

TEST REPORT



Report No. : KES-EM-23T0740-R1
Page 1 / 73

KES Co., Ltd.
3701, 40, Simin-daero 365beon-gil, Dongan-gu, Anyang-si,
Gyeonggi-do, 14057, Korea
Tel : +82-31-425-6200, Fax : +82-31-425-6200

1. Client

Applicant : Hanwha Vision Co., Ltd

Applicant Address : 6, Pangyo-ro 319Beon-gil, Bundang-gu, Seongnam-si, Gyeonggi-do,
Republic of Korea

2. Sample Description

Product name : NETWORK CAMERA

Model/Type No. : PNO-A9311R

Variant Model : PNO-A9311RLP

Manufacturer : 1. HANWHA VISION VIETNAM COMPANY LIMITED
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, Vietna
2. 173-25, Saneop-ro, Gwonseon-gu, Suwon-si, Gyeonggi-do, Korea
(Suwon Industrial Complex)

3. Date of Receipt : Dec. 28, 2023

4. Test date : Aug. 14, 2023 ~ Aug. 16, 2023

5. Date of Issue : Dec. 29, 2023

6. Test Results : In Compliance

Tested by

Jae Won, Lee
EMC Test Engineer

Reviewed by

Dae Jung, Choi
EMC Technical Manager

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

REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Aug. 24, 2023	KES-EM-23T0740	Issued
Dec. 29, 2023	KES-EM-23T0740-R1	Reissuance due to the addition of a derivative

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd. This document may be altered or revised by KES Co., Ltd. personnel only, and shall be noted in the revision section of the document. Any alteration of this document not carried out by KES Co., Ltd. will constitute fraud and shall nullify the document.

TABLE OF CONTENTS

1.0	General Product Description.....	4
1.1	Test Voltage & Frequency.....	7
1.2	Variant Model Differences.....	7
1.3	Device Modifications.....	7
1.4	Equipment Under Test	7
1.5	Support Equipments	7
1.6	External I/O Cabling.....	8
1.7	EUT Operating Mode(s).....	9
1.8	Configuration	10
1.9	Remarks when standards applied	11
1.10	Calibration Details of Equipment Used for Measurement	11
1.11	Test Facility	11
1.12	Laboratory Accreditations and Listings.....	11
2.0	Test Regulations	12
2.1	Conducted Emissions at Mains Power Ports.....	13
2.2	Conducted Emissions at Telecommunication Ports.....	14
2.3	Radiated Electric Field Emissions(Below 1 GHz).....	15
2.4	Radiated Electric Field Emissions(Above 1 GHz)	16
2.5	Harmonic Current Emissions	17
2.6	Voltage Fluctuations and Flicker.....	18
3.0	Criteria for compliance.....	19
3.1	Electrostatic Discharge	21
3.2	Radiated Electric Field Immunity	25
3.3	Electrical Fast Transients/Bursts	28
3.4	Surge Transients.....	31
3.5	Conducted Disturbance	35
3.6	Voltage Dips and Short Interruptions.....	38
	APPENDIX A – TEST DATA	40
	Conducted Emissions at Mains Power Ports	40
	Conducted Emissions at Telecommunication Ports	42
	Radiated Electric Field Emissions(Below 1 GHz)	44
	Radiated Electric Field Emissions(Above 1 GHz).....	46
	Harmonic Current Emissions and Voltage Fluctuations and Flicker	48
	Test Setup Photos and Configuration.....	51
	Conducted Emissions at Mains Power Ports	51
	Conducted Emissions at Telecommunication Ports	52
	Radiated Electric Field Emissions(Below 1 GHz)	54
	Radiated Electric Field Emissions(Above 1 GHz).....	56
	Harmonic Current Emissions and Voltage Fluctuations and Flicker	58
	Electrostatic Discharge.....	59
	Radiated Electric Field Immunity	60
	Electrical Fast Transients/Bursts	61
	Surge Transients	62
	Conducted Disturbance.....	63
	Voltage Dips and Short Interruptions.....	64
	EUT External Photographs.....	65
	EUT Internal Photographs.....	66

1.0 General Product Description

Main Specifications of EUT are:

Video	
Imaging Device	1/1.8" CMOS
Resolution	3840x2160, 3072x1728, 2592x1944, 2688x1520, 2560x1440, 2048x1536, 1920x1080, 1600x1200, 1280x1024, 1280x960, 1280x720, 1024x768, 800 x 600, 800 x 448, 720 x 576, 720x480, 640x480, 640x360
Max. Framerate	H.265/H.264: Max. 30fps/25fps(60Hz/50Hz) MJPEG: Max. 30fps/25fps(60Hz/50Hz)
NETD	None
Pixel Size	None
Min. Illumination	Color: 0.05Lux(F1.6, 1/30sec) BW: 0.005Lux(F1.6, 1/30sec), 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
Video Transmission Distance	None
Lens	
Focal Length (Zoom Ratio)	6.91~214.7mm (31x) motorized varifocal
Max. Aperture Ratio	F1.36(Wide)~F4.6(Tele)
Angular Field of View	H: 60.92°(Wide)~2.2°(Tele) / V: 35.26°(Wide)~1.24°(Tele) / D: 69.18°(Wide)~2.52°(Tele) [TBD]
Min. Object Distance	3m(9.84ft)
Focus Control	Simple focus
Lens Type	P iris
Mount Type	None
Optional Lens	None
Pan / Tilt / Rotate	
Pan / Tilt / Rotate Range	None
Pan Range	None
Pan Speed	None
Tilt Range	None
Tilt Speed	None
Rotate Range	None
Sequence	None
Preset Accuracy	None
Operational	
Camera Title	Displayed up to 85 characters
Direction Indicator	None
Day & Night	Auto(ICR)
Backlight Compensation	BLC, WDR, SSDR
Wide Dynamic Range	None
Digital Noise Reduction	SSNRV, WiseNR II(using AI engine)
Digital Image Stabilization	Stabilization Support(built-in gyro sensor)
Defog	None
Motion Detection	8ea, polygonal zones
Privacy Masking	6ea, rectangle zones - Color: Gray/Black/White
Gain Control	Low / Middle / High
White Balance	ATW / AWC / Manual / Indoor / Outdoor
LDC	Support
Electronic Shutter Speed	Minimum / Maximum / Anti flicker (1/5~1/12,000sec) Auto prefer shutter control based on AI engine
Digital PTZ	None
Video Rotation	Flip, Mirror, Hallway view(90°/270°)
Analytics	Classified object type : Person/Face/Vehicle/License plate Attributes : Person(Gender, Color and Bag), Face(Age, Gender, Mask and Glasses), Vehicle(Type:car/bus/truck/motorcycle/bicycle and Color) Support Bestshot per object Analytics events based on AI engine - Object detection, Virtual line*(Crossing/Direction), Virtual area*(Loitering/Intrusion/Enter/Exit), Face mask detection, Digital auto tracking, Social distancing detection, Slip&Fall detection Analytics events - Defocus detection, Motion detection, Tampering, Audio detection, Sound classification, Shock detection, Virtual area(Appear/Disappear) *Some of the video analytics only works with people and vehicle detection
Business Intelligence	People/Vehicle/Crowd counting, Queue management, Heatmap based on AI engine
Serial Interface	None

Report No. : KES-EM-23T0740-R1

Alarm I/O	2 configurable I/O ports, DC 12V output(Max. 50mA)
Alarm Triggers	Analytics, Network disconnect, Alarm input
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 Viewable Length	70m(229.66ft) TBD, testing up to 90m(295.28ft)
IR Illuminator (Optional)	None
Water Removal	None
Auto Tracking	None
Coaxial Protocol	None
Color Palettes	None
Radiometry	
Temperature detect range	None
Temperature accuracy	None
Temperature detection	None
Additional	None
Network	
Ethernet	Metal shielded RJ-45(10/100/1000 BASE-T)
Video Compression	H.265/H.264: Main/High, MJPEG
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
Smart Codec	Manual(Sea area), WiseStreamII, WiseStreamIII(using AI engine)
Video Quality Adjustment	H.264/H.265: Target bitrate level control MJPEG: Target bitrate level control
Bitrate Control	H.264/H.265: CBR or VBR MJPEG: VBR
Streaming	Unicast(6 users) / Multicast Multiple streaming(Up to 6 profiles)
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) Secure boot
Application Programming Interface	ONVIF Profile S/G/T/M SUNAPI(HTTP API) Wisenet open platform
General	
Webpage Language	English, French, German, Spanish, Italian, Chinese, Korean, Russian, Japanese, Swedish ,Portuguese, Czech, Polish, Turkish, Dutch, Hungarian, Greek
Web Viewer	None
Edge Storage	Micro SD/SDHC/SDXC 2slots 512GB
Memory	4096MB RAM, 1024MB Flash
Environmental & Electrical	
Operating Temperature / Humidity	-40°C ~ +55°C(-40°F ~ +131°F) / Less than 90% RH * 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, IK10, NEMA4X
Input Voltage	PoE+(IEEE802.3at), 12VDC
Power Consumption	PoE+: Max 20.0W, typical 17.00W 12VDC: Max 18.00W, typical 16.00W
Mechanical	
Color / Material	Dark gray / Aluminum
RAL Code	None
Product dimensions / weight	Ø136.2x358.7mm (Ø5.36" x 14.12") (Without sunshield), Weight : 0.00Kg (0.00lb) TBD, New design
Compatible Conduit hole / Gangbox	None
Hanging mount(Dome)	None
Skin cover(Dome)	None
Weather cap(Dome)	None

KES-QP16-F01(00-23-01-01)

KES Co., Ltd.

The authenticity of the test report, contact kes@kes.co.kr

Power module	None
Backbox	None
DORI (EN62676-4 standard)	
Detect (25PPM/ 8PPF)	Wide: 73.5m(241ft) / Tele: 2,250m(7,382ft) [TBD]
Observe (63PPM/ 19PPF)	Wide: 29.4m(96.4ft) / Tele: 900m(2,953ft) [TBD]
Recognize (125PPM/ 38PPF)	Wide: 14.7m(48.2ft) / Tele: 450m(1,476ft) [TBD]
Identify (250PPM/ 76PPF)	Wide: 7.3m(24.1ft) / Tele: 225m(738.2ft) [TBD]

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 ☒ PoE

1.2 Variant Model Differences

Differences between basic model and SW

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
NETWORK CAMERA	PNO-A9311R	-	HANWHA VISION VIETNAM COMPANY LIMITED	EUT

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
Adapter	2ACB022F	-	ChAnnel Well Technology (Guangzhou) Co.,Ltd.	-
PoE Adapter	PT-PSE109GBRO-AH	-	Dongguan PROCET Network Technology Co.,Ltd	-
Laptop	P95G001	8KM8HT2	DELL INC.	-
Laptop Adapter	LA65NS2-01	-	LITE-ON TECHNOLOGY(CHANGZH OU)CO.,LTD.	-
Micro SD Card1	-	-	SanDisk	8 GB
Micro SD Card2	-	-	SanDisk	8 GB
Alarm	PRO-SL	-	SENSOR PRO	-
Button Alarm	-	-	-	-
Headset	K550	-	Britz®	-
Smartphone	-	-	SAMSUNG	-

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(LAN)	Laptop	RJ-45(LAN)	3.5	U
	Alarm OUT	Alarm	Alarm IN	3.5	U
	Alarm IN	Button Alarm	Alarm OUT	3.5	U
	Audio OUT	Headset	Audio IN	1.5	U
	Audio IN		Audio OUT	1.5	U
	Micro SD Card Slot	Micro SD Card1	Micro SD Card Slot	-	-
	Micro SD Card Slot	Micro SD Card2	Micro SD Card Slot	-	-
	DC Jack	Adapter	DC Jack	1.6	U
Laptop	DC Jack	Laptop Adapter	DC Jack	1.3	U
	3.5 mm	Smartphone	3.5 mm	1.0	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)	PoE Adapter	RJ-45(PoE)	3.5	U
	Alarm OUT	Alarm	Alarm IN	3.5	U
	Alarm IN	Button Alarm	Alarm OUT	3.5	U
	Audio OUT	Headset	Audio IN	1.5	U
	Audio IN		Audio OUT	1.5	U
	Micro SD Card Slot	Micro SD Card1	Micro SD Card Slot	-	-
	Micro SD Card Slot	Micro SD Card2	Micro SD Card Slot	-	-
Laptop	DC Jack	Laptop Adapter	DC Jack	1.3	U
	3.5 mm	Smartphone	3.5 mm	1.0	U

* Unshielded=U, Shielded=S

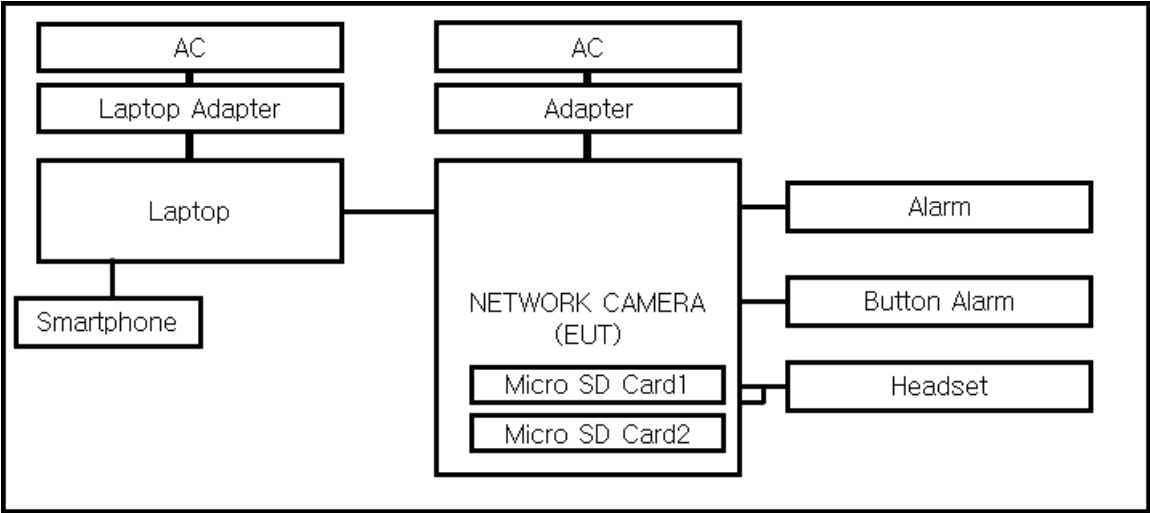
1.7 EUT Operating Mode(s)

Test mode	operating
Operater	After arranging the test equipment and peripherals as shown in the layout diagram below, 1. Run the Web Viewer on your laptop and check the camera video output 2. PingTest from your laptop to check the network status 3. Confirm the alarm output by pressing the alarm button 4. Play 1KHz toon on your smartphone and check the output on your headset 5. Record in the notebook and check the input in the headset microphone 6. After the test, the Micro SD Card storage file was checked.

