EMC TEST REPORT

Test Report No.	:	KES-EM-22T0877-R1
Date of Issue	:	Feb. 24, 2023
Product name	:	DVR
Model/Type No.	:	ARD-810
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	:	Oct. 13, 2022
Test date	:	Oct. 19, 2022 ~ Oct. 25, 2022
Test Results	:	☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Seong Min, Jang
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
Nov. 03, 2022	KES-EM-22T0877	Issued
Feb. 24, 2023	KES-EM-22T0877-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:

			ARD-810
Display	Display		
Analog camera	Analog camera	Inputs	
		Signal Type	
Network camera	Network camera	Inputs	Additional 2CH (Max. 8CH) TBD
		Resolution	5MP ~ CIF
		Protocols	SUNAPI(Wisenet), ONVIF
Decoding	Decoding	Local Display	None
		Multi Screen Display	None
		Resolution	None
Live	Live	Local Display	1x HDMI, 1x VGA [Single Mode] - HDMI: 3840 x 2160, 2560x1440, 1920x1080, 1280x1024, 1280x720 [Dual Mode] Clone - HDMI: 1920x1080, 1280x1024, 1280x720 - VGA: 1920x1080, 1280x1024, 1280x720
		Multi Screen Display	[Local monitor] - Dynamic layout, Virtual channel view - up to 7 division [Web] 1 / 4 / 10
		Resolution	[Analog Camera(NTSC/PAL)] 5MP(5M Half 20fps/12fps) 4MP(4M Half 30fps/25fps) 2MP(2M Half 30fps/25fps) 1MP(1M Half 30fps/25fps) [Network Camera] - Typ. 2MP(120fps)
Performance	Performance		
Operating System	Operating System	Embedded	Linux
Record	Record	Compression	H.265, H.264, MJPEG
		Record Rate(Analog)	[Analog Camera(NTSC/PAL)] (Main Stream) 5MP(5M Half 20fps/12fps) 4MP(4M Half 30fps/25fps) 2MP(2M Half 30fps/25fps) 1MP(1M Half 30fps/25fps) (Sub Stream) 720p or higher : 640x368 full fps/CH SD signal : upto CIF 30/25fps/CH * The maximum recording frame rate depends on the frame rate of the input camera.
		Recording Bandwidth	Max. 80Mbps
		Resolution	5MP ~ CIF
		Mode	Manual, Schedule (Continuous/Event), Event(Pre/Post), Dual Track
		Event Trigger	Alarm input Analog Camera : Video Loss, Motion Detection,Tampering Network Camera : Camera Event (Sensor, MD, Video analytics), VA event (Tampering, Enter / Exit, Passing, Virtual- line, (Dis)Appear, Face Detection, Audio detection), Defocus camera event, Dynamic camera event
		Event Action	E-mail, PTZ preset, Alarm out, Buzzer, Monitor out
Search & Play	Search & Play	Playback Bandwidth	Max. 32Mbps
		User	Max. 4 users (Set 1, Remote 3)
		Simultaneous playback	8CH(Local Monitor, CMS, Wisenet Mobile) 1CH(Web)
		Fisheye Dewarping	WEB / CMS
		Mode	Date & Time (Calendar) / Event log list / Text search (POS), Back up, Motion, Smart search (Virtual Line w/ direction, Enter / Exit) * All Search included Preview function ARB search
		Resolution	5MP ~ CIF
		Playback Control	Fast Forward/Backward (x2,x4,x8,x16,x32,x64, x128, x256) Slow Forward/Backward (x1/2,x1/4,x1/8) ※Move one step up/down
Storage	Storage	Supported HDD	Up to 6TB
		HDD Slot	SATA 1ea(Max. 6TB)
		External	None
		RAID	None

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Backup	Backup	File backup	BU, EXE(Include Player), AVI(Webviewer only)	BU, EXE(Include Player), AVI(Webviewer only)
		Function	Max. 10 CH play, Date-time/title display	Max. 16 CH play, Date-time/title display
Network	**Network**			
Protocol	Protocol		TCP/IP, UDP/IP, RTP (UDP), RTP (TCP), RTSP, NTP, HTTP, DHCP (Server, Client), PPPoE, SMTP, ICMP, IGMP, ARP, DNS, DDNS, uPnP, HTTPS, SNMP, ONVIF (Profile-S), SUNAPI(Server, Client)	TCP/IP, UDP/IP, RTP (UDP), RTP (TCP), RTSP, NTP, HTTP, DHCP (Server, Client), PPPoE, SMTP, ICMP, IGMP, ARP, DNS, DDNS, uPnP, HTTPS, SNMP, ONVIF (Profile-S), SUNAPI(Server, Client)
DDNS	DDNS		Wisenet DDNS	Wisenet DDNS
Transmission speed	Transmission speed		[Analog Camera(NTSC/PAL)] (Main Stream) 5MP(5M Half 20fps/12fps) 4MP(4M Half 30fps/25fps) 2MP(2M Half 30fps/25fps) 1MP(1M Half 30fps/25fps) (Sub Stream) 720p or higher : 640x368 full fps/CH SD signal : upto CIF 30/25fps/CH * The maximum recording frame rate depends on the frame rate of the input camera.	[Analog Camera(NTSC/PAL)] (Main Stream) 5MP(5M Half 20fps/12fps) 4MP(4M Half 30fps/25fps) 2MP(2M Half 30fps/25fps) 1MP(1M Half 30fps/25fps) (Sub Stream) 720p or higher : 640x368 full fps/CH SD signal : upto CIF 30/25fps/CH * The maximum recording frame rate depends on the frame rate of the input camera.
Transmission Bandwidth	Transmission Bandwidth		Max. 40Mbps	Max. 100Mbps
Transmission Bandwidth	Transmission Bandwidth		None	None
Wireless	Wireless	WiFi	None	None
		3G/LTE	None	None
Audio	Audio	Input/Output	1 Line In / 1 Line out	1 Line In / 1 Line out
		Compression	G.711 (N/W Cam G.711, 726)	G.711 (N/W Cam G.711, 726)
		Audio Communication	2-Way	2-Way
Max. Remote Users			None	None
Security			IP address filtering, User access log, 802.1x Authentication, Encryption (ID/PW, Recording, Transmission, Backup) Device Certificate(Hanwha Techwin Root CA)	IP address filtering, User access log, 802.1x Authentication, Encryption (ID/PW, Recording, Transmission, Backup) Device Certificate(Hanwha Techwin Root CA)
Web viewer	Web viewer	Supported OS	Windows 10, Mac OS 11 Big Sur and later	Windows 10, Mac OS 11 Big Sur and later
		Supported browser	Chrome v89 or above, Edge v89 or above, Safari v14.0.3 or above	Chrome v89 or above, Edge v89 or above, Safari v14.0.3 or above
Viewer Software	Viewer Software		SSM, Webviewer, Wisenet Viewer, Wisenet mobile Support SDK/CGI(SUNAPI) for integration to 3'rd party VMS	SSM, Webviewer, Wisenet Viewer, Wisenet mobile Support SDK/CGI(SUNAPI) for integration to 3'rd party VMS
Functions	**Functions**			
Camera Setup	Camera Setup	Register	Auto, Manual	Auto, Manual
		Alert	None	None
PTZ	PTZ	Control	Via GUI, Webviewer, SSM, WisenetViewer, WisenetMobile Viewer, System Controller	Via GUI, Webviewer, SSM, WisenetViewer, Wisenet Mobile Viewer, System Controller
		Preset	300 presets	300 presets
Smart phone	Smart phone	Support Model	iOS, Android	iOS, Android
		Protocol Support	RTP, RTSP, HTTP, CGI(SUNAPI)	RTP, RTSP, HTTP, CGI(SUNAPI)
		Control	Live(16ch) : Multi-Profile Support Playback(4Ch Multi Playback, Max 2MP) Eventpush	Live(16ch) : Multi-Profile Support Playback(4Ch Multi Playback, Max 2MP) Eventpush
		Max. Remote Users	Search(3), Live Unicast(10)	Search(3), Live Unicast(10)
Redundancy	Redundancy	Failover	None	None
		ARB	Support	Support
Easy configuration	Easy configuration		Setup Wizard (Language, Date/Time, Password, Network, Auto Camera Configuration), P2P (QR code)	Setup Wizard (Language, Date/Time, Password, Network, Auto Camera Configuration), P2P (QR code)
Coaxial Control	Coaxial Control		CVBS(Pelco-C)/AHD/CVI/TVI	CVBS(Pelco-C)/AHD/CVI/TVI
Interface	**Interface**			
Front	Front	Indicator	LED(Status Indicator) : Power(1), Record(1), Network(1)	LED(Status Indicator) : Power(1), Record(1), Network(1)
Storage	Storage		None	None
Reset	Reset		Switch(1EA)	Switch(1EA)
HDD Key Lock	HDD Key Lock		None	None
HDMI	HDMI		1EA	1EA
VGA	VGA		1EA	1EA
BNC	BNC		8CH In / 1CH Out(Spot Output)	16CH In / 1CH Out(Spot Output)
DP	DP		None	None
DVI	DVI		None	None
e-SATA	e-SATA		None	None
Audio	Audio		Out(1EA, RCA, Line)	Out(1EA, RCA, Line)
Ethernet	Ethernet		RJ-45(10/100 BASE-T)	RJ-45(10/100 BASE-T)
Alarm	Alarm		In 4EA, Out 1EA - Relay Out 1(NO,NC/COM)	In 4EA, Out 1EA - Relay Out 1(NO,NC/COM)
USB	USB		2EA(Front/Rear USB2.0)	2EA(Front/Rear USB2.0)
GPS	GPS		None	None
WiFi	WiFi		None	None

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Serial(Protocol)	Serial(Protocol)		RS-485 (Samsung-T/Pelco-D/Pelco-p) * for PTZ	RS-485 (Samsung-T/Pelco-D/Pelco-p) * for PTZ
Power Inlet	Power Inlet		1EA DC Input Jack	1EA DC Input Jack
System	System			
Log	Log	Log List	Max. 100,000 (System Log, Event Log each)	Max. 100,000 (System Log, Event Log each)
System Control	System Control		Mouse, Webviewer, System Controller(SPC-7000, SPC-6000, SPC-2000)	Mouse, Webviewer, System Controller(SPC-7000, SPC-6000, SPC-2000)
Power Management	Power Management	Shutdown Delay	None	None
		Startup Delay	None	None
Language	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	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	Environmental			
Operating Temperature			0°C to +40°C(+32°F to +104°F)	0°C to +40°C(+32°F to +104°F)
Operating Humidity			20% ~ 85% RH	20% ~ 85% RH
Certification	Certification		UL, CE, FCC, KC	UL, CE, FCC, KC
Electrical	Electrical			
Power Input			DC12V	DC12V
Power Consumption			TBD	TBD
PoE Budget	PoE Budget		None	None
Mechanical	Mechanical			
Color / Material	Color / Material		Black / Metal	Black / Metal
Dimension (WxHxD)	Dimension (WxHxD)		160 x 47 x 208.7mm (11.85" x 1.89" x 8.22")	370.0x 44.0 x 320mm(14.57" x 1.73" x 12.6")
Weight	Weight		TBD	TBD
Control Box	Control Box			
Interface	Interface	Indicator		
		Emergency Button		
		Audio/Power Switch		
		Main I/O		
Mechanical	Mechanical	Color / Material		
		Dimension (WxHxD)		
		Weight		

