



EMC TEST REPORT For CE

Test Report No. : KES-EM-20T0598
Date of Issue : Sep. 14, 2020
Product name : NETWORK VIDEO RECORDER
Model/Type No. : XRN-2010
Variant Model : XRN-3010, XRN-2010P/DM, XRN-3010P/DM, XNR-2010-1T,
XRN-1610A, XRN-3010A, XRN-2010-1T, XRN-2010P,
XRN-2010/VDM, ARN-1650, ARN-3250, ERN-1610A, KRN-3200,
XRN-1610, XRN-2010A
Applicant : Hanwha Techwin Co., Ltd.
Applicant Address : 6, Pangyo-ro 319Beon-gil, Bundang-gu, Seongnam-si,
Gyeonggi-do, Republic of Korea
Manufacturer : 1. HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.
2. D-TECH CO.,LTD.
Manufacturer Address : 1. Lot O-2, Que Vo Industrial Zone extended area,
Nam Son commune, Bac Ninh city, Bac Ninh province, Vietnam
2. 173-25, Saneop-ro, Gwonseon-gu, Suwon-si, Gyeonggi- do,
Korea (Suwon Industrial Complex)
Date of Receipt : Aug. 24, 2020
Test date : Aug. 26, 2020 ~ Aug. 30, 2020
Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Min Senog, KIM
EMC Test Engineer

Reviewed by

Dong-Hun, Jang
EMC Technical Manager

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

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Report No.:
KES-EM-20T0598
Page (2) of (60)

REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Sep. 14, 2020	KES-EM-20T0598	Issued

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TABLE OF CONTENTS

1.0	General Product Description	4
1.1	Test Voltage & Frequency	6
1.2	Variant Model Differences.....	6
1.3	Device Modifications	6
1.4	Equipment Under Test.....	6
1.5	Support Equipments	7
1.6	External I/O Cabling	8
1.7	EUT Operating Mode(s)	8
1.8	Configuration.....	9
1.9	Remarks when standards applied	10
1.10	Calibration Details of Equipment Used for Measurement.....	10
1.11	Test Facility	10
1.12	Laboratory Accreditations and Listings	10
2.0	Test Regulations.....	11
2.1	Conducted Emissions at Mains Power Ports.....	13
2.2	Conducted Emissions at Telecommunication Ports	14
2.3	Radiated Electric Field Emissions(Below 1 GHz)	15
2.4	Radiated Electric Field Emissions(Above 1 GHz).....	16
2.5	Harmonic Current Emissions.....	17
2.6	Voltage Fluctuations and Flicker	18
3.0	Criteria for compliance.....	19
3.1	Electrostatic Discharge.....	21
3.2	Radiated Electric Field Immunity	25
3.3	Electrical Fast Transients/Bursts	28
3.4	Surge Transients	30
3.5	Conducted Disturbance	33
3.6	Voltage Dips and Short Interruptions	35
APPENDIX A – TEST DATA.....		37
Conducted Emissions at Mains Power Ports.....		37
Conducted Emissions at Telecommunication Ports		39
Radiated Electric Field Emissions(Below 1 GHz)		40
Radiated Electric Field Emissions(Above 1 GHz).....		41
Harmonic Current Emissions and Voltage Fluctuations and Flicker		42
Test Setup Photos and Configuration		45
Conducted Emissions at Mains Power Ports.....		45
Conducted Emissions at Telecommunication Ports		46
Radiated Electric Field Emissions(Below 1 GHz)		47
Radiated Electric Field Emissions(Above 1 GHz).....		48
Harmonic Current Emissions and Voltage Fluctuations and Flicker		49
Electrostatic Discharge		50
Radiated Electric Field Immunity		50
Electrical Fast Transients/Bursts		51
Surge Transients.....		51
Conducted Disturbance.....		52
Voltage Dips and Short Interruptions.....		52
EUT External Photographs		53
EUT Internal Photographs		54



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Report No.:
KES-EM-20T0598
Page (4) of (60)

1.0 General Product Description

Main Specifications of EUT are:

단계		DVR
Model		XRN-2010
Display		
Network Camera	Inputs	Max. 32CH
	Resolution	CIF ~ 12MP
	Protocols	Samsung, ONVIF
Live	Local Display	1x HDMI / 1x VGA
	Multi-Channel Display	[Local Monitor] 1 / 2V / 3V / 4 / 6 / 8 / 9 / 13 / 16 / 25 / 36 / Sequence [Web] 1 / 2V / 3V / 4 / 6 / 9 / 16 / 25 / 36 / Sequenc
	Performance	[Local Monitor] - 12M (30fps) - 8.3M (120fps) - 720P (960fps) - D1 (1920fps) [Web] TBD
Performance		
Operating System	Embedded	Linux
Record	Compression	H.265, H.264, MJPEG
	Recording Bandwidth	Max. 250Mbps (2MP 32camera real-time recording)
	Resolution	CIF ~ 12MP
	Type	Manual, Schedule (Continuous/Event), Event (Pre/Post)
	Event Trigger	Alarm Input, Video Loss, Camera Event (Sensor, MD, Video Analytics)
	Event Action	e-Mail, PTZ Preset, Alarm Out, Buzzer, Monitor Out
Search & Play	Playback Bandwidth	32Mbps (16CH simultaneously)
	Performance	Max. 4 Users (Local 1, Remote 3)
	Mode	Date & Time (Calendar)/Event Log list / Text Search
	Simultaneous playback	Max. 16CH (Local Monitor, CMS)
	Resolution	CIF ~ 12MP
	Fisheye Dewarping	Remote Viewer (CMS, WEB)
Storage	Playback Control	Fast/Slow Forward / Backward, Move one step Up / Down
	Built-In	0TB ~ 8TB
	Internal HDD	8 (Max 48TB)
	External	iSCSI storage (Max. 384TB) ① Promise VessRaid R2600
	RAID	N/A
Backup	File backup (Via Web)	BU/Exe (GUI), JPG/AVI (Network)
	Function	Multi channel (Upto 16CH) Play, Date-Time/Title display
Sensor	I/O	8/4 (NO/NC Selectable)
Audio	Input	32 CH (network)
	Compression	G.711, G.726, AAC (16/48KHz)
	Audio Communication	2-Way
Network		
Interface		RJ-45, Gigabit Ethernet x2
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		Samsung iPolls DDNS
Transmission Bandwidth		☞☞ - 512Mbps (iSCSI Off), 256Mbps (iSCSI On)
Max Remote Users		Search (3), Live Unicast (10), Multicast (20)
IP Version		IPv4/v6
Security		User access Log, IP Filtering, 802.1x, Encryption
Language (24)		English, French, German, Italian, Spanish, Russian, Turkish, Polish, Dutch, Swedish, Czech, Portuguese, Danish, Rumanian, Serbian, Croatian, Hungarian, Greek, Norwegian, Finnish, Korean, Chinese, Japanese, Thai
OS		Supported OS : Vista, 7, 8, 10, Mac OS X (10.7 or above)
Web Browser		MS IE, Google Chrome, Mac Safari, Firefox

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Report No.:
KES-EM-20T0598
Page (5) of (60)

단계		DVR
Model		XRN-2010
Viewer Software	Type	SSM, Webviewer, Smart Viewer, iPolis Mobile
	CMS Support	Support SDK/CGI
Smart phone	Support Model	I-Phone, Android
	Protocol Support	RTP, RTSP, HTTP, CGI
	Control	Live(16ch) : Multi-Profile Support Playback(1ch)
	Max. Remote Users	Search (3), Live Unicast (10), Multicast (20)
Functions		
Camera Setup	Register	Auto, 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, Hallway View Setup, Camera Web
	PoE Power Control	N/A
PTZ	Control	Via GUI, Webviewer, SPC-2000
	Preset	255 Presets
Redundancy	Failover	N+1
	ARB	Yes
System Control		Mouse, Web, SPC-2000 (Controller)
Indicator/Interface		
Front	Indicator	LED(Status indicator) : - SRN-2000 (6%) ① HDD Action(1), ② Alarm(1), ③ Power(1), ④ Record(1), ⑤ Backup(1), ⑥ Network(1)
	Switch	N/A
Connectors	VGA	1 EA (Support Live screen upto 16 div. mode)
	HDMI	1 EA (Both Support Live / PB / Setup) - Support upto 4K (3840 x 2160)
	Audio	Out(1EA, RCA, Line)
	Ethernet	RJ-45 2ea (LAN/WAN, 1Gbps)
	Alarm	(1) In(8EA, Terminal Block) (2) Alarm Reset(1EA) (3) Out(4EA, Terminal Block) - Relay Out1(NO/NC/COM) - Relay Out2~4(NO/COM)
	USB	2EA(Front 1, Rear 1(USB3.0))
	Storage	1 e-SATA
	Serial	RS-232C
	Reset	Switch(1EA)
	Power Cord	1EA AC Inlet
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
Electrical		
Power		100 to 240 VAC ±10%; 50/60 Hz, 4~1.5A
Power Consumption		Normal 90W, MAX200W
PoE Budget		N/A
Mechanical		
Color / Material		Black / Metal
Dimension (WxHxD)		440*88*384.8
Weight		5.38kg
Standards		
Approvals	Safety	UL, KC
	EMC	CE, FCC, CCC, Gost-R, KC

