

EMC TEST REPORT

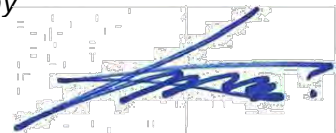
Test Report No. : KES-EM-22T0730
Date of Issue : Aug. 25, 2022
Product Name : NETWORK CAMERA
Model/Type No. : XNV-6083RZ
Variant Model : -
Applicant : Hanwha Techwin Co., Ltd.
Applicant Address : 6, Pangyo-ro 319Beon-gil, Bundang-gu, Seongnam-si,
Gyeonggi-do, Republic of Korea
Manufacturer : 1. HANWHA TECHWIN SECURITY VIETNAM CO.,LTD
2. D-TECH CO.,LTD.
Manufacturer Address : 1. Lot O-2, Que Vo Industrial Zone extended area,
Nam Son commune, Bac Ninh city, Bac Ninh province, Vietnam
2. 173-25, Saneop-ro, Gwonseon-gu, Suwon-si, Gyeonggi- do,
Korea (Suwon Industrial Complex)
Date of Receipt : Jul. 29, 2022
Test date : Aug. 02, 2022 ~ Aug. 05, 2022
Test Results : ☒ In Compliance ☐ Not in Compliance

Tested by



Dae Hyun, Kim
EMC Test Engineer

Reviewed by



Dong Hun, Jang
EMC Technical Manager

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

**KES Co., Ltd.**

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KES-EM-22T0730
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REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Aug. 25, 2022	KES-EM-22T0730	Issued

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1.0 General Product Description

Main Specifications of EUT are:

XNV-6083RZ		Radiometry	
Video		Temperature Detect Range	None
Imaging Device	1/2.8" progressive CMOS	Temperature Accuracy	None
Resolution	1920x1080, 1280x1024, 1280x960, 1280x720, 1024x768, 800x600, 800x448, 720x576, 720x480, 640x480, 640x360, 320x240	Temperature Detection	None
Max. Framerate	H.265/H.264: Max. 120fps/100fps(60Hz/50Hz)(WDR on) MPEG: Max. 30fps/25fps(60Hz/50Hz)	Additional	None
NETO	None	Network	
Pixel Size	None	Ethernet	Metal shielded RJ-45(10/100/1000BASE-T)
	Color: 0.01Lux(F1.4, 1/30sec, 30IRE) B/W : 0.001Lux(F1.4, 1/30sec, 30IRE), 0Lux(IR LED on), 30/25fps Color: 0.02Lux(F1.4, 1/60sec, 30IRE) B/W : 0.002Lux(F1.4, 1/60sec, 30IRE), 0Lux(IR LED on), 60/50fps Color: 0.04Lux(F1.4, 1/120sec, 30IRE) B/W : 0.004Lux(F1.4, 1/120sec, 30IRE), 0Lux(IR LED on), 120/100fps	Video Compression	H.265/H.264: Main/High, MPEG
Video Out	None	Audio Compression	None
Video Transmission Distance	None	Smart Codec	Manual(Sea area), WiseStreamII, WiseStreamIII(Based on AI engine)
Lens		Video Quality Adjustment	H.264/H.265: Target bitrate level control MPEG: Target bitrate level control
Focal Length (Zoom Ratio)	2.8~12mm(4.3x) motorized varifocal	Bitrate Control	H.264/H.265: CBR or VBR MPEG: VBR
Max. Aperture Ratio	F1.4(Wide) ~ F3.6(Tele)	Streaming	Unicast(20 users) / Multicast Multiple streaming(Up to 10 profiles, 3 virtual channel support)
Angular Field of View	H: 120°(Wide) ~ 27°(Tele) V: 63°(Wide) ~ 15°(Tele) D: 143°(Wide) ~ 32°(Tele)	Protocol	IPv4, IPv6, TCP/IP, UDP/IP, RTP/UDP, RTCP, RTPSP, NTP, HTTP, HTTPS, SSL/TLS, DHCP, FTP, SMTP, ICMP, IGMP, SNMPv1/v2c/v3(MIB-2), ARP, DNS, DDNS, QoS, UPnP, Bonjour, LLDP, SRTP (TCP, UDP Unicast)
Min. Object Distance	0.5m(1.64ft)	Security	TPM 2.0 (TPS 140-2 level 2) HTTP(S)SLL Login Authentication Digest Login Authentication IP Address Filtering User access log 802.1X Authentication(EAP-TLS, EAP-LEAP, EAP-PEAP MSCHAPv2) Device Certificate(Hanwha Techwin Root CA, pre-installed) Secure by default certificate Secure OS/Boot/Storage, Verify firmware forgery
Focus Control	Simple focus, Manual	SIP support (VoIP, Peer-to-peer, SIPV)	None
Lens Type	DC auto iris with hall sensor (IR corrected)	Application Programming Interface	ONVIF Profile S/G/I/M SUNAPI(HTTP API) Wisetnet open platform
Mount Type	None	General	
Optional Lens	None	Webpage Language	English, Korean, Chinese, French, Italian, Spanish, German, Japanese, Russian, Portuguese, Czech, Polish, Turkish, Dutch, Greek, Hungarian
Pan / Tilt / Rotate		Web Viewer	None
Pan / Tilt / Rotate Range	Remote adjustment(Max. 200cycles) 0°~350° / 0°~85° / 0°~340°	Edge Storage	Micro SD/SDHC/SDXC, 2slot Max. 1TB (512GB * 2)
Pan Range	None	Memory	2GB RAM, 512MB Flash
Pan Speed	None	Environmental & Electrical	
Tilt Range	None	Operating Temperature / Humidity	-50°C ~ +55°C (-58°F ~ +131°F) ~74°C(165°F)(Max) based on NEMA TS-2(2.7) * Start up should be done at above -30°C 0~95%RH(non-condensing) Humidity control /w AIR vent
Tilt Speed	None	Storage Temperature / Humidity	-50°C ~ +60°C(-58°F ~ +140°F) / Less than 90% RH
Rotate Range	None	Certification	IP66/IP67/IP68, NEMA4X, IK10+
Sequence	None	Input Voltage	PoE+(IEEE802.3at, Class4)
Preset Accuracy	None	Power Consumption	PoE+ : Max 22.5W, typical 11W
Operational		Mechanical	
Camera Title	Displayed up to 85 characters	Color / Material	White / Aluminum
Direction Indicator	None	RAL Code	RAL9003
Day & Night	Auto(ICR)	Product Dimensions / Weight	Q180x135mm(7.09x5.31") 2000g(4.41 lb)
Backlight Compensation	BLC, HLC, WDR, SDR	Compatible Conduit hole / Gangbox	19.1mm(3/4")M25
Wide Dynamic Range	extremeWDR (150dB)	Hanging Mount (Dome)	SBP-18THMW
Digital Noise Reduction	WiseNRII(Based on AI engine), SSNR-V	Skin Cover (Dome)	None
Digital Image Stabilization	Support	Weather Cap (Dome)	include
Defog	Support	Power Module	None
Motion Detection	Bea, 8point Polygonal zones	Backbox	None
Privacy Masking	3Area, 4point Quadrangle zones - Color : Gray, Green, Red, Blue, Black, White - Mosaic	Certifications & Standards	
Gain Control	Off / Max Gain / Manual	Network	None
White Balance	ATW / Narrow ATW / AWC / Manual / Indoor / Outdoor		EN 50121-4 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 C1SPR 32 Class A RCM AS/NZS CISPR 32 Class A KC C 9832 Class A, KS C 9835
LDC	Support (Fill/stretch mode)	Safety	UL 62368-1, CAN/CSA C22.2 NO. 62368-1
Electronic Shutter Speed	Minimum / Maximum / Prefer / Anti flicker (2~1/12,000sec) Auto Prefer shutter control(Based on AI engine)	Environment	EN IEC 63000 IEC 60529 IP66/IP67, ISO 20653 IP68, IEC 62662 IK10+
Digital PTZ	Support(preset/group)	Video	None
Video Rotation	Flip, Mirror, Halfway view(90°/270°)	DORI (EN62676-4 standard)	
	Classified object type : Person/Face/Vehicle/License plate Attributes : VehicleType(car/bus/truck/motorcycle/bicycle) Support DetectionShot Analytics events based on AI engine - Object detection, Virtual line(Crossing/Direction), Virtual area(Loitering/Intrusion/Enter/Exit) Analytics events - Defocus detection, Motion detection, Tampering, Fog detection, Virtual area(Appear/Disappear) * Audio detection, Sound classification(with NW I/O box SPM-4210)	Detect (25PPM/ 8PPF)	Wide: 22.2m(72.74ft) / Tele: 15.93m(52.476ft)
Business Intelligence	None	Observe (33PPM/ 19PPF)	Wide: 8.9m(29.09ft) / Tele: 64.0m(209.90ft)
Serial Interface	None	Recognize (125PPM/ 38PPF)	Wide: 4.4m(14.55ft) / Tele: 32.0m(104.95ft)
Alarm I/O	None	Identify (250PPM/ 76PPF)	Wide: 2.2m(7.27ft) / Tele: 16.0m(52.48ft)
Alarm Triggers	Analytics, Network disconnect, App event, Time schedule * Alarm input(with NW I/O Box SPM-4210)		
	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(with NW I/O box SPM-4210) - Handover/PTZ preset, Send message by HTTP/HTTPS/TCP		
Alarm Events			
Audio In	None		
Audio Out	None		
IR Viewable Length	15m(49.21ft)		
IR Illuminator (Optional)	None		
Water Removal	None		
Auto Tracking	None		
Coaxial Protocol	None		
Color Palettes	None		

