



EMC TEST REPORT For VCCI

Test Report No. : KES-EM-21T0345
Date of Issue : May. 06, 2021
Product name : DVR
Model/Type No. : HRX-434
Variant Model : -
Applicant : Hanwha Techwin Co., Ltd.
Applicant Address : 6, Pangyo-ro 319Beon-gil, Bundang-gu, Seongnam-si,
Gyeonggi-do, Republic of Korea
Manufacturer : 1. HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.
2. D-TECH CO.,LTD.
Manufacturer Address : 1. Lot O-2, Que Vo Industrial Zone extended area,
Nam Son commune, Bac Ninh city, Bac Ninh province, Vietnam
2. 173-25, Saneop-ro, Gwonseon-gu, Suwon-si, Gyeonggi- do,
Korea (Suwon Industrial Complex)
Date of Receipt : Apr. 09, 2021
Test date : Apr. 15, 2021
Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Seon Ho, Choi
EMC Test Engineer

Reviewed by

Dong-Hun, Jang
EMC Technical Manager

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

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REPORT REVISION HISTORY

Date	Test Report No.	Revision History
May. 06, 2021	KES-EM-21T0345	Issued

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1.0 General Product Description

Main Specifications of EUT are:

Display		
Analog camera	Inputs	4CH(1Vp-p 75ohm, BNC)
	Signal Type	AHD(8MP, 5MP, 4MP, 1080p, 720p) HDTV(8MP 5MP 4MP 1080p 720p)
Network camera	Inputs	Max. 6CH
	Resolution	8MP ~ CIF
	Protocols	SUNAPI(Wisenet), ONVIF
Live	Local Display	HDMI: 3840 x 2160, 1920x1080, 1280x720 VGA: 1920x1080, 1280x720
	Multi Screen Display	[Local monitor] 1 / 2H / 2V / 3V / 4 / 6(1+5) / 6(3x2) / Auto sequence [Web] 1 / 4
	Resolution	[Analog Camera(NTSC/PAL)] - 8MP(15/12fps), 5MP(20/12fps), 4MP(30/25fps), 2MP(30/25fps), 1MP(30/25fps), 960H(or 720H)(30/25fps) * per CH [Network Camera] - Typ. 2MP(120fps)
Performance		
Operating System	Embedded	Linux
Record	Compression	H.265, H.264, MJPEG
	Record Rate(Analog)	Analog Camera) (Main Stream) 8MP 8/8fps, 5M 12/12fps, 4M 15/12fps, 2M 30/25fps, 720p 30/25fps, 960H/640H 30/25fps (NTSC/PAL per CH) (Sub Stream) 720p or higher : 640x360 full fps/CH, SD signal : upto SD full fps/CH * The maximum recording frame rate depends on the frame rate of the input camera
	Recording Bandwidth	Max. 25Mbps
	Resolution	8MP ~ CIF
	Mode	Manual, Schedule (Continuous/Event), Event(Pre/Post), Dual Track
Event	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
	Event Action	E-mail, PTZ preset, Alarm out, Buzzer, Monitor out
Search & Play	Playback Bandwidth	Max. 32Mbps (6CH simultaneously)
	Resolution	8MP ~ 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 1ea(Max 6TB)
Backup	File backup	BU, EXE(Include Player), AVI(Webviewer only)
	Function	Max. 6 CH play, Date-time/title display
Network		
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) (Main Stream) 8MP 8/8fps, 5M 12/12fps, 4M 15/12fps, 2M 30/25fps, 720p 30/25fps, 960H/640H 30/25fps (NTSC/PAL per CH) (Sub Stream) 720p or higher : 640x360 full fps/CH, SD signal : upto SD full fps/CH * The maximum recording frame rate depends on the frame rate of the input camera.
Audio	Input/Output	1 Line in / 1 Line out
	Compression	G.711 (N/W Cam G.711, 726)
	Audio Communication	2-Way

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Max Remote Users		Search(3), Live Unicast(10), Multicast(20)
Security		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	Window 10, Mac OS X (10.15 or above)
	Supported browser	Google Chrome 88 or above, MS Edge 88 or above, Safari 13 or above *support Plug-in free Web
Viewer Software		SSM, Webviewer, Smart Viewer, Wisenet mobile Support SDK/CGI(SUNAPI) for integration to 3'rd party VMS
Functions		
Camera Setup	Register	Auto, Manual
	Item	None
PTZ	Control	Via GUI, Webviewer, SSM, SmartViewer, Wisenet Mobile Viewer, System Controller
	Preset	300 presets
Smart phone	Support Model	iOS, Android
	Protocol Support	RTP, RTSP, HTTP, CGI(SUNAPI)
	Control	Live(4ch) : Multi-Profile Support Playback(4Ch Multi Playback, Max 2MP) Event push
	Max. Remote Users	Search(3), Live Unicast(10)
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)
HDD Key Lock		None
HDMI		1EA
VGA		1EA
BNC		4CH In / 1CH Out(Spot Output)
DP		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. 20,000 (System Log, Event Log each)
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
Environmental		
Operating Temperature		0°C to +40°C(+32°F to +104°F)
Operating Humidity		20% ~ 85% RH
Certification		UL, CE, FCC, KC
Electrical		
Power Input		DC12V
Power Consumption		Max. 22W (6T HDD 1ea)
PoE Budget		None
Mechanical		
Color / Material		Black / Metal
Dimension (WxHxD)		300 x 47 x 208.7mm (11.85" x 1.89" x 8.22")
Weight		Approx. 1.5Kg (4TB HDD 1ea)

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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 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	HRX-434	-	HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.	EUT

1.5 System Configuration

Description	Model Number	Serial Number	Manufacturer	Remarks
Mouse	MOKJUO	-	Primax Electronics Ltd.	-
HDD	ST4000VX000	ZGY8LJ5N	SEAGATE	4 TB
DVR Adaptor	KPL-048-VI	-	Channel Well Techonolohgy (Guangzhou) Co.,Ltd.	-

