EMC TEST REPORT For VCCI

Test Report No.	:	KES-EM-22T0883-R1
Date of Issue	:	Feb. 24, 2023
Product name	:	DVR
Model/Type No.	:	ARD-1610
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. 24, 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.

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Nov. 04, 2022	KES-EM-22T0883	Issued
Feb. 24, 2023	KES-EM-22T0883-R1	Change the Applicant and manufacturer at the request of the customer

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd. This document may be altered or revised by KES Co., Ltd. personnel only, and shall be noted in the revision section of the document. Any alteration of this document not carried out by KES Co., Ltd. will constitute fraud and shall nullify the document.

TABLE OF CONTENTS

1.0 General Product Description 4
1.1 Test Voltage & Frequency 11
1.2 Variant Model Differences 11
1.3 Device Modifications 11
1.4 Equipment Under Test 11
1.5 Support Equipments 12
1.6 External I/O Cabling 13
1.7 EUT Operating Mode(s) 14
1.8 Configuration 14
1.9 Remarks when standards applied 15
1.10 Calibration Details of Equipment Used for Measurement 15
1.11 Test Facility 15
1.12 Laboratory Accreditations and Listings 15
2.0 Test Regulations 16
2.1 Conducted Emissions Mains Power Ports 17
2.2 Conducted Emissions at Telecommunication Ports 18
2.3 Radiated Electric Field Emissions(Below 1 ㎓) 19
2.4 Radiated Electric Field Emissions(Above 1 ㎓) 20
APPENDIX A – TEST DATA 21
Conducted Emissions at Mains Power Ports 21
Conducted Emissions at Telecommunication Ports 23
Radiated Electric Field Emissions(Below 1 ㎓) 24
Radiated Electric Field Emissions(Above 1 ㎓) 25
Test Setup Photos and Configuration 26
Conducted Emissions at Mains Power Ports 26
Conducted Emissions at Telecommunication Ports 27
Radiated Electric Field Emissions(Below 1 ㎓) 28
Radiated Electric Field Emissions(Above 1 ㎓) 29
EUT External Photographs 30
EUT Internal Photographs 31

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

1.0 General Product Description

Main Specifications of EUT are:

		ARD-1610
Display		
Analog camera	Inputs	16CH(1Vp-p 75ohm, BNC)
	Signal Type	AHD(5MP, 4MP, 1080p, 720p) HDTVI5MP, 4MP, 1080p, 720p) HDCVI(5MP, 4MP, 1080p, 720p) CVBS(NTSC/PAL)
Network camera	Inputs	Additional 2CH (Max. 18CH)
	Resolution	5MP ~ CIF
	Protocols	SUNAPI(Wisenet), ONVIF
Decoding	Local Display	None
	Multi Screen Display	None
	Resolution	None
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 ? division [Web] 1 / 4 / 9 / sequence

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

	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		
Operating System	Embedded	Linux
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/CHSD signal : upto CIF 30/25fps/CH* The maximum recording frame rate depends on the frame rate of the input camera.
	Recording Bandwidth	Max. 100Mbps
	Resolution	5MP ~ CIF
	Mode	Manual, Schedule (Continuous/Event), Event(Pre/Post), Dual Track

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

	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	Playback Bandwidth	Max. 32Mbps
	User	Max. 4 users (Set 1, Remote 3)
	Simultaneous playback	16CH(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	Supported HDD	Up to 6TB
	HDD Slot	SATA 2ea(Max 12TB)
	External	None
	RAID	None
Backup	File backup	BU, EXE(Include Player), AVI(Webviewer only)
	Function	Max. 16 CH play, Date-time/title display
Network		

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

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)
DDNS		Wisenet DDNS
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.
Transmission Bandwidth		Max. 100Mbps
Transmission Bandwidth Wired(LAN)		None
Wireless	WiFi	None
	3G/LTE	None
Audio	Input/Output	1 Line in / 1 Line out
	Compression	G.711 (N/W Cam G.711, 726)
	Audio Communication	2-Way
		None
		IP address filtering, User access log, 802.1x Authentication, Encryption (ID/PW, Recording, Transmission, Backup) Device Certificate(Hanwha Techwin Root CA)
Web viewer	Supported OS	Windows 10, Mac OS 11 Big Sur and later

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

	Supported browser	Chrome v89 or above, Edge v89 or above, Safari v14.0.3 or above
Viewer Software		SSM, Webviewer, Wisenet Viewer, Wisenet mobileSupport SDK/CGI(SUNAPI) for integration to 3'rd party VMS
Functions		
Camera Setup	Register	Auto, Manual
	Item	None
PTZ	Control	Via GUI, Webviewer, SSM, Wisenet Viewer, Wisenet Mobile Viewer, System Controller
	Preset	300 presets
Smart phone	Support Model	iOS, Android
	Protocol Support	RTP, RTSP, HTTP, CGI(SUNAPI)
	Control	Live(16ch) : Multi-Profile Support Playback(4Ch Multi Playback, Max 2MP) Event push
	Max. Remote Users	Search(3), Live Unicast(10)
Redundancy	Failover	None
	ARB	Support
Easy configuration		Setup Wizard (Language Date/Time, Password, Network, Auto Camera Configuration), P2P (QR code)
Coaxial Control		CVBS(Pelco-C)/AHD/CVI/TVI
Interface		
Front	Indicator	LED(Status indicator) : Power(1), Record(1), Network(1)
Storage		None
Reset		Switch(1EA)

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

HDD Key Lock		None
HDMI		1EA
VGA		1EA
BNC		16CH In / 1CH Out(Spot Output)
DP		None
DVI		None
e-SATA		None
Audio		Out(1EA, RCA, Line)
Ethernet		RJ-45(10/100 BASE-T)
Alarm		In 4EA, Out 1EA - Relay Out1(NO/NC/COM)
USB		2EA(Front/Rear USB2.0)
GPS		None
WiFi		None
Serial(Protocols)		RS-485 (Samsung-T/Pelco-D/Pelco-p) * for PTZ
Power inlet		1EA DC Input Jack
System		
Log	Log List	Max. 100,000 (System Log, Event Log each)
System Control		Mouse, Webviewer, System Controller(SPC-7000, SPC-6000, SPC-2000)
Power Management	Shutdown Delay	None
	Startup Delay	None
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		
		0°C to +40°C(+32°F to +104°F)
		20% ~ 85% RH
Certification		UL, CE, FCC, KC

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

Electrical		
		DC12V
		TBD
PoE Budget		None
Mechanical		
Color / Material		Black / Metal
Dimension (WxHxD)		370.0x 44.0 x 320mm(14.57″ x 1.73″ x 12.6″)
Weight		TBD
Control Box		
Interface	Indicator	
	Emergency Button	
	Audio/Power Switch	
	Main I/O	
Mechanical	Color / Material	
	Dimension (WxHxD)	
	Weight	

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

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 100 V, 60 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-1610	-	HANWHA VISION VIETNAM COMPANY LIMITED	EUT
Adapter	KPL-048F-VI	-	Channel Well Technology (Guangzhou) Co., Ltd.	-
Mouse	MOKJUO	21H07051	Primax Electronics Ltd.	-
HDD	SC HA500	-	Western Digital	-

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

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	-
USB Memory	-	-	San Disk	-

