



# TEST REPORT



Report No. : KES-EM242530

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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. : QNO-C8023R

Variant Model : QNO-C8013R

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 : Jul. 24, 2024

4. Test date : Jul. 25, 2024 ~ Jul. 30, 2024

5. Date of Issue : Aug. 08, 2024

6. Test Results : In Compliance

*Tested by*

*Reviewed by*

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Se Heon, Kim  
EMC Test Engineer

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Seong Min, Choi  
EMC Technical Manager

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



### REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Aug. 08, 2024	KES-EM242530	Issued

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# 1.0 General Product Description

## Main Specifications of EUT are:

Highest internal Frequency : 1 866 Mhz

QNO-C8013R	
<b>Video</b>	
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)
NETD	None
Pixel Size	None
Min. Illumination	Color: 0.03Lux(F1.6, 1/30sec, 30IRE) BW: 0.003Lux(F1.6, 1/30sec, 30IRE), 0Lux(IR LED on)
Video Out	USB: Micro USB Type B, 1280x720 for installation
Video Transmission Distance	None
<b>Lens</b>	
Focal Length (Zoom Ratio)	3.0mm fixed focal
Optical Zoom	None
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
Optional Lens	None
<b>Pan / Tilt / Rotate</b>	
Pan / Tilt / Rotate Range	0°~360° / 0°~100° / 0°~360°
Pan Range	None
Pan Speed	None
Tilt Range	None
Tilt Speed	None
Rotate Range	None
Sequence	None
Preset Accuracy	None
<b>Operational</b>	
Camera Title	Displayed up to 85 characters
Direction Indicator	None
Day & Night	Auto(ICR)
Backlight Compensation	BLC, WDR, SDDR
Wide Dynamic Range	120dB
Digital Noise Reduction	WiseNR II (Based on AI engine) SSNRV
Digital Image Stabilization	None
Defog	None
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)
Video Rotation	Flip, Mirror, Hallway view(90°/270°)
Analytics	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 DetectionShot 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, Virtual area(Appear/Disappear)  * Some of the video analytics only works with people and vehicle detection
Business Intelligence	Based on AI engine: People counting, Vehicle counting, Queue management, Heatmap
Serial Interface	None
Alarm I/O	Input 1ea / Output 1ea
Alarm Triggers	Analytics, Network disconnect, Alarm input
Alarm Events	When alarm trigger occurred - File upload(image) : e-mail/FTP - 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)
Audio Out	Line out
Light Type	IR LED (850nm)
Light Viewable Length	20m(65.62ft)~25m(TBD)
IR Viewable Length	None
IR Illuminator (Optional)	None
IR Radiation angle	None
IR LED	None



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IR Wavelength	long-life 850 nm IR LED
IR Operation	None
Water Removal	None
Auto Tracking	None
Coaxial Protocol	None
Color Palettes	None
<b>Radiometry</b>	
Temperature Detect Range	None
Temperature Accuracy	None
Temperature Detection	None
Additional	None
<b>Network</b>	
Ethernet	RJ-45 (10/100BASE-T)
Video Compression	H.265/H.264: Main/High, MJPEG
Audio Compression	G.711 u-law /G.726 Selectable G.726(ADPCM) 8KHz, G.711 8KHz G.726: 16Kbps, 24Kbps, 32Kbps, 40Kbps AAC-LC: 48Kbps at 16KHz
Smart Codec	Manual(Sea area), WiseStreamⅢ(Based on AI engine)
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, SMTP, ICMP, IGMP, SNMPv1/v2c/v3(MIB-2), ARP, DNS, DDNS, QoS, UPnP, Bonjour, LLDP, CDP, SRTP (TCP, UDP Unicast)
SIP support (VoIP, Peer-to-peer)	None
Security	None
Application Programming Inter	ONVIF Profile S/G/T/M SUNAPI(HTTP API)
<b>Security</b>	
OS / Firmware Protect	Secure boot, Signed firmware, Firmware encryption
User authentication	Digest Authentication, Prevent brute-force attack
Network authentication	802.1X Authentication(EAP-TLS, EAP-LEAP, EAP-PEAP MSCHAPv2)
Secure Communication	HTTPS, SRTP, WSS(Websocket secure)
Access Control	Access control based on IP address
Data Protect	Authentication information encryption, ZIP compression encryption
Audit	User Access/System/Event log management
Device ID	Device Certificate(Hanwha Private Root CA)
Secure Storage	SDcard partition encrypt
Security Certificate	None
<b>General</b>	
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
<b>Environmental &amp; Electrical</b>	
Operating Temperature / Hum	-30°C~+55°C(-22°F~+131°F) / 0~100% RH * Start up should be done at above -30°C Humidity control /w Air vent
Storage Temperature / Humid	-50°C~+60°C(-58°F~+140°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 8.1W, typical 4.0W
<b>Mechanical</b>	
Color / Material	White / Aluminum
RAL Code	RAL9003
Product Dimensions / Weight	ø93.4x245.8mm(ø3.68x9.68"), 890g(1.96 lb)
Compatible Conduit hole / Gar	Conduit hole : None Gangbox (SBO-090GP) : Single, Double, 4" Octagon (sold separately)
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

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).



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 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, IEC/EN 62262 IK10
Video	None
Compatible Models	
Hanging Adaptor	None
Back Box	SBO-140BW
Ceiling Mount (Assy)	None
Ceiling Mount (Single Unit)	None
Wall Mount	None
Wall Mount Adaptor	None
Pole Mount	SBD-140PMW※ Gang Plate(SBO-090GP) needed separately
In-ceiling Mount	None
Corner Mount	SBD-140KMB※ Gang Plate(SBO-090GP) needed separately
Parapet Mount	None
Tilt Mount	None
Cabinet	None
Housing	None
Gang Plate	SBO-090GP
Skin Cover	None
Weather Cap	None
Dome Cover	None
Conduit Adaptor	None
Power Module	None
Interface Box	None
Other Compatible Models	None
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)
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
Wisenet Road AI LPR/ANPR/MMCR	
Solution	None
Speed Description	None
Lane Coverage	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
Vehicle Recognition	None
Available Countries	None
Ver	
Ver	202407



## 1.1 Test Voltage & Frequency

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

AC 230 V, 50 Hz (PoE Adapter Input power)

## 1.2 Variant Model Differences

Addition of a simple derivative model due to the difference in fixed lenses  
(No electronics in the lens, same as the base model, no changes in circuitry, appearance, or hardware.)