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1.6 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
Camera	HCD-7030RA	-	HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.	-
Camera Adaptor	MC12D-1200500	-	Shen zhen MaCable Technology co.,ltd	-
Notebook	ProBook4430s	-	HP	-
Notebook Adapter	SeriesPPP0009H	-	CHICONY POWER TECHNOLOGY (SUZHOU) CO.,LTD,	-
Alarm IN	-	-	-	-
Alarm OUT	-	-	-	-
Monitor1	SMT-2232	C95V67VF900025B	Weiha Daewoo Electronics Co., Ltd.	-
Monitor2	HSTND-7041-L	6CM6020YQQ	HP Inc.	-
Monitor3	S24E370DL	0NTWHTPH200179Y	Samsung Electronics Co., Ltd.	-
Monitor3 Adaptor	HP14300	-	Haneulcomplus Co., Ltd.	-
iPad	A1432	DQXJWFHDF193	APPLE .Inc	-
Speaker	BR1000A CUVE	-	Britz	-
Controller	SPC-1010	C50E67WG10100F	SamSung Techwin Co.,Ltd.	-
Controller Adaptor	RS-AB1000	-	Dongguan Jinhuasheng Power Technology Co.,Ltd.	-
USB Memory	-	-	Sandisk	32 GB

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1.7 External I/O Cabling

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
DVR (EUT)	NETWORK	Notebook	RJ-45	3.5	U
	Alarm OUT	Alarm OUT	Alarm IN	3.0	U
	Alarm IN	Alarm IN	Alarm OUT	3.0	U
	RS485	Controller	2 PIN	3.0	U
	Audio OUT	Speaker	Audio IN	1.4	U
	Audio IN	Smartphone	Audio OUT	1.6	U
	USB	USB Memory	USB	-	-
	VIDEO IN	Camera	BNC	3.0	S
	SPOT	Monitor1	BNC	3.0	S
	VGA OUT	Monitor2	D-sub	1.6	U
	HDMI	Monitor3	HDMI	1.5	S
	USB	Mouse (EUT)	USB	1.8	U

* Unshielded=U, Shielded=S

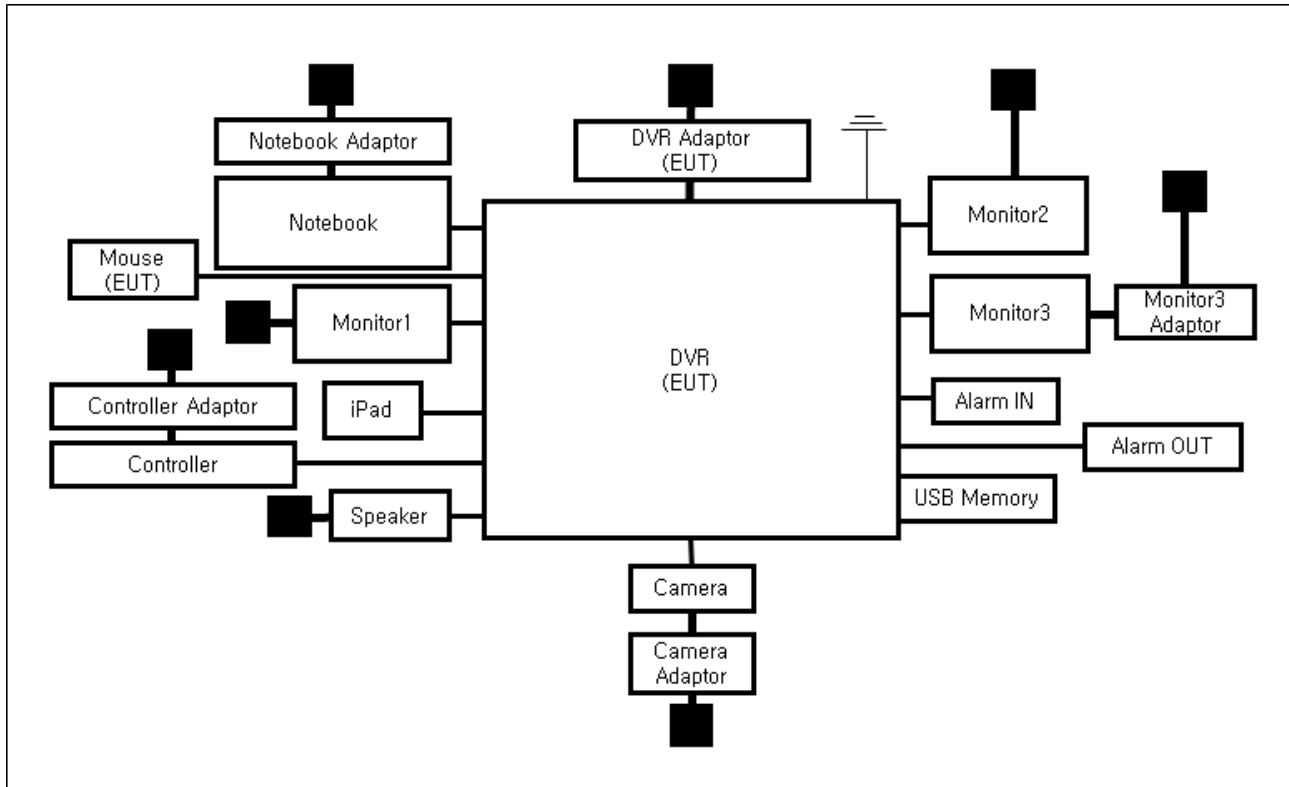
1.8 EUT Operating Mode(s)

Test Mode	operating
Operation	the test was conducted while checking the camera video output from the laptop and making sure that they operate normally while performing a ping test.

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

1.9 Configuration

■ AC Main
 □ DC Main



1.10 Remarks when standards applied

N/A







1.11 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.