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

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
	USB A-type	USB Memory	USB A-type	-	-
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

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

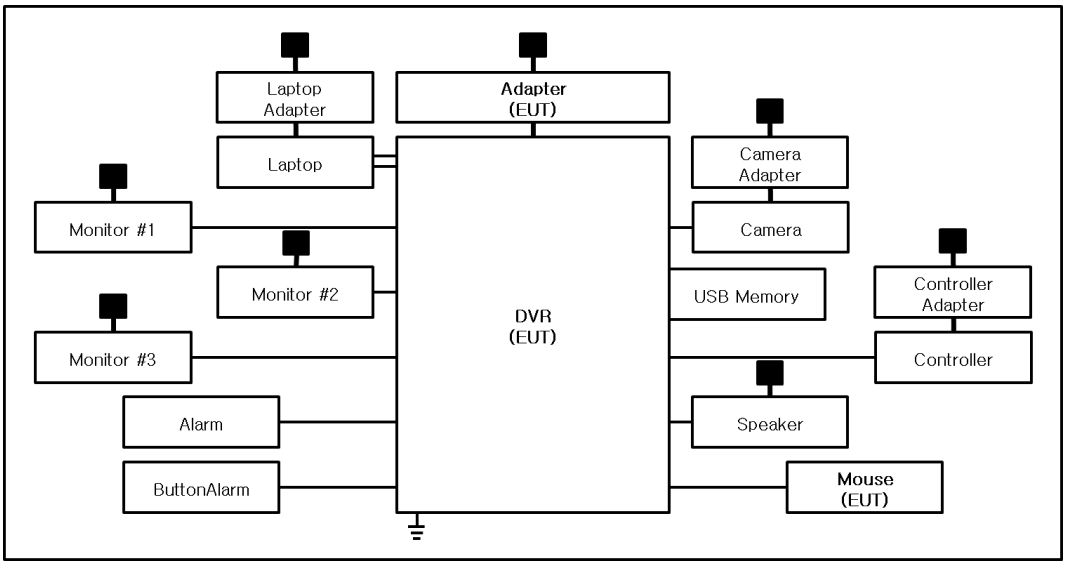
1.7 EUT Operating Mode(s)

Test Mode	operating
Operating Mode	EUT Monitoring, Ping Test

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

1.8 Configuration

■ AC Main
□ DC Main



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

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

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

2.0 Test Regulations

The emissions tests were performed according to following regulations:

☒ **VCCI-CISPR 32:2016** ☒ Class A ☐ Class B

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

2.1 Conducted Emissions 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: (47,8 ± 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.

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

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 CAT3,5	ENY81	R & S	100174	12, 28, 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.

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

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 ± 0,2) ℃
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.

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

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
☒	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.

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

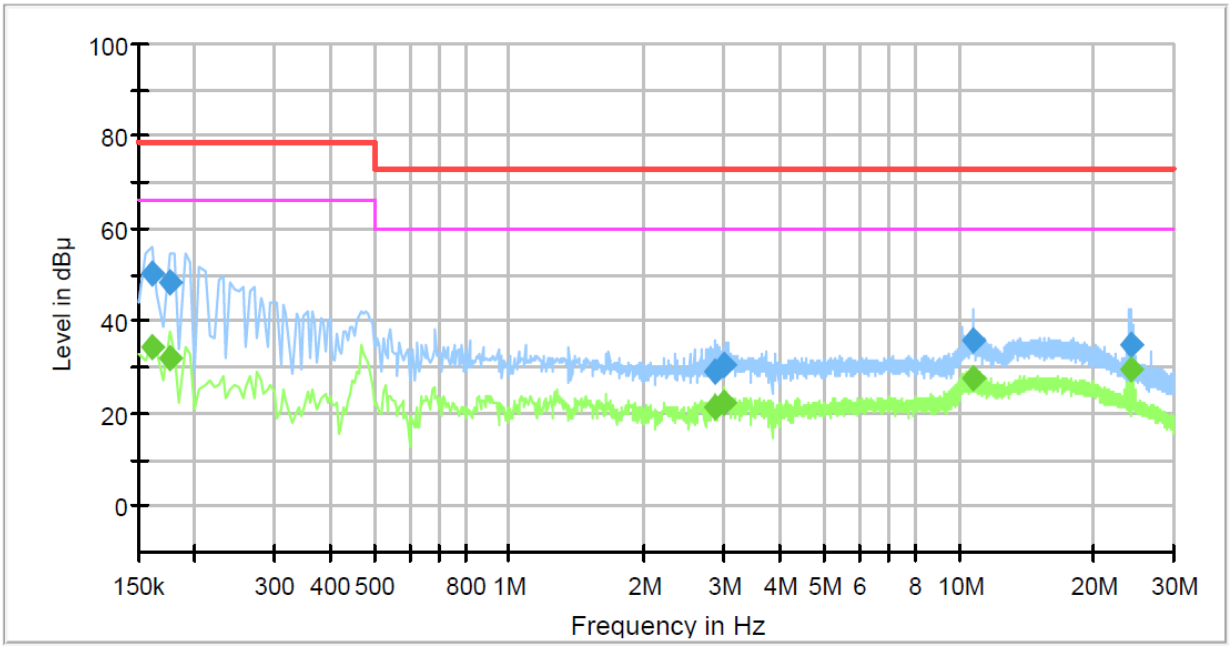
APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

HOT LINE

Common Information

Test Description:	Conducted Emission
Model No.:	ARD-1610
Phase:	
Mode:	L1
Operator Name:	KES



Final_Result

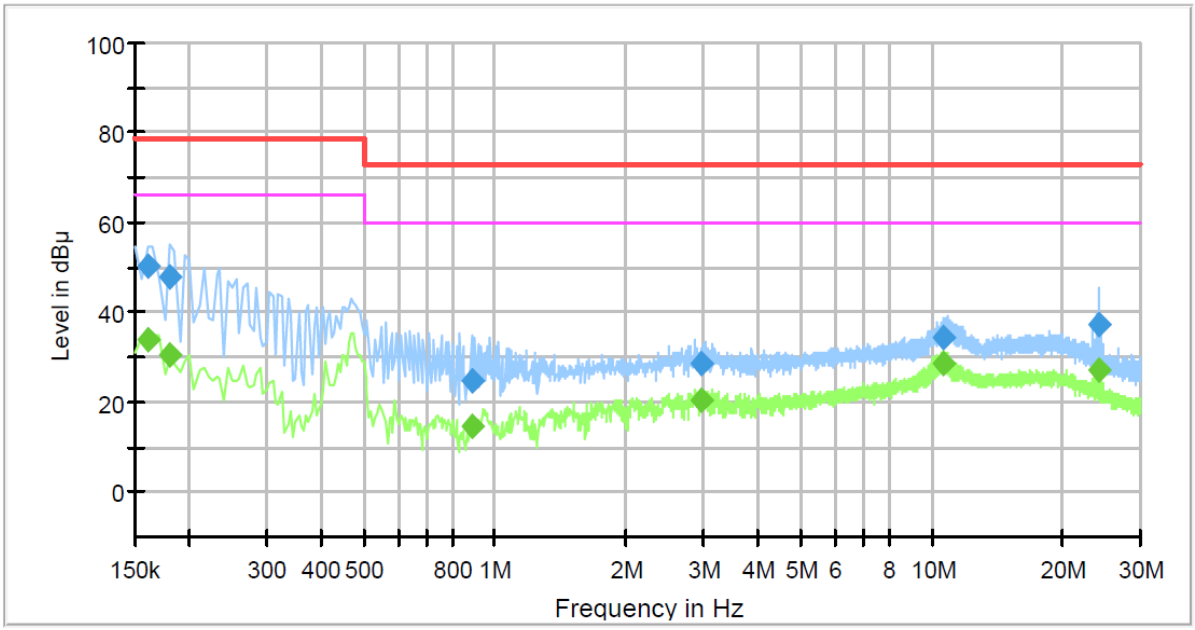
Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.160000	---	34.53	66.00	31.47	1000.0	9.000	L1	19.4
0.160000	50.19	---	79.00	28.81	1000.0	9.000	L1	19.4
0.175000	---	32.15	66.00	33.85	1000.0	9.000	L1	19.4
0.175000	48.53	---	79.00	30.47	1000.0	9.000	L1	19.4
2.865000	---	21.36	60.00	38.64	1000.0	9.000	L1	20.2
2.865000	28.89	---	73.00	44.11	1000.0	9.000	L1	20.2
3.010000	---	22.25	60.00	37.75	1000.0	9.000	L1	20.1
3.010000	30.49	---	73.00	42.51	1000.0	9.000	L1	20.1
10.800000	---	27.68	60.00	32.32	1000.0	9.000	L1	19.9
10.800000	35.99	---	73.00	37.01	1000.0	9.000	L1	19.9
24.115000	---	29.63	60.00	30.37	1000.0	9.000	L1	20.1
24.115000	35.03	---	73.00	37.97	1000.0	9.000	L1	20.1

