EMC TEST REPORT For CE

Test Report No.	:	KES-E1-17T0163-R1
Date of Issue	:	Oct, 23, 2017
Product name	:	DVR
Model/Type No.	:	HRD-842P
Variant Model	:	-
Applicant	:	Hanwha Techwin Co., Ltd.
Applicant Address	:	1204, Changwon-daero, Seongsan-gu, Changwon-si, Gyeongsangnam-do, Korea
Manufacturer	:	Hanwha Techwin (Tianjin) Co.,Ltd.
Manufacturer Address	:	No.11 Weiliu Rd,Micro-Electronic Industrial Park,TEDA, Tianjin, 300385,people's Republic of China
Date of Receipt	:	Feb, 13, 2017
Test date	:	Feb, 20, 2017 – Feb, 22, 2017
Test Results	:	☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Young Suk, Song
EMC Test Engineer

Reviewed by

Dong-Hun, Jang
EMC Technical Manager

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REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Feb, 27, 2017	KES-E1-17T0163	Issued
Oct, 23, 2017	KES-E1-17T0163-R1	Standard Revision

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1.0 General Product Description

Main Specifications of E.U.T are:

		HRD-842
Video	Inputs	8channel BNC : AHD(~4MP), TVI(~2MP), CVI(~2MP), NTSC/PAL
	Resolution	2560x1440, 1920 x 1080, 1280 x 720, 960 x 480, 704 x 480 / 960 x 576, 704 x 576
Live	Frame rate	240fps , 200fps
	Resolution	2560x1440, 1920 x 1080, 1280 x 720, 960 x 480, 704 x 480 / 960 x 576, 704 x 576
	Multi Screen display	1/4/7/9/PIP/Sequence
Performance		
Operating System	Embedded	Linux
Recording	Compression	H.264, Wisestream
	Record Rate(Analog)	NTSC : Up to 120fps@4MP / PAL : Up to 100fps@4MP -
		NTSC : Up to 240fps@1920 x 1080 / PAL : Up to 200fps@1920 x 1080
		NTSC: Up to 240fps @ 1280 x 720, 928x480, 704X480, 704X240, 352X240 PAL: Up to 200fps @ 1280 x 720, 928x576, 704x576, 704x288, 352x288
	Mode	Manual, Schedule (Continuous/Event), Event(Pre/Post), Time lapse (1~30 fps(N), 1~25fps(P))
	Event	Video Loss, Motion(Level 1~10), Alarm Input(16), Tampering(Level Low,Medium, High)
	Overwrite modes	Continuous
	Pre-alarm	Up to 30 sec (5,10,20,30 Sec)
	Post-Alarm	Up to 6 hour (5,10,20,30 sec,1,3,5,10,20 min,1,2,3,4,5,6 hour)
Search & Playback	Search mode	Date/time, Event, Back up, POS(SD Signal only), Motion (※ All Search Included Preview Function)
	Playback function	Fast Forward/Backward (x2,x4,x8,x16,x32,x64) ※Backward Play with I-frame Only, Slow Forward/Backward (x1/2,x1/4,x1/8) Step Forward/Backward ※ Backward Play with I-frame Only
	Simultaneous playback	8CH(Local Monitor, CMS)
Network(IPv4)	Transmission speed	Record(Main) Stream) 4MP : 15fps/CH, 1080p/720p/WD1/4CIF/CIF : 30fps/CH(N), 25fps/CH(P) Network(Sub) Stream) WD1/4CIF : 12fps/CH, 2CIF/CIF/QVGA/QCUF : 30fps/CH(N), 25fps/CH(P)
	Transmission Bandwidth	Up to 64Mbps
	Bandwidth control	Selectable
	Stream	Record Stream and Network Stream Selectable (at monitoring Viewer)
	Remote users Maximum	Search(3)/Live Unicast(10)/Live Multicast(20)
	Protocol support	TCP/IP,DHCP,PPPoE,SMTP,NTP,HTTP,DDNS,RTP,RTSP,SNMP,(SUNAPI 2017.07)
	Web Browser	Windows OS : Internet Explorer 8, 9, 10, Firefox 3.6 or higher, Chrome 12 or higher Mac OS : Safari 5 or higher, Firefox 3.6 or higher
	Viewer Software	SSM, Webviewer, SmartViewer, IPOLIS mobile viewer, WiseNet Mobile (~7. 2017)
Smart phone	Platform	Android , IOS
	Protocol support	RTP, RTSP, HTTP,CGI(SUNAPI 2017.07)
	Control	Live(8ch) : Multi-Profile Support Playback(1ch)
	Remote users Maximum	Search (3), Live Unicast (10), Multicast (20)
Storage	Internal	Up to 4 SATA HDDs (0~8TB HDD)
	External (e-SATA Interface)	e-SATA, USB(for Backup)
	File Format (Back-up)	BU(DVR Player), SEC(Include Player), AVI
Security	Password Protection	1 Admin, 10 Group , 10 User per 1 Group
	Data Authentication	Watermark
Easy Configuration	Easy Configuration	P2P (TUTK) (~7. 2017)
Interface		
Monitors	VGA	1 VGA (1920x1080, 1280x1024, 1280x720)
	HDMI	1 HDMI (4K(3840 x 2160), 2K(2560 x 1440), 1920x1080, 1280x1024, 1280x720)
	Composite(Spot)	BNC(1CH) ※ Included OSD On Screen, Multi mode Support
	Loop Outputs	-
Audio	Inputs/Output	8CH line in (Built in 4CH, Option : Audio Extension Cable)/ 1CH line out
	Compression	G.711
	Sampling rate	8KHz
Alarm	Inputs/Outputs	Terminal 8 Inputs (NO/NC) / Terminal 4 relay Outputs (NO/NC), Rating : 30V DC/2A, 250V AC/0.25A
	Remote notification	Notification via e-mail
Connections	Ethernet	1 RJ45 10/100/1000 Base-T
	Serial Interface	RS-485(Full Duplex) for PTZ, Samsung System Keyboard
	USB	1 ports(USB 3.0, Rear), 1 ports(USB 2.0, Front)
	e-SATA	2 External SATA ports
	Application Supoort	Mouse, Remote Controller,SPC-2000 (RS-485 protocol)
	Protocol support(RS-485)	Samsung-E/Samsung-T/Pelco-D/Pelco-p/Panasonic/ Phillips/ AD/ DIAMOND/ ERNA/ KALATEL/ VCL TP/VICON/ ELMO/GE
	Protocol support(Coaxial)	NTSC/PAL : Pelco-C (Coaxitron) AHD : ACP(AHD Coax Protocol)
General		
Electrical	Input Voltage/Current	100 ~ 240 VAC ±10%, 50/60 Hz
	Power consumption	Max. 25W (1x2T HDD)
Environmental	Operating Temperature/Humidity	+0°C to +40°C (+32°F to +104°F) / 20% to 85% RH
Mechanical	Dimension (W x H x D)	W440 x H88 x D384.8(17.32" x 3.46" x 15.14")
	Weight (with hard disks)	5.665kg
Lauguage	GUI	English, French, German, Spanish, Italian, Russian, Polish, Czech, Turkish, Netherlands Portuguese, Swedish, Danish, Rumania, Serbia, Croatia, Hungary, Greek, Finnish, Norwegian, Korean, Japanese, Chinese(Traditional), Thai , Taiwanese(25 Language)
	Web Browser	English, French, German, Italian, Spanish, Russian, Turkish, Polish, Dutch, Swedish, Czech, Portuguese, Danish, Rumanian, Serbian, Croatian, Hungarian, Greek, Norwegian, Finnish, Korean, Chinese(Simplified), Japanese, Thai

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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.

Voltage ☒ 230 Vac ☐ 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
DVR	HRD-842P	-	Hanwha Techwin (Tianjin) Co.,Ltd	E.U.T
Mouse 1	MOEIUOA	PMX-MMOEIUA	PRIMAX ELECTRONICS LTD.	-
Remote Controller	EP10-000329A	-	Samsung Techwin (Sta)	-
HDD	WD10PURX	WCC4J7TS2NSC	WD Purple	1 TB
Switching Power Supply	FSP250-50GUB	-	FSP	-

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1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
MONITOR 1	W2261VT	005NDCRDV451	LG Electronics NanJing Display Co., Ltd	-
MONITOR 1 Adaptor	S24E370DL	0NTWHTPH200179Y	Samsung Electronics Co., Ltd	-
MONITOR 2	A3514_FPN	CN07BN4400832ASK2 8GCTR235 R.D	POWERNET Technologies Crop.	-
MONITOR 3	SMT-2232	C95V67VF900025B	Weihai Daewoo Electronics Co., Ltd.	-
Notebook	X56K	HN11N5151FJ0045W	HANSUNG	-
Notebook Adaptor	A12-120P1A	F180271552011758	CHICONY POWER TECHNOLOGY CO.,LTD.	-
CAMERA	SDC-8440BC	-	Hanwha Techwin (Tianjin) Co.,Ltd	-
CAMERA AC / DC Adapter	EO-1210	-	EO Electronics	-
Speaker	BR-100A	-	Britz International Co., Ltd.	-
Microphone 1	CMK-303	-	CAMAC	-
Microphone 2	CMK-303	-	CAMAC	-
Mouse 2	SMB-400	0DJM010118	SEJIN ELECTRON INC.	-
External hard disk drives	MDY-US2528	-	Q-DRIVER	-
Alarm 1	-	-	-	-
Alarm 2	-	-	-	-

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1.6 External I/O Cabling

Start		END		Cable Spec.	
Description	**I/O Port**	**Description**	**I/O Port**	**Length**	**Shield**
DVR (E.U.T)	RJ 45	Notebook	RJ 45	3.0	U
	HDMI	MONITOR 1	HDMI	1.5	S
	D-SUB	MONITOR 2	D-SUB	1.5	S
	BNC	MONITOR 3	BNC	3.0	S
	BNC	CAMERA	BNC	10	S
	Audio out	Speaker	Audio in	1.4	U
	Audio in	Microphone 1	Audio out	1.2	U
	Audio in	Microphone 2	Audio out	1.7	U
	USB	Mouse 1	USB	1.2	U
	RS 232	Mouse 2	RS 232	1.4	U
	e sata	External hard disk drives	e sata	0.15	U
	2 Pin	Alarm 1	2 Pin	3.0	U
	2 Pin	Alarm 2	2 Pin	3.0	U

* Unshielded=U, Shielded=S

1.7 E.U.T Operating Mode(s)

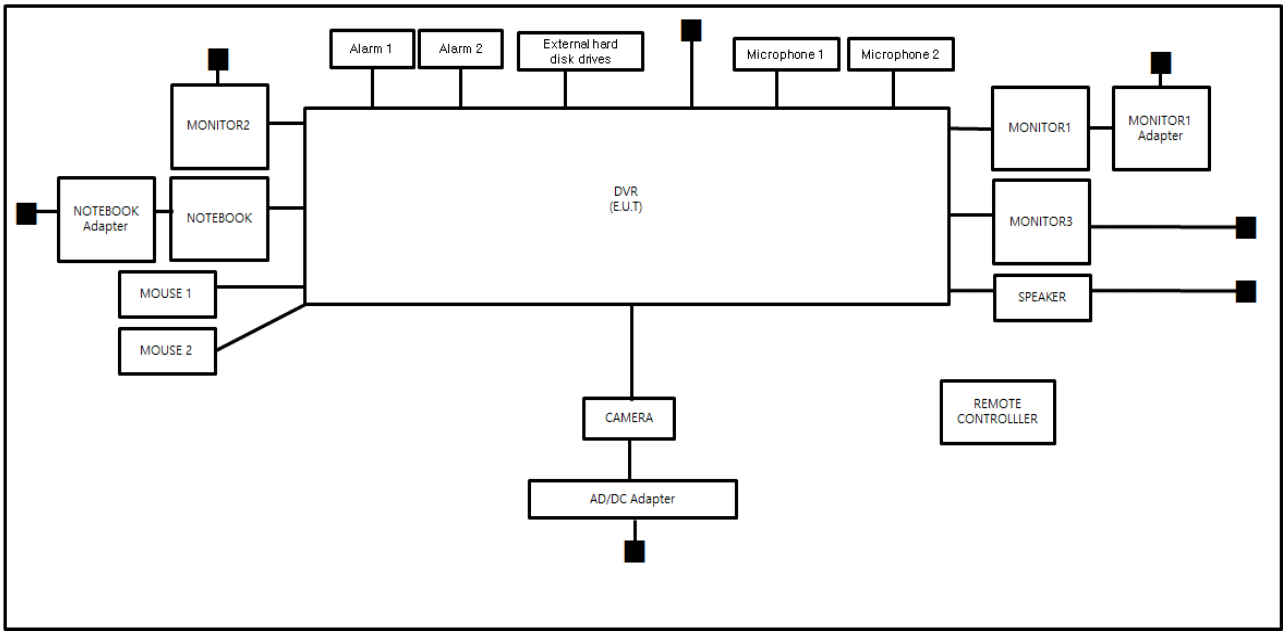
Test mode	operating
AC 230 V	E.U.T Monitoring, Ping test, 1 ㎑

E.U.T Test operating S/W		
Name	**Version**	**Manufacture Company**
SmartViewer	-	Hanwha Techwin Co., Ltd.