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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
DVR	ARD-810	-	HANWHA VISION VIETNAM COMPANY LIMITED	EUT
Adapter	KPL-048F-VI	-	Channel Well Technology (Guangzhou) Co., Ltd.	-
Mouse	MOKJUO	21H07051	Primax Electronics Ltd.	-
HDD	ST2000VX012	-	SEAGATE	-

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1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
Laptop	LG15N54	503NZWY038929	LG	-
Laptop Adapter	PA-1900-14	OF2R263348701 7764	LITE-ON TECHNOLOGY COPORATION	-
Monitor 1	SMT-2232	C95V67VF90003 8B	Weihai Daewoo Electronics Co., Ltd.	-
Monitor 2	SMT-2233	ZC6U67VH50019 4D	Weihai Daewoo Electronics Co., Ltd.	-
Monitor 3	-	-	DELL. INC	-
Speaker	-	-	Britz	-
Controller	SPC-1010	C50E67WG10100 F	SamSung Techwin Co.,Ltd.	-
Controller Adapter	AP-12005A	-	A Power	-
Alarm	PRO-SL	-	SENSOR PRO	-
ButtonAlarm	-	-	-	-
Camera	SCD-6083RN	-	TB-eye Ltd.	-
Camera Adapter	KP-1220	-	Korea Power	-

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1.6 External I/O Cabling

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
DVR (EUT)	DC Jack	Adapter (EUT)	DC Jack	1.4	U
	USB A-type	Mouse (EUT)	USB A-type	1.5	U
	BNC(SPOT)	Monitor #1	BNC	3.5	S
	VGA	Monitor #2	VGA	1.5	U
	HDMI	Monitor #3	HDMI	1.4	S
	AUDIO OUT	Speaker	AUDIO OUT	2.0	U
	RS-485	Controller	RS-485	3.2	U
	Alarm OUT	Alarm	Alarm IN	3.1	U
	Alarm IN	ButtonAlarm	Alarm OUT	3.2	U
	VIDEO IN	Camera	BNC	3.5	S
	RJ-45	Laptop	RJ-45	3.0	U
	AUDIO IN	Laptop	AUDIO IN	1.5	U
Laptop	DC Jack	Laptop Adapter	DC Jack	1.4	S
Controller	DC Jack	Controller Adapter	DC Jack	1.4	S
Camera	DC Jack	Camera Adapter	DC Jack	1.4	S

* Unshielded=U, Shielded=S

1.7 EUT Operating Mode(s)

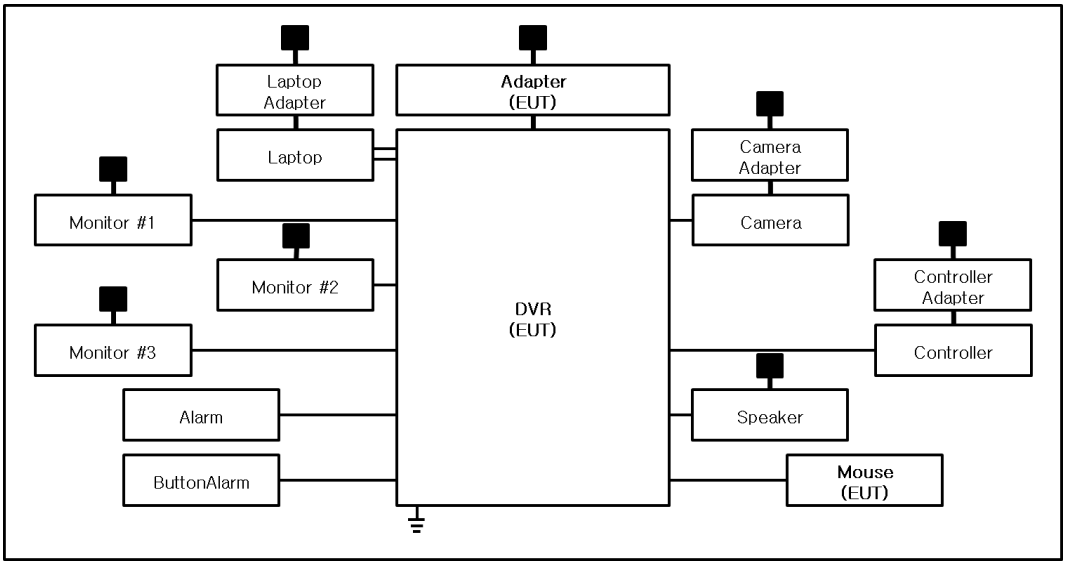
Test Mode	operating
Operating Mode	EUT Monitoring, Ping Test

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

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1.8 Configuration

■ AC Main
□ DC Main



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1.9 Remarks when standards applied

N/A

1.10 Calibration Details of Equipment Used for Measurement

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

1.11 Test Facility

The measurement facility is located at 473-21, Gayeo-ro, 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 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

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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

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2.1 Conducted Emissions at Mains Power Ports

Test Date
Oct. 25, 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: (23,0 ± 0,1) ℃
Relative Humidity: (47,0 ± 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.

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2.2 Conducted Emissions at Telecommunication Ports

Test Date
Oct. 25, 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 CAT6	ENY81-CAT6	R & S	101665	12, 28, 2022

Test Conditions
Temperature: (23,0 ± 0,1) ℃
Relative Humidity: (47,0 ± 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.

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2.3 Radiated Electric Field Emissions(Below 1 ㎓)

Test Date
Oct. 25, 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: (22,5 ± 0,1) ℃
Relative Humidity: (47,0 ± 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.

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2.4 Radiated Electric Field Emissions(Above 1 ㎓)

Test Date
Oct. 24, 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, 01, 2023
☒	PREAMPLIFIER	8449B	AGILENT	3008A01967	04, 01, 2023
☒	ATTENUATOR	8491A	HP	35496	03, 08, 2023
☐	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	03, 03, 2023

Test Conditions
Temperature: (22,8 ± 0,2) ℃
Relative Humidity: (47,2 ± 0,1) % 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.

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2.5 Harmonic Current Emissions

Test Date
Oct. 19, 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 ± 0,2) ℃
Relative Humidity: (49,9 ± 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.

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2.6 Voltage Fluctuations and Flicker

Test Date
Oct. 19, 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 ± 0,2) ℃
Relative Humidity: (49,9 ± 0,1) % R.H.

Test Results
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks
See Appendix A for test data.

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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.

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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.

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3.1 Electrostatic Discharge

Reference Standard
EN 61000-4-2:2009

Test Date
Oct. 19, 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: (22,1 ± 0,1) ℃
Relative Humidity: (49,9 ± 0,1) % R.H.
Atmospheric Pressure: (100,9 ± 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

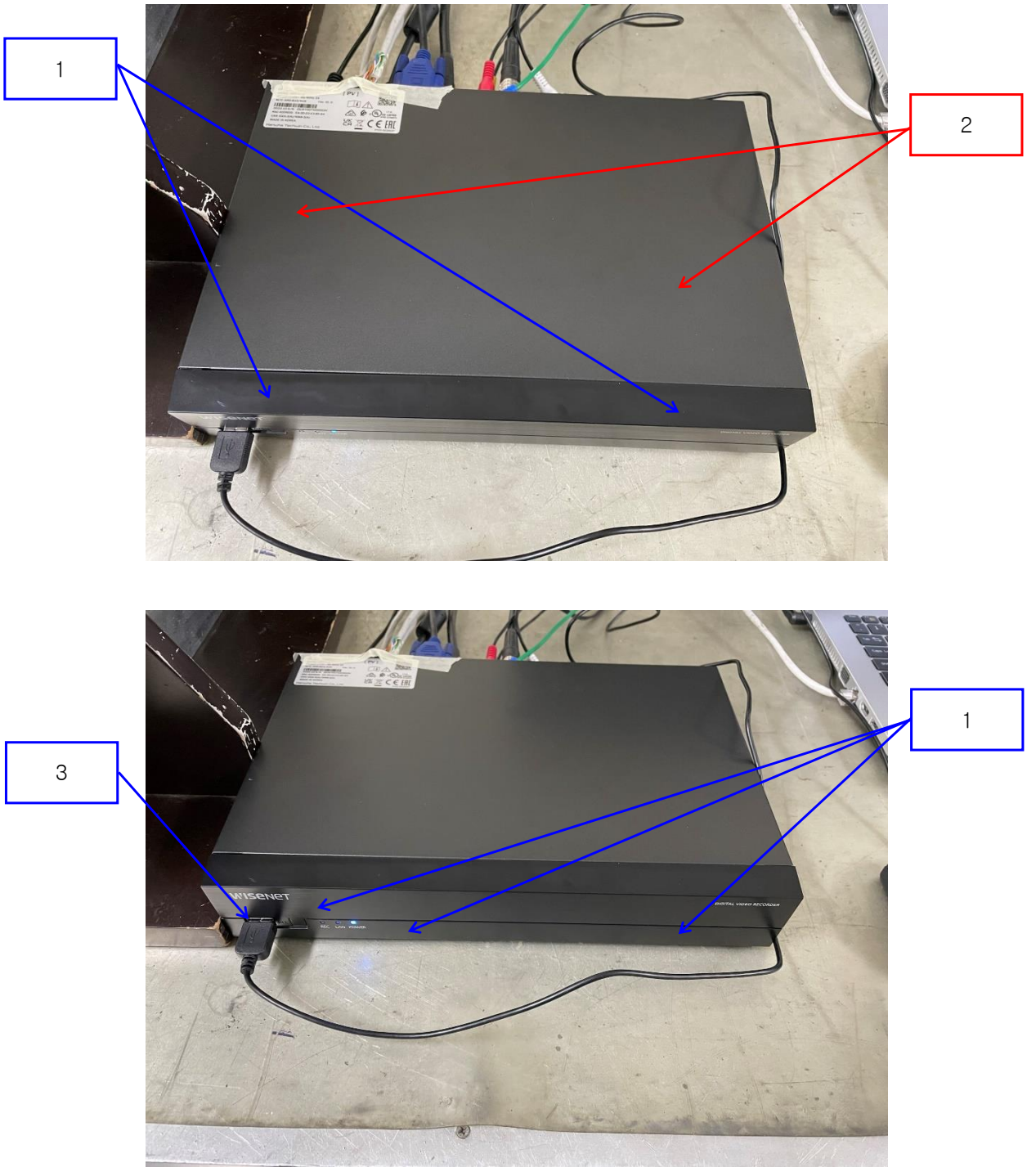
Notes: HCP: Horizontal coupling plane
VCP: Vertical coupling plane