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

NEUTRAL LINE

Common Information

Test Description:	Conducted Emission
Model No.:	ARD-1610
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)
0.160000	---	33.94	66.00	32.06	1000.0	9.000	N	19.4
0.160000	50.53	---	79.00	28.47	1000.0	9.000	N	19.4
0.180000	---	30.44	66.00	35.56	1000.0	9.000	N	19.4
0.180000	48.05	---	79.00	30.95	1000.0	9.000	N	19.4
0.885000	---	14.54	60.00	45.46	1000.0	9.000	N	20.1
0.885000	24.82	---	73.00	48.18	1000.0	9.000	N	20.1
2.975000	---	20.30	60.00	39.70	1000.0	9.000	N	20.2
2.975000	28.41	---	73.00	44.59	1000.0	9.000	N	20.2
10.635000	---	28.77	60.00	31.23	1000.0	9.000	N	19.9
10.635000	34.50	---	73.00	38.50	1000.0	9.000	N	19.9
24.215000	---	27.35	60.00	32.65	1000.0	9.000	N	20.2
24.215000	37.13	---	73.00	35.87	1000.0	9.000	N	20.2

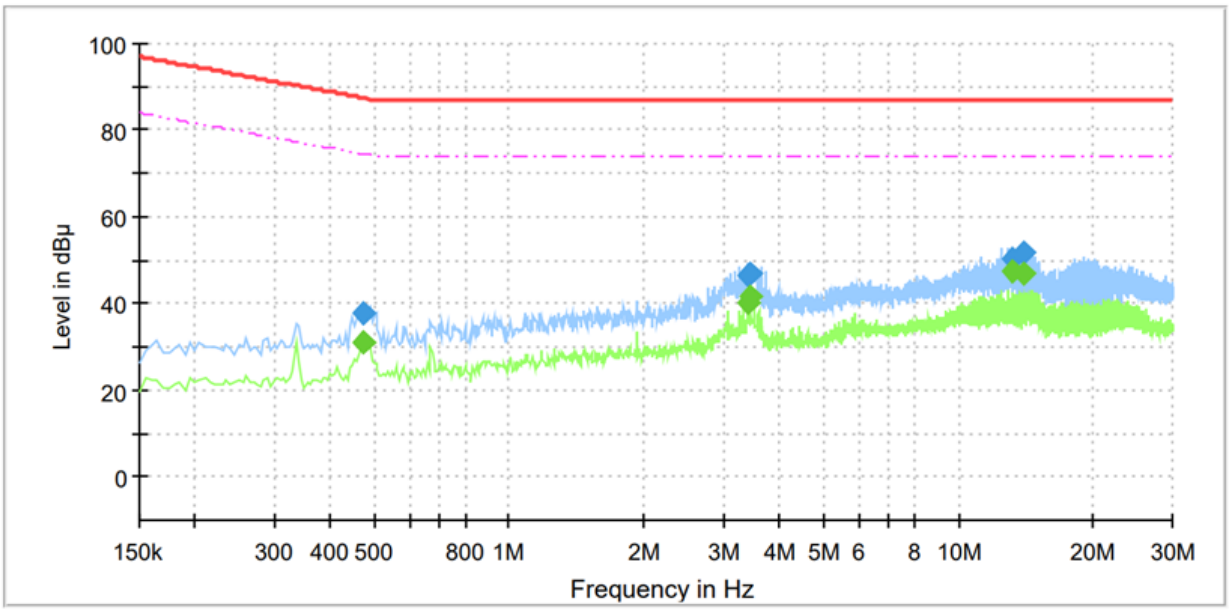
♦ Calculation
QuasiPeak[dBuV] / CAverage [dBuV] = Reading Value[dBuV] + Corr. [dB]
QuasiPeak / CAverage : The Final Value
Reading Value : Not shown in the table.
Corr. : Correction values (LISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

Conducted Emissions at Telecommunication Ports
[1 000 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	ARD-1610
Mode :	
Speed :	1000 Mbps
Operator Name:	KES



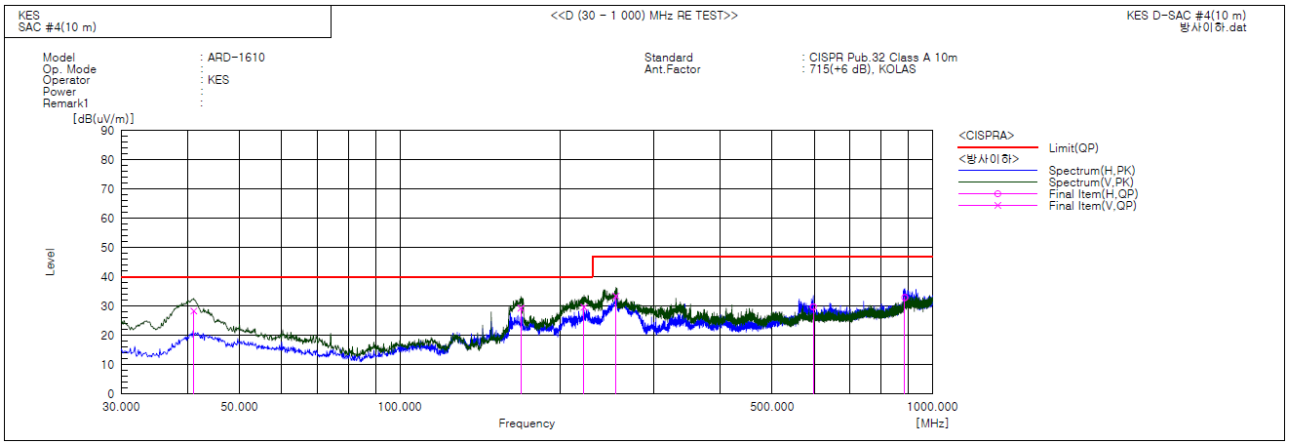
Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.475000	---	31.05	74.43	43.38	1000.0	9.000	Single Line	19.7
0.475000	37.75	---	87.43	49.68	1000.0	9.000	Single Line	19.7
3.390000	---	40.07	74.00	33.93	1000.0	9.000	Single Line	19.8
3.390000	46.26	---	87.00	40.74	1000.0	9.000	Single Line	19.8
3.455000	---	41.62	74.00	32.38	1000.0	9.000	Single Line	19.8
3.455000	47.11	---	87.00	39.89	1000.0	9.000	Single Line	19.8
13.170000	---	47.25	74.00	26.75	1000.0	9.000	Single Line	19.7
13.170000	50.16	---	87.00	36.84	1000.0	9.000	Single Line	19.7
13.935000	---	46.97	74.00	27.03	1000.0	9.000	Single Line	19.6
13.935000	51.82	---	87.00	35.18	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))

