EMC TEST REPORT For VCCI

Test Report No.	:	KES-E1-17T0102
Date of Issue	:	Feb, 08, 2017
Product name	:	NETWORK CAMERA
Model/Type No.	:	XNV-8020RN
Variant Model	:	-
Applicant	:	Hanwha Techwin Co., Ltd.
Applicant Address	:	Changwon-daero, Seongsan-gu Changwon-si, Gyeongsangnam-do
Manufacturer	:	Hanwha Techwin (Tianjin) Co.,Ltd.
Manufacturer Address	:	No.11 Weiliu Rd,Micro-Electronic Industrial Park, TEDA,Tianjin,300385,People's Republic of China
Date of Receipt	:	Jan, 10, 2017
Test date	:	Jan, 31, 2017
Test Results	:	☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Young Suk, Song
EMC Test Engineer

Reviewed by

Dong-Hun, Jang
EMC Technical Manager

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REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Feb. 08, 2017	KES-E1-17T0102	Issued

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1.0 General Product Description

Main Specifications of EUT are:

	XNV-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
Pan / Tilt / Rotate	
Pan / Tilt / Rotate range	0° ~ 354° / 0° ~ 67° / 0° ~ 355°
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
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

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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	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
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 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-dierctional (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	HTTPS(SSL) Login Authentication Digest Login Authentication IP Address Filtering User access Log 802.1X Authentication (EAP-TLS, EAP-LEAP)
Streaming Method	Unicast / Multicast
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	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 Soft	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
Storage Temperature / Humidity	-50°C ~ +60°C (-22°F ~ +140°F) / Less than 90% RH
Ingress Protection	IP67, IP66
Vandal Resistance	IK10
Electrical	
Input Voltage / Current	DC12V,PoE(IEEE802.3af,Class3)
Power Consumption	Max. 8W(12VDC), Max. 9W(PoE)
Mechanical	
Color / Material	Ivory / Metal
Dimension (WxHxD)	Ø120xH97.5mm(Ø4.72" x 3.84")
Weight	625g (1.37lb)

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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

Not applicable

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
NETWORK CAMERA	XNV-8020RN	-	Hanwha Techwin(Tianjin) Co.,Ltd.	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	-

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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 ㎜	1.7	U
		Speaker	3.5 ㎜	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 ㎜	1.7	U
		Speaker	3.5 ㎜	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 ㎑, Ping Test

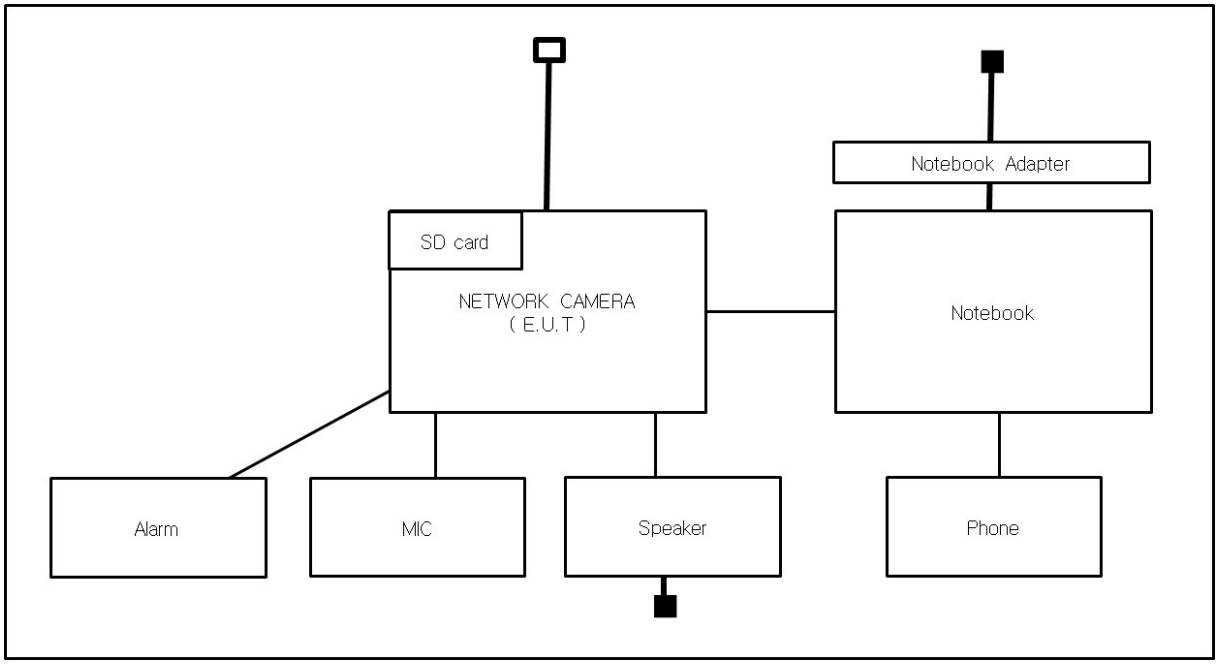
E.U.T Test operating S/W		
Name	Version	Manufacture Company
SmartViewer	-	Hanwha Techwin Co., Ltd.

