EMC TEST REPORT For CE

Test Report No.	:	KES-E1-16T0563-R2
Date of Issue	:	May. 15, 2019
Product name	:	NETWORK VIDEO RECORDER
Model/Type No.	:	XRN-410S
Variant Model	:	XRN-410SP, XRN-410SP1T
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	:	Nov. 01, 2016
Test date	:	Nov. 08, 2016 – Nov. 09, 2016
Test Results	:	☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Dae Hyun, Kim
EMC Test Engineer

Reviewed by

Dong-Hun, Jang
EMC Technical Manager

This test report is not related to KOLAS.

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REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Nov. 14, 2016	KES-E1-16T0563	Issued
Jun. 29, 2018	KES-E1-16T0563-R1	Re-issue due to manufacturer change
May. 15, 2019	KES-E1-16T0563-R2	Add a derived model

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1.0 General Product Description

Main Specifications of E.U.T are:

Model		XRN-410S
Display		
Network Camera	Inputs	Max. 4CH
	Resolution	CIF ~ 8MP
	Protocols	Samsung, ONVIF
Live	Local Display	1x HDMI / 1x VGA
	Multi-Channel Display	[Local Monitor] 1 /2V / 3V/ 4 / Auto Sequence [Web] 1 / 4 / Auto Sequence
	Performance	[Local Monitor] 8MP(60fps,only One Ch) 5MP(90fps), 3MP(120fps), 2MP(240fps), 720p(240fps), D1(240fps) [Web] 5MP(30fps), 3MP(60fps), 2MP(120fps), 720p(240fps), D1(240fps)
Performance		
Operating System	Embedded	Linux
Record	Compression	H.265, H.264, MJPEG
	Recording Bandwidth	Max. 50Mbps
	Resolution	CIF ~ 8MP
	Type	Manual, Schedule(Continuous/Event), Event (Pre/Post)
	Event Action	e-Mail, PTZ Preset, Alarm Out, Buzzer, Monitor Out
Search & Play	Playback Bandwidth	32Mbps (4CH simultaneously)
	Performance	Max. 3 Users (Remote 3)
	Mode	Date & Time(Calendar) Event Log list Text Search(POS, ANPR)
	Simultaneous playback	Max. 4CH (Local, Network)
	Resolution	CIF ~ 8MP
	Playback Control	Fast/Slow Forward / Backward, Move one step Up / Down
Storage	Default Built-In	0TB ~ 8TB (dependent on region)
	Internal	1 SATA
	Max.Capacity	8TB
Backup	File backup	BU/Exe(USB), JPG/AVI(Web, CMS)
	Function	Multi channel(Upto 4CH) Play, Date-Time/Title display
Sensor	I/O	4/2 (NO 1EA, NO/NC 1EA)
Audio	Input	4 CH (network)
	Compression	G.711, G.726, AAC(16/48KHz)
	Audio Communication	2-Way
Network		
Protocol		TCP/IP, UDP/IP, RTP (UDP), RTP (TCP), RTSP, NTP, HTTP, DHCP (Server, Client), PPPoE, SMTP, ICMP, IGMP, ARP, DNS, DDNS, uPnP, HTTPS, SNMP, ONVIF (Profile-S), SUNAPI(Server, Client)
DDNS		Hanwha Security DDNS
Transmission Bandwidth		64Mbps
Max Remote Users		Search (3), Live Unicast (10), Multicast (20)
IP Version		IPv4/v6
Security		User access Log, IP Filtering, 802.1x, Encryption
OS		Supported OS : Windows 7, 8, 10, Mac OS X 10.8, 10.9, 10.10, 10.11

Web Browser		Non-plugin Webviewer Supported Browser: Google Chrome 47, MS Edge 20 Plug-in Webviewer Supported MS Explore 11 , Mozilla Firefox 43 , Apple Safari 9 * Mac OS X only
Viewer Software	Type	SSM, Webviewer, Smart Viewer, wisenet Mobile
	CMS Support	Support SDK/CGI(SUNAPI)
Functions		
Camera Setup	Register	PnP, Manual
	Setup Items	IP address, Add profile edit, Bitrate, Compression, GOP, Quality, Camera MD setup Camera video setup (Simple focus, Brightness/Contrast, Flip/Mirror, IRIS, WDR, D&N, SSNR, Shutter, SSDR, DIS), Fisheye Dewarping(web), Hallway View Setup, Camera Webpage
Camera Control	PoE	1) Monitor PoE Power consumption 2) On/Off Control for each PoE camera 3) Remote Reset for each PoE camera
Easy Configuration		Setup Wizard (Date/Time, Network, Auto Camera Configuration) P2P (TUTK)
Redundancy	ARB	Yes
PTZ	Control	Via GUI, Webviewer, SPC-2000
	Preset	300 Presets (Camera)
Smart phone	Support Model	I-Phone, Android
	Protocol Support	RTP, RTSP, HTTP, CGI(SUNAPI)
	Control	Live(4ch) : Multi-Profile Support Playback(1ch) Event push
	Max. Remote Users	Search (3), Live Unicast (10), Multicast (20)
System Control	Control Applications	Mouse, Web, SPC-2000 (Controller), IR Remocon
Indicator/Interface		
Front	Indicator	Power Status LED 1EA Lan Status LED 1EA Record Status LED 1EA
Connectors	HDMI	1 EA - Support upto 4K (3840 x 2160)
	Audio	Out(1EA, RCA, Line)
	Ethernet	■ 4EA (PoE/PoE+, 100Mbps) ■ 1EA (WAN, 1Gbps) - WAN : Uplink to CMS
	Alarm	In(4EA, Terminal Block) Out(2EA, Terminal Block)
	USB	2EA(Front 1, Rear 1)
	Reset	Switch(1EA)
	Power Cord	Included
System		
Log	Log List	Max. 20000 (System Log, Event Log each)
Environmental		
Operating Temperature / Humidity		+0°C to +40°C(+32°F to +104°F)
Humidity		20% ~ 85% RH

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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 ☐ 220 Vac ☒ 230 Vac ☐ 240 Vac ☐ 12 Vdc ☐ PoE

Frequency ☒ 50 Hz ☐ 60 Hz ☐ Hz

1.2 Variant Model Differences

- Add derivative model for vendor management

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
NETWORK VIDEO RECORDER	XRN-410S	-	Hanwha Techwin (Tianjin) Co.,Ltd.	E.U.T
MOUSE	MOEIUOA,AA-SM2PCPB	-	Dongguan Primax Electronic & Telecommunication Products Ltd.	
REMOTE CONTROL	EP10-000331A	-	SAMSUNG	
Switching Power Adapter	FSP090-AWAN2	-	Zhonghan Electronics (Shenzhen) Co., Ltd.	
HDD	WD10PURX	WCC4J4FCN8RZ	West digital	

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1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
MONITOR 1	SMT-2232	C95V67VF900025B	Weihai Daewoo Electronics Co., Ltd.	-
MONITOR 2	SMT-2232	C95V67VF900038B	Weihai Daewoo Electronics Co., Ltd.	-
SPEAKER	BZ-T3400 AV Soundbar	-	AVIM AUDIO	-
NETWORK CAMERA	SND-L6013RN	-	SAMSUNG TECHWIN CO., LTD.	4 ea
USB MEMORY	-	-	SanDisk	16 GB
NOTEBOOK	X56K	HN11N5151FJ0045W	HANSUNG	-
NOTEBOOK ADAPTOR	A12-120P1A	F180271552011758	CHICONY POWER TECHNOLOGY CO.,LTD.	-
Alarm	-	-	-	-

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1.6 External I/O Cabling

■ BNC Mode

Start		END		Cable Spec.	
Description	**I/O Port**	**Description**	**I/O Port**	**Length**	**Shield**
LCD MONITOR (E.U.T.)	HDMI	MONITOR 1	HDMI	1.4	S
	VGA OUT	MONITOR 2	D-SUB	1.6	S
	AUDIO OUT	SPEAKER	AUX	1.4	U
	USB 3.0	USB MEMORY	USB 3.0	-	-
	VIEWER	NOTEBOOK	RJ-45	3.0	U
	USB 2.0	MOUSE	USB 2.0	1.8	U
	2 PIN	Alarm	2 PIN	3.0	U
	POE CAMERA	NETWORK CAMERA	RJ-45	5.0	U
	POE CAMERA	NETWORK CAMERA	RJ-45	5.0	U
	POE CAMERA	NETWORK CAMERA	RJ-45	5.0	U
	POE CAMERA	NETWORK CAMERA	RJ-45	5.0	U

* Unshielded=U, Shielded=S

1.7 E.U.T Operating Mode(s)

Test mode	Normal operating
-	E.U.T Monitoring , Ping test, 1 ㎑

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

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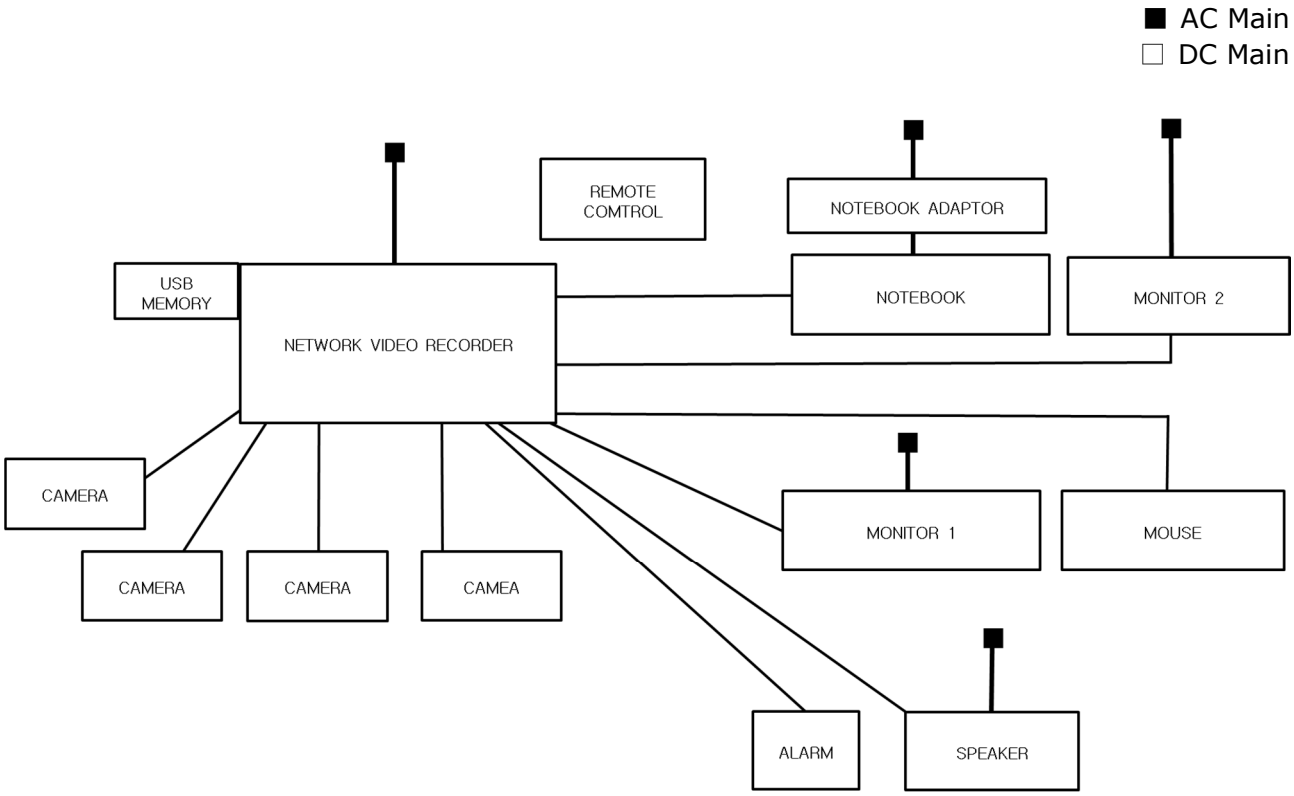
1.8 Configuration