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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

Add the same simple derivative as the base model

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
NETWORK VIDEO RECORDER	XRN-2010	-	HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.	EUT
Switching Power Supply	FSAK250J	-	Channel Well Technology Co., Ltd.	EUT
HDD	ST1000VM002	-	Seagate	1 TB

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Report No.:
KES-EM-20T0598
Page (7) of (60)

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
PoE Adaptor	POE 36U-1AT-R	P90215791A1	PHIHONG	-
Notebook	ProBook4430s	-	HP	-
Notebook AC Adaptor	SeriesPPP0009H	-	CHICONY POWER TECHNOLOGY (SUZHOU) CO.,LTD,	-
USB Memory	-	-	TRANSCEND	-
ALARM IN	-	-	-	-
ALARM OUT	-	-	-	-
Speaker	E5	-	PreSonus®	-
Mouse 2	SMB-400	-	SEJIN ELECTRON INC.	-
Monitor 1	HSTND-7041-L	6CM6020YQQ	HP Inc.	-
Monitor 2	SMT-2233	ZC6U67VH50019 4D	Weihai Daewoo Electronics Co., Ltd.	-
HDD CASE	F2	E20H129520092	Sarotech	-
HDD CASE AC Adaptor	RS-AB1000	-	Dongguan Jinhua Sheng Power Technology Co.,Ltd.	-
HDD	WD1600AAJS- 00L7A0	WCAV35750099	Western Digital®	-
CAMERA	XNV-6012	-	Hanwha Techwin Co., Ltd.	-
Mouse 1	MOKJUO	-	Primax Electronics (CQ) Corp., LTD	-

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1.6 External I/O Cabling

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
NETWORK VIDEO RECORDER (EUT)	NETWORK 1	PoE Adaptor	IN	3.0	U
	NETWORK 2	Notebook	NETWORK 2	4.0	U
	USB	USB Memory	USB	-	-
	ALARM IN	ALARM IN	ALARM OUT	3.0	U
	ALARM OUT	ALARM OUT	ALARM IN	3.0	U
	AUDIO OUT	Speaker	AUDIO OUT	1.0	U
	USB	Mouse 1	USB	1.4	U
	RS-232C	Mouse 2	RS-232C	1.6	U
	HDMI	Monitor 1	HDMI	2.0	S
	VGA OUT	Monitor 2	VGA IN	1.6	S
	eSATA	HDD CASE	eSATA	1.0	U
	EARTH	GND	EARTH	1.6	-
PoE Adaptor	OUT	CAMERA	LAN	1.0	U
HDD CASE	SATA SLOT	HDD	SATA SLOT	-	-

* Unshielded=U, Shielded=S

1.7 EUT Operating Mode(s)

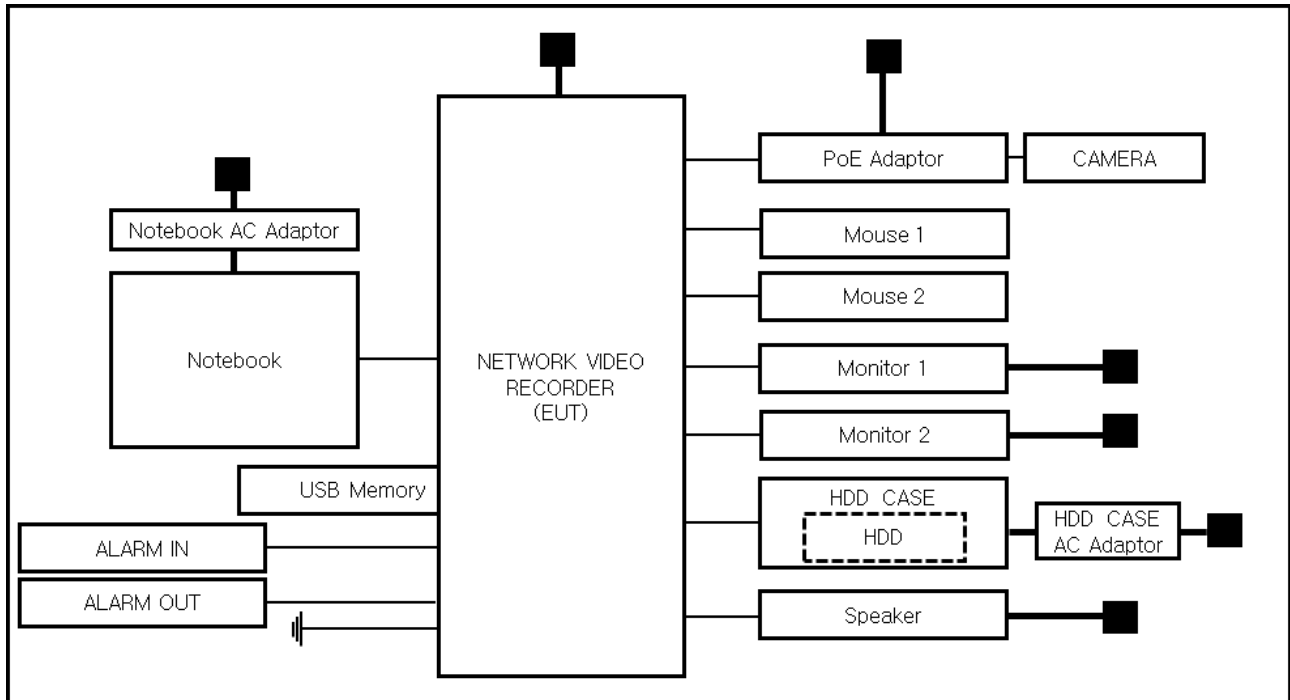
Test Mode	operating
Operation mode	Tested by checking the operation status through the screen transmitted to the web viewer and monitor on the laptop and conducting a PING test.

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

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1.8 Configuration

■ AC Main
 □ DC Main



1.9 Remarks when standards applied

The console port is an administrator port and is excluded from the test.

1.10 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less.

1.11 Test Facility

The measurement facility is located at 473-21 Gayeo-ro, Yeoju-si, Gyeonggi-do, 12658, Korea. The sites are constructed in conformance with the requirements of ANSI C63.4:2014 and CISPR 16-1-4:2012

1.12 Laboratory Accreditations and Listings

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



2.0 Test Regulations

The emissions tests were performed according to following regulations:

☒ **EMC – Directive 2014/30/EU**

☐ EN 61000-6-3:2011

☐ EN 61000-6-1:2007

☐ EN 61000-6-4:2007 +A1:2011

☐ EN 61000-6-2:2005

☐ EN 55011:2007 +A1:2010

☐ Group 1
☐ Class A

☐ Group 2
☐ Class B

☐ EN 55014-1:2006 +A2:2011

☐ EN 55014-2:1997 +A2:2008

☐ EN 55015:2013

☐ EN 61547:2009

☒ EN 55032:2012/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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Report No.:
KES-EM-20T0598
Page (12) of (60)

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- | | | |
|---|----------------------------------|----------------------------------|
| ☐ VCCI-CISPR 32:2016 | ☐ Class A | ☐ Class B |
| ☐ AS/NZS CISPR32:2015 | ☐ Class A | ☐ Class B |
| ☐ 47 CFR Part 15, Subpart B | | |
| ☐ CISPR 22:2009 +A1:2010 | ☐ Class A | ☐ Class B |
| ☐ ANSI C63.4-2014 | | |
| ☐ IC Regulation ICES-003 : 2016 | | |
| ☐ CAN/CSA CISPR 22-10 | ☐ Class A | ☐ Class B |
| ☐ ANSI C63.4-2014 | | |
| ☐ RE- Directive 2014/53/EU | | |
| ☐ EN 301 489-1 V1.9.2 | | |
| ☐ Equipment for fixed use | | |
| ☐ Equipment for vehicular use | | |
| ☐ Equipment for portable use | | |
| ☐ EN 301 489-3 V1.6.1 | | |
| ☐ EN 301 489-17 V2.2.1 | | |
| ☐ EN 60945:2002 | | |

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2.1 Conducted Emissions at Mains Power Ports

Test Date

Aug. 26, 2020

Test Location

Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EMC32	R & S	9.12.00	-
☒	EMI TEST RECEIVER	ESR3	R & S	101783	01, 20, 2021
☒	LISN	ENV216	R & S	101787	01, 02, 2021
☒	LISN	ESH2-Z5	R & S	100450	01, 02, 2021
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	01, 02, 2021

Test Conditions

Temperature: 23,2 °C
Relative Humidity: 52,0 % R.H.

