EMC TEST REPORT For CE

Test Report No.	:	KES-E1-19T0480
Date of Issue	:	Aug. 19, 2019
Product name	:	Pentabrid DVR (Digital Video Recoder)
Model/Type No.	:	HRX-1621P
Variant Model	:	-
Applicant	:	Hanwha Techwin Co., Ltd.
Applicant Address	:	6, Pangyo-ro 319 Beon-gil, Bundang-gu, Seongnam-si, Gyeonggi-do, 13488, KOREA
Manufacturer	:	1. HANWHA TECHWIN(TIANJIN) CO., LTD 2. HANWHA TECHWIN SECURITY VIETNAM CO.,LTD. 3. D-TECH CO.,LTD.
Manufacturer Address	:	1. No.11 Weiliu Rd,Micro-Electronic Industrial Park, TEDA,Tianjin, 300385,People's Republic of China 2. Lot O-2, Que Vo Industrial Zone extended area, Nam Son commune, Bac Ninh city, Bac Ninh province, Vietnam 3. 173-25, Saneop-ro, Gwonseon-gu, Suwon-si, Gyeonggi- do, Korea (Suwon Industrial Complex)
Date of Receipt	:	Jul. 25, 2019
Test date	:	Aug. 12, 2019 ~ Aug. 17, 2019
Test Results	:	☒ In Compliance ☐ Not in Compliance

Tested by

Min Seong, Kim
EMC Test Engineer

Reviewed by

Dong-Hun, Jang
EMC Technical Manager

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

REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Aug. 19, 2019	KES-E1-19T0480	Issued

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1.0 General Product Description

Main Specifications of EUT are:

Video			
Video Input	Analog Camera	Input	16CH, 1Vp-p 75ohm, BNC
		Signal Type	AHD(8MP, 5MP, 4MP, 1080p, 720p) HDTVI(8MP, 5MP, 4MP, 1080p, 720p) HDCVI(5MP, 4MP, 1080p, 720p) CVBS (NTSC/PAL)
	Network Camera	Input	2CH (up to 18CH)
		Resolution	CIF ~ 8MP
		Protocols	SUNAPI(Wisenet), ONVIF
Live	Local Display		1x HDMI, 1x VGA dual monitor
Operating System	Embedded		Linux
Recording	Compression		H.265, H.264, MJPEG
	Record Rate(Analog)		- Analog Camera(NTSC/PAL) (Main Stream) 8MP 8/8fps CH, 5M 12/12fps CH, 4M 15/12fps CH, 2M 30/25fps CH, 720p 30/25fps/CH, SD 30/25fps/CH (Sub Stream) HD: 640x360 full fps/CH, SD: upto SD full fps/CH *The maximum recording frame rate depends on the frame rate of the input camera.
	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
	Event Action		E-mail, PTZ preset, Alarm out, Buzzer, Monitor out
	Overwrite modes		Overwrite On/Off

Search & Playback	Performance		Max. 4 users (Set 1, Remote 3)
	Resolution		CIF ~ 8MP
	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
	Internal		**Up to 8 SATA HDDs** **Max. 6TB/HDD(TBD)**
Storage	External		USB(for Backup)
	File Format		BU(DVR Player), SEC(Set, Include Player), AVI(Webviewer only)
NETWORK			
Protocol support			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)
Max. Remote users			Search (3), Live Unicast (10), Multicast (20)
Security			IPv4/v6
Security			IP address filtering, User access log, 802.1x Authentication, Encryption (ID/PW, Recording, Transmission, Backup)
OS			Supported OS : Window XP (Service pack 2 or above), Vista, 7, 8, 10, Mac OS X (10.7 or above)
Web Browser			Google Chrome 47 or above, MS Edge 20 or above, Safari 9 or above *support Plug-in free Web
Viewer Software			SSM, Webviewer, SmartViewer, Wisenet Mobile Viewer
CMS Support			SDK/CGI(SUNAPI)
Function			
Easy Configuration			Setup Wizard (Language Date/Time, Password, Network, Auto Camera Configuration), P2P (QR code)
ARB (Auto Recovery Backup)			support
PTZ	Control/Preset		Via GUI & RS-485, Webviewer, SPC-7000 / 300 presets
Smart phone	OS / Protocol support		Android , iOS, RTP, RTSP, HTTP, CGI(SUNAPI)
	Control		Live(16ch) : Multi-Profile Support Playback(1CH, Max. 2MP) Event push
System Control			Mouse, IR Remocon, Web, SPC-7000

INDICATOR / INTERFACE		
Front	Indicator	Power status LED 1ea, HDD Action LED 1ea, Alarm Status LED 1ea Record status LED 1ea, Network Action LED 1ea, Backup LED 1ea
Monitors	Mode	HDMI/VGA Dual Monitor
	HDMI	1 HDMI (4K(3840 x 2160), 2K(2560 x 1440), 1920x1080, 1280x1024, 1280x720)
	VGA	1 VGA (1920x1080, 1280x1024, 1280x720)
	Composite(Spot)	BNC(1CH) ※ Included OSD On Screen, Single, Multi, Auto Change mode Support
Audio	Inputs/Output	16CH line in (Built in 4CH, Option : Audio Extension Cable)/ 1CH line out
	Compression	G.711
	Sampling rate	8KHz
Alarm	Inputs/Outputs	Terminal 16 Inputs (NO/NC) / Terminal 4 relay Outputs (NO/NC & NO) MAX DC18V, 2A, Typical DC12V, 2A
Ethernet		1 RJ45 10/100/1000 Base-T
USB		1 ports(USB 3.0, Rear), 1 ports(USB 2.0, Front)
Serial		RS-485(Full Duplex) for PTZ, Samsung System Keyboard
Coaxia Control		Support (CVBS and AHD/CVI/TVI)
Reset		Yes(Factory Reset, Alarm Reset)
General		
Electrical	Input Voltage/Current	100 ~ 240 VAC ±10%; 50/60 Hz
	Power consumption	(TBD) Max. W
Environmental	Operating Temperature/Humidity	+0°C to +40°C (+32°F to +104°F) / 20% to 85% RH
Mechanical	Color / Material	Black / Metal
	Dimension (W x H x D)	(TBD) W440 x H88 x D384.8(17.32" x 3.46" x 15.15")
	Weight (with hard disks)	TBD kg

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.

Voltage ☒ 230Vac ☐ 100 Vac ☐ 24 Vac ☐ 12 Vdc ☐ PoE

Frequency ☒ 50 Hz ☐ 60 Hz ☐ 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
Pentabrid DVR (Digital Video Recoder)	HRX-1621P	-	HANWHA TECHWIN (TIANJIN) CO., LTD	EUT
Mouse	MOKJUO	-	Primax Electronics Ltd.	-
HDD	WD40PUEX-64N96Y0	-	Western Digital	4 TB

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
Camera	SDC-79446BF	-	HANWHA TECHWIN(TIANJIN) CO., LTD	-
Camera Adapter	FSP-060-DIBAN2	-	Zhonghan Electronics(Shenzhen) Co., Ltd.	-
Monitor 1	SMT-2233	ZC6U67VH500194D	Weihai Daewoo Electronics Co., Ltd.	-
Monitor 2	SMT-2232	C95V67VF900038B	Weihai Daewoo Electronics Co., Ltd.	-
Monitor 3	SMT-2232	C95V67VF900015Y	Weihai Daewoo Electronics Co., Ltd.	-
Notebook	NT730U3E	JJRE91CF200065A	Samsung Electronics	-
Notebook Adapter	PA-1600-66	AD-6019P	LITEON	-
Speaker	BR10000A CUVE	-	BEIJING EDIFIER HI-TECH GROUP.	-
MIC 1	CMK-303	-	CAMAC	-
MIC 2	MP1000	-	-	-
Controller	SPC-1010	C50E67WG10100F	SamSung Techwin Co.,Ltd.	-
Controller Adapter	RS-AB1000	-	Dongguan Jinhuasheng Power Technology Co.,Ltd.	-
Alarm	-	-	-	-
Button Alarm	-	-	-	-
USB Memory	-	-	SONY	16 GB

1.6 External I/O Cabling

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
Pentabrid DVR (Digital Video Recoder) (EUT)	VIDEO IN	Camera	BNC	10.0	U
	HDMI	Monitor 1	HDMI	1.5	S
	VGA OUT	Monitor 2	D-SUB	1.5	S
	SPOT	Monitor 3	BNC	3.0	S
	NETWORK	Notebook	RJ-45	3.0	U
	AUDIO OUT	Speaker	RCA	1.6	U
	AUDIO IN	MIC 1	RCA	1.6	U
	AUDIO IN (2 Pin)	MIC 2	XLR	1.7	U
	RS-485	Controller	RS-485	10.0	U
	Alarm Out	Alarm	Alarm In	10.0	U
	Alarm In	Button Alarm	Alarm Out	10.0	U
	USB 2.0	Mouse	USB	1.3	U
	USB 3.0	USB Memory	USB	-	-

* Unshielded=U, Shielded=S

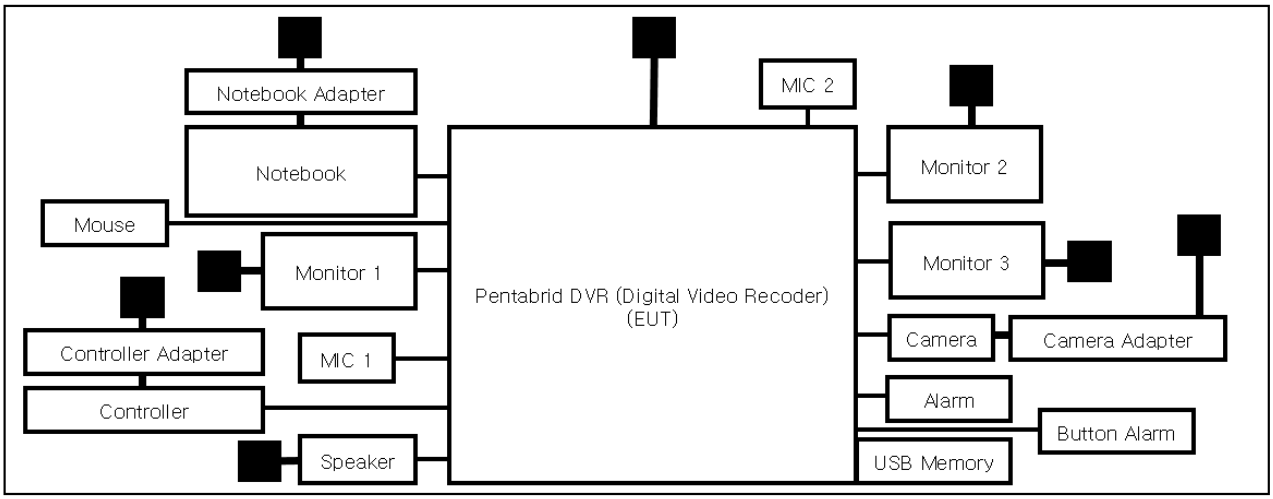
1.7 EUT Operating Mode(s)

Test Mode	operating
OP	EUT Monitoring, Ping Test

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

1.8 Configuration

■ AC Main
□ DC Main



1.9 Remarks when standards applied

The eSATA port is not tested, because it is not used.

