



KES Co., Ltd.

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Report No.:

KES-EM-22T0018-R2

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EMC TEST REPORT For CE

Test Report No. : KES-EM-22T0018-R2

Date of Issue : Feb. 24, 2023

Product name : NETWORK CAMERA

Model/Type No. : PNM-9084RQZ

Variant Model : PNM-9084RQZ1

Applicant : Hanwha Vision Co., Ltd

Applicant Address : 6, Pangyo-ro 319Beon-gil, Bundang-gu, Seongnam-si,
Gyeonggi-do, Republic of Korea

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 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 : Dec. 22, 2021

Test date : Dec. 24, 2021 ~ Dec. 27, 2021

Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Eun Gu, Jeon
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.

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REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Jan. 05, 2022	KES-EM-22T0018	Issued
Feb. 17, 2022	KES-EM-22T0018-R1	Re-issue due to variant model addition
Feb. 24, 2023	KES-EM-22T0018-R2	Change the Applicant and manufacturer at the request of the customer

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1.0 General Product Description

Main Specifications of EUT are:

	PNM-9084RQZ
Video	
Imaging Device	1/2.8" 2MP CMOS: each CH
Effective Pixels	1945(H)x1097(V): each CH
Min. Illumination	Color: 0.05lux(F1.6,30 IRE) BW: 0Lux(IR LED on)
Lens	
Focal Length (Zoom Ratio)	3.2~10mm(3.1x) motorized varifocal
Max. Aperture Ratio	F1.6(Wide)~F2.9(Tele)
Angular Field of View	H: 109.0°(Wide)~33.2°(Tele), V: 57.4°(Wide)~18.7°(Tele), D: 132.0°(Wide)~38.0°(Tele)
Min. Object Distance	0.5m(1.64ft)
Focus Control	Simple focus
Pan / Tilt / Rotate	
Pan / Tilt / Rotate Range	Remote adjustment (Max. 200cycles) Pan : 0~360°, Tilt : 30~90°, Rotate : 0~90°
Operational	
IR Viewable Length	30m
Camera Title	Displayed up to 85 characters
Day & Night	Auto(ICR)
Backlight Compensation	BLC, HLC, WDR, SSDR
Wide Dynamic Range	120dB
Digital Noise Reduction	SSNR V
Digital Image Stabilization	Support
Defog	Support
Motion Detection	8ea, 8point polygonal zones
Privacy Masking	32ea, polygonal zones - Color: Grey/Green/Red/Blue/Black/White - Mosaic
Gain Control	Low / Middle / High
White Balance	ATW / AWC / Manual / Indoor / Outdoor

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LDC	Support
Electronic Shutter Speed	Minimum / Maximum / Anti flicker (2~1/12,000sec)
Video Rotation	Flip, Mirror, Hallway view(90°/270°)
Analytics	Defocus detection, Directional detection, Fog detection, Face detection, Motion detection, Appear/Disappear, Enter/Exit, Loitering, Tampering, Virtual line, Audio detection
Alarm I/O	Input 1ea / Output 1ea
Alarm Triggers	Analytics, Network disconnect, Alarm input
Alarm Events	File upload via FTP and e-mail Notification via e-mail SD/SDHC/SDXC at event triggers Alarm output Handover
Audio In	Selectable(mic in/line in) Supply voltage: 2.5VDC(4mA), Input impedance: 2K Ohm
Audio Out	Line out, Max.output level: 1Vrms
Network	
Ethernet	RJ-45(10/100/1000BASE-T)
Video Compression	H.265/H.264: Main/Baseline/High, MJPEG
Resolution	1920x1080, 1280x1024, 1280x960, 1280x720, 1024x768, 800x600, 800x448, 720x576, 720x480, 640x480, 640x360, 320x240
Max. Framerate	H.265/H.264: Max. 60fps/50fps(60Hz/50Hz) MJPEG: Max. 30fps/25fps(60Hz/50Hz)
Smart Codec	Manual(5ea area), WiseStreamⅡ
Bitrate Control	H.264/H.265: CBR or VBR MJPEG: VBR
Streaming	Unicast(20 users) / Multicast Multiple streaming(Up to 10 profiles)
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

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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, PIM-SM, UPnP, Bonjour, LLDP
Security	HTTPS(SSL) Login Authentication Digest Login Authentication IP Address Filtering User access log 802.1X Authentication(EAP-TLS, EAP-LEAP)
Edge Storage	Micro SD/SDHC/SDXC 4slot 512GB(Each CH)
Application Programming Interface	ONVIF Profile S/T SUNAPI(HTTP API) Wisenet open platform
Web Viewer	Supported OS: Windows 7, 8.1, 10, Mac OS X 10.10, 10.11, 10.12 Recommended Browser: Google Chrome Supported Browser: MS Explore11, MS Edge, Mozilla Firefox(Window 64bit only), Apple Safari(Mac OS X only)
Memory	5GB RAM, 1280MB Flash
Environmental	
Operating Temperature / Humidity	-40°C~+55°C(-40°F~+131°F) / Less than 90% RH
Storage Temperature / Humidity	-50°C~+60°C(-58°F~+140°F) / Less than 90% RH
Certification	IP66, IK10, NEMA4X
Electrical	
Input Voltage	HPoE, 12VDC
Power Consumption	Max : 42W Typical : 28W
Mechanical	
Color / Material	White / Aluminum
RAL Code	RAL9003
Product dimensions / weight	φ315x145.9mm / 5.2kg

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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.

☒ AC 230 V, 50 Hz ☒ DC 12V ☒ PoE

1.2 Variant Model Differences

GYRO SENSOR Delete

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
NETWORK CAMERA	PNM-9084RQZ	-	HANWHA VISION VIETNAM COMPANY LIMITED	EUT
PoE Injector	PT-PSE109GBRO-AH	PT2138221217	Dongguan PROCET Network Technology co.,Ltd	-

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
Adapter	2ACB022F	-	Channel Well Technology (Guangzhou) Co., Ltd.	
Notebook	HSN-Q07C	5CD8367KND	HP	-
Notebook Adapter	HSTNN-CA40	WFTKU0ERLB4Q CH	HP	-
Smartphone	A1586	-	APPLE .Inc	-
Speaker	BR1000A Cuve Black 2	-	DONGGUAN EDIFIER TECHNOLOGY Co., Ltd	-
Alarm	-	-	-	-
Button Alarm	-	-	-	-
Micro SD Card	-	-	Sandisk	8 GB

1.6 External I/O Cabling

■ DC Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
NETWORK CAMERA (EUT)	DC IN	Adapter	DC OUT	1.0	U
	Audio Out	Speaker	Audio In	2.1	U
	Alarm Out	Alarm	Alarm In	3.0	U
	Alarm In	Button Alarm	Alarm Out	3.0	U
	Micro SD Slot	Micro SD Card	Micro SD Slot	-	-
	RJ-45	Notebook	RJ-45	3.0	U
	Audio In		3.5 mm	1.7	U
Smartphone	3.5 mm			1.1	U
Notebook	DC IN	Notebook Adapter	DC OUT	1.6	U

* Unshielded=U, Shielded=S

■ PoE Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
NETWORK CAMERA (EUT)	RJ-45	PoE Injector (EUT)	RJ-45(PoE)	3.0	U
	Audio Out	Speaker	Audio In	2.1	U
	Alarm Out	Alarm	Alarm In	3.0	U
	Alarm In	Button Alarm	Alarm Out	3.0	U
	Micro SD Slot	Micro SD Card	Micro SD Slot	-	-
	Audio In	Notebook	3.5 mm	1.7	U
Smartphone	3.5 mm			1.1	U
PoE Injector (EUT)	RJ-45(LAN)		RJ-45	3.0	U
Notebook	DC IN	Notebook Adapter	DC OUT	1.6	U

* Unshielded=U, Shielded=S



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1.7 EUT Operating Mode(s)

Test Mode	operating
DC Mode	After placing the test equipment and peripheral devices as shown in the layout below, the tests were conducted while checking the 1 kHz tone output from the smartphone, the camera video output from the notebook and verifying that they were operating normally while Ping test.
PoE Mode	

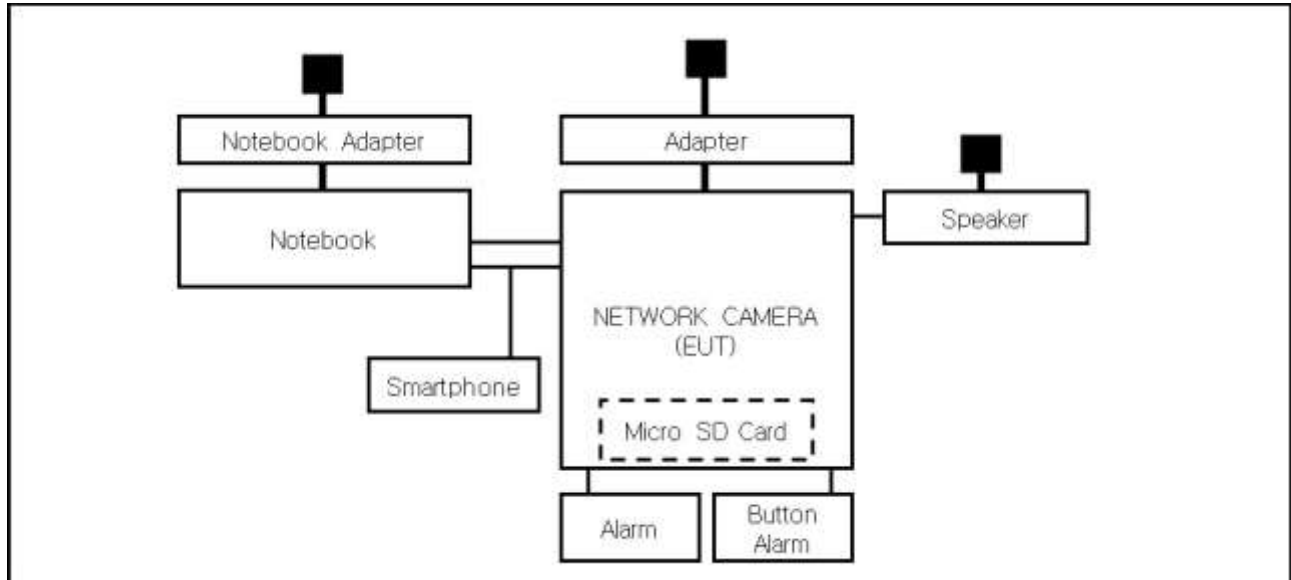
EUT Test operating S/W		
Name	Version	Manufacture Company
Web Viewer	-	Hanwha Vision Co., Ltd