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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

Not applicable

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
NETWORK CAMERA	XNV-6083RZ	-	HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.	EUT

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
PoE Adapter	PT-PSE109GBRO-AH	-	Dongguan PROCET Network Technology Co.,Ltd	-
Notebook	P95G001	8KM8HT2	DELL INC.	-
Notebook Adapter	HA65NM130	-	Chicony Power Technology(Suzhou) Co.,Ltd.	-
Micro SD Card	-	-	Sandisck	-

1.6 External I / O Cabling

Start		END		Cable Spec.	
Description	I / O Port	Description	I / O Port	Length	Shield
NETWORK CAMERA (EUT)	Micro SD Card Slot	Micro SD Card	Micro SD Card Slot	-	-
	RJ-45 (PoE)	PoE Adapter	RJ-45 (PoE)	3.0	S
PoE Adapter	RJ-45 (LAN)	Notebook	RJ-45 (LAN)	1.5	U
Notebook	DC Jack	Notebook Adapter	DC Jack	1.8	U

* Unshielded=U, Shielded=S

1.7 EUT Operating Mode(s)

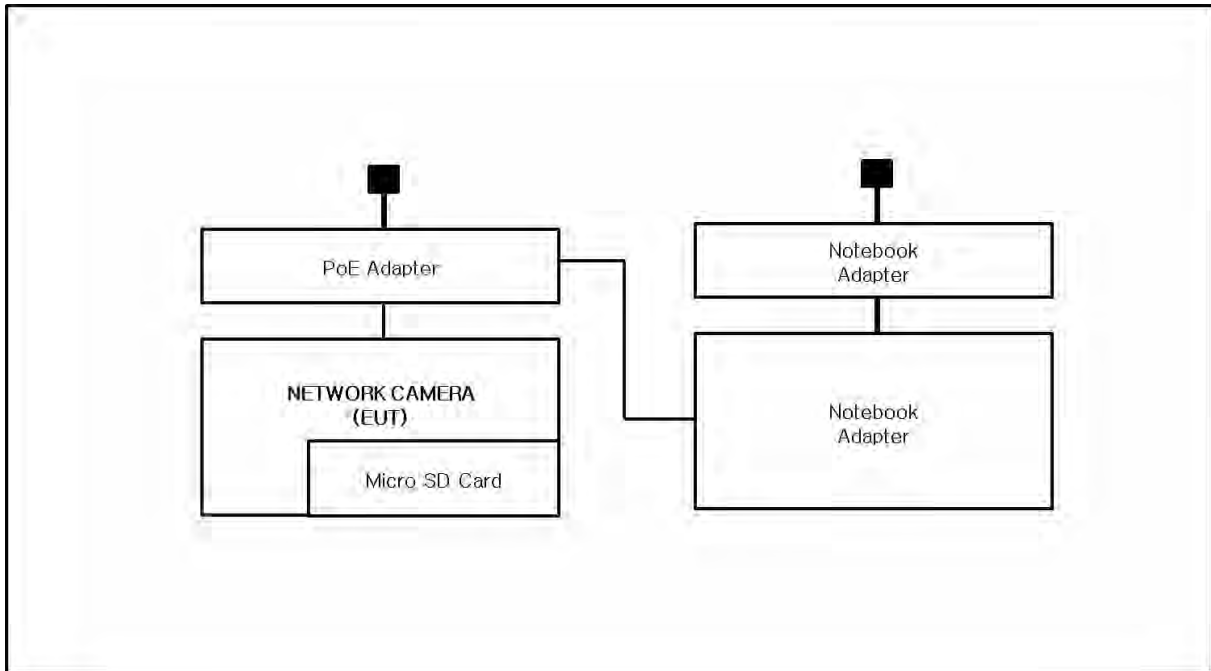
Test Mode	operating
Operating	Check the Normal Operation status. after testing, check if the recording is normally done on the Micro SD Card

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

1.8 Configuration

■ AC Main

□ DC Main



1.9 Remarks When Standards Applied

N/A

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 , 10 m Open Area 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, 10 m Open Area and 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	Mains Ports Conducted Interference Measurement, Telecommunication Ports Conducted Disturbance Measurement and Radiation 10 meter site, Facility for measuring radiated disturbance above 1 GHz	 R-20056, C-20036, T-20040, G-20057
Europe	TÜV SÜD	EMI (3 m & 10 m Semi-Anechoic Chamber , 10 m Open Area and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 CARAT 001633 0004

2.0 Test Regulations

The emissions tests were performed according to following regulations:

☒ **EMC – Directive 2014 / 30 / EU**

☒ EN 50121-4:2016

☐ EN 61000-3-2:2014

☐ EN 61000-3-3:2013

☒ **EMC – Regulations 2016**

☒ EN 50121-4:2016

☐ EN 61000-3-2:2014

☐ EN 61000-3-3:2013

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
☐	EMI Test S/W	EMC32	R & S	9.12.00	-
☐	EMI TEST RECEIVER	ESR3	R & S	101783	Dec, 28, 2022
☐	LISN	ENV216	R & S	101787	Dec, 27, 2022
☐	LISN	ESH2-Z5	R & S	100450	Dec, 27, 2022
☐	PULSE LIMITER	ESH3-Z2	R & S	101915	Dec, 27, 2022

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

It is not tested apply because it is powered by PoE.

2.2 Conducted Emissions at Telecommunication Ports

Test Date

Aug 04, 2022

Test Location

Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EMC32	R & S	9.12.00	-
☒	EMI TEST RECEIVER	ESR3	R & S	101783	Dec, 28, 2022
☒	LISN	ENV216	R & S	101787	Dec, 27, 2022
☒	LISN	ESH2-Z5	R & S	100450	Dec, 27, 2022
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	Dec, 27, 2022
☒	ISN	ISN S8	SCHWARZBECK	ISN-S8-0019	Mar 07, 2023
☐	CDN	CDNS502A	TESEQ	40431	Dec 27, 2022

Test Conditions

Temperature: (24,6 ± 0,1) °C

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

Frequency Range of Measurement

150 kHz to 30 MHz

Instrument Settings

IF Band Width: 9 kHz

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

RemarksSee Appendix A for test data.

2.3 Impulse Noise (click)

Test Date

N/A

Test Location

Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☐	EMI Test S/W	CLICK METER SOFTWARE CMS FOR DDA55	AFJ	4.19	-
☐	CLICK ANALYZER	DDA55+	AFJ INSTRUMENTS	14042211198	Mar 31, 2023
☐	LISN	ENV216	R & S	101787	Dec 27, 2022

Test ConditionsTemperature: °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

RemarksIt is not tested apply because it is powered by PoE.

2.4 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Aug 03, 2022

Test Location☐ OPEN AREA TEST SITE #2 ☒ SEMI ANECHOIC CHAMBER #4(10 m)**Test Equipment**

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.0	-
☒	EMI TEST RECEIVER	ESU26	R & S	100551	Mar 31, 2023
☒	AMPLIFIER	SCU 01	R & S	100603	Nov 24, 2022
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	Dec 08, 2022
☒	ATTENUATOR	8491A	HP	32173	Mar 08, 2023

Test Conditions

Temperature: (24,5 ± 0,1) °C

Relative Humidity: (46,3 ± 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**Remarks**See Appendix A for test data.

2.5 Radiated Electric Field Emissions(Above 1 GHz)

Test Date

Aug 03, 2022

Test Location

SEMI ANECHOIC CHAMBER #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.0	-
☒	EMI TEST RECEIVER	ESR7	R & S	101190	Aug 01, 2023
☒	PREAMPLIFIER	8449B	AGILENT	3008A01967	Apr 01, 2023
☐	ATTENUATOR	8491A	HP	35496	Mar 08, 2023
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	Mar 03, 2023

Test Conditions

Temperature: (24,6 ± 0,2) °C

Relative Humidity: (45,9 ± 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.

2.6 Harmonic Current Emissions

Test Date

N/A

Test Location

Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☐	EMI Test S/W	net.control	EM TEST	2.1.4	-
☐	DIGITAL POWER ANALYZER	DPA 500N	EM TEST	V1024106759	Apr 06, 2023
☐	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

Test Conditions

Temperature:

℃

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

It is not tested apply because it is powered by PoE.

2.7 Voltage Fluctuations and Flicker

Test Date

N/A

Test Location

Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☐	EMI Test S/W	net.control	EM TEST	2.1.4	-
☐	DIGITAL POWER ANALYZER	DPA 500N	EM TEST	V1024106759	Apr 06, 2022
☐	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

It is not tested apply because it is powered by PoE.

