



EMC TEST REPORT For CE

Test Report No. : KES-EM-20T0315
Date of Issue : May. 12, 2020
Product name : NETWORK CAMERA
Model/Type No. : XNV-9082R
Variant Model : XNV-8082R
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 : Apr. 03, 2020
Test date : May. 06, 2020 ~ May. 12, 2020
Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Jun Soo, Jung
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.

**KES Co., Ltd.**

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REPORT REVISION HISTORY

Date	Test Report No.	Revision History
May. 12, 2020	KES-EM-20T0315	Issued

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1.0 General Product Description

Main Specifications of EUT are:

Video	XNV-9082R
Imaging Device	1/2.8" 8.46M CMOS
Effective Pixels	3864(H)x2192(V)
NETD	None
Pixel Size	None
Min. Illumination	Color: 0.05Lux(F1.2, 1/30sec) B/W: 0Lux(IR LED On)
Video Out	CVBS: 1.0 Vp-p / 75Ω composite, 720x480(N), 720x576(P) for installation USB: Micro USB Type B, 1280x720 for installation
Lens	
Focal Length (Zoom Ratio)	2.8~8.4mm(3x) motorized varifocal
Max. Aperture Ratio	F1.2(Wide)~F2.8(Tele)
Angular Field of View	H: 114°(Wide)~40.2°(Tele) / V: 62.0°(Wide)~22.5°(Tele) / D: 133.0°(Wide)~46.3°(Tele)
Min. Object Distance	0.7m (2.23ft)
Focus Control	Simple focus
Lens Type	DC Auto Iris, P iris
Mount Type	None
Optional Lens	None
Pan / Tilt / Rotate	
Pan / Tilt / Rotate Range	0°~360° / -45°~85° / 0°~355°
Pan Range	None
Pan Speed	None
Tilt Range	None
Tilt Speed	None
Rotate Range	None
Sequence	None
Preset Accuracy	None
Azimuth	None
Auto Tracking	None
Operational	

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IR Viewable Length	40m(131.23ft)
Camera Title	Off / On (Up to 85 characters) - W/W : English / Numeric / Special characters - China : English / Numeric / Special / Chinese characters - Common : Multi-line (Max. 5), Color (Grey / Green / Red / Blue / Black / White), Auto scale by resolution
Day & Night	Auto(ICR)/Color/BW/External/Schedule
Backlight Compensation	BLC, HLC, WDR
Wide Dynamic Range	150dB
Contrast Enhancement	SSDR (Off / On)
Digital Noise Reduction	SSNR V
Digital Image Stabilization	Support(built-in gyro sensor)
Defog	Support
Motion Detection	8ea, 8point Polygonal zones
Privacy Masking	32ea, polygonal zones - Color : Gray, Green, Red, Blue, Black, White - Mosaic
Gain Control	Support
White Balance	ATW / Narrow ATW / AWC / Manual / Indoor / Outdoor
LDC	Support
Electronic Shutter Speed	Minimum / Maximum / Anti flicker (1/5~1/12,000sec)
Digital PTZ	Support(Preset, Group)
Video Rotation	Flip, Mirror, Hallway view(90°/270°)
Analytics	Defocus detection, Directional detection, Motion detection, Digital auto tracking, Appear/Disappear, Enter/Exit, Loitering, Tampering, Virtual line, Audio detection, Sound classification, Shock detection, Face/upper body detection
Business Intelligence	People counting, Queue management, Heatmap
Serial Interface	None
Alarm I/O	2 configurable I/O ports
Alarm Triggers	Analytics, Network disconnect, Alarm input

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Alarm Events	File upload via FTP and e-mail Notification via e-mail SD/SDHC/SDXC or NAS recording at event triggers Alarm output Handover Audio playback
Audio In	Selectable(mic in/line in) Supply voltage: 2.5VDC(4mA), Input impedance: 2K Ohm
Audio Out	Line out, Max.output level: 1Vrms
IR Illuminator (Optional)	None
Wiper	None
Coaxial Protocol	None
Video Transmission Distance	None
Radiometry	
Temperature detect range	None
Temperature accuracy	None
Temperature detection	None
Additional	None
Network	
Ethernet	RJ-45(10/100/1000BASE-T)
Video Compression	H.265/H.264: Main/High, MJPEG
Resolution	3840x2160, 3328x1872, 3072x1728, 2592x1944, 2688x1520, 1920x1080, 1600x1200, 1280x1024, 1280x960, 1280x720, 1024x768, 800x600, 800x448, 720x576, 720x480, 640x480, 640x360, 320x240
Max. Framerate	H.265/H.264: Max. 30fps/25fps(60Hz/50Hz) MJPEG: Max. 15fps/12fps(60Hz/50Hz)
Smart Codec	Manual(Sea area), WiseStream II
Video Quality Adjustment	H.264/H.265: Target bitrate level control MJPEG: Quality level control
Bitrate Control	H.264/H.265: CBR or VBR MJPEG: VBR
Streaming	Unicast(20 users) / Multicast Multiple streaming(Up to 3 profiles)

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Audio Compression	G.711 u-law /G.726 Selectable G.726(ADPCM) 8KHz, G.711 8KHz G.726: 16Kbps, 24Kbps, 32Kbps, 40Kbps AAC-LC: 48Kbps at 16KHz
Protocol	IPv4, IPv6, TCP/IP, UDP/IP, RTP(UDP), RTP(TCP), RTCP,RTSP, NTP, HTTP, HTTPS, SSL/TLS, DHCP, FTP, SMTP, ICMP, IGMP, SNMPv1/v2c/v3(MIB-2), ARP, DNS, DDNS, QoS, UPnP, Bonjour, LLDP, SRTP (TCP, UDP Unicast)
Security	HTTPS(SSL) Login Authentication Digest Login Authentication IP Address Filtering User access log 802.1X Authentication(EAP-TLS, EAP-LEAP) Device Certificate(Hanwha Techwin Root CA)
Edge Storage	Micro SD/SDHC/SDXC 2slot 512GB(256Gx2)
Application Programming Interface	ONVIF Profile S/G/T SUNAPI(HTTP API) Wisenet open platform
Webpage Language	English, Korean, Chinese, French, Italian, Spanish, German, Japanese, Russian, Swedish,, Portuguese, Czech, Polish, Turkish, Dutch, Hungarian, Greek
Web Viewer	Supported OS: Windows 8.1 or later, Mac OS X 10.13 or later Recommended Browser: Google Chrome Supported Browser: MS Explore11, MS Edge, Mozilla Firefox(Window 64bit only), Apple Safari(Mac OS X only)
Memory	4GB RAM, 512MB Flash
Environmental	
Operating Temperature / Humidity	-50°C~+60°C(-58°F ~ +140°F) / Less than 95% RH(non condensing) * Start up should be done at above -30°C
Storage Temperature / Humidity	-50°C ~ +60°C(-58°F ~ +140°F) / Less than 90% RH
Certification	IP66/IP67/IP6K9K, IK10+, NEMA4X
Electrical	
Input Voltage	PoE(IEEE802.3af), 12VDC, 24VAC(액세서리)
Power Consumption	PoE : typ 10.7W, max 12.95W 12VDC : typ 9.0W, max 11.5W

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	24VAC : typ 11.0W, max13.5W
Mechanical	
Color / Material	White / Aluminum
RAL Code	RAL9003
Product dimensions / weight	Ø180x125mm(7.09x4.92"), Weight : 1.9kg
Conduit hole	3/4"
Hanging mount(Dome)	SBP-187HMW, SBP-187HM
Skin cover(Dome)	SBC-180B
Weather cap(Dome)	-
Power module	SPC-100AC
Backbox	-

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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

Added a simple variant model for the purpose of the vendor management and a country of origin for the dualization.

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
NETWORK CAMERA	XNV-9082R	-	HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.	EUT
AC accessories	-	-	-	-

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1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
AC/DC Adapter	2ACB022F	-	Channel Well Technology (Guangzhou) Co.,Ltd.	-
AC/AC Adapter	DRL-246000AC	-	Dream Electronics Co., Ltd.	-
PoE Adapter	ANY4805C-LT1	-	ANY ELECTRONICS CO.,LTD.	-
Notebook	LG15N54	410NZXE015458	LG Electronics Co., Ltd.	-
Notebook Adapter	ADP-90WH B	84ZW19F1747	DELTA ELECTRONICS(JIANGSU) LTD.	-
Speaker	BR1000A Cuve Black 2	-	DONGGUAN EDIFIER TECHNOLOGY Co., Ltd	-
MIC	CMK-303	-	-	-
Alarm	-	-	-	-
Button Alarm	-	-	-	-
Alarm Adapter	HN1220	-	Wifitech	-
IPhone	A1586	-	APPLE .Inc	-
Micro SD Card	-	-	SanDisk	8 GB

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1.6 External I/O Cabling

■ DC Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
NETWORK CAMERA (EUT)	RJ-45	Notebook	RJ-45	3.0	U
	Audio Out	Speaker	3.5 mm	1.4	U
	Audio In	MIC	3.5 mm	1.4	U
	Alarm Out	Alarm	Alarm In	3.0	U
	Alarm In	Button Alarm	Alarm Out	3.0	U
	SLOT	Micro SD Card	SLOT	-	-
Notebook	3.5 mm	IPhone	3.5 mm	0.5	U

* Unshielded=U, Shielded=S

■ PoE Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
NETWORK CAMERA (EUT)	RJ-45	PoE Adapter	RJ-45	3.0	S
	Audio Out	Speaker	3.5 mm	1.4	U
	Audio In	MIC	3.5 mm	1.4	U
	Alarm Out	Alarm	Alarm In	3.0	U
	Alarm In	Button Alarm	Alarm Out	3.0	U
	SLOT	Micro SD Card	SLOT	-	-
Notebook	RJ-45	PoE Adapter	RJ-45	3.0	S
	3.5 mm	IPhone	3.5 mm	0.5	U

* Unshielded=U, Shielded=S



■ AC Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
NETWORK CAMERA (EUT)	RJ-45	Note book	RJ-45	3.0	U
	Audio Out	Speaker	3.5 mm	1.4	U
	Audio In	MIC	3.5 mm	1.4	U
	Alarm Out	Alarm	Alarm In	3.0	U
	Alarm In	Button Alarm	Alarm Out	3.0	U
	SLOT	Micro SD Card	SLOT	-	-
	SLOT	AC Accessories	SLOT	-	-
Notebook	3.5 mm	IPhone	3.5 mm	0.5	U

* Unshielded=U, Shielded=S

1.7 EUT Operating Mode(s)

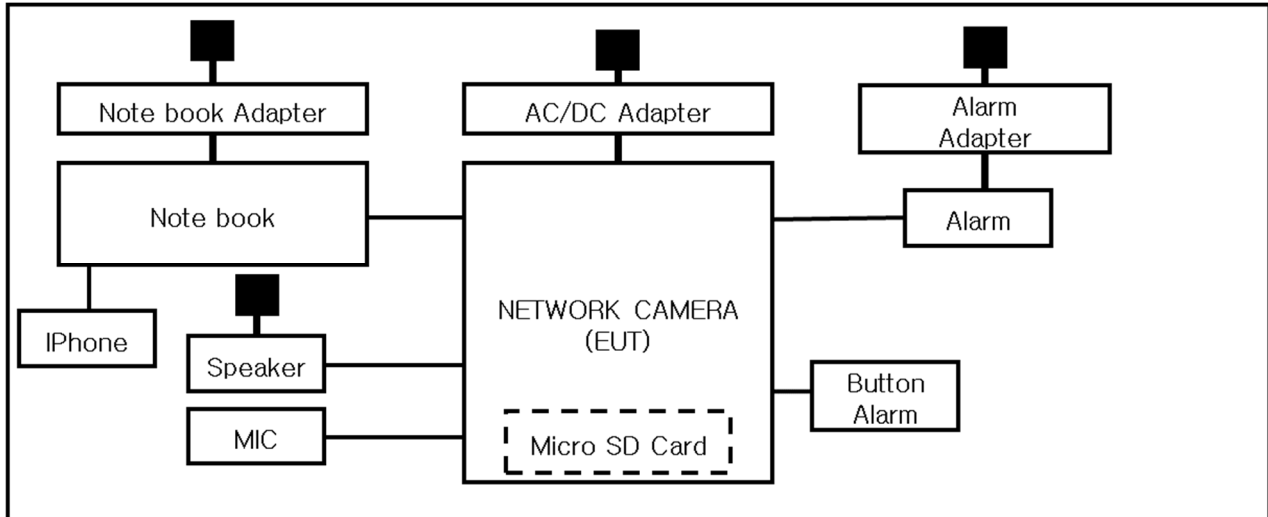
Test Mode	operating
DC / PoE / AC Mode	Checked the normal operated of the web viewer and network ping tested.