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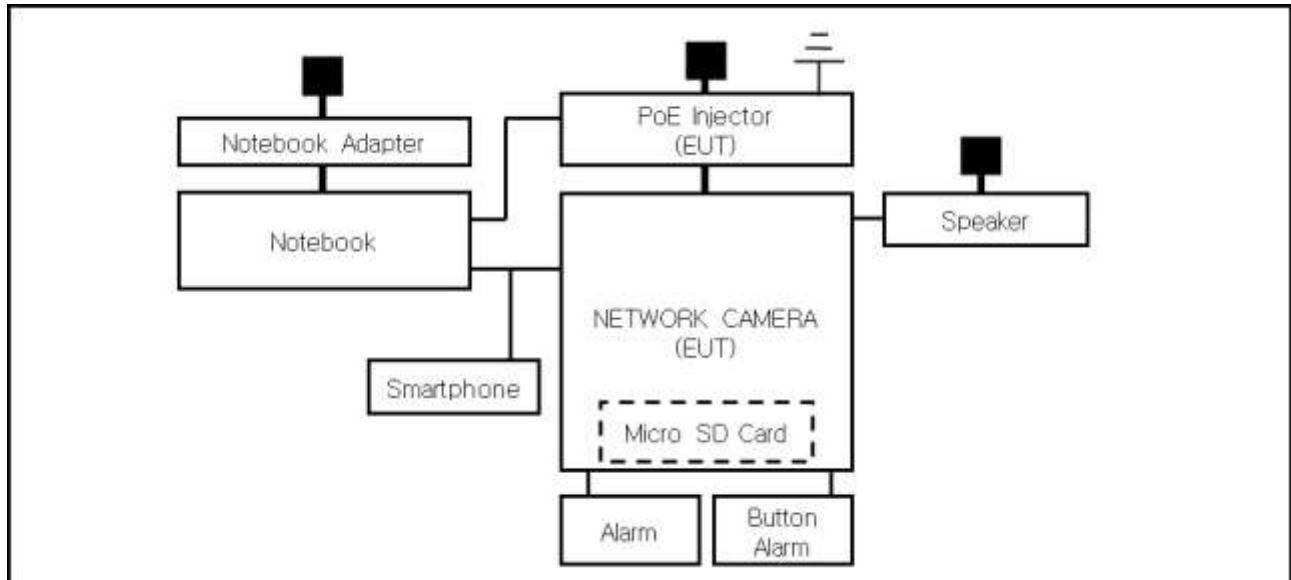
1.8 Configuration

■ AC Main
 □ DC Main

■ DC Mode



■ PoE Mode



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 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 0004



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

☒ EN 61000-3-2:2014

☒ EN 61000-3-3:2013

☒ **EMC – Regulations 2016**

☒ EN 55032:2015/A11:2020

☒ Class A

☐ Class B

☒ EN 50130-4:2011

☒ EN 61000-3-2:2014

☒ EN 61000-3-3:2013

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2.1 Conducted Emissions at Mains Power Ports

Test Date

Dec. 25, 2021

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	01, 15, 2022
☒	LISN	ENV216	R & S	101787	12, 29, 2021
☒	LISN	ESH2-Z5	R & S	100450	12, 29, 2021
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	12, 29, 2021

Test Conditions

Temperature: (22,6 ± 0,1) °C

Relative Humidity: (43,3 ± 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

Remarks

See Appendix A for test data.

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2.2 Conducted Emissions at Telecommunication Ports

Test Date

Dec. 25, 2021

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	01, 15, 2022
☒	LISN	ENV216	R & S	101787	12, 29, 2021
☒	LISN	ESH2-Z5	R & S	100450	12, 29, 2021
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	12, 29, 2021
☐	8-WIRE ISN CAT3,5	ENY81	R & S	100174	12, 30, 2021
☒	8-WIRE ISN CAT6	ENY81-CAT6	R & S	101665	12, 30, 2021
☐	CDN	CDNS502A	TESEQ	40431	12, 29, 2021

Test Conditions

Temperature: (22,6 ± 0,1) °C

Relative Humidity: (43,3 ± 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

Remarks

- See Appendix A for test data.
- For Ethernet interfaces, measurements are required at the highest data rate supported by the interface.

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2.3 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Dec. 25, 2021

Test Location☐ OPEN AREA TEST SITE #2☒ SEMI ANECHOIC CHAMBER #4(10m)**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	04, 01, 2022
☒	AMPLIFIER	SCU 01	R & S	100603	11, 24, 2022
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	12, 08, 2022
☒	ATTENUATOR	8491A	HP	32173	03, 10, 2022

Test Conditions

Temperature: (22,1 ± 0,1) °C

Relative Humidity: (43,3 ± 0,2) % 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.

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2.4 Radiated Electric Field Emissions(Above 1 GHz)

Test Date

Dec. 25, 2021

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	08, 03, 2022
☒	PREAMPLIFIER	8449B	AGILENT	3008A01967	04, 07, 2022
☐	ATTENUATOR	8491A	HP	35496	03, 10, 2022
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	03, 11, 2022

Test Conditions

Temperature: (22,2 ± 0,2) °C

Relative Humidity: (42,9 ± 0,2) % R.H.

Frequency Range of Measurement

1 GHz to 6 GHz

Instrument Settings

IF Band Width: 1 MHz

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.

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2.5 Harmonic Current Emissions

Test Date

Dec. 26, 2021

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	04, 06, 2022
☒	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

Test Conditions

Temperature: (22,0 ± 0,2) °C

Relative Humidity: (42,9 ± 0,3) % R.H.

Classification of Equipment for Harmonic Current Emissions

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

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

RemarksSee Appendix A for test data.

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2.6 Voltage Fluctuations and Flicker

Test Date

Dec. 26, 2021

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	04, 06, 2022
☒	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

Test Conditions

Temperature: (22,0 ± 0,2) °C
Relative Humidity: (42,9 ± 0,3) % R.H.

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.

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3.0 Criteria for compliance

Criteria for compliance was based on the following guidelines:

EN 50130-4:2011 / BS EN 50130-4:2011/A1:2014 Alarm systems-Part 4: Electromagnetic compatibility Product family standard: Immunity requirements for components of fire, intruder and social alarm systems

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

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

A functional description and a definition of performance by the manufacture and noted in the test

report, based on the following criteria:

Electrostatic discharge

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

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

Radiated electromagnetic fields

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

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

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

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

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

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

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

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

Fast transient burst / slow high energy voltage surge

There shall be no damage, malfunction or change of status due to the conditioning.
Flickering of an indicator during the application of discharge is permissible, providing
That there is no residual is permissible, providing that there is no residual change in the EUT or
any
change in outputs, which could be interpreted by associated equipment as a change.

Conducted RF immunity

There shall be no damage, malfunction or change of status due to the conditioning.
Flickering of an indicator during the application of discharge is permissible, providing
That there is no residual is permissible, providing that there is no residual change in the EUT or
any
change in outputs, which could be interpreted by associated equipment as a change,
and no such flickering of indicators oeuvres at $U = 130 \text{ dB}\mu\text{V}$.
For component of CCTV systems, where the status is monitored by observing the TV picture,
then deterioration of the picture is allowed at $U = 140 \text{ dB}\mu\text{V}$, providing:
(a) there is no permanent damage or change to the EUT
(e.g. no corruption of memory or changes to programmable settings etc.)
(b) at $U = 130 \text{ dB}\mu\text{V}$, any deterioration of the picture is so minor that the system could
still be used; and
(c) there in no observable deterioration of the picture at $U = 120 \text{ dB}\mu\text{V}$.

Voltage dip/interruption / Voltage variation

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



3.1 Electrostatic Discharge

Reference Standard

EN 61000-4-2:2009
BS EN 61000-4-2:2009

Test Date

Dec. 27, 2021

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	02, 01, 2022
☒	HCP	-	KES	-	-
☒	VCP	-	Noise Ken	-	-

Test Conditions

Temperature: (22,2 ± 0,1) °C
Relative Humidity: (43,2 ± 0,1) % R.H.
Atmospheric Pressure: (100,3 ± 0,1) kPa

Test Specifications

Discharge Factor: ≥ 1 s

Discharge Impedance: 330 ohm / 150 pF

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

Polarity: Positive and Negative

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

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

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

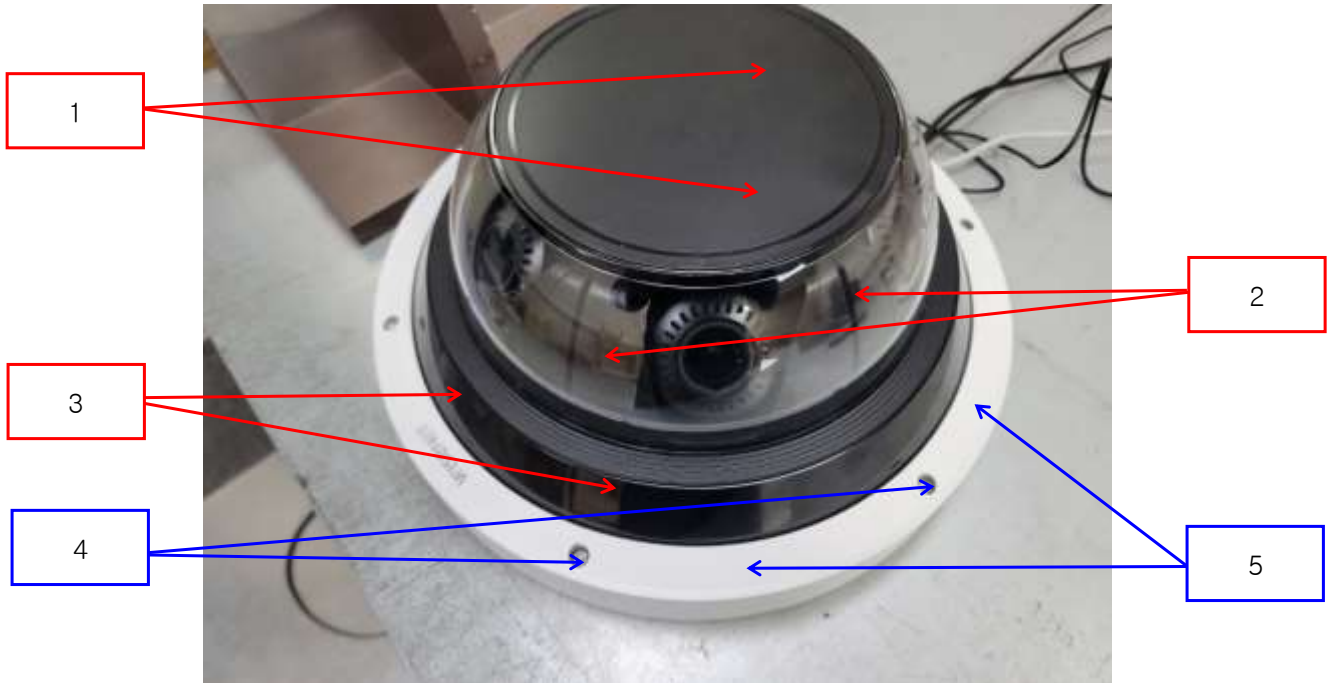
Required Performance Criteria: ☒ Complied