## 1.3 Device Modifications

Not applicable

## 1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
NETWORK CAMERA	QNO-C8023R	-	HANWHA VISION VIETNAM COMPANY LIMITED	EUT

## 1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
Laptop	P95G001	9JM8HT2	DELL INC.	-
Laptop Adapter	HA65NM130	-	Chicony Power Technology(Suzhou)Co.,Ltd.	-
Alarm	-	-	-	-
Button Alarm	-	-	-	-
Micro SD Card	-	-	SanDisk	16 GB
PoE Injector	PT-PSE109GBRO-AH	-	Dongguan PROCET Network Technology Co.,Ltd	-
Headset	K550	-	Britz®	-
Smartphone	SM-N960N	-	Samsung Electronics Co., Ltd.	-



## 1.6 External I/O Cabling

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
NETWORK CAMERA (EUT)	RJ-45 (PoE)	PoE Injector	RJ-45 (PoE)	3.5	U
	Audio OUT	Headset	Audio In	2.0	U
	Audio In		Audio OUT	2.0	U
	Alarm OUT	Alarm	Alarm IN	3.5	U
	Alarm IN	Button Alarm	Alarm OUT	3.5	U
PoE Injector	Micro SD Slot	Micor SD Card	Micro SD Slot	-	-
PoE Injector Laptop	RJ-45 (LAN)	Laptop	RJ-45 (LAN)	2.0	U
	DC Jack	Laptop Adapter	DC Jack	1.5	U

\* Unshielded = U, Shielded = S

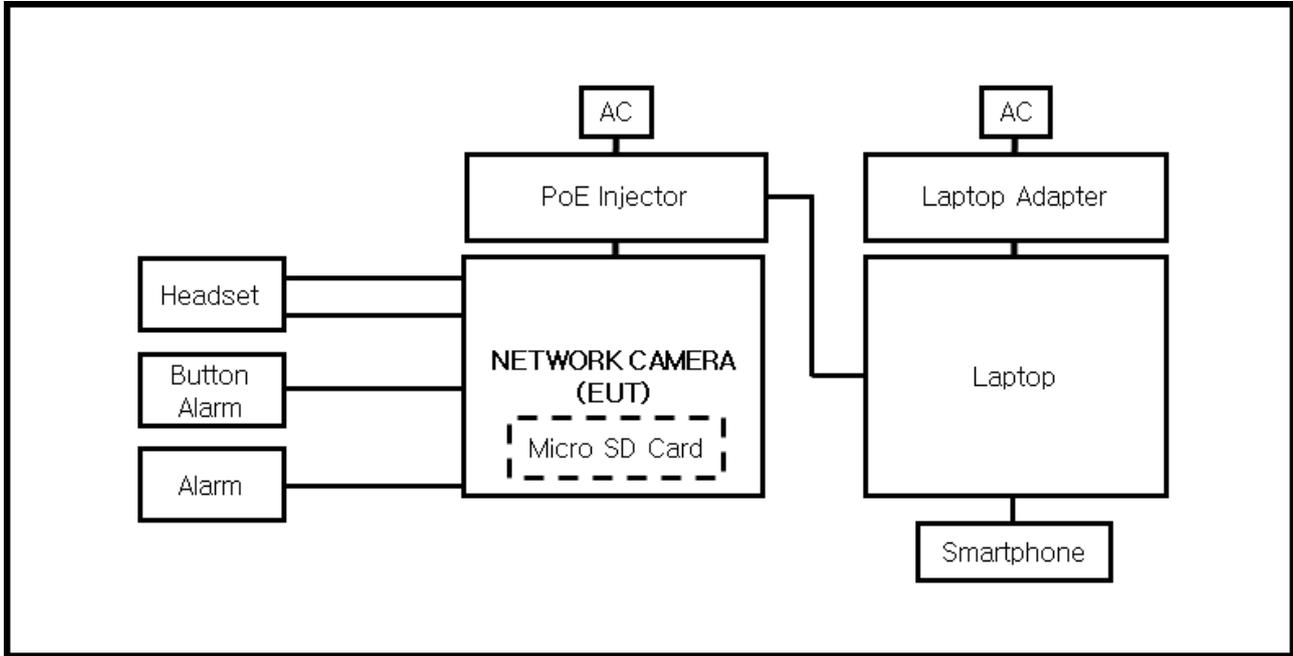
## 1.7 EUT Operating Mode(s)

Test mode	Normal operating	Test Voltages
Operating	<ul style="list-style-type: none"> <li>- Monitoring EUT Using Web Viewer, Ping Test</li> <li>- Check Audio Port Behavior Through Headset</li> <li>- When the Button Alarm is pressed, make sure the Alarm is working</li> <li>- Check the files stored on the Micro SD Card after testing</li> </ul>	AC 230 V, 50 Hz

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



## 1.8 Configuration





### 1.9 Remarks when standards applied

- PoE port is considered to be wired network port, so power-related test items are excluded.
- The USB port was excluded from the test as a port for administrators.

### 1.10 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less.

### 1.11 Test Facility

The measurement facility is located at 473-21, Gayeo-ro, Yeosu-si, Gyeonggi-do, 12658, Korea, Republic of. The sites are constructed in conformance with the requirements of ANSI C63.4a-2017 and CISPR 16-1-4:2019

### 1.12 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
KOREA	RRA	EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 KR0100
International	KOLAS	EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 KT489
USA	FCC	3 m & 10 m Semi-Anechoic Chamber Conducted test site to perform FCC Part 15/18 measurements.	 KR0100
Canada	ISED	3 m & 10 m Semi-Anechoic Chamber and Conducted test site	 23298
JAPAN	VCCI	EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site)	 C-20136, T-20137, R-20181, G-20176
Europe	TÜV SÜD	EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 CARAT 001633 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

**EMC –Regulations 2016**

EN 55032:2015/A11:2020

Class A

Class B

EN 50130-4:2011/A1:2014





## 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	11, 08, 2024
<input type="checkbox"/>	LISN	ENV216	R & S	101787	11, 08, 2024
<input type="checkbox"/>	LISN	ENV216	R & S	101137	01, 10, 2025
<input type="checkbox"/>	PULSE LIMITER	ESH3-Z2	R & S	101915	11, 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

### Remarks

Refer to 'Remarks when standards applied'.