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1.8 Configuration

■ AC Main
□ DC Main



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1.9 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.

1.10 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 and CISPR Publication 22.

1.11 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
USA	**FCC**	3 & 10 meter Open Area Test Sites and one conducted site to perform FCC Part 15/18 measurements.	
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-4308, C-4798, T-2311, G-914
KOREA	**MSIP**	EMI (10 meter Open Area Test Site and two conducted sites) Radio(3 & 10 meter Open Area Test Sites and one conducted site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	KR0100
Canada	**IC**	3 & 10 meter Open Area Test Sites and one conducted site	4769B-1
Europe	**CE**	EMI (10 meter Open Area Test Site and two conducted sites) Radio(3 & 10 meter Open Area Test Sites and one conducted site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	
International	**KOLAS**	EMI (10 meter Open Area Test Site and two conducted sites) Radio(3 & 10 meter Open Area Test Sites and one conducted site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	KOREA LABORATORY ACCREDITATION SCHEME KOLAS TESTING NO. 489

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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 55032:2012	☒ Class A	☐ Class B
☐ EN 55024:2010 +A1:2015		
☒ EN 50130-4:2011		
☒ EN 61000-3-2:2014		
☒ EN 61000-3-3:2013		
☐ EN 61326-1:2013		

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☐ **VCCI V-3 / 2015.04** ☐ Class A ☐ Class B

☐ **AS/NZS CISPR22:2009 +A1:2010** ☐ Class A ☐ Class B

☐ **47 CFR Part 15, Subpart B**

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

☐ **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

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2.1 Conducted Emissions at Mains Power Ports

Test Date
Feb, 20, 2017

Test Location
Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test Receiver	ESR3	R & S	101783	05, 03, 2017
☒	LISN	ENV216	R & S	101137	02, 03, 2018
☒	LISN	ENV216	R & S	101786	05, 02, 2017
☒	PULSE LIMITER	ESH3-Z2	R & S	101914	12, 13, 2017
☒	Shield Room #3	-	SEMITEC	-	-
☒	EMI Test S/W	EMC32	R & S	9.12.00	-

Test Conditions
Temperature: 20,9 ℃
Relative Humidity: 40,4 %

.

Frequency Range of Measurement
150 ㎑ to 30 ㎒

Instrument Settings
IF Band Width: 9 ㎑

Test Results
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks
See Appendix A for test data.

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2.2 Conducted Emissions at Telecommunication Ports

Test Date
Feb, 20, 2017

Test Location
Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test Receiver	ESR3	R & S	101783	05, 03, 2017
☒	LISN	ENV216	R & S	101137	02, 03, 2018
☒	LISN	ENV216	R & S	101786	05, 02, 2017
☒	8-Wire ISN CAT3	CAT3 8158	Schwarzbeck Mess	8158-0019	04, 01, 2017
☒	8-Wire ISN CAT5	CAT5 8158	Schwarzbeck Mess	8158-0030	04, 01, 2017
☒	PULSE LIMITER	ESH3-Z2	R & S	101914	12, 13, 2017
☒	Shield Room #3	-	SEMITEC	-	-
☒	EMI Test S/W	EMC32	R & S	9.12.00	-

Test Conditions
Temperature: 20,9 ℃
Relative Humidity: 40,4 %

Frequency Range of Measurement
150 ㎑ to 30 ㎒

Instrument Settings
IF Band Width: 9 ㎑

Test Results
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks
See Appendix A for test data.

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2.3 Radiated Electric Field Emissions(Below 1 ㎓)

Test Date
Feb, 20, 2017

Test Location
☐ Open Area Test Site #1 ☒ Open Area Test Site #2

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI TEST Receiver	ESR3	R & S	101781	05, 03, 2017
☒	Trilog-Broadband ANT	VULB9163	Schwarzbeck	715	04, 14, 2018
☒	Open Area Test Site	-	KES	-	-
☒	Antenna Mast	-	DAEIL EMC	-	-
☒	Turn Table	-	DAEIL EMC	-	-
☒	EMI Test S/W	-	-	-	-

Test Conditions
Temperature: 2,1 ℃
Relative Humidity: 42,0 %

Frequency Range of Measurement
30 ㎒ to 1 ㎓

Instrument Settings
IF Band Width: 120 ㎑

Test Results
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks
See Appendix A for test data.

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2.4 Radiated Electric Field Emissions(Above 1 ㎓)

Test Date
Feb, 20, 2017

Test Location
Semi Anechoic Chamber #2

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	Log-Periodic Antenna	STLP 9149	SCHWARZBECK	9149-255	05, 17, 2018
☒	EMI Test Receiver	ESU26	R & S	100552	04, 24, 2017
☒	Broadband Coaxial Preamplifier	BBV 9718	Schwarzbeck Mess - Elektronik	9718-246	10, 14, 2017
☒	Semi Anachoic Chamber #2	-	SEMITEC	-	-
☒	Antenna Mast	-	AUDIX	-	-
☒	Turn Table	-	AUDIX	-	-
☒	EMI Test S/W	e3	AUDIX	8.083b	-

Test Conditions
Temperature: 20,9 ℃
Relative Humidity: 40,4 %

Frequency Range of Measurement
1 ㎓ to 6 ㎓

Instrument Settings
IF Band Width: 1 ㎒

Test Results
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks
See Appendix A for test data.

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2.5 Harmonic Current Emissions

Test Date
Feb, 20, 2017

Test Location
Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	AC Source	ACS 500 N	EM TEST	V1024106760	08, 08, 2017
☒	Digital Power Analyzer	DPA 500 N	EM TEST	V1024106759	08, 08, 2017
☒	EMI Test S/W	dpa.control	EM TEST AG	5.4.8.0	-

Test Conditions
Temperature: 20,9 ℃
Relative Humidity: 40,4 %

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

Test Results
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks
See Appendix A for test data.

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2.6 Voltage Fluctuations and Flicker

Test Date
Feb, 20, 2017

Test Location
Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	AC Source	ACS 500 N	EM test	V1024106760	08, 08, 2017
☒	Digital Power Analyzer	DPA 500 N	EM test	V1024106759	08, 08, 2017
☒	EMI Test S/W	dpa.control	EM TEST AG	5.4.8.0	-

Test Conditions
Temperature: 20,9 ℃
Relative Humidity: 40,4 %

Test Results
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks
See Appendix A for test data.

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3.0 Criteria for compliance

Criteria for compliance was based on the following guidelines:
EN 50130-4:2011 +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.

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Fast transient burst / slow high energy voltage surge

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

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

That there is no residual is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change.

Conducted RF immunity

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

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

That there is no residual is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change,

and no such flickering of indicators oeuvres at U = 130 $dB\mu V$.

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

then deterioration of the picture is allowed at U = 140 $dB\mu V$, providing:

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

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

(b) at U = 130 $dB\mu V$, any deterioration of the picture is so minor that the system could

still be used; and

(c) there in no observable deterioration of the picture at U = 120 $dB\mu V$.

Voltage dip/interruption / Voltage variation

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

Flickering of an indicator during the conditioning is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change. The EUT shall meet the acceptance criteria for the functional test, after the conditioning.

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3.1 Electrostatic Discharge

Reference Standard
EN 61000-4-2:2009

Test Date
Feb, 21, 2017

Test Location
EMS-ESD: Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	ESD SIMULATOR	ESS-2000	Noise Ken	ESS05X4620	02, 24, 2018
☒	HCP	-	Noise Ken	-	-
☒	VCP	-	Noise Ken	-	-
☒	EMS Test S/W	-	-	-	-

Test Conditions
Temperature: 21,4 ℃
Relative Humidity: 41,3 %
Atmospheric Pressure: 101,8 kPa

Test Specifications
Discharge Factor: ≥ 1 s

Discharge Impedance: 330 ohm / 150 pF

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

Polarity: Positive and Negative

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

Discharge Voltage:

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

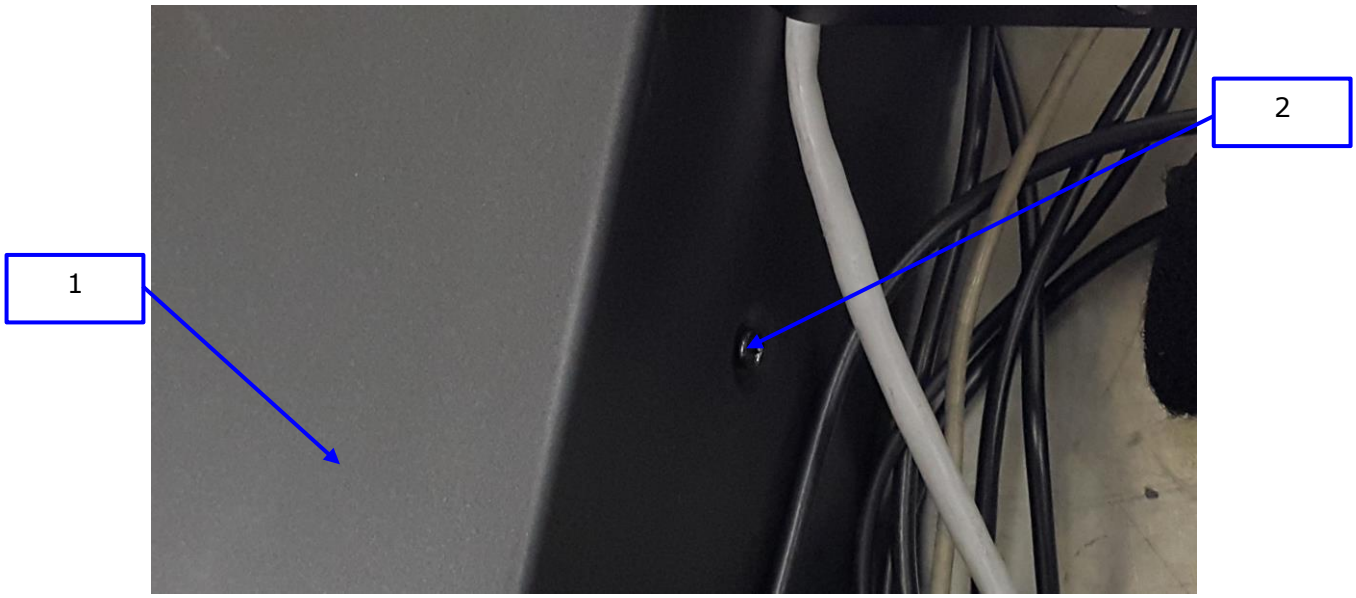
Notes: HCP: Horizontal coupling plane
VCP: Vertical coupling plane

Required Performance Criteria: ☒ Complied

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Location of Discharge:

Air
Contact



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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	Surface	Contact Discharge	Complied	-
2	Screw	Contact Discharge	Complied	-

Note: "Blank" = Not performed

Observations:
Complied – No degradation of function

Test Results

☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria

Remarks

PASS Required Performance Criteria.

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The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

3.2 Radiated Electric Field Immunity

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

Test Date
Feb, 21, 2017

Test Location
EMS-RS: ☐ Semi Anechoic Chamber #1 ☒ Semi Anechoic Chamber #2

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	Signal Generator	ESG-3000A	HP	US37040210	11, 01, 2017
☒	Amplifier	ITA0300-200	Infinitech	-	11, 01, 2017
☒	Amplifier	ITA0750-200	Infinitech	-	11, 01, 2017
☒	Amplifier	ITA1500-100	Infinitech	-	11, 01, 2017
☒	Amplifier	ITA2500-100	Infinitech	-	11, 01, 2017
☒	GPIB INTERFACE CONTROL	SYSTEM CONTROL UNIT	Infinitech	-	-
☒	POWER SUPPLY	SYSTEM POWER SUPPLY	Infinitech	-	-
☒	Power Meter	E4419B	Agilent	MY45101506	06, 27, 2017
☒	Average Power Sensor	E9301A	Agilent	-	06, 27, 2017
☒	Average Power Sensor	E9301A	Agilent	MY41495698	11, 17, 2017
☒	Stacked Double Log-Per- Antenna	STPL9128 D	SCHWARZBECK	9128D038	-
☒	Semi Anechoic Chamber #2	-	SEMITEC	-	-
☒	EMS Test S/W	EMS Test S/W	KTI_RS2012	KOREA TECHNOLOGY INSTITUDE CO., LTD	2.1.1

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Test Conditions

Temperature:	21,4 ℃
Relative Humidity:	41,3 %
Atmospheric Pressure:	101,8 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

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The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

Test Data

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

Note: "Blank" = Not performed

Observations:
Complied – No degradation of function

Test Results

☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria

Remarks

PASS Required Performance Criteria.

