



EMC TEST REPORT For CE

Test Report No. : KES-EM-22T0348
Date of Issue : Apr. 12, 2022
Product name : NVR
Model/Type No. : QRN-1630S
Variant Model : -
Applicant : Hanwha Techwin Co., Ltd.
Applicant Address : 6, Pangyo-ro 319Beon-gil, Bundang-gu, Seongnam-si,
Gyeonggi-do, Republic of Korea
Manufacturer : 1. HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.
2. D-TECH CO.,LTD.
Manufacturer Address : 1. Lot O-2, Que Vo Industrial Zone extended area,
Nam Son commune, Bac Ninh city, Bac Ninh province, Vietnam
2. 173-25, Saneop-ro, Gwonseon-gu, Suwon-si, Gyeonggi- do,
Korea (Suwon Industrial Complex)
Date of Receipt : Mar. 24, 2022
Test date : Mar. 28, 2022 ~ Apr. 07, 2022
Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Ki Man, 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 REVISION HISTORY

Date	Test Report No.	Revision History
Apr. 12, 2022	KES-EM-22T0348	Issued

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1.0 General Product Description

Main Specifications of EUT are:

Display		
Video	Inputs	Max. 16CH
	Resolution	CIF ~ 8MP
	Protocols	sunapi, ONVIF
Live	Local Display	HDMI1, HDMI2 1) HDMI1 : 3840x2160 30Hz HDMI2 : 1920x1080 60Hz
	Multi Screen Display	[Clone Monitor] Dynamic layout [Expand Mode] HDMI1 : Dynamic layout HDMI2 : Max 16 Div
	Resolution	[Local Monitor] 8M(60fps), 1080p(240fps), 720P(480fps), D1(960fps)
Intelligent Analysis		
Search	Object image	N/A
Comparision	Event Trigger	N/A
Attribute (AI)	Person	N/A
	Face	N/A
	Vehicle	N/A
Performance		
System	Operating System	Linux
	Processor	NT98336
Record	Compression	H.265, H.264, MJPEG, WiseStream(H.265, H.264)
	Recording Bandwidth	128Mbps
	Resolution	CIF ~ 8MP
	Mode	Normal, Dual Stream, Schedule(Continuous/Event),

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		Event (Pre/Post), Bookmark
	Event Trigger	Alarm Input, Video Loss, Camera Event(Sensor, MD, Video Analytics, Defocus, Audio), Dynamic Event, User Event
	Event Action	e-Mail, Event Push, PTZ Preset, Alarm Out, Buzzer, Monitor Out, FTP, SUNAPI Command, Shutdown
Search & Play	Playback Bandwidth	Max 32Mbps
	User	Max. 4 Users (Local 1, Remote 3)
	Mode	Time, Event, Text, Export, ARB, Bookmark
	Simultaneous playback	Max 40CH - Set : 16CH - Remote : 8CH Per User
	Resolution	CIF ~ 8MP
	Fisheye Dewarping	No
	Playback Control	Fast/Slow Forward / Backward, Move one step Up / Down
Storage	Built-In	2TB ~ 10TB
	Internal HDD	2ea (Max 20TB)
	External	N/A
	RAID	N/A
Backup	File backup	BU/AVI(GUI), JPG/AVI(Network)
	Function	Multi channel(Upto 8 CH) Play, Date-Time/Title display
Sensor	I/O	4/2 (NO/NC Selectable)
Audio	Input/Output	16CH (network)/output (Set)
	Compression	G.711, G.726, AAC(16/48KHz)
	Audio Communication	2-Way
Network		
Interface		16 Port PoE, RJ-45(1 Gbps)

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Protocol		TCP/IP, UDP/IP, RTP (UDP), RTP (TCP), RTSP, NTP, HTTP, DHCP (Server, Client), SMTP, ICMP, IGMP, ARP, DNS, DDNS, uPnP, HTTPS, SNMP, ONVIF (Profile-S), FTP, SUNAPI (Server, Client)
DDNS		Hanwha DDNS
Transmission Bandwidth		128Mbps
Max Remote Users		Search (3), Live Unicast (10), Multicast (20)
IP Version		IPv4/v6
Security		IP address filtering, User access Log, 802.1x, Encryption
Language		English, French, German, Italian, Spanish, Russian, Turkish, Polish, Dutch, Swedish , Czech, Portuguese, Danish, Rumanian, Serbian, Croatian, Hungarian, Greek, Norwegian, Finnish, Korean, Chinese, Japanese, Thai, Vietnam
OS		Windows 10, Mac OS 11 Big Sur and later
Web Browser		Chrome v99 or above, Edge v99 or above, Safari v14.0.3 or above
Viewer Software	Type	WAVE(Sunapi peristalsis), SSM, Webviewer, Smart Viewer, Wisenet Viewer, Wisenet Mobile
	CMS Support	Support CGI(SUNAPI) for integration to 3'rd party VMS
Functions		
Camera Setup	Register	Auto, Manual
	Setup Items	IP address, Add profile edit, Bitrate, Camera MD setup (8 point polygon) Camera video setup (Simple focus, Brightness/Contrast, Flip/Mirror, IRIS, WDR, D&N, SSNR, Shutter, SSDR, DIS), Fisheye Dewarping Mode, Hallway View Setup, Camera Webpage

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PTZ	Control	Via GUI, Webviewer
	Preset	300 Presets
Smart phone	Support Model	iOS, Android
	Protocol Support	RTP, RTSP, HTTP, CGI(SUNAPI)
	Control	Live : Multi-Profile Support Multi Channel Playback
	Max. Remote Users	Search (3), Live Unicast (10)
Redundancy	Failover	N+1
	ARB	Yes
Easy configuration		P2P(QR code)
System Control		Mouse, Keyboard, Web
Indicator/Interface		
Front	Indicator	LED(Status indicator) : - Power(1), Record(1), Network(1)
Connectors	HDMI	2 EA
	VGA	N/A
	Audio	Out(1EA) : RCA output
	Ethernet	PoE RJ-45(LAN, 10/100) 16 ea ,RJ-45 1ea (WAN, 1Gbps)
	Alarm	(1) In(4EA, Terminal Block) (2) Out(2EA, Terminal Block) - Relay Out1(NO/NC/COM) - Relay Out2(NO/COM)
	USB	2EA(Front 2, USB 2.0)
	Storage	N/A
	Serial	N/A
	Reset	Switch(1EA, PW clear)
	Power Cord	1EA
	POE Budget	Max. 130W
System		
Log	Log List	Max. 100,000 (System, Event each log)
Environmental		

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Operating Temperature / Humidity	+0°C to +40°C(+32°F to +104°F)
Humidity	20% ~ 85% RH
Noise	47 db
Electrical	
Power	100 ~ 240 VAC ±10%; 50/60 Hz
Power Consumption	Max 200W(2HDD, PoE ON)
Mechanical	
Color / Material	Black
Dimension (WxHxD)	370*50.7*320 (370*44*320 FOOT except)
Weight	2,873g

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1.1 Test Voltage & Frequency

Unless indicated otherwise on the individual data sheet or test results, the test voltage and frequency was as indicated below.

☒ AC 230 V, 50 Hz

1.2 Variant Model Differences

Not applicable

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
NVR	QRN-1630S	-	HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.	EUT
Mouse	MOKJUO	-	Primax Electronics Ltd.	-
SWITCHING POWER SUPPLY	DPS-200PB-185 C	-	Delta Electronics Power(Dongguan) Co., Ltd.	-



1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
Camera	QNV-6023R	-	HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.	-
Laptop	P95G001	8KM8HT2	DELL INC.	-
Laptop Adapter	LA65NS2-01	-	LITE-ON TECHNOLOGY(CHANGZ HOU)CO.,LTD.	-
Monitor	SMT-2232	C95V67VF90002 5B	Weihai Daewoo Electronics Co., Ltd.	-
Earphone	-	-	-	-
Alarm	-	-	-	-
Button alarm	-	-	-	-
HDD	810051	-	WESTERN DIGITAL TECHNOLOGIES, INC.	4 TB
MIC	MP1000	-	-	-
USB Memory	-	-	Sandisk	32 GB



1.6 External I/O Cabling

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
NVR (EUT)	RJ-45 (PoE)	Camera	RJ-45 (PoE)	3.0	U
	RJ-45 (LAN)	Laptop	RJ-45 (LAN)	3.0	U
	USB	Mouse (EUT)	USB	1.4	U
	USB	USB Memory	USB	-	-
	HDMI	Monitor	HDMI	1.5	S
	grounding	grounding	grounding	1.2	-
	RCA	Earphone	3.5mm	1.5	U
	Alarm out	Alarm	Alarm in	3.0	U
	Alarm in	Button alarm	Alarm out	3.0	U
	SATA	HDD	SATA	0.2	U
Laptop	DC Jack	Laptop Adapter	DC Jack	1.6	U
	3.5 mm	MIC	3.5 mm	1.5	U