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 C63.4:2014 and CISPR 16-1-4:2012

1.11 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-4308, C-4798, T-2311, G-914
Europe	**TÜV SÜD**	EMI (3 m & 10 m Semi-Anechoic Chamber , 10 m Open Area and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	CARAT 17 07 01633 001

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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/AC:2013	☒ 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
Nov. 08, 2016

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, 04, 2017
☒	LISN	ENV216	R & S	101786	05, 02, 2017
☒	Electro wave Shieldroom	-	SEMITEC	-	-
☒	EMI Test S/W	EMC32	R&S	9.12.00	-

Test Conditions
Temperature: 18,2 ℃
Relative Humidity: 41,5 %

.

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
Nov. 08, 2016

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, 04, 2017
☒	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
☒	8-Wire ISN CAT6	NTFM 8158	Schwarzbeck Mess	8158-0029	08, 11, 2017
☒	Electro wave Shieldroom	-	SEMITEC	-	-
☒	EMI Test S/W	EMC32	R&S	9.12.00	-

Test Conditions
Temperature: 18,2 ℃
Relative Humidity: 41,5 %

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
Nov. 08, 2016

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	VULB 9163	Schwarzbeck	9163-713	05, 15, 2017
☒	Open Area Test Site	-	KES	-	-
☒	Antenna Mast	-	DAEIL EMC	-	-
☒	Turn Table	-	DAEIL EMC	-	-
☒	EMI Test S/W	-	-	-	-

Test Conditions
Temperature: 10,1 ℃
Relative Humidity: 50,0 %

Frequency Range of Measurement
30 ㎒ to 1 ㎓

Instrument Settings
IF Band Width: 120 ㎑

Test Results
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks
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2.4 Radiated Electric Field Emissions(Above 1 ㎓)

Test Date
Nov. 08, 2016

Test Location
Semi Anechoic Chamber #2

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	05, 07, 2017
☒	EMI Test Receiver	ESU26	R&S	100552	04, 24, 2017
☒	Broadband Coaxial Preamplifier	BBV 9718	Schwarzbeck Mess - Elektronik	9718-246	10, 23, 2016
☒	Semi Anachoic Chamber #2	-	SEMITEC	-	-
☒	Antenna Mast	-	AUDIX	-	-
☒	Turn Table	-	AUDIX	-	-
☒	EMI Test S/W	e3	AUDIX	8.083b	-

Test Conditions
Temperature: 18,2 ℃
Relative Humidity: 41,5 %

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
Nov. 09, 2016

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: 16,4 ℃
Relative Humidity: 39,7 %

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
Nov. 09, 2016

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: 16,4 ℃
Relative Humidity: 39,7 %

Test Results
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks
See Appendix A for test data.

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3.0 Criteria for compliance

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

The variety and the diversity of the apparatus within the scope of this document makes it difficult to define precise criteria for the evaluation of the immunity test results.

If as a result of the application of the tests defined in this standard, the apparatus becomes dangerous or unsafe then the apparatus shall be deemed to have failed the test.

A functional description and a definition of performance by the manufacture and noted in the test report, based on the following criteria:

Electrostatic discharge

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

Flickering of an indicator during the application of discharge is permissible, providing that is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change.

Radiated electromagnetic fields

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

Flickering of an indicator during the application of discharge is permissible, providing which could be interpreted by associated equipment as a change, and no such Flickering of indicators occurs at a field strength of 3 V/m.

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

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

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

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

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

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Fast transient burst / slow high energy voltage surge

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

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

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

Conducted RF immunity

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

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

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

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

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

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

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

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

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

still be used; and

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

Voltage dip/interruption / Voltage variation

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

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

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3.1 Electrostatic Discharge

Reference Standard
EN 61000-4-2:2009

Test Date
Nov. 09, 2016

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, 2017
☒	HCP	-	Noise Ken	-	-
☒	VCP	-	Noise Ken	-	-
☒	EMS Test S/W	N/A	N/A	N/A	-

Test Conditions
Temperature: 16,4 ℃
Relative Humidity: 39,7 %
Atmospheric Pressure: 101,6 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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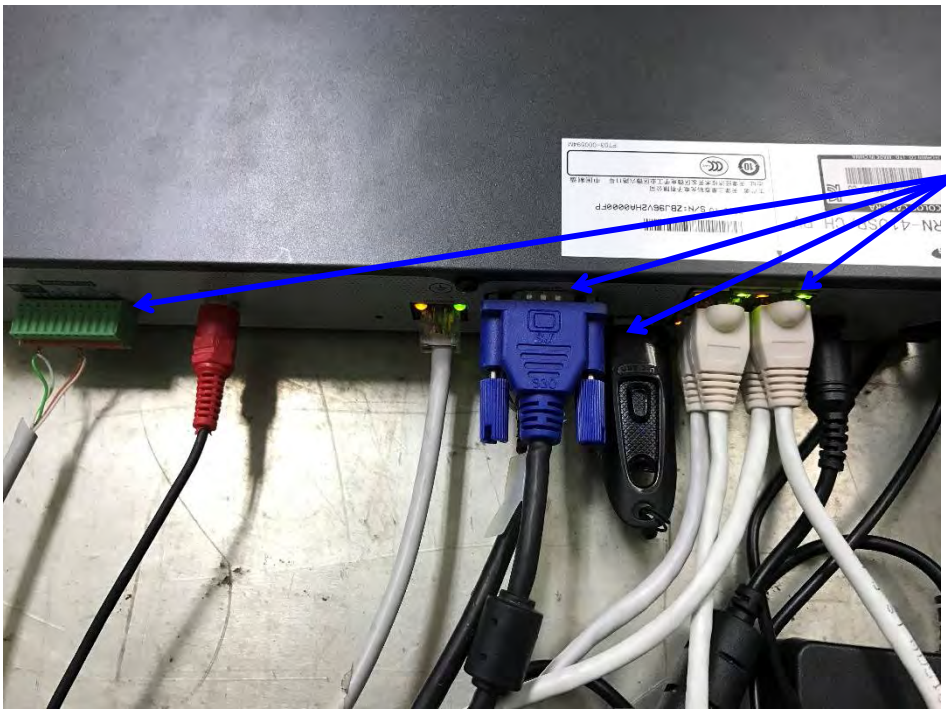
Location of Discharge:

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	Emclosure	Contact Discharge	Complied	-
2	Near Port	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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3.2 Radiated Electric Field Immunity

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

Test Date
Nov. 08, 2016

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	SMB 100A	Rohde & Schwarz	108252	08, 08, 2017
☒	BROADBAND AMPLIFIER	BBA100	Rohde & Schwarz	101239	08, 08, 2017
☒	BROADBAND AMPLIFIER	100S1G6M1	AR	579931	08, 08, 2017
☒	POWER METER	NRP2	Rohde & Schwarz	103475	08, 08, 2017
☒	AVG POWER SENSOR	NRP-Z91	Rohde & Schwarz	102526	08, 08, 2017
☒	AVG POWER SENSOR	NRP-Z91	Rohde & Schwarz	102527	08, 08, 2017
☒	Stacked Log.-Per.Antenna	STLP 9128 D	Schwarzbeck	9128D038	-
☒	DIRECTIONAL COUPLER	KYDC-D1070-DX40	Kytelecom Co., Ltd.	KY150001	08, 08, 2017
☒	Semi Anechoic Chamber #2	-	SEMITEC	-	-
☒	EMS Test S/W	EMC32	R&S	9.12.00	-

Test Conditions

Temperature: 18,2 ℃
Relative Humidity: 41,5 %
Atmospheric Pressure: 100,8 kPa

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Test Specifications

Antenna Polarization: Horizontal & vertical unless indicated otherwise

Antenna Distance: ☒ 3 m

Field Strength: ☐ 1 V/m ☐ 3 V/m
☒ 10 V/m

Frequency Range: ☐ 80 MHz to 1 GHz ☐ 1,4 GHz to 2,7 GHz
☒ 80 MHz to 2,7 GHz

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

Frequency step: ☒ 1 % step

Dwell Time: ☐ 1 s ☒ 3 s

# of Sides Radiated: ☒ 4

Required Performance Criteria: ☒ Complied

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Test Data

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

Note: "Blank" = Not performed

Observations:
Complied – No degradation of function

Test Results

☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria

Remarks

PASS Required Performance Criteria.

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3.3 Electrical Fast Transients/Bursts

Reference Standard
EN 61000-4-4:2012

Test Date
Nov. 09, 2016

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
☒	Capacitive Coupling Clamp	HFK	EM TEST	070925	06, 27, 2017
☒	Motor Variac	MV2616	EM TEST	V0936105123	06, 27, 2017
☒	EMS Test S/W	iec.control	EM TEST AG	5.0.9.0	-

Test Conditions
Temperature: 16,4 ℃
Relative Humidity: 39,7 %
Atmospheric Pressure: 101,6 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 (kV)	(-) Burst (kV)
L – N - PE	Complied	Complied

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

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

☒ Signal ports and telecommunication ports – Coupling Clamp used

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
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
Nov. 09, 2016

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 504N	EM TEST	V0936105121	06, 27, 2017
☒	CDN	CNV 508T5	EM TEST	P1549168422	04, 27, 2017
☒	EMS Test S/W	iec.control	EM TEST AG	5.0.9.0	-

Test Conditions
Temperature: 16,4 ℃
Relative Humidity: 39,7 %
Atmospheric Pressure: 101,6 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 (kV)	(-) Surge (kV)
L – N	Complied	Complied
L – PE	Complied	Complied
N - PE	Complied	Complied

☐ Line to Earth – Common Mode

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

Signal Lines

☐ Line to Earth – Common Mode

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
RJ-45	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
Nov. 09, 2016

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, 04, 2017
☒	EMS Test S/W	icd.control	EM TEST AG	5.3.7	

Test Conditions
Temperature: 16,4 ℃
Relative Humidity: 39,4 %
Atmospheric Pressure: 101,6 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
-	CDN (☐M2, ☐M3)	-

☒ Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Observations
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
Nov. 09, 2016

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 AG	5.0.9.0	-

Test Conditions
Temperature: 16,4 ℃
Relative Humidity: 39,7 %
Atmospheric Pressure: 101,6 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
PASS Required Performance Criteria.

