



EMC TEST REPORT For VCCI

Test Report No. : KES-E1-17T0086-R1
Date of Issue : Feb. 24, 2023
Product name : NETWORK CAMERA
Model/Type No. : XNO-8020R
Variant Model : XNO-8030R, XNO-8040R
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 : Jan, 20, 2017
Test date : Feb, 01, 2017
Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Dae Hyun, Kim
EMC Test Engineer

Reviewed by

Dong-Hun, Jang
EMC Technical Manager

Tested by Yung Suk, Song
(Retired person)
Proxy signature : Dae Hyun, Kim

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
Feb. 06, 2017	KES-E1-17T0086	Issued
Feb. 24, 2023	KES-E1-17T0086-R1	Change the Model No, Applicant, Applicant address and manufacturer, manufacturer address at the request of the customer

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1.0 General Product Description

Main Specifications of EUT are:

	XNO-8020R
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 : 0.2 lux(F1.6, 1/30sec) B/W : 0 Lux (IR LED On)
S / N Ratio	50dB
Video Out	CVBS : 1.0 Vp-p / 75Ω composite, 720x480(N), 720x576(P), for installation USB : Micro USB type B, 1280x720, for installation
Lens	
Focal Length (Zoom Ratio)	3.7mm Fixed
Max. Aperture Ratio	F1.6
Angular Field of View	H: 97.5°, V:71.9°, D: 126.2°
Min. Object Distance	0.4m
Focus Control	Manual
Lens Type	Fixed
Mount Type	Board-in type
Operational	
IR Viewable Length	30m(98.43ft)
Camera Title	Off / On (Displayed up to 85 characters) - W/W : English/Numeric/Special Characters - China : English/Numeric/Special/Chinese Characters - Common : Multi-line (Max 5), 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
Wide Dynamic Range	120dB
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 detection) / Manual / Off
Motion Detection	Off/ On(8ea, 8point Polygonal zones), Handover
Privacy Masking	Off / On (32ea, polygonal zones) - Color : Grey/Green/Red/Blue/Black/White - Mosaic
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)
Digital PTZ	24X, 'Digital PTZ(Preset, Group)
Flip / Mirror	Flip : On/Off Mirror : On/Off Hallway view : 90°/270°
Video & Audio Analytics	Tampering, Loitering, Directional Detection, Defocus Detection, Fog&Dust Detection, Virtual Line, Enter/Exit, Appear / Disappear, Audio Detection, Face Detection, Motion Detection, Digital Auto Tracking, Sound Classification, People counting, Heat map, Queue management
Alarm I/O	Input 1ea / Output 1ea
Alarm Triggers	Alarm Input, Motion Detection, Video & Audio 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

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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
Pixel Counter	Support
Network	
Ethernet	RJ-45 (10/100BASE-T)
Video Compression Format	H.265/H.264 (MPEG-4 Part 10/AVC) : Main/Baseline/High , Motion JPEG
Resolution	2560 x 1920, 2560 x 1440, 1920 x 1080, 1600 x 1200, 1280 x 1024, 1280 x 960 1280 x 720, 1024 x 768, 800 x 600, 800 x 448, 720 x 576, 720 x 480, 640 x 480, 640 x 360, 320 x 240
Max. Framerate	H.265/H.264 : Max. 30fps at all resolutions Motion JPEG : Max. 30fps
Smart Codec	Manual Mode (area-based : 5EA)
WiseStream II	Support
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 MJPEG : VBR
Streaming Capability	Multiple Streaming (Up to 10 Profiles)
Audio Compression Format	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
Security	Supported OS: Windows 7, 8, 10, Mac OS X 10.10, 10.11, 10.12 Non-plugin Webviewer Supported Browser: Google Chrome 54, MS Edge 38, Mozilla Firefox 49, Apple Safari 9 (Mac OS X only) Plug-in Webviewer Supported Browser : MS Explore 11, Apple Safari 9 (Mac OS X only)
Streaming Method	Streaming Method
Max. User Access	20 users at Unicast Mode
Edge Storage	SD/SDHC/SDXC 2slot (up to 512 GB) - Continuous recording(1'st slot to 2'nd slot) - Motion Images recorded in the SD/SDHC/SDXC memory card can be downloaded. NAS(Network Attached Storage) Local PC for Instant Recording
Application Programming Interface	ONVIF Profile S/G SUNAPI(HTTP API) Open Platform
Webpage Language	English, Korean, Chinese, French, Italian, Spanish, German, Japanese, Russian, Swedish, Portuguese, Czech, Polish, Turkish, Dutch, Hungarian, Greek
Web Viewer	Supported OS: Windows 7, 8.1, 10, Mac OS X 10.10, 10.11, 10.12 Non-plugin Webviewer Supported Browser: Google Chrome 54, MS Edge 38, Mozilla Firefox 49(Window 64bit only), Apple Safari 9 (Mac OS X only) Plug-in Webviewer Supported Browser : MS Explore 11, Apple Safari 9 (Mac OS X only)
Central Management Software	SmartViewer, SSM
Environmental	
Operating Temperature / Humidity	-30°C ~ +55°C (-22°F ~ +131°F) / Less than 90% RH *Start up should be done at above -20°C

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Storage Temperature / Humidity	-50°C ~ +80°C (-22°F ~ +140°F) / Less than 90% RH
Ingress Protection	IP67, IP68, NEMA 4X
Vandal Resistance	IK10
Electrical	
Input Voltage / Current	12VDC ± 10%, PoE(IEEE802.3af)
Power Consumption	Max. 8.8W(12VDC), Max. 9.8W(PoE)
Mechanical	
Color / Material	Ivory / Aluminum
Dimension (WxHxD)	Ø120x296mm(Ø4.72" x 11.65")
Weight	1.3Kg

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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 ☐ 100 Vac ☐ 110 Vac ☐ 24 Vac ☒ 12 Vdc ☒ PoE
Frequency ☐ 50 Hz ☐ 60 Hz ☐ Hz

1.2 Variant Model Differences

Variant Model	Difference
XNO-8030R	No circuit and hardware changes. Simple sales place distinction. different model.
XNO-8040R	

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
NETWORK CAMERA	XNO-8020R	-	HANWHA VISION VIETNAM COMPANY LIMITED	E.U.T

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
POE Adapter	PD-3001GC/AC	RD9356082016964200	Power Dsine	-
Notebook	X56K	HN11N5151FJ0045W	HANSUNG	-
Notebook Adapter	A12-120P1A	F180271552011758	CHICONY POWER TECHNOLOGY CO.,LTD.	-
Phone	A1530	-	APPLE	-
MIC	CMK-303	-	CAMAC	-
Speaker	BR10000A CUVE	-	BEIJING EDIFIER HI-TECH GROUP.	-
Alarm	-	-	-	-
SD card	-	-	SanDisk	-

1.6 External I/O Cabling

- DC 12 V Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
NETWORK CAMERA (E.U.T)	RJ-45	Notebook	RJ-45	3.0	U
	7 Pin	MIC	3.5 mm	1.7	U
		Speaker	3.5 mm	1.6	U
		Alarm	2 pin	3.0	U
	Slot	SD card	Slot	-	-
Notebook	Audio in	Phone	Audio out	1.7	U

- PoE Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
NETWORK CAMERA (E.U.T)	RJ-45 (POE)	POE Adapter	RJ-45 (POE)	3.0	U
	7 Pin	MIC	3.5 mm	1.7	U
		Speaker	3.5 mm	1.6	U
		Alarm	2 pin	3.0	U
	Slot	SD card	Slot	-	-
Notebook	Audio in	Phone	Audio out	1.7	U
	RJ-45 (DATA)	POE Adapter	RJ-45 (DATA)	3.0	U

* Unshielded = U, Shielded = S

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1.7 EUT Operating Mode(s)

Test mode	operating
DC, POE	E.U.T Monitoring, 1 kHz, Ping Test

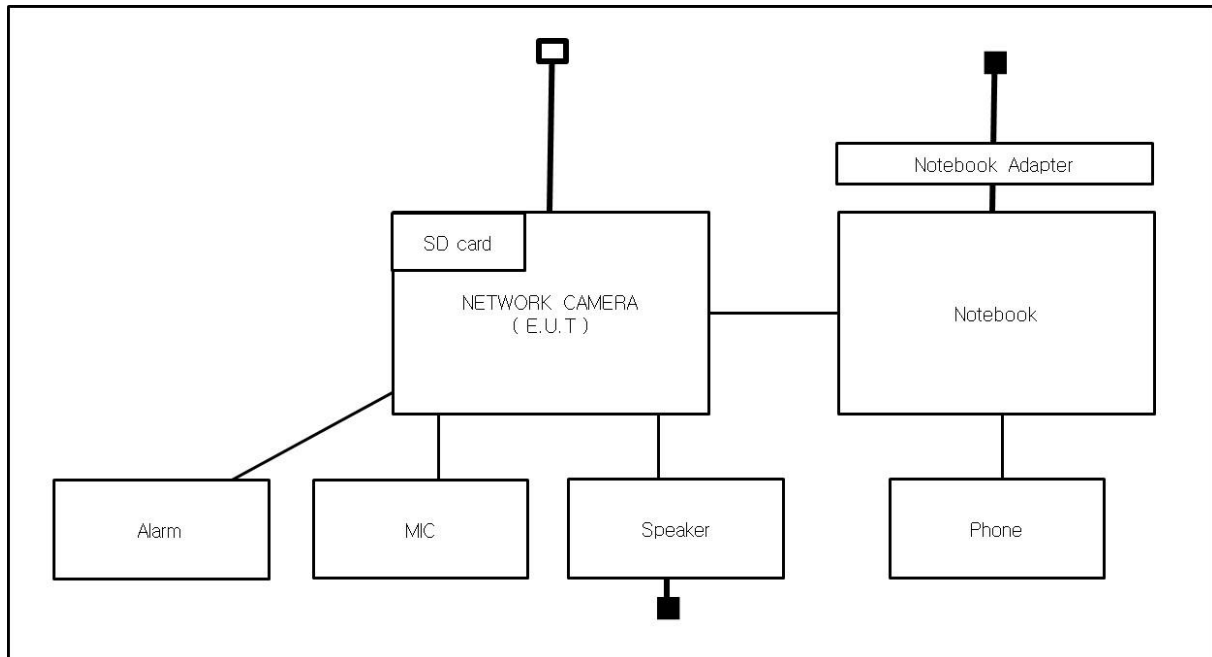
E.U.T Test operating S/W		
Name	Version	Manufacture Company
SmartViewer	-	Hanwha Vision Co., Ltd

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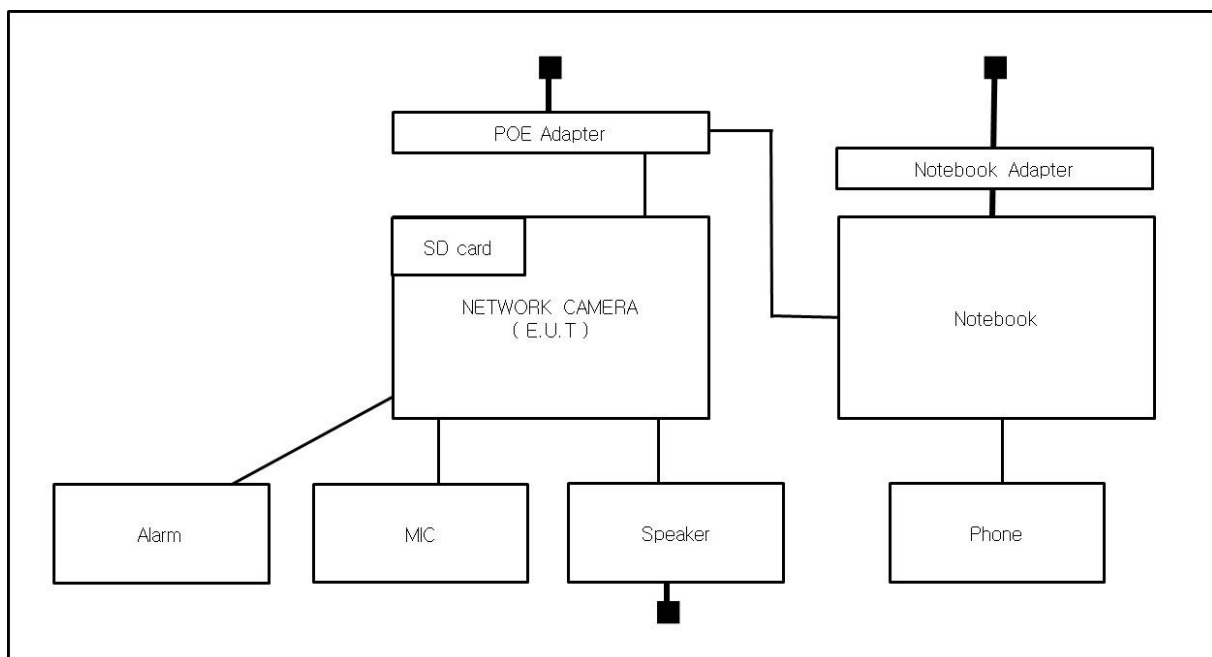
1.8 Configuration

■ AC Main
 □ DC Main

- DC 12 V Mode



- PoE Mode



1.9 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.