Frequency Range of Measurement

150 kHz to 30 MHz

Instrument Settings

IF Band Width: 9 kHz

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.



2.2 Conducted Emissions at Telecommunication Ports

Test Date

Aug. 26, 2020

Test Location

Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EMC32	R & S	9.12.00	-
☒	EMI TEST RECEIVER	ESR3	R & S	101783	01, 20, 2021
☒	LISN	ENV216	R & S	101787	01, 02, 2021
☒	LISN	ESH2-Z5	R & S	100450	01, 02, 2021
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	01, 02, 2021
☐	8-WIRE ISN CAT3,5	ENY81	R & S	100174	01, 07, 2021
☒	8-WIRE ISN CAT6	ENY81-CAT6	R & S	101665	01, 07, 2021
☐	CDN	CDNS502A	TESEQ	40431	01, 02, 2021

Test Conditions

Temperature: 23,2 °C
Relative Humidity: 52,0 % R.H.

Frequency Range of Measurement

150 kHz to 30 MHz

Instrument Settings

IF Band Width: 9 kHz

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.



2.3 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Aug. 26, 2020

Test Location

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

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.0	-
☒	EMI TEST RECEIVER	ESU26	R & S	100551	04, 01, 2021
☒	AMPLIFIER	SCU 01	R & S	100603	11, 25, 2020
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	11, 29, 2020
☒	ATTENUATOR	8491A	HP	32173	03, 10, 2021

Test Conditions

Temperature: 23,4 °C
Relative Humidity: 52,1 % R.H.

Frequency Range of Measurement

30 MHz to 1 GHz

Instrument Settings

IF Band Width: 120 kHz

Test Results

The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.



2.4 Radiated Electric Field Emissions(Above 1 GHz)

Test Date

Aug. 26, 2020

Test Location

SEMI ANECHOIC CHAMBER #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.0	-
☒	EMI TEST RECEIVER	ESR7	R & S	101190	08, 05, 2021
☒	PREAMPLIFIER	8449B	AGILENT	3008A01967	04, 20, 2021
☐	ATTENUATOR	8491A	HP	35496	03, 10, 2021
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	03, 11, 2021

Test Conditions

Temperature: 23,2 °C
Relative Humidity: 52,0 % R.H.

Frequency Range of Measurement

1 GHz to 6 GHz

Instrument Settings

IF Band Width: 1 MHz

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.



2.5 Harmonic Current Emissions

Test Date

Aug. 30, 2020

Test Location

Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	net.control	EM TEST	2.1.4	-
☒	DIGITAL POWER ANALYZER	DPA 500N	EM TEST	V1024106759	04, 06, 2021
☒	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

Test Conditions

Temperature: 23,2 °C
Relative Humidity: 51,8 % R.H.

Classification of Equipment for Harmonic Current Emissions

- ☒ Class A
☐ Class B
☐ Class C(Below 25 W)
☐ Class C(Above 25 W)
☐ Class D

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.



2.6 Voltage Fluctuations and Flicker

Test Date

Aug. 30, 2020

Test Location

Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	net.control	EM TEST	2.1.4	-
☒	DIGITAL POWER ANALYZER	DPA 500N	EM TEST	V1024106759	04, 06, 2021
☒	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

Test Conditions

Temperature: 23,2 °C
Relative Humidity: 51,8 % R.H.

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.

3.0 Criteria for compliance

Criteria for compliance was based on the following guidelines:

EN 50130-4:2011 Alarm systems-Part 4: Electromagnetic compatibility Product family standard: Immunity requirements for components of fire, intruder and social alarm systems

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

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

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

Electrostatic discharge

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

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

Radiated electromagnetic fields

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

Flickering of an indicator during the application of discharge is permissible, providing which could be interpreted by associated equipment as a change, and no such

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

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

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

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

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

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



Fast transient burst / slow high energy voltage surge

There shall be no damage, malfunction or change of status due to the conditioning.
Flickering of an indicator during the application of discharge is permissible, providing
That there is no residual is permissible, providing that there is no residual change in the EUT or
any
change in outputs, which could be interpreted by associated equipment as a change.

Conducted RF immunity

There shall be no damage, malfunction or change of status due to the conditioning.
Flickering of an indicator during the application of discharge is permissible, providing
That there is no residual is permissible, providing that there is no residual change in the EUT or
any
change in outputs, which could be interpreted by associated equipment as a change,
and no such flickering of indicators oeuvres at $U = 130 \text{ dB}\mu\text{V}$.
For component of CCTV systems, where the status is monitored by observing the TV picture,
then deterioration of the picture is allowed at $U = 140 \text{ dB}\mu\text{V}$, 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 $U = 130 \text{ dB}\mu\text{V}$, 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 $U = 120 \text{ dB}\mu\text{V}$.

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.



3.1 Electrostatic Discharge

Reference Standard

EN 61000-4-2:2009

Test Date

Aug. 30, 2020

Test Location

EMS-ESD: Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	ESD SIMULATOR	ESS-2000	Noise Ken	ESS05X4620	01, 28, 2021
☒	HCP	-	KES	-	-
☒	VCP	-	Noise Ken	-	-

Test Conditions

Temperature: 23,5 °C
Relative Humidity: 51,9 % R.H.
Atmospheric Pressure: 99,8 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

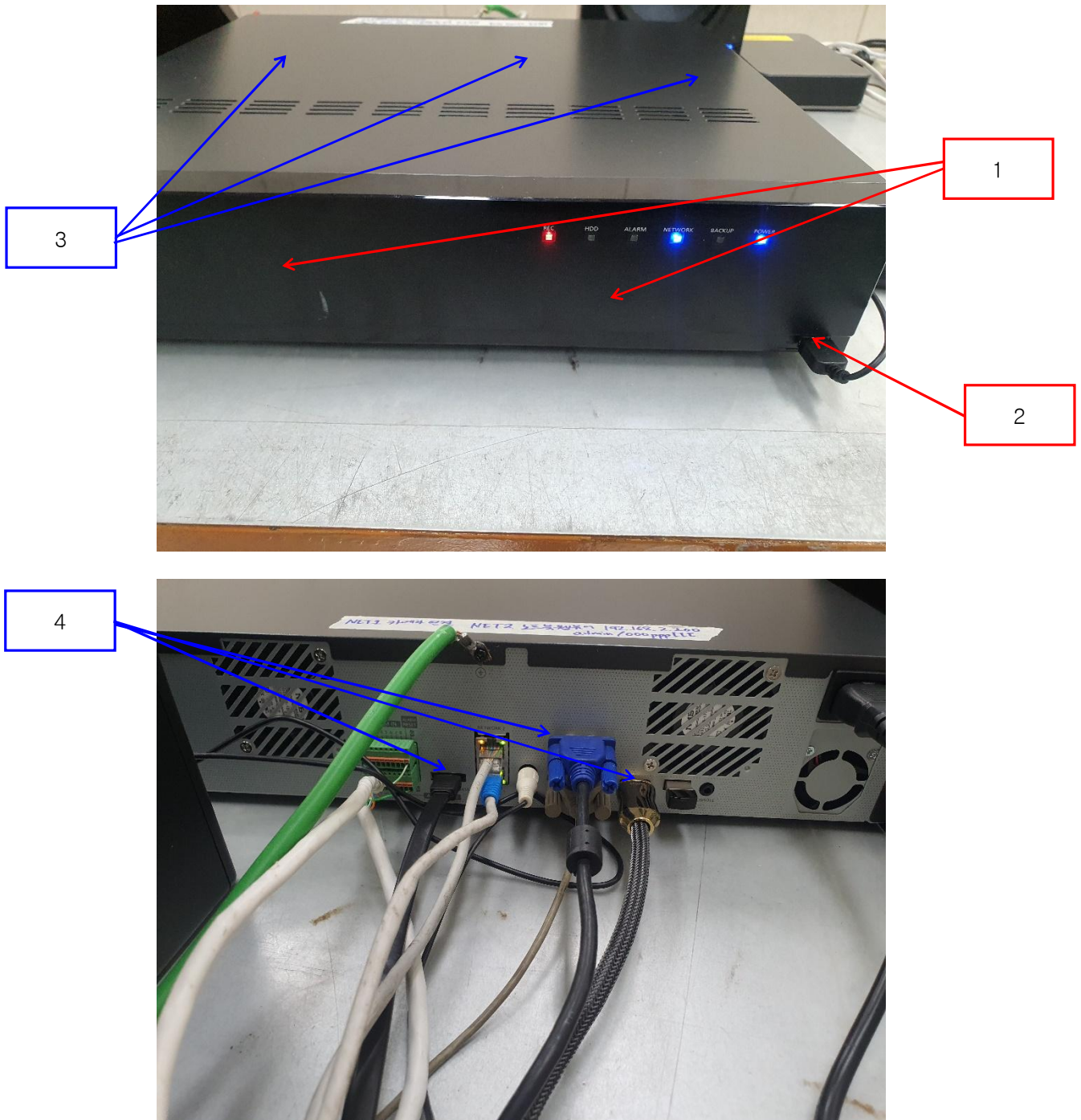
Discharge Voltage:	Contact	Air	HCP	VCP
	☐ 2 kV	☒ 2 kV	☐ 2 kV	☐ 2 kV
	☐ 4 kV	☒ 4 kV	☐ 4 kV	☐ 4 kV
	☒ 6 kV	☐ 6 kV	☒ 6 kV	☒ 6 kV
	☐ 8 kV	☒ 8 kV	☐ 8 kV	☐ 8 kV
	☐ 15 kV	☐ 15 kV	☐ 15 kV	☐ 15 kV

