



TEST REPORT



Report No. : KES-EM243531

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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 : +82-31-341-3838

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. : TNV-C8014RM

Variant Model : TNV-C8034RM, SPG-VAN23W

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. 15, 2024

4. Test date : Oct. 25, 2024 ~ Nov. 04, 2024

5. Date of Issue : Nov. 14, 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
Nov. 14, 2024	KES-EM243531	Issued

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1.0 General Product Description

Main Specifications of EUT are:

Internal highest operating frequency : 1.866 Mhz

Mechanical	
Color / Material	White / Aluminum
RAL Code	RAL9003
Product Dimensions / Weight	106x105x55mm(4.17x4.13x2.17"), 466g(1.03 lb)
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 VCCI CISPR 32 Class A RCM AS/NZS CISPR 32 Class A Railway/Vehicle Application EN50121-4, EN50121-3-2
Safety	UL 62368-1, CAN/CSA C22.2 NO. 62368-1 IEC/EN 62471
Environment	IEC/EN 63000 IEC/EN 60529 IP66, IEC/EN 62262 IK10 Railway/Vehicle Application JIS E 5006, IEC62236-3-2, IEC62236-4, EN50121-4, , JIS E 4031, EN50498, EN50155, IEC/EN61373, EN45545-2 HL3,
Video	None
Compatible Models	
Dome Cover	SPB-VAN23W, SPG-VAN23W
Other Compatible Models	SBD-110GPA
DORI (EN62676-4 standard)	
Detect (25PPM/ 8PPF)	43.5m(142.71ft)
Observe (63PPM/ 19PPF)	17.5m(57.09ft)
Recognize (125PPM/ 38PPF)	8.7m(28.54ft)
Identify (250PPM/ 76PPF)	4.3m(14.27ft)



Bitrate Control	H.264/H.265: CBR or VBR MJPEG: VBR
Streaming	Unicast(20 users) / Multicast Multiple streaming(Up to 5 profiles)
Protocol	IPv4, IPv6, TCP/IP, UDP/IP, RTP(UDP), RTP(TCP), RTCP, RTSP, NTP, HTTP, HTTPS, SSL/TLS, DHCP, FTP/SFTP, SMTP, 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, SIP/PB	None
Security	None
Application Programming Interface	ONVIF Profile S/G/T/M SUNAPI(HTTP API) Hanwha Vision Open Platform
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)
Access Control	IP-based access control
Data Protect	Encryption credentials, Encrypt compress for live recording file
Audit	Access / System / Event Log management
Device ID	Device certificate(Hanwha Vision Root CA)
Secure Storage	SDcard partition encrypt
Security Certificate	None
General	
Webpage Language	English, Korean, Simplified Chinese, Traditional Chinese, French, Italian, Spanish, German, Japanese, Russian, Portuguese, Czech, Polish, Turkish, Dutch, Hungarian, Greek
Web Viewer	None
Edge Storage	Micro SD/SDHC/SDXC 1slot 256GB
Memory	2GB RAM, 1GB Flash
Environmental & Electrical	
Operating Temperature / Humidity	-40°C~+55°C(-40°F~+131°F) / 0~100% RH(Condensing) * Start up should be done at above -30°C Humidity control /w Air vapor control
Storage Temperature / Humidity	-40°C~+55°C(-40°F~+131°F) / 0~95% RH
Wind Load	None
EPA(Effective Projected Area)	None
Certification	IP66, IK10
Input Voltage	PoE(IEEE802.3af, Class3)
Power Consumption	PoE: Max 7.2W, typical 4.2W



Digital PTZ	Support
Video Rotation	Flip, Mirror, Hallway view(90°/270°)
Analytics	<p>Classified object type: Person/Vehicle(Type:car/bus/truck/motorcycle/bicycle) Attributes: Person(Upper/lower clothes color), Vehicle(Type:car/bus/truck/motorcycle/bicycle and color) Support BestShot Analytics events based on AI engine - Motion detection*, Object detection, Virtual line*(Crossing/Direction), Virtual area*(Loitering/Intrusion/Enter/Exit) Analytics events - Defocus detection, Tampering, Shock detection, Virtual area(Appear/Disappear)</p> <p>* Some of the video analytics only works with people and vehicle detection</p>
Business Intelligence	Based on AI engine: People counting, Vehicle counting, Queue management, Heatmap
Serial Interface	None
Alarm I/O	None
Alarm Triggers	Analytics, Network disconnect, MQTT subscription
Alarm Events	<p>When alarm trigger occurred - File upload(image) : e-mail/FTP/SFTP - Notification : e-mail - Recording : SD/SDHC/SDXC or NAS recording at event triggers - Handover(PTZ preset, Send message by HTTP/HTTPS/TCP/Custom String) - Audio clip playback - MQTT: publication</p>
Audio Streaming	None
Audio In	Selectable(Mic in/Line in/Built-in mic)
Audio Out	Line out
Light Type	IR LED (850nm)
Light Viewable Length	20m(65.62ft) (QA컨셉대기종)
Network	
Ethernet	M12(10/100BASE-T)
Video Compression	H.265/H.264: Main/High, MJPEG
Audio Compression	<p>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</p>
Smart Codec	Manual(5ea area), WiseStreamⅢ(Based on AI engine)
Video Quality Adjustment	<p>H.264/H.265: Target bitrate level control MJPEG: Quality Level control</p>



Video	
Imaging Device	1/2.8" CMOS
Resolution	2592x1944, 2560x1440, 1920x1080, 1280x960, 1280x720, 800x600, 800x448, 720x576, 720x480, 640x480, 640x360, 320x240
Max. Framerate	H.265/H.264: Max. 30fps/25fps(60Hz/50Hz) (WDR on/off) MJPEG: Max. 30fps(@5MP Max. 5fps)
Min. Illumination	Color: 0.03Lux (F1.6, 1/30sec) BW: 0.003Lux (F1.6, 1/30sec, 30IRE), 0Lux(IR LED on)
Video Out	USB: Micro USB Type B, 1280x720 for installation
Lens	
Focal Length (Zoom Ratio)	3.0mm fixed focal
Max. Aperture Ratio	F1.6
Angular Field of View	H: 100°/ V: 73°/ D: 129°
Min. Object Distance	0.5m (1.64ft)
Focus Control	Fixed
Lens Type	Fixed IRIS
Mount Type	M12
Pan / Tilt / Rotate	
Pan / Tilt / Rotate Range	±5° / 0°~67° / ±90°
Operational	
Camera Title	Displayed up to 85 characters
Day & Night	Auto(ICR)
Backlight Compensation	BLC, WDR, SDR, Clear HDR
Wide Dynamic Range	120dB
Digital Noise Reduction	WiseNRⅡ(Based on AI engine) SSNRV
Digital Image Stabilization	Support(built-in gyro sensor)
Defog	Support : Manual
Motion Detection	8ea, 8point polygonal zones
Privacy Masking	32ea, 4point quadrangle zones - Color: Gray/Green/Red/Blue/Black/White Dynamic Privacy Mask - Mosaic
Gain Control	Low / Middle / High
White Balance	ATW / AWC / Manual / Indoor / Outdoor
LDC	Support
Electronic Shutter Speed	Minimum / Maximum / Anti flicker (1/5~1/25,000sec) Prefer shutter control(Based on AI engine)



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.