Required Performance Criteria: ☒ Complied

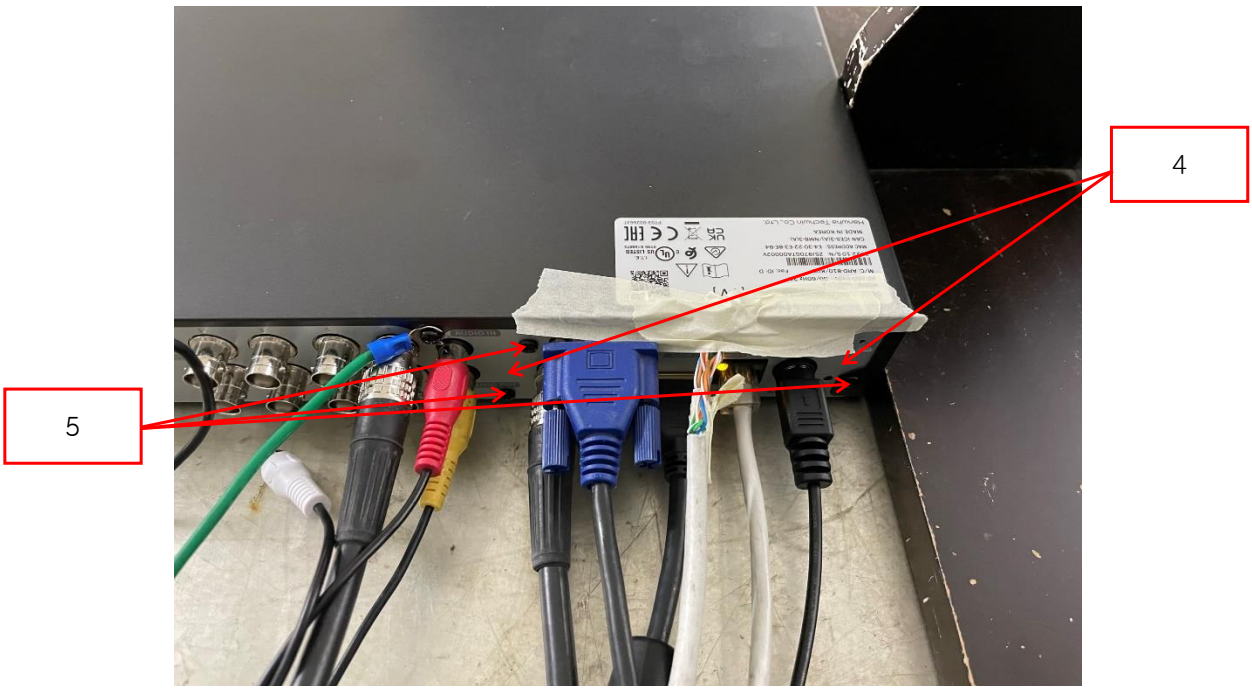
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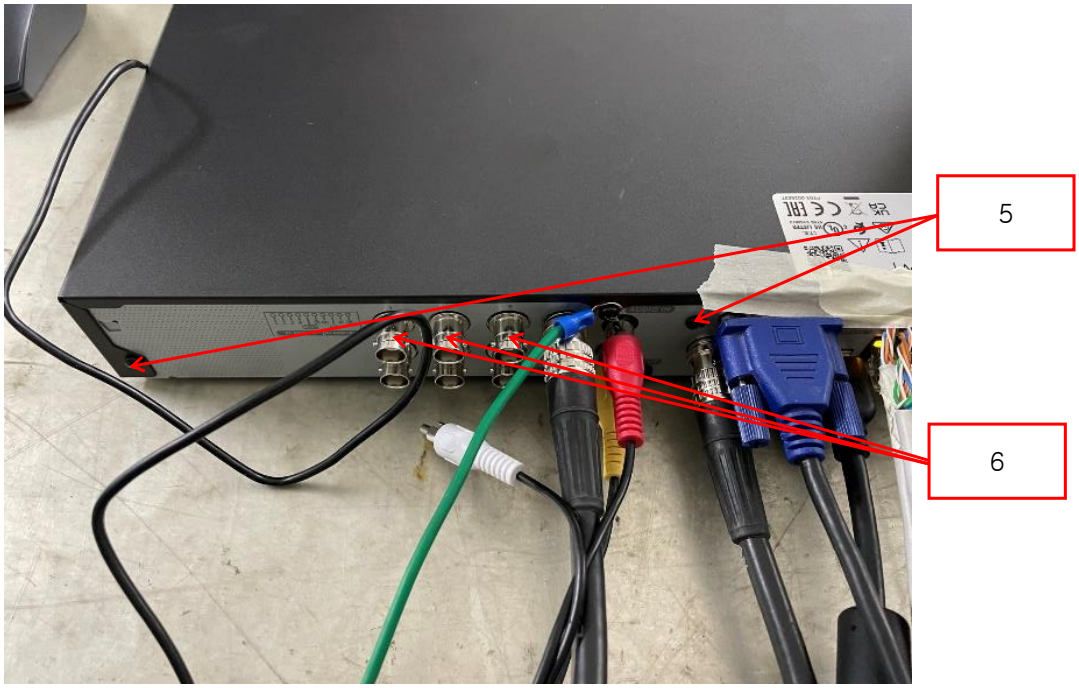
Location of Discharge:

Air
Contact



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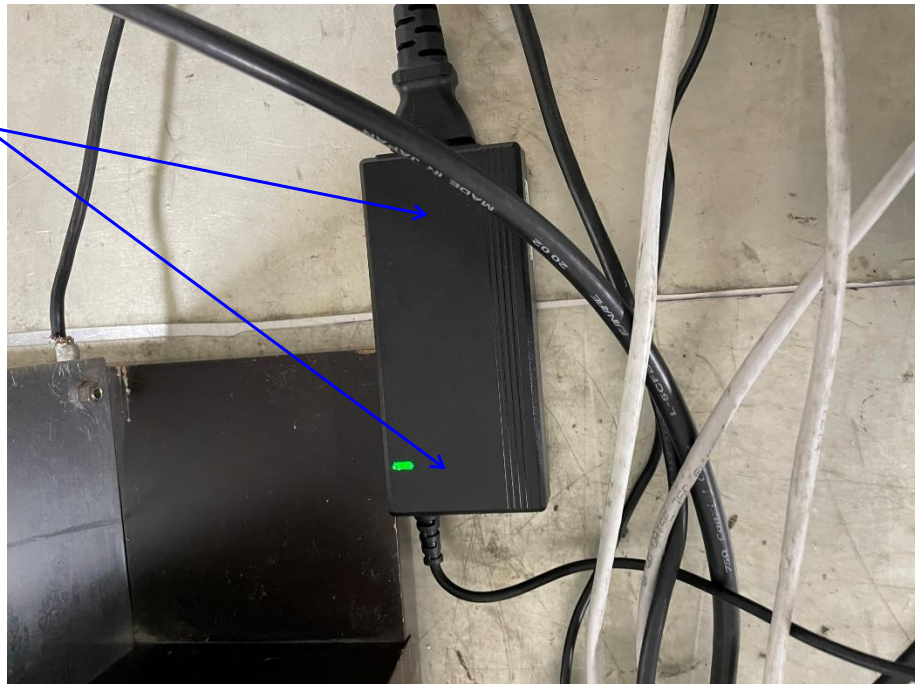


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Test Data

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 1	Air Discharge	Complied	-
2	Enclosure 2	Contact Discharge	Complied	-
3	Port 1	Air Discharge	Complied	-
4	Around Port	Contact Discharge	Complied	-
5	Screw	Contact Discharge	Complied	-
6	Port 2	Contact Discharge	Complied	-
7	Mouse Enclosure	Air Discharge	Complied	-
8	Adapter 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

Remarks

PASS Required Performance Criteria

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3.2 Radiated Electric Field Immunity

Reference Standard
EN IEC 61000-4-3:2020

Test Date
Oct. 23, 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: (22,9 ± 0,1) ℃
Relative Humidity: (47,7 ± 0,1) % R.H.
Atmospheric Pressure: (100,4 ± 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

Remarks

PASS Required Performance Criteria

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3.3 Electrical Fast Transients/Bursts

Reference Standard
EN 61000-4-4:2012

Test Date
Oct. 19, 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: (22,1 ± 0,2) ℃
Relative Humidity: (49,9 ± 0,1) % R.H.
Atmospheric Pressure: (100,9 ± 0,1) ㎪

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	

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Test Data

☒ 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 (㎸)
RJ-45	Complied	Complied
BNC (SPOT)	Complied	Complied
VIDEO IN	Complied	Complied
Alarm IN	Complied	Complied
Alarm OUT	Complied	Complied
RS-485	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
Oct. 19, 2022

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	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
☐	CDN	CNV 508N1	EM TEST	P1551168979	04, 01, 2023

Test Conditions
Temperature: (22,1 ± 0,1) ℃
Relative Humidity: (49,9 ± 0,1) % R.H.
Atmospheric Pressure: (100,9 ± 0,1) ㎪

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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 (㎸)	(-) 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 (㎸)
RJ-45(PoE)	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

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3.5 Conducted Disturbance

Reference Standard
EN 61000-4-6:2014

Test Date
Oct. 21, 2022

Test Location
EMS-CS: Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	icd.control	EM TEST	5.3.7	-
☒	CONTINUOUS WAVE SIMULATOR	CWS 500N1	EM TEST	V0936105119	08, 01, 2023
☒	ATTENUATOR	ATT6	EM TEST	1208-34	08, 01, 2023
☒	CDN	CDN-M2/M3N	EM TEST	0909-06	08, 01, 2023
☒	CDN	CDN T8RJ45	EM TEST	0909-09	08, 01, 2023
☒	EM CLAMP	KEMZ 801A	TESEQ	44099	11, 25, 2022

Test Conditions
Temperature: (22,1 ± 0,3) ℃
Relative Humidity: (49,8 ± 0,1) % R.H.
Atmospheric Pressure: (100,3 ± 0,1) kPa

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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	

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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	CDN	Complied
BNC (SPOT)	Clamp	Complied
VIDEO IN	Clamp	Complied
Alarm IN	Clamp	Complied
Alarm OUT	Clamp	Complied
RS-485	Clamp	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

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3.6 Voltage Dips and Short Interruptions

Reference Standard
EN IEC 61000-4-11:2020

Test Date
Oct. 19, 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 ± 0,1) ℃
Relative Humidity: (49,9 ± 0,1) % R.H.
Atmospheric Pressure: (100,9 ± 0,1) kPa

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Test Specifications & Observations/Remarks

- 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.