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

Required Performance Criteria: ☒ Complied

Location of Discharge:

Air
Contact





5

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Report No.:
KES-EM-20T0598
Page (24) of (60)

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	Air Discharge	Complied	-
2	Around Port	Air Discharge	Complied	-
3	Surface (Conductor)	Contact Discharge	Complied	-
4	Around Port (Conductor)	Contact Discharge	Complied	-
5	Mouse	Air Discharge	Complied	-

Note: "Blank" = Not performed

Observations:

Complied – No degradation of function

Test Results

- ☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria

Remarks

PASS Required Performance Criteria

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3.2 Radiated Electric Field Immunity

Reference Standard

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

Test Date

Aug. 27, 2020

Test Location

EMS-RS: ☐ SEMI ANECHOIC CHAMBER #2 ☒ SEMI ANECHOIC CHAMBER #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	EMC32	R & S	9.12.00	-
☒	SIGNAL GENERATOR	SMB 100A	Rohde & Schwarz	108252	08, 05, 2021
☒	HIGH POWER DUAL AMP	SSA532	SUNGSAN	SSA532-001	-
☒	POWER METER	E4419B	Agilent	GB40203000	04, 20, 2021
☒	CW POWER SENSOR	E4412A	Agilent	US38488240	04, 20, 2021
☒	CW POWER SENSOR	E4412A	Agilent	MY41501662	04, 20, 2021
☒	STACKED DOUBLE LOG-PER- ANTENNA	STPL9128 E	Schwarzbeck	9128ES-121	-
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	03, 11, 2021

Test Conditions

Temperature: 22,9 °C
Relative Humidity: 52,0 % R.H.
Atmospheric Pressure: 99,2 kPa



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Report No.:
KES-EM-20T0598
Page (26) of (60)

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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Report No.:
KES-EM-20T0598
Page (27) of (60)

Test Data

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

Note: "Blank" = Not performed

Observations:

Complied – No degradation of function

Test Results

- ☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria

Remarks

PASS Required Performance Criteria



3.3 Electrical Fast Transients/Bursts

Reference Standard

EN 61000-4-4:2012

Test Date

Aug. 29, 2020

Test Location

EMS-EFT: Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	iec.control	EM TEST	5.4.7	-
☒	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	11, 27, 2020
☒	MOTOR VARIAC	MV2616	EM TEST	P1552169719	11, 27, 2020
☒	CAPACITIVE COUPLING CLAMP	HFK	EM TEST	P1633183115	11, 27, 2020

Test Conditions

Temperature: 23,2 °C
Relative Humidity: 51,5 % R.H.
Atmospheric Pressure: 99,4 kPa

Test Specifications

Pulse Amplitude & Polarity:
(AC Power Lines) ☐ ± 1.0 kV ☒ ± 2.0 kV
☐ ± 4.0 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

Test Data

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

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

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

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

☒ Signal ports and telecommunication ports – Coupling Clamp used

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
NETWORK 1	Complied	Complied
NETWORK 2	Complied	Complied
ALARM IN	Complied	Complied
ALARM OUT	Complied	Complied

Note: “Blank” = Not performed

Observations:

Complied – No degradation of function

Test Results

☒ PASS Required Performance Criteria

☐ NOT PASS Required Performance Criteria

Remarks

PASS Required Performance Criteria



3.4 Surge Transients

Reference Standard

EN 61000-4-5:2014

Test Date

Aug. 29, 2020

Test Location

EMS-EFT: Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	iec.control	EM TEST	5.4.7	-
☒	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	11, 27, 2020
☒	MOTOR VARIAC	MV2616	EM TEST	P1552169719	11, 27, 2020
☒	CDN	CNV 508N1	EM TEST	P1610176296	11, 27, 2020

Test Conditions

Temperature: 23,2 °C
Relative Humidity: 51,5 % R.H.
Atmospheric Pressure: 99,4 kPa



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Report No.:
KES-EM-20T0598
Page (31) of (60)

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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Report No.:
KES-EM-20T0598
Page (32) of (60)

Test Data

☒ Line to Line – Differential Mode

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

☒ Line to Earth – Common Mode

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

Signal Lines

☒ Line to Earth – Common Mode

Mode of Application	Coupling Method	Observations	
		(+) Surge (kV)	(-) Surge (kV)
NETWORK 1	CDN	Complied	Complied
	LINE	Complied	Complied
NETWORK 2	CDN	Complied	Complied
	LINE	Complied	Complied

Note: "Blank" = Not performed

Observations:

Complied – No degradation of function

Test Results

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

Remarks

PASS Required Performance Criteria



3.5 Conducted Disturbance

Reference Standard

EN 61000-4-6:2014

Test Date

Aug. 28, 2020

Test Location

EMS-CS: Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	icd.control	EM TEST	5.3.11	-
☒	CONTINUOUS WAVE SIMULATOR	CWS 500N1.4	EM TEST	P1602169880	07, 22, 2021
☒	ATTENUATOR	ATT 6/80	EM TEST	P1614178148	11, 25, 2020
☒	CDN	CDN M016	TESEQ	43694	11, 25, 2020
☒	CDN	CDN M016	TESEQ	43697	11, 25, 2020
☒	CDN	CDN T8RJ45	EM TEST	0909-09	08, 05, 2021
☒	EM CLAMP	KEMZ 801A	TESEQ	44099	11, 26, 2020

Test Conditions

Temperature: 23,6 °C
Relative Humidity: 52,2 % R.H.
Atmospheric Pressure: 99,8 kPa

Test Specifications

Frequency range: ☒ 150 kHz to 100 MHz ☐ 150 kHz to 80 MHz
Voltage Level: ☐ 1 Vrms ☐ 3 Vrms
☒ 10 Vrms
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
Required Performance Criteria: ☒ Complied

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Report No.:
KES-EM-20T0598
Page (34) of (60)

Test Data

☒ Input a.c. power ports

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

☐ Input d.c. power ports

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

☒ Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Observations
NETWORK 1	CDN	Complied
NETWORK 2	CDN	Complied
ALARM IN	Clamp	Complied
ALARM OUT	Clamp	Complied

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

Observations:

Complied – No degradation of function

Test Results

- ☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria

Remarks

PASS Required Performance Criteria



3.6 Voltage Dips and Short Interruptions

Reference Standard

EN 61000-4-11:2004

Test Date

Aug. 30, 2020

Test Location

EMS-Voltage dip: Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	iec.control	EM TEST	5.4.7	-
☒	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	11, 27, 2020
☒	MOTOR VARIAC	MV2616	EM TEST	P1552169719	11, 27, 2020

Test Conditions

Temperature: 23,5 °C
Relative Humidity: 51,7 % R.H.
Atmospheric Pressure: 99,8 kPa



Test Specifications & Observations/Remarks

- Voltage Dips and Short Interruptions

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

- Voltage variations

☒ Unom + 10 %	☒ 253.0 V (ac)	<u>Complied</u>
☒ Unom - 15 %	☒ 195.5 V (ac)	<u>Complied</u>

Observations:

Complied – No degradation of function

Degradation - See "Remarks "

Test Results

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

Remarks

During the test(100%, 250cycle), EUT was turned off but after the test, it was recovered by no operator's intervention.