☒ PoE

1.2 Variant Model Differences

- TNV-C8034RM : Fixed Lens Difference
- SPG-VAN23W : Add derivative model for vendor management

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
NETWORK CAMERA	TNV-C8014RM	-	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	-
Headset	K550	-	Britz®	-
Smartphone	-	-	SAMSUNG	-
4 Pin to RJ-45 Gender	-	-	-	-
Micro SD Card	-	-	SanDisk	16 GB



1.7 External I/O Cabling

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
NETWORK CAMERA (EUT)	4 Pin	4 Pin to RJ-45 Gender	4 Pin	-	-
	Audio IN	Headset	Audio OUT	1.5	U
	Audio OUT		Audio IN	1.5	U
	Micro SD Card Slot	Micro SD Card	Micro SD Card Slot	-	-
4 Pin to RJ-45 Gender	RJ-45(PoE)	PoE Injector	RJ-45(PoE)	3.5	U
PoE Injector	RJ-45(LAN)	Laptop	RJ-45(LAN)	2.0	U
Laptop	DC Jack	Laptop Adapter	DC Jack	1.6	U
Laptop	3.5 mm	Smartphone	3.5 mm	1.0	U

* Unshielded=U, Shielded=S

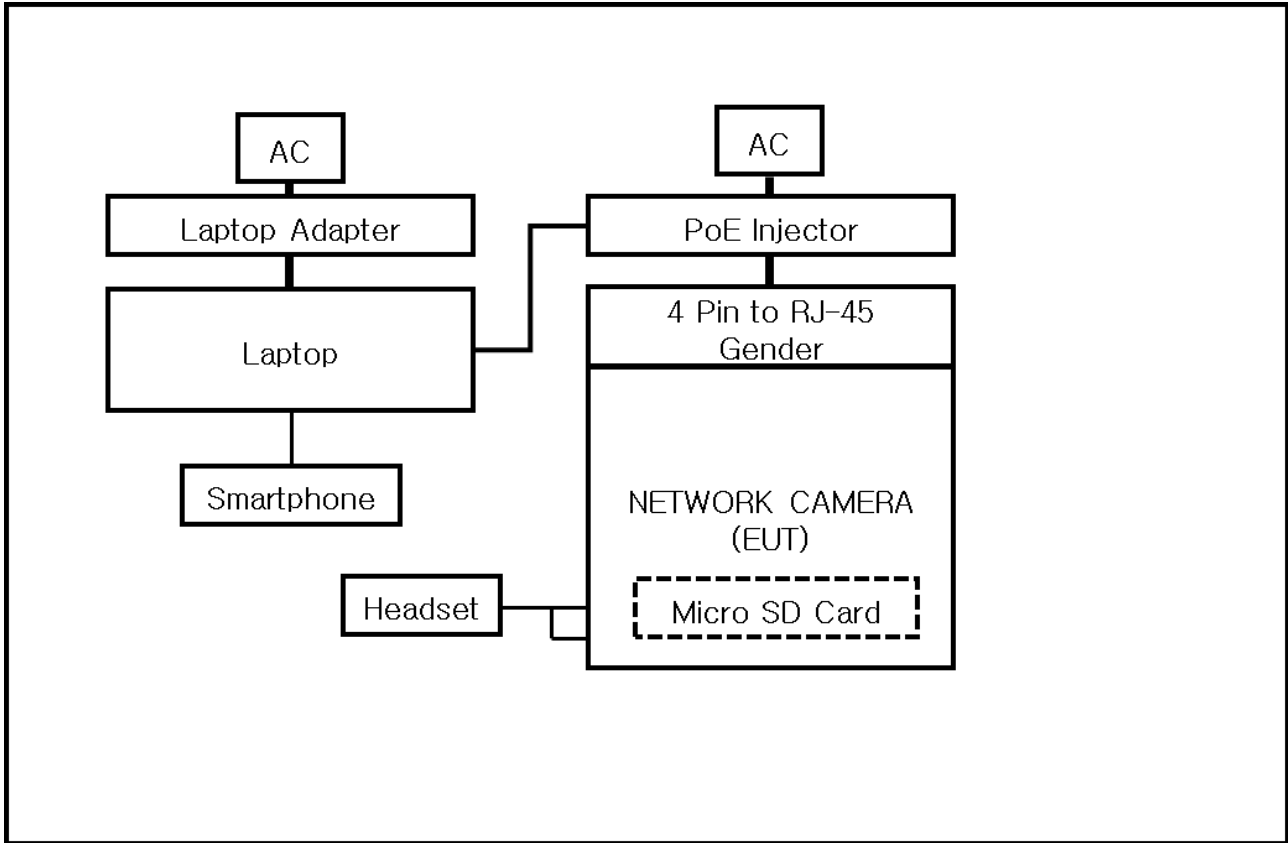
1.8 EUT Operating Mode(s)

Test mode	Normal operating
Operating	1. Connect to the web viewer and test while checking the video output of the test equipment. 2. Run the Ping Test to check whether the network of the test equipment is operating normally. 3. Confirm normal output from the headset by outputting 1 kHz Tone. 4. Activate the microphone in the web viewer to check if the microphone is in normal condition. 5. Check whether the recording file is saved on the Micro SD Card before/after the test.

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



1.9 Configuration





1.10 Remarks When Standards Applied

- It receives PoE power, and the PoE port is considered a wired network port. Test items related to the power port are not applicable.
- The Micro 5 Pin port is not tested as it is for administrator use.
- Administrator port photo



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**

☒ IEC 62236-3-2:2018





2.1 Conducted Emissions at Mains Power Ports

Test Date

N/A

Test Location

Electro wave Shieldroom #6

Test Equipment

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

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

RemarksRefer to 'Remarks when standards applied'.



2.2 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Nov. 03, 2024

Test Location

SEMI ANECHOIC CHAMBER #4(10 m)

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	Feb 13, 2025
<input checked="" type="checkbox"/>	AMPLIFIER	SCU 01	R & S	100603	Nov 08, 2024
<input checked="" type="checkbox"/>	BILOG ANTENNA	VULB 9168	SCHWARZBECK	9168-461	May 09, 2026
<input checked="" type="checkbox"/>	ATTENUATOR	6806.17.A	HUBER+SUHNER	-	Feb 13, 2025

Test Conditions

Temperature: (23,4 ± 0,1) °C

Relative Humidity: (45,0 ± 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.



2.3 Radiated Electric Field Emissions(Above 1 GHz)

Test Date

Oct. 25, 2024

Test Location

SEMI ANECHOIC CHAMBER #3

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	ESR7	R & S	101190	Jul 29, 0255
<input checked="" type="checkbox"/>	PREAMPLIFIER	8449B	AGILENT	3008A01967	Mar 05, 2025
<input checked="" type="checkbox"/>	ATTENUATOR	8491A	HP	35496	Feb 13, 2025
<input checked="" type="checkbox"/>	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	Mar 05, 2025

Test Conditions

Temperature: (23,7 ± 0,1) °C

Relative Humidity: (45,3 ± 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.



2.4 Harmonic Current Emissions

Test Date

N/A

Test Location

SHIELD ROOM #7

Test Equipment

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

Test Conditions

Temperature:

°C

Relative Humidity:

% 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

RemarksRefer to 'Remarks when standards applied'.