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

Radiated Electric Field Emissions(Below 1 ㎓)



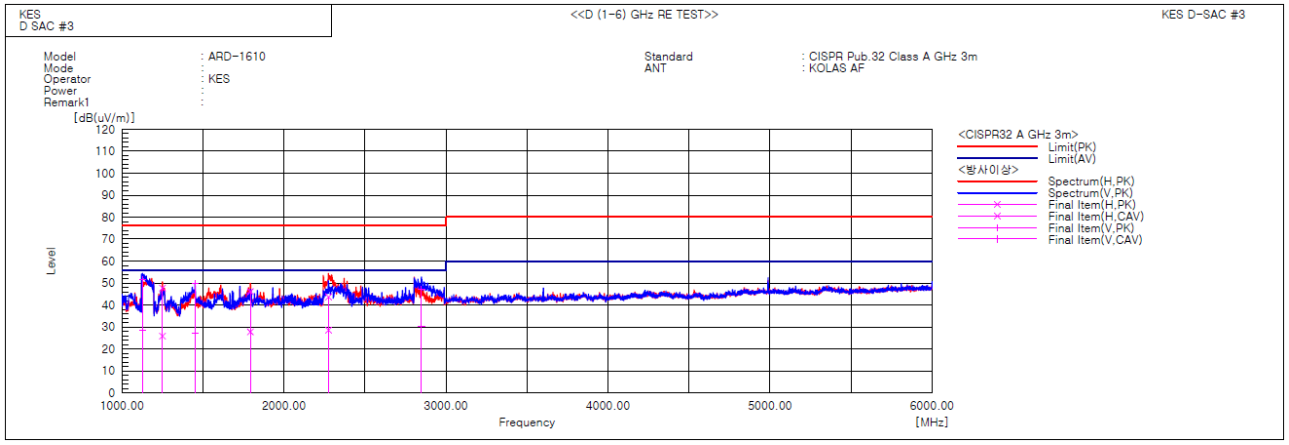
Final Result

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	41.034	V	50.3	-22.0	28.3	40.0	11.7	113.0	275.0	
2	168.831	V	53.4	-24.1	29.3	40.0	10.7	100.0	23.0	
3	221.623	V	49.7	-20.1	29.6	40.0	10.4	100.0	171.0	
4	254.555	V	52.3	-18.9	33.4	47.0	13.6	113.0	12.0	
5	597.563	H	37.9	-8.2	29.7	47.0	17.3	386.0	318.0	
6	887.116	H	36.7	-3.8	32.9	47.0	14.1	400.0	337.0	

♦ Calculation
Corrected Amplitude [㏈uV] = Amplitude[㏈uV] + Correction Factor [㏈]
Corrected Amplitude : The Final Value, Amplitude : Reading Value,
Correction Factor : ANT FACTOR + Cable loss

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

Radiated Electric Field Emissions(Above 1 ㎓)



Final Result

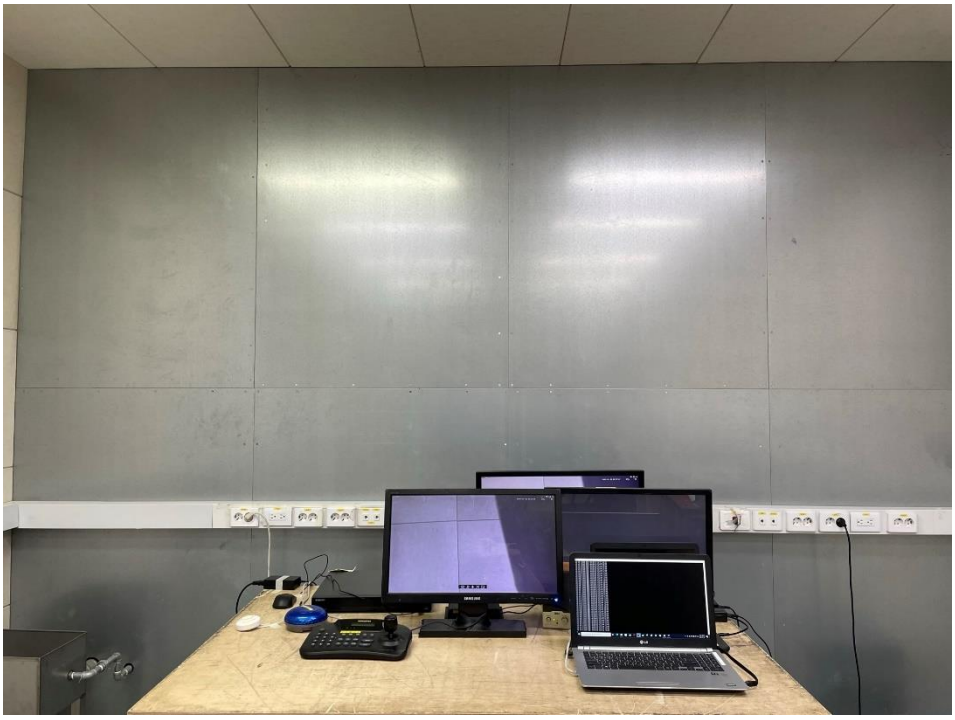
No.	Frequency [MHz]	(P)	Reading PK [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB(1/m)]	Result PK [dB(uV/m)]	Result CAV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin CAV [dB]	Height [cm]	Angle [deg]	Remark
1	1126.638	V	60.5	37.7	-9.0	51.5	28.7	76.0	56.0	24.5	27.3	100.0	17.1	
2	1249.315	H	56.1	34.2	-8.3	47.8	25.9	76.0	56.0	28.2	30.1	100.0	330.5	
3	1451.675	V	56.2	33.6	-6.3	49.9	27.3	76.0	56.0	26.1	28.7	100.0	355.3	
4	1792.358	H	49.0	30.6	-2.8	46.2	27.8	76.0	56.0	29.8	28.2	100.0	35.1	
5	2274.495	H	44.0	28.9	-0.3	43.7	28.6	76.0	56.0	32.3	27.4	100.0	64.1	
6	2848.364	V	45.3	28.8	1.7	47.0	30.5	76.0	56.0	29.0	25.5	100.0	36.0	