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. The sites are constructed in conformance with the requirements of ANSI C63.4:2014 and CISPR 16-1-4:2012

1.12 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
KOREA	RRA	EMI (3 m & 10 m Semi-Anechoic Chamber , 10 m Open Area and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	KR0100
International	KOLAS	EMI (3 m & 10 m Semi-Anechoic Chamber , and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	KT489
USA	FCC	3 m & 10 m Semi-Anechoic Chamber, 10 m Open Area and Conducted test site to perform FCC Part 15/18 measurements.	KR0100
Canada	ISED	3 m & 10 m Semi-Anechoic Chamber and Conducted test site	23298-1
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	TÜ V SÜ D	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 0003

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 ☐ Group 2
☐ Class A ☐ Class B

☐ EN 55014-1:2006 +A2:2011

☐ EN 55014-2:1997 +A2:2008

☐ EN 55015:2013

☐ EN 61547:2009

☒ EN 55032:2015/AC:2013 ☒ 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

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

☐ AS/NZS CISPR32:2015 ☐ Class A ☐ Class B

☐ 47 CFR Part 15, Subpart B

- ☐ CISPR 22:2009 +A1:2010 ☐ Class A ☐ Class B
- ☐ ANSI C63.4-2014

☐ IC Regulation ICES-003 : 2016

- ☐ CAN/CSA CISPR 22-10 ☐ Class A ☐ Class B
- ☐ ANSI C63.4-2014

☐ RE– Directive 2014/53/EU

☐ EN 301 489-1 V1.9.2

- ☐ Equipment for fixed use
- ☐ Equipment for vehicular use
- ☐ Equipment for portable use

☐ EN 301 489-3 V1.6.1

☐ EN 301 489-17 V2.2.1

☐ EN 60945:2002

2.1 Conducted Emissions at Mains Power Ports

Test Date
Aug. 12, 2019

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	101781	04, 22, 2020
☒	LISN	ENV216	R & S	101787	01, 04, 2020
☒	LISN	ESH2-Z5	R & S	100450	04, 22, 2020
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	11, 26, 2019

Test Conditions
Temperature: 23,3 ℃
Relative Humidity: 54,5 % R.H.

Frequency Range of Measurement
150 ㎑ to 30 ㎒

Instrument Settings
IF Band Width: 9 ㎑

Test Results
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks
See Appendix A for test data.

2.2 Conducted Emissions at Telecommunication Ports

Test Date
Aug. 12, 2019

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	101781	04, 22, 2020
☒	LISN	ENV216	R & S	101787	01, 04, 2020
☒	LISN	ESH2-Z5	R & S	100450	04, 22, 2020
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	11, 26, 2019
☐	8-WIRE ISN CAT3,5	ENY81	R & S	100174	01, 07, 2020
☒	8-WIRE ISN CAT6	ENY81-CAT6	R & S	101665	01, 07, 2020

Test Conditions
Temperature: 23,3 ℃
Relative Humidity: 54,5 % R.H.

Frequency Range of Measurement
150 ㎑ to 30 ㎒

Instrument Settings
IF Band Width: 9 ㎑

Test Results
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks
See Appendix A for test data.

2.3 Radiated Electric Field Emissions(Below 1 ㎓)

Test Date
Aug. 12, 2019

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	04, 09, 2020
☒	AMPLIFIER	SCU 01	R & S	100603	11, 26, 2019
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	11, 29, 2020
☒	ATTENUATOR	8491A	HP	32173	03, 11, 2020

Test Conditions
Temperature: 23,9 ℃
Relative Humidity: 54,1 % R.H.

Frequency Range of Measurement
30 ㎒ to 1 ㎓

Instrument Settings
IF Band Width: 120 ㎑

Test Results
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks
See Appendix A for test data.

2.4 Radiated Electric Field Emissions(Above 1 ㎓)

Test Date
Aug. 13, 2019

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, 06, 2020
☒	PREAMPLIFIER	8449B	AGILENT	3008A01967	05, 27, 2020
☐	ATTENUATOR	8491A	HP	35496	03, 11, 2020
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	03, 12, 2021

Test Conditions
Temperature: 24,0 ℃
Relative Humidity: 54,5 % 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.

2.5 Harmonic Current Emissions

Test Date
Aug. 12, 2019

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, 09, 2020
☒	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

Test Conditions
Temperature: 23,7 ℃
Relative Humidity: 54,0 % R.H.

Classification of Equipment for Harmonic Current Emissions
☒ Class A
☐ Class B
☐ Class C(Below 25 W)
☐ Class C(Above 25 W)
☐ Class D

Test Results
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks
See Appendix A for test data.

2.6 Voltage Fluctuations and Flicker

Test Date
Aug. 12, 2019

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, 09, 2020
☒	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

Test Conditions
Temperature: 23,7 ℃
Relative Humidity: 54,0 % R.H.

Test Results
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks
See Appendix A for test data.

3.0 Criteria for compliance

Criteria for compliance was based on the following guidelines:
EN 50130-4:2011+A1:2014 Alarm systems-Part 4: Electromagnetic compatibility Product family standard: Immunity requirements for components of fire, intruder and social alarm systems

The variety and the diversity of the apparatus within the scope of this document makes it

difficult to define precise criteria for the evaluation of the immunity test results.

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

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

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

report, based on the following criteria:

Electrostatic discharge

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

Flickering of an indicator during the application of discharge is permissible, providing that is no

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

equipment as a change.

Radiated electromagnetic fields

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

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

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

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

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

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

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

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

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

Fast transient burst / slow high energy voltage surge

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

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

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

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

Conducted RF immunity

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

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

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

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

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

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

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

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

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

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

still be used; and

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

Voltage dip/interruption / Voltage variation

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

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

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

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

3.1 Electrostatic Discharge

Reference Standard
EN 61000-4-2:2009

Test Date
Aug. 17, 2019

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	10, 11, 2019
☒	HCP	-	KES	-	-
☒	VCP	-	KES	-	-

Test Conditions
Temperature: 23,2 ℃
Relative Humidity: 53,1 % R.H.
Atmospheric Pressure: 99,7 kPa

Test Specifications
Discharge Factor: ≥ 1 s

Discharge Impedance: 330 ohm / 150 pF

Kind of Discharge: Air, Contact (direct and indirect)

Polarity: Positive and Negative

Number of Discharge: 10 at all locations for Air discharge
10 at all locations for Contact discharge

Discharge Voltage:

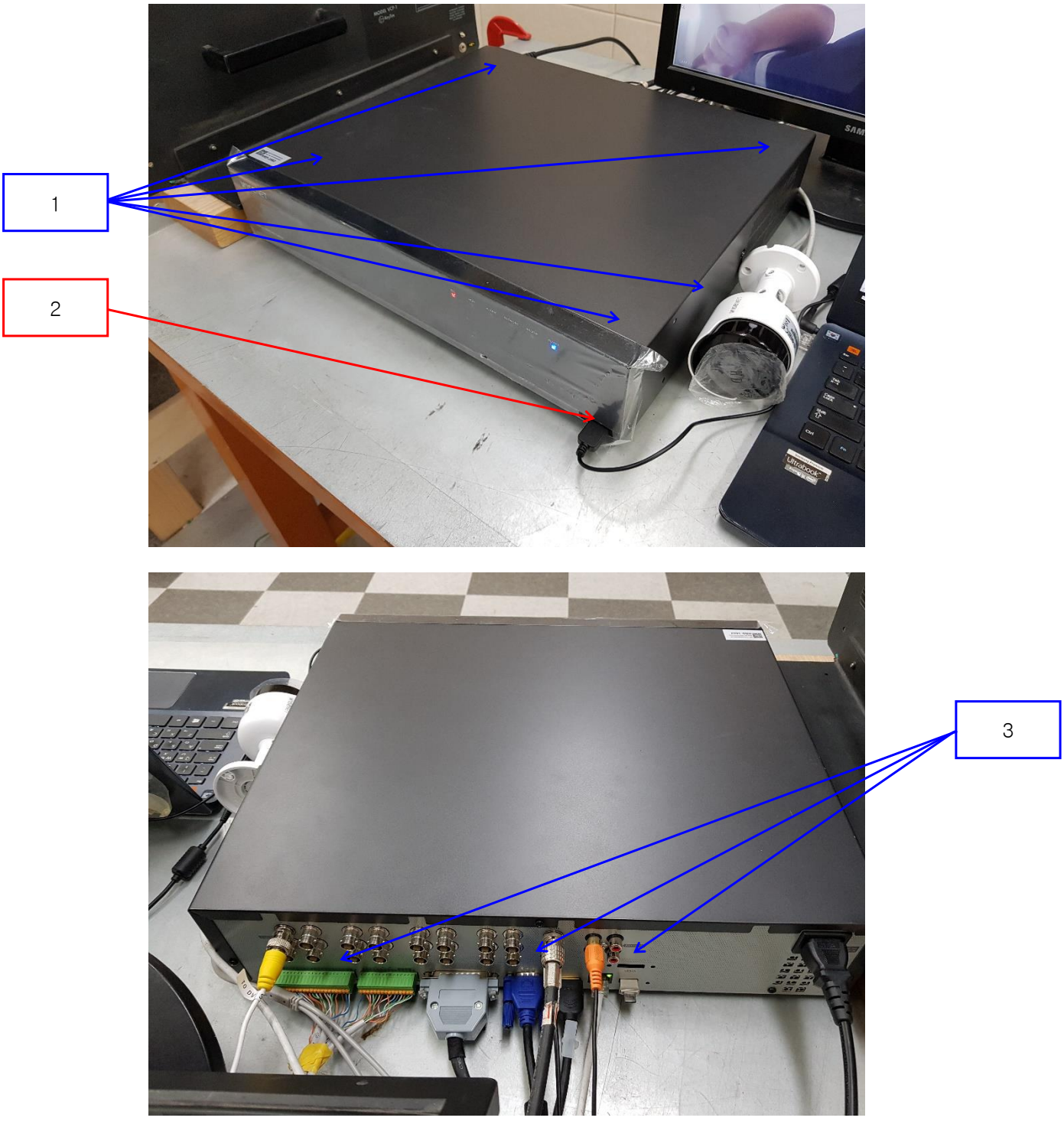
Contact	Air	HCP	VCP
☐ 2 kV	☒ 2 kV	☐ 2 kV	☐ 2 kV
☐ 4 kV	☒ 4 kV	☐ 4 kV	☐ 4 kV
☒ 6 kV	☐ 6 kV	☒ 6 kV	☒ 6 kV
☐ 8 kV	☒ 8 kV	☐ 8 kV	☐ 8 kV
☐ 15 kV	☐ 15 kV	☐ 15 kV	☐ 15 kV

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

Required Performance Criteria: ☒ Complied

Location of Discharge:

Air
Contact



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	Contact Discharge	Complied	-
2	Front USB Port	Air Discharge	Complied	-
3	Back Panel	Contact Discharge	Complied	-
4	Mouse	Air Discharge	Complied	-

Note: "Blank" = Not performed

Observations:
Complied – No degradation of function

Test Results

☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria

Remarks

PASS Required Performance Criteria

3.2 Radiated Electric Field Immunity

Reference Standard
EN 61000-4-3:2006 +A2:2010

Test Date
Aug. 15, 2019

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	R & S	177586	08, 06, 2020
☒	BROADBAND AMPLIFIER	BBA100	R & S	101239	08, 06, 2020
☒	BROADBAND AMPLIFIER	100S1G6M1	AR	579931	08, 06, 2020
☒	POWER METER	NRP2	R & S	103475	08, 06, 2020
☒	AVG POWER SENSOR	NRP-Z91	R & S	102526	08, 06, 2020
☒	AVG POWER SENSOR	NRP-Z91	R & S	102527	08, 06, 2020
☒	STACKED DOUBLE LOG-PER- ANTENNA	STPL9128 E	Schwarzbeck	9128ES-121	-
☒	DIRECTIONAL COUPLER	KYDC-D1070-DX40	KY TELECOM	KY150001	08, 06, 2020
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	03, 12, 2021