EUT Test operating S/W		
Name	Version	Manufacture Company
Web Viewer	-	-

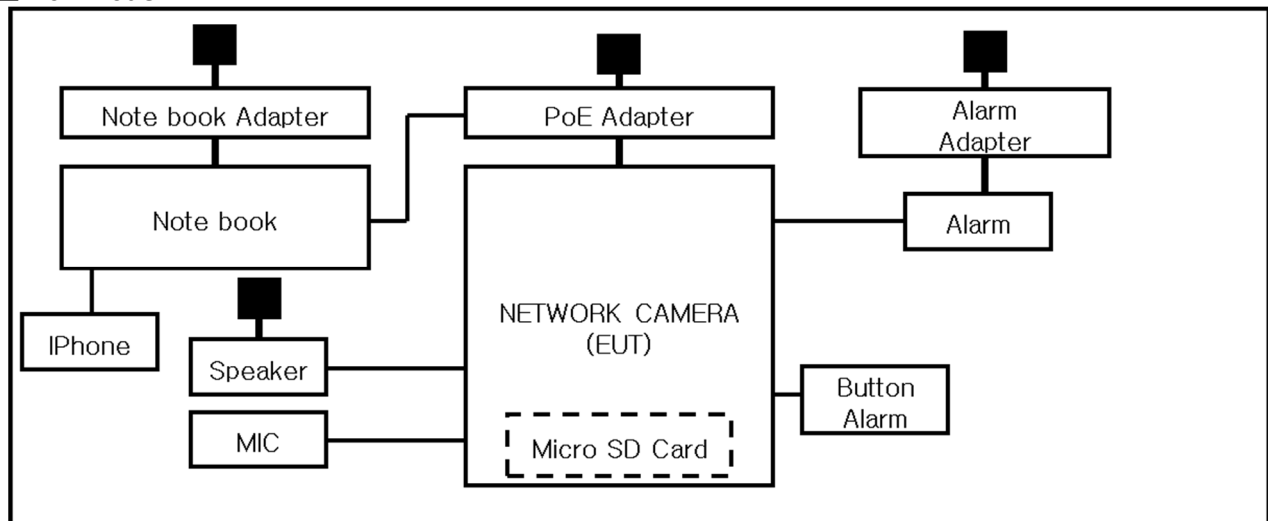
1.8 Configuration

■ AC Main
 □ DC Main

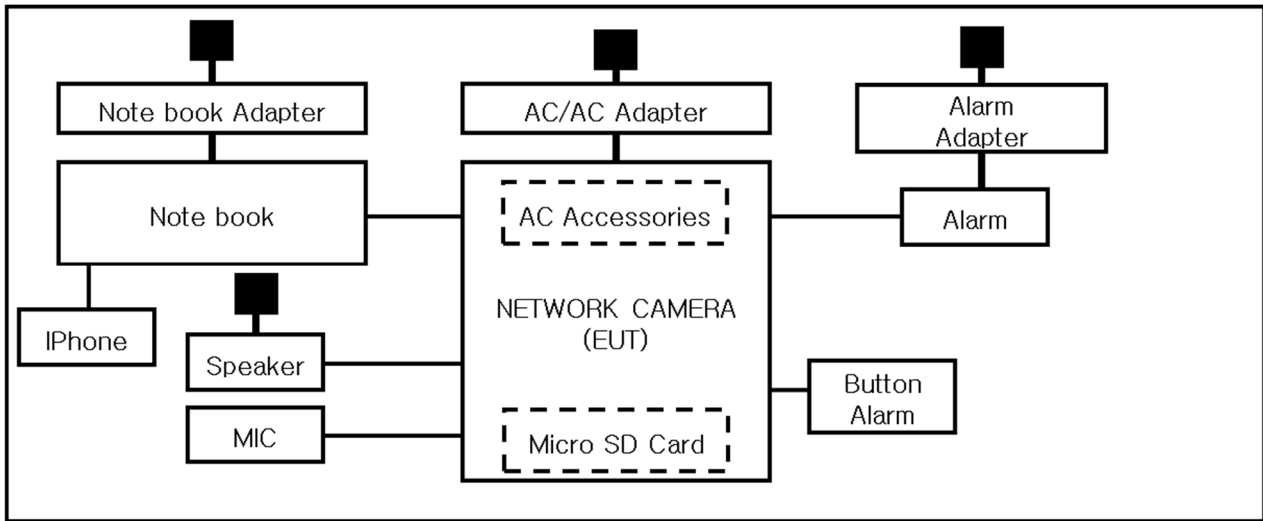
■ DC Mode



■ PoE Mode



■ AC Mode



1.9 Remarks when standards applied

The USB port and VIDEO port are excluded for testing as the manager port.

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 C63.4:2014 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 0003

2.0 Test Regulations

The emissions tests were performed according to following regulations:

☒ **EMC – Directive 2014/30/EU**

☐ EN 61000-6-3:2011

☐ EN 61000-6-1:2007

☐ EN 61000-6-4:2007 +A1:2011

☐ EN 61000-6-2:2005

☐ EN 55011:2007 +A1:2010

☐ Group 1
☐ 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-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

May. 06, 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	ESU26	R & S	100552	04, 01, 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: 23,3 °C
Relative Humidity: 51,5 % 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

May. 06, 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	ESU26	R & S	100552	04, 01, 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
☐	ISN	ISN S8	SCHWARZBECK	ISN-S8-0019	03, 10, 2021
☐	CDN	CDNS502A	TESEQ	40431	01, 02, 2021

Test Conditions

Temperature: 23,3 °C
Relative Humidity: 51,5 % 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.

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2.3 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

May. 07, 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: 23,9 °C
Relative Humidity: 49,4 % 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

May. 07, 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, 06, 2020
☒	PREAMPLIFIER	8449B	AGILENT	3008A01967	05, 27, 2020
☐	ATTENUATOR	8491A	HP	35496	03, 10, 2021
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	03, 11, 2021

Test Conditions

Temperature: 23,5 °C
Relative Humidity: 49,2 % 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

May. 12, 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: 22,6 °C
Relative Humidity: 51,6 % 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

May. 12, 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: 22,6 °C
Relative Humidity: 51,6 % 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

May. 12, 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: 23,2 °C
Relative Humidity: 50,0 % R.H.
Atmospheric Pressure: 99,1 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

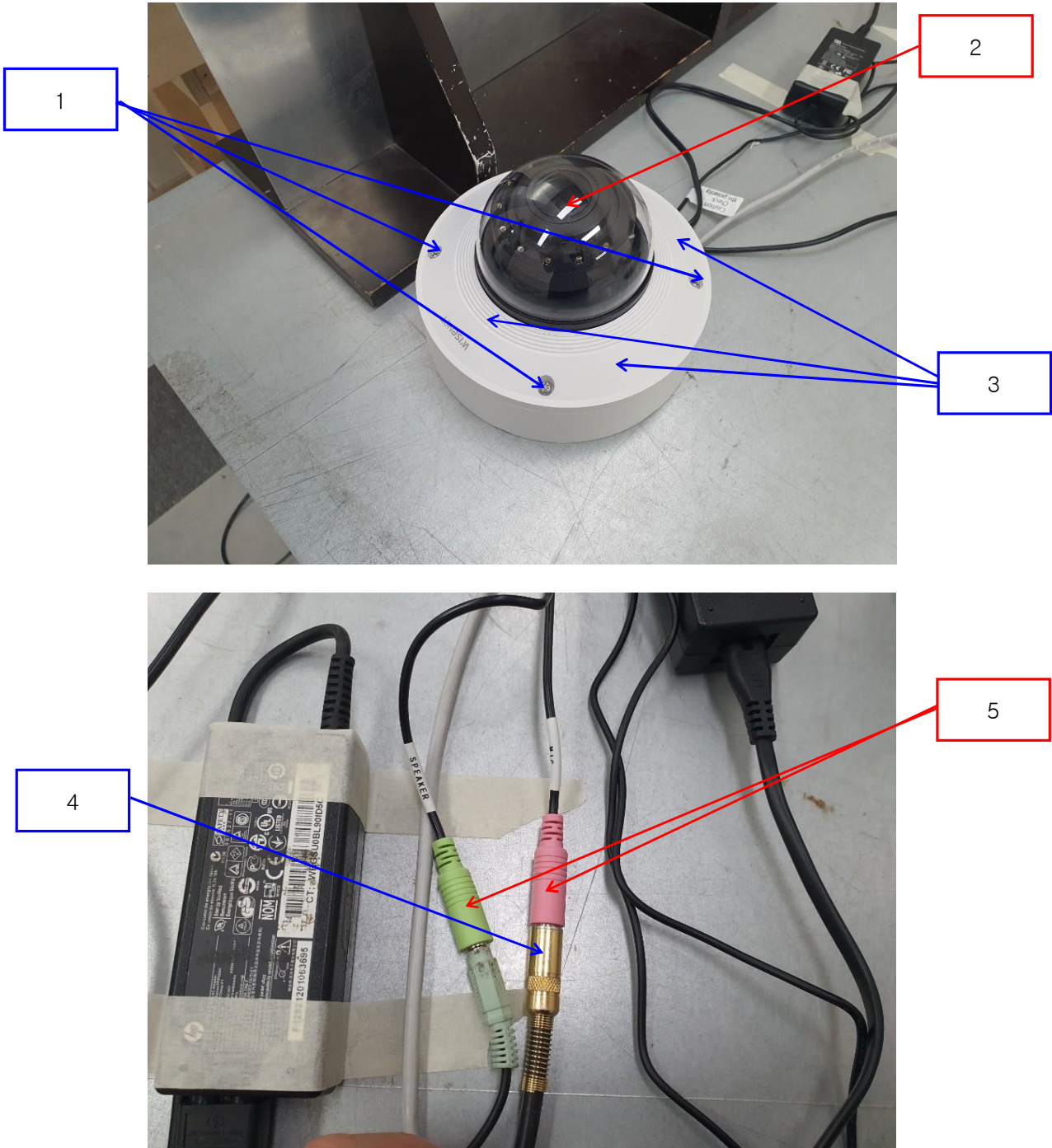
Required Performance Criteria: ☒ Complied

Location of Discharge:

Air
Contact

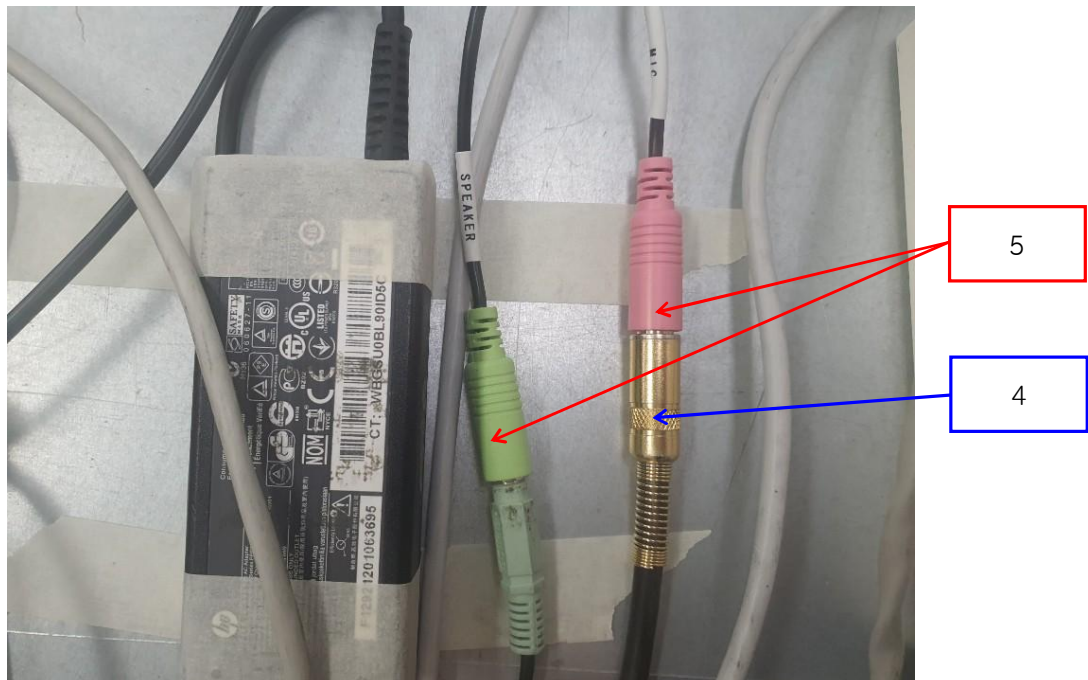
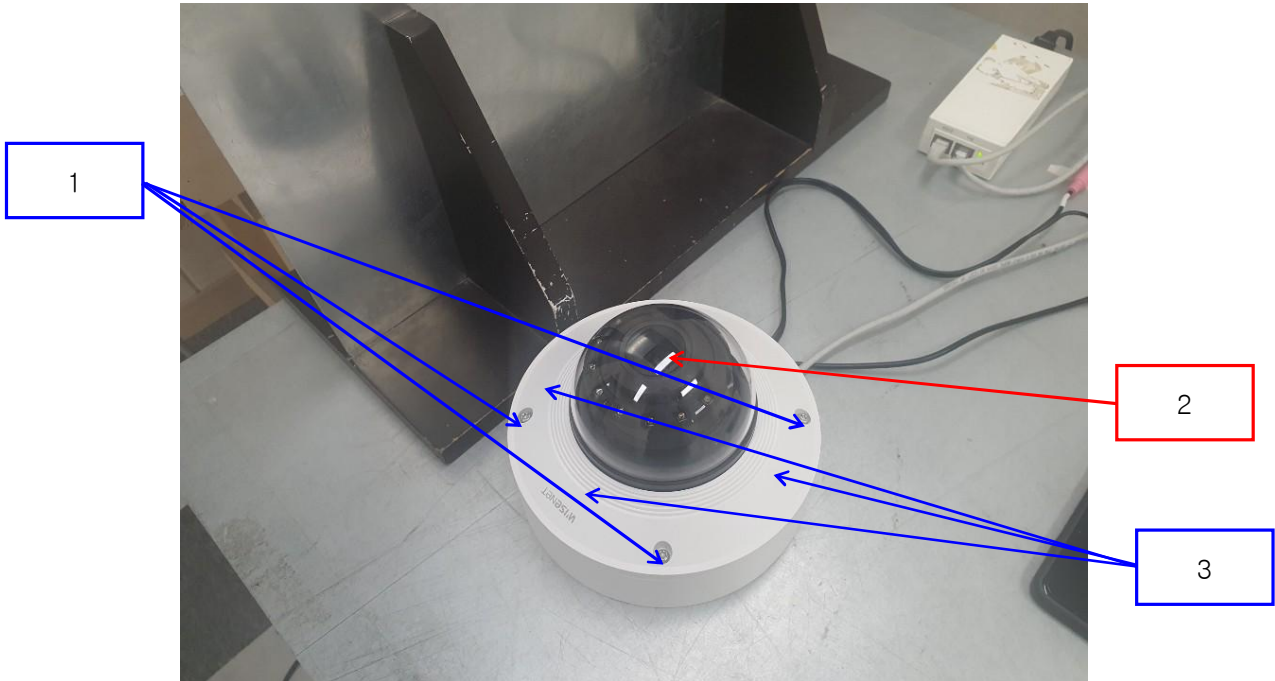


■ DC / AC Mode



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■ PoE Mode



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Test Data**■ DC Mode****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	Screw	Contact Discharge	Complied	-
2	Lens	Air Discharge	Complied	-
3	Enclosure	Contact Discharge	Complied	-
4	Port	Contact Discharge	Complied	-
5	Around port	Air Discharge	Complied	-

■ PoE Mode**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	Screw	Contact Discharge	Complied	-
2	Lens	Air Discharge	Complied	-
3	Enclosure	Contact Discharge	Complied	-
4	Port	Contact Discharge	Complied	-
5	Around port	Air Discharge	Complied	-

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■ AC Mode**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	Screw	Contact Discharge	Complied	-
2	Lens	Air Discharge	Complied	-
3	Enclosure	Contact Discharge	Complied	-
4	Port	Contact Discharge	Complied	-
5	Around port	Air Discharge	Complied	-

Note: "Blank" = Not performed

Observations:

Complied – No degradation of function

Test Results

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

Remarks

PASS Required Performance Criteria



3.2 Radiated Electric Field Immunity

Reference Standard

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

Test Date

May. 08, 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, 06, 2020
☒	HIGH POWER DUAL AMP	SSA532	SUNGSAN	SSA532-001	05, 15, 2020
☒	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: 24,0 °C
Relative Humidity: 49,1 % R.H.
Atmospheric Pressure: 100,1 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

■ DC Mode

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

■ PoE Mode

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

■ AC Mode

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

May. 10, 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: 23,1 °C
Relative Humidity: 49,5 % R.H.
Atmospheric Pressure: 100,0 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

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Test Data**■ DC Mode**

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

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

☐ 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 in	Complied	Complied
Alarm out	Complied	Complied

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■ PoE Mode

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

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

☐ 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 in	Complied	Complied
Alarm out	Complied	Complied

■ AC Mode

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

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

☐ 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 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

May. 11, 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: 22,8 °C
Relative Humidity: 50,6 % R.H.
Atmospheric Pressure: 100,0 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

■ DC Mode

☒ 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	CDN	Complied	Complied
	LINE	Complied	Complied

■ PoE Mode

☐ Line to Line – Differential Mode

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

☐ Line to Earth – Common Mode

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

Signal Lines

☒ Line to Earth – Common Mode

Mode of Application	Coupling Method	Observations	
		(+) Surge (kV)	(-) Surge (kV)
RJ-45	CDN	Complied	Complied
	LINE	Complied	Complied

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■ AC Mode☒ 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	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

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3.5 Conducted Disturbance

Reference Standard

EN 61000-4-6:2014

Test Date

May. 09, 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	11, 25, 2020
☒	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 ST08A	TESEQ	43886	11, 25, 2020
☒	EM CLAMP	KEMZ 801A	TESEQ	44099	11, 26, 2020

Test Conditions

Temperature: 22,9 °C
Relative Humidity: 50,4 % R.H.
Atmospheric Pressure: 100,5 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

Test Data

■ DC Mode

☒ Input a.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Observations
L - N	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	CDN	Complied
Alarm in	CDN	Complied
Alarm out	CDN	Complied

■ PoE Mode

☐ Input a.c. power ports

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

☐ 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	CDN	Complied
Alarm in	CDN	Complied
Alarm out	CDN	Complied

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■ AC Mode☒ Input a.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Observations
L – N	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	CDN	Complied
Alarm in	CDN	Complied
Alarm out	CDN	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

May. 12, 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: 23,2 °C
Relative Humidity: 50,0 % R.H.
Atmospheric Pressure: 99,1 kPa



Test Specifications & Observations/Remarks

■ DC Mode

- 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>

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■ AC Mode**- 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

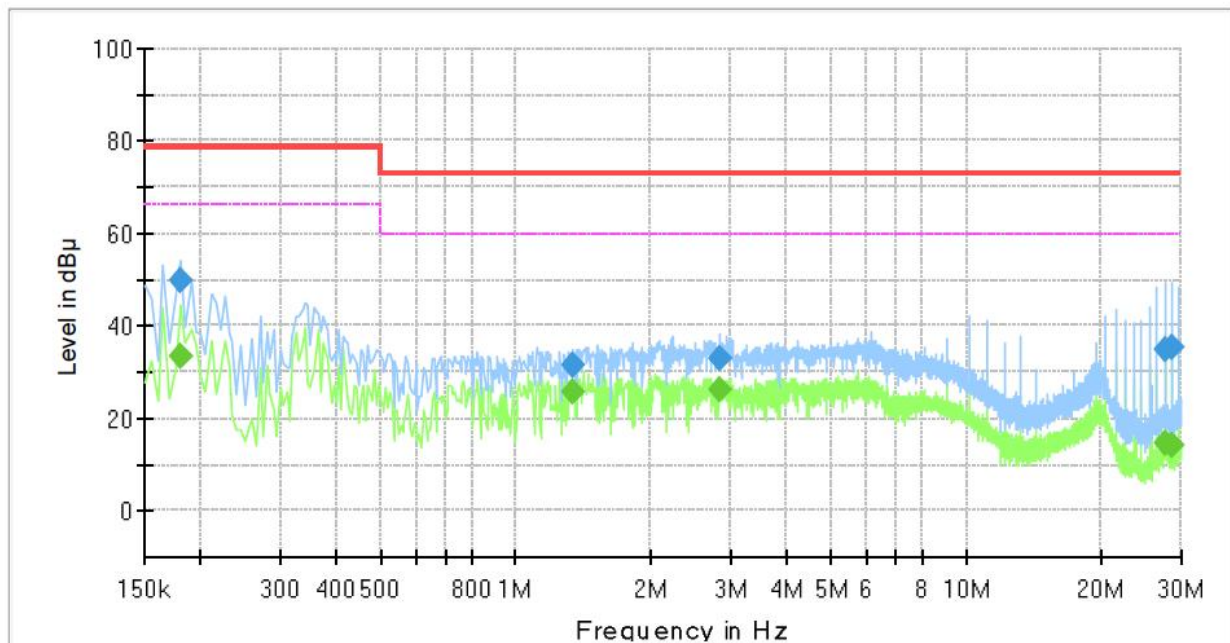
Conducted Emissions at Mains Power Ports

■ DC Mode

[HOT]

Common Information

Test Description:	Conducted Emission
Model No.:	XNV-9082R
Phase:	L1
Mode:	DC
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.180000	---	33.64	66.00	32.36	1000.0	9.000	L1	19.5
0.180000	49.81	---	79.00	29.19	1000.0	9.000	L1	19.5
1.335000	---	25.66	60.00	34.34	1000.0	9.000	L1	19.7
1.335000	31.60	---	73.00	41.40	1000.0	9.000	L1	19.7
2.835000	---	26.16	60.00	33.84	1000.0	9.000	L1	19.7
2.835000	33.00	---	73.00	40.00	1000.0	9.000	L1	19.7
27.620000	---	14.48	60.00	45.52	1000.0	9.000	L1	20.4
27.620000	34.81	---	73.00	38.19	1000.0	9.000	L1	20.4
28.650000	---	14.11	60.00	45.89	1000.0	9.000	L1	20.4
28.650000	35.53	---	73.00	37.47	1000.0	9.000	L1	20.4



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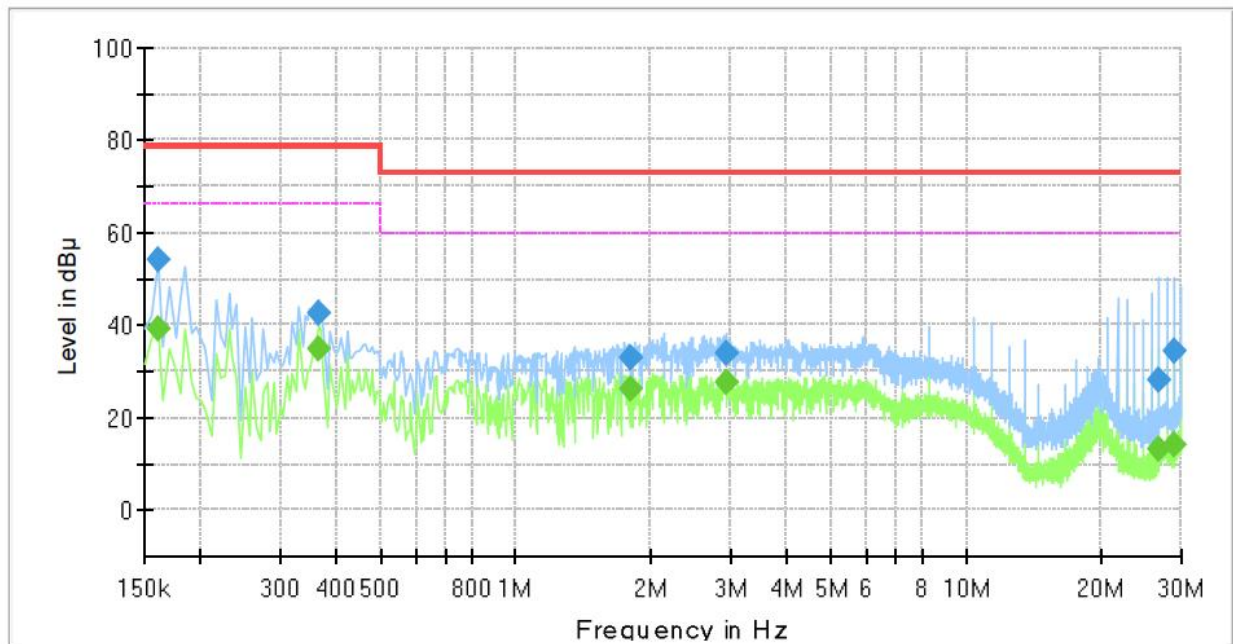
3701, 40, Simin-daero 365beon-gil,
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[NEUTRAL]