1.10 Test Facility

The measurement facility is located at 473-21, Gayeo-ro, Yeoju-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

1.11 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 55022:2010

☐ Class A

☐ Class B

☐ EN 55024:2010 +A1:2015

☐ EN 50130-4:2011 +A1:2014

☐ EN 61000-3-2:2014

☐ EN 61000-3-3:2013

☐ EN 61326-1:2013



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☒ **VCCI V-3 / 2015.04**

☒ Class A

☐ Class B

☐ **AS/NZS CISPR22:2009 +A1:2010**

☐ Class A

☐ Class B

☐ **47 CFR Part 15, Subpart B**

☐ CISPR 22:2009 +A1:2010

☐ Class A

☐ Class B

☐ ANSI C63.4-2009

☐ **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 Mains Power Ports

Test Date

N/A

Test Location

Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☐	EMI Test Receiver	ESR3	R & S	101783	05, 03, 2017
☐	LISN	ENV216	R & S	101137	02, 04, 2017
☐	LISN	ENV216	R & S	101786	05, 02, 2017
☐	Electro wave Shieldroom	-	SEMITEC	-	-
☐	EMI Test S/W	EMC32	R & S	9.12.00	-

Test Conditions

Temperature: °C
Relative Humidity: %

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

N/A Because the E.U.T power is 12 v (dc) power and PoE, limits are not specified.

2.2 Conducted Emissions at Telecommunication Ports

Test Date

Feb, 01, 2017

Test Location

Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test Receiver	ESR3	R & S	101783	05, 03, 2017
☒	LISN	ENV216	R & S	101137	02, 04, 2017
☒	LISN	ENV216	R & S	101786	05, 02, 2017
☒	8-Wire ISN CAT3	CAT3 8158	Schwarzbeck Mess	8158-0019	04, 01, 2017
☒	8-Wire ISN CAT5	CAT5 8158	Schwarzbeck Mess	8158-0030	04, 01, 2017
☐	8-Wire ISN CAT6	NTFM 8158	Schwarzbeck Mess	8158-0029	08, 11, 2017
☒	PULSE LIMITER	ESH3-Z2	R&S	101914	12, 13, 2017
☒	Shield Room #3	-	SEMITEC	-	-
☒	EMI Test S/W	EMC32	R & S	9.12.00	-

Test Conditions

Temperature: 24,7 °C

Relative Humidity: 35,1 %

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.

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2.3 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Feb, 01, 2017

Test Location

☐ Open Area Test Site #1 ☒ Open Area Test Site #2

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI TEST Receiver	ESR3	R&S	101781	05, 03, 2017
☒	Trilog-Broadband Antenna	VULB9163	Schwarzbeck	714	11, 28, 2018
☒	OATS	-	KES	-	-
☒	Antenna Mast	-	DAEIL EMC	-	-
☒	Turn Table	-	DAEIL EMC	-	-
☒	EMI Test S/W	-	-	-	-

Test Conditions

Temperature: 2,2 °C
Relative Humidity: 40,0 %

Frequency Range of Measurement

30 MHz to 1 GHz

Instrument Settings

IF Band Width: 120 kHz

Test Results

The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.

2.4 Radiated Electric Field Emissions(Above 1 GHz)

Test Date

Feb, 01, 2017

Test Location

Semi Anechoic Chamber #2

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	05, 07, 2017
☒	EMI Test Receiver	ESU26	R&S	100552	04, 24, 2017
☒	Broadband Coaxial Preamplifier	BBV 9718	Schwarzbeck Mess - Elektronik	9718-246	10, 14, 2017
☒	Semi Anechoic Chamber #2	-	SEMITEC	-	-
☒	Antenna Mast	-	AUDIX	-	-
☒	Turn Table	-	AUDIX	-	-
☒	EMI Test S/W	e3	AUDIX	8.083b	-

Test Conditions

Temperature: 24,7 °C

Relative Humidity: 35,1 %

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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APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

[HOT]

N/A

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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

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[NEUTRAL]

N/A

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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

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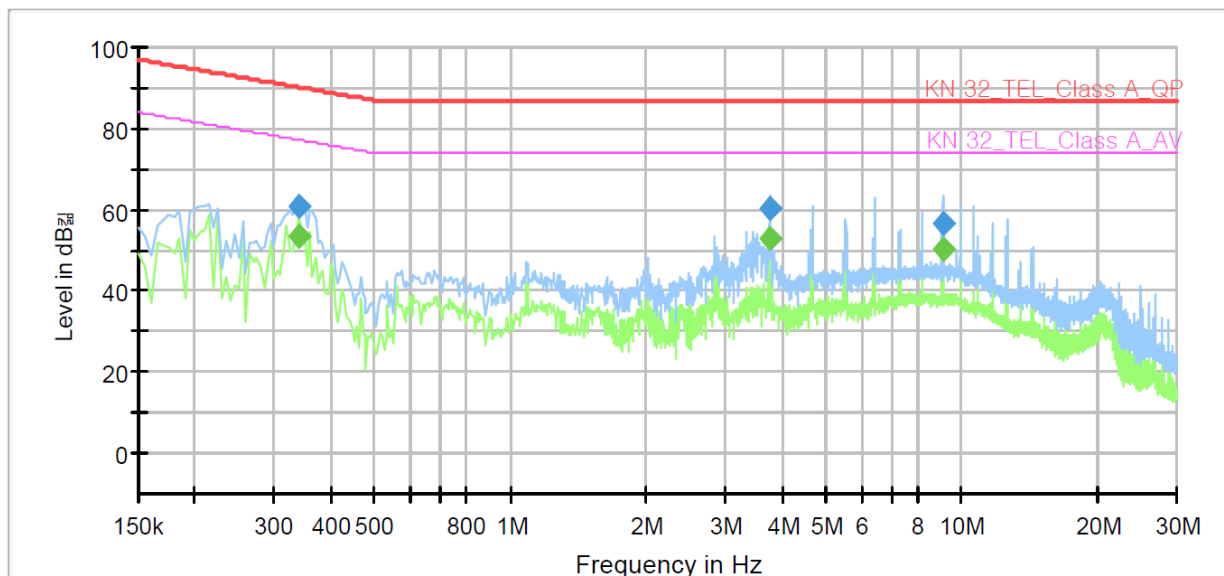
Conducted Emissions at Telecommunication Ports

- DC 12 V Mode

[10 Mbps]

Common Information

Test Description: Telecommunication Emission
 Model No.: XNO-8020RN
 Mode: DC 12V_10M
 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	---	53.58	77.20	23.62	1000.0	9.000	Single Line	21.1
0.340000	60.74	---	90.20	29.46	1000.0	9.000	Single Line	21.1
3.750000	---	52.68	74.00	21.32	1000.0	9.000	Single Line	19.8
3.750000	60.21	---	87.00	26.79	1000.0	9.000	Single Line	19.8
9.075000	---	50.26	74.00	23.74	1000.0	9.000	Single Line	20.0
9.075000	56.57	---	87.00	30.43	1000.0	9.000	Single Line	20.0

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

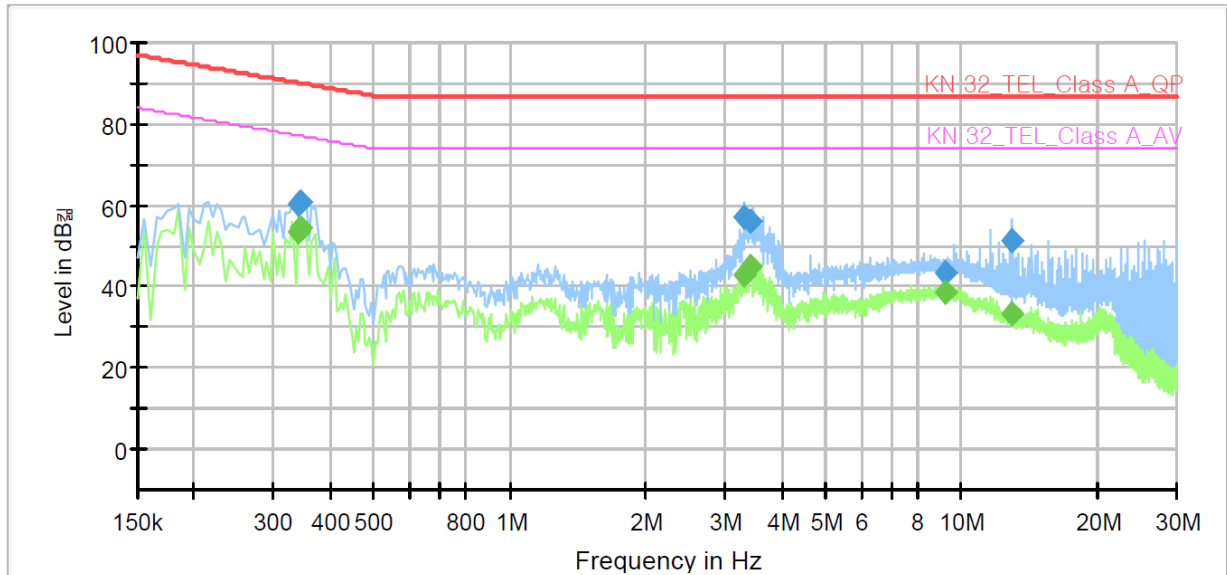
Reading Value : Not shown in the table.

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

[100 Mbps]

Common Information

Test Description: Telecommunication Emission
Model No.: XNO-8020RN
Mode: DC 12V_100M
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	---	53.35	77.20	23.85	1000.0	9.000	Single Line	20.6
0.340000	60.53	---	90.20	29.67	1000.0	9.000	Single Line	20.6
0.345000	---	54.41	77.08	22.67	1000.0	9.000	Single Line	20.6
0.345000	61.06	---	90.08	29.02	1000.0	9.000	Single Line	20.6
3.315000	---	42.89	74.00	31.11	1000.0	9.000	Single Line	19.3
3.315000	57.35	---	87.00	29.65	1000.0	9.000	Single Line	19.3
3.430000	---	45.06	74.00	28.94	1000.0	9.000	Single Line	19.3
3.430000	56.27	---	87.00	30.73	1000.0	9.000	Single Line	19.3
9.265000	---	38.71	74.00	35.29	1000.0	9.000	Single Line	19.5
9.265000	43.46	---	87.00	43.54	1000.0	9.000	Single Line	19.5
13.005000	---	33.16	74.00	40.84	1000.0	9.000	Single Line	19.5
13.005000	51.29	---	87.00	35.71	1000.0	9.000	Single Line	19.5

◆ 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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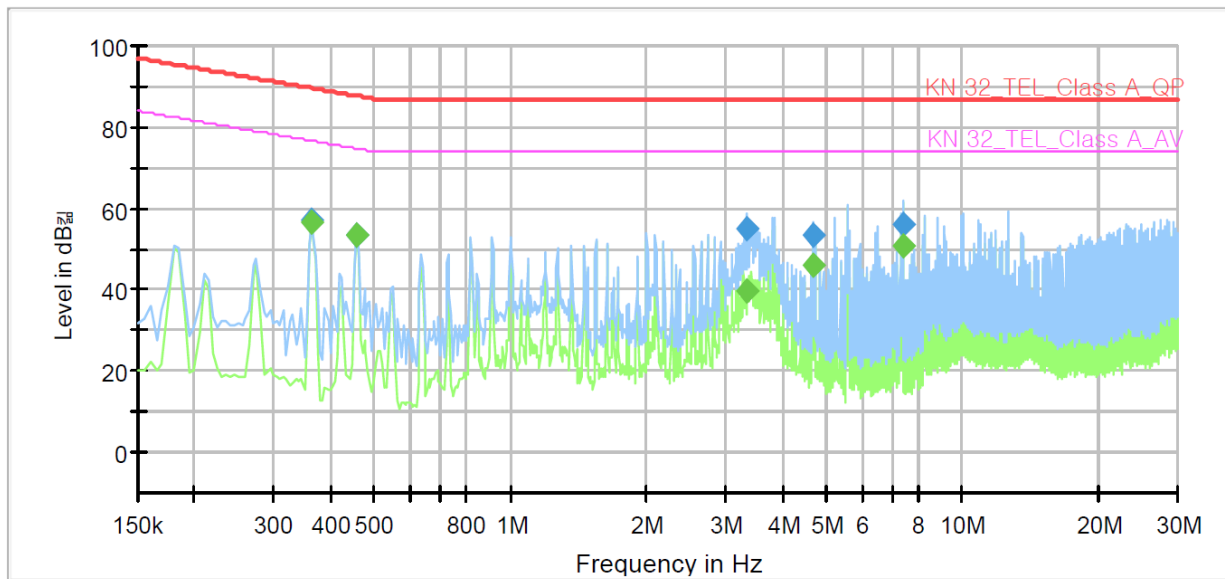
The authenticity of the test report, contact kes@kes.co.kr