Test Conditions
Temperature: 23,9 ℃
Relative Humidity: 54,2 % R.H.
Atmospheric Pressure: 99,4 kPa

Test Specifications

Antenna Polarization: Horizontal & vertical unless indicated otherwise

Antenna Distance:	☒ 3 m	
Field Strength:	☐ 1 V/m	☐ 3 V/m
	☒ 10 V/m	
Frequency Range:	☐ 80 MHz to 1 GHz	☐ 1,4 GHz to 2,7 GHz
	☒ 80 MHz to 2,7 GHz	
Modulation:	☒ AM, 80 %, 1 kHz sine wave	
	☒ PM, 1 Hz (0,5 s ON : 0,5 s OFF)	
Frequency step:	☒ 1 % step	
Dwell Time:	☒ 1 s	☐ 3 s
# of Sides Radiated:	☒ 4	
Required Performance Criteria:	☒ Complied	

Test Data

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

Note: "Blank" = Not performed

Observations:
Complied – No degradation of function

Test Results

☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria

Remarks

PASS Required Performance Criteria

3.3 Electrical Fast Transients/Bursts

Reference Standard
EN 61000-4-4:2012

Test Date
Aug. 17, 2019

Test Location
EMS-EFT: Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	iec.control	EM TEST	5.4.7	-
☒	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	11, 27, 2019
☒	MOTOR VARIAC	MV2616	EM TEST	P1552169719	11, 27, 2019
☒	CAPACITIVE COUPLING CLAMP	HFK	EM TEST	P1633183115	11, 26, 2019

Test Conditions
Temperature: 23,2 ℃
Relative Humidity: 53,1 % R.H.
Atmospheric Pressure: 99,7 ㎪

Test Specifications

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

Test Data

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

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

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

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

☒ Signal ports and telecommunication ports – Coupling Clamp used

Mode of Application	Observations	
	(+) Burst (㎸)	(-) Burst (㎸)
NETWORK	Complied	Complied
VIDEO IN	Complied	Complied
SPOT	Complied	Complied
RS-485	Complied	Complied
Alarm Cable	Complied	Complied
Batton Alarm Cable	Complied	Complied

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

Test Results

☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria

Remarks

PASS Required Performance Criteria

3.4 Surge Transients

Reference Standard
EN 61000-4-5:2014

Test Date
Aug. 17, 2019

Test Location
EMS-Surge: Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	iec.control	EM TEST	5.4.7	-
☒	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	11, 27, 2019
☒	MOTOR VARIAC	MV2616	EM TEST	P1552169719	11, 27, 2019
☐	CAPACITIVE COUPLING CLAMP	HFK	EM TEST	P1633183115	11, 26, 2019

Test Conditions
Temperature: 23,2 ℃
Relative Humidity: 53,1 % R.H.
Atmospheric Pressure: 99,7 kPa

Test Specifications

AC Power Lines

Source Impedance:	12 ohm for common Mode and 2 ohm for differential Mode
Surge Amplitude :	Common Mode ☒ (0,5 / 1,0 / 2,0) kV Differential Mode ☒ (0,5 / 1,0) kV
Number of Surges:	☒ 5 surges per angle
Angle:	☒ 0°, 90°, 180°, 270° (input a.c. power port)
Polarity:	☒ Positive & Negative
Repetition Rate:	☐ 1 surge per min ☒ 1 surge per 30 sec.
Required Performance Criteria:	☒ Complied

Other supply / Signal Lines

Source Impedance:	42 ohm for common Mode
Surge Amplitude:	Common Mode ☐ (0,5 / 1,0) kV
Number of Surges:	☐ 5 Surges
Polarity:	☐ Positive & Negative
Repetition Rate:	☐ 1 surge per min ☐ 1 surge per 30 sec.
Required Performance Criteria:	☐ Complied

Test Data

☒ 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	Observations	
	(+) Surge (㎸)	(-) Surge (㎸)
-	-	-

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

Test Results

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

Remarks

PASS Required Performance Criteria
Other supply/signal lines : No test is required because it is not permitted to connect cables > 30 m long.

3.5 Conducted Disturbance

Reference Standard
EN 61000-4-6:2014

Test Date
Aug. 16, 2019

Test Location
EMS-CS: Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	icd.control	EM TEST	5.3.11	-
☒	CONTINUOUS WAVE SIMULATOR	CWS 500N1.4	EM TEST	P1602169880	11, 26, 2019
☒	ATTENUATOR	ATT 6/80	EM TEST	P1614178148	11, 26, 2019
☒	CDN	CDN M016	TESEQ	43694	11, 26, 2019
☐	CDN	CDN M016	TESEQ	43697	11, 26, 2019
☒	CDN	CDN T800	TESEQ	42800	11, 26, 2019
☒	EM CLAMP	KEMZ 801A	TESEQ	44099	11, 27, 2019

Test Conditions
Temperature: 23,3 ℃
Relative Humidity: 56,9 % R.H.
Atmospheric Pressure: 100,0 ㎪

Test Specifications
Frequency range: ☒ 150 ㎑ to 100 ㎒ ☐ 150 ㎑ to 80 ㎒

Voltage Level: ☐ 1 Vrms ☐ 3 Vrms
☒ 10 Vrms

Modulation: ☒ AM, 80 %, 1 ㎑ sine wave
☒ PM, 1 ㎐ (0,5 s ON : 0,5 s OFF)

Frequency step: ☒ 1 % step

Dwell Time: ☒ 1 s ☐ 3 s

Required Performance Criteria: ☒ Complied

Test Data

☒ Input a.c. power ports

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

☐ Input d.c. power ports

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

☒ Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Observations
NETWORK	CDN	Complied
VIDEO IN	Clamp	Complied
SPOT	Clamp	Complied
RS-485	Clamp	Complied
Alarm Cable	Clamp	Complied
Batton Alarm Cable	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

3.6 Voltage Dips and Short Interruptions

Reference Standard
EN 61000-4-11:2004

Test Date
Aug. 17, 2019

Test Location
EMS-Voltage dip: Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	iec.control	EM TEST	5.4.7	-
☒	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	11, 27, 2019
☒	MOTOR VARIAC	MV2616	EM TEST	P1552169719	11, 27, 2019

Test Conditions
Temperature: 23,2 ℃
Relative Humidity: 53,1 % R.H.
Atmospheric Pressure: 99,7 kPa

Test Specifications & Observations/Remarks

- Voltage Dips and Short Interruptions

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

- Voltage variations

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

Observations:
Complied – No degradation of function

Test Results

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

Remarks

PASS Required Performance Criteria

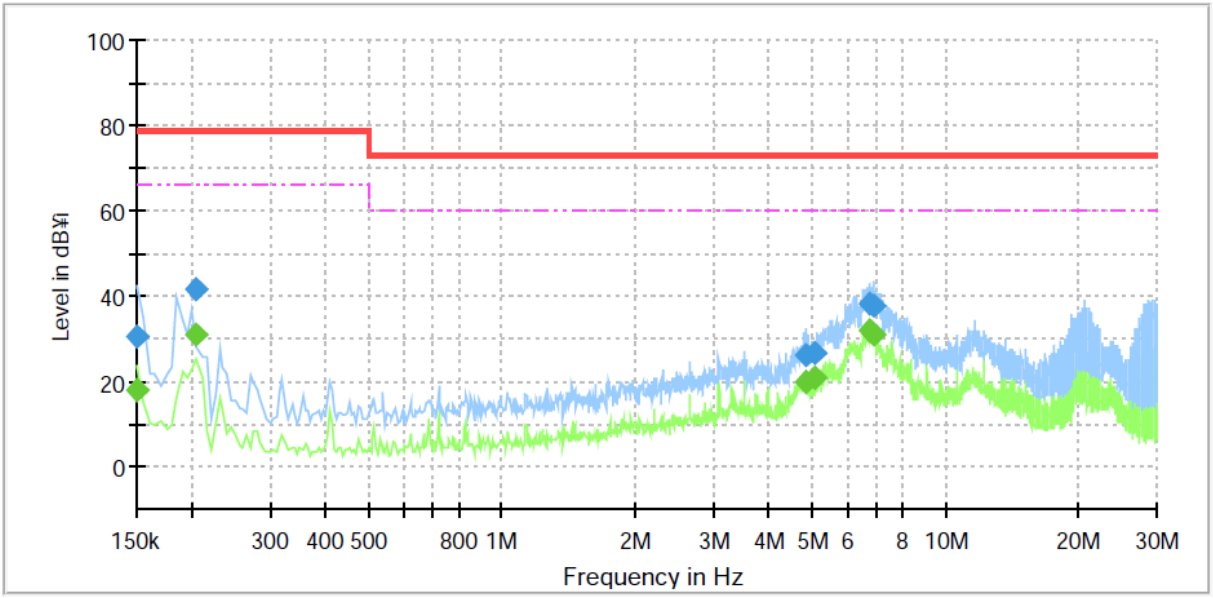
APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

[HOT]

Common Information

Test Description:	Conducted Emission
Model No.:	HRX-1621P
Phase:	
Mode:	H
Operator Name:	KES



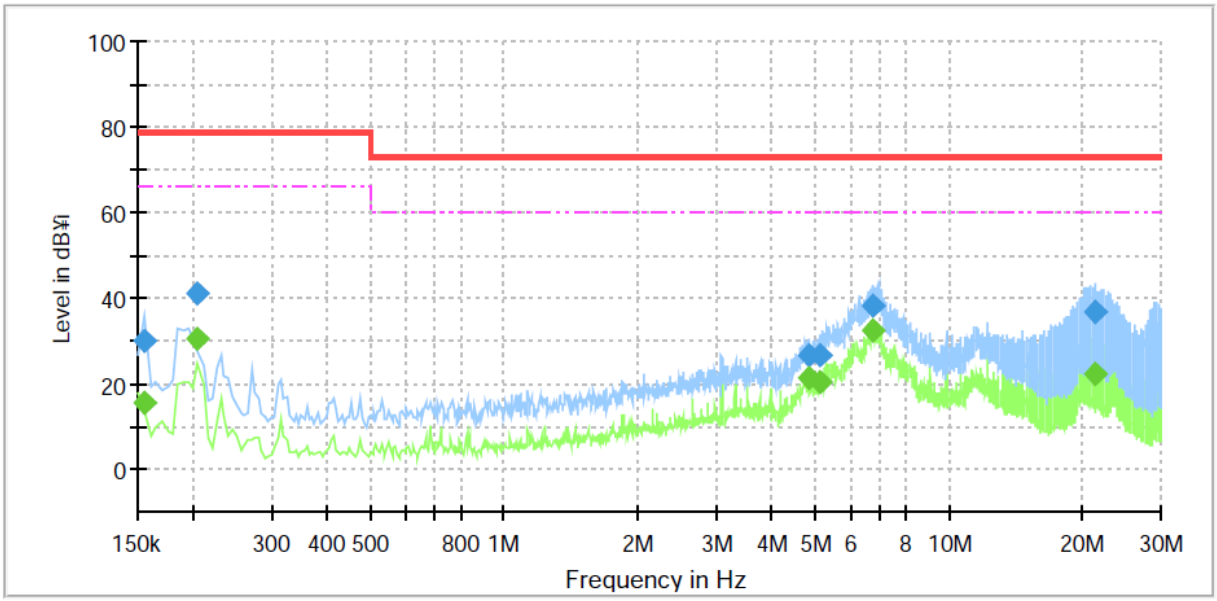
Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.150000	---	17.87	66.00	48.13	1000.0	9.000	L1	19.5
0.150000	30.37	---	79.00	48.63	1000.0	9.000	L1	19.5
0.205000	---	31.02	66.00	34.98	1000.0	9.000	L1	19.5
0.205000	41.60	---	79.00	37.40	1000.0	9.000	L1	19.5
4.840000	---	20.13	60.00	39.87	1000.0	9.000	L1	19.7
4.840000	25.96	---	73.00	47.04	1000.0	9.000	L1	19.7
5.070000	---	21.11	60.00	38.89	1000.0	9.000	L1	19.6
5.070000	26.44	---	73.00	46.56	1000.0	9.000	L1	19.6
6.740000	---	32.04	60.00	27.96	1000.0	9.000	L1	19.9
6.740000	38.31	---	73.00	34.69	1000.0	9.000	L1	19.9
6.910000	---	31.23	60.00	28.77	1000.0	9.000	L1	19.9
6.910000	37.69	---	73.00	35.31	1000.0	9.000	L1	19.9