* Unshielded=U, Shielded=S

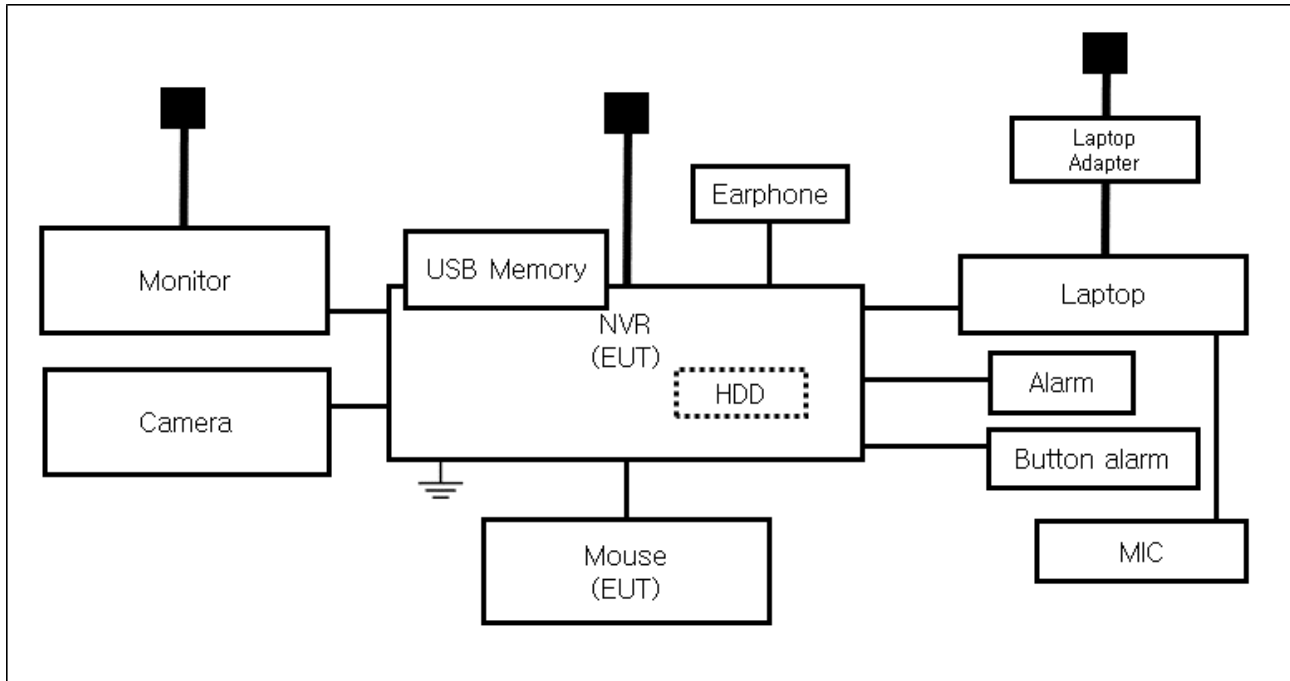
1.7 EUT Operating Mode(s)

Test Mode	operating
Operation Mode	EUT Monitoring, Ping Test after testing, check if the recording is normally done on the HDD and USB Memory

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

1.8 Configuration

■ AC Main
 □ DC Main



1.9 Remarks when standards applied

N/A

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, Yeosu-si, Gyeonggi-do, 12658, Korea. The sites are constructed in conformance with the requirements of ANSI C63.4a-2017 and CISPR 16-1-4:2019

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 55032:2015/A11:2020 ☒ Class A ☐ Class B

☒ EN 50130-4:2011

☒ EN 61000-3-2:2014

☒ EN 61000-3-3:2013

☒ **EMC – Regulations 2016/1091**

☒ BS EN 55032:2015/A11:2020 ☒ Class A ☐ Class B

☒ BS EN 50130-4:2011/A1:2014

☒ BS EN 61000-3-2:2014

☒ BS EN 61000-3-3:2013



2.1 Conducted Emissions at Mains Power Ports

Test Date

Mar. 28, 2022

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	12, 28, 2022
☒	LISN	ENV216	R & S	101787	12, 27, 2022
☒	LISN	ESH2-Z5	R & S	100450	12, 27, 2022
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	12, 27, 2022

Test Conditions

Temperature: (24,9 ± 0,2) °C

Relative Humidity: (44,8 ± 0,2) % 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

Mar. 28, 2022

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	12, 28, 2022
☒	LISN	ENV216	R & S	101787	12, 27, 2022
☒	LISN	ESH2-Z5	R & S	100450	12, 27, 2022
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	12, 27, 2022
☒	8-WIRE ISN CAT3,5	ENY81	R & S	100174	12, 28, 2022
☒	8-WIRE ISN CAT6	ENY81-CAT6	R & S	101665	12, 28, 2022

Test Conditions

Temperature: (24,9 ± 0,1) °C

Relative Humidity: (44,8 ± 0,2) % 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.
- For Ethernet interfaces, measurements are required at the highest data rate supported by the interface.



2.3 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Mar. 29, 2022

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	03, 31, 2023
☒	AMPLIFIER	SCU 01	R & S	100603	11, 24, 2022
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	12, 08, 2022
☒	ATTENUATOR	8491A	HP	32173	03, 08, 2023

Test Conditions

Temperature: (24,9 ± 0,2) °C
Relative Humidity: (44,7 ± 0,2) % 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

Mar. 30, 2022

Test Location

SEMI ANECHOIC CHAMBER #5

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.120	-
☒	EMI TEST RECEIVER	ESU26	Rohde & Schwarz	100552	03, 31, 2023
☒	HORN ANTENNA	BBHA 9120D	SCHWARZBECK	9120D-1802	12, 16, 2022
☒	PREAMPLIFIER	8449B	HP	3008A00538	06, 21, 2022

Test Conditions

Temperature: (25,2 ± 0,2) °C

Relative Humidity: (46,5 ± 0,2) % R.H.

Frequency Range of Measurement

1 GHz to 6 GHz

Instrument Settings

IF Band Width: 1 MHz

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.



2.5 Harmonic Current Emissions

Test Date

Apr. 07, 2022

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, 2023
☒	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

Test Conditions

Temperature: (24,9 ± 0,1) °C
Relative Humidity: (45,7 ± 0,1) % 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

Apr. 07, 2022

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, 2023
☒	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

Test Conditions

Temperature: (24,9 ± 0,2) °C
Relative Humidity: (45,7 ± 0,2) % 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 / BS EN 50130-4:2011/A1:2014 Alarm systems-Part 4: Electromagnetic compatibility Product family standard: Immunity requirements for components of fire, intruder and social alarm systems

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

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

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

report, based on the following criteria:

Electrostatic discharge

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

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

Radiated electromagnetic fields

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

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

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

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

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

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

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

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



Fast transient burst / slow high energy voltage surge

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

Conducted RF immunity

There shall be no damage, malfunction or change of status due to the conditioning.
Flickering of an indicator during the application of discharge is permissible, providing
That there is no residual is permissible, providing that there is no residual change in the EUT or
any
change in outputs, which could be interpreted by associated equipment as a change,
and no such flickering of indicators oeuvres at $U = 130 \text{ dB}\mu\text{V}$.
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
BS EN 61000-4-2:2009

Test Date

Apr. 06, 2022

Test Location

EMS-ESD: Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	ESD SIMULATOR	ESS-2000	Noise Ken	ESS01Z0454	02, 24, 2023
☒	HCP	-	KES	-	-
☒	VCP	-	Noise Ken	-	-

Test Conditions

Temperature: (24,4 ± 0,1) °C
Relative Humidity: (44,6 ± 0,2) % R.H.
Atmospheric Pressure: (100,9 ± 0,0) 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