1.12 Test Facility

The measurement facility is located at 473-21 Gayeo-ro, Yeosu-si, Gyeonggi-do, 12658, Korea. The sites are constructed in conformance with the requirements of ANSI C63.4:2014 and CISPR 16-1-4:2019

1.13 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
KOREA	RRA	EMI (3 m & 10 m Semi-Anechoic Chamber , 10 m Open Area and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 KR0100
International	KOLAS	EMI (3 m & 10 m Semi-Anechoic Chamber , and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 KT489
USA	FCC	3 m & 10 m Semi-Anechoic Chamber, 10 m Open Area and Conducted test site to perform FCC Part 15/18 measurements.	 KR0100
Canada	ISED	3 m & 10 m Semi-Anechoic Chamber and Conducted test site	 23298-1
JAPAN	VCCI	Mains Ports Conducted Interference Measurement, Telecommunication Ports Conducted Disturbance Measurement and Radiation 10 meter site, Facility for measuring radiated disturbance above 1 GHz	 R-20056, C-20036, T-20040, G-20057
Europe	TÜV SÜD	EMI (3 m & 10 m Semi-Anechoic Chamber , 10 m Open Area and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 CARAT 001633 0004

2.0 Test Regulations

The emissions tests were performed according to following regulations:

☐ **EMC – Directive 2014/30/EU**

☐ EN 61000-6-3:2011

☐ EN 61000-6-1:2007

☐ EN 61000-6-4:2007 +A1:2011

☐ EN 61000-6-2:2005

☐ EN 55011:2007 +A1:2010

☐ Group 1
☐ Class A

☐ Group 2
☐ Class B

☐ EN 55014-1:2006 +A2:2011

☐ EN 55014-2:1997 +A2:2008

☐ EN 55015:2013

☐ EN 61547 :2009

☐ EN 55032:2015

☐ Class A

☐ Class B

☐ EN 55024:2010 +A1:2015

☐ EN 50130-4:2011 +A1:2014

☐ EN 61000-3-2:2014

☐ EN 61000-3-3:2013

☐ EN 61326-1:2013



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- | | | |
|----------------------------------------------------------------|---------------------------------------------|----------------------------------|
| <input checked="" type="checkbox"/> VCCI-CISPR 32:2016 | <input checked="" type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> AS/NZS CISPR32:2015 | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> 47 CFR Part 15, Subpart B | | |
| <input type="checkbox"/> CISPR 22:2009 +A1:2010 | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> ANSI C63.4-2017 | | |
| <input type="checkbox"/> IC Regulation ICES-003 Issue 7 | | |
| <input type="checkbox"/> CAN/CSA CISPR 32:17 | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> ANSI C63.4-2017 | | |
|
<input type="checkbox"/> RE- Directive 2014/53/EU | | |
| <input type="checkbox"/> EN 301 489-1 V1.9.2 | | |
| <input type="checkbox"/> Equipment for fixed use | | |
| <input type="checkbox"/> Equipment for vehicular use | | |
| <input type="checkbox"/> Equipment for portable use | | |
| <input type="checkbox"/> EN 301 489-3 V1.6.1 | | |
| <input type="checkbox"/> EN 301 489-17 V2.2.1 | | |
| <input type="checkbox"/> EN 60945:2002 | | |

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2.1 Conducted Emissions Mains Power Ports

Test Date

Apr. 15, 2021

Test Location

Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMI Test S/W	EMC32	R & S	9.12.00	-
<input checked="" type="checkbox"/>	EMI TEST RECEIVER	ESR3	R & S	101783	01, 15, 2022
<input checked="" type="checkbox"/>	LISN	ENV216	R & S	101787	12, 29, 2021
<input checked="" type="checkbox"/>	LISN	ESH2-Z5	R & S	100450	12, 29, 2021
<input checked="" type="checkbox"/>	PULSE LIMITER	ESH3-Z2	R & S	101915	12, 29, 2021

Test Conditions

Temperature: (23,6 ± 0,1) °C

Relative Humidity: (45,8 ± 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

Apr. 15, 2021

Test Location

Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMI Test S/W	EMC32	R & S	9.12.00	-
<input checked="" type="checkbox"/>	EMI TEST RECEIVER	ESR3	R & S	101783	01, 15, 2022
<input checked="" type="checkbox"/>	LISN	ENV216	R & S	101787	12, 29, 2021
<input checked="" type="checkbox"/>	LISN	ESH2-Z5	R & S	100450	12, 29, 2021
<input checked="" type="checkbox"/>	PULSE LIMITER	ESH3-Z2	R & S	101915	12, 29, 2021
<input checked="" type="checkbox"/>	8-WIRE ISN CAT3,5	ENY81	R & S	100174	12, 30, 2021
<input type="checkbox"/>	8-WIRE ISN CAT6	ENY81-CAT6	R & S	101665	12, 30, 2021
<input type="checkbox"/>	CDN	CDNS502A	TESEQ	40431	12, 29, 2021

Test Conditions

Temperature: (23,6 ± 0,1) °C
Relative Humidity: (45,8 ± 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.



2.3 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Apr. 15, 2021

Test Location

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

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.0	-
<input checked="" type="checkbox"/>	EMI TEST RECEIVER	ESU26	R & S	100551	04, 01, 2022
<input checked="" type="checkbox"/>	AMPLIFIER	SCU 01	R & S	100603	11, 25, 2021
<input checked="" type="checkbox"/>	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	12, 08, 2022
<input checked="" type="checkbox"/>	ATTENUATOR	8491A	HP	32173	03, 10, 2022

Test Conditions

Temperature: (23,6 ± 0,2) °C
Relative Humidity: (45,9 ± 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

Apr. 15, 2021

Test Location

SEMI ANECHOIC CHAMBER #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.0	-
<input checked="" type="checkbox"/>	EMI TEST RECEIVER	ESR7	R & S	101190	08, 05, 2021
<input checked="" type="checkbox"/>	PREAMPLIFIER	8449B	AGILENT	3008A01967	04, 07, 2022
<input type="checkbox"/>	ATTENUATOR	8491A	HP	35496	03, 10, 2022
<input checked="" type="checkbox"/>	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	03, 11, 2022

Test Conditions

Temperature: (24,1 ± 0,2) °C

Relative Humidity: (45,8 ± 0,2) % R.H.

Frequency Range of Measurement

1 GHz to 6 GHz

Instrument Settings

IF Band Width: 1 MHz

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.