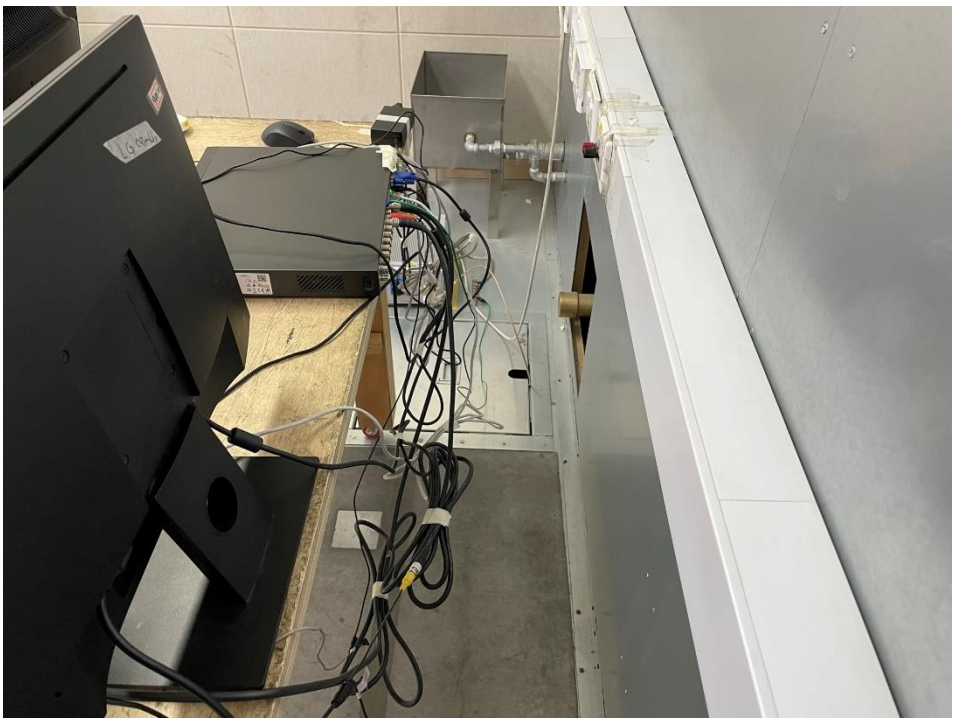
♦ Calculation
Result(PK/CAV) [㏈(㎶/m)] = (Reading(PK/CAV)[㏈(㎶)] + c.f[㏈(1/m)]
Margin(PK/CAV)[㏈] = Limit[㏈(㎶/m)] - Result(PK/CAV) [㏈(㎶/m)]
Reading(PK/CAV) : Reading value, Result(PK/CAV) : Reading value + Factor value
Limit(QP) : Limit value, c.f : (ANT Factor + Cable Loss - Preamp Factor), Margin: Margin value

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

Test Setup Photos and Configuration

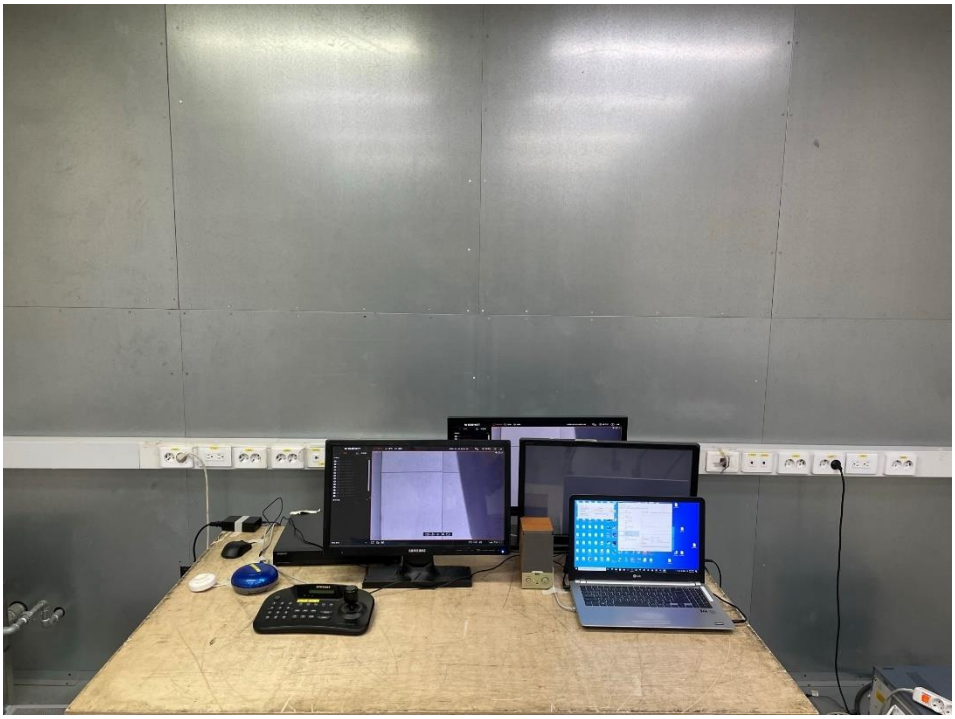
Conducted Emissions at Mains Power Ports