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The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

3.3 Electrical Fast Transients/Bursts

Reference Standard
EN 61000-4-4:2012

Test Date
Feb, 22, 2017

Test Location
EMS-EFT: Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	Ultra Compact Simulator	UCS 500 N5	EM TEST	V0936105120	06, 27, 2017
☒	Motor Variac	MV2616	EM TEST	V0936105123	06, 27, 2017
☒	Capacitive Coupling Clamp	HFK	EM TEST	070925	06, 27, 2017
☒	EMS Test S/W	iec.control	EM TEST AG	5.0.9.0	-

Test Conditions

Temperature:	21,6 ℃
Relative Humidity:	40,9 %
Atmospheric Pressure:	100,8 kPa

Test Specifications

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

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Test Data

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

Mode of Application	Observations	
	(+) Burst (㎸)	(-) Burst (㎸)
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 (㎸)
BNC	Complied	Complied
RJ-45	Complied	Complied
Alarm	Complied	Complied

Note: "Blank" = Not performed

Observations:
Complied – No degradation of function

Test Results

☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria

Remarks

PASS Required Performance Criteria.

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3.4 Surge Transients

Reference Standard
EN 61000-4-5:2014

Test Date
Feb, 22, 2017

Test Location
EMS-Surge: Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	ULTRA COMPACT SIMULATOR	UCS 500 N5	EM TEST	V0936105120	06, 27, 2017
☒	MOTOR VARIAC	MV2616	EM TEST	V0936105123	06, 27, 2017
☒	CDN	CNV 508N1	EM TEST	P1551168979	04, 27, 2017
☐	CDN	CNV 508T5	EM TEST	P1549168422	04, 27, 2017
☒	EMS Test S/W	iec.control	EM TEST	5.0.9.0	-

Test Conditions
Temperature: 21,6 ℃
Relative Humidity: 40,9 %
Atmospheric Pressure: 100,8 kPa

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Test Specifications

AC Power Lines

Source Impedance: 12 ohm for common mode and 2 ohm for differential mode

Surge Amplitude : Common Mode
☒ (0,5 / 1,0 / 2,0) kV
Differential Mode
☐ (0,5 / 1,0) kV

Number of Surges: ☒ 5 surges per angle

Angle: ☒ 0°, 90°, 180°, 270° (input a.c. power port)

Polarity: ☒ Positive & Negative

Repetition Rate: ☒ 1 surge per min ☐ 1 surge per 30 sec.

Required Performance Criteria: ☒ Complied

Other supply / Signal Lines

Source Impedance: 42 ohm for common mode
Surge Amplitude: Common Mode
☒ (0,5 / 1,0) kV

Number of Surges: ☒ 5 Surges

Polarity: ☒ Positive & Negative

Repetition Rate: ☒ 1 surge per min ☐ 1 surge per 30 sec.

Required Performance Criteria: ☒ Complied

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Test Data

☒ Line to Line – Differential Mode

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

☐ Line to Earth – Common Mode

Mode of Application	Observations	
	(+) Surge (㎸)	(-) Surge (㎸)
L1-PE	-	-
L2-PE	-	-

Signal Lines

☒ Line to Earth – Common Mode

Mode of Application	Observations	
	(+) Surge (㎸)	(-) Surge (㎸)
BNC	Complied	Complied
RJ-45	Complied	Complied
Alarm	Complied	Complied

Note: "Blank" = Not performed

Observations:
Complied – No degradation of function

Test Results

☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria

Remarks

PASS Required Performance Criteria.

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3.5 Conducted Disturbance

Reference Standard
EN 61000-4-6:2014

Test Date
Feb, 22, 2017

Test Location
EMS-CS: Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	Continuous Wave Generator	CWS 500N1	EM TEST	V0936105119	08, 08, 2017
☒	6 dB Attenuator	ATT6	EM TEST	1208-34	08, 08, 2017
☒	CDN	CDN-M2/M3N	EM TEST	0909-06	08, 08, 2017
☐	CDN	CDN-T2-RJ11	EM TEST	0909-07	08, 08, 2017
☐	CDN	CDN-T4	EM TEST	0909-08	08, 08, 2017
☐	CDN	CDN-T8RJ45	EM TEST	0909-09	08, 08, 2017
☐	CDN	CDN-AF2	EM TEST	0909-10	08, 08, 2017
☐	CDN	CDN-AF4	EM TEST	0909-11	08, 08, 2017
☒	EM Injection Clamp	EM 101	Liithi	35943	02, 03, 2018
☒	EMS Test S/W	icd.control	EM TEST	5.3.7	-

Test Conditions
Temperature: 21,6 ℃
Relative Humidity: 40,9 %
Atmospheric Pressure: 100,8 kPa

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Test Specifications

Frequency range:	☒ 150 ㎑ to 100 ㎒	☐ 150 ㎑ to 80 ㎒
Voltage Level:	☐ 1 Vrms ☒ 10 Vrms	☐ 3 Vrms
Modulation:	☒ AM, 80 %, 1 ㎑ sine wave ☒ PM, 1 ㎐ (0,5 s ON : 0,5 s OFF)	
Frequency step:	☒ 1 % step	
Dwell Time:	☒ 1 s	☐ 3 s
Required Performance Criteria:	☒ Complied	

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Test Data

☒ Input a.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Observations
L – N - PE	CDN (☐M2, ☒M3)	Complied

☐ Input d.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Observations
L1 – L2	CDN (☐M2, ☐M3)	-

☒ Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Observations
BNC	EM Injection Clamp	Complied
RJ-45	EM Injection Clamp	Complied
Alarm	EM Injection Clamp	Complied

Notes: CDN = Coupling Decoupling Network
"blank" = Not performed

Observations:
Complied – No degradation of function

Test Results

☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria

Remarks

PASS Required Performance Criteria.

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3.6 Voltage Dips and Short Interruptions

Reference Standard
EN 61000-4-11:2004

Test Date
Feb, 22, 2017

Test Location
EMS-Voltage dip: Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	Ultra Compact Simulator	UCS 500 N5	EM TEST	V0936105120	06, 27, 2017
☒	Motor Variac	MV2616	EM TEST	V0936105123	06, 27, 2017
☒	EMS Test S/W	iec.control	EM TEST	5.0.9.0	-

Test Conditions

Temperature:	21,6 ℃
Relative Humidity:	40,9 %
Atmospheric Pressure:	100,8 kPa

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Test Specifications & Observations/Remarks

(Test Voltage : 50 ㎐)

Test Level	Duration [in period/ms (50 ㎐)]	Results
☒ 20 % dip	☒ 250 / 5000	Complied
☒ 30 % dip	☒ 25 / 500	Complied
☒ 60 % dip	☒ 10 / 200	Complied
☒ 100 % dip	☒ 250 / 5000	Complied

- Voltage cariations

☒ Unom + 10 %	☒ 253 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

The test has been tested using the ac Adapter

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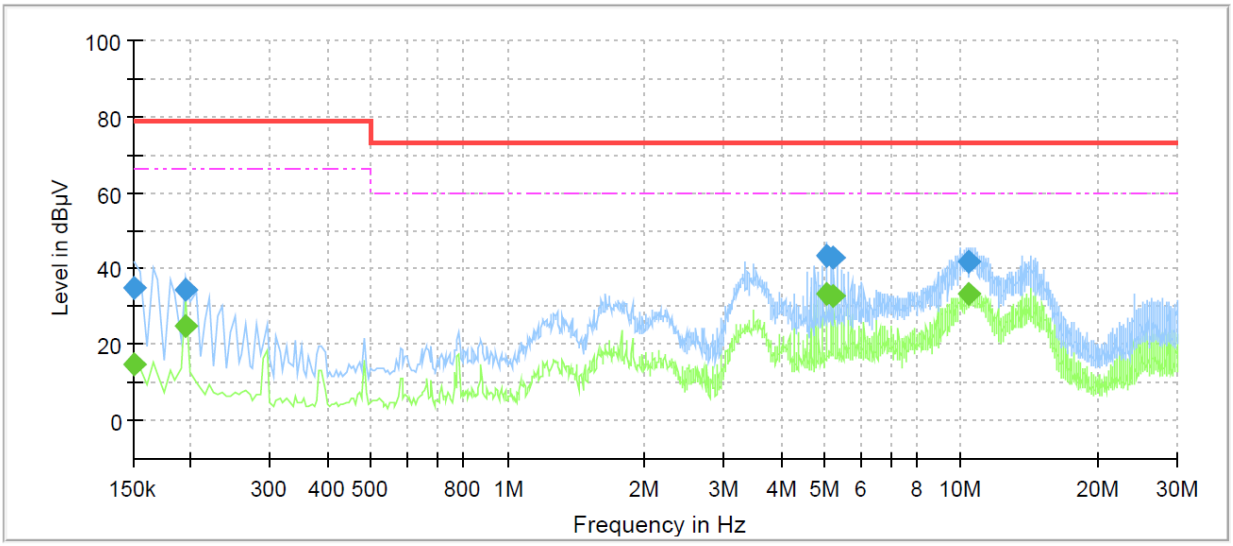
APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

[HOT]

Common Information

Test Description:	Conducted Emission
Model No.:	HRD-842P
Mode	
Operator Name:	KES



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.150000	---	14.99	66.00	51.01	1000.0	9.000	L1	21.1
0.150000	34.78	---	79.00	44.22	1000.0	9.000	L1	21.1
0.195000	---	25.12	66.00	40.88	1000.0	9.000	L1	20.9
0.195000	34.54	---	79.00	44.46	1000.0	9.000	L1	20.9
5.050000	---	33.12	60.00	26.88	1000.0	9.000	L1	19.7
5.050000	43.37	---	73.00	29.63	1000.0	9.000	L1	19.7
5.245000	---	32.76	60.00	27.24	1000.0	9.000	L1	19.8
5.245000	42.92	---	73.00	30.08	1000.0	9.000	L1	19.8
10.395000	---	33.59	60.00	26.41	1000.0	9.000	L1	19.9
10.395000	41.68	---	73.00	31.32	1000.0	9.000	L1	19.9

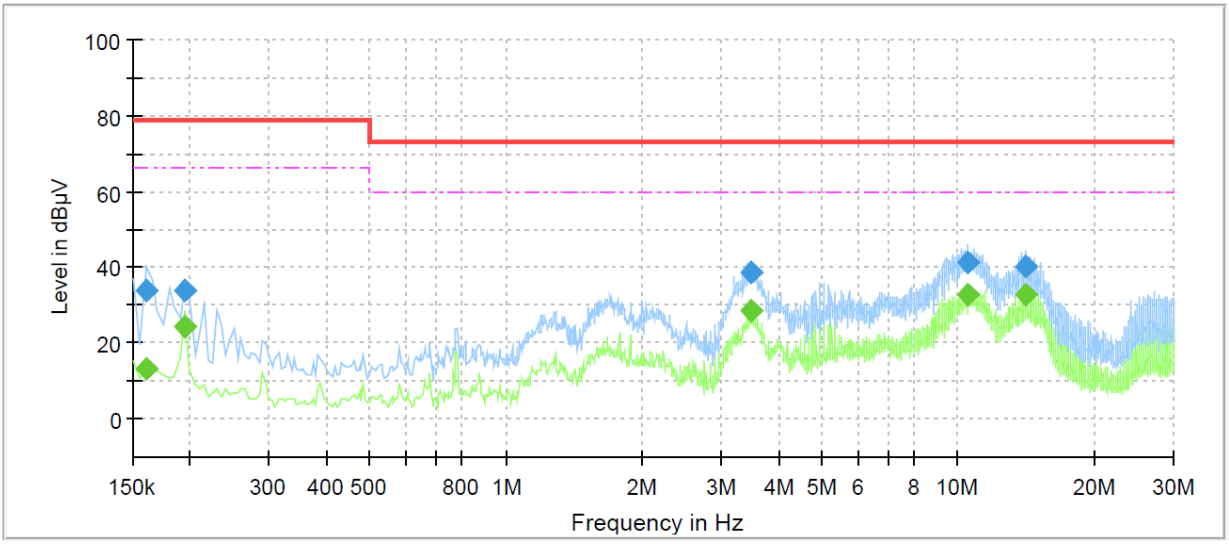
♦ Calculation
QuasiPeak[dBuV] / CAverage [dBuV] = Reading Value[dBuV] + Corr. [dB]
QuasiPeak / CAverage : The Final Value
Reading Value : Not shown in the table.
Corr. : Correction values (LISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

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[NEUTRAL]

Common Information

Test Description:	Conducted Emission
Model No.:	HRD-842P
Mode	
Operator Name:	KES



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.160000	---	13.32	66.00	52.68	1000.0	9.000	N	21.0
0.160000	33.71	---	79.00	45.29	1000.0	9.000	N	21.0
0.195000	---	24.22	66.00	41.78	1000.0	9.000	N	20.8
0.195000	33.78	---	79.00	45.22	1000.0	9.000	N	20.8
3.480000	---	28.72	60.00	31.28	1000.0	9.000	N	19.7
3.480000	38.48	---	73.00	34.52	1000.0	9.000	N	19.7
10.460000	---	32.61	60.00	27.39	1000.0	9.000	N	19.9
10.460000	41.38	---	73.00	31.62	1000.0	9.000	N	19.9
14.090000	---	32.96	60.00	27.04	1000.0	9.000	N	20.0
14.090000	40.25	---	73.00	32.75	1000.0	9.000	N	20.0