- PoE Mode

[10 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	XNO-8020RN
Mode	POE_10M
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.365000	---	56.81	76.61	19.80	1000.0	9.000	Single Line	21.1
0.365000	57.08	---	89.61	32.53	1000.0	9.000	Single Line	21.1
0.455000	---	53.41	74.78	21.37	1000.0	9.000	Single Line	20.9
0.455000	53.69	---	87.78	34.09	1000.0	9.000	Single Line	20.9
3.330000	---	39.89	74.00	34.11	1000.0	9.000	Single Line	19.8
3.330000	55.00	---	87.00	32.00	1000.0	9.000	Single Line	19.8
4.675000	---	46.31	74.00	27.69	1000.0	9.000	Single Line	19.8
4.675000	53.49	---	87.00	33.51	1000.0	9.000	Single Line	19.8
7.390000	---	50.80	74.00	23.20	1000.0	9.000	Single Line	19.9
7.390000	56.13	---	87.00	30.87	1000.0	9.000	Single Line	19.9

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

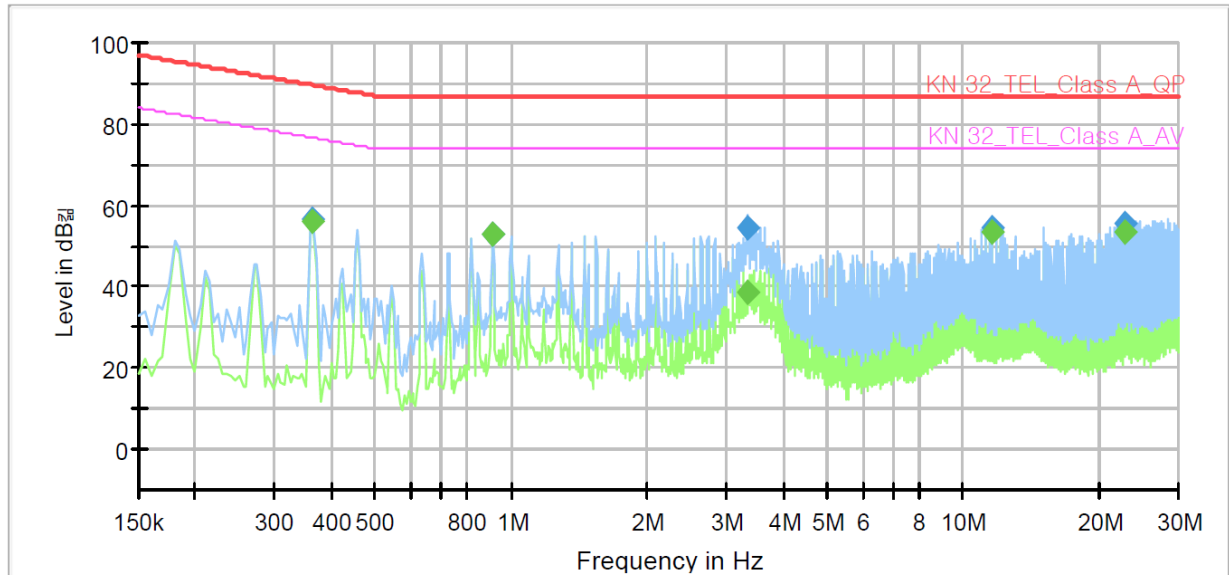
Reading Value : Not shown in the table.

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

[100 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	XNO-8020RN
Mode	POE_100M
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.365000	---	56.12	76.61	20.49	1000.0	9.000	Single Line	20.6
0.365000	56.43	---	89.61	33.18	1000.0	9.000	Single Line	20.6
0.910000	---	52.69	74.00	21.31	1000.0	9.000	Single Line	19.9
0.910000	52.74	---	87.00	34.26	1000.0	9.000	Single Line	19.9
3.320000	---	38.46	74.00	35.54	1000.0	9.000	Single Line	19.3
3.320000	54.35	---	87.00	32.65	1000.0	9.000	Single Line	19.3
11.640000	---	53.34	74.00	20.66	1000.0	9.000	Single Line	19.5
11.640000	54.77	---	87.00	32.23	1000.0	9.000	Single Line	19.5
22.855000	---	53.65	74.00	20.35	1000.0	9.000	Single Line	19.5
22.855000	55.41	---	87.00	31.59	1000.0	9.000	Single Line	19.5

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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



Radiated Electric Field Emissions(Below 1 GHz)

- DC 12 V Mode

Frequency	Amplitude	ANT	ANT. Height	Correction Factor		Corrected Amplitude	Applicable Limit	Margin
[MHz]	[dB μ V]	Polar. (H/V)	[m]	ANT. [dB/m]	Cable [dB]	[dB μ V/m]	[dB μ V/m]	[dB]
232.67	12.33	H	2.31	12.25	4.51	29.09	47.00	17.91
266.51	11.96	V	1.25	12.80	4.86	29.62	47.00	17.38
370.38	13.22	V	2.33	14.96	5.86	34.04	47.00	12.96
370.43	16.21	H	1.95	14.96	5.86	37.03	47.00	9.97
459.69	10.32	V	3.01	16.65	6.84	33.81	47.00	13.19
459.79	17.25	H	2.01	16.65	6.84	40.74	47.00	6.26
603.15	12.63	V	2.09	19.33	7.85	39.81	47.00	7.19
646.97	14.87	H	1.03	19.48	8.13	42.48	47.00	4.52

* H : Horizontal, V : Vertical

◆ Calculation

Corrected Amplitude [dB μ V] = Amplitude[dBuV] + Correction Factor [dB]

Corrected Amplitude : The Final Value, Amplitude : Reading Value,

Correction Factor : ANT FACTOR + Cable loss

**KES Co., Ltd.**

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Report No.:

KES-E1-17T0086-R1

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- PoE Mode

Frequency	Amplitude	ANT	ANT. Height	Correction Factor		Corrected Amplitude	Applicable Limit	Margin
[MHz]	[dBμV]	Polar. (H/V)	[m]	ANT. [dB/m]	Cable [dB]	[dBμV/m]	[dBμV/m]	[dB]
138.62	12.33	H	1.26	7.64	3.43	23.40	40.00	16.60
259.76	13.93	V	3.01	12.67	4.80	31.40	47.00	15.60
282.17	13.25	H	2.00	13.09	5.00	31.34	47.00	15.66
351.05	12.36	V	1.96	14.54	5.65	32.55	47.00	14.45
360.65	11.91	H	3.01	14.75	5.75	32.41	47.00	14.59
459.79	10.09	V	1.25	16.65	6.84	33.58	47.00	13.42
602.32	11.32	V	1.02	19.33	7.85	38.50	47.00	8.50
607.08	10.85	H	3.01	19.34	7.88	38.07	47.00	8.93

* H : Horizontal, V : Vertical

◆ Calculation

Corrected Amplitude [dBμV] = Amplitude[dBμV] + Correction Factor [dB]

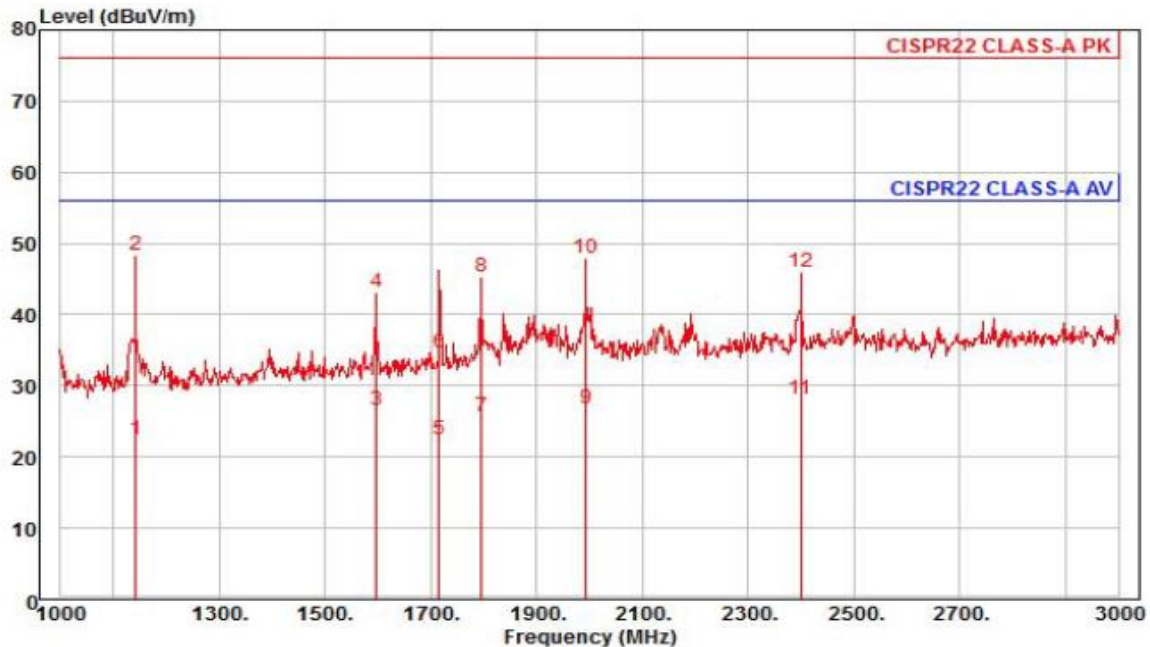
Corrected Amplitude : The Final Value, Amplitude : Reading Value,

Correction Factor : ANT FACTOR + Cable loss

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Radiated Electric Field Emissions(Above 1 GHz)

- DC 12 V Mode



Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : XNO-8020RN
Mode : DC 12V
Memo : 1 ~ 3 GHz

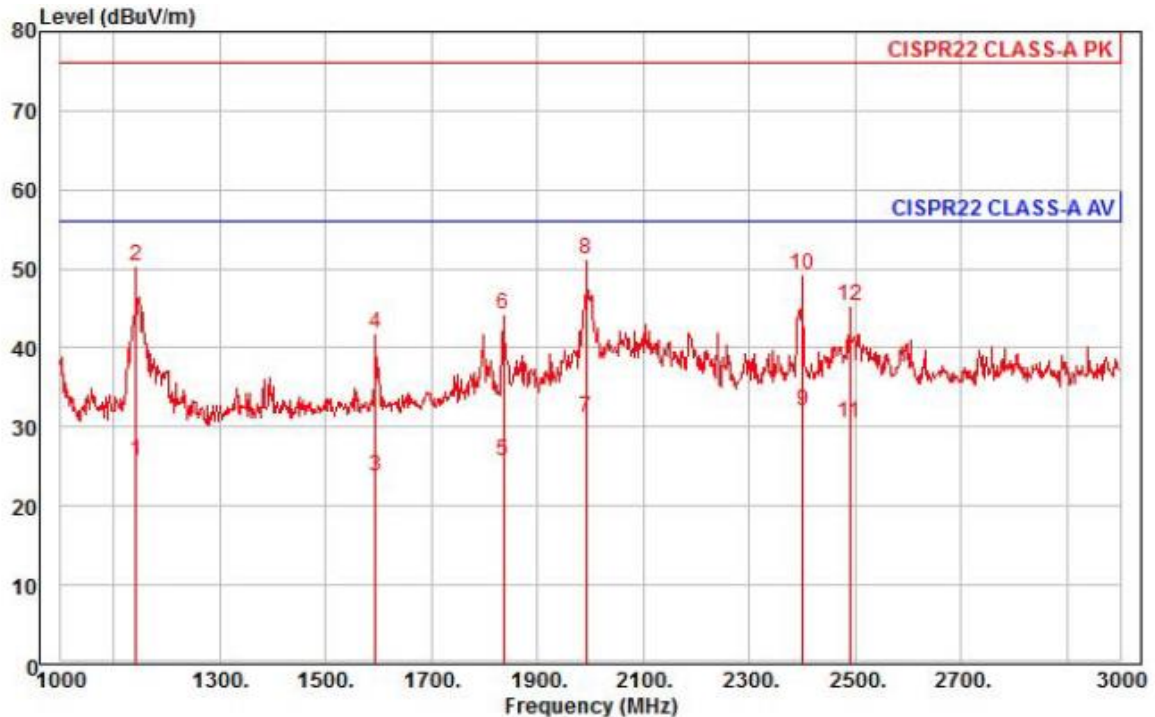
	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	1142.00	30.71	24.47	6.95	39.75	141	56.00	-33.62	horizontal	Average
2 pp	1142.00	56.82	24.47	6.95	39.75	141	76.00	-27.51	horizontal	Peak
3	1598.00	31.23	26.28	8.31	39.22	9	56.00	-29.40	horizontal	Average
4	1598.00	47.85	26.28	8.31	39.22	9	76.00	-32.78	horizontal	Peak
5	1716.00	26.31	26.75	8.61	39.28	214	56.00	-33.61	horizontal	Average
6	1716.00	38.60	26.75	8.61	39.28	214	76.00	-41.32	horizontal	Peak
7	1796.00	29.11	27.07	8.82	39.31	69	56.00	-30.31	horizontal	Average
8	1796.00	48.66	27.07	8.82	39.31	69	76.00	-30.76	horizontal	Peak
9	1994.00	29.05	27.86	9.32	39.41	32	56.00	-29.18	horizontal	Average
10	1994.00	50.12	27.86	9.32	39.41	32	76.00	-28.11	horizontal	Peak
11 av	2400.00	28.44	28.86	10.32	39.42	49	56.00	-27.80	horizontal	Average
12	2400.00	46.19	28.86	10.32	39.42	49	76.00	-30.05	horizontal	Peak