## 2.2 Conducted Emissions at Telecommunication Ports

**Test Date**

Jul. 30, 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 checked="" type="checkbox"/>	8-WIRE ISN CAT3,5	ENY81	R & S	100174	11, 09, 2024
<input type="checkbox"/>	8-WIRE ISN CAT6	ENY81-CAT6	R & S	101666	03, 06, 2025
<input type="checkbox"/>	ISN	ISN S8	SCHWARZBECK	ISN-S8-0019	03, 05, 2025

**Test Conditions**

Temperature: (25,0 ± 0,0) °C

Relative Humidity: (50,4 ± 0,0) % R.H.

**Frequency Range of Measurement**

150 kHz to 30 MHz

**Instrument Settings**

IF Band Width: 9 kHz

**Test Results**

The requirements are:

- PASS  
 NOT PASS  
 NOT APPLICABLE

**Remarks**See Appendix A for test data.



## 2.3 Radiated Electric Field Emissions(Below 1 GHz)

**Test Date**

Jul. 30, 2024

**Test Location** OPEN AREA TEST SITE #2       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	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: (24,1 ± 0,1) °C  
 Relative Humidity: (46,5 ± 0,0) % R.H.

**Frequency Range of Measurement**

30 MHz to 1 GHz

**Instrument Settings**

IF Band Width: 120 kHz

**Test Results**

The requirements are:

- PASS  
 NOT PASS  
 NOT APPLICABLE

**Remarks**See Appendix A for test data.



## 2.4 Radiated Electric Field Emissions(Above 1 GHz)

### Test Date

Jul. 30, 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: (23,5 ± 0,1) °C

Relative Humidity: (47,7 ± 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

### Remarks

- See Appendix A for test data.

- The Average of the test data is the cispr average result.



## 2.5 Harmonic Current Emissions

**Test Date**

N/A

**Test Location**

Electro wave Shieldroom #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	03, 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

**Remarks**

Refer to 'Remarks when standards applied'.



## 2.6 Voltage Fluctuations and Flicker

**Test Date**

N/A

**Test Location**

Electro wave Shieldroom #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	03, 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

**Remarks**

Refer to 'Remarks when standards applied'.



### 3.0 Criteria for compliance

Criteria for compliance was based on the following guidelines:

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

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

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

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

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

#### **Electrostatic discharge**

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

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

#### **Radiated electromagnetic fields**

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

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

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

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

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

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

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

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



### **Fast transient burst / slow high energy voltage surge**

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

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

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

### **Conducted RF immunity**

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

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

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

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

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

### **Voltage dip/interruption / Voltage variation**

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

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



### 3.1 Electrostatic Discharge

**Reference Standard**

EN 61000-4-2

**Test Date**

Jul. 28, 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	01, 30, 2025
<input checked="" type="checkbox"/>	HCP	-	KES	-	-
<input checked="" type="checkbox"/>	VCP	-	Noise Ken	-	-

**Test Conditions**

Temperature: (25,4 ± 0,0) °C  
 Relative Humidity: (50,9 ± 0,0) % 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:

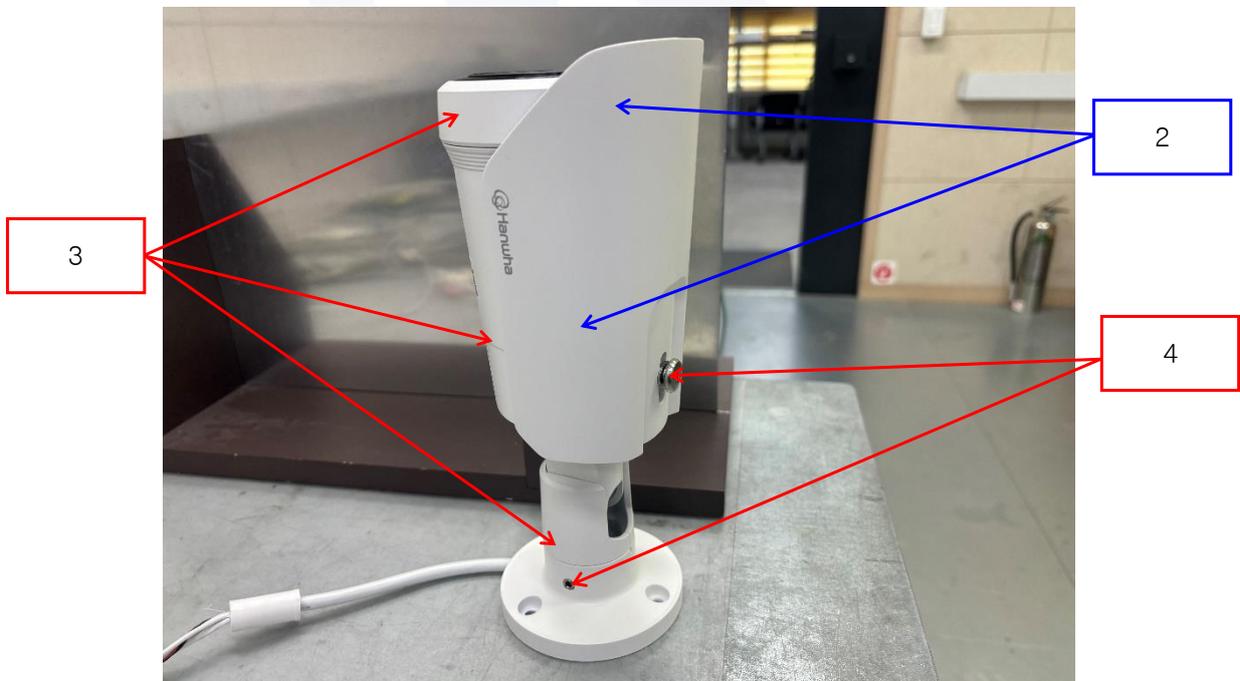
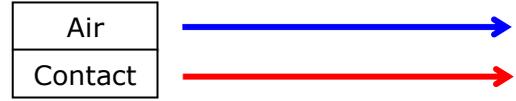
Contact	Air	HCP	VCP
<input type="checkbox"/> 2 kV	<input checked="" type="checkbox"/> 2 kV	<input type="checkbox"/> 2 kV	<input type="checkbox"/> 2 kV
<input type="checkbox"/> 4 kV	<input checked="" type="checkbox"/> 4 kV	<input type="checkbox"/> 4 kV	<input type="checkbox"/> 4 kV
<input checked="" type="checkbox"/> 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			