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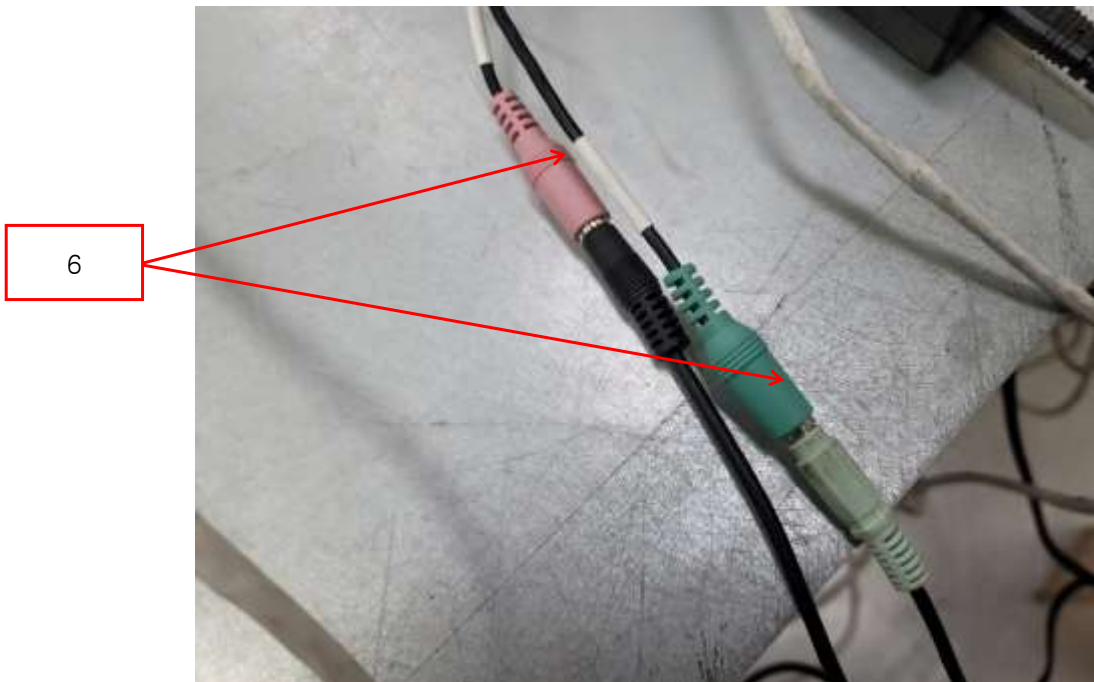
Location of Discharge:

■ DC Mode

Air
Contact

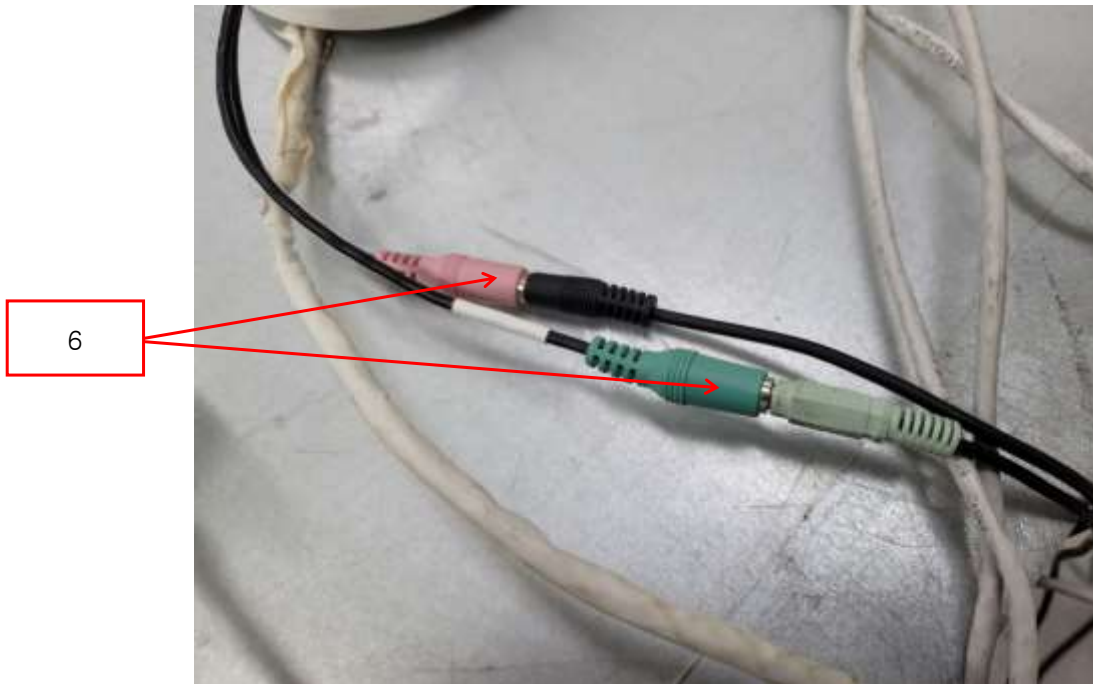


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■ PoE Mode





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Test Data**■ DC Mode**

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	Enclosure 1	Air Discharge	Complied	-
2	Enclosure 2	Air Discharge	Complied	-
3	Enclosure 3	Air Discharge	Complied	-
4	Screw	Contact Discharge	Complied	-
5	Enclosure 4	Contact Discharge	Complied	-
6	Port	Air Discharge	Complied	-

■ PoE Mode**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	Enclosure 1	Air Discharge	Complied	-
2	Enclosure 2	Air Discharge	Complied	-
3	Enclosure 3	Air Discharge	Complied	-
4	Screw	Contact Discharge	Complied	-
5	Enclosure 4	Contact Discharge	Complied	-
6	Port	Air Discharge	Complied	-
7	PoE Injector	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

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3.2 Radiated Electric Field Immunity

Reference Standard

EN 61000-4-3:2006 +A2:2010
BS EN 61000-4-3:2006 +A2:2010

Test Date

Dec. 24, 2021

Test Location

EMS-RS: ☐ SEMI ANECHOIC CHAMBER #2 ☒ SEMI ANECHOIC CHAMBER #3

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	08, 03, 2022
☒	HIGH POWER DUAL AMP	SSA532	SUNGSAN	SSA532-001	-
☒	POWER METER	E4419B	Agilent	GB40203000	04, 01, 2022
☒	CW POWER SENSOR	E4412A	Agilent	US38488240	04, 01, 2022
☒	CW POWER SENSOR	E4412A	Agilent	MY41501662	04, 01, 2022
☒	STACKED DOUBLE LOG-PER- ANTENNA	STPL9128 E	Schwarzbeck	9128ES-121	-
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	03, 11, 2022

Test Conditions

Temperature: (22,6 ± 0,1) °C
Relative Humidity: (43,1 ± 0,2) % R.H.
Atmospheric Pressure: (100,6 ± 0,2) kPa



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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

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Test Data

■ DC Mode

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

■ PoE Mode

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

RemarksPASS Required Performance Criteria

3.3 Electrical Fast Transients/Bursts

Reference Standard

EN 61000-4-4:2012

BS EN 61000-4-4:2012

Test Date

Dec. 26, 2021

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	12, 03, 2022
☒	MOTOR VARIAC	MV2616	EM TEST	P1552169719	04, 01, 2022
☒	CAPACITIVE COUPLING CLAMP	HFK	EM TEST	P1633183115	12, 03, 2022

Test Conditions

Temperature: (22,4 ± 0,2) °C
Relative Humidity: (43,7 ± 0,1) % R.H.
Atmospheric Pressure: (100,1 ± 0,1) kPa

Test Specifications

Pulse Amplitude & Polarity:
(AC Power Lines) ☐ ± 1.0 kV ☒ ± 2.0 kV
☐ ± 4.0 kV
Pulse Amplitude & Polarity:
(Other supply / Signal Lines) ☐ ± 0.5 kV ☒ ± 1.0 kV
☐ ± 2.0 kV
Burst Period: ☒ 300 ms ☐ 2 s
Repetition Rate: ☐ 5 kHz ☒ 100 kHz
Duration of Test Voltage: ☒ ≥ 1 min
Required Performance Criteria: ☒ Complied

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Test Data

■ DC Mode

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

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

☐ 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)
Alarm Out	Complied	Complied
Alarm In	Complied	Complied
RJ-45	Complied	Complied

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

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

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

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

☒ Signal ports and telecommunication ports – Coupling Clamp used

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
Alarm Out	Complied	Complied
Alarm In	Complied	Complied
RJ-45 (LAN)	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



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3.4 Surge Transients

Reference Standard

EN 61000-4-5:2014
BS EN 61000-4-5:2014

Test Date

Dec. 26, 2021

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	12, 03, 2022
☒	MOTOR VARIAC	MV2616	EM TEST	P1552169719	04, 01, 2022
☒	CDN	CNV 508N1	EM TEST	P1610176296	12, 03, 2022

Test Conditions

Temperature: (22,4 ± 0,2) °C
Relative Humidity: (43,7 ± 0,2) % R.H.
Atmospheric Pressure: (100,1 ± 0,1) kPa

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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

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Test Data

☒ DC Mode

☒ Line to Line – Differential Mode

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

☐ Line to Earth – Common Mode

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

Signal Lines

☒ Line to Earth – Common Mode

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

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■ PoE Mode☒ Line to Line – Differential Mode

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

☒ Line to Earth – Common Mode

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

Signal Lines☒ Line to Earth – Common Mode

Mode of Application	Coupling Method	Observations	
		(+) Surge (kV)	(-) Surge (kV)
RJ-45 (LAN)	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
☐ NOT APPLICABLE

Remarks

PASS Required Performance Criteria

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3.5 Conducted Disturbance

Reference Standard

EN 61000-4-6:2014

BS EN 61000-4-6:2014

Test Date

Dec. 27, 2021

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	11, 24, 2022
☒	ATTENUATOR	ATT 6/80	EM TEST	P1614178148	11, 24, 2022
☒	CDN	CDN M016	TESEQ	43694	11, 24, 2022
☒	CDN	CDN M016	TESEQ	43697	11, 24, 2022
☒	CDN	CDN T8RJ45	EM TEST	0909-09	08, 03, 2022
☒	EM CLAMP	KEMZ 801A	TESEQ	44099	11, 25, 2022

Test Conditions

Temperature: (22,1 ± 0,2) °C

Relative Humidity: (43,6 ± 0,1) % R.H.