[NEUTRAL]

Common Information

Test Description:	Conducted Emission
Model No.:	HRX-1621P
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	---	15.77	66.00	50.23	1000.0	9.000	N	19.5
0.155000	30.05	---	79.00	48.95	1000.0	9.000	N	19.5
0.205000	---	30.43	66.00	35.57	1000.0	9.000	N	19.5
0.205000	41.32	---	79.00	37.68	1000.0	9.000	N	19.5
4.850000	---	21.28	60.00	38.72	1000.0	9.000	N	19.7
4.850000	26.71	---	73.00	46.29	1000.0	9.000	N	19.7
5.125000	---	20.27	60.00	39.73	1000.0	9.000	N	19.7
5.125000	26.60	---	73.00	46.40	1000.0	9.000	N	19.7
6.720000	---	32.34	60.00	27.66	1000.0	9.000	N	19.9
6.720000	38.37	---	73.00	34.63	1000.0	9.000	N	19.9
21.405000	---	22.35	60.00	37.65	1000.0	9.000	N	20.5
21.405000	37.03	---	73.00	35.97	1000.0	9.000	N	20.5

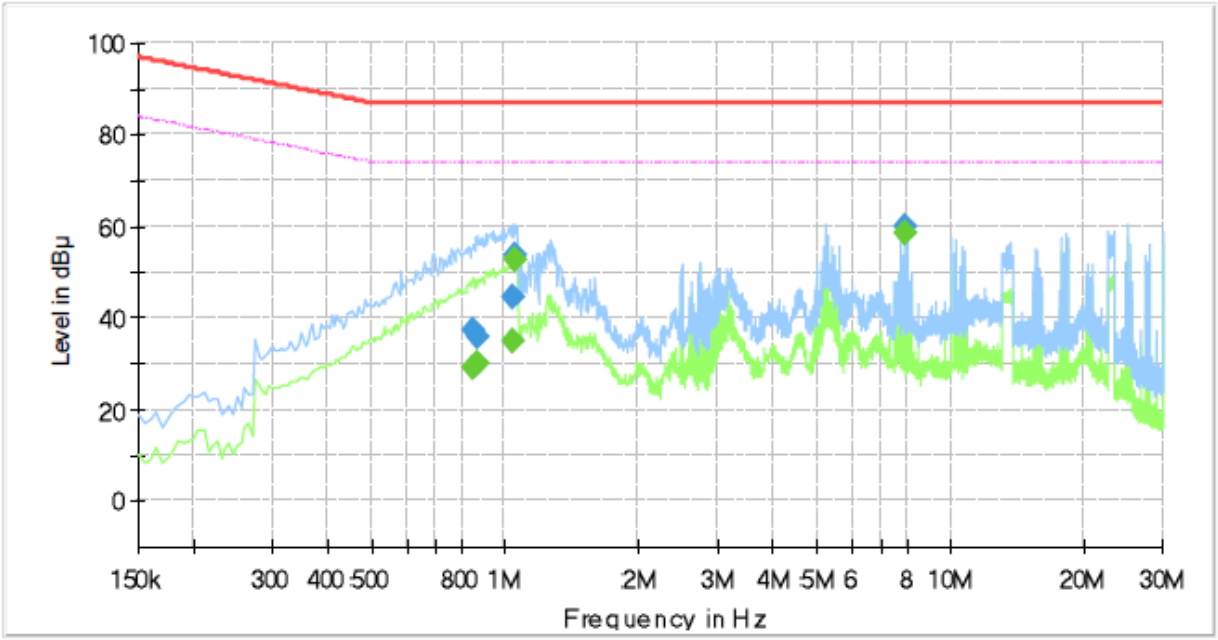
♦ Calculation
QuasiPeak[dBuV] / CAverage [dBuV] = Reading Value[dBuV] + Corr. [dB]
QuasiPeak / CAverage : The Final Value
Reading Value : Not shown in the table.
Corr. : Correction values (LISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

Conducted Emissions at Telecommunication Ports

[1 000 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	HRX-1621P
Mode :	
Speed :	1 000 Mbps
Operator Name:	KES

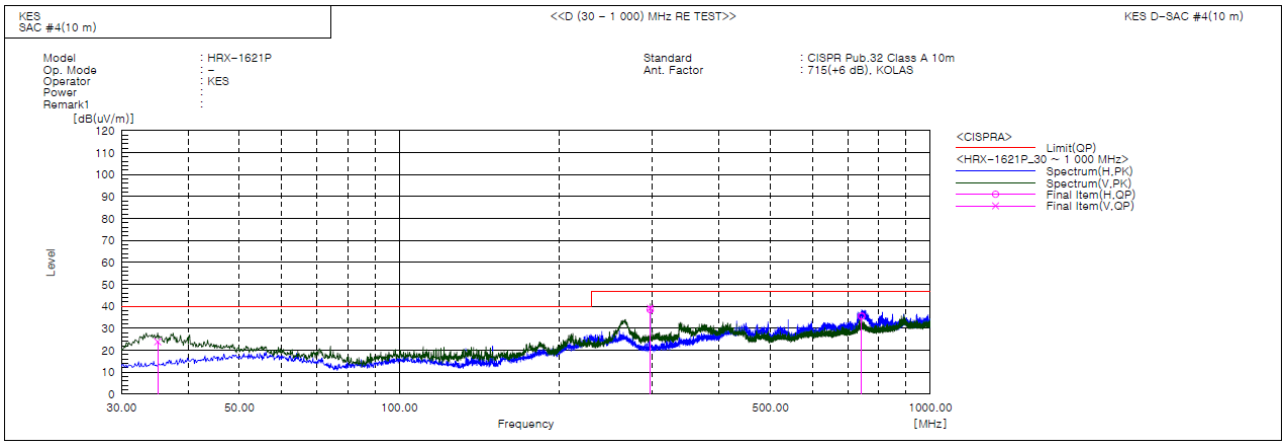


Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.845000	---	29.22	74.00	44.78	1000.0	9.000	Single Line	20.2
0.845000	37.17	---	87.00	49.83	1000.0	9.000	Single Line	20.2
0.865000	---	30.08	74.00	43.92	1000.0	9.000	Single Line	20.2
0.865000	35.74	---	87.00	51.26	1000.0	9.000	Single Line	20.2
1.040000	---	35.10	74.00	38.90	1000.0	9.000	Single Line	20.3
1.040000	44.36	---	87.00	42.64	1000.0	9.000	Single Line	20.3
1.050000	---	52.51	74.00	21.49	1000.0	9.000	Single Line	20.3
1.050000	53.56	---	87.00	33.44	1000.0	9.000	Single Line	20.3
7.925000	---	58.28	74.00	15.72	1000.0	9.000	Single Line	19.9
7.925000	59.86	---	87.00	27.14	1000.0	9.000	Single Line	19.9

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

Radiated Electric Field Emissions(Below 1 GHz)

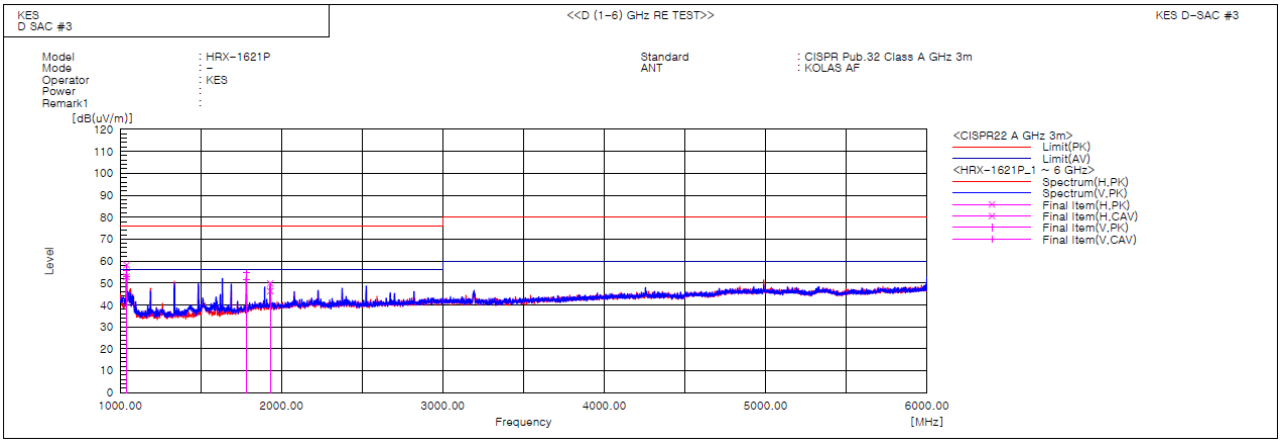


Final Result

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	35.093	V	48.8	-24.9	23.9	40.0	16.1	105.0	341.0	
2	296.986	V	57.9	-18.7	39.2	47.0	7.8	135.0	333.0	
3	296.996	H	57.2	-18.7	38.5	47.0	8.5	320.0	186.0	
4	742.465	H	42.9	-7.4	35.5	47.0	11.5	400.0	332.0	

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

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	1039.460	H	67.5	62.1	-9.3	58.2	52.8	76.0	56.0	17.8	3.2	100.0	348.0	
2	1930.290	H	52.1	48.5	-2.3	49.8	46.2	76.0	56.0	26.2	9.8	100.0	69.3	
3	1039.550	V	64.9	62.0	-9.3	55.6	52.7	76.0	56.0	20.4	3.3	100.0	358.0	
4	1781.890	V	58.3	55.0	-3.6	54.7	51.4	76.0	56.0	21.3	4.6	100.0	351.4	

♦ Calculation

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

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

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

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

Harmonic Current Emissions and Voltage Fluctuations and Flicker

Average harmonic current results

Hn	Ieff [A]	% of Limit	Limit [A]	Result
1	0.099			
2	0.037	3.389	1.080	PASS
3	0.048	2.066	2.300	PASS
4	0.025	5.913	0.430	PASS
5	0.016	1.447	1.140	PASS
6	0.010	3.191	0.300	PASS
7	0.008	1.014	0.770	PASS
8	0.009	3.737	0.230	PASS
9	0.005	1.294	0.400	PASS
10	0.005	2.806	0.184	PASS
11	0.005	1.475	0.330	n/a
12	0.005	3.049	0.153	n/a
13	0.005	2.184	0.210	n/a
14	0.004	2.869	0.131	n/a
15	0.004	2.426	0.150	n/a
16	0.003	2.916	0.115	n/a
17	0.003	2.411	0.132	n/a
18	0.003	2.904	0.102	n/a
19	0.003	2.353	0.118	n/a
20	0.003	2.991	0.092	n/a
21	0.002	1.540	0.161	n/a
22	0.003	3.004	0.084	n/a
23	0.002	1.591	0.147	n/a
24	0.002	3.029	0.077	n/a
25	0.002	1.697	0.135	n/a
26	0.002	3.057	0.071	n/a
27	0.002	1.725	0.125	n/a
28	0.002	3.046	0.066	n/a
29	0.002	1.770	0.116	n/a
30	0.002	3.243	0.061	n/a
31	0.002	1.779	0.109	n/a
32	0.002	3.327	0.058	n/a
33	0.002	1.848	0.102	n/a
34	0.002	3.447	0.054	n/a
35	0.002	1.870	0.096	n/a
36	0.002	3.561	0.051	n/a
37	0.002	1.985	0.091	n/a
38	0.002	3.611	0.048	n/a
39	0.002	1.998	0.087	n/a
40	0.002	3.760	0.046	n/a

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.