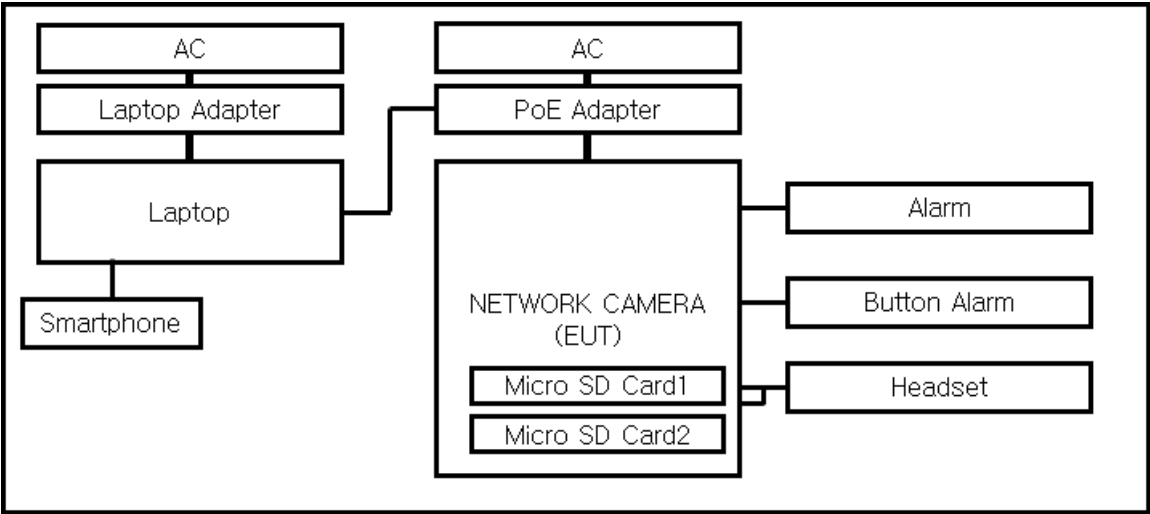
EUT Test operating S/W		
Name	Version	Manufacture Company
Web Viewer	-	Hanwha Vision Co., Ltd

1.8 Configuration

■ DC Mode



■ PoE Mode



1.9 Remarks when standards applied

- In PoE mode, the LAN port is regarded as a wired communication network port and power-related ports are not tested.
- Micro 5 Pin, VIDEO port is not tested because it is for administrators.

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, Republic of. 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 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 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
JAPAN	VCCI	EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site)	 C-20136, T-20137, R-20181, G-20176
Europe	TÜV SÜD	EMI (3 m & 10 m Semi-Anechoic Chamber 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/A1:2014

☒ EN 61000-3-2:2014

☒ EN 61000-3-3:2013

☒ **EMC – Regulations 2016**

☒ EN 55032:2015/A11:2020

☒ Class A

☐ Class B

☒ EN 50130-4:2011/A1:2014

☒ EN 61000-3-2:2014

☒ EN 61000-3-3:2013

2.1 Conducted Emissions at Mains Power Ports

Test Date

Aug. 16, 2023

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	11, 11, 2023
☒	LISN	ENV216	R & S	101787	11, 10, 2023
☒	LISN	ESH2-Z5	R & S	100450	11, 10, 2023
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	11, 10, 2023

Test Conditions

Temperature: (24,2 ± 0,1) °C

Relative Humidity: (48,8 ± 0,1) % 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

RemarksSee Appendix A for test data.

2.2 Conducted Emissions at Telecommunication Ports

Test Date

Aug. 16, 2023

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	11, 11, 2023
☒	LISN	ENV216	R & S	101787	11, 10, 2023
☒	LISN	ESH2-Z5	R & S	100450	11, 10, 2023
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	11, 10, 2023
☐	8-WIRE ISN CAT3,5	ENY81	R & S	100174	11, 22, 2023
☒	8-WIRE ISN CAT6	ENY81-CAT6	R & S	101665	11, 22, 2023

Test Conditions

Temperature: (24,2 ± 0,1) °C

Relative Humidity: (48,8 ± 0,1) % 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

Aug. 15, 2023

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, 21, 2024
☒	AMPLIFIER	SCU 01	R & S	100603	11, 10, 2023
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	11, 17, 2024
☒	ATTENUATOR	8491A	HP	32173	03, 03, 2024

Test Conditions

Temperature: (24,7 ± 0,1) °C

Relative Humidity: (48,7 ± 0,1) % R.H.

Frequency Range of Measurement

30 MHz to 1 GHz

Instrument Settings

IF Band Width: 120 kHz

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

RemarksSee Appendix A for test data.

2.4 Radiated Electric Field Emissions(Above 1 GHz)

Test Date

Aug. 16, 2023

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	07, 31, 2024
☒	PREAMPLIFIER	8449B	AGILENT	3008A01967	03, 06, 2024
☒	ATTENUATOR	8491A	HP	35496	03, 03, 2024
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	03, 06, 2024

Test Conditions

Temperature: (24,2 ± 0,1) °C

Relative Humidity: (48,5 ± 0,1) % 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

RemarksSee Appendix A for test data.

2.5 Harmonic Current Emissions

Test Date

Aug. 14, 2023

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	03, 27, 2024
☒	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

Test Conditions

Temperature: (24,5 ± 0,1) °C

Relative Humidity: (48,2 ± 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

RemarksSee Appendix A for test data.

2.6 Voltage Fluctuations and Flicker

Test Date

Aug. 14, 2023

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	03, 27, 2024
☒	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

Test Conditions

Temperature: (24,5 ± 0,6) °C

Relative Humidity: (48,2 ± 0,6) % R.H.

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

RemarksSee Appendix A for test data.

3.0 Criteria for compliance

Criteria for compliance was based on the following guidelines:

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

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

If as a result of the application of the tests defined in this standard, the apparatus

becomes dangerous or unsafe then the apparatus shall be deemed to have failed the test.

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

Electrostatic discharge

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

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

Radiated electromagnetic fields

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

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

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

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

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

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

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

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

Fast transient burst / slow high energy voltage surge

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

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

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

Conducted RF immunity

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

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

That there is no residual is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change, and no such flickering of indicators oeuvres at $U = 130 \text{ dB}\mu\text{V}$.

For component of CCTV systems, where the status is monitored by observing the TV picture, then deterioration of the picture is allowed at $U = 140 \text{ dB}\mu\text{V}$, providing:

- (a) there is no permanent damage or change to the EUT
(e.g. no corruption of memory or changes to programmable settings etc.)
- (b) at $U = 130 \text{ dB}\mu\text{V}$, any deterioration of the picture is so minor that the system could still be used; and
- (c) there in no observable deterioration of the picture at $U = 120 \text{ dB}\mu\text{V}$.

Voltage dip/interruption / Voltage variation

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

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

3.1 Electrostatic Discharge

Reference Standard

EN 61000-4-2:2009

Test Date

Aug. 16, 2023

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	01, 31, 2024
☒	HCP	-	KES	-	-
☒	VCP	-	Noise Ken	-	-

Test Conditions

Temperature: (24,2 ± 0,1) °C
 Relative Humidity: (48,0 ± 0,1) % R.H.
 Atmospheric Pressure: (99,5 ± 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 ☐ 2 kV ☐ 4 kV ☒ 6 kV ☐ 8 kV ☐ 15 kV	Air ☒ 2 kV ☒ 4 kV ☐ 6 kV ☒ 8 kV ☐ 15 kV	HCP ☐ 2 kV ☐ 4 kV ☒ 6 kV ☐ 8 kV ☐ 15 kV	VCP ☐ 2 kV ☐ 4 kV ☒ 6 kV ☐ 8 kV ☐ 15 kV
--------------------	---	---	---	---

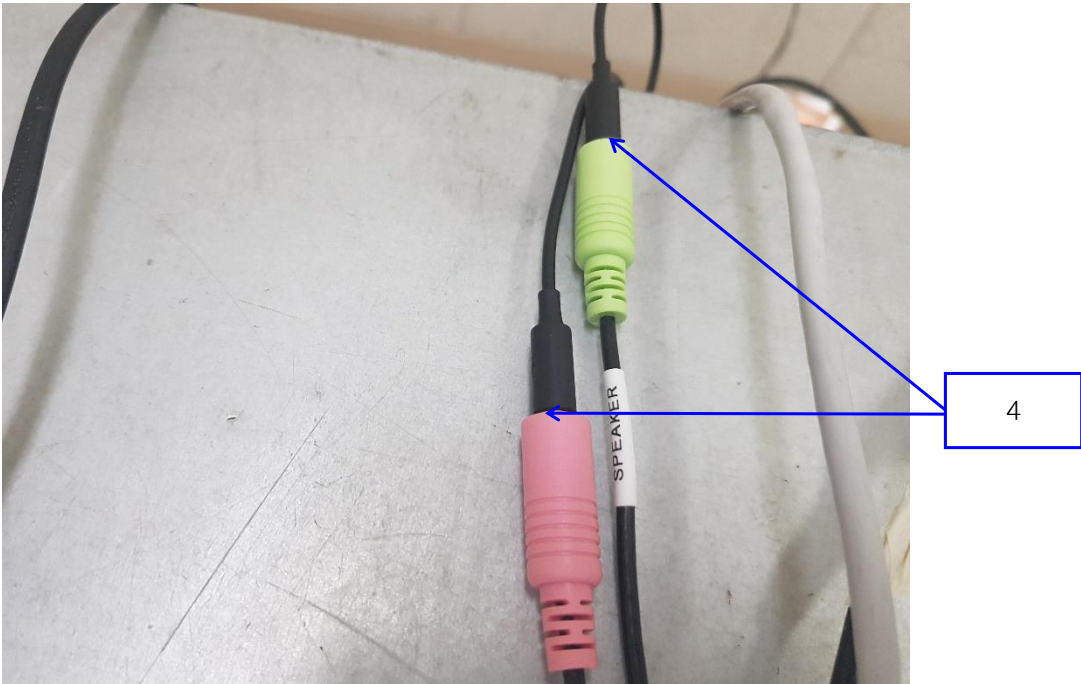
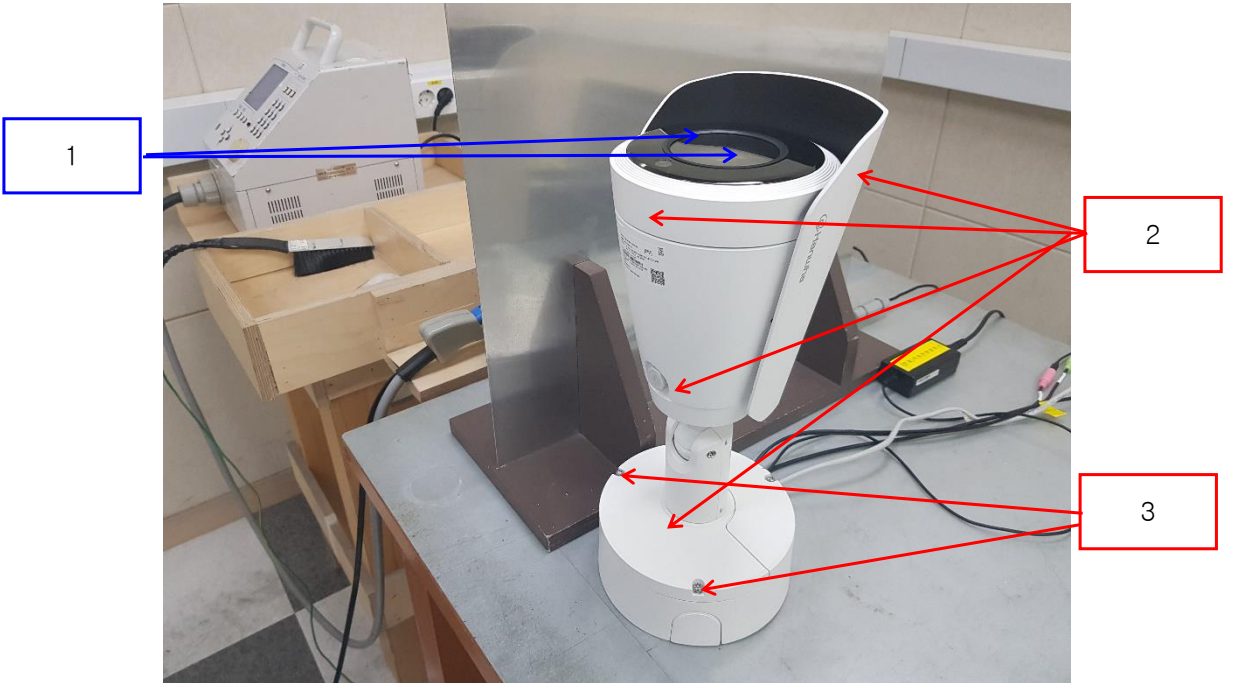
Notes: HCP: Horizontal coupling plane
 VCP: Vertical coupling plane