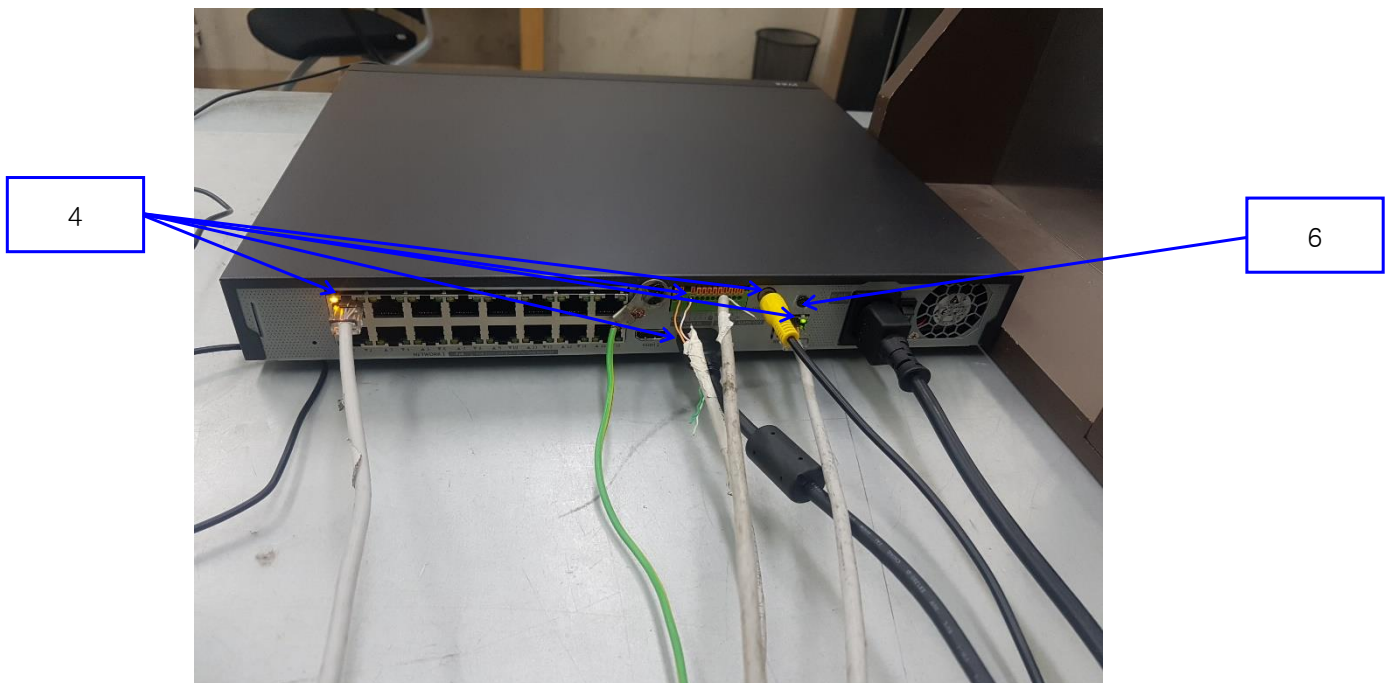
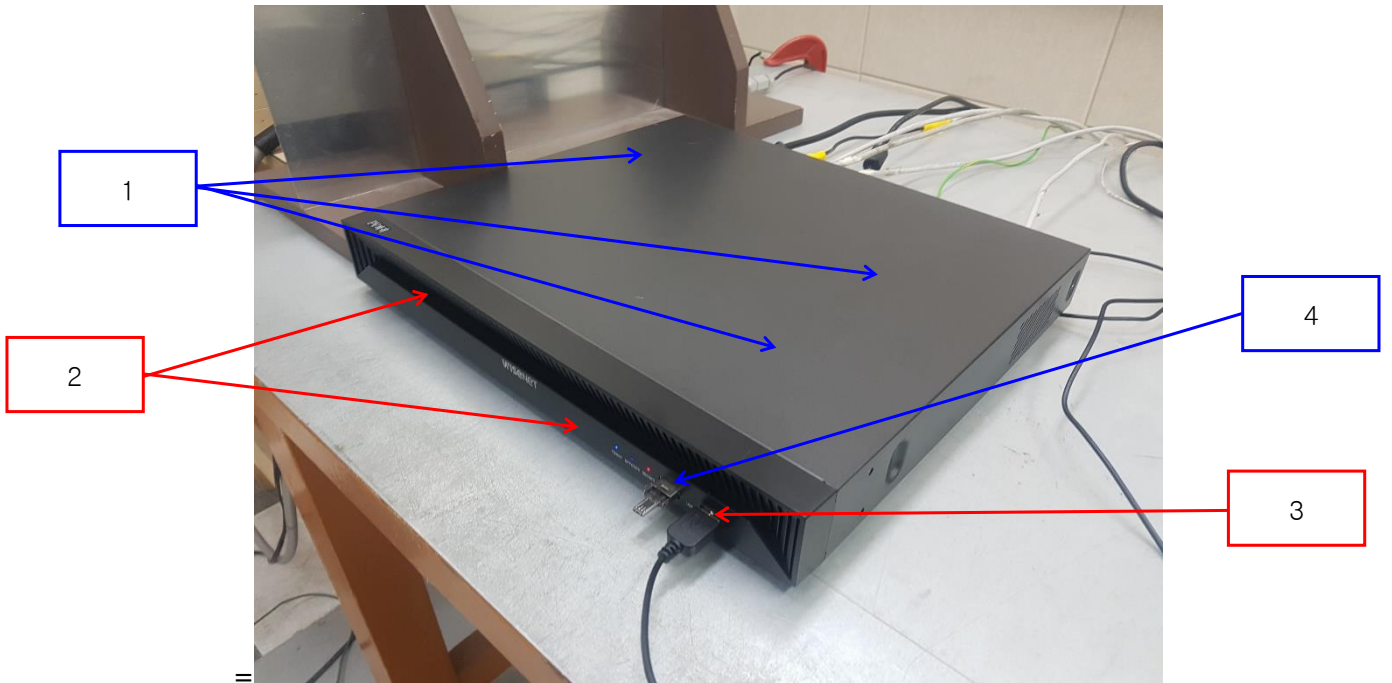
Notes: HCP: Horizontal coupling plane
VCP: Vertical coupling plane

Required Performance Criteria: ☒ Complied

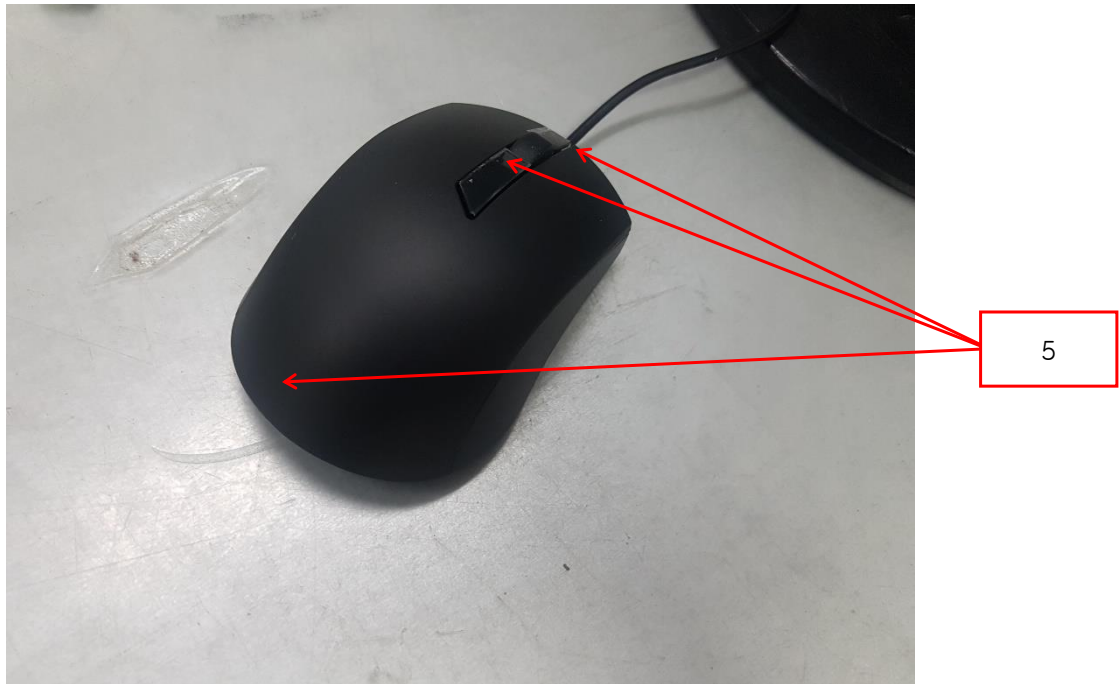
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Location of Discharge:

Air
Contact



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Test Data

No.	Test Point	Discharge Method	Observations	Remarks
1	HCP Contact	Contact Discharge	Complied	-
2	VCP Contact	Contact Discharge	Complied	-

Direct Discharge

No.	Test Point	Discharge Method	Observations	Remarks
1	Enclosure 1	Contact Discharge	Complied	-
2	Enclosure 2	Air Discharge	Complied	-
3	Around the port 1	Air Discharge	Complied	-
4	Around the port 2	Contact Discharge	Complied	-
5	Mouse Enclosure	Air Discharge	Complied	-
6	Screw	Contact Discharge	Complied	-

Note: "Blank" = Not performed

Observations:

Complied – No degradation of function

Test Results

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

Remarks

PASS Required Performance Criteria

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3.2 Radiated Electric Field Immunity

Reference Standard

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

Test Date

Apr. 05, 2022

Test Location

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

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	EMC32	R & S	10.10.02	-
☒	SIGNAL GENERATOR	SMB 100A	Rohde & Schwarz	108252	08, 03, 2022
☒	HIGH POWER DUAL AMP	SSA532	SUNGSAN	SSA532-001	-
☒	POWER METER	E4419B	Agilent	GB40203000	03, 31, 2023
☒	AVERAGE POWER SENSOR	E9301A	Agilent	MY41495698	02, 03, 2023
☒	CW POWER SENSOR	E4412A	Agilent	MY41501662	03, 31, 2023
☒	STACKED DOUBLE LOG-PER- ANTENNA	STPL9128 E	Schwarzbeck	9128ES-121	-
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	03, 03, 2023

Test Conditions

Temperature: (24,1 ± 0,2) °C
Relative Humidity: (44,7 ± 0,3) % R.H.
Atmospheric Pressure: (100,9 ± 0,0) 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
BS EN 61000-4-4:2012

Test Date

Apr. 06, 2022

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	5.4.8	-
☒	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	12, 03, 2022
☒	MOTOR VARIAC	MV2616	EM TEST	P1552169719	03, 31, 2023
☒	CAPACITIVE COUPLING CLAMP	HFK	EM TEST	P1633183115	12, 03, 2022

Test Conditions

Temperature: (24,4 ± 0,2) °C
Relative Humidity: (44,6 ± 0,3) % R.H.
Atmospheric Pressure: (100,9 ± 0,0) 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)
RJ-45 (LAN)	Complied	Complied
RJ-45 (PoE)	Complied	Complied
Alarm	Complied	Complied
Button 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

BS EN 61000-4-5:2014

Test Date

Apr. 06, 2022

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	5.4.8	-
☒	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	12, 03, 2022
☒	MOTOR VARIAC	MV2616	EM TEST	P1552169719	03, 31, 2023
☒	CDN	CNV 508N1	EM TEST	P1610176296	12, 03, 2022

Test Conditions

Temperature: (24,4 ± 0,2) °C
Relative Humidity: (44,6 ± 0,3) % R.H.
Atmospheric Pressure: (100,9 ± 0,0) 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

☒ 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)
RJ-45 (LAN)	CDN	Complied	Complied
	LINE	Complied	Complied
RJ-45 (PoE)	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
BS EN 61000-4-6:2014

Test Date

Apr. 01, 2022

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	5.3.12	-
☒	CONTINUOUS WAVE SIMULATOR	CWS 500N1.4	EM TEST	P1602169880	11, 24, 2022
☒	ATTENUATOR	ATT 6/80	EM TEST	P1614178148	11, 24, 2022
☒	CDN	CDN M016	TESEQ	43694	11, 24, 2022
☒	CDN	CDN M016	TESEQ	43697	11, 24, 2022
☒	CDN	CDN T8RJ45	EM TEST	0909-09	08, 03, 2022
☒	EM CLAMP	KEMZ 801A	TESEQ	44099	11, 25, 2022

Test Conditions

Temperature: (24,7 ± 0,2) °C
Relative Humidity: (45,3 ± 0,4) % R.H.
Atmospheric Pressure: (100,8 ± 0,0) kPa



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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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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
RJ-45 (LAN)	CDN	Complied
RJ-45 (PoE)	CDN	Complied
Alarm	Clamp	Complied
Button Alarm	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
BS EN 61000-4-11:2004

Test Date

Apr. 06, 2022

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	5.4.8	-
☒	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	03, 31, 2023
☒	MOTOR VARIAC	MV2616	EM TEST	P1552169719	03, 31, 2023

Test Conditions

Temperature: (24,4 ± 0,2) °C
Relative Humidity: (44,6 ± 0,2) % R.H.
Atmospheric Pressure: (100,9 ± 0,0) 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.