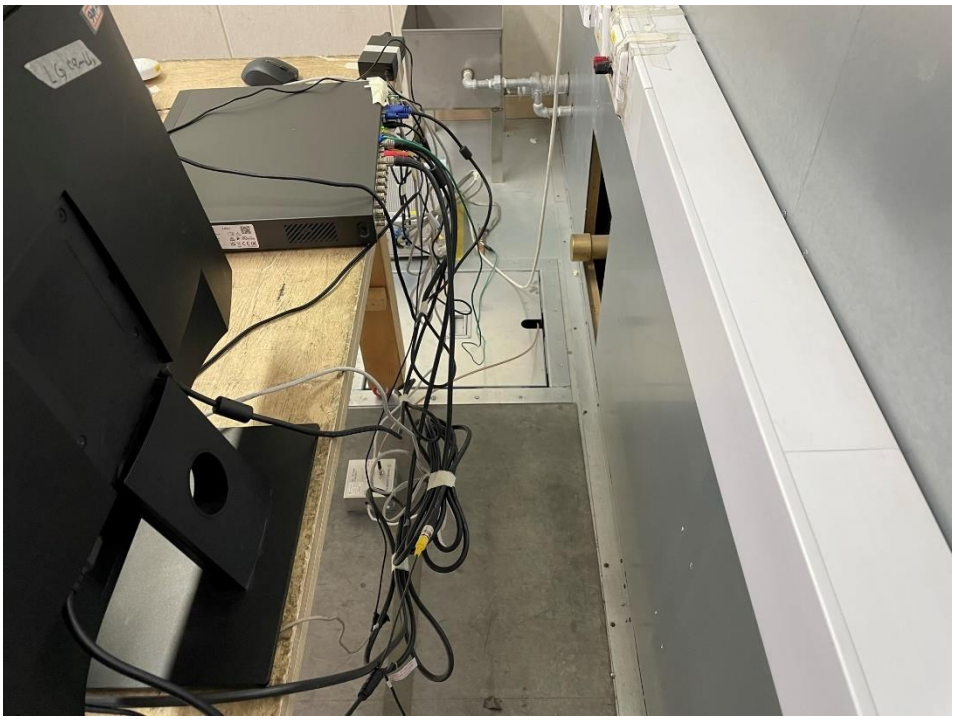




This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

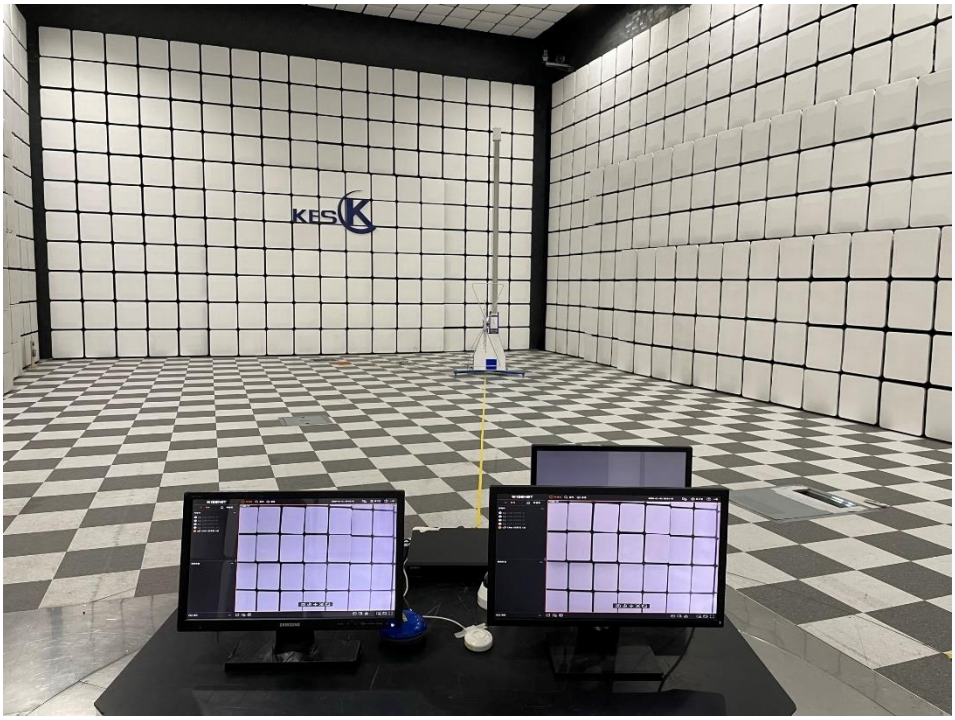
Conducted Emissions at Telecommunication Ports





This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

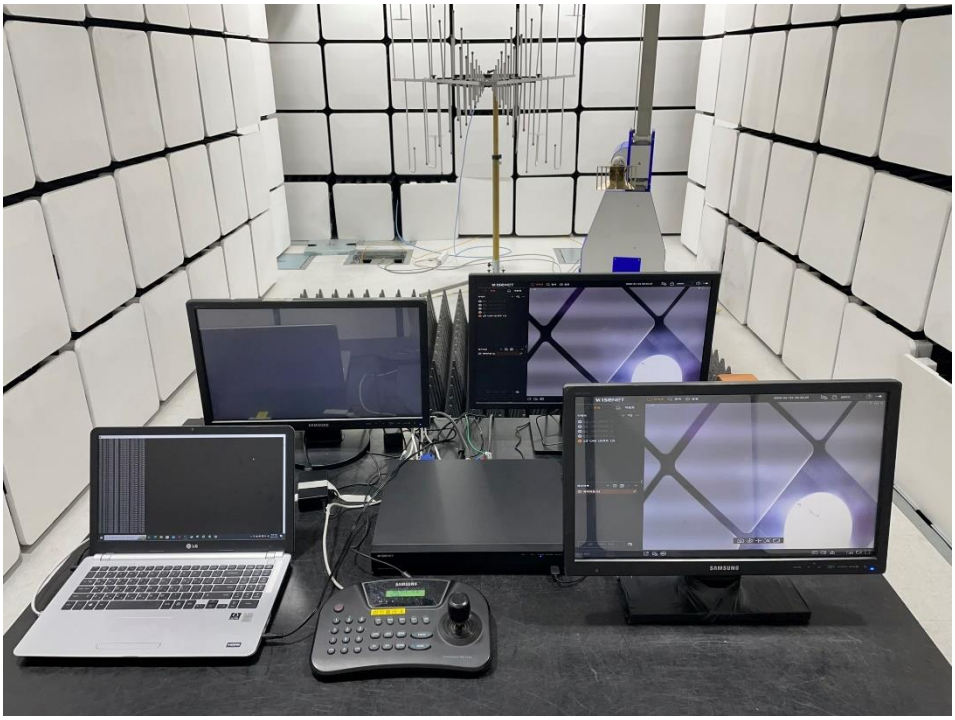
Radiated Electric Field Emissions(Below 1 ㎓)





This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

Radiated Electric Field Emissions(Above 1 ㎓)





This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

EUT External Photographs

(Top)



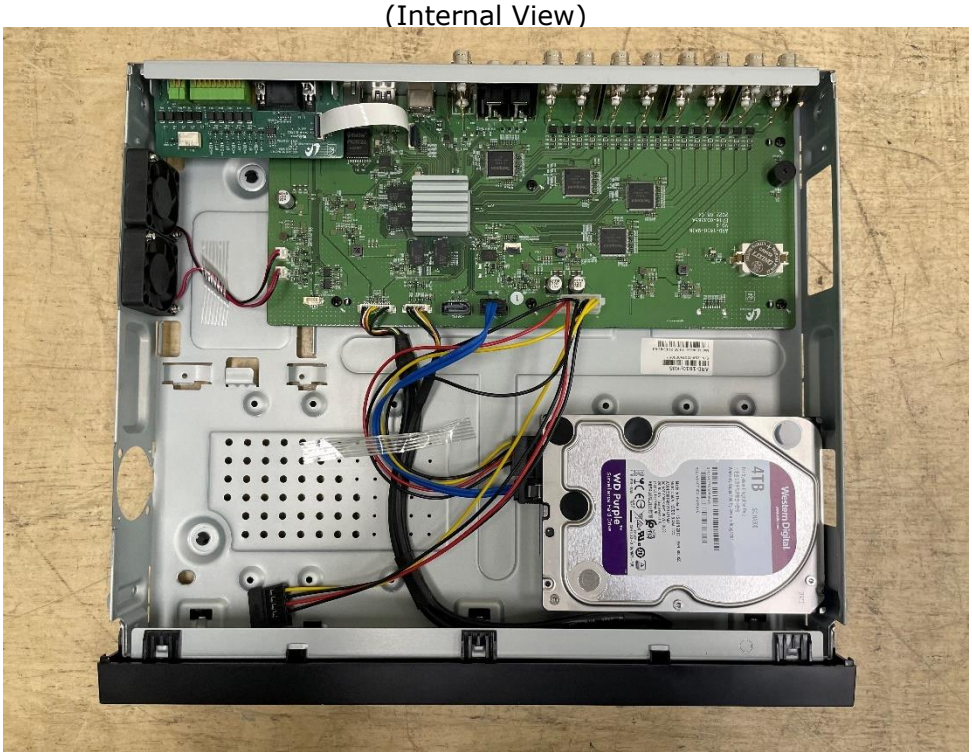
(Bottom)