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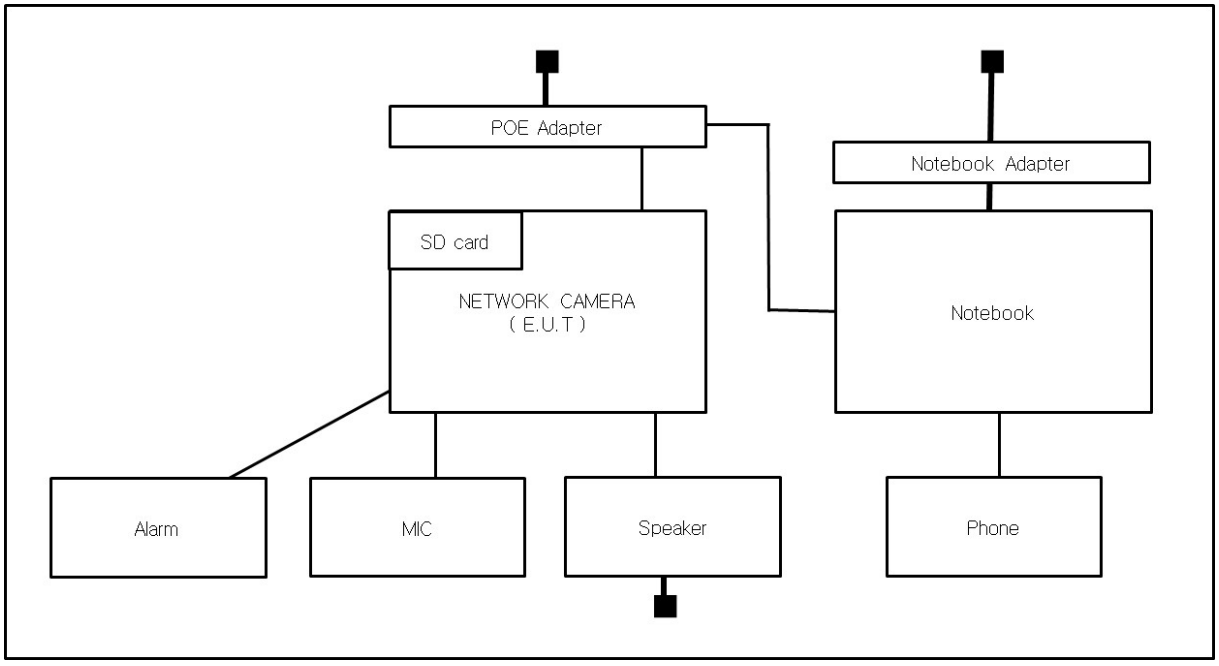
1.8 Configuration

■ AC Main
□ DC Main

- DC 12 V Mode



- PoE Mode



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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. The sites are constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22.

1.11 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
USA	**FCC**	3 & 10 meter Open Area Test Sites and one conducted site to perform FCC Part 15/18 measurements.	
JAPAN	**VCCI**	Mains Ports Conducted Interference Measurement, Telecommunication Ports Conducted Disturbance Measurement and Radiation 10 meter site, Facility for measuring radiated disturbance above 1 GHz	R-4308, C-4798, T-2311, G-914
KOREA	**MSIP**	EMI (10 meter Open Area Test Site and two conducted sites) Radio(3 & 10 meter Open Area Test Sites and one conducted site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	KR0100
Canada	**IC**	3 & 10 meter Open Area Test Sites and one conducted site	4769B-1
Europe	**CE**	EMI (10 meter Open Area Test Site and two conducted sites) Radio(3 & 10 meter Open Area Test Sites and one conducted site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	
International	**KOLAS**	EMI (10 meter Open Area Test Site and two conducted sites) Radio(3 & 10 meter Open Area Test Sites and one conducted site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	KOREA LABORATORY ACCREDITATION SCHEME KOLAS TESTING NO. 489

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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, 03, 2018
☐	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: ℃
Relative Humidity: %

Frequency Range of Measurement
150 ㎑ to 30 ㎒

Instrument Settings
IF Band Width: 9 ㎑

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.

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2.2 Conducted Emissions at Telecommunication Ports

Test Date
Jan, 31, 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, 03, 2018
☒	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: 26,6 ℃
Relative Humidity: 38,5 %

Frequency Range of Measurement
150 ㎑ to 30 ㎒

Instrument Settings
IF Band Width: 9 ㎑

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 ㎓)

Test Date
Jan, 31, 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: -1,9 ℃
Relative Humidity: 50,0 %

Frequency Range of Measurement
30 ㎒ to 1 ㎓

Instrument Settings
IF Band Width: 120 ㎑

Test Results
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks
See Appendix A for test data.