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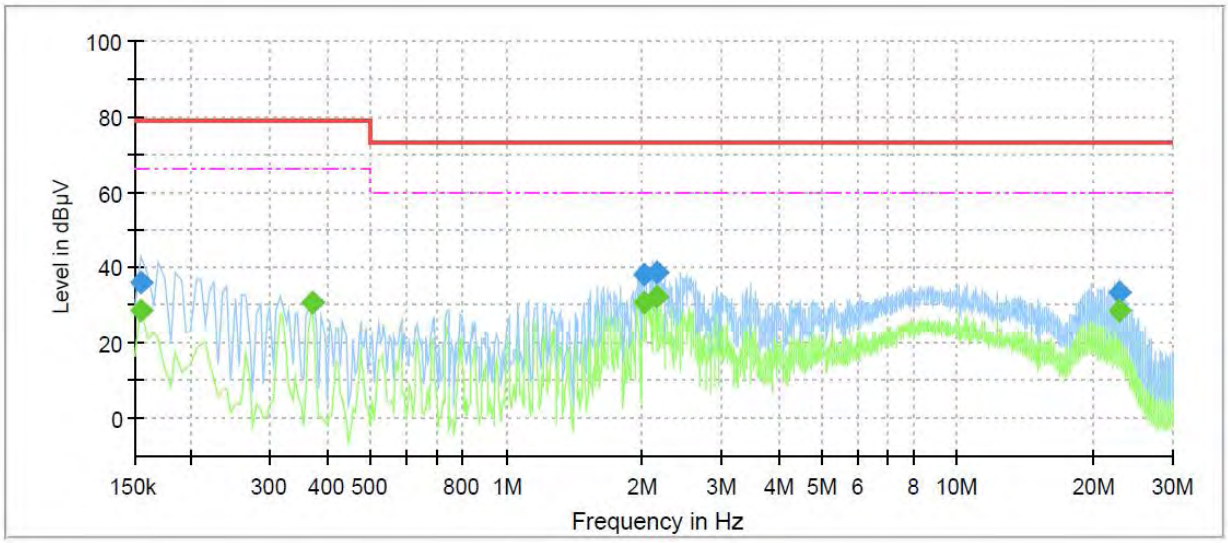
APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

[HOT]

Common Information

Test Description:	Conducted Emission
Model No.:	XRN-410SP
Mode	
Operator Name:	KES



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.155000	---	28.58	66.00	37.42	1000.0	9.000	L1	9.7
0.155000	36.02	---	79.00	42.98	1000.0	9.000	L1	9.7
0.370000	---	30.47	66.00	35.53	1000.0	9.000	L1	9.7
0.370000	30.90	---	79.00	48.10	1000.0	9.000	L1	9.7
2.020000	---	30.57	60.00	29.43	1000.0	9.000	L1	10.0
2.020000	38.19	---	73.00	34.81	1000.0	9.000	L1	10.0
2.160000	---	32.52	60.00	27.48	1000.0	9.000	L1	10.0
2.160000	38.67	---	73.00	34.33	1000.0	9.000	L1	10.0
22.885000	---	28.67	60.00	31.33	1000.0	9.000	L1	10.3
22.885000	33.15	---	73.00	39.85	1000.0	9.000	L1	10.3

♦ 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)

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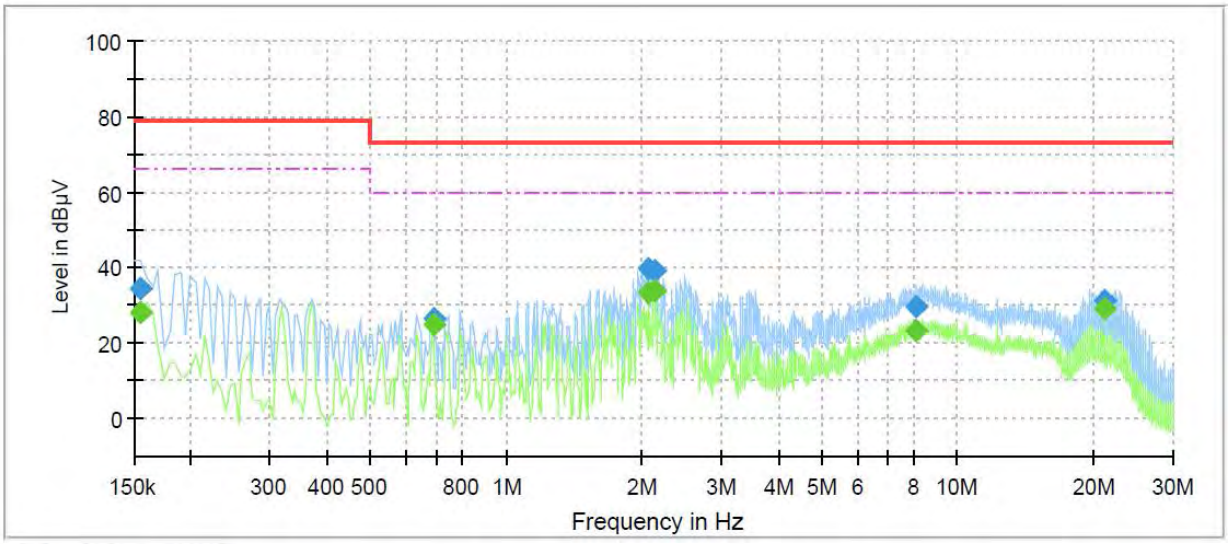
[NEUTRAL]

Common Information

Test Description:	Conducted Emission
Model No.:	XRN-410SP
Mode	
Operator Name:	KES



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.155000	---	28.20	66.00	37.80	1000.0	9.000	N	9.7
0.155000	34.18	---	79.00	44.82	1000.0	9.000	N	9.7
0.690000	---	24.77	60.00	35.23	1000.0	9.000	N	9.8
0.690000	26.43	---	73.00	46.57	1000.0	9.000	N	9.8
2.070000	---	33.42	60.00	26.58	1000.0	9.000	N	10.0
2.070000	39.56	---	73.00	33.44	1000.0	9.000	N	10.0
2.125000	---	33.66	60.00	26.34	1000.0	9.000	N	10.0
2.125000	39.12	---	73.00	33.88	1000.0	9.000	N	10.0
8.055000	---	23.22	60.00	36.78	1000.0	9.000	N	9.9
8.055000	29.52	---	73.00	43.48	1000.0	9.000	N	9.9
21.240000	---	29.32	60.00	30.68	1000.0	9.000	N	10.2
21.240000	31.19	---	73.00	41.81	1000.0	9.000	N	10.2

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

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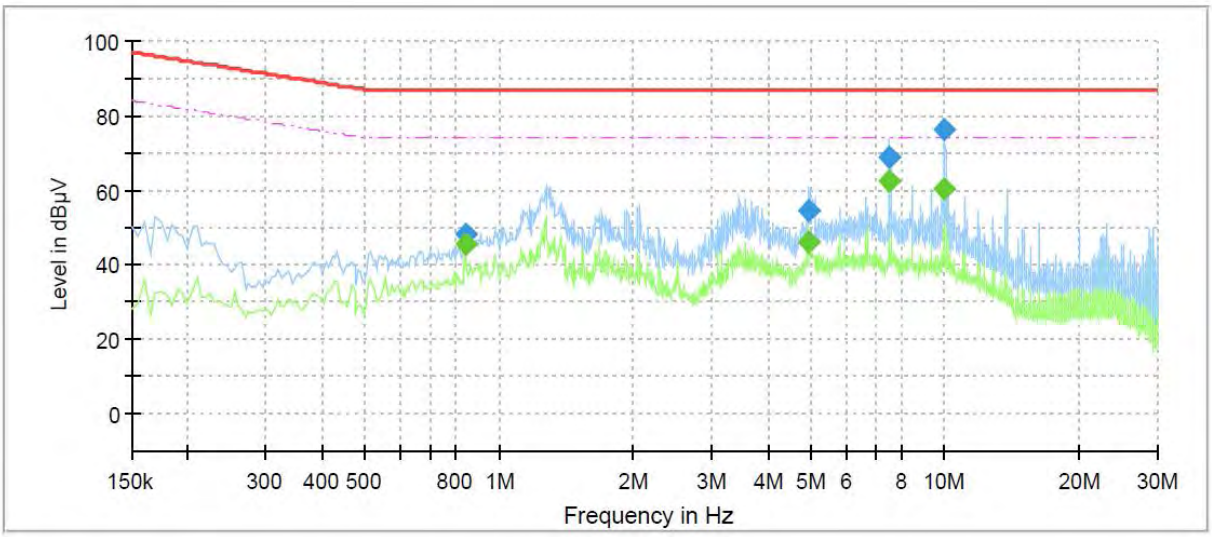
Conducted Emissions at Telecommunication Ports

[10 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	XRN-410SP
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)
0.840000	---	45.39	74.00	28.61	1000.0	9.000	Single Line	10.1
0.840000	48.35	---	87.00	38.65	1000.0	9.000	Single Line	10.1
4.940000	---	46.18	74.00	27.82	1000.0	9.000	Single Line	10.1
4.940000	54.68	---	87.00	32.32	1000.0	9.000	Single Line	10.1
7.500000	---	62.37	74.00	11.63	1000.0	9.000	Single Line	10.1
7.500000	68.75	---	87.00	18.25	1000.0	9.000	Single Line	10.1
10.000000	---	60.42	74.00	13.58	1000.0	9.000	Single Line	10.0
10.000000	76.38	---	87.00	10.62	1000.0	9.000	Single Line	10.0

♦ 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)