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

EUT Internal Photographs

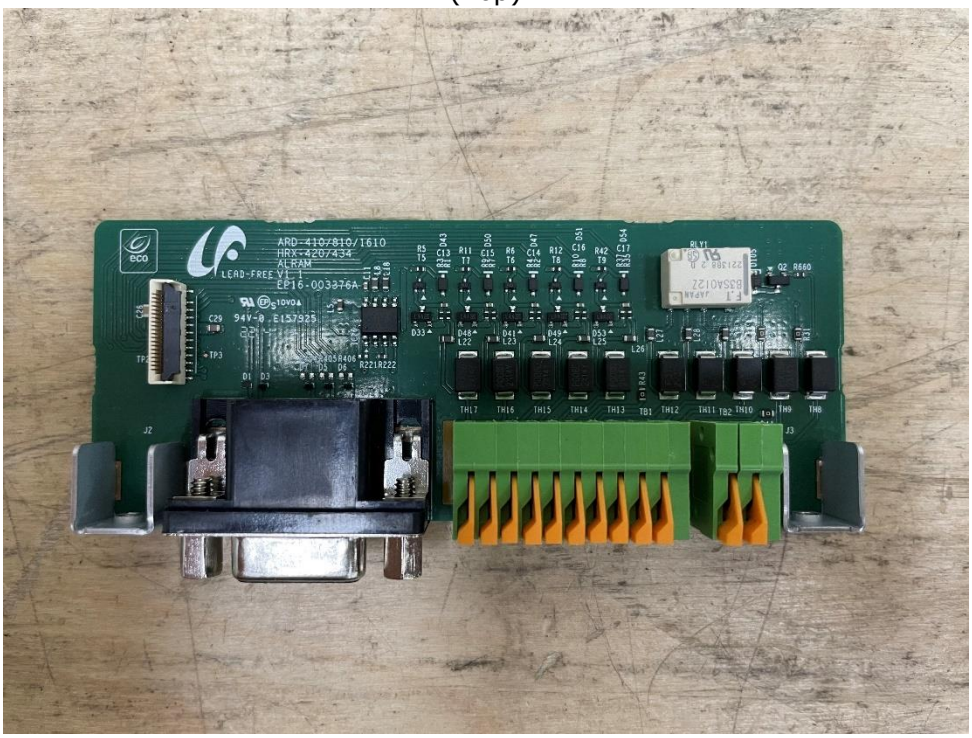
(Internal View)



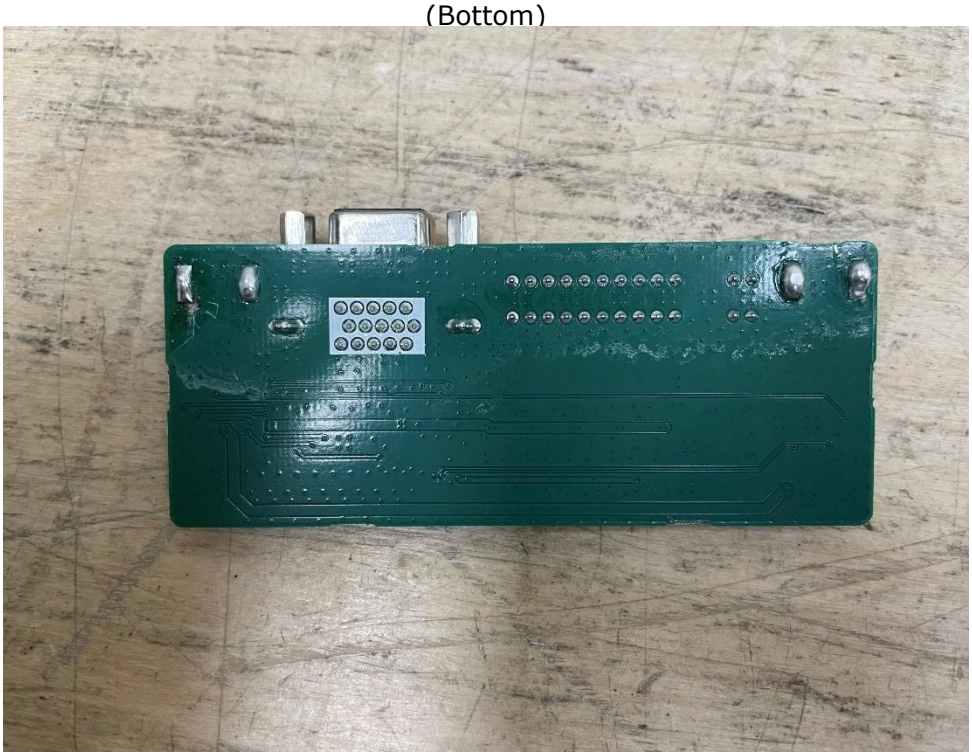
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

EUT Internal View – Board 1

(Top)



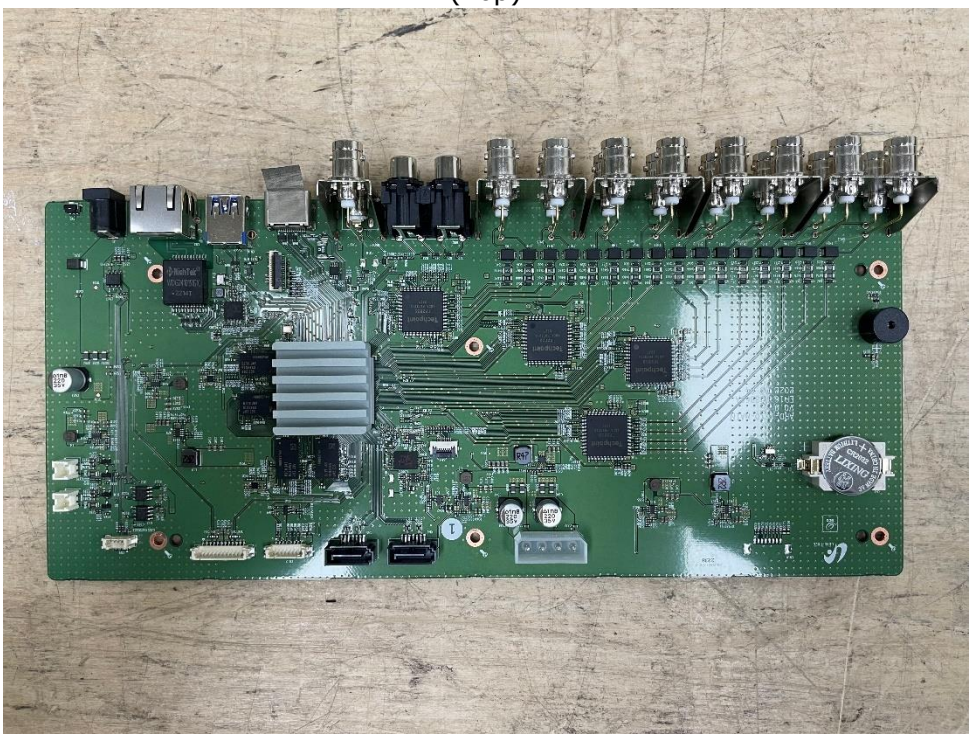
(Bottom)