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2.4 Radiated Electric Field Emissions(Above 1 ㎓)

Test Date
Jan, 31, 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: 26,6 ℃
Relative Humidity: 38,5 %

Frequency Range of Measurement
1 ㎓ to 6 ㎓

Instrument Settings
IF Band Width: 1 ㎒

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[㏈uV] / CAverage [㏈uV] = Reading Value[㏈uV] + Corr. [㏈]
QuasiPeak / CAverage : The Final Value
Reading Value : Not shown in the table.
Corr. : Correction values (LISN FACTOR+ Cable Loss)

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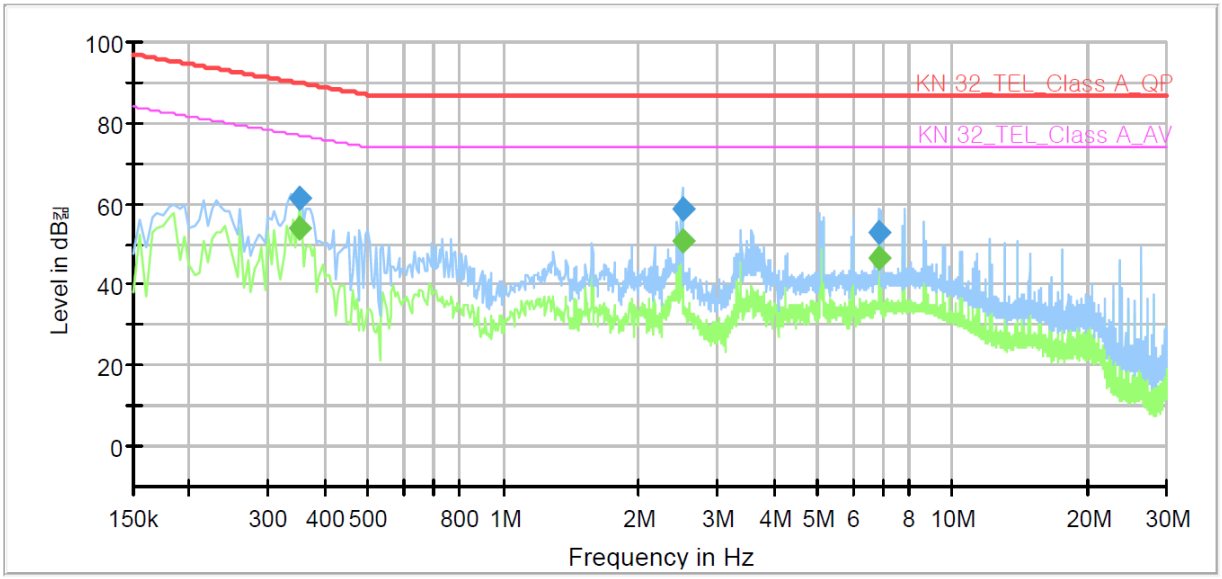
Conducted Emissions at Telecommunication Ports

- DC 12 V Mode

[10 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	XNV-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)
0.350000	---	54.03	76.96	22.93	1000.0	9.000	Single Line	21.1
0.350000	61.50	---	89.96	28.46	1000.0	9.000	Single Line	21.1
2.500000	---	50.83	74.00	23.17	1000.0	9.000	Single Line	19.9
2.500000	58.74	---	87.00	28.26	1000.0	9.000	Single Line	19.9
6.900000	---	46.64	74.00	27.36	1000.0	9.000	Single Line	19.9
6.900000	52.81	---	87.00	34.19	1000.0	9.000	Single Line	19.9

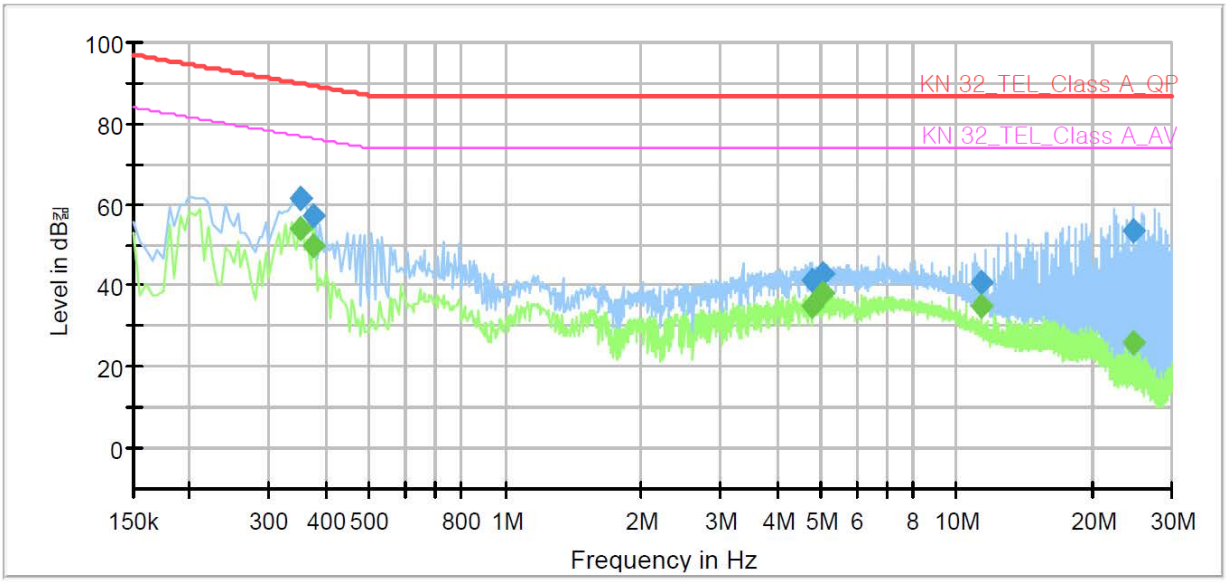
♦ Calculation
QuasiPeak[dBuV] / CAverage [dBuV] = Reading Value[dBuV] + Corr. [dB]
QuasiPeak / CAverage : The Final Value
Reading Value : Not shown in the table.
Corr. : Correction values (ISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