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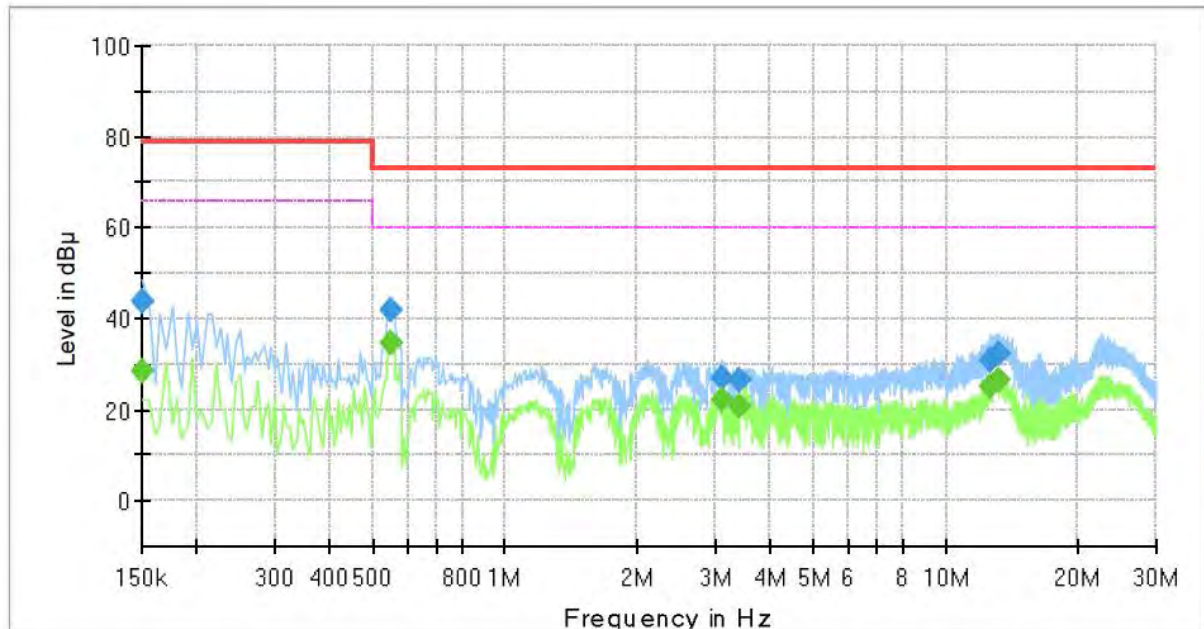
APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

HOT LINE

Common Information

Test Description:	Conducted Emission
Model No.:	HRX-434
Phase:	H
Mode:	100 V 60 Hz
Operator Name:	KES



Final Result

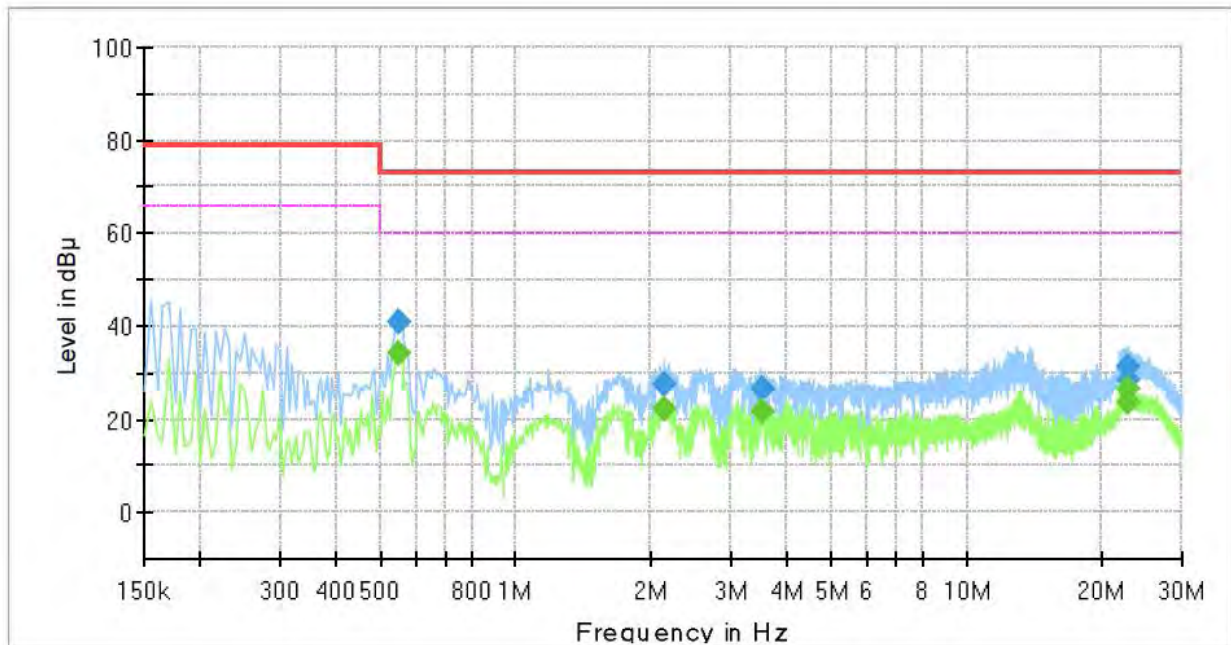
Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.150000	---	28.55	66.00	37.45	1000.0	9.000	L1	19.4
0.150000	43.93	---	79.00	35.07	1000.0	9.000	L1	19.4
0.550000	---	34.90	60.00	25.10	1000.0	9.000	L1	19.8
0.550000	41.65	---	73.00	31.35	1000.0	9.000	L1	19.8
3.090000	---	22.32	60.00	37.68	1000.0	9.000	L1	20.1
3.090000	26.91	---	73.00	46.09	1000.0	9.000	L1	20.1
3.420000	---	20.75	60.00	39.25	1000.0	9.000	L1	20.0
3.420000	26.33	---	73.00	46.67	1000.0	9.000	L1	20.0
12.630000	---	24.84	60.00	35.16	1000.0	9.000	L1	20.0
12.630000	30.99	---	73.00	42.01	1000.0	9.000	L1	20.0
13.280000	---	26.40	60.00	33.60	1000.0	9.000	L1	19.9
13.280000	32.49	---	73.00	40.51	1000.0	9.000	L1	19.9