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

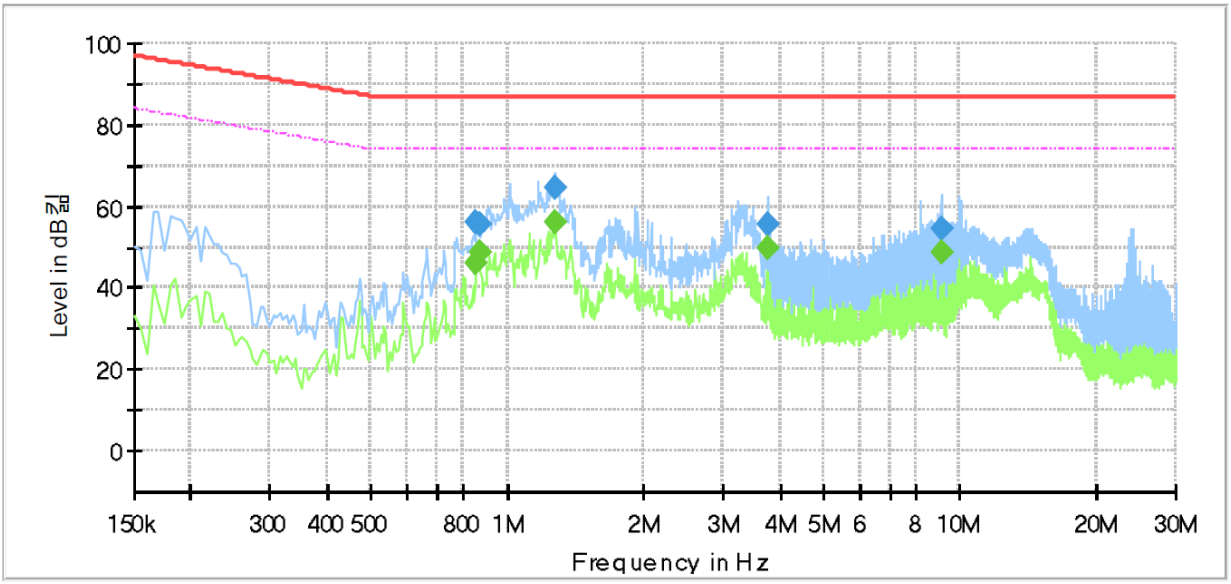
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Conducted Emissions at Telecommunication Ports

[10 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	HRD-842P
Mode	10 Mbps
Operator Name:	KES



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.855000	---	46.07	74.00	27.93	1000.0	9.000	Single Line	20.5
0.855000	56.10	---	87.00	30.90	1000.0	9.000	Single Line	20.5
0.870000	---	48.89	74.00	25.11	1000.0	9.000	Single Line	20.5
0.870000	55.49	---	87.00	31.51	1000.0	9.000	Single Line	20.5
1.270000	---	56.04	74.00	17.96	1000.0	9.000	Single Line	20.2
1.270000	64.41	---	87.00	22.59	1000.0	9.000	Single Line	20.2
3.750000	---	50.01	74.00	23.99	1000.0	9.000	Single Line	19.8
3.750000	55.69	---	87.00	31.31	1000.0	9.000	Single Line	19.8
9.075000	---	48.69	74.00	25.31	1000.0	9.000	Single Line	20.0
9.075000	54.39	---	87.00	32.61	1000.0	9.000	Single Line	20.0

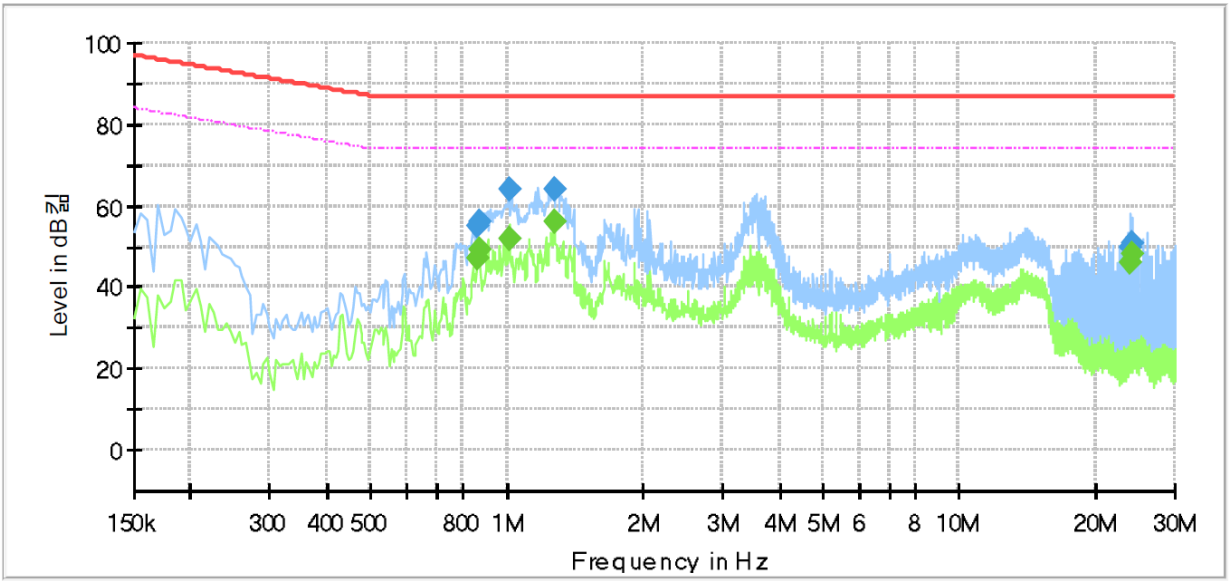
♦ Calculation
QuasiPeak[dBuV] / CAverage [dBuV] = Reading Value[dBuV] + Corr. [dB]
QuasiPeak / CAverage : The Final Value
Reading Value : Not shown in the table.
Corr. : Correction values (ISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

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.

[100 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	HRD-842P
Mode	100 Mbps
Operator Name:	KES



Final_Result

Frequency (MHz)	QuasiPeak (dB㎶)	CAverage (dB㎶)	Limit (dB㎶)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.865000	---	47.23	74.00	26.77	1000.0	9.000	Single Line	20.0
0.865000	55.03	---	87.00	31.97	1000.0	9.000	Single Line	20.0
0.870000	---	49.41	74.00	24.59	1000.0	9.000	Single Line	20.0
0.870000	56.35	---	87.00	30.65	1000.0	9.000	Single Line	20.0
1.010000	---	52.01	74.00	21.99	1000.0	9.000	Single Line	19.9
1.010000	64.14	---	87.00	22.86	1000.0	9.000	Single Line	19.9
1.270000	---	55.99	74.00	18.01	1000.0	9.000	Single Line	19.7
1.270000	63.85	---	87.00	23.15	1000.0	9.000	Single Line	19.7
23.980000	---	46.05	74.00	27.95	1000.0	9.000	Single Line	19.6
23.980000	49.63	---	87.00	37.37	1000.0	9.000	Single Line	19.6
24.050000	---	48.00	74.00	26.00	1000.0	9.000	Single Line	19.6
24.050000	50.66	---	87.00	36.34	1000.0	9.000	Single Line	19.6

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

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Radiated Electric Field Emissions(Below 1 ㎓)

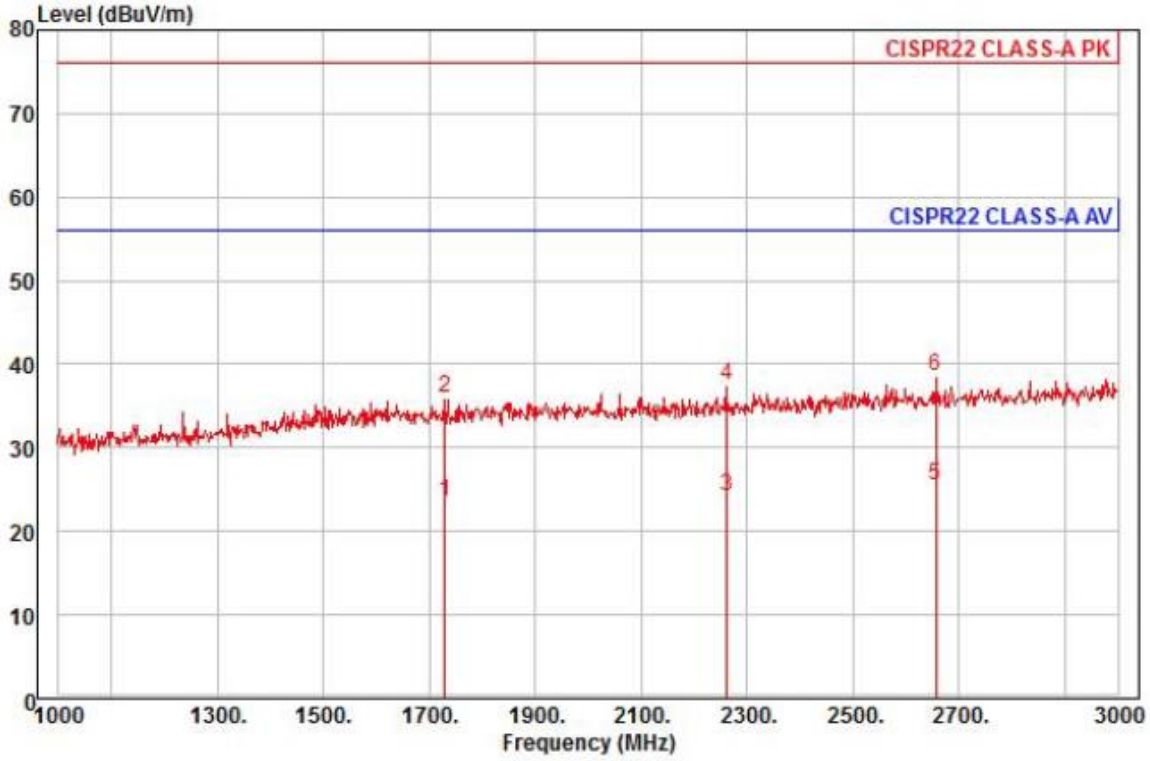
Frequency	Amplitude	ANT Polar. (H/V)	ANT. Height	Correction Factor		Corrected Amplitude	Applicable Limit	Margin
[㎒]	[dB㎶]		[m]	ANT. [dB/m]	Cable [dB]	[dB㎶/m]	[dB㎶/m]	[dB]
251.78	13.65	H	3.99	12.58	4.16	30.39	47.00	16.61
253.09	13.14	V	1.01	12.60	4.18	29.92	47.00	17.08
371.83	11.83	V	1.02	14.96	5.08	31.87	47.00	15.13
432.62	10.33	H	3.98	16.13	5.80	32.26	47.00	14.74
594.01	13.84	V	1.00	19.15	6.79	39.78	47.00	7.22
632.13	9.84	H	4.00	19.41	7.07	36.32	47.00	10.68

* H : Horizontal, V : Vertical

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

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Radiated Electric Field Emissions(Above 1 ㎓)




```
Site      : chamber
Condition: CISPR22 CLASS-A PK 3m STLP9149(9149-255,2016-05-17) horizontal
          : RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project   :
Model     : HRD-842P
Mode      :
Memo      : 1 ~ 3 GHz
```

