



TEST REPORT



Report No. : KES-EM241550

Page 1 / 81

KES Co., Ltd.

#3002, #3503, #3701, 40, Simin-daero365beon-gil, Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Republic of 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-A9081R

Variant Model : -

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 Ward, Bac Ninh City, Bac Ninh Province, Vietnam
2. 173-25, Saneop-ro, Gwonseon-gu, Suwon-si, Gyeonggi- do, Korea (Suwon Industrial Complex)

3. Date of Receipt : May. 10, 2024

4. Test date : May. 29, 2024 ~ Jun. 03, 2024

5. Date of Issue : Jun. 10, 2024

6. Test Results : In Compliance

Tested by

Reviewed by

Jae Won, Lee
EMC Test Engineer

Dae Jung, Choi
EMC Technical Manager

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

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

KES Co., Ltd.

The authenticity of this test report can be found on the verification page of our website (www.kes.co.kr).



REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Jun. 10, 2024	KES-EM241550	Issued

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	6
1.2 Variant Model Differences	6
1.3 Device Modifications	6
1.4 Equipment Under Test	6
1.5 System Configuration	6
1.6 Support Equipments	7
1.7 External I/O Cabling.....	8
1.8 EUT Operating Mode(s).....	9
1.9 Configuration	10
1.10 Remarks When Standards Applied.....	11
1.11 Calibration Details of Equipment Used for Measurement	11
1.12 Test Facility	11
1.13 Laboratory Accreditations and Listings	12
2.0 Test Regulations	13
2.1 Conducted Emissions at Mains Power Ports.....	14
2.2 Conducted Emissions at Telecommunication Ports.....	15
2.3 Impulse Noise (click).....	16
2.4 Radiated Electric Field Emissions(Below 1 GHz).....	17
2.5 Radiated Electric Field Emissions(Above 1 GHz)	18
2.6 Harmonic Current Emissions	19
2.7 Voltage Fluctuations and Flicker.....	20
3.0 Criteria for Compliance	21
3.1 Electrostatic Discharge	22
3.2 Radio-frequency Electromagnetic Field.....	26
3.3 Fast Transients	29
3.4 Surges.....	32
3.5 Conducted Disturbance	36
3.6 Power Frequency Magnetic Field Immunity	39
APPENDIX A – TEST DATA	42
Conducted Emissions at Mains Power Ports	42
Conducted Emissions at Telecommunication Ports	44
Impulse Noise (click)	46
Radiated Electric Field Emissions(Below 1 GHz)	47
Radiated Electric Field Emissions(Above 1 GHz).....	49
Harmonic Current Emissions and Voltage Fluctuations and Flicker	51
Test Setup Photos and Configuration.....	54
Conducted Emissions at Mains Power Ports	54
Conducted Emissions at Telecommunication Ports	55
Impulse Noise (click)	57
Radiated Electric Field Emissions(Below 1 GHz)	58
Radiated Electric Field Emissions(Above 1 GHz).....	60
Harmonic Current Emissions and Voltage Fluctuations and Flicker	62
Electrostatic Discharge.....	63
Radio-frequency Electromagnetic Field	64
Fast Transients.....	65
Surges	66
Conducted Disturbance.....	67
Power Frequency Magnetic Field Immunity	68
EUT Photographs	72
EUT Internal Layout Photographs	73



1.0 General Product Description

Main Specifications of EUT are:

Video		PNO-A9081R	
Imaging Device	1/1.8" 8MP CMOS	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
Effective Pixels	3864(H) x 2180(V)		
NETD	None		
Pixel Size	None		
Min. Illumination	Color: 0.1Lux(F1.6, 1/30sec) BW: 0Lux(IR LED on)	Day & Night	Auto(ICR)/Color/BW/External/Schedule
Video Out	CVBS: 1.0 Vp-p / 75Ω composite, 720x480(N), 720x576(P) for installation USB: Micro USB Type B, 1280x720 for installation	Backlight Compensation	BLC, WDR
		Wide Dynamic Range	120dB
		Contrast Enhancement	SSDR (Off / On)
		Digital Noise Reduction	SSNR(III(2D+3D Noise filter) (Off / On)
		Digital Image Stabilization	Support(built-in gyro sensor)
Lens		Defog	None
Focal Length (Zoom Ratio)	4.5~10mm(2.2x) motorized varifocal	Motion Detection	8ea, 8point Polygonal zones
Max. Aperture Ratio	F1.6(Wide)~F2.65(Tele)	Privacy Masking	32ea, polygonal zones - Color : Gray, Green, Red, Blue, Black, White - Mosaic
Angular Field of View	H: 101.4°(Wide)~45.5°(Tele) / V: 53.6° (Wide)~25.5°(Tele) / D: 120.7°(Wide)~52.3° (Tele)		
Min. Object Distance	0.5m(1.64ft)		
Focus Control	Simple focus		
Lens Type	DC auto iris, P iris	Gain Control	Support
Mount Type	None	White Balance	ATW / AWC / Manual / Indoor / Outdoor(include Mercury & Sodium)
Optional Lens	None	Contrast	Level adjustment
Pan / Tilt / Rotate		LDC	Support
Pan / Tilt / Rotate Range	None	Electronic Shutter Speed	Minimum / Maximum / Anti flicker (1/5~1/12,000sec)
Pan Range	None	Digital PTZ	Support(Preset, Group)
Pan Speed	None	Video Rotation	Flip, Mirror, Hallway view(90°/270°)
Tilt Range	None	Analytics	Object detection(Person/Vehicle/Face/ License plate), Defocus detection, Directional detection, Motion detection, Digital auto tracking, Appear/Disappear, Enter/Exit, Loitering, Tampering, Virtual line, Audio detection, Sound classification, Shock detection BestShot, Feature extraction
Tilt Speed	None		
Rotate Range	None		
Sequence	None		
Preset Accuracy	None	Business Intelligence	People counting, Queue management, Heatmap
Azimuth	None		
Auto Tracking	None	Serial Interface	None
Operational		Alarm I/O	Input 1ea / Output 1ea / 12V Power (Max. 50mA) 1ea - 2 configurable i/o ports
IR Viewable Length	30m(98.42ft)		
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		



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 DPTZ Preset Handover Audio playback	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
Audio In	Selectable(mic in/line in) Supply voltage: 2.5VDC(4mA), Input impedance: 2K Ohm	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)
Audio Out	Line out, Max.output level: 1Vrms	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)
IR Illuminator (Optional)	None	Edge Storage	Micro SD/SDHC/SDXC 2slot 각 256GB Total 512GB
Wiper	None	Application Programming Interface	ONVIF Profile S/G/T SUNAPI(HTTP API) Wisenet open platform
Coaxial Protocol	None	Webpage Language	English, Korean, Chinese, French, Italian, Spanish, German, Japanese, Russian, Swedish, Portuguese, Czech, Polish, Turkish, Dutch, Hungarian, Greek
Video Transmission Distance	None	Web Viewer	Supported OS: Windows 8.1, 10, Mac OS X 10.10, 10.11, 10.12 Recommended Browser: Google Chrome Supported Browser: MS Explore11, MS Edge, Mozilla Firefox(Window 64bit only), Apple Safari(Mac OS X only)
Radiometry		Memory	4096MB RAM, 512MB Flash
Temperature detect range	None	Environmental	
Temperature accuracy	None	Operating Temperature / Humidity	-40°C ~ +55°C(-40°F ~ +131°F) / Less than 90% RH * Start up should be done at above -30°C
Temperature detection	None		
Additional	None		
Network			
Ethernet	RJ-45(10/100/1000BASE-T)		
Video Compression	H.265/H.264: Main/High, MJPEG		
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. 15fps/12fps(60Hz/50Hz)		
Smart Codec	Manual(Sea area), WiseStreamII		
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)		

Storage Temperature / Humidity	-50°C ~ +60°C(-58°F ~ +140°F) / Less than 90% RH
Certification	IP66/IP67, IK10, NEMA4X
Electrical	
Input Voltage	PoE+(IEEE802.3at), 12VDC
Power Consumption	PoE+: Max 25.50W, typical 21.00W 12VDC: Max 21.50W, typical 17.00W
Mechanical	
Color / Material	Dark grey / Aluminum
RAL Code	None
Product dimensions / weight	Ø91.0x368.6mm (3.58" x 14.51") (Without sunshield), Weight : 2.48Kg (5.47lb)
Conduit hole	
Hanging mount(Dome)	
Skin cover(Dome)	
Weather cap(Dome)	
Power module	
Backbox	



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 (AC/DC Adapter Input Power)
- ☒ AC 230 V, 50 Hz (PoE Adapter Input Power)

1.2 Variant Model Differences

Not applicable

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
NETWORK CAMERA	PNO-A9081R	-	HANWHA VISION VIETNAM COMPANY LIMITED	EUT

1.5 System Configuration

Description	Model Number	Serial Number	Manufacturer	Remarks
-	-	-	-	-



1.6 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
Laptop	P95G001	9JM8HT2	DELL INC.	-
Laptop Adapter	HA65NM130	-	Chicony Power Technology(Suzhou)Co.,Ltd.	-
PoE Injector	PT-PSE109GBRO-AH	-	Dongguan PROCET Network Technology Co.,Ltd	-
Micro SD Card	-	-	SanDisk	16 GB
AC/DC Adapter	2ACB022F	-	ChAnnel Well Technology (Guangzhou) Co.,Ltd.	-
Alarm	-	-	-	-
Button Alarm	-	-	-	-
Smartphone	SM-J500	R59M503KX0M	Samsung Electronics	-
Headset	K550	-	Britz®	-



1.7 External I/O Cabling

■ #1

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
NETWORK CAMERA (EUT)	2 Pin	AC/DC Adapter	2 Pin	1.5	U
	RJ-45 (LAN)	Laptop	RJ-45 (LAN)	3.5	U
	Audio OUT	Headset	Audio IN	1.8	U
	Audio IN		Audio OUT	1.8	U
	Alarm OUT	Alarm	Alarm IN	3.5	U
	Alarm IN	Button Alarm	Alarm OUT	3.5	U
	Micro SD Card SLOT	Micro SD Card	Micro SD Card SLOT	-	-
Laptop	3.5 mm	Smartphone	3.5 mm	1.0	U
	DC Jack	Laptop Adaptor	DC Jack	1.5	U

* Unshielded=U, Shielded=S



■ #2

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
	Audio OUT	Headset	Audio IN	1.8	U
	Audio IN		Audio OUT	1.8	U
	Alarm OUT	Alarm	Alarm IN	3.5	U
	Alarm IN	Button Alarm	Alarm OUT	3.5	U
	Micro SD Card SLOT	Micro SD Card	Micro SD Card SLOT	-	-
PoE Adapter	RJ-45 (LAN)	Laptop	RJ-45 (LAN)	2.0	U
Laptop	3.5 mm	Smartphone	3.5 mm	1.0	U
	DC Jack	Laptop Adapter	DC Jack	1.5	U

* Unshielded=U, Shielded=S

1.8 EUT Operating Mode(s)

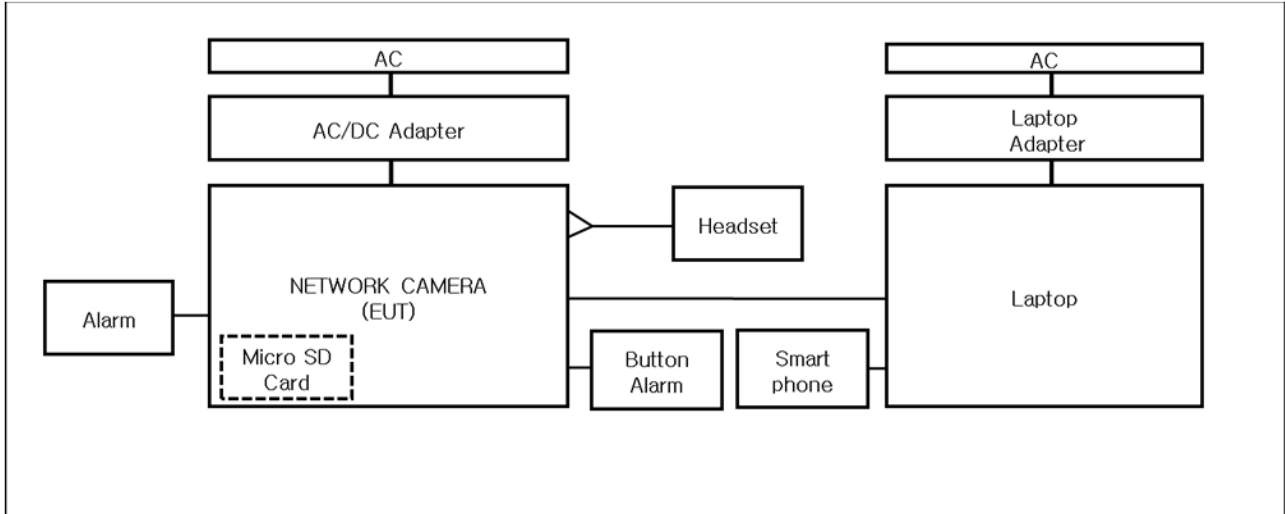
Division	Mode name	Operating status
#1	AC/DC Adapter	1. After connecting EUT and AD/DC Adapter 2. Check the camera video output on the Notebook. 3. Check if the network status is operating normally during PING TEST. 4. Check the output of the 1 kHz tone output from the smartphone and the microphone input from the headset. 5. Press the alarm button to check the normal operation of the button alarm. 6. After testing, I checked the files stored on Micro SD card.
#2	PoE	1. After connecting EUT and PoE Injector 2. Check the camera video output on the Notebook. 3. Check if the network status is operating normally during PING TEST. 4. Check the output of the 1 kHz tone output from the Laptop and the microphone input from the headset. 5. Press the alarm button to check the normal operation of the button alarm. 6. After testing, I checked the files stored on Micro SD card.