◆ Calculation

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

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

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Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : XNO-8020RN
Mode : DC 12V
Memo : 1 ~ 3 GHz

	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	1142.00	34.05	24.47	6.95	39.75	121	56.00	-30.28	vertical	Average
2	1142.00	58.73	24.47	6.95	39.75	121	76.00	-25.60	vertical	Peak
3	1594.00	28.32	26.27	8.29	39.22	273	56.00	-32.34	vertical	Average
4	1594.00	46.50	26.27	8.29	39.22	273	76.00	-34.16	vertical	Peak
5	1836.00	28.81	27.23	8.92	39.33	93	56.00	-30.37	vertical	Average
6	1836.00	47.40	27.23	8.92	39.33	93	76.00	-31.78	vertical	Peak
7	1992.00	33.33	27.85	9.32	39.41	113	56.00	-24.91	vertical	Average
8 pk	1992.00	53.49	27.85	9.32	39.41	113	76.00	-24.75	vertical	Peak
9 pp	2400.00	32.23	28.86	10.32	39.42	50	56.00	-24.01	vertical	Average
10	2400.00	49.60	28.86	10.32	39.42	50	76.00	-26.64	vertical	Peak
11	2490.00	30.34	29.08	10.51	39.52	315	56.00	-25.59	vertical	Average
12	2490.00	45.18	29.08	10.51	39.52	315	76.00	-30.75	vertical	Peak

◆ Calculation

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

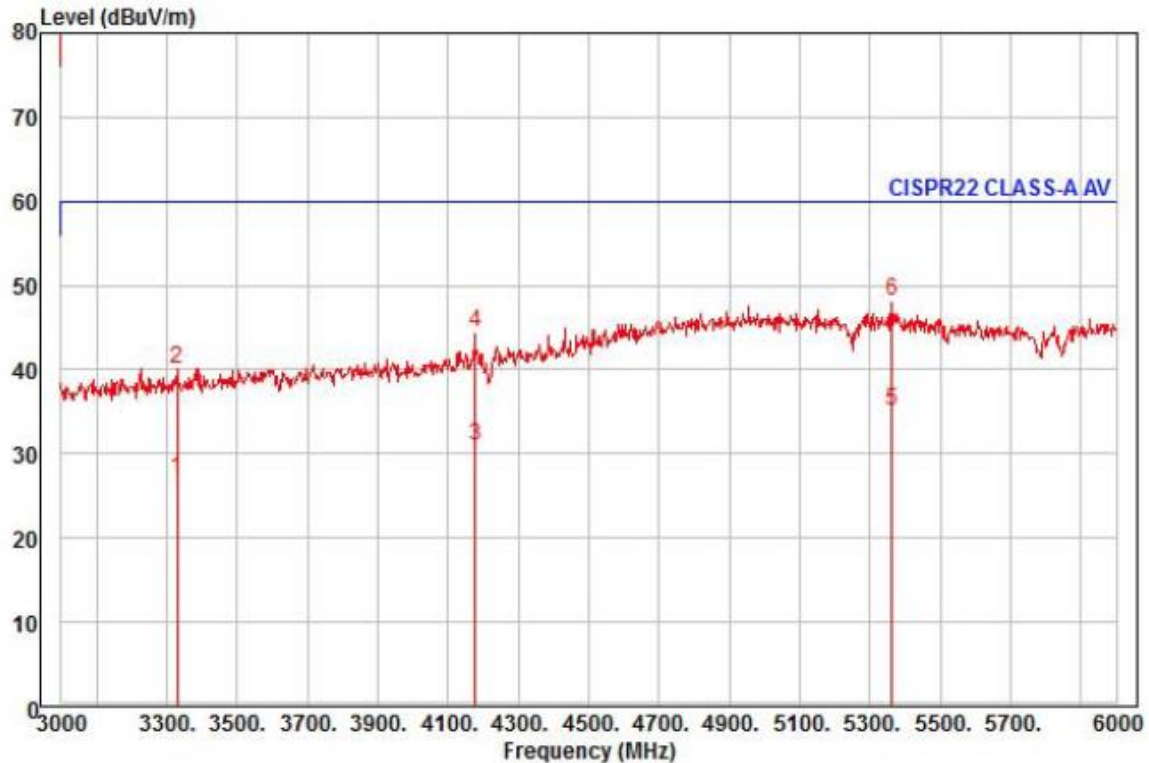
Over Limit : Margin Value, Read Level : Reading Value, Ant Factor : Ant Factor,

Cable Loss : Cable loss, Preamp Factor : Preamp Factor

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Site : chamber

Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto

Project :

Model : XNO-8020RN

Mode : DC 12V

Memo : 3 ~ 6 GHz

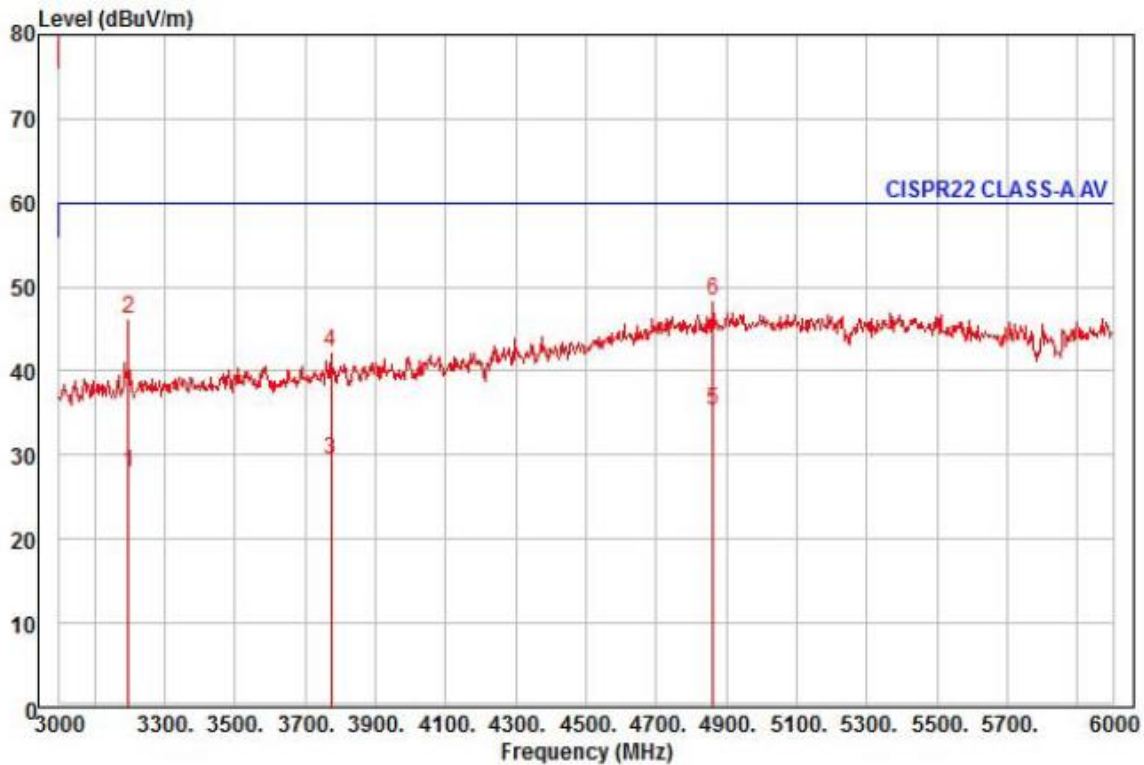
	Read	Ant	Cable	Preamp	TPos	Limit	Over		
Freq	Level	Factor	Loss	Factor		Line	Limit	Pol/Phase	Remark
MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	3330.00	24.45	30.88	12.31	40.62	296	60.00	-32.98	horizontal Average
2	3330.00	37.44	30.88	12.31	40.62	296	80.00	-39.99	horizontal Peak
3	4179.00	24.76	33.03	13.90	40.73	104	60.00	-29.04	horizontal Average
4	4179.00	38.26	33.03	13.90	40.73	104	80.00	-35.54	horizontal Peak
5 pp	5361.00	23.11	36.99	15.97	40.87	143	60.00	-24.80	horizontal Average
6 pk	5361.00	36.02	36.99	15.97	40.87	143	80.00	-31.89	horizontal Peak

◆ Calculation

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

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

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Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : XNO-8020RN
Mode : DC 12V
Memo : 3 ~ 6 GHz

	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	3198.00	25.69	30.66	12.05	40.41	21	60.00	-32.01	vertical	Average
2	3198.00	43.93	30.66	12.05	40.41	21	80.00	-33.77	vertical	Peak
3	3774.00	25.51	31.63	13.13	40.78	273	60.00	-30.51	vertical	Average
4	3774.00	38.41	31.63	13.13	40.78	273	80.00	-37.61	vertical	Peak
5 pp	4860.00	23.69	36.92	15.16	40.41	268	60.00	-24.64	vertical	Average
6 pk	4860.00	36.68	36.92	15.16	40.41	268	80.00	-31.65	vertical	Peak

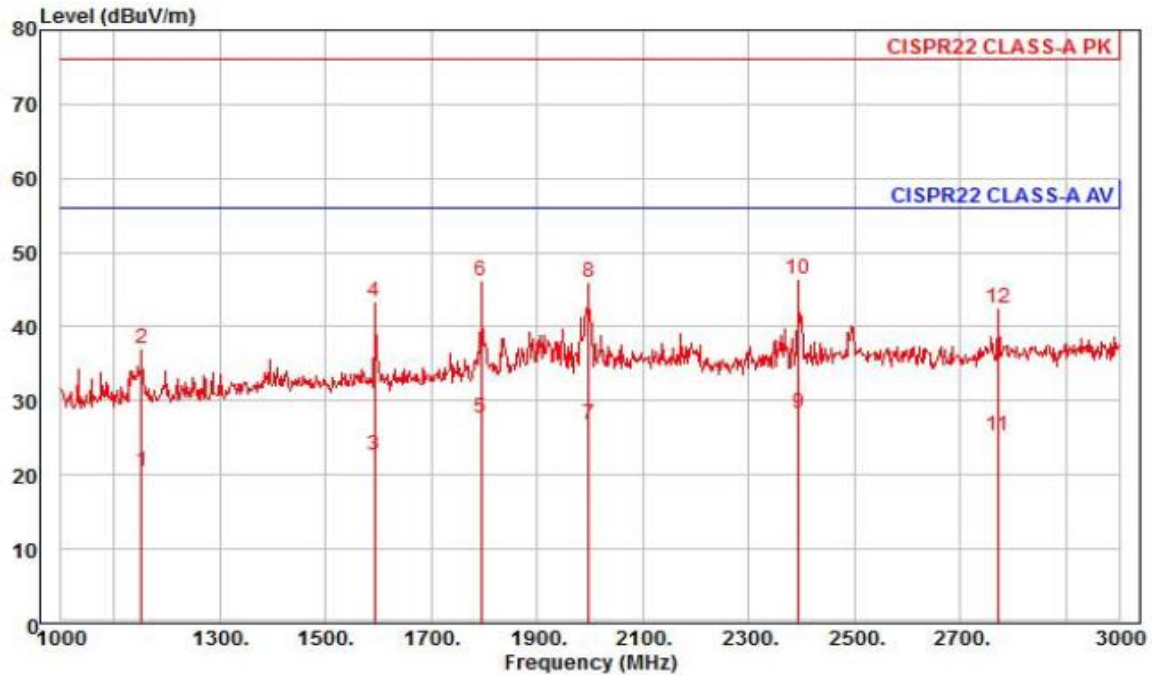
◆ Calculation

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

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

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- PoE Mode



Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : XNO-8020RN
Mode : POE
Memo : 1 ~ 3 GHz