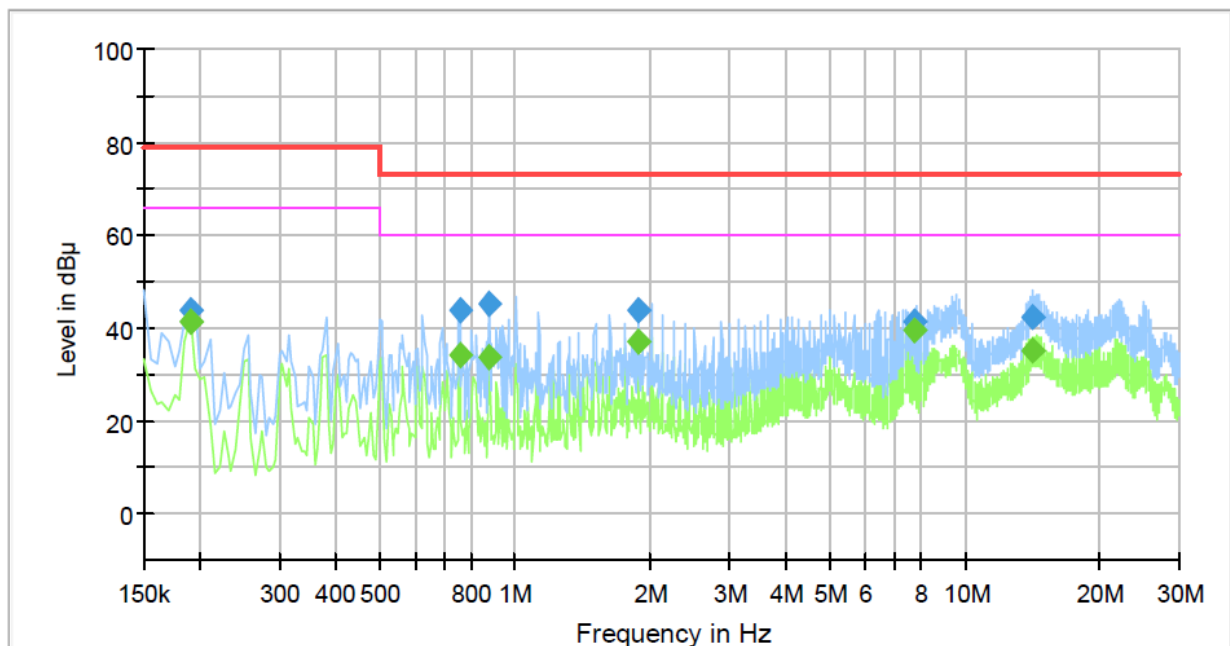


APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports [HOT]

Common Information

Test Description: Conducted Emission
Model No.: QRN-1630S
Phase: L1
Mode:
Operator Name: KES



Final Result

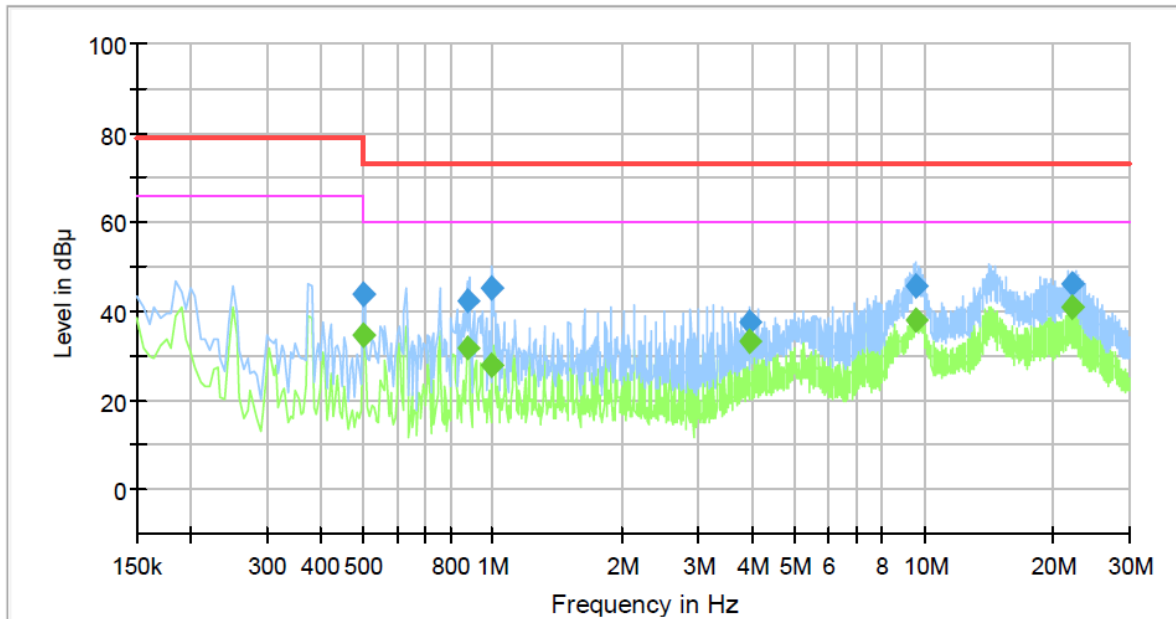
Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.190000	---	41.25	66.00	24.75	1000.0	9.000	L1	19.4
0.190000	43.83	---	79.00	35.17	1000.0	9.000	L1	19.4
0.755000	---	34.15	60.00	25.85	1000.0	9.000	L1	20.0
0.755000	43.87	---	73.00	29.13	1000.0	9.000	L1	20.0
0.880000	---	33.76	60.00	26.24	1000.0	9.000	L1	20.1
0.880000	45.34	---	73.00	27.66	1000.0	9.000	L1	20.1
1.885000	---	37.22	60.00	22.78	1000.0	9.000	L1	20.3
1.885000	43.95	---	73.00	29.05	1000.0	9.000	L1	20.3
7.700000	---	39.39	60.00	20.61	1000.0	9.000	L1	19.6
7.700000	41.36	---	73.00	31.64	1000.0	9.000	L1	19.6
14.150000	---	34.96	60.00	25.04	1000.0	9.000	L1	19.9
14.150000	42.45	---	73.00	30.55	1000.0	9.000	L1	19.9

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[NEUTRAL]

Common Information

Test Description: Conducted Emission
 Model No.: QRN-1630S
 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)
0.500000	---	34.70	60.00	25.30	1000.0	9.000	N	19.7
0.500000	43.79	---	79.00	29.21	1000.0	9.000	N	19.7
0.875000	---	31.94	60.00	28.06	1000.0	9.000	N	20.0
0.875000	42.36	---	73.00	30.64	1000.0	9.000	N	20.0
1.000000	---	28.05	60.00	31.95	1000.0	9.000	N	20.0
1.000000	45.35	---	73.00	27.65	1000.0	9.000	N	20.0
3.955000	---	33.41	60.00	26.59	1000.0	9.000	N	19.9
3.955000	37.68	---	73.00	35.32	1000.0	9.000	N	19.9
9.565000	---	38.23	60.00	21.77	1000.0	9.000	N	19.8
9.565000	45.63	---	73.00	27.37	1000.0	9.000	N	19.8
22.015000	---	41.06	60.00	18.94	1000.0	9.000	N	20.2
22.015000	46.28	---	73.00	26.72	1000.0	9.000	N	20.2

◆ 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 + Pulse Limiter FACTOR))