Test Data - Harmonics (continued)

Maximum harmonic current results

Hn	Ieff [A]	% of Limit	Limit [A]	Result
1	0.100			
2	0.041	2.510	1.620	PASS
3	0.050	1.453	3.450	PASS
4	0.027	4.182	0.645	PASS
5	0.018	1.076	1.710	PASS
6	0.011	2.463	0.450	PASS
7	0.009	0.739	1.155	PASS
8	0.009	2.648	0.345	PASS
9	0.006	0.965	0.600	PASS
10	0.006	2.047	0.276	PASS
11	0.005	1.076	0.495	PASS
12	0.005	2.216	0.230	PASS
13	0.005	1.573	0.315	n/a
14	0.004	2.245	0.197	n/a
15	0.004	1.752	0.225	n/a
16	0.004	2.112	0.173	n/a
17	0.003	1.741	0.199	n/a
18	0.003	2.116	0.153	n/a
19	0.003	1.716	0.178	n/a
20	0.003	2.132	0.138	n/a
21	0.003	1.676	0.161	n/a
22	0.003	2.167	0.125	n/a
23	0.002	1.701	0.147	n/a
24	0.003	2.187	0.115	n/a
25	0.003	1.858	0.135	n/a
26	0.002	2.194	0.106	n/a
27	0.002	1.842	0.125	n/a
28	0.002	2.240	0.099	n/a
29	0.002	1.970	0.116	n/a
30	0.002	2.408	0.092	n/a
31	0.002	1.971	0.109	n/a
32	0.002	2.426	0.086	n/a
33	0.002	2.035	0.102	n/a
34	0.002	2.540	0.081	n/a
35	0.002	2.061	0.096	n/a
36	0.002	2.618	0.077	n/a
37	0.002	2.149	0.091	n/a
38	0.002	2.628	0.073	n/a
39	0.002	2.185	0.087	n/a
40	0.002	2.705	0.069	n/a

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.

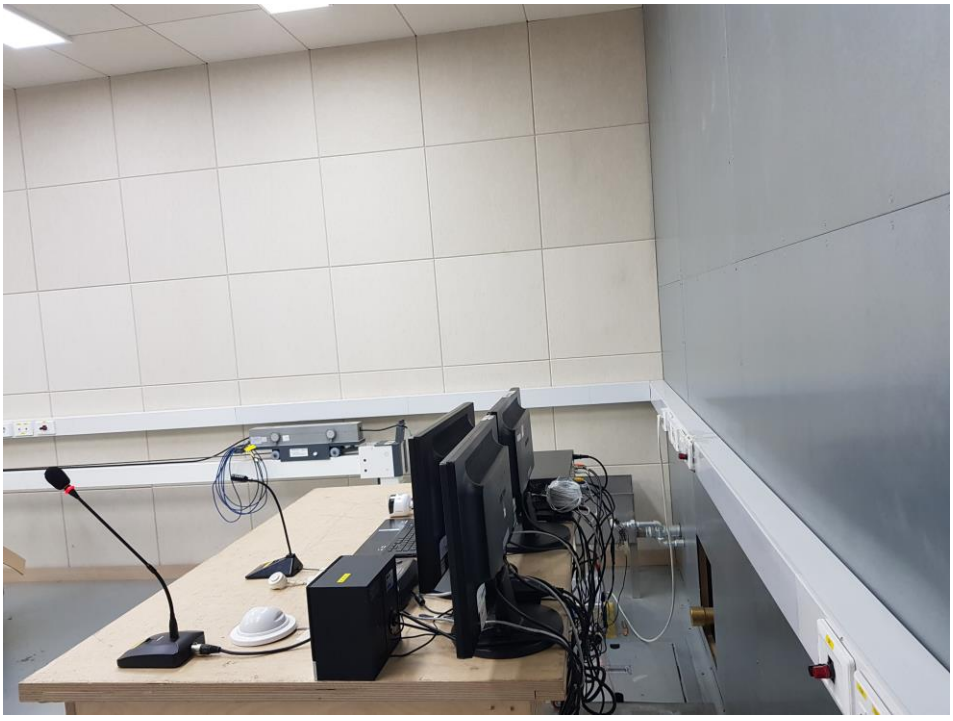
Test Data - Voltage Fluctuations

Maximum Flicker results

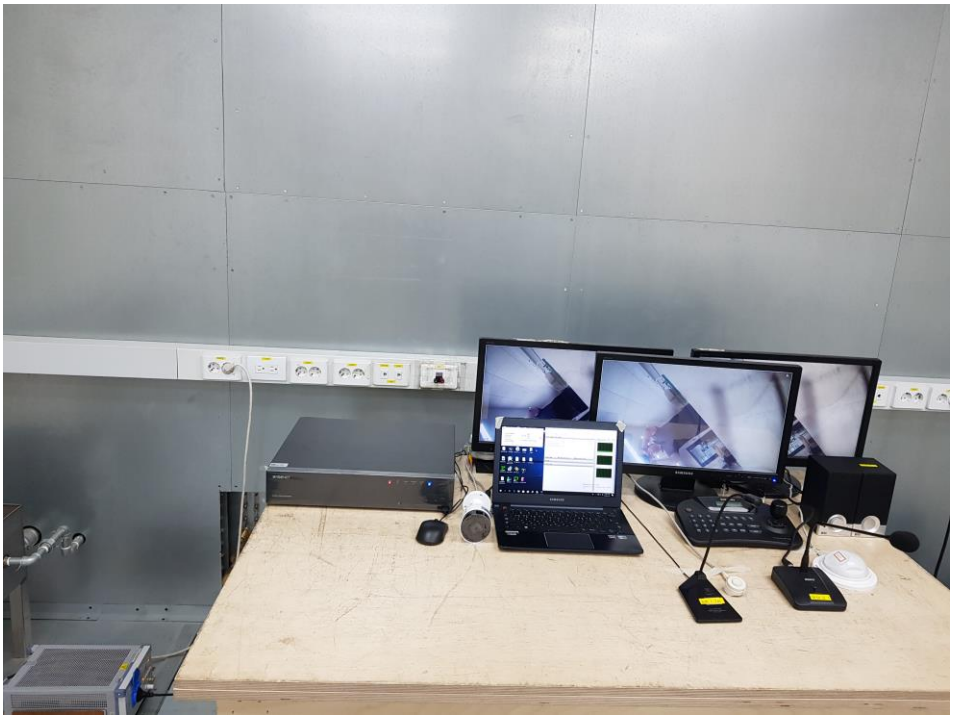
Flicker Measurements					
	Plt	**Max Pst**	**Max Dc**	**Max Dmax**	**Max Tmax**
Line 1:	0.028	0.028	0	< 0.2	0
Limits:	0.65	1	3.3	4	0.5
Results:	PASS	PASS	PASS	PASS	PASS