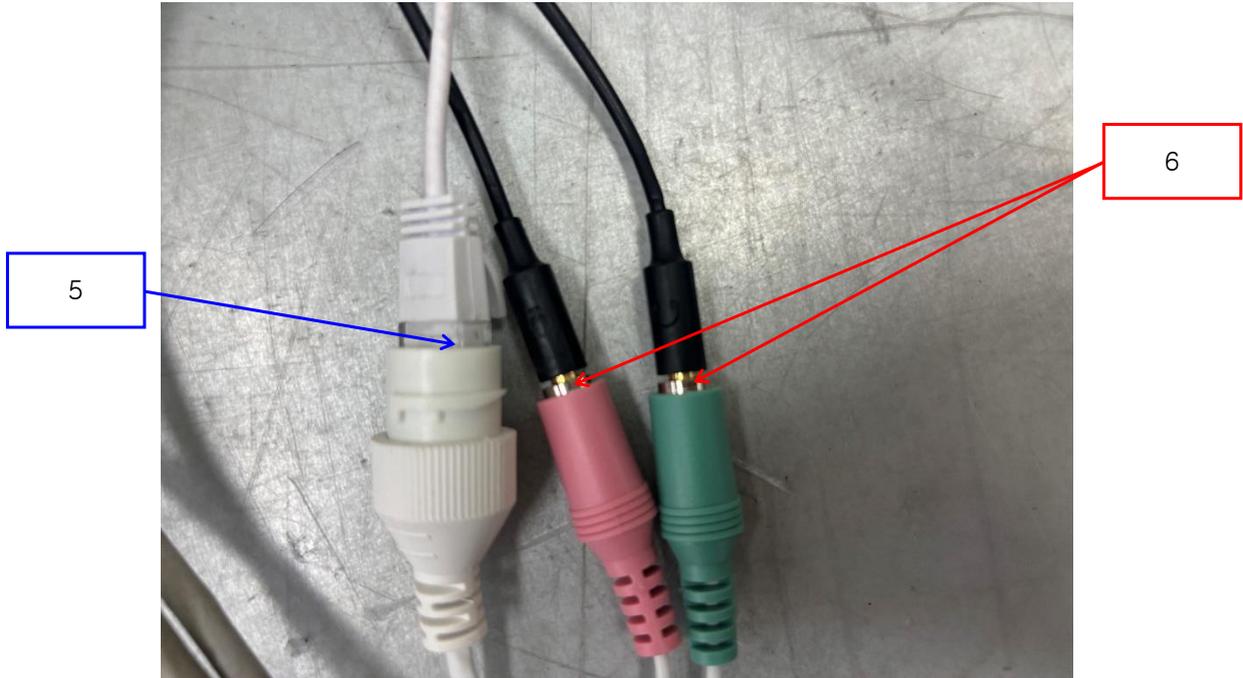
Notes: HCP: Horizontal coupling plane  
 VCP: Vertical coupling plane

Required Performance Criteria:  Complied



**Location of Discharge:**







**Test Data**

Indirect Discharge

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

Direct Discharge

No.	Test Point	Discharge Method	Observations	Remarks
1	Lens	Air Discharge	Complied	-
2	Enclosure 1	Air Discharge	Complied	-
3	Enclosure 2	Contact Discharge	Complied	-
4	Screws	Contact Discharge	Complied	-
5	Port 1	Air Discharge	Complied	-
6	Port 2	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

**Test Date**

Jul. 29, 2024

**Test Location**EMS-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	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: (25,0 ± 0,8) °C  
Relative Humidity: (46,8 ± 0,6) % R.H.  
Atmospheric Pressure: (99,8 ± 0,0) kPa



**Test Specifications**

Antenna Polarization: Horizontal & vertical unless indicated otherwise

Antenna Distance:  3 m

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

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

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

Frequency step:  1 % step

Dwell Time:  1 s  3 s

# of Sides Radiated:  4

Required Performance Criteria:  Complied



**Test Data**

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

Note: "Blank" = Not performed

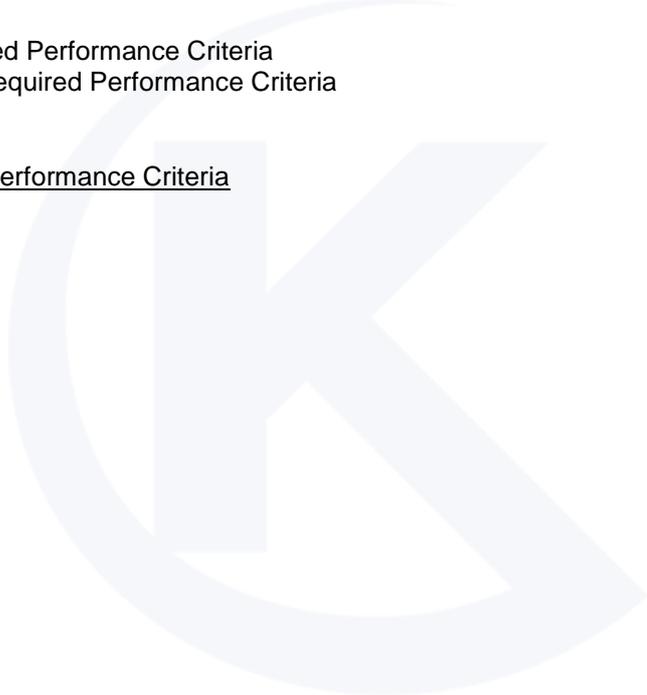
Observations:  
Complied – No degradation of function

**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

**Test Date**

Jul. 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: (24,8 ± 0,0) °C  
 Relative Humidity: (49,8 ± 0,0) % R.H.  
 Atmospheric Pressure: (100,1 ± 0,0) 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**

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

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

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

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

Signal ports and telecommunication ports – Coupling Clamp used

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
RJ-45(PoE)	Complied	Complied
Alarm OUT	Complied	Complied
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

**Test Date**

Jul. 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 checked="" type="checkbox"/>	CDN	CNV 508N1	EM TEST	P1610176296	11, 10, 2024

**Test Conditions**

Temperature: (24,8 ± 0,2) °C  
Relative Humidity: (49,8 ± 0,2) % R.H.  
Atmospheric Pressure: (100,1 ± 0,0) kPa



### Test Specifications

#### AC Power Lines

Source Impedance: 12 ohm for common Mode and 2 ohm for differential Mode

Surge Amplitude : Common Mode  
 (0,5 / 1,0 / 2,0) 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**

Line to Line – Differential Mode

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

Line to Earth – Common Mode

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

**Signal Lines**

Line to Earth – Common Mode

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

Note: "Blank" = Not performed  
Observations:  
Complied – No degradation of function