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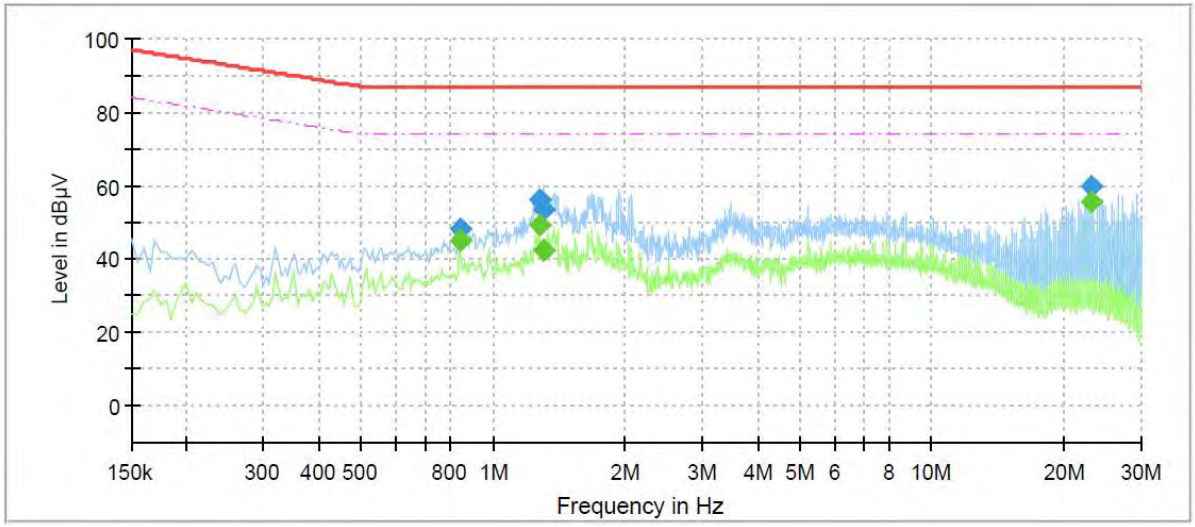
[100 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	XRN-410SP
Mode	100 Mbps
Operator Name:	KES



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.840000	---	44.92	74.00	29.08	1000.0	9.000	Single Line	9.6
0.840000	48.10	---	87.00	38.90	1000.0	9.000	Single Line	9.6
1.270000	---	49.42	74.00	24.58	1000.0	9.000	Single Line	9.6
1.270000	56.31	---	87.00	30.69	1000.0	9.000	Single Line	9.6
1.300000	---	42.29	74.00	31.71	1000.0	9.000	Single Line	9.6
1.300000	53.64	---	87.00	33.36	1000.0	9.000	Single Line	9.6
23.130000	---	55.77	74.00	18.23	1000.0	9.000	Single Line	9.5
23.130000	59.88	---	87.00	27.12	1000.0	9.000	Single Line	9.5

♦ 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 (ISN FACTOR+ Cable Loss)

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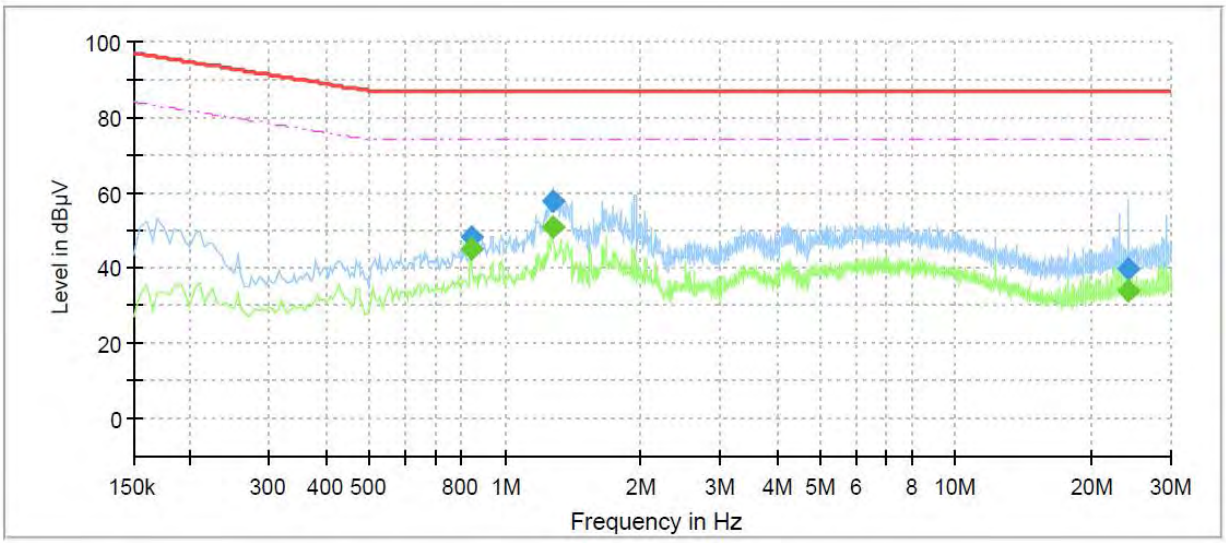
[1000 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	XRN-410SP
Mode	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)
0.840000	---	45.13	74.00	28.87	1000.0	9.000	Single Line	9.5
0.840000	48.19	---	87.00	38.81	1000.0	9.000	Single Line	9.5
1.270000	---	50.62	74.00	23.38	1000.0	9.000	Single Line	9.5
1.270000	57.77	---	87.00	29.23	1000.0	9.000	Single Line	9.5
24.000000	---	34.13	74.00	39.87	1000.0	9.000	Single Line	9.5
24.000000	39.87	---	87.00	47.13	1000.0	9.000	Single Line	9.5

♦ 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 (ISN FACTOR+ Cable Loss)

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Radiated Electric Field Emissions(Below 1 ㎓)

Frequency	Amplitude	ANT Polar.	ANT. Height	Correction Factor		Corrected Amplitude	Applicable Limit	Margin
[㎒]	[dBμV]	(H/V)	[m]	ANT. [dB/m]	Cable [dB]	[dBμV/m]	[dBμV/m]	[dB]
51.39	10.15	H	3.82	13.77	2.11	26.03	40.00	13.97
300.11	8.15	V	1.21	13.38	5.15	26.68	47.00	20.32
400.80	7.26	H	3.98	15.71	6.18	29.15	47.00	17.85
540.48	9.21	V	1.00	17.99	7.33	34.53	47.00	12.47
647.82	8.00	H	4.00	19.49	8.14	35.63	47.00	11.37
648.13	8.44	V	1.18	19.49	8.14	36.07	47.00	10.93

* 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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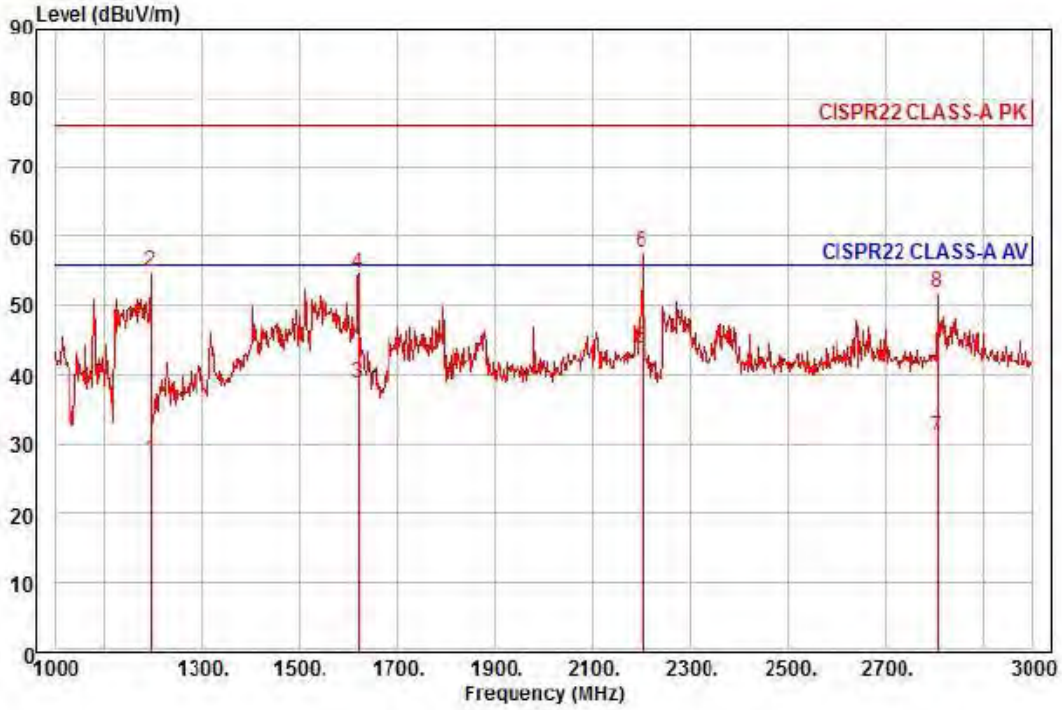
Radiated Electric Field Emissions(Above 1 ㎓)



Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : XRN-410SP
Mode :
Memo :

	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	1196.00	35.50	24.69	7.13	39.62	312	56.00	-28.30	horizontal	Average
2	1196.00	62.72	24.69	7.13	39.62	312	76.00	-21.08	horizontal	Peak
3	1620.00	43.23	26.37	8.36	39.23	318	56.00	-17.27	horizontal	Average
4	1620.00	59.24	26.37	8.36	39.23	318	76.00	-21.26	horizontal	Peak
5 pp	2200.00	45.22	28.37	9.80	39.42	127	56.00	-12.03	horizontal	Average
6 pk	2200.00	58.96	28.37	9.80	39.42	127	76.00	-18.29	horizontal	Peak
7	2806.00	29.85	29.85	11.25	39.89	7	56.00	-24.94	horizontal	Average
8	2806.00	50.82	29.85	11.25	39.89	7	76.00	-23.97	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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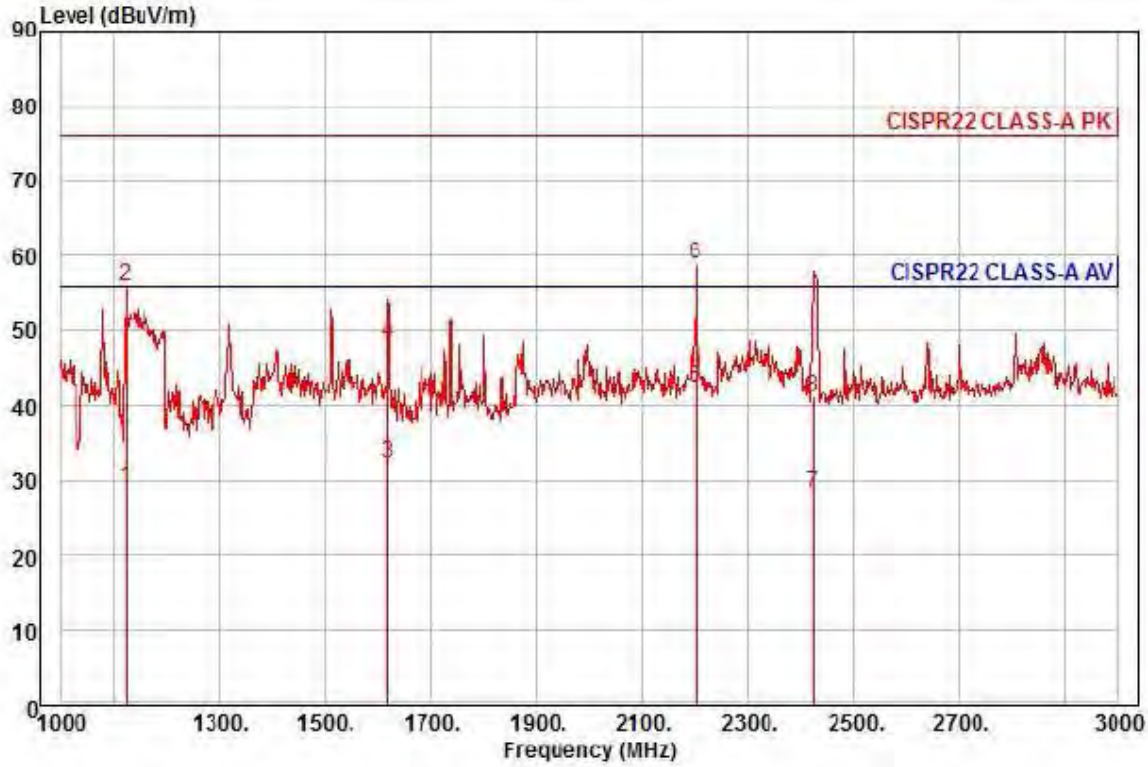

Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : XRN-410SP
Mode :
Memo :

	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	1122.00	37.47	24.39	6.88	39.80	356	56.00	-27.06	vertical	Average
2	1122.00	64.36	24.39	6.88	39.80	356	76.00	-20.17	vertical	Peak
3	1618.00	36.88	26.36	8.36	39.23	159	56.00	-23.63	vertical	Average
4	1618.00	52.88	26.36	8.36	39.23	159	76.00	-27.63	vertical	Peak
5 pp	2200.00	43.75	28.37	9.80	39.42	147	56.00	-13.50	vertical	Average
6 pk	2200.00	60.11	28.37	9.80	39.42	147	76.00	-17.14	vertical	Peak
7	2424.00	28.32	28.92	10.37	39.45	62	56.00	-27.84	vertical	Average
8	2424.00	41.39	28.92	10.37	39.45	62	76.00	-34.77	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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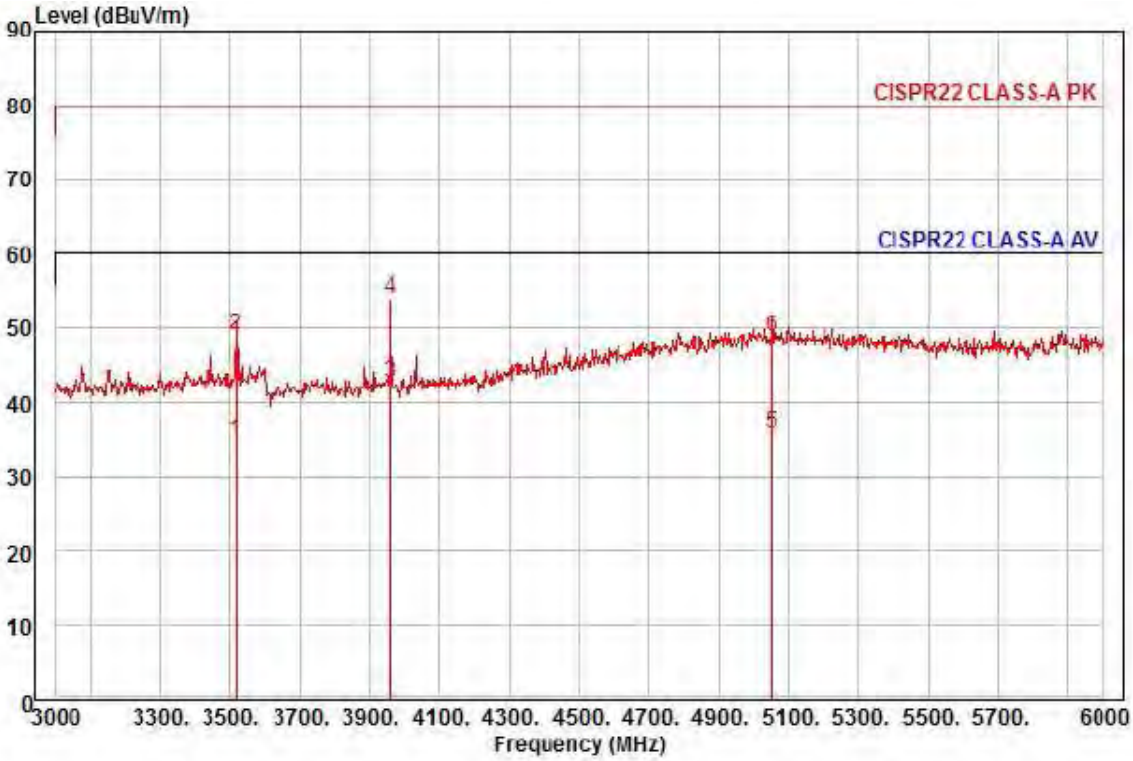

Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : XRN-410SP
Mode :
Memo :

	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	3519.00	31.86	31.20	12.66	40.87	45	60.00	-25.15	horizontal	Average
2	3519.00	46.08	31.20	12.66	40.87	45	80.00	-30.93	horizontal	Peak
3 pp	3960.00	37.84	31.94	13.49	40.71	0	60.00	-17.44	horizontal	Average
4 pk	3960.00	49.30	31.94	13.49	40.71	0	80.00	-25.98	horizontal	Peak
5	5055.00	23.18	37.61	15.42	40.36	199	60.00	-24.15	horizontal	Average
6	5055.00	36.09	37.61	15.42	40.36	199	80.00	-31.24	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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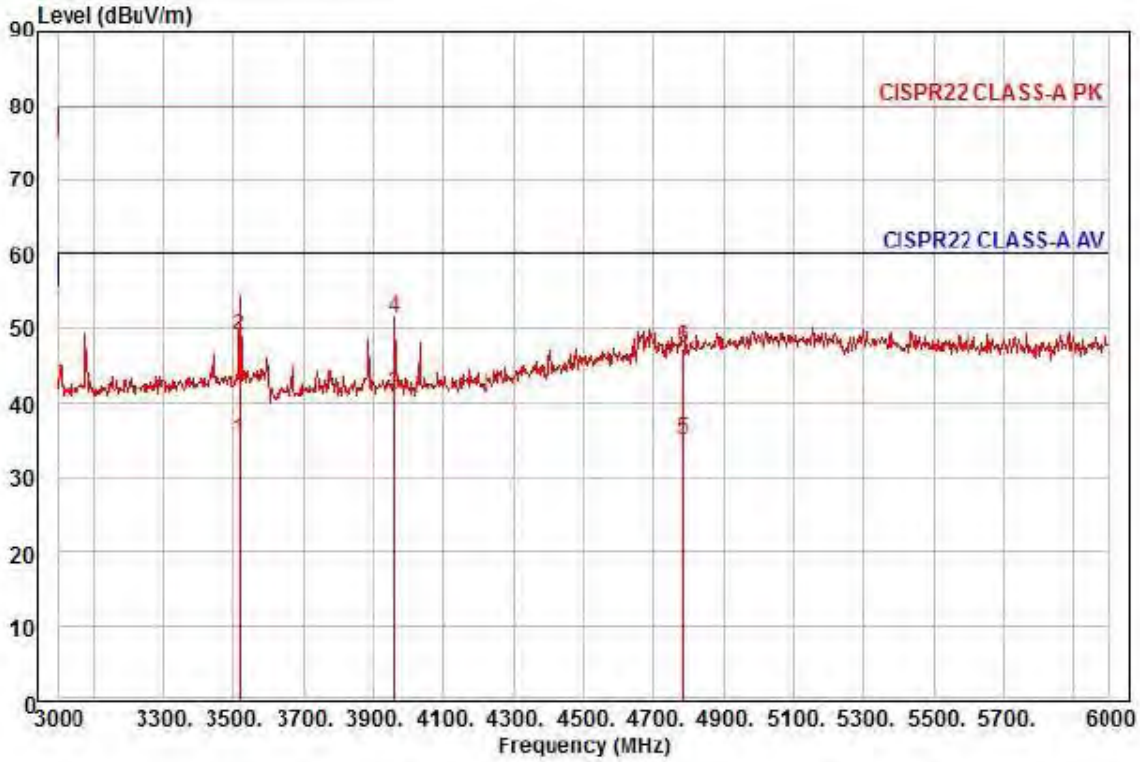

Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : XRN-410SP
Mode :
Memo :

	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	3519.00	32.10	31.20	12.66	40.87	283	60.00	-24.91	vertical	Average
2	3519.00	46.14	31.20	12.66	40.87	283	80.00	-30.87	vertical	Peak
3 pp	3960.00	36.40	31.94	13.49	40.71	28	60.00	-18.88	vertical	Average
4 pk	3960.00	46.86	31.94	13.49	40.71	28	80.00	-28.42	vertical	Peak
5	4782.00	24.01	36.48	15.06	40.49	124	60.00	-24.94	vertical	Average
6	4782.00	36.37	36.48	15.06	40.49	124	80.00	-32.58	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	91.590E-3			
2	2.543E-3			PASS
3	85.763E-3	4.143	2.07	PASS
4	2.182E-3			PASS
5	83.241E-3	8.113	1.03	PASS
6	2.806E-3			PASS
7	80.469E-3	11.612	693.00E-3	PASS
8	2.349E-3			PASS
9	77.639E-3	21.566	360.00E-3	PASS
10	2.497E-3			PASS
11	73.337E-3	24.693	297.00E-3	PASS
12	2.558E-3			PASS
13	68.037E-3	35.998	189.00E-3	PASS
14	2.394E-3			PASS
15	62.279E-3	46.132	135.00E-3	PASS
16	2.228E-3			PASS
17	56.514E-3	47.445	119.11E-3	PASS
18	2.247E-3			PASS
19	50.642E-3	47.516	106.58E-3	PASS
20	2.113E-3			PASS
21	44.521E-3	46.171	96.43E-3	PASS
22	2.090E-3			PASS
23	38.682E-3	43.933	88.05E-3	PASS
24	1.857E-3			PASS
25	32.851E-3	40.557	81.00E-3	PASS
26	1.712E-3			PASS
27	27.441E-3	36.590	75.00E-3	PASS
28	1.554E-3			PASS
29	22.301E-3	31.935	69.83E-3	PASS
30	1.353E-3			PASS
31	17.618E-3	26.970	65.32E-3	PASS
32	1.222E-3			PASS
33	13.579E-3	22.129	61.36E-3	PASS
34	989.921E-6			PASS
35	9.828E-3	16.985	57.86E-3	PASS
36	888.134E-6			PASS
37	6.822E-3	12.465	54.73E-3	PASS
38	699.414E-6			PASS
39	4.335E-3			PASS
40	514.270E-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	91.998E-3			
2	2.933E-3			PASS
3	86.112E-3	1.872	4.60	PASS
4	2.599E-3			PASS
5	83.498E-3	3.662	2.28	PASS
6	3.287E-3			PASS
7	80.822E-3	5.248	1.54	PASS
8	2.739E-3			PASS
9	77.914E-3	9.739	800.00E-3	PASS
10	2.967E-3			PASS
11	73.630E-3	11.156	660.00E-3	PASS
12	2.978E-3			PASS
13	68.297E-3	16.261	420.00E-3	PASS
14	2.843E-3			PASS
15	62.517E-3	20.839	300.00E-3	PASS
16	2.588E-3			PASS
17	56.704E-3	21.422	264.70E-3	PASS
18	2.604E-3			PASS
19	50.773E-3	21.437	236.84E-3	PASS
20	2.537E-3			PASS
21	44.690E-3	20.856	214.28E-3	PASS
22	2.430E-3			PASS
23	38.764E-3	19.812	195.66E-3	PASS
24	2.209E-3			PASS
25	32.936E-3	18.298	180.00E-3	PASS
26	2.003E-3			PASS
27	27.538E-3	16.523	166.66E-3	PASS
28	1.813E-3			PASS
29	22.400E-3	14.435	155.18E-3	PASS
30	1.548E-3			PASS
31	17.736E-3	12.218	145.16E-3	PASS
32	1.412E-3			PASS
33	13.695E-3	10.043	136.36E-3	PASS
34	1.162E-3			PASS
35	9.947E-3	7.736	128.58E-3	PASS
36	1.017E-3			PASS
37	6.901E-3	5.674	121.62E-3	PASS
38	809.405E-6			PASS
39	4.464E-3			PASS
40	603.312E-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	0.028	1.00	PASS
Plt	0.028	0.65	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.106	4.00	PASS
Tmax [s]	0.000	0.50	PASS