	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	1152.00	28.78	24.51	6.98	39.73	307	56.00	-35.46	horizontal	Average
2	1152.00	45.38	24.51	6.98	39.73	307	76.00	-38.86	horizontal	Peak
3	1592.00	27.34	26.26	8.29	39.22	7	56.00	-33.33	horizontal	Average
4	1592.00	48.06	26.26	8.29	39.22	7	76.00	-32.61	horizontal	Peak
5	1794.00	31.03	27.06	8.81	39.31	66	56.00	-28.41	horizontal	Average
6	1794.00	49.58	27.06	8.81	39.31	66	76.00	-29.86	horizontal	Peak
7	1998.00	29.10	27.87	9.33	39.41	176	56.00	-29.11	horizontal	Average
8	1998.00	48.12	27.87	9.33	39.41	176	76.00	-30.09	horizontal	Peak
9 pp	2394.00	28.63	28.85	10.31	39.42	52	56.00	-27.63	horizontal	Average
10 pk	2394.00	46.69	28.85	10.31	39.42	52	76.00	-29.57	horizontal	Peak
11	2772.00	24.14	29.77	11.16	39.85	244	56.00	-30.78	horizontal	Average
12	2772.00	41.46	29.77	11.16	39.85	244	76.00	-33.46	horizontal	Peak

◆ Calculation

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

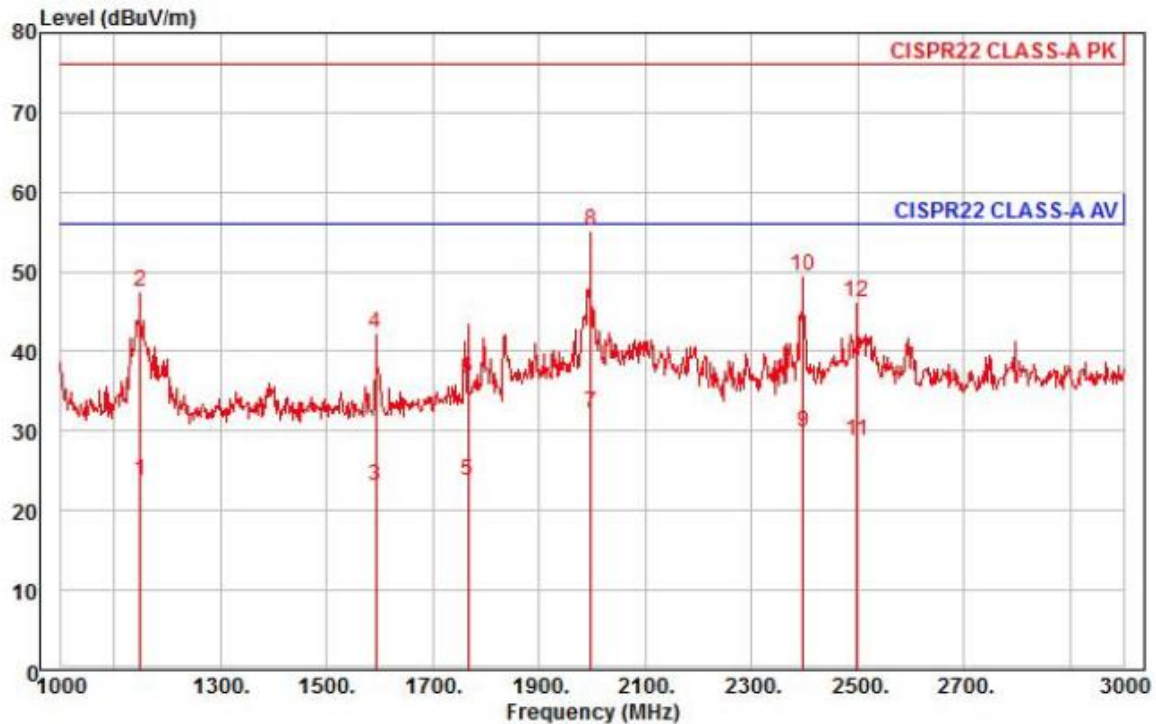
Over Limit : Margin Value, Read Level : Reading Value, Ant Factor : Ant Factor,

Cable Loss : Cable loss, Preamp Factor : Preamp Factor

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Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : XNO-8020RN
Mode : POE
Memo : 1 ~ 3 GHz

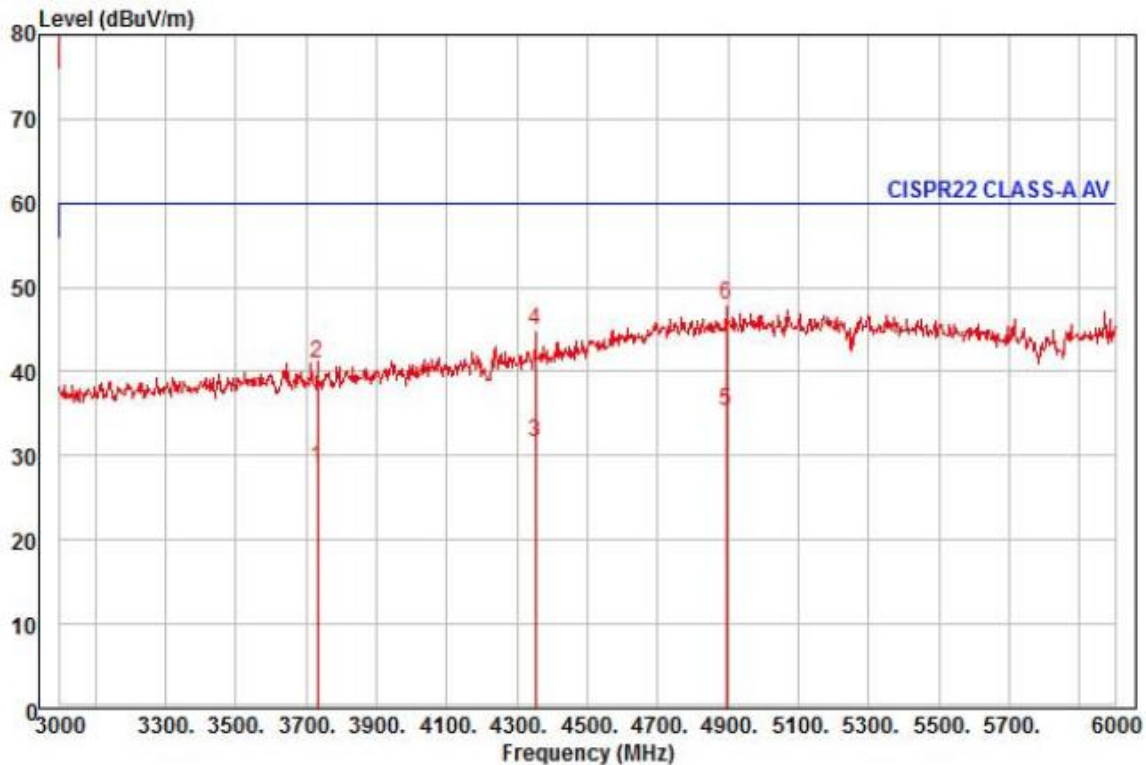
	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	1148.00	32.06	24.50	6.97	39.73	236	56.00	-32.20	vertical	Average
2	1148.00	55.87	24.50	6.97	39.73	236	76.00	-28.39	vertical	Peak
3	1592.00	27.69	26.26	8.29	39.22	351	56.00	-32.98	vertical	Average
4	1592.00	46.89	26.26	8.29	39.22	351	76.00	-33.78	vertical	Peak
5	1766.00	27.31	26.95	8.74	39.30	131	56.00	-32.30	vertical	Average
6	1766.00	40.23	26.95	8.74	39.30	131	76.00	-39.38	vertical	Peak
7 av	1998.00	34.38	27.87	9.33	39.41	348	56.00	-23.83	vertical	Average
8 pp	1998.00	57.39	27.87	9.33	39.41	348	76.00	-20.82	vertical	Peak
9	2398.00	30.12	28.86	10.32	39.42	45	56.00	-26.12	vertical	Average
10	2398.00	49.73	28.86	10.32	39.42	45	76.00	-26.51	vertical	Peak
11	2498.00	28.64	29.10	10.53	39.53	306	56.00	-27.26	vertical	Average
12	2498.00	46.12	29.10	10.53	39.53	306	76.00	-29.78	vertical	Peak

Calculation

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

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

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Site : chamber
 Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) horizontal
 : RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
 Project :
 Model : XNO-8020RN
 Mode : POE
 Memo : 3 ~ 6 GHz

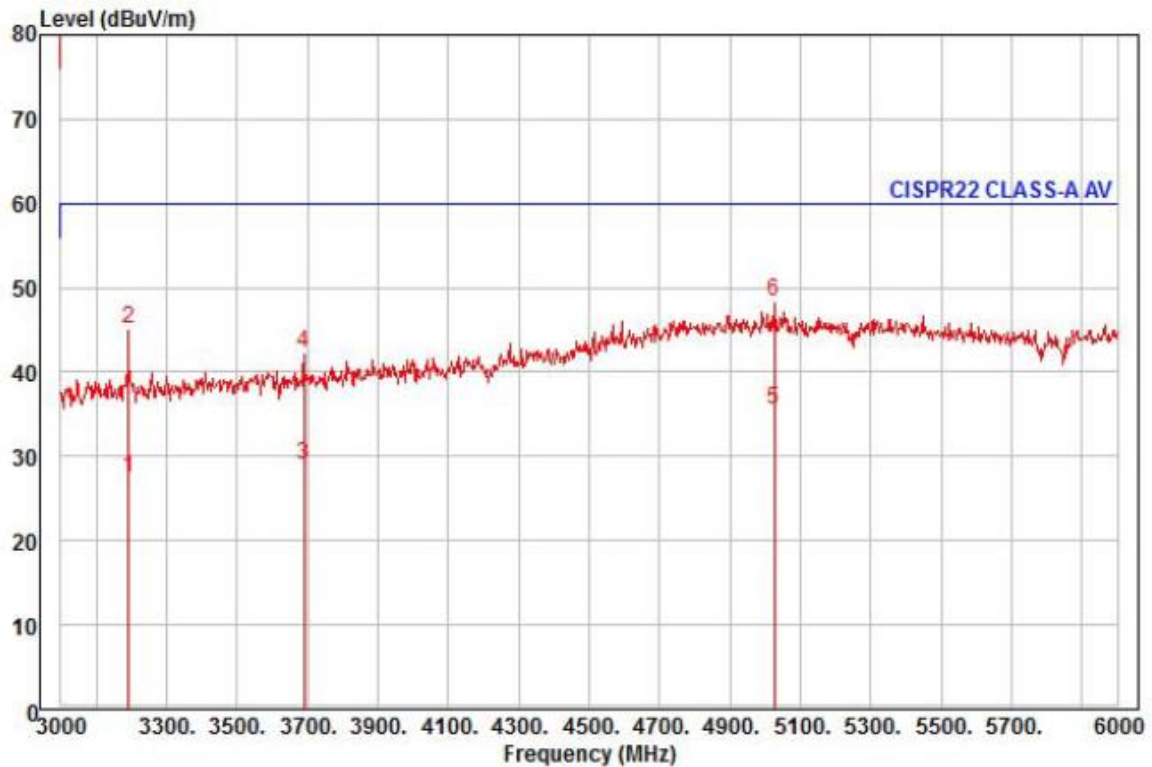
	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	3732.00	24.77	31.56	13.05	40.80	111	60.00	-31.42	horizontal	Average
2	3732.00	37.21	31.56	13.05	40.80	111	80.00	-38.98	horizontal	Peak
3	4353.00	24.22	34.03	14.19	40.75	52	60.00	-28.31	horizontal	Average
4	4353.00	37.50	34.03	14.19	40.75	52	80.00	-35.03	horizontal	Peak
5 pp	4896.00	23.33	37.13	15.20	40.37	206	60.00	-24.71	horizontal	Average
6 pk	4896.00	36.03	37.13	15.20	40.37	206	80.00	-32.01	horizontal	Peak

◆ Calculation

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

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

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Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : XNO-8020RN
Mode : POE
Memo : 3 ~ 6 GHz