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

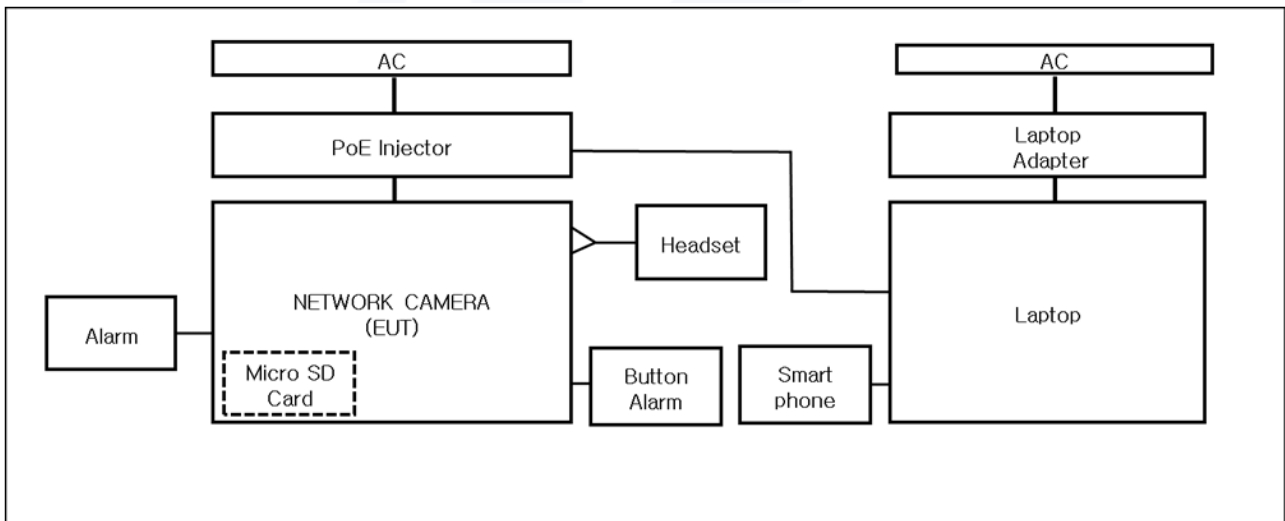


1.9 Configuration

■ #1



■ #2





1.10 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.
- VIDEO and USB ports are for administrator use only and are not tested.
- Port photo for administrator



1.11 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.

1.12 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



1.13 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 0008



2.0 Test Regulations

The emissions tests were performed according to following regulations:

☒ **EMC – Directive 2014/30/EU**

☒ EN 50121-4:2016/A1:2019

☒ EN IEC 61000-3-2:2019

☒ EN 61000-3-3:2013/A2:2021

☒ **EMC – Regulations 2016**

☒ EN 50121-4:2016/A1:2019

☒ EN IEC 61000-3-2:2019

☒ EN 61000-3-3:2013/A2:2021



2.1 Conducted Emissions at Mains Power Ports

Test Date

May. 29, 2024

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	Nov 08, 2024
☒	LISN	ENV216	R & S	101787	Nov 08, 2024
☒	LISN	ENV216	R & S	101137	Jan 10, 2025
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	Nov 08, 2024

Test Conditions

Temperature: (22,4 ± 0,1) °C

Relative Humidity: (46,1 ± 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

May. 29, 2024

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	Nov 08, 2024
☒	LISN	ENV216	R & S	101787	Nov 08, 2024
☒	LISN	ENV216	R & S	101137	Jan 10, 2025
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	Nov 08, 2024
☐	8-WIRE ISN CAT3,5	ENY81	R & S	100174	Nov 09, 2024
☒	8-WIRE ISN CAT6	ENY81-CAT6	R & S	101666	Mar 05, 2025

Test Conditions

Temperature: (22,4 ± 0,1) °C

Relative Humidity: (46,1 ± 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.



2.3 Impulse Noise (click)

Test Date

N/A

Test Location

Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☐	EMI Test S/W	CLICK METER SOFTWARE CMS FOR DDA55	AFJ	4.19	-
☐	CLICK ANALYZER	DDA55+	AFJ INSTRUMENTS	14042211198	Feb 13, 2025
☐	LISN	ENV216	R & S	101786	Jan 10, 2025

Test Conditions

Temperature:

°C

Relative Humidity:

% 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

RemarksImpulse Noise(click) does not occurrence.



2.4 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

May 29, 2024

Test Location☒ SEMI ANECHOIC CHAMBER #4(10 m)**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	Feb 13, 2025
☒	AMPLIFIER	SCU 01	R & S	100603	Nov 08, 2024
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	Nov 17, 2024
☒	ATTENUATOR	8491A	HP	32173	Feb 13, 2025

Test Conditions

Temperature: (22,6 ± 0,1) °C

Relative Humidity: (46,5 ± 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.



2.5 Radiated Electric Field Emissions(Above 1 GHz)

Test Date

May 29, 2024

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	Jul 31, 2024
☒	PREAMPLIFIER	8449B	AGILENT	3008A01967	Mar 05, 2025
☒	ATTENUATOR	8491A	HP	35496	Feb 13, 2025
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	Mar 05, 2025

Test Conditions

Temperature: (23,2 ± 0,1) °C

Relative Humidity: (46,4 ± 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.



2.6 Harmonic Current Emissions

Test Date

Jun 03, 2024

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	Mar 28, 2025
☒	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

Test Conditions

Temperature: (22,7 ± 0,1) °C

Relative Humidity: (45,9 ± 0,1) % R.H.

Classification of Equipment for Harmonic Current Emissions

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

Test Results

The requirements are:

- ☒ PASS
- ☐ NOT PASS
- ☐ NOT APPLICABLE

Remarks

- See Appendix A for test data.

- The LAN port is regarded as a wired communication network port and power related ports are not tested.



2.7 Voltage Fluctuations and Flicker

Test Date

Jun 03, 2024

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	Mar 28, 2025
☒	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

Test Conditions

Temperature: (22,7 ± 0,6) °C
Relative Humidity: (45,9 ± 0,6) % R.H.

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

- See Appendix A for test data.
- The LAN port is regarded as a wired communication network port and power related ports are not tested.



3.0 Criteria for Compliance

Criteria for compliance was based on the following guidelines:

General performance criteria

The general principles (performance criteria) for the evaluation of the immunity test results are the following.

Performance criteria A

The apparatus shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

Performance criteria B

The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

Performance criteria C

Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.



3.1 Electrostatic Discharge

Reference Standard

EN 61000-4-2:2009

Test Date

May 31, 2024

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	Jan 30, 2025
☒	HCP	-	KES	-	-
☒	VCP	-	Noise Ken	-	-

Test Conditions

Temperature: (23,7 ± 0,1) °C
Relative Humidity: (48,0 ± 0,1) % R.H.
Atmospheric Pressure: (100,2 ± 0,0) kPa

Test Specifications

Discharge Factor: ≥ 1 s

Discharge Impedance: 330 ohm / 150 pF

Kind of Discharge: Air, Contact (direct and indirect)

Polarity: Positive and Negative

Number of Discharge: ■ 10 at all locations for Air discharge
■ 10 at all locations for Contact discharge

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

Notes: HCP: Horizontal Coupling Plane

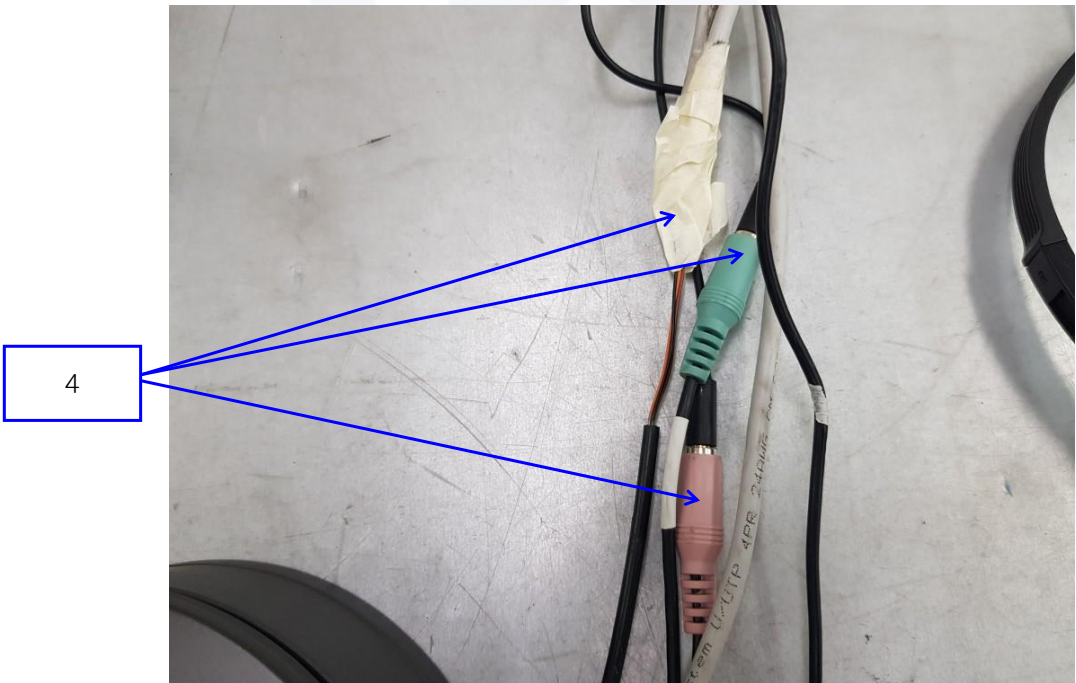
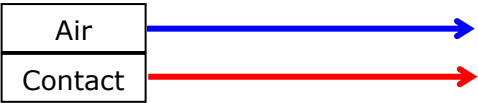
VCP: Vertical Coupling Plane

Required Performance Criteria: ☒ B



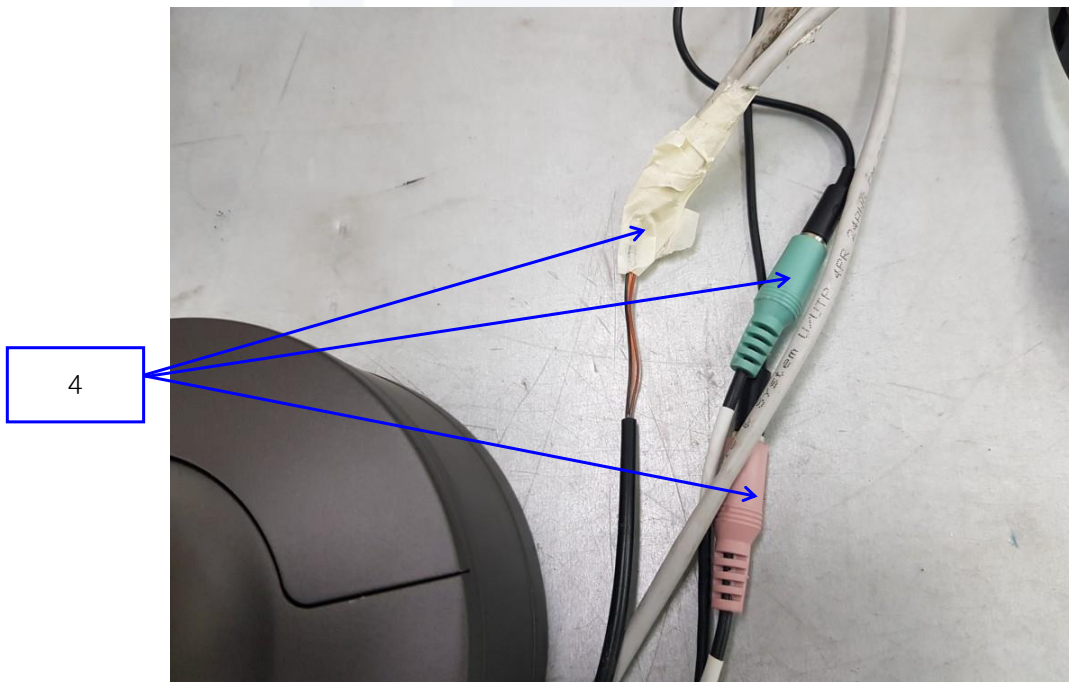
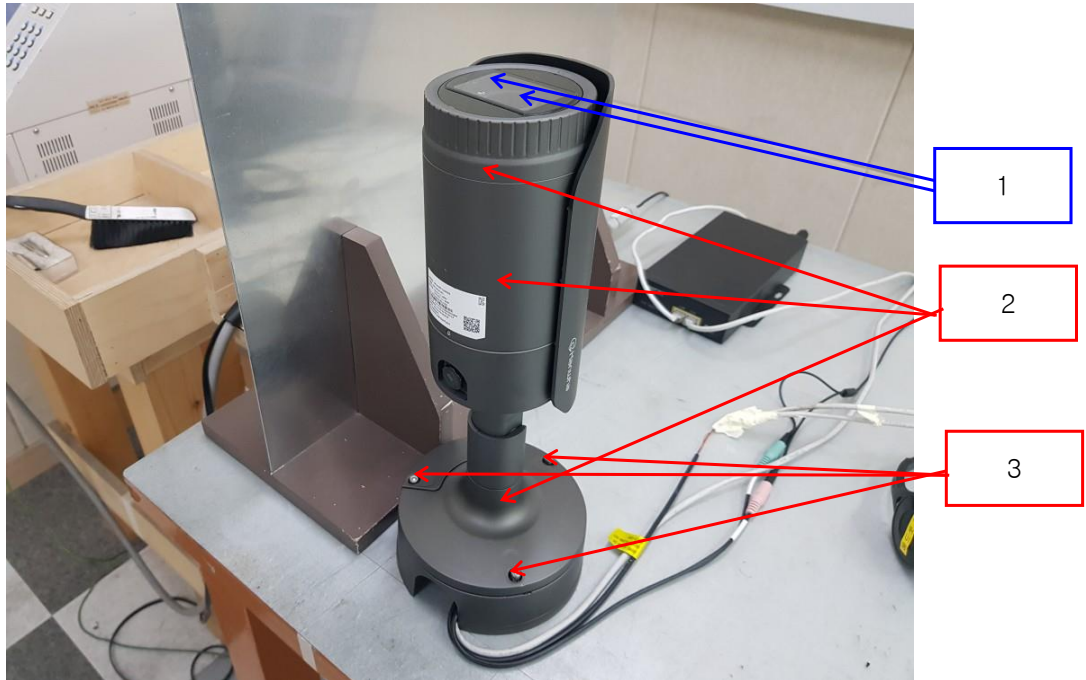
Location of Discharge:

■ #1





■ #2



**Test Data**

■ #1

Indirect Discharge

No.	Test Point	Discharge Method	Performance	
			Criteria	Results
1	HCP Contact	Contact Discharge	B	A
2	VCP Contact	Contact Discharge	B	A

Direct Discharge

No.	Test Point	Discharge Method	Performance	
			Criteria	Results
1	Camera Lens	Air Discharge	B	A
2	Enclosure	Contact Discharge	B	A
3	Screw	Contact Discharge	B	A
4	Around the Port	Air Discharge	B	A

■ #2

Indirect Discharge

No.	Test Point	Discharge Method	Performance	
			Criteria	Results
1	HCP Contact	Contact Discharge	B	A
2	VCP Contact	Contact Discharge	B	A

Direct Discharge

No.	Test Point	Discharge Method	Performance	
			Criteria	Results
1	Camera Lens	Air Discharge	B	A
2	Enclosure	Contact Discharge	B	A
3	Screw	Contact Discharge	B	A
4	Around the Port	Air Discharge	B	A

Note: "Blank" = Not performed

Results:

A – No degradation of function

B – Distortion/Error of function (self-recoverable)

C – Loss of function

Test Results

☒ PASS Required Performance Criteria

☐ NOT PASS Required Performance Criteria

Remarks

Any degradations of performance was not observed during in the test.



3.2 Radio-frequency Electromagnetic Field

Reference Standard

EN IEC 61000-4-3:2020

Test Date

May 29, 2024

Test LocationEMS-RS: ☒ SEMI ANECHOIC CHAMBER #3 ☐ SEMI ANECHOIC CHAMBER #4(10 m)**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	Jul 31, 2024
☒	HIGH POWER DUAL AMP	SSA532	SUNGSAN	SSA532-001	-
☒	POWER METER	E4419B	Agilent	GB40203000	Feb 13, 2025
☒	AVERAGE POWER SENSOR	E9301A	Agilent	MY52170007	Feb 13, 2025
☒	AVERAGE POWER SENSOR	E9301A	Agilent	MY41498669	Feb 13, 2025
☒	STACKED DOUBLE LOG-PER- ANTENNA	STPL9128 E	Schwarzbeck	9128ES-121	-
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	Mar 05, 2025

Test Conditions

Temperature: (23,2 ± 0,6) °C
Relative Humidity: (46,4 ± 0,6) % R.H.
Atmospheric Pressure: (100,5 ± 0,0) kPa



Test Specifications

Antenna Polarization: Horizontal & Vertical unless indicated otherwise

Antenna Distance: ☒ 3 m

Frequency Range: ☒ 80 MHz to 800 MHz [10V/m]
[Field Strength] ☒ 800 MHz to 1 GHz [20 V/m]
☒ 1,4 GHz to 2,0 GHz [10 V/m]
☒ 2,0 GHz to 2,7 GHz [5 V/m]
☒ 5,1 GHz to 6,0 GHz [3 V/m]

Modulation: ☒ 80 % AM, 1 kHz sine wave

Frequency Step: ☒ 1 % step

Dwell Time: ☐ 1 s ☒ 3 s

of Sides Radiated: ☒ 4

Required Performance Criteria: ☒ A

**Test Data**

■ #1

Side Exposed	Performance Criteria	Results	
		Horizontal	Vertical
Front	A	A	A
Right	A	A	A
Back	A	A	A
Left	A	A	A

■ #2

Side Exposed	Performance Criteria	Results	
		Horizontal	Vertical
Front	A	A	A
Right	A	A	A
Back	A	A	A
Left	A	A	A

Note: "Blank" = Not performed

Results:

A – No degradation of function

B – Distortion/Error of function (self-recoverable)

C – Loss of function

Test Results

☒ PASS Required Performance Criteria

☐ NOT PASS Required Performance Criteria

Remarks

Any degradations of performance was not observed during in the test.



3.3 Fast Transients

Reference Standard

EN 61000-4-4:2012

Test Date

May 31, 2024

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	Nov 09, 2024
☒	MOTOR VARIAC	MV2616	EM TEST	P1552169719	Nov 09, 2024
☒	CAPACITIVE COUPLING CLAMP	HFK	EM TEST	P1633183115	Nov 10, 2024

Test Conditions

Temperature: (23,7 ± 0,1) °C
Relative Humidity: (48,0 ± 0,1) % R.H.
Atmospheric Pressure: (100,2 ± 0,0) kPa

Test Specifications

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

Pulse Amplitude & Polarity: ☒ ± 2.0 kV ☐ ± 4.0 kV
(Signal Lines)

Pulse Amplitude & Polarity: ☐ ± 1.0 kV
(Earth Lines)

Burst Period: ☒ 300 ms

Repetition Rate: ☒ 5 kHz

Duration of Test Voltage: ☒ ≥ 1 min

Required Performance Criteria: ☒ A

**Test Data**

■ #1

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

Mode of Application	Performance Criteria	Results	
		(+) Burst (kV)	(-) Burst (kV)
L	A	A	A
N	A	A	A
L – N	A	A	A

☒ Signal ports and telecommunication ports – Coupling Clamp used

Mode of Application	Performance Criteria	Results	
		(+) Burst (kV)	(-) Burst (kV)
RJ-45 (LAN)	A	A	A
Alarm IN	A	A	A
Alarm OUT	A	A	A

☐ Earth ports – Coupling Clamp used

Mode of Application	Performance Criteria	Results	
		(+) Burst (kV)	(-) Burst (kV)
-	A	-	-



■ #2

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

Mode of Application	Performance Criteria	Results	
		(+) Burst (kV)	(-) Burst (kV)
-	A	-	-

☒ Signal ports and telecommunication ports – Coupling Clamp used

Mode of Application	Performance Criteria	Results	
		(+) Burst (kV)	(-) Burst (kV)
RJ-45 (PoE)	A	A	A
Alarm IN	A	A	A
Alarm OUT	A	A	A

☐ Earth ports – Coupling Clamp used

Mode of Application	Performance Criteria	Results	
		(+) Burst (kV)	(-) Burst (kV)
-	A	-	-

Note: “Blank” = Not performed

Results:

A – No degradation of function

B – Distortion/Error of function (self-recoverable)

C – Loss of function

Test Results☒ PASS Required Performance Criteria☐ NOT PASS Required Performance Criteria**Remarks**Any degradations of performance was not observed during in the test.



3.4 Surges

Reference Standard

EN 61000-4-5:2014+A1:2017

Test Date

May 31, 2024

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	Nov 09, 2024
☒	MOTOR VARIAC	MV2616	EM TEST	P1552169719	Nov 09, 2024
☒	CDN	CNV 508N1	EM TEST	P1610176296	Nov 10, 2024

Test Conditions

Temperature: (23,7 ± 0,6) °C
Relative Humidity: (48,0 ± 0,6) % R.H.
Atmospheric Pressure: (100,2 ± 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
☐ (2,0) kV
Differential Mode
☒ (1,0) kVNumber of Surges: ☒ 5 surges per angleAngle: ☒ 0°, 90°, 180°, 270° (input AC power port)Polarity: ☒ Positive & NegativeRepetition Rate: ☒ 1 surge per min ☐ 1 surge per 30 sec.Required Performance Criteria: ☒ B**DC Power Lines**Source Impedance: 42 ohm
Surge Amplitude: Common Mode
☐ (2,0) kV
Differential Mode
☐ (1,0) kVNumber of Surges: ☐ 5 SurgesPolarity: ☐ Positive & NegativeRepetition Rate: ☐ 1 surge per min ☐ 1 surge per 30 sec.Required Performance Criteria: ☐ B**Signal Lines**Source Impedance: 42 ohm
Surge Amplitude: Common Mode
☐ (2,0) kV
Differential Mode
☒ (1,0) kVNumber of Surges: ☒ 5 SurgesPolarity: ☒ Positive & NegativeRepetition Rate: ☒ 1 surge per min ☐ 1 surge per 30 sec.Required Performance Criteria: ☒ B

**Test Data**

■ #1

☒ Line to Line – Differential Mode

Mode of Application	Performance Criteria	Results	
		(+) Surge (kV)	(-) Surge (kV)
L – N	B	A	A

☐ Line to Earth – Common Mode

Mode of Application	Performance Criteria	Results	
		(+) Surge (kV)	(-) Surge (kV)
-	B	-	-

Signal Lines☒ Line to Line – Differential Mode

Mode of Application	Performance Criteria	Observations	
		(+) Surge (kV)	(-) Surge (kV)
RJ-45 (LAN)	B	A	A

☐ Line to Earth – Common Mode

Mode of Application	Performance Criteria	Results	
		(+) Surge (kV)	(-) Surge (kV)
-	B	-	-



■ #2

☐ Line to Line – Differential Mode

Mode of Application	Performance Criteria	Results	
		(+) Surge (kV)	(-) Surge (kV)
-	B	-	-

☐ Line to Earth – Common Mode

Mode of Application	Performance Criteria	Results	
		(+) Surge (kV)	(-) Surge (kV)
-	B	-	-

Signal Lines☒ Line to Line – Differential Mode

Mode of Application	Performance Criteria	Observations	
		(+) Surge (kV)	(-) Surge (kV)
RJ-45 (PoE)	B	A	A

☐ Line to Earth – Common Mode

Mode of Application	Performance Criteria	Results	
		(+) Surge (kV)	(-) Surge (kV)
-	B	-	-

Note: "Blank" = Not performed

Results:

A – No degradation of function

B – Distortion/Error of function (self-recoverable)

C – Loss of function

Test Results☒ PASS Required Performance Criteria☐ NOT PASS Required Performance Criteria**Remarks**Any degradations of performance was not observed during in the test.



3.5 Conducted Disturbance

Reference Standard

EN 61000-4-6:2014

Test Date

May 30, 2024

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	Nov 08, 2024
☒	ATTENUATOR	ATT 6/80	EM TEST	P1614178148	Nov 08, 2024
☒	CDN	CDN M016	TESEQ	43694	Nov 08, 2024
☒	CDN	CDN M016	TESEQ	43697	Nov 08, 2024
☒	CDN	CDN T800	TESEQ	42800	Nov 08, 2024
☒	EM CLAMP	KEMZ 801A	TESEQ	44099	Nov 09, 2024

Test Conditions

Temperature: (23,5 ± 0,6) °C
Relative Humidity: (46,0 ± 0,6) % R.H.
Atmospheric Pressure: (100,4 ± 0,0) kPa

Test Specifications

Frequency Range: ☒ 150 kHz to 80 MHz
Voltage Level: ☒ 10 Vrms
Modulation: ☒ 80 % AM, 1 kHz sine wave
Frequency Step: ☒ 1 % step
Dwell Time: ☐ 1 s ☒ 3 s
Required Performance Criteria: ☒ A

**Test Data**

■ #1

☒ Input a.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Performance Criteria	Results
L – N	CDN	A	A

☒ Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Performance Criteria	Results
RJ-45 (LAN)	CDN	A	A
Alarm IN	Clamp	A	A
Alarm OUT	Clamp	A	A

☐ Earth ports

Coupling Location (Line Stressed)	Coupling Method	Performance Criteria	Results
-	-	-	-



■ #2

☐ Input a.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Performance Criteria	Results
-	CDN	-	-

☒ Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Performance Criteria	Results
RJ-45 (PoE)	CDN	A	A
Alarm IN	Clamp	A	A
Alarm OUT	Clamp	A	A

☐ Earth ports

Coupling Location (Line Stressed)	Coupling Method	Performance Criteria	Results
-	-	-	-

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

Results:

A – No degradation of function

B – Distortion/Error of function (self-recoverable)

C – Loss of function

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

Any degradations of performance was not observed during in the test.



3.6 Power Frequency Magnetic Field Immunity

Reference Standard

EN 61000-4-8:2010

Test Date

May 31, 2024

Test Location

EMS-Magnetic: 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	-
☒	EMS Test S/W	NET.CONTROL	EM TEST	1.2.11	-
☒	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	Nov 09, 2024
☒	MOTOR VARIAC	MV2616	EM TEST	P1552169719	Nov 09, 2024
☒	MAGNETIC FIELD COIL	MS 100N	EM TEST	P1536163691	Nov 10, 2024
☒	CURRENT TRANSFORMER	MC 26100 (100 A 교정)	EM TEST	P1550168963	Feb 14, 2025
☒	MULTIFUNCTION AC/DC POWER SOURCE	NETWAVE 7-400	EM TEST	P1614178393	Nov 08, 2024
☒	MAGNETICFIELD COIL	INA 703	Teseq AG	3006	Feb 14, 2025

Test Conditions

Temperature: (23,7 ± 0,1) °C
Relative Humidity: (48,0 ± 0,1) % R.H.
Atmospheric Pressure: (100,2 ± 0,0) kPa



Test Specifications

Field Strength(Power Source):

☒ 100 A/m (ac)

☒ 300 A/m (dc)

Frequency (ac):

☒ 16.7 Hz

☒ 50 Hz

☐ 60 Hz

Frequency (dc):

☒ 0 Hz

Required Performance Criteria:

☒ A



**Test Data**

■ #1

☒ Immersion method

Coil orientation	Performance	
	Criteria	Results
X - axis	A	A
Y - axis	A	A
Z - axis	A	A

■ #2

☒ Immersion method

Coil orientation	Performance	
	Criteria	Results
X - axis	A	A
Y - axis	A	A
Z - axis	A	A

Note: "blank" = Not performed

Results:

A – No degradation of function

B – Distortion/Error of function (self-recoverable)

C – Loss of function

Test Results☒ PASS Required Performance Criteria☐ NOT PASS Required Performance Criteria**Remarks**Any degradations of performance was not observed during in the test.