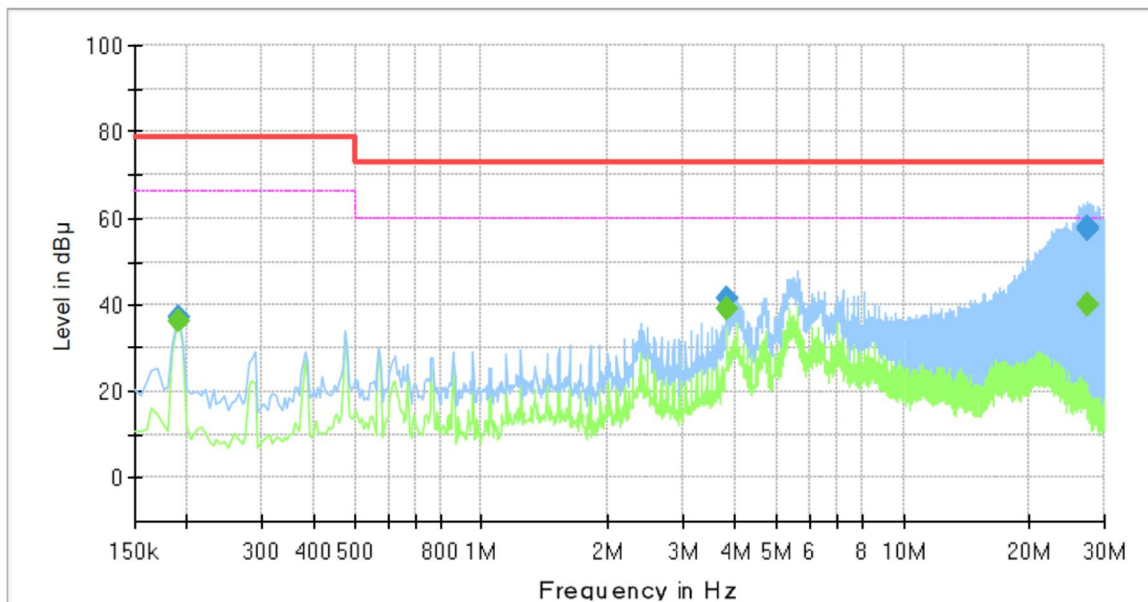
APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

[HOT]

Common Information

Test Description:	Conducted Emission
Model No.:	XRN-2010
Phase:	H
Mode:	
Operator Name:	KES



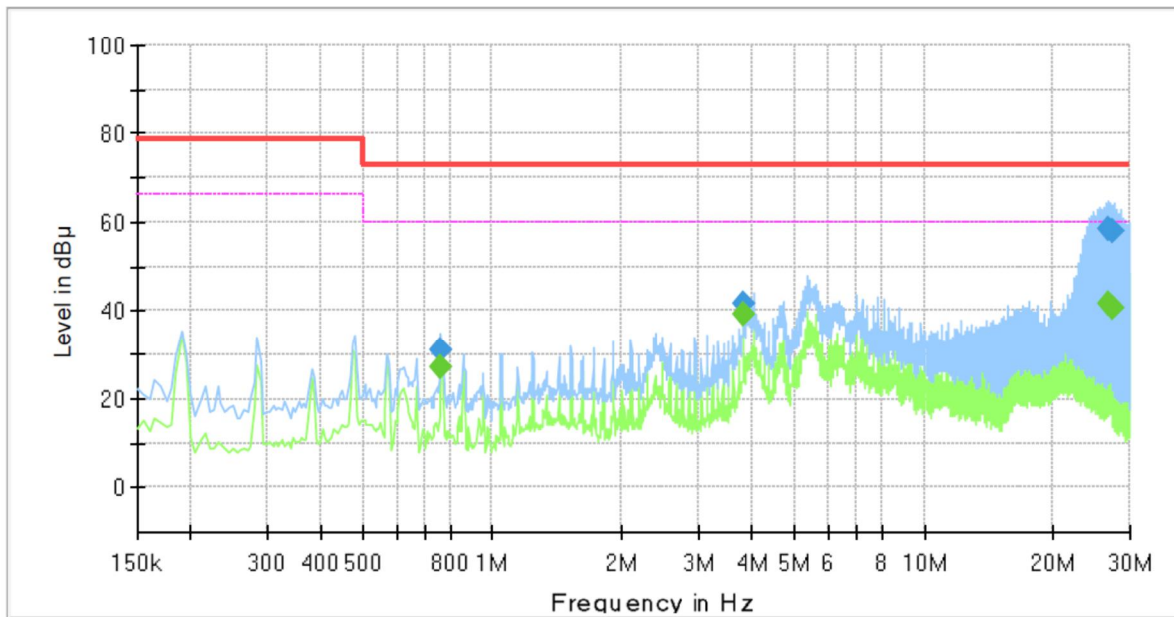
Final_Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.190000	---	36.36	66.00	29.64	1000.0	9.000	L1	19.5
0.190000	37.18	---	79.00	41.82	1000.0	9.000	L1	19.5
3.815000	---	39.35	60.00	20.65	1000.0	9.000	L1	19.8
3.815000	41.58	---	73.00	31.42	1000.0	9.000	L1	19.8
27.365000	---	40.03	60.00	19.97	1000.0	9.000	L1	20.4
27.365000	57.44	---	73.00	15.56	1000.0	9.000	L1	20.4
27.370000	---	40.16	60.00	19.84	1000.0	9.000	L1	20.4
27.370000	57.90	---	73.00	15.10	1000.0	9.000	L1	20.4

[NEUTRAL]

Common Information

Test Description: Conducted Emission
 Model No.: XRN-2010
 Phase: N
 Mode:
 Operator Name: KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.760000	---	27.17	60.00	32.83	1000.0	9.000	N	20.0
0.760000	30.96	---	73.00	42.04	1000.0	9.000	N	20.0
3.815000	---	39.33	60.00	20.67	1000.0	9.000	N	19.8
3.815000	41.47	---	73.00	31.53	1000.0	9.000	N	19.8
26.705000	---	41.51	60.00	18.49	1000.0	9.000	N	20.5
26.705000	58.46	---	73.00	14.54	1000.0	9.000	N	20.5
27.375000	---	40.74	60.00	19.26	1000.0	9.000	N	20.5
27.375000	57.96	---	73.00	15.04	1000.0	9.000	N	20.5

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

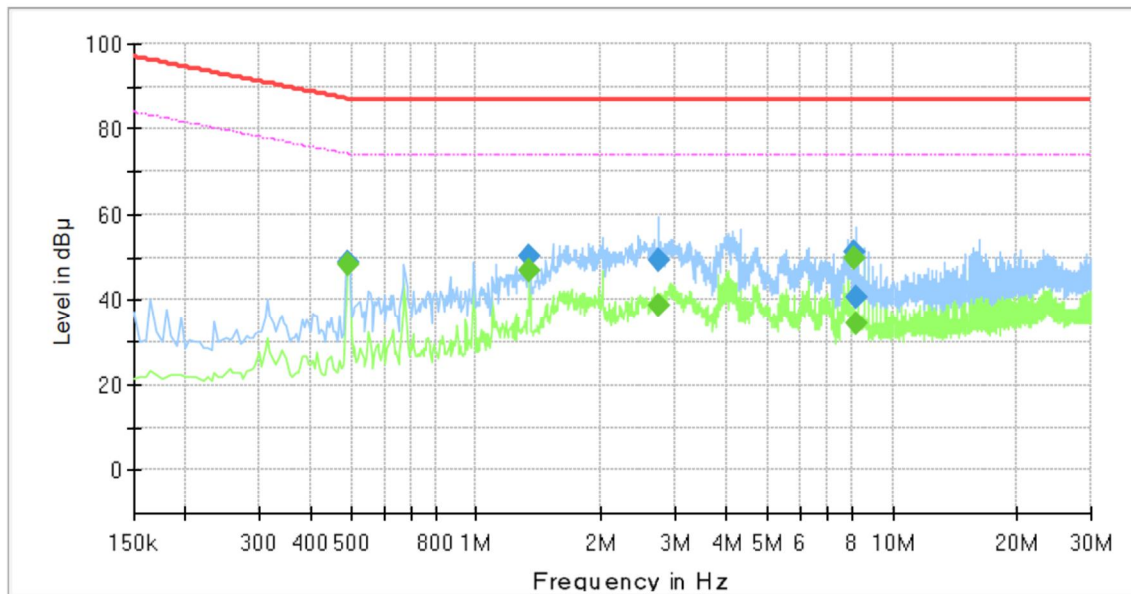
Corr. : Correction values (LISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

Conducted Emissions at Telecommunication Ports

[1 000 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	XRN-2010
Mode :	NETWORK 2
Speed :	1 000 Mbps
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.490000	---	48.52	74.17	25.65	1000.0	9.000	Single Line	19.8
0.490000	48.88	---	87.17	38.29	1000.0	9.000	Single Line	19.8
1.340000	---	46.80	74.00	27.20	1000.0	9.000	Single Line	20.0
1.340000	50.12	---	87.00	36.88	1000.0	9.000	Single Line	20.0
2.745000	---	38.86	74.00	35.14	1000.0	9.000	Single Line	19.9
2.745000	49.26	---	87.00	37.74	1000.0	9.000	Single Line	19.9
8.080000	---	49.75	74.00	24.25	1000.0	9.000	Single Line	19.5
8.080000	51.48	---	87.00	35.52	1000.0	9.000	Single Line	19.5
8.145000	---	34.29	74.00	39.71	1000.0	9.000	Single Line	19.5
8.145000	40.85	---	87.00	46.15	1000.0	9.000	Single Line	19.5