Required Performance Criteria: ☒ Complied

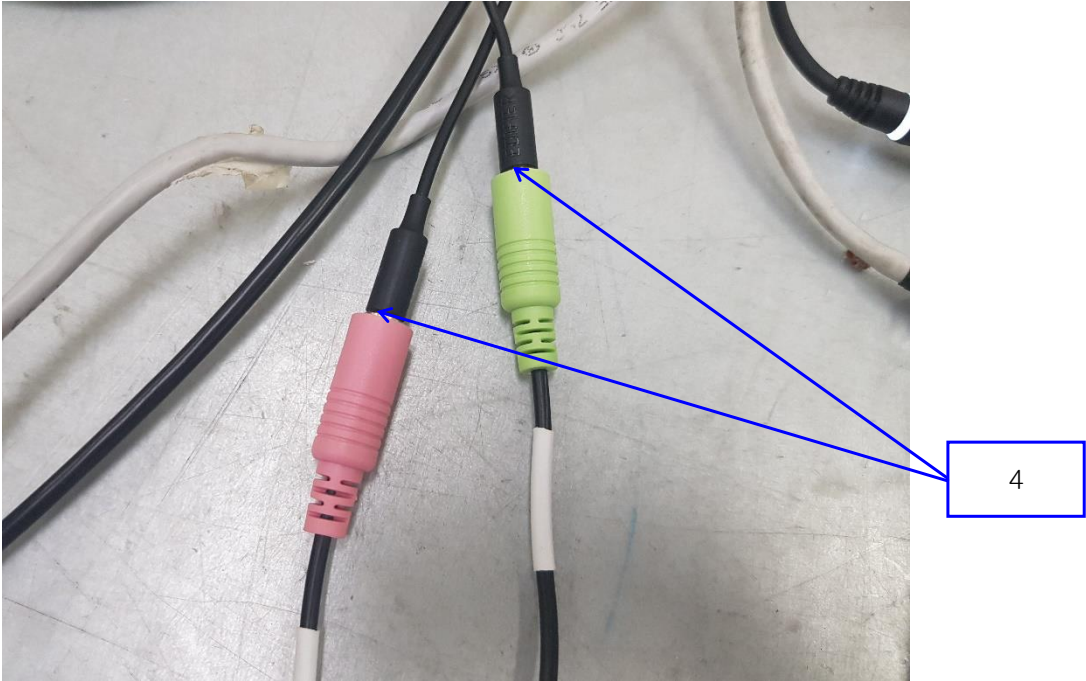
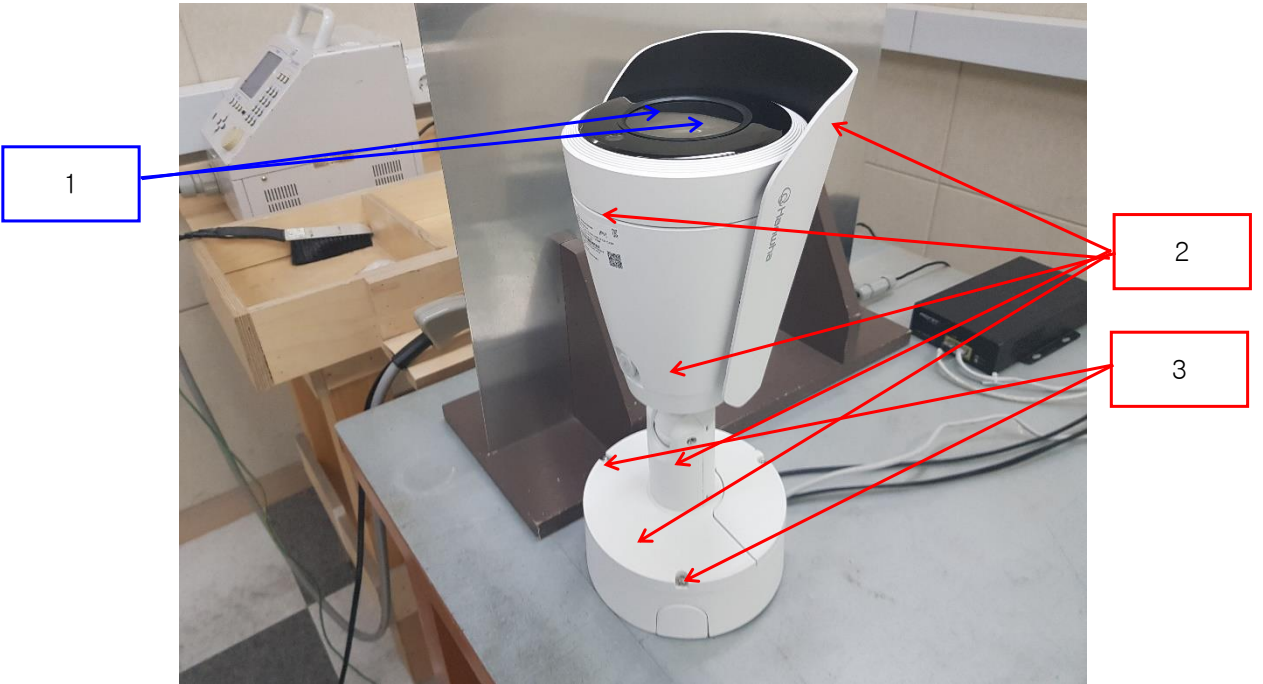
Location of Discharge:



■ DC Mode



■ PoE Mode



Test Data**■ DC Mode**

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	Camera Lens	Air Discharge	Complied	-
2	Enclosure	Contact Discharge	Complied	-
3	Screw	Contact Discharge	Complied	-
4	Around the Port	Air Discharge	Complied	-

■ PoE Mode

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	Camera Lens	Air Discharge	Complied	-
2	Enclosure	Contact Discharge	Complied	-
3	Screw	Contact Discharge	Complied	-
4	Around the 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 IEC 61000-4-3:2020

Test Date

Aug. 15, 2023

Test LocationEMS-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	07, 31, 2024
☒	HIGH POWER DUAL AMP	SSA532	SUNGSAN	SSA532-001	-
☒	POWER METER	E4419B	Agilent	GB40203000	03, 21, 2024
☒	AVERAGE POWER SENSOR	E9301A	Agilent	MY52170007	03, 21, 2024
☒	AVERAGE POWER SENSOR	E9301A	Agilent	MY41498669	03, 21, 2024
☒	STACKED DOUBLE LOG-PER- ANTENNA	STPL9128 E	Schwarzbeck	9128ES-121	-
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	03, 06, 2024

Test Conditions

Temperature: (24,8 ± 0,6) °C
Relative Humidity: (48,3 ± 0,6) % R.H.
Atmospheric Pressure: (100,1 ± 0,0) kPa

Test Specifications

Antenna Polarization: Horizontal & vertical unless indicated otherwise

Antenna Distance: ☒ 3 m

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

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

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

Frequency step: ☒ 1 % step

Dwell Time: ☐ 1 s ☒ 3 s

of Sides Radiated: ☒ 4

Required Performance Criteria: ☒ Complied

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

Note: "Blank" = Not performed

Observations:

Complied – No degradation of function

Test Results

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

Remarks

PASS Required Performance Criteria

3.3 Electrical Fast Transients/Bursts

Reference Standard

EN 61000-4-4:2012

Test Date

Aug. 16, 2023

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	11, 28, 2023
☒	MOTOR VARIAC	MV2616	EM TEST	P1552169719	11, 29, 2023
☒	CAPACITIVE COUPLING CLAMP	HFK	EM TEST	P1633183115	11, 28, 2023

Test Conditions

Temperature: (24,2 ± 0,1) °C
 Relative Humidity: (48,0 ± 0,1) % R.H.
 Atmospheric Pressure: (99,5 ± 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 klz ☒ 100 klz

Duration of Test Voltage: ☒ ≥ 1 min

Required Performance Criteria: ☒ Complied

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
L – N	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
Alarm IN	Complied	Complied
Alarm OUT	Complied	Complied

☒ PoE Mode

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

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

☐ 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 (PoE)	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/A1:2017

Test Date

Aug. 16, 2023

Test Location

EMS-Surge: 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	11, 28, 2023
☒	MOTOR VARIAC	MV2616	EM TEST	P1552169719	11, 29, 2023
☒	CDN	CNV 508N1	EM TEST	P1610176296	11, 29, 2023

Test Conditions

Temperature: (24,2 ± 0,6) °C
Relative Humidity: (48,0 ± 0,6) % R.H.
Atmospheric Pressure: (99,5 ± 0,0) kPa

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) kVDifferential 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

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	-	-
N – PE	-	-

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

☒ 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 (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

Remarks

PASS Required Performance Criteria

3.5 Conducted Disturbance

Reference Standard

EN 61000-4-6:2014

Test Date

Aug. 14, 2023

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, 10, 2023
☒	ATTENUATOR	ATT 6/80	EM TEST	P1614178148	11, 10, 2023
☒	CDN	CDN M016	TESEQ	43694	11, 10, 2023
☒	CDN	CDN M016	TESEQ	43697	11, 10, 2023
☒	CDN	CDN T8RJ45	EM TEST	0909-09	07, 31, 2024
☒	EM CLAMP	KEMZ 801A	TESEQ	44099	11, 14, 2023

Test Conditions

Temperature: (24,8 ± 0,6) °C
Relative Humidity: (48,9 ± 0,6) % R.H.
Atmospheric Pressure: (99,7 ± 0,0) 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 (LAN)	CDN	Complied
Alarm IN	Clamp	Complied
Alarm OUT	Clamp	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 (PoE)	CDN	Complied
Alarm IN	Clamp	Complied
Alarm OUT	Clamp	Complied

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

Observations:
 Complied – No degradation of function

Test Results☒ PASS Required Performance Criteria☐ NOT PASS Required Performance Criteria**Remarks**PASS Required Performance Criteria

3.6 Voltage Dips and Short Interruptions

Reference Standard

EN IEC 61000-4-11:2020

Test Date

Aug. 16, 2023

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	11, 29, 2023
☒	MOTOR VARIAC	MV2616	EM TEST	P1552169719	11, 29, 2023

Test Conditions

Temperature: (24,2 ± 0,1) °C
Relative Humidity: (48,0 ± 0,0) % R.H.
Atmospheric Pressure: (99,5 ± 0,0) 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>

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

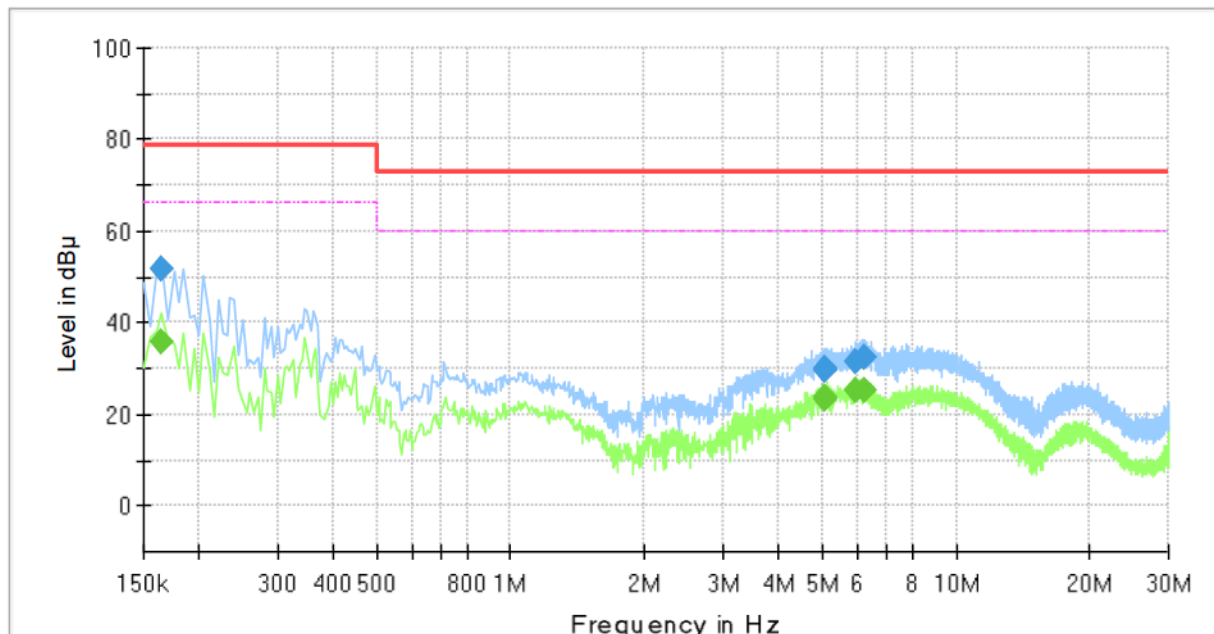
Conducted Emissions at Mains Power Ports

■ DC Mode

[HOT]

Common Information

Test Description: Conducted Emission
 Model No.: PNO-A9311R
 Phase: DC_L1
 Mode:
 Operator Name: KES