2.5 Voltage Fluctuations and Flicker

Test Date

N/A

Test Location

SHIELD ROOM #7

Test Equipment

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

Test Conditions

Temperature:

°C

Relative Humidity:

% R.H.

Test Results

The requirements are:

- ☐ PASS
☐ NOT PASS
☒ NOT APPLICABLE

RemarksRefer to 'Remarks when standards applied'.



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

Test Date

Nov. 02, 2024

Test Location

EMS-ESD: SHIELD ROOM #6

Test Equipment

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

Test Conditions

Temperature: (23,3 ± 0,1) °C
Relative Humidity: (45,8 ± 0,1) % R.H.
Atmospheric Pressure: (100,1 ± 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
	<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

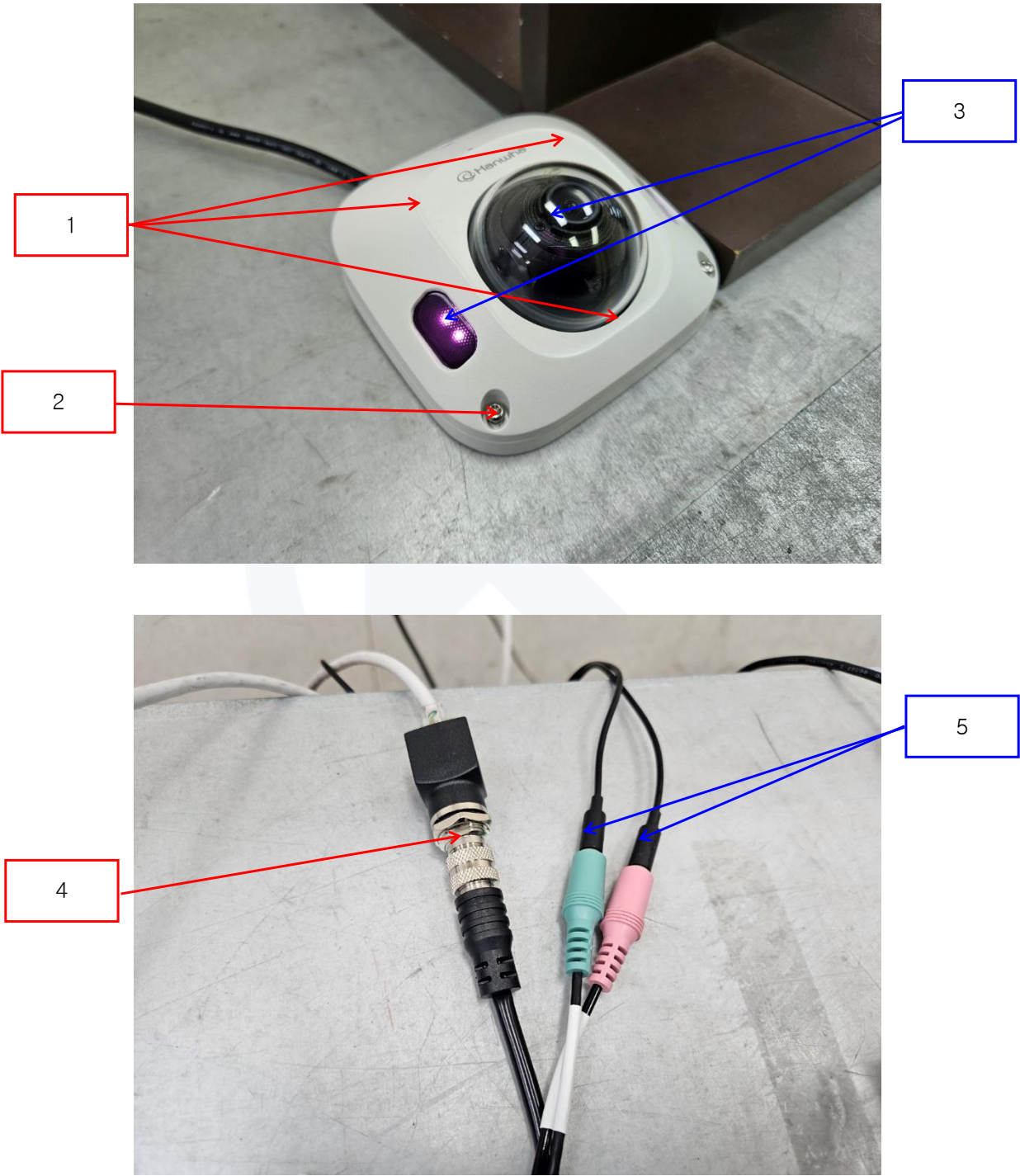
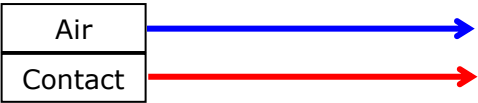
Notes: HCP: Horizontal Coupling Plane

VCP: Vertical Coupling Plane

Required Performance Criteria: ☒ B



Location of Discharge:



**Test Data**

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	Enclosure	Contact Discharge	B	A
2	Screw	Contact Discharge	B	A
3	Camera Lens	Air Discharge	B	A
4	Around the Port 1	Contact Discharge	B	A
5	Around the Port 2	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

Test Date

Nov. 02, 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
<input checked="" type="checkbox"/>	EMS Test S/W	EMC32	R & S	9.12.00	-
<input checked="" type="checkbox"/>	SIGNAL GENERATOR	SMB 100A	Rohde & Schwarz	108252	Jul 29, 2025
<input checked="" type="checkbox"/>	HIGH POWER DUAL AMP	SSA532	SUNGSAN	SSA532-001	-
<input checked="" type="checkbox"/>	POWER METER	E4419B	Agilent	GB40203000	Feb 13, 2025
<input checked="" type="checkbox"/>	AVERAGE POWER SENSOR	E9301A	Agilent	MY52170007	Feb 13, 2025
<input checked="" type="checkbox"/>	AVERAGE POWER SENSOR	E9301A	Agilent	MY41498669	Feb 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	Mar 05, 2025

Test Conditions

Temperature: (22,4 ± 0,6) °C
Relative Humidity: (46,0 ± 0,6) % R.H.
Atmospheric Pressure: (100,2 ± 0,0) kPa



Test Specifications

Antenna Polarization: Horizontal & Vertical unless indicated otherwise

Antenna Distance: ☒ 3 m

Frequency Range: ☒ 80 MHz to 800 MHz [20 V/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**

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

Test Date

Nov. 04, 2024

Test Location

EMS-EFT: SHIELD ROOM #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	Nov 09, 2024
<input checked="" type="checkbox"/>	MOTOR VARIAC	MV2616	EM TEST	P1552169719	Nov 09, 2024
<input checked="" type="checkbox"/>	CAPACITIVE COUPLING CLAMP	HFK	EM TEST	P1633183115	Nov 10, 2024

Test Conditions

Temperature: (22,6 ± 0,1) °C
Relative Humidity: (45,9 ± 0,1) % R.H.
Atmospheric Pressure: (100,3 ± 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**☐ 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

☐ 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

Test Date

N/A

Test Location

EMS-Surge: SHIELD ROOM #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input type="checkbox"/>	EMS Test S/W	iec.control	EM TEST	5.4.8	-
<input type="checkbox"/>	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	Nov 09, 2024
<input type="checkbox"/>	MOTOR VARIAC	MV2616	EM TEST	P1552169719	Nov 09, 2024
<input type="checkbox"/>	CDN	CNV 504N7.3	EM TEST	P1744207079	Nov 10, 2024

Test Conditions

Temperature:

°C

Relative Humidity:

% R.H.

