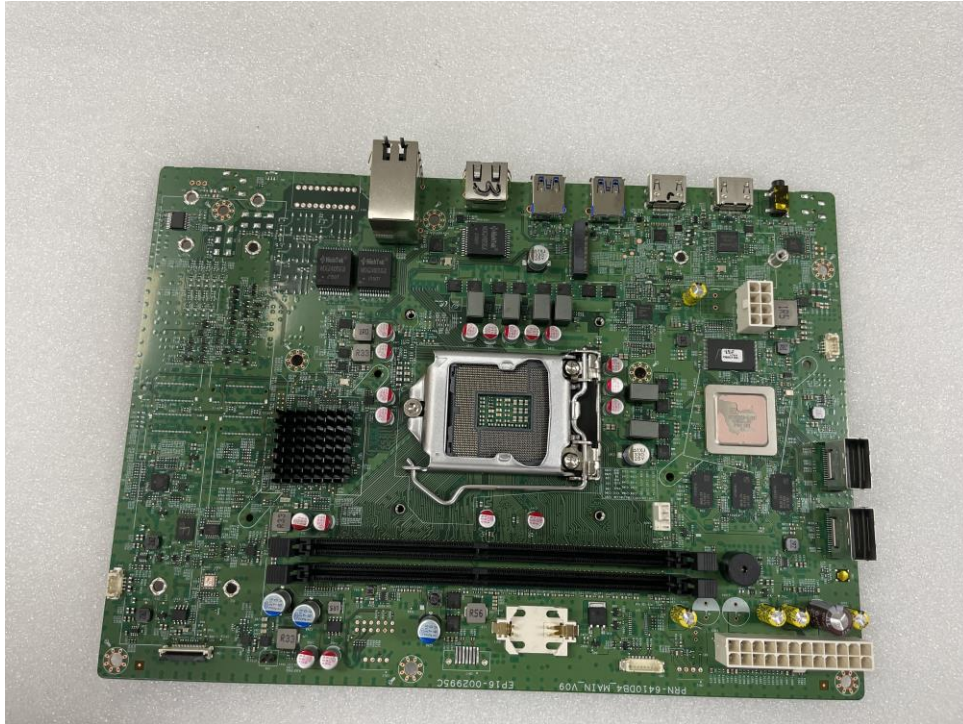
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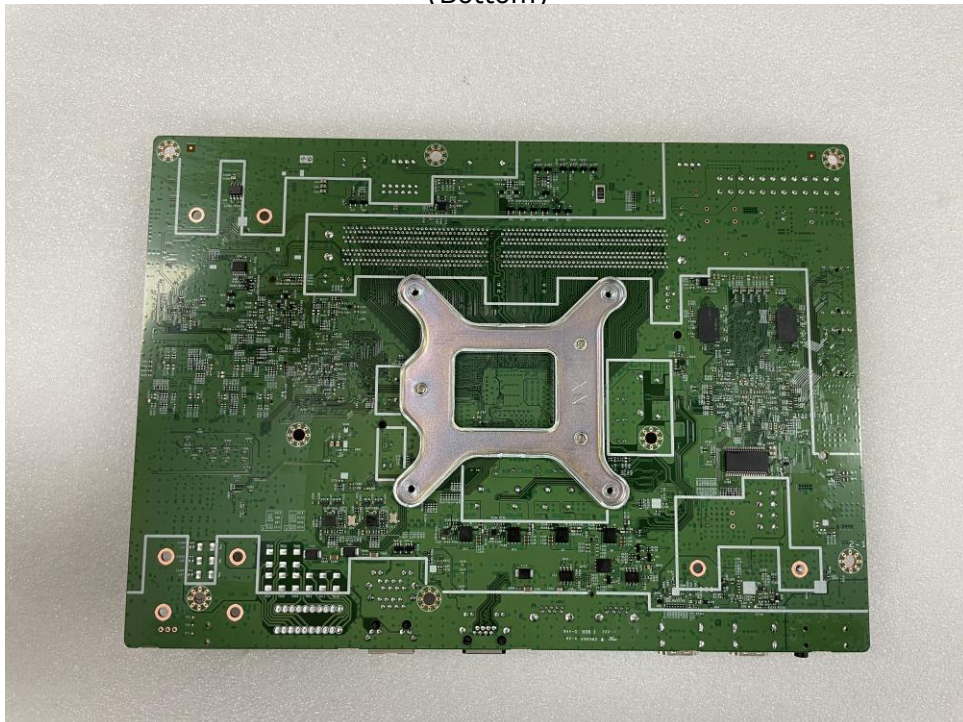
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EUT Internal View – Mother Board

(Top)



(Bottom)