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 criterion 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 criterion 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 criterion C

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

3.1 Electrostatic Discharge

Reference Standard

EN 61000-4-2:2009

Test Date

Aug 05, 2022

Test Location

EMS-ESD: Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	ESD SIMULATOR	ESS-2000	Noise Ken	ESS01Z0454	Feb 24, 2023
☒	HCP	-	KES	-	-
☒	VCP	-	Noise Ken	-	-

Test Conditions

Temperature: (24,4 ± 0,2) °C
 Relative Humidity: (45,3 ± 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 ☒ 2 kV ☒ 4 kV ☒ 6 kV ☐ 8 kV ☐ 15 kV	Air ☒ 2 kV ☒ 4 kV ☐ 6 kV ☒ 8 kV ☐ 15 kV	HCP ☒ 2 kV ☒ 4 kV ☒ 6 kV ☐ 8 kV ☐ 15 kV	VCP ☒ 2 kV ☒ 4 kV ☒ 6 kV ☐ 8 kV ☐ 15 kV
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Notes: HCP: Horizontal Coupling Plane

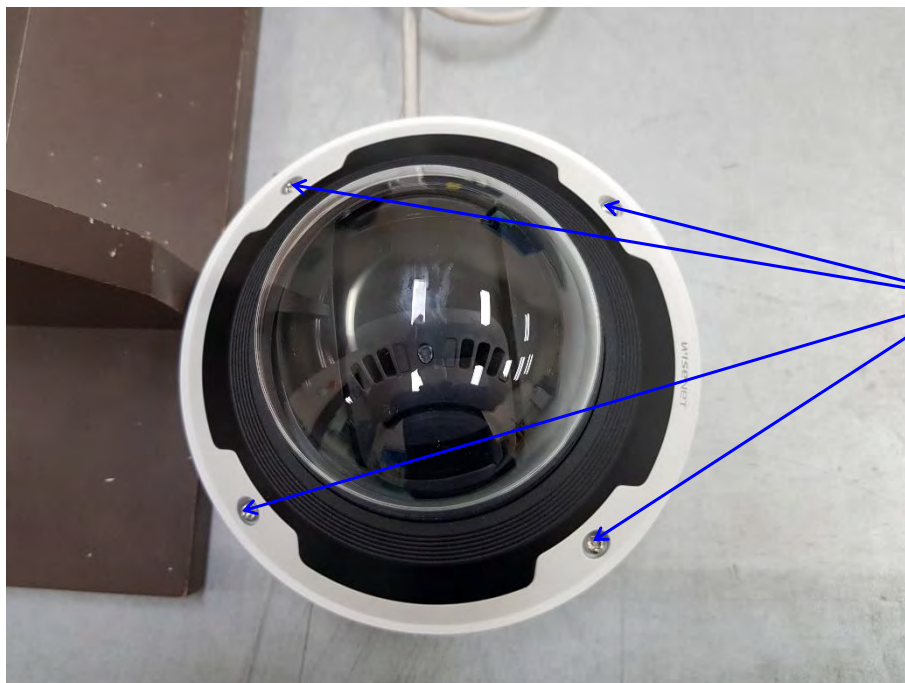
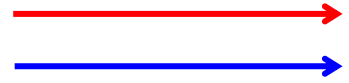
VCP: Vertical Coupling Plane

Required Performance Criteria: ☒ B

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Location of Discharge:

Air
Contact



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Test Data

Indirect Discharge

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

Direct Discharge

No.	Test Point	Discharge Method	Observations	Remarks
1	Lens	Air Discharge	A	-
2	Screws	Contact Discharge	A	-
3	Enclosure	Contact Discharge	A	-

Note: "Blank" = Not performed

Observations:

- A – No response observed from EUT
- B – Unit shuts down then automatically restarts when full voltage is restored.
- C – Unit shuts down then manually restarts when full voltage is restored or Loss of function.

Test Results

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

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

3.2 Radio-frequency Electromagnetic Field

Reference Standard

EN IEC 61000-4-3:2020

Test Date

Aug 02, 2022

Test LocationEMS-RS: ☒ SEMI ANECHOIC CHAMBER #3 ☐ SEMI ANECHOIC CHAMBER #4(10 m)**Test Equipment**

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	EMC32	R & S	10.10.02	-
☒	SIGNAL GENERATOR	SMB 100A	Rohde & Schwarz	108252	Aug 01, 2023
☒	HIGH POWER DUAL AMP	SSA532	SUNGSAN	SSA532-001	-
☒	POWER METER	E4419B	Agilent	GB40203000	Mar 31, 2023
☒	AVERAGE POWER SENSOR	E9301A	Agilent	MY52170007	Apr 04, 2023
☒	AVERAGE POWER SENSOR	E9301A	Agilent	MY41498669	Apr 04, 2023
☒	STACKED DOUBLE LOG-PER- ANTENNA	STPL9128 E	Schwarzbeck	9128ES-121	-
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM, INC	781	Mar 03, 2023

Test ConditionsTemperature: (24,6 ± 0,2) °C
Relative Humidity: (45,5 ± 0,2) % R.H.
Atmospheric Pressure: (100,0 ± 0,1) kPa

Test Specifications

Antenna Polarization: Horizontal & Vertical unless indicated otherwise

Antenna Distance: ☒ 3 m

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

Modulation: ☒ 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: ☒ A

Test Data

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

Note: "Blank" = Not performed

Observations:

- A – No response observed from EUT
B – Unit shuts down then automatically restarts when full voltage is restored.
C – Unit shuts down then manually restarts when full voltage is restored or Loss of function.

Test Results

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

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

3.3 Fast Transients

Reference Standard

EN 61000-4-4:2012

Test Date

Aug 05, 2022

Test Location

EMS-EFT: Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	iec.control	EM TEST	5.4.8	-
☒	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	Dec 03, 2022
☒	MOTOR VARIAC	MV2616	EM TEST	P1552169719	Mar 31, 2023
☒	CAPACITIVE COUPLING CLAMP	HFK	EM TEST	P1633183115	Dec 03, 2022

Test Conditions

Temperature: (24,4 ± 0,1) °C
Relative Humidity: (45,3 ± 0,1) % R.H.
Atmospheric Pressure: (100,1 ± 0,1) kPa

Test Specifications

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

Pulse Amplitude & Polarity: ☐ ± 0.5 kV ☐ ± 1.0 kV
(Signal Lines) ☒ ± 2.0 kV

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

Burst Period: ☒ 300 ms ☐ 2 s

Repetition Rate: ☒ 5 kHz ☐ 100 kHz

Duration of Test Voltage: ☒ ≥ 1 min

Required Performance Criteria: ☒ A

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Test Data

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

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

☒ Signal ports and telecommunication ports – Coupling Clamp used

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
RJ-45 (PoE)	A	A

☐ Earth ports – Coupling Clamp used

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

Note: “Blank” = Not performed

Observations:

- A – No response observed from EUT
- B – Unit shuts down then automatically restarts when full voltage is restored.
- C – Unit shuts down then manually restarts when full voltage is restored or Loss of function.

Test Results

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

Remarks

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

3.4 Surges

Reference Standard

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

Test Date

Aug 05, 2022

Test Location

EMS-Surge: Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	iec.control	EM TEST	5.4.8	-
☒	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	Dec 03, 2022
☒	MOTOR VARIAC	MV2616	EM TEST	P1552169719	Mar 31, 2023

Test Conditions

Temperature: (24,4 ± 0,2) °C
Relative Humidity: (45,3 ± 0,1) % R.H.
Atmospheric Pressure: (100,1 ± 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
☐ (2,0) kV
Differential Mode
☐ (1,0) kVNumber of Surges: ☐ 5 surges per angleAngle: ☐ 0°, 90°, 180°, 270° (input AC power port)Polarity: ☐ Positive & NegativeRepetition Rate: ☐ 1 surge per min ☐ 1 surge per 30 sec.Required Performance Criteria: ☐ B**DC Power Lines**Source Impedance: 42 ohm
Surge Amplitude: Common Mode
☐ (2,0) kV
Differential Mode
☐ (1,0) kVNumber of Surges: ☐ 5 SurgesPolarity: ☐ Positive & NegativeRepetition Rate: ☐ 1 surge per min ☐ 1 surge per 30 sec.Required Performance Criteria: ☐ B**Signal Lines**Source Impedance: 42 ohm
Surge Amplitude: Common Mode
☒ (2,0) kV
Differential Mode
☐ (1,0) kVNumber of Surges: ☒ 5 SurgesPolarity: ☒ Positive & NegativeRepetition Rate: ☒ 1 surge per min ☐ 1 surge per 30 sec.Required Performance Criteria: ☒ B

Test Data

☐ 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 Line – Differential Mode

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

☐ Line to ☐ Line to Earth – Common Mode

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

Note: "Blank" = Not performed

Observations:

- A – No response observed from EUT
- B – Unit shuts down then automatically restarts when full voltage is restored.
- C – Unit shuts down then manually restarts when full voltage is restored or Loss of function.

Test Results

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

Remarks

Any degradations of performance was not observed during the test.

3.5 Conducted Disturbance

Reference Standard

EN 61000-4-6:2014

Test Date

Aug 04, 2022

Test Location

EMS-CS: Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	icd.control	EM TEST	5.3.12	-
☒	CONTINUOUS WAVE SIMULATOR	CWS 500N1.4	EM TEST	P1602169880	Nov 24, 2022
☒	ATTENUATOR	ATT 6/80	EM TEST	P1614178148	Nov 24, 2022
☒	CDN	CDN M016	TESEQ	43694	Nov 24, 2022
☒	CDN	CDN M016	TESEQ	43697	Nov 24, 2022
☒	CDN	CDN ST08A	TESEQ	43886	Nov 24, 2022
☐	EM CLAMP	KEMZ 801A	TESEQ	44099	Nov 25, 2022

Test Conditions

Temperature: (24,6 ± 0,2) °C
Relative Humidity: (45,9 ± 0,1) % R.H.
Atmospheric Pressure: (100,2 ± 0,1) 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

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	Observations
-	-	-

☒ Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Observations
RJ-45 (PoE)	CDN	A

☐ Earth ports

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

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

Observations:

- A – No response observed from EUT
- B – Unit shuts down then automatically restarts when full voltage is restored.
- C – Unit shuts down then manually restarts when full voltage is restored or Loss of function.