**Test Results**

- PASS Required Performance Criteria
- NOT PASS Required Performance Criteria

**Remarks**

PASS Required Performance Criteria



### 3.5 Conducted Disturbance

**Reference Standard**

EN 61000-4-6

**Test Date**

Jul. 25, 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 T8RJ45	EM TEST	0909-09	07, 29, 2025

**Test Conditions**

Temperature: (24,8 ± 0,5) °C  
Relative Humidity: (50,3 ± 0,6) % R.H.  
Atmospheric Pressure: (99,4 ± 0,0) kPa



**Test Specifications**

- Frequency range:  150 kHz to 100 MHz  150 kHz to 80 MHz
- Voltage Level:  1 Vrms  3 Vrms  
 10 Vrms
- Modulation:  AM, 80 %, 1 kHz sine wave  
 PM, 1 Hz (0,5 s ON : 0,5 s OFF)
- Frequency step:  1 % step
- Dwell Time:  1 s  3 s
- Required Performance Criteria:  Complied





**Test Data**

Input a.c. power ports

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

Input d.c. power ports

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

Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Observations
RJ-45(PoE)	CDN	Complied
Alarm OUT	Clamp	Complied
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

**Test Date**

N/A

**Test Location**

EMS-Voltage dip: Electro wave Shieldroom #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	11, 09, 2024
<input type="checkbox"/>	MOTOR VARIAC	MV2616	EM TEST	P1552169719	11, 09, 2024

**Test Conditions**

Temperature:

°C

Relative Humidity:

% R.H.

Atmospheric Pressure:

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 type="checkbox"/> 20 % dip	<input type="checkbox"/> 250 / 5 000	<u>N/A</u>
<input type="checkbox"/> 30 % dip	<input type="checkbox"/> 25 / 500	<u>N/A</u>
<input type="checkbox"/> 60 % dip	<input type="checkbox"/> 10 / 200	<u>N/A</u>
<input type="checkbox"/> 100 % dip	<input type="checkbox"/> 250 / 5 000	<u>N/A</u>

- Voltage variations

<input type="checkbox"/> Unom + 10 %	<input type="checkbox"/> 253.0 V (ac)	<u>N/A</u>
<input type="checkbox"/> Unom - 15 %	<input type="checkbox"/> 195.5 V (ac)	<u>N/A</u>

Observations:

Complied – No degradation of function

Degradation - See "Remarks "

**Test Results**

- PASS Required Performance Criteria
- NOT PASS Required Performance Criteria
- NOT APPLICABLE

**Remarks**

Refer to 'Remarks when standards applied'.



## APPENDIX A – TEST DATA

### Conducted Emissions at Mains Power Ports

[HOT]





[NEUTRAL]



◆ 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))

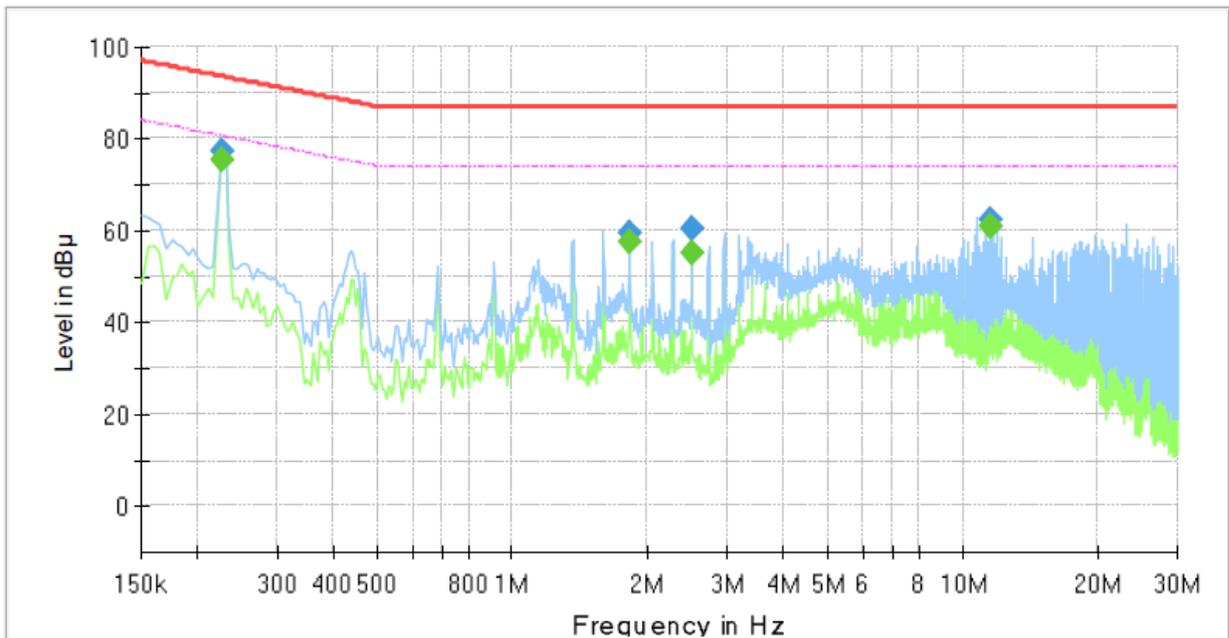


### Conducted Emissions at Telecommunication Ports

[1 000 Mbps]

### Common Information

Test Description:	Telecommunication Emission
Job No.:	KES-EM242530
Mode :	
Speed :	100 Mbps
Operator Name:	KES



### Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.225000	---	75.55	80.63	5.08	1000.0	9.000	Single Line	19.8
0.225000	77.33	---	93.63	16.30	1000.0	9.000	Single Line	19.8
1.820000	---	57.43	74.00	16.57	1000.0	9.000	Single Line	19.5
1.820000	59.46	---	87.00	27.54	1000.0	9.000	Single Line	19.5
2.500000	---	55.03	74.00	18.97	1000.0	9.000	Single Line	19.5
2.500000	60.62	---	87.00	26.38	1000.0	9.000	Single Line	19.5
11.465000	---	60.80	74.00	13.20	1000.0	9.000	Single Line	19.8
11.465000	62.37	---	87.00	24.63	1000.0	9.000	Single Line	19.8