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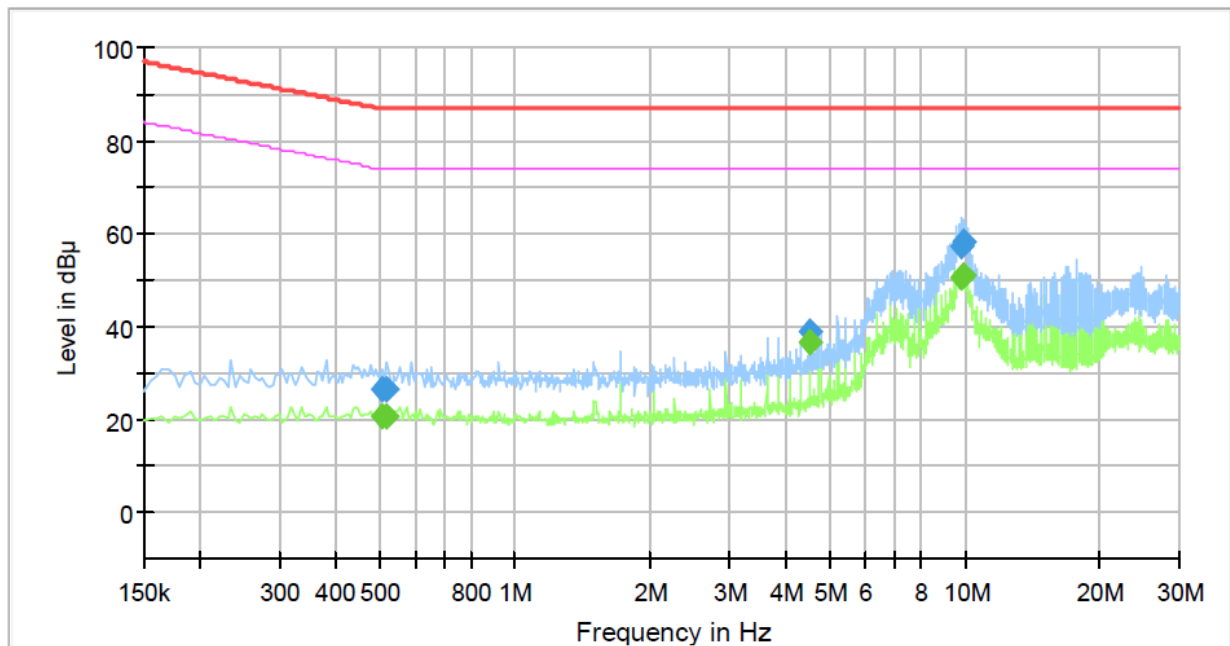
Conducted Emissions at Telecommunication Ports

■ LAN

[1 000 Mbps]

Common Information

Test Description: Telecommunication Emission
Model No.: QRN-1630S
Mode : LAN
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)
0.510000	---	20.91	74.00	53.09	1000.0	9.000	Single Line	19.7
0.510000	26.39	---	87.00	60.61	1000.0	9.000	Single Line	19.7
0.520000	---	20.85	74.00	53.15	1000.0	9.000	Single Line	19.7
0.520000	26.42	---	87.00	60.58	1000.0	9.000	Single Line	19.7
4.535000	---	36.81	74.00	37.19	1000.0	9.000	Single Line	19.5
4.535000	39.07	---	87.00	47.93	1000.0	9.000	Single Line	19.5
9.845000	---	50.56	74.00	23.44	1000.0	9.000	Single Line	19.6
9.845000	57.45	---	87.00	29.55	1000.0	9.000	Single Line	19.6
9.965000	---	51.03	74.00	22.97	1000.0	9.000	Single Line	19.6
9.965000	57.97	---	87.00	29.03	1000.0	9.000	Single Line	19.6

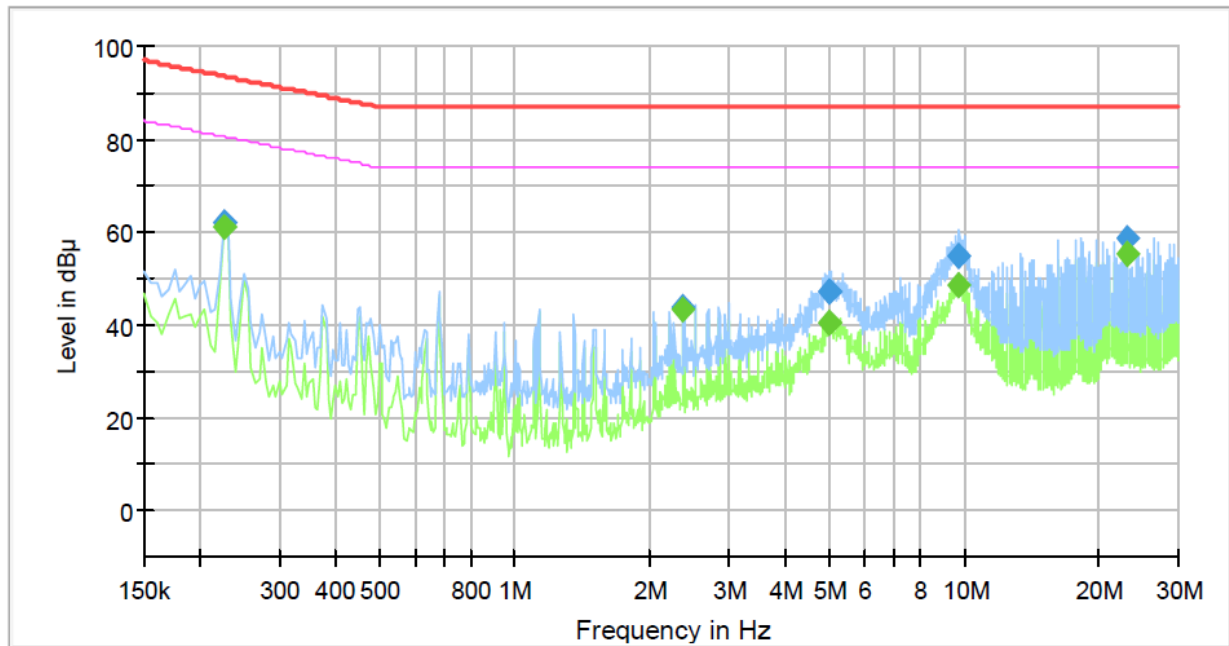
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■ PoE

[100 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	QRN-1630S
Mode :	PoE
Speed :	100 Mbps
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.225000	---	61.01	80.63	19.62	1000.0	9.000	Single Line	19.7
0.225000	62.05	---	93.63	31.58	1000.0	9.000	Single Line	19.7
2.375000	---	43.39	74.00	30.61	1000.0	9.000	Single Line	20.1
2.375000	43.94	---	87.00	43.06	1000.0	9.000	Single Line	20.1
5.000000	---	40.51	74.00	33.49	1000.0	9.000	Single Line	19.4
5.000000	47.24	---	87.00	39.76	1000.0	9.000	Single Line	19.4
9.765000	---	48.52	74.00	25.48	1000.0	9.000	Single Line	19.6
9.765000	54.82	---	87.00	32.18	1000.0	9.000	Single Line	19.6
23.130000	---	55.32	74.00	18.68	1000.0	9.000	Single Line	20.1
23.130000	58.50	---	87.00	28.50	1000.0	9.000	Single Line	20.1

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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

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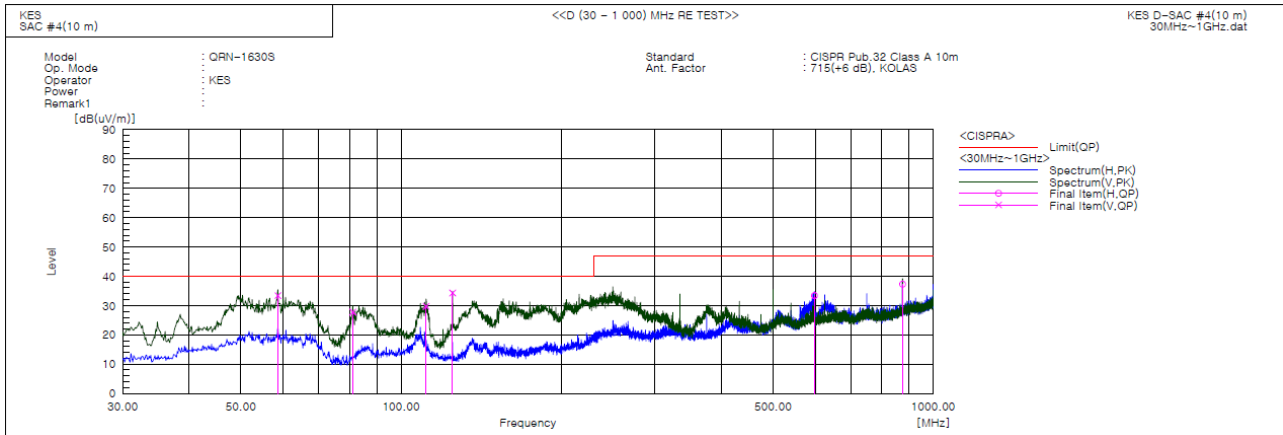


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KES-EM-22T0348
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Radiated Electric Field Emissions(Below 1 GHz)



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	58.736	V	55.2	-21.8	33.4	40.0	6.6	144.0	284.0	
2	81.168	V	55.4	-27.6	27.8	40.0	12.2	366.0	132.0	
3	111.480	V	52.1	-22.4	29.7	40.0	10.3	168.0	162.0	
4	124.939	V	59.2	-24.9	34.3	40.0	5.7	146.0	110.0	
5	597.693	H	41.9	-8.5	33.4	47.0	13.6	100.0	29.0	
6	875.113	H	41.9	-4.6	37.3	47.0	9.7	100.0	194.0	