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[100 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	XNV-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)
0.350000	---	53.75	76.96	23.21	1000.0	9.000	Single Line	20.6
0.350000	61.13	---	89.96	28.83	1000.0	9.000	Single Line	20.6
0.375000	---	49.86	76.39	26.53	1000.0	9.000	Single Line	20.6
0.375000	56.90	---	89.39	32.49	1000.0	9.000	Single Line	20.6
4.765000	---	35.20	74.00	38.80	1000.0	9.000	Single Line	19.3
4.765000	41.40	---	87.00	45.60	1000.0	9.000	Single Line	19.3
5.040000	---	37.87	74.00	36.13	1000.0	9.000	Single Line	19.3
5.040000	43.00	---	87.00	44.00	1000.0	9.000	Single Line	19.3
11.340000	---	35.12	74.00	38.88	1000.0	9.000	Single Line	19.5
11.340000	40.54	---	87.00	46.46	1000.0	9.000	Single Line	19.5
24.550000	---	26.21	74.00	47.79	1000.0	9.000	Single Line	19.6
24.550000	53.38	---	87.00	33.62	1000.0	9.000	Single Line	19.6

♦ 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))

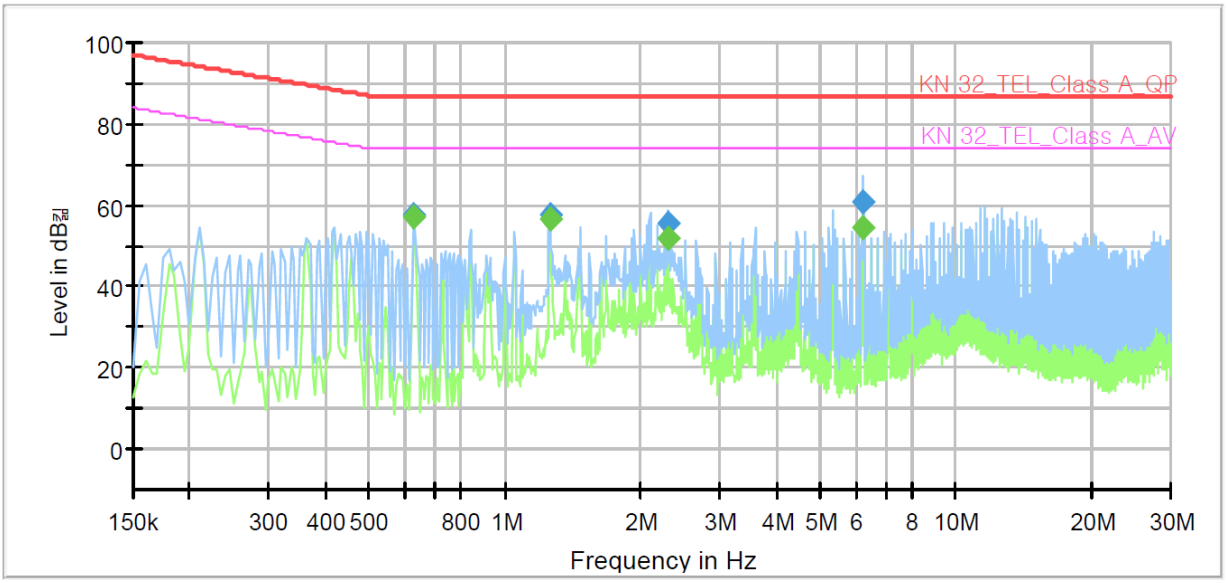
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- PoE Mode

[10 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	XNV-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)
0.630000	---	57.16	74.00	16.84	1000.0	9.000	Single Line	20.7
0.630000	57.66	---	87.00	29.34	1000.0	9.000	Single Line	20.7
1.260000	---	56.79	74.00	17.21	1000.0	9.000	Single Line	20.2
1.260000	57.83	---	87.00	29.17	1000.0	9.000	Single Line	20.2
2.305000	---	52.01	74.00	21.99	1000.0	9.000	Single Line	19.9
2.305000	55.37	---	87.00	31.63	1000.0	9.000	Single Line	19.9
6.250000	---	54.74	74.00	19.26	1000.0	9.000	Single Line	19.9
6.250000	60.71	---	87.00	26.29	1000.0	9.000	Single Line	19.9