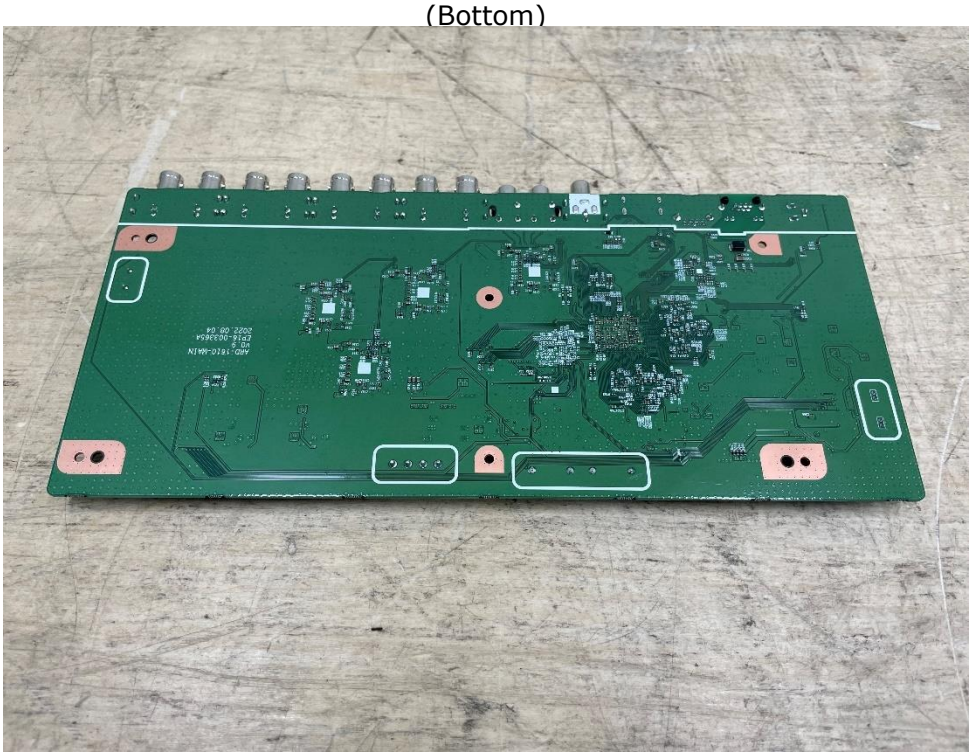
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

EUT Internal View – Board 2

(Top)



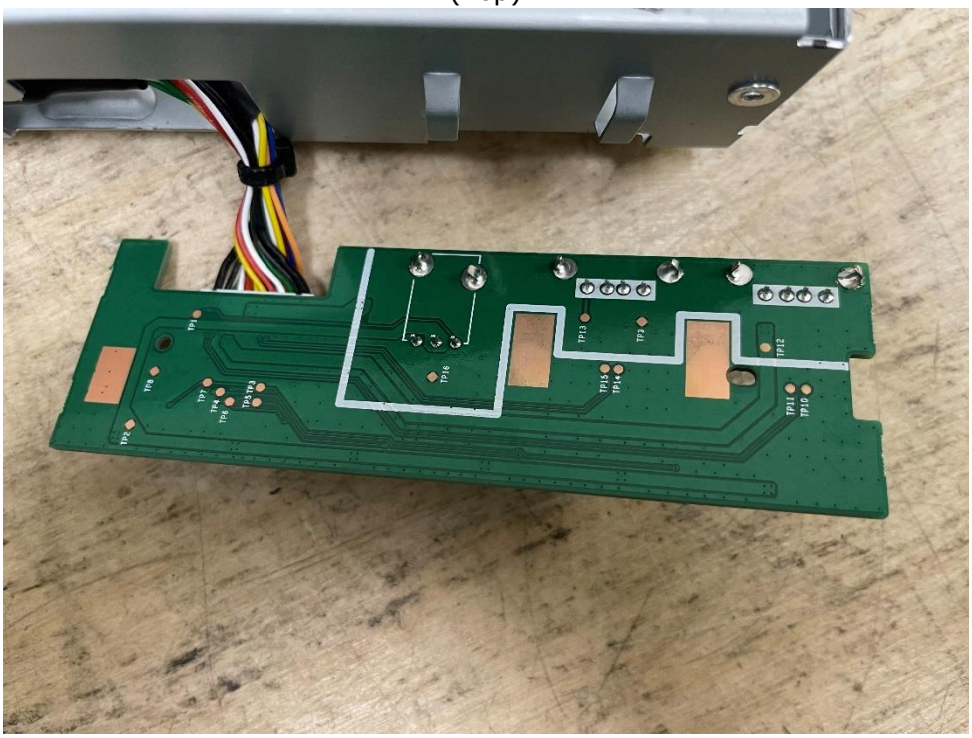
(Bottom)



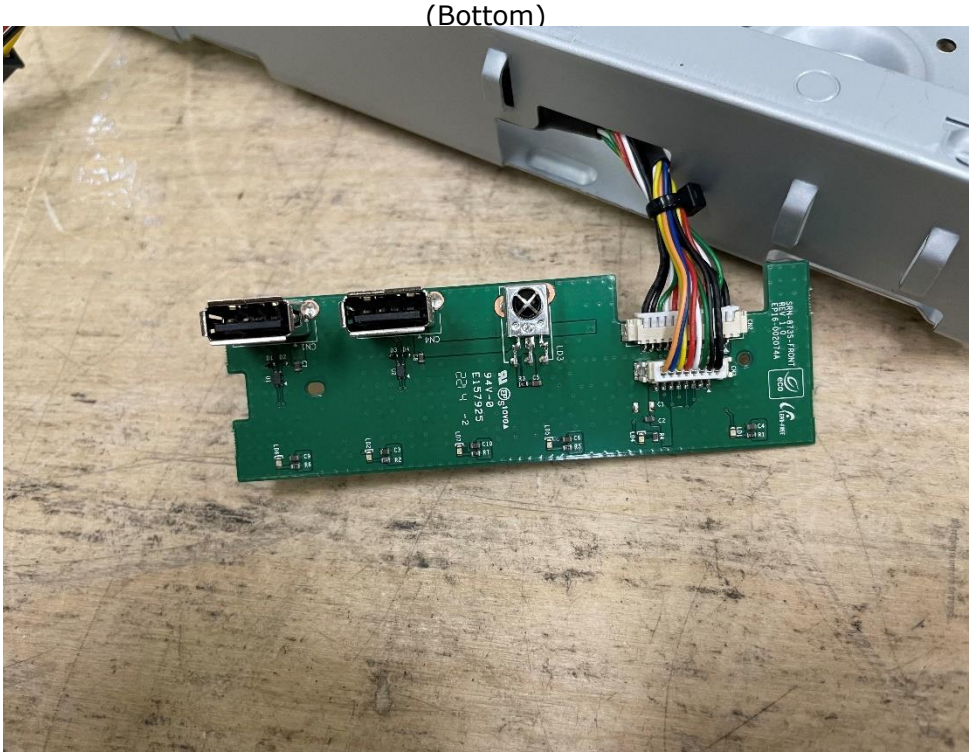
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

EUT Internal View – Board 3

(Top)



(Bottom)



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

EUT Internal View – HDD

(Top)



(Bottom)



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

Label Photographs



この装置は、クラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。 VCCI－A

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr