



KES Co., Ltd.

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Report No.:

KES-E1-19T0492-R2

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EMC TEST REPORT For CE

Test Report No. : KES-E1-19T0492-R2

Date of Issue : Feb. 24, 2023

Product name : NETWORK CAMERA

Model/Type No. : XNB-8000

Variant Model : -

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 : Aug. 06, 2019

Test date : Aug. 15, 2019 ~ Aug. 19, 2019

Test Results : ☒ In Compliance ☐ Not in Compliance

Tested by

Dong Hyun, Won
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
Aug. 20, 2019	KES-E1-19T0492	Issued
Jan. 15, 2021	KES-E1-19T0492-R1	Reissue due to manufacturer change
Feb. 24, 2023	KES-E1-19T0492-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:

Video	
Imaging Device	1/1.8" 6M CMOS
Total Pixels	3096(H) x 2094(V)
Effective Pixels	2616(H) x 1976(V)
Scanning System	Progressive Scan
Min. Illumination	Color : 0.03 lux (TBD) B/W : 0.003Lux(TBD)
S / N Ratio	50dB
Video Out	CVBS : 1.0 Vp-p / 75Ω composite, 720x480(N), 720x576(P), for installation USB : Micro USB type B, 1920 x 1080(TBD), for installation
Lens	
Focal Length (Zoom Ratio)	
Max. Aperture Ratio	
Angular Field of View	
Min. Object Distance	
Focus Control	Simple focus / Manual, Remote control via network, Butto control (Manual, Simple focus)
Lens Type	Manual / DC Auto Iris, P-iris
Mount Type	C/CS
Pan / Tilt / Rotate	
Pan / Tilt / Rotate range	
Operational	
IR LED	
Viewable Length	
Camera Title	Off / On (Displayed up to 55 characters) - W/W : English/Numeric/Special Characters - China : English/Numeric/Special/Chinese Characters - Common : Multi-line (Max 6), Color (Grey/Green/Red/Blue/Black/White), Transparency, Auto Scale by Resolution
Day & Night	Auto (ICR) / Color / B/W / External / Schedule
Backlight Compensation	Off / BLC / HLC(Masking/Dimming), WDR(Seamless transition TBD)
Wide Dynamic Range	120dB(TBD)
Contrast Enhancement	SSDR (Off / On)
Digital Noise Reduction	SSNR5 (2D+3D Noise Filter) (Off / On)
Digital Image Stabilization	Off / On
Defog	Auto(input from fog&Dust detection) / Manual / Off
Motion Detection	Yes(8ea, 4point Polygonal zones)
Privacy Masking	Off / On (32ea, polygonal zones) - Color : Grey/Green/Red/Blue/Black/White - Mosaic ※ Zoom ratio option for mask mode (TBD)
Gain Control	Off / Low / Middle / High
White Balance	ATW / AWC / Manual / Indoor / Outdoor((included Mercury & Sodium)
Contrast	level adjustment
LDC	On/Off (5 levels with Min/Max)
Electronic Shutter Speed	Minimum / Maximum / Anti flicker (2 ~ 1/12,000sec →TBD)

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Digital PTZ	24X, 'Digital PTZ(Preset, Group)
Flip / Mirror	Flip : On/Off Mirror : On/Off Hallway view : 90°/270°
Intelligent Video & Audio A	Tampering, Loitering, Directional Detection, Defocus Detection, Fog&Dust Detection, Virtual Line, Enter/Exit, Appear / Disappear, Audio Detection, Motion Detection, Digital Auto Tracking, Sound Classification
Alarm I/O	Input 1ea / Output 1ea
Remote Control Interface	-
RS-485 Protocol	-
Alarm Triggers	Alarm Input, Motion Detection, Intelligent Video Analytics, Network Disconnect
Alarm events	File upload via FTP, E-Mail Notification via E-Mail local storage(SD/SDHC/SDXC) or NAS recording at Event Triggers External output DPTZ preset
Audio In	Selectable (Mic IN/Line IN), Supply voltage: 2.5VDC(4mA), Input impedance: approx. 2K Ohm
Audio out	Line out, Max output level: 1 Vrms
Fan / Heater	-
Pixel Counter	Support
Network	
Ethernet	RJ-45 (10/100BASE-T)
Video Compression Forma	H.265/H.264 (MPEG-4 Part 10/AVC) : Main/Baseline/High , Motion JPEG
Resolution	5M mode : 2592 x 1944, 2592 x 1464, 1920 x 1080, 1600 x 1200, 1280 x 1024, 1280 x 960 1280 x 720, 1024 x 768, 800 x 600, 720 x 576, 720 x 480, 640 x 480, 320 x 240 2M mode : 1920x1080, 1280x1024, 1280x960, 1280x720, 1024x768, 800x600, 800x450, 720x576 640x480, 640x360, 320x240, 320x180
Max. Framerate	5M mode : H.265/H.264 : Max. 30fps at all resolutions Motion JPEG : Max. 30fps 2M mode : H.265/H.264 : Max. 60fps at all resolutions Motion JPEG : Max. 30fps
Smart Codec	Manual Mode (area-based : 5EA)
Video Quality Adjustment	H.264/H.265 : Target Bitrate Level Control MJPEG : Target Bitrate Level Control
Bitrate Control Method	H.264/H.265 : CBR or VBR, with WiseStream MJPEG : VBR
Streaming Capability	Multiple Streaming (Up to 10 Profiles)
Audio Compression Forma	G.711 u-law /G.726 Selectable G.726 (ADPCM) 8KHz, G.711 8KHz G.726 : 16Kbps, 24Kbps, 32Kbps, 40Kbps AAC-LC : 48Kbps at 8/16/32/48KHz
Audio Communication	Bi-directional (2-Way)
IP	IPv4, IPv6
Protocol	TCP/IP, UDP/IP, RTP(UDP), RTP(TCP), RTCP,RTSP, NTP, HTTP, HTTPS, SSL/TLS, DHCP, PPPoE, FTP, SMTP, ICMP, IGMP, SNMPv1/v2c/v3(MIB-2), ARP, DNS, DDNS, QoS, PIM-SM, UPnP, Bonjour

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Security	HTTPS(SSL) Login Authentication Digest Login Authentication IP Address Filtering User access Log 802.1X Authentication (EAP-TLS, EAP-LEAP) - Streaming Encryption 기능구현
Streaming Method	Streaming Method
Max. User Access	20 users at Unicast Mode(TBD)
Edge Storage	SD/SDHC/SDXC 2slot (up to 512 GB) - Continuous recording(1'st slot to 2'nd slot) - (TBD) Redundant recording - Motion Images recorded in the SD/SDHC/SDXC memory card can be downloaded. NAS(Network Attached Storage) Local PC for Instant Recording
Application Programming	ONVIF Profile S/G SUNAPI(HTTP API) Open Platform
Webpage Language	English, Korean, Chinese, French, Italian, Spanish, German, Japanese, Russian, Swedish, Danish, Portuguese, Czech, Polish, Turkish, Rumanian, Serbian, Dutch, Croatia, Hungary, Greek, Norsk, Finnish
Web Viewer	Supported OS: Windows 7, 8, 10, Mac OS X 10.8. 10.9. 10.10. 10.11 Non-plugin Webviewer Supported Browser: Google Chrome 47, MS Edge 20 Support Codec : Video : H.264, MJPEG (MAX 1M 15FPS) Audio : G.711 Plug-in Webviewer Supported Browser : MS Explore 11 , Mozilla Firefox 43 , Apple Safari 9 * Mac OS X only
Central Management Soft	SmartViewer, SSM
Environmental	
Operating Temperature / Humidity	-10°C ~ +55°C (-14°F ~ +131°F) / Less than 90% RH
Storage Temperature / Humidity	-50°C ~ +60°C (-22°F ~ +140°F) / Less than 90% RH
Ingress Protection	-
Vandal Resistance	-
Electrical	
Input Voltage / Current	24VAC ± 10%, 12VDC ± 10%, PoE(IEEE802.3af)
Power Consumption	TBD
Mechanical	
Color / Material	Black, Ivory / Plastic
Dimension (WxHxD)	TBD
Weight	TBD
스펙시트 미표기 요구사항	
Cable Connection	Plug-in
SD카드	듀얼슬롯

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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.

Voltage ☐ 230Vac ☐ 100 Vac ☒ 24 Vac ☒ 12 Vdc ☒ PoE
Frequency ☐ 50 Hz ☐ 60 Hz ☐ Hz

1.2 Variant Model Differences

Not applicable

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
NETWORK CAMERA	XNB-8000	-	HANWHA VISION VIETNAM COMPANY LIMITED	EUT



1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
Lens	-	-	-	-
Notebook	LG15N54	410NZGK015231	LG Electronics Co., Ltd.	-
Notebook Adaptor	ADP-90WH B	84ZW19F1663	DELTA ELECTRONICS (JIANGSU) LTD.	-
PoE Adaptor	POE 36U-1AT-R	P90215791A1	PHIHONG	-
Alarm 1	SIP-1201DD D0	-	SAMSUNG TECHWIN CO., LTD.	-
Alarm 2	-	-	-	-
Speaker	BR1000A Cuve Black 2	-	DONGGUAN EDIFIER TECHNOLOGY Co., Ltd	-
Mic	CMK-303	-	CAMAC	-
Controller	SPC-1010	C50E67WG10100F	SamSung Techwin Co.,Ltd.	-
Controller Adaptor	RS-AB1000	-	Dongguan Jinhua sheng Power Technology Co.,Ltd.	-
Smart Phone	SHV-E210L	R33D713KA3F	SAMSUNG TECHWIN CO., LTD.	-
Micro SD Card	-	-	-	-

1.6 External I/O Cabling

■ AC 24 V, DC 12 V

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
NETWORK CAMERA (EUT)	IRIS	Lens	IRIS	0.2	U
	RJ-45	Notebook	RJ-45	3.0	U
	Alarm Out	Alarm 1	Alarm In	3.0	U
	Alarm In	Alarm 2	Alarm Out	3.0	U
	Audio Out	Speaker	Audio In	1.4	U
	Audio In	Mic	Audio Out	1.7	U
	RS-485	Controller	RS-485	4.0	U
	-	Micro SD Card	-	-	-
Notebook	3.5 mm	Smart Phone	3.5 mm	1.2	U

* Unshielded=U, Shielded=S

■ PoE

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
NETWORK CAMERA (EUT)	IRIS	Lens	IRIS	0.2	U
	RJ-45	PoE Adaptor	RJ-45	3.0	U
	Alarm Out	Alarm 1	Alarm In	3.0	U
	Alarm In	Alarm 2	Alarm Out	3.0	U
	Audio Out	Speaker	Audio In	1.4	U
	Audio In	Mic	Audio Out	1.7	U
	RS-485	Controller	RS-485	4.0	U
	-	Micro SD Card	-	-	-
Notebook	RJ-45	PoE Adaptor	RJ-45	3.0	U
	3.5 mm	Smart Phone	3.5 mm	1.2	U

* Unshielded=U, Shielded=S

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1.7 EUT Operating Mode(s)

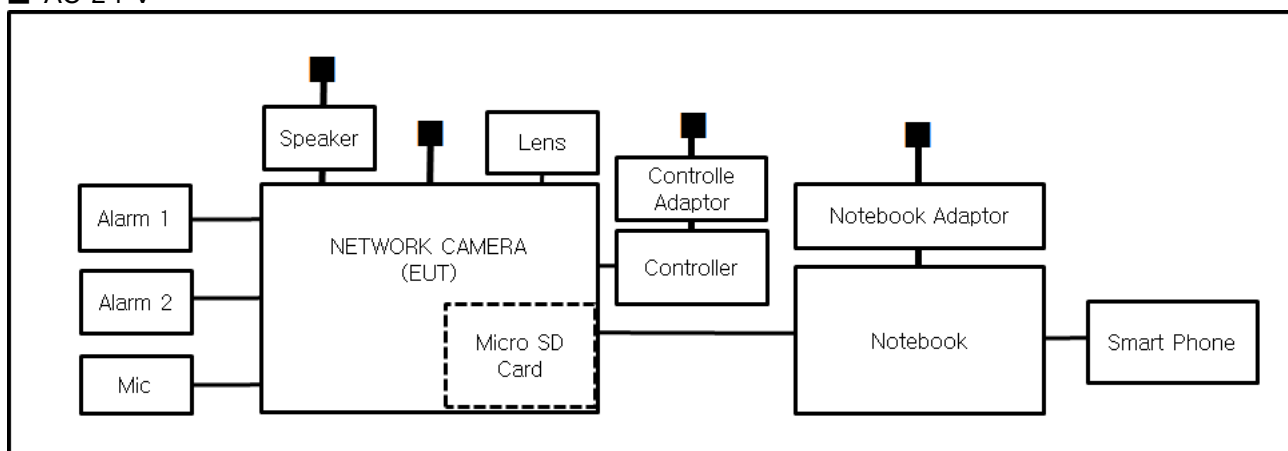
Test mode	operating
AC 24 V	EUT Monitoring, Ping Test
DC 12 V	EUT Monitoring, Ping Test
PoE	EUT Monitoring, Ping Test