Atmospheric Pressure: (100,3 ± 0,2) kPa

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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

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Test Data

■ DC Mode

☒ Input a.c. power ports

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

☐ Input d.c. power ports

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

☒ Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Observations
Alarm Out	Clamp	Complied
Alarm In	Clamp	Complied
RJ-45	CDN	Complied

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■ PoE Mode☒ Input a.c. power ports

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

☐ Input d.c. power ports

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

☒ Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Observations
Alarm Out	Clamp	Complied
Alarm In	Clamp	Complied
RJ-45 (LAN)	CDN	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

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3.6 Voltage Dips and Short Interruptions

Reference Standard

EN 61000-4-11:2004

BS EN 61000-4-11:2004

Test Date

Dec. 26, 2021

Test Location

EMS-Voltage dip: 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	04, 01, 2022
☒	MOTOR VARIAC	MV2616	EM TEST	P1552169719	04, 01, 2022

Test Conditions

Temperature: (22,4 ± 0,1) °C
Relative Humidity: (43,7 ± 0,1) % R.H.
Atmospheric Pressure: (100,1 ± 0,1) kPa

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Test Specifications & Observations/Remarks

■ DC Mode

- Voltage Dips and Short Interruptions

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

- Voltage variations

☒ Unom + 10 %	☒ 253.0 V (ac)	<u>Complied</u>
☒ Unom - 15 %	☒ 195.5 V (ac)	<u>Complied</u>

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■ PoE Mode**- Voltage Dips and Short Interruptions**

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

- Voltage variations

☒ Unom + 10 %	☒ 253.0 V (ac)	<u>Complied</u>
☒ Unom - 15 %	☒ 195.5 V (ac)	<u>Complied</u>

Observations:

Complied – No degradation of function

Degradation - See "Remarks "

Test Results

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

Remarks

During the test(100%, 250cycle), EUT was turned off but after the test, it was recovered by no operator's intervention.

APPENDIX A – TEST DATA

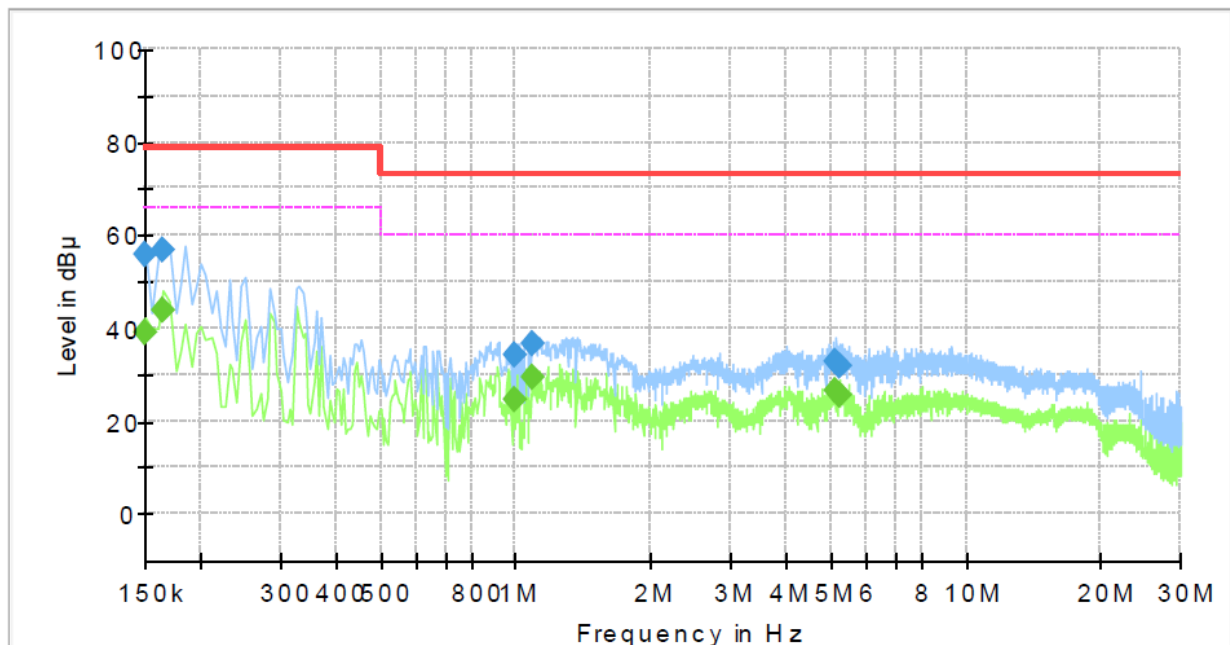
Conducted Emissions at Mains Power Ports

■ DC Mode

[HOT]

Common Information

Test Description:	Conducted Emission
Model No.:	PNM-9084RQZ
Phase:	L1
Mode:	DC
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.150000	---	39.21	66.00	26.79	1000.0	9.000	L1	19.4
0.150000	55.87	---	79.00	23.13	1000.0	9.000	L1	19.4
0.165000	---	43.79	66.00	22.21	1000.0	9.000	L1	19.5
0.165000	56.75	---	79.00	22.25	1000.0	9.000	L1	19.5
1.000000	---	24.78	60.00	35.22	1000.0	9.000	L1	20.1
1.000000	34.27	---	73.00	38.73	1000.0	9.000	L1	20.1
1.090000	---	29.24	60.00	30.76	1000.0	9.000	L1	20.1
1.090000	36.72	---	73.00	36.28	1000.0	9.000	L1	20.1
5.155000	---	26.55	60.00	33.45	1000.0	9.000	L1	19.7
5.155000	32.95	---	73.00	40.05	1000.0	9.000	L1	19.7
5.270000	---	25.67	60.00	34.33	1000.0	9.000	L1	19.7
5.270000	31.86	---	73.00	41.14	1000.0	9.000	L1	19.7

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Report No.:

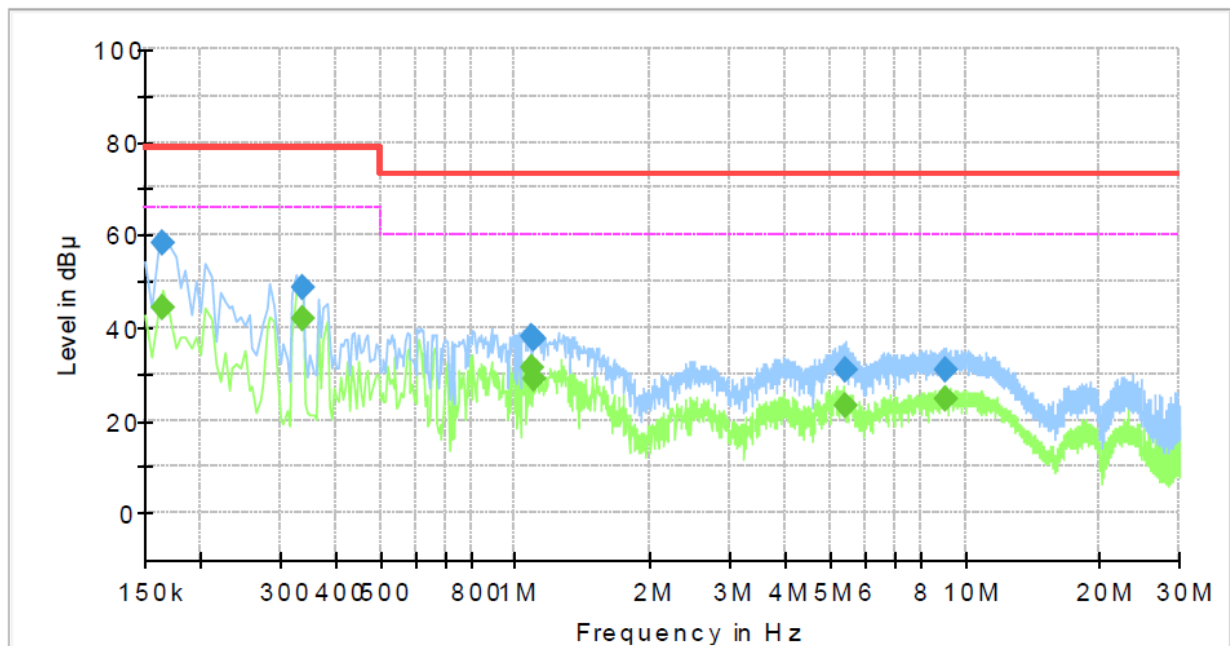
KES-EM-22T0018-R2

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[NEUTRAL]

Common Information

Test Description: Conducted Emission
Model No.: PNM-9084RQZ
Phase: N
Mode: DC
Operator Name: KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.165000	---	44.50	66.00	21.50	1000.0	9.000	N	19.4
0.165000	58.34	---	79.00	20.66	1000.0	9.000	N	19.4
0.335000	---	41.81	66.00	24.19	1000.0	9.000	N	19.6
0.335000	48.80	---	79.00	30.20	1000.0	9.000	N	19.6
1.090000	---	31.52	60.00	28.48	1000.0	9.000	N	20.1
1.090000	38.27	---	73.00	34.73	1000.0	9.000	N	20.1
1.100000	---	28.77	60.00	31.23	1000.0	9.000	N	20.1
1.100000	37.55	---	73.00	35.45	1000.0	9.000	N	20.1
5.435000	---	23.30	60.00	36.70	1000.0	9.000	N	19.6
5.435000	30.71	---	73.00	42.29	1000.0	9.000	N	19.6
9.025000	---	24.81	60.00	35.19	1000.0	9.000	N	19.8
9.025000	30.69	---	73.00	42.31	1000.0	9.000	N	19.8