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NEUTRAL LINE

Common Information

Test Description:	Conducted Emission
Model No.:	HRX-434
Phase:	N
Mode:	100 V 60 Hz
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.550000	---	34.35	60.00	25.65	1000.0	9.000	N	19.8
0.550000	41.15	---	73.00	31.85	1000.0	9.000	N	19.8
2.130000	---	22.07	60.00	37.93	1000.0	9.000	N	20.3
2.130000	27.58	---	73.00	45.42	1000.0	9.000	N	20.3
3.515000	---	21.74	60.00	38.26	1000.0	9.000	N	20.0
3.515000	26.44	---	73.00	46.56	1000.0	9.000	N	20.0
22.715000	---	26.29	60.00	33.71	1000.0	9.000	N	20.2
22.715000	31.27	---	73.00	41.73	1000.0	9.000	N	20.2
22.940000	---	23.48	60.00	36.52	1000.0	9.000	N	20.1
22.940000	28.62	---	73.00	44.38	1000.0	9.000	N	20.1

◆ Calculation

QuasiPeak[dBuV] / CAverage [dBuV] = Reading Value[dBuV] + Corr. [dB]

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

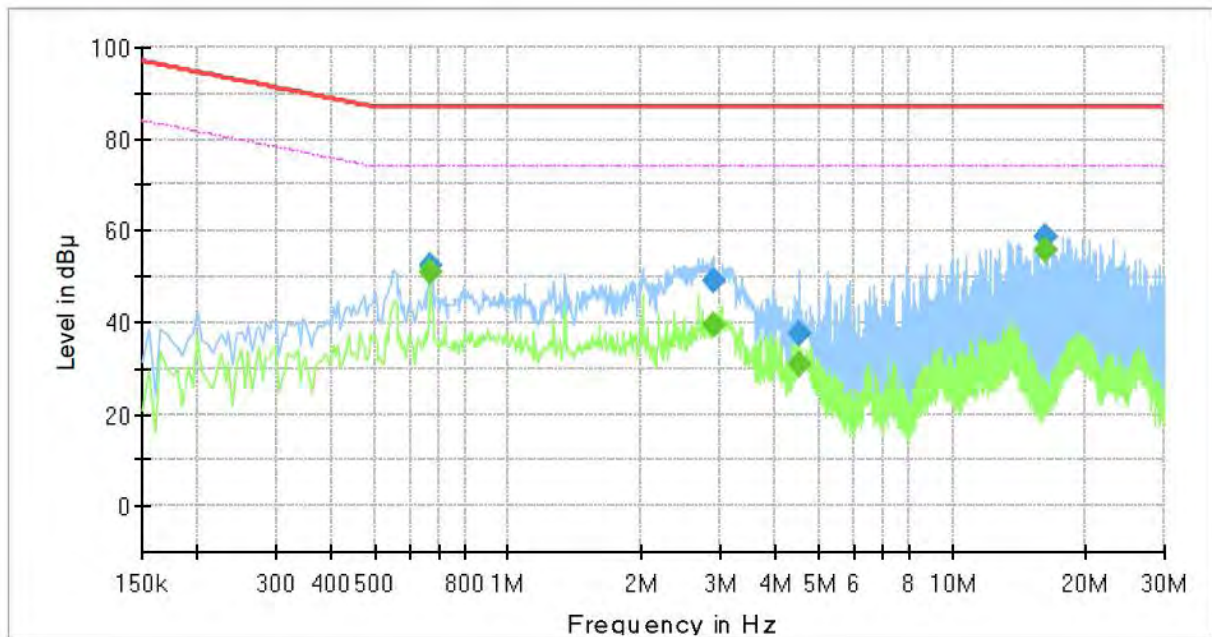
Corr. : Correction values (LISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

Conducted Emissions at Telecommunication Ports

[100 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	HRX-434
Mode :	100 V 60 Hz
Speed :	100 Mbps
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.670000	---	50.79	74.00	23.21	1000.0	9.000	Single Line	19.9
0.670000	52.65	---	87.00	34.35	1000.0	9.000	Single Line	19.9
2.890000	---	39.29	74.00	34.71	1000.0	9.000	Single Line	20.0
2.890000	49.28	---	87.00	37.72	1000.0	9.000	Single Line	20.0
4.510000	---	31.01	74.00	42.99	1000.0	9.000	Single Line	19.6
4.510000	37.43	---	87.00	49.57	1000.0	9.000	Single Line	19.6
16.165000	---	55.78	74.00	18.22	1000.0	9.000	Single Line	19.7
16.165000	58.46	---	87.00	28.54	1000.0	9.000	Single Line	19.7
16.225000	---	55.91	74.00	18.09	1000.0	9.000	Single Line	19.7
16.225000	58.60	---	87.00	28.40	1000.0	9.000	Single Line	19.7

◆ Calculation

QuasiPeak[dBuV] / CAverage [dBuV] = Reading Value[dBuV] + Corr. [dB]

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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

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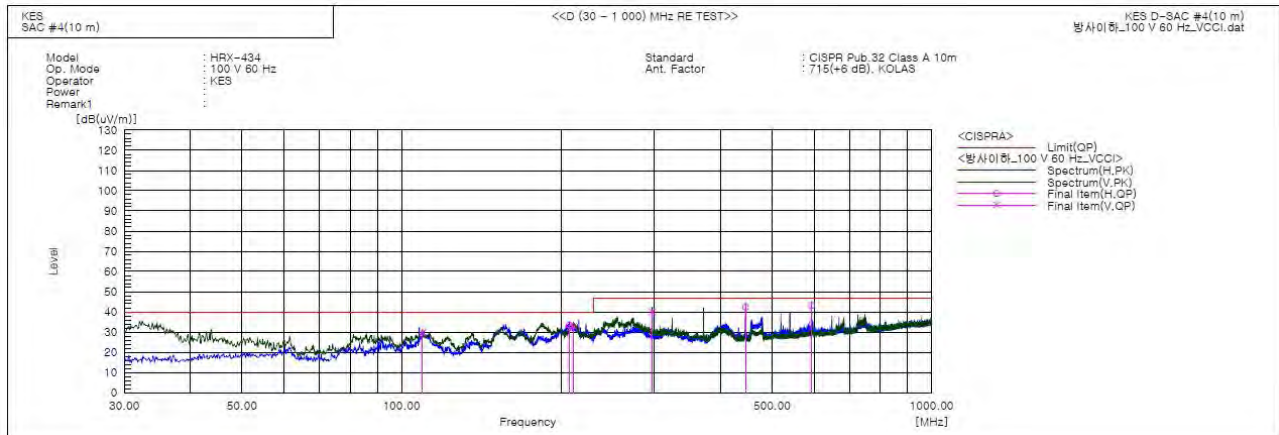
3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
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KES-EM-21T0345