◆ Calculation

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

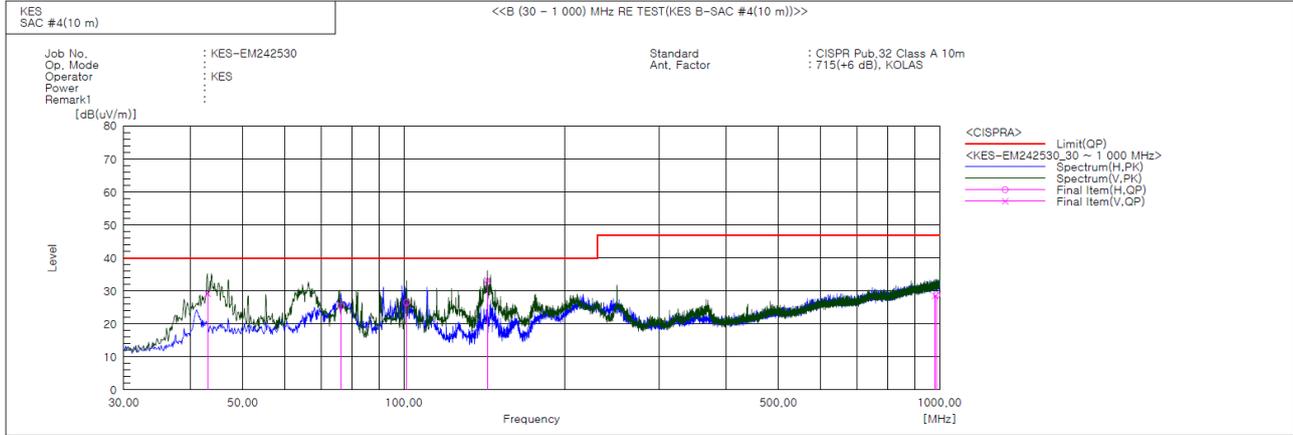
QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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



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



#### 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	42.974	V	51.1	-21.9	29.2	40.0	10.8	149.0	75.0	
2	76.318	H	52.6	-27.2	25.4	40.0	14.6	393.0	45.0	
3	101.174	H	48.9	-22.4	26.5	40.0	13.5	343.0	104.0	
4	143.248	V	58.4	-25.2	33.2	40.0	6.8	157.0	195.0	
5	981.813	V	30.6	-2.1	28.5	47.0	18.5	124.0	146.0	
6	988.360	H	30.7	-1.9	28.8	47.0	18.2	365.0	187.0	

#### ◆ Calculation

$$\text{Result(QP)} [\text{dB}(\mu\text{V}/\text{m})] = (\text{Reading(QP)}[\text{dB}(\mu\text{V})] + \text{c.f}[\text{dB}(1/\text{m})])$$

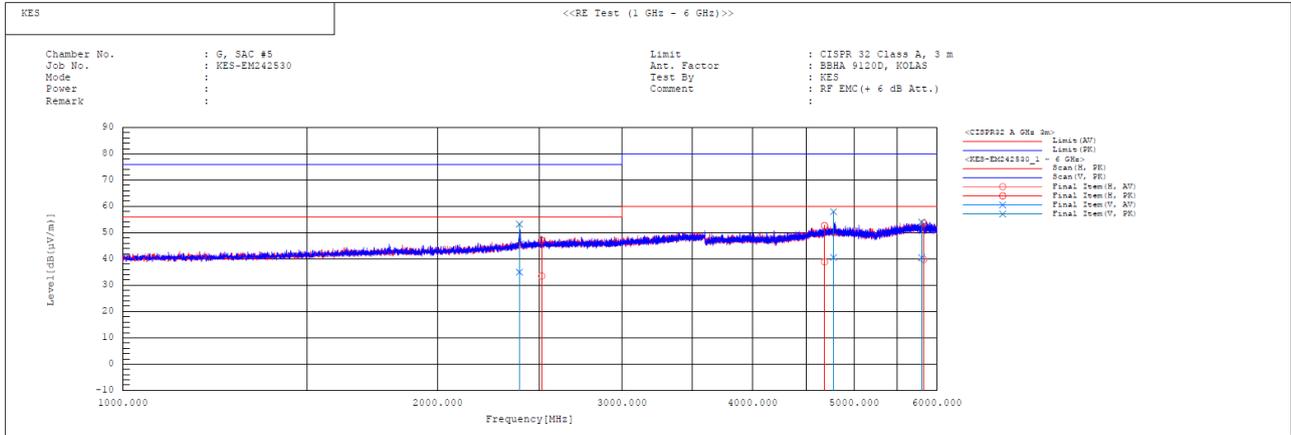
$$\text{Margin(QP)}[\text{dB}] = \text{Limit}[\text{dB}(\mu\text{V}/\text{m})] - \text{Result(QP)} [\text{dB}(\mu\text{V}/\text{m})]$$

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)



#### ◆ Calculation

$$\text{Result(PK/CAV)} \text{ [dB(}\mu\text{V/m)}] = (\text{Reading(PK/CAV)} \text{ [dB(}\mu\text{V)}] + \text{c.f [dB(1/m)}])$$

$$\text{Margin(PK/CAV)} \text{ [dB]} = \text{Limit [dB(}\mu\text{V/m)}] - \text{Result(PK/CAV) [dB(}\mu\text{V/m)}]$$

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

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



### Harmonic Current Emissions and Voltage Fluctuations and Flicker

<b>Average harmonic current results</b>				
Hn	I <sub>eff</sub> [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 - Harmonics (continued)

<b>Maximum harmonic current results</b>				
Hn	I <sub>eff</sub> [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