Atmospheric Pressure:

kPa



Test Specifications

AC Power Lines

Source Impedance: ☐ 42 Ω + 0.5 μF

Surge Amplitude: Common Mode
☐ (2,0) kV
Differential Mode
☐ (1,0) kV

Voltage waveform: ☐ 1,2 / 50 μs

Current waveform: ☐ 8 / 20 μs

Number of Surges: ☐ 5 surges per angle

Angle: ☐ 0°, 90°, 180°, 270° (input AC power port)

Polarity: ☐ Positive & Negative

Repetition Rate: ☐ 1 surge per min ☐ 1 surge per 30 sec.

Required Performance Criteria: ☐ B

DC Power Lines

Source Impedance: ☐ 42 Ω + 0.5 μF

Surge Amplitude: Common Mode
☐ (2,0) kV
Differential Mode
☐ (1,0) kV

Voltage waveform: ☐ 1,2 / 50 μs

Current waveform: ☐ 8 / 20 μs

Number of Surges: ☐ 5 Surges

Polarity: ☐ Positive & Negative

Repetition Rate: ☐ 1 surge per min ☐ 1 surge per 30 sec.

Required Performance Criteria: ☐ B

**Test Data****AC Power Lines**☐ 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	-	-

DC Power Lines☐ Line to Line – Differential Mode

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

☐ 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**Refer to 'Remarks when standards applied'.



3.5 Conducted Disturbance

Reference Standard

EN 61000-4-6

Test Date

Nov. 04, 2024

Test Location

EMS-CS: SHIELD ROOM #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	Nov 08, 2024
<input checked="" type="checkbox"/>	ATTENUATOR	ATT 6/80	EM TEST	P1614178148	Nov 08, 2024
<input checked="" type="checkbox"/>	CDN	CDN M016	TESEQ	43694	Nov 08, 2024
<input checked="" type="checkbox"/>	CDN	CDN M016	TESEQ	43697	Nov 08, 2024
<input checked="" type="checkbox"/>	CDN	CDN T8RJ45	EM TEST	0909-09	Jul 29, 2025
<input type="checkbox"/>	EM CLAMP	KEMZ 801A	TESEQ	44099	Nov 09, 2024

Test Conditions

Temperature: (22,8 ± 0,6) °C
Relative Humidity: (45,7 ± 0,6) % R.H.
Atmospheric Pressure: (100,0 ± 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**☐ Input a.c. power ports

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

☒ Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Performance Criteria	Results
RJ-45(PoE)	CDN	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.



APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

[HOT]





[NEUTRAL]

N/A

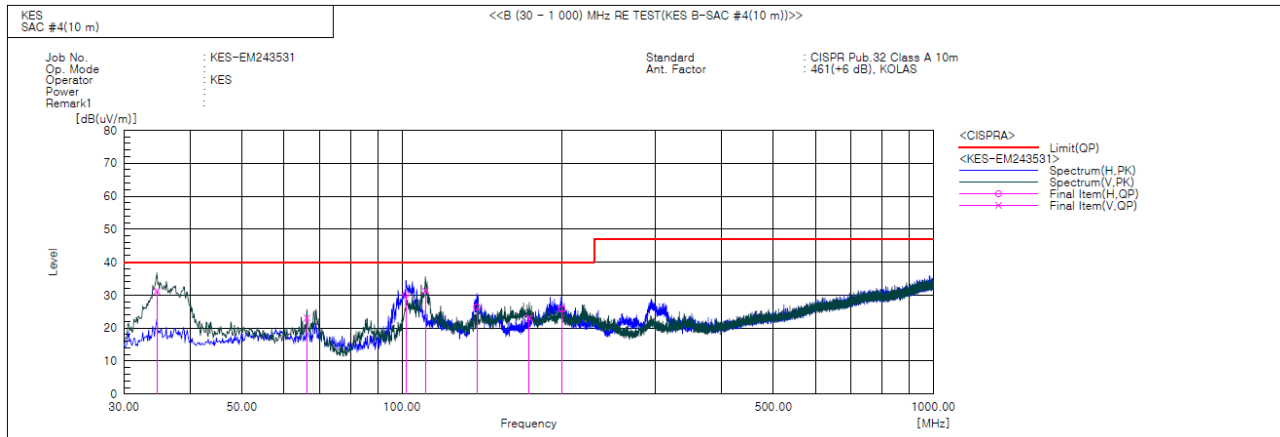
◆ Calculation

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))

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

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	34.608	V	53.6	-22.4	31.2	40.0	8.8	114.0	348.0	
2	66.254	V	45.2	-22.1	23.1	40.0	16.9	146.0	151.0	
3	101.780	H	54.9	-24.7	30.2	40.0	9.8	195.0	120.0	
4	110.753	V	54.8	-23.5	31.3	40.0	8.7	111.0	69.0	
5	138.398	H	46.8	-20.4	26.4	40.0	13.6	199.0	317.0	
6	173.560	V	43.5	-20.4	23.1	40.0	16.9	106.0	55.0	
7	199.993	H	47.8	-22.0	25.8	40.0	14.2	396.0	57.0	

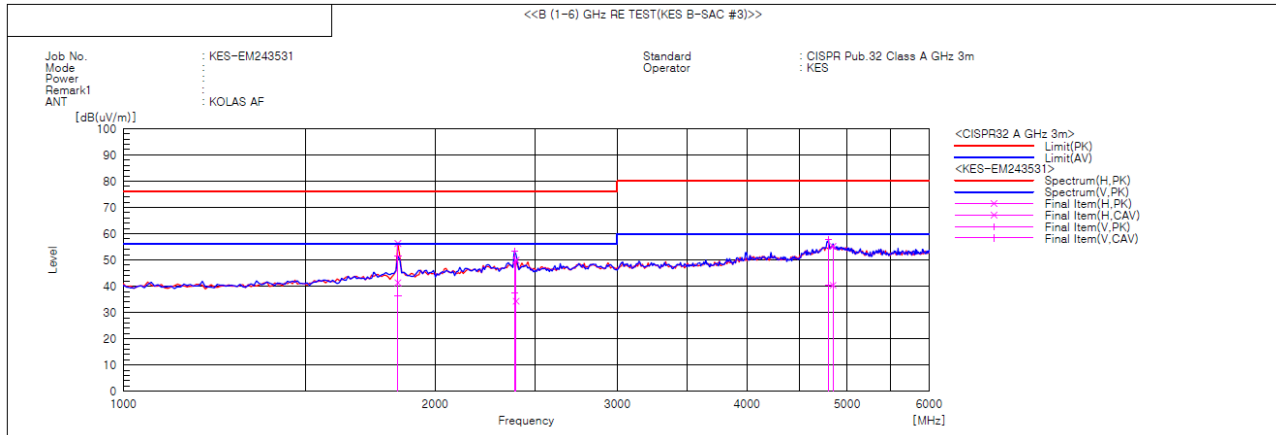
◆ Calculation

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)**

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	1841.346	V	48.6	33.3	2.9	51.5	36.2	76.0	56.0	24.5	19.8	100.0	294.7	
2	1841.388	H	53.4	38.5	2.9	56.3	41.4	76.0	56.0	19.7	14.6	100.0	356.7	
3	2386.218	V	46.9	31.1	6.4	53.3	37.5	76.0	56.0	22.7	18.5	100.0	291.8	
4	2394.231	H	43.5	27.9	6.4	49.9	34.3	76.0	56.0	26.1	21.7	100.0	105.8	
5	4798.077	V	41.9	24.8	15.8	57.7	40.6	80.0	60.0	22.3	19.4	100.0	34.6	
6	4846.154	H	39.2	24.4	16.0	55.2	40.4	80.0	60.0	24.8	19.6	100.0	258.8	

◆ 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****Average harmonic current results**

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
N/A				

Note: Harmonic currents less than 0.6 % of the input current measured under the test conditions, or less than 5 mA, whichever is greater, are disregarded.