	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	3192.00	25.16	30.65	12.04	40.41	132	60.00	-32.56	vertical	Average
2	3192.00	42.81	30.65	12.04	40.41	132	80.00	-34.91	vertical	Peak
3	3690.00	25.42	31.49	12.97	40.81	283	60.00	-30.93	vertical	Average
4	3690.00	38.62	31.49	12.97	40.81	283	80.00	-37.73	vertical	Peak
5 pp	5025.00	22.81	37.67	15.37	40.31	202	60.00	-24.46	vertical	Average
6 pk	5025.00	35.68	37.67	15.37	40.31	202	80.00	-31.59	vertical	Peak

◆ Calculation

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

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



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www.kes.co.kr

Report No.:
KES-E1-17T0086-R1
Page (34) of (48)

Test Setup Photos and Configuration

Conducted Voltage Emissions

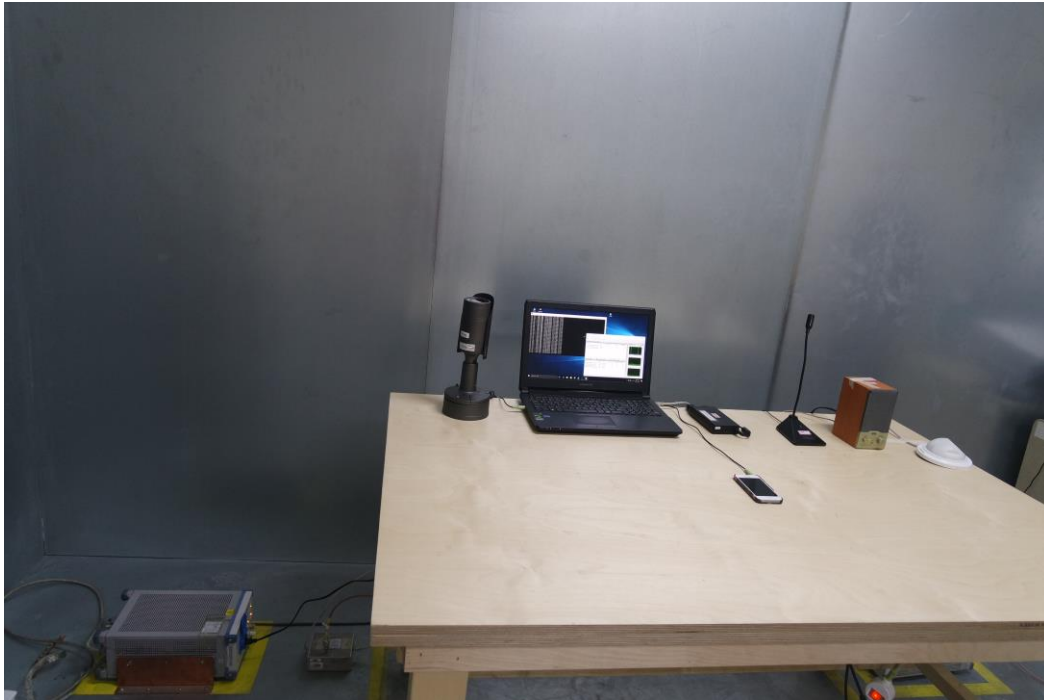
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N/A

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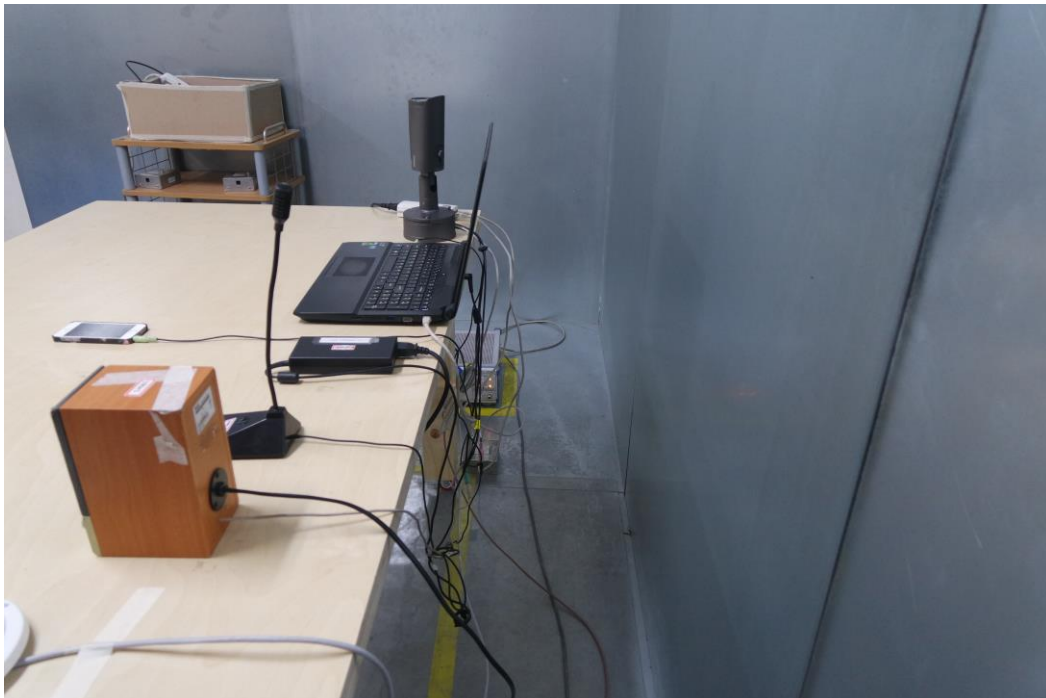
Conducted Telecommunication Emissions

- DC 12 V Mode



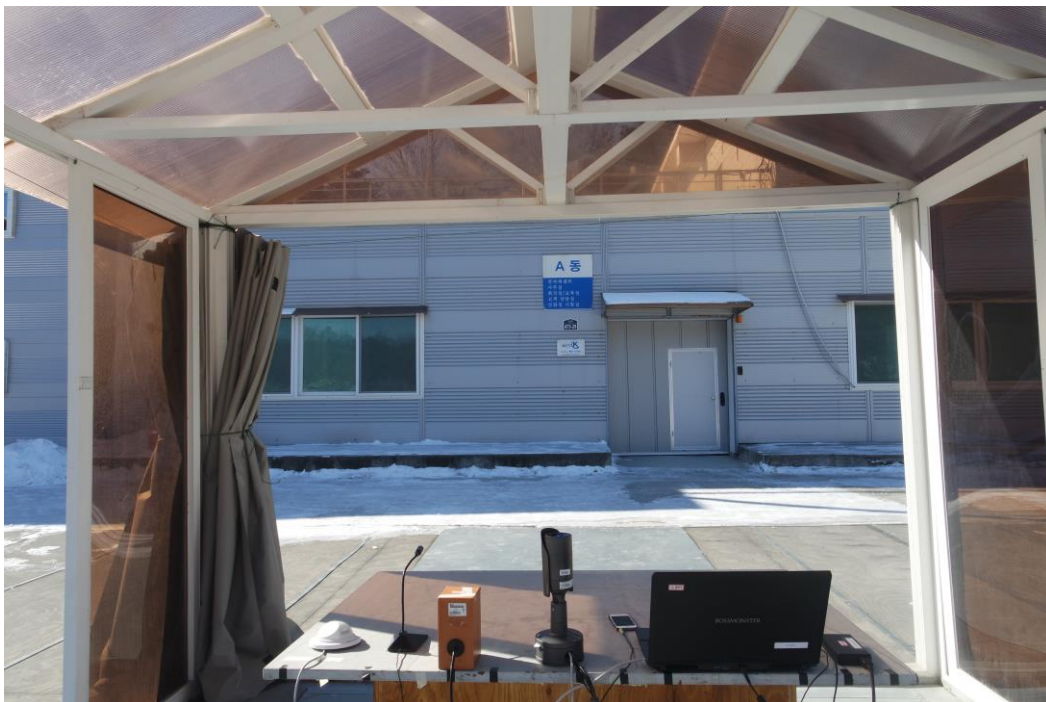
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- PoE Mode



Radiated Electric Field Emissions(Below 1 GHz)

- DC 12 V Mode



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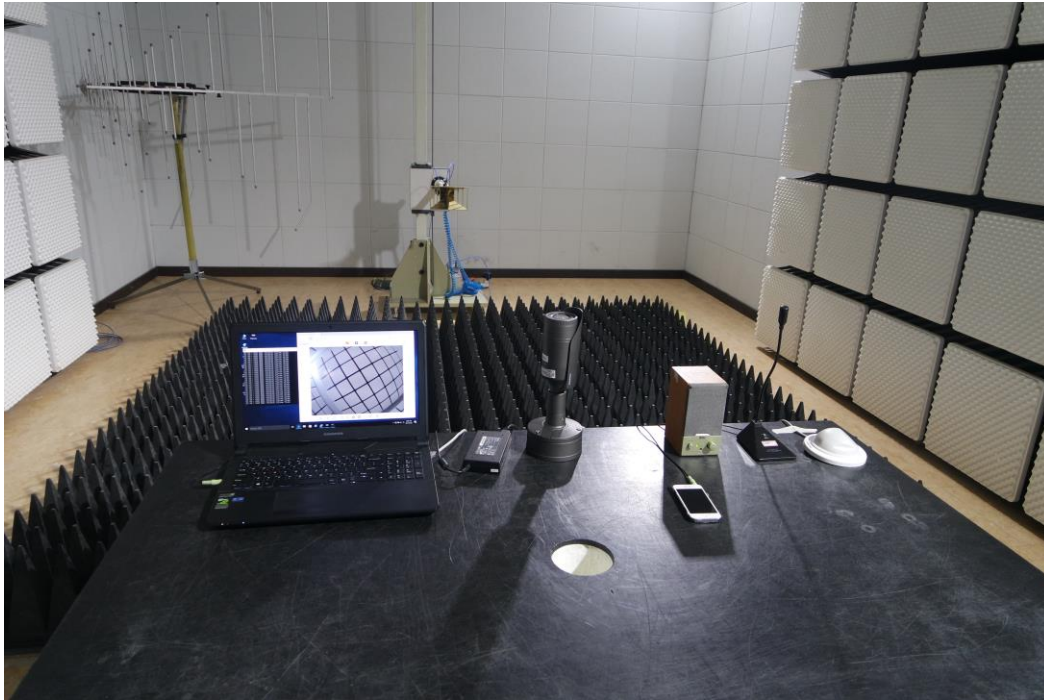
- PoE Mode