Common Information

Test Description:	Conducted Emission
Model No.:	XNV-9082R
Phase:	N
Mode:	DC
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.160000	---	39.34	66.00	26.66	1000.0	9.000	N	19.5
0.160000	54.17	---	79.00	24.83	1000.0	9.000	N	19.5
0.365000	---	35.00	66.00	31.00	1000.0	9.000	N	19.6
0.365000	42.38	---	79.00	36.62	1000.0	9.000	N	19.6
1.805000	---	26.37	60.00	33.63	1000.0	9.000	N	19.7
1.805000	32.71	---	73.00	40.29	1000.0	9.000	N	19.7
2.930000	---	27.58	60.00	32.42	1000.0	9.000	N	19.7
2.930000	33.91	---	73.00	39.09	1000.0	9.000	N	19.7
26.840000	---	13.17	60.00	46.83	1000.0	9.000	N	20.4
26.840000	28.23	---	73.00	44.77	1000.0	9.000	N	20.4
28.910000	---	13.91	60.00	46.09	1000.0	9.000	N	20.5
28.910000	34.57	---	73.00	38.43	1000.0	9.000	N	20.5

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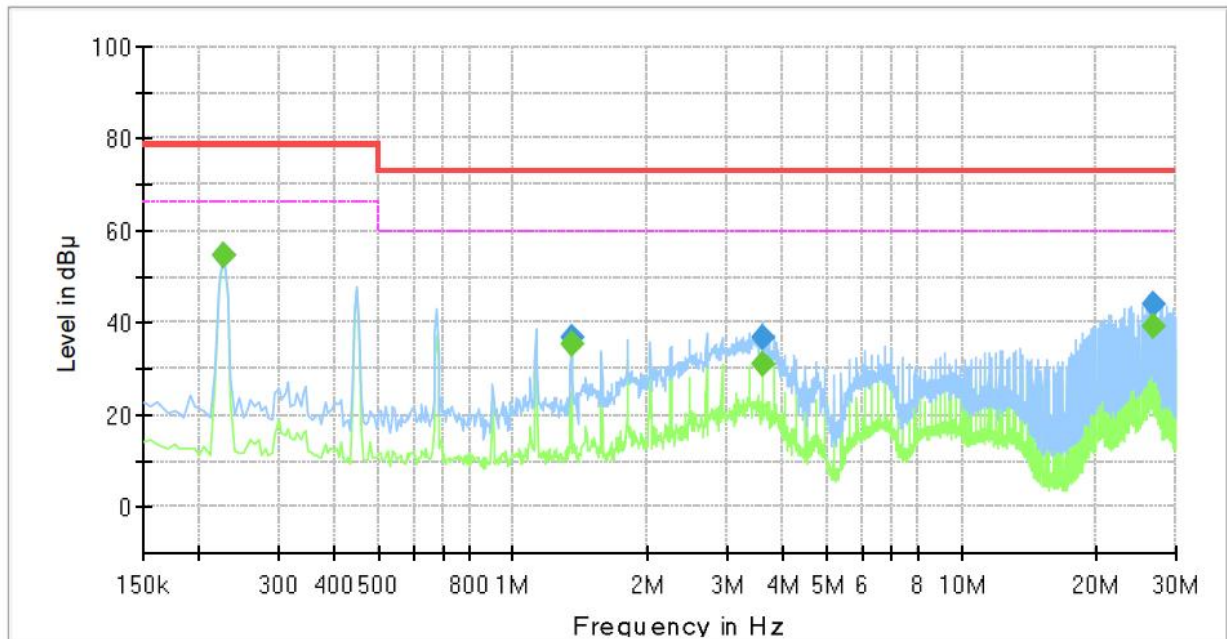
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■ AC Mode

[HOT]

Common Information

Test Description: Conducted Emission
Model No.: XNV-9082R
Phase: L1
Mode: AC
Operator Name: KES



Final Result

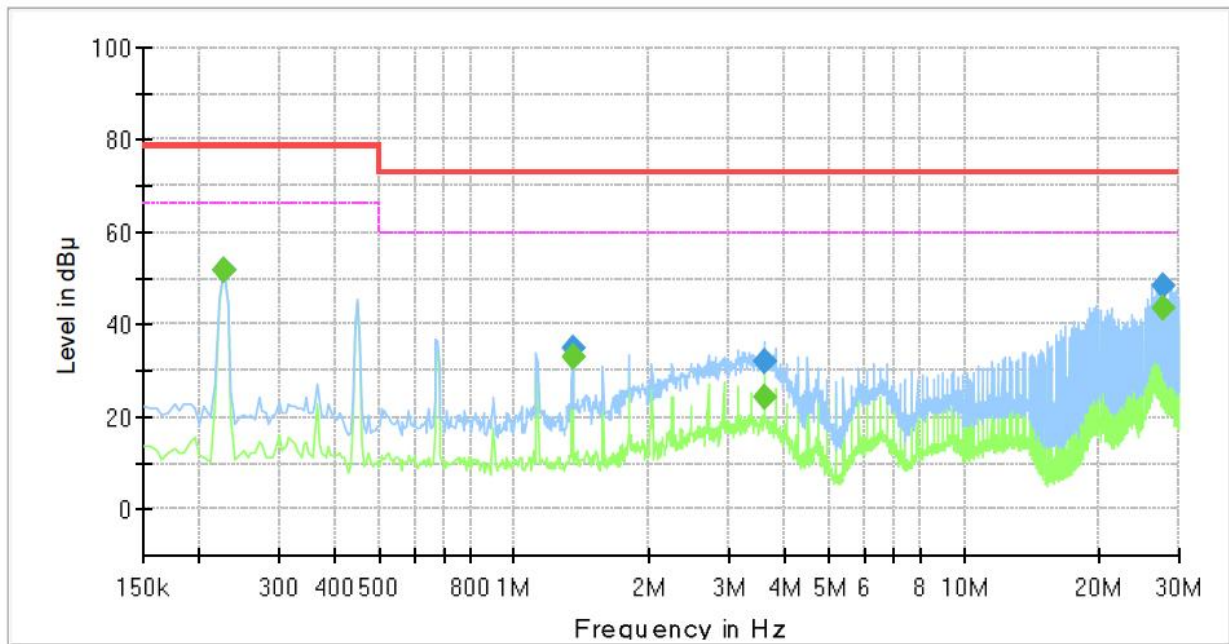
Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.225000	---	54.48	66.00	11.52	1000.0	9.000	L1	19.6
0.225000	54.63	---	79.00	24.37	1000.0	9.000	L1	19.6
1.350000	---	35.13	60.00	24.87	1000.0	9.000	L1	19.7
1.350000	36.78	---	73.00	36.22	1000.0	9.000	L1	19.7
3.595000	---	30.82	60.00	29.18	1000.0	9.000	L1	19.7
3.595000	36.98	---	73.00	36.02	1000.0	9.000	L1	19.7
26.740000	---	39.04	60.00	20.96	1000.0	9.000	L1	20.4
26.740000	44.11	---	73.00	28.89	1000.0	9.000	L1	20.4

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[NEUTRAL]

Common Information

Test Description:	Conducted Emission
Model No.:	XNV-9082R
Phase:	N
Mode:	AC
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	---	51.64	66.00	14.36	1000.0	9.000	N	19.5
0.225000	51.78	---	79.00	27.22	1000.0	9.000	N	19.5
1.350000	---	33.13	60.00	26.87	1000.0	9.000	N	19.7
1.350000	34.76	---	73.00	38.24	1000.0	9.000	N	19.7
3.600000	---	24.18	60.00	35.82	1000.0	9.000	N	19.7
3.600000	31.87	---	73.00	41.13	1000.0	9.000	N	19.7
27.640000	---	43.79	60.00	16.21	1000.0	9.000	N	20.5
27.640000	48.34	---	73.00	24.66	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))



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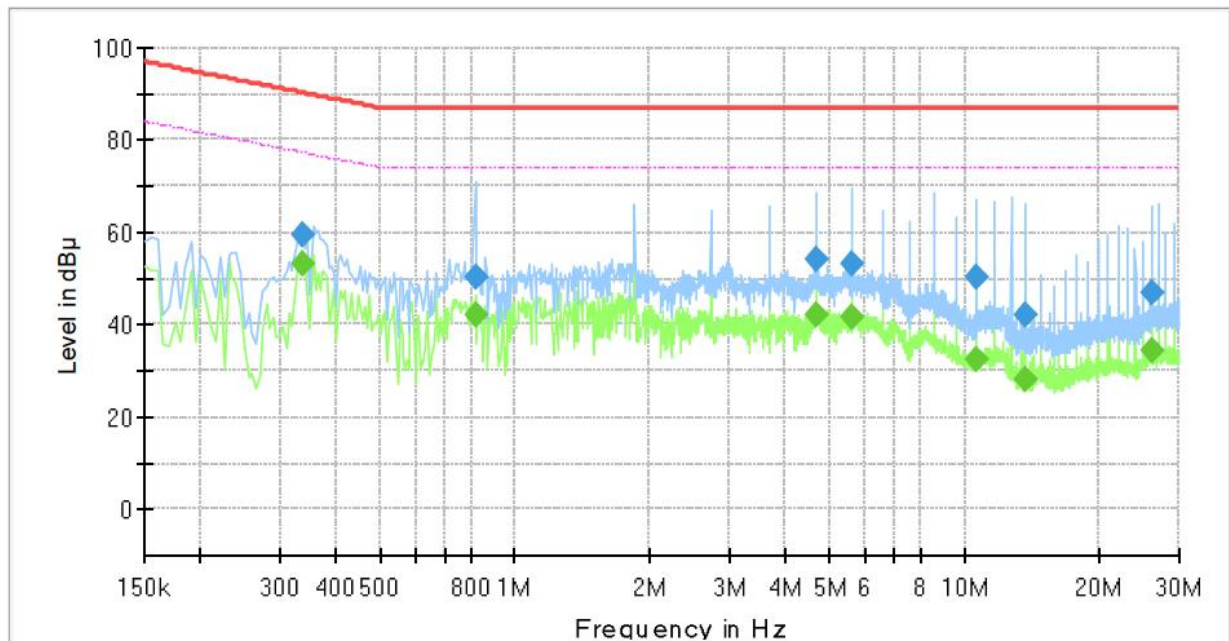
Conducted Emissions at Telecommunication Ports

■ DC Mode

[1 000 Mbps]

Common Information

Test Description: Telecommunication Emission
Model No.: XNV-9082R
Mode : DC
Speed : 1000 Mbps
Operator Name: KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.335000	59.29	---	90.33	31.04	1000.0	9.000	Single Line	19.7
0.335000	---	53.16	77.33	24.17	1000.0	9.000	Single Line	19.7
0.815000	50.42	---	87.00	36.58	1000.0	9.000	Single Line	19.6
0.815000	---	42.26	74.00	31.74	1000.0	9.000	Single Line	19.6
4.665000	54.16	---	87.00	32.84	1000.0	9.000	Single Line	19.5
4.665000	---	41.91	74.00	32.09	1000.0	9.000	Single Line	19.5
5.640000	53.26	---	87.00	33.74	1000.0	9.000	Single Line	19.6
5.640000	---	41.67	74.00	32.33	1000.0	9.000	Single Line	19.6
10.625000	50.26	---	87.00	36.74	1000.0	9.000	Single Line	19.8
10.625000	---	32.56	74.00	41.44	1000.0	9.000	Single Line	19.8
13.735000	---	28.15	74.00	45.85	1000.0	9.000	Single Line	19.9
13.735000	42.09	---	87.00	44.91	1000.0	9.000	Single Line	19.9
26.090000	---	34.20	74.00	39.80	1000.0	9.000	Single Line	20.0
26.090000	46.96	---	87.00	40.04	1000.0	9.000	Single Line	20.0