◆ 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 + Pulse Limiter FACTOR))

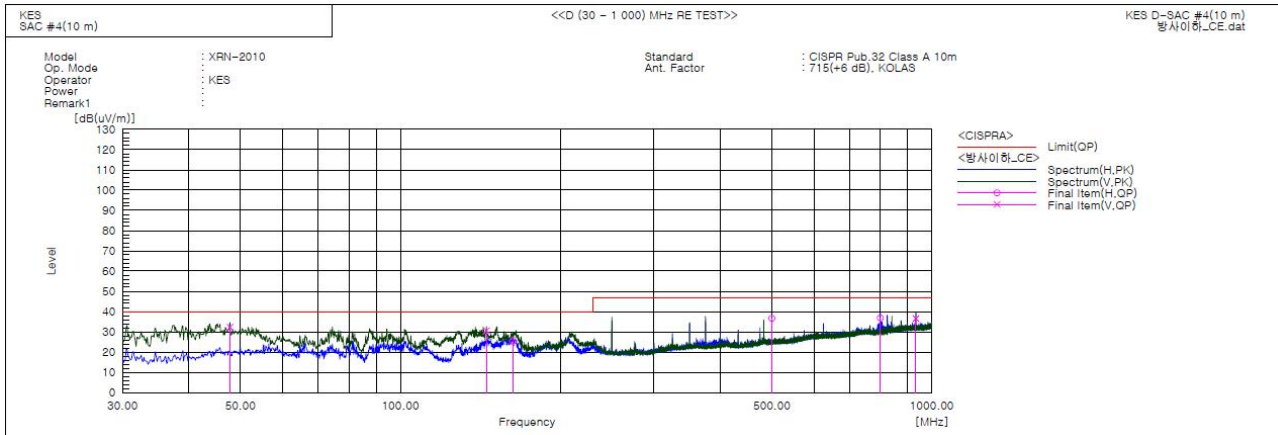


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Report No.:
KES-EM-20T0598
Page (40) of (60)

Radiated Electric Field Emissions(Below 1 GHz)



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	47.824	V	53.9	-21.5	32.4	40.0	7.6	100.0	162.0	
2	145.188	V	56.7	-26.1	30.6	40.0	9.4	103.0	355.0	
3	162.769	H	50.3	-24.9	25.4	40.0	14.6	400.0	255.0	
4	499.965	H	49.5	-12.8	36.7	47.0	10.3	354.0	181.0	
5	800.059	H	44.8	-7.9	36.9	47.0	10.1	396.0	315.0	
6	933.070	V	42.1	-5.5	36.6	47.0	10.4	159.0	193.0	

◆ Calculation – SEMI ANECHOIC CHAMBER #4(10 m)

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

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

Reading(QP) : Reading value, Result(QP) : Reading value + Factor value

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

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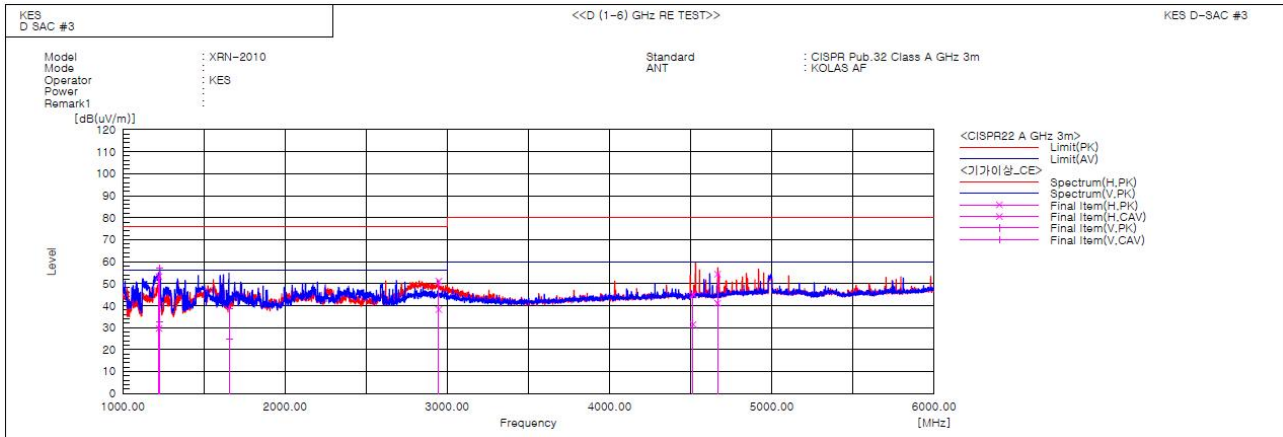


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Report No.:
KES-EM-20T0598
Page (41) of (60)

Radiated Electric Field Emissions(Above 1 GHz)



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB(1/m)]	Result PK [dB(uV/m)]	Result CAV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin CAV [dB]	Height [cm]	Angle [deg]	Remark
1	1222.710	H	61.5	37.9	-8.3	53.2	29.6	76.0	56.0	22.8	26.4	100.0	33.4	
2	1225.871	V	65.4	40.9	-8.3	57.1	32.6	76.0	56.0	18.9	23.4	100.0	32.5	
3	1658.299	V	43.7	29.8	-5.2	38.5	24.6	76.0	56.0	37.5	31.4	100.0	297.3	
4	2947.668	H	49.6	36.6	1.5	51.1	38.1	76.0	56.0	24.9	17.9	100.0	60.2	
5	4514.423	H	38.9	25.3	6.1	45.0	31.4	80.0	60.0	35.0	28.6	100.0	98.1	
6	4665.020	H	47.6	34.4	6.7	54.3	41.1	80.0	60.0	25.7	18.9	100.0	142.5	

◆ Calculation

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

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

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

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



Harmonic Current Emissions and Voltage Fluctuations and Flicker

Average harmonic current results				
Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	0.141			
2	0.053	4.952	1.080	PASS
3	0.167	7.250	2.300	PASS
4	0.052	12.147	0.430	PASS
5	0.039	3.442	1.140	PASS
6	0.015	5.101	0.300	PASS
7	0.012	1.536	0.770	PASS
8	0.010	4.225	0.230	PASS
9	0.012	2.904	0.400	PASS
10	0.009	4.805	0.184	PASS
11	0.013	4.077	0.330	PASS
12	0.008	5.529	0.153	PASS
13	0.011	5.075	0.210	PASS
14	0.008	5.890	0.131	PASS
15	0.007	4.972	0.150	PASS
16	0.006	5.303	0.115	PASS
17	0.006	4.454	0.132	PASS
18	0.005	4.569	0.102	n/a
19	0.005	4.118	0.118	n/a
20	0.004	4.870	0.092	n/a
21	0.004	2.675	0.161	n/a
22	0.004	4.604	0.084	n/a
23	0.004	2.835	0.147	n/a
24	0.003	4.475	0.077	n/a
25	0.004	3.151	0.135	n/a
26	0.003	4.556	0.071	n/a
27	0.004	3.033	0.125	n/a
28	0.003	4.676	0.066	n/a
29	0.003	2.828	0.116	n/a
30	0.003	4.429	0.061	n/a
31	0.003	2.565	0.109	n/a
32	0.002	4.208	0.058	n/a
33	0.003	2.469	0.102	n/a
34	0.002	4.244	0.054	n/a
35	0.003	2.623	0.096	n/a
36	0.002	4.115	0.051	n/a
37	0.002	2.335	0.091	n/a
38	0.002	4.045	0.048	n/a
39	0.002	2.223	0.087	n/a
40	0.002	3.972	0.046	n/a

Note: 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.

* Application of limits for average is 100% except for odd harmonics from 21 to 39, where 150% applies.



Test Data - Harmonics (continued)

Maximum harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	0.156			
2	0.073	4.476	1.620	PASS
3	0.173	5.007	3.450	PASS
4	0.065	10.037	0.645	PASS
5	0.043	2.521	1.710	PASS
6	0.020	4.456	0.450	PASS
7	0.014	1.197	1.155	PASS
8	0.011	3.330	0.345	PASS
9	0.014	2.274	0.600	PASS
10	0.010	3.794	0.276	PASS
11	0.015	3.107	0.495	PASS
12	0.010	4.544	0.230	PASS
13	0.012	3.789	0.315	PASS
14	0.009	4.577	0.197	PASS
15	0.008	3.717	0.225	PASS
16	0.007	4.064	0.173	PASS
17	0.007	3.479	0.199	PASS
18	0.005	3.538	0.153	PASS
19	0.006	3.138	0.178	PASS
20	0.005	3.703	0.138	PASS
21	0.005	3.023	0.161	n/a
22	0.005	3.621	0.125	n/a
23	0.005	3.227	0.147	n/a
24	0.004	3.428	0.115	n/a
25	0.005	3.508	0.135	n/a
26	0.004	3.498	0.106	n/a
27	0.004	3.384	0.125	n/a
28	0.004	3.576	0.099	n/a
29	0.004	3.218	0.116	n/a
30	0.003	3.392	0.092	n/a
31	0.003	3.039	0.109	n/a
32	0.003	3.365	0.086	n/a
33	0.003	2.794	0.102	n/a
34	0.003	3.272	0.081	n/a
35	0.003	2.926	0.096	n/a
36	0.002	3.124	0.077	n/a
37	0.002	2.615	0.091	n/a
38	0.002	3.106	0.073	n/a
39	0.002	2.611	0.087	n/a
40	0.002	3.090	0.069	n/a

Note: 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.