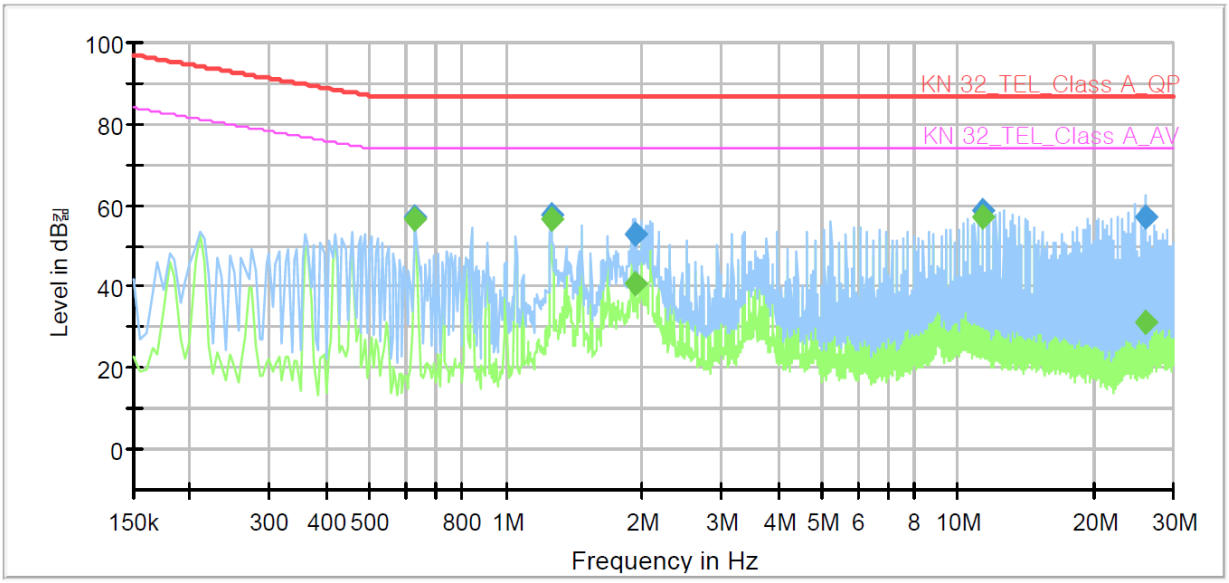
♦ Calculation
QuasiPeak[dBuV] / CAverage [dBuV] = Reading Value[dBuV] + Corr. [dB]
QuasiPeak / CAverage : The Final Value
Reading Value : Not shown in the table.
Corr. : Correction values (ISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

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[100 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	XNV-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)
0.630000	---	56.70	74.00	17.30	1000.0	9.000	Single Line	20.2
0.630000	57.35	---	87.00	29.65	1000.0	9.000	Single Line	20.2
1.260000	---	56.84	74.00	17.16	1000.0	9.000	Single Line	19.7
1.260000	57.68	---	87.00	29.32	1000.0	9.000	Single Line	19.7
1.935000	---	40.55	74.00	33.45	1000.0	9.000	Single Line	19.5
1.935000	53.01	---	87.00	33.99	1000.0	9.000	Single Line	19.5
11.335000	---	57.07	74.00	16.93	1000.0	9.000	Single Line	19.5
11.335000	58.98	---	87.00	28.02	1000.0	9.000	Single Line	19.5
26.015000	---	31.16	74.00	42.84	1000.0	9.000	Single Line	19.6
26.015000	57.08	---	87.00	29.92	1000.0	9.000	Single Line	19.6

♦ 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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Radiated Electric Field Emissions(Below 1 ㎓)

- DC 12 V Mode

Frequency	Amplitude	ANT Polar. (H/V)	ANT. Height	Correction Factor		Corrected Amplitude	Applicable Limit	Margin
[㎒]	[dB㎶]		[m]	ANT. [dB/m]	Cable [dB]	[dB㎶/m]	[dB㎶/m]	[dB]
250.06	15.32	H	2.63	12.49	4.72	32.53	47.00	14.47
250.17	11.58	V	1.22	12.49	4.72	28.79	47.00	18.21
350.13	15.33	H	2.31	14.52	5.64	35.49	47.00	11.51
350.14	13.95	V	1.58	14.52	5.64	34.11	47.00	12.89
512.94	16.32	H	2.33	17.60	7.11	41.03	47.00	5.97
591.63	14.10	V	3.01	19.16	7.76	41.02	47.00	5.98
650.08	14.43	V	1.02	19.49	8.15	42.07	47.00	4.93
650.82	12.87	H	1.95	19.49	8.16	40.52	47.00	6.48

* H : Horizontal, V : Vertical

♦ Calculation
Corrected Amplitude [㏈uV] = Amplitude[㏈uV] + Correction Factor [㏈]
Corrected Amplitude : The Final Value, Amplitude : Reading Value,
Correction Factor : ANT FACTOR + Cable loss