EUT Test operating S / W		
Name	Version	Manufacture Company
WebViewer	-	-

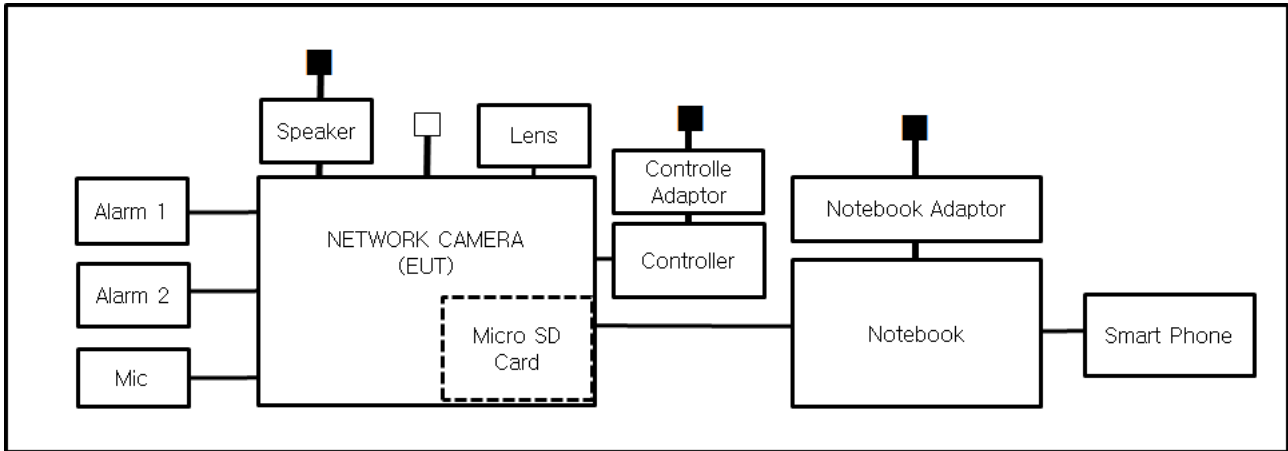
1.8 Configuration

■ AC Main
 □ DC Main

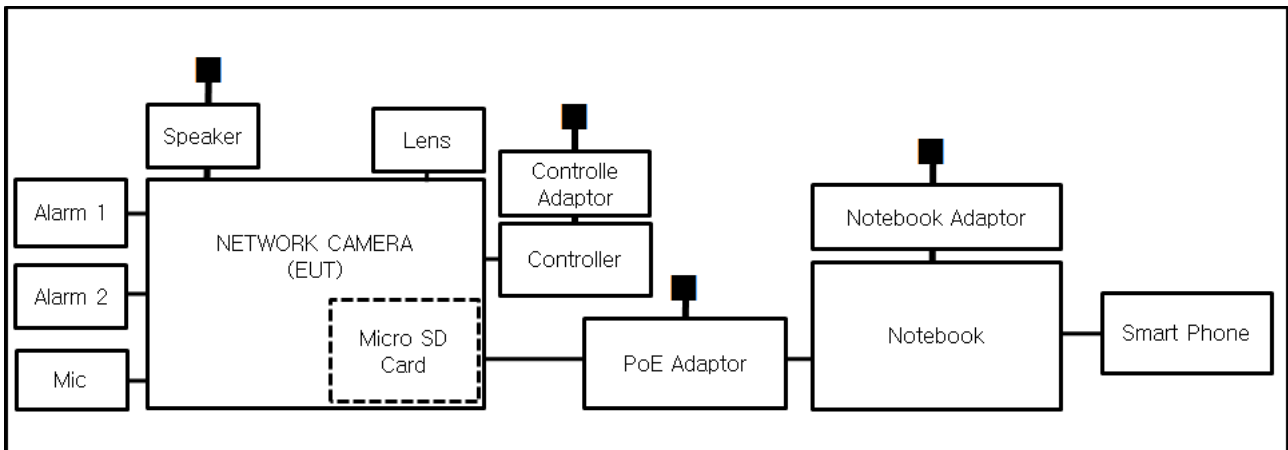
■ AC 24 V



■ DC 12 V



■ PoE



1.9 Remarks when standards applied

The power frequency magnetic field (EN 61000-4-8) are not tested because the EUT is not sensitive to magnetic fields.

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 61000-6-3:2011

☐ EN 61000-6-1:2007

☐ EN 61000-6-4:2007 +A1:2011

☐ EN 61000-6-2:2005

☐ EN 55011:2007 +A1:2010

☐ Group 1
☐ Class A

☐ Group 2
☐ Class B

☐ EN 55014-1:2006 +A2:2011

☐ EN 55014-2:1997 +A2:2008

☐ EN 55015:2013

☐ EN 61547:2009

☐ EN 55032:2012/AC:2013

☐ Class A

☐ Class B

☐ EN 55024:2010 +A1:2015

☐ EN 50130-4:2011

☒ EN 50121-4:2016

☒ EN 61000-3-2:2014

☒ EN 61000-3-3:2013

☐ EN 61326-1:2013



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- | | | |
|---|----------------------------------|----------------------------------|
| ☐ VCCI-CISPR 32:2016 | ☐ Class A | ☐ Class B |
| ☐ AS/NZS CISPR32:2015 | ☐ Class A | ☐ Class B |
| ☐ 47 CFR Part 15, Subpart B | | |
| ☐ CISPR 22:2009 +A1:2010 | ☐ Class A | ☐ Class B |
| ☐ ANSI C63.4-2014 | | |
| ☐ IC Regulation ICES-003 : 2016 | | |
| ☐ CAN/CSA CISPR 22-10 | ☐ Class A | ☐ Class B |
| ☐ ANSI C63.4-2014 | | |
|
☐ RE- Directive 2014/53/EU | | |
|
☐ EN 301 489-1 V1.9.2 | | |
| ☐ Equipment for fixed use | | |
| ☐ Equipment for vehicular use | | |
| ☐ Equipment for portable use | | |
|
☐ EN 301 489-3 V1.6.1 | | |
|
☐ EN 301 489-17 V2.2.1 | | |
|
☐ EN 60945:2002 | | |

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2.1 Conducted Emissions at Mains Power Ports

Test Date

Aug. 15, 2019

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	101781	04, 22, 2020
☒	LISN	ENV216	R & S	101787	01, 04, 2020
☒	LISN	ESH2-Z5	R & S	100450	04, 22, 2020
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	11, 26, 2019

Test Conditions

Temperature: 23,4 °C
Relative Humidity: 57,0 % 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

RemarksSee Appendix A for test data.PoE is not tested apply because it is considered to be wired networks ports



2.2 Conducted Emissions at Telecommunication Ports

Test Date

Aug. 15, 2019

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	101781	04, 22, 2020
☒	LISN	ENV216	R & S	101787	01, 04, 2020
☒	LISN	ESH2-Z5	R & S	100450	04, 22, 2020
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	11, 26, 2019
☒	8-WIRE ISN CAT3,5	ENY81	R & S	100174	01, 07, 2020
☐	8-WIRE ISN CAT6	ENY81-CAT6	R & S	101665	01, 07, 2020

Test Conditions

Temperature: 23,4 °C
Relative Humidity: 57,0 % 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.

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2.3 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Aug. 16, 2019

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	04, 09, 2020
☒	AMPLIFIER	SCU 01	R & S	100603	11, 26, 2019
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	11, 29, 2020
☒	ATTENUATOR	8491A	HP	32173	03, 11, 2020

Test Conditions

Temperature: 24,7 °C

Relative Humidity: 55,1 % R.H.

Frequency Range of Measurement

30 MHz to 1 GHz

Instrument Settings

IF Band Width: 120 kHz

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

RemarksSee Appendix A for test data.

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2.4 Radiated Electric Field Emissions(Above 1 GHz)

Test Date

Aug. 16, 2019

Test Location

Electro wave Shieldroom #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, 06, 2020
☒	PREAMPLIFIER	8449B	AGILENT	3008A01967	05, 27, 2020
☐	ATTENUATOR	8491A	HP	35496	03, 11, 2020
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	03, 12, 2021

Test Conditions

Temperature: 23,8 °C
Relative Humidity: 54,0 % R.H.

Frequency Range of Measurement

1 GHz to 6 GHz

Instrument Settings

IF Band Width: 1 MHz

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

RemarksSee Appendix A for test data.

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2.5 Harmonic Current Emissions

Test Date

Aug. 19, 2019

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, 09, 2020
☒	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

Test Conditions

Temperature: 22,8 °C
Relative Humidity: 53,1 % R.H.

Classification of Equipment for Harmonic Current Emissions

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

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

RemarksSee Appendix A for test data.The test has been tested using the AC / AC adaptor.(DC and PoE are not applicable.)

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2.6 Voltage Fluctuations and Flicker

Test Date

Aug. 19, 2019

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, 09, 2020
☒	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

Test Conditions

Temperature: 22,8 °C
Relative Humidity: 53,1 % R.H.

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.

The test has been tested using the AC / AC adaptor.(DC and PoE are not applicable.)

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. 19, 2019

Test Location

EMS-ESD: Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	ESD SIMULATOR	ESS-2000	Noise Ken	ESS05X4620	02, 22, 2022
☒	HCP	-	Noise Ken	-	-
☒	VCP	-	Noise Ken	-	-

Test Conditions

Temperature: 22,8 °C
Relative Humidity: 53,1 % R.H.
Atmospheric Pressure: 99,3 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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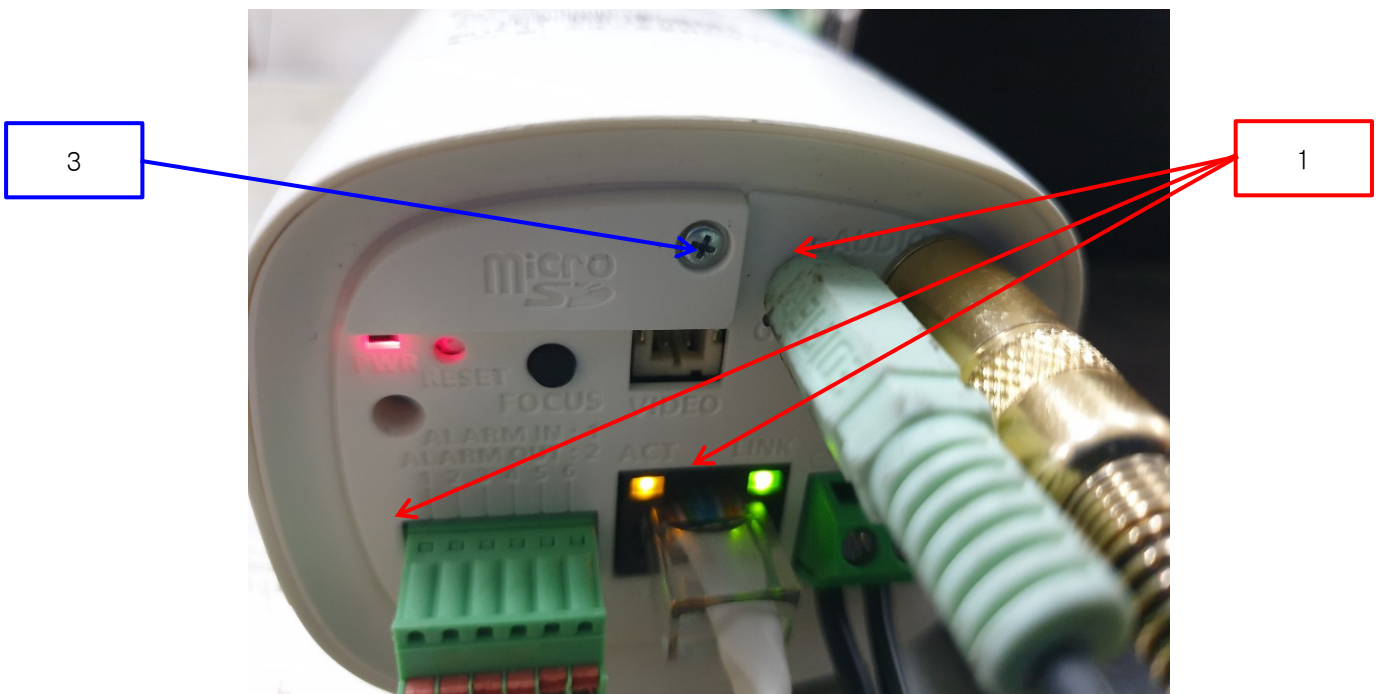
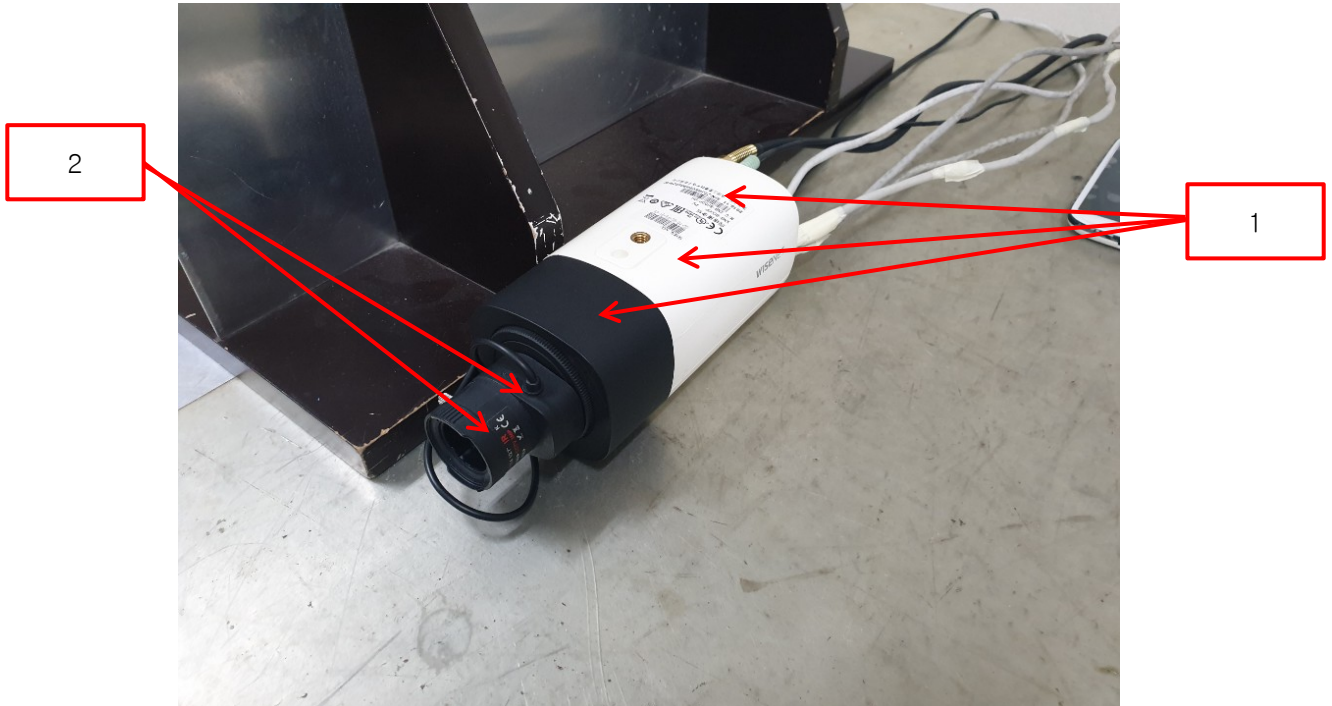
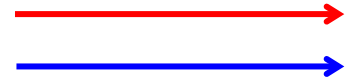
Notes: HCP: Horizontal coupling plane