* Application of limits for average is 100% except for odd harmonics from 21 to 39, where 150% applies.

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Report No.:
KES-EM-20T0598
Page (44) of (60)

Test Data - Voltage Fluctuations

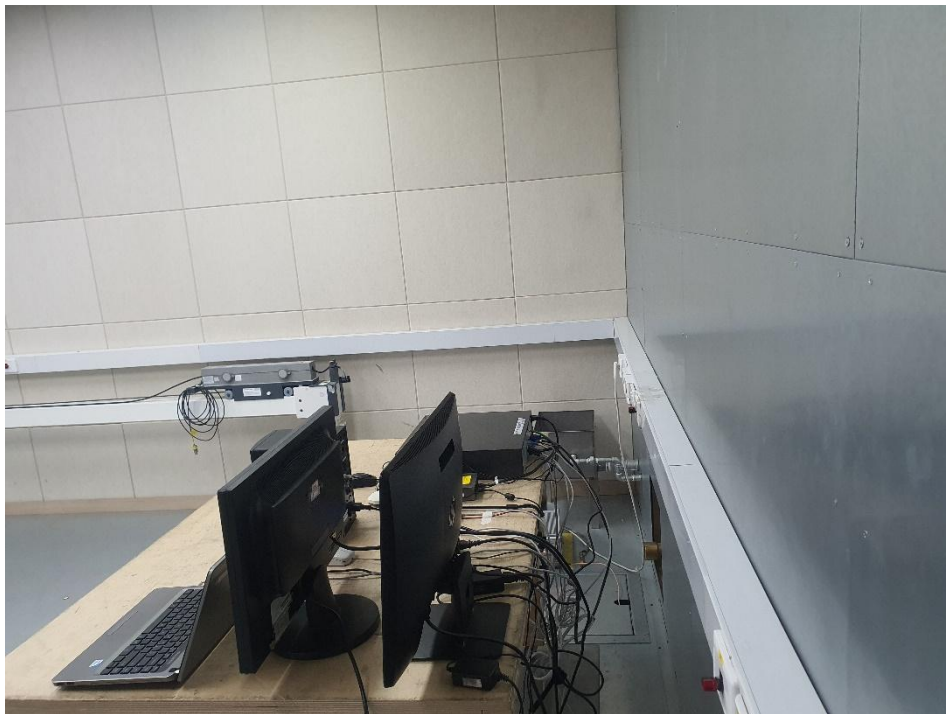
Maximum Flicker results

Flicker Measurements					
	Plt	Max Pst	Max Dc	Max Dmax	Max Tmax
Line 1:	0.12	0.122	0	< 0.2	0
Limits:	0.65	1	3.3	4	0.5
Results:	PASS	PASS	PASS	PASS	PASS

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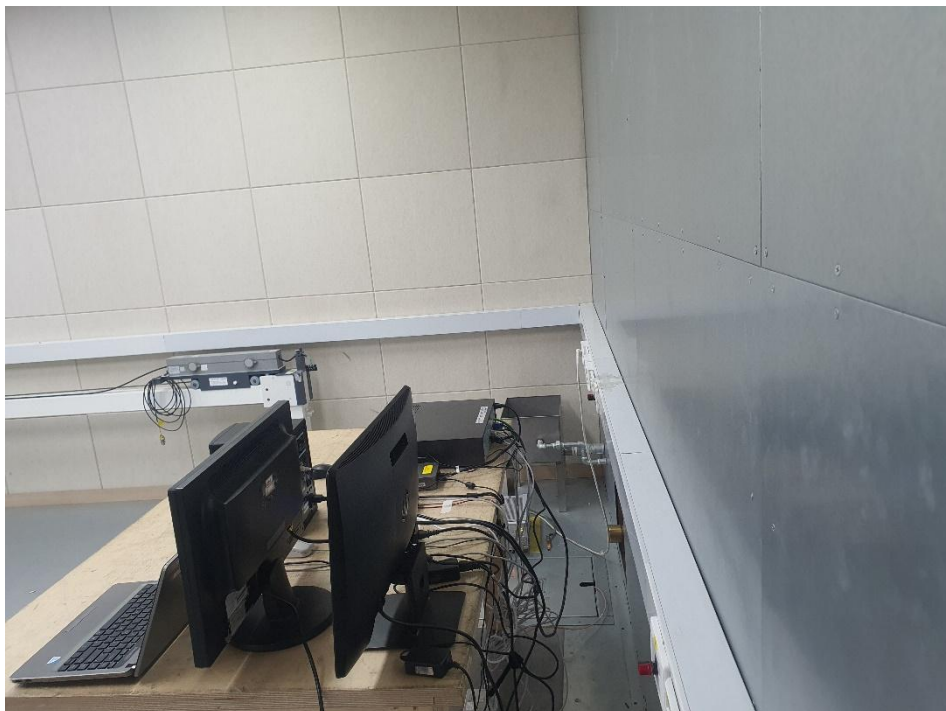
Test Setup Photos and Configuration

Conducted Emissions at Mains Power Ports



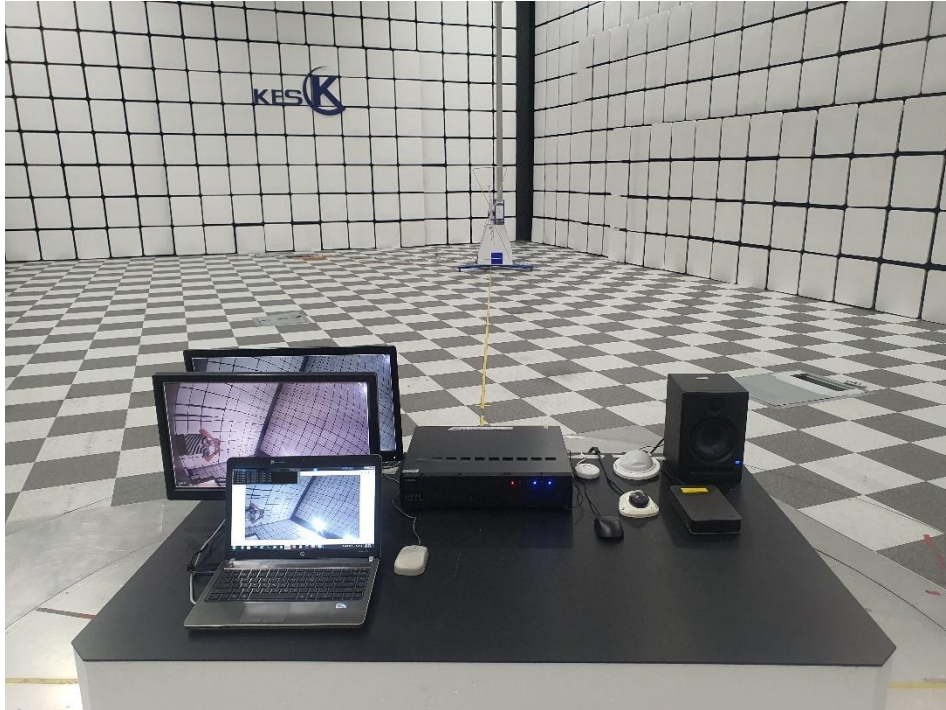
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Conducted Emissions at Telecommunication Ports