APPENDIX A – TEST DATA

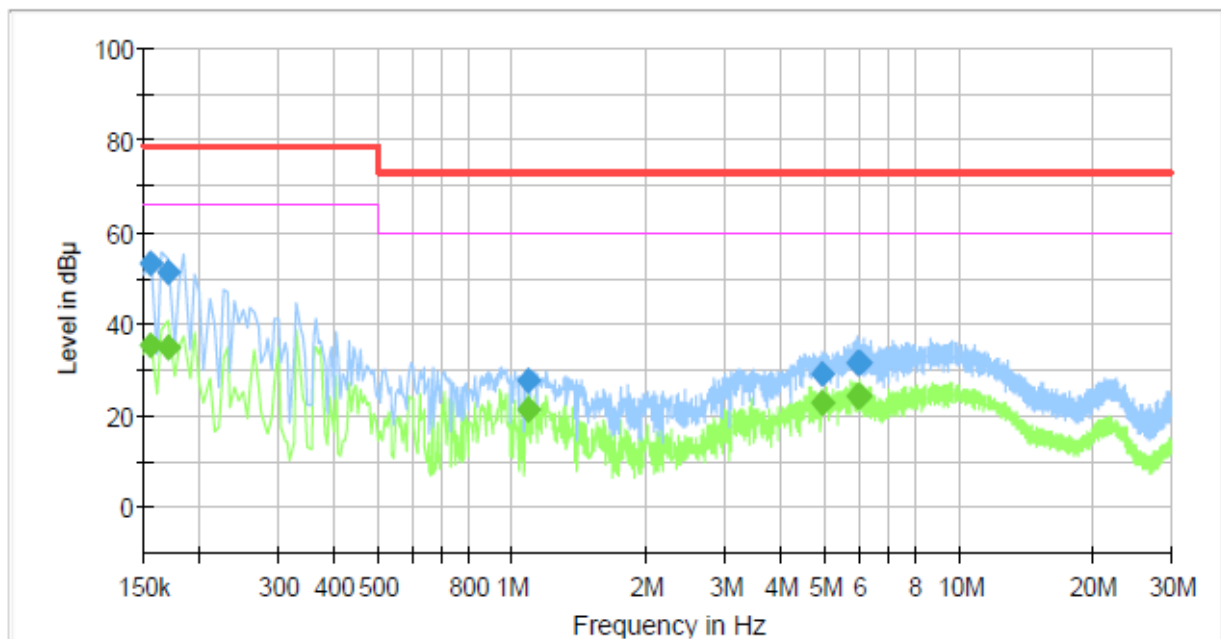
Conducted Emissions at Mains Power Ports

■ #1

[HOT]

Common Information

Test Description: Conducted Emission
Job No.: KES-EM241550
Phase: L1
Mode:
Operator Name: KES



Final Result

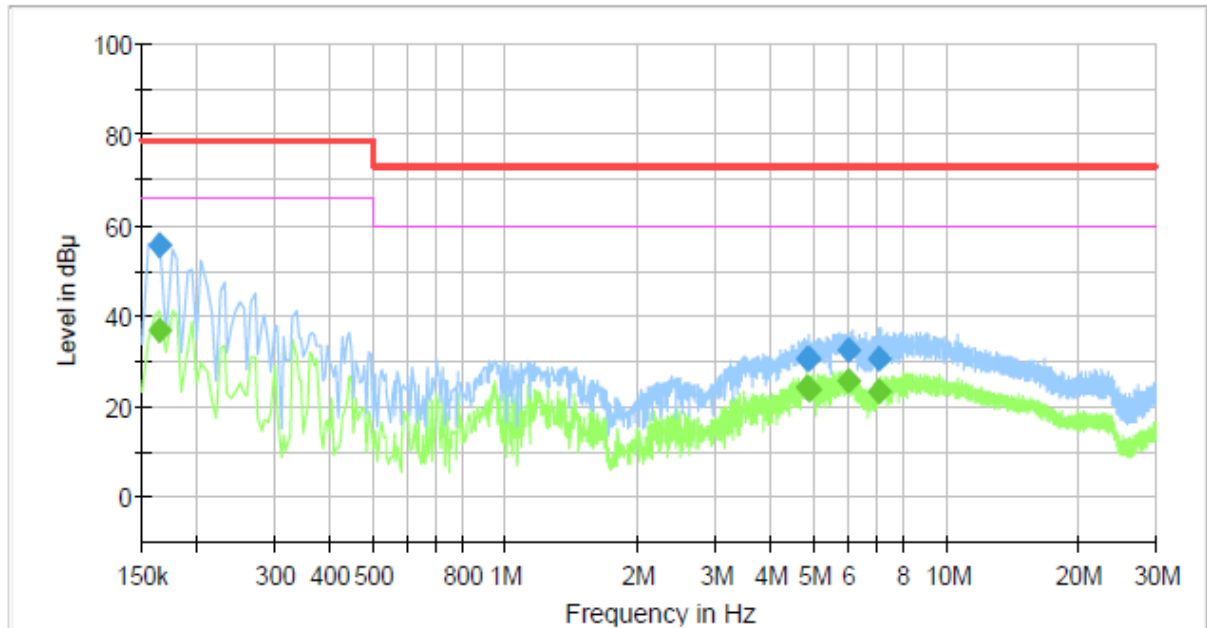
Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.155000	---	35.45	66.00	30.55	1000.0	9.000	L1	19.4
0.155000	53.14	---	79.00	25.86	1000.0	9.000	L1	19.4
0.170000	---	34.79	66.00	31.21	1000.0	9.000	L1	19.4
0.170000	51.46	---	79.00	27.54	1000.0	9.000	L1	19.4
1.085000	---	21.28	60.00	38.72	1000.0	9.000	L1	19.5
1.085000	27.63	---	73.00	45.37	1000.0	9.000	L1	19.5
4.950000	---	22.92	60.00	37.08	1000.0	9.000	L1	19.7
4.950000	29.00	---	73.00	44.00	1000.0	9.000	L1	19.7
5.930000	---	24.20	60.00	35.80	1000.0	9.000	L1	19.8
5.930000	31.72	---	73.00	41.28	1000.0	9.000	L1	19.8
6.015000	---	24.17	60.00	35.83	1000.0	9.000	L1	19.8
6.015000	31.72	---	73.00	41.28	1000.0	9.000	L1	19.8



[NEUTRAL]

Common Information

Test Description: Conducted Emission
Job No.: KES-EM241550
Phase: N
Mode:
Operator Name: KES

**Final Result**

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.165000	---	36.98	66.00	29.02	1000.0	9.000	N	19.3
0.165000	55.58	---	79.00	23.42	1000.0	9.000	N	19.3
4.845000	---	24.08	60.00	35.92	1000.0	9.000	N	19.7
4.845000	30.56	---	73.00	42.44	1000.0	9.000	N	19.7
4.905000	---	23.98	60.00	36.02	1000.0	9.000	N	19.7
4.905000	30.41	---	73.00	42.59	1000.0	9.000	N	19.7
5.985000	---	25.69	60.00	34.31	1000.0	9.000	N	19.8
5.985000	32.63	---	73.00	40.37	1000.0	9.000	N	19.8
7.070000	---	23.23	60.00	36.77	1000.0	9.000	N	19.9
7.070000	30.58	---	73.00	42.42	1000.0	9.000	N	19.9

◆ Calculation

$$\text{QuasiPeak [dB}\mu\text{V]} / \text{CAverage [dB}\mu\text{V]} = \text{Reading Value [dB}\mu\text{V]} + \text{Corr. [dB]}$$

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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

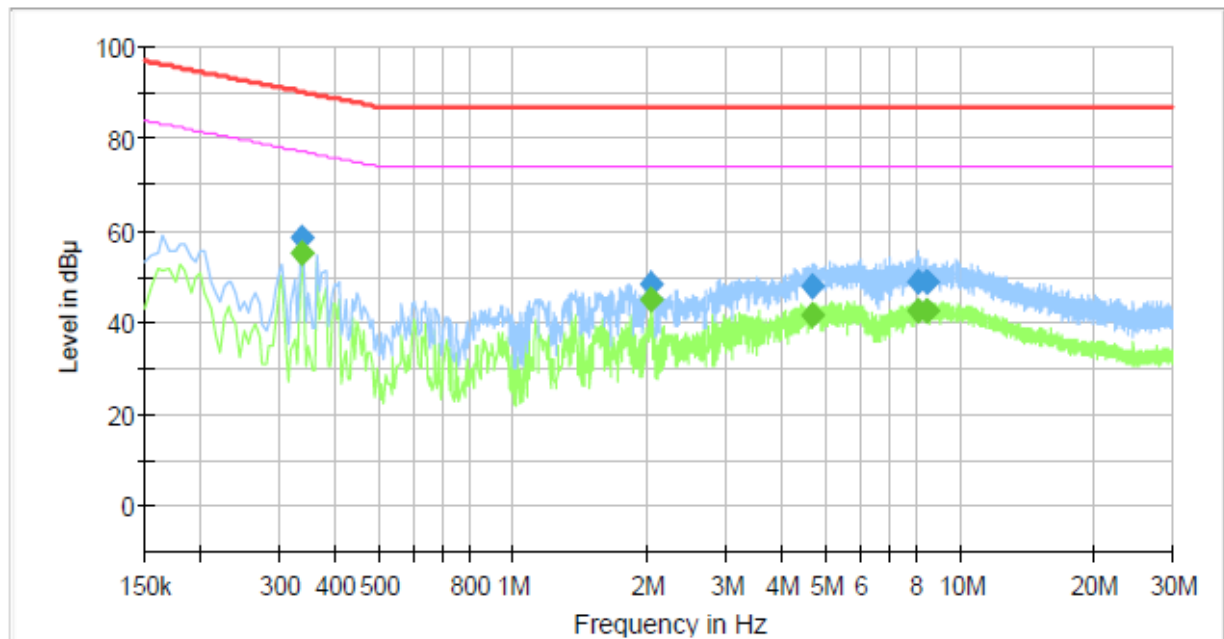
**Conducted Emissions at Telecommunication Ports**

■ #1

[1 000 Mbps]

Common Information

Test Description: Telecommunication Emission
Job No.: KES-EM241550
Mode : #1_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)
0.335000	---	55.02	77.33	22.31	1000.0	9.000	Single Line	19.3
0.335000	58.33	---	90.33	32.00	1000.0	9.000	Single Line	19.3
2.050000	---	45.04	74.00	28.96	1000.0	9.000	Single Line	19.2
2.050000	48.39	---	87.00	38.61	1000.0	9.000	Single Line	19.2
4.675000	---	41.54	74.00	32.46	1000.0	9.000	Single Line	19.3
4.675000	47.92	---	87.00	39.08	1000.0	9.000	Single Line	19.3
8.110000	---	42.60	74.00	31.40	1000.0	9.000	Single Line	19.4
8.110000	48.73	---	87.00	38.27	1000.0	9.000	Single Line	19.4
8.430000	---	42.50	74.00	31.50	1000.0	9.000	Single Line	19.5
8.430000	48.80	---	87.00	38.20	1000.0	9.000	Single Line	19.5

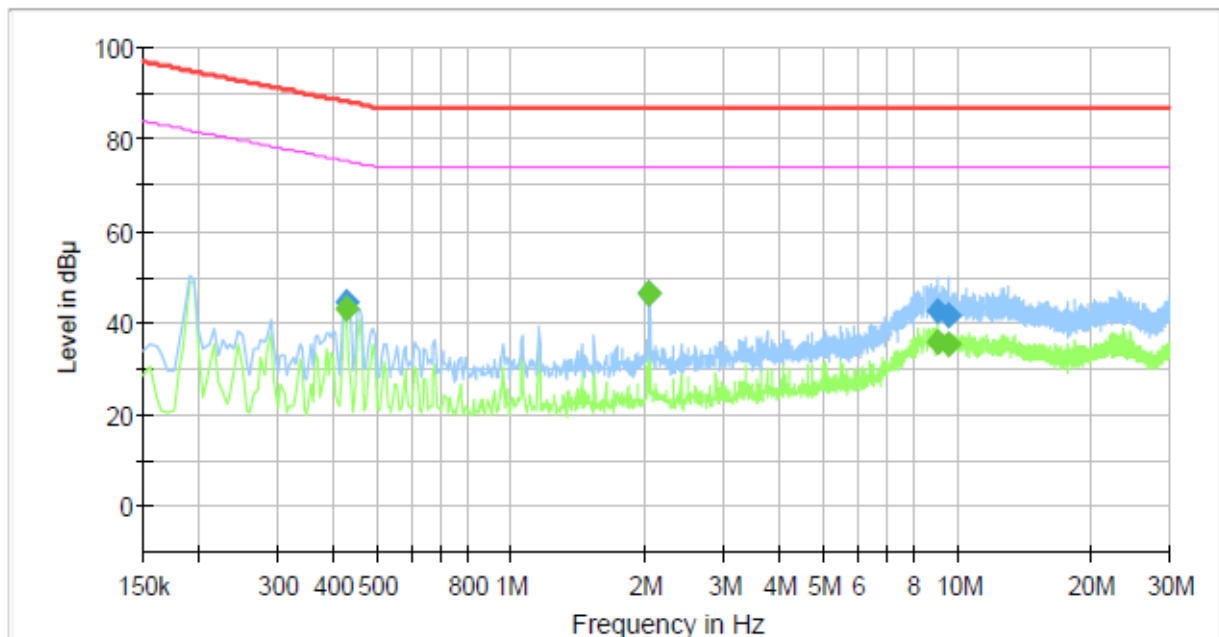


#2

[1 000 Mbps]