VCP: Vertical coupling plane

Required Performance Criteria: ☒ B

Location of Discharge:

Air
Contact



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Test Data

■ AC 24 V

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	Surface	Air Discharge	A	-
2	Lens	Air Discharge	A	-
3	Screw	Contact Discharge	A	-
4	Port	Air Discharge	A	-

■ DC 12 V

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	Surface	Air Discharge	A	-
2	Lens	Air Discharge	A	-
3	Screw	Contact Discharge	A	-
4	Port	Air Discharge	A	-

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■ PoE

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	Surface	Air Discharge	A	-
2	Lens	Air Discharge	A	-
3	Screw	Contact Discharge	A	-
4	Port	Air Discharge	A	-

Note: "Blank" = Not performed

Observations:

- A – No response observed from E.U.T
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

RemarksPASS Required Performance Criteria.

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3.2 Radiated Electric Field Immunity

Reference Standard

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

Test Date

Aug. 17, 2019

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, 06, 2020
☒	HIGH POWER DUAL AMP	SSA532	SUNGSAN	SSA532-001	05, 15, 2020
☒	POWER METER	E4419B	Agilent	GB40203000	05, 15, 2020
☒	CW POWER SENSOR	E4412A	Agilent	US38488240	05, 15, 2020
☒	CW POWER SENSOR	E4412A	Agilent	MY41501662	05, 15, 2020
☒	STACKED DOUBLE LOG-PER- ANTENNA	STPL9128 D	SCHWARZBECK	9128D038	-
☒	HORN ANTENNA	BBHA 9120D	SCHWARZBECK	9120D-1802	03, 12, 2020

Test Conditions

Temperature: 24,1 °C
Relative Humidity: 54,6 % R.H.
Atmospheric Pressure: 99,1 kPa



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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

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Test Data

■ AC 24 V

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

■ DC 12 V

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

■ PoE

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 E.U.T
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

RemarksPASS Required Performance Criteria.

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3.3 Electrical Fast Transients / Bursts

Reference Standard

EN 61000-4-4:2012

Test Date

Aug. 18, 2019

Test Location

EMS-EFT: Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	iec.control	AMETEK CTS	7.1.2	-
☒	ULTRA COMPACT SIMULATOR	UCS 500 N5	EM TEST	V0936105120	06, 24, 2020
☒	MOTOR VARIAC	MV2616	EM TEST	V0936105123	06, 24, 2020
☒	CAPACITIVE COUPLING CLAMP	HFK	EM TEST	070925	06, 24, 2020

Test Conditions

Temperature: 23,4 °C
Relative Humidity: 53,5 % R.H.
Atmospheric Pressure: 99,9 kPa

Test Specifications

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

Pulse Amplitude & Polarity:
(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: ☒ A

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Test Data

■ AC 24 V

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

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

☐ 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	A	A
Alarm IN	A	A
Alarm OUT	A	A
RS-485	A	A

■ DC 12 V

☐ 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)
L1	A	A
L2	A	A
L1 – L2	A	A

☒ Signal ports and telecommunication ports – Coupling Clamp used

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
RJ-45	A	A
Alarm IN	A	A
Alarm OUT	A	A
RS-485	A	A

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■ PoE

☐ 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	A	A
Alarm IN	A	A
Alarm OUT	A	A
RS-485	A	A

Note: “Blank” = Not performed

Observations:

A – No response observed from E.U.T

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**PASS Required Performance Criteria.

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3.4 Surge Transients

Reference Standard

EN 61000-4-5:2014

Test Date

Aug. 18, 2019

Test Location

EMS-Surge: Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	iec.control	AMETEK CTS	7.1.2	-
☒	ULTRA COMPACT SIMULATOR	UCS 500 N5	EM TEST	V0936105120	06, 24, 2020
☒	MOTOR VARIAC	MV2616	EM TEST	V0936105123	06, 24, 2020
☐	CDN	CNV 508N1	EM TEST	P1551168979	04, 22, 2020
☐	CDN	CNV 508T5	EM TEST	P1549168422	04, 22, 2020
☒	CDN	CNV 504N7.3	EM TEST	P1744207079	11, 28, 2019

Test Conditions

Temperature: 23,4 °C
Relative Humidity: 53,5 % R.H.
Atmospheric Pressure: 99,9 kPa

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Test Specifications**Power Lines**

Source Impedance: 12 ohm for common Mode and 2 ohm for differential Mode and 42 ohm for DC Mode ((power supply is isolated from earth)

Surge Amplitude :

Common Mode☐ 2 kVDifferential Mode☒ 1 kV

Number of Surges:

☒ 5 surges per angle

Angle:

☒ 0°, 90°, 180°, 270° (input AC power port)

Polarity:

☒ Positive & Negative

Repetition Rate:

☐ 1 surge per min ☒ 1 surge per 30 sec.Required Performance Criteria: ☒ B**Signal Lines**

Source Impedance:

42 ohm

Surge Amplitude:

Common Mode☒ 2 kVDifferential Mode☒ 1 kV

Number of Surges:

☒ 5 Surges

Polarity:

☒ Positive & Negative

Repetition Rate:

☒ 1 surge per min ☐ 1 surge per 30 sec.Required Performance Criteria: ☒ B

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Test Data

■ AC 24 V

☒ Line to Line – Differential Mode

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

☐ Line to Earth – Common Mode

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

Signal Lines

☒ Line to Earth – Common Mode

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
RJ-45	B	B
Alarm IN	B	B
Alarm OUT	B	B
RS-485	B	B

■ DC 12 V

☒ Line to Line – Differential Mode

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
L1 – L2	B	B

☐ Line to Earth – Common Mode

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

Signal Lines

☒ Line to Line –Differential Mode

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
RJ-45	B	B
Alarm IN	B	B
Alarm OUT	B	B
RS-485	B	B

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■ PoE

☐ 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 Line –Differential Mode

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
RJ-45	B	B
Alarm IN	B	B
Alarm OUT	B	B
RS-485	B	B

Note: "Blank" = Not performed

Observations:

- A – No response observed from E.U.T
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

RemarksPASS Required Performance Criteria.

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3.5 Conducted Disturbance

Reference Standard

EN 61000-4-6:2014

Test Date

Aug. 15, 2019

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	5.3.11	-
☒	CONTINUOUS WAVE SIMULATOR	CWS 500N1.4	EM TEST	P1602169880	11, 26, 2019
☒	ATTENUATOR	ATT 6/80	EM TEST	P1614178148	11, 26, 2019
☒	CDN	CDN M016	TESEQ	43694	11, 26, 2019
☒	CDN	CDN M016	TESEQ	43697	11, 26, 2019
☒	CDN	CDN T800	TESEQ	42800	11, 26, 2019
☒	EM CLAMP	KEMZ 801A	TESEQ	44099	11, 27, 2019

Test Conditions

Temperature: 23,4 °C
Relative Humidity: 57,0 % R.H.
Atmospheric Pressure: 99,8 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

■ AC 24 V

☒ Input a.c. power ports

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

☐ Input d.c. power ports

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

☒ Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Observations
RJ-45	CDN	A
Alarm IN	Clamp	A
Alarm OUT	Clamp	A
RS-485	Clamp	A

■ DC 12 V

☐ Input a.c. power ports

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

☒ Input d.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Observations
L1 – L2	CDN	A

☒ Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Observations
RJ-45	CDN	A
Alarm IN	Clamp	A
Alarm OUT	Clamp	A
RS-485	Clamp	A

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Report No.:

KES-E1-19T0492-R2

Page (38) of (71)

■ PoE

☐ Input a.c. power ports

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

☐ Input d.c. power ports

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

☒ Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Observations
RJ-45	CDN	A
Alarm IN	Clamp	A
Alarm OUT	Clamp	A
RS-485	Clamp	A

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

Observations:

- A – No response observed from E.U.T
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

PASS Required Performance Criteria.

APPENDIX A – TEST DATA

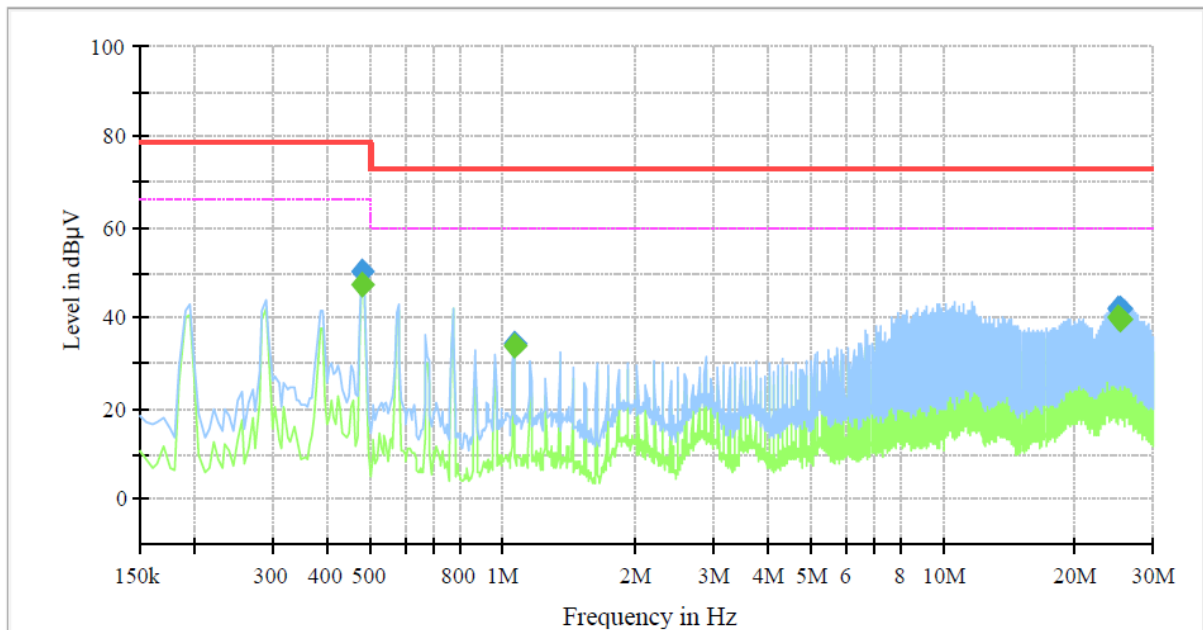
Conducted Emissions at Mains Power Ports