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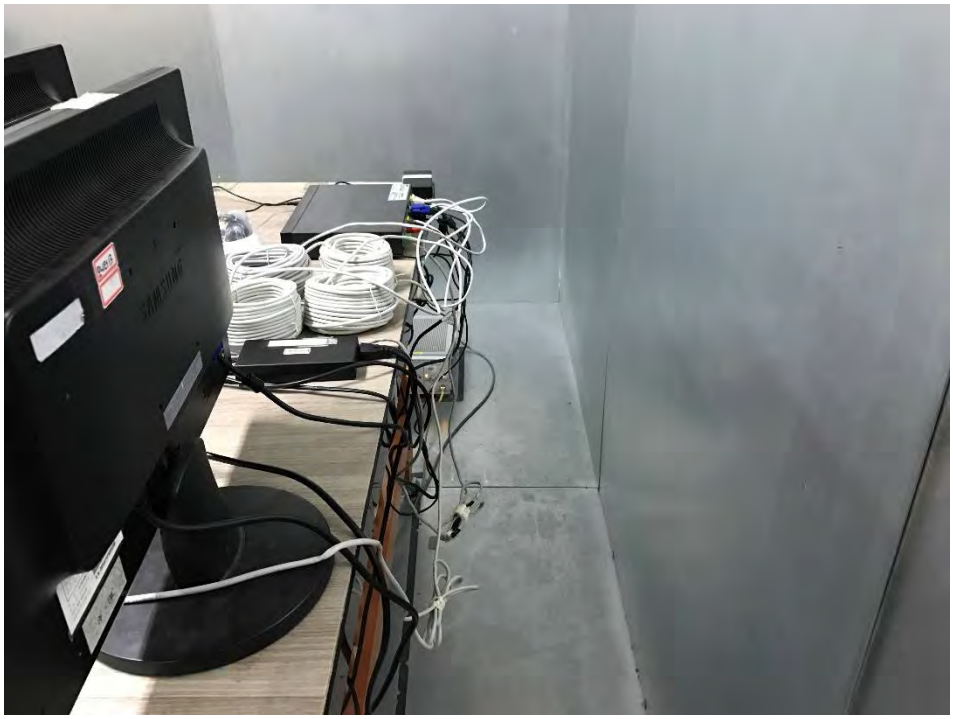
Test Setup Photos and Configuration

Conducted Voltage Emissions



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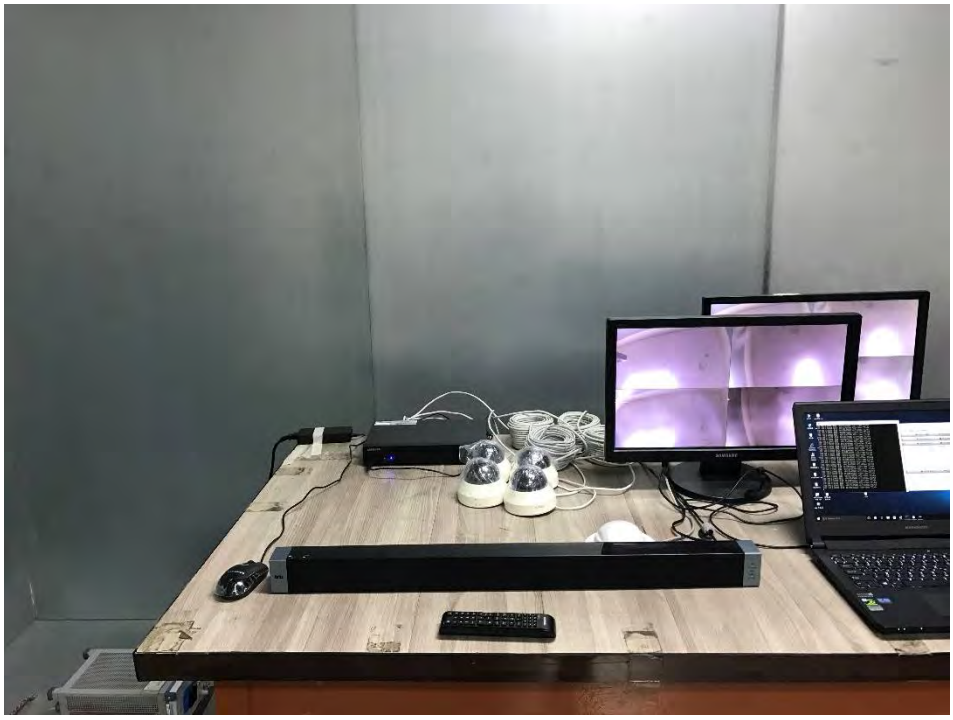
Conducted Telecommunication Emissions



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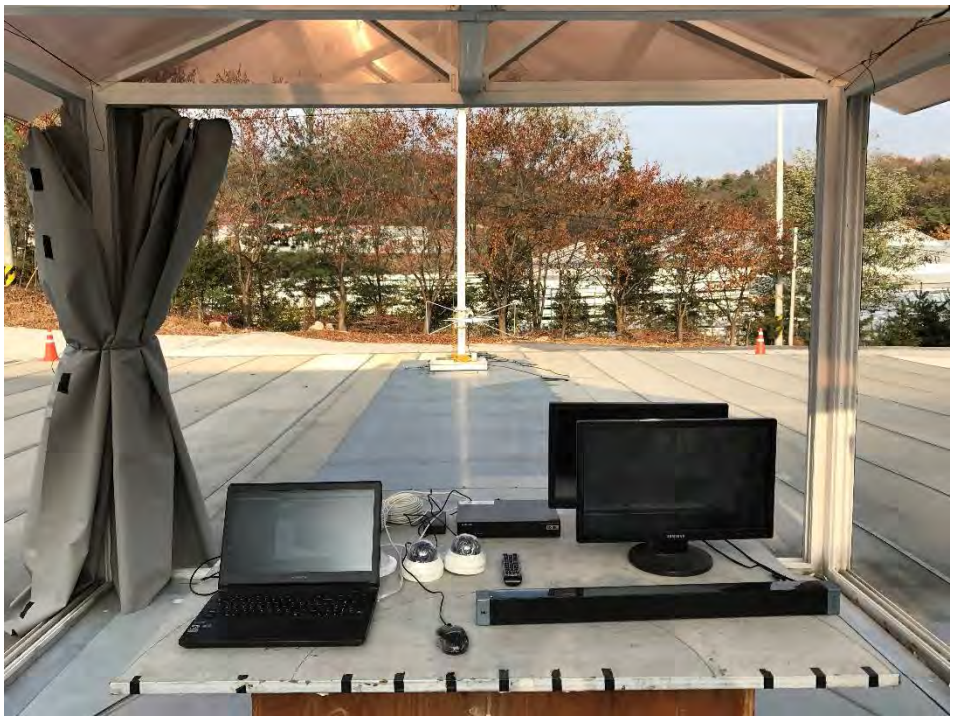
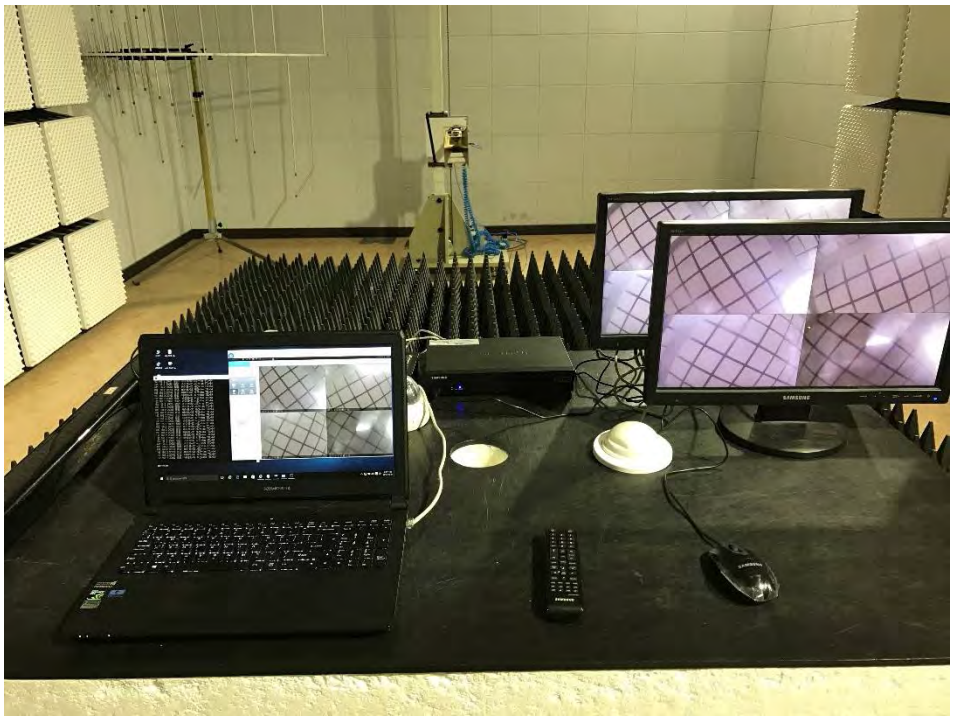
Radiated Electric Field Emissions(Below 1 ㎓)



