



TEST REPORT



Report No. : KES-EM243580

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KES Co., Ltd.

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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. : TNO-A26081

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 : Oct. 16, 2024

4. Test date : Oct. 24, 2024 ~ Oct. 28, 2024

5. Date of Issue : Nov. 06, 2024

6. Test Results : In Compliance

Tested by

Reviewed by

Eun Gu, Jeon
EMC Test Engineer

Dong Hun, Jang
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
Nov. 06, 2024	KES-EM243580	Issued

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1.0 General Product Description

Main Specifications of EUT are:

Highest Maximum Frequency	1.2 GHz
Video	
Imaging Device	Diagonal 28.3mm 1.8" CMOS
Resolution	6240x4160(WiseAI off 30fps, WiseAI on 20fps), 3840x2160, 2880x1920, 1920x1280, 1600x1200, 1440x960, 1280x800, 1024x768, 1280x720, 720x480, 640x480
Max. Framerate	H.265/H.264: Max. 30fps MJPEG: Max. 30fps(@26MP Max. 1fps)
NETD	None
Pixel Size	None
Min. Illumination	Color : 0.2Lux(F4.0, 1/30sec) B/W : 0.02Lux(F4.0, 1/30sec)
Video Out	USB: Micro USB Type C, 1280x720 for installation
Video Transmission Distance	None
Lens	
Focal Length (Zoom Ratio)	55~250mm(4.54x) manual varifocal
Max. Aperture Ratio	F4(Wide)~F5.6(Tele)
Angular Field of View	H: 24°(Wide)~5.4°(Tele) V: 16°(Wide)~3.6°(Tele) D: 29°(Wide)~6.5°(Tele)
Min. Object Distance	0.85m (2.8ft)
Focus Control	Simple focus
Lens Type	Canon EF-S 55~250mm F4-5.6 IS STM
Mount Type	Canon EF-S
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, SDR
Wide Dynamic Range	None
Digital Noise Reduction	SSNRV, WiseNR II (Based on AI engine)(revision)
Digital Image Stabilization	None
Defog	None
Motion Detection	8ea, 8point Polygonal zones
Privacy Masking	6ea, Rectangular - Color: Gray/Black/White
Gain Control	Low / Middle / High
White Balance	ATW / AWC / Manual / Indoor / Outdoor
LDC	None
Electronic Shutter Speed	Minimum / Maximum / Anti flicker (1/5~1/12,000sec) Prefer shutter control(Based on AI engine)



Digital PTZ	Flip, Mirror, Hallway view(90°/270°)
Video Rotation	Support
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), Motion detection Analytics events - Defocus detection, Tampering, Audio detection, Virtual area(Appear/Disappear) <i>*Some of the video analytics only works with people and vehicle detection</i>
Business Intelligence	Based on AI engine: People counting, Queue management, Heatmap, Vehicle counting
Serial Interface	None
Alarm I/O	2 configurable I/O ports
Alarm Triggers	Analytics, Network disconnect, Alarm input, App event, Time schedule, MQTT subscription
Alarm Events	When alarm trigger occurred - File upload(image/video clip): e-mail/FTP/SFTP - Notification: e-mail - Recording: SD/SDHC/SDXC or NAS recording at event triggers - Alarm output - Handover: PTZ preset, send message by HTTP/HTTPS/TCP - Audio clip playback - MQTT: publication
Audio Streaming	None
Audio In	Selectable(mic in/line in) Supply voltage: 2.5VDC(4mA), Input impedance: 2K Ohm
Audio Out	Line out, Max.output level: 1Vrms
Light Type	None
Light Viewable Length	None
IR Viewable Length	None
IR Illuminator (Optional)	None
IR Radiation angle	None
IR LED	None
IR Wavelength	None
IR Operation	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), SFP slot(100/1000Mbps)
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



Video Quality Adjustment	None
Bitrate Control	H.264/H.265: CBR or VBR MPEG: VBR
Streaming	Unicast(20 users) / Multicast Multiple streaming(Up to 10 profiles)
Protocol	IPv4, IPv6, TCP/IP, UDP/IP, RTP(UDP), RTP(TCP), RTCP, RTSP, NTP, HTTP, HTTPS, SSL/TLS, DHCP, FTP, SFTP, SMTP, SMTPS, ICMP, IGMP, SNMPv1/v2c/v3(MIB-2), ARP, DNS, DDNS, QoS, UPnP, Bonjour, LLDP, CDP, SRTP (TCP, UDP Unicast), MQTT
SIP support (VoIP, Peer-to-peer, S	None
Security	None
Application Programming Interfac	ONVIF Profile S/G/T/M SUNAPI(HTTP API)
Security	
OS / Firmware Protect	Encrypted Firmware, Secure boot, Signed Firmware
User authentication	Digest Authentication, Prevent brute-force attack
Network authentication	IEEE 802.1X (EAP-TLS, EAP-LEAP, EAP-PEAP, MSCHAPv2)
Secure Communication	HTTPS, WSS (WebSocket Secure), SRTP
Access Control	IP-based access control, MAC-based access control
Data Protect	Encryption Credentials, Encrypt compress for live recording file export
Audit	Access / System / Event Log management
Device ID	Device certificate (Hanwha Techwin Root CA)
Secure Storage	TPM(Trusted platform module), SDcard partition encrypt
Security Certificate	TPM with FIPS 140-3 level 3
General	
Webpage Language	None
Web Viewer	None
Edge Storage	Micro SD/SDHC/SDXC 2slot 1TB
Memory	8GB RAM, 16GB EMMC
Environmental & Electrical	
Operating Temperature / Humidity	-40°C~+50°C (-40°F~+122°F) / 0~95% RH
Storage Temperature / Humidity	-50°C~+60°C (-58°F~+140°F) / 0~95% RH
Certification	IP66/IP67, IK10(Excluding window glass), NEMA4X
Input Voltage	HPoE(IEEE802.3bt type4, Class8, Injector not included), DC12V
Power Consumption	PoE++ : Max 44.3W, Typical : 24.9W 12VDC : Max 35.4W, Typical : 19.6W
Mechanical	
Color / Material	White / Aluminum, PC(Polycarbonate)
RAL Code	RAL9003
Product Dimensions / Weight	193.5x193.5x532mm(7.62"x7.62"x20.94"), 8100g(17.86 lb)
Compatible Conduit hole / Gangb	None
Hanging Mount (Dome)	None
Skin Cover	None
Skin Cover (Dome)	None
Weather Cap (Dome)	None
Power Module	None
Backbox	None
Ceiling Mount (Assy)	None
Wall Mount	None
Pole Mount	None



In-ceiling Mount	None
Parapet Mount	None
Corner Mount	None
Tilt Mount	None
Housing (Box)	None
Cabinet	None
Gang Plate	None
Conduit Adaptor	None
Other Compatible Models	None
Certifications & Standards	
Network	None
EMC	FCC 47 CFR 15 Subpart B Class A ICES-3(A)/NMB-3(A) CE/UKCA - EN 55032 Class A, EN 50130-4, EN 61000-3-2, EN 61000-3-3 RCM AS/NZS CISPR 32 Class A KS C 9832 Class A , KS C 9835
Safety	UL 62368-1, CAN/CSA C22.2 NO. 62368-1 IEC/EN 62471
Environment	IEC/EN 63000 IEC/EN 60529 IP66/IP67, IEC/EN 62262 IK10 NEMA 250 type 4X
Video	None
DORI (EN62676-4 standard)	
Detect (25PPM/ 8PPF)	Wide: 587.1m(1,926.3ft) / Tele: 2,646.4m(8,682.3ft)
Observe (63PPM/ 19PPF)	Wide: 234.9m(770.5ft) / Tele: 1,058.6m(3,472.9ft)
Recognize (125PPM/ 38PPF)	Wide: 117.4m(385.3ft) / Tele: 529.3m(1,736.5ft)
Identify (250PPM/ 76PPF)	Wide: 58.7m(192.6ft) / Tele: 264.6m(868.2ft)
LPR/ANPR/MMCR	
Speed Description	None
Speed limit	None
Min. Forward Distance	None
Max. Forward Distance	None
Max. Horizontal Angle	None
Max. Vertical Angle	None
Horizontal Offset	None
Camera Height	None
Lane Coverage	None
Vehicle Recognition	None
Available Countries	None



1.1 Test Voltage & Frequency

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

☒ AC 230 V 50 Hz

1.2 Variant Model Differences

Not applicable

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
NETWORK CAMERA	TNO-A26081	-	HANWHA VISION VIETNAM COMPANY LIMITED	EUT

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
AC/DC Adapter	KPL-048F-VI	-	Channel Well Technology (Guangzhou) Co., Ltd.	-
PoE Injector	PT-PSE109GBRO-AH-S	-	Dongguan PROCET Network Technology Co.,Ltd	-
Optical Module#1	-	-	SOLTECH	-
Optical Module#2	-	-	SOLTECH	-
Laptop	P95G001	9JM8HT2	DELL INC.	-
Laptop Adapter	HA65NM130	-	Chicony Power Technology(Suzhou)Co.,Ltd	-
Smartphone	SM-N920S	-	Samsung Electronics Co., Ltd.	-
Headset	K550	-	Britz®	-
Alarm	-	-	-	-
Button Alarm	-	-	-	-
Micro SD Card#1	-	-	SanDisk	16 GB
Micro SD Card#2	-	-	SanDisk	16 GB



1.6 External I/O Cabling

■ #1

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
NETWORK CAMERA (EUT)	DC IN (Terminal)	AC/DC Adapter	Line	1.2	U
	RJ-45	Laptop	RJ-45	3.1	S
	ALARM AUDIO (SPEAKER)	Headset	Line	1.8	U
	ALARM AUDIO (MIC)				
	ALARM AUDIO (ALARM OUT)	Alarm	Line	3.1	U
	ALARM AUDIO (ALARM IN)	Button Alarm	Line	3.1	U
	SFP	Optical Module#1	SFP	-	-
	Micro SD Slot	Micro SD Card#1	Micro SD Slot	-	-
	Micro SD Slot	Micro SD Card#2	Micro SD Slot	-	-
Optical Module#1	Optical	Optical Module#2	Optical	5.0	U
PoE Injector	SFP		SFP	-	-
Laptop	DC Jack	Laptop Adapter	Line	1.4	U
	3.5 mm	Smartphone	3.5 mm	1.0	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 Injector	RJ-45	3.1	S
	ALARM AUDIO (SPEAKER)	Headset	Line	1.8	U
	ALARM AUDIO (MIC)				
	ALARM AUDIO (ALARM OUT)	Alarm	Line	3.1	U
	ALARM AUDIO (ALARM IN)	Button Alarm	Line	3.1	U
	SFP	Optical Module#1	SFP	-	
	Micro SD Slot	Micro SD Card#1	Micro SD Slot	-	-
	Micro SD Slot	Micro SD Card#2	Micro SD Slot	-	-
Optical Module#1	Optical	Optical Module#2	Optical	5.0	U
PoE Injector	SFP		SFP	-	-
Laptop	DC Jack	Laptop Adapter	Line	1.4	U
	3.5 mm	Smartphone	3.5 mm	1.0	U
	RJ-45	PoE Injector	RJ-45	0.8	S

* Unshielded=U, Shielded=S

1.7 EUT Operating Mode(s)

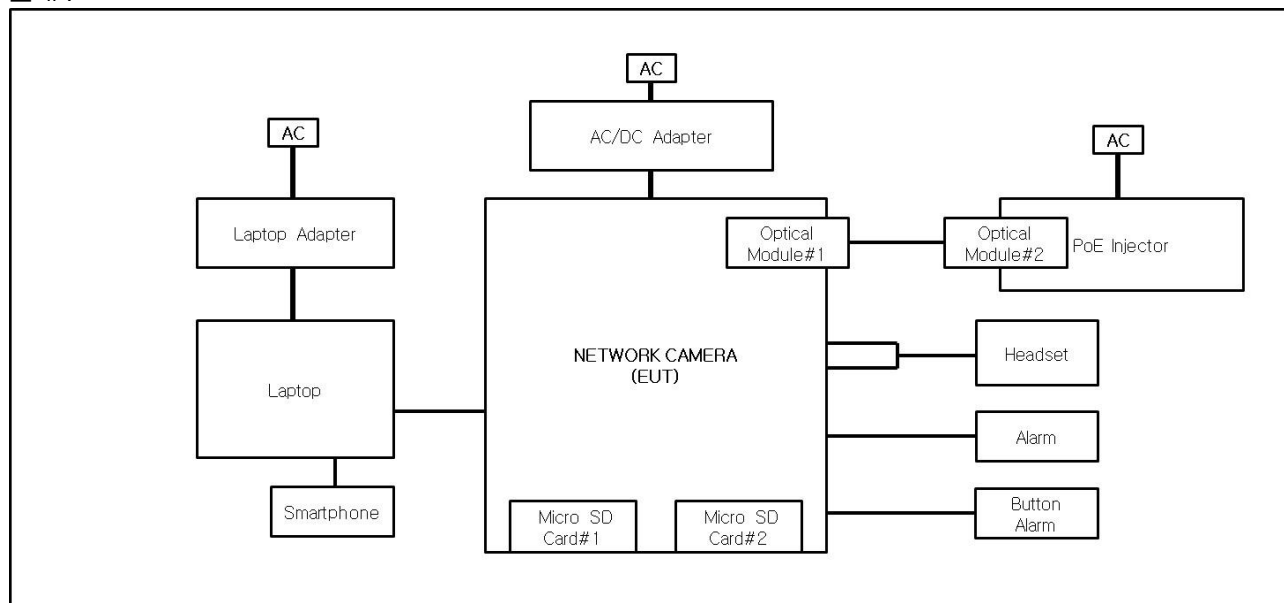
Division	Test mode	Normal operating	Test Voltages
#1	DC	<ul style="list-style-type: none"> - Monitoring EUT Using Web Viewer, Ping Test - Check Audio Port Behavior Through Headset - When the Button Alarm is pressed, make sure the Alarm is working - Check the operation of the SFP port through a link in PoE Injector - Check the files stored on the Micro SD Card after testing 	AC 230 V, 50 Hz
#2	PoE		

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

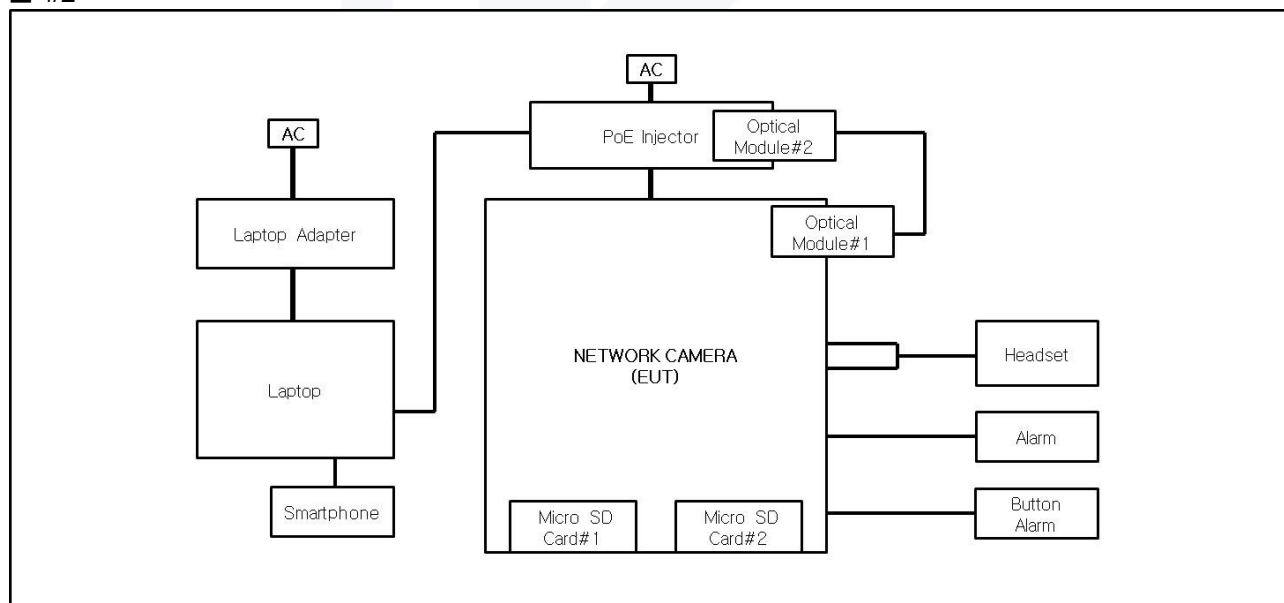


1.8 Configuration

■ #1



■ #2





1.9 Remarks when standards applied

- The USB C Type port was excluded from the test as a port for administrators.
- It receives PoE power, and the PoE port is considered a wired network port.
- Test items related to the power port are not applicable.



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 0008



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 IEC 61000-3-2:2019

☒ EN 61000-3-3:2013/A2:2021

☒ **EMC – Regulations 2016**

☒ EN 55032:2015/A11:2020

☒ Class A

☐ Class B

☒ EN 50130-4:2011/A1:2014

☒ EN IEC 61000-3-2:2019

☒ EN 61000-3-3:2013/A2:2021



2.1 Conducted Emissions at Mains Power Ports

Test Date

Oct. 24, 2024

Test Location

Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMI Test S/W	EMC32	R & S	9.12.00	-
<input checked="" type="checkbox"/>	EMI TEST RECEIVER	ESR3	R & S	101783	11, 08, 2024
<input checked="" type="checkbox"/>	LISN	ENV216	R & S	101787	11, 08, 2024
<input checked="" type="checkbox"/>	LISN	ESH2-Z5	R & S	100450	11, 08, 2024
<input checked="" type="checkbox"/>	PULSE LIMITER	ESH3-Z2	R & S	101915	11, 08, 2024

Test Conditions

Temperature: (24,1 ± 0,1) °C
Relative Humidity: (47,0 ± 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

Oct. 24, 2024

Test Location

Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMI Test S/W	EMC32	R & S	9.12.00	-
<input checked="" type="checkbox"/>	EMI TEST RECEIVER	ESR3	R & S	101783	11, 08, 2024
<input checked="" type="checkbox"/>	LISN	ENV216	R & S	101787	11, 08, 2024
<input checked="" type="checkbox"/>	LISN	ESH2-Z5	R & S	100450	11, 08, 2024
<input checked="" type="checkbox"/>	PULSE LIMITER	ESH3-Z2	R & S	101915	11, 08, 2024
<input type="checkbox"/>	8-WIRE ISN CAT3,5	ENY81	R & S	100174	11, 09, 2024
<input checked="" type="checkbox"/>	ISN	ISN S8	SCHWARZBECK	ISN-S8-0019	03, 05, 2025

Test Conditions

Temperature: (24,1 ± 0,1) °C

Relative Humidity: (47,0 ± 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 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Oct. 25, 2024

Test Location☒ SEMI ANECHOIC CHAMBER #4(10m)**Test Equipment**

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.0	-
<input checked="" type="checkbox"/>	EMI TEST RECEIVER	ESU26	R & S	100551	02, 13, 2025
<input checked="" type="checkbox"/>	AMPLIFIER	SCU 01	R & S	100603	11, 08, 2024
<input checked="" type="checkbox"/>	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	11, 17, 2024
<input checked="" type="checkbox"/>	ATTENUATOR	8491A	HP	32173	02, 13, 2025

Test Conditions

Temperature: (23,3 ± 0,1) °C

Relative Humidity: (46,8 ± 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

Oct. 26, 2024

Test Location

SEMI ANECHOIC CHAMBER #5

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMI Test S/W	ES10/RE	TOYO Corporation	2022.01.000	-
<input checked="" type="checkbox"/>	EMI TEST RECEIVER	ESU26	Rohde & Schwarz	100552	02, 13, 2025
<input checked="" type="checkbox"/>	HORN ANTENNA	BBHA 9120D	SCHWARZBECK	9120D-1802	11, 03, 2024
<input checked="" type="checkbox"/>	PREAMPLIFIER	8449B	HP	3008A00538	04, 30, 2025
<input checked="" type="checkbox"/>	ATTENUATOR	8491B	HP	23094	02, 13, 2025

Test Conditions

Temperature: (22,9 ± 0,1) °C

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

Frequency Range of Measurement

1 GHz to 6 GHz

Instrument Settings

IF Band Width: 1 MHz

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

RemarksSee Appendix A for test data.



2.5 Harmonic Current Emissions

Test Date

Oct. 26, 2024

Test Location

Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMI Test S/W	net.control	EM TEST	2.1.4	-
<input checked="" type="checkbox"/>	DIGITAL POWER ANALYZER	DPA 500N	EM TEST	V1024106759	03, 28, 2025
<input checked="" type="checkbox"/>	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

Test Conditions

Temperature: (23,4 ± 0,1) °C

Relative Humidity: (46,3 ± 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

Oct. 26, 2024

Test Location

Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMI Test S/W	net.control	EM TEST	2.1.4	-
<input checked="" type="checkbox"/>	DIGITAL POWER ANALYZER	DPA 500N	EM TEST	V1024106759	03, 28, 2025
<input checked="" type="checkbox"/>	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

Test Conditions

Temperature: (23,4 ± 0,2) °C

Relative Humidity: (46,3 ± 0,2) % 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/A1 :2014 Alarm systems-Part 4: Electromagnetic compatibility Product family standard:

Immunity requirements for components of fire, intruder and social alarm systems

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

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

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

Electrostatic discharge

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

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

Radiated electromagnetic fields

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

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

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

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

- (a) there is no permanent damage or change to EUT
(e.g. no corruption of memory or changes to programmable setting etc.)
- (b) at 3 V/m, any deterioration of the picture is so minor that the system could still be used; and
- (c) there is no observable deterioration of the picture at 1 V/m.



Fast transient burst / slow high energy voltage surge

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

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

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

Conducted RF immunity

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

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

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

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

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

Voltage dip/interruption / Voltage variation

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

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



3.1 Electrostatic Discharge

Reference Standard

EN 61000-4-2:2009

Test Date

Oct. 25, 2024

Test Location

EMS-ESD: Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	ESD SIMULATOR	ESS-2000	Noise Ken	ESS01Z0454	01, 30, 2025
<input checked="" type="checkbox"/>	HCP	-	KES	-	-
<input checked="" type="checkbox"/>	VCP	-	Noise Ken	-	-

Test Conditions

Temperature: (23,8 ± 0,1) °C
Relative Humidity: (46,5 ± 0,1) % R.H.
Atmospheric Pressure: (100,1 ± 0,1) kPa

Test Specifications

Discharge Factor: ≥ 1 s

Discharge Impedance: 330 ohm / 150 pF

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

Polarity: Positive and Negative

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

Discharge Voltage:	Contact	Air	HCP	VCP
	<input type="checkbox"/> 2 kV	<input checked="" type="checkbox"/> 2 kV	<input type="checkbox"/> 2 kV	<input type="checkbox"/> 2 kV
	<input type="checkbox"/> 4 kV	<input checked="" type="checkbox"/> 4 kV	<input type="checkbox"/> 4 kV	<input type="checkbox"/> 4 kV
	<input checked="" type="checkbox"/> 6 kV	<input type="checkbox"/> 6 kV	<input checked="" type="checkbox"/> 6 kV	<input checked="" type="checkbox"/> 6 kV
	<input type="checkbox"/> 8 kV	<input checked="" type="checkbox"/> 8 kV	<input type="checkbox"/> 8 kV	<input type="checkbox"/> 8 kV
	<input type="checkbox"/> 15 kV	<input type="checkbox"/> 15 kV	<input type="checkbox"/> 15 kV	<input type="checkbox"/> 15 kV

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

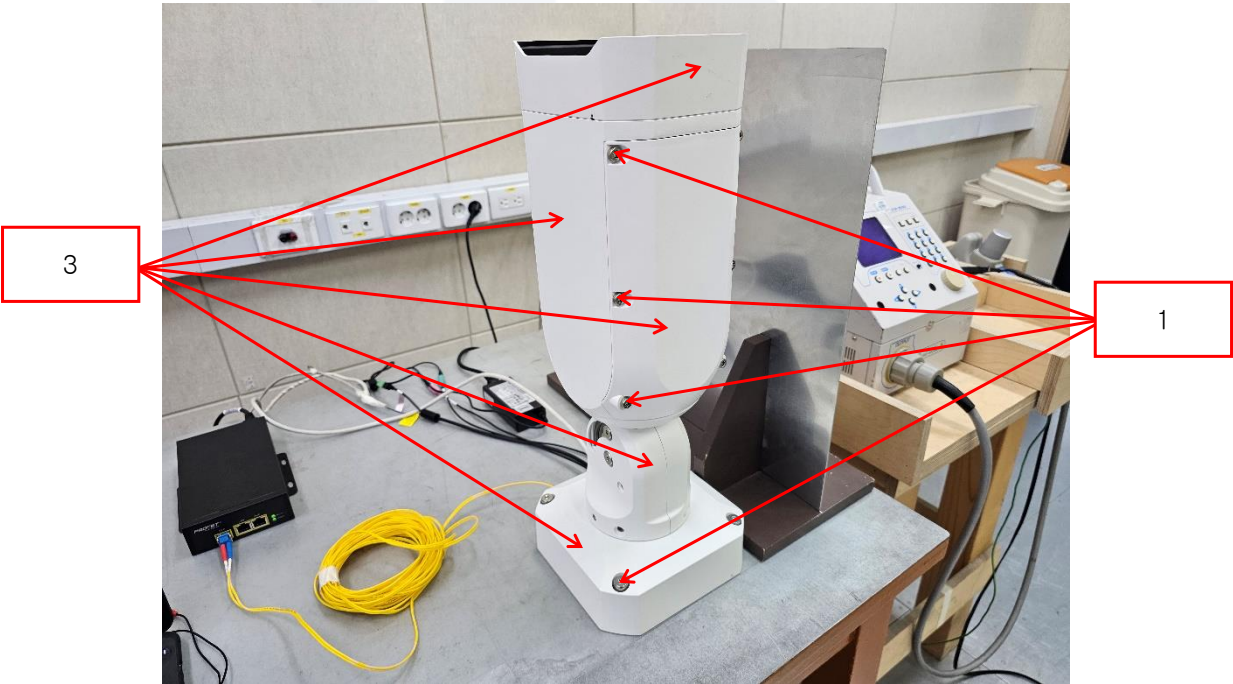
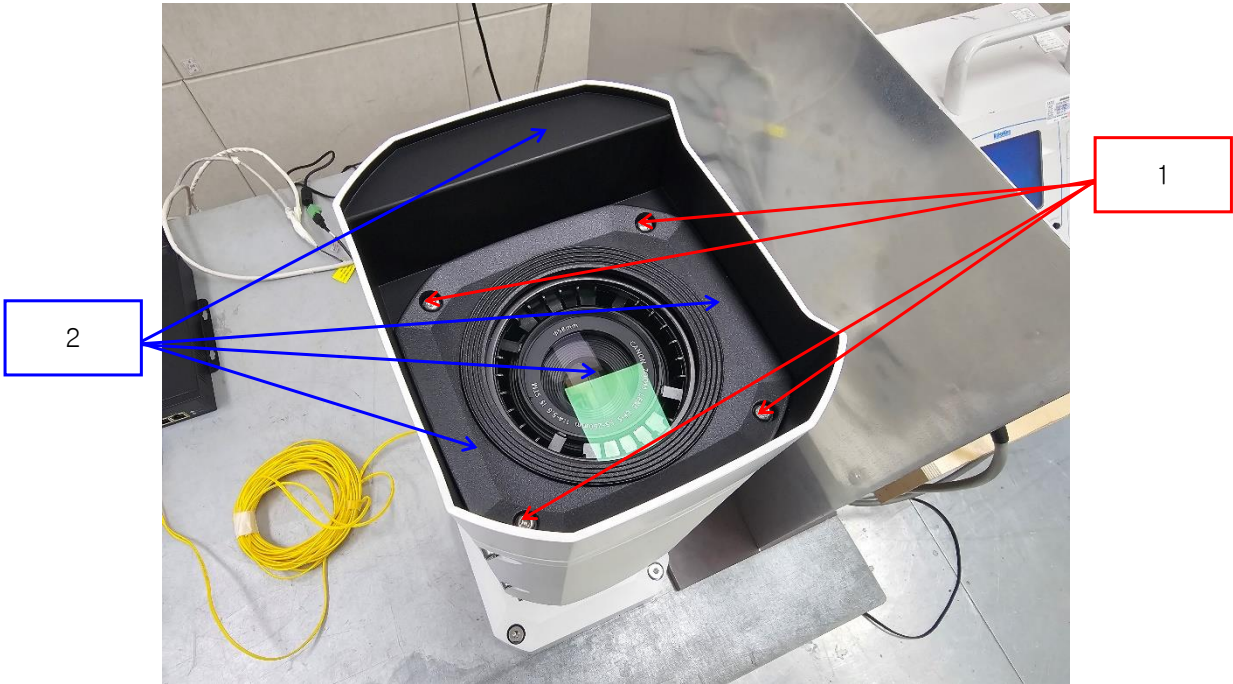
Required Performance Criteria: ☒ Complied

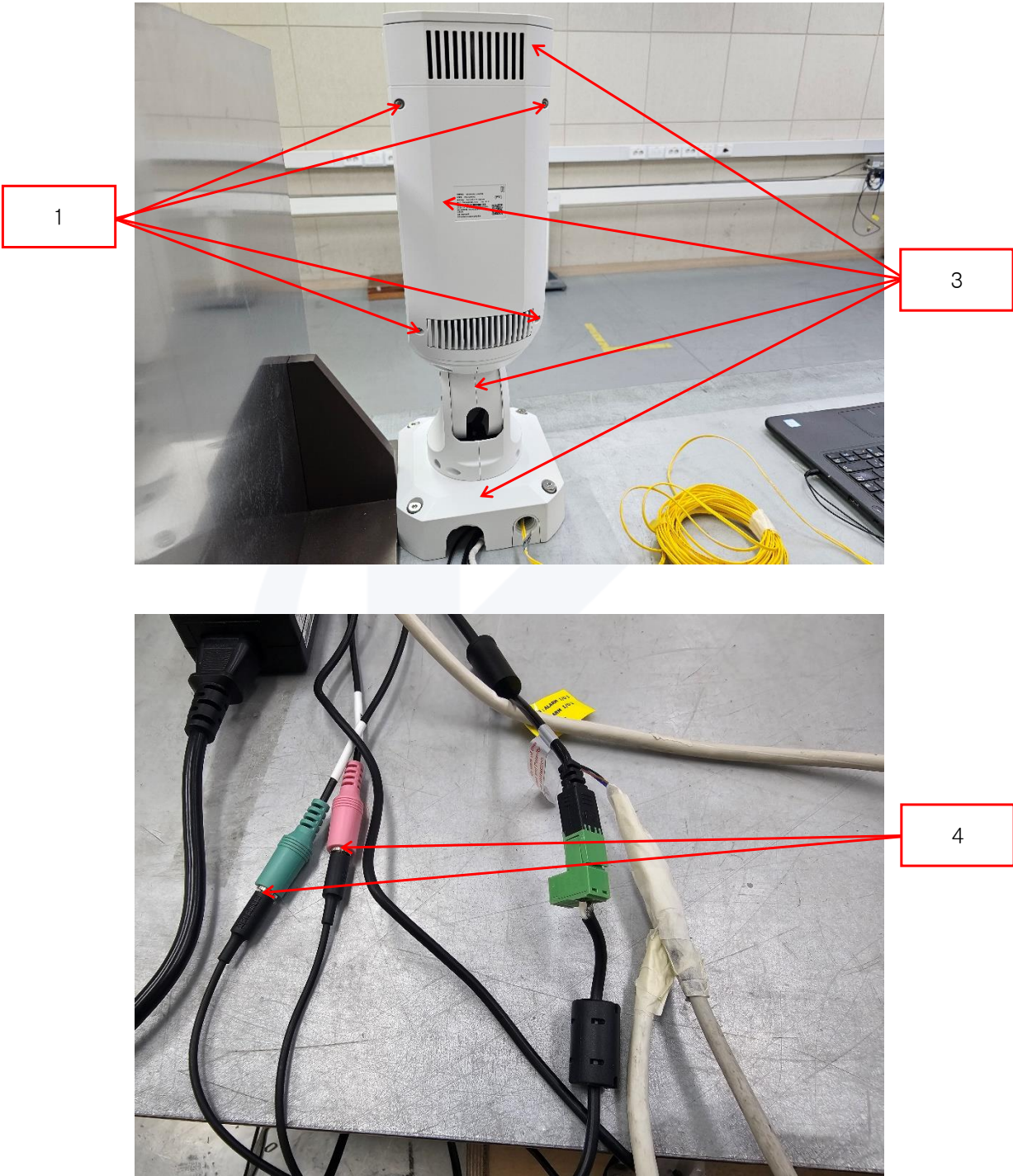


Location of Discharge:

Air	
Contact	

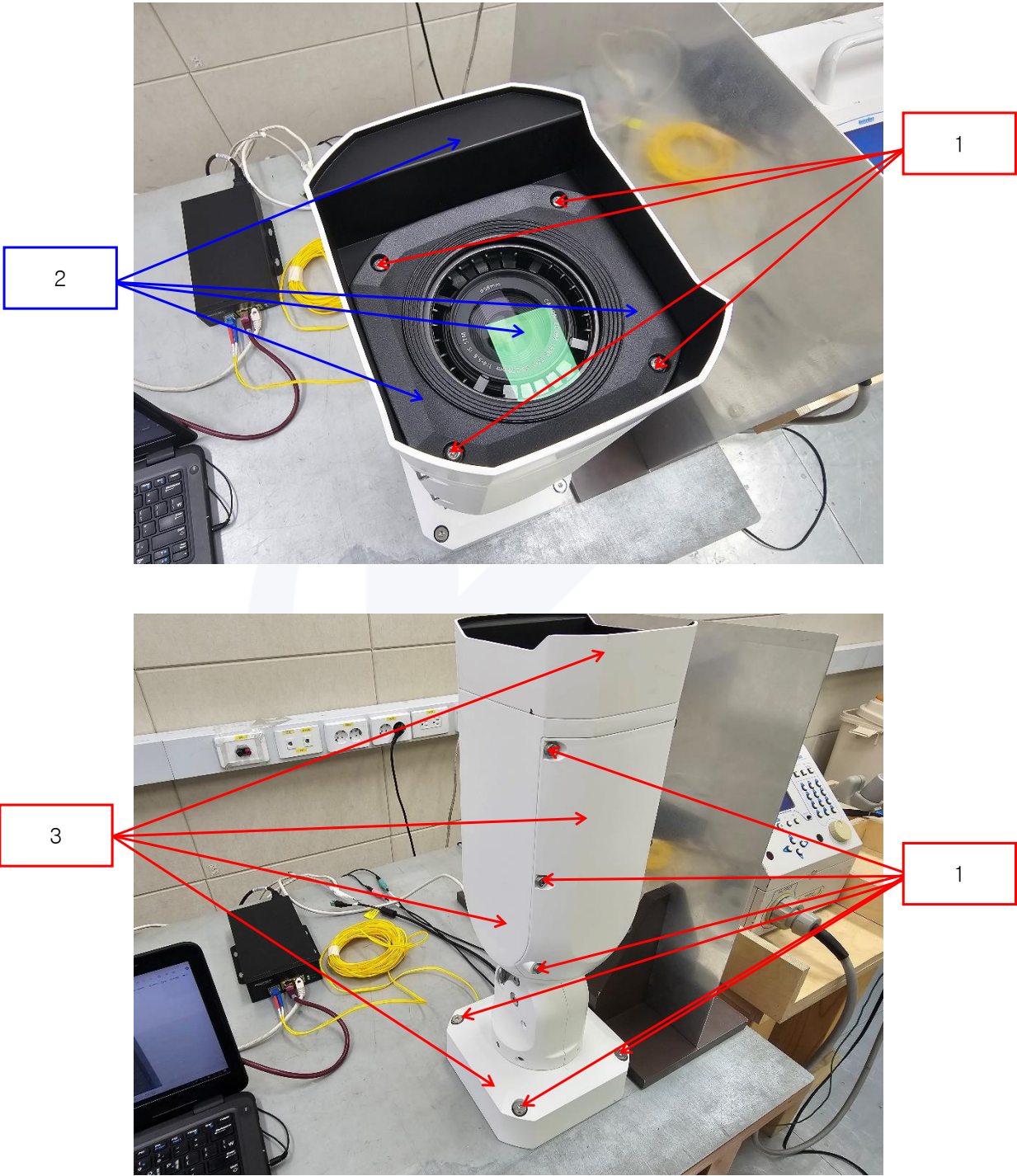
■ #1

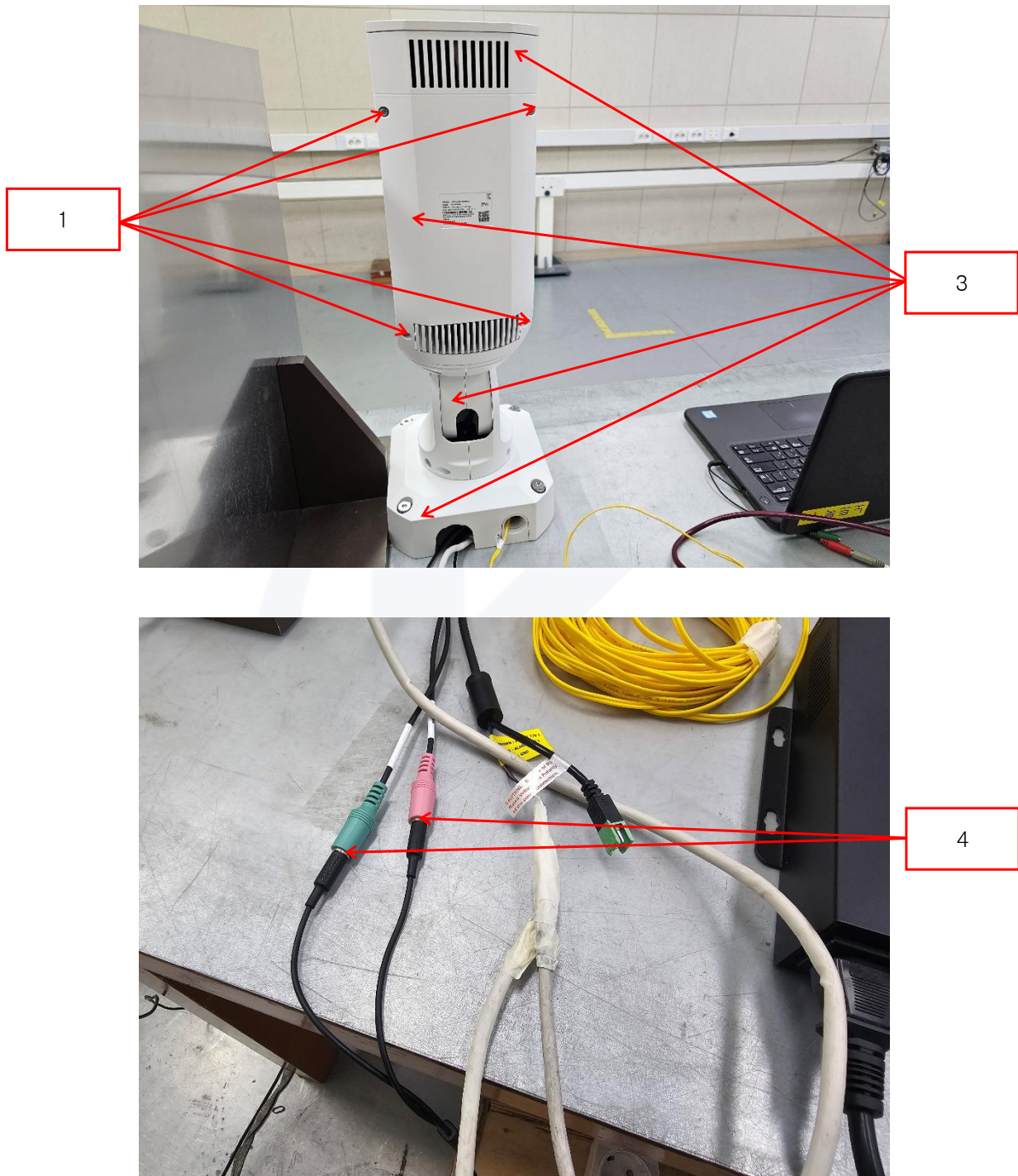






■ #2





**Test Data**

■ #1

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

Direct Discharge

No.	Test Point	Discharge Method	Observations	Remarks
1	Screw	Contact Discharge	Complied	-
2	Enclosure1, Lens	Air Discharge	Complied	-
3	Enclosure2	Contact Discharge	Complied	-
4	Port	Contact Discharge	Complied	-

■ #2

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

Direct Discharge

No.	Test Point	Discharge Method	Observations	Remarks
1	Screw	Contact Discharge	Complied	-
2	Enclosure1, Lens	Air Discharge	Complied	-
3	Enclosure2	Contact Discharge	Complied	-
4	Port	Contact Discharge	Complied	-

Note: "Blank" = Not performed

Observations:

Complied – No degradation of function

Test Results

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

Remarks

PASS Required Performance Criteria



3.2 Radiated Electric Field Immunity

Reference Standard

EN IEC 61000-4-3:2020

Test Date

Oct. 28, 2024

Test LocationEMS-RS: ☐ SEMI ANECHOIC CHAMBER #2☒ SEMI ANECHOIC CHAMBER #3**Test Equipment**

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMS Test S/W	EMC32	R & S	10.10.02	-
<input checked="" type="checkbox"/>	SIGNAL GENERATOR	SMB 100A	Rohde & Schwarz	108252	07, 29, 2025
<input checked="" type="checkbox"/>	HIGH POWER DUAL AMP	SSA532	SUNGSAN	SSA532-001	-
<input checked="" type="checkbox"/>	POWER METER	E4419B	Agilent	GB40203000	02, 13, 2025
<input checked="" type="checkbox"/>	AVERAGE POWER SENSOR	E9301A	Agilent	MY52170007	02, 13, 2025
<input checked="" type="checkbox"/>	AVERAGE POWER SENSOR	E9301A	Agilent	MY41498669	02, 13, 2025
<input checked="" type="checkbox"/>	STACKED DOUBLE LOG-PER- ANTENNA	STPL9128 E	Schwarzbeck	9128ES-121	-
<input checked="" type="checkbox"/>	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	03, 05, 2025

Test Conditions

Temperature: (23,6 ± 0,2) °C
Relative Humidity: (45,7 ± 0,1) % R.H.
Atmospheric Pressure: (100,2 ± 0,1) 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**

■ #1

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

■ #2

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

Oct. 28, 2024

Test Location

EMS-EFT: Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMS Test S/W	iec.control	EM TEST	5.4.8	-
<input checked="" type="checkbox"/>	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	11, 09, 2024
<input checked="" type="checkbox"/>	MOTOR VARIAC	MV2616	EM TEST	P1552169719	11, 09, 2024
<input checked="" type="checkbox"/>	CAPACITIVE COUPLING CLAMP	HFK	EM TEST	P1633183115	11, 10, 2024

Test Conditions

Temperature: (23,5 ± 0,1) °C
Relative Humidity: (46,4 ± 0,1) % R.H.
Atmospheric Pressure: (100,5 ± 0,1) kPa

Test Specifications

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

Pulse Amplitude & Polarity: ☐ ± 0.5 kV ☒ ± 1.0 kV
(Other supply / Signal Lines) ☐ ± 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**

■ #1

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

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

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

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

☒ Signal ports and telecommunication ports – Coupling Clamp used

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
RJ-45	Complied	Complied
ALARM AUDIO (ALARM OUT), ALARM AUDIO (ALARM IN)	Complied	Complied



■ #2

☐ 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	Complied	Complied
ALARM AUDIO (ALARM OUT), ALARM AUDIO (ALARM IN)	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

Oct. 28, 2024

Test Location

EMS-Surge: Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMS Test S/W	iec.control	EM TEST	5.4.8	-
<input checked="" type="checkbox"/>	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	11, 09, 2024
<input checked="" type="checkbox"/>	MOTOR VARIAC	MV2616	EM TEST	P1552169719	11, 09, 2024
<input type="checkbox"/>	CDN	CNV 508N1	EM TEST	P1610176296	11, 10, 2024

Test Conditions

Temperature: (23,5 ± 0,2) °C
Relative Humidity: (46,4 ± 0,2) % R.H.
Atmospheric Pressure: (100,5 ± 0,1) 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) kV

Differential Mode

☒ (0,5 / 1,0) kV

Number of Surges:

☒ 5 surges per angle

Angle:

☒ 0°, 90°, 180°, 270° (input a.c. power port)

Polarity:

☒ Positive & Negative

Repetition Rate:

☐ 1 surge per min

☒ 1 surge per 30 sec.

Required Performance Criteria:

☒ Complied

Other supply / Signal Lines

Source Impedance:

42 ohm for common Mode

Surge Amplitude:

Common Mode

☒ (0,5 / 1,0) kV

Number of Surges:

☒ 5 Surges

Polarity:

☒ Positive & Negative

Repetition Rate:

☒ 1 surge per min

☐ 1 surge per 30 sec.

Required Performance Criteria:

☒ Complied

**Test Data**

■ #1

☒ Line to Line – Differential Mode

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

☒ Line to Earth – Common Mode

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

Signal Lines☒ Line to Earth – Common Mode

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



■ #2

☐ Line to Line – Differential Mode

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

☐ Line to Earth – Common Mode

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

Signal Lines☒ Line to Earth – Common Mode

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

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

Oct. 27, 2024

Test Location

EMS-CS: Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMS Test S/W	icd.control	EM TEST	5.3.12	-
<input checked="" type="checkbox"/>	CONTINUOUS WAVE SIMULATOR	CWS 500N1.4	EM TEST	P1602169880	11, 08, 2024
<input checked="" type="checkbox"/>	ATTENUATOR	ATT 6/80	EM TEST	P1614178148	11, 08, 2024
<input checked="" type="checkbox"/>	CDN	CDN M016	TESEQ	43694	11, 08, 2024
<input checked="" type="checkbox"/>	CDN	CDN M016	TESEQ	43697	11, 08, 2024
<input type="checkbox"/>	CDN	CDN T800	TESEQ	42800	11, 08, 2024
<input checked="" type="checkbox"/>	EM CLAMP	KEMZ 801A	TESEQ	44099	11, 09, 2024
<input checked="" type="checkbox"/>	CDN	CDN ST08A	TESEQ	43886	11, 08, 2024

Test Conditions

Temperature: (23,7 ± 0,1) °C
Relative Humidity: (46,4 ± 0,1) % R.H.
Atmospheric Pressure: (100,1 ± 0,2) 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**

■ #1

☒ Input a.c. power ports

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

☐ Input d.c. power ports

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

☒ Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Observations
RJ-45	CDN	Complied
ALARM AUDIO (ALARM OUT), ALARM AUDIO (ALARM IN)	Clamp	Complied



■ #2

☐ Input a.c. power ports

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

☐ Input d.c. power ports

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

☒ Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Observations
RJ-45	CDN	Complied
ALARM AUDIO (ALARM OUT), ALARM AUDIO (ALARM IN)	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

Oct. 28, 2024

Test Location

EMS-Voltage dip: Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMS Test S/W	iec.control	EM TEST	5.4.8	-
<input checked="" type="checkbox"/>	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	11, 09, 2024
<input checked="" type="checkbox"/>	MOTOR VARIAC	MV2616	EM TEST	P1552169719	11, 09, 2024

Test Conditions

Temperature: (23,5 ± 0,1) °C
Relative Humidity: (46,4 ± 0,1) % R.H.
Atmospheric Pressure: (100,5 ± 0,0) kPa

**Test Specifications & Observations/Remarks****- Voltage Dips and Short Interruptions**

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

- Voltage variations

<input checked="" type="checkbox"/> Unom + 10 %	<input checked="" type="checkbox"/> 253.0 V (ac)	<u>Complied</u>
<input checked="" type="checkbox"/> Unom - 15 %	<input checked="" type="checkbox"/> 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

RemarksPASS Required Performance Criteria.During the test(100%, 250cycle), EUT was turned off but after the test, it was recovered without operator's intervention.



APPENDIX A – TEST DATA

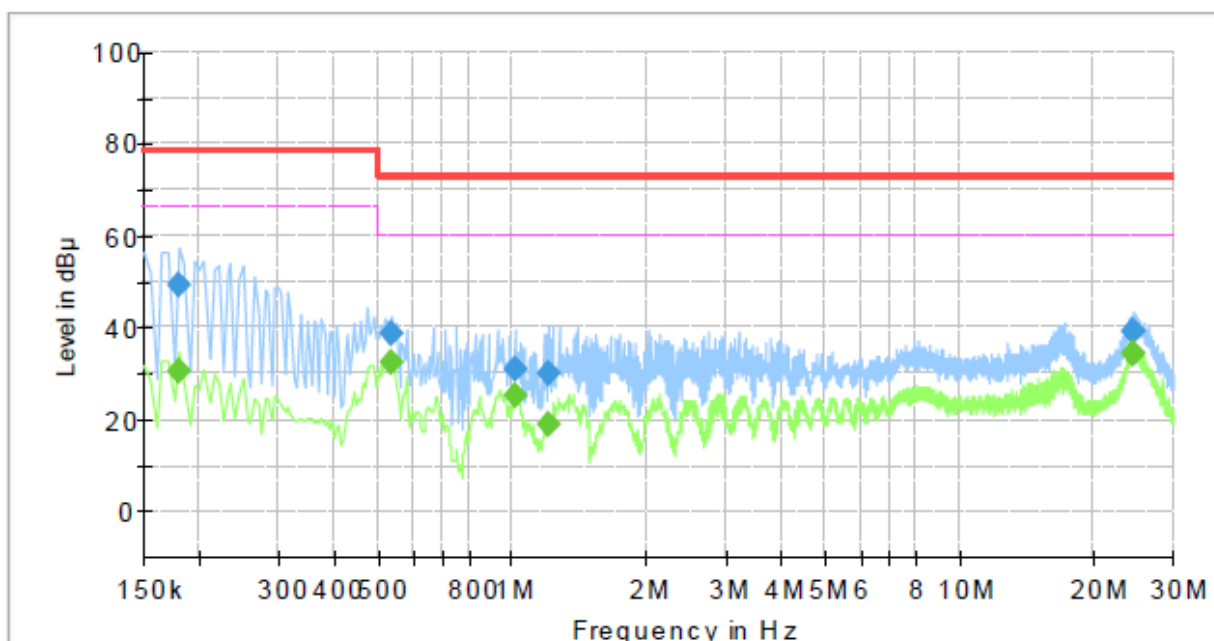
Conducted Emissions at Mains Power Ports

■ #1

[HOT]

Common Information

Test Description:	Conducted Emission
Job No.:	KES-EM243580
Phase:	N
Mode:	#1
Operator Name:	KES



Final Result

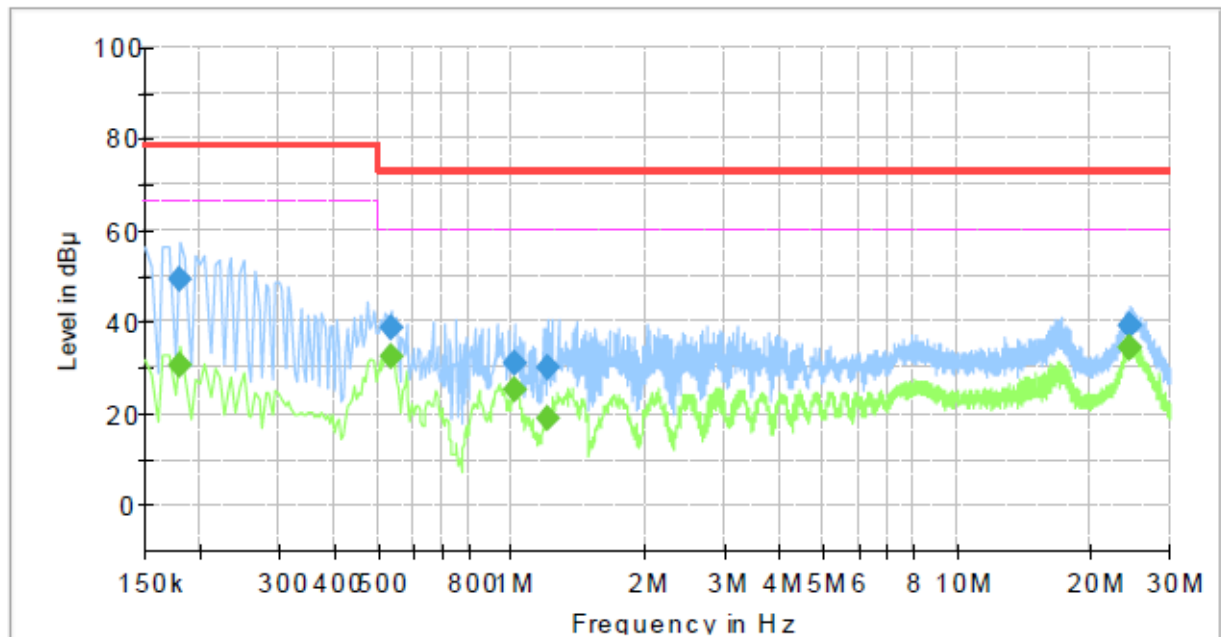
Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.180000	---	30.40	66.00	35.60	1000.0	9.000	N	19.5
0.180000	49.50	---	79.00	29.50	1000.0	9.000	N	19.5
0.540000	---	32.62	60.00	27.38	1000.0	9.000	N	19.6
0.540000	38.66	---	73.00	34.34	1000.0	9.000	N	19.6
1.020000	---	25.18	60.00	34.82	1000.0	9.000	N	19.7
1.020000	30.96	---	73.00	42.04	1000.0	9.000	N	19.7
1.205000	---	19.07	60.00	40.93	1000.0	9.000	N	19.7
1.205000	29.81	---	73.00	43.19	1000.0	9.000	N	19.7
24.395000	---	34.27	60.00	25.73	1000.0	9.000	N	20.6
24.395000	39.33	---	73.00	33.67	1000.0	9.000	N	20.6
24.560000	---	34.35	60.00	25.65	1000.0	9.000	N	20.6
24.560000	39.38	---	73.00	33.62	1000.0	9.000	N	20.6



[NEUTRAL]

Common Information

Test Description: Conducted Emission
Job No.: KES-EM243580
Phase: N
Mode: #1
Operator Name: KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.180000	---	30.40	66.00	35.60	1000.0	9.000	N	19.5
0.180000	49.50	---	79.00	29.50	1000.0	9.000	N	19.5
0.540000	---	32.62	60.00	27.38	1000.0	9.000	N	19.6
0.540000	38.66	---	73.00	34.34	1000.0	9.000	N	19.6
1.020000	---	25.18	60.00	34.82	1000.0	9.000	N	19.7
1.020000	30.96	---	73.00	42.04	1000.0	9.000	N	19.7
1.205000	---	19.07	60.00	40.93	1000.0	9.000	N	19.7
1.205000	29.81	---	73.00	43.19	1000.0	9.000	N	19.7
24.395000	---	34.27	60.00	25.73	1000.0	9.000	N	20.6
24.395000	39.33	---	73.00	33.67	1000.0	9.000	N	20.6
24.560000	---	34.35	60.00	25.65	1000.0	9.000	N	20.6
24.560000	39.38	---	73.00	33.62	1000.0	9.000	N	20.6

♦ Calculation

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

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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

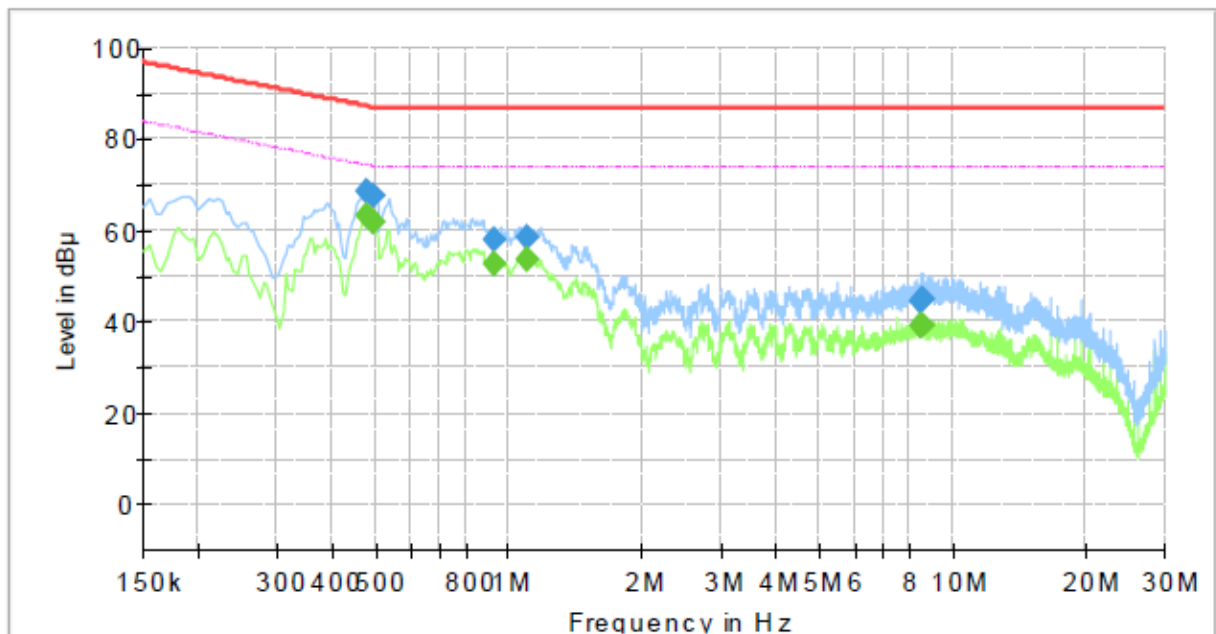
**Conducted Emissions at Telecommunication Ports**

■ #1

[1000 Mbps]

Common Information

Test Description: Telecommunication Emission
Job No.: KES-EM243580
Mode : #1
Speed : 1 000 Mbps
Operator Name: KES

**Final Result**

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.480000	---	63.41	74.34	10.93	1000.0	9.000	Single Line	19.5
0.480000	68.73	---	87.34	18.61	1000.0	9.000	Single Line	19.5
0.495000	---	61.98	74.08	12.10	1000.0	9.000	Single Line	19.5
0.495000	67.68	---	87.08	19.40	1000.0	9.000	Single Line	19.5
0.930000	---	52.90	74.00	21.10	1000.0	9.000	Single Line	19.4
0.930000	57.86	---	87.00	29.14	1000.0	9.000	Single Line	19.4
1.105000	---	53.80	74.00	20.20	1000.0	9.000	Single Line	19.4
1.105000	58.73	---	87.00	28.27	1000.0	9.000	Single Line	19.4
8.485000	---	39.05	74.00	34.95	1000.0	9.000	Single Line	19.6
8.485000	44.74	---	87.00	42.26	1000.0	9.000	Single Line	19.6
8.595000	---	39.25	74.00	34.75	1000.0	9.000	Single Line	19.6
8.595000	45.12	---	87.00	41.88	1000.0	9.000	Single Line	19.6

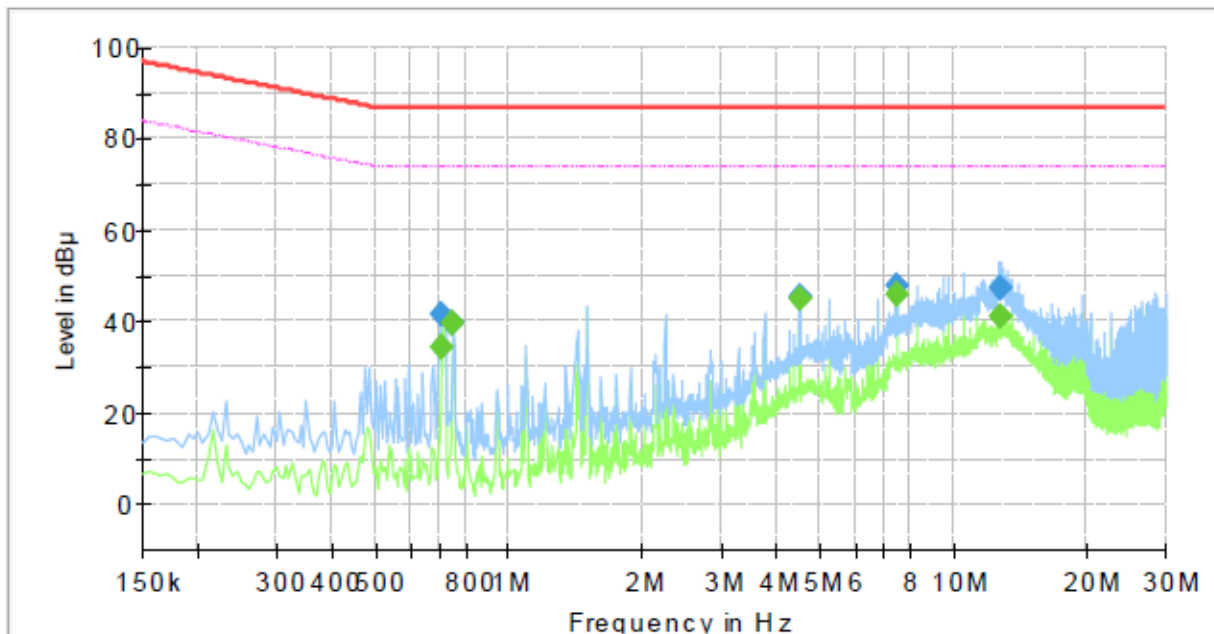


■ #2

[1000 Mbps]

Common Information

Test Description: Telecommunication Emission
Job No.: KES-EM243580
Mode : #2
Speed : 1 000 Mbps
Operator Name: KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.705000	---	34.24	74.00	39.76	1000.0	9.000	Single Line	19.4
0.705000	41.69	---	87.00	45.31	1000.0	9.000	Single Line	19.4
0.750000	---	39.51	74.00	34.49	1000.0	9.000	Single Line	19.4
0.750000	39.47	---	87.00	47.53	1000.0	9.000	Single Line	19.4
4.500000	---	44.91	74.00	29.09	1000.0	9.000	Single Line	19.5
4.500000	45.54	---	87.00	41.46	1000.0	9.000	Single Line	19.5
7.500000	---	46.17	74.00	27.83	1000.0	9.000	Single Line	19.6
7.500000	47.66	---	87.00	39.34	1000.0	9.000	Single Line	19.6
12.750000	---	41.29	74.00	32.71	1000.0	9.000	Single Line	19.8
12.750000	47.36	---	87.00	39.64	1000.0	9.000	Single Line	19.8

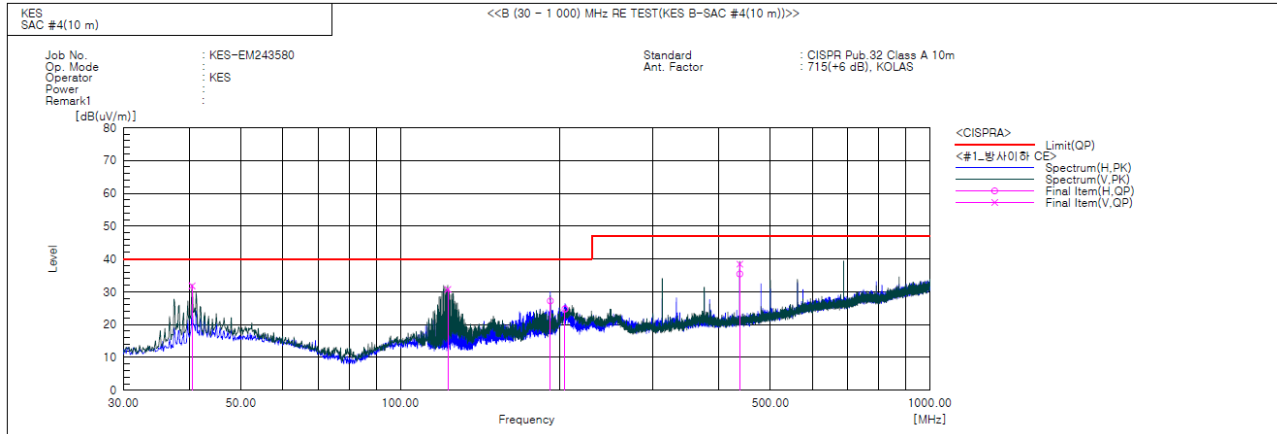
◆ Calculation

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

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

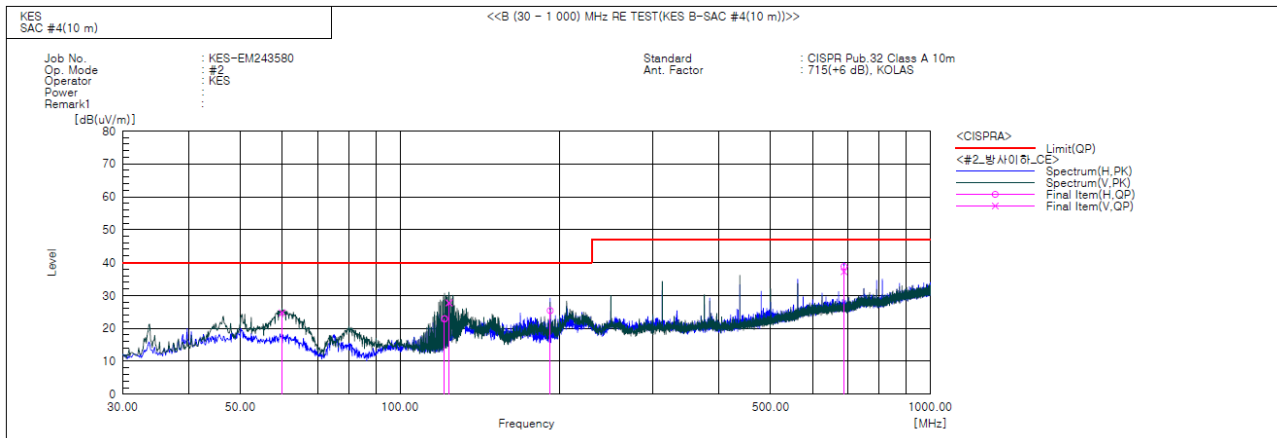
Corr. : Correction values (ISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

**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	40.428	V	54.5	-22.7	31.8	40.0	8.2	114.0	262.0	
2	122.999	V	55.0	-24.3	30.7	40.0	9.3	141.0	196.0	
3	191.990	H	48.9	-21.7	27.2	40.0	12.8	371.0	23.0	
4	204.721	H	45.2	-20.4	24.8	40.0	15.2	385.0	98.0	
5	437.521	V	51.5	-13.1	38.4	47.0	8.6	100.0	3.0	
6	437.821	H	48.5	-13.1	35.4	47.0	11.6	391.0	210.0	



#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	59.949	V	46.9	-22.1	24.8	40.0	15.2	135.0	147.0	
2	121.423	H	47.1	-24.2	22.9	40.0	17.1	381.0	249.0	
3	123.794	V	52.2	-24.4	27.8	40.0	12.2	100.0	207.0	
4	191.971	H	47.1	-21.7	25.4	40.0	14.6	347.0	106.0	
5	687.539	V	43.9	-6.7	37.2	47.0	9.8	106.0	140.0	
6	687.854	H	45.5	-6.7	38.8	47.0	8.2	383.0	53.0	

◆ 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)]

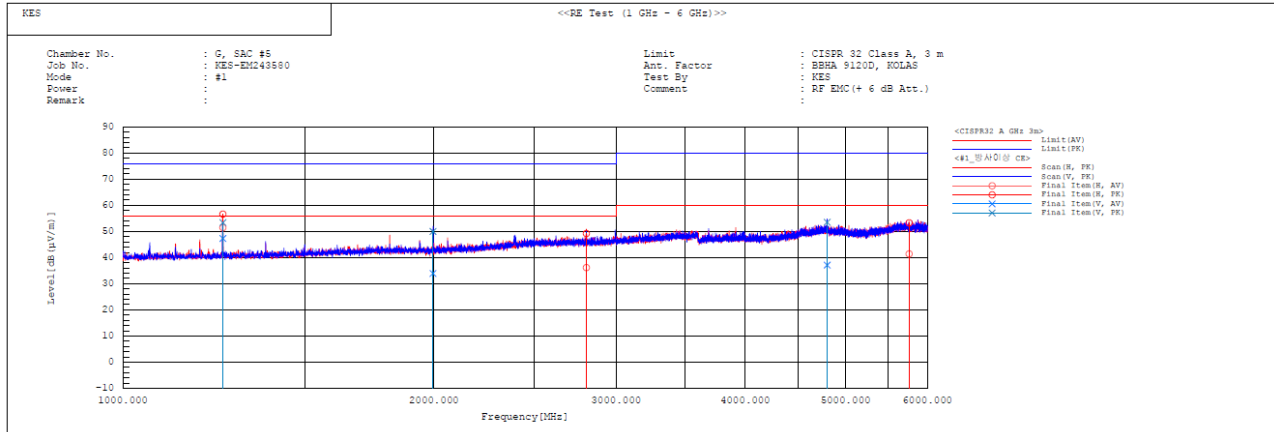
Reading(QP) : Reading value, Result(QP) : Reading value + Factor value

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



Radiated Electric Field Emissions(Above 1 GHz)

■ #1

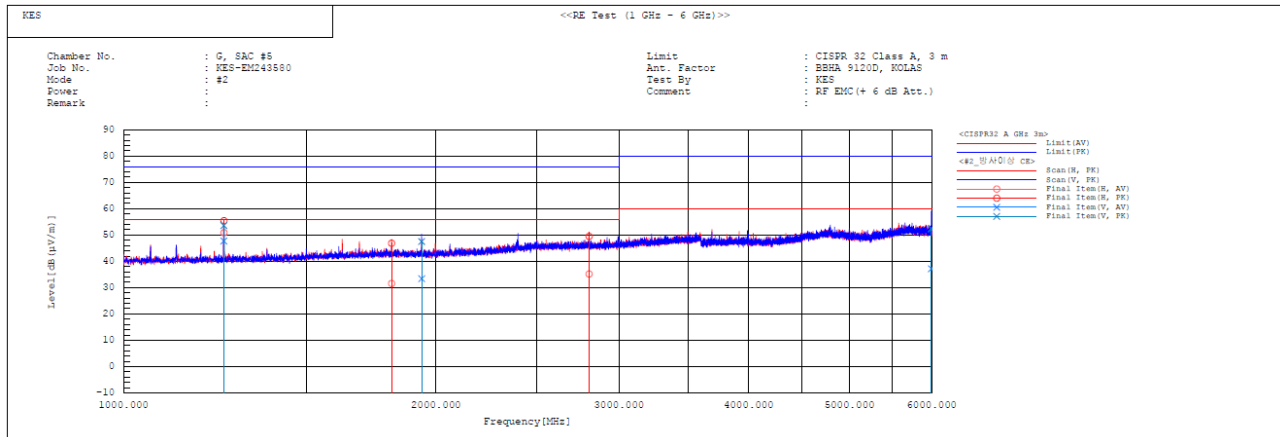


Final Result

No.	Frequency [MHz]	Pol	Reading AV [dB(μV)]	Reading PK [dB(μV)]	c.f [dB(1/m)]	Result AV [dB(μV/m)]	Result PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Limit PK [dB(μV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Remark
1	1249.821	V	47.8	53.9	-0.5	47.3	53.4	56.0	76.0	8.7	22.6	100.0	200.9	
2	1250.042	H	52.0	57.1	-0.5	51.5	56.6	56.0	76.0	4.5	19.4	100.0	27.0	
3	1995.382	V	31.1	47.2	2.8	33.9	50.0	56.0	76.0	22.1	26.0	100.0	65.6	
4	2808.205	H	30.6	43.6	5.6	36.2	49.2	56.0	76.0	19.8	26.8	100.0	200.1	
5	4799.772	V	25.5	41.9	11.6	37.1	53.5	60.0	80.0	22.9	26.5	100.0	169.5	
6	5762.162	H	27.7	39.6	13.7	41.4	53.3	60.0	80.0	18.6	26.7	100.0	175.1	



■ #2



Final Result

No.	Frequency	Pol	Reading AV	Reading PK	c.f	Result AV	Result PK	Limit AV	Limit PK	Margin AV	Margin PK	Height	Angle	Remark
	[MHz]		[dB(μV)]	[dB(μV)]	[dB(1/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	[dB]	[cm]	[deg]	
1	1249.541	V	48.2	54.1	-0.5	47.7	53.6	56.0	76.0	8.3	22.4	100.0	203.0	
2	1249.721	H	51.4	55.9	-0.5	50.9	55.4	56.0	76.0	5.1	20.6	100.0	5.5	
3	1812.418	H	29.6	44.9	2.0	31.6	46.9	56.0	76.0	24.4	29.1	100.0	148.7	
4	1937.348	V	30.8	44.9	2.6	33.4	47.5	56.0	76.0	22.6	28.5	100.0	61.4	
5	2807.504	H	29.6	43.9	5.6	35.2	49.5	56.0	76.0	20.8	26.5	100.0	37.5	
6	5995.261	V	23.0	38.2	14.2	37.2	52.4	60.0	80.0	22.8	27.6	100.0	241.3	

◆ 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**

■ #1

Average harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	0.082			
2	0.003	0.241	1.080	n/a
3	0.077	3.336	2.300	PASS
4	0.004	0.915	0.430	n/a
5	0.075	6.546	1.140	PASS
6	0.004	1.340	0.300	n/a
7	0.073	9.519	0.770	PASS
8	0.003	1.392	0.230	n/a
9	0.072	17.886	0.400	PASS
10	0.003	1.823	0.184	n/a
11	0.068	20.745	0.330	PASS
12	0.003	2.254	0.153	n/a
13	0.065	30.845	0.210	PASS
14	0.003	2.480	0.131	n/a
15	0.061	40.636	0.150	PASS
16	0.003	2.612	0.115	n/a
17	0.057	43.056	0.132	PASS
18	0.003	3.003	0.102	n/a
19	0.053	44.535	0.118	PASS
20	0.003	3.271	0.092	n/a
21	0.048	30.014	0.161	PASS
22	0.003	3.361	0.084	n/a
23	0.044	29.807	0.147	PASS
24	0.003	3.310	0.077	n/a
25	0.039	28.965	0.135	PASS
26	0.002	3.389	0.071	n/a
27	0.034	27.559	0.125	PASS
28	0.002	3.528	0.066	n/a
29	0.030	25.655	0.116	PASS
30	0.002	3.435	0.061	n/a
31	0.025	23.377	0.109	PASS
32	0.002	3.297	0.058	n/a
33	0.021	20.867	0.102	PASS
34	0.002	3.086	0.054	n/a
35	0.017	18.069	0.096	PASS
36	0.001	2.823	0.051	n/a
37	0.014	15.101	0.091	PASS
38	0.001	2.692	0.048	n/a
39	0.011	12.148	0.087	PASS
40	0.001	2.615	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	0.082			
2	0.003	0.190	1.620	n/a
3	0.077	2.231	3.450	PASS
4	0.005	0.713	0.645	n/a
5	0.075	4.400	1.710	PASS
6	0.005	1.047	0.450	n/a
7	0.073	6.362	1.155	PASS
8	0.004	1.071	0.345	n/a
9	0.072	11.972	0.600	PASS
10	0.004	1.425	0.276	n/a
11	0.069	13.893	0.495	PASS
12	0.004	1.797	0.230	n/a
13	0.065	20.672	0.315	PASS
14	0.004	1.970	0.197	n/a
15	0.061	27.228	0.225	PASS
16	0.004	2.070	0.173	n/a
17	0.057	28.805	0.199	PASS
18	0.004	2.374	0.153	n/a
19	0.053	29.759	0.178	PASS
20	0.004	2.557	0.138	n/a
21	0.048	30.082	0.161	PASS
22	0.003	2.702	0.125	n/a
23	0.044	29.895	0.147	PASS
24	0.003	2.673	0.115	n/a
25	0.039	29.062	0.135	PASS
26	0.003	2.730	0.106	n/a
27	0.035	27.667	0.125	PASS
28	0.003	2.852	0.099	n/a
29	0.030	25.784	0.116	PASS
30	0.003	2.747	0.092	n/a
31	0.026	23.499	0.109	PASS
32	0.002	2.723	0.086	n/a
33	0.021	21.001	0.102	PASS
34	0.002	2.504	0.081	n/a
35	0.018	18.230	0.096	PASS
36	0.002	2.242	0.077	n/a
37	0.014	15.257	0.091	PASS
38	0.002	2.163	0.073	n/a
39	0.011	12.362	0.087	PASS
40	0.001	2.016	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





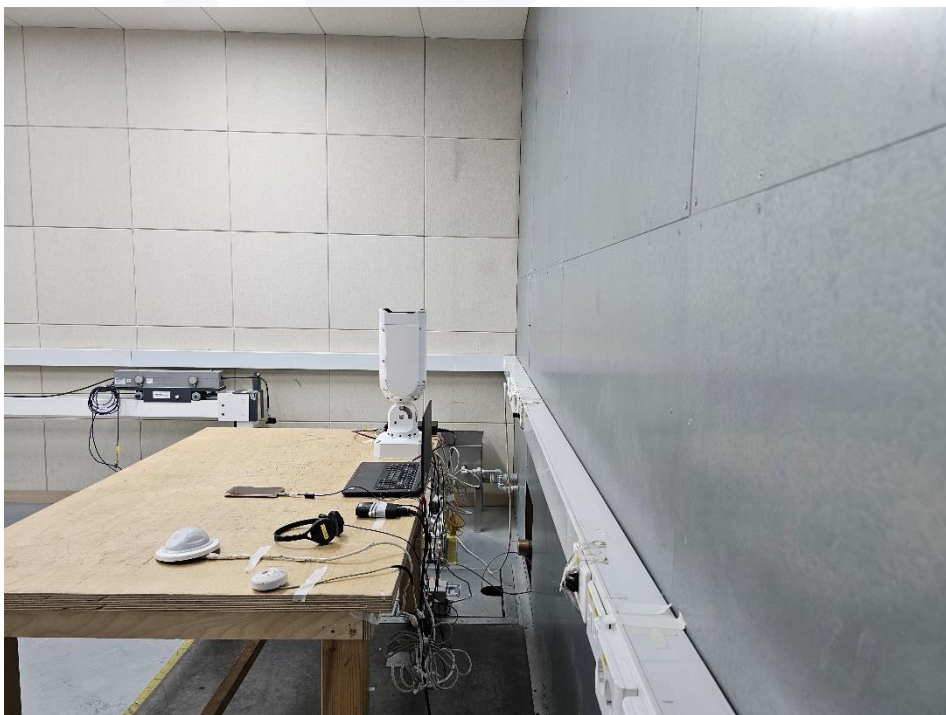
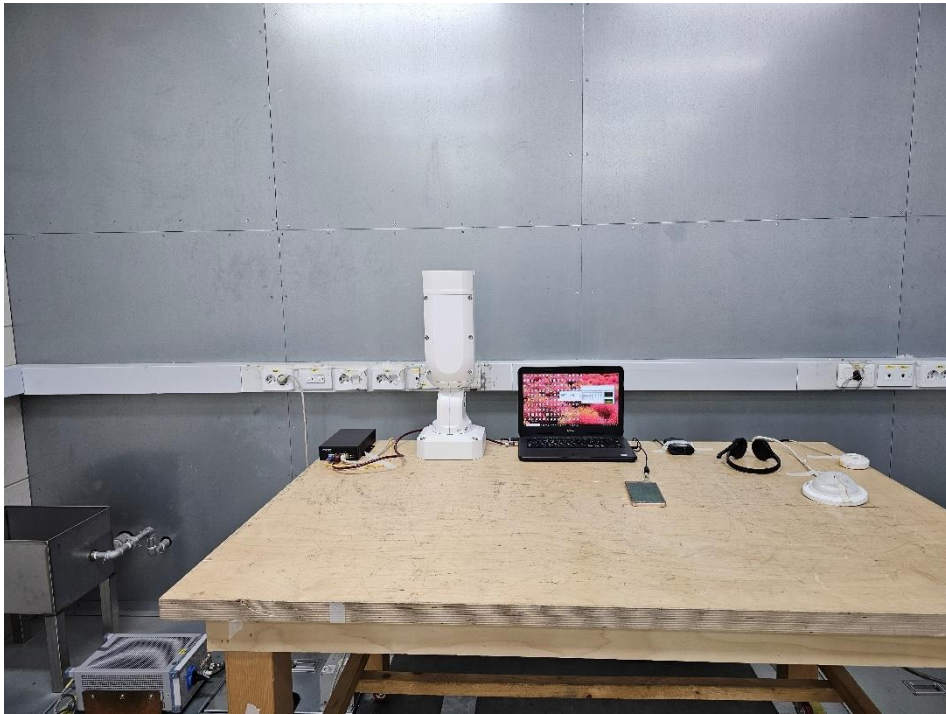
Conducted Emissions at Telecommunication Ports

■ #1





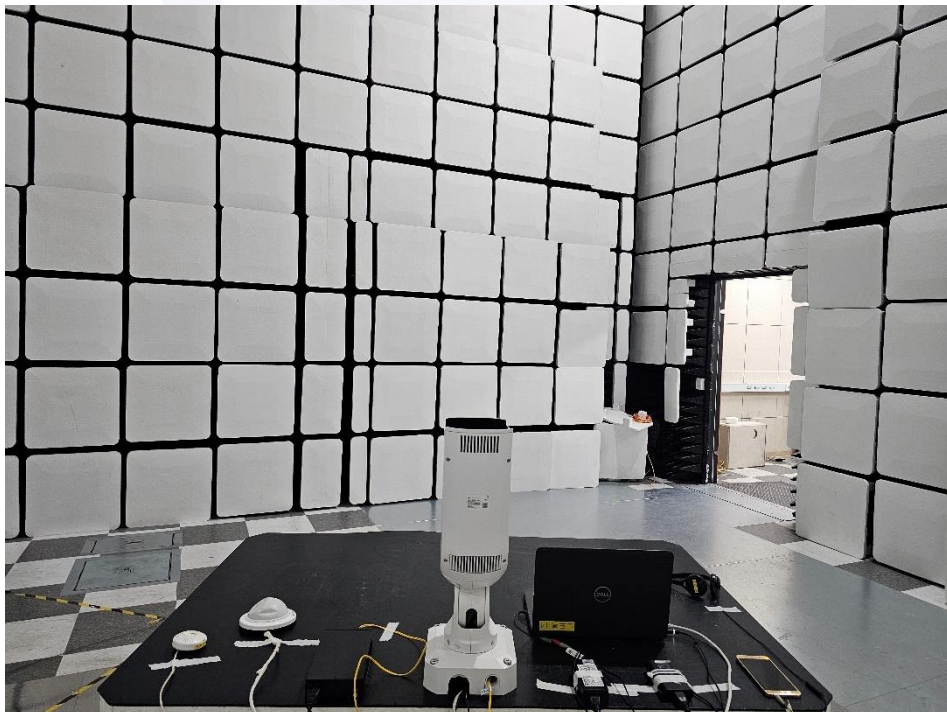
■ #2





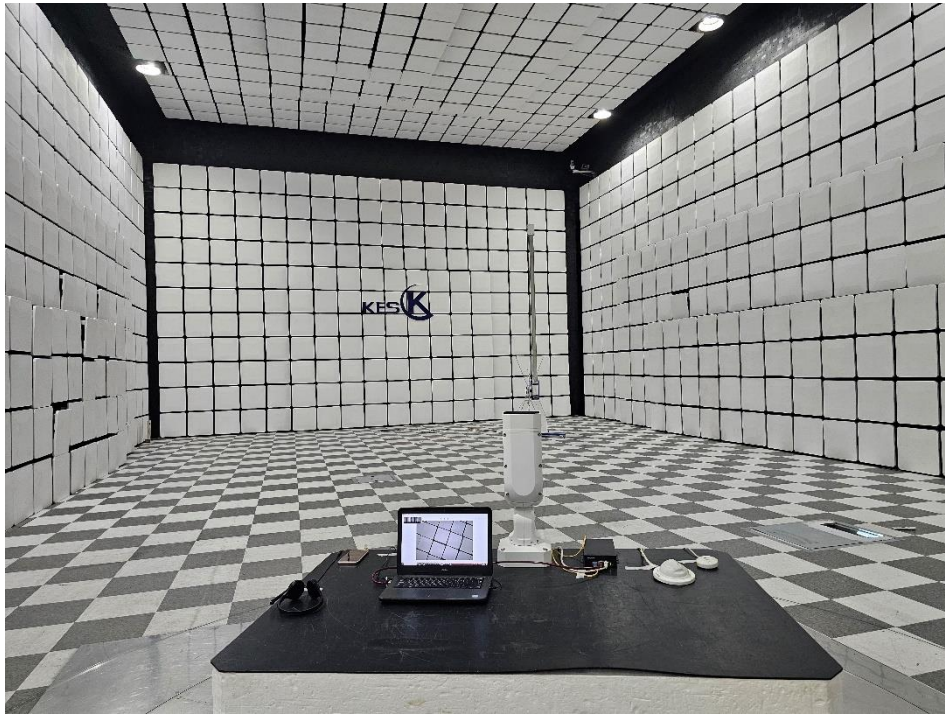
Radiated Electric Field Emissions(Below 1 GHz)

■ #1





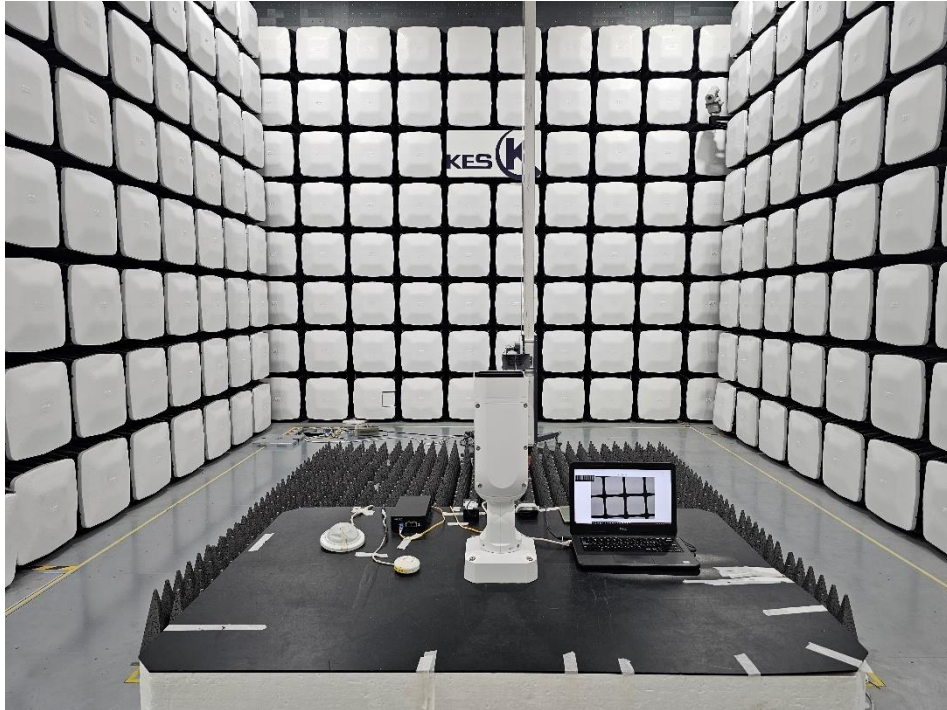
■ #2





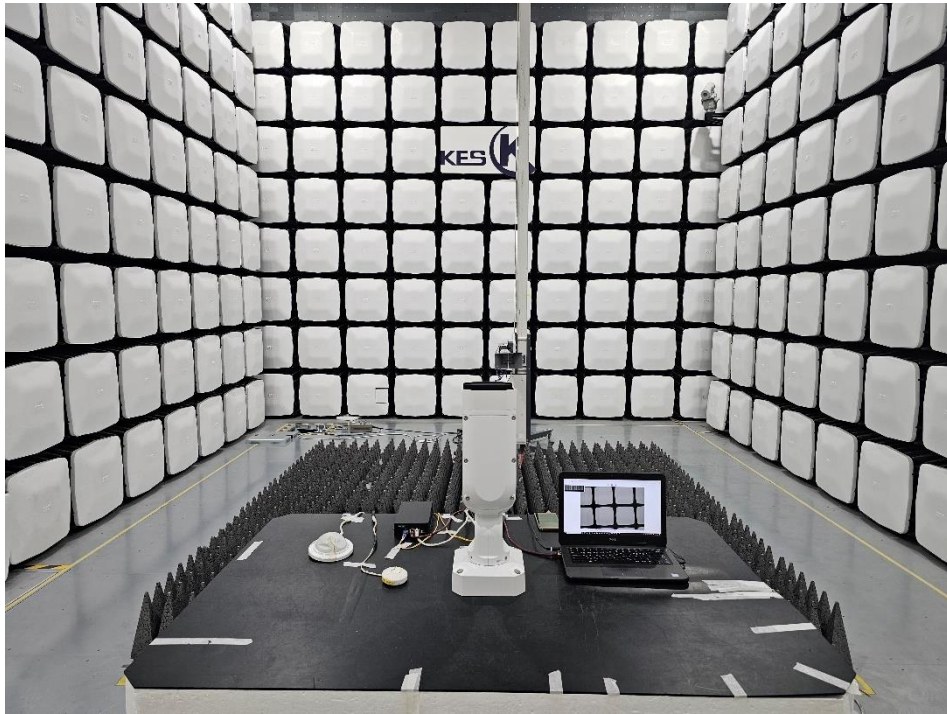
Radiated Electric Field Emissions(Above 1 GHz)

■ #1





■ #2





Harmonic Current Emissions and Voltage Fluctuations and Flicker

■ #1





Electrostatic Discharge

■ #1



■ #2



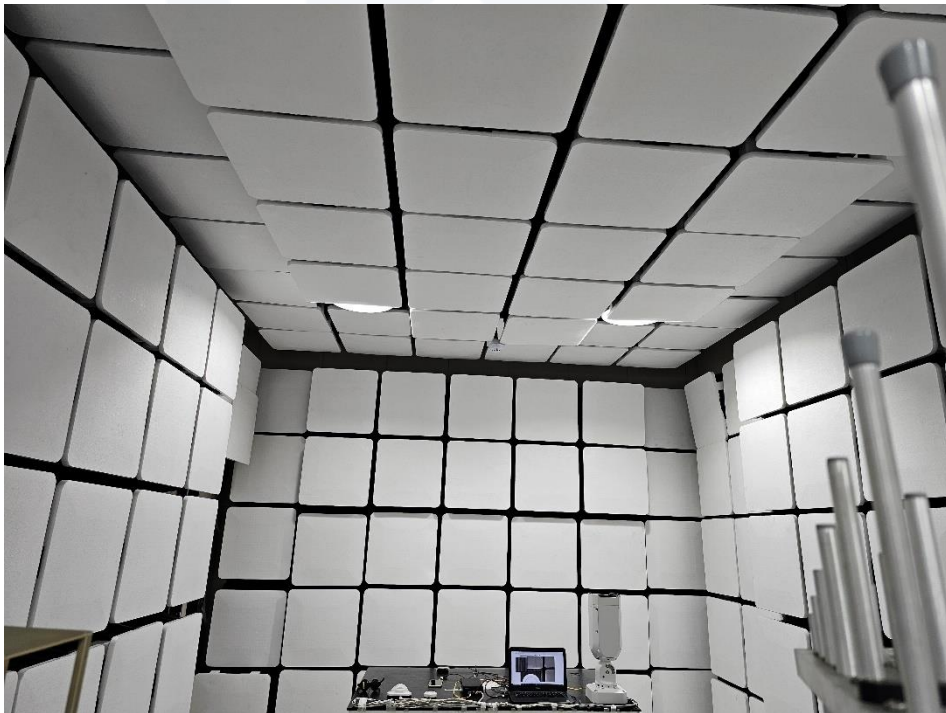


Radiated Electric Field Immunity

■ #1



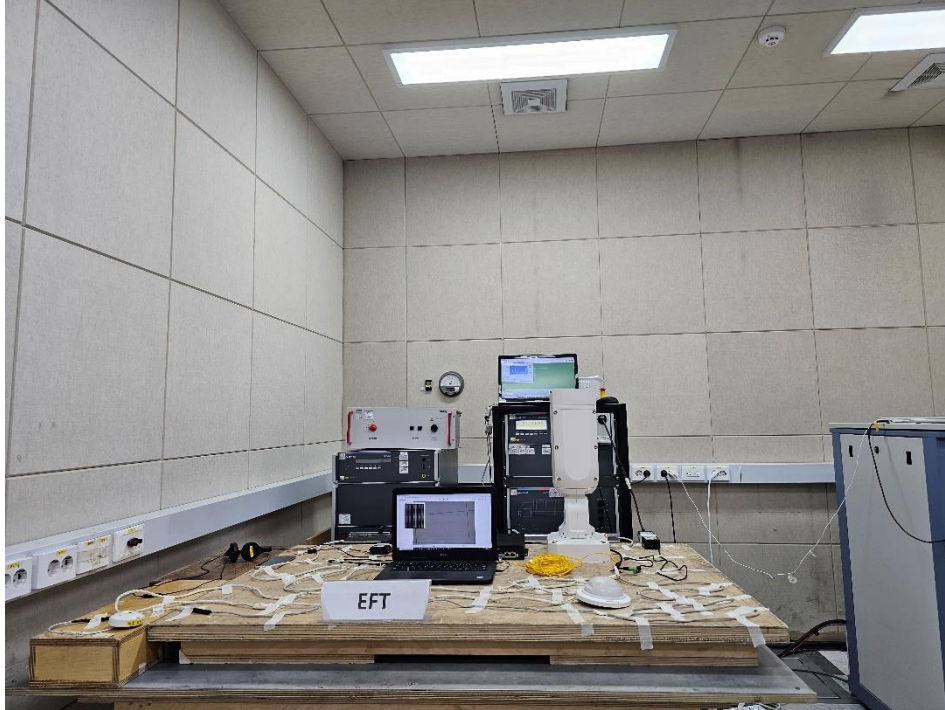
■ #2



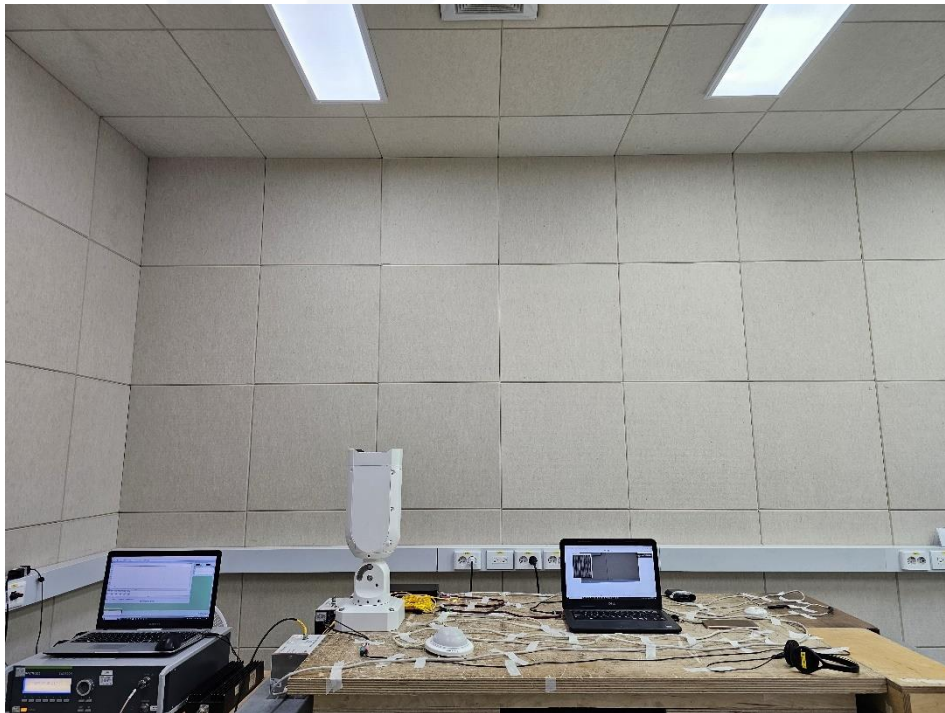


Electrical Fast Transients/Bursts

■ #1



■ #2





Surge Transients

■ #1



■ #2



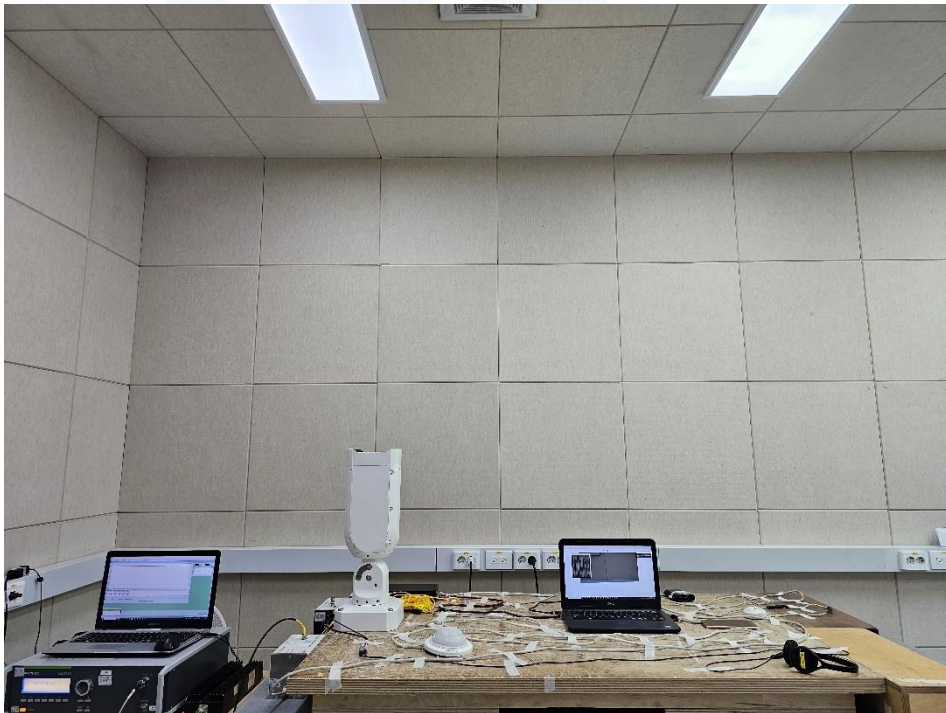


Conducted Disturbance

■ #1



■ #2





Voltage Dips and Short Interruptions

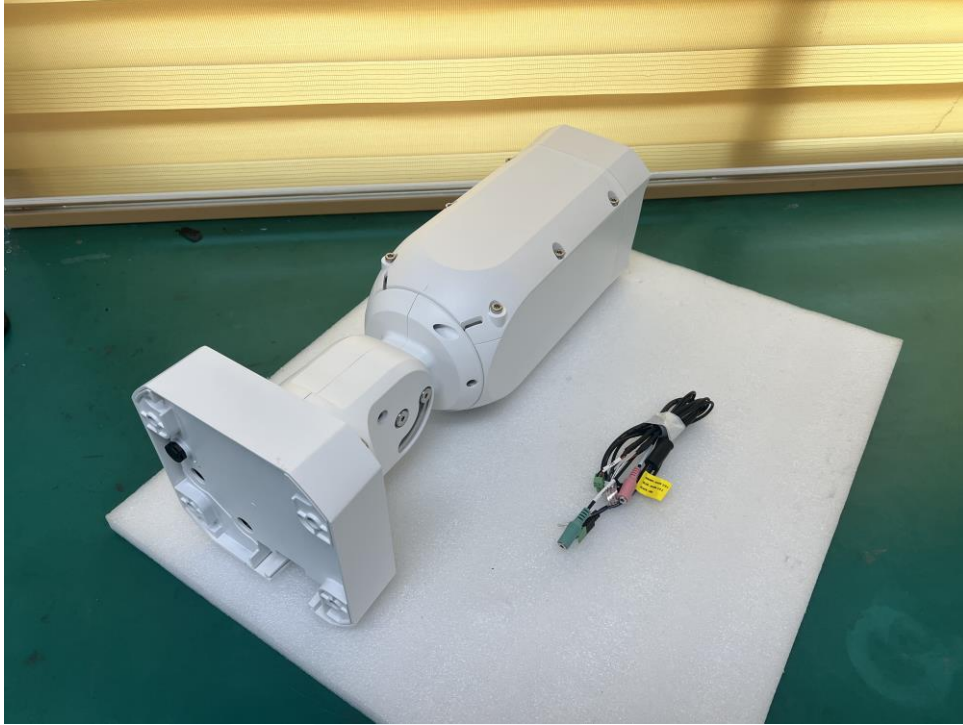
■ #1



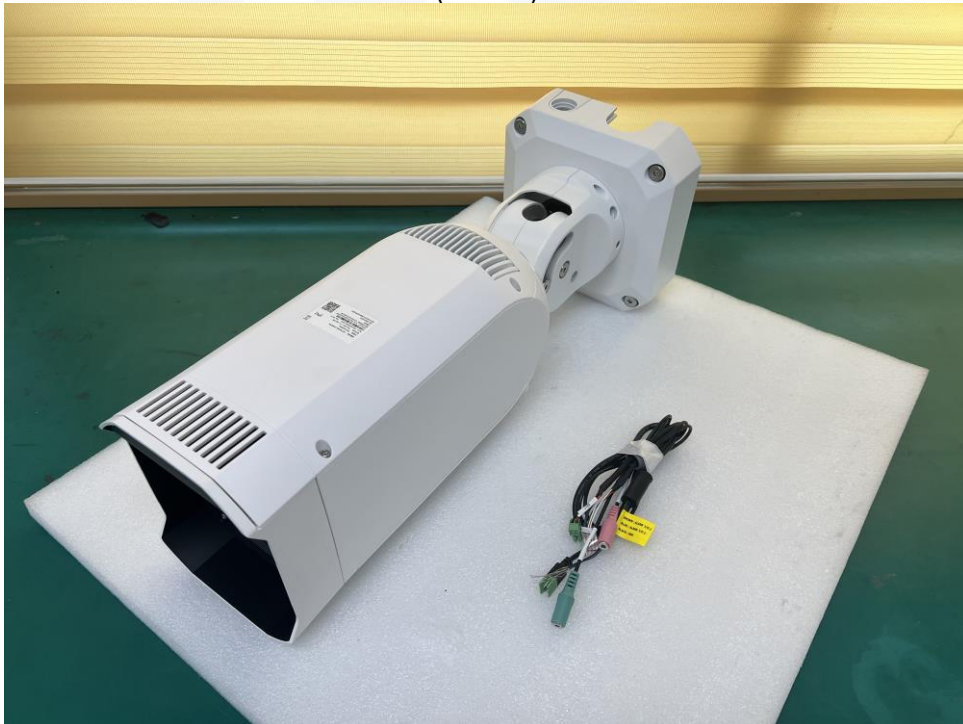


EUT External Photographs

(Top)



(Bottom)





EUT Internal Photographs

(Internal View)





EUT Internal View – Board 1

(Top)



(Bottom)



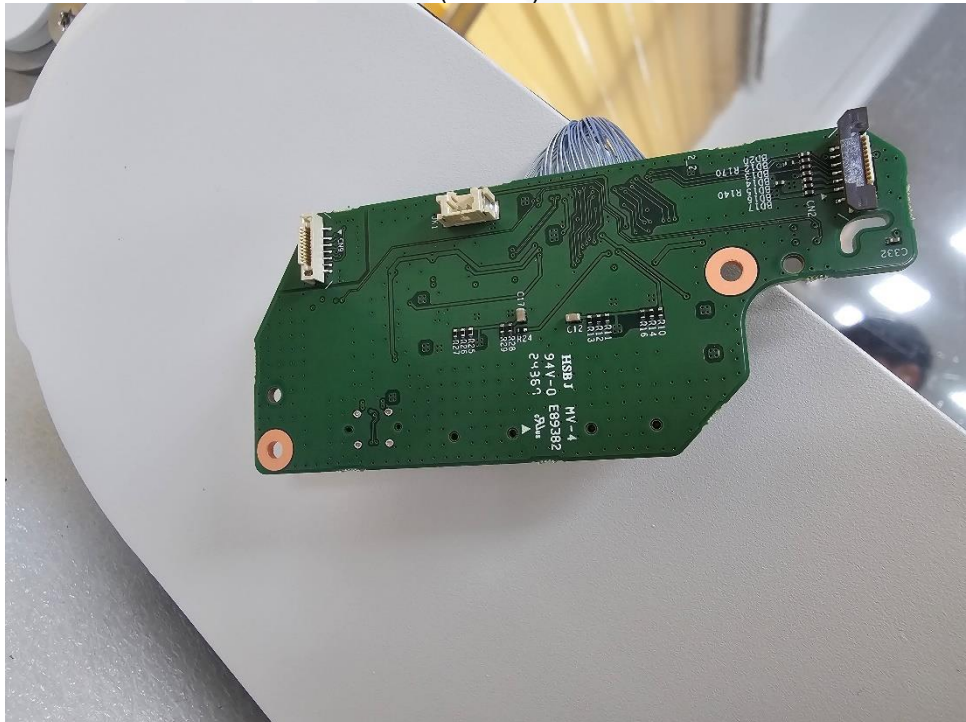


EUT Internal View – Board 2

(Top)



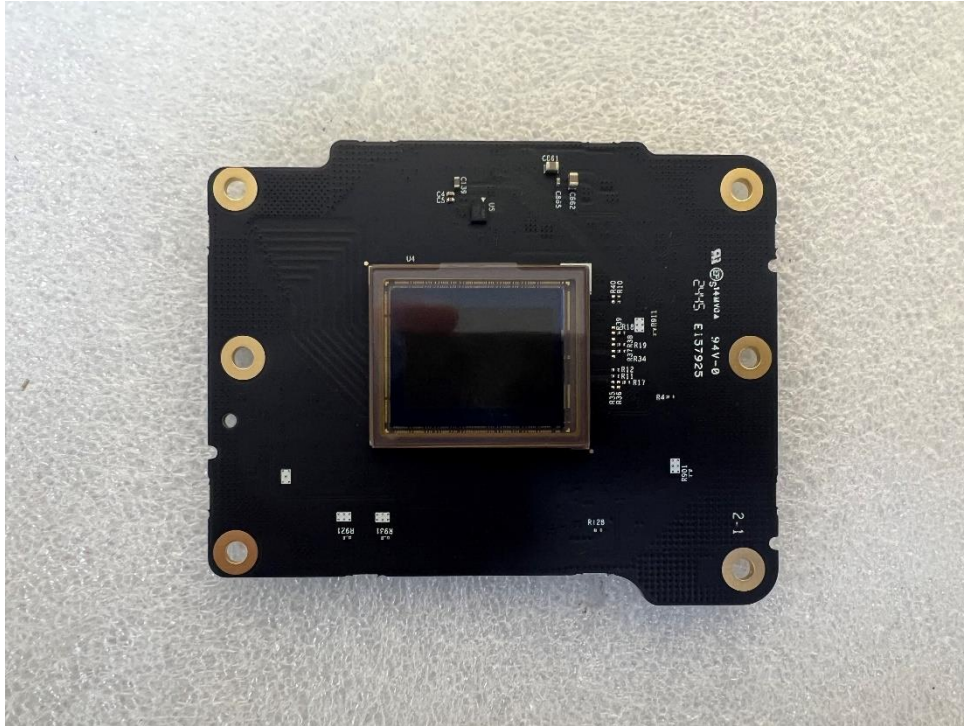
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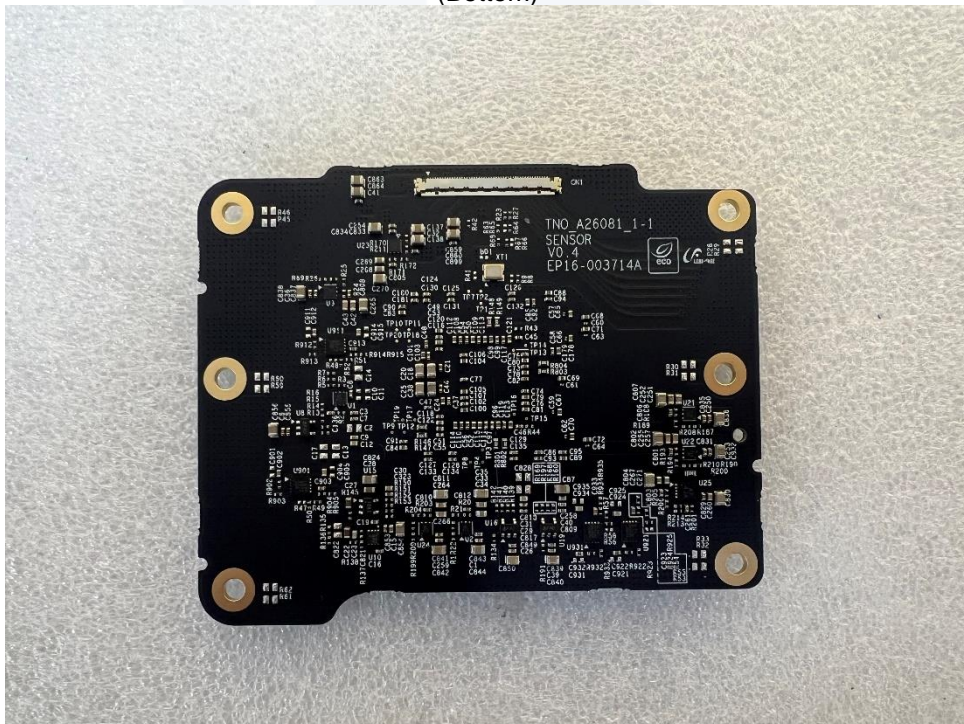


EUT Internal View – Board 3

(Top)



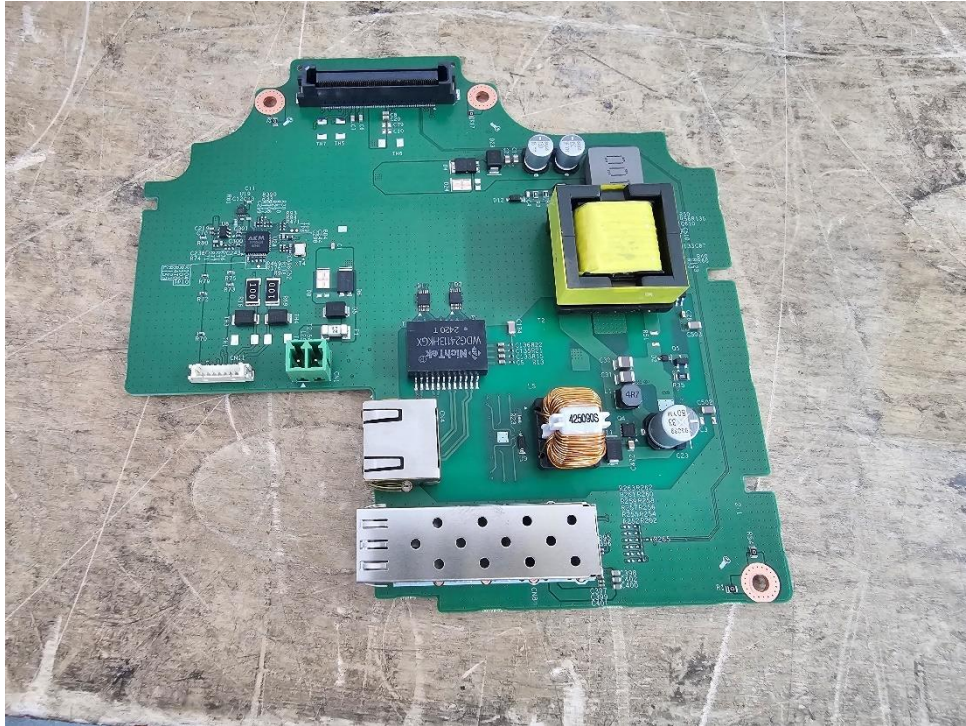
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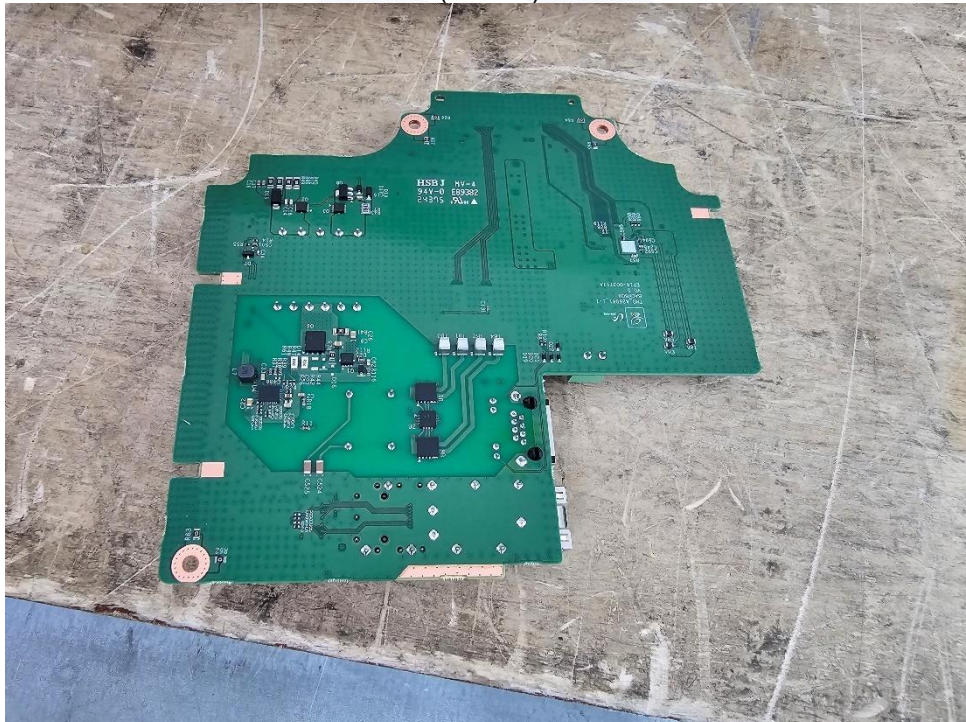


EUT Internal View – Board 4

(Top)



(Bottom)



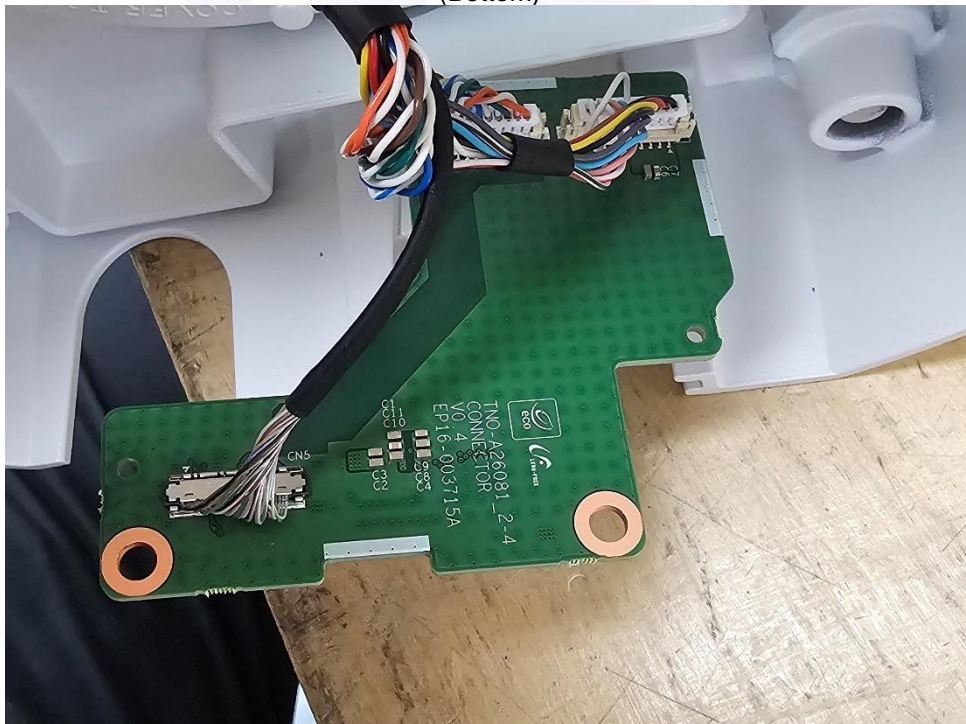


EUT Internal View – Board 5

(Top)



(Bottom)





EUT Internal View – Lens

(Top)



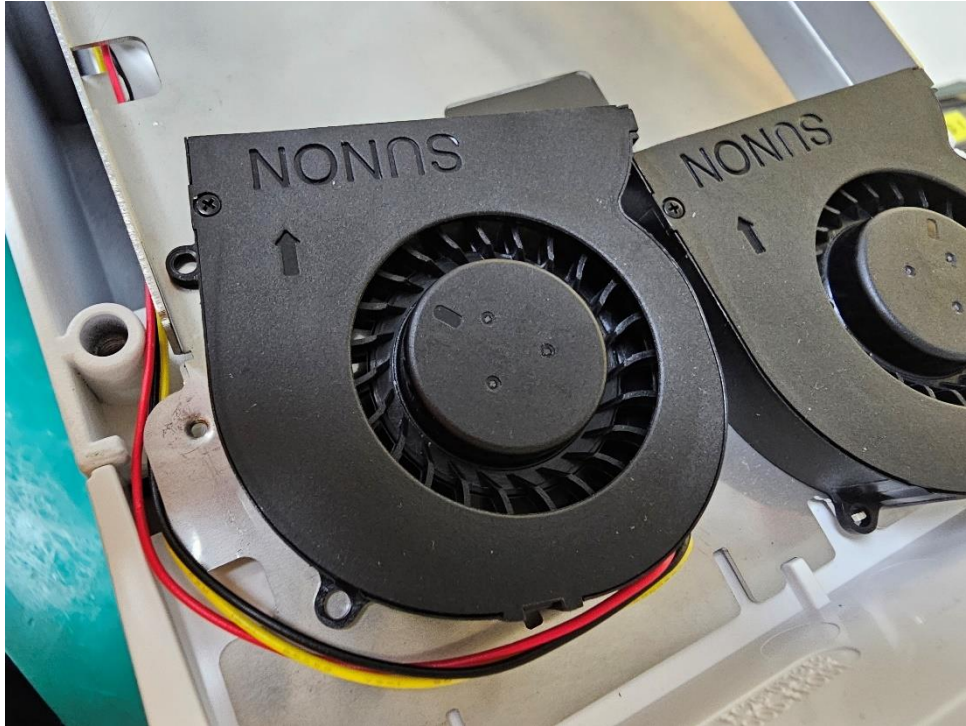
(Bottom)





EUT Internal View – FAN

(Top)



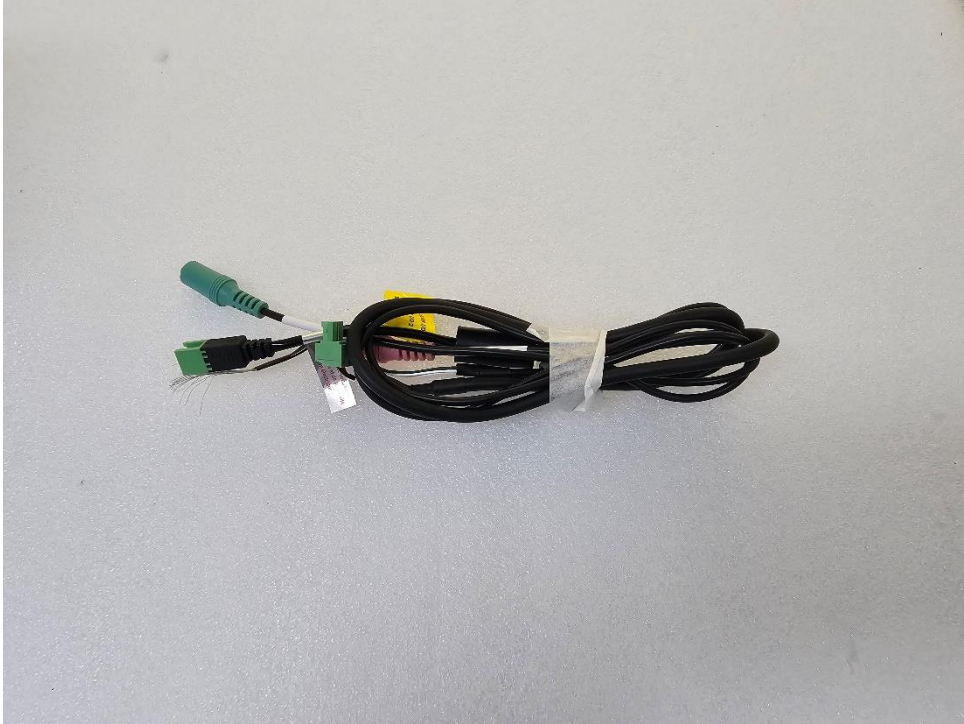
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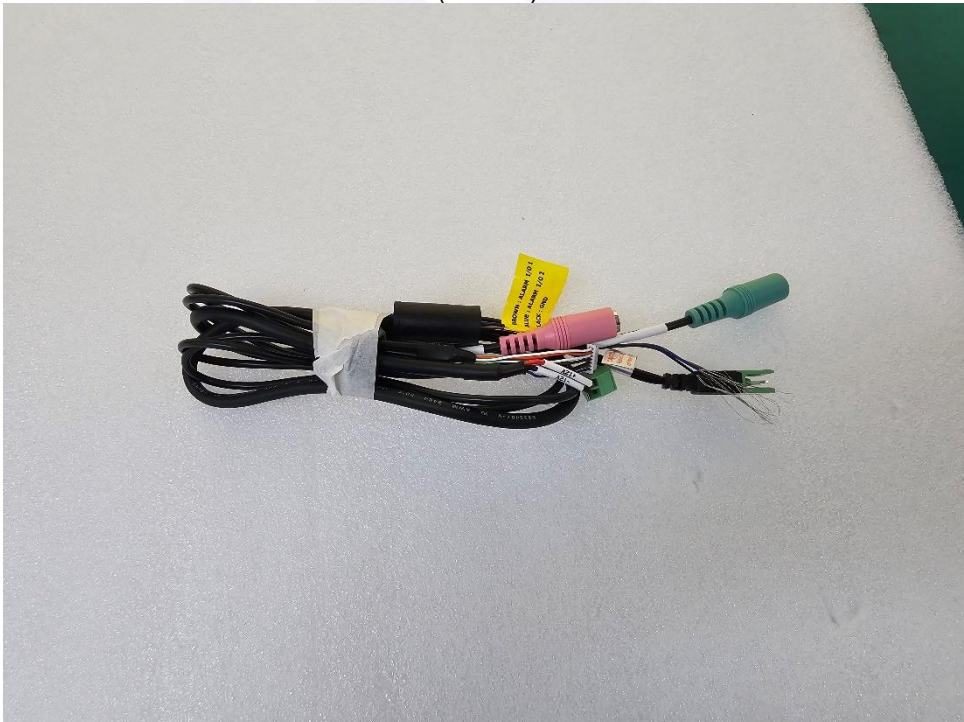


EUT Internal View – Cable

(Top)

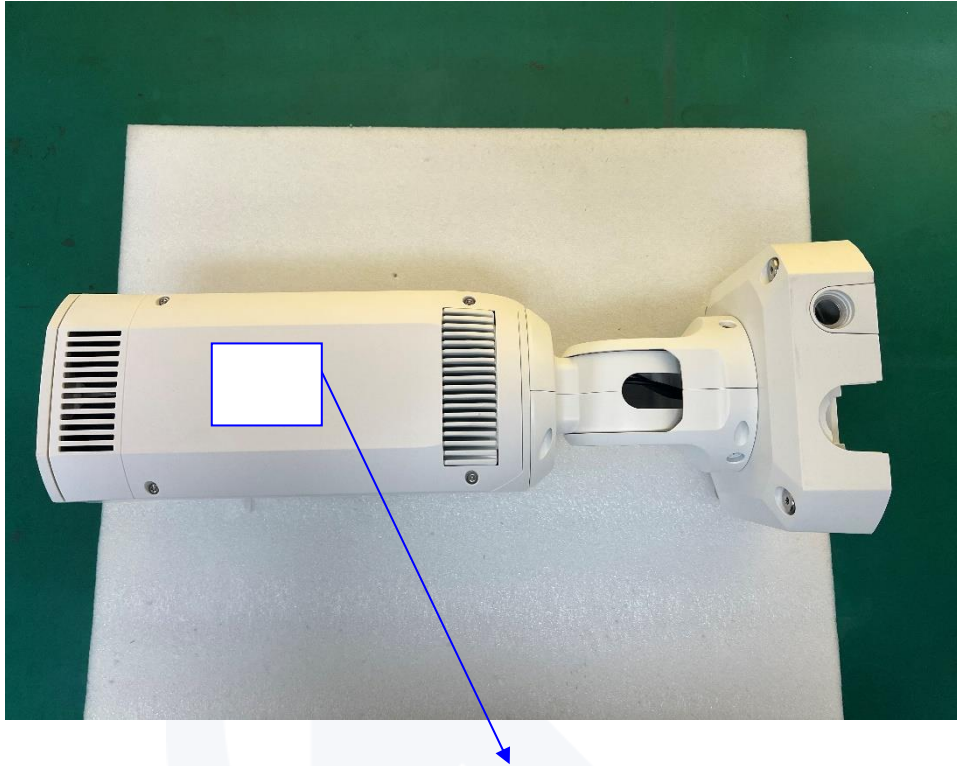


(Bottom)





Label and Location

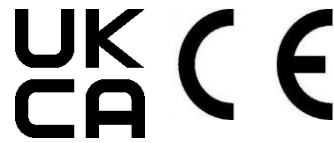


Network Camera

Model No : TNO-A26081

Manufacturer : HANWHA VISION VIETNAM COMPANY LIMITED

Made in Vietnam



The End.