Test Results

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

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

3.6 Power Frequency Magnetic Field Immunity

Reference Standard

EN 61000-4-8:2010

Test Date

Jul 03, 2022

Test Location

EMS-Magnetic: Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	iec.control	EM TEST	5.4.8	-
☒	EMS Test S/W	NET.CONTROL	EM TEST	1.2.11	-
☒	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	Dec 03, 2022
☒	MOTOR VARIAC	MV2616	EM TEST	P1552169719	Mar 31, 2023
☒	MAGNETIC FIELD COIL	MS 100N	EM TEST	P1536163691	Dec 07, 2022
☒	CURRENT TRANSFORMER	MC 26100	EM TEST	P1550168963	Mar 31, 2023
☒	MULTIFUNCTION AC/DC POWER SOURCE	NETWAVE 7-400	EM TEST	P1614178393	Nov 25, 2022
☒	MAGNETICFIELD COIL	INA 703	Teseq AG	3006	Mar 31, 2023

Test Conditions

Temperature: (24,4 ± 0,1) °C
Relative Humidity: (45,3 ± 0,1) % R.H.
Atmospheric Pressure: (100,1 ± 0,0) kPa



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Test Specifications

Field Strength(Power Source): ☒ 100 A/m (ac)

☒ 300 A/m (dc)

Frequency (ac): ☒ 16.7 Hz ☒ 50 Hz ☐ 60 Hz

Frequency (dc): ☒ 0 Hz

Required Performance Criteria: ☒ A

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Test Data☒ PoE Mode☒ Immersion method

Coil orientation	Result
X	A
Y	A
Z	A

☐ Proximity method

Coil orientation	Result
X	-
Y	-
Z	-

* During the test, the Y / Z polarization is tested indirectly.

Note: "blank" = Not performed

Observations:

- A – No response observed from EUT
- B – Unit shuts down then automatically restarts when full voltage is restored.
- C – Unit shuts down then manually restarts when full voltage is restored or 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.



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APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

[HOT]

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[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))

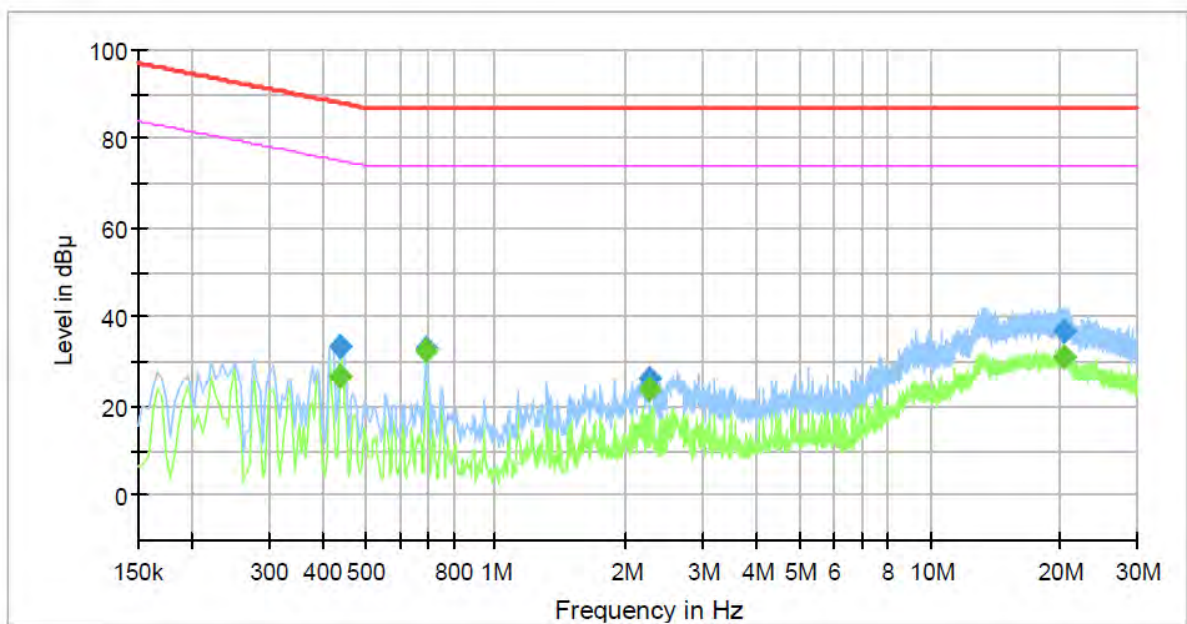
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Conducted Emissions at Telecommunication Ports

[1 000 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	XNV-6083RZ
Mode :	
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)
0.438000	---	26.69	75.10	48.41	1000.0	9.000	Single Line	19.5
0.438000	33.22	---	88.10	54.88	1000.0	9.000	Single Line	19.5
0.694000	---	32.55	74.00	41.45	1000.0	9.000	Single Line	19.8
0.694000	33.15	---	87.00	53.85	1000.0	9.000	Single Line	19.8
2.250000	---	23.70	74.00	50.30	1000.0	9.000	Single Line	20.2
2.250000	26.13	---	87.00	60.87	1000.0	9.000	Single Line	20.2
20.342000	---	31.22	74.00	42.78	1000.0	9.000	Single Line	20.2
20.342000	36.86	---	87.00	50.14	1000.0	9.000	Single Line	20.2
20.470000	---	31.01	74.00	42.99	1000.0	9.000	Single Line	20.2
20.470000	36.68	---	87.00	50.32	1000.0	9.000	Single Line	20.2

◆ 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))

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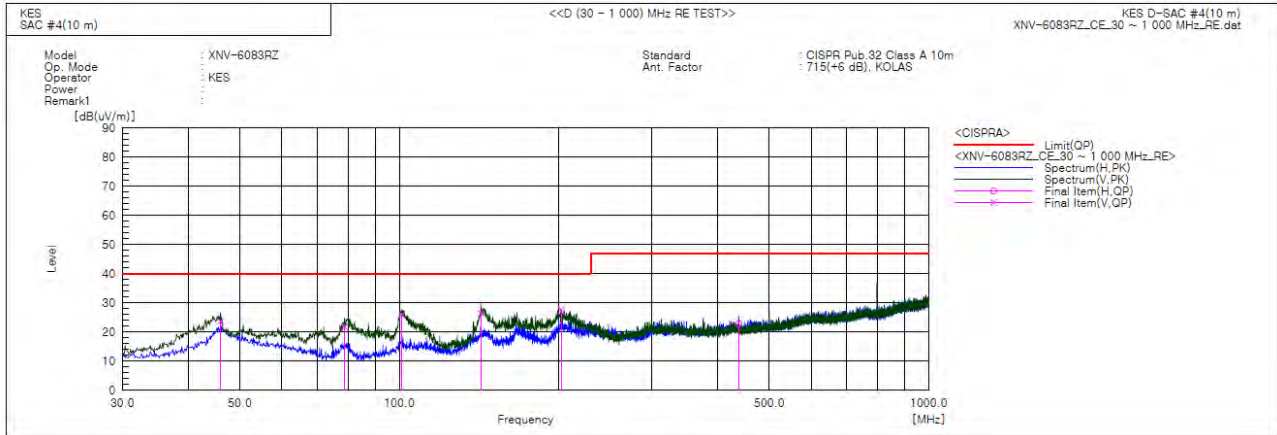
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Impulse Noise (click)

N/A

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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	46.005	V	44.9	-21.3	23.6	40.0	16.4	108.0	152.0	
2	78.864	V	49.4	-27.7	21.7	40.0	18.3	116.0	288.0	
3	101.174	V	48.3	-22.5	25.8	40.0	14.2	139.0	36.0	
4	142.641	V	51.9	-25.5	26.4	40.0	13.6	100.0	297.0	
5	202.175	V	48.4	-20.9	27.5	40.0	12.5	103.0	305.0	
6	437.521	H	36.2	-13.4	22.8	47.0	24.2	400.0	59.0	

◆ Calculation – SAC #4(10 m)