Common Information

Test Description: Telecommunication Emission
Job No.: KES-EM241550
Mode : #2_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)
0.430000	---	43.00	75.25	32.25	1000.0	9.000	Single Line	19.3
0.430000	44.69	---	88.25	43.56	1000.0	9.000	Single Line	19.3
2.050000	---	46.23	74.00	27.77	1000.0	9.000	Single Line	19.2
2.050000	46.67	---	87.00	40.33	1000.0	9.000	Single Line	19.2
9.035000	---	35.99	74.00	38.01	1000.0	9.000	Single Line	19.5
9.035000	42.72	---	87.00	44.28	1000.0	9.000	Single Line	19.5
9.610000	---	35.55	74.00	38.45	1000.0	9.000	Single Line	19.5
9.610000	41.76	---	87.00	45.24	1000.0	9.000	Single Line	19.5

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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



Report No. : KES-EM241550

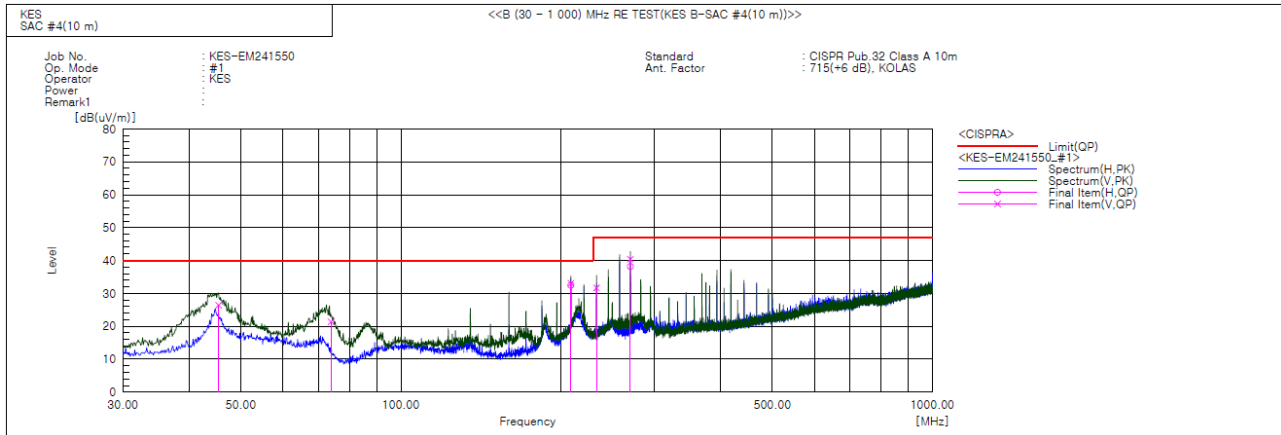
Page 46 / 81

Impulse Noise (click)

N/A

**Radiated Electric Field Emissions(Below 1 GHz)**

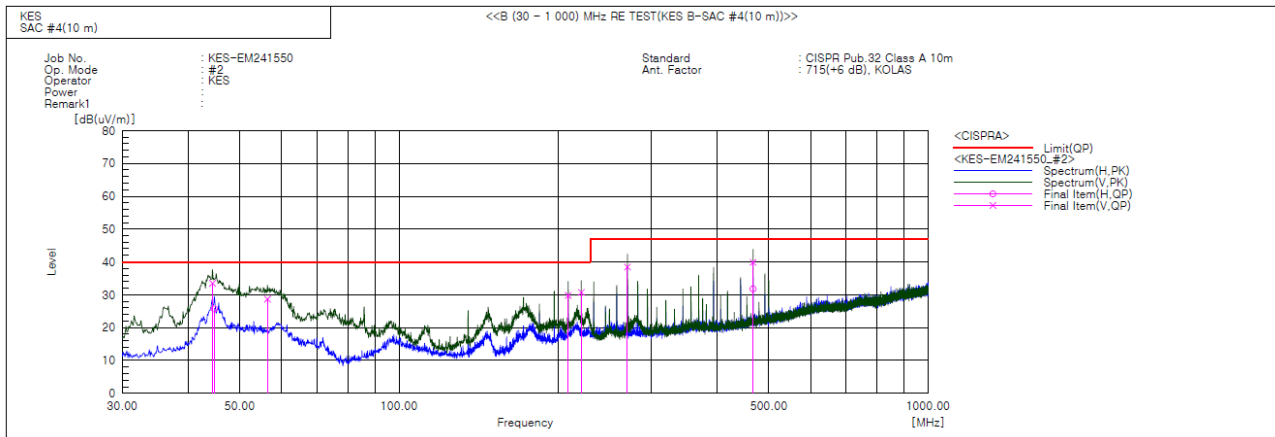
■ #1

**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	45.399	V	47.9	-21.5	26.4	40.0	13.6	112.0	97.0	
2	73.893	V	47.8	-26.4	21.4	40.0	18.6	106.0	139.0	
3	208.844	V	53.2	-20.1	33.1	40.0	6.9	146.0	295.0	
4	208.844	H	52.6	-20.1	32.5	40.0	7.5	395.0	251.0	
5	233.458	V	50.7	-19.0	31.7	47.0	15.3	149.0	187.0	
6	270.318	V	58.8	-18.4	40.4	47.0	6.6	111.0	120.0	
7	270.318	H	56.6	-18.4	38.2	47.0	8.8	399.0	2.0	



■ #2



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	44.429	V	55.1	-21.6	33.5	40.0	6.5	141.0	274.0	
2	44.793	H	47.3	-21.6	25.7	40.0	14.3	396.0	87.0	
3	56.433	V	50.2	-21.5	28.7	40.0	11.3	112.0	195.0	
4	208.844	V	49.9	-20.1	29.8	40.0	10.2	106.0	191.0	
5	221.211	V	50.1	-19.4	30.7	40.0	9.3	112.0	198.0	
6	270.318	V	56.9	-18.4	38.5	47.0	8.5	103.0	34.0	
7	466.985	V	52.1	-12.2	39.9	47.0	7.1	148.0	27.0	
8	466.985	H	44.0	-12.2	31.8	47.0	15.2	196.0	20.0	

◆ Calculation

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

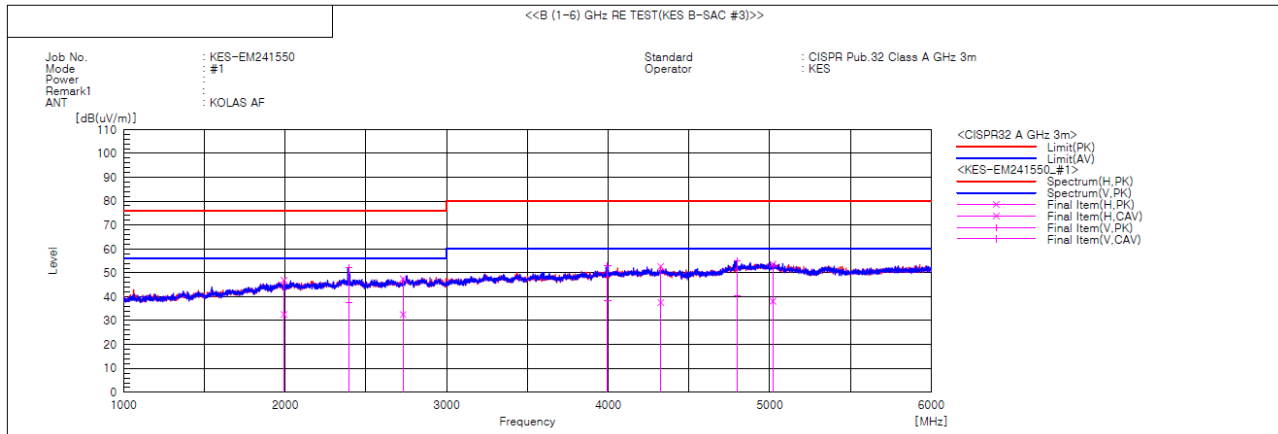
Margin(QP)[dB] = Limit[dB(μV/m)] - Result(QP) [dB(μV/m)]

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)**

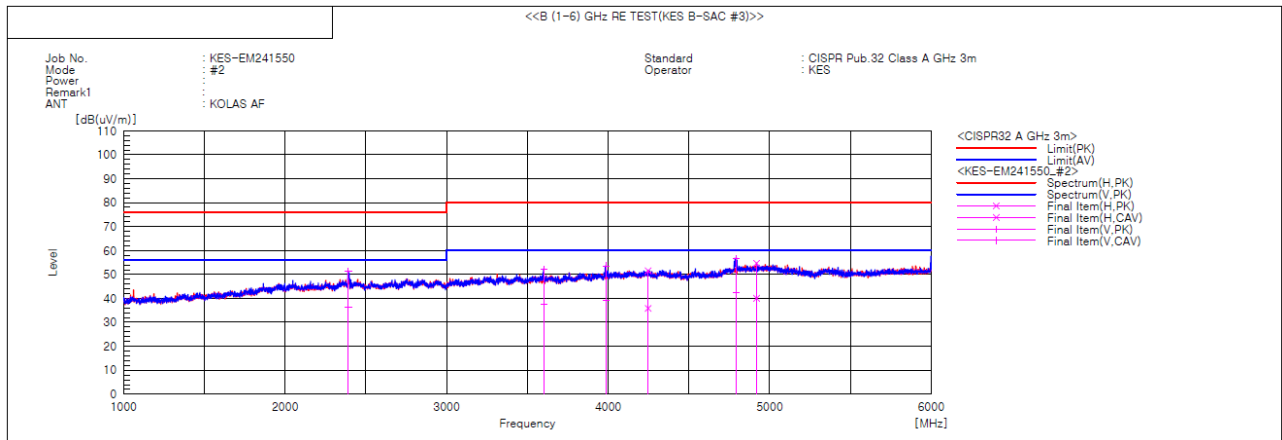
■ #1

**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	1992.746	H	42.1	27.8	4.8	46.9	32.6	76.0	56.0	29.1	23.4	100.0	69.9	
2	2393.151	V	46.4	31.6	5.9	52.3	37.5	76.0	56.0	23.7	18.5	100.0	262.3	
3	2729.978	H	40.5	25.6	7.0	47.5	32.6	76.0	56.0	28.5	23.4	100.0	270.9	
4	3995.863	V	41.6	27.2	11.2	52.8	38.4	80.0	60.0	27.2	21.6	100.0	131.4	
5	4324.974	H	40.1	25.0	12.6	52.7	37.6	80.0	60.0	27.3	22.4	100.0	206.3	
6	4796.742	V	40.7	26.1	14.3	55.0	40.4	80.0	60.0	25.0	19.6	100.0	185.2	
7	5019.978	H	38.2	22.6	15.5	53.7	38.1	80.0	60.0	26.3	21.9	100.0	120.7	



■ #2



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	2392.516	V	45.5	30.5	5.9	51.4	36.4	76.0	56.0	24.6	19.6	100.0	230.9	
2	3600.867	V	42.1	27.5	10.2	52.3	37.7	80.0	60.0	27.7	22.3	100.0	139.3	
3	3985.086	V	42.4	27.8	11.2	53.6	39.0	80.0	60.0	26.4	21.0	100.0	47.8	
4	4247.115	H	39.3	23.6	12.3	51.6	35.9	80.0	60.0	28.4	24.1	100.0	256.7	
5	4794.728	V	42.5	28.1	14.3	56.8	42.4	80.0	60.0	23.2	17.6	100.0	170.6	
6	4918.711	H	39.4	24.8	15.3	54.7	40.1	80.0	60.0	25.3	19.9	100.0	352.2	

◆ Calculation

Over Limit [dB] = (Read Level[dB μ V] + Ant Factor[dB/m] + Cable Loss [dB] – Preamp Factor [dB]) – Limit Line[dB μ V]

Over Limit : Marjin, Read Level : Reading value, Ant Factor : ANT Factor,
Cable Loss : Cable loss, Preamp Factor : Preamp Factor