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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	109.540	V	52.1	-22.3	29.8	40.0	10.2	103.0	227.0	
2	207.268	H	54.1	-20.6	33.5	40.0	6.5	391.0	7.0	
3	210.905	V	53.2	-20.5	32.7	40.0	7.3	192.0	179.0	
4	296.993	V	58.1	-18.0	40.1	47.0	6.9	100.0	309.0	
5	445.524	H	55.6	-13.3	42.3	47.0	4.7	301.0	280.0	
6	594.055	H	51.8	-8.6	43.2	47.0	3.8	309.0	288.0	

◆ Calculation

Corrected Amplitude [dBuV] = Amplitude[dBuV] + Correction Factor [dB]

Corrected Amplitude : The Final Value, Amplitude : Reading Value,

Correction Factor : ANT FACTOR + Cable loss

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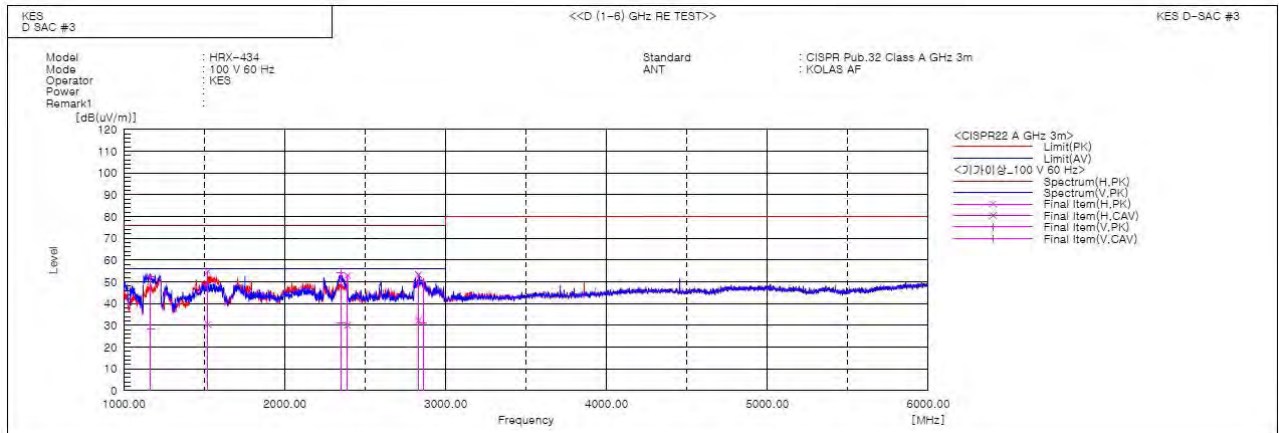
3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
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www.kes.co.kr

Report No.:

KES-EM-21T0345

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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	1165.376	V	61.0	37.1	-8.5	52.5	28.6	76.0	56.0	23.5	27.4	100.0	336.6	
2	1522.500	H	60.6	36.4	-5.9	54.7	30.5	76.0	56.0	21.3	25.5	100.0	20.4	
3	2347.580	V	54.2	31.1	0.1	54.3	31.2	76.0	56.0	21.7	24.8	100.0	11.5	
4	2390.180	H	52.6	29.8	0.2	52.8	30.0	76.0	56.0	23.2	26.0	100.0	44.6	
5	2831.786	H	50.8	29.8	2.4	53.2	32.2	76.0	56.0	22.8	23.8	100.0	359.5	
6	2859.606	V	47.6	28.6	2.3	49.9	30.9	76.0	56.0	26.1	25.1	100.0	57.1	

◆ 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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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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EUT External Photographs

(Top)



(Bottom)



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EUT Internal Photographs

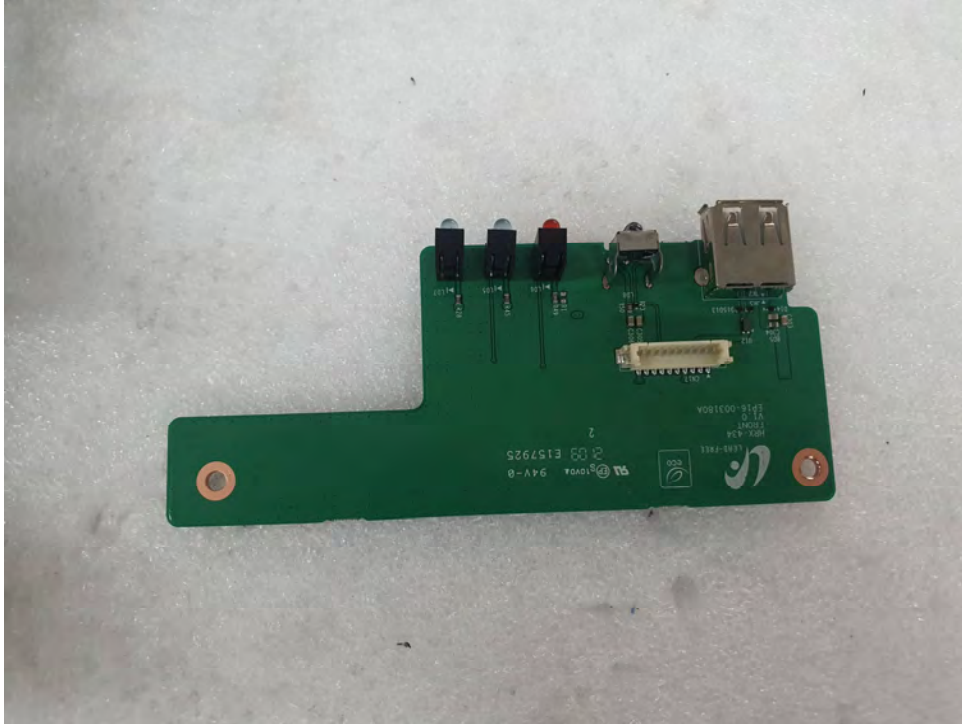
(Internal View)