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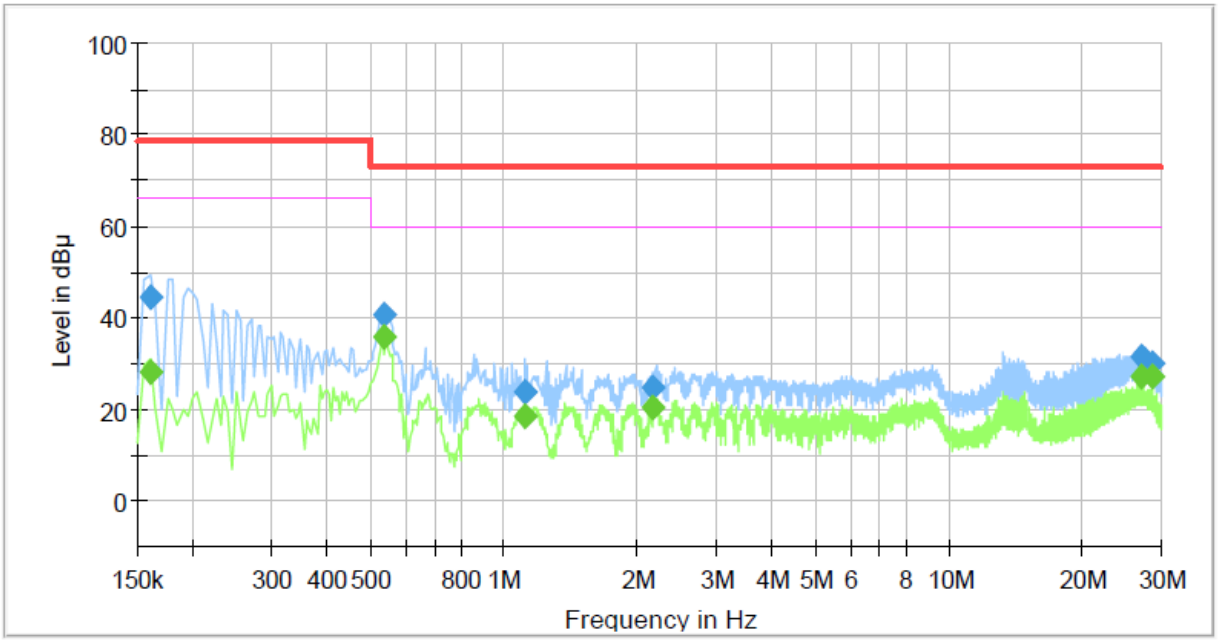
APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

[HOT]

Common Information

Test Description:	Conducted Emission
Model No.:	ARD-810
Phase:	
Mode:	L1
Operator Name:	KES



Final_Result

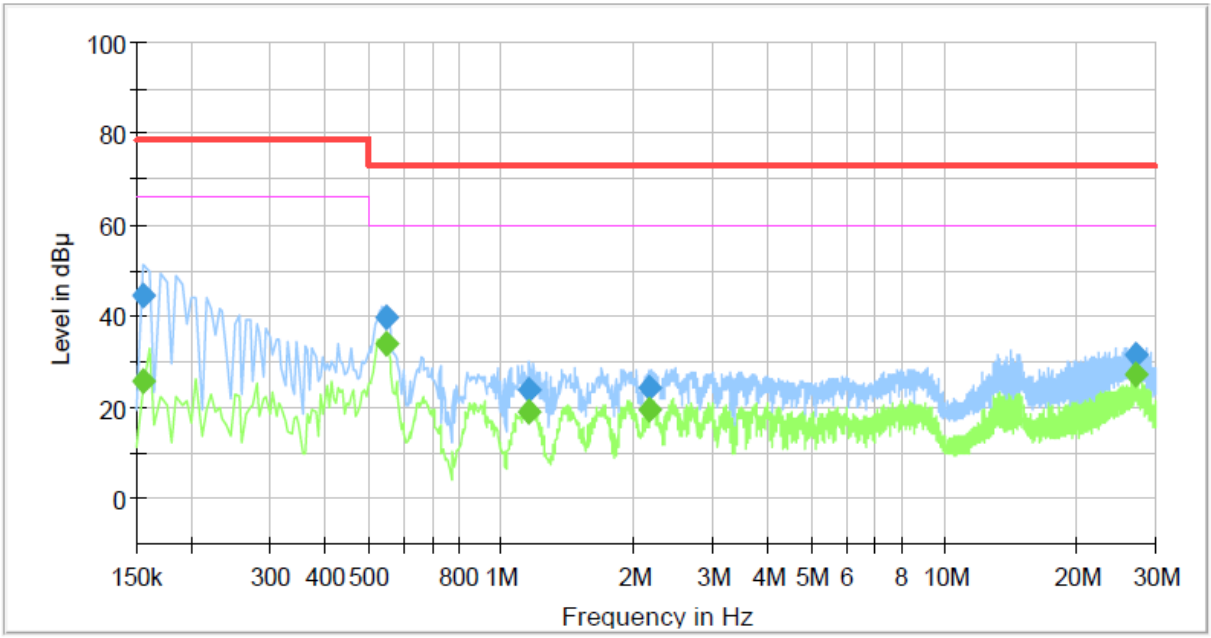
Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.160000	---	28.06	66.00	37.94	1000.0	9.000	L1	19.4
0.160000	44.31	---	79.00	34.69	1000.0	9.000	L1	19.4
0.535000	---	35.80	60.00	24.20	1000.0	9.000	L1	19.8
0.535000	40.84	---	73.00	32.16	1000.0	9.000	L1	19.8
1.115000	---	18.65	60.00	41.35	1000.0	9.000	L1	20.1
1.115000	23.71	---	73.00	49.29	1000.0	9.000	L1	20.1
2.170000	---	20.19	60.00	39.81	1000.0	9.000	L1	20.3
2.170000	24.96	---	73.00	48.04	1000.0	9.000	L1	20.3
27.160000	---	27.24	60.00	32.76	1000.0	9.000	L1	20.2
27.160000	31.50	---	73.00	41.50	1000.0	9.000	L1	20.2
28.685000	---	27.01	60.00	32.99	1000.0	9.000	L1	20.3
28.685000	30.24	---	73.00	42.76	1000.0	9.000	L1	20.3

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[NEUTRAL]

Common Information

Test Description:	Conducted Emission
Model No.:	ARD-810
Phase:	
Mode:	N
Operator Name:	KES



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.155000	---	25.61	66.00	40.39	1000.0	9.000	N	19.4
0.155000	44.55	---	79.00	34.45	1000.0	9.000	N	19.4
0.550000	---	33.86	60.00	26.14	1000.0	9.000	N	19.8
0.550000	39.77	---	73.00	33.23	1000.0	9.000	N	19.8
1.155000	---	18.96	60.00	41.04	1000.0	9.000	N	20.1
1.155000	23.73	---	73.00	49.27	1000.0	9.000	N	20.1
2.150000	---	19.57	60.00	40.43	1000.0	9.000	N	20.3
2.150000	24.36	---	73.00	48.64	1000.0	9.000	N	20.3
27.160000	---	27.26	60.00	32.74	1000.0	9.000	N	20.3
27.160000	31.34	---	73.00	41.66	1000.0	9.000	N	20.3

♦ Calculation
QuasiPeak[㏈uV] / CAverage [㏈uV] = Reading Value[㏈uV] + Corr. [㏈]
QuasiPeak / CAverage : The Final Value
Reading Value : Not shown in the table.
Corr. : Correction values (LISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

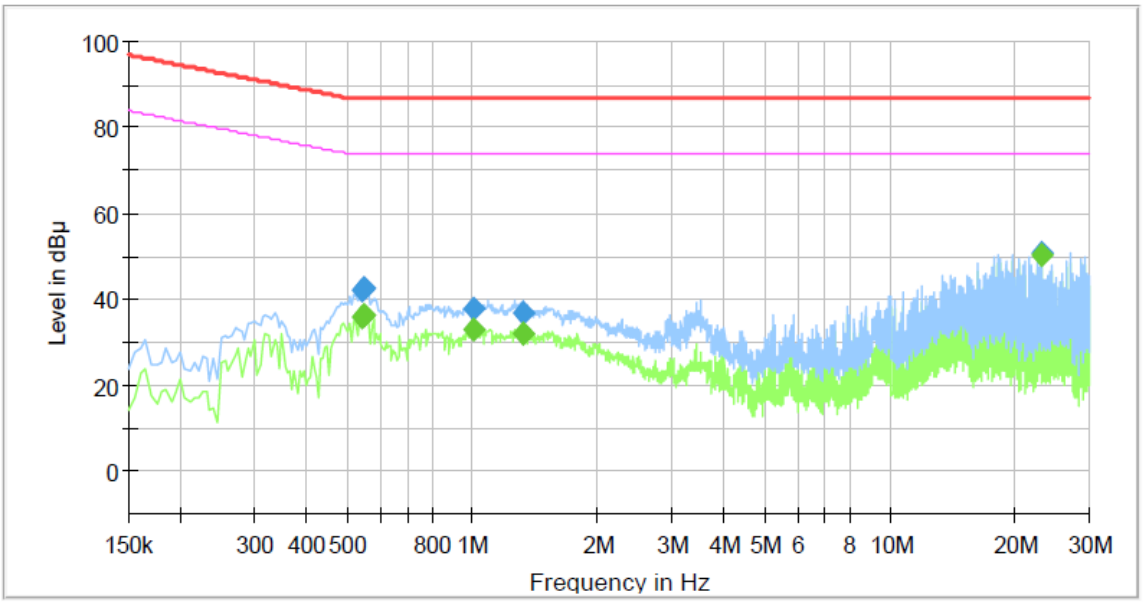
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Conducted Emissions at Telecommunication Ports

[1 000 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	ARD-810
Mode :	
Speed :	1000 Mbps
Operator Name:	KES



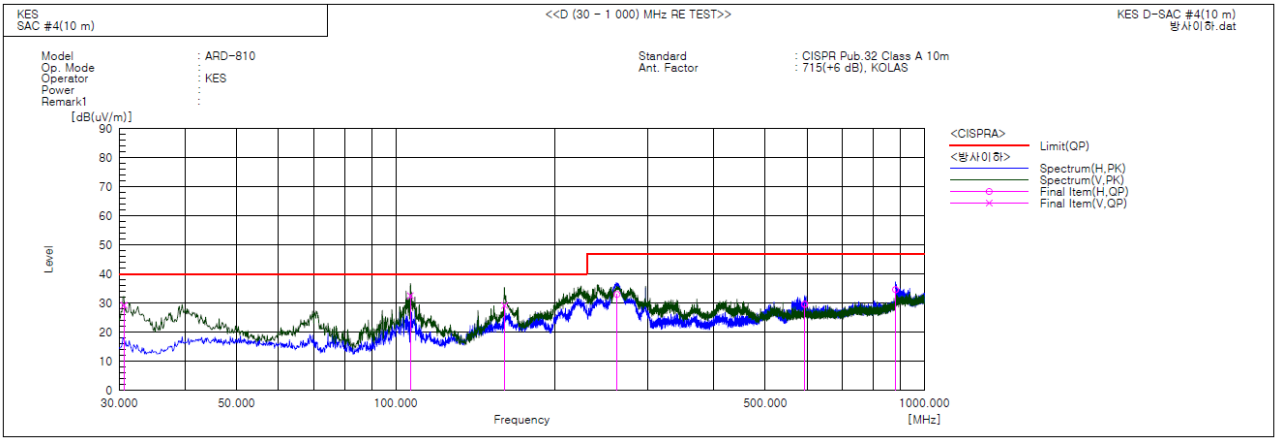
Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.545000	---	35.77	74.00	38.23	1000.0	9.000	Single Line	19.8
0.545000	42.04	---	87.00	44.96	1000.0	9.000	Single Line	19.8
0.550000	---	36.53	74.00	37.47	1000.0	9.000	Single Line	19.8
0.550000	42.50	---	87.00	44.50	1000.0	9.000	Single Line	19.8
1.010000	---	32.88	74.00	41.12	1000.0	9.000	Single Line	19.9
1.010000	37.74	---	87.00	49.26	1000.0	9.000	Single Line	19.9
1.325000	---	31.93	74.00	42.07	1000.0	9.000	Single Line	20.0
1.325000	36.71	---	87.00	50.29	1000.0	9.000	Single Line	20.0
23.130000	---	50.46	74.00	23.54	1000.0	9.000	Single Line	19.9
23.130000	50.65	---	87.00	36.35	1000.0	9.000	Single Line	19.9

♦ Calculation
QuasiPeak[㏈uV] / CAverage [㏈uV] = Reading Value[㏈uV] + Corr. [㏈]
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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Radiated Electric Field Emissions(Below 1 ㎓)



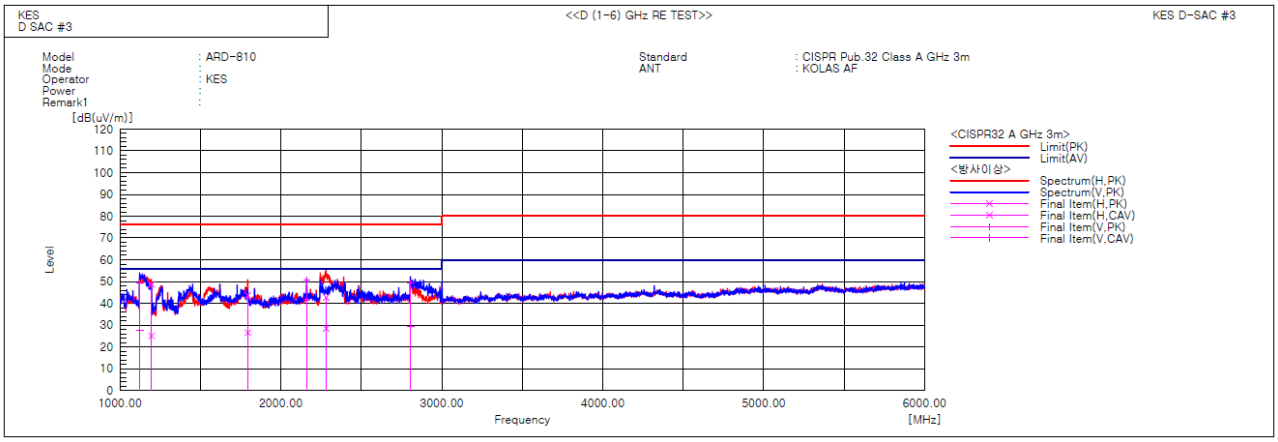
Final Result

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	30.606	V	54.3	-25.0	29.3	40.0	10.7	110.0	75.0	
2	106.630	V	54.7	-22.2	32.5	40.0	7.5	110.0	194.0	
3	160.586	V	53.7	-24.5	29.2	40.0	10.8	110.0	12.0	
4	262.073	H	51.7	-18.7	33.0	47.0	14.0	378.0	178.0	
5	593.691	H	37.8	-8.2	29.6	47.0	17.4	376.0	319.0	
6	881.903	H	38.6	-4.0	34.6	47.0	12.4	376.0	334.0	

♦ Calculation – SEMI ANECHOIC CHAMBER #4(10 m)
Result(QP) [㏈(㎶/m)] = (Reading(QP)[㏈(㎶)] + c.f[㏈(1/m)]
Margin(QP)[㏈] = Limit[㏈(㎶/m)] - Result(QP) [㏈(㎶/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 ㎓)



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	1122.487	V	58.5	36.5	-9.0	49.5	27.5	76.0	56.0	26.5	28.5	100.0	12.7	
2	1195.475	H	57.3	33.7	-8.6	48.7	25.1	76.0	56.0	27.3	30.9	100.0	355.7	
3	1793.582	H	46.4	29.4	-2.8	43.6	26.6	76.0	56.0	32.4	29.4	100.0	74.0	
4	2160.689	V	51.2	42.6	-0.7	50.5	41.9	76.0	56.0	25.5	14.1	100.0	194.8	
5	2280.892	H	43.0	28.8	-0.3	42.7	28.5	76.0	56.0	33.3	27.5	100.0	63.9	
6	2805.637	V	47.8	27.7	1.7	49.5	29.4	76.0	56.0	26.5	26.6	100.0	38.8	

♦ Calculation
Result(PK/CAV) [㏈(㎶/m)] = (Reading(PK/CAV)[㏈(㎶)] + c.f[㏈(1/m)]
Margin(PK/CAV)[㏈] = Limit[㏈(㎶/m)] - Result(PK/CAV) [㏈(㎶/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	Ieff [A]	% of Limit	Limit [A]	Result
1	0.044			
2	0.004	0.382	1.080	n/a
3	0.035	1.531	2.300	PASS
4	0.003	0.748	0.430	n/a
5	0.035	3.035	1.140	PASS
6	0.005	1.613	0.300	n/a
7	0.034	4.414	0.770	PASS
8	0.004	1.597	0.230	n/a
9	0.033	8.322	0.400	PASS
10	0.003	1.622	0.184	n/a
11	0.032	9.811	0.330	PASS
12	0.003	2.102	0.153	n/a
13	0.031	14.838	0.210	PASS
14	0.003	2.553	0.131	n/a
15	0.030	19.913	0.150	PASS
16	0.003	2.825	0.115	n/a
17	0.029	21.639	0.132	PASS
18	0.003	3.118	0.102	n/a
19	0.027	22.849	0.118	PASS
20	0.003	3.130	0.092	n/a
21	0.025	15.627	0.161	PASS
22	0.003	3.401	0.084	n/a
23	0.024	16.135	0.147	PASS
24	0.003	3.440	0.077	n/a
25	0.022	16.234	0.135	PASS
26	0.002	3.428	0.071	n/a
27	0.020	16.124	0.125	PASS
28	0.002	3.747	0.066	n/a
29	0.019	15.958	0.116	PASS
30	0.002	3.346	0.061	n/a
31	0.017	15.231	0.109	PASS
32	0.002	3.366	0.058	n/a
33	0.015	14.618	0.102	PASS
34	0.002	3.352	0.054	n/a
35	0.013	13.817	0.096	PASS
36	0.001	2.821	0.051	n/a
37	0.012	12.625	0.091	PASS
38	0.001	2.980	0.048	n/a
39	0.010	11.700	0.087	PASS
40	0.001	2.517	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.

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Test Data - Harmonics (continued)

Maximum harmonic current results

Hn	Ieff [A]	% of Limit	Limit [A]	Result
1	0.048			
2	0.005	0.319	1.620	PASS
3	0.039	1.128	3.450	PASS
4	0.006	0.884	0.645	PASS
5	0.038	2.249	1.710	PASS
6	0.006	1.376	0.450	PASS
7	0.038	3.284	1.155	PASS
8	0.005	1.521	0.345	PASS
9	0.037	6.098	0.600	PASS
10	0.006	2.056	0.276	PASS
11	0.035	7.157	0.495	PASS
12	0.005	2.248	0.230	PASS
13	0.034	10.820	0.315	PASS
14	0.005	2.406	0.197	n/a
15	0.033	14.546	0.225	PASS
16	0.004	2.604	0.173	n/a
17	0.032	15.881	0.199	PASS
18	0.004	2.860	0.153	n/a
19	0.029	16.585	0.178	PASS
20	0.004	3.074	0.138	n/a
21	0.028	17.115	0.161	PASS
22	0.004	3.112	0.125	n/a
23	0.026	17.523	0.147	PASS
24	0.004	3.291	0.115	n/a
25	0.024	17.417	0.135	PASS
26	0.004	3.349	0.106	n/a
27	0.021	17.165	0.125	PASS
28	0.003	3.265	0.099	n/a
29	0.020	16.817	0.116	PASS
30	0.003	3.275	0.092	n/a
31	0.017	16.014	0.109	PASS
32	0.003	3.190	0.086	n/a
33	0.016	15.219	0.102	PASS
34	0.003	3.125	0.081	n/a
35	0.014	14.228	0.096	PASS
36	0.002	3.028	0.077	n/a
37	0.012	13.003	0.091	PASS
38	0.002	2.769	0.073	n/a
39	0.010	11.961	0.087	PASS
40	0.002	2.725	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