Radiated Electric Field Emissions(Above 1 ㎓)



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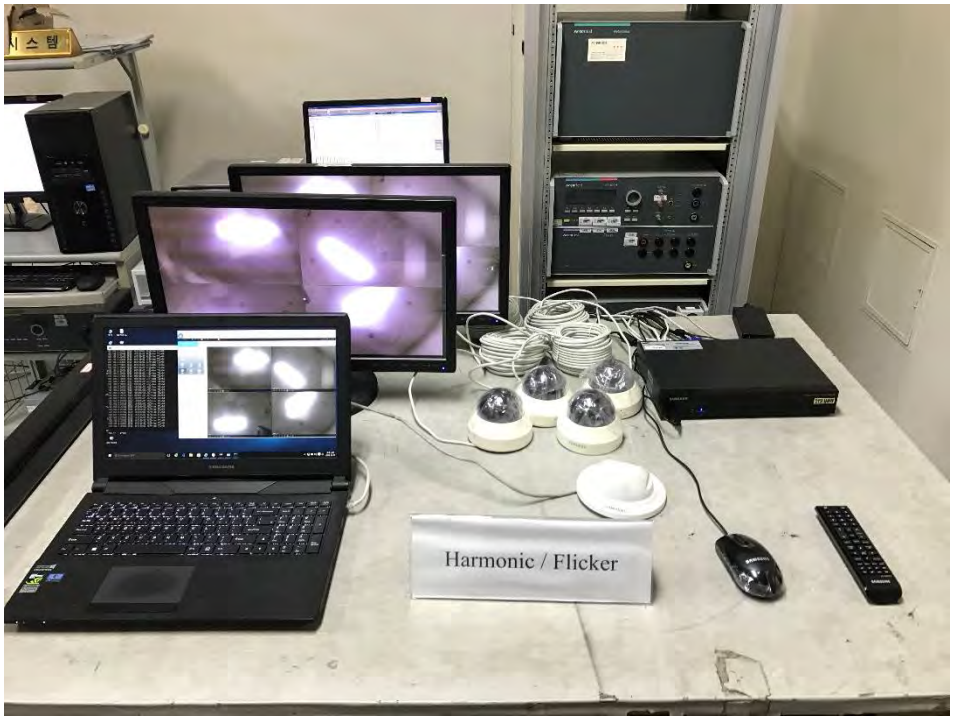
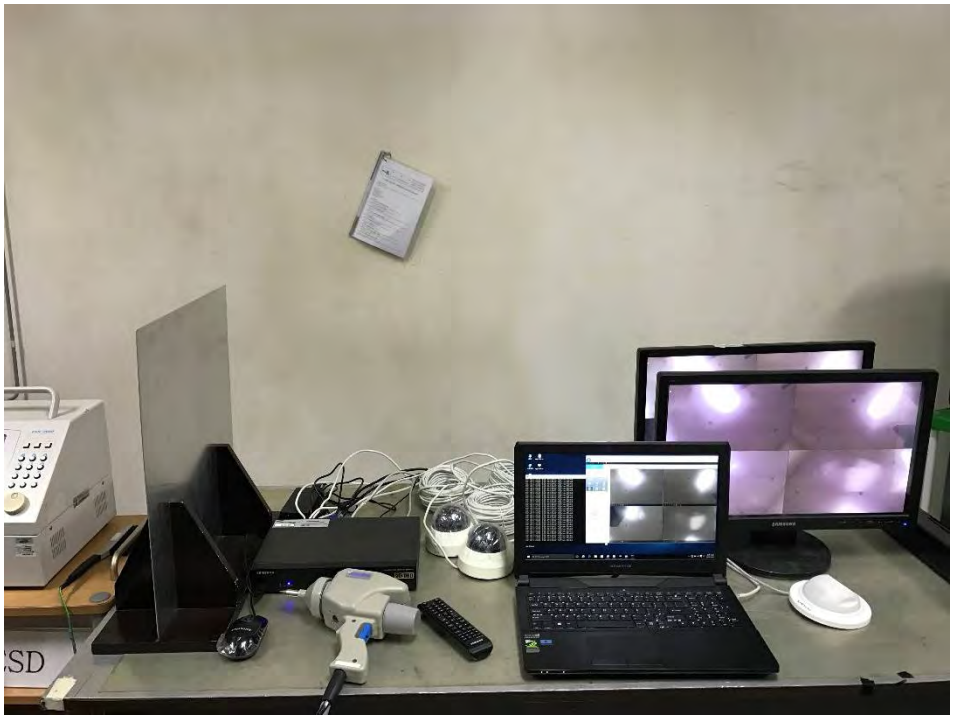
Harmonic Current Emissions and Voltage Fluctuations and Flicker



Electrostatic Discharge



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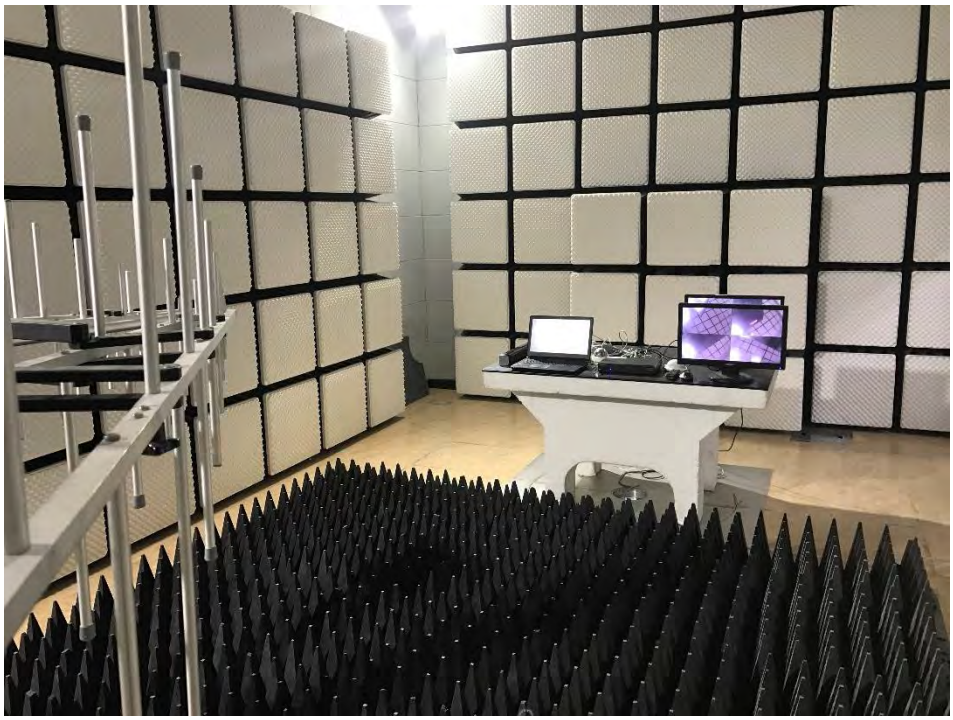
Radiated Electric Field Immunity



N/A

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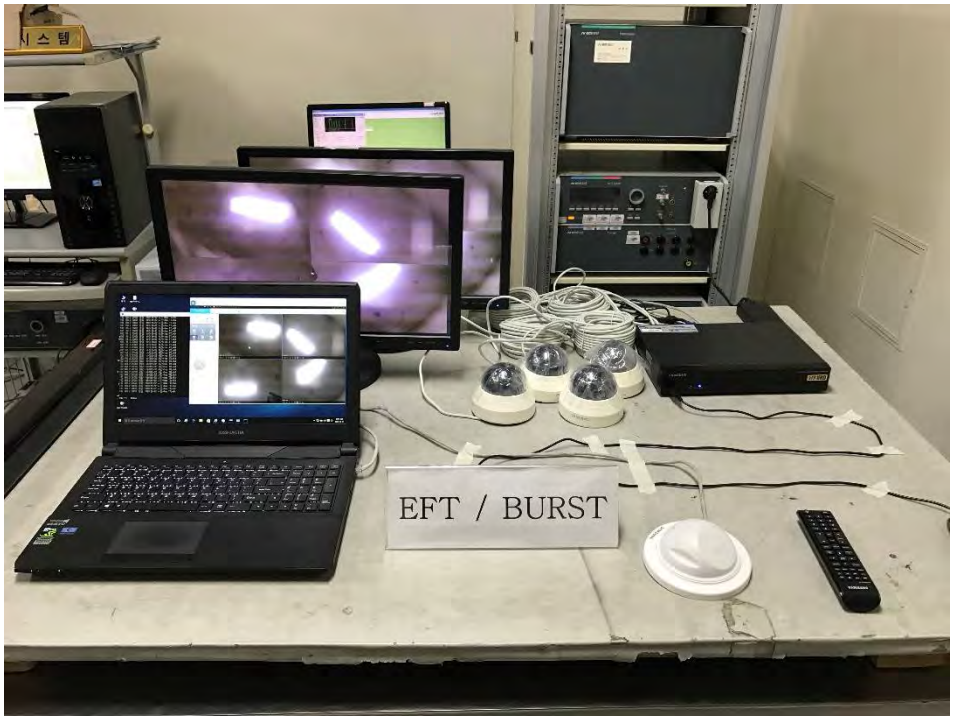
Electrical Fast Transients/Bursts



N/A

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Surge Transients

N/A

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Conducted Disturbance

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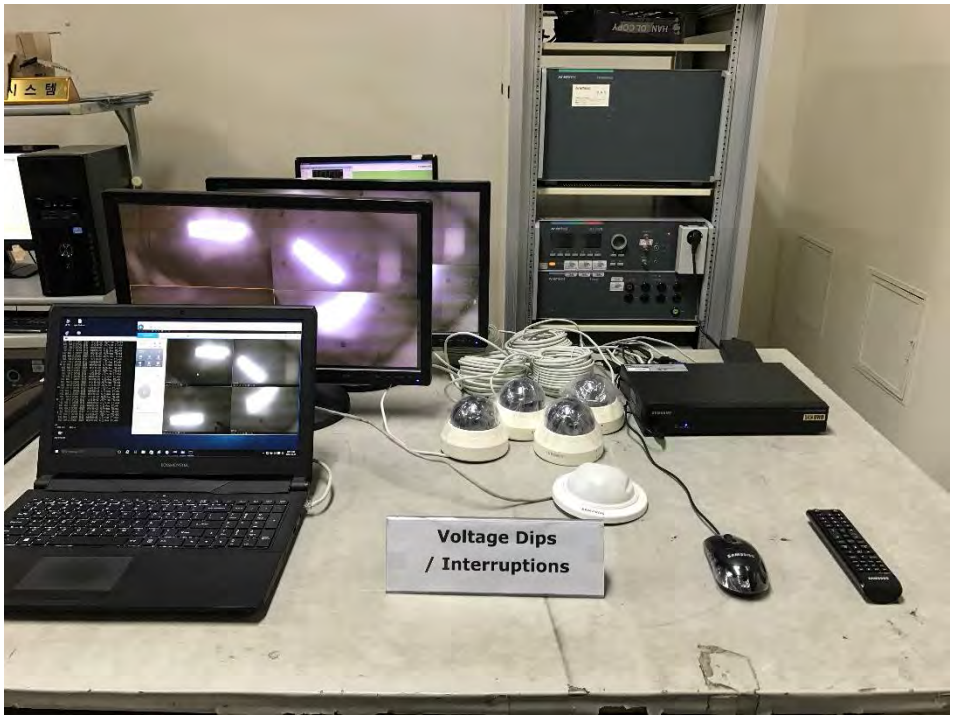
Voltage Dips and Short Interruptions