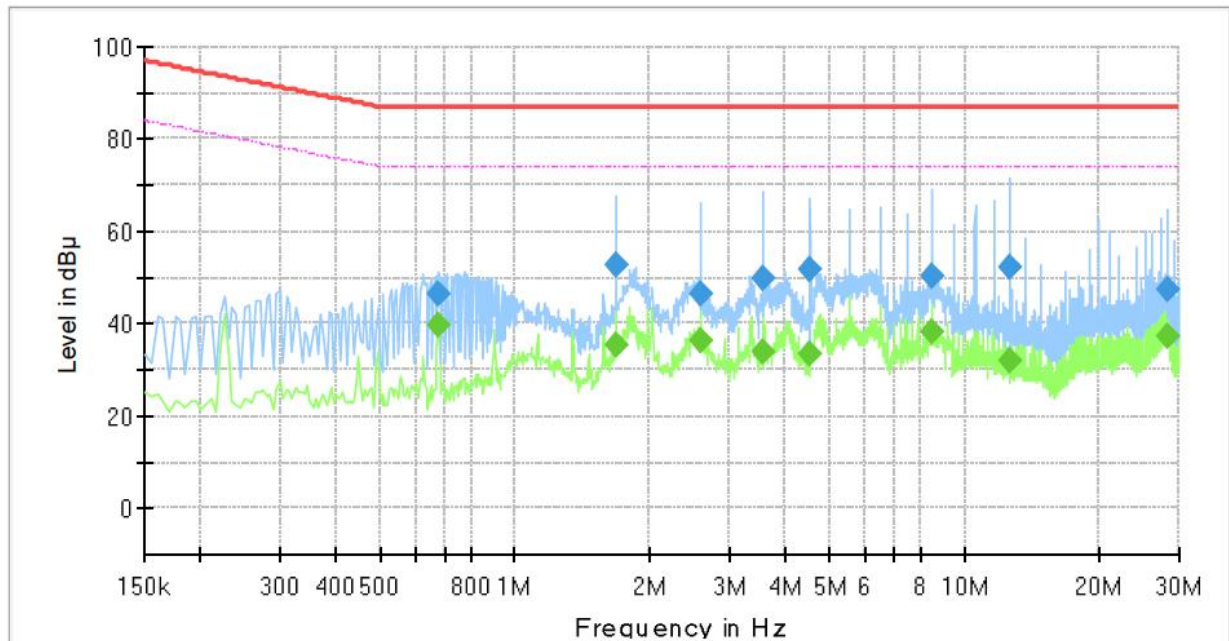
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■ PoE Mode

[1 000 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	XNV-9082R
Mode :	PoE
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)
0.675000	46.66	---	87.00	40.34	1000.0	9.000	Single Line	19.6
0.675000	---	39.91	74.00	34.09	1000.0	9.000	Single Line	19.6
1.680000	---	35.34	74.00	38.66	1000.0	9.000	Single Line	19.5
1.680000	52.85	---	87.00	34.15	1000.0	9.000	Single Line	19.5
2.580000	46.56	---	87.00	40.44	1000.0	9.000	Single Line	19.4
2.580000	---	36.13	74.00	37.87	1000.0	9.000	Single Line	19.4
3.565000	---	34.02	74.00	39.98	1000.0	9.000	Single Line	19.4
3.565000	49.79	---	87.00	37.21	1000.0	9.000	Single Line	19.4
4.545000	51.54	---	87.00	35.46	1000.0	9.000	Single Line	19.5
4.545000	---	33.55	74.00	40.45	1000.0	9.000	Single Line	19.5
8.485000	50.31	---	87.00	36.69	1000.0	9.000	Single Line	19.7
8.485000	---	38.40	74.00	35.60	1000.0	9.000	Single Line	19.7
12.680000	---	31.79	74.00	42.21	1000.0	9.000	Single Line	19.9
12.680000	52.31	---	87.00	34.69	1000.0	9.000	Single Line	19.9
28.340000	---	37.44	74.00	36.56	1000.0	9.000	Single Line	20.0
28.340000	47.40	---	87.00	39.60	1000.0	9.000	Single Line	20.0

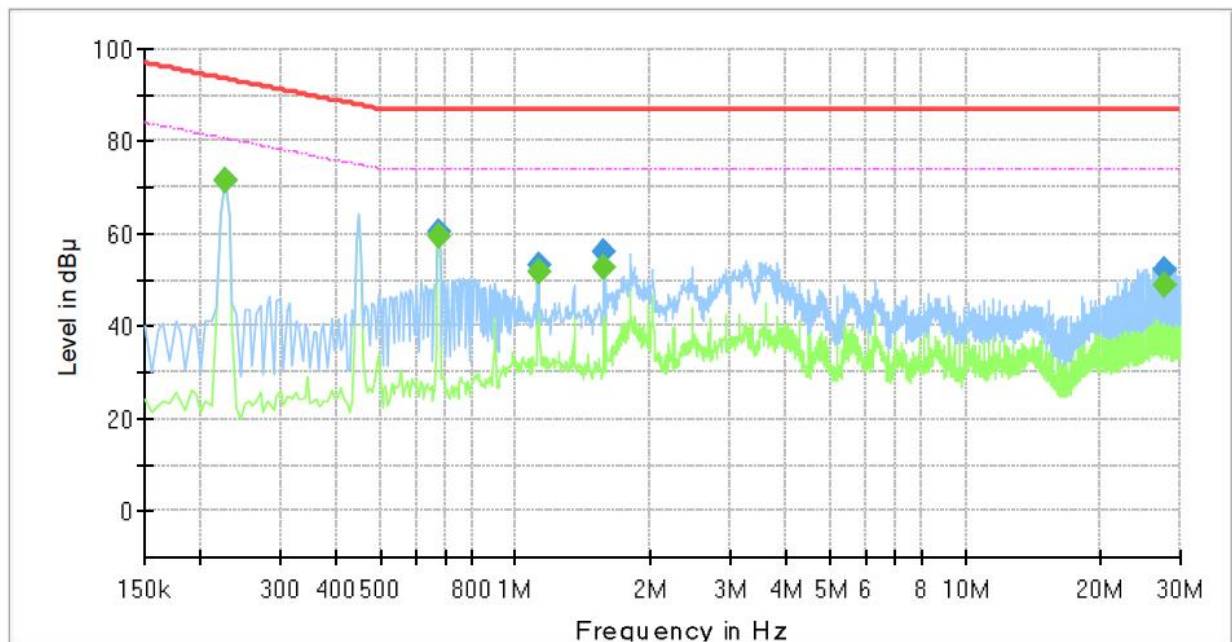
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■ AC Mode

[1 000 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	XNV-9082R
Mode :	AC
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)
0.225000	71.47	---	93.63	22.16	1000.0	9.000	Single Line	19.8
0.225000	---	71.32	80.63	9.31	1000.0	9.000	Single Line	19.8
0.675000	---	59.68	74.00	14.32	1000.0	9.000	Single Line	19.6
0.675000	60.42	---	87.00	26.58	1000.0	9.000	Single Line	19.6
1.125000	---	51.63	74.00	22.37	1000.0	9.000	Single Line	19.5
1.125000	53.44	---	87.00	33.56	1000.0	9.000	Single Line	19.5
1.575000	55.96	---	87.00	31.04	1000.0	9.000	Single Line	19.5
1.575000	---	52.49	74.00	21.51	1000.0	9.000	Single Line	19.5
27.650000	---	48.76	74.00	25.24	1000.0	9.000	Single Line	20.0
27.650000	52.03	---	87.00	34.97	1000.0	9.000	Single Line	20.0

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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



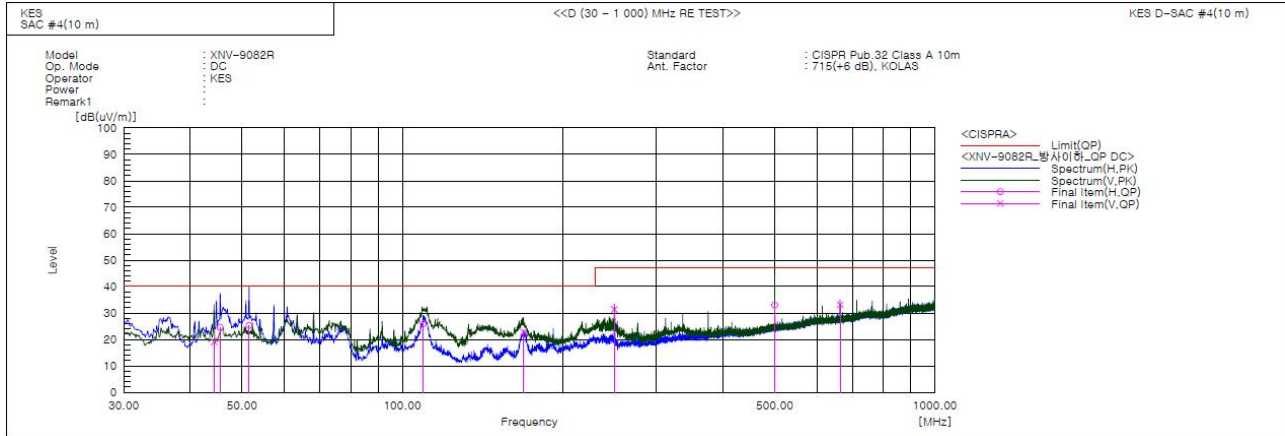
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Radiated Electric Field Emissions(Below 1 GHz)

■ DC Mode



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	44.308	V	41.1	-22.0	19.1	40.0	20.9	100.0	220.0	
2	45.520	H	46.4	-21.8	24.6	40.0	15.4	400.0	217.0	
3	51.583	H	46.7	-21.4	25.3	40.0	14.7	397.0	189.0	
4	109.419	H	48.5	-22.6	25.9	40.0	14.1	388.0	340.0	
5	168.831	V	47.3	-24.4	22.9	40.0	17.1	109.0	304.0	
6	249.948	V	51.3	-19.9	31.4	47.0	15.6	112.0	209.0	
7	499.965	H	45.6	-12.5	33.1	47.0	13.9	341.0	202.0	
8	663.531	V	42.1	-8.9	33.2	47.0	13.8	148.0	189.0	

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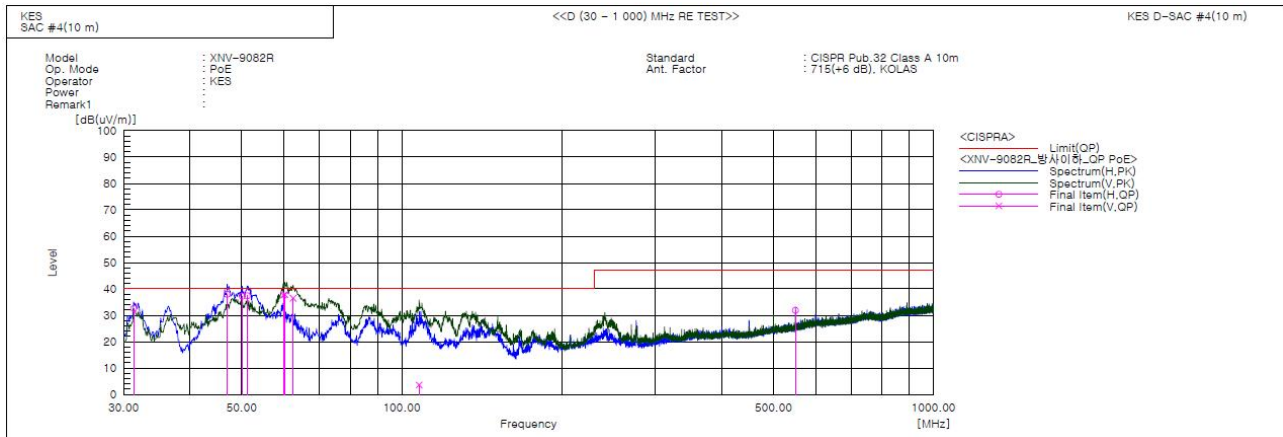


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PoE Mode



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	31.334	H	57.7	-25.1	32.6	40.0	7.4	379.0	356.0	
2	46.975	H	59.6	-21.6	38.0	40.0	2.0	400.0	173.0	
3	50.128	H	58.7	-21.4	37.3	40.0	2.7	398.0	357.0	
4	51.219	H	58.8	-21.4	37.4	40.0	2.6	397.0	309.0	
5	59.949	V	60.1	-22.4	37.7	40.0	2.3	102.0	177.0	
6	60.313	V	60.4	-22.5	37.9	40.0	2.1	100.0	177.0	
7	62.495	V	59.5	-23.0	36.5	40.0	3.5	105.0	229.0	
8	107.843	V	26.1	-22.5	3.6	40.0	36.4	111.0	317.0	
9	550.041	H	43.5	-11.6	31.9	47.0	15.1	349.0	101.0	

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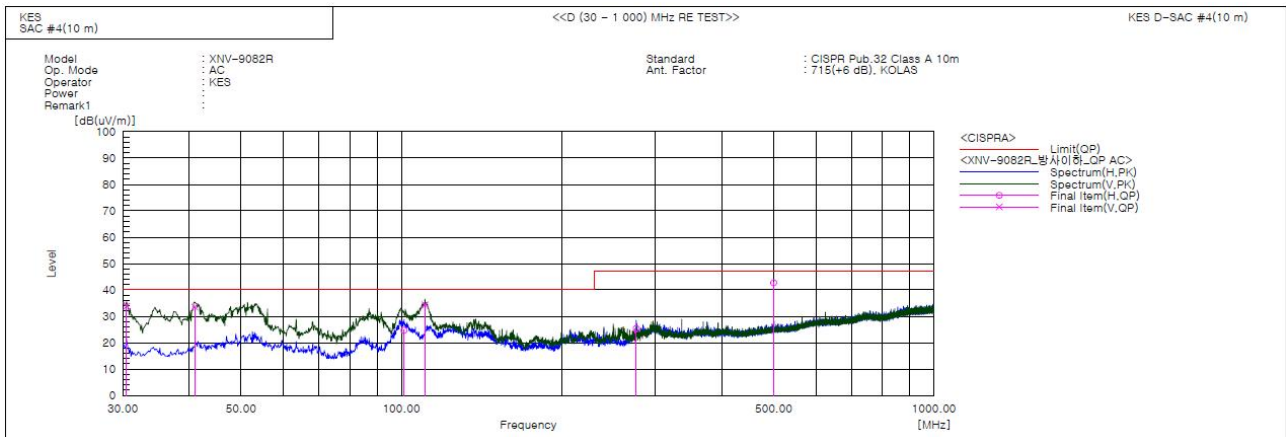