◆ 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

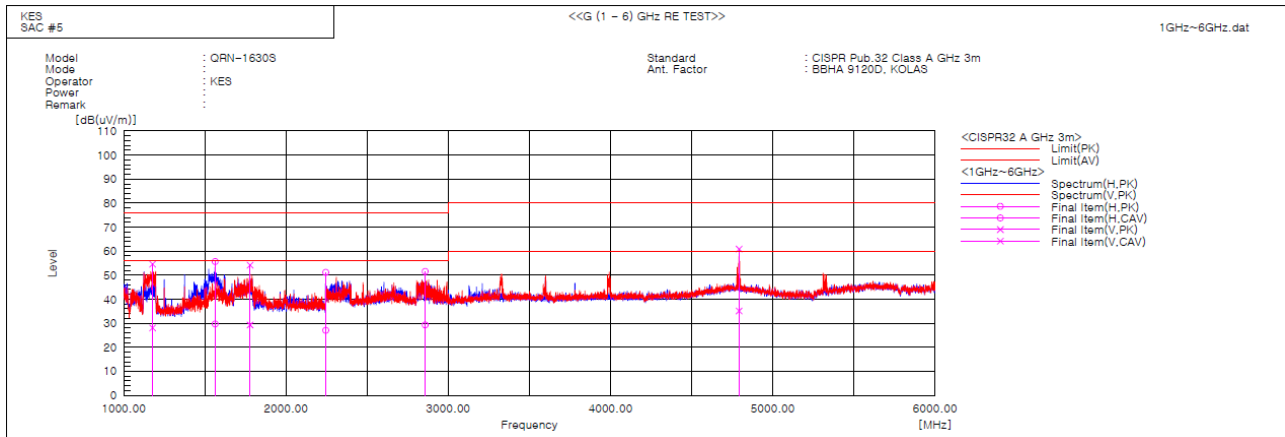


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Radiated Electric Field Emissions(Above 1 GHz)



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	1177.500	V	61.3	34.8	-6.7	54.6	28.1	76.0	56.0	21.4	27.9	100.0	343.3	
2	1563.125	H	60.4	34.4	-4.7	55.7	29.7	76.0	56.0	20.3	26.3	100.0	320.0	
3	1778.125	V	58.0	33.1	-3.8	54.2	29.3	76.0	56.0	21.8	26.7	100.0	2.8	
4	2244.375	H	53.4	29.3	-2.2	51.2	27.1	76.0	56.0	24.8	28.9	100.0	54.0	
5	2857.500	H	51.0	28.7	0.6	51.6	29.3	76.0	56.0	24.4	26.7	100.0	54.0	
6	4791.875	V	54.3	28.6	6.6	60.9	35.2	80.0	60.0	19.1	24.8	100.0	155.3	

◆ Calculation

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

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

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

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

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Harmonic Current Emissions and Voltage Fluctuations and Flicker

Average harmonic current results				
Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	0.151			
2	0.001	0.059	1.080	n/a
3	0.018	0.771	2.300	PASS
4	0.001	0.172	0.430	n/a
5	0.011	0.956	1.140	PASS
6	0.001	0.234	0.300	n/a
7	0.009	1.131	0.770	PASS
8	0.001	0.284	0.230	n/a
9	0.007	1.743	0.400	PASS
10	0.001	0.396	0.184	n/a
11	0.005	1.497	0.330	n/a
12	0.001	0.415	0.153	n/a
13	0.003	1.342	0.210	n/a
14	0.001	0.502	0.131	n/a
15	0.003	2.082	0.150	n/a
16	0.001	0.557	0.115	n/a
17	0.003	2.116	0.132	n/a
18	0.001	0.612	0.102	n/a
19	0.003	2.769	0.118	n/a
20	0.001	0.714	0.092	n/a
21	0.003	1.605	0.161	n/a
22	0.001	0.722	0.084	n/a
23	0.002	1.450	0.147	n/a
24	0.001	0.907	0.077	n/a
25	0.002	1.504	0.135	n/a
26	0.001	0.898	0.071	n/a
27	0.001	1.074	0.125	n/a
28	0.001	1.022	0.066	n/a
29	0.002	1.304	0.116	n/a
30	0.001	1.106	0.061	n/a
31	0.002	1.507	0.109	n/a
32	0.001	1.106	0.058	n/a
33	0.001	1.319	0.102	n/a
34	0.001	1.278	0.054	n/a
35	0.001	1.355	0.096	n/a
36	0.001	1.298	0.051	n/a
37	0.001	1.399	0.091	n/a
38	0.001	1.337	0.048	n/a
39	0.002	1.874	0.087	n/a
40	0.001	1.366	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	0.152			
2	0.001	0.051	1.620	n/a
3	0.018	0.518	3.450	PASS
4	0.001	0.147	0.645	n/a
5	0.011	0.651	1.710	PASS
6	0.001	0.179	0.450	n/a
7	0.009	0.763	1.155	PASS
8	0.001	0.226	0.345	n/a
9	0.007	1.183	0.600	PASS
10	0.001	0.303	0.276	n/a
11	0.005	1.064	0.495	PASS
12	0.001	0.304	0.230	n/a
13	0.003	0.944	0.315	n/a
14	0.001	0.399	0.197	n/a
15	0.003	1.437	0.225	n/a
16	0.001	0.414	0.173	n/a
17	0.003	1.457	0.199	n/a
18	0.001	0.460	0.153	n/a
19	0.003	1.896	0.178	n/a
20	0.001	0.523	0.138	n/a
21	0.003	1.670	0.161	n/a
22	0.001	0.525	0.125	n/a
23	0.002	1.519	0.147	n/a
24	0.001	0.673	0.115	n/a
25	0.002	1.610	0.135	n/a
26	0.001	0.688	0.106	n/a
27	0.001	1.157	0.125	n/a
28	0.001	0.740	0.099	n/a
29	0.002	1.412	0.116	n/a
30	0.001	0.817	0.092	n/a
31	0.002	1.646	0.109	n/a
32	0.001	0.816	0.086	n/a
33	0.001	1.443	0.102	n/a
34	0.001	0.972	0.081	n/a
35	0.001	1.469	0.096	n/a
36	0.001	0.986	0.077	n/a
37	0.001	1.472	0.091	n/a
38	0.001	1.002	0.073	n/a
39	0.002	2.014	0.087	n/a
40	0.001	1.037	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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KES-EM-22T0348
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Test Data - Voltage Fluctuations

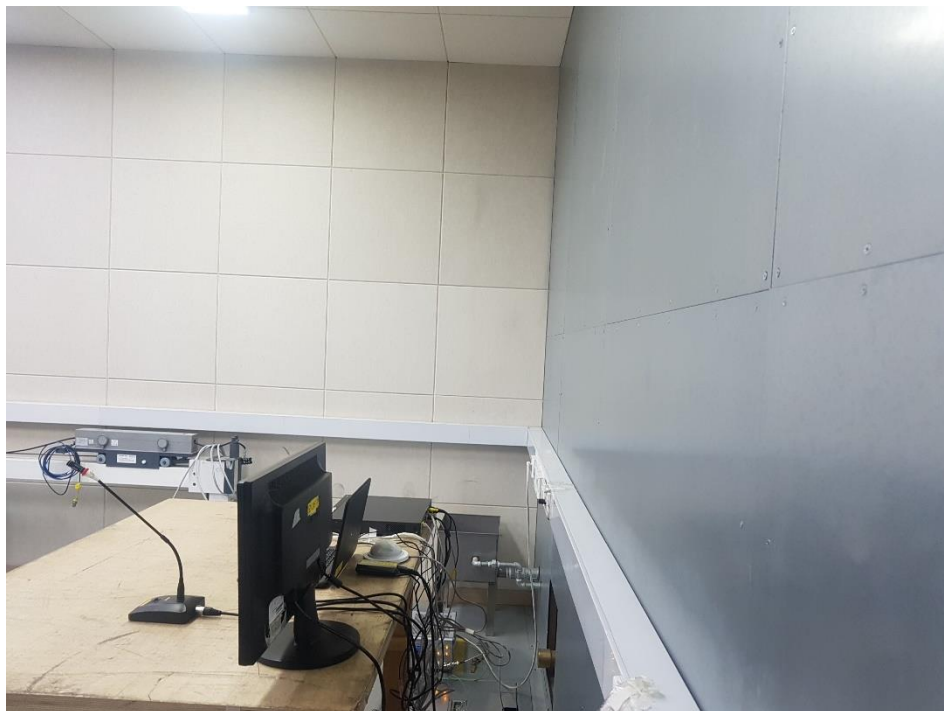
Maximum Flicker results

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

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Test Setup Photos and Configuration

Conducted Emissions at Mains Power Ports



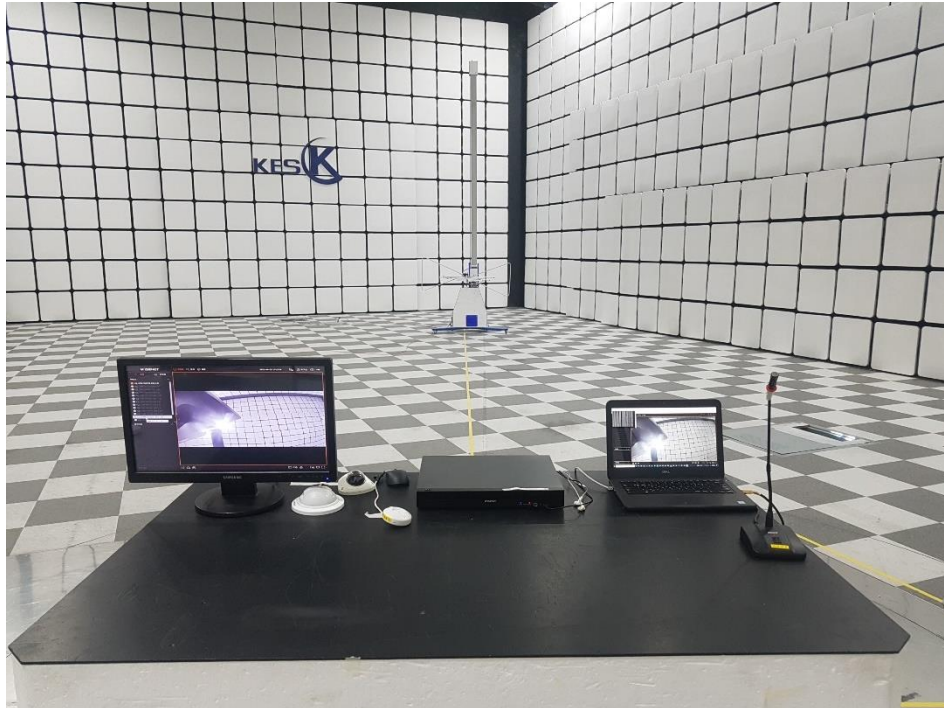
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Conducted Emissions at Telecommunication Ports