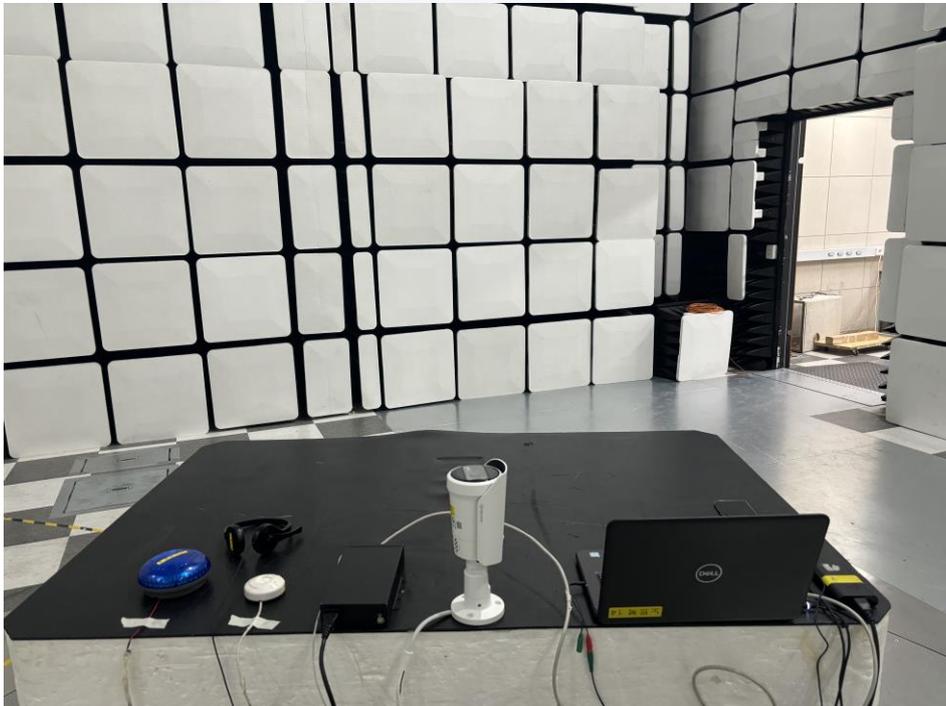
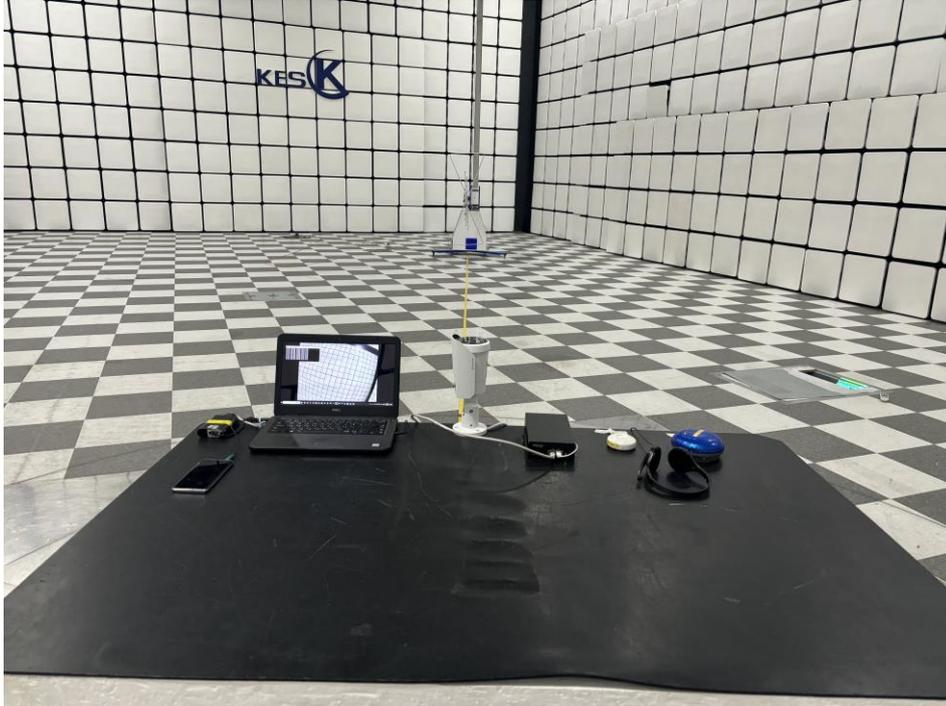