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- PoE Mode

Frequency	Amplitude	ANT Polar. (H/V)	ANT. Height	Correction Factor		Corrected Amplitude	Applicable Limit	Margin
[㎒]	[dBμV]		[m]	ANT. [dB/m]	Cable [dB]	[dBμV/m]	[dBμV/m]	[dB]
225.91	12.93	V	2.31	12.16	4.43	29.52	40.00	10.48
225.92	11.52	H	2.22	12.16	4.43	28.11	40.00	11.89
350.07	13.58	H	1.58	14.52	5.64	33.74	47.00	13.26
350.08	11.25	V	1.36	14.52	5.64	31.41	47.00	15.59
400.47	13.35	V	3.21	15.62	6.18	35.15	47.00	11.85
459.70	14.58	H	1.25	16.65	6.84	38.07	47.00	8.93
512.98	13.90	H	1.00	17.61	7.11	38.62	47.00	8.38
650.03	14.43	V	1.98	19.49	8.15	42.07	47.00	4.93

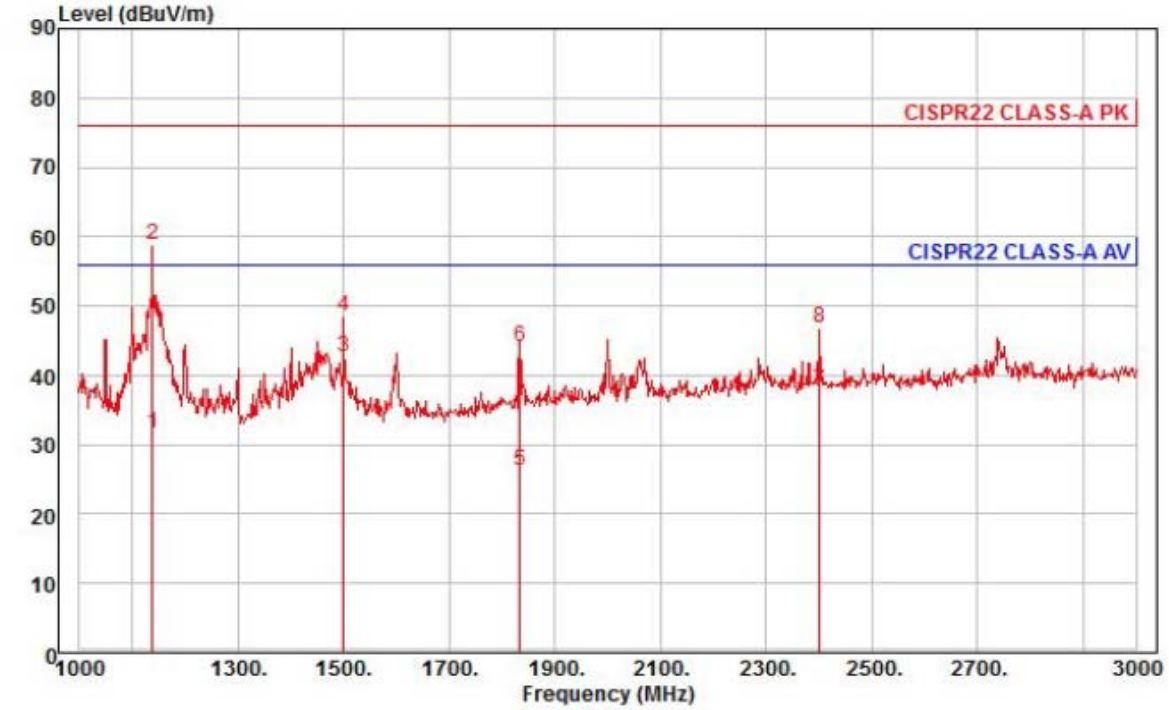
* H : Horizontal, V : Vertical

♦ Calculation
Corrected Amplitude [dBuV] = Amplitude[dBuV] + 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 ㎓)