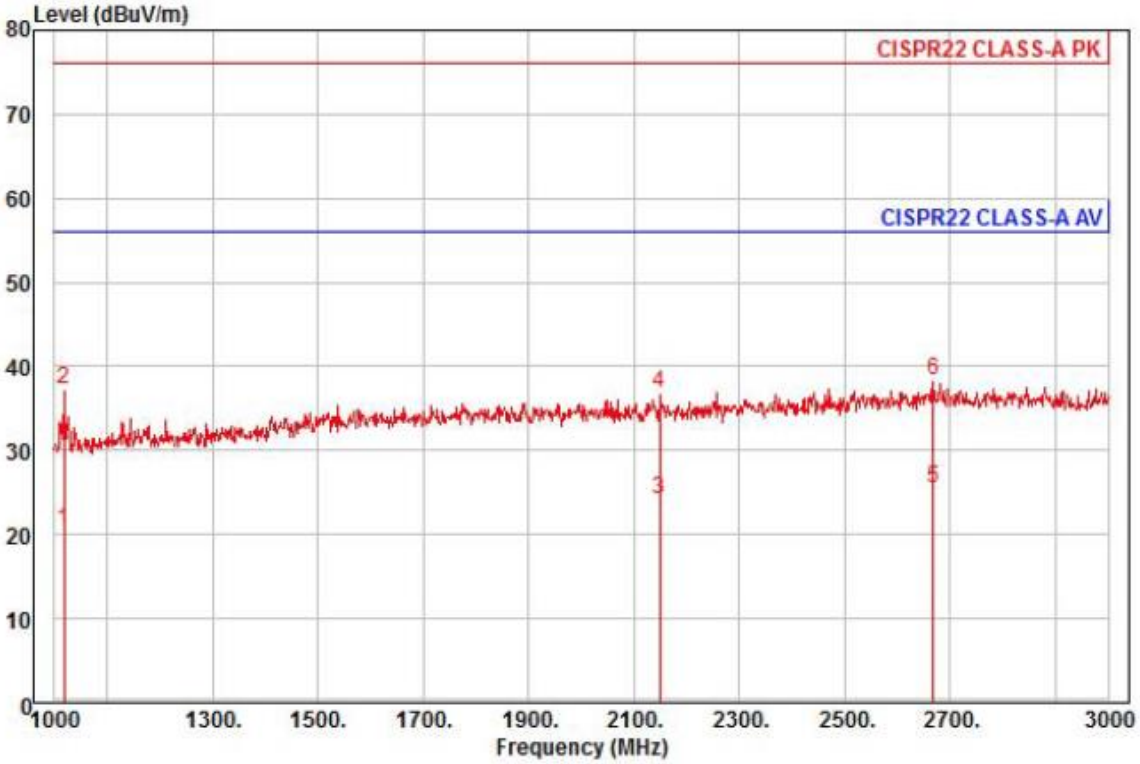
	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	1730.00	29.50	24.63	8.65	39.28	263	56.00	-32.50	horizontal	Average
2	1730.00	42.06	24.63	8.65	39.28	263	76.00	-39.94	horizontal	Peak
3	2262.00	27.03	26.63	9.96	39.42	38	56.00	-31.80	horizontal	Average
4	2262.00	40.23	26.63	9.96	39.42	38	76.00	-38.60	horizontal	Peak
5 pp	2656.00	26.05	28.26	10.88	39.71	321	56.00	-30.52	horizontal	Average
6 pk	2656.00	39.14	28.26	10.88	39.71	321	76.00	-37.43	horizontal	Peak

♦ Calculation

Over Limit [㏈] = (Read Level[㏈uV] + Ant Factor[㏈/m] + Cable Loss [㏈] − Preamp Factor [㏈]) − Limit Line[㏈uV]

Over Limit : Margin Value, Read Level : Reading Value, Ant Factor : Ant Factor, Cable Loss : Cable loss, Preamp Factor : Preamp Factor

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Site : chamber
Condition: CISPR22 CLASS-A PK 3m STLP9149(9149-255,2016-05-17) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : HRD-842P
Mode :
Memo : 1 ~ 3 GHz

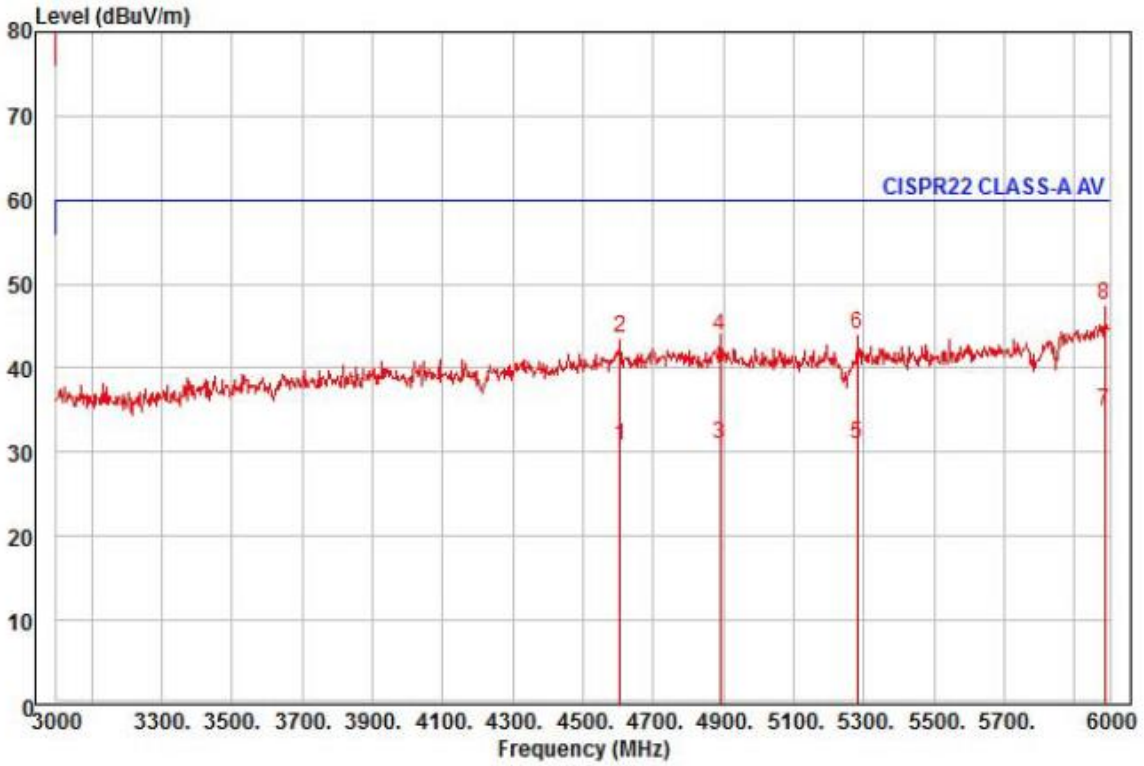
	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	1018.00	33.47	20.61	6.54	40.05	342	56.00	-35.43	vertical	Average
2	1018.00	50.17	20.61	6.54	40.05	342	76.00	-38.73	vertical	Peak
3	2148.00	27.64	26.18	9.68	39.41	233	56.00	-31.91	vertical	Average
4	2148.00	40.37	26.18	9.68	39.41	233	76.00	-39.18	vertical	Peak
5 pp	2668.00	25.98	28.32	10.91	39.73	252	56.00	-30.52	vertical	Average
6 pk	2668.00	38.85	28.32	10.91	39.73	252	76.00	-37.65	vertical	Peak

♦ Calculation

Over Limit [㏈] = (Read Level[㏈uV] + Ant Factor[㏈/m] + Cable Loss [㏈] − Preamp Factor [㏈]) − Limit Line[㏈uV]

Over Limit : Margin Value, Read Level : Reading Value, Ant Factor : Ant Factor, Cable Loss : Cable loss, Preamp Factor : Preamp Factor

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Site : chamber
Condition: CISPR22 CLASS-A PK 3m STLP9149(9149-255,2016-05-17) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : HRD-842P
Mode :
Memo : 3 ~ 6 GHz

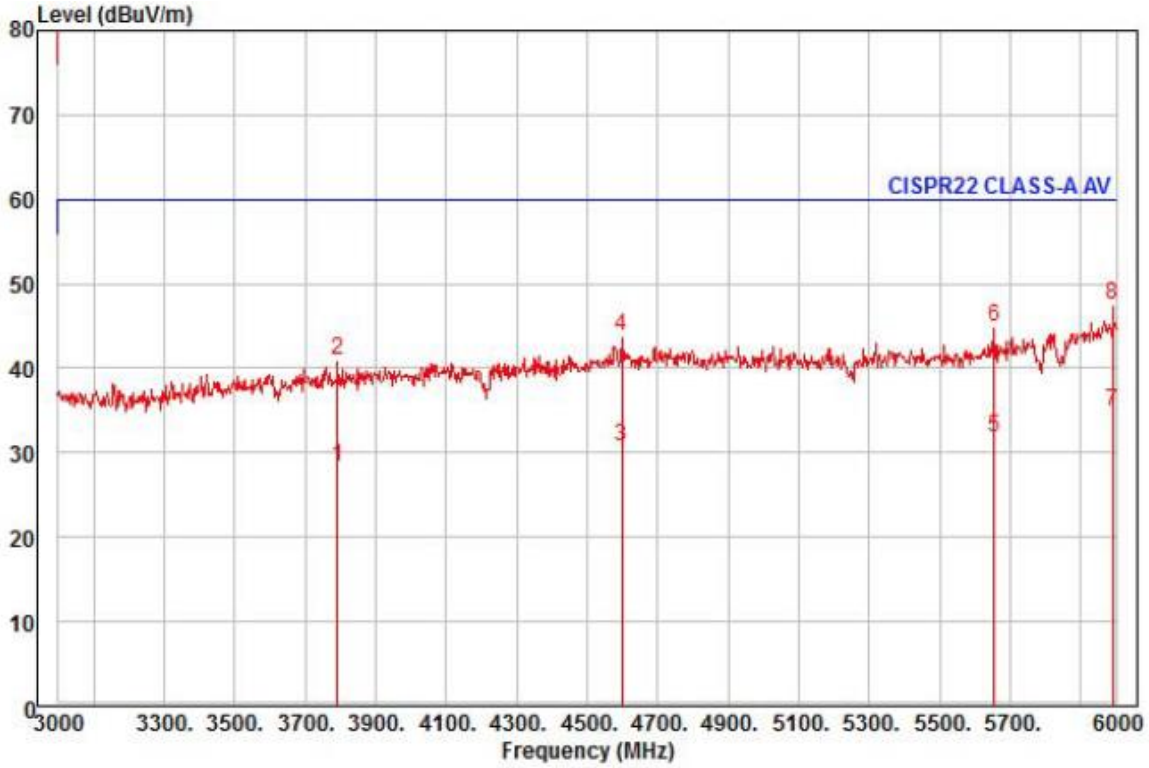
	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	4605.00	23.91	32.89	14.67	40.67	235	60.00	-29.20	horizontal	Average
2	4605.00	36.64	32.89	14.67	40.67	235	80.00	-36.47	horizontal	Peak
3	4890.00	23.08	33.14	15.20	40.38	42	60.00	-28.96	horizontal	Average
4	4890.00	35.92	33.14	15.20	40.38	42	80.00	-36.12	horizontal	Peak
5	5280.00	22.40	33.40	15.84	40.73	360	60.00	-29.09	horizontal	Average
6	5280.00	35.44	33.40	15.84	40.73	360	80.00	-36.05	horizontal	Peak
7 pp	5985.00	21.76	36.46	17.05	40.45	331	60.00	-25.18	horizontal	Average
8 pk	5985.00	34.52	36.46	17.05	40.45	331	80.00	-32.42	horizontal	Peak

♦ Calculation

Over Limit [dB] = (Read Level[dBuV] + Ant Factor[dB/m] + Cable Loss [dB] – Preamp Factor [dB]) – Limit Line[dBuV]

Over Limit : Margin Value, Read Level : Reading Value, Ant Factor : Ant Factor, Cable Loss : Cable loss, Preamp Factor : Preamp Factor

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Site : chamber
Condition: CISPR22 CLASS-A PK 3m STLP9149(9149-255,2016-05-17) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : HRD-842P
Mode :
Memo : 3 ~ 6 GHz

	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	3792.00	25.02	30.93	13.16	40.77	146	60.00	-31.66	vertical	Average
2	3792.00	37.66	30.93	13.16	40.77	146	80.00	-39.02	vertical	Peak
3	4599.00	23.96	32.89	14.66	40.67	93	60.00	-29.16	vertical	Average
4	4599.00	36.88	32.89	14.66	40.67	93	80.00	-36.24	vertical	Peak
5	5655.00	21.87	34.47	16.44	40.89	107	60.00	-28.11	vertical	Average
6	5655.00	34.89	34.47	16.44	40.89	107	80.00	-35.09	vertical	Peak
7 pp	5991.00	21.74	36.50	17.06	40.44	204	60.00	-25.14	vertical	Average
8 pk	5991.00	34.34	36.50	17.06	40.44	204	80.00	-32.54	vertical	Peak

♦ Calculation
Over Limit [dB] = (Read Level[dBuV] + Ant Factor[dB/m] + Cable Loss [dB] – Preamp Factor [dB]) – Limit Line[dBuV]
Over Limit : Margin Value, Read Level : Reading Value, Ant Factor : Ant Factor, Cable Loss : Cable loss, Preamp Factor : Preamp Factor

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Harmonic Current Emissions and Voltage Fluctuations and Flicker

Average harmonic current results

Hn	Ieff [A]	% of Limit	Limit [A]	Result
1	116.649E-3			
2	56.579E-3	5.239	1.08	PASS
3	51.321E-3	2.231	2.30	PASS
4	16.140E-3	3.754	430.00E-3	PASS
5	7.919E-3	0.695	1.14	PASS
6	8.135E-3	2.712	300.00E-3	PASS
7	7.239E-3	0.940	770.00E-3	PASS
8	3.939E-3			PASS
9	5.120E-3	1.280	400.00E-3	PASS
10	3.978E-3			PASS
11	2.426E-3			PASS
12	2.048E-3			PASS
13	2.079E-3			PASS
14	1.282E-3			PASS
15	3.157E-3			PASS
16	894.229E-6			PASS
17	1.223E-3			PASS
18	1.232E-3			PASS
19	1.534E-3			PASS
20	1.093E-3			PASS
21	592.672E-6			PASS
22	863.771E-6			PASS
23	591.958E-6			PASS
24	593.164E-6			PASS
25	523.469E-6			PASS
26	498.686E-6			PASS
27	768.611E-6			PASS
28	573.841E-6			PASS
29	891.388E-6			PASS
30	540.064E-6			PASS
31	464.287E-6			PASS
32	730.554E-6			PASS
33	649.083E-6			PASS
34	547.808E-6			PASS
35	449.023E-6			PASS
36	501.189E-6			PASS
37	697.053E-6			PASS
38	398.067E-6			PASS
39	640.564E-6			PASS
40	334.995E-6			PASS

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.