Test Setup Photos and Configuration

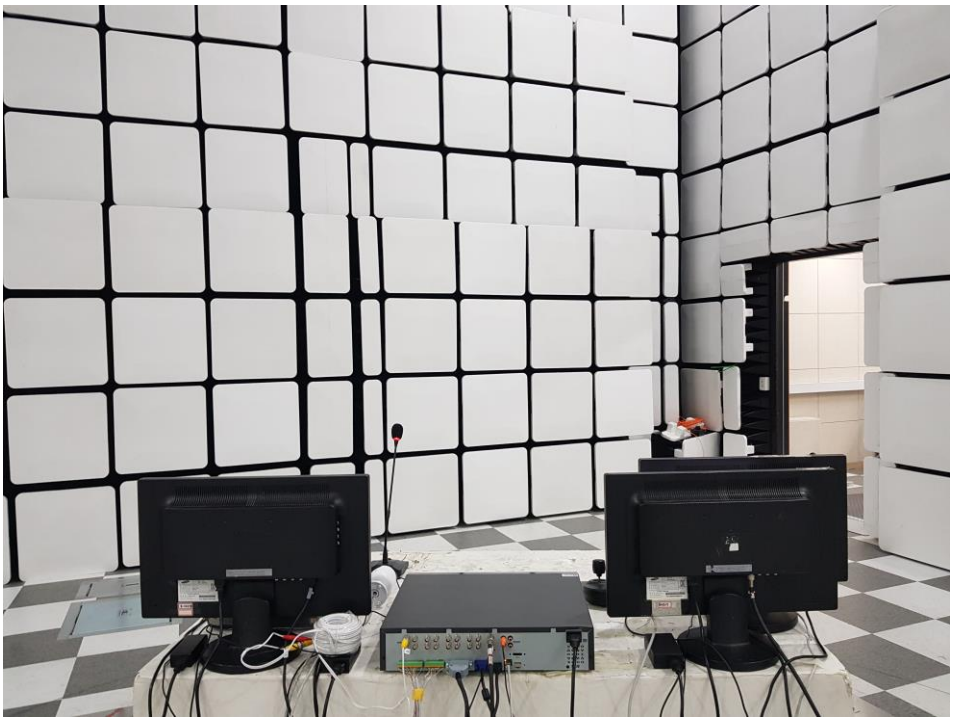
Conducted Voltage Emissions



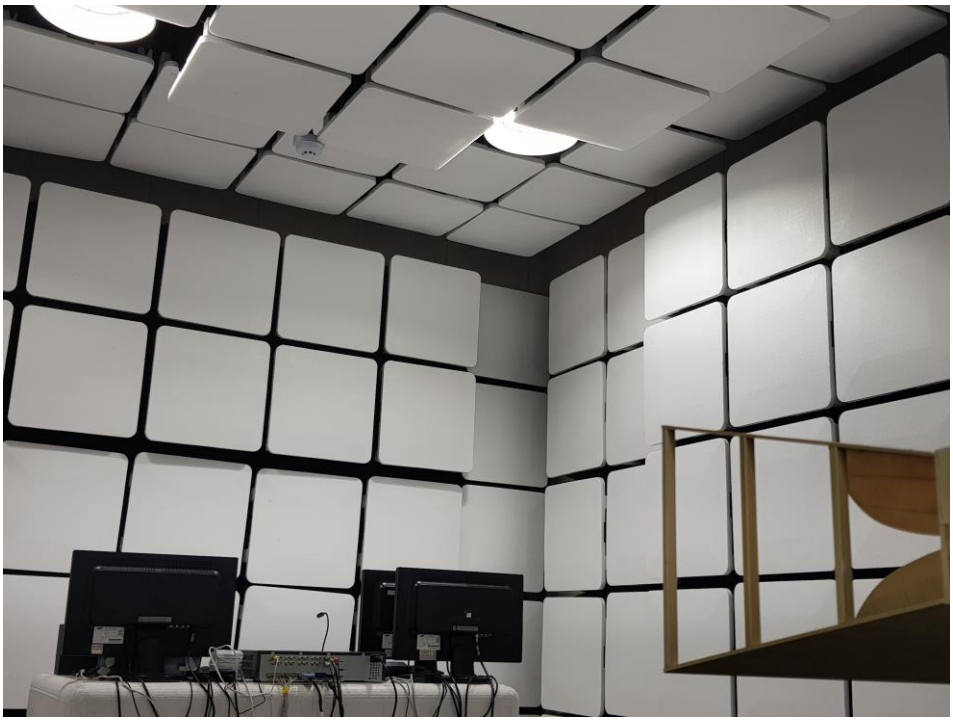
Conducted Telecommunication Emissions



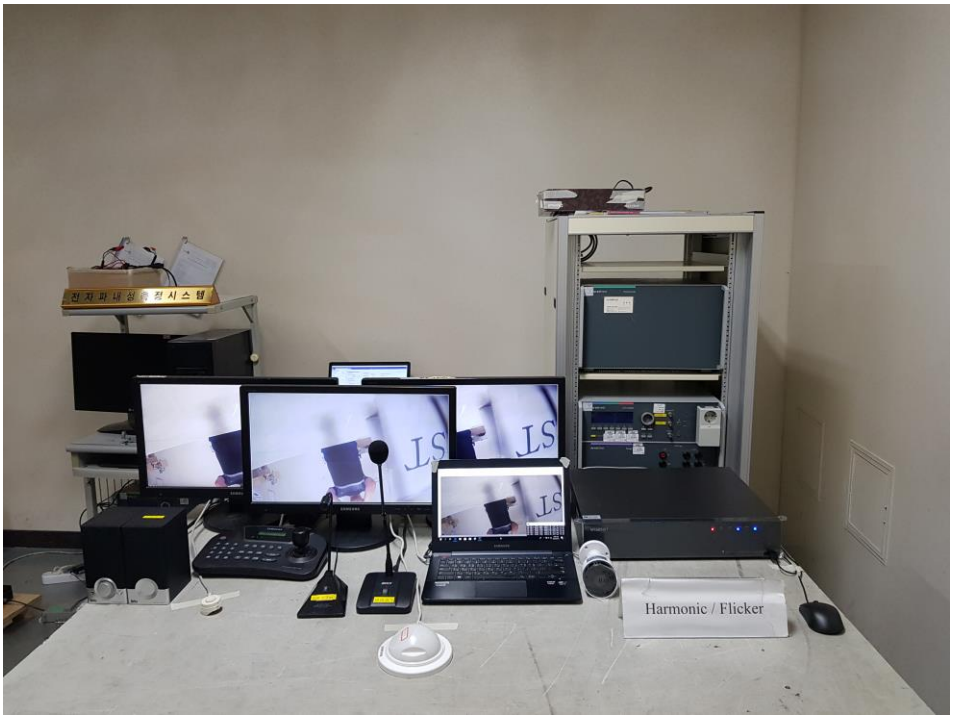
Radiated Electric Field Emissions(Below 1 GHz)



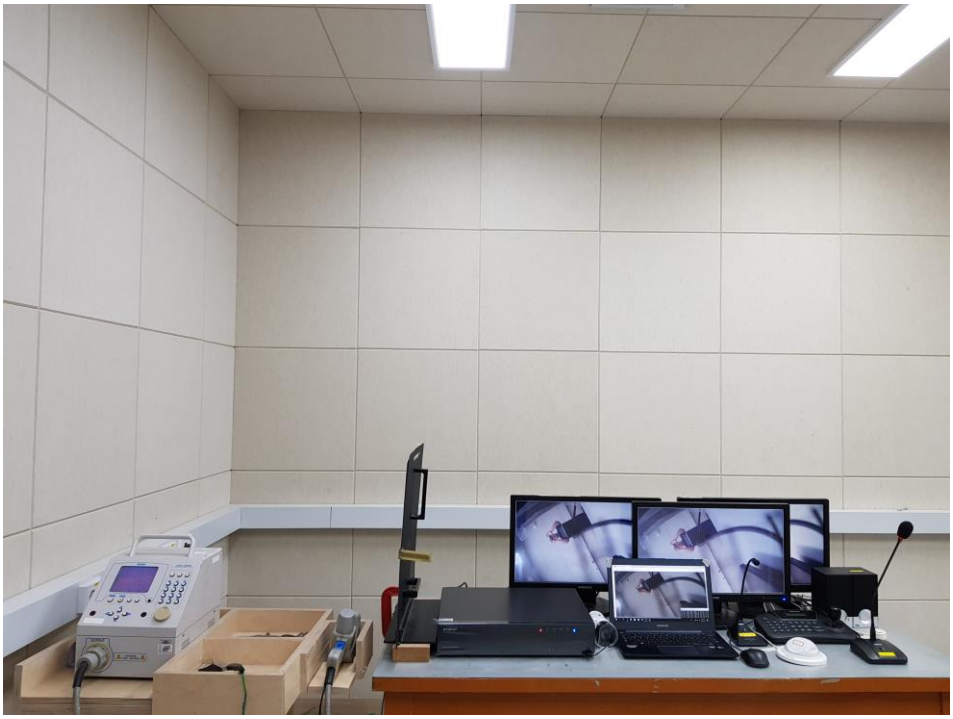
Radiated Electric Field Emissions(Above 1 GHz)



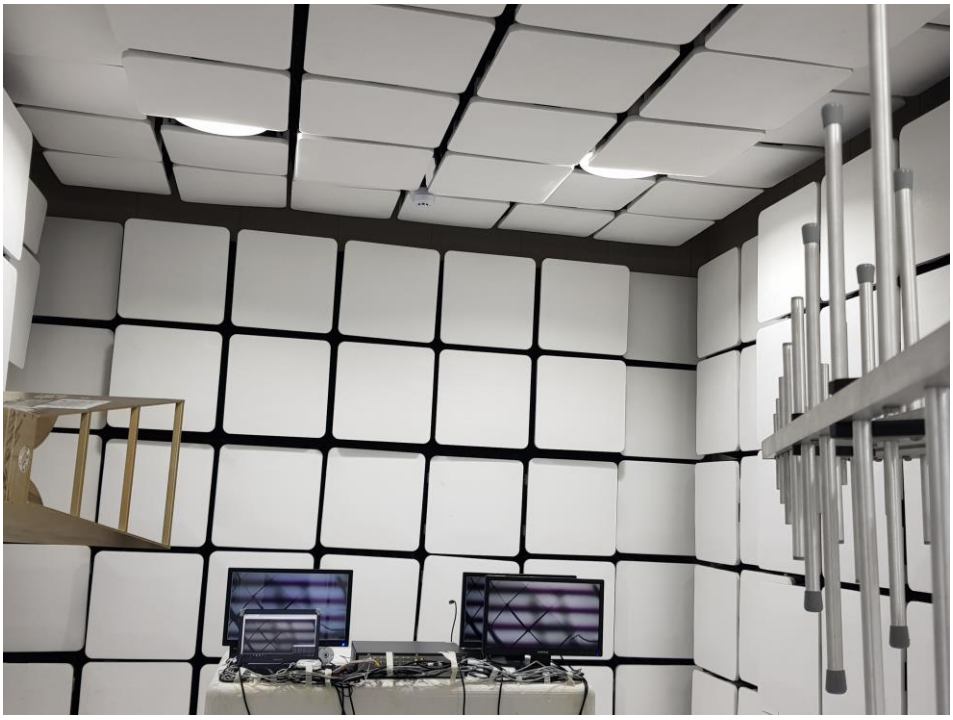
Harmonic Current Emissions and Voltage Fluctuations and Flicker



Electrostatic Discharge



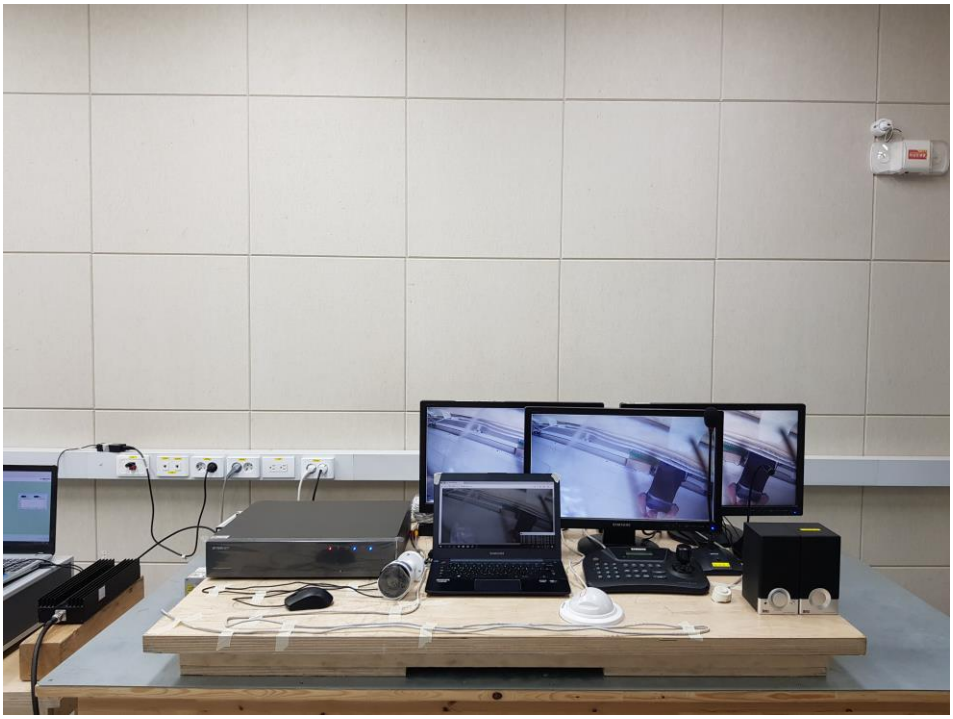
Radiated Electric Field Immunity



Electrical Fast Transients / Bursts

Surge Transients

Conducted Disturbance

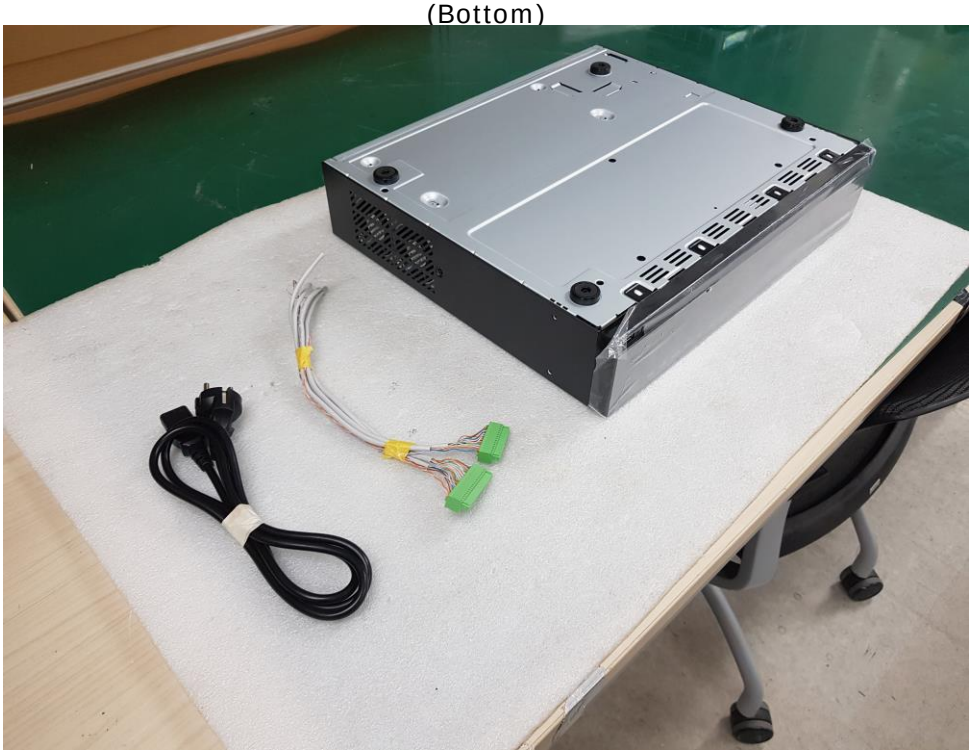


Voltage Dips and Short Interruptions

EUT External Photographs

(Top)