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■ AC Mode



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	30.485	V	59.1	-25.2	33.9	40.0	6.1	122.0	129.0	
2	40.913	V	56.3	-22.7	33.6	40.0	6.4	111.0	255.0	
3	101.174	H	47.3	-22.6	24.7	40.0	15.3	397.0	52.0	
4	110.753	V	57.3	-22.9	34.4	40.0	5.6	100.0	103.0	
5	276.016	H	45.0	-19.6	25.4	47.0	21.6	276.0	16.0	
6	499.965	H	55.6	-12.9	42.7	47.0	4.3	241.0	323.0	

◆ 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



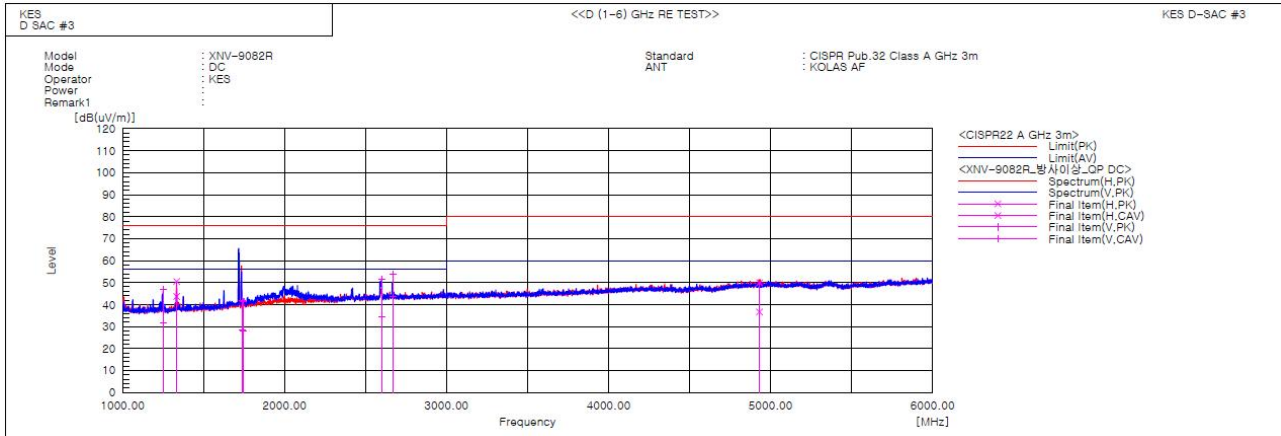
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Radiated Electric Field Emissions(Above 1 GHz)

■ DC Mode



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	1249.630	V	56.1	41.1	-9.3	46.8	31.8	76.0	56.0	29.2	24.2	100.0	174.7	
2	1332.930	H	59.3	52.5	-8.8	50.5	43.7	76.0	56.0	25.5	12.3	100.0	141.9	
3	1739.306	V	47.4	34.2	-5.7	41.7	28.5	76.0	56.0	34.3	27.5	100.0	359.6	
4	1745.048	V	47.1	33.7	-5.6	41.5	28.1	76.0	56.0	34.5	27.9	100.0	78.9	
5	2598.899	V	52.5	35.7	-1.0	51.5	34.7	76.0	56.0	24.5	21.3	100.0	281.4	
6	2666.140	V	54.4	44.3	-0.8	53.6	43.5	76.0	56.0	22.4	12.5	100.0	53.6	
7	4931.149	H	43.2	29.9	6.8	50.0	36.7	80.0	60.0	30.0	23.3	100.0	240.1	

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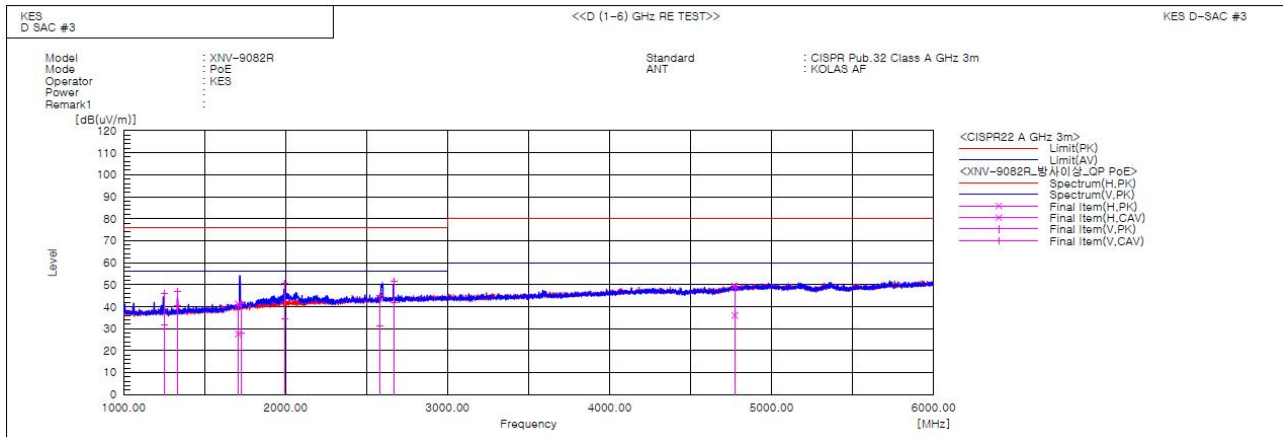


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KES-EM-20T0315
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PoE Mode



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	1249.410	V	55.4	40.8	-9.3	46.1	31.5	76.0	56.0	29.9	24.5	100.0	199.1	
2	1332.860	V	55.7	49.2	-8.8	46.9	40.4	76.0	56.0	29.1	15.6	100.0	351.9	
3	1707.252	H	47.2	33.5	-6.0	41.2	27.5	76.0	56.0	34.8	28.5	100.0	130.1	
4	1728.078	V	47.2	33.7	-5.8	41.4	27.9	76.0	56.0	34.6	28.1	100.0	216.4	
5	1992.130	V	53.9	38.1	-3.5	50.4	34.6	76.0	56.0	25.6	21.4	100.0	0.5	
6	2582.663	V	45.8	32.1	-1.0	44.8	31.1	76.0	56.0	31.2	24.9	100.0	295.1	
7	2666.160	V	52.4	42.7	-0.8	51.6	41.9	76.0	56.0	24.4	14.1	100.0	329.6	
8	4772.212	H	43.4	30.0	6.0	49.4	36.0	80.0	60.0	30.6	24.0	100.0	46.6	

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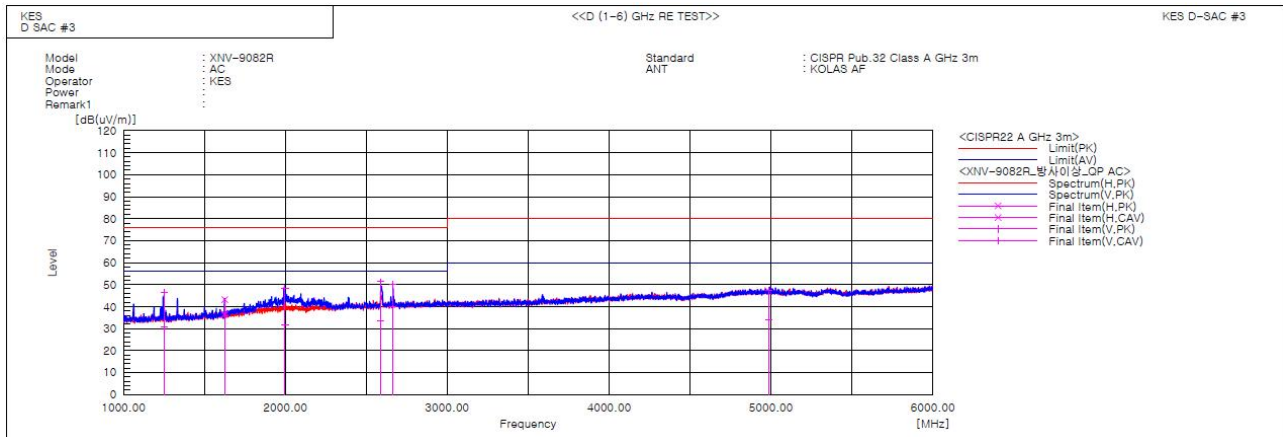


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AC Mode



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	1249.960	V	54.4	38.7	-8.1	46.3	30.6	76.0	56.0	29.7	25.4	100.0	203.3	
2	1624.720	H	48.7	41.9	-5.5	43.2	36.4	76.0	56.0	32.8	19.6	100.0	333.2	
3	1998.109	V	50.3	33.7	-2.0	48.3	31.7	76.0	56.0	27.7	24.3	100.0	346.6	
4	2588.781	V	50.9	33.3	0.4	51.3	33.7	76.0	56.0	24.7	22.3	100.0	306.3	
5	2665.920	V	49.5	39.6	0.6	50.1	40.2	76.0	56.0	25.9	15.8	100.0	356.5	
6	4986.571	V	38.9	25.4	8.5	47.4	33.9	80.0	60.0	32.6	26.1	100.0	248.6	

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

■ DC Mode

Average harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	0.046			
2	0.003			
3	0.039			
4	0.004			
5	0.039			
6	0.004			
7	0.039			
8	0.003			
9	0.036			
10	0.003			
11	0.034			
12	0.003			
13	0.032			
14	0.003			
15	0.030			
16	0.003			
17	0.028			
18	0.003			
19	0.025			
20	0.003			
21	0.023			
22	0.003			
23	0.020			
24	0.003			
25	0.018			
26	0.003			
27	0.016			
28	0.003			
29	0.013			
30	0.003			
31	0.011			
32	0.003			
33	0.010			
34	0.003			
35	0.008			
36	0.003			
37	0.007			
38	0.003			
39	0.006			
40	0.002			

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	0.046			
2	0.003			
3	0.041			
4	0.004			
5	0.039			
6	0.004			
7	0.039			
8	0.004			
9	0.036			
10	0.004			
11	0.035			
12	0.004			
13	0.033			
14	0.004			
15	0.030			
16	0.004			
17	0.028			
18	0.003			
19	0.025			
20	0.003			
21	0.023			
22	0.003			
23	0.020			
24	0.003			
25	0.018			
26	0.003			
27	0.016			
28	0.003			
29	0.013			
30	0.003			
31	0.012			
32	0.003			
33	0.010			
34	0.003			
35	0.008			
36	0.003			
37	0.007			
38	0.003			
39	0.006			
40	0.003			

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.