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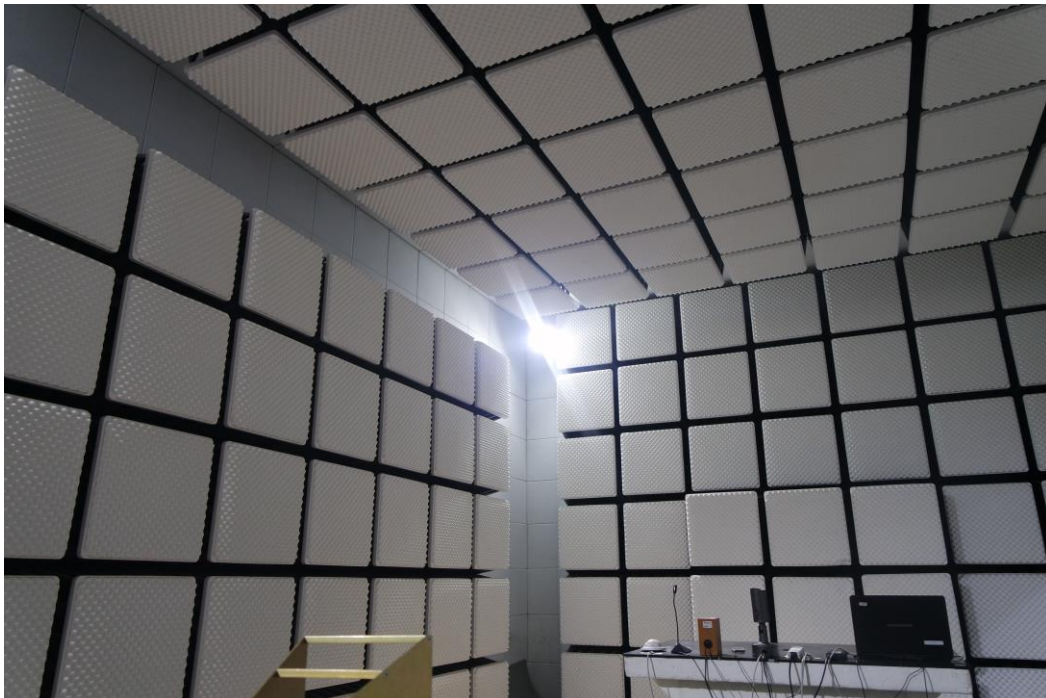
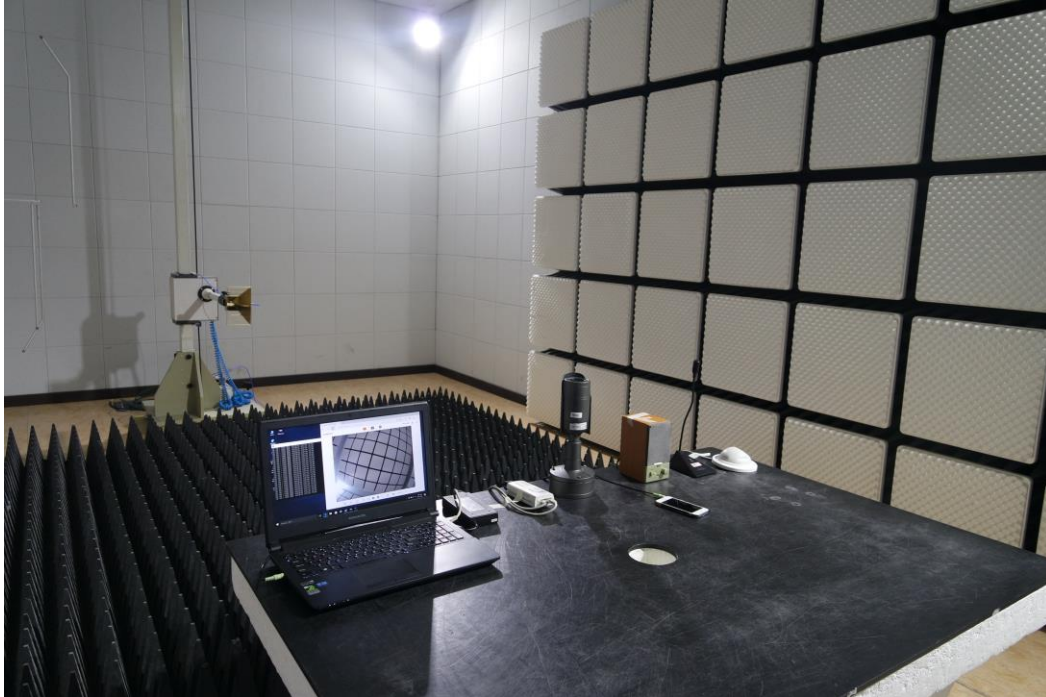
Radiated Electric Field Emissions(Above 1 GHz)

- DC 12 V Mode



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- PoE Mode



EUT External Photographs

(Top)



(Bottom)



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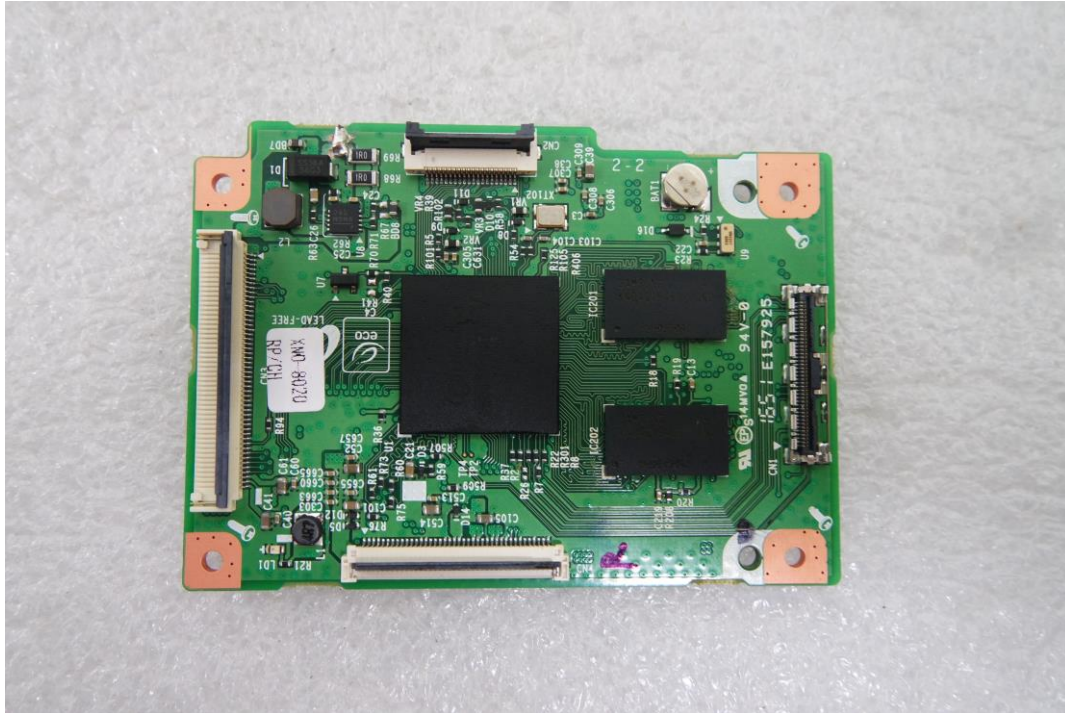
EUT Internal Photographs

(Internal View)

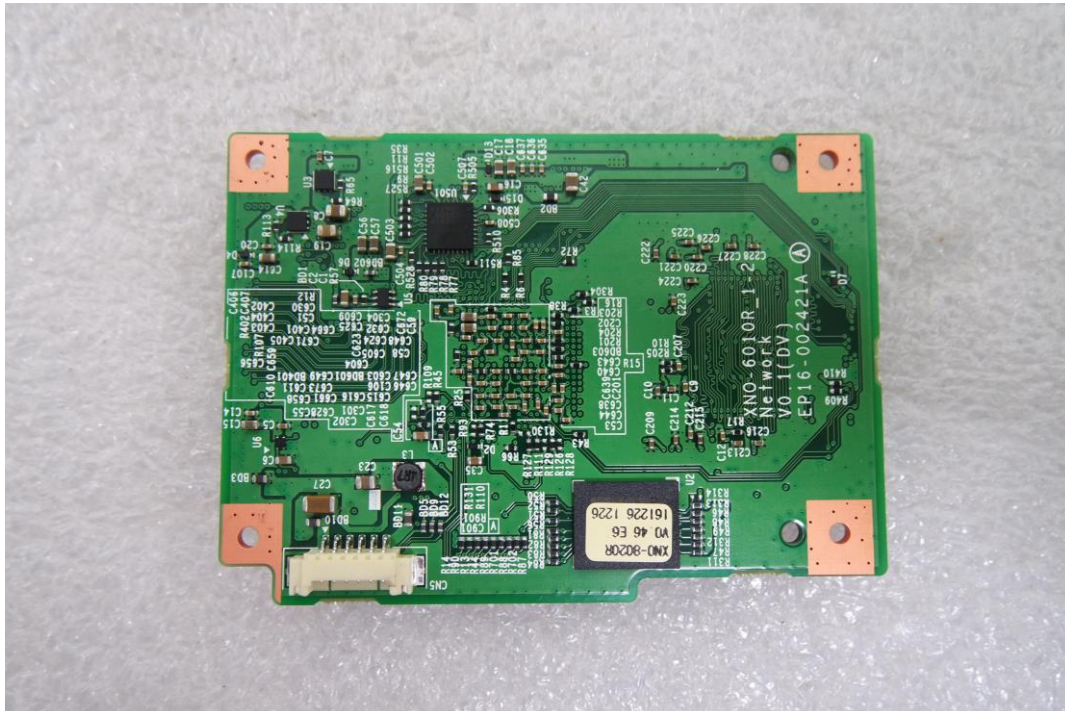


EUT Internal View – Main Board

(Top)



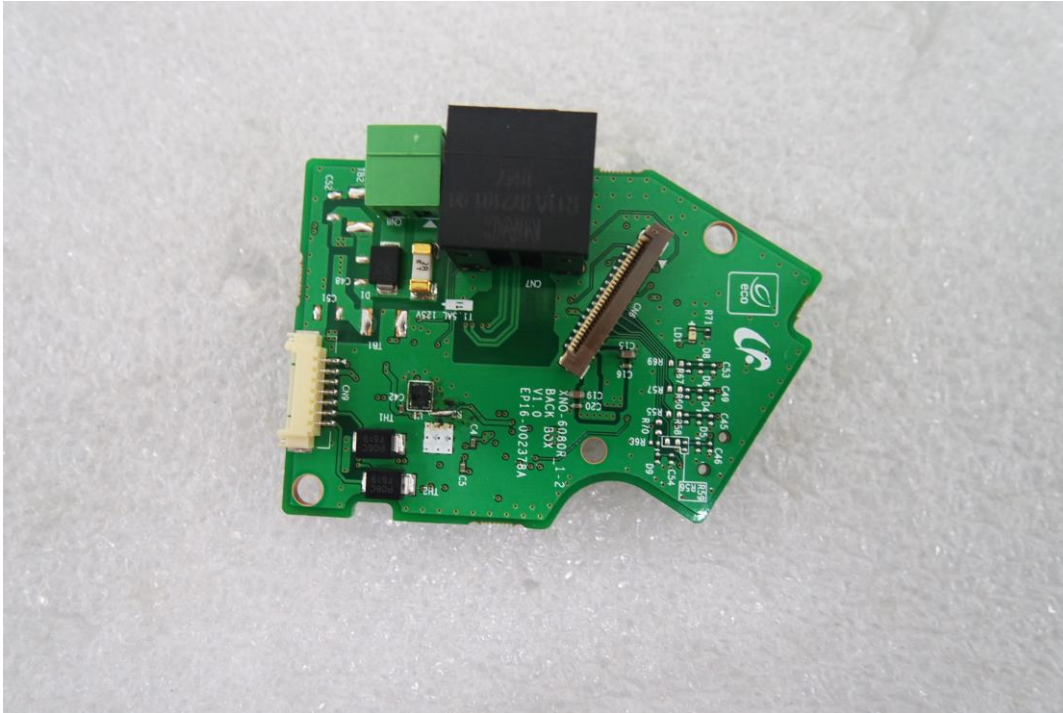
(Bottom)



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EUT Internal View – Sub Board 1

(Top)



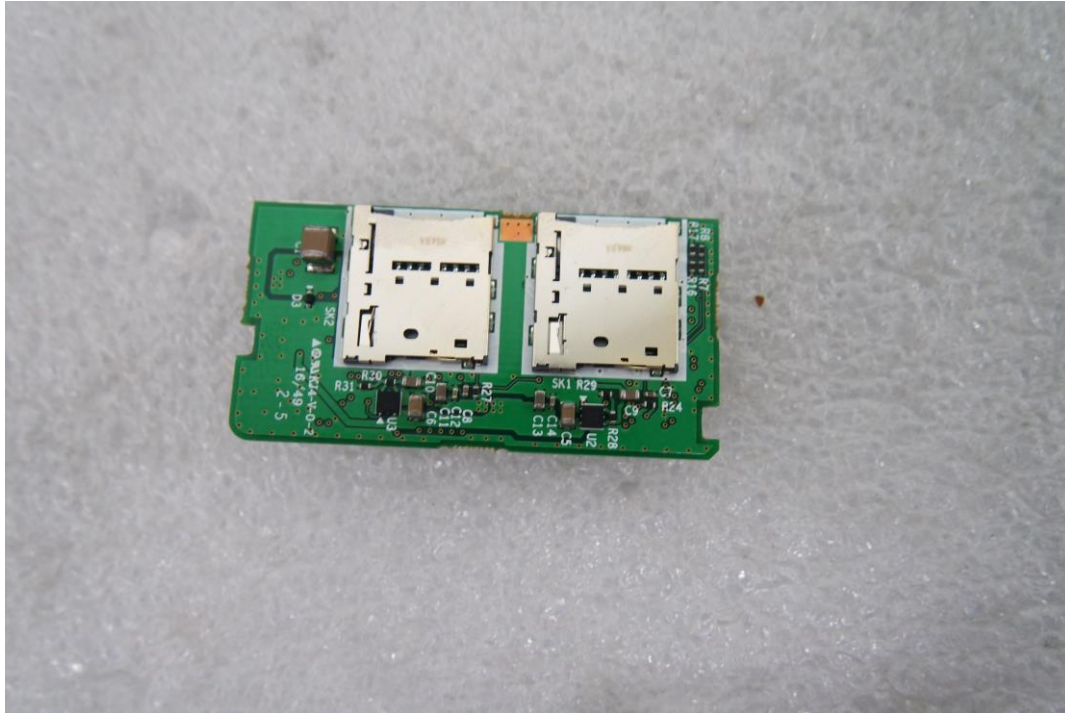
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EUT Internal View – Sub Board 2