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Test Data - Harmonics (continued)

Maximum harmonic current results

Hn	Ieff [A]	% of Limit	Limit [A]	Result
1	117.168E-3			
2	58.845E-3	3.632	1.62	PASS
3	52.494E-3	1.522	3.45	PASS
4	16.848E-3	2.612	645.00E-3	PASS
5	8.498E-3	0.497	1.71	PASS
6	8.652E-3	1.923	450.00E-3	PASS
7	8.188E-3	0.709	1.15	PASS
8	5.061E-3	1.467	345.00E-3	PASS
9	5.713E-3	0.952	600.00E-3	PASS
10	4.318E-3			PASS
11	3.403E-3			PASS
12	2.901E-3			PASS
13	2.829E-3			PASS
14	1.748E-3			PASS
15	3.619E-3			PASS
16	1.472E-3			PASS
17	1.800E-3			PASS
18	1.886E-3			PASS
19	2.019E-3			PASS
20	1.576E-3			PASS
21	1.110E-3			PASS
22	1.143E-3			PASS
23	1.042E-3			PASS
24	912.383E-6			PASS
25	813.525E-6			PASS
26	949.169E-6			PASS
27	1.038E-3			PASS
28	1.087E-3			PASS
29	1.160E-3			PASS
30	939.987E-6			PASS
31	707.238E-6			PASS
32	1.081E-3			PASS
33	978.043E-6			PASS
34	807.504E-6			PASS
35	737.372E-6			PASS
36	736.079E-6			PASS
37	910.383E-6			PASS
38	580.111E-6			PASS
39	837.937E-6			PASS
40	462.493E-6			PASS

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.

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Test Data - Voltage Fluctuations

Maximum Flicker results

	EUT values	Limit	Result
Pst	0.033	1.00	PASS
Plt	0.033	0.65	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.196	4.00	PASS
Tmax [s]	0.000	0.50	PASS

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Test Setup Photos and Configuration

Conducted Voltage Emissions





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Conducted Telecommunication Emissions





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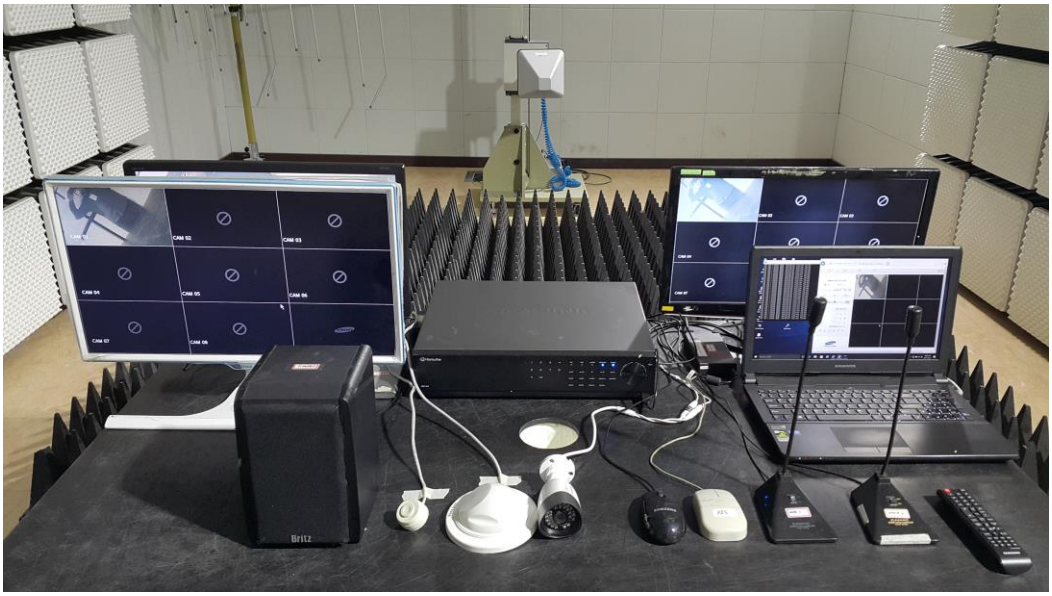
Radiated Electric Field Emissions(Below 1 ㎓)





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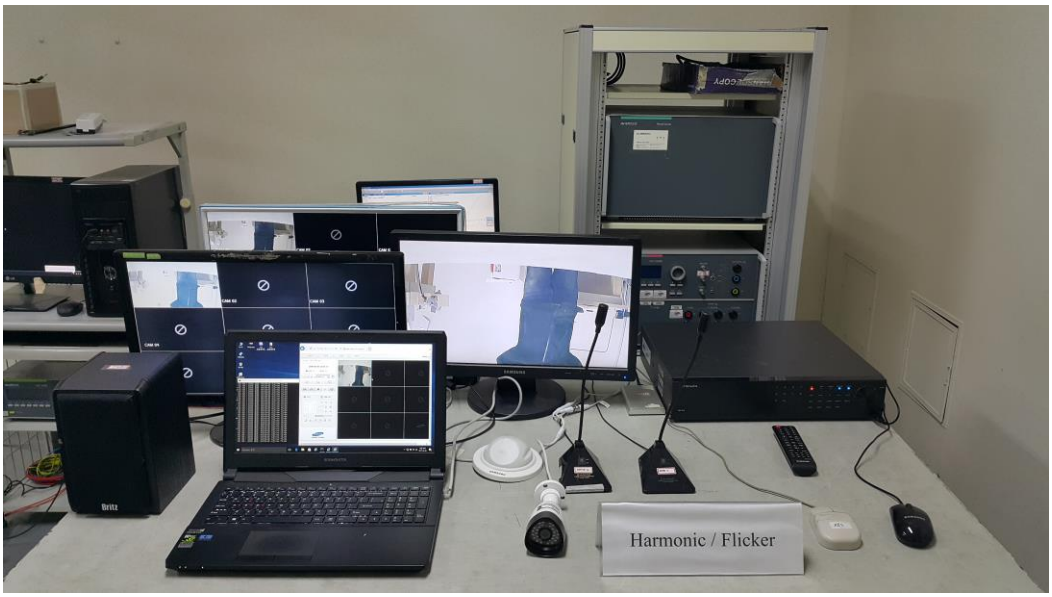
Radiated Electric Field Emissions(Above 1 ㎓)





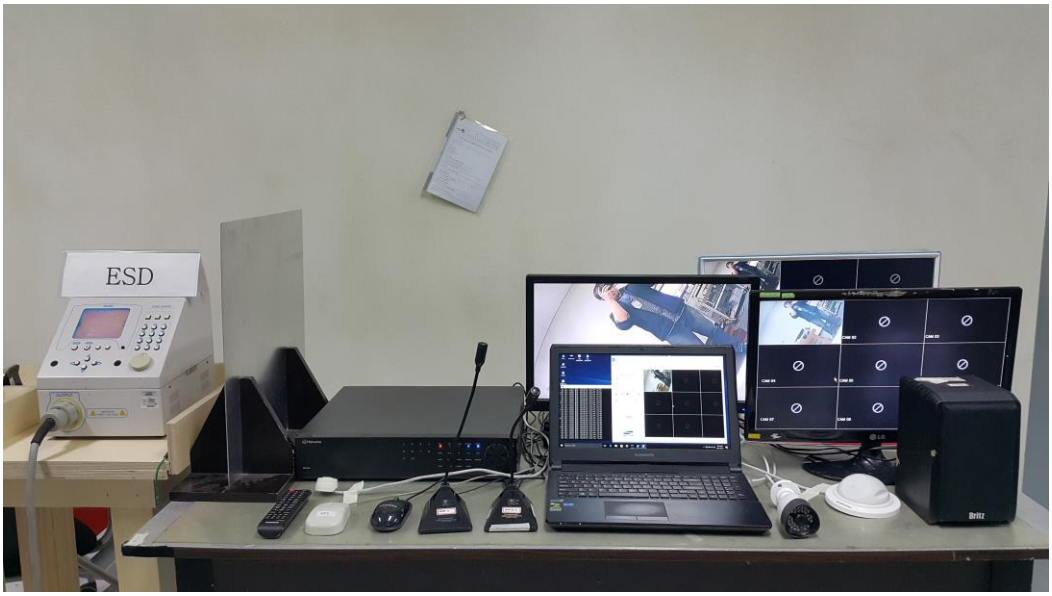
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Harmonic Current Emissions and Voltage Fluctuations and Flicker