(Bottom)

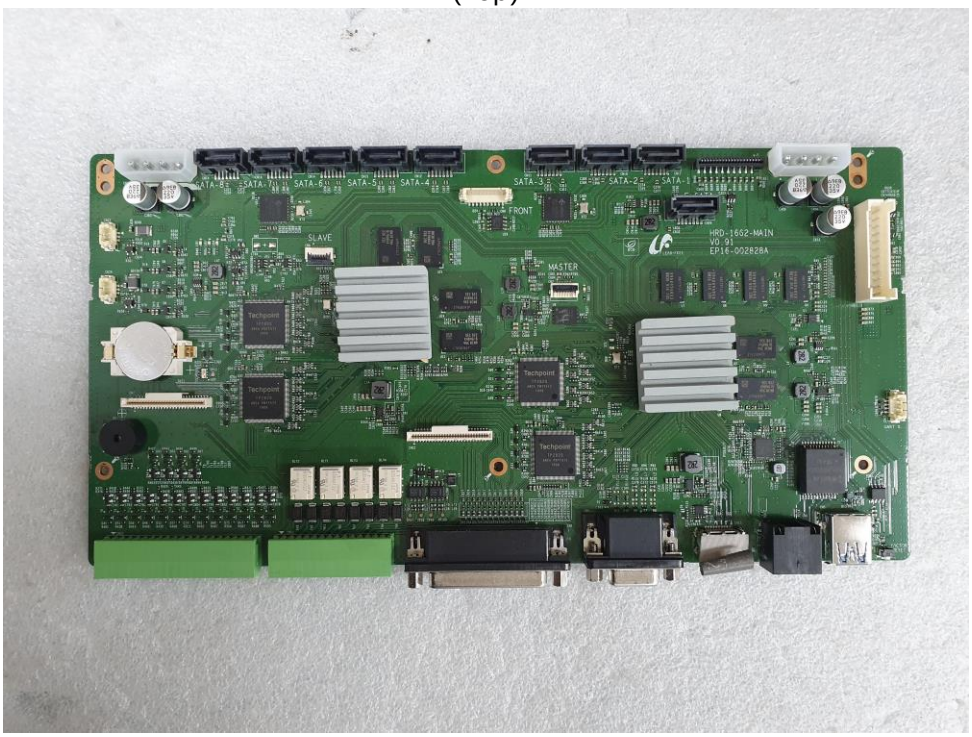


EUT Internal Photographs

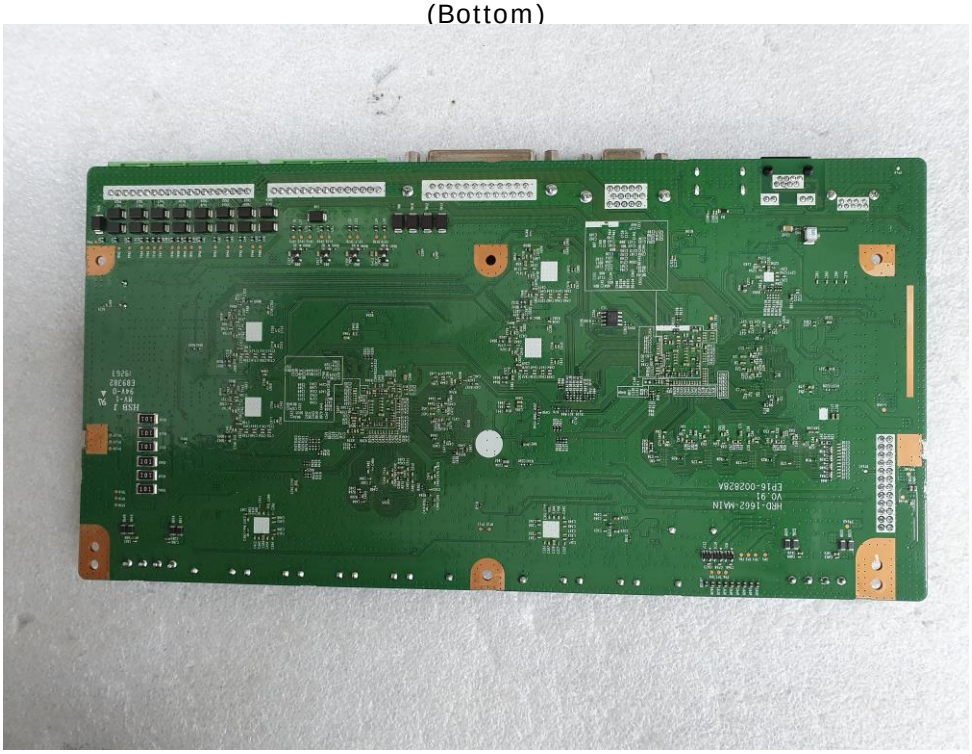
(Internal View)

EUT Internal View – Main Board

(Top)

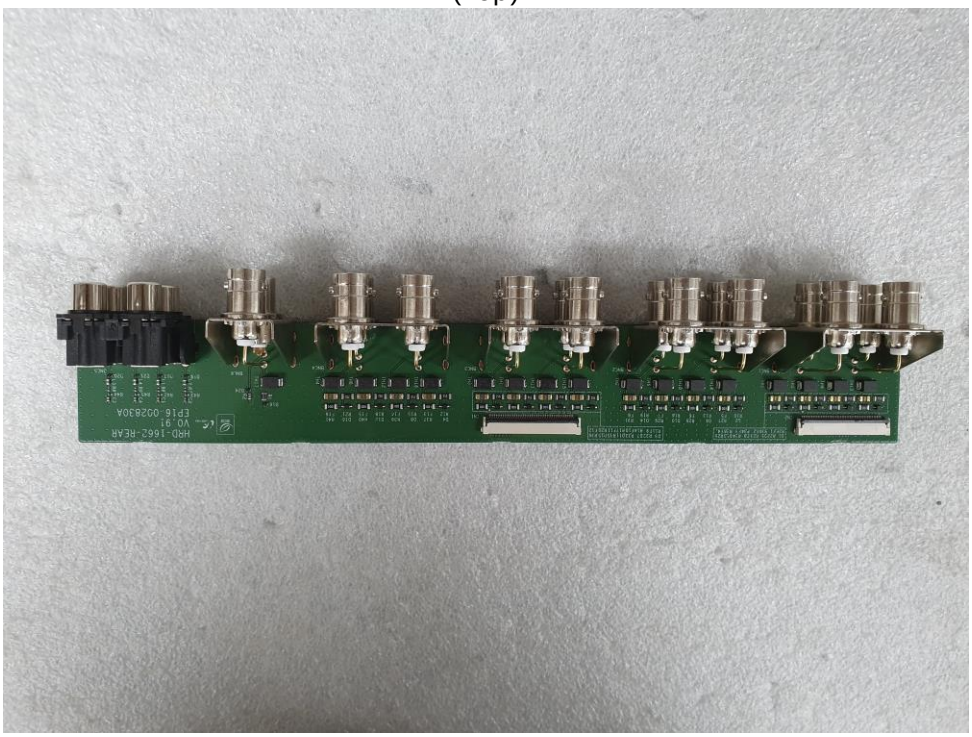


(Bottom)

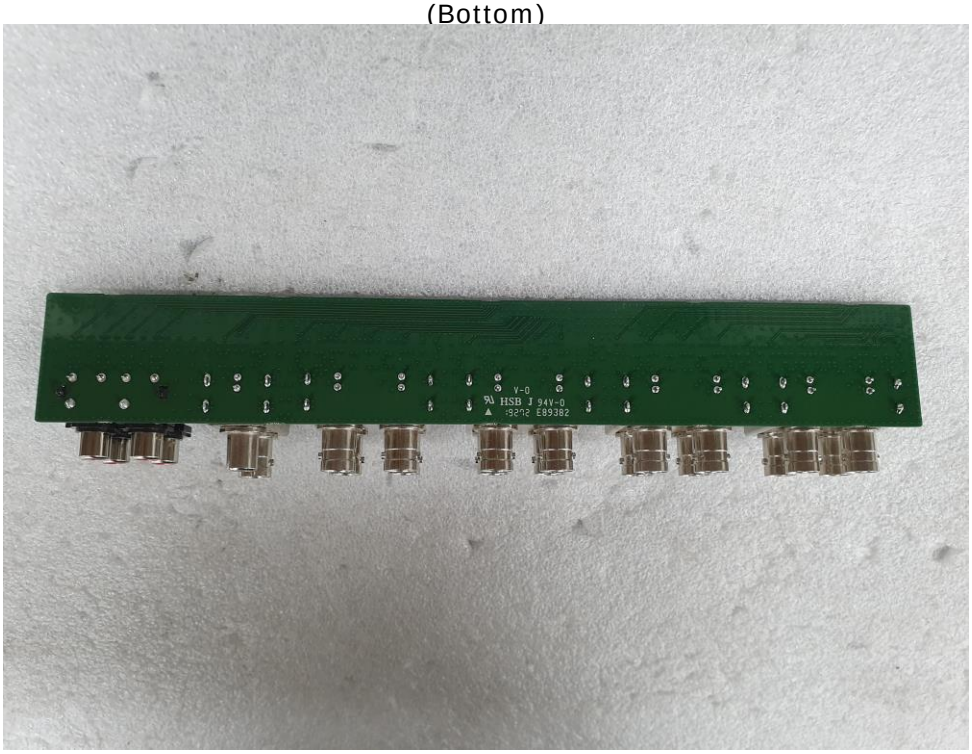


EUT Internal View – Sub Board 1

(Top)