- AC 24 V

[HOT]

Common Information

Test Description:	Conducted Emission
Model No.:	XNB-8000
Phase:	
Mode:	AC_H
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.480000	---	47.40	66.00	18.60	1000.0	9.000	L1	19.8
0.480000	50.31	---	79.00	28.69	1000.0	9.000	L1	19.8
1.060000	---	34.00	60.00	26.00	1000.0	9.000	L1	20.4
1.060000	34.20	---	73.00	38.80	1000.0	9.000	L1	20.4
25.140000	---	39.96	60.00	20.04	1000.0	9.000	L1	20.5
25.140000	42.09	---	73.00	30.91	1000.0	9.000	L1	20.5
25.430000	---	39.93	60.00	20.07	1000.0	9.000	L1	20.5
25.430000	42.26	---	73.00	30.74	1000.0	9.000	L1	20.5

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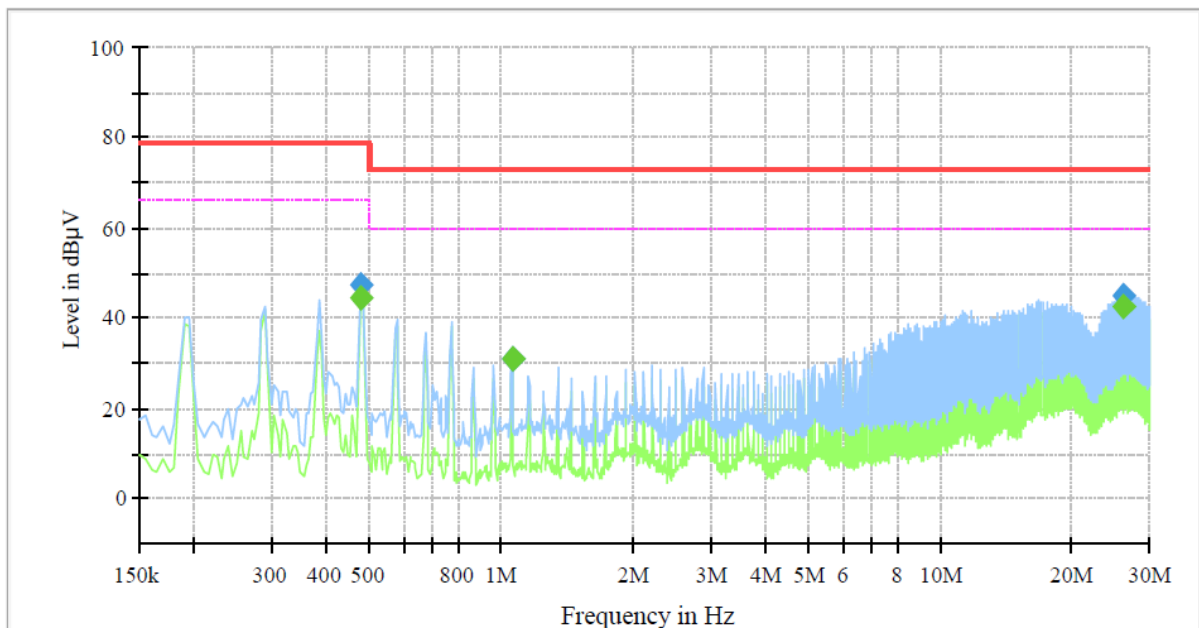
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[NEUTRAL]

Common Information

Test Description:	Conducted Emission
Model No.:	XNB-8000
Phase:	
Mode:	AC_N
Operator Name:	KES



Final_Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.480000	---	44.59	66.00	21.41	1000.0	9.000	N	19.8
0.480000	47.39	---	79.00	31.61	1000.0	9.000	N	19.8
1.060000	---	30.80	60.00	29.20	1000.0	9.000	N	20.4
1.060000	31.01	---	73.00	41.99	1000.0	9.000	N	20.4
26.100000	---	42.63	60.00	17.37	1000.0	9.000	N	20.6
26.100000	45.02	---	73.00	27.98	1000.0	9.000	N	20.6

- DC 12 V

[HOT]

Common Information

Test Description:

Conducted Emission

Model No.:

XNB-8000

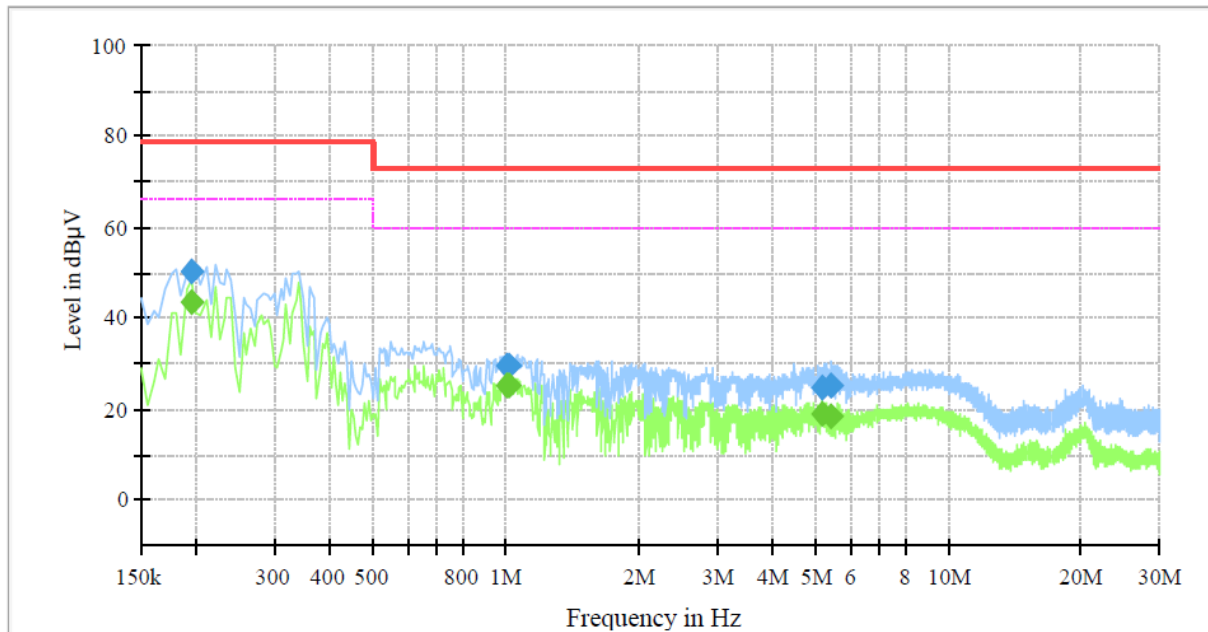
Phase:

Mode:

DC_H

Operator Name:

KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.195000	---	43.33	66.00	22.67	1000.0	9.000	L1	19.5
0.195000	50.15	---	79.00	28.85	1000.0	9.000	L1	19.5
1.010000	---	25.10	60.00	34.90	1000.0	9.000	L1	20.3
1.010000	29.36	---	73.00	43.64	1000.0	9.000	L1	20.3
1.020000	---	25.17	60.00	34.83	1000.0	9.000	L1	20.3
1.020000	29.77	---	73.00	43.23	1000.0	9.000	L1	20.3
5.165000	---	18.81	60.00	41.19	1000.0	9.000	L1	19.7
5.165000	24.84	---	73.00	48.16	1000.0	9.000	L1	19.7
5.425000	---	18.46	60.00	41.54	1000.0	9.000	L1	19.7
5.425000	24.99	---	73.00	48.01	1000.0	9.000	L1	19.7

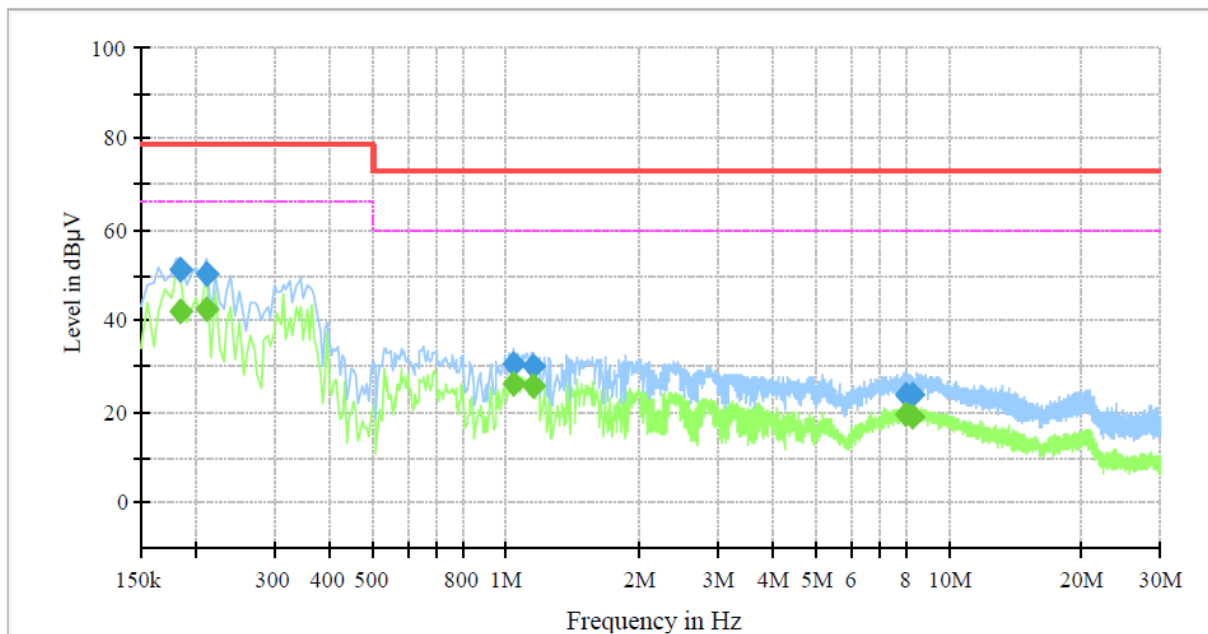
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[NEUTRAL]
Common Information

Test Description:	Conducted Emission
Model No.:	XNB-8000
Phase:	
Mode:	DC_N
Operator Name:	KES


Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.185000	---	42.06	66.00	23.94	1000.0	9.000	N	19.5
0.185000	51.26	---	79.00	27.74	1000.0	9.000	N	19.5
0.210000	---	42.82	66.00	23.18	1000.0	9.000	N	19.5
0.210000	50.49	---	79.00	28.51	1000.0	9.000	N	19.5
1.040000	---	25.99	60.00	34.01	1000.0	9.000	N	20.4
1.040000	30.63	---	73.00	42.37	1000.0	9.000	N	20.4
1.150000	---	25.82	60.00	34.18	1000.0	9.000	N	20.4
1.150000	30.07	---	73.00	42.93	1000.0	9.000	N	20.4
7.955000	---	19.40	60.00	40.60	1000.0	9.000	N	20.1
7.955000	23.74	---	73.00	49.26	1000.0	9.000	N	20.1
8.300000	---	19.08	60.00	40.92	1000.0	9.000	N	20.1
8.300000	23.82	---	73.00	49.18	1000.0	9.000	N	20.1

◆ 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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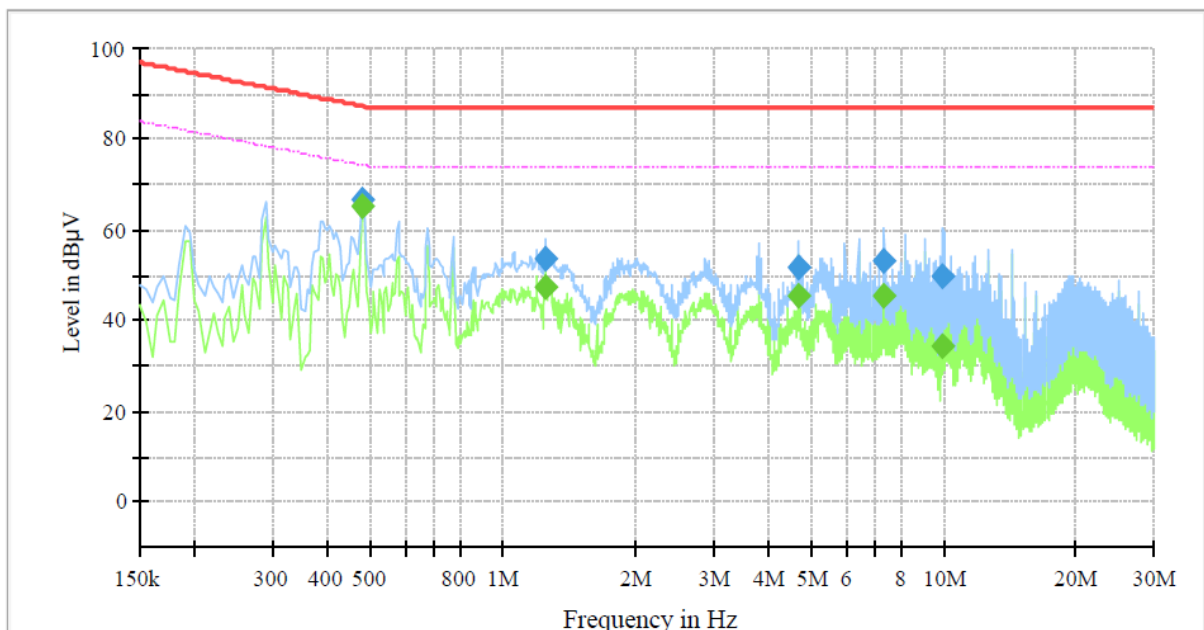
Conducted Emissions at Telecommunication Ports

■ AC 24 V

[10 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	XNB-8000
Mode :	
Speed :	AC_ 10 Mbps
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.480000	---	65.19	74.34	9.15	1000.0	9.000	Single Line	20.0
0.480000	66.75	---	87.34	20.59	1000.0	9.000	Single Line	20.0
1.250000	---	47.19	74.00	26.81	1000.0	9.000	Single Line	20.4
1.250000	53.80	---	87.00	33.20	1000.0	9.000	Single Line	20.4
4.675000	---	45.44	74.00	28.56	1000.0	9.000	Single Line	19.6
4.675000	51.56	---	87.00	35.44	1000.0	9.000	Single Line	19.6
7.335000	---	45.61	74.00	28.39	1000.0	9.000	Single Line	19.9
7.335000	53.15	---	87.00	33.85	1000.0	9.000	Single Line	19.9
9.990000	---	34.18	74.00	39.82	1000.0	9.000	Single Line	20.0
9.990000	49.95	---	87.00	37.05	1000.0	9.000	Single Line	20.0

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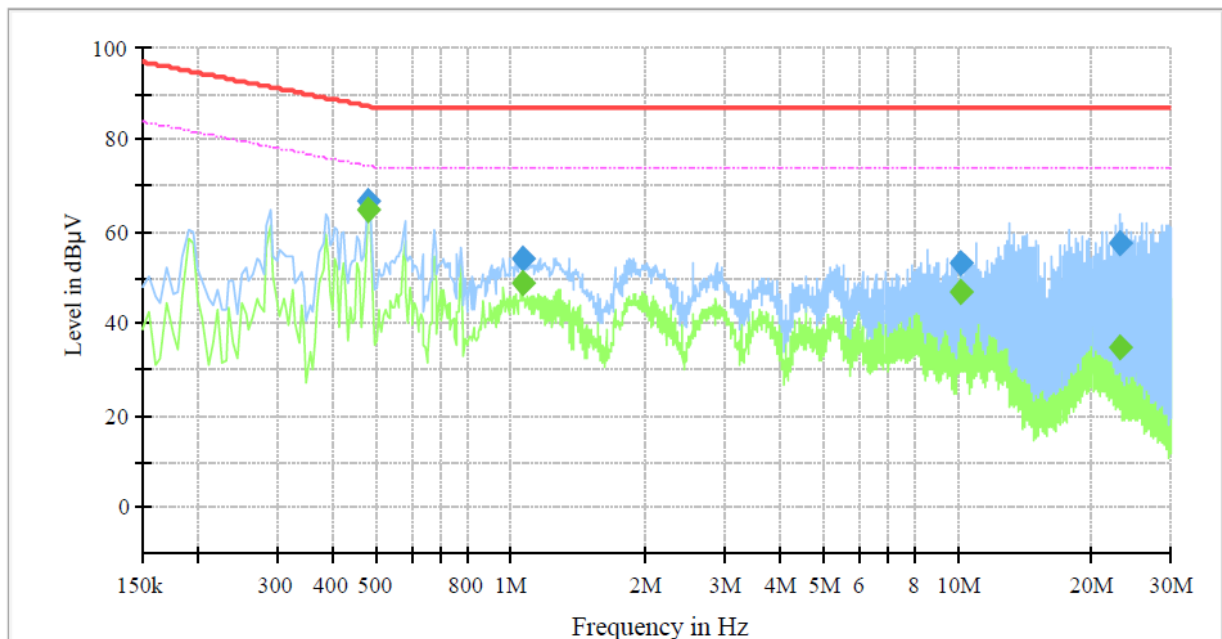
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[100 Mbps]

Common Information

Test Description: Telecommunication Emission
 Model No.: XNB-8000
 Mode :
 Speed : AC_ 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)
0.480000	---	64.91	74.34	9.43	1000.0	9.000	Single Line	19.9
0.480000	66.47	---	87.34	20.87	1000.0	9.000	Single Line	19.9
1.060000	---	48.87	74.00	25.13	1000.0	9.000	Single Line	20.3
1.060000	54.40	---	87.00	32.60	1000.0	9.000	Single Line	20.3
10.115000	---	46.78	74.00	27.22	1000.0	9.000	Single Line	19.9
10.115000	52.97	---	87.00	34.03	1000.0	9.000	Single Line	19.9
23.130000	---	35.05	74.00	38.95	1000.0	9.000	Single Line	20.5
23.130000	57.51	---	87.00	29.49	1000.0	9.000	Single Line	20.5

■ DC 12 V

[10 Mbps]

Common Information

Test Description:

Telecommunication Emission

Model No.:

XNB-8000

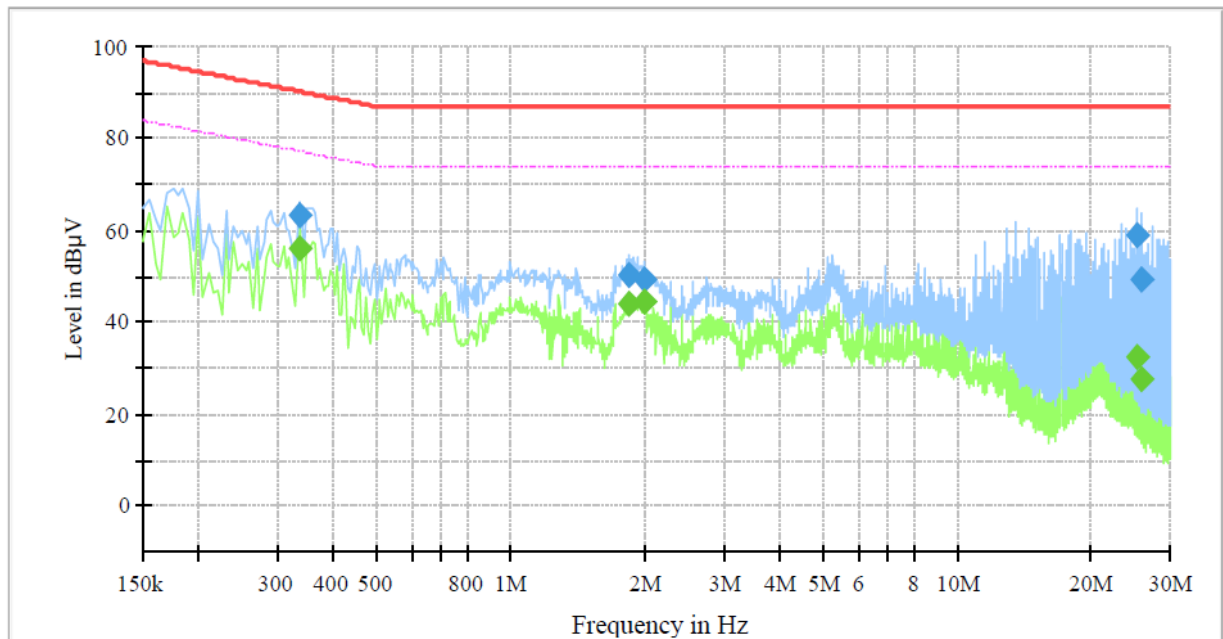
Mode :

DC_ 10 Mbps

Speed :

Operator Name:

KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.335000	---	56.13	77.33	21.20	1000.0	9.000	Single Line	20.0
0.335000	63.24	---	90.33	27.09	1000.0	9.000	Single Line	20.0
1.845000	---	44.04	74.00	29.96	1000.0	9.000	Single Line	20.5
1.845000	50.51	---	87.00	36.49	1000.0	9.000	Single Line	20.5
1.995000	---	44.73	74.00	29.27	1000.0	9.000	Single Line	20.5
1.995000	49.29	---	87.00	37.71	1000.0	9.000	Single Line	20.5
25.340000	---	32.63	74.00	41.37	1000.0	9.000	Single Line	20.8
25.340000	58.94	---	87.00	28.06	1000.0	9.000	Single Line	20.8
25.765000	---	27.48	74.00	46.52	1000.0	9.000	Single Line	20.8
25.765000	49.40	---	87.00	37.60	1000.0	9.000	Single Line	20.8

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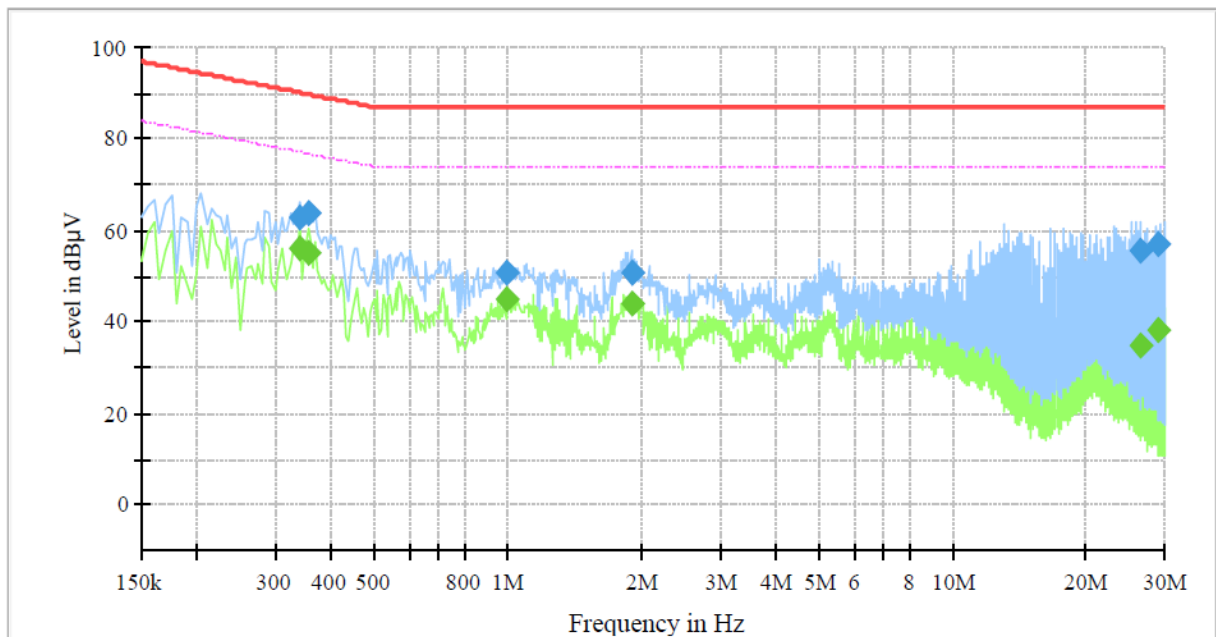
KES-E1-19T0492-R2

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[100 Mbps]

Common Information

Test Description: Telecommunication Emission
Model No.: XNB-8000
Mode : DC_ 100 Mbps
Speed :
Operator Name: KES