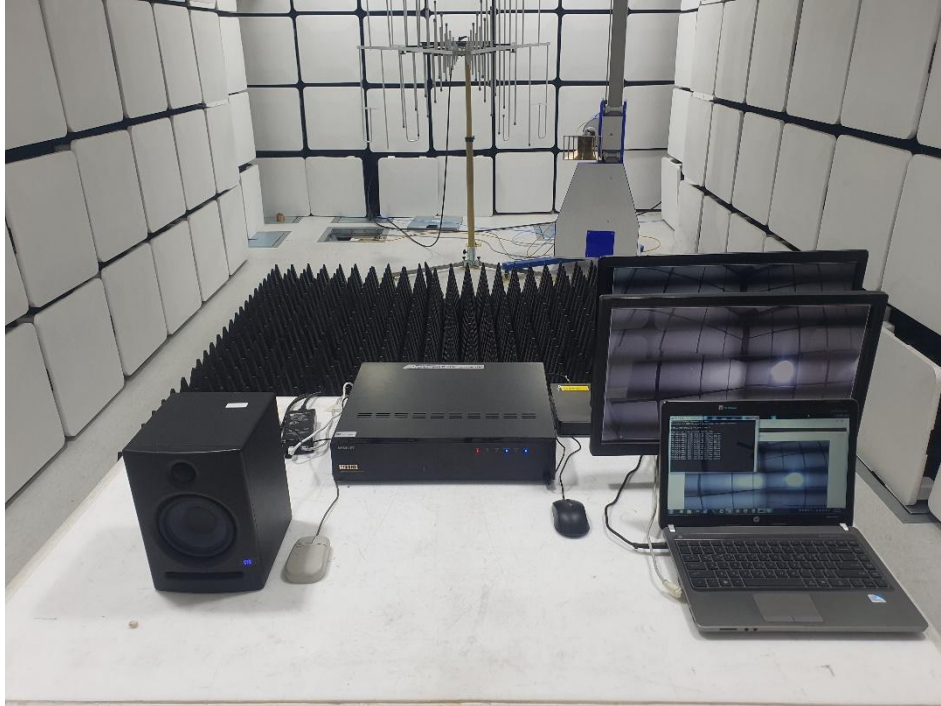
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Radiated Electric Field Emissions(Below 1 GHz)



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Radiated Electric Field Emissions(Above 1 GHz)



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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



Surge Transients



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Conducted Disturbance



Voltage Dips and Short Interruptions



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EUT External Photographs

(Top)



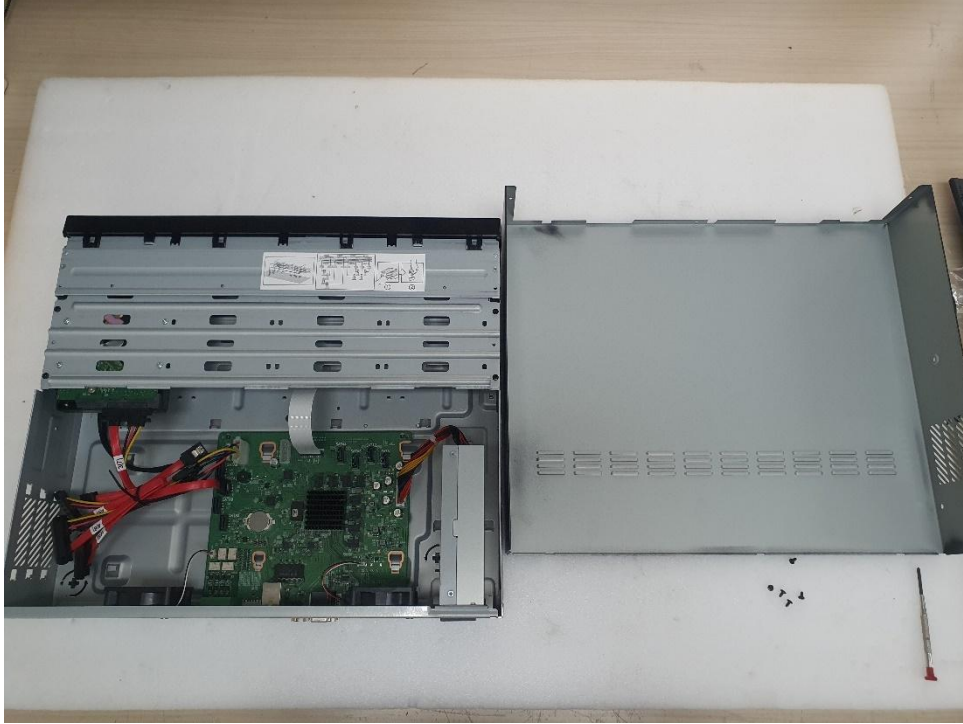
(Bottom)



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EUT Internal Photographs

(Internal View)

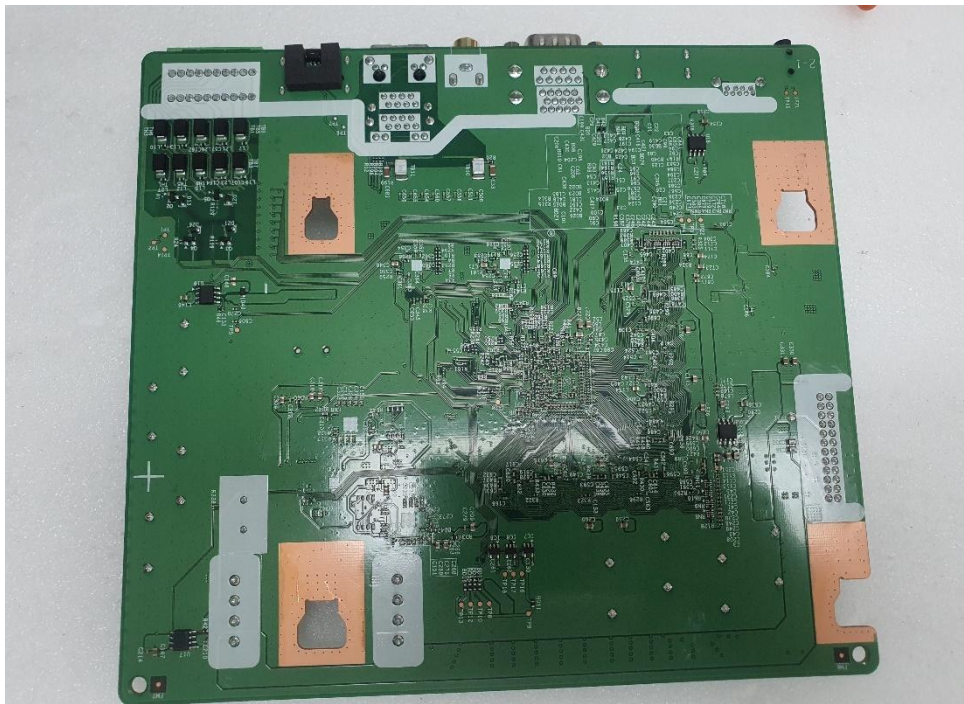


EUT Internal View – Board 1

(Top)



(Bottom)



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EUT Internal View – Board 2

(Top)



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EUT Internal View –Board 3

(Top)



(Bottom)



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EUT Internal View – HDD

(Top)



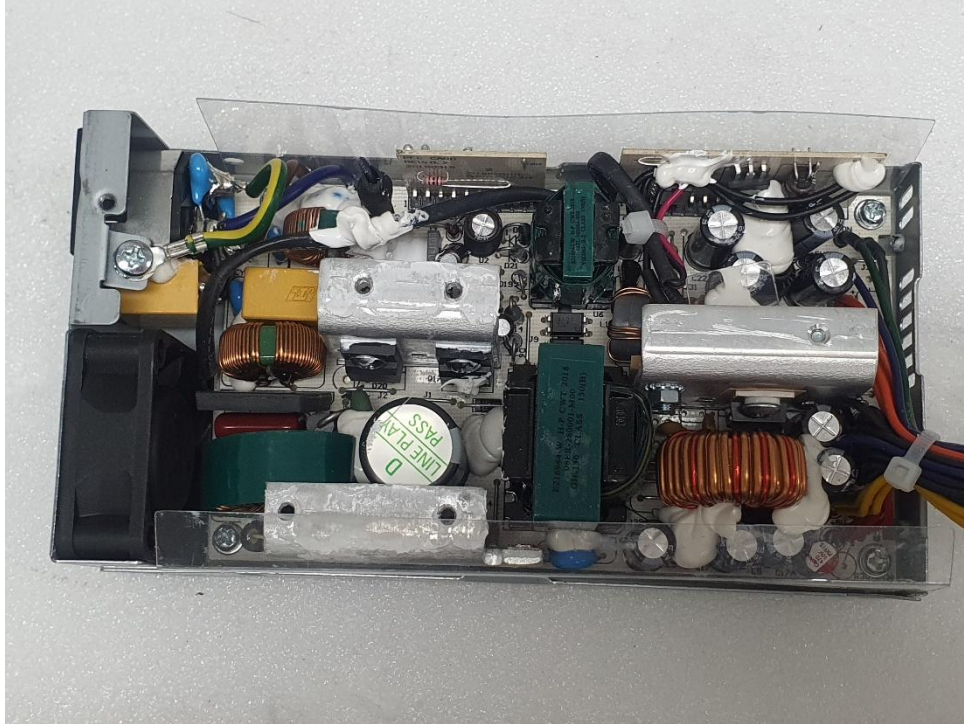
(Bottom)



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EUT Internal View – POWER

(Top)



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