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

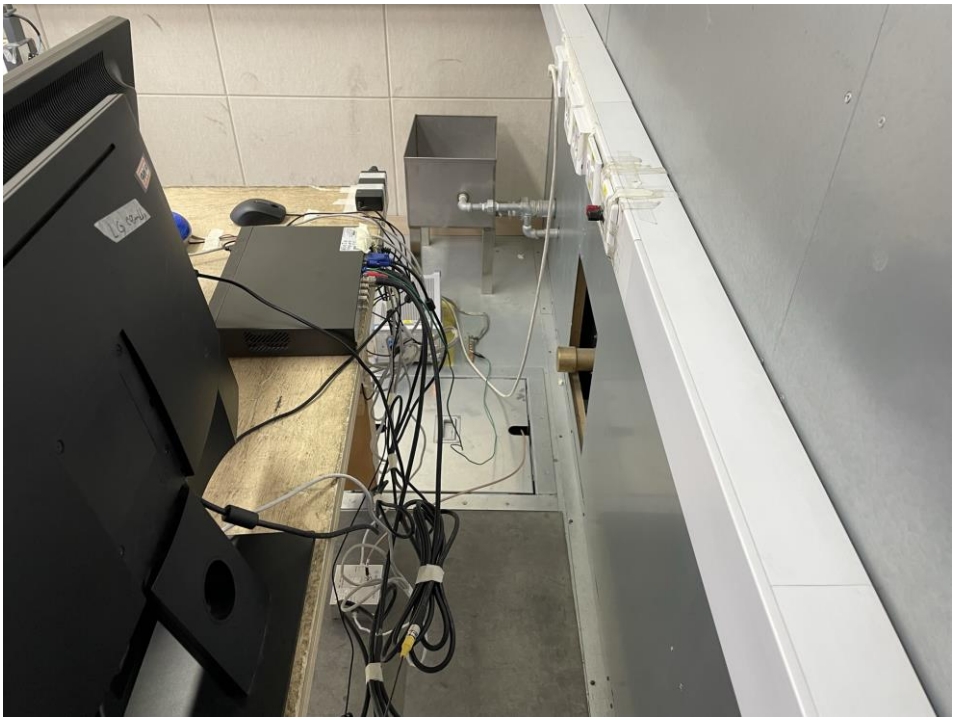




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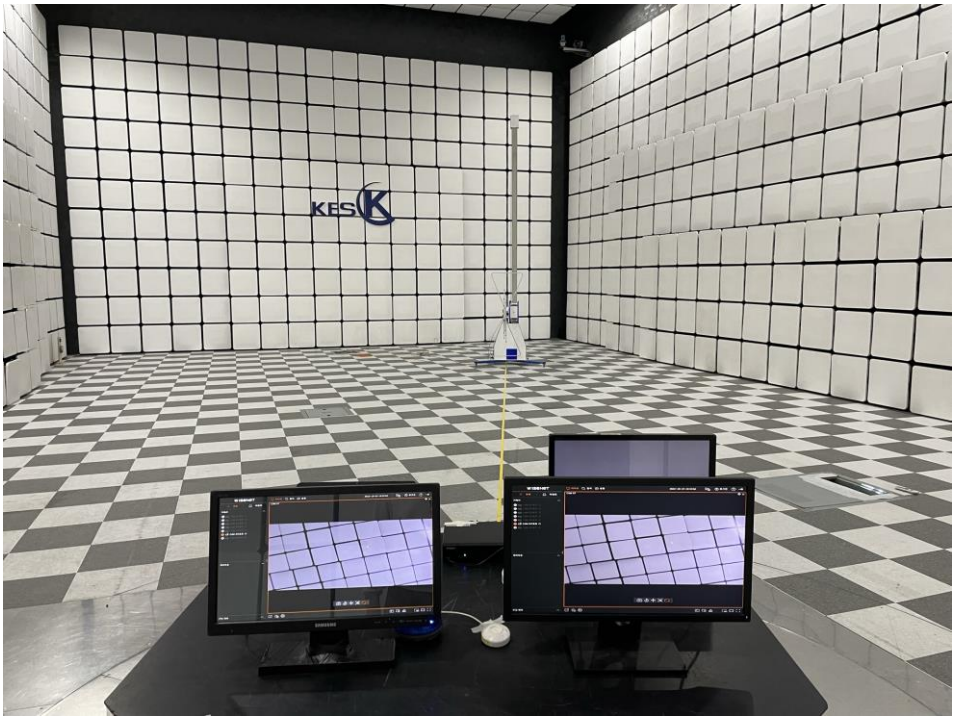
Conducted Emissions at Telecommunication Ports





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Radiated Electric Field Emissions(Below 1 ㎓)

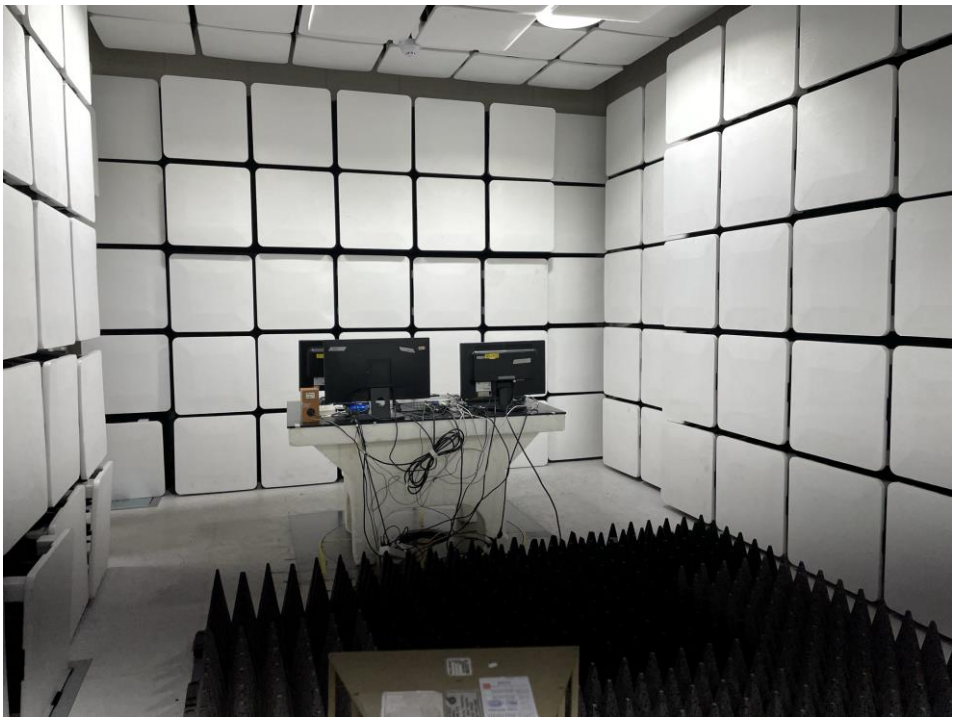




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Radiated Electric Field Emissions(Above 1 ㎓)





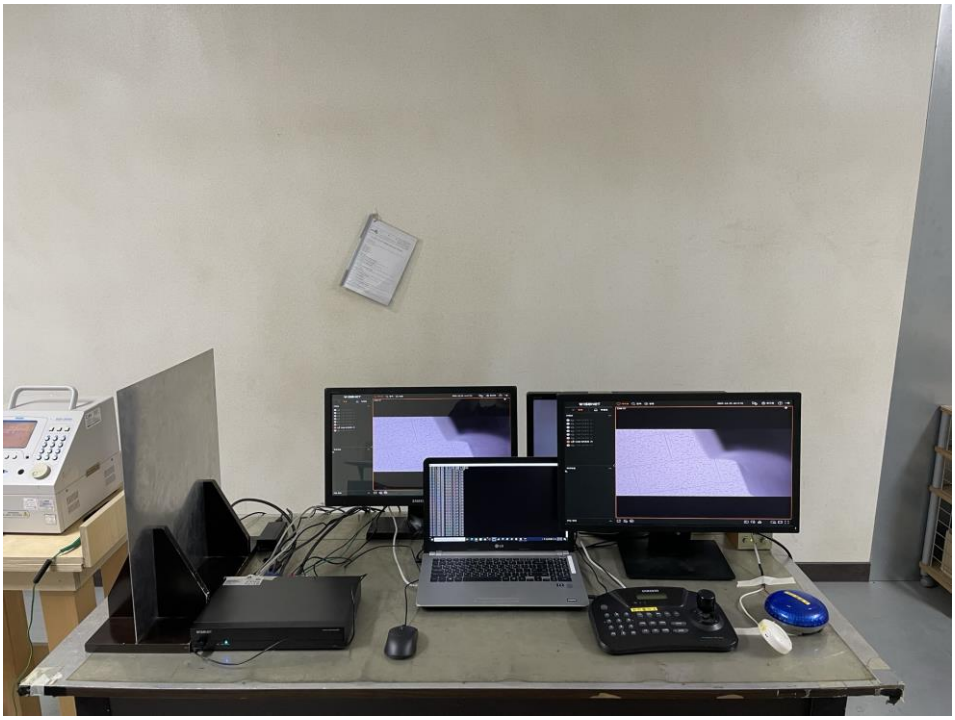
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Harmonic Current Emissions and Voltage Fluctuations and Flicker

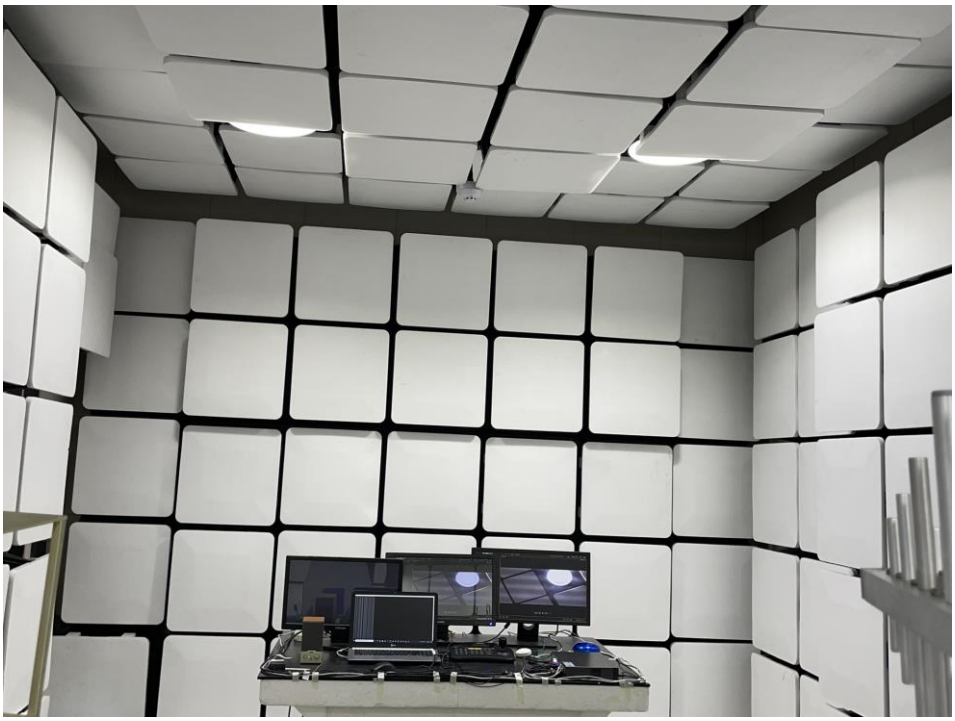


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Electrostatic Discharge



Radiated Electric Field Immunity

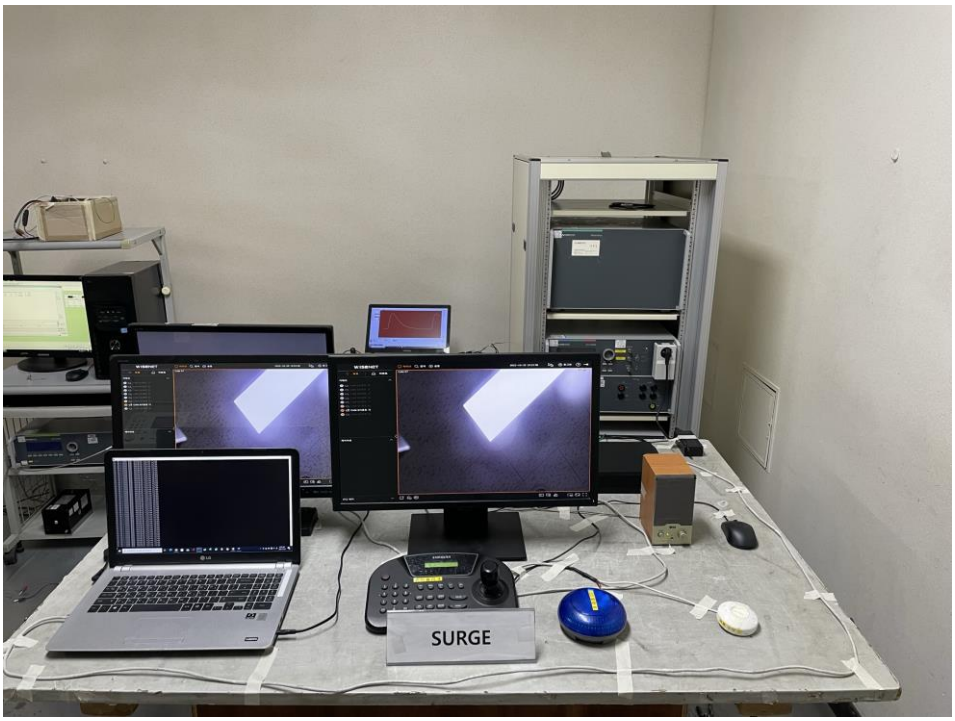


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Electrical Fast Transients/Bursts