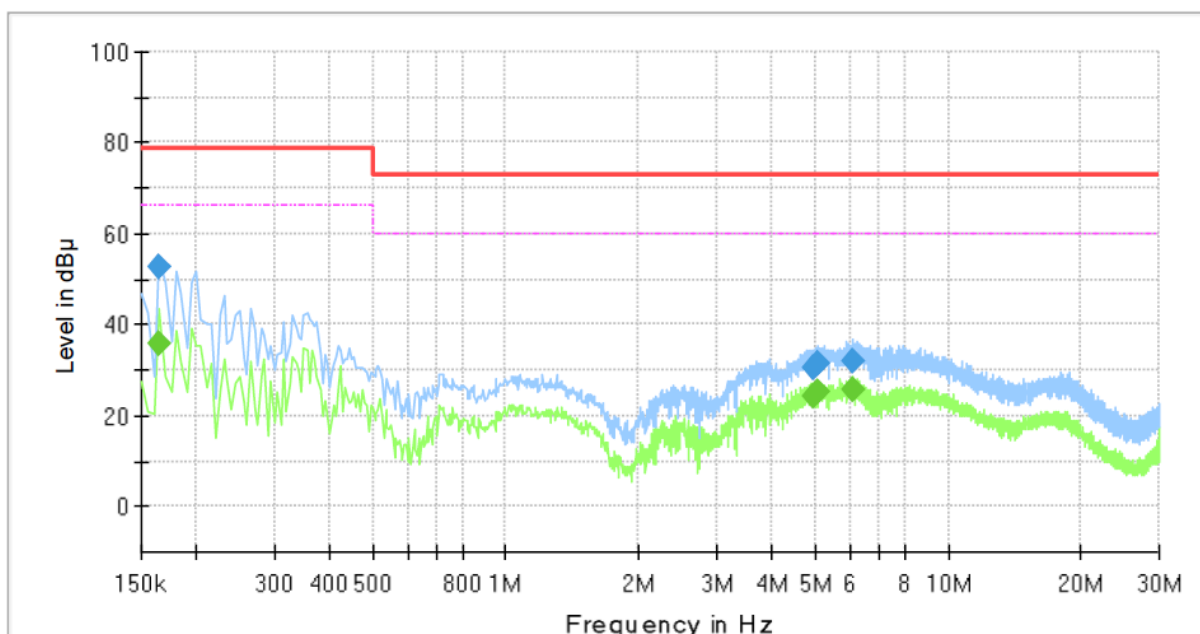
Final_Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.165000	---	35.63	66.00	30.37	1000.0	9.000	L1	19.4
0.165000	51.93	---	79.00	27.07	1000.0	9.000	L1	19.4
5.045000	---	23.28	60.00	36.72	1000.0	9.000	L1	19.7
5.045000	29.41	---	73.00	43.59	1000.0	9.000	L1	19.7
5.065000	---	23.81	60.00	36.19	1000.0	9.000	L1	19.7
5.065000	29.93	---	73.00	43.07	1000.0	9.000	L1	19.7
5.955000	---	25.35	60.00	34.65	1000.0	9.000	L1	19.8
5.955000	31.62	---	73.00	41.38	1000.0	9.000	L1	19.8
6.250000	---	25.41	60.00	34.59	1000.0	9.000	L1	19.8
6.250000	32.23	---	73.00	40.77	1000.0	9.000	L1	19.8

[NEUTRAL]

Common Information

Test Description: Conducted Emission
 Model No.: PNO-A9311R
 Phase: DC_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)
0.165000	---	36.07	66.00	29.93	1000.0	9.000	N	19.4
0.165000	52.92	---	79.00	26.08	1000.0	9.000	N	19.4
4.970000	---	24.39	60.00	35.61	1000.0	9.000	N	19.7
4.970000	30.73	---	73.00	42.27	1000.0	9.000	N	19.7
5.080000	---	24.99	60.00	35.01	1000.0	9.000	N	19.7
5.080000	31.38	---	73.00	41.62	1000.0	9.000	N	19.7
6.100000	---	25.83	60.00	34.17	1000.0	9.000	N	19.8
6.100000	32.11	---	73.00	40.89	1000.0	9.000	N	19.8

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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

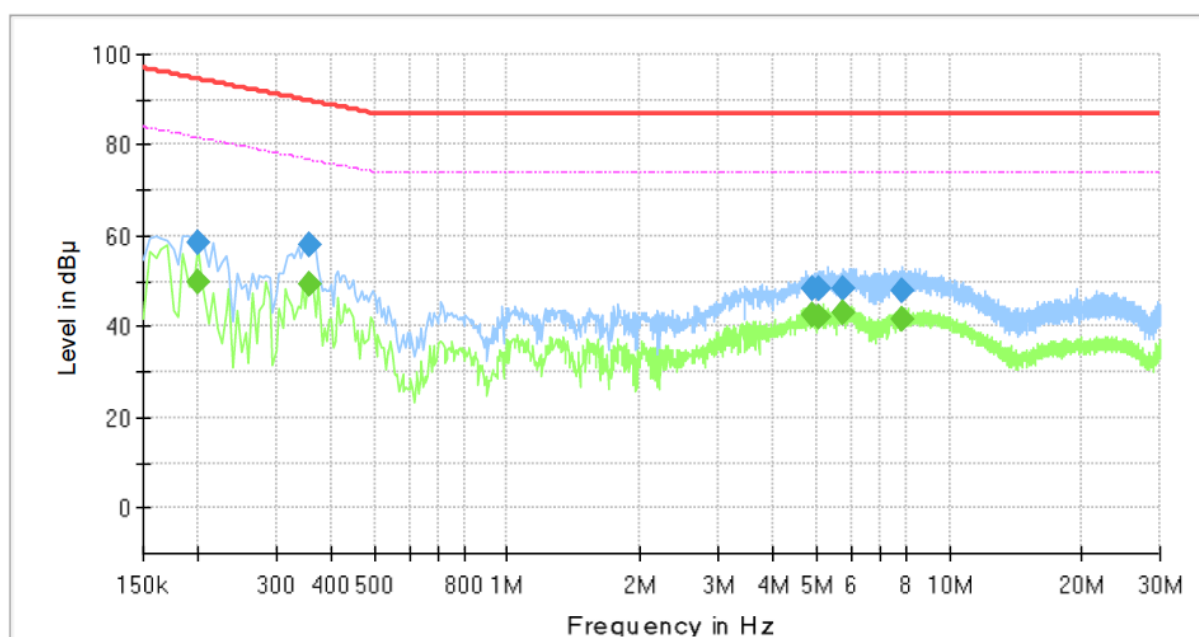
Conducted Emissions at Telecommunication Ports

■ DC Mode

[1 000 Mbps]

Common Information

Test Description: Telecommunication Emission
 Model No.: PNO-A9311R
 Mode : DC_TEL 1 000 Mbps
 Speed :
 Operator Name: KES

**Final Result**

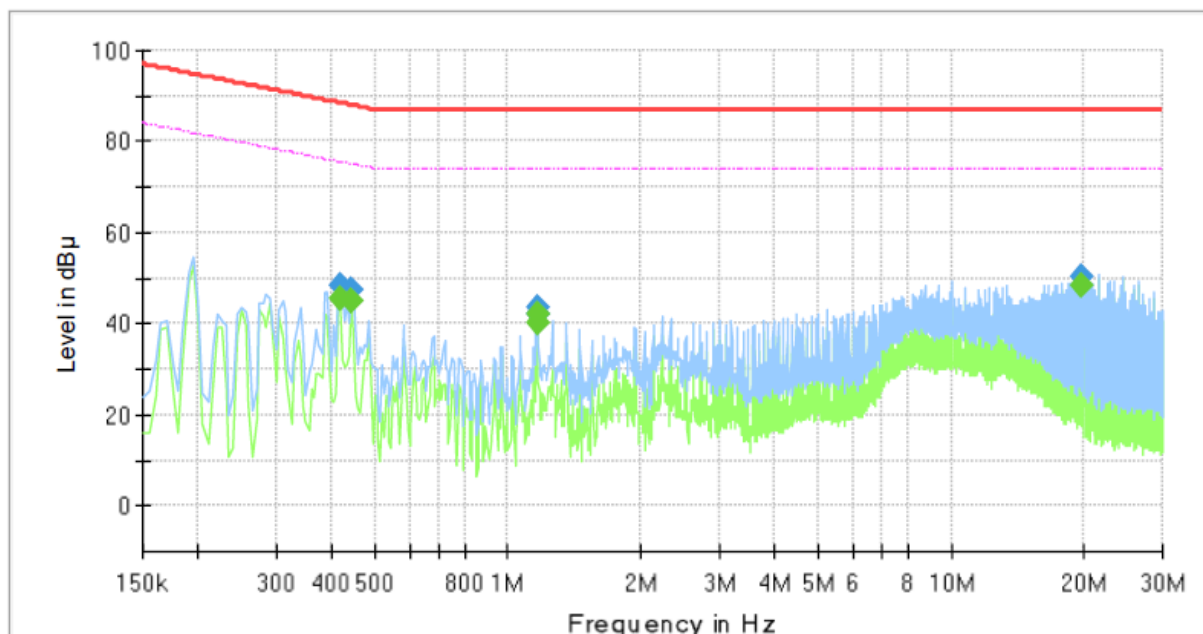
Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.200000	---	49.75	81.61	31.86	1000.0	9.000	Single Line	19.6
0.200000	58.71	---	94.61	35.90	1000.0	9.000	Single Line	19.6
0.355000	---	49.24	76.84	27.60	1000.0	9.000	Single Line	19.5
0.355000	58.01	---	89.84	31.83	1000.0	9.000	Single Line	19.5
4.895000	---	42.63	74.00	31.37	1000.0	9.000	Single Line	19.4
4.895000	48.36	---	87.00	38.64	1000.0	9.000	Single Line	19.4
5.085000	---	42.02	74.00	31.98	1000.0	9.000	Single Line	19.5
5.085000	48.14	---	87.00	38.86	1000.0	9.000	Single Line	19.5
5.725000	---	42.85	74.00	31.15	1000.0	9.000	Single Line	19.5
5.725000	48.48	---	87.00	38.52	1000.0	9.000	Single Line	19.5
7.800000	---	41.69	74.00	32.31	1000.0	9.000	Single Line	19.6
7.800000	47.85	---	87.00	39.15	1000.0	9.000	Single Line	19.6

■ PoE Mode

[1 000 Mbps]

Common Information

Test Description: Telecommunication Emission
 Model No.: PNO-A9311R
 Mode : PoE_TEL 1 000 Mbps
 Speed :
 Operator Name: KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.420000	---	45.60	75.45	29.85	1000.0	9.000	Single Line	19.4
0.420000	48.49	---	88.45	39.96	1000.0	9.000	Single Line	19.4
0.445000	---	45.16	74.97	29.81	1000.0	9.000	Single Line	19.4
0.445000	47.29	---	87.97	40.68	1000.0	9.000	Single Line	19.4
1.160000	---	42.02	74.00	31.98	1000.0	9.000	Single Line	19.3
1.160000	43.35	---	87.00	43.65	1000.0	9.000	Single Line	19.3
1.165000	---	40.31	74.00	33.69	1000.0	9.000	Single Line	19.3
1.165000	42.21	---	87.00	44.79	1000.0	9.000	Single Line	19.3
19.710000	---	48.46	74.00	25.54	1000.0	9.000	Single Line	19.9
19.710000	50.43	---	87.00	36.57	1000.0	9.000	Single Line	19.9

◆ Calculation

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

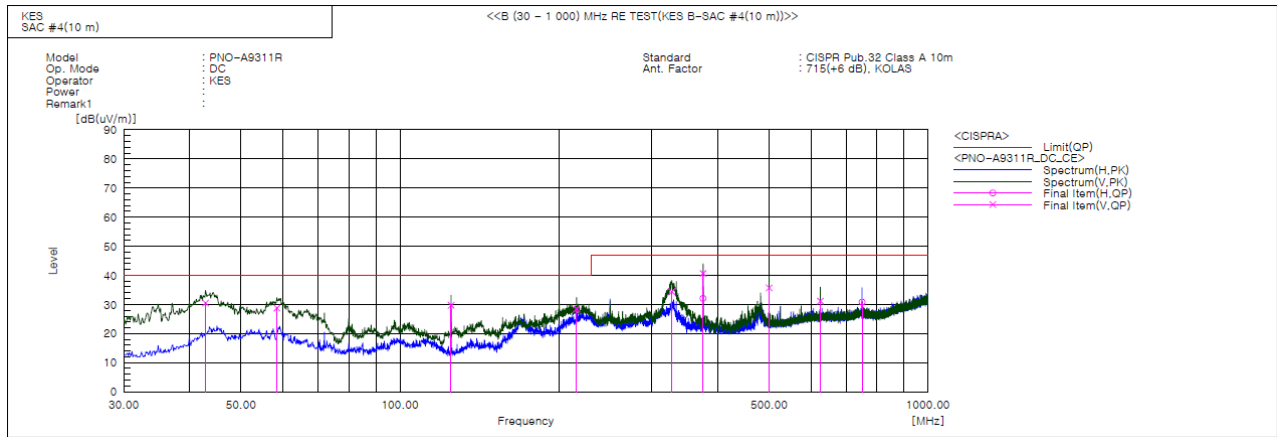
QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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

Radiated Electric Field Emissions(Below 1 GHz)