- 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     : XNV-8020RN
Mode      : DC 12 V
Memo      :
```

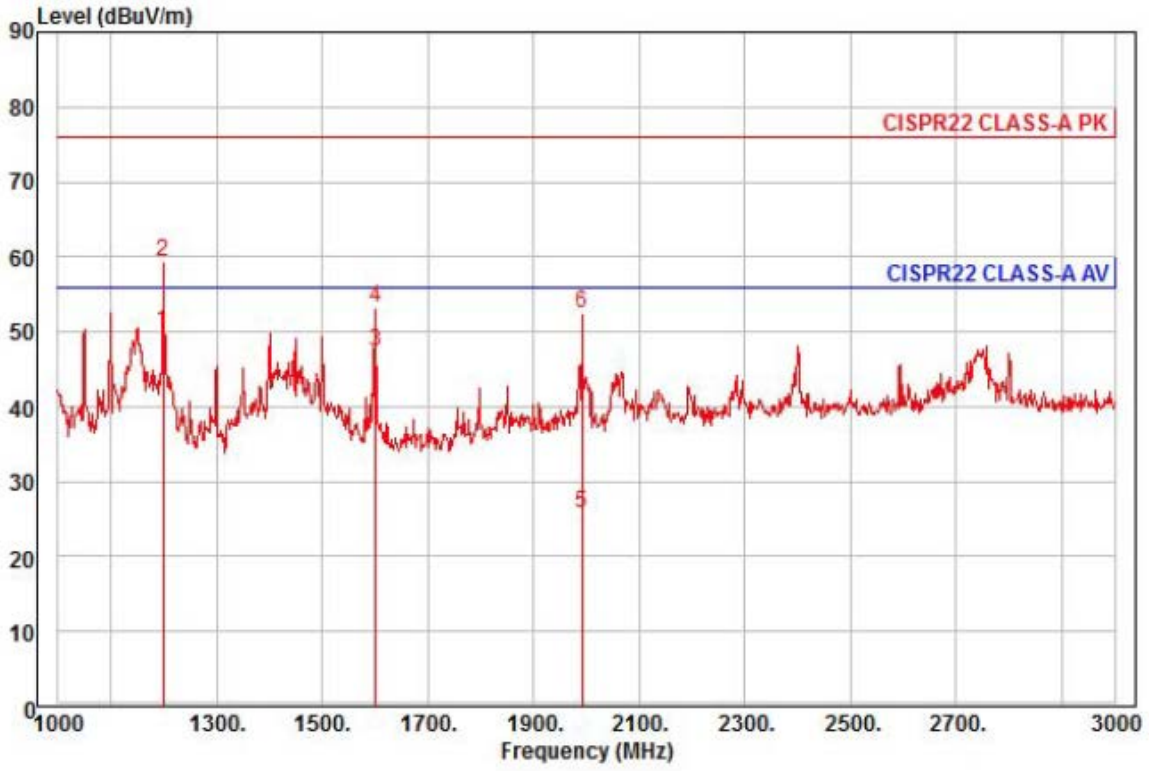
	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	1138.00	40.10	24.46	6.93	39.76	217	56.00	-24.27	horizontal	Average
2 pk	1138.00	67.17	24.46	6.93	39.76	217	76.00	-17.20	horizontal	Peak
3 pp	1500.00	47.91	25.90	8.02	39.18	47	56.00	-13.35	horizontal	Average
4	1500.00	53.85	25.90	8.02	39.18	47	76.00	-27.41	horizontal	Peak
5	1834.00	29.47	27.22	8.91	39.33	170	56.00	-29.73	horizontal	Average
6	1834.00	47.24	27.22	8.91	39.33	170	76.00	-31.96	horizontal	Peak
7	2400.00	38.09	28.86	10.32	39.42	209	56.00	-18.15	horizontal	Average
8	2400.00	47.06	28.86	10.32	39.42	209	76.00	-29.18	horizontal	Peak

♦ Calculation

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

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 : XNV-8020RN
Mode : DC 12 V
Memo :

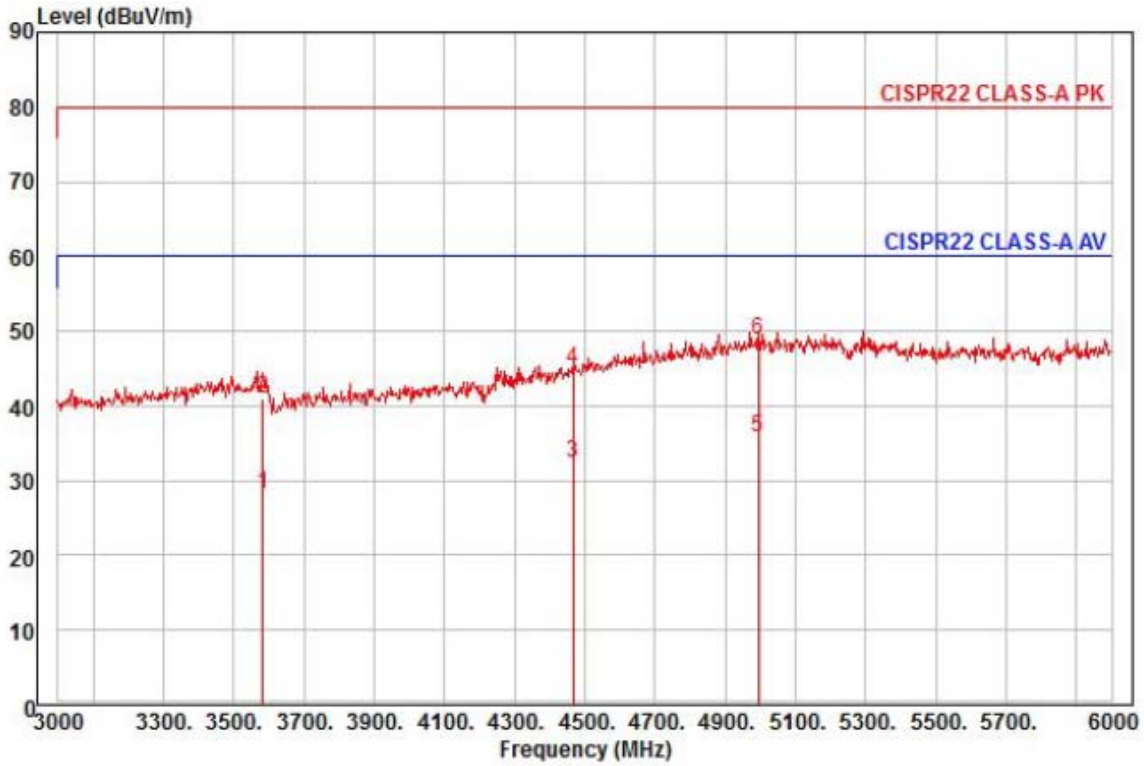
	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1 pp	1200.00	57.76	24.70	7.14	39.61	23	56.00	-6.01	vertical	Average