■ AC Mode

Average harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	0.182			
2	0.004			
3	0.061			
4	0.004			
5	0.043			
6	0.002			
7	0.019			
8	0.001			
9	0.014			
10	0.001			
11	0.005			
12	0.001			
13	0.003			
14	0.001			
15	0.003			
16	0.001			
17	0.003			
18	0.001			
19	0.002			
20	0.001			
21	0.001			
22	0.001			
23	0.001			
24	0.001			
25	0.001			
26	0.001			
27	0.001			
28	0.001			
29	0.001			
30	0.001			
31	0.001			
32	0.001			
33	0.001			
34	0.001			
35	0.001			
36	0.001			
37	0.001			
38	0.001			
39	0.001			
40	0.001			

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	0.182			
2	0.004			
3	0.062			
4	0.004			
5	0.043			
6	0.003			
7	0.020			
8	0.002			
9	0.014			
10	0.001			
11	0.006			
12	0.001			
13	0.003			
14	0.001			
15	0.003			
16	0.001			
17	0.003			
18	0.001			
19	0.002			
20	0.001			
21	0.001			
22	0.001			
23	0.001			
24	0.001			
25	0.002			
26	0.001			
27	0.001			
28	0.001			
29	0.001			
30	0.001			
31	0.001			
32	0.001			
33	0.001			
34	0.001			
35	0.001			
36	0.001			
37	0.001			
38	0.001			
39	0.001			
40	0.001			

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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Test Data - Voltage Fluctuations**Maximum Flicker results****■ DC Mode**

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

■ AC Mode

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

■ DC / AC Mode



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Conducted Emissions at Telecommunication Ports

■ DC / AC Mode



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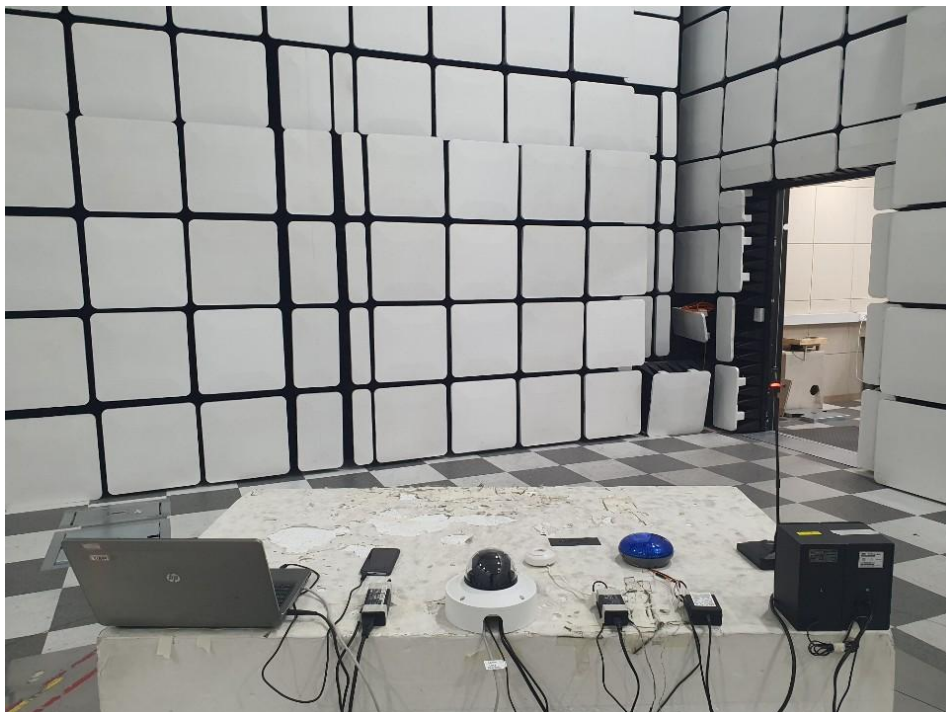
■ PoE Mode



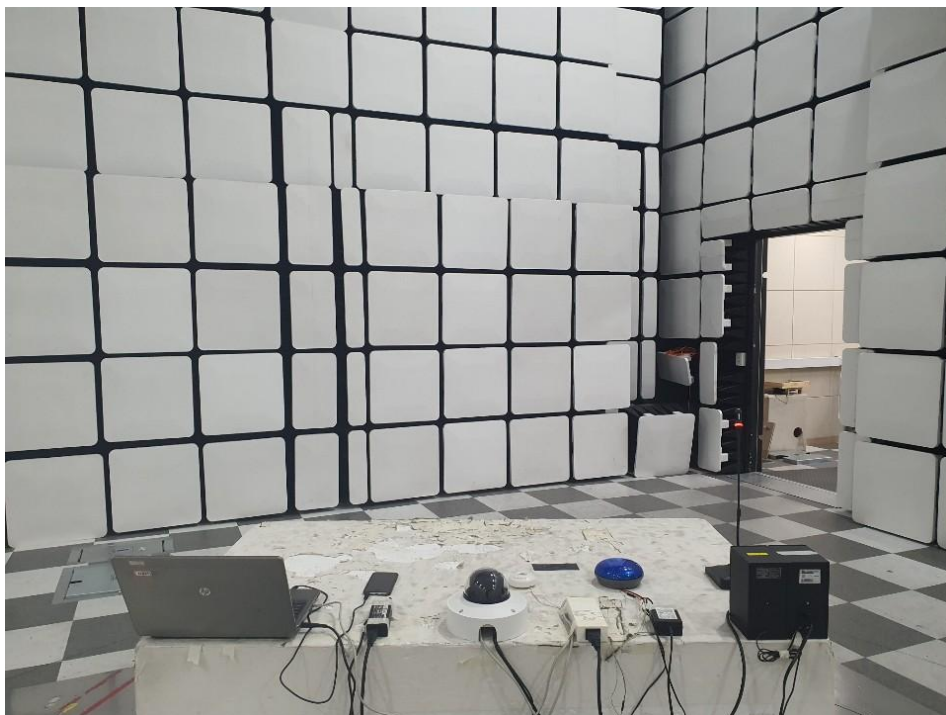
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Radiated Electric Field Emissions(Below 1 GHz)

■ DC / AC Mode

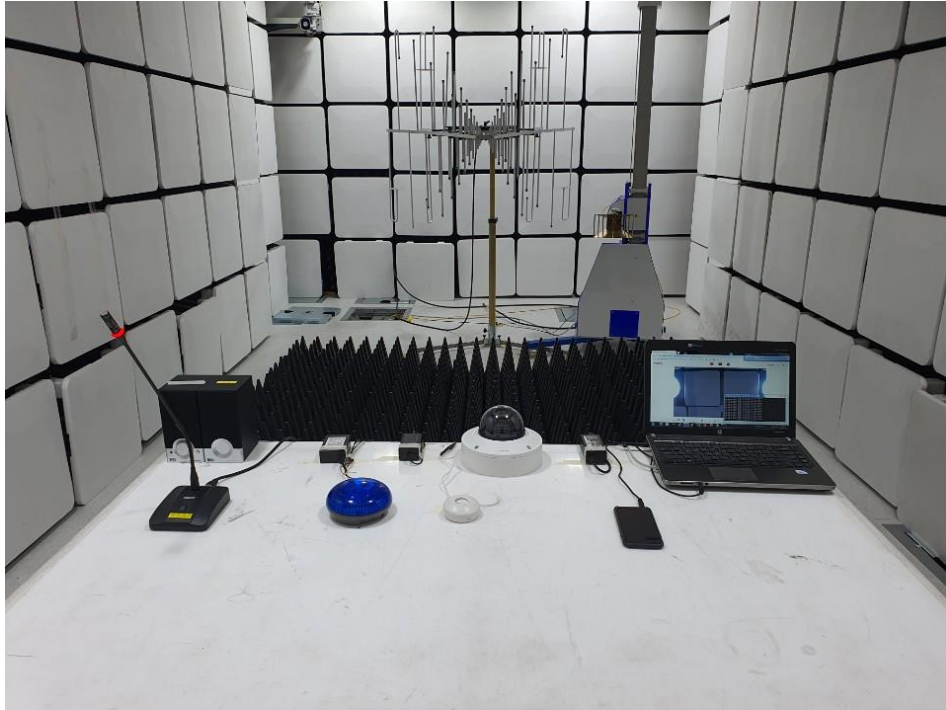


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■ PoE Mode

Radiated Electric Field Emissions(Above 1 GHz)

■ DC / AC Mode



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■ PoE Mode

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Harmonic Current Emissions and Voltage Fluctuations and Flicker

■ DC Mode



■ AC Mode



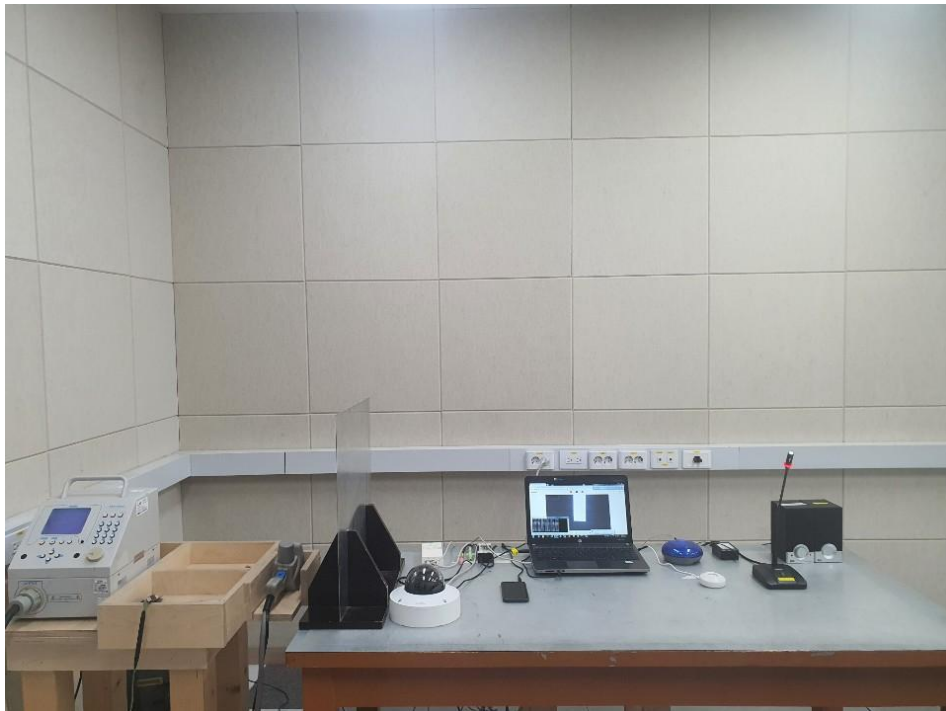
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Electrostatic Discharge

■ DC / AC Mode



■ PoE Mode



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Radiated Electric Field Immunity

■ DC / AC Mode



■ PoE Mode



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Electrical Fast Transients/Bursts

■ DC / AC Mode



■ PoE Mode



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Surge Transients

■ DC / AC Mode



■ PoE Mode



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Conducted Disturbance

■ DC / AC Mode



■ PoE Mode



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Voltage Dips and Short Interruptions

■ DC / AC Mode



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EUT External Photographs

(Top)



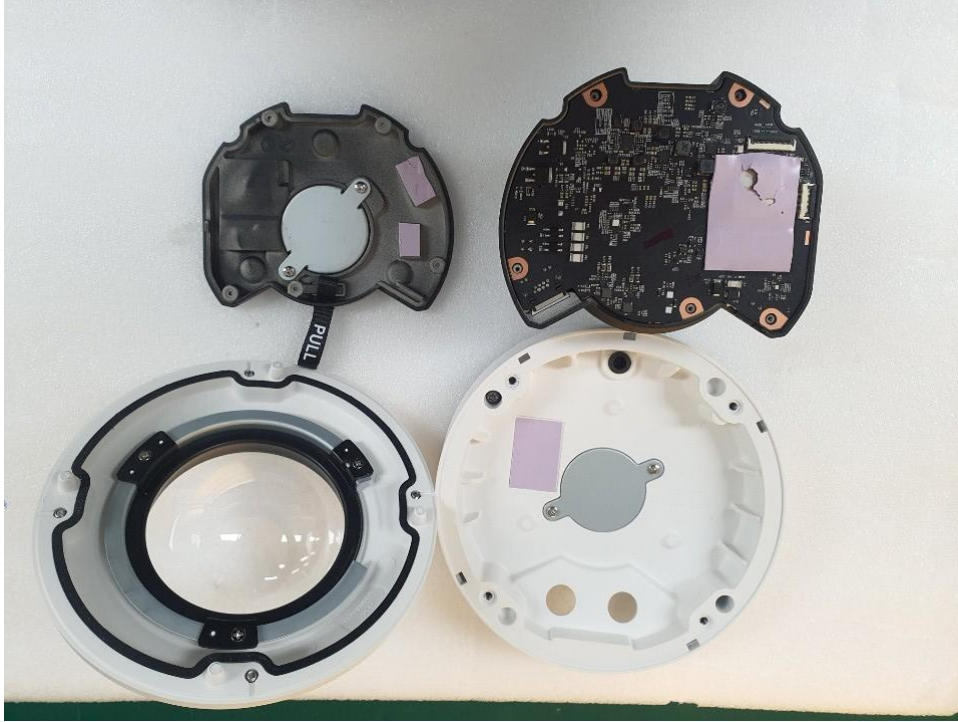
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EUT Internal Photographs