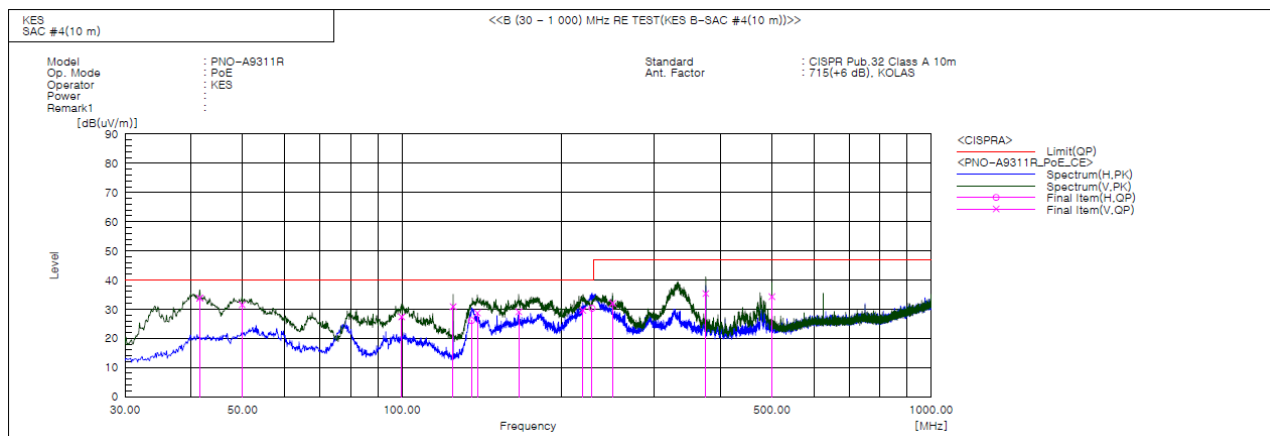
DC Mode



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c.f [dB(1/m)]	Result QP [dB(μV/m)]	Limit QP [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	42.853	V	51.8	-21.3	30.5	40.0	9.5	100.0	64.0	
2	58.494	V	50.0	-21.2	28.8	40.0	11.2	144.0	268.0	
3	124.939	V	54.0	-24.3	29.7	40.0	10.3	145.0	101.0	
4	215.998	V	48.3	-19.8	28.5	40.0	11.5	115.0	94.0	
5	327.305	V	50.4	-16.0	34.4	47.0	12.6	111.0	16.0	
6	374.956	V	54.7	-14.0	40.7	47.0	6.3	100.0	161.0	
7	374.997	H	46.1	-14.0	32.1	47.0	14.9	396.0	310.0	
8	499.965	V	46.3	-10.6	35.7	47.0	11.3	145.0	157.0	
9	625.095	V	38.8	-7.6	31.2	47.0	15.8	112.0	72.0	
10	749.983	H	37.0	-6.2	30.8	47.0	16.2	195.0	136.0	

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	41.519	V	55.5	-21.7	33.8	40.0	6.2	107.0	297.0	
2	49.885	V	51.9	-20.4	31.5	40.0	8.5	112.0	157.0	
3	99.840	V	49.5	-22.1	27.4	40.0	12.6	397.0	142.0	
4	124.939	V	55.2	-24.3	30.9	40.0	9.1	100.0	342.0	
5	135.488	H	51.1	-25.0	26.1	40.0	13.9	196.0	107.0	
6	138.883	V	53.8	-25.1	28.7	40.0	11.3	111.0	127.0	
7	166.285	V	53.5	-24.4	29.1	40.0	10.9	100.0	271.0	
8	219.635	V	49.2	-19.6	29.6	40.0	10.4	112.0	358.0	
9	228.729	H	49.6	-19.3	30.3	40.0	9.7	195.0	74.0	
10	249.948	V	50.9	-18.8	32.1	47.0	14.9	107.0	97.0	
11	374.956	V	49.4	-14.0	35.4	47.0	11.6	112.0	168.0	
12	500.086	V	44.9	-10.6	34.3	47.0	12.7	142.0	212.0	

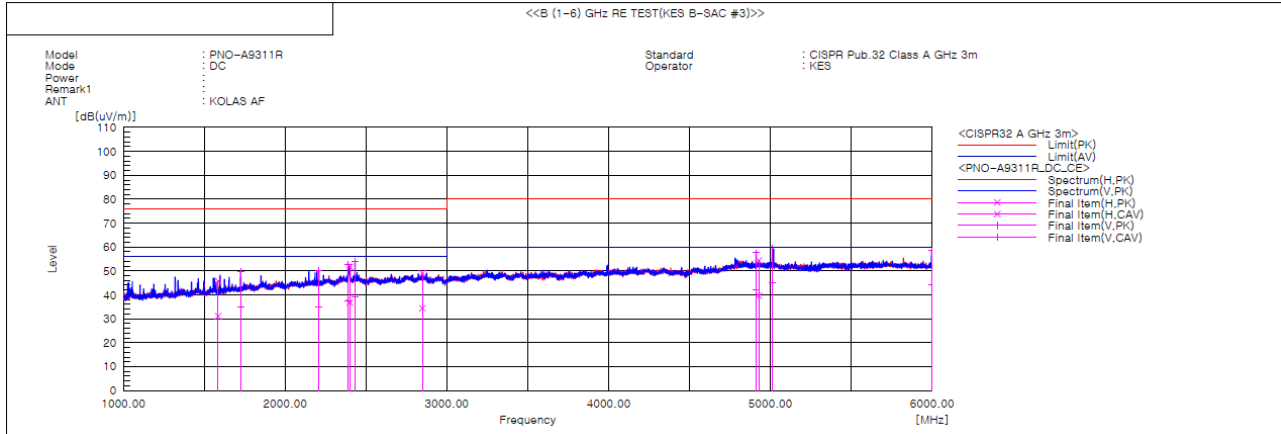
◆ Calculation – SEMI ANECHOIC CHAMBER #4(10 m)

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)]

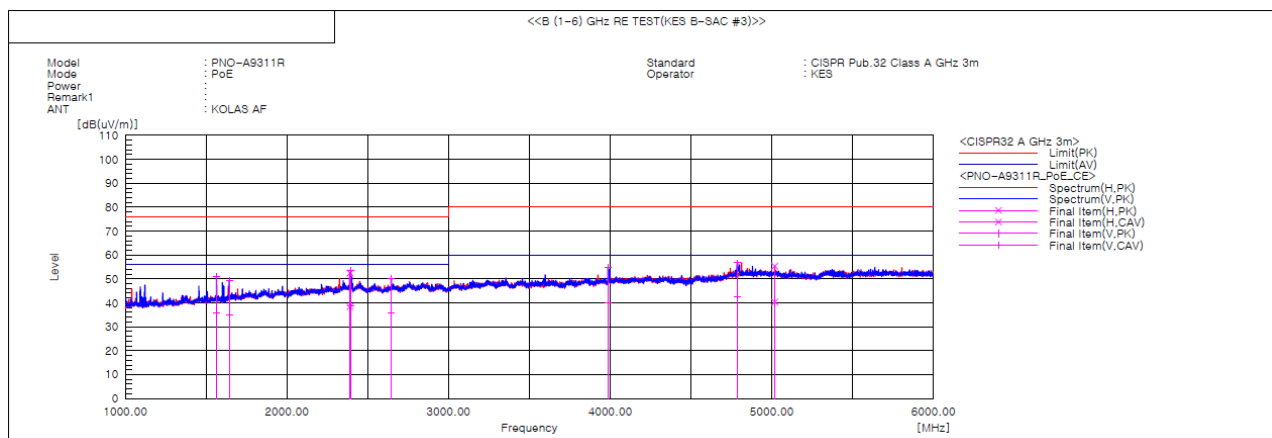
Reading(QP) : Reading value, Result(QP) : Reading value + Factor value

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

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	1584.756	H	45.2	30.5	0.6	45.8	31.1	76.0	56.0	30.2	24.9	100.0	32.7	
2	1725.642	V	47.9	32.9	2.0	49.9	34.9	76.0	56.0	26.1	21.1	100.0	55.6	
3	2208.015	V	45.1	30.0	5.1	50.2	35.1	76.0	56.0	25.8	20.9	100.0	58.5	
4	2390.152	V	46.3	31.2	6.3	52.6	37.5	76.0	56.0	23.4	18.5	100.0	279.9	
5	2400.163	H	45.4	30.5	6.3	51.7	36.8	76.0	56.0	24.3	19.2	100.0	327.5	
6	2432.052	V	47.6	32.6	6.4	54.0	39.0	76.0	56.0	22.0	17.0	100.0	227.7	
7	2848.085	H	41.3	26.6	7.8	49.1	34.4	76.0	56.0	26.9	21.6	100.0	139.9	
8	4911.642	V	42.5	27.0	15.1	57.6	42.1	80.0	60.0	22.4	17.9	100.0	194.3	
9	4928.263	H	39.3	24.6	15.1	54.4	39.7	80.0	60.0	25.6	20.3	100.0	17.4	
10	5011.174	V	44.4	29.8	15.3	59.7	45.1	80.0	60.0	20.3	14.9	100.0	199.4	
11	5996.978	V	42.1	27.8	16.4	58.5	44.2	80.0	60.0	21.5	15.8	100.0	274.8	

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	1564.015	V	50.7	35.3	0.4	51.1	35.7	76.0	56.0	24.9	20.3	100.0	253.9	
2	1642.756	V	48.4	33.7	1.1	49.5	34.8	76.0	56.0	26.5	21.2	100.0	317.1	
3	2389.857	H	46.2	32.1	6.3	52.5	38.4	76.0	56.0	23.5	17.6	100.0	358.4	
4	2395.574	V	47.2	32.3	6.3	53.5	38.6	76.0	56.0	22.5	17.4	100.0	325.0	
5	2645.264	V	43.4	29.0	6.7	50.1	35.7	76.0	56.0	25.9	20.3	100.0	217.6	
6	3986.746	V	43.9	29.2	10.9	54.8	40.1	80.0	60.0	25.2	19.9	100.0	149.4	
7	4787.554	V	42.4	28.1	14.3	56.7	42.4	80.0	60.0	23.3	17.6	100.0	217.6	
8	5018.512	H	40.1	25.1	15.3	55.4	40.4	80.0	60.0	24.6	19.6	100.0	225.9	

♦ Calculation

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

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

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

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

Harmonic Current Emissions and Voltage Fluctuations and Flicker

■ DC Mode

Average harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	0.047			
2	0.001	0.105	1.080	n/a
3	0.040	1.741	2.300	PASS
4	0.001	0.340	0.430	n/a
5	0.040	3.526	1.140	PASS
6	0.001	0.390	0.300	n/a
7	0.040	5.200	0.770	PASS
8	0.001	0.515	0.230	n/a
9	0.037	9.300	0.400	PASS
10	0.001	0.603	0.184	n/a
11	0.035	10.536	0.330	PASS
12	0.001	0.686	0.153	n/a
13	0.033	15.546	0.210	PASS
14	0.001	0.893	0.131	n/a
15	0.030	20.099	0.150	PASS
16	0.001	0.919	0.115	n/a
17	0.028	20.792	0.132	PASS
18	0.001	0.999	0.102	n/a
19	0.025	21.048	0.118	PASS
20	0.001	1.080	0.092	n/a
21	0.022	13.891	0.161	PASS
22	0.001	1.201	0.084	n/a
23	0.020	13.356	0.147	PASS
24	0.001	1.288	0.077	n/a
25	0.017	12.788	0.135	PASS
26	0.001	1.289	0.071	n/a
27	0.015	12.014	0.125	PASS
28	0.001	1.459	0.066	n/a
29	0.013	11.063	0.116	PASS
30	0.001	1.466	0.061	n/a
31	0.011	10.294	0.109	PASS
32	0.001	1.597	0.058	n/a
33	0.010	9.447	0.102	PASS
34	0.001	1.662	0.054	n/a
35	0.009	8.912	0.096	PASS
36	0.001	1.729	0.051	n/a
37	0.008	8.402	0.091	PASS
38	0.001	1.867	0.048	n/a
39	0.007	8.049	0.087	PASS
40	0.001	1.825	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	0.057			
2	0.001	0.091	1.620	n/a
3	0.050	1.454	3.450	PASS
4	0.002	0.309	0.645	n/a
5	0.050	2.927	1.710	PASS
6	0.001	0.313	0.450	n/a
7	0.049	4.281	1.155	PASS
8	0.001	0.415	0.345	n/a
9	0.046	7.617	0.600	PASS
10	0.001	0.485	0.276	n/a
11	0.042	8.563	0.495	PASS
12	0.001	0.558	0.230	n/a
13	0.039	12.473	0.315	PASS
14	0.001	0.685	0.197	n/a
15	0.036	15.899	0.225	PASS
16	0.001	0.725	0.173	n/a
17	0.032	16.122	0.199	PASS
18	0.001	0.793	0.153	n/a
19	0.028	16.008	0.178	PASS
20	0.001	0.859	0.138	n/a
21	0.025	15.478	0.161	PASS
22	0.001	0.927	0.125	n/a
23	0.021	14.481	0.147	PASS
24	0.001	1.026	0.115	n/a
25	0.018	13.455	0.135	PASS
26	0.001	1.055	0.106	n/a
27	0.015	12.254	0.125	PASS
28	0.001	1.232	0.099	n/a
29	0.013	11.167	0.116	PASS
30	0.001	1.276	0.092	n/a
31	0.011	10.518	0.109	PASS
32	0.001	1.308	0.086	n/a
33	0.010	9.620	0.102	PASS
34	0.001	1.396	0.081	n/a
35	0.009	9.601	0.096	PASS
36	0.001	1.444	0.077	n/a
37	0.009	9.490	0.091	PASS
38	0.001	1.487	0.073	n/a
39	0.009	9.918	0.087	PASS
40	0.001	1.540	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.