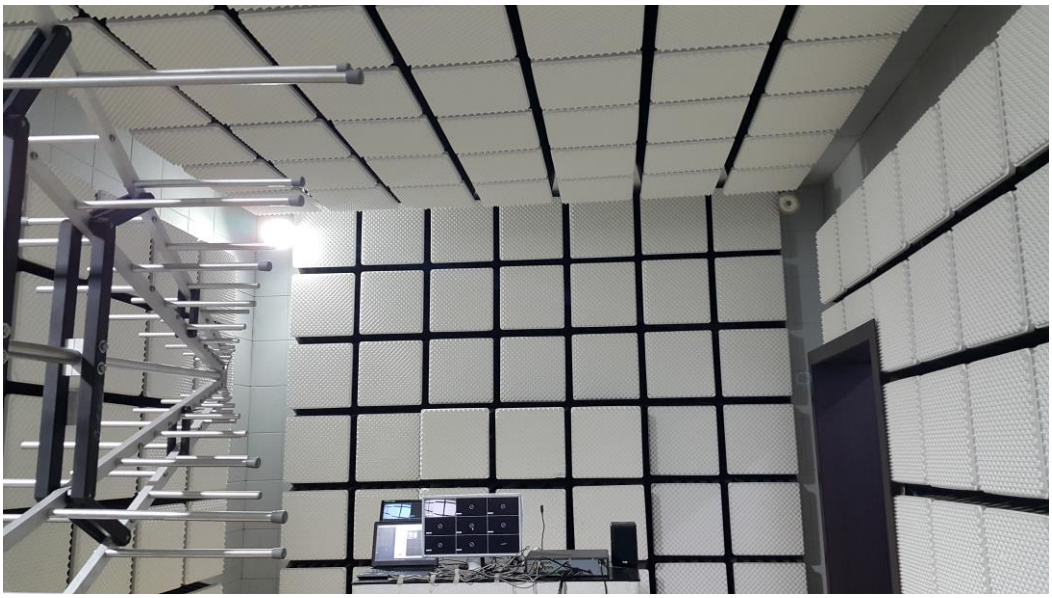


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Electrostatic Discharge

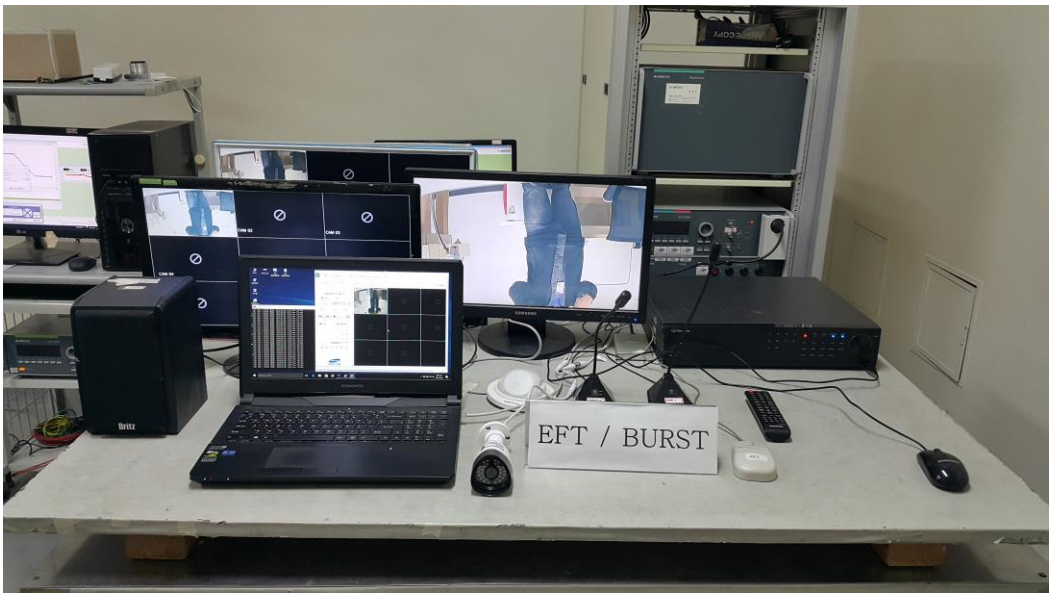


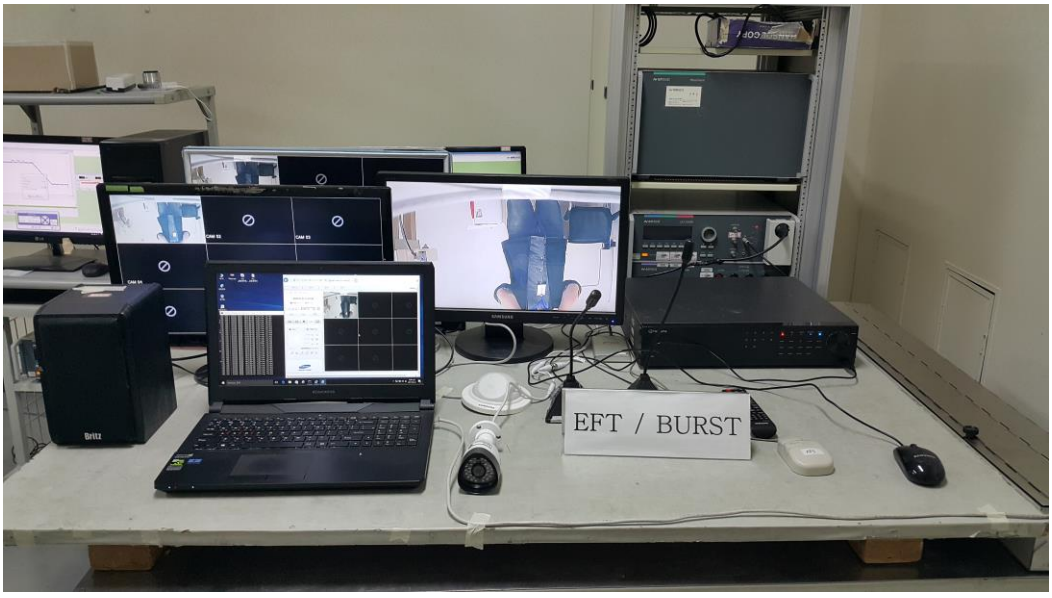
Radiated Electric Field Immunity



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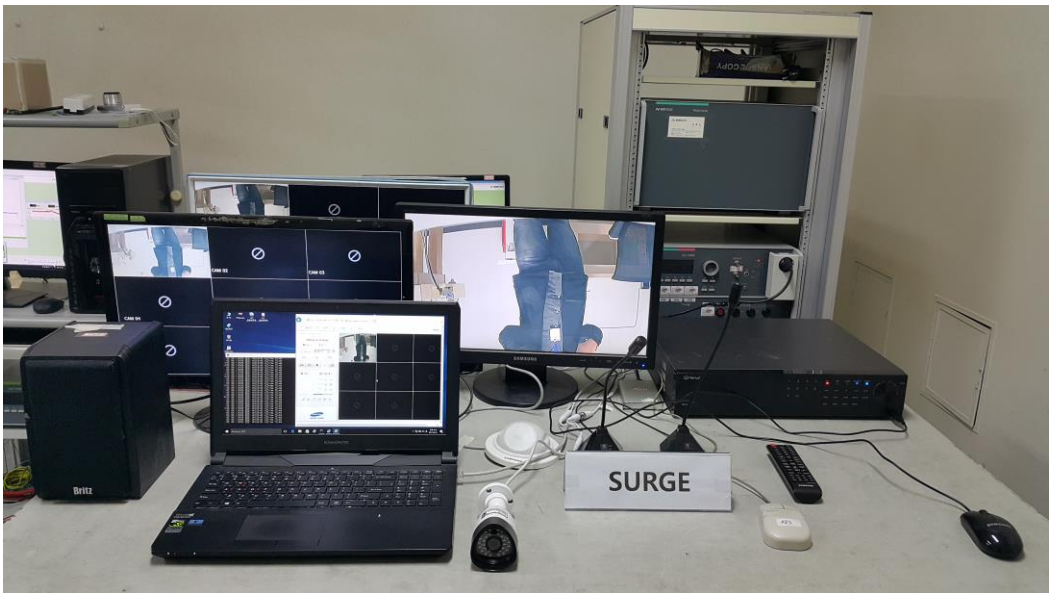
Electrical Fast Transients/Bursts





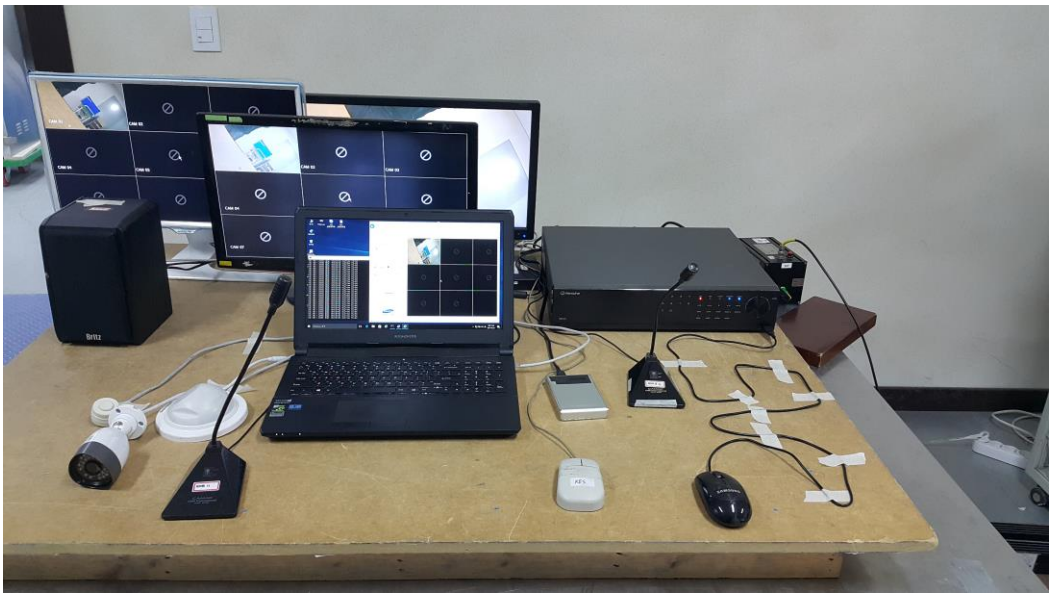
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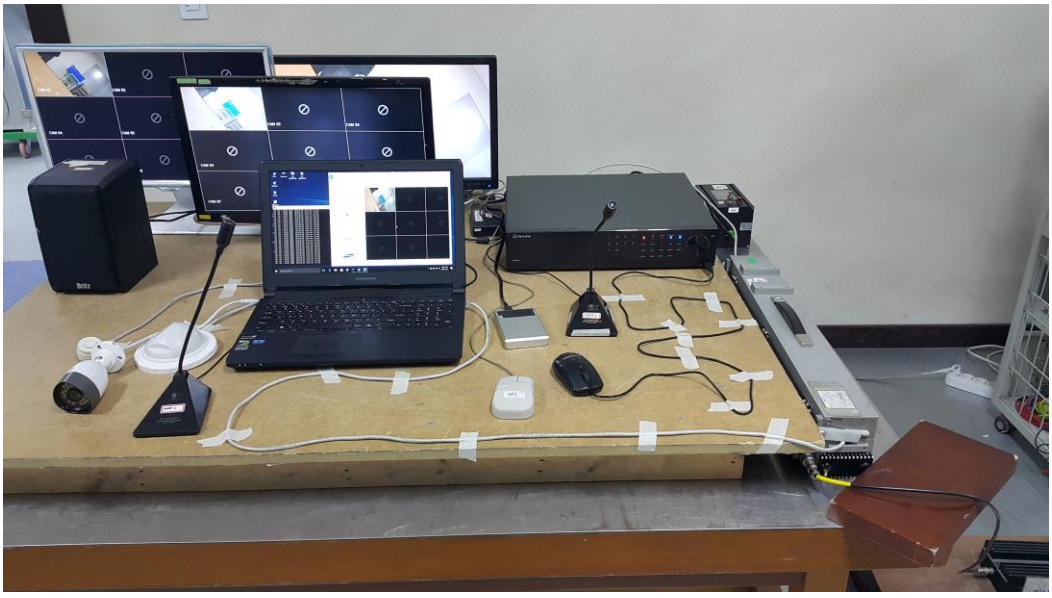
Surge Transients



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Conducted Disturbance





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Voltage Dips and Short Interruptions



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EUT External Photographs

(Top)



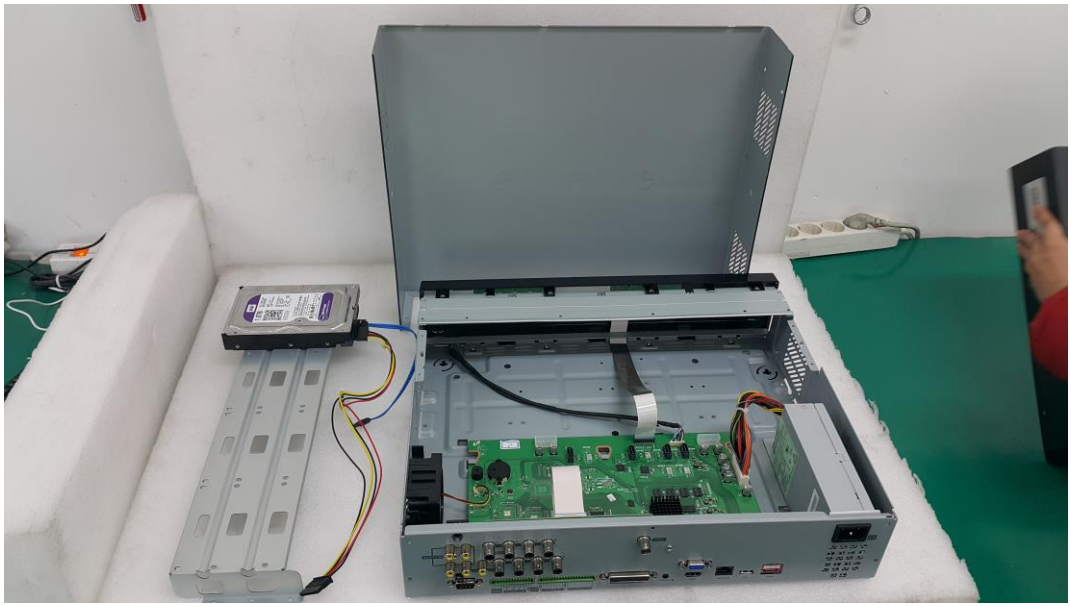
(Bottom)



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EUT Internal Photographs

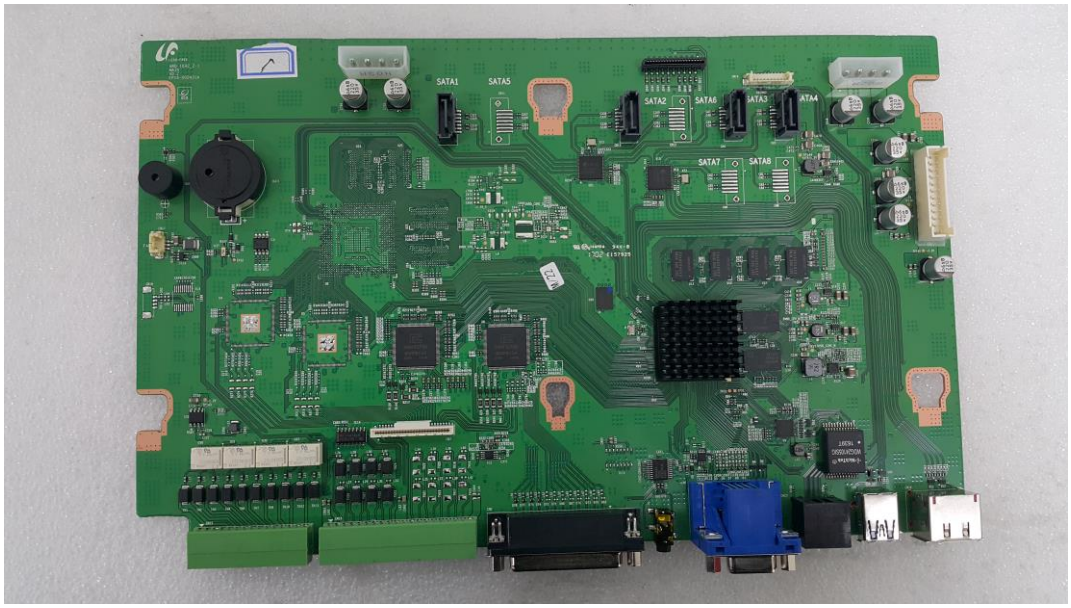
(Internal View)