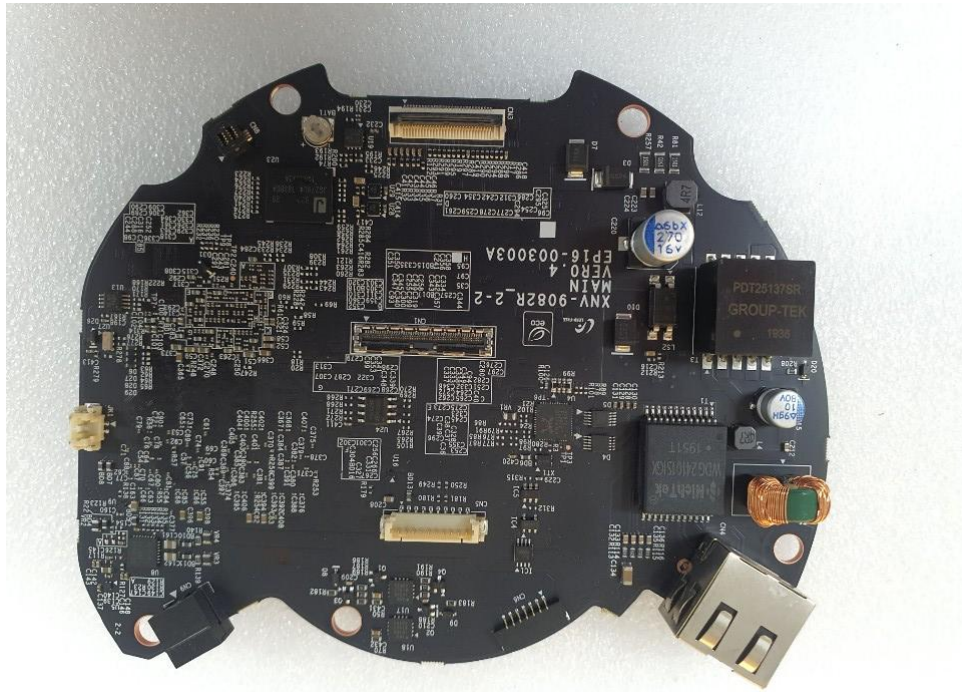
(Internal View)



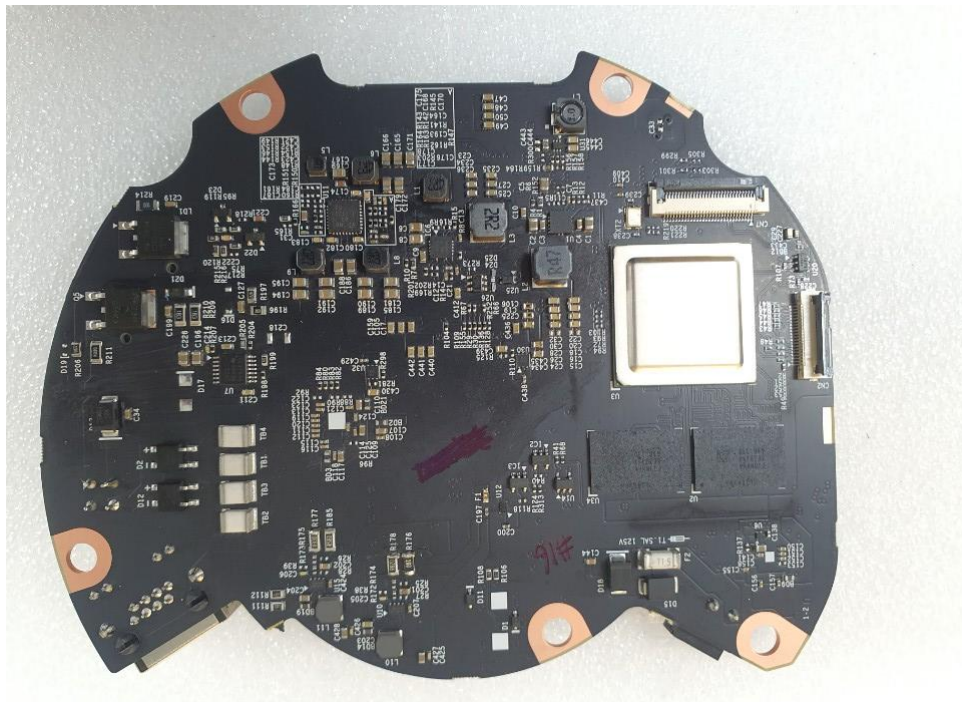
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EUT Internal View – Main Board

(Top)



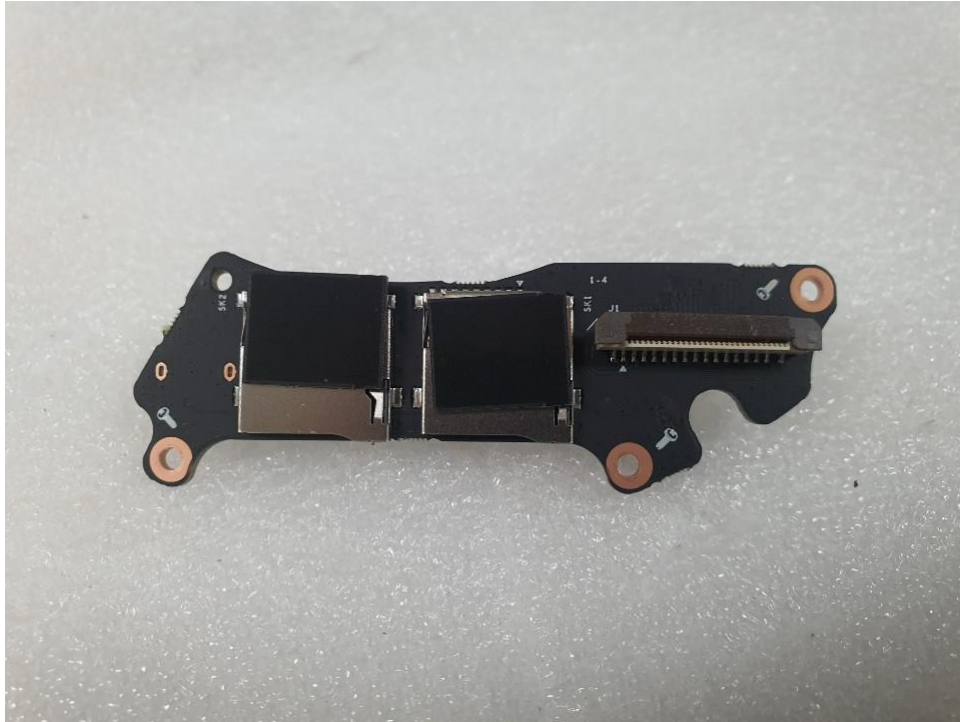
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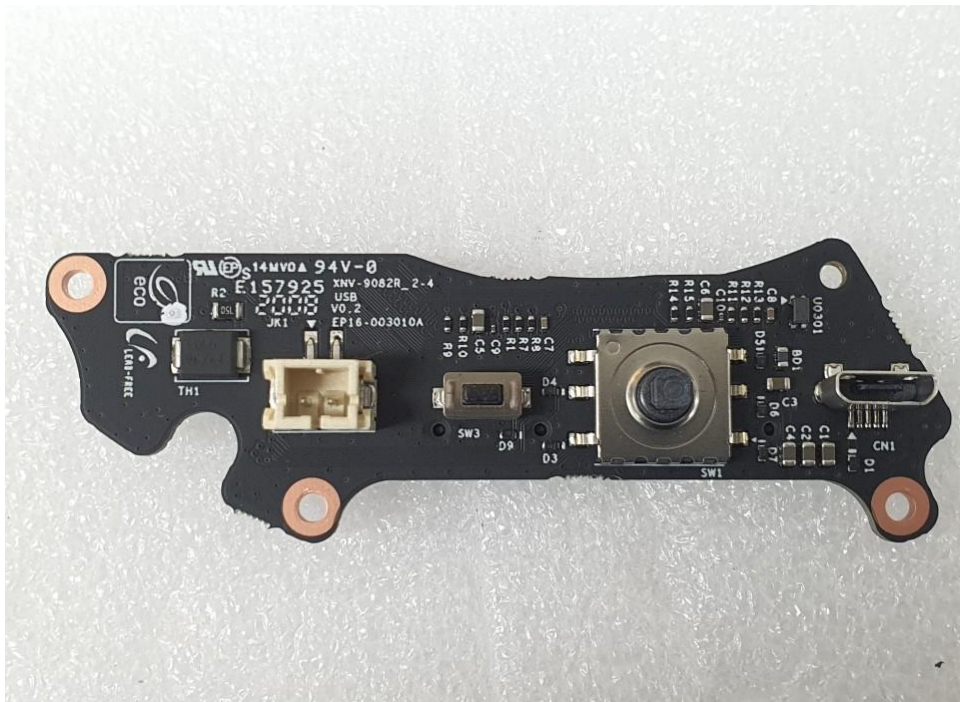
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EUT Internal View – SUB Board 1

(Top)



(Bottom)



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EUT Internal View – SUB Board 2

(Top)



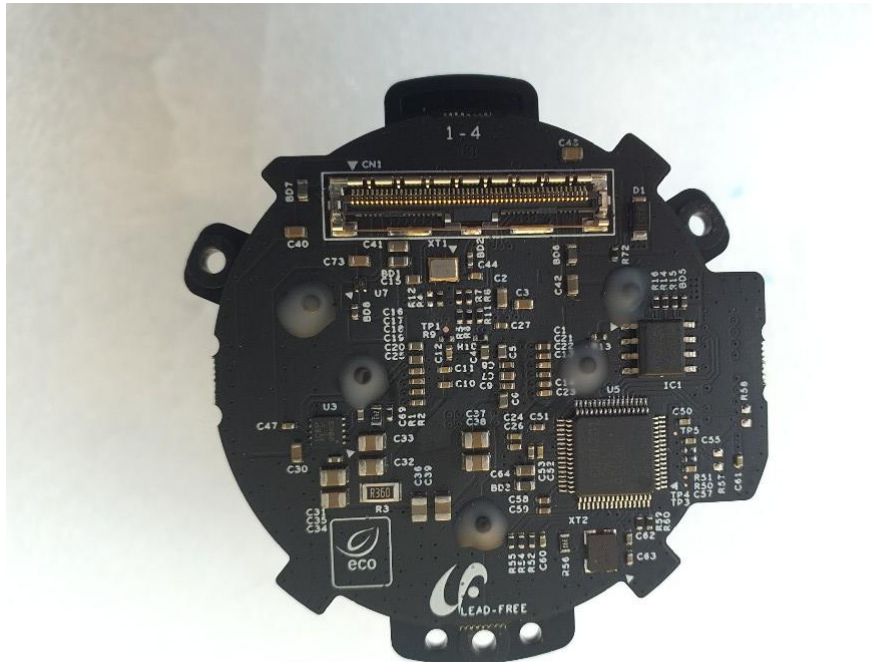
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EUT Internal View – SUB Board 3

(Top)

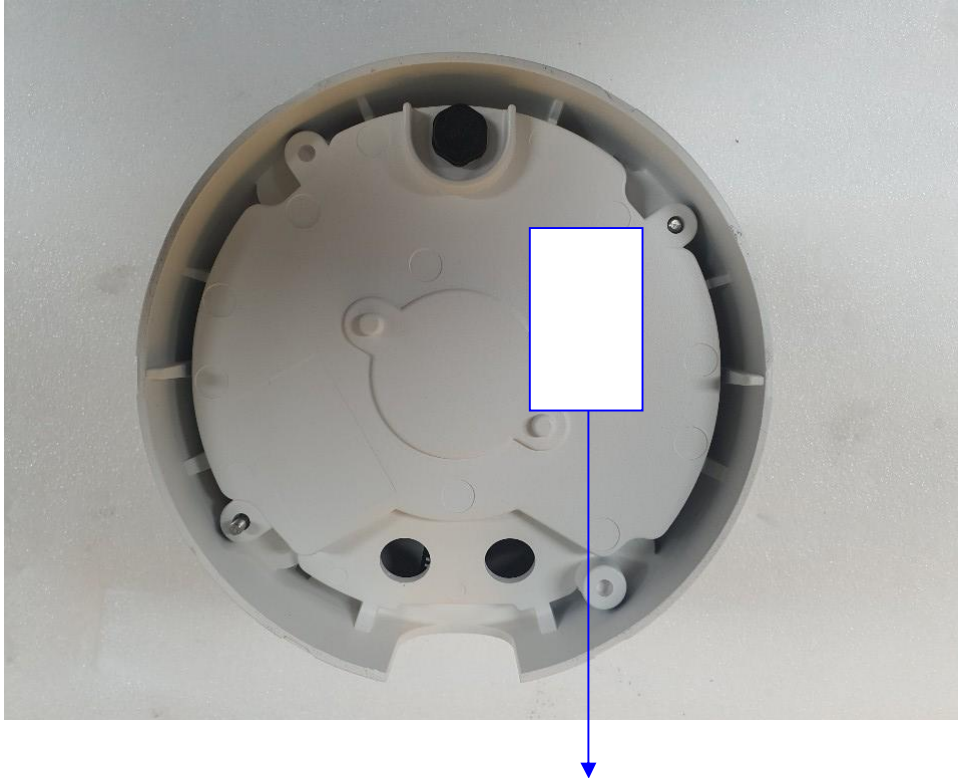


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