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

Test Setup Photos and Configuration

Conducted Emissions at Mains Power Ports

■ DC Mode



Conducted Emissions at Telecommunication Ports

■ DC Mode

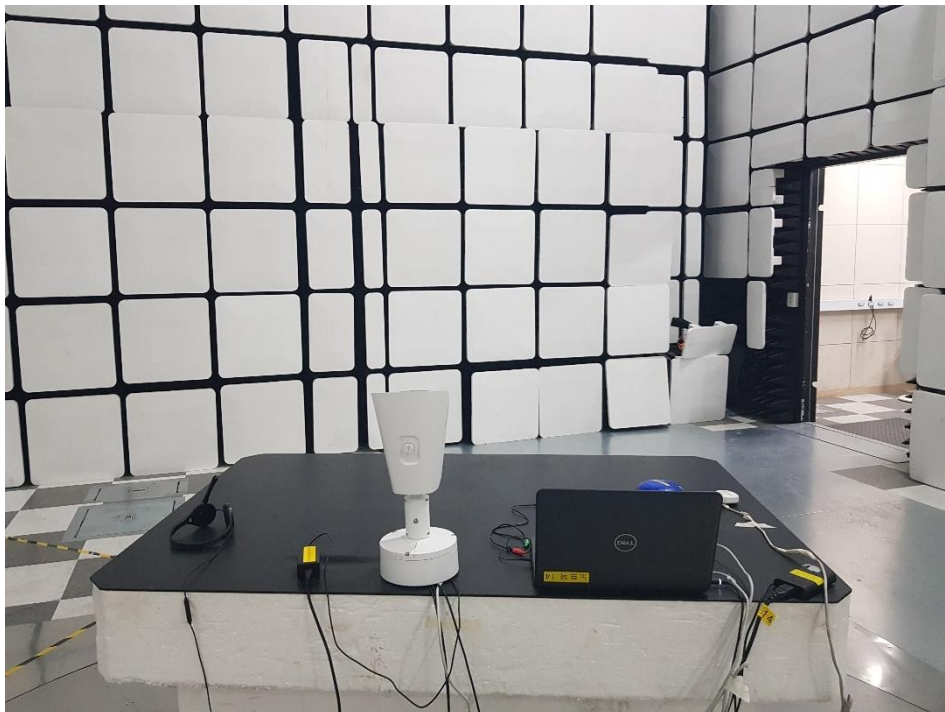


■ PoE Mode

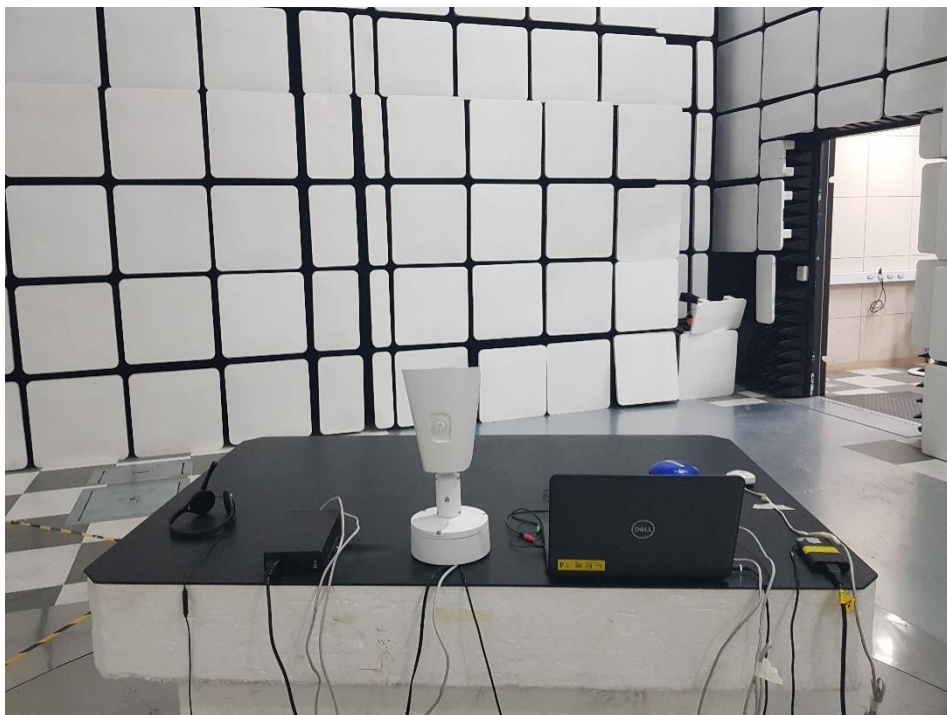


Radiated Electric Field Emissions(Below 1 GHz)

■ DC Mode

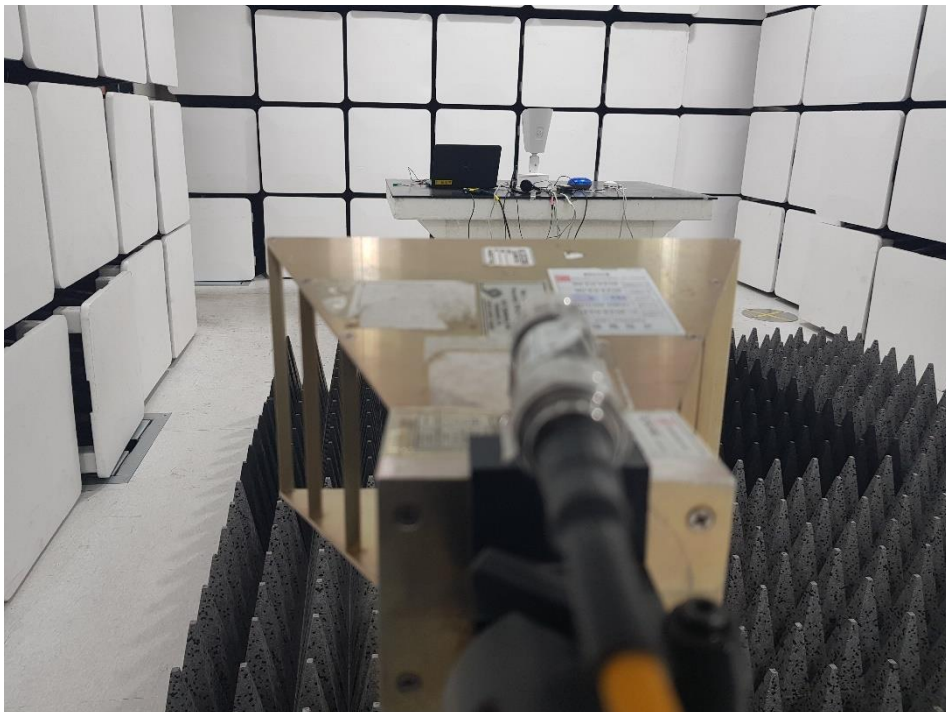
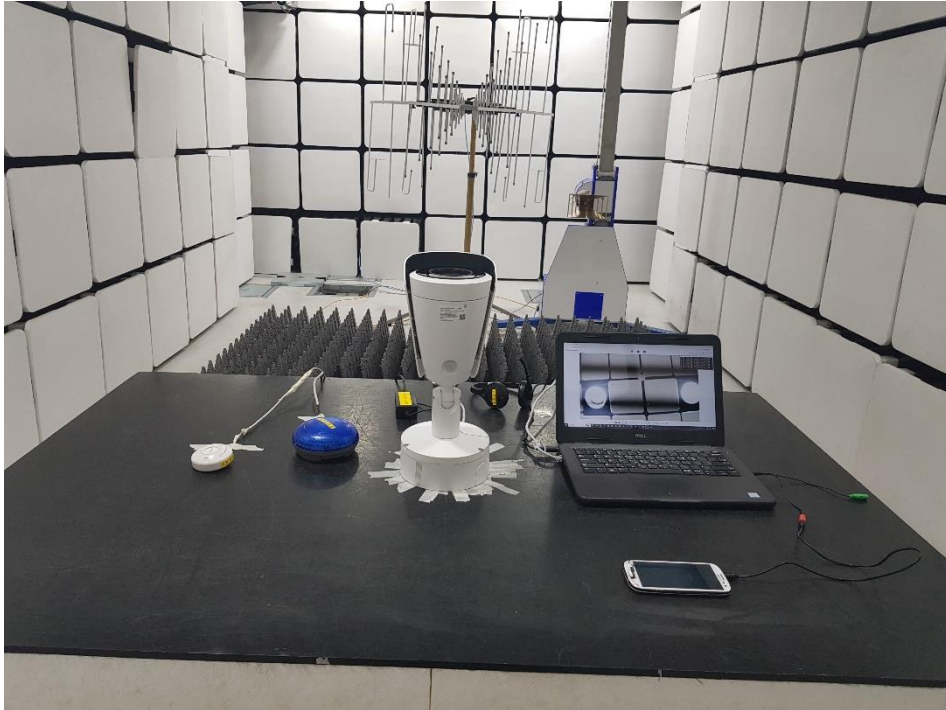


■ PoE Mode

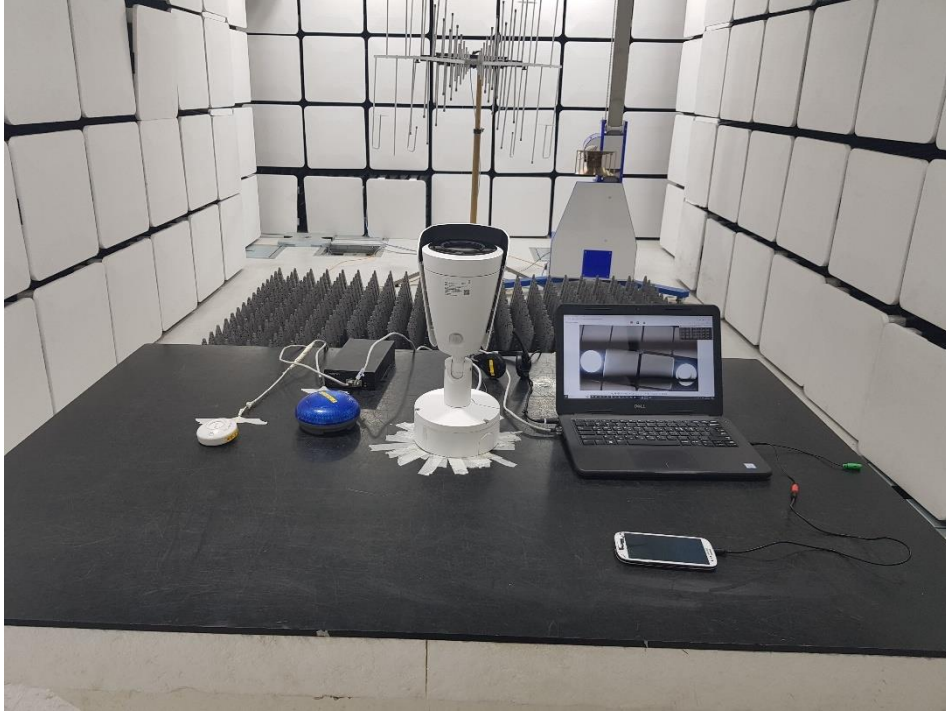


Radiated Electric Field Emissions(Above 1 GHz)