**Harmonic Current Emissions and Voltage Fluctuations and Flicker**

■ #1

Average harmonic current results				
Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	0.054			
2	0.001	0.100	1.080	n/a
3	0.047	2.052	2.300	PASS
4	0.002	0.423	0.430	n/a
5	0.047	4.119	1.140	PASS
6	0.001	0.428	0.300	n/a
7	0.046	6.022	0.770	PASS
8	0.001	0.608	0.230	n/a
9	0.043	10.822	0.400	PASS
10	0.001	0.688	0.184	n/a
11	0.040	12.223	0.330	PASS
12	0.001	0.780	0.153	n/a
13	0.037	17.850	0.210	PASS
14	0.001	1.060	0.131	n/a
15	0.034	22.919	0.150	PASS
16	0.001	1.103	0.115	n/a
17	0.031	23.526	0.132	PASS
18	0.001	1.169	0.102	n/a
19	0.028	23.572	0.118	PASS
20	0.001	1.266	0.092	n/a
21	0.025	15.363	0.161	PASS
22	0.001	1.479	0.084	n/a
23	0.021	14.515	0.147	PASS
24	0.001	1.556	0.077	n/a
25	0.018	13.618	0.135	PASS
26	0.001	1.611	0.071	n/a
27	0.016	12.512	0.125	PASS
28	0.001	1.764	0.066	n/a
29	0.013	11.307	0.116	PASS
30	0.001	1.808	0.061	n/a
31	0.011	10.350	0.109	PASS
32	0.001	1.996	0.058	n/a
33	0.010	9.435	0.102	PASS
34	0.001	1.981	0.054	n/a
35	0.009	9.126	0.096	PASS
36	0.001	2.158	0.051	n/a
37	0.008	8.799	0.091	PASS
38	0.001	2.206	0.048	n/a
39	0.008	8.984	0.087	PASS
40	0.001	2.204	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	0.054			
2	0.001	0.085	1.620	n/a
3	0.048	1.402	3.450	PASS
4	0.002	0.370	0.645	n/a
5	0.047	2.755	1.710	PASS
6	0.002	0.341	0.450	n/a
7	0.047	4.046	1.155	PASS
8	0.002	0.521	0.345	n/a
9	0.043	7.240	0.600	PASS
10	0.002	0.581	0.276	n/a
11	0.041	8.240	0.495	PASS
12	0.001	0.645	0.230	n/a
13	0.038	12.003	0.315	PASS
14	0.002	0.893	0.197	n/a
15	0.035	15.348	0.225	PASS
16	0.002	0.897	0.173	n/a
17	0.031	15.789	0.199	PASS
18	0.002	0.991	0.153	n/a
19	0.028	15.780	0.178	PASS
20	0.001	1.060	0.138	n/a
21	0.025	15.446	0.161	PASS
22	0.002	1.262	0.125	n/a
23	0.021	14.586	0.147	PASS
24	0.001	1.261	0.115	n/a
25	0.019	13.726	0.135	PASS
26	0.001	1.294	0.106	n/a
27	0.016	12.618	0.125	PASS
28	0.001	1.446	0.099	n/a
29	0.013	11.428	0.116	PASS
30	0.001	1.457	0.092	n/a
31	0.011	10.468	0.109	PASS
32	0.001	1.589	0.086	n/a
33	0.010	9.541	0.102	PASS
34	0.001	1.534	0.081	n/a
35	0.009	9.281	0.096	PASS
36	0.001	1.723	0.077	n/a
37	0.008	8.960	0.091	PASS
38	0.001	1.735	0.073	n/a
39	0.008	9.166	0.087	PASS
40	0.001	1.733	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

■ #1

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

■ #1





Conducted Emissions at Telecommunication Ports

■ #1





■ #2





Impulse Noise (click)

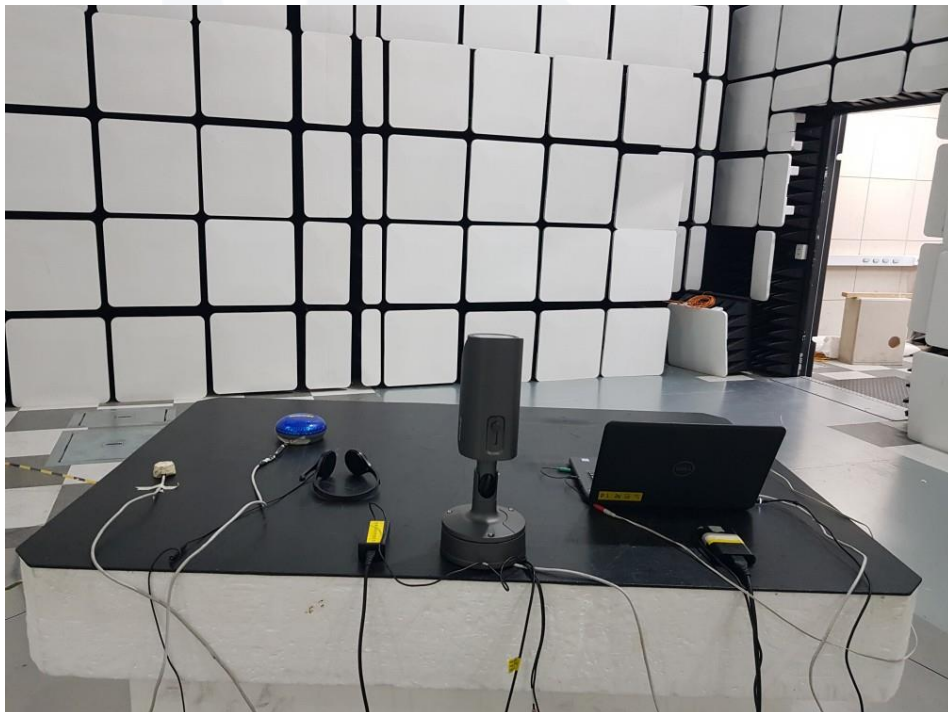
N/A





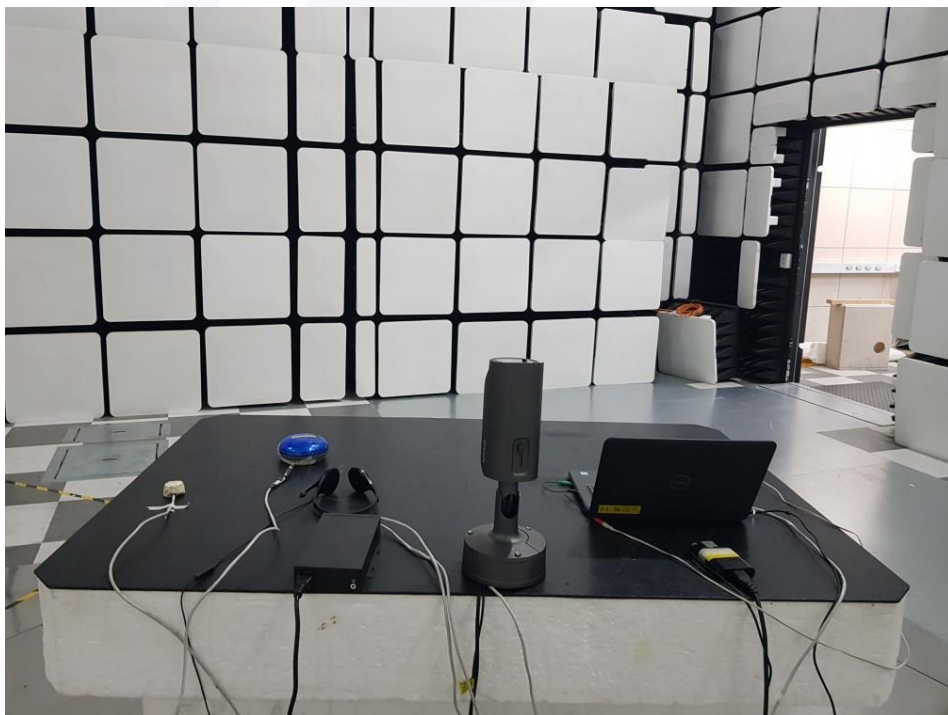
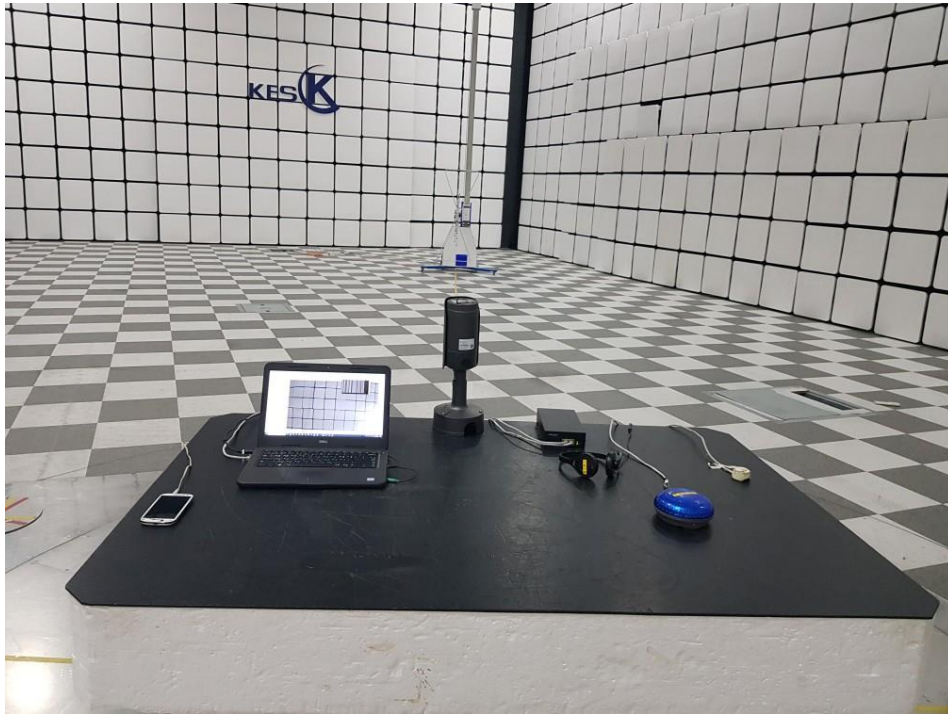
Radiated Electric Field Emissions(Below 1 GHz)

■ #1





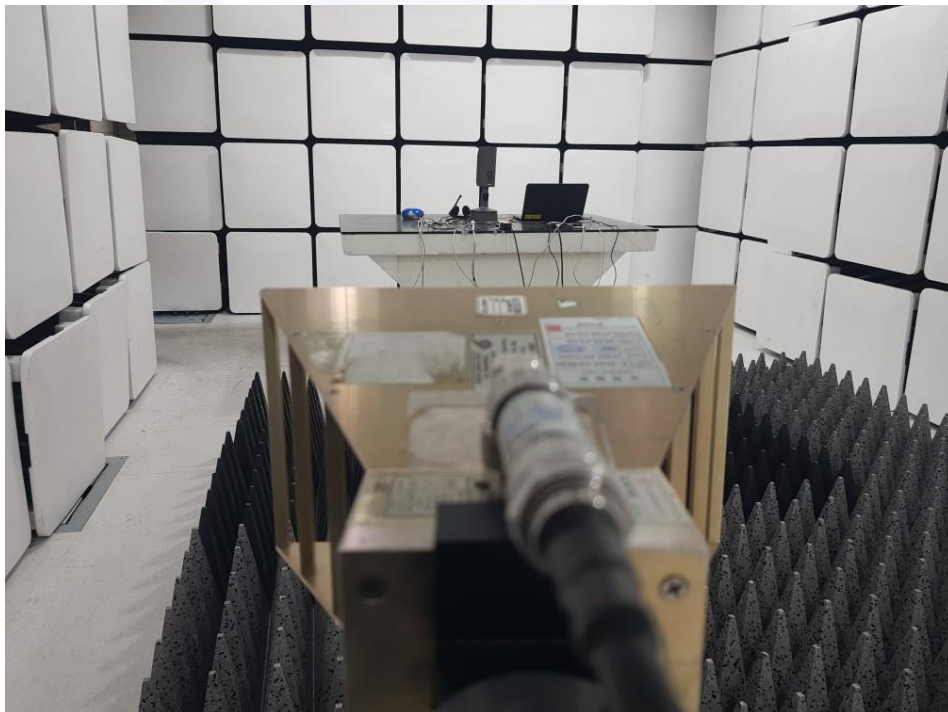
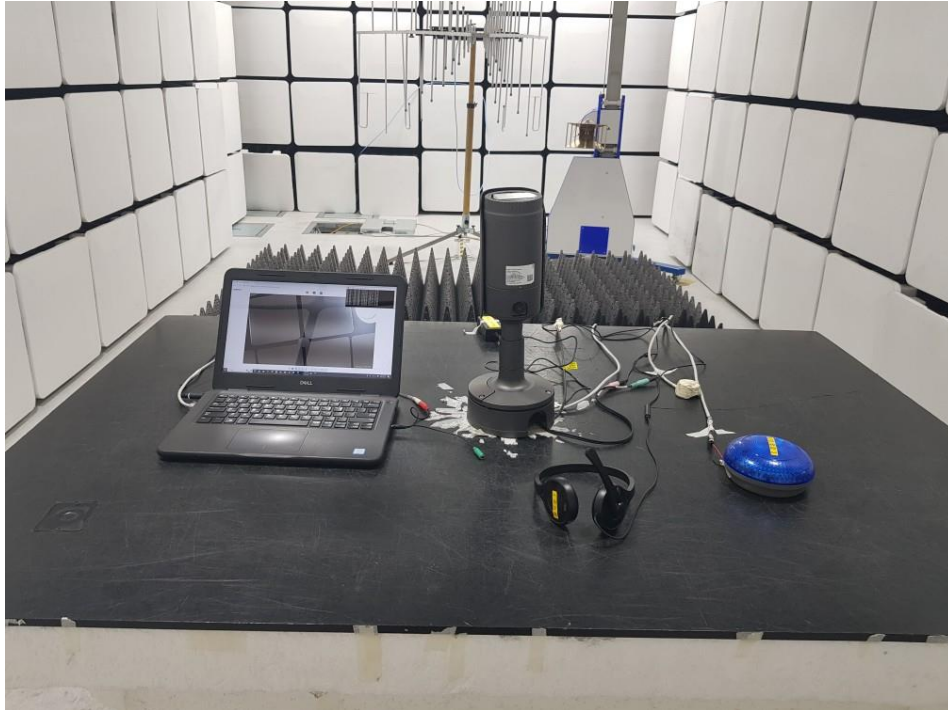
■ #2