Final Result

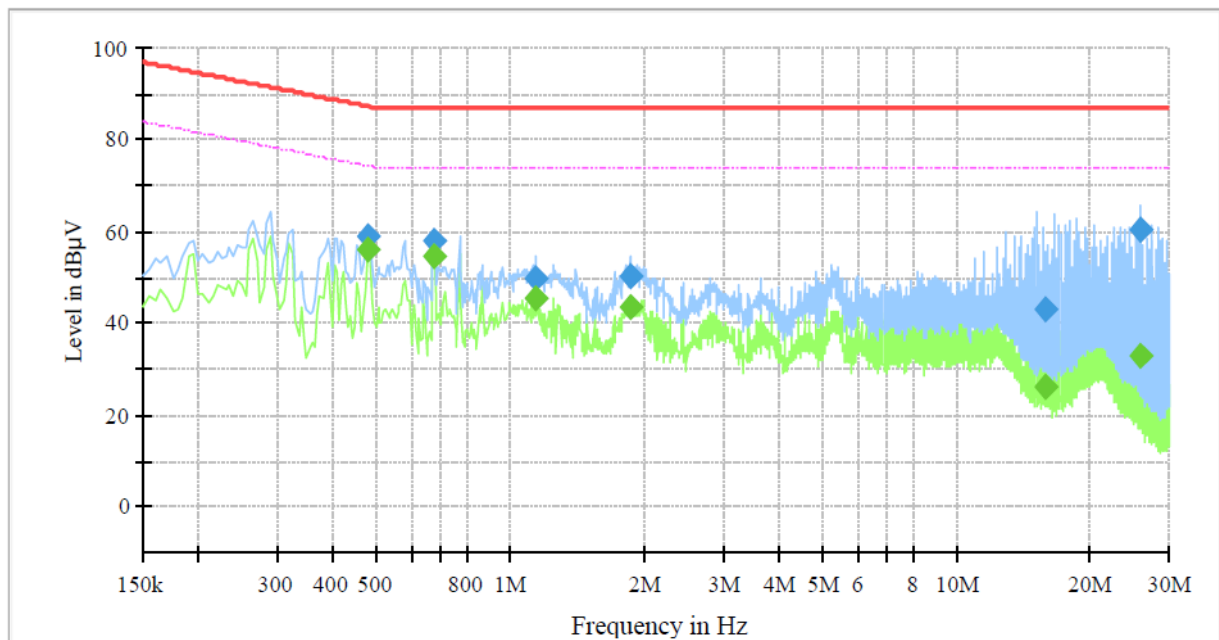
Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.340000	---	56.20	77.20	21.00	1000.0	9.000	Single Line	19.8
0.340000	62.65	---	90.20	27.55	1000.0	9.000	Single Line	19.8
0.355000	---	55.29	76.84	21.55	1000.0	9.000	Single Line	19.8
0.355000	63.67	---	89.84	26.17	1000.0	9.000	Single Line	19.8
0.995000	---	44.87	74.00	29.13	1000.0	9.000	Single Line	20.3
0.995000	50.74	---	87.00	36.26	1000.0	9.000	Single Line	20.3
1.895000	---	44.13	74.00	29.87	1000.0	9.000	Single Line	20.3
1.895000	50.81	---	87.00	36.19	1000.0	9.000	Single Line	20.3
26.485000	---	35.08	74.00	38.92	1000.0	9.000	Single Line	20.6
26.485000	55.82	---	87.00	31.18	1000.0	9.000	Single Line	20.6
29.140000	---	38.27	74.00	35.73	1000.0	9.000	Single Line	20.9
29.140000	56.91	---	87.00	30.09	1000.0	9.000	Single Line	20.9

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■ PoE
[10 Mbps]

Common Information

Test Description: Telecommunication Emission
 Model No.: XNB-8000
 Mode : PoE_ 10 Mbps
 Speed :
 Operator Name: KES



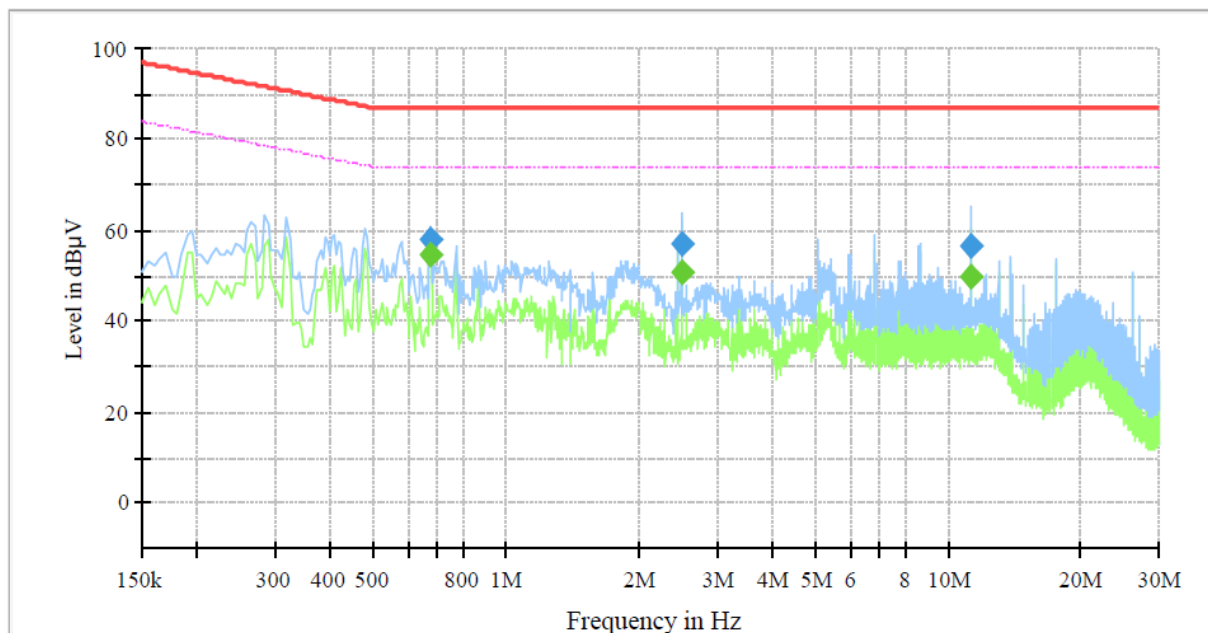
Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.480000	---	56.27	74.34	18.07	1000.0	9.000	Single Line	20.0
0.480000	59.17	---	87.34	28.17	1000.0	9.000	Single Line	20.0
0.675000	---	54.67	74.00	19.33	1000.0	9.000	Single Line	20.2
0.675000	58.26	---	87.00	28.74	1000.0	9.000	Single Line	20.2
1.140000	---	45.33	74.00	28.67	1000.0	9.000	Single Line	20.4
1.140000	49.87	---	87.00	37.13	1000.0	9.000	Single Line	20.4
1.855000	---	43.72	74.00	30.28	1000.0	9.000	Single Line	20.5
1.855000	50.21	---	87.00	36.79	1000.0	9.000	Single Line	20.5
15.770000	---	26.22	74.00	47.78	1000.0	9.000	Single Line	20.3
15.770000	43.07	---	87.00	43.93	1000.0	9.000	Single Line	20.3
26.015000	---	33.00	74.00	41.00	1000.0	9.000	Single Line	20.8
26.015000	60.53	---	87.00	26.47	1000.0	9.000	Single Line	20.8

[100 Mbps]

Common Information

Test Description: Telecommunication Emission
 Model No.: XNB-8000
 Mode : PoE_ 100 Mbps
 Speed :
 Operator Name: KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.675000	---	54.80	74.00	19.20	1000.0	9.000	Single Line	20.1
0.675000	58.16	---	87.00	28.84	1000.0	9.000	Single Line	20.1
2.500000	---	50.97	74.00	23.03	1000.0	9.000	Single Line	20.2
2.500000	57.27	---	87.00	29.73	1000.0	9.000	Single Line	20.2
11.250000	---	49.78	74.00	24.22	1000.0	9.000	Single Line	19.8
11.250000	56.78	---	87.00	30.22	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))



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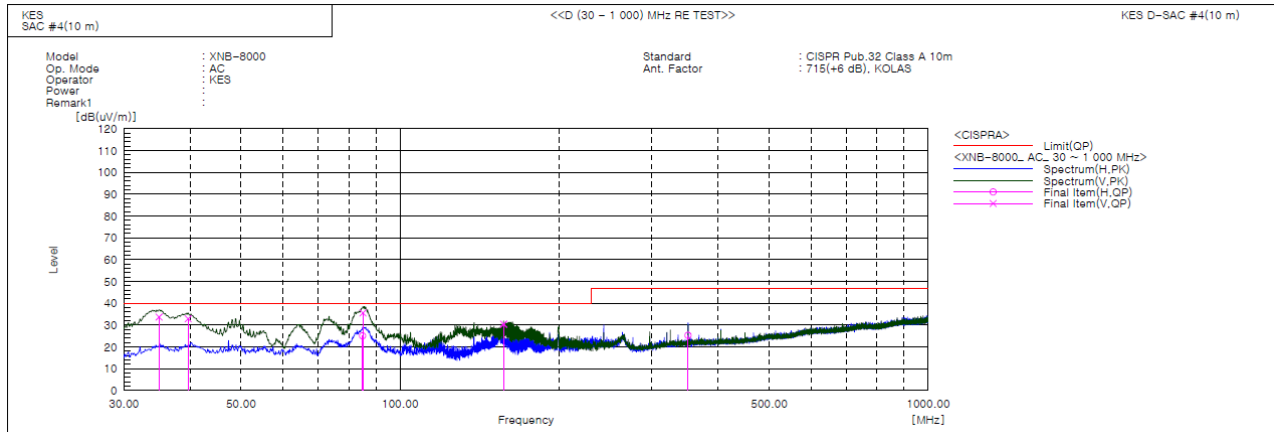
Report No.:

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Radiated Electric Field Emissions(Below 1 GHz)

■ AC 24 V



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	34.971	V	58.6	-24.9	33.7	40.0	6.3	158.0	110.0	
2	39.700	V	55.9	-23.0	32.9	40.0	7.1	110.0	290.0	
3	84.926	H	51.4	-26.3	25.1	40.0	14.9	369.0	301.0	
4	85.048	V	61.8	-26.2	35.6	40.0	4.4	162.0	74.0	
5	157.070	V	55.8	-25.3	30.5	40.0	9.5	113.0	286.0	
6	350.949	H	41.5	-16.2	25.3	47.0	21.7	259.0	326.0	

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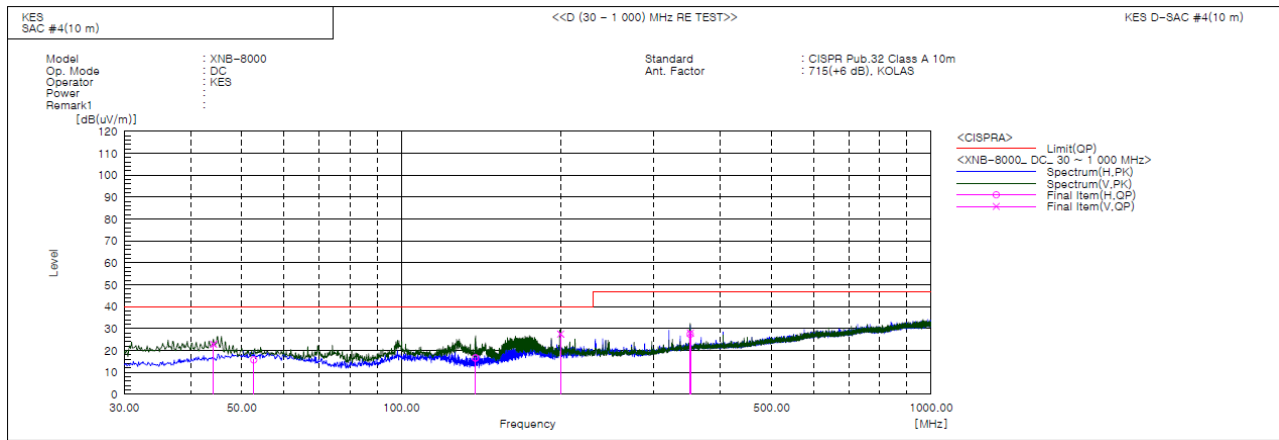


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DC 12 V



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	44.204	V	44.8	-21.9	22.9	40.0	17.1	312.0	329.0	
2	52.674	H	37.2	-21.5	15.7	40.0	24.3	241.0	349.0	
3	138.034	H	42.6	-26.0	16.6	40.0	23.4	369.0	175.0	
4	199.913	V	49.3	-21.8	27.5	40.0	12.5	105.0	182.0	
5	350.949	H	43.6	-16.2	27.4	47.0	19.6	329.0	110.0	
6	351.356	V	44.2	-16.2	28.0	47.0	19.0	139.0	23.0	

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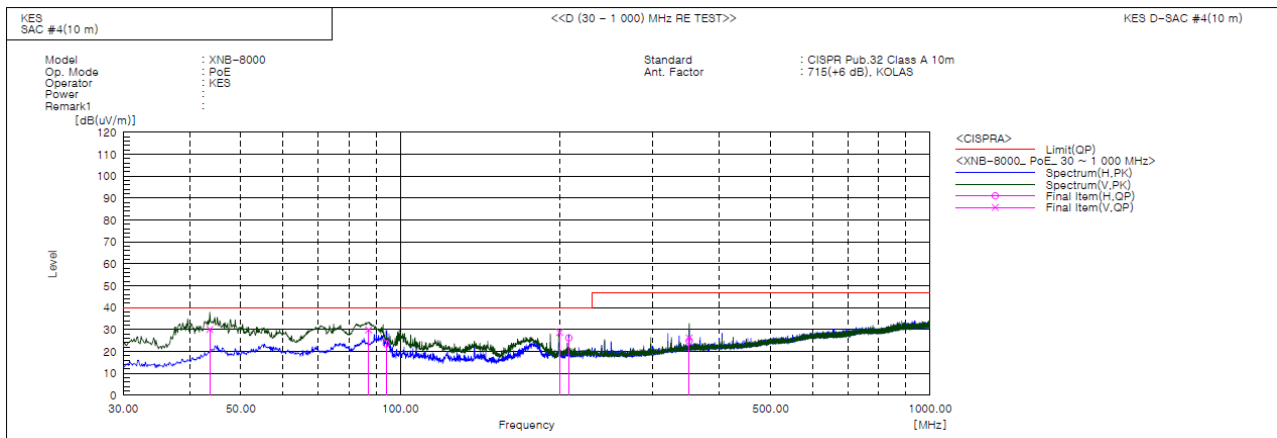
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Report No.:

KES-E1-19T0492-R2

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PoE



Final Result

No.	Frequency	(P)	Reading	c.f	Result	Limit	Margin	Height	Angle	Remark
	[MHz]		QP		QP	QP	QP			
			[dB(uV)]	[dB(1/m)]	[dB(uV/m)]	[dB(uV/m)]	[dB]	[cm]	[deg]	
1	43.701	V	52.1	-22.0	30.1	40.0	9.9	151.0	103.0	
2	87.109	V	55.5	-25.6	29.9	40.0	10.1	139.0	114.0	
3	94.020	H	47.2	-23.6	23.6	40.0	16.4	362.0	233.0	
4	199.871	V	50.5	-21.8	28.7	40.0	11.3	116.0	167.0	
5	207.995	H	47.3	-21.1	26.2	40.0	13.8	349.0	93.0	
6	350.949	V	42.4	-16.2	26.2	47.0	20.8	125.0	346.0	
7	350.991	H	41.0	-16.2	24.8	47.0	22.2	210.0	321.0	

◆ Calculation – SAC #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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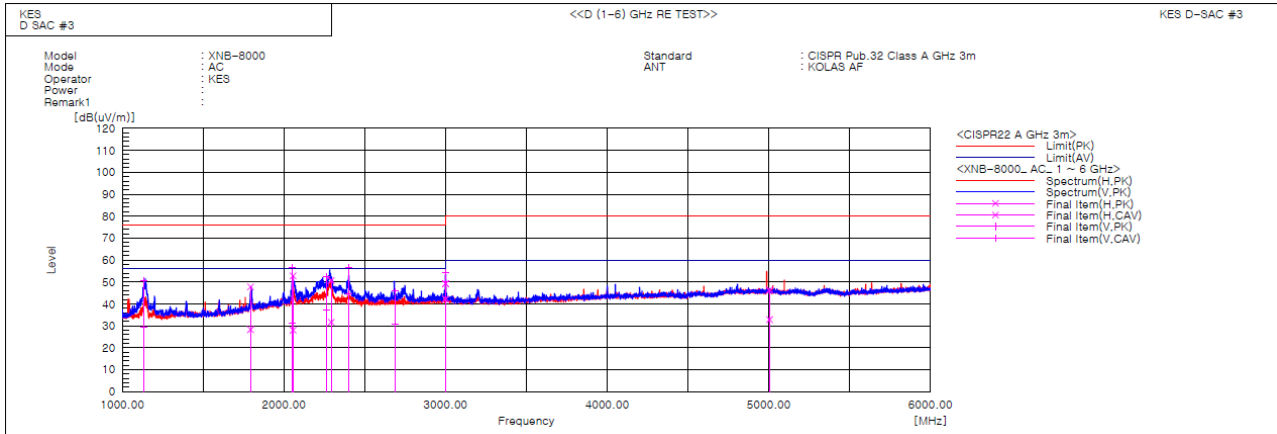
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Radiated Electric Field Emissions(Above 1 GHz)

■ AC 24 V



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	1132.392	V	59.4	38.5	-8.9	50.5	29.6	76.0	56.0	25.5	26.4	100.0	12.5	
2	1793.401	H	51.2	31.8	-3.5	47.7	28.3	76.0	56.0	28.3	27.7	100.0	54.9	
3	2052.971	V	58.3	32.8	-1.7	56.6	31.1	76.0	56.0	19.4	24.9	100.0	24.6	
4	2056.781	H	54.5	29.7	-1.7	52.8	28.0	76.0	56.0	23.2	28.0	100.0	269.5	
5	2262.444	V	53.5	38.4	-1.2	52.3	37.2	76.0	56.0	23.7	18.8	100.0	26.7	
6	2291.649	H	51.8	32.8	-1.1	50.7	31.7	76.0	56.0	25.3	24.3	100.0	357.5	
7	2399.980	V	57.1	45.4	-0.6	56.5	44.8	76.0	56.0	19.5	11.2	100.0	36.3	
8	2688.059	V	45.4	30.4	0.4	45.8	30.8	76.0	56.0	30.2	25.2	100.0	39.7	
9	2999.730	H	47.7	40.8	1.5	49.2	42.3	76.0	56.0	26.8	13.7	100.0	194.3	
10	3000.100	V	52.6	48.7	1.5	54.1	50.2	80.0	60.0	25.9	9.8	100.0	124.1	
11	5004.297	H	38.2	24.6	8.2	46.4	32.8	80.0	60.0	33.6	27.2	100.0	296.5	

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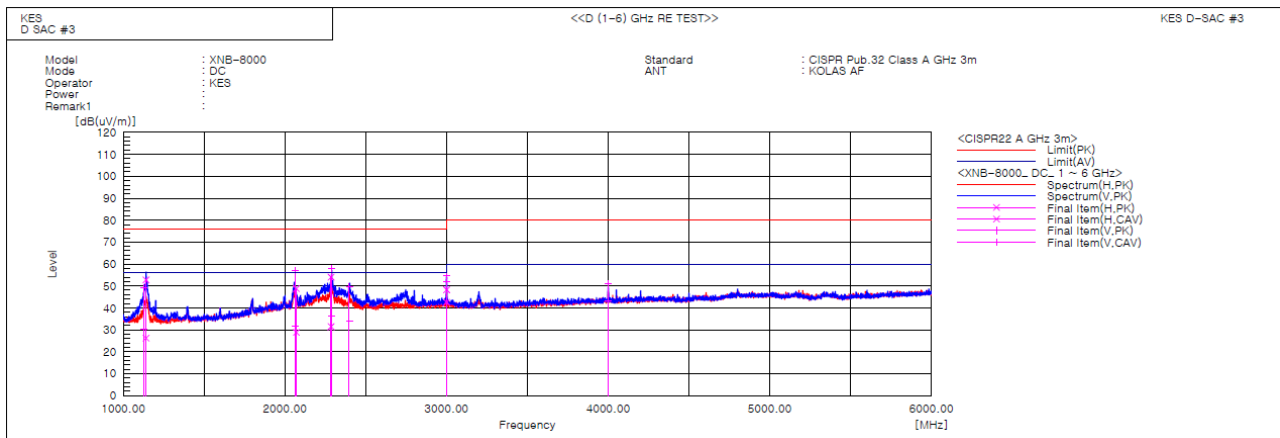
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DC 12 V



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	1126.133	V	57.9	39.1	-8.9	49.0	30.2	76.0	56.0	27.0	25.8	100.0	152.6	
2	1140.500	H	61.6	35.1	-8.9	52.7	26.2	76.0	56.0	23.3	29.8	100.0	233.6	
3	2063.929	V	58.5	33.5	-1.6	56.9	31.9	76.0	56.0	19.1	24.1	100.0	17.3	
4	2069.967	H	50.4	30.4	-1.6	48.8	28.8	76.0	56.0	27.2	27.2	100.0	356.8	
5	2284.950	H	55.2	32.6	-1.1	54.1	31.5	76.0	56.0	21.9	24.5	100.0	315.6	
6	2288.510	V	59.1	37.4	-1.1	58.0	36.3	76.0	56.0	18.0	19.7	100.0	2.9	
7	2397.341	V	50.1	34.4	-0.6	49.5	33.8	76.0	56.0	26.5	22.2	100.0	12.7	
8	3000.160	V	53.4	50.5	1.5	54.9	52.0	80.0	60.0	25.1	8.0	100.0	154.3	
9	3000.350	H	46.8	41.1	1.5	48.3	42.6	80.0	60.0	31.7	17.4	100.0	244.5	
10	3999.870	V	46.2	38.4	4.7	50.9	43.1	80.0	60.0	29.1	16.9	100.0	338.0	

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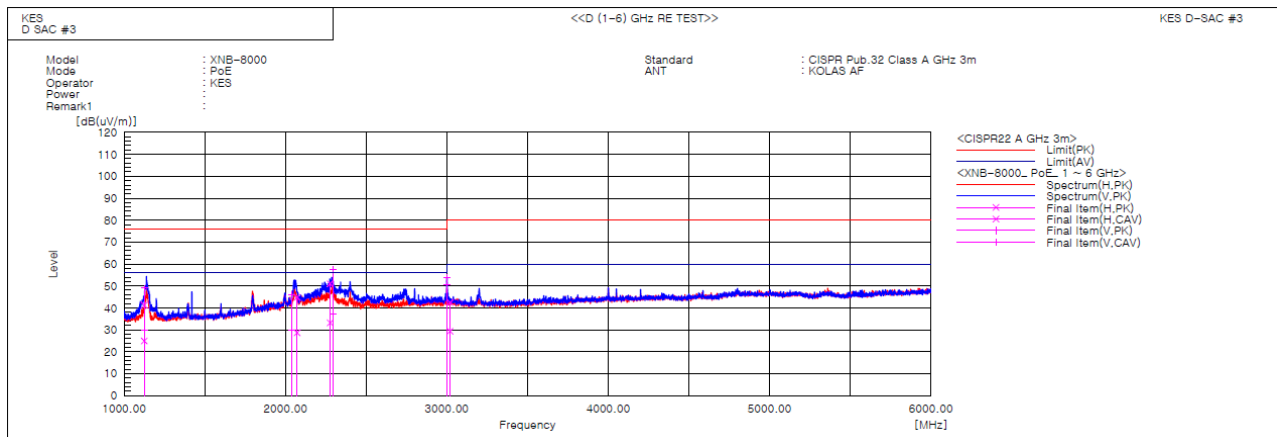
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PoE



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	1124.013	H	50.1	33.9	-8.9	41.2	25.0	76.0	56.0	34.8	31.0	100.0	60.8	
2	1125.672	V	57.9	38.8	-8.9	49.0	29.9	76.0	56.0	27.0	26.1	100.0	2.6	
3	2035.134	V	47.8	31.6	-1.7	46.1	29.9	76.0	56.0	29.9	26.1	100.0	5.2	
4	2071.527	H	46.4	30.3	-1.6	44.8	28.7	76.0	56.0	31.2	27.3	100.0	208.6	
5	2275.853	H	52.1	34.3	-1.1	51.0	33.2	76.0	56.0	25.0	22.8	100.0	195.8	
6	2295.348	V	58.4	38.2	-1.0	57.4	37.2	76.0	56.0	18.6	18.8	100.0	15.4	
7	3000.280	V	52.2	48.9	1.5	53.7	50.4	80.0	60.0	26.3	9.6	100.0	150.2	
8	3020.056	H	40.8	27.8	1.6	42.4	29.4	80.0	60.0	37.6	30.6	100.0	115.3	

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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Harmonic Current Emissions and Voltage Fluctuations and Flicker

Average harmonic current results				
Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	0.134			
2	0.002	0.141	1.080	n/a
3	0.048	2.065	2.300	PASS
4	0.001	0.299	0.430	n/a
5	0.028	2.454	1.140	PASS
6	0.001	0.264	0.300	n/a
7	0.009	1.161	0.770	PASS
8	0.001	0.316	0.230	n/a
9	0.010	2.489	0.400	PASS
10	0.001	0.389	0.184	n/a
11	0.004	1.216	0.330	n/a
12	0.001	0.479	0.153	n/a
13	0.003	1.359	0.210	n/a
14	0.001	0.499	0.131	n/a
15	0.002	1.058	0.150	n/a
16	0.001	0.639	0.115	n/a
17	0.002	1.244	0.132	n/a
18	0.001	0.649	0.102	n/a
19	0.001	1.158	0.118	n/a
20	0.001	0.775	0.092	n/a
21	0.001	0.928	0.161	n/a
22	0.001	0.778	0.084	n/a
23	0.001	0.726	0.147	n/a
24	0.001	0.835	0.077	n/a
25	0.001	0.908	0.135	n/a
26	0.001	0.936	0.071	n/a
27	0.001	0.662	0.125	n/a
28	0.001	0.965	0.066	n/a
29	0.001	0.759	0.116	n/a
30	0.001	1.132	0.061	n/a
31	0.001	0.701	0.109	n/a
32	0.001	1.135	0.058	n/a
33	0.001	0.853	0.102	n/a
34	0.001	1.220	0.054	n/a
35	0.001	0.742	0.096	n/a
36	0.001	1.229	0.051	n/a
37	0.001	0.778	0.091	n/a
38	0.001	1.306	0.048	n/a
39	0.001	0.745	0.087	n/a
40	0.001	1.324	0.046	n/a

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.



Test Data - Harmonics (continued)

Maximum harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	0.134			
2	0.002	0.128	1.620	n/a
3	0.048	1.380	3.450	PASS
4	0.002	0.241	0.645	n/a
5	0.028	1.643	1.710	PASS
6	0.001	0.202	0.450	n/a
7	0.009	0.790	1.155	PASS
8	0.001	0.244	0.345	n/a
9	0.010	1.698	0.600	PASS
10	0.001	0.287	0.276	n/a
11	0.004	0.834	0.495	n/a
12	0.001	0.369	0.230	n/a
13	0.003	0.949	0.315	n/a
14	0.001	0.447	0.197	n/a
15	0.002	0.754	0.225	n/a
16	0.001	0.497	0.173	n/a
17	0.002	0.919	0.199	n/a
18	0.001	0.490	0.153	n/a
19	0.002	0.875	0.178	n/a
20	0.001	0.585	0.138	n/a
21	0.002	1.016	0.161	n/a
22	0.001	0.649	0.125	n/a
23	0.001	0.787	0.147	n/a
24	0.001	0.641	0.115	n/a
25	0.001	1.052	0.135	n/a
26	0.001	0.718	0.106	n/a
27	0.001	0.742	0.125	n/a
28	0.001	0.764	0.099	n/a
29	0.001	0.831	0.116	n/a
30	0.001	0.831	0.092	n/a
31	0.001	0.768	0.109	n/a
32	0.001	1.001	0.086	n/a
33	0.001	0.929	0.102	n/a
34	0.001	0.926	0.081	n/a
35	0.001	0.827	0.096	n/a
36	0.001	0.937	0.077	n/a
37	0.001	0.849	0.091	n/a
38	0.001	0.994	0.073	n/a
39	0.001	0.841	0.087	n/a
40	0.001	0.996	0.069	n/a

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.

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Test Data - Voltage Fluctuations

Maximum Flicker results

Flicker Measurements					
	Plt	Max Pst	Max Dc	Max Dmax	Max Tmax
Line 1:	0.012	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 Voltage Emissions



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Conducted Telecommunication Emissions



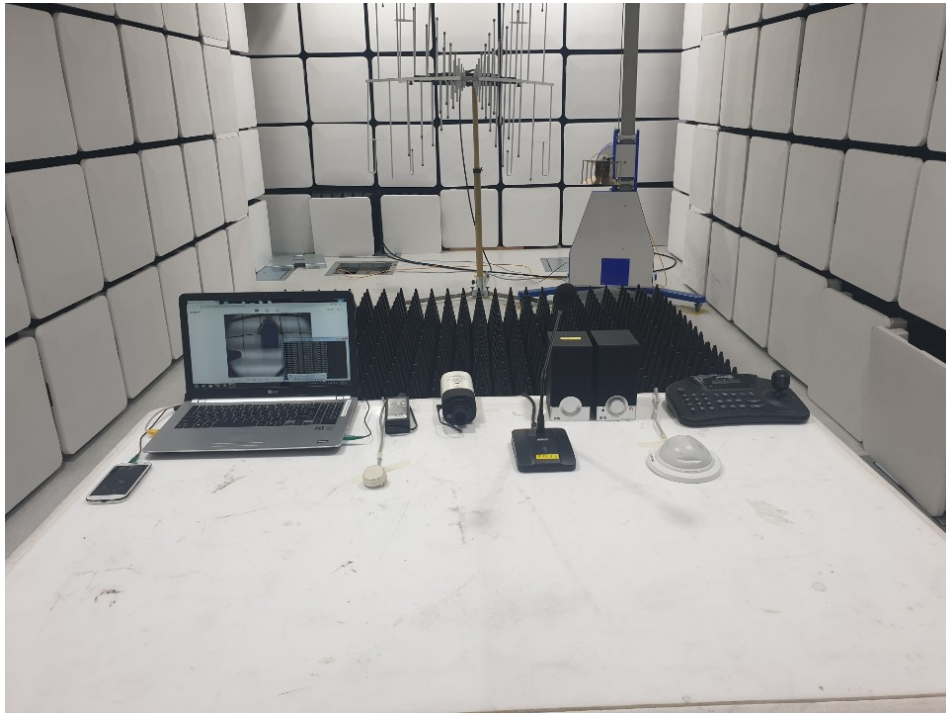
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Radiated Electric Field Emissions(Below 1 GHz)



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Radiated Electric Field Emissions(Above 1 GHz)



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Harmonic Current Emissions and Voltage Fluctuations and Flicker



Electrostatic Discharge



Radiated Electric Field Immunity



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Electrical Fast Transients / Bursts



Surge Transients



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Conducted Disturbance



EUT External Photographs

(Top)



(Bottom)



EUT Internal Photographs

(Internal View)



EUT Internal View – Main board

(Top)



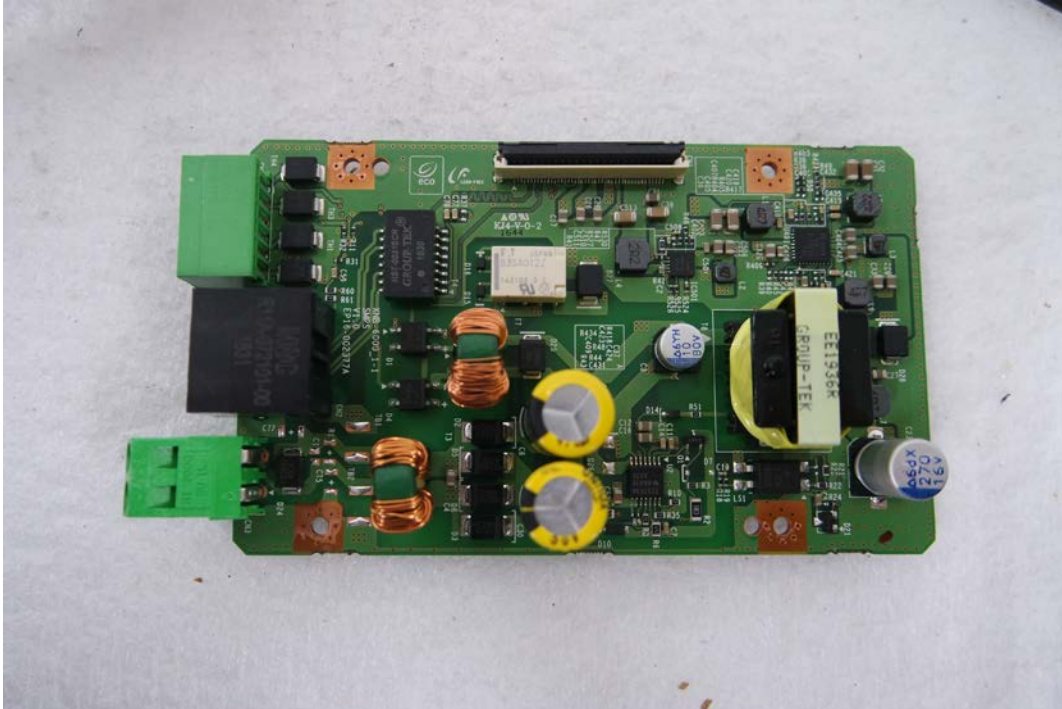
(Bottom)



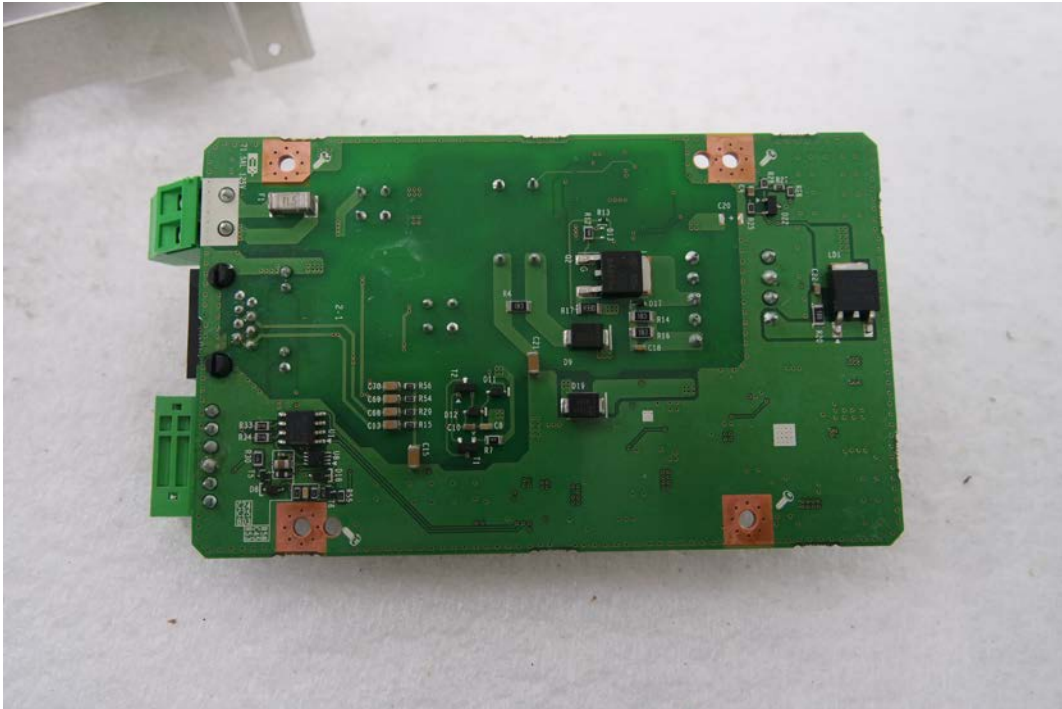
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EUT Internal View – Power board

(Top)



(Bottom)



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EUT Internal View – Lens

(Top)

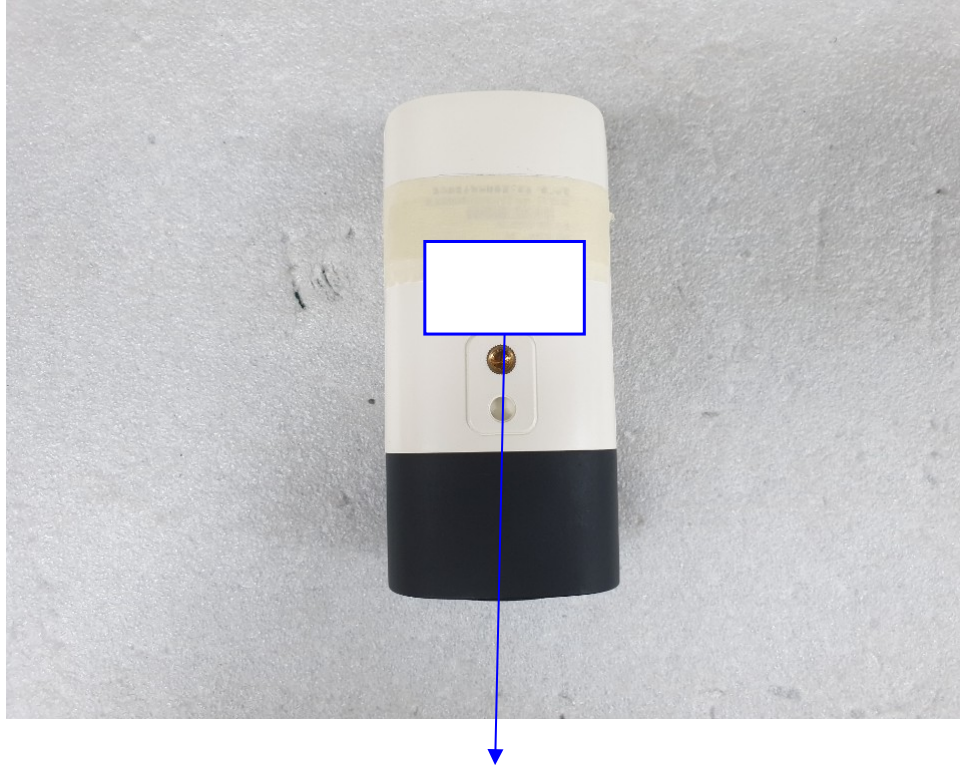


(Bottom)



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