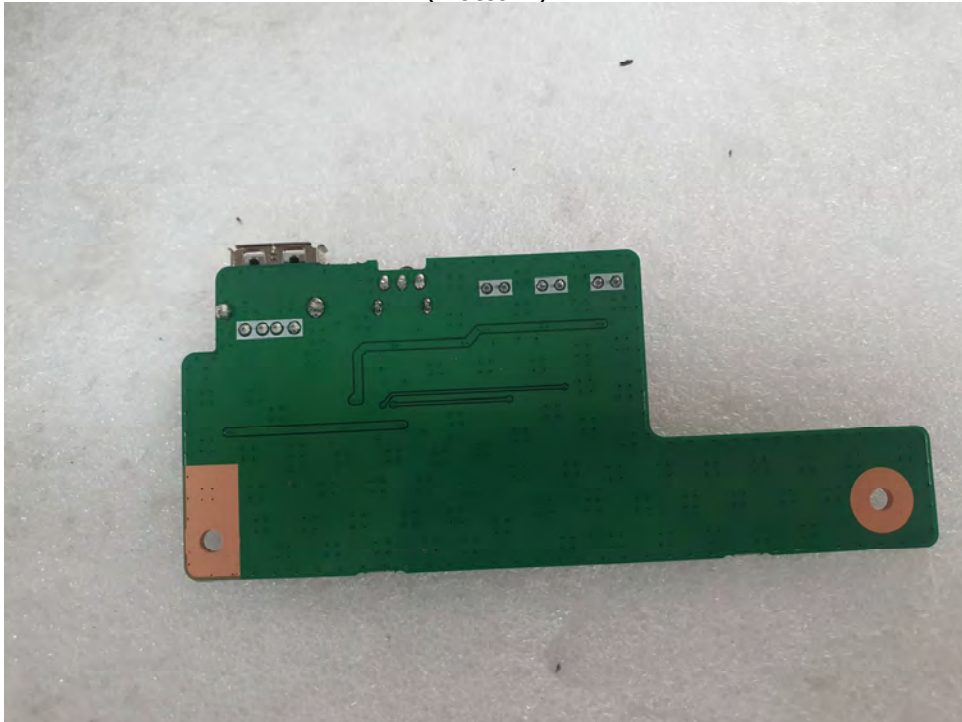
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EUT Internal View – Board 1

(Top)



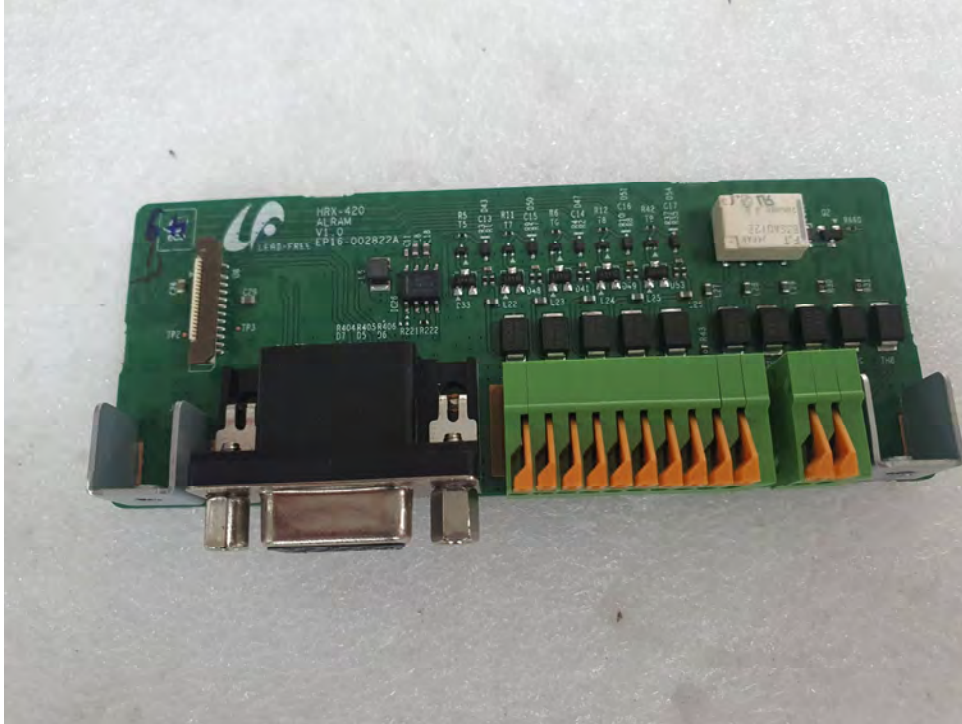
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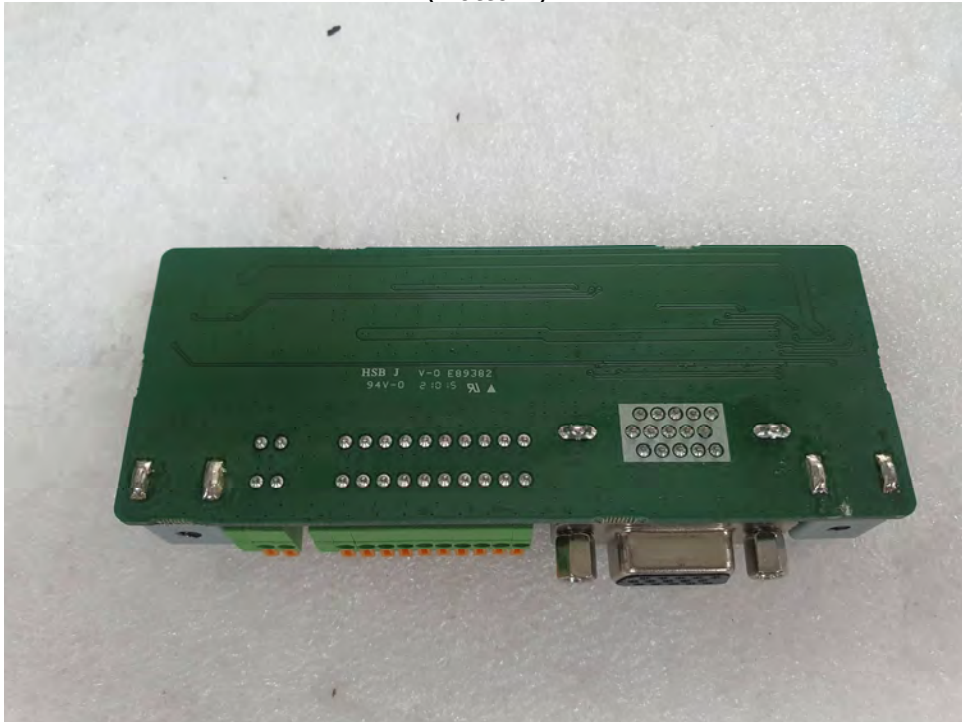
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EUT Internal View – Board 2