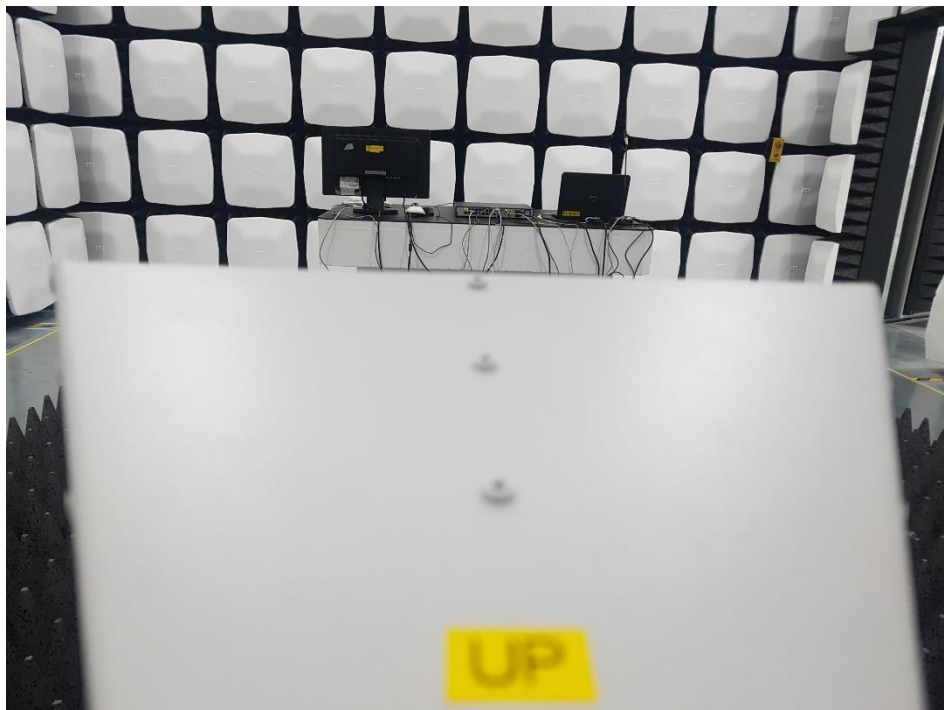
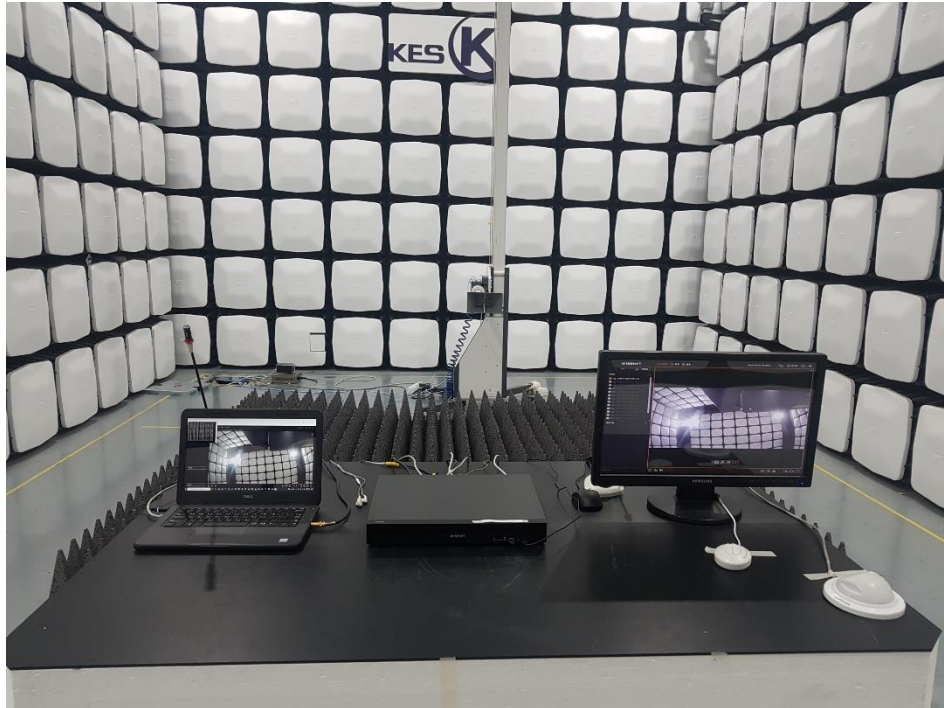
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Radiated Electric Field Emissions(Below 1 GHz)



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Radiated Electric Field Emissions(Above 1 GHz)



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Harmonic Current Emissions and Voltage Fluctuations and Flicker



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)



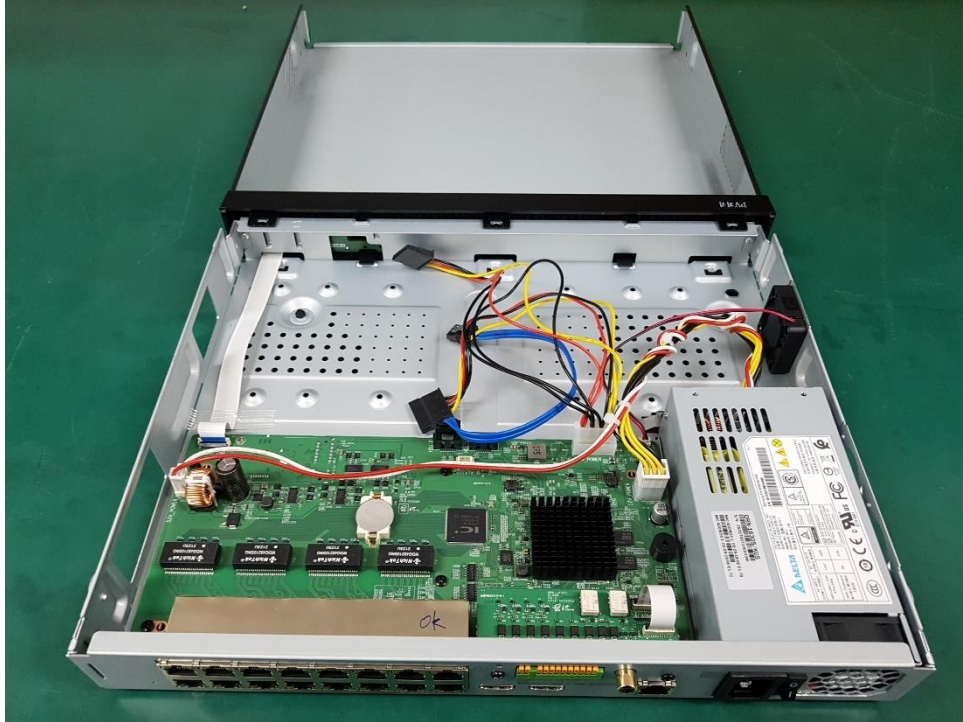
(Bottom)



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EUT Internal Photographs

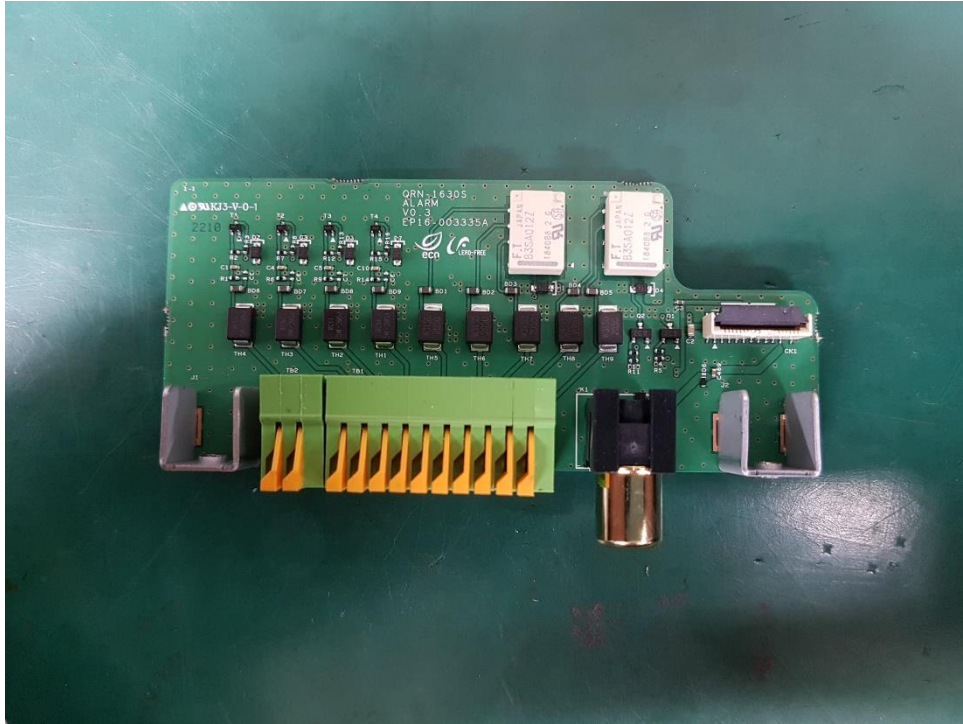
(Internal View)