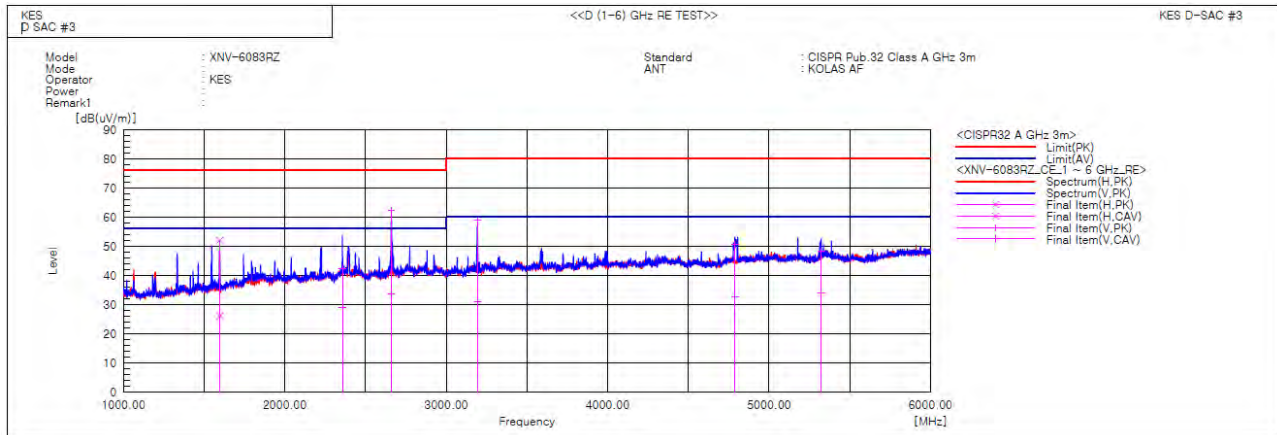
Result(QP) [dB(μ V/m)] = (Reading(QP)[dB(μ V)] + c.f[dB(1/m)])

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



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB(1/m)]	Result PK [dB(uV/m)]	Result CAV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin CAV [dB]	Height [cm]	Angle [deg]	Remark
1	1596.124	H	57.1	31.2	-5.0	52.1	26.2	76.0	56.0	23.9	29.8	100.0	45.4	
2	2356.000	V	41.2	27.9	1.0	42.2	28.9	76.0	56.0	33.8	27.1	100.0	81.5	
3	2660.326	V	61.0	32.4	1.3	62.3	33.7	76.0	56.0	13.7	22.3	100.0	327.5	
4	3193.110	V	55.9	28.1	3.1	59.0	31.2	80.0	60.0	21.0	28.8	100.0	157.0	
5	4789.556	V	43.2	25.0	7.6	50.8	32.6	80.0	60.0	29.2	27.4	100.0	177.3	
6	5323.824	V	39.1	24.7	9.3	48.4	34.0	80.0	60.0	31.6	26.0	100.0	226.6	

◆ Calculation

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

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

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Test Data - Voltage Fluctuations

Maximum Flicker results

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

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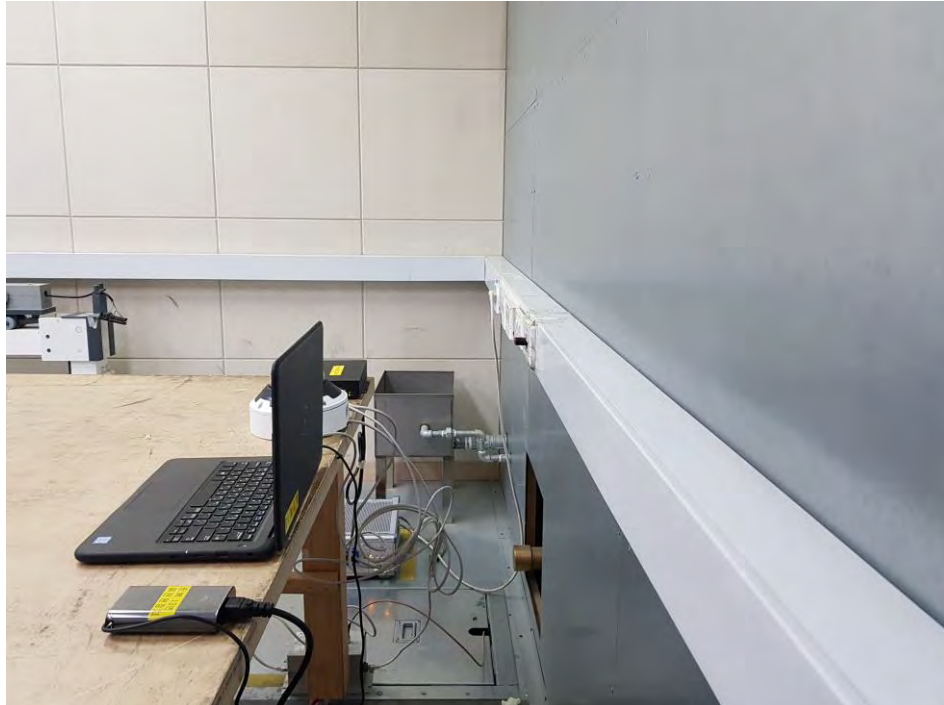
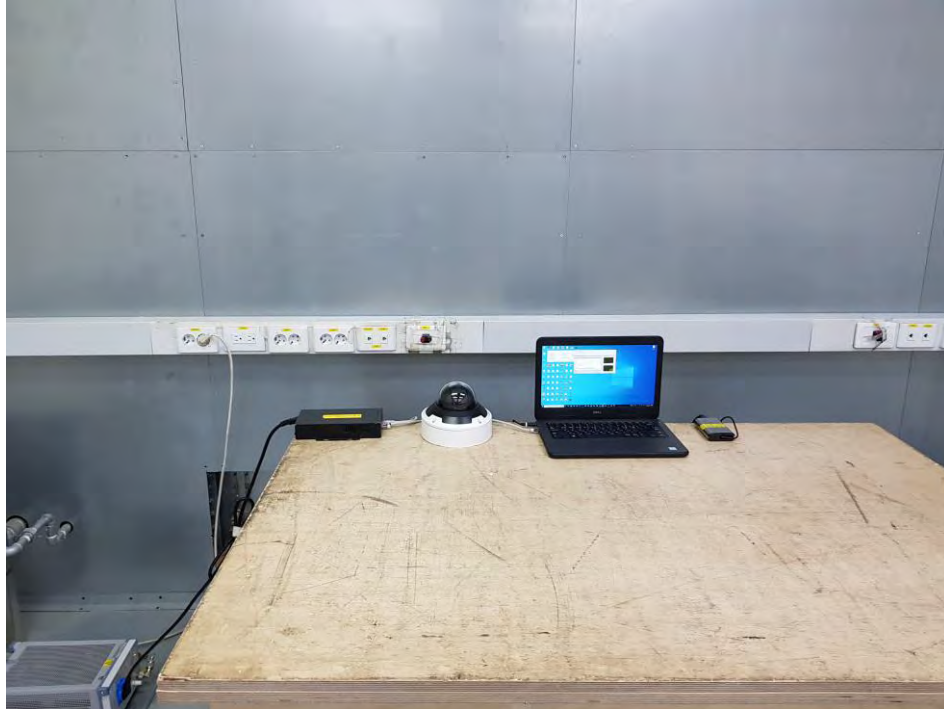


Test Setup Photos and Configuration

Conducted Emissions at Mains Power Ports

N/A

Conducted Emissions at Telecommunication Ports



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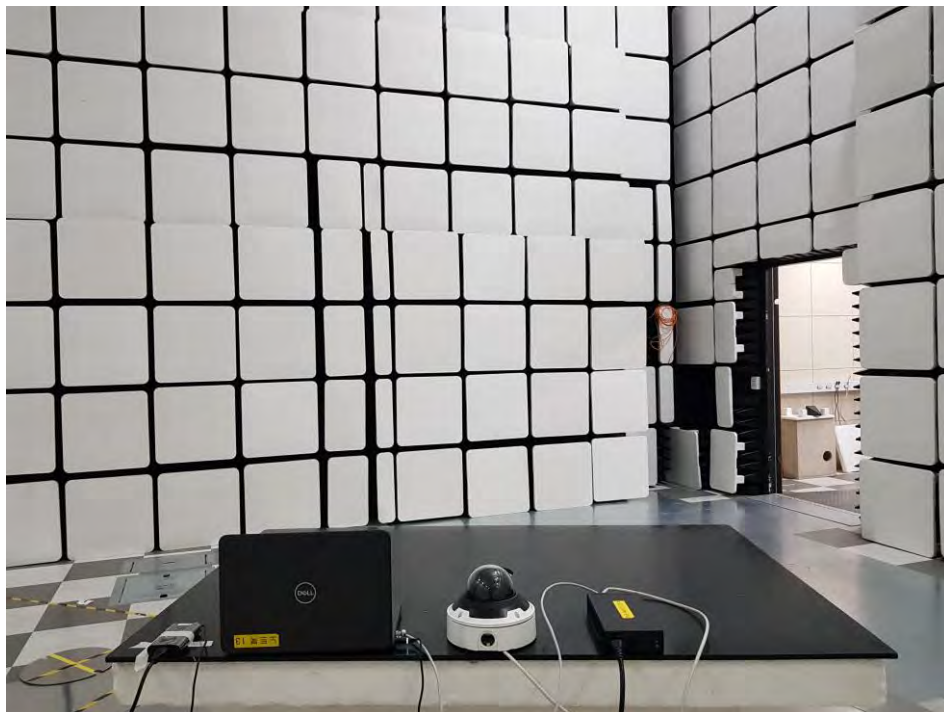
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Impulse Noise (click)

N/A

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Radiated Electric Field Emissions(Below 1 GHz)



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Radiated Electric Field Emissions(Above 1 GHz)



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www.kes.co.kr

Report No.:

KES-EM-22T0730

Page (50) of (83)