### Conducted Emissions at Telecommunication Ports



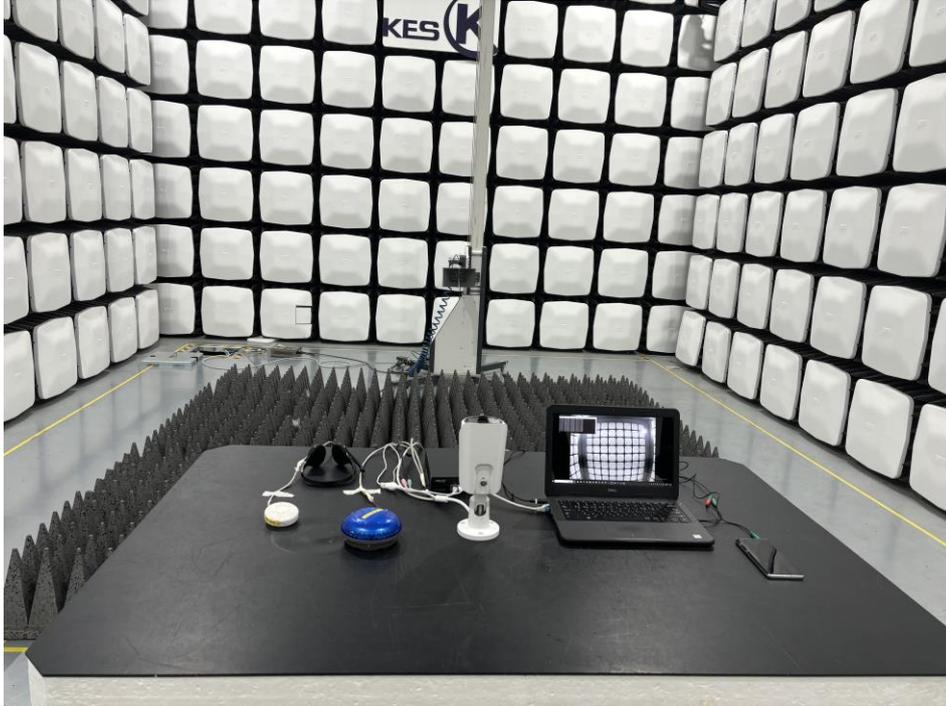


### Radiated Electric Field Emissions(Below 1 GHz)





### Radiated Electric Field Emissions(Above 1 GHz)





## Harmonic Current Emissions and Voltage Fluctuations and Flicker

N/A

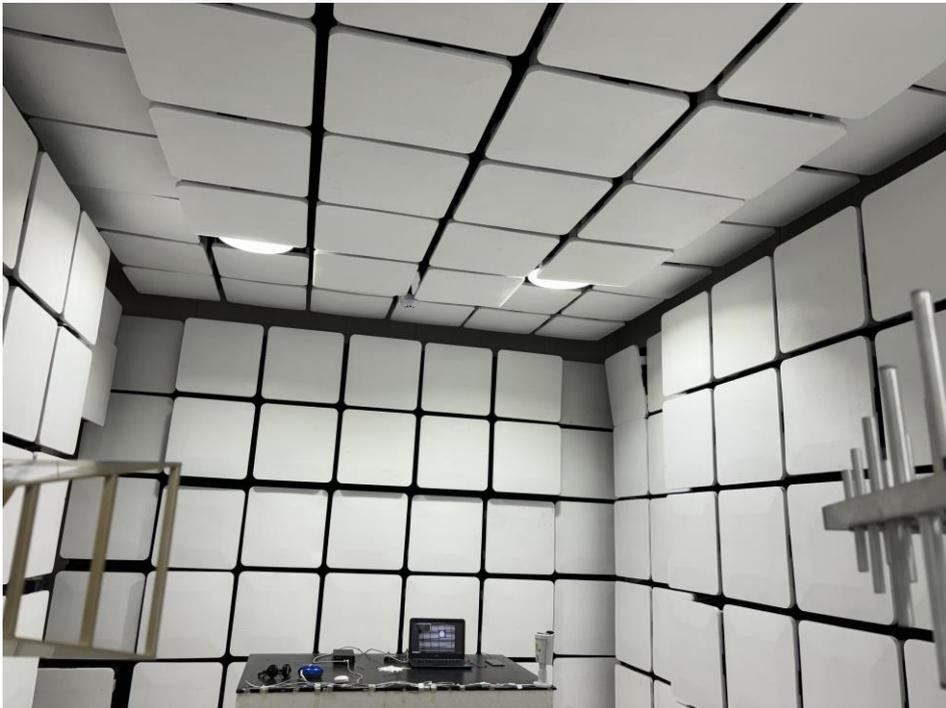




## Electrostatic Discharge



## Radiated Electric Field Immunity





### Electrical Fast Transients/Bursts

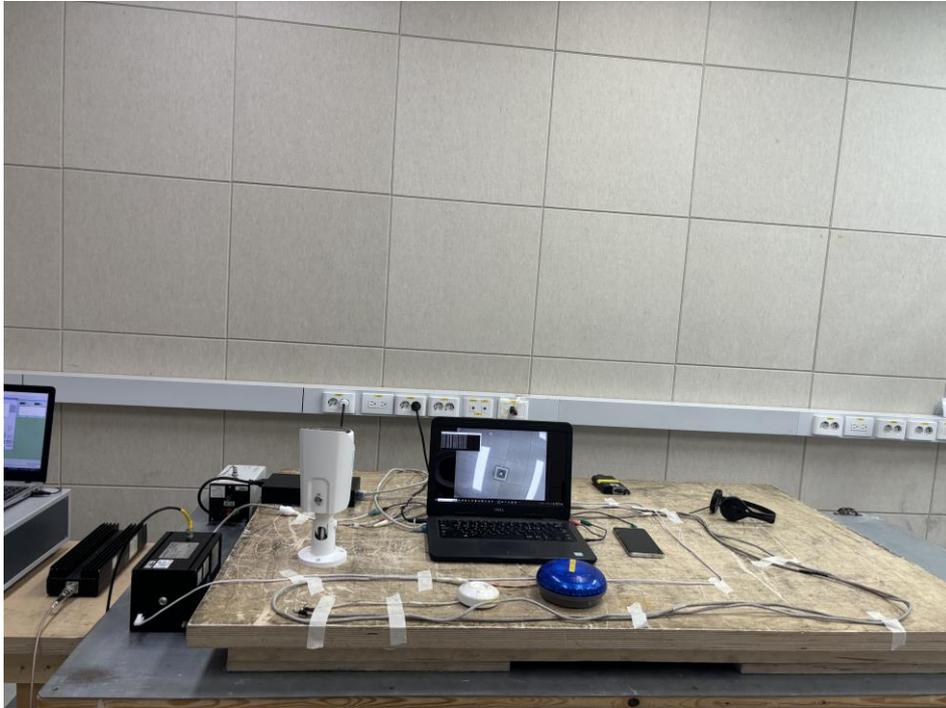


### Surge Transients





## Conducted Disturbance



## Voltage Dips and Short Interruptions

N/A



### EUT External Photographs

(Top)



(Bottom)





## EUT Internal Photographs

(Internal View)



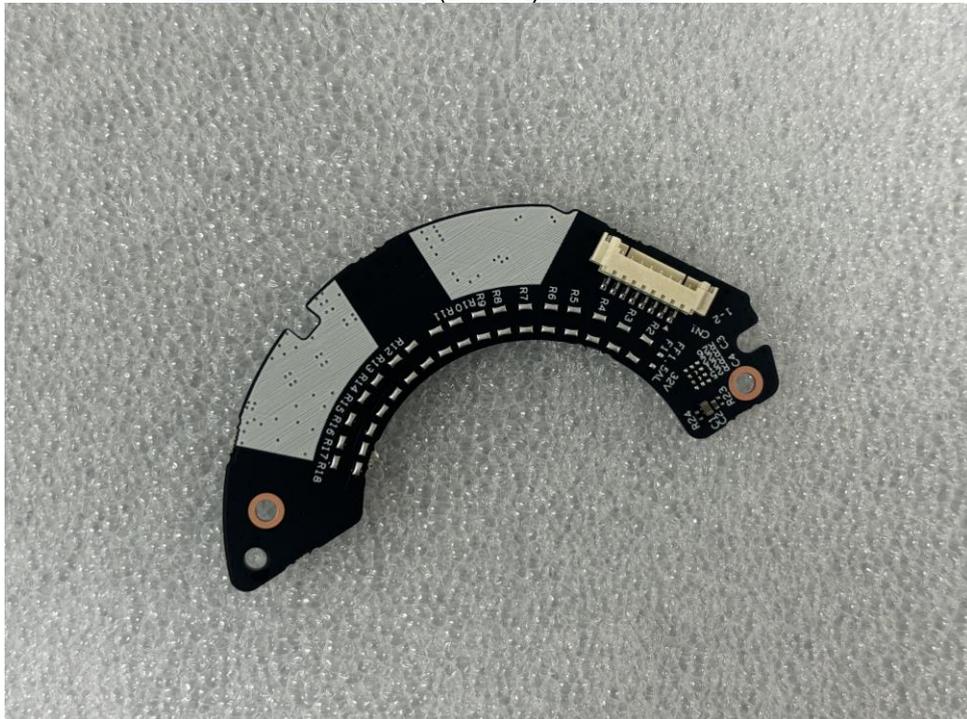


### EUT Internal View – Board 1

(Top)



(Bottom)





### EUT Internal View – Board 2

(Top)



(Bottom)









### EUT Internal View – Lens

(Top)



(Bottom)





### Label and Location



<p><b><u>NETWORK CAMERA</u></b></p> <p>Model No : QNO-C8023R</p> <p>Manufacturer : HANVHA VISION VIETNAM COMPANY LIMITED</p> <p>Made in Vietnam</p>	<p><b>UK CA</b> <b>CE</b> <b>€</b></p>
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