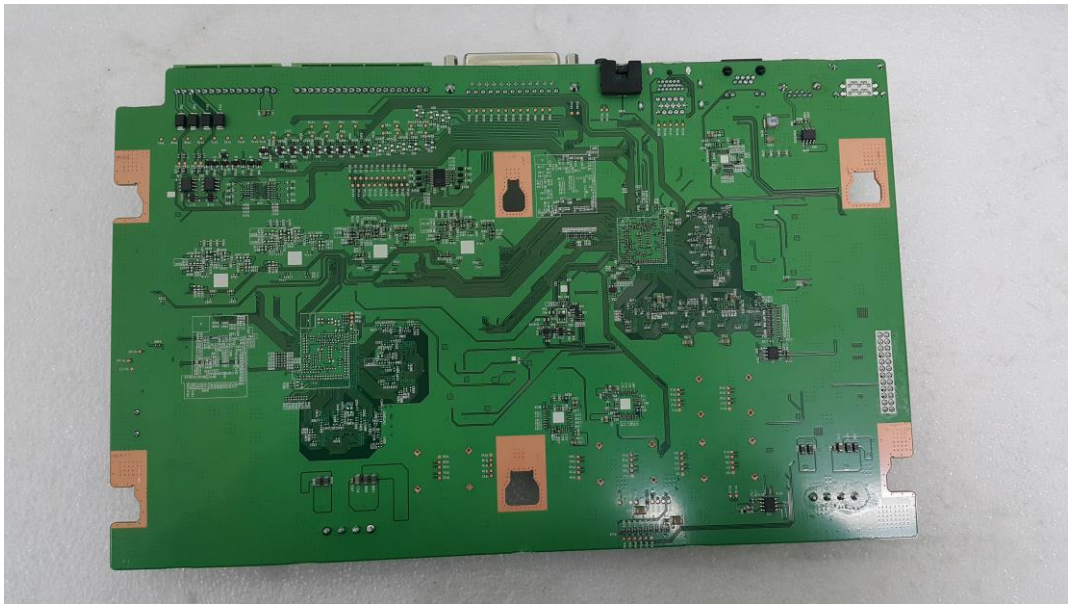
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EUT Internal View – Main Board

(Top)



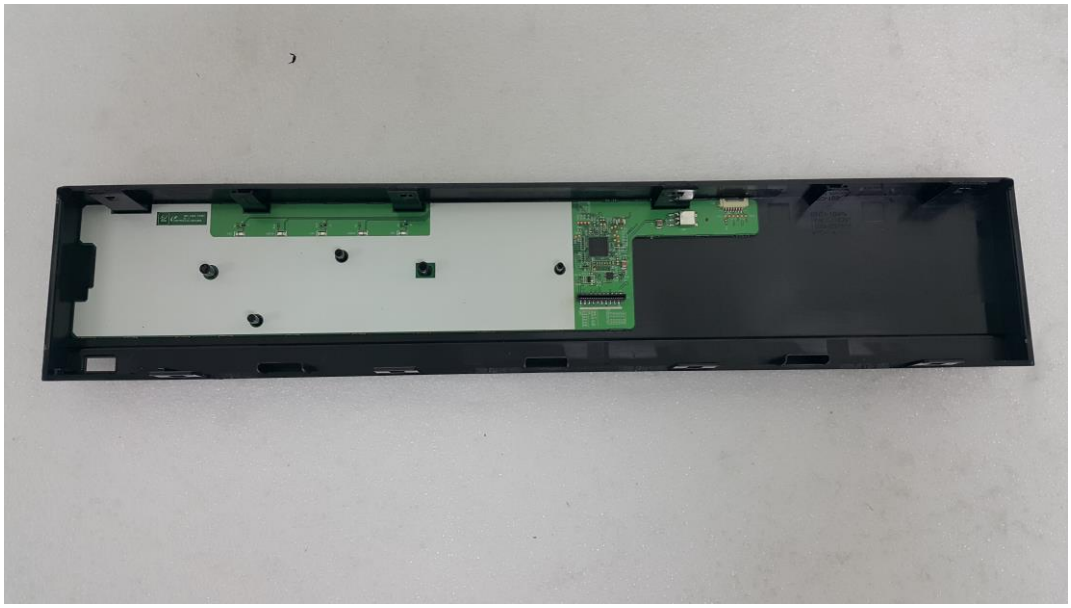
(Bottom)



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EUT Internal View – Board 1

(Top)

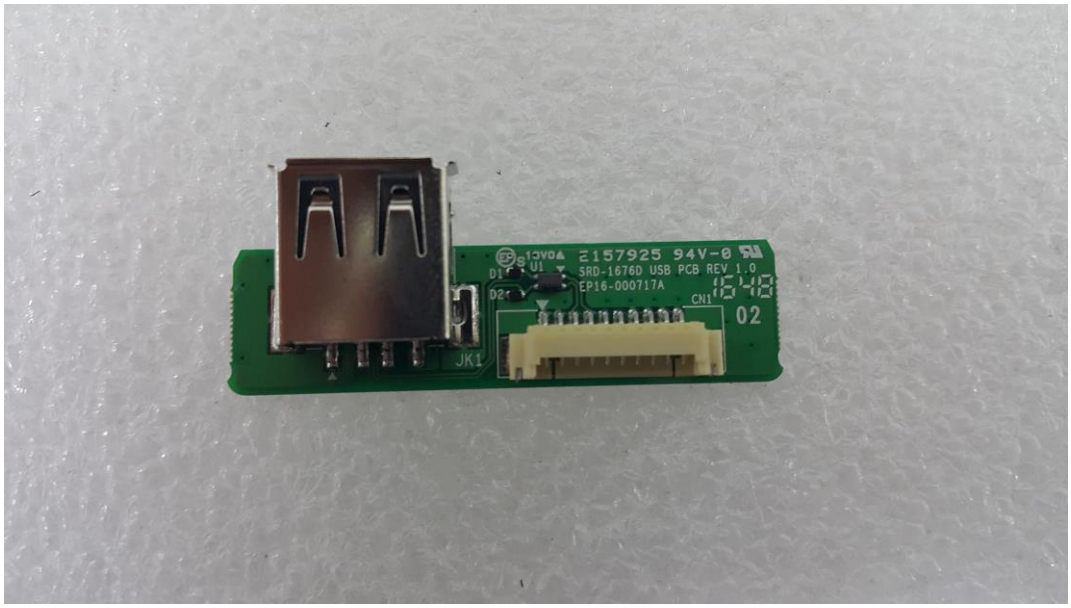


(Bottom)

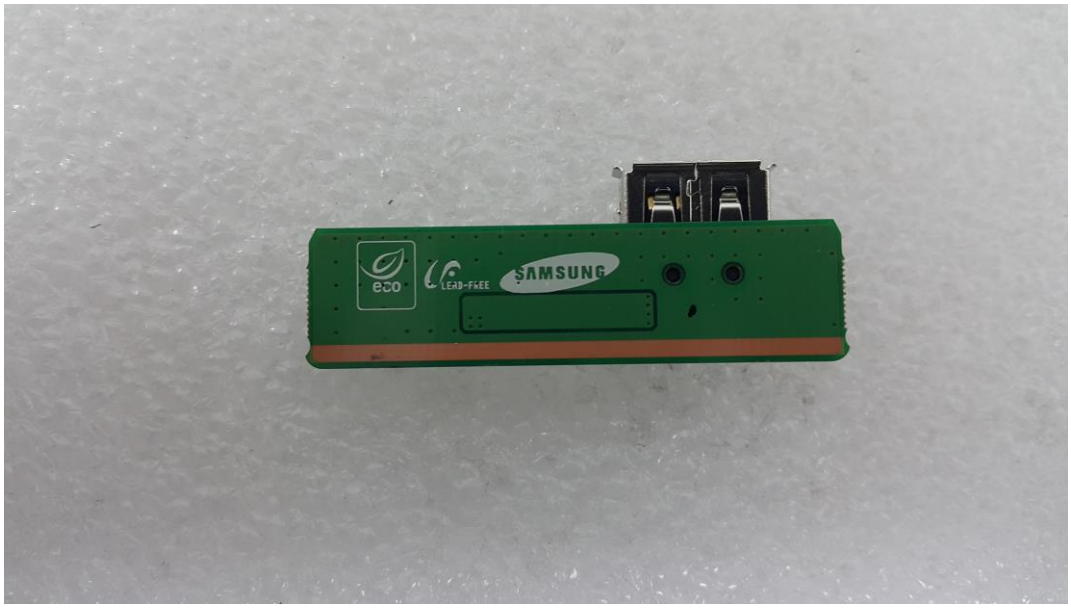
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EUT Internal View – Board 2

(Top)



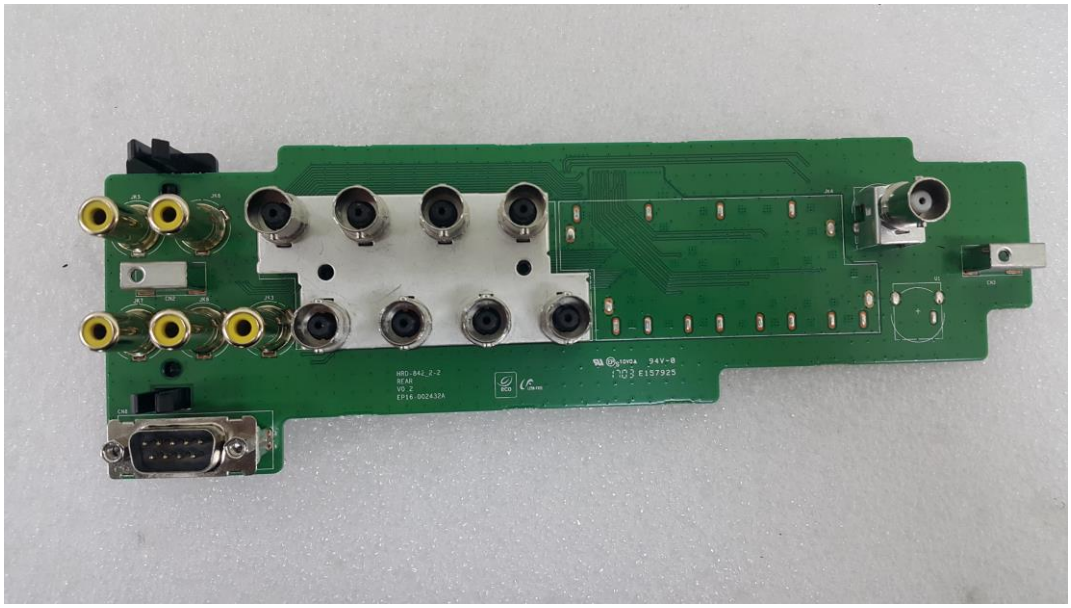
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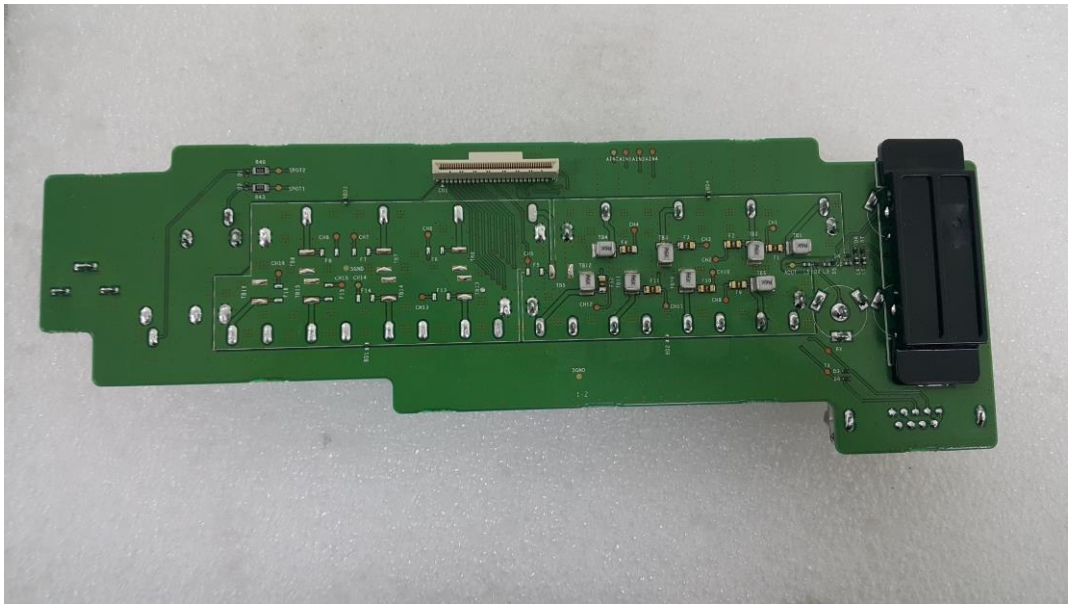
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EUT Internal View – Board 3

(Top)



(Bottom)



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The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

Label and Location



DVR

Model No : HRD-842P

Manufacturer : Hanwha Techwin (Tianjin) Co.,Ltd.

Made in of China

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