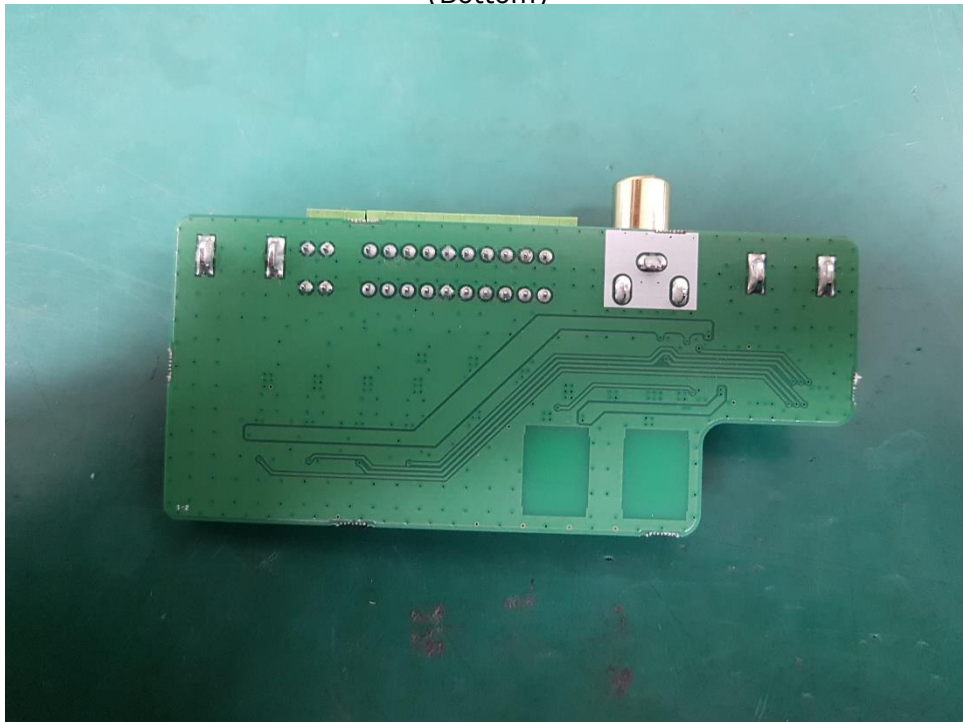
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EUT Internal View – Board 1

(Top)



(Bottom)



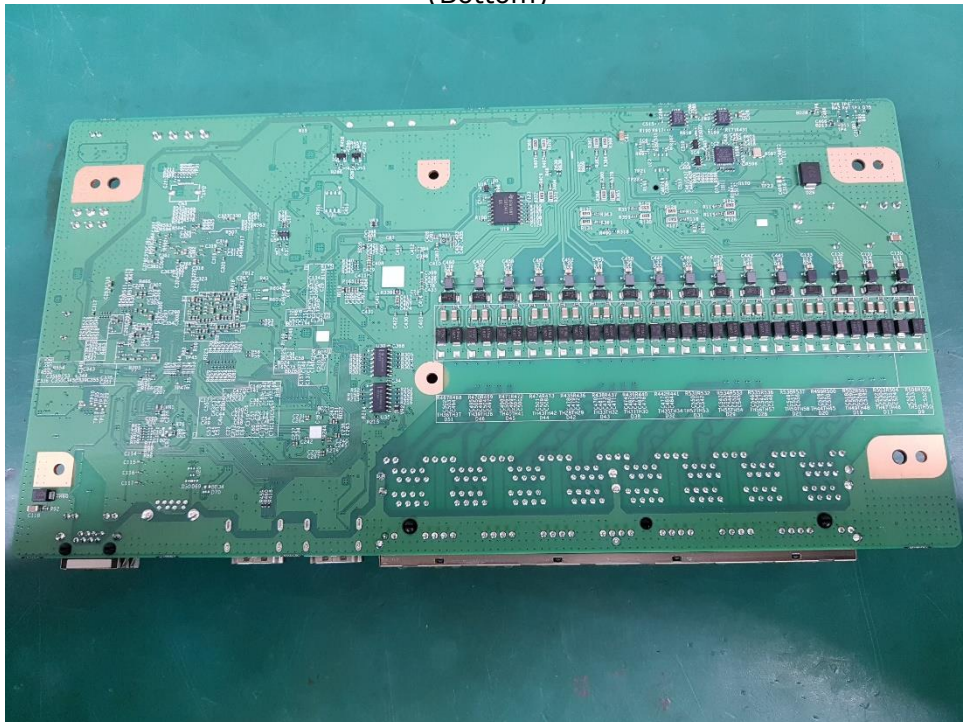
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EUT Internal View – Board 2

(Top)



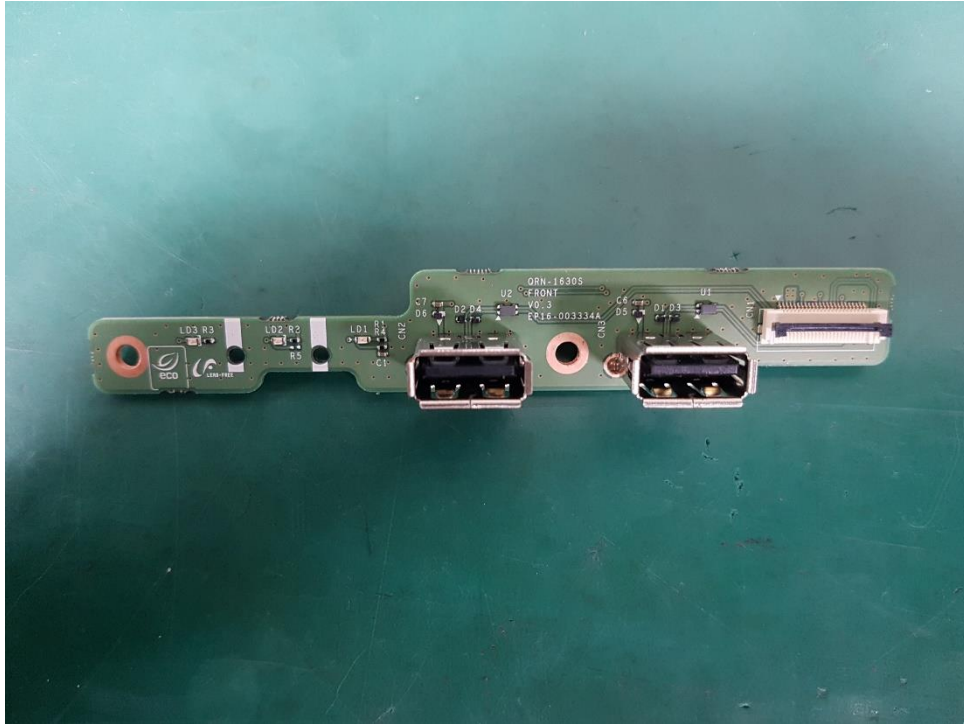
(Bottom)



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EUT Internal View – Board 3

(Top)



(Bottom)



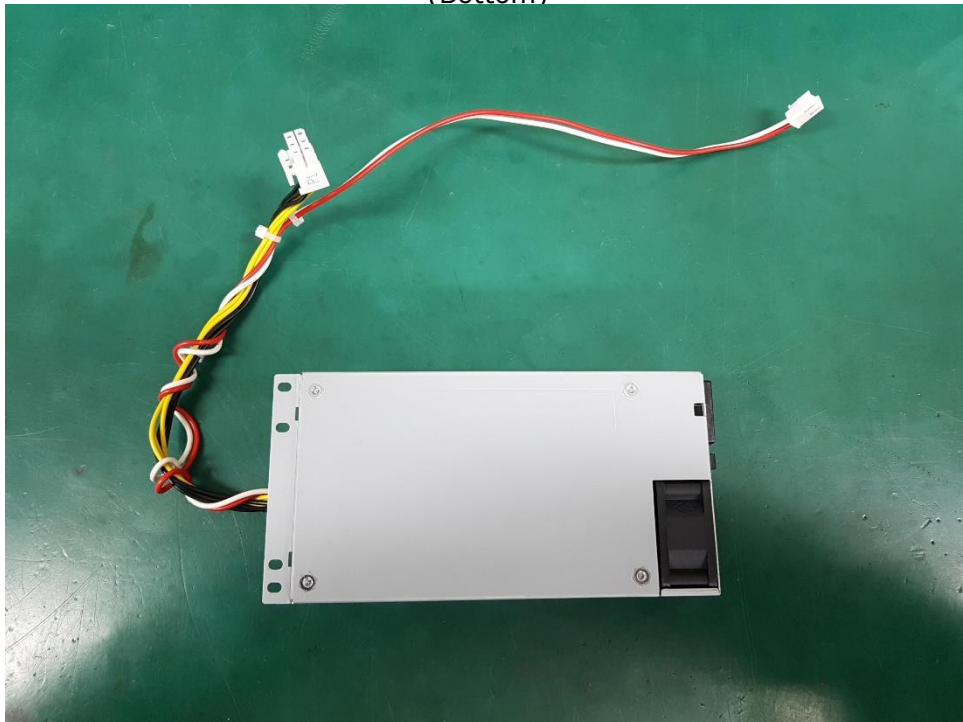
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EUT Internal View – SWITCHING POWER SUPPLY

(Top)



(Bottom)



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EUT Internal View – Mouse

(Top)



(Bottom)



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(Label)



Label and Location



NVR

Model No : QRN-1630S

Manufacturer : HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.

Made in Vietnam