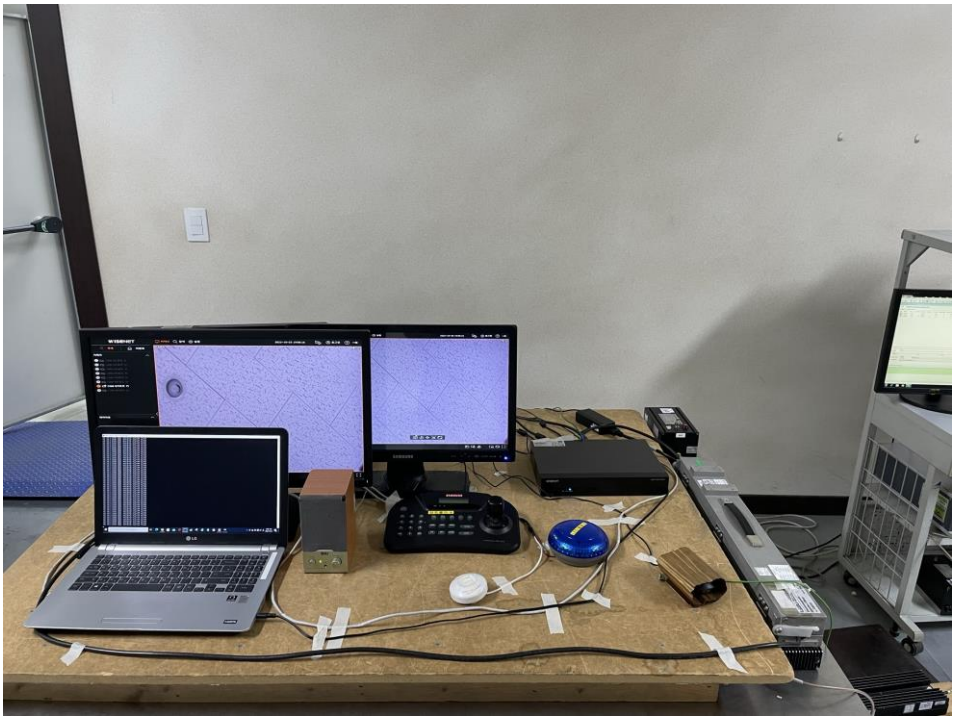


Surge Transients



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Conducted Disturbance



Voltage Dips and Short Interruptions



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EUT External Photographs

(Top)



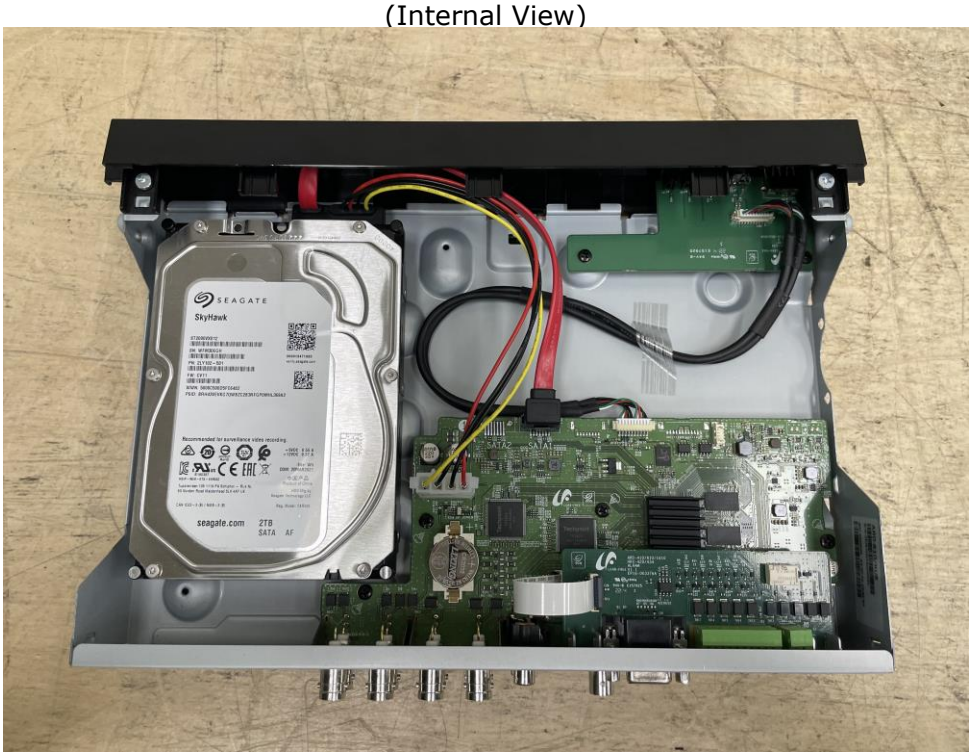
(Bottom)



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EUT Internal Photographs

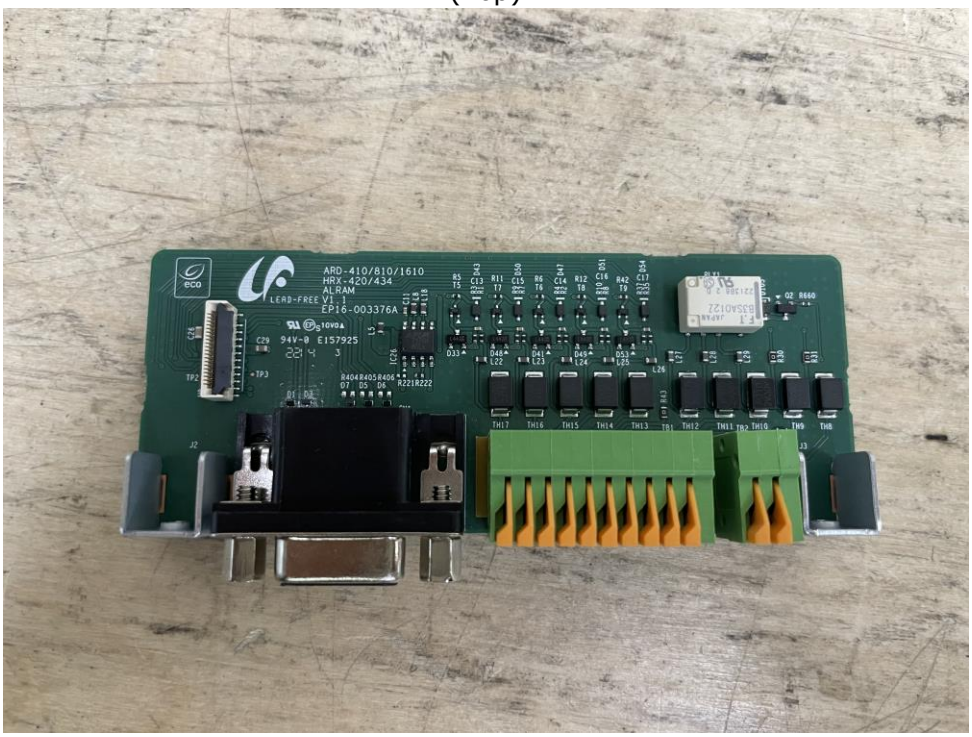
(Internal View)



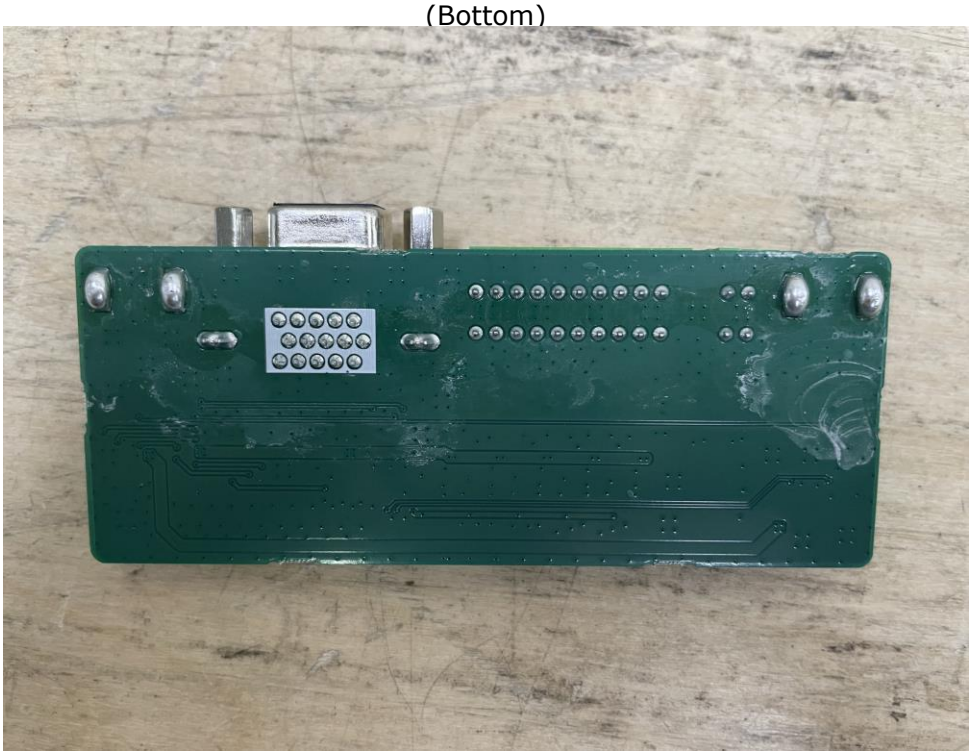
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EUT Internal View – Board 1

(Top)