■ DC Mode



■ PoE Mode



Harmonic Current Emissions and Voltage Fluctuations and Flicker

■ DC Mode



Electrostatic Discharge

■ DC Mode



■ PoE Mode



Radiated Electric Field Immunity

■ DC Mode



■ PoE Mode

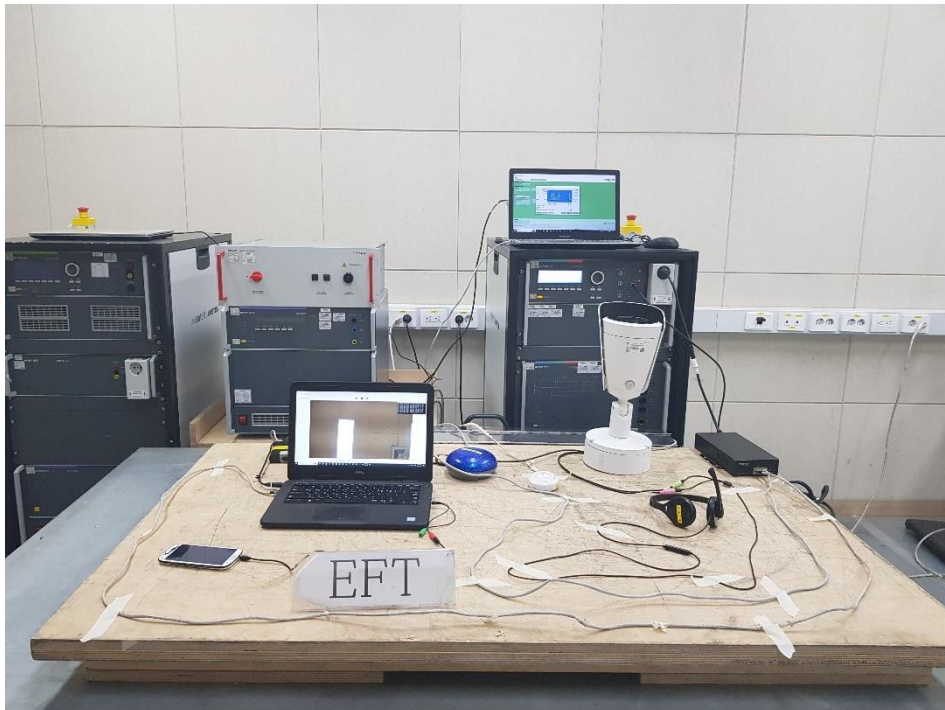


Electrical Fast Transients/Bursts

■ DC Mode

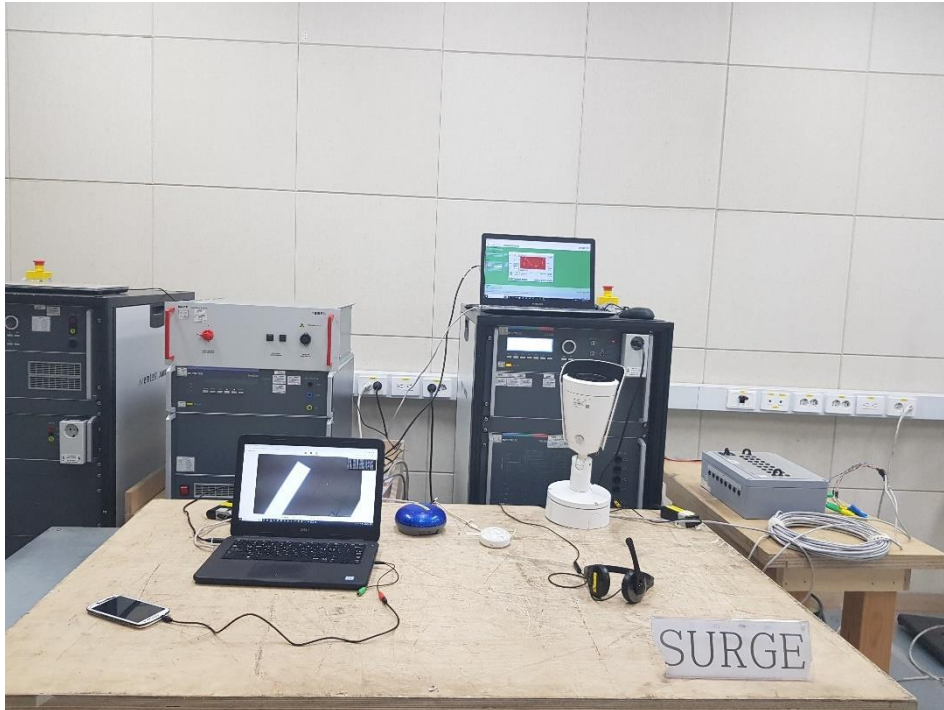


■ PoE Mode

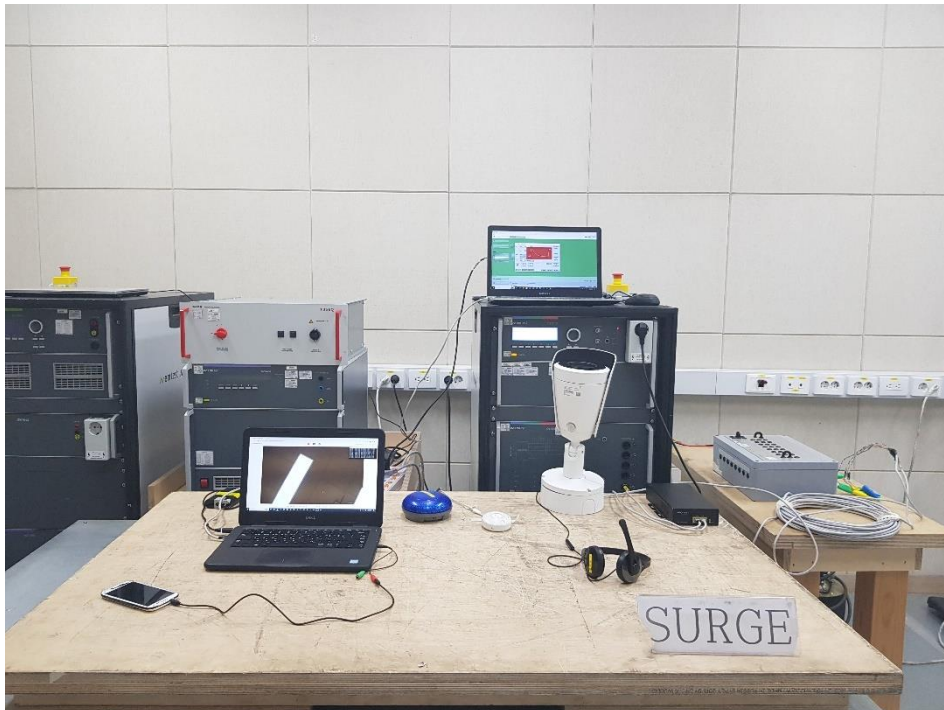


Surge Transients

■ DC Mode



■ PoE Mode

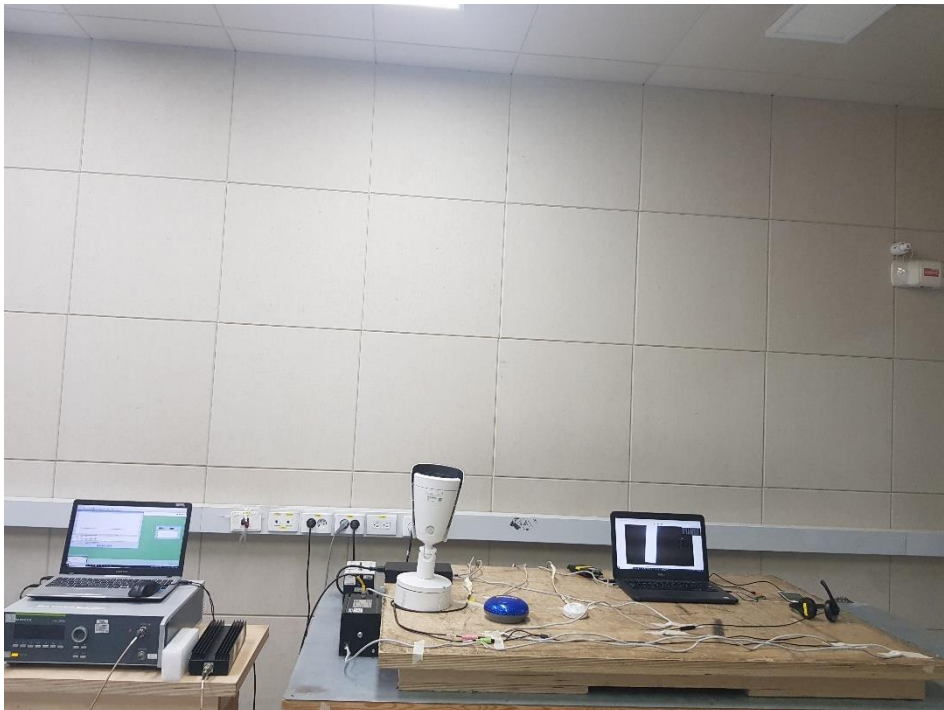


Conducted Disturbance

■ DC Mode



■ PoE Mode



Voltage Dips and Short Interruptions

■ DC Mode



EUT External Photographs

(Top)



(Bottom)



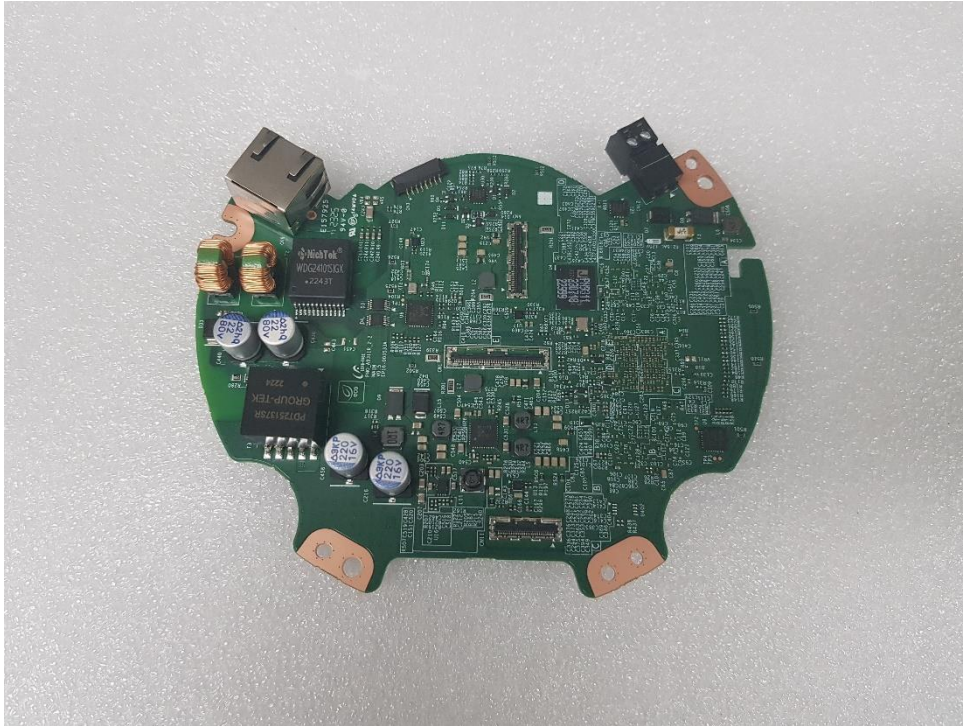
EUT Internal Photographs

(Internal View)

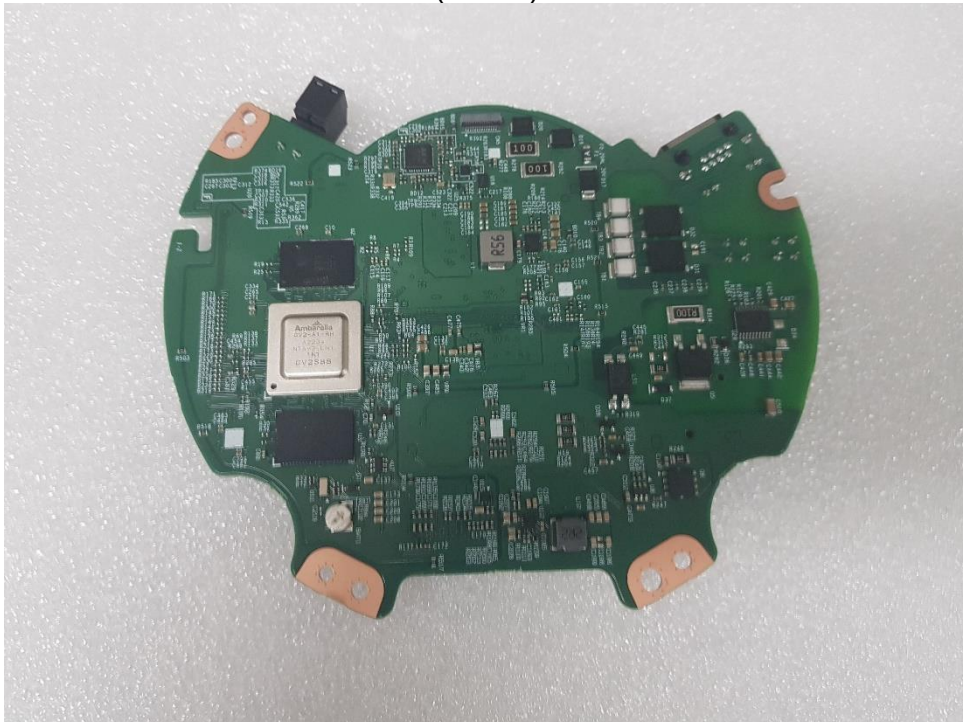


EUT Internal View – Main board

(Top)

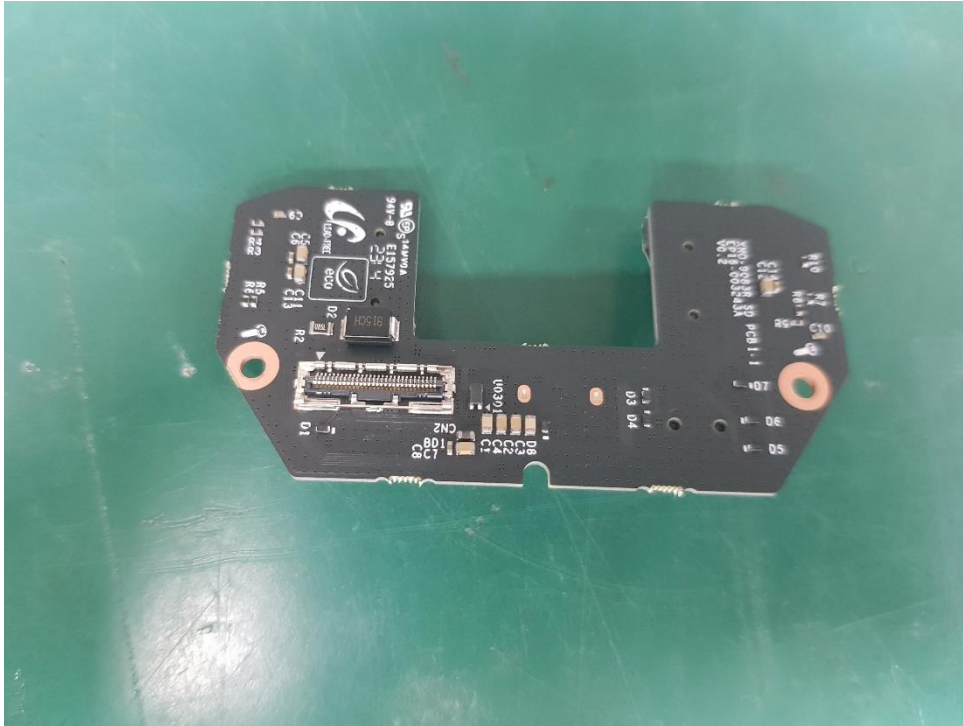


(Bottom)