(Top)



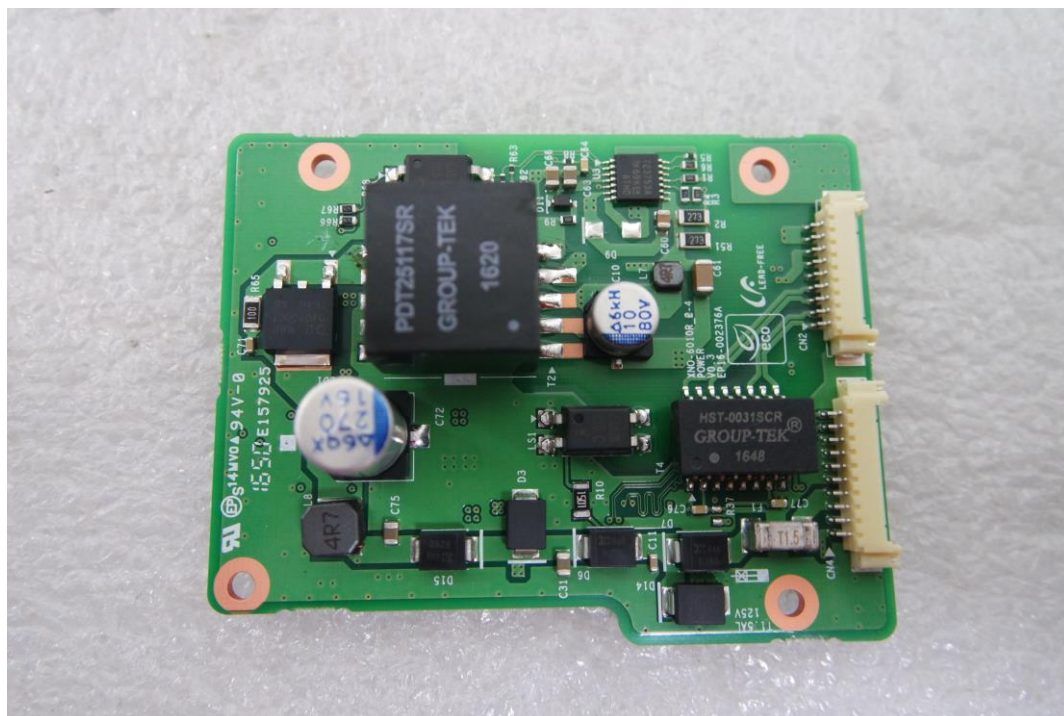
(Bottom)



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EUT Internal View – Sub Board 3

(Top)



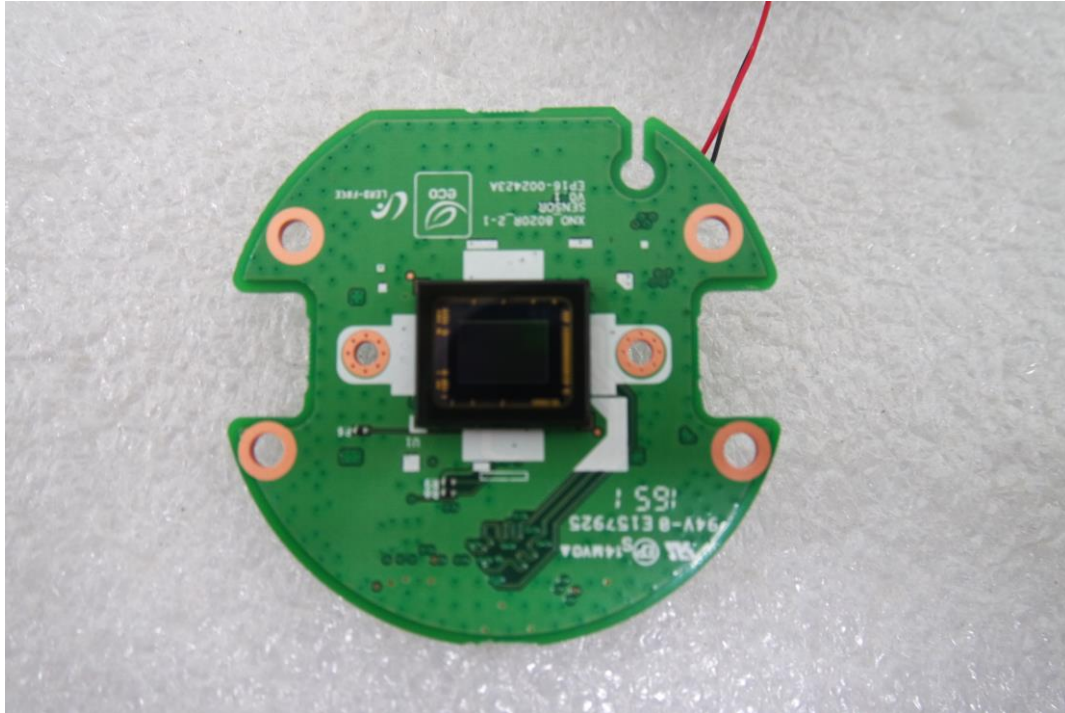
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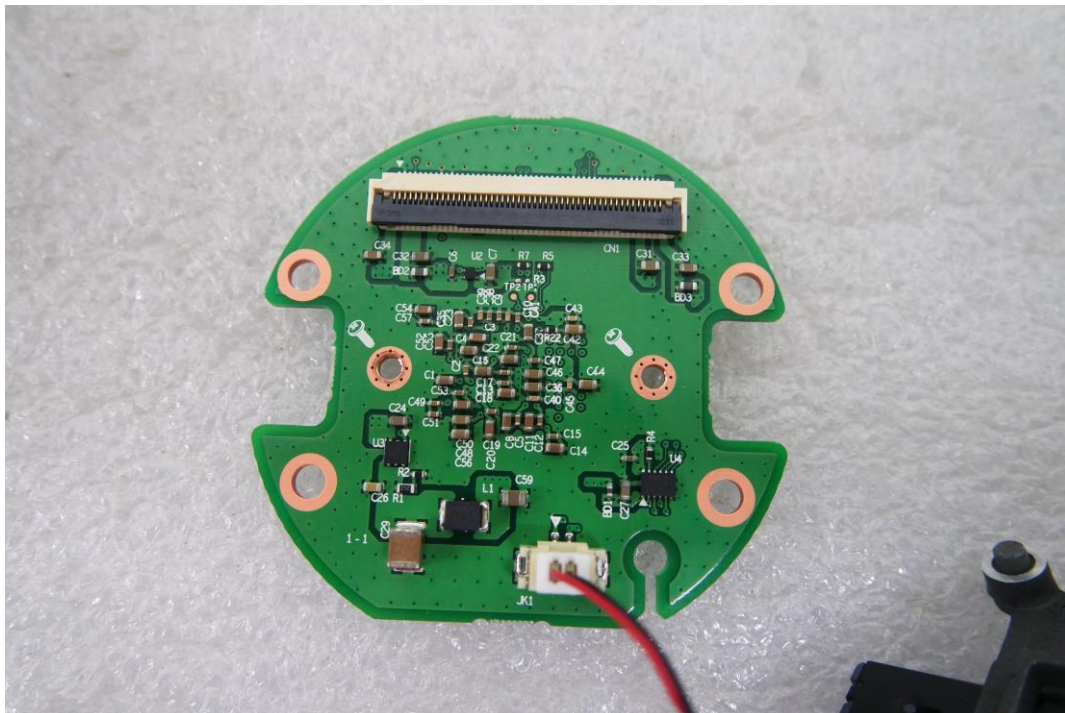
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EUT Internal View – Lens Board

(Top)



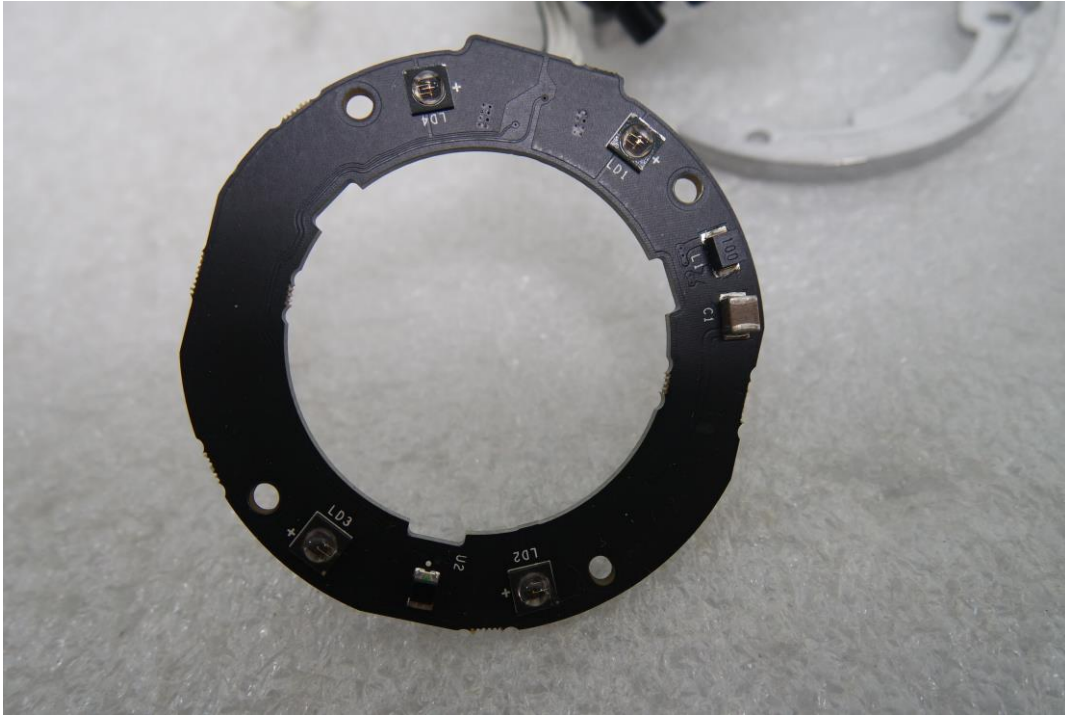
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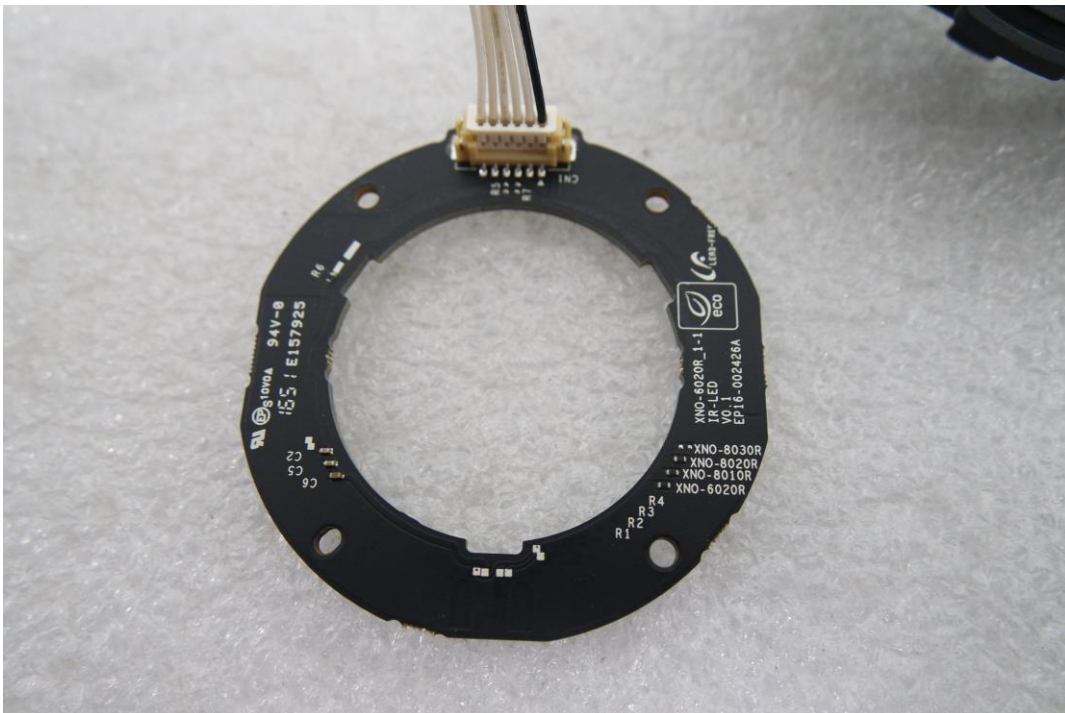
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EUT Internal View – LED Board

(Top)



(Bottom)



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