Harmonic Current Emissions and Voltage Fluctuations and Flicker

N/A

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Electrostatic Discharge



Radio-frequency Electromagnetic Field



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Fast Transients



Surges



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Conducted Disturbance

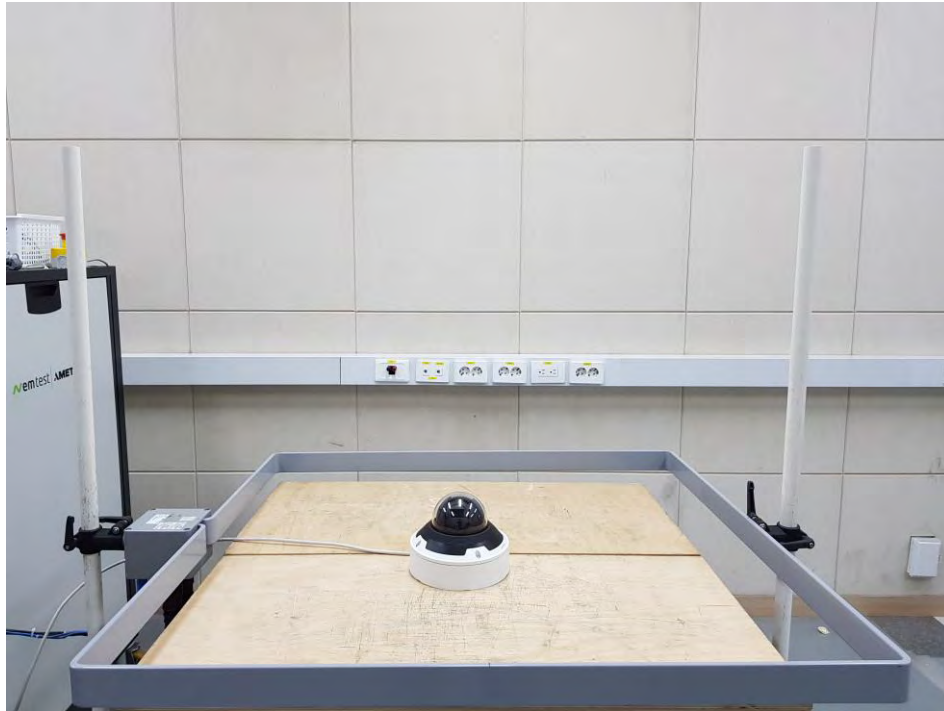


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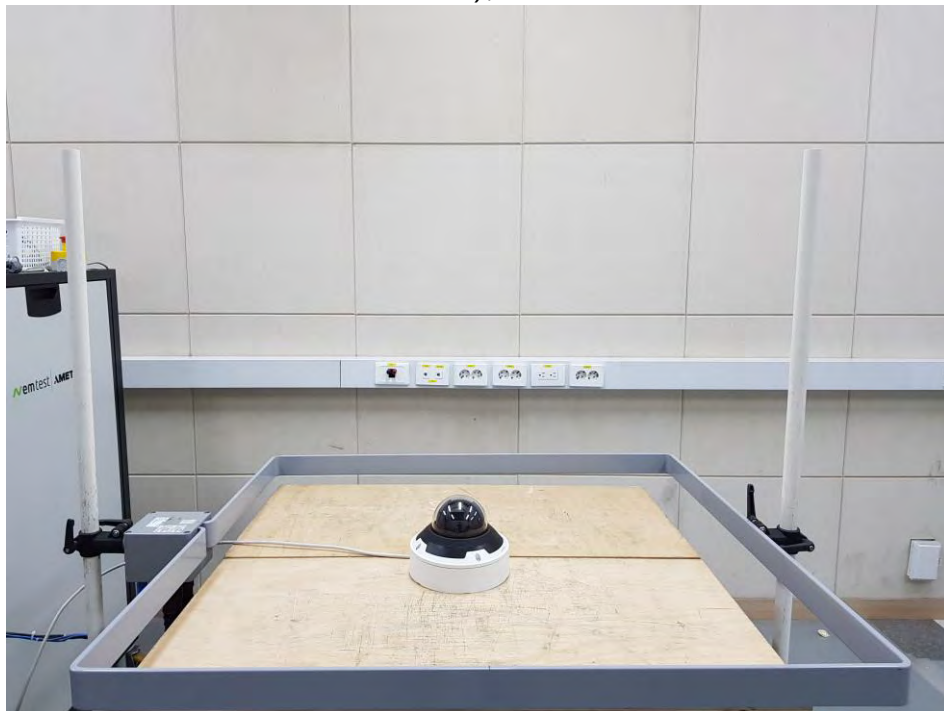
Power Frequency Magnetic Field Immunity

■ DC Mode

16.7 Hz (AC), 100 A/m

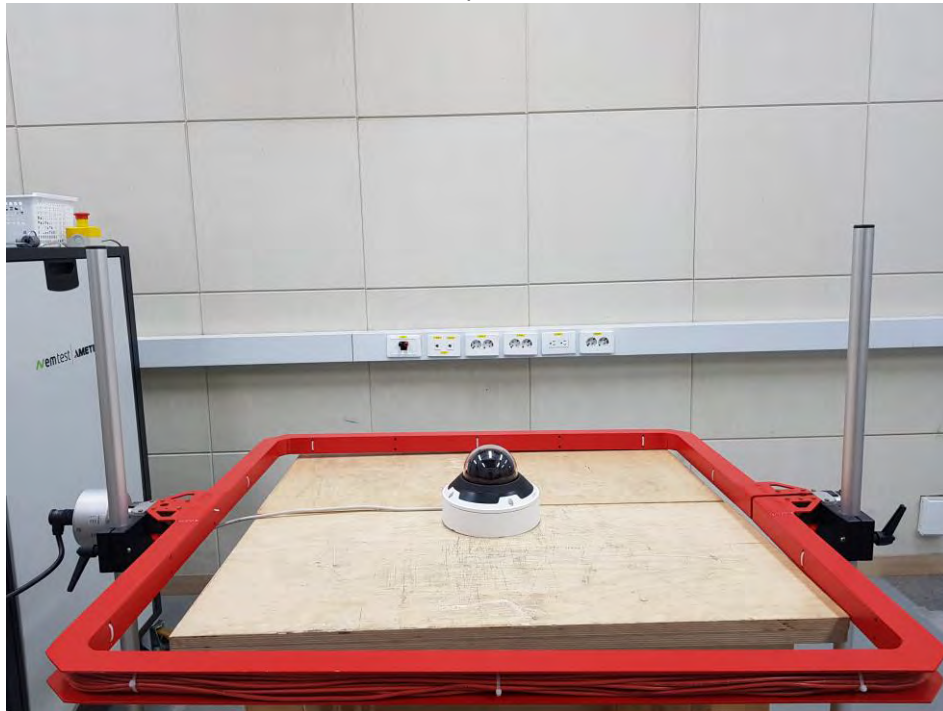


50 Hz (AC), 100 A/m



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0 Hz (DC), 300 A/m



EUT External Photographs

(Top)



(Bottom)



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EUT Internal Photographs

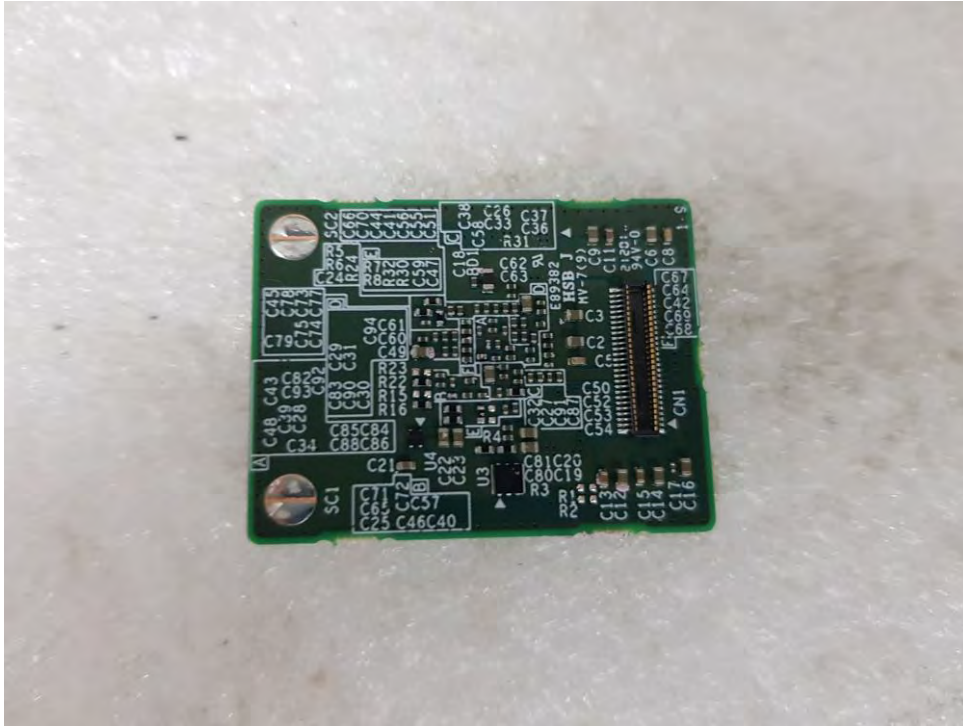
(Internal View)



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EUT Internal View – Board 1

(Top)



(Bottom)



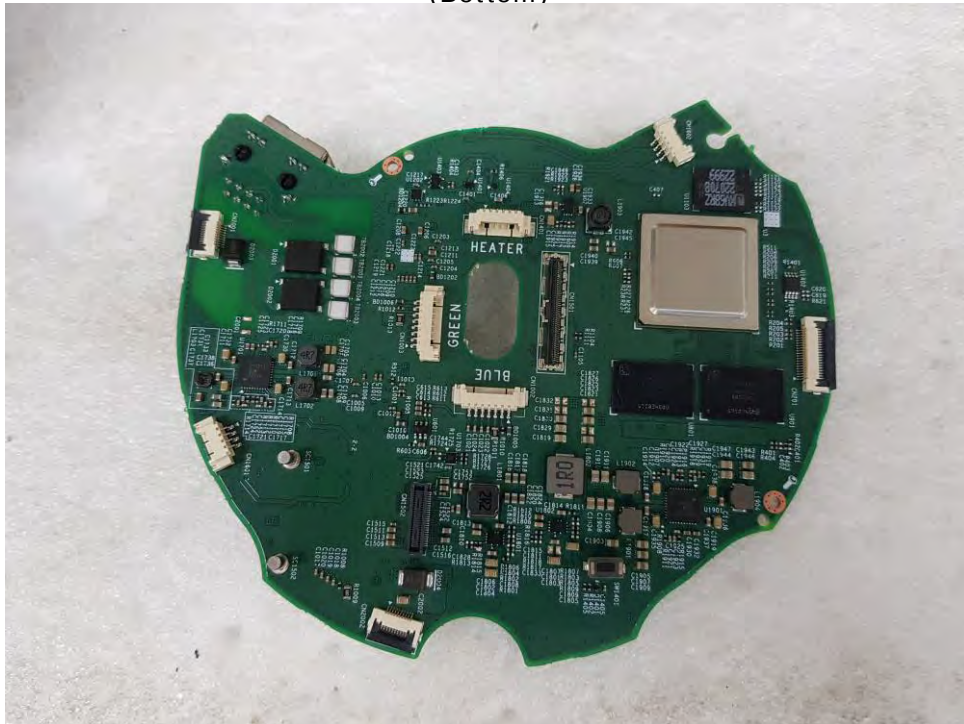
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EUT Internal View – Board 2

(Top)



(Bottom)



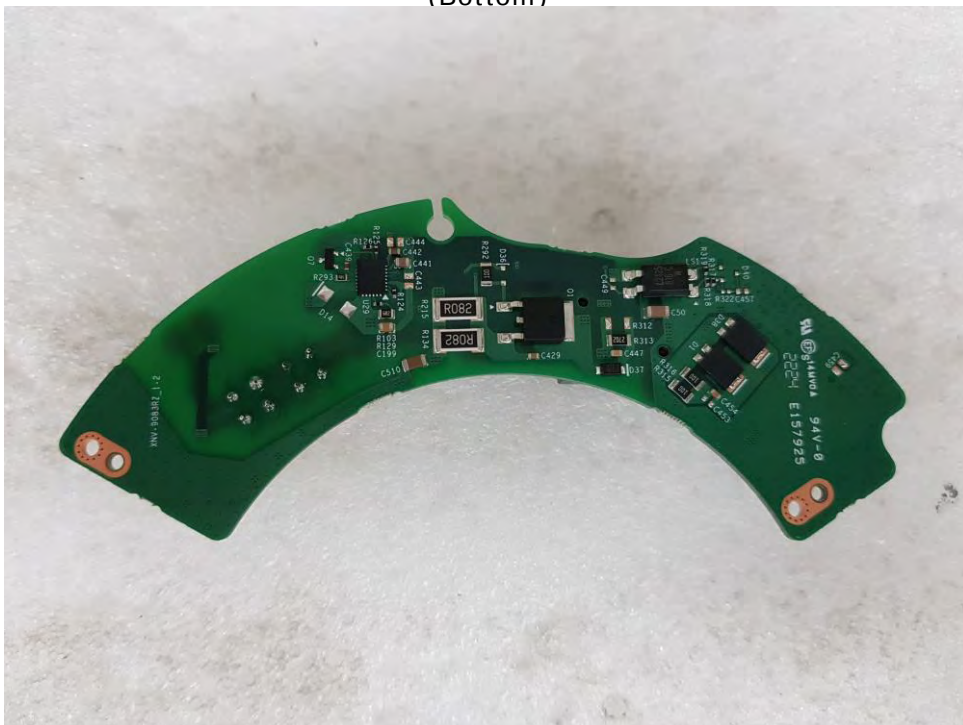
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EUT Internal View – Board 3

(Top)



(Bottom)



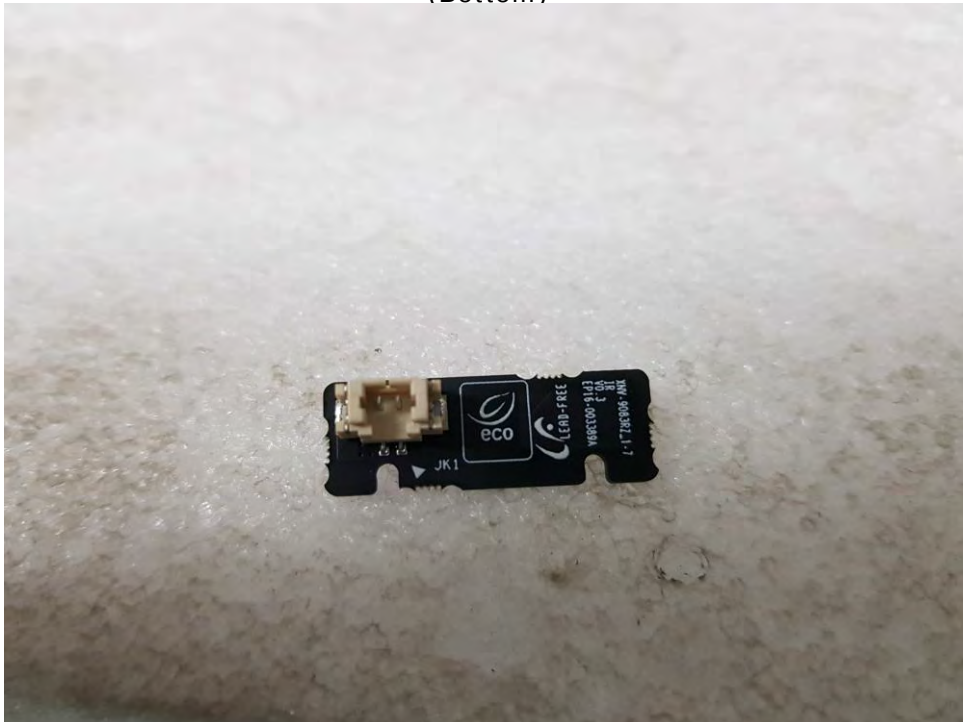
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EUT Internal View – Board 4

(Top)



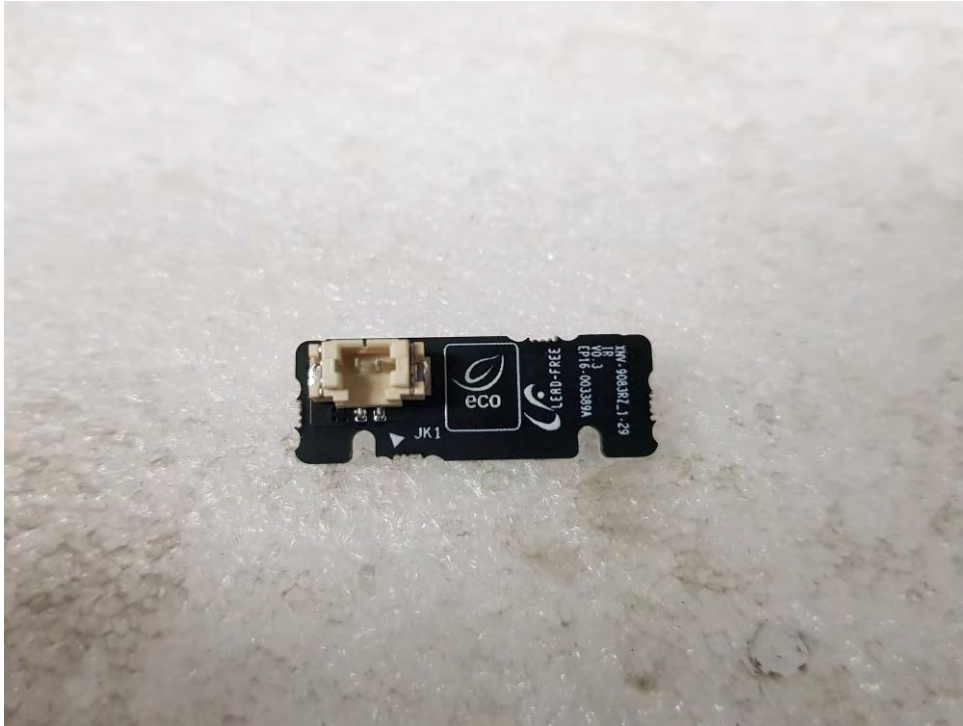
(Bottom)



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EUT Internal View – Board 5

(Top)



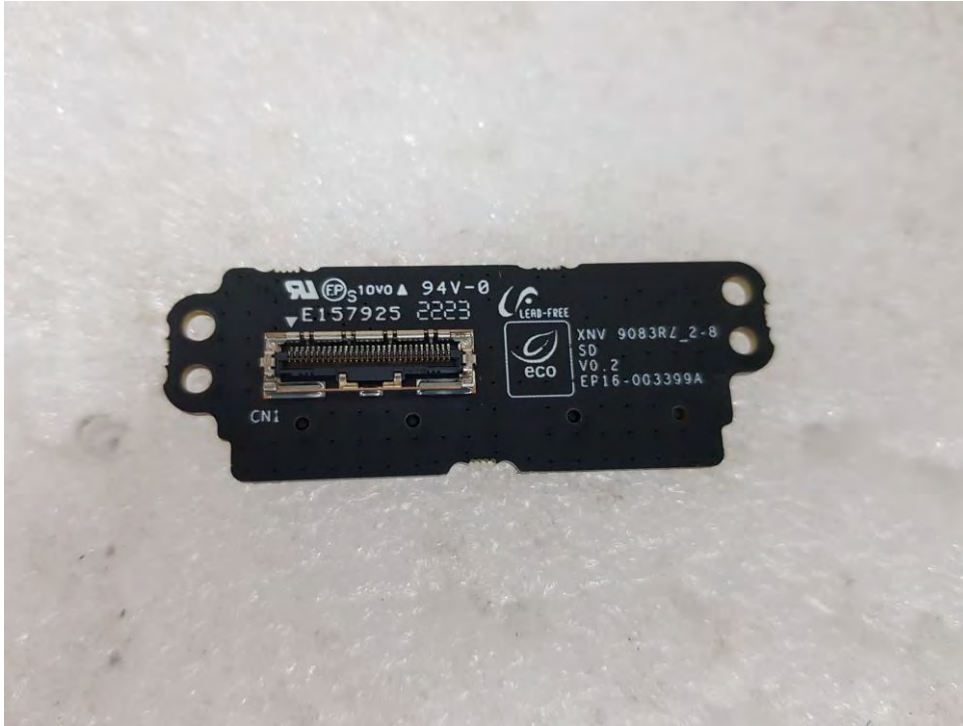
(Bottom)



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EUT Internal View – Board 6

(Top)



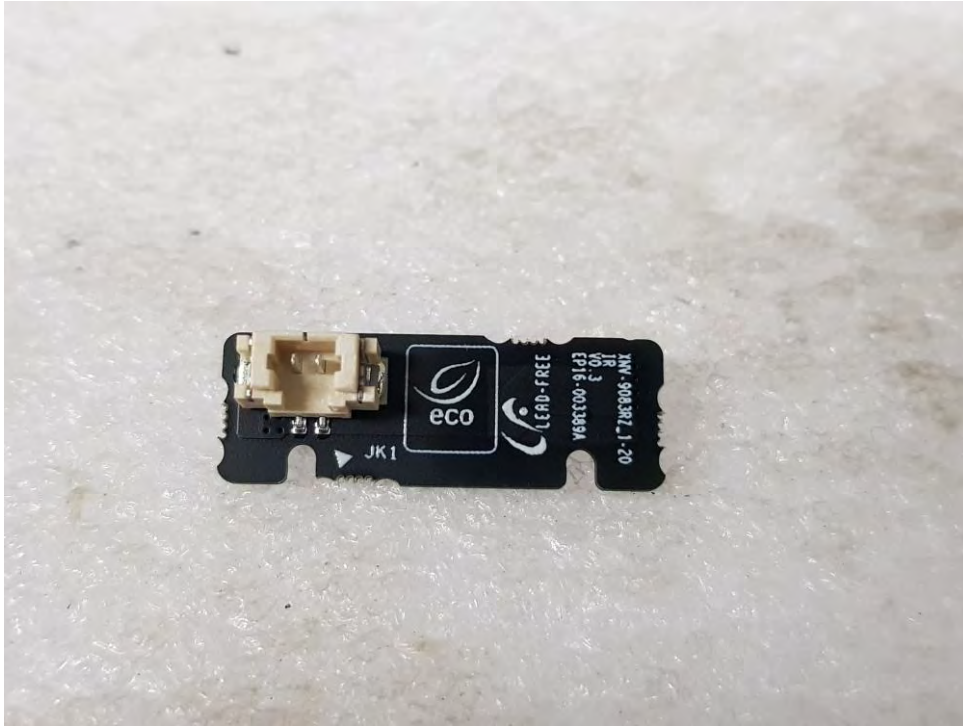
(Bottom)



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EUT Internal View – Board 7

(Top)



(Bottom)



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EUT Internal View – Board 8

(Top)



(Bottom)



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EUT Internal View – Board 9

(Top)



(Bottom)



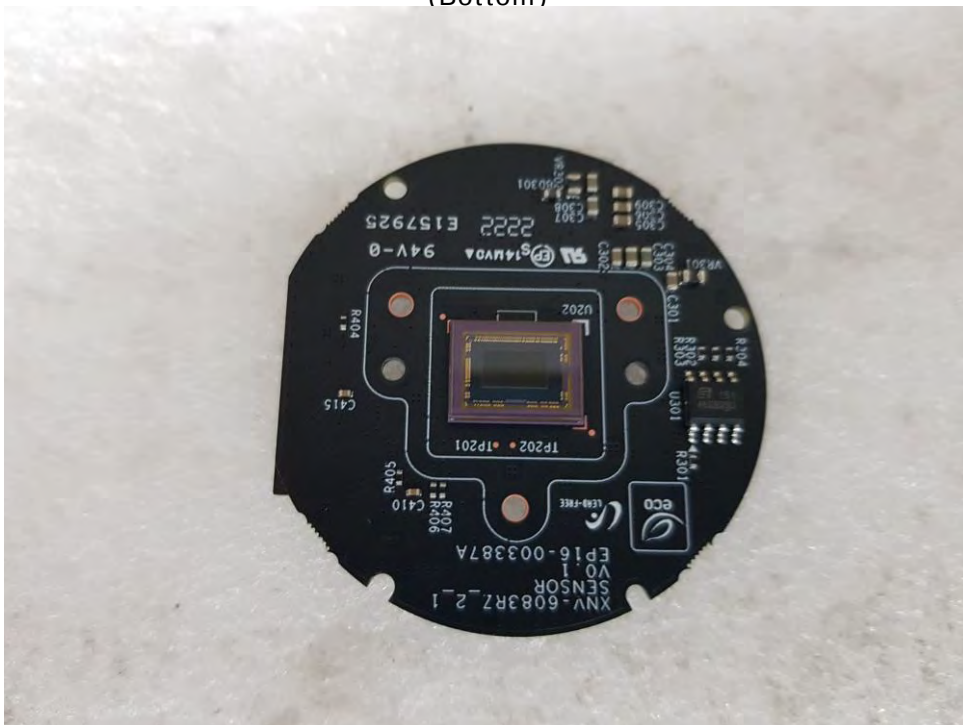
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EUT Internal View – Board 10

(Top)



(Bottom)



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EUT Internal View – Lens

(Top)

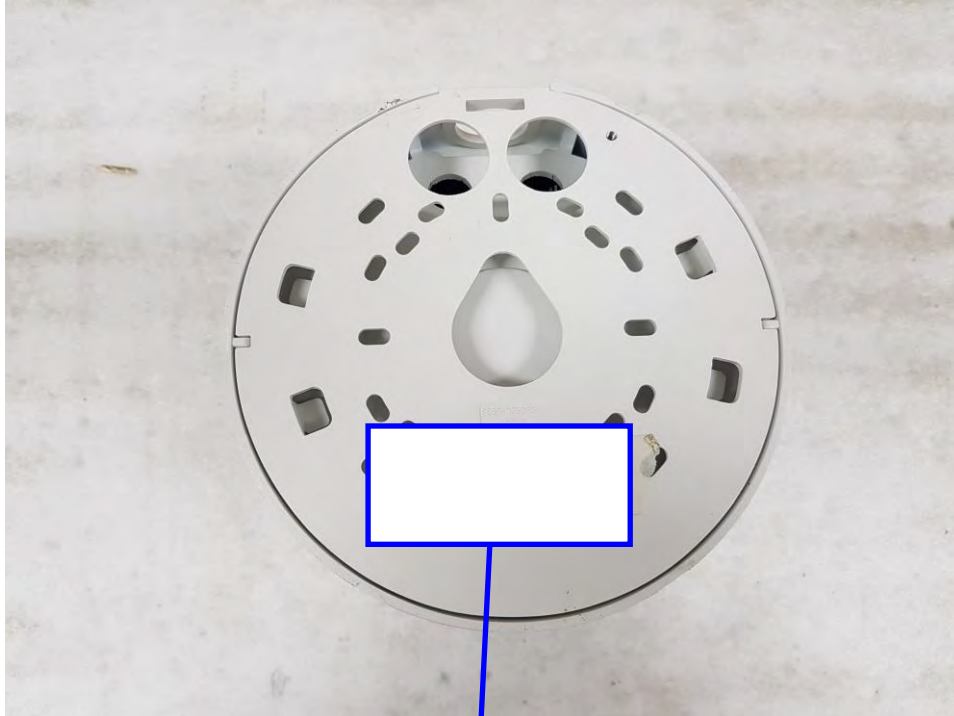


(Bottom)



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Manufacturer : HANWHA TECHWIN SECURITY VIETNAM CO.,LTD

Made in Vietnam