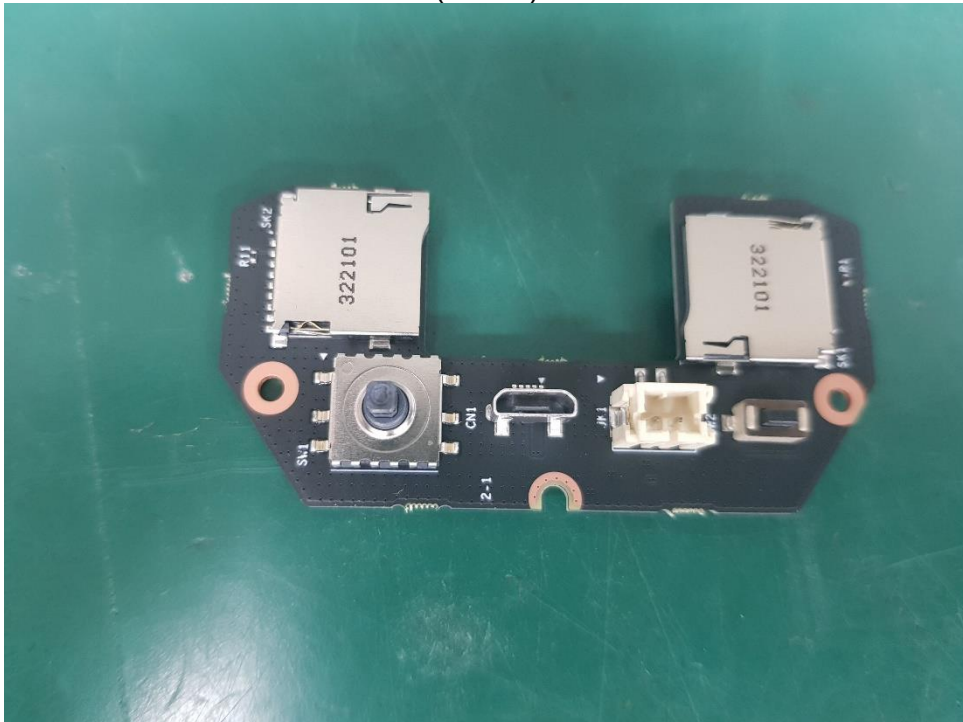


EUT Internal View – Sub board 1

(Top)

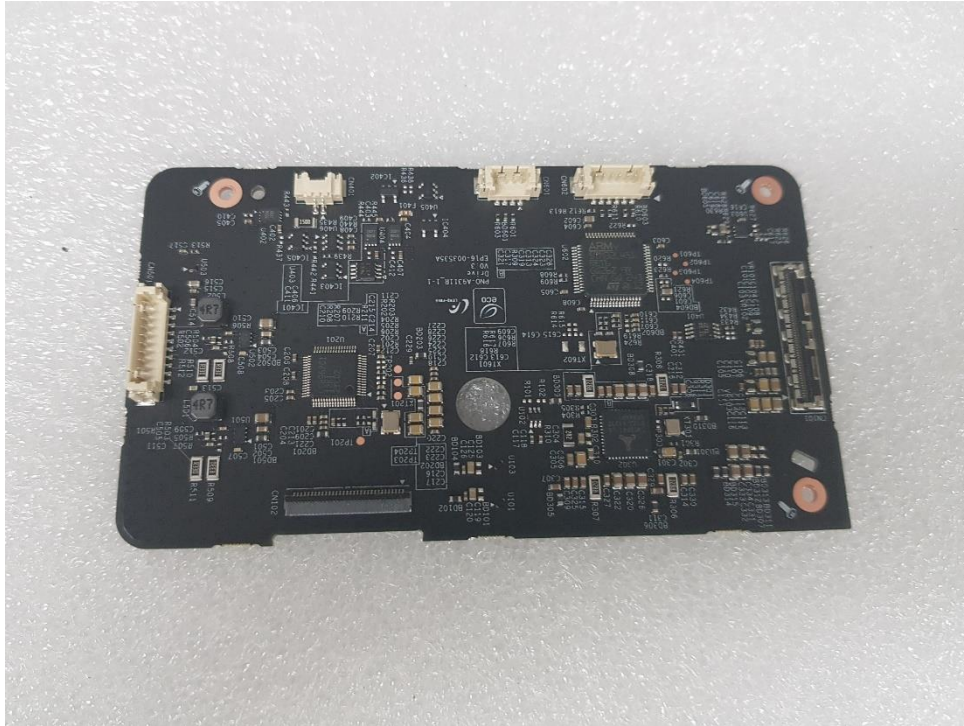


(Bottom)

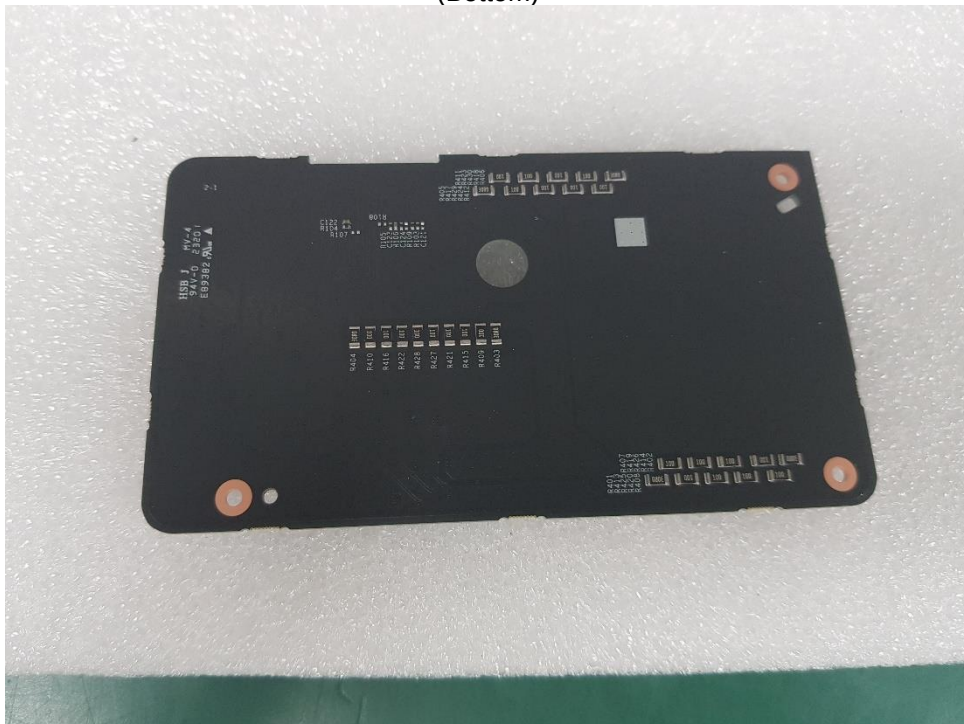


EUT Internal View – Sub board 3

(Top)

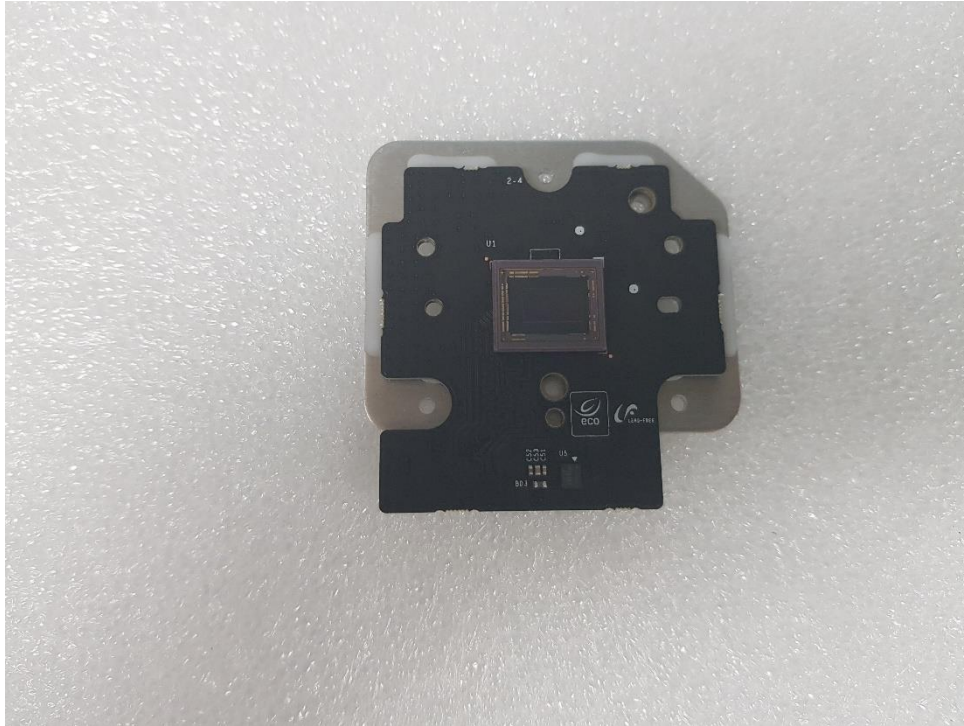


(Bottom)

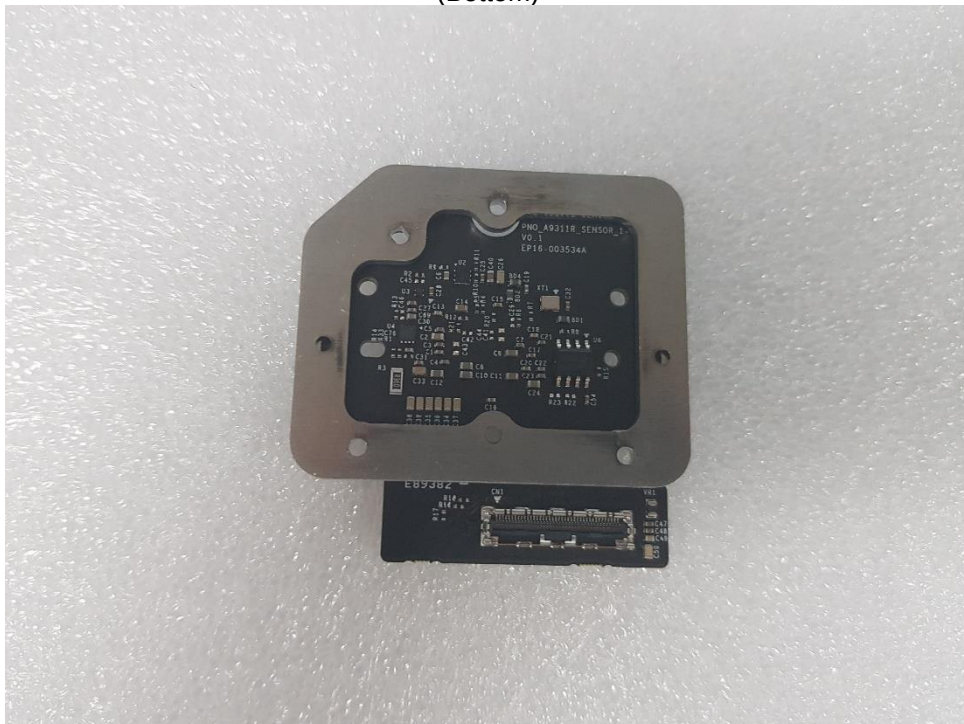


EUT Internal View – Sub board 4

(Top)



(Bottom)



EUT Internal View – Camera Lens

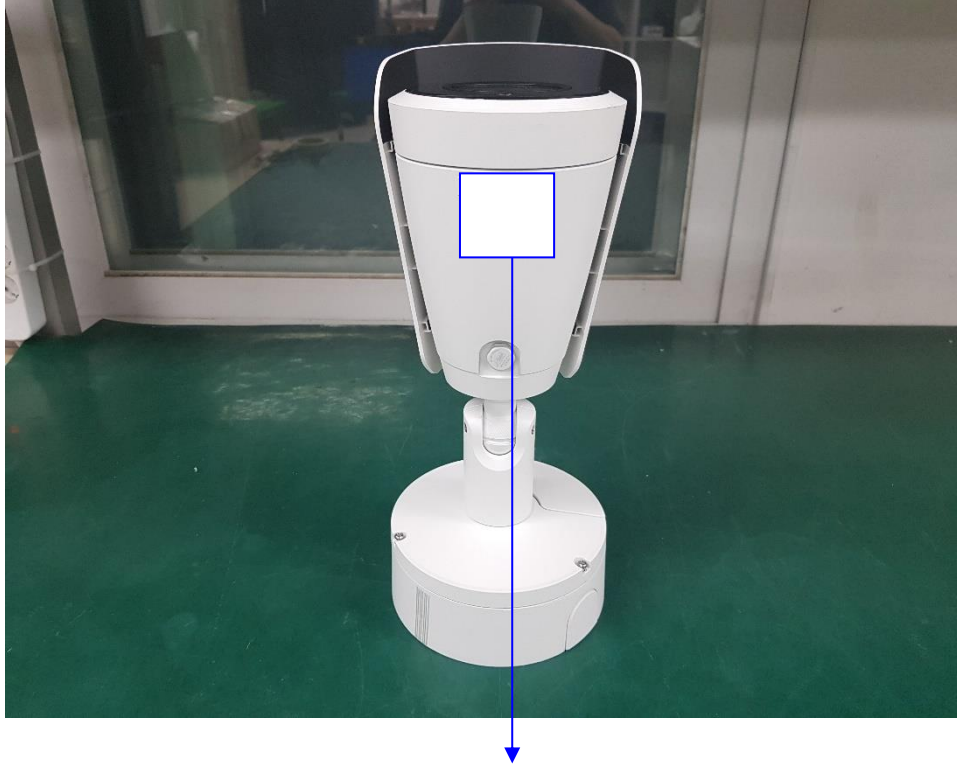
(Top)



(Bottom)



Label and Location



NETWORK CAMERA

Model No : PNO-A9311R

Manufacturer : HANWHA VISION VIETNAM COMPANY LIMITED

Made in Vietnam