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EUT External Photographs

(Top)

(Bottom)

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EUT Internal Photographs

(Internal View)

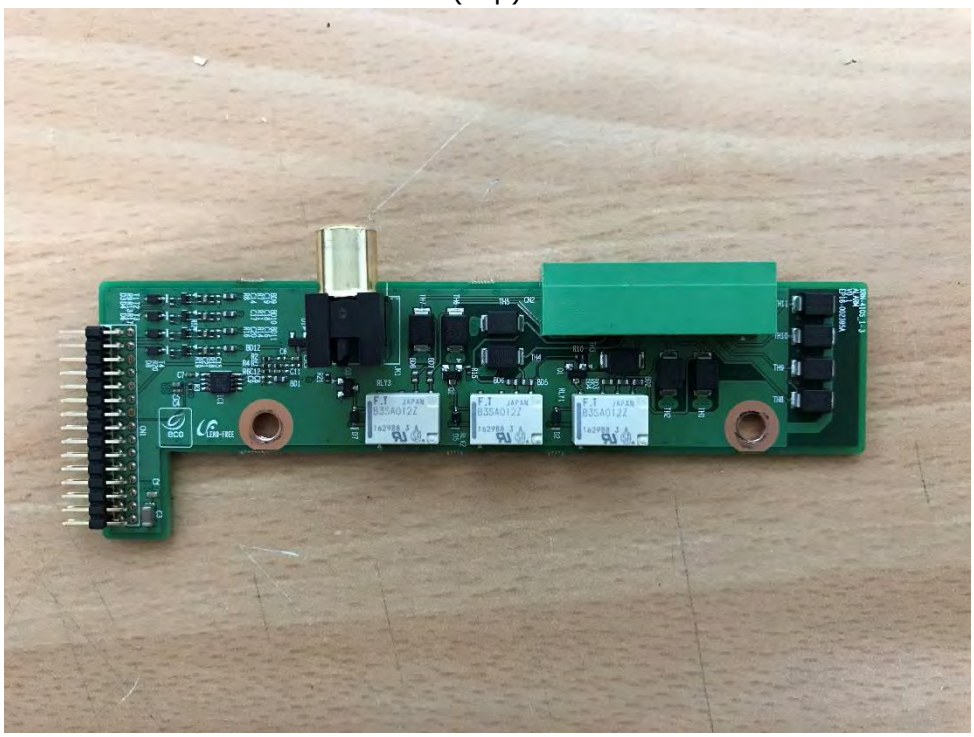
EUT Internal View – HDD

(Top)

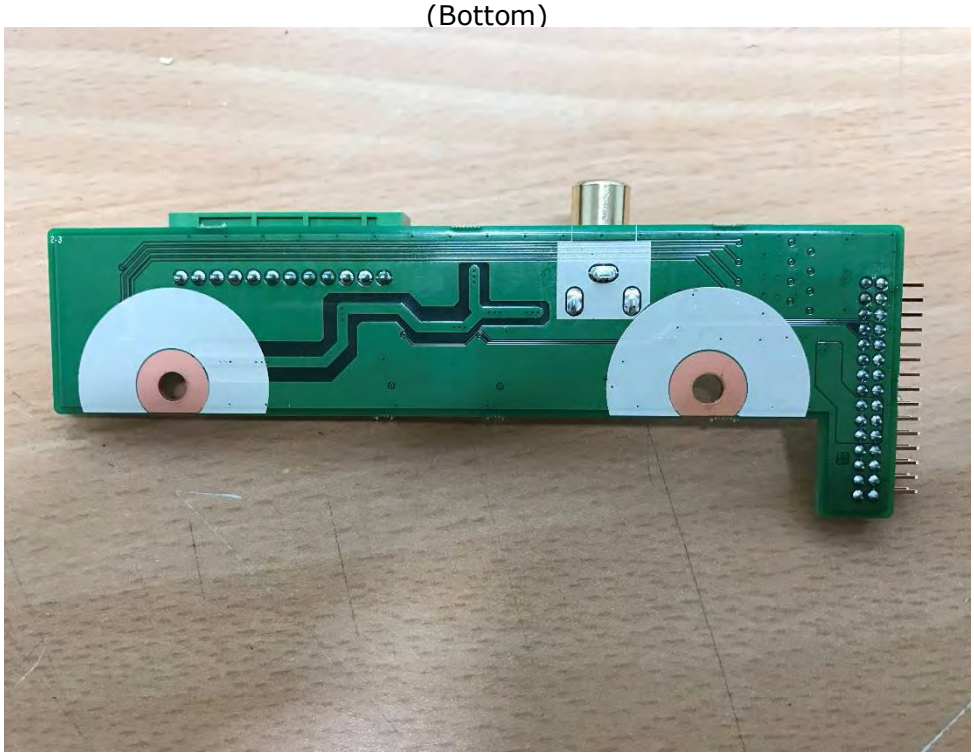
(Bottom)

EUT Internal View – Board 1

(Top)



(Bottom)



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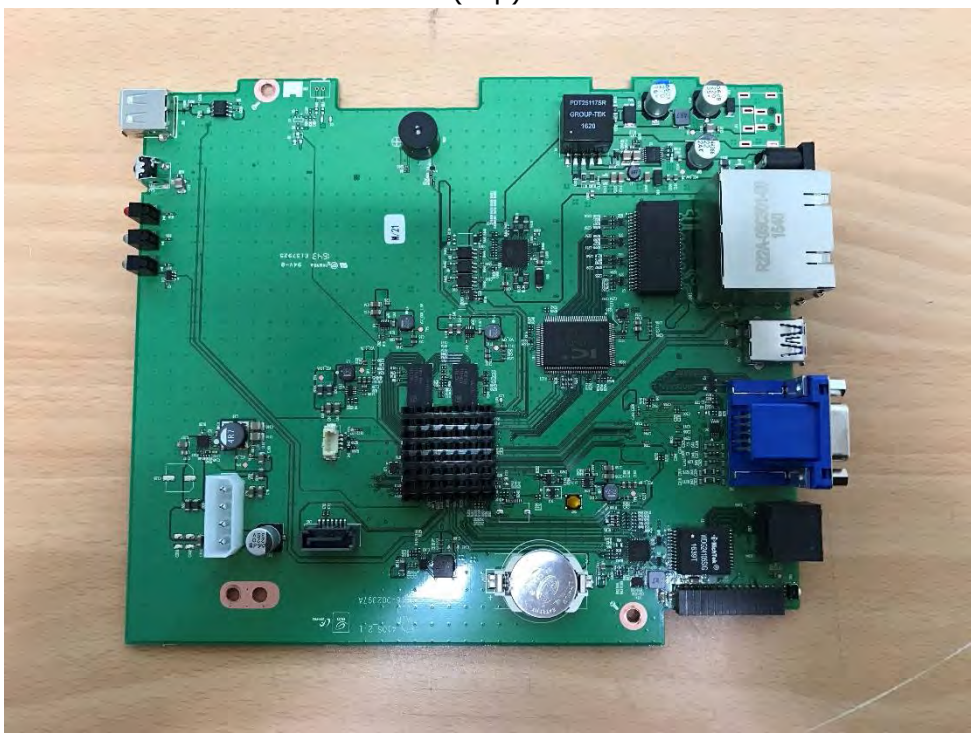
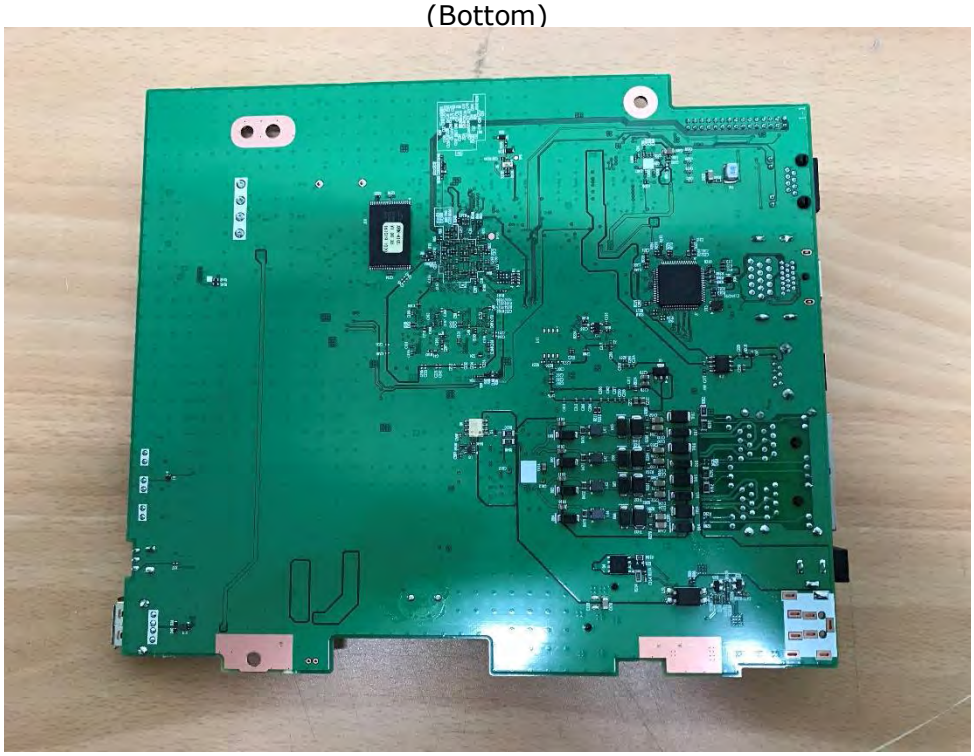
EUT Internal View – Board 2

(Top)



(Bottom)



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Label and Location

LCD MONITOR

Model No : XRN-410S

Manufacturer : HANWHA TECHWIN(TIANJIN)CO., LTD

Made in China

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