(Top)



(Bottom)



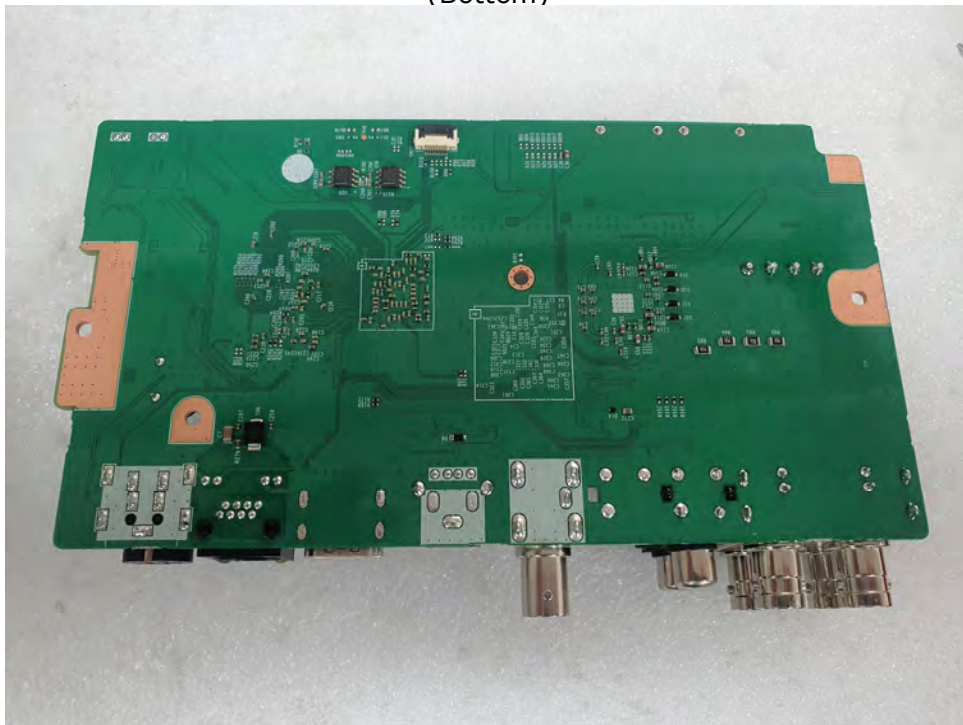
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EUT Internal View – Board 3

(Top)



(Bottom)



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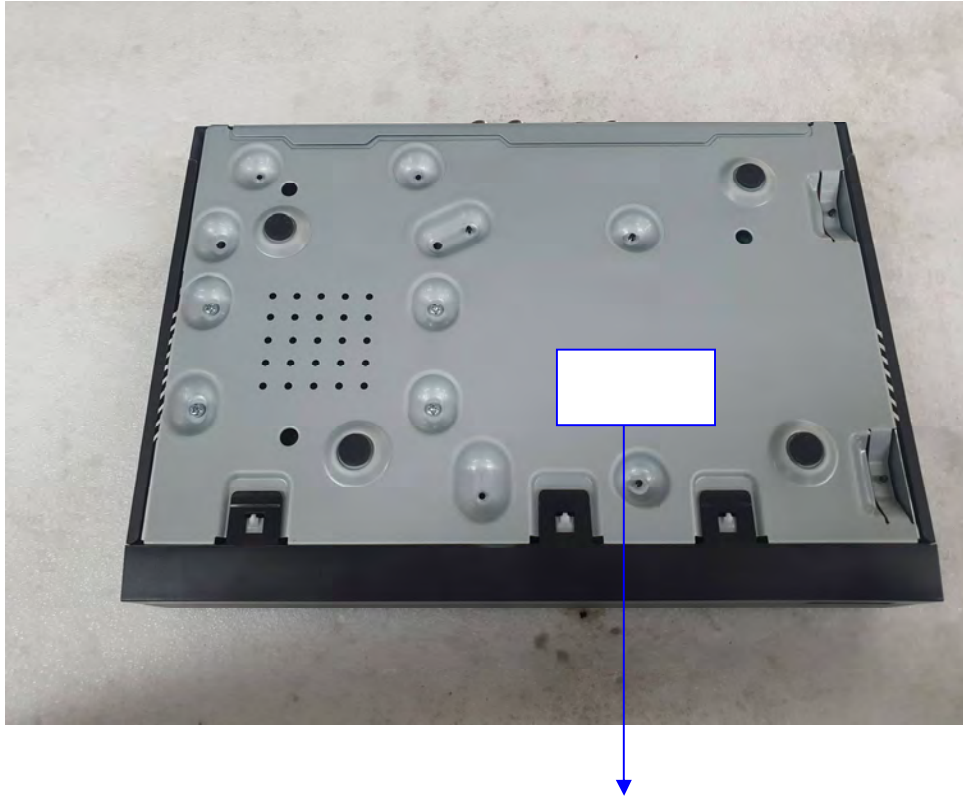
EUT Internal View – HDD

(Top)



(Bottom)

Label Photographs



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