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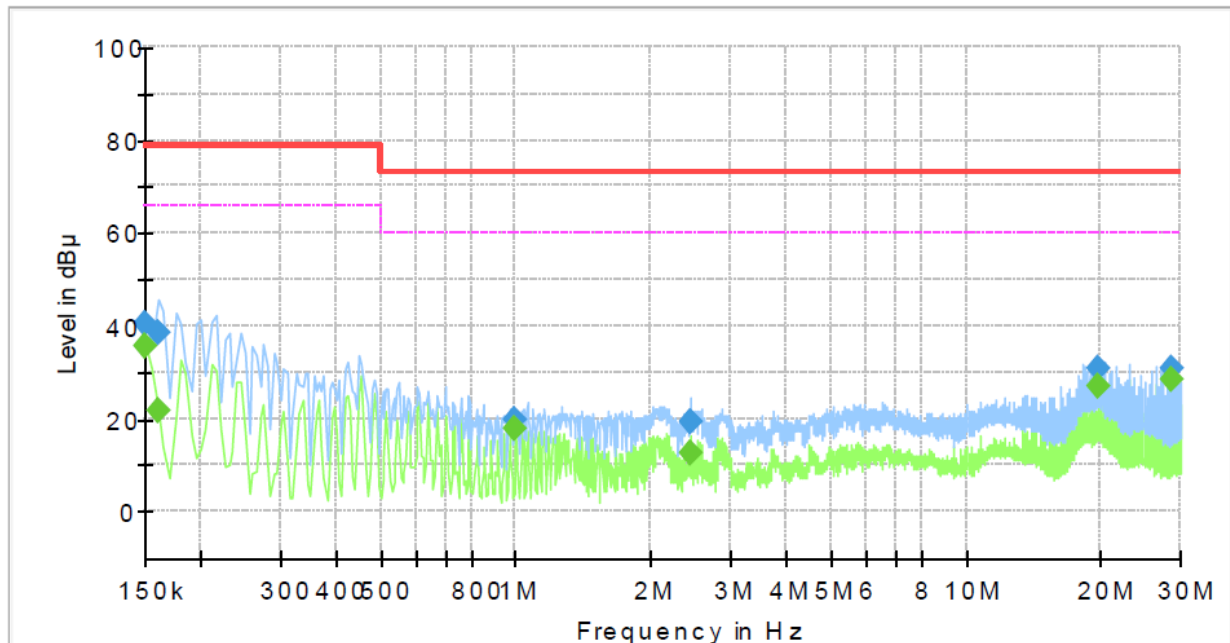
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■ PoE Mode

[HOT]

Common Information

Test Description: Conducted Emission
Model No.: PNM-9084RQZ
Phase: L1
Mode: PoE
Operator Name: KES



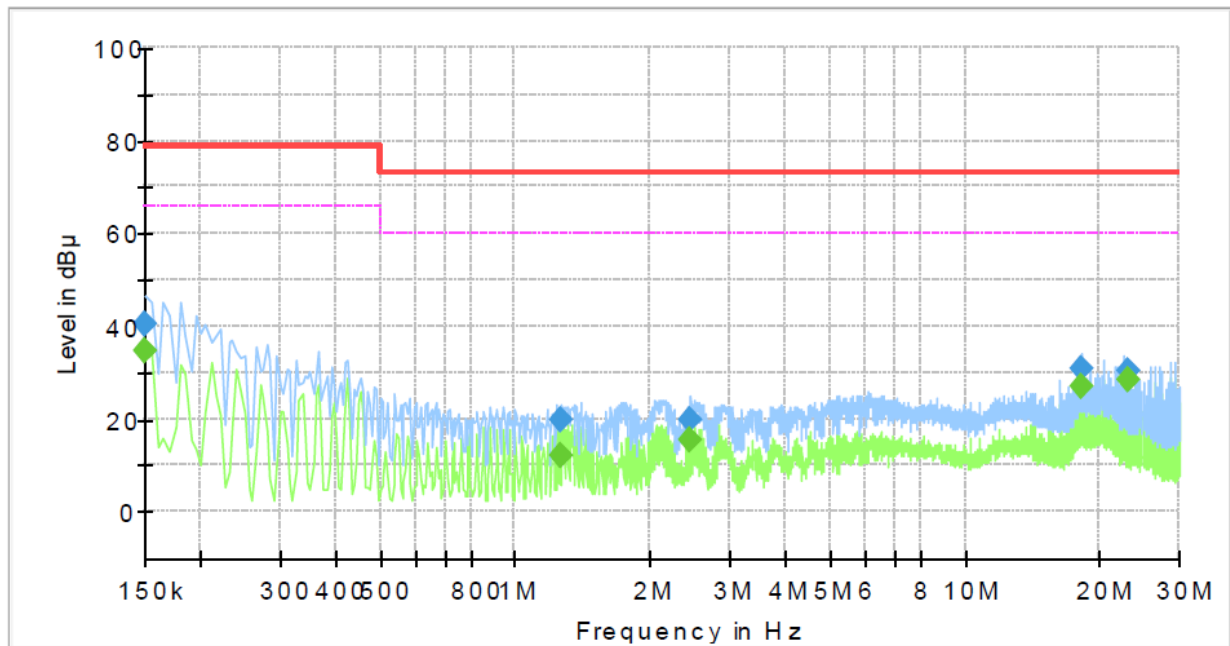
Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.150000	---	35.65	66.00	30.35	1000.0	9.000	L1	19.4
0.150000	40.42	---	79.00	38.58	1000.0	9.000	L1	19.4
0.160000	---	21.55	66.00	44.45	1000.0	9.000	L1	19.5
0.160000	38.69	---	79.00	40.31	1000.0	9.000	L1	19.5
1.000000	---	17.70	60.00	42.30	1000.0	9.000	L1	20.1
1.000000	19.71	---	73.00	53.29	1000.0	9.000	L1	20.1
2.445000	---	12.45	60.00	47.55	1000.0	9.000	L1	20.3
2.445000	19.16	---	73.00	53.84	1000.0	9.000	L1	20.3
19.710000	---	26.81	60.00	33.19	1000.0	9.000	L1	20.2
19.710000	30.90	---	73.00	42.10	1000.0	9.000	L1	20.2
28.685000	---	28.46	60.00	31.54	1000.0	9.000	L1	20.3
28.685000	30.61	---	73.00	42.39	1000.0	9.000	L1	20.3

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[NEUTRAL]
Common Information

Test Description:	Conducted Emission
Model No.:	PNM-9084RQZ
Phase:	N
Mode:	PoE
Operator Name:	KES


Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.150000	---	34.58	66.00	31.42	1000.0	9.000	N	19.4
0.150000	40.63	---	79.00	38.37	1000.0	9.000	N	19.4
1.265000	---	12.20	60.00	47.80	1000.0	9.000	N	20.2
1.265000	19.65	---	73.00	53.35	1000.0	9.000	N	20.2
2.460000	---	15.35	60.00	44.65	1000.0	9.000	N	20.3
2.460000	19.99	---	73.00	53.01	1000.0	9.000	N	20.3
18.245000	---	26.88	60.00	33.12	1000.0	9.000	N	20.1
18.245000	30.73	---	73.00	42.27	1000.0	9.000	N	20.1
23.130000	---	28.66	60.00	31.34	1000.0	9.000	N	20.2
23.130000	30.44	---	73.00	42.56	1000.0	9.000	N	20.2

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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

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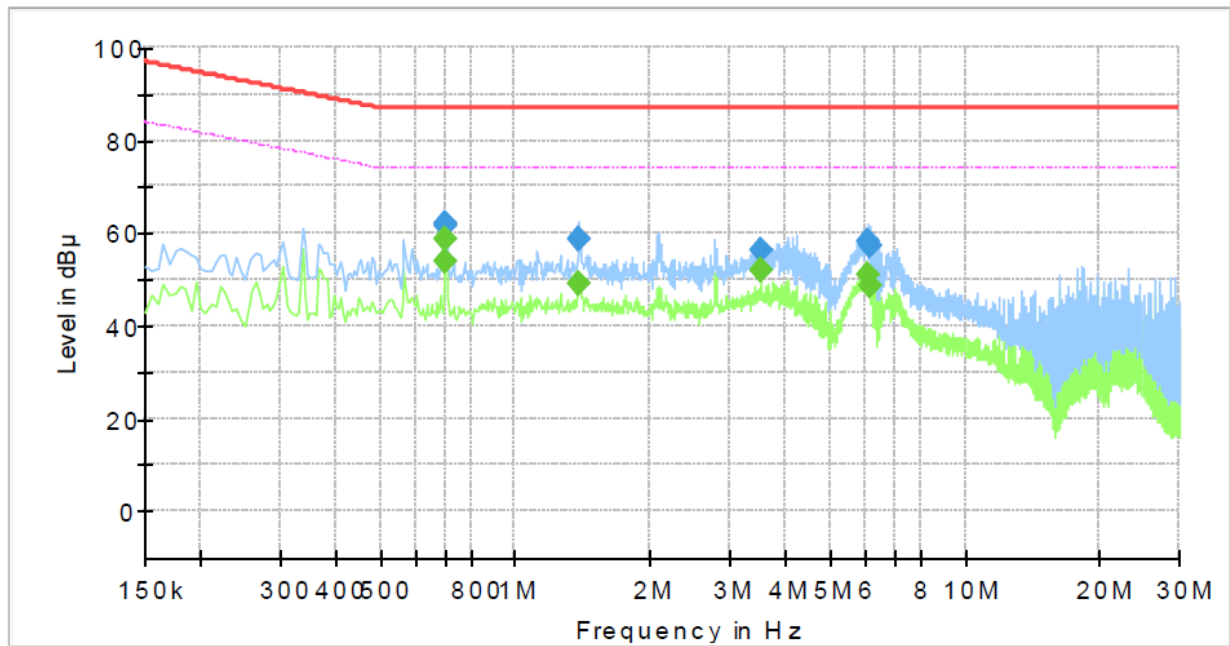
Conducted Emissions at Telecommunication Ports

■ DC Mode

[1 000 Mbps]

Common Information

Test Description: Telecommunication Emission
Model No.: PNM-9084RQZ
Mode : DC
Speed : 1 000 Mbps
Operator Name: KES



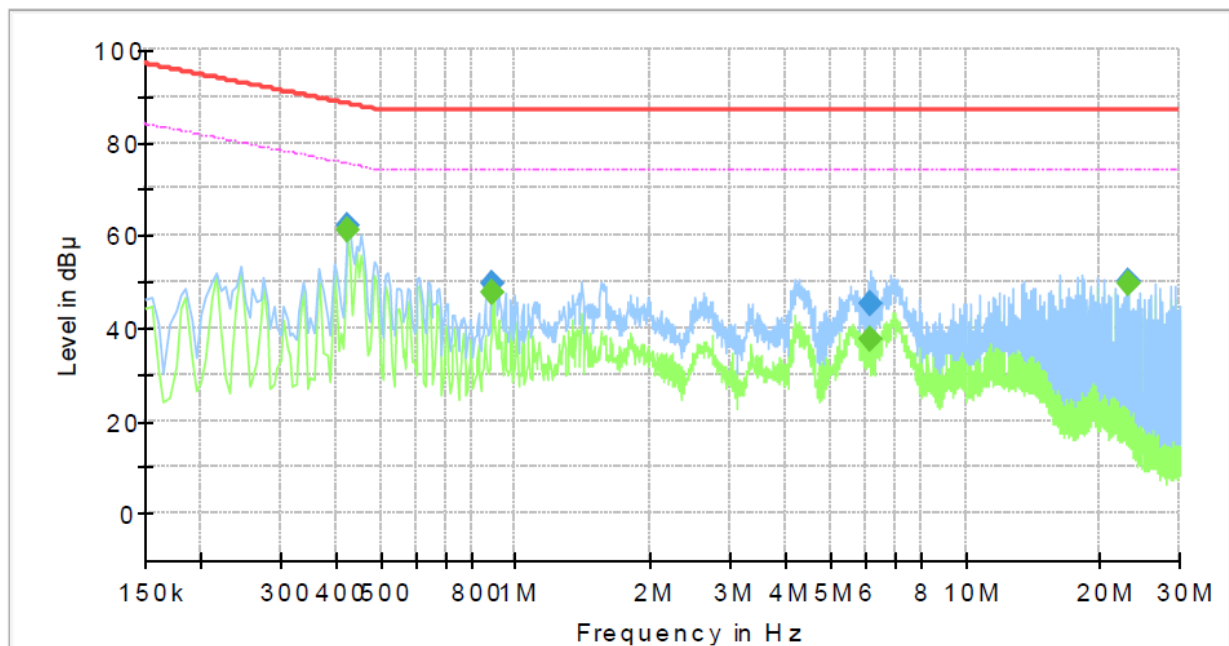
Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.695000	---	54.12	74.00	19.88	1000.0	9.000	Single Line	19.9
0.695000	61.93	---	87.00	25.07	1000.0	9.000	Single Line	19.9
0.700000	---	58.82	74.00	15.18	1000.0	9.000	Single Line	19.9
0.700000	61.51	---	87.00	25.49	1000.0	9.000	Single Line	19.9
1.385000	---	49.13	74.00	24.87	1000.0	9.000	Single Line	20.1
1.385000	58.58	---	87.00	28.42	1000.0	9.000	Single Line	20.1
3.510000	---	51.80	74.00	22.20	1000.0	9.000	Single Line	19.9
3.510000	56.29	---	87.00	30.71	1000.0	9.000	Single Line	19.9
6.075000	---	50.81	74.00	23.19	1000.0	9.000	Single Line	19.3
6.075000	58.27	---	87.00	28.73	1000.0	9.000	Single Line	19.3
6.140000	---	48.62	74.00	25.38	1000.0	9.000	Single Line	19.3
6.140000	57.43	---	87.00	29.57	1000.0	9.000	Single Line	19.3

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PoE Mode
[1 000 Mbps]
Common Information

Test Description:	Telecommunication Emission
Model No.:	PNM-9084RQZ
Mode :	PoE
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)
0.425000	---	61.09	75.35	14.26	1000.0	9.000	Single Line	19.8
0.425000	61.98	---	88.35	26.37	1000.0	9.000	Single Line	19.8
0.890000	---	47.70	74.00	26.30	1000.0	9.000	Single Line	20.0
0.890000	49.74	---	87.00	37.26	1000.0	9.000	Single Line	20.0
6.155000	---	37.69	74.00	36.31	1000.0	9.000	Single Line	19.3
6.155000	45.28	---	87.00	41.72	1000.0	9.000	Single Line	19.3
23.130000	---	49.54	74.00	24.46	1000.0	9.000	Single Line	20.0
23.130000	50.15	---	87.00	36.85	1000.0	9.000	Single Line	20.0

◆ Calculation

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

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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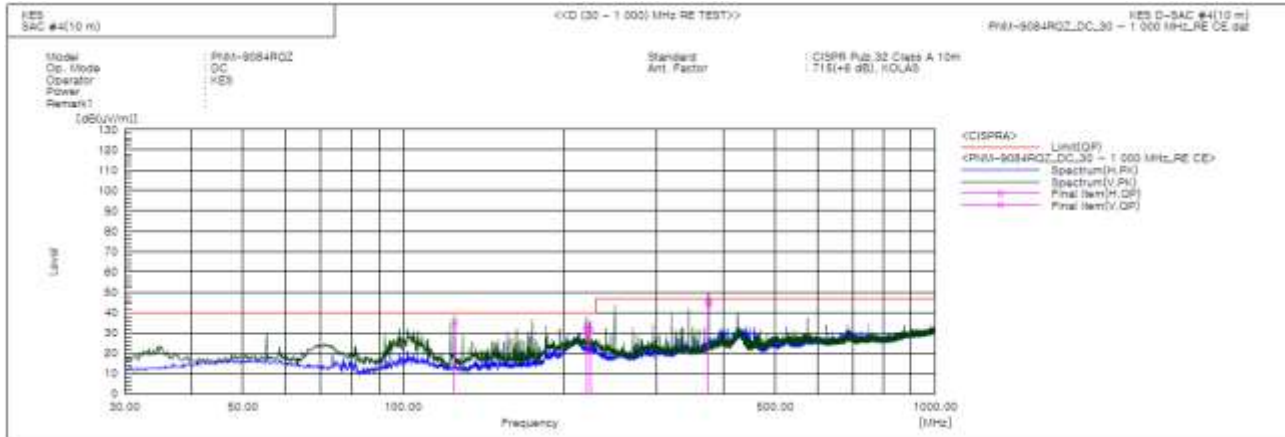
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Radiated Electric Field Emissions(Below 1 GHz)

■ DC Mode

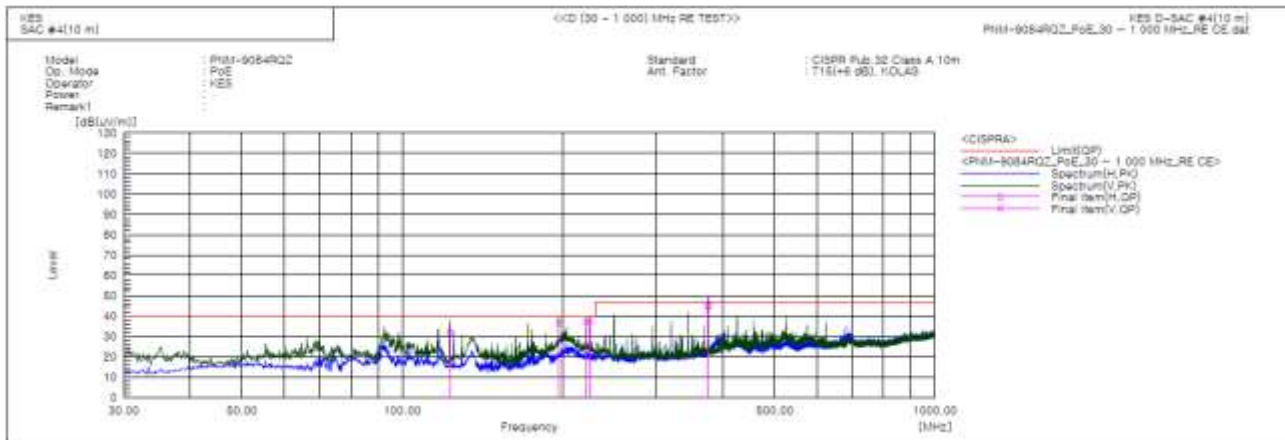


Final Result

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	124.957	V	60.0	-24.8	35.2	40.0	4.8	144.0	118.0	
2	221.243	H	52.0	-20.2	31.8	40.0	8.2	394.0	325.0	
3	221.246	V	53.5	-20.2	33.3	40.0	6.7	148.0	355.0	
4	224.992	H	51.0	-20.1	30.9	40.0	9.1	373.0	310.0	
5	374.979	H	59.5	-14.6	44.9	47.0	2.1	398.0	333.0	
6	374.984	V	58.8	-14.6	44.2	47.0	2.8	136.0	126.0	

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■ PoE Mode



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	122.911	H	56.6	-24.5	32.1	40.0	7.9	351.0	235.0	
2	196.621	V	57.4	-21.0	36.4	40.0	3.6	133.0	356.0	
3	221.252	V	57.3	-20.2	37.1	40.0	2.9	146.0	12.0	
4	224.985	V	57.7	-20.1	37.6	40.0	2.4	164.0	323.0	
5	374.984	V	59.5	-14.6	44.9	47.0	2.1	155.0	218.0	
6	374.984	H	59.3	-14.6	44.7	47.0	2.3	339.0	341.0	

◆ Calculation – SEMI ANECHOIC CHAMBER #4(10 m)

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



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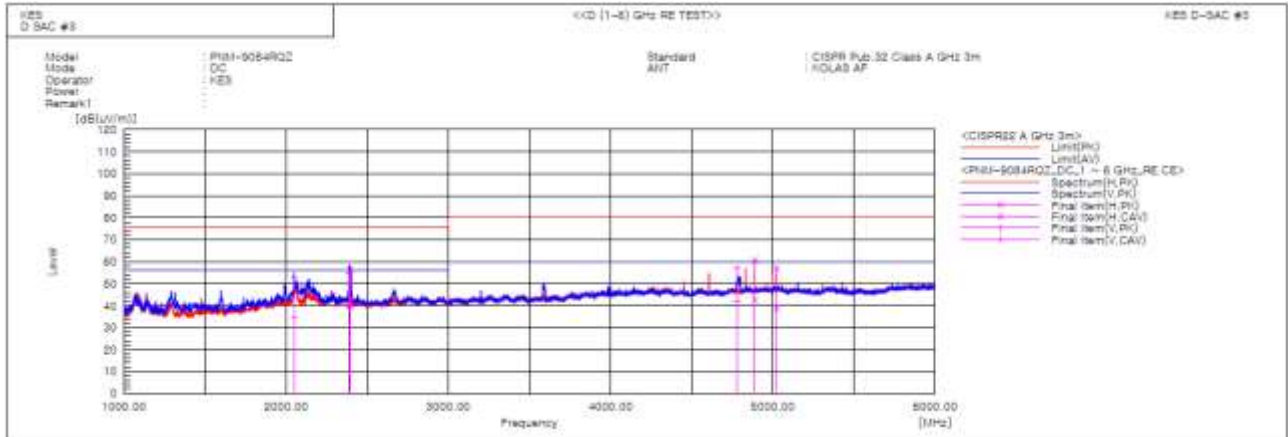
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Radiated Electric Field Emissions(Above 1 GHz)

■ DC Mode



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	2048.194	V	53.6	35.2	-0.8	52.8	34.4	76.0	56.0	23.2	21.6	100.0	201.7	
2	2389.821	V	54.4	38.9	0.2	54.6	39.1	76.0	56.0	21.4	16.9	100.0	142.3	
3	2395.092	H	56.1	39.6	0.2	56.3	39.8	76.0	56.0	19.7	16.2	100.0	343.3	
4	4780.384	V	49.3	33.8	7.8	57.1	41.6	80.0	60.0	22.9	18.4	100.0	250.2	
5	4888.052	H	52.2	34.2	8.5	60.7	42.7	80.0	60.0	19.3	17.3	100.0	283.8	
6	5023.244	H	48.3	29.8	8.8	57.1	38.6	80.0	60.0	22.9	21.4	100.0	288.9	

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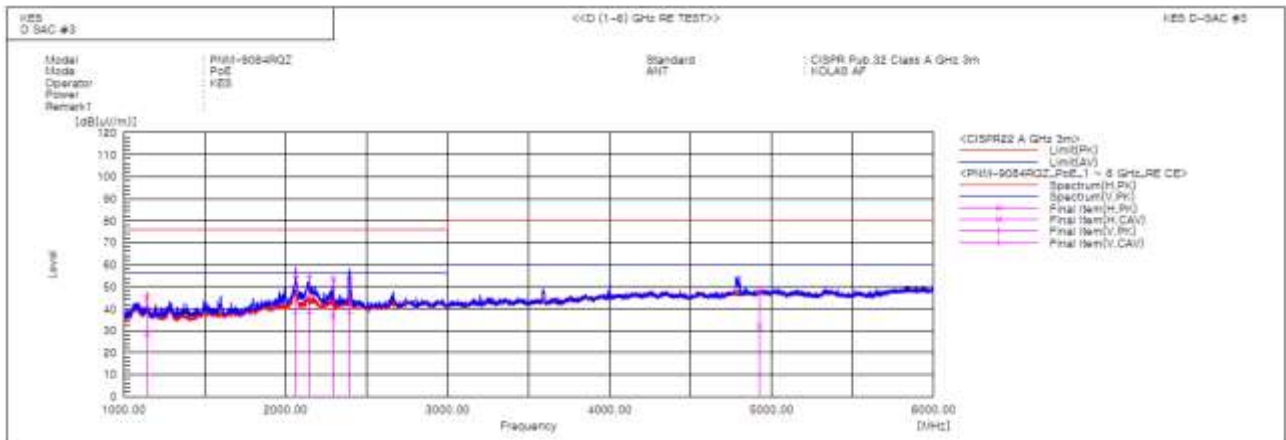


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■ PoE Mode



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(μV)]	Reading CAV [dB(μV)]	c.f [dB(1/m)]	Result PK [dB(μV/m)]	Result CAV [dB(μV/m)]	Limit PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Margin PK [dB]	Margin CAV [dB]	Height [cm]	Angle [deg]	Remark
1	1144.394	H	53.8	37.6	-8.9	44.9	28.7	76.0	56.0	31.1	27.3	100.0	350.3	
2	2063.214	V	55.1	38.5	-0.8	54.3	37.7	76.0	56.0	21.7	18.3	100.0	5.2	
3	2147.293	V	54.8	38.6	-0.5	54.3	38.1	76.0	56.0	21.7	17.9	100.0	250.4	
4	2293.128	H	53.9	36.8	-0.1	53.8	36.7	76.0	56.0	22.2	19.3	100.0	36.6	
5	2395.821	V	53.8	37.9	0.2	54.0	38.1	76.0	56.0	22.0	17.9	100.0	209.1	
6	4924.245	H	39.2	23.2	8.7	47.9	31.9	80.0	60.0	32.1	28.1	100.0	352.3	

◆ Calculation

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

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

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

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



Harmonic Current Emissions and Voltage Fluctuations and Flicker

■ DC Mode

Average harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	0.076			
2	0.002	0.162	1.080	n/a
3	0.069	2.986	2.300	PASS
4	0.002	0.489	0.430	n/a
5	0.068	5.956	1.140	PASS
6	0.002	0.668	0.300	n/a
7	0.065	8.443	0.770	PASS
8	0.002	0.863	0.230	n/a
9	0.059	14.765	0.400	PASS
10	0.002	0.971	0.184	n/a
11	0.054	16.291	0.330	PASS
12	0.002	1.181	0.153	n/a
13	0.048	22.941	0.210	PASS
14	0.002	1.434	0.131	n/a
15	0.042	28.054	0.150	PASS
16	0.002	1.572	0.115	n/a
17	0.036	27.263	0.132	PASS
18	0.002	1.794	0.102	n/a
19	0.030	25.717	0.118	PASS
20	0.002	1.954	0.092	n/a
21	0.025	15.770	0.161	PASS
22	0.002	2.204	0.084	n/a
23	0.020	13.965	0.147	PASS
24	0.002	2.323	0.077	n/a
25	0.017	12.550	0.135	PASS
26	0.002	2.446	0.071	n/a
27	0.014	11.464	0.125	PASS
28	0.002	2.516	0.066	n/a
29	0.013	11.082	0.116	PASS
30	0.002	2.693	0.061	n/a
31	0.012	11.065	0.109	PASS
32	0.002	2.797	0.058	n/a
33	0.012	11.350	0.102	PASS
34	0.002	2.785	0.054	n/a
35	0.011	11.916	0.096	PASS
36	0.001	2.893	0.051	n/a
37	0.011	11.879	0.091	PASS
38	0.001	2.780	0.048	n/a
39	0.010	11.878	0.087	PASS
40	0.001	2.946	0.046	n/a

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

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



Test Data - Harmonics (continued)

Maximum harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	0.078			
2	0.002	0.126	1.620	n/a
3	0.071	2.064	3.450	PASS
4	0.002	0.374	0.645	n/a
5	0.070	4.110	1.710	PASS
6	0.002	0.549	0.450	n/a
7	0.067	5.819	1.155	PASS
8	0.002	0.694	0.345	n/a
9	0.061	10.154	0.600	PASS
10	0.002	0.760	0.276	n/a
11	0.055	11.172	0.495	PASS
12	0.002	0.936	0.230	n/a
13	0.049	15.673	0.315	PASS
14	0.002	1.163	0.197	n/a
15	0.043	19.121	0.225	PASS
16	0.002	1.259	0.173	n/a
17	0.037	18.491	0.199	PASS
18	0.002	1.431	0.153	n/a
19	0.031	17.382	0.178	PASS
20	0.002	1.560	0.138	n/a
21	0.026	15.925	0.161	PASS
22	0.002	1.701	0.125	n/a
23	0.021	14.065	0.147	PASS
24	0.002	1.861	0.115	n/a
25	0.017	12.652	0.135	PASS
26	0.002	1.949	0.106	n/a
27	0.015	11.610	0.125	PASS
28	0.002	1.999	0.099	n/a
29	0.013	11.376	0.116	PASS
30	0.002	2.119	0.092	n/a
31	0.013	11.495	0.109	PASS
32	0.002	2.274	0.086	n/a
33	0.012	11.877	0.102	PASS
34	0.002	2.304	0.081	n/a
35	0.012	12.489	0.096	PASS
36	0.002	2.327	0.077	n/a
37	0.011	12.448	0.091	PASS
38	0.002	2.273	0.073	n/a
39	0.011	12.370	0.087	PASS
40	0.002	2.338	0.069	n/a

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

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



■ PoE Mode

Average harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	0.093			
2	0.003	0.258	1.080	n/a
3	0.084	3.632	2.300	PASS
4	0.004	0.903	0.430	n/a
5	0.080	7.055	1.140	PASS
6	0.003	1.084	0.300	n/a
7	0.076	9.918	0.770	PASS
8	0.003	1.249	0.230	n/a
9	0.071	17.740	0.400	PASS
10	0.004	1.926	0.184	n/a
11	0.065	19.619	0.330	PASS
12	0.003	1.976	0.153	n/a
13	0.058	27.589	0.210	PASS
14	0.002	1.735	0.131	n/a
15	0.051	33.728	0.150	PASS
16	0.002	1.665	0.115	n/a
17	0.043	32.610	0.132	PASS
18	0.002	1.759	0.102	n/a
19	0.036	30.055	0.118	PASS
20	0.001	1.543	0.092	n/a
21	0.028	17.477	0.161	PASS
22	0.001	1.235	0.084	n/a
23	0.022	14.762	0.147	PASS
24	0.001	1.167	0.077	n/a
25	0.016	11.642	0.135	PASS
26	0.001	0.981	0.071	n/a
27	0.010	8.322	0.125	PASS
28	0.001	1.101	0.066	n/a
29	0.006	5.361	0.116	PASS
30	0.001	1.114	0.061	n/a
31	0.003	2.682	0.109	n/a
32	0.001	1.188	0.058	n/a
33	0.002	1.482	0.102	n/a
34	0.001	1.295	0.054	n/a
35	0.003	2.680	0.096	n/a
36	0.001	1.350	0.051	n/a
37	0.004	3.960	0.091	n/a
38	0.001	1.445	0.048	n/a
39	0.004	4.481	0.087	n/a
40	0.001	1.404	0.046	n/a

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

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



Test Data - Harmonics (continued)

Maximum harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	0.093			
2	0.005	0.280	1.620	n/a
3	0.084	2.427	3.450	PASS
4	0.005	0.728	0.645	n/a
5	0.081	4.712	1.710	PASS
6	0.004	0.827	0.450	n/a
7	0.077	6.630	1.155	PASS
8	0.004	1.086	0.345	n/a
9	0.071	11.866	0.600	PASS
10	0.004	1.554	0.276	n/a
11	0.065	13.209	0.495	PASS
12	0.004	1.616	0.230	n/a
13	0.058	18.435	0.315	PASS
14	0.003	1.375	0.197	n/a
15	0.051	22.641	0.225	PASS
16	0.002	1.371	0.173	n/a
17	0.043	21.850	0.199	PASS
18	0.002	1.407	0.153	n/a
19	0.036	20.269	0.178	PASS
20	0.002	1.266	0.138	n/a
21	0.029	17.753	0.161	PASS
22	0.002	1.210	0.125	n/a
23	0.022	15.193	0.147	PASS
24	0.001	0.978	0.115	n/a
25	0.016	11.786	0.135	PASS
26	0.001	0.902	0.106	n/a
27	0.011	8.503	0.125	PASS
28	0.001	0.902	0.099	n/a
29	0.006	5.488	0.116	PASS
30	0.001	0.864	0.092	n/a
31	0.003	2.860	0.109	n/a
32	0.001	0.916	0.086	n/a
33	0.002	1.634	0.102	n/a
34	0.001	0.973	0.081	n/a
35	0.003	3.107	0.096	n/a
36	0.001	1.018	0.077	n/a
37	0.004	4.656	0.091	n/a
38	0.001	1.102	0.073	n/a
39	0.004	4.776	0.087	n/a
40	0.001	1.079	0.069	n/a

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

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

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KES-EM-22T0018-R2
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Test Data - Voltage Fluctuations

Maximum Flicker results

■ DC Mode

Flicker Measurements					
	Plt	Max Pst	Max Dc	Max Dmax	Max Tmax
Line 1:	0.028	0.028	0	< 0.2	0
Limits:	0.65	1	3.3	4	0.5
Results:	PASS	PASS	PASS	PASS	PASS

■ PoE Mode

Flicker Measurements					
	Plt	Max Pst	Max Dc	Max Dmax	Max Tmax
Line 1:	0.028	0.028	0	< 0.2	0
Limits:	0.65	1	3.3	4	0.5
Results:	PASS	PASS	PASS	PASS	PASS

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Test Setup Photos and Configuration

Conducted Emissions at Mains Power Ports

■ DC Mode



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■ PoE Mode



Conducted Emissions at Telecommunication Ports

■ DC Mode



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■ PoE Mode

Radiated Electric Field Emissions(Below 1 GHz)

■ DC Mode



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■ PoE Mode



Radiated Electric Field Emissions(Above 1 GHz)

■ DC Mode



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■ PoE Mode

Harmonic Current Emissions and Voltage Fluctuations and Flicker

■ DC Mode



■ PoE Mode



Electrostatic Discharge

■ DC Mode



■ PoE Mode

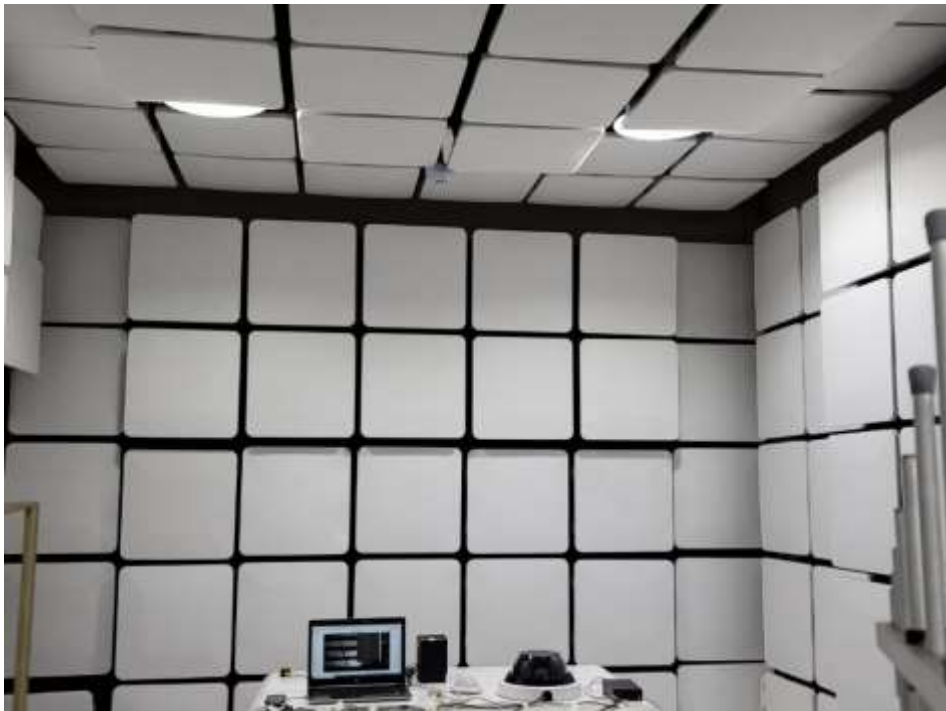


Radiated Electric Field Immunity

■ DC Mode



■ PoE Mode



Electrical Fast Transients/Bursts

■ DC Mode



■ PoE Mode



Surge Transients

■ DC Mode



■ PoE Mode



Conducted Disturbance

■ DC Mode



■ PoE Mode



Voltage Dips and Short Interruptions

■ DC Mode



■ PoE Mode

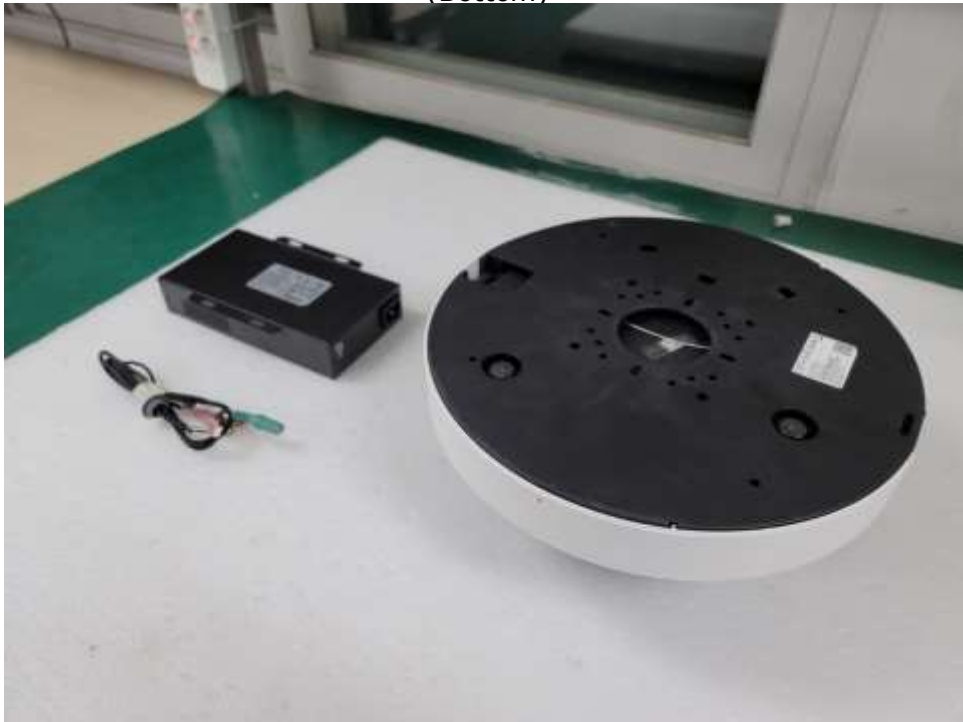


EUT External Photographs

(Top)



(Bottom)



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EUT Internal Photographs

(Internal View)



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)



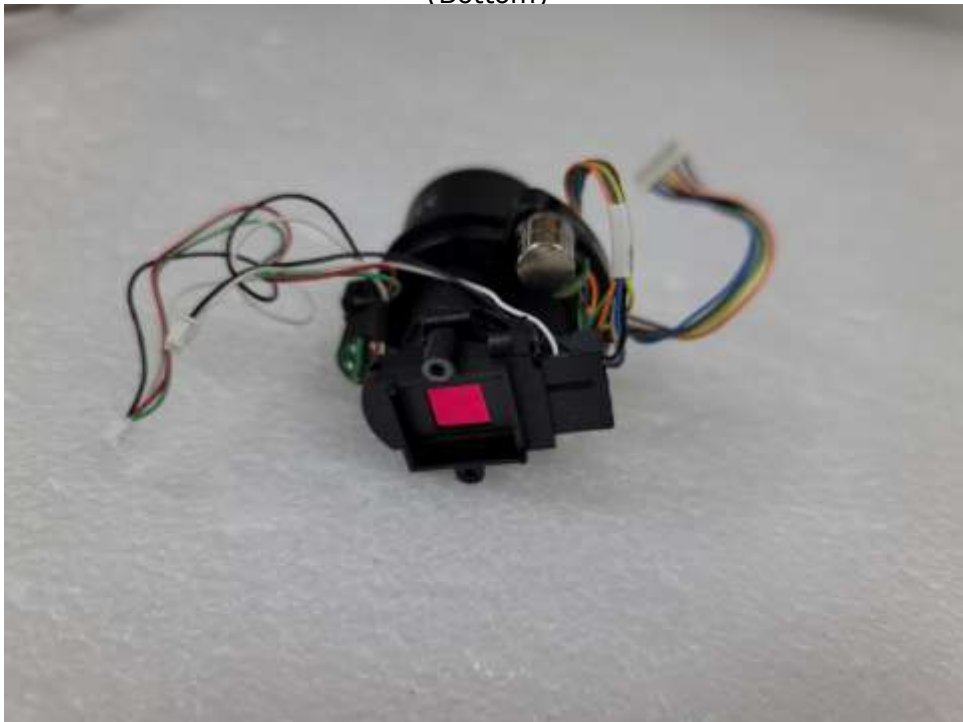
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EUT Internal View – Lens

(Top)



(Bottom)



Label and Location



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