** Application of limits for average is 100% except for odd harmonics from 21 to 39, where 150% applies.*



Test Data - Voltage Fluctuations

Maximum Flicker results

Flicker Measurements					
	Plt	Max Pst	Max Dc	Max Dmax	Max Tmax
Line 1:	N/A				
Limits:					
Results:					





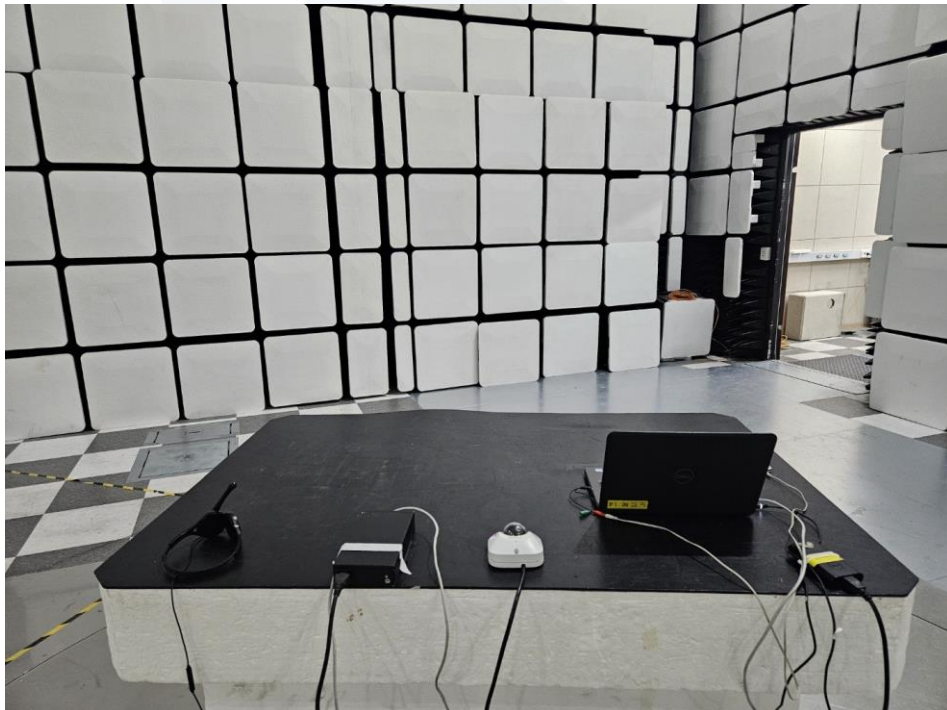
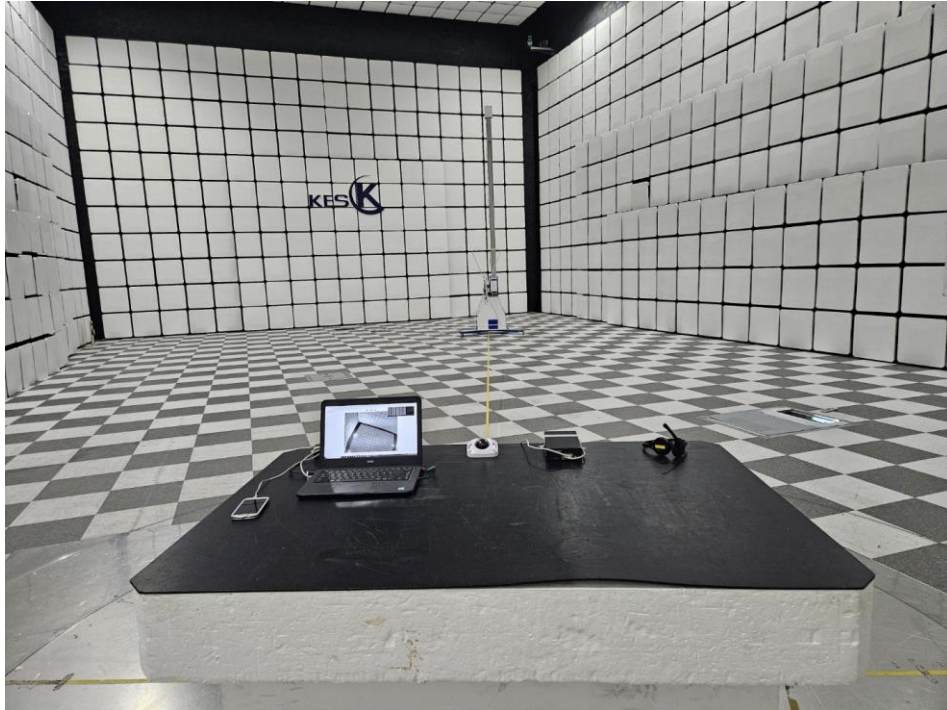
Test Setup Photos and Configuration

Conducted Emissions at Mains Power Ports

N/A

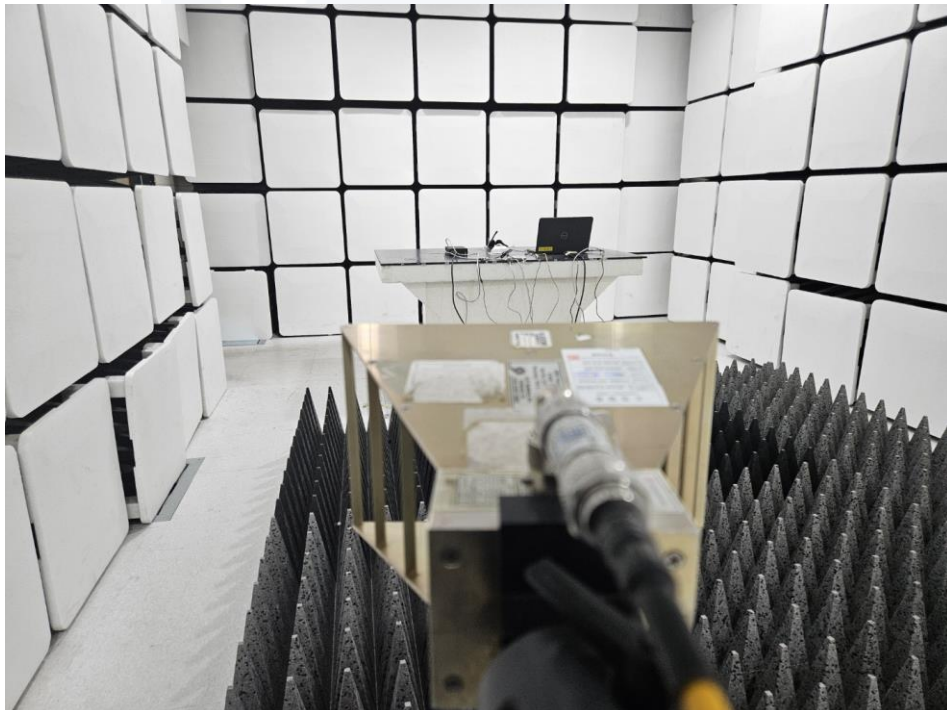


Radiated Electric Field Emissions(Below 1 GHz)





Radiated Electric Field Emissions(Above 1 GHz)





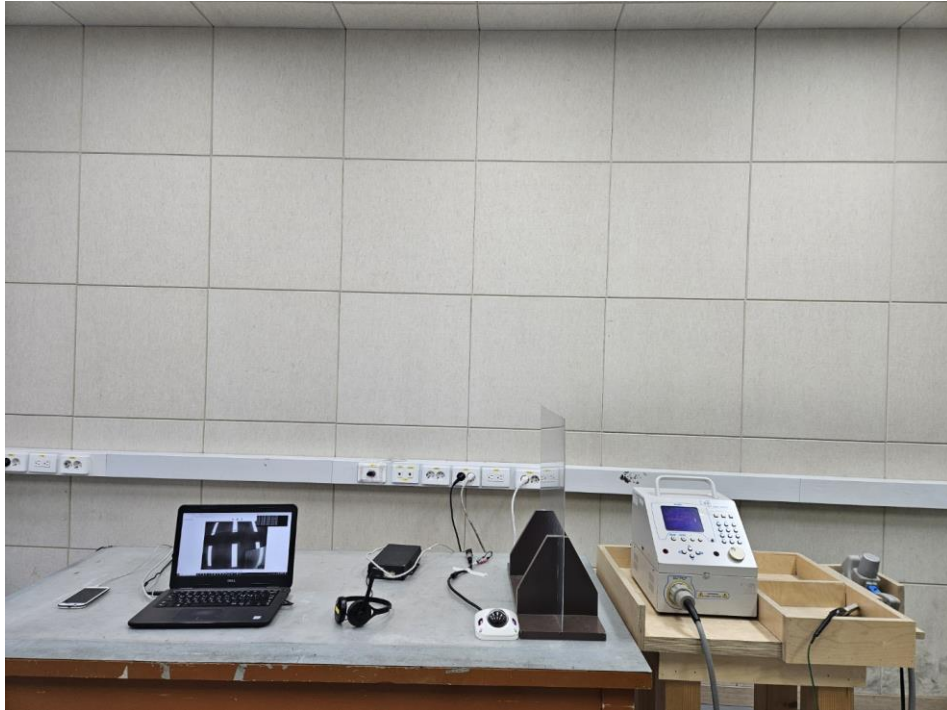
Harmonic Current Emissions and Voltage Fluctuations and Flicker

N/A





Electrostatic Discharge

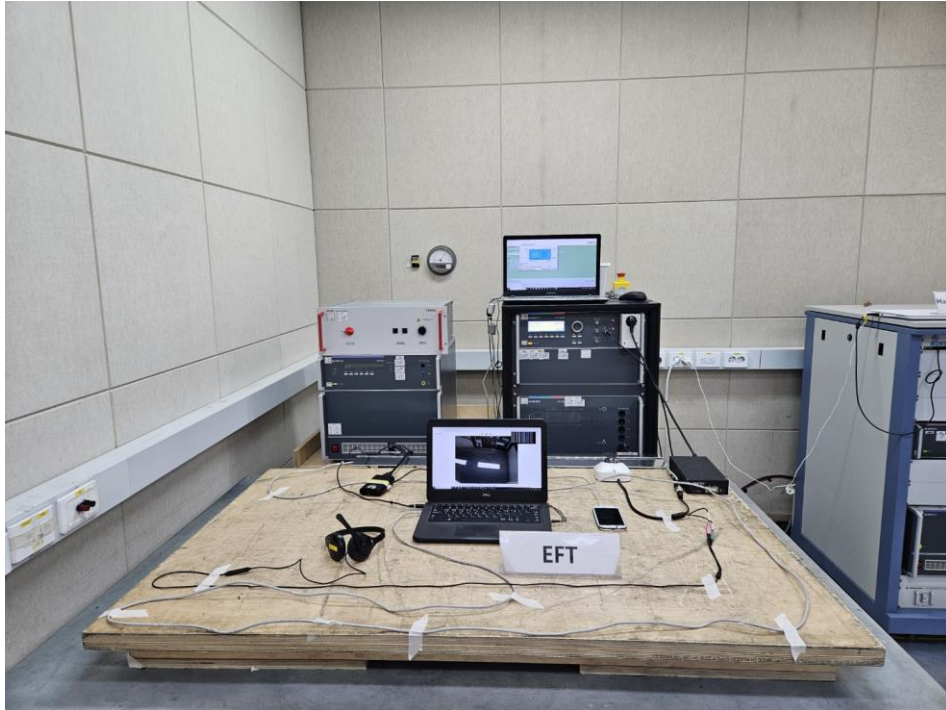


Radio-frequency Electromagnetic Field





Fast Transients



Surges

N/A



Conducted Disturbance





EUT External Photographs

(Top)



(Bottom)





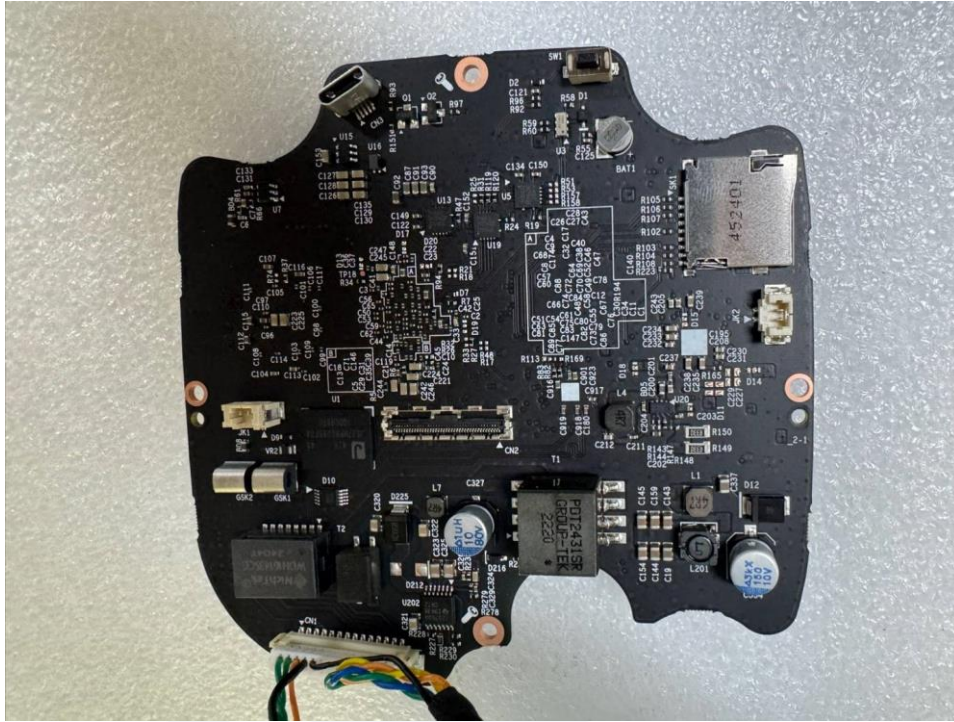
EUT Internal Photographs



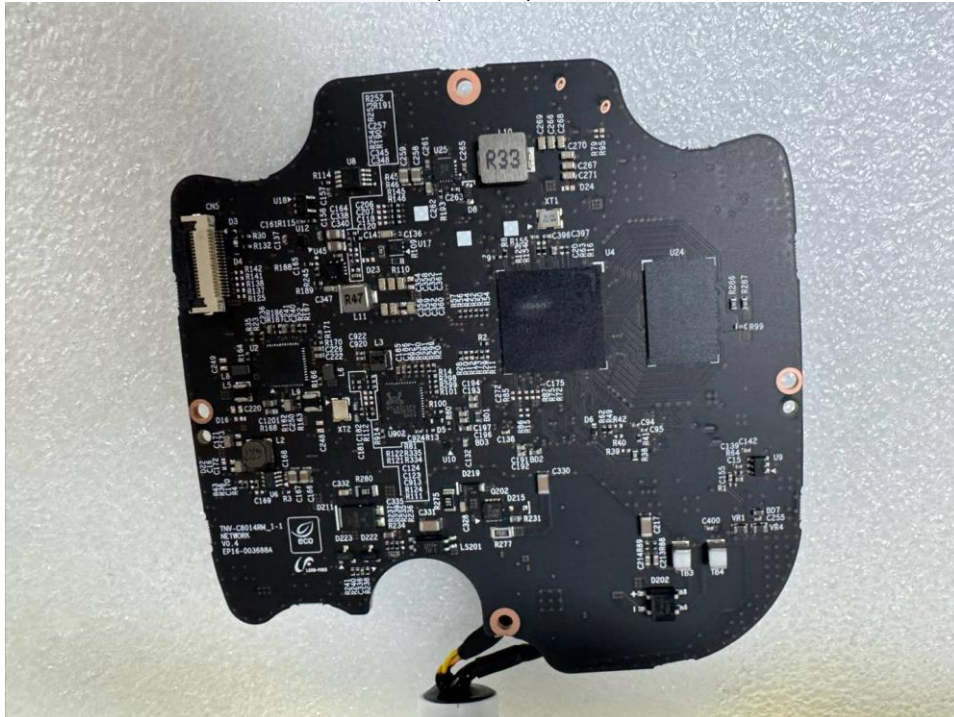


EUT Internal View – Main Board

(Top)



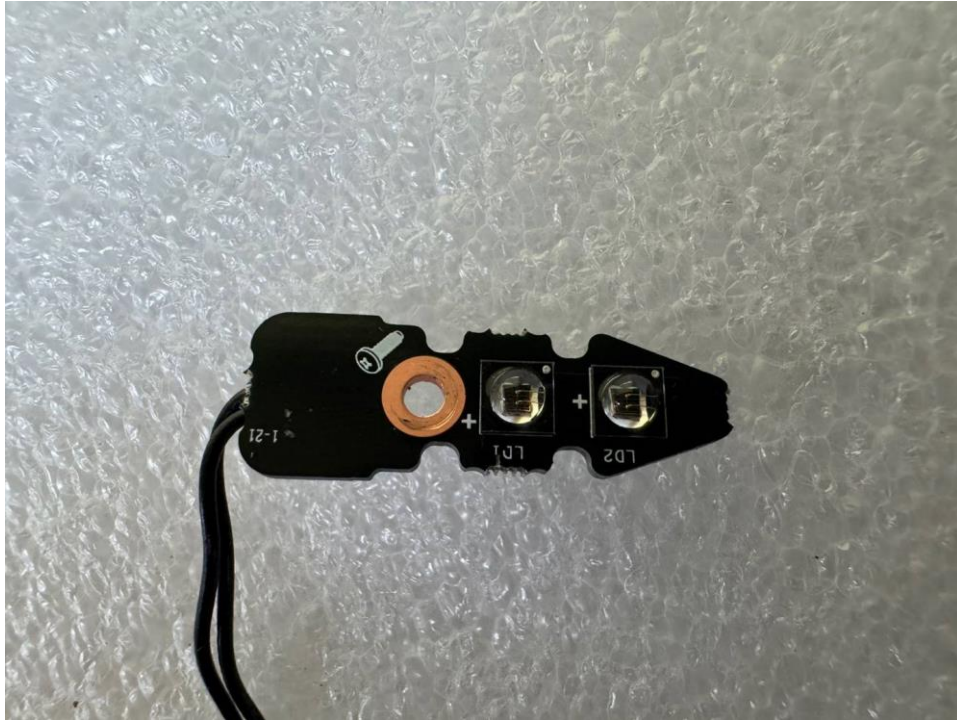
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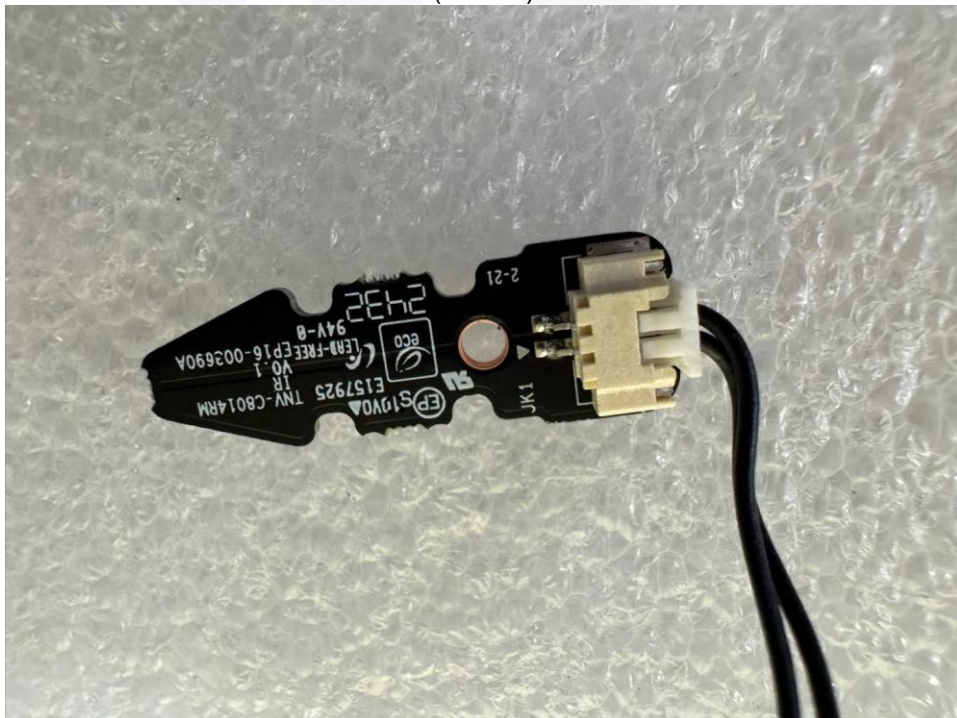


EUT Internal View – SUB Board 1

(Top)



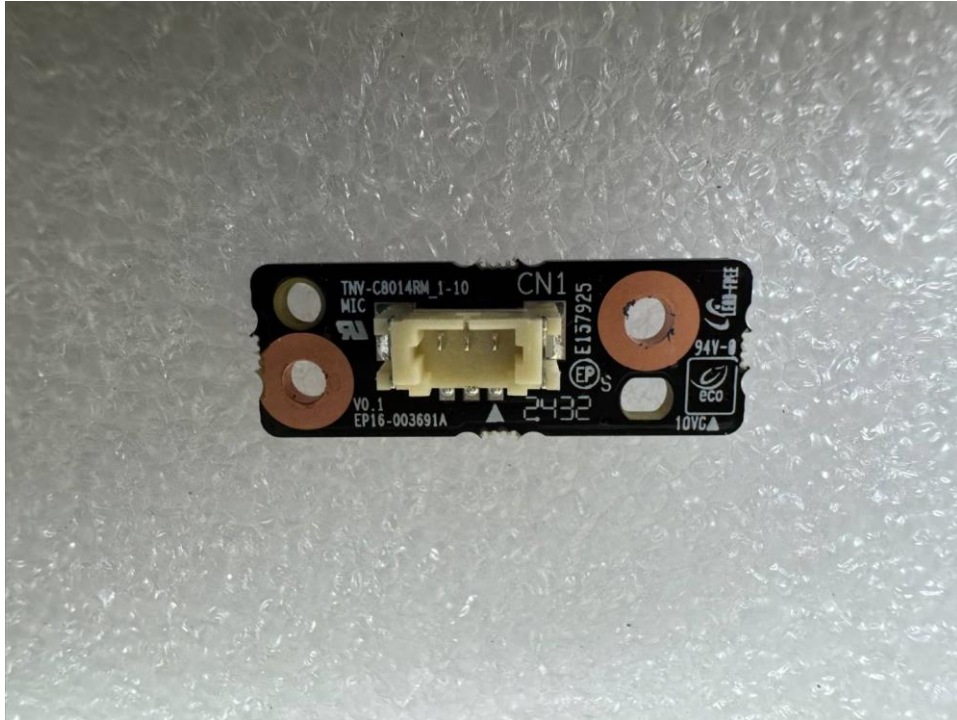
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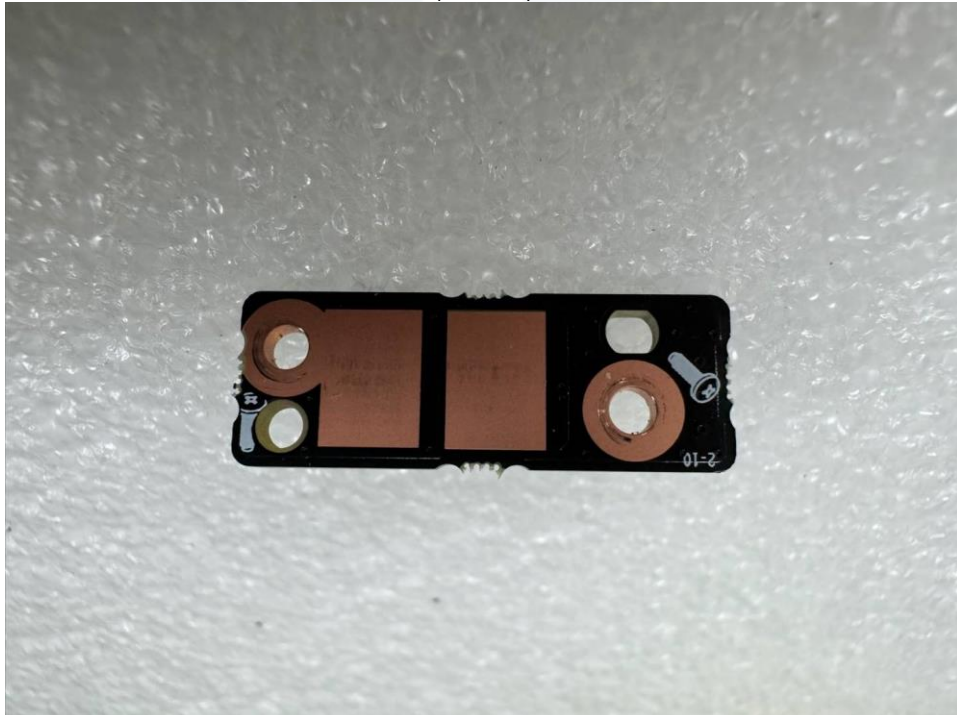


EUT Internal View – SUB Board 3

(Top)



(Bottom)



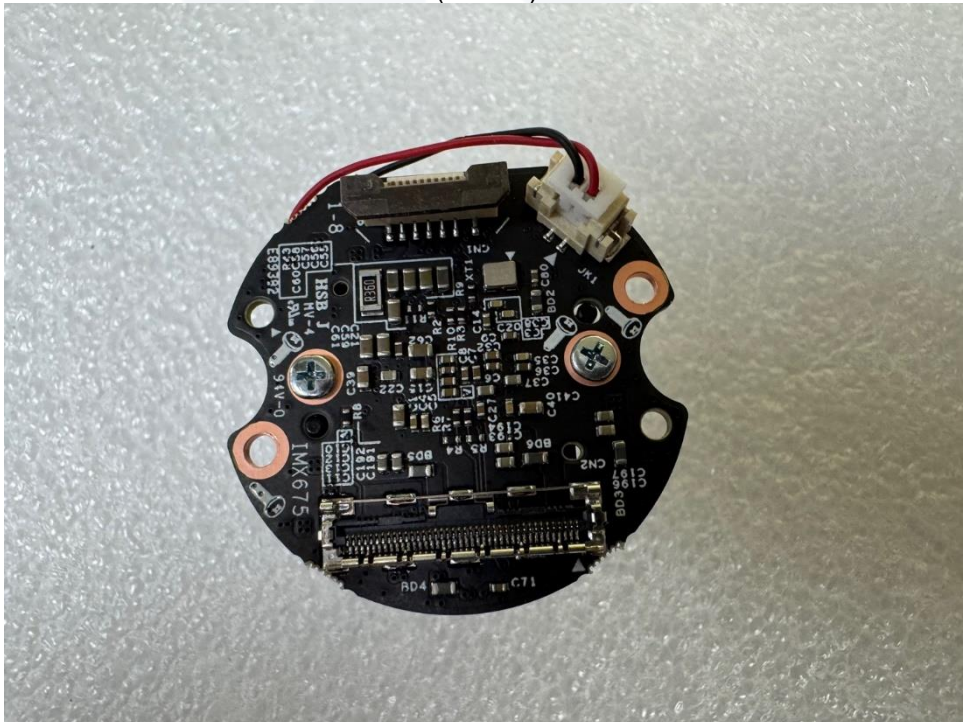


EUT Internal View – Lens Board

(Top)



(Bottom)





EUT Internal View – Microphone

(Top)



(Bottom)





Label and Location



NETWORK CAMERA

Model No : TNV-C8014RM

Manufacturer : HANWHA VISION VIETNAM COMPANY LIMITED

Made in Vietnam



The End.