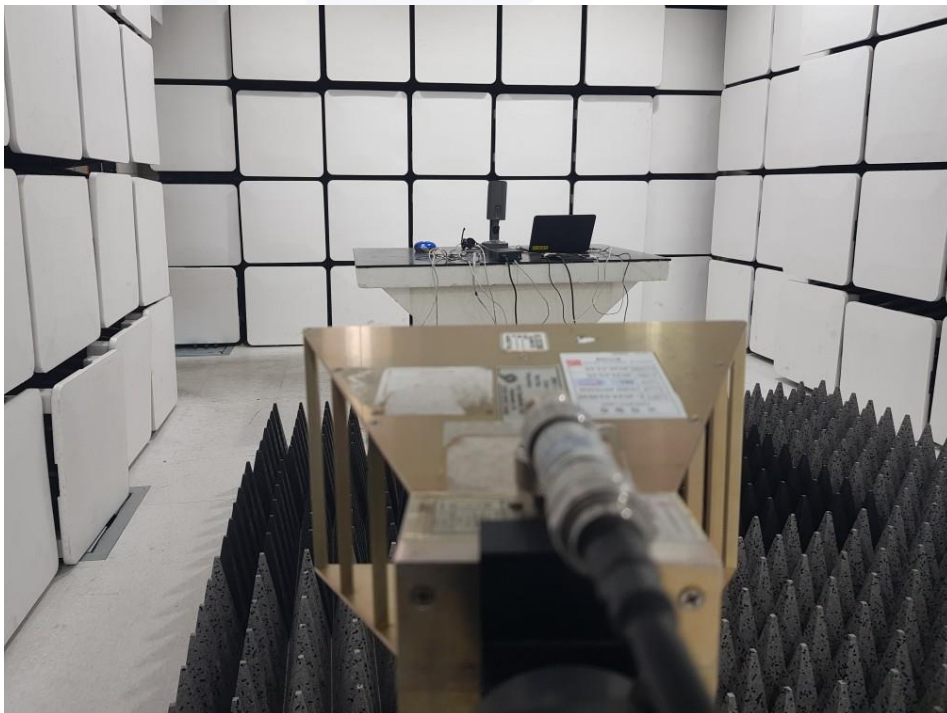
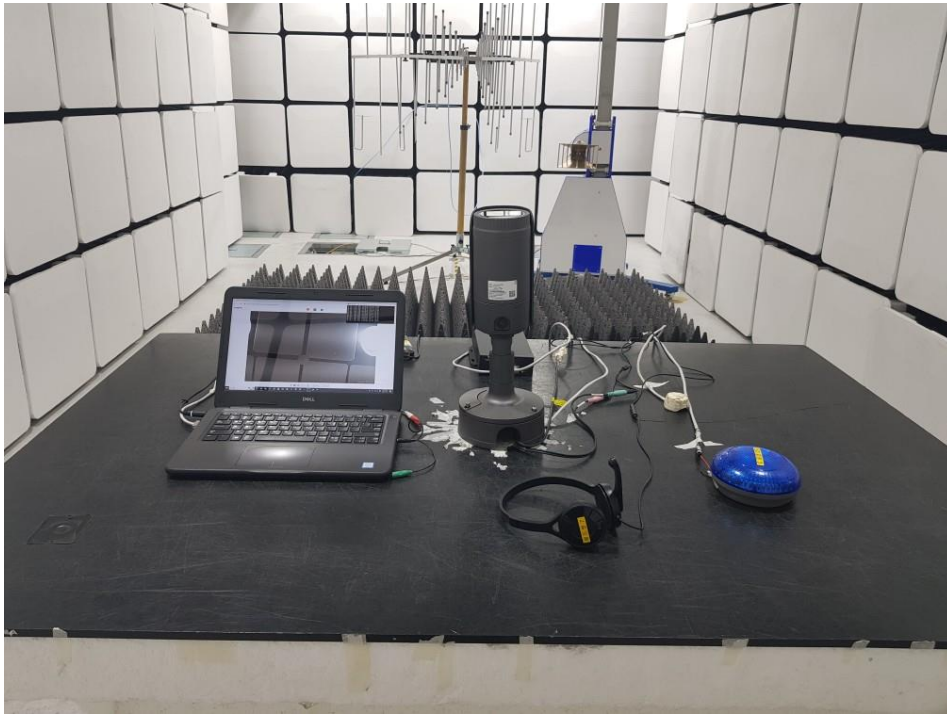
Radiated Electric Field Emissions(Above 1 GHz)

■ #1





■ #2





Harmonic Current Emissions and Voltage Fluctuations and Flicker

■ #1





Electrostatic Discharge

■ #1



■ #2





Radio-frequency Electromagnetic Field

■ #1



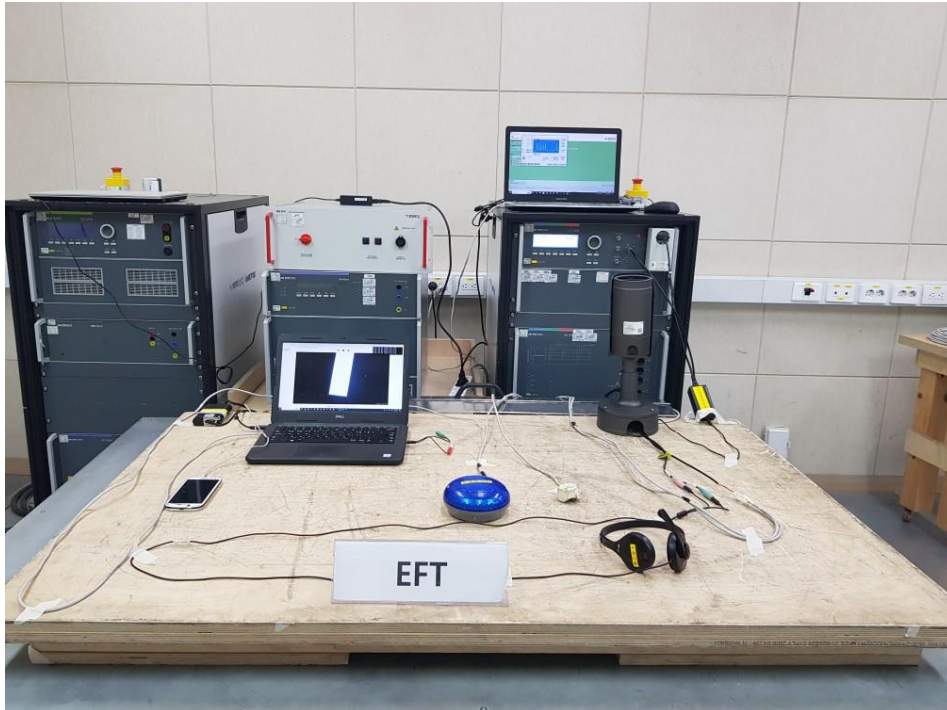
■ #2





Fast Transients

■ #1



■ #2





Surges

■ #1



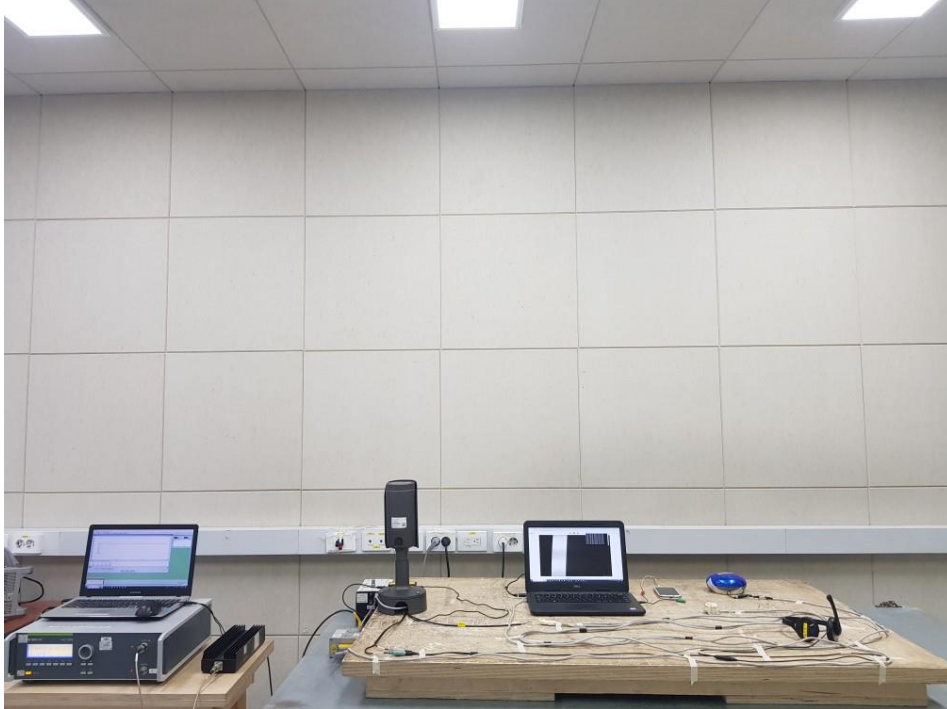
■ #2





Conducted Disturbance

■ #1



■ #2





Power Frequency Magnetic Field Immunity

■ #1

[16.7 Hz (AC), 100 A/m]



[50 Hz (AC), 100 A/m]





[0 Hz (DC), 300 A/m]





■ #2

[16.7 Hz (AC), 100 A/m]



[50 Hz (AC), 100 A/m]





[0 Hz (DC), 300 A/m]





EUT Photographs

(Top)



(Bottom)





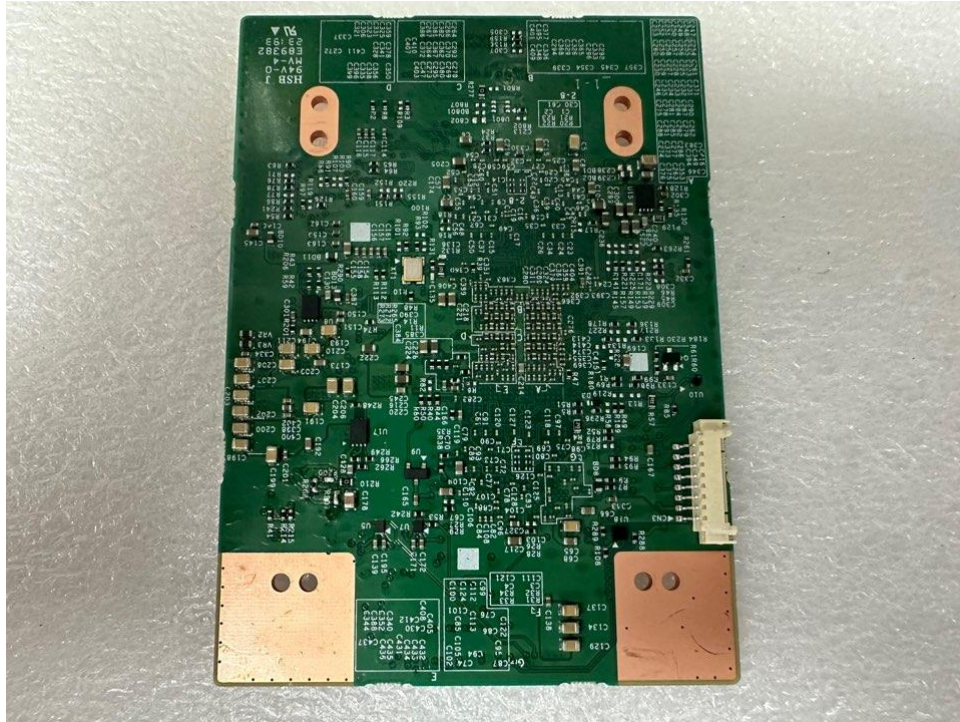
EUT Internal Layout Photographs



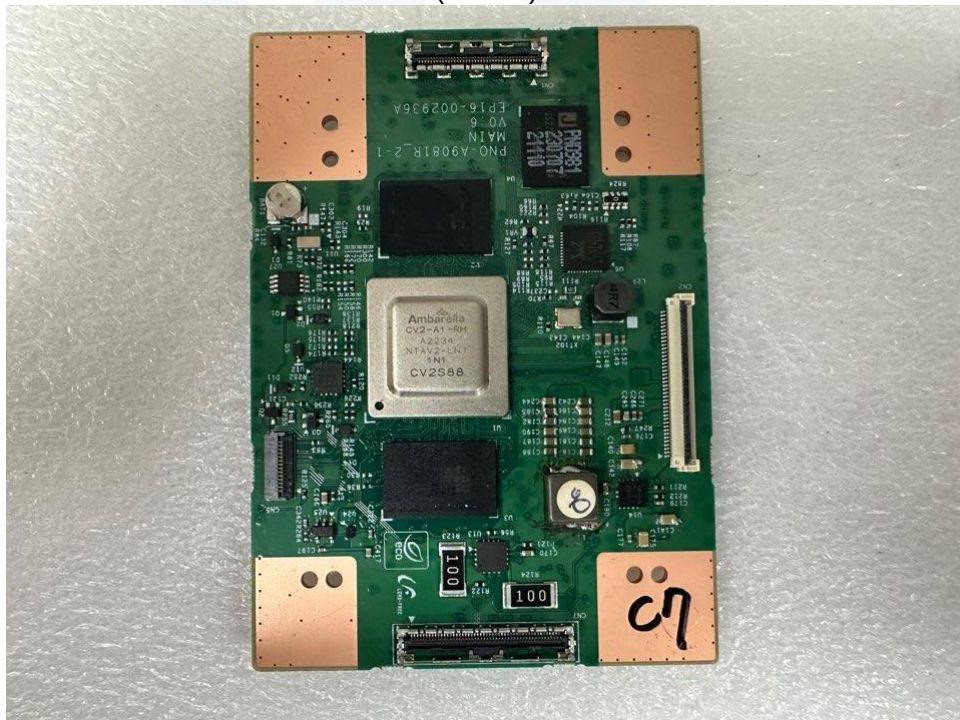


EUT Internal View – Main Board 1

(Top)



(Bottom)



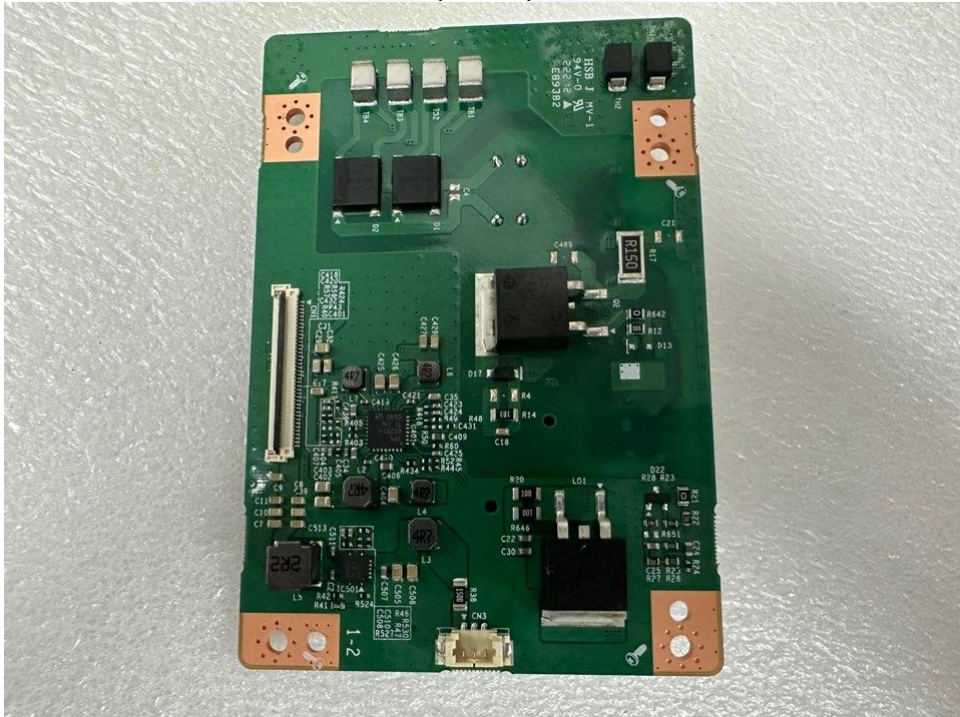


EUT Internal View – Main Board 2

(Top)



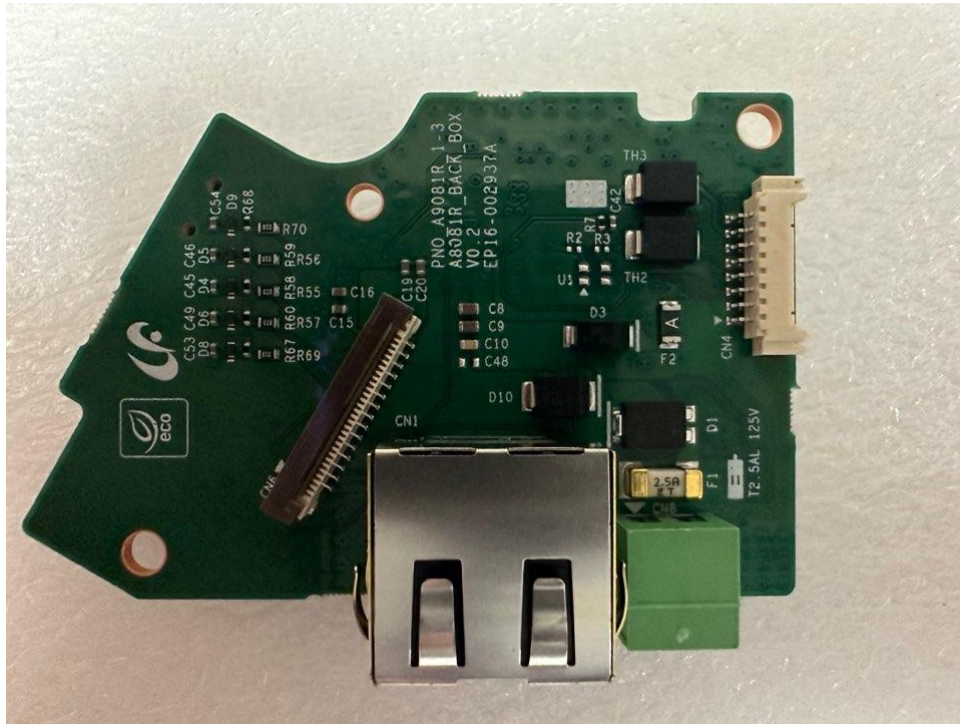
(Bottom)



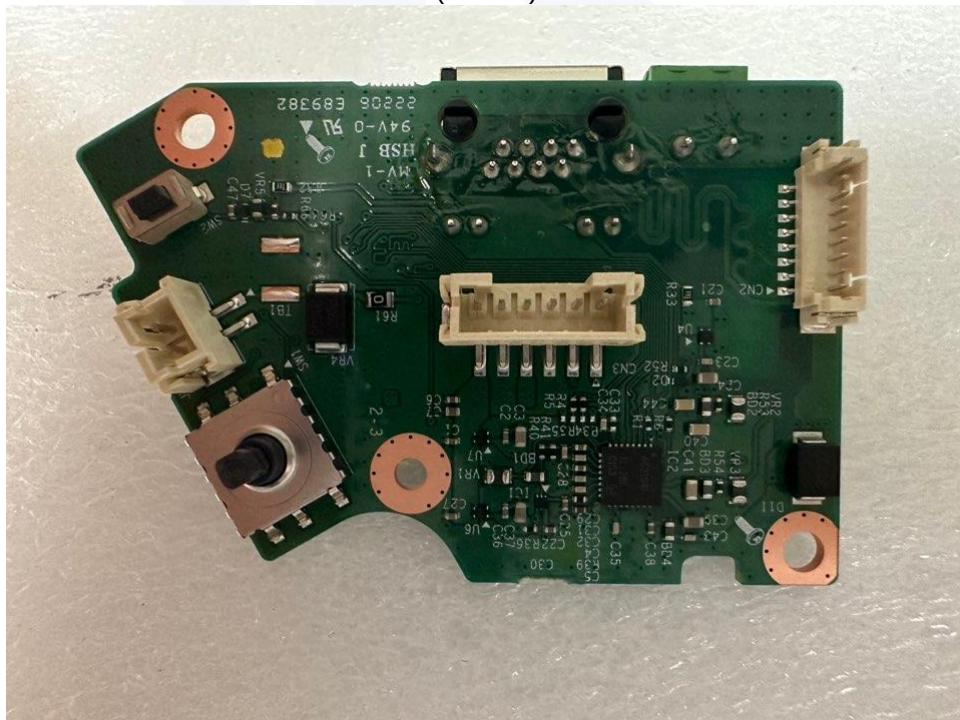


EUT Internal View – LAN Board

(Top)



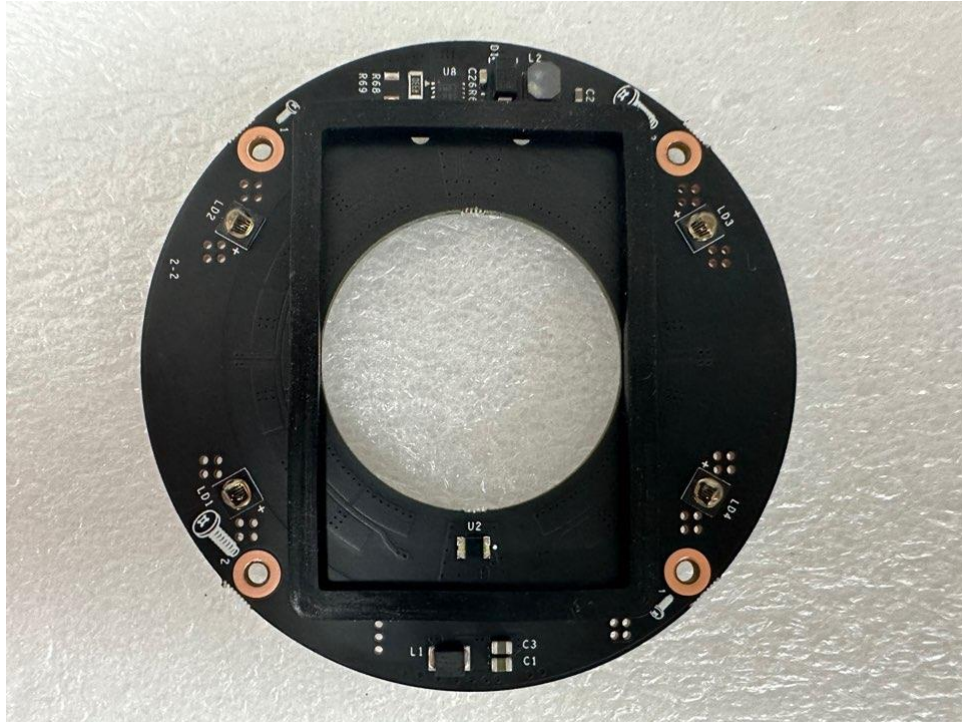
(Bottom)



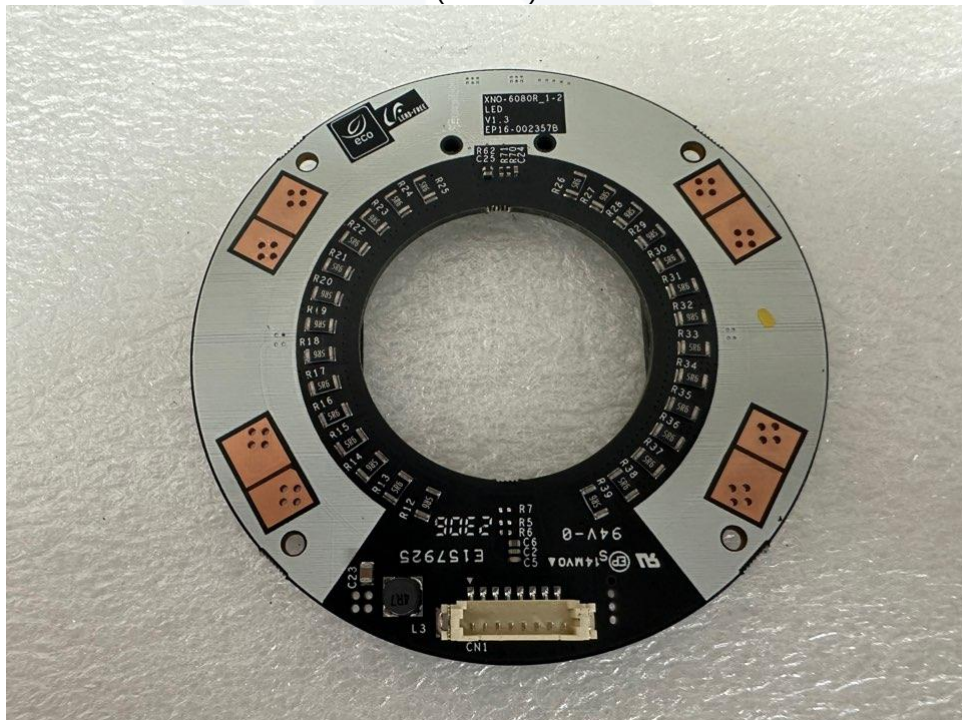


EUT Internal View – LED

(Top)



(Bottom)



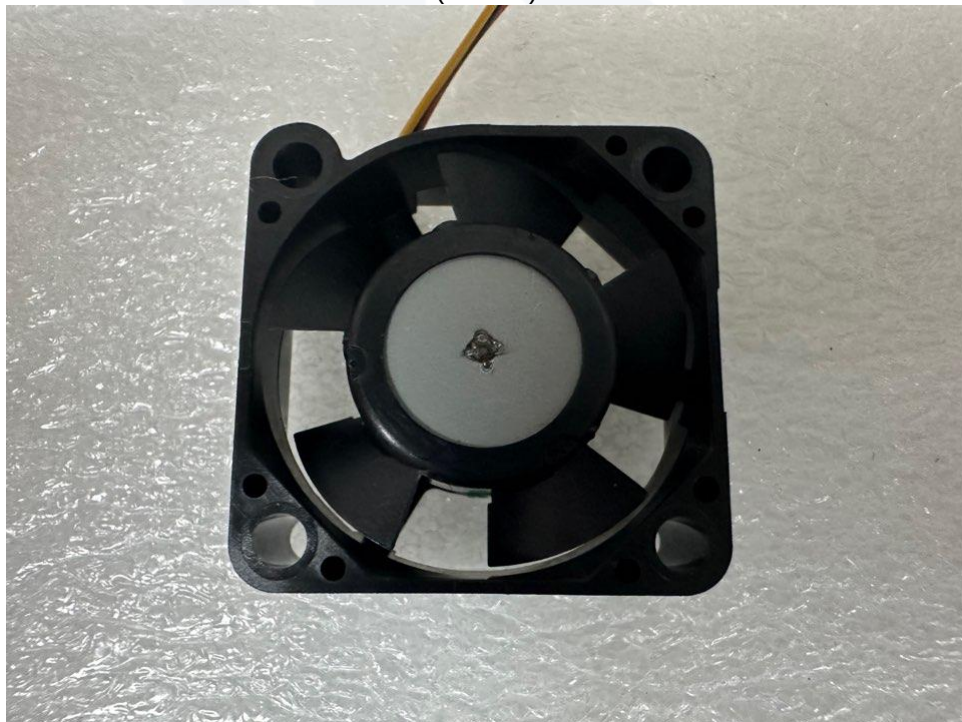


EUT Internal View – Cooler

(Top)



(Bottom)





EUT Internal View – Lens

(Top)



(Bottom)





Label and Location



NETWORK CAMERA

Model No : PNO-A9081R

Manufacturer : HANWHA VISION VIETNAM COMPANY LIMITED

Made in Vietnam

UK CA **CE**