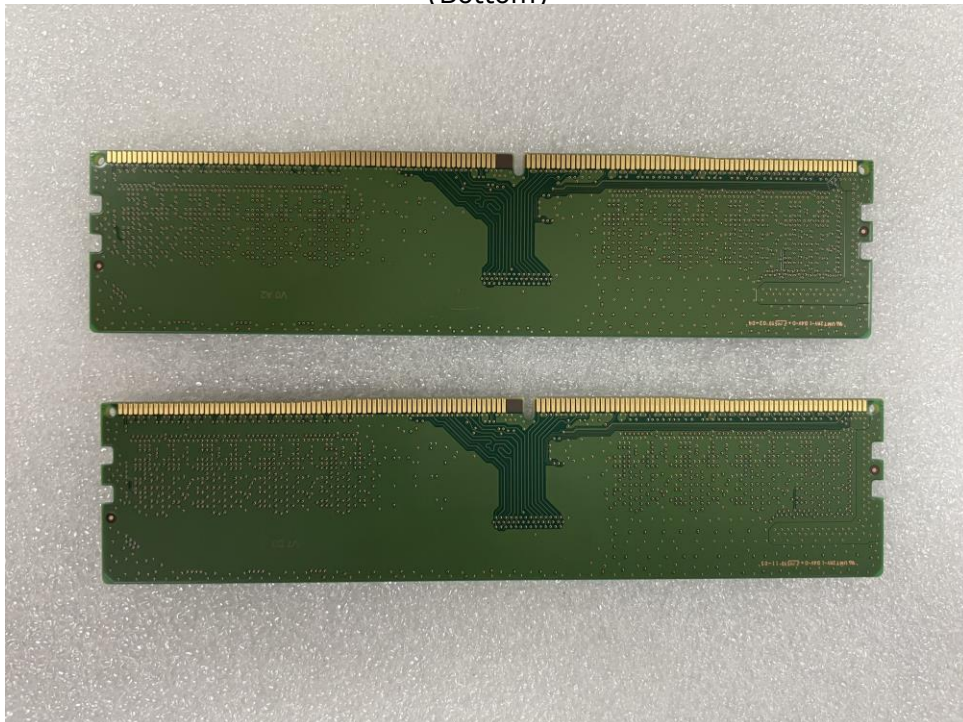
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EUT Internal View – Memory

(Top)

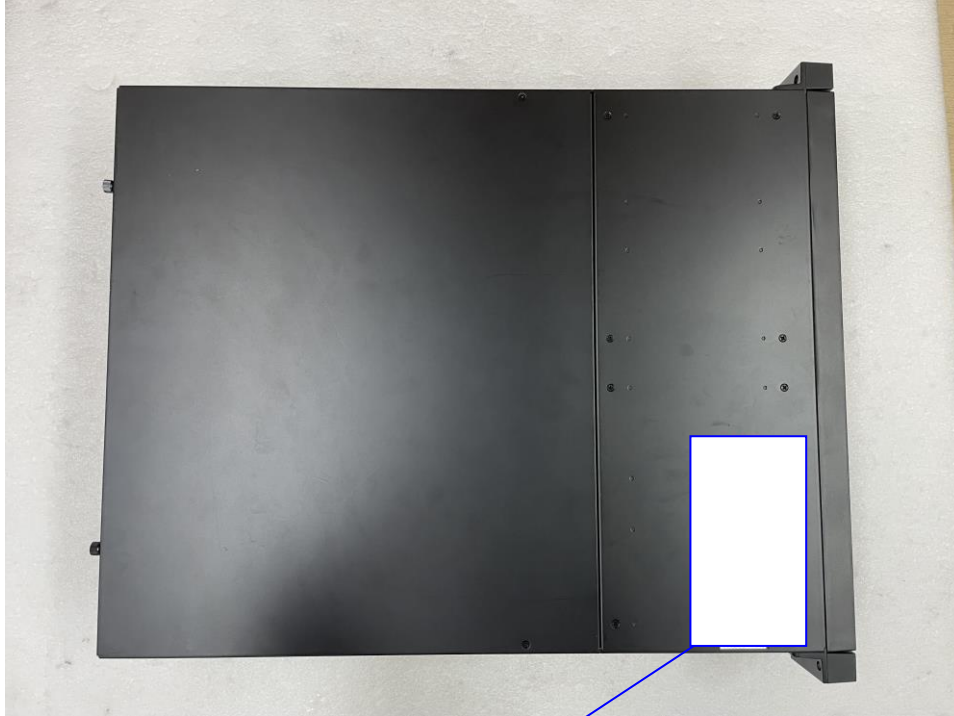


(Bottom)



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Label and Location

**NVR**

Model No : XRP-4210B4

Manufacturer : HANWHA VISION VIETNAM COMPANY LIMITED

Made in Vietnam