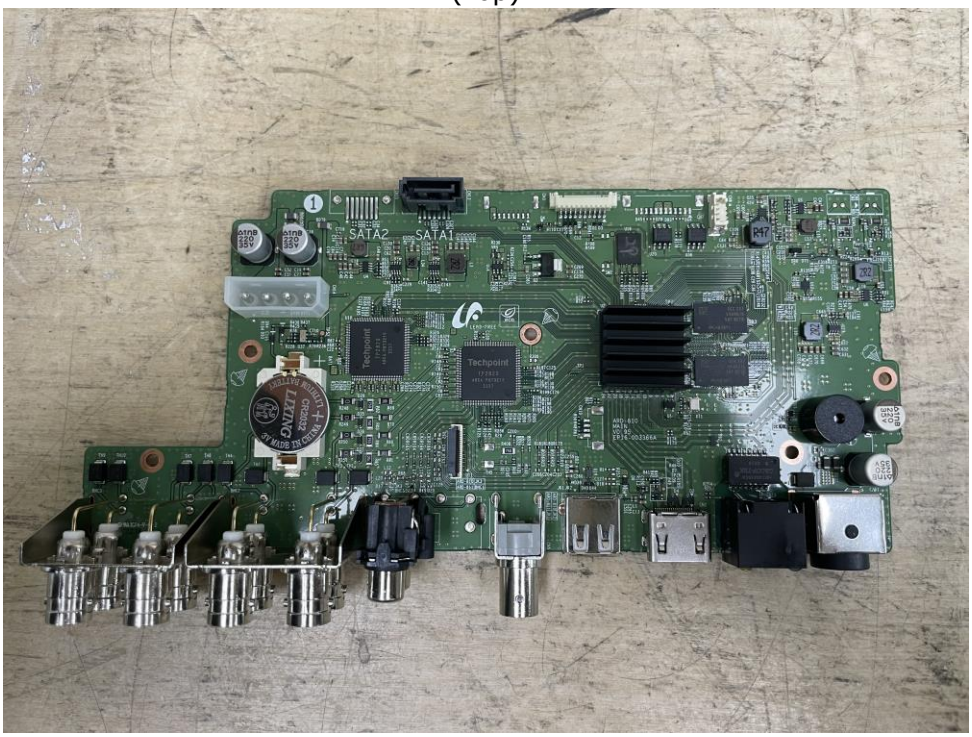
(Bottom)



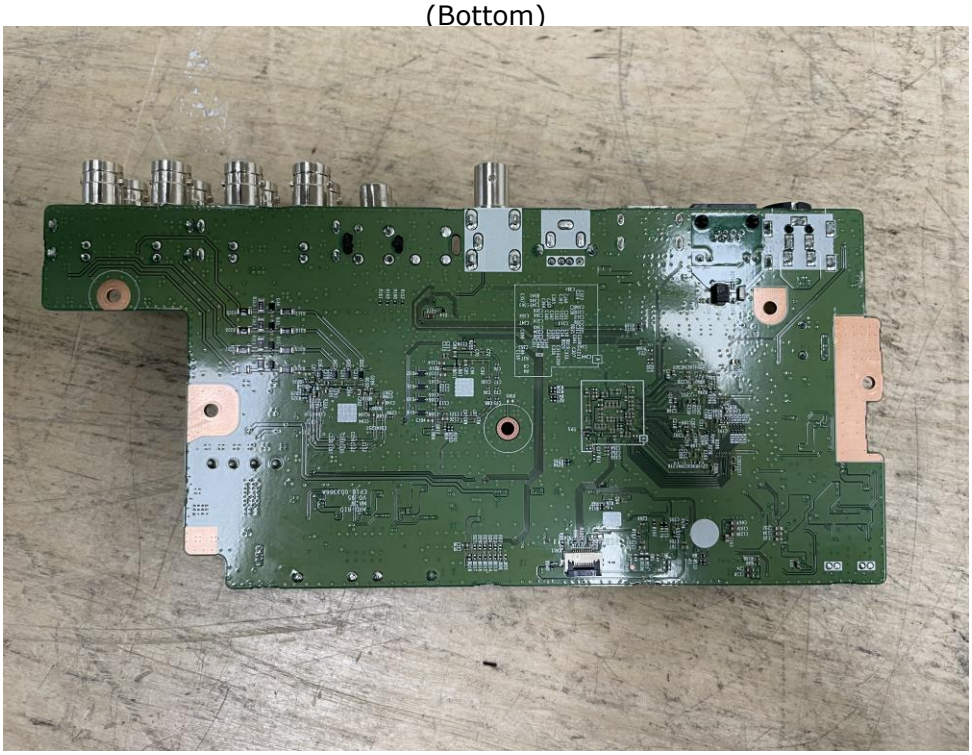
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EUT Internal View – Board 2

(Top)



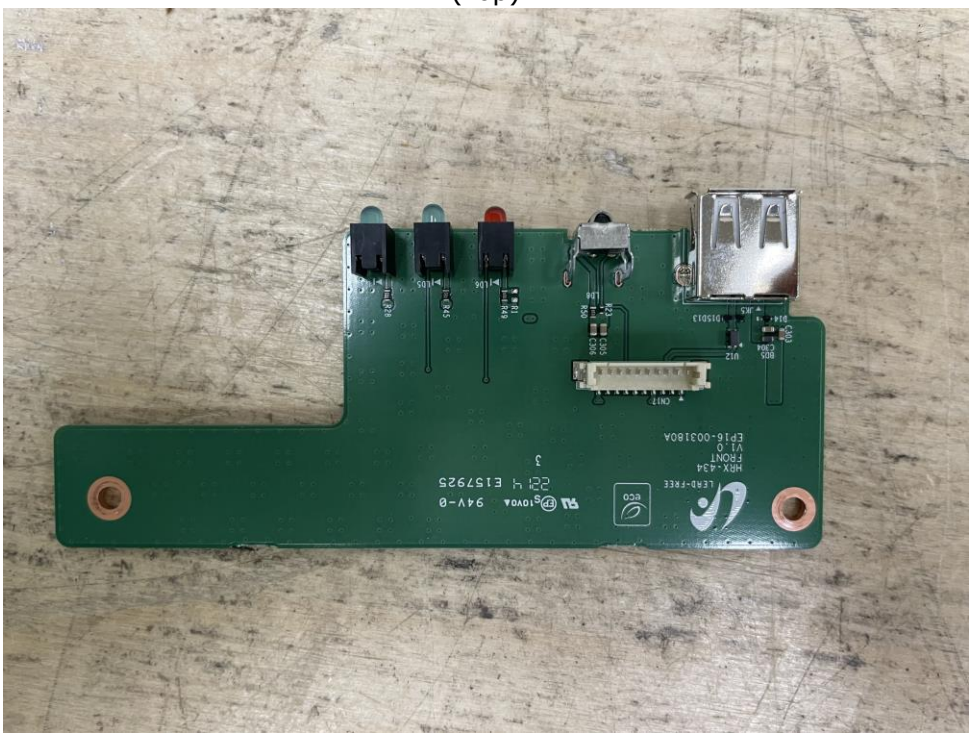
(Bottom)



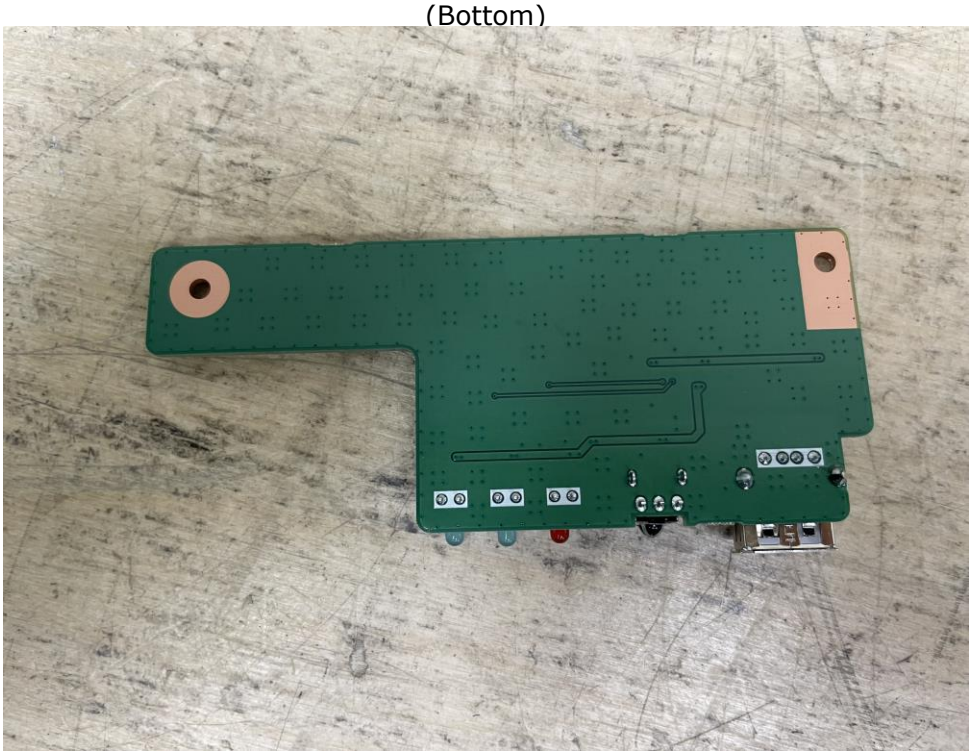
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EUT Internal View – Board 3

(Top)



(Bottom)



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EUT Internal View – HDD

(Top)

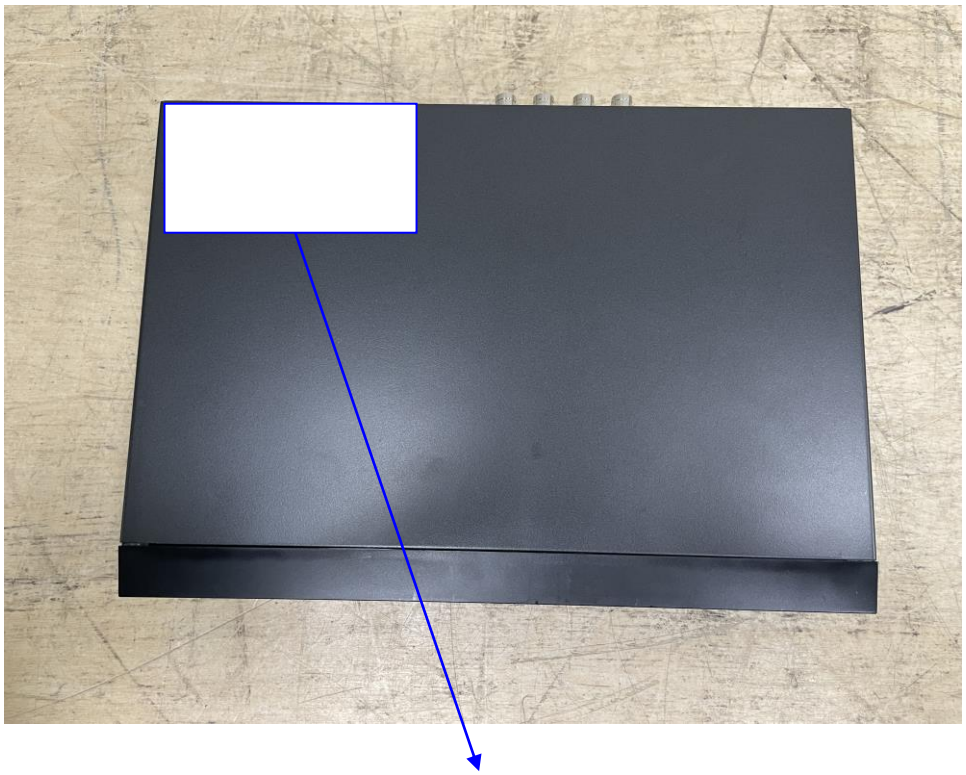


(Bottom)



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Label and Location



DVR

Model No : ARD-810

Manufacturer : HANWHA VISION VIETNAM COMPANY LIMITED

Made in Vietnam

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