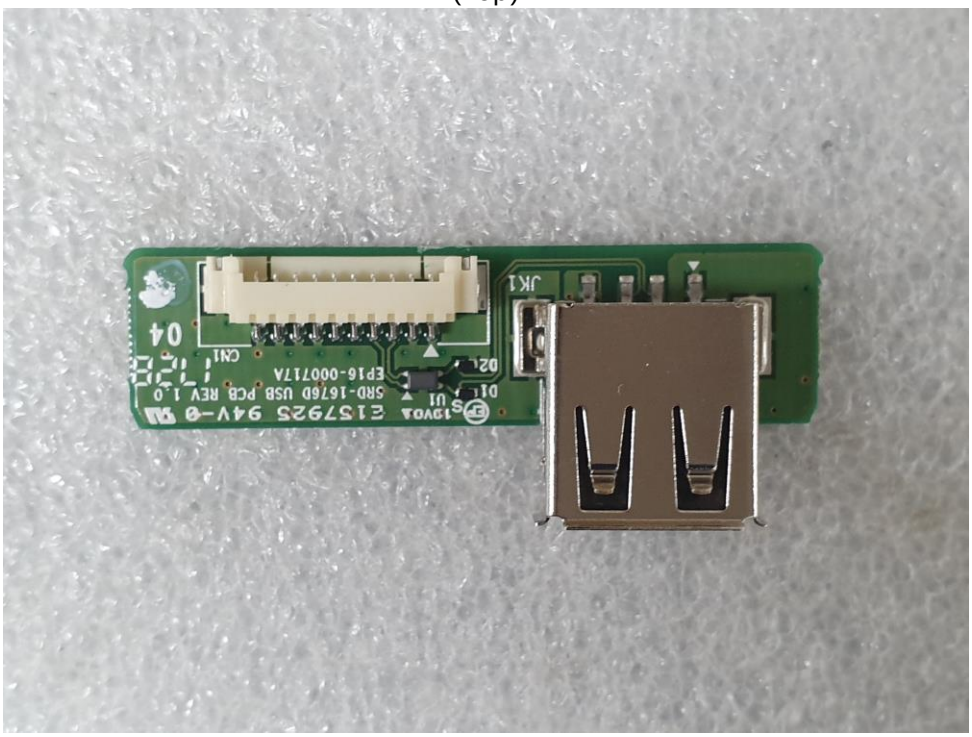


(Bottom)

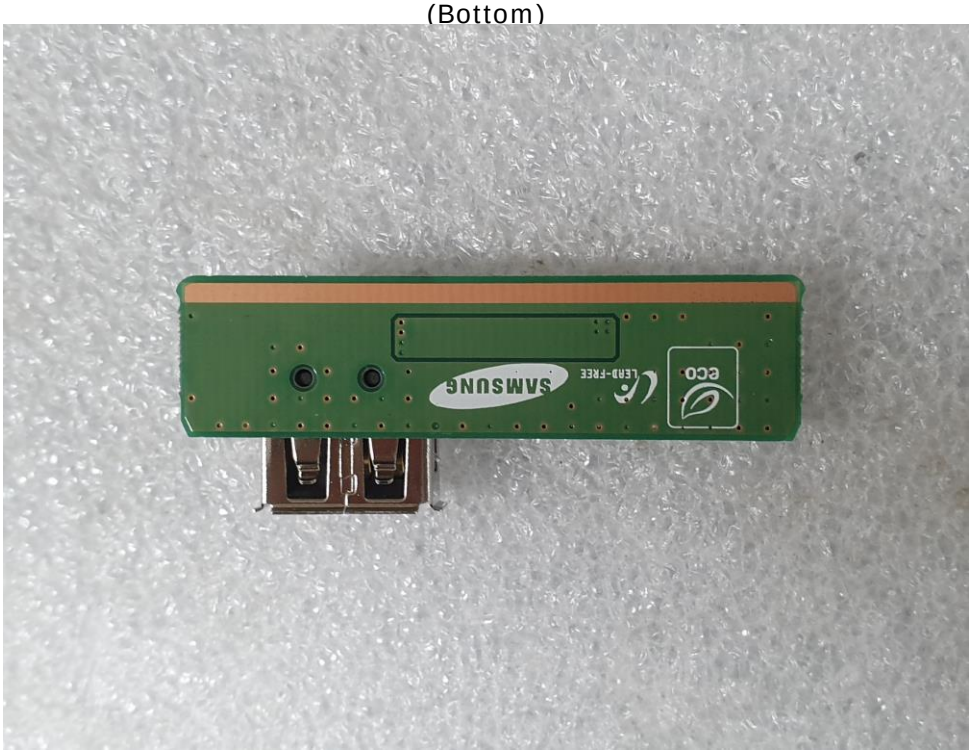


EUT Internal View – Sub Board 2

(Top)



(Bottom)



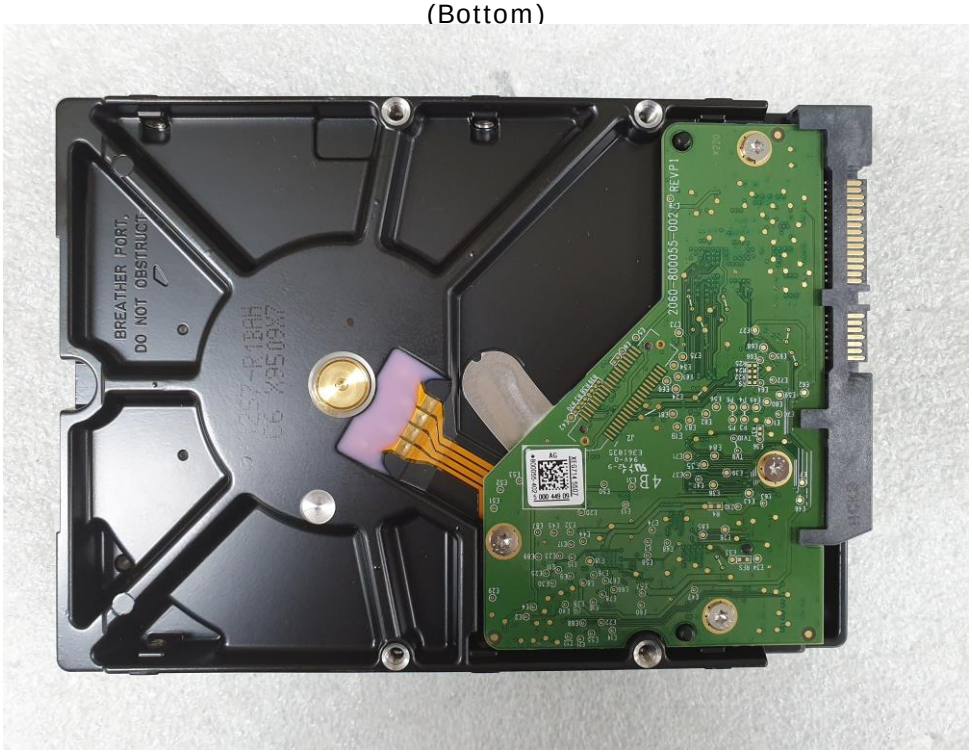
EUT Internal View – Sub Board 3

(Top)

EUT Internal View – HDD

(Top)

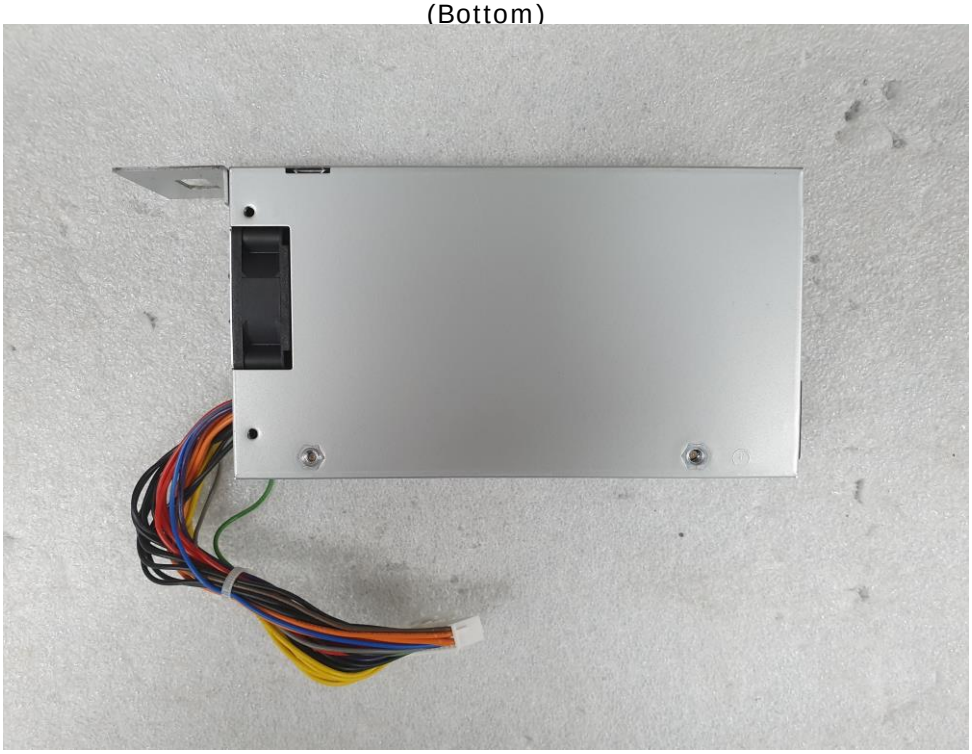
(Bottom)



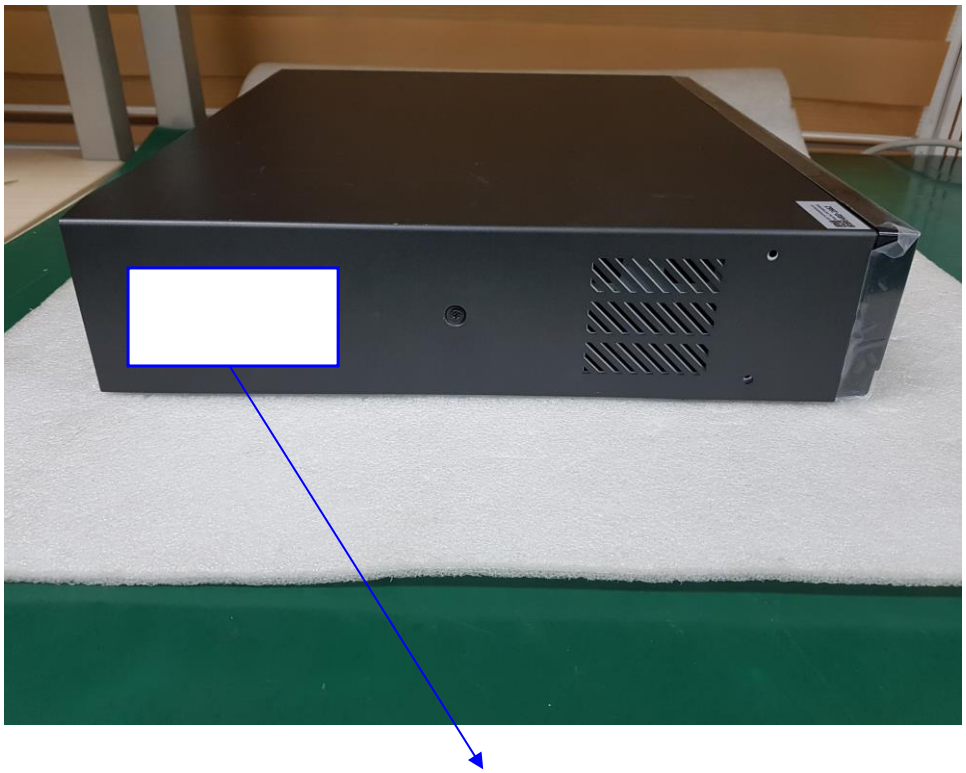
EUT Internal View – SMPS

(Top)

(Bottom)



Label and Location



Pentabrid DVR (Digital Video Recoder)

Model No : HRX-1621P

Manufacturer : HANWHA TECHWIN(TIANJIN) CO., LTD

Made in China

CE