2 pk	1200.00	67.19	24.70	7.14	39.61	23	76.00	-16.58	vertical	Peak
3	1600.00	51.91	26.29	8.31	39.22	37	56.00	-8.71	vertical	Average
4	1600.00	57.92	26.29	8.31	39.22	37	76.00	-22.70	vertical	Peak
5	1992.00	28.00	27.85	9.32	39.41	225	56.00	-30.24	vertical	Average
6	1992.00	54.77	27.85	9.32	39.41	225	76.00	-23.47	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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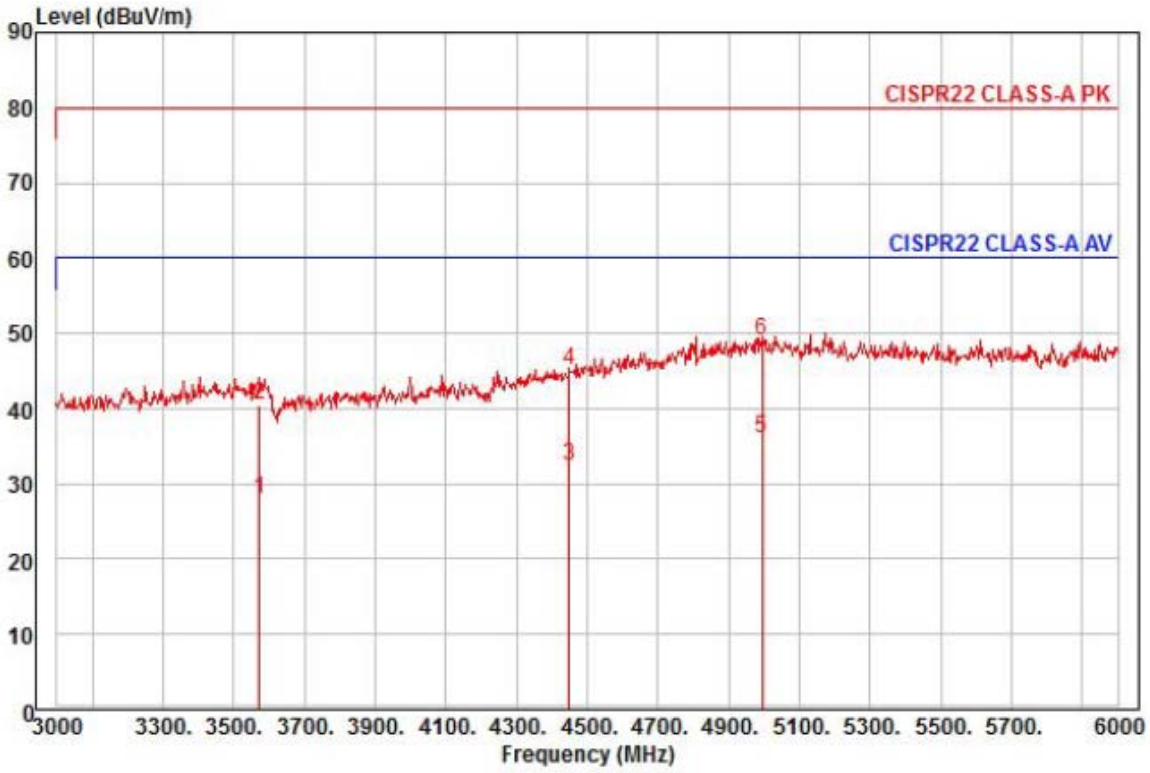


Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : XNV-8020RN
Mode : DC 12 V
Memo :

	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	3582.00	25.09	31.31	12.77	40.85	109	60.00	-31.68	horizontal	Average
2	3582.00	37.75	31.31	12.77	40.85	109	80.00	-39.02	horizontal	Peak
3	4467.00	24.14	34.68	14.40	40.77	201	60.00	-27.55	horizontal	Average
4	4467.00	36.50	34.68	14.40	40.77	201	80.00	-35.19	horizontal	Peak
5 pp	4995.00	23.16	37.69	15.31	40.28	177	60.00	-24.12	horizontal	Average
6 pk	4995.00	36.20	37.69	15.31	40.28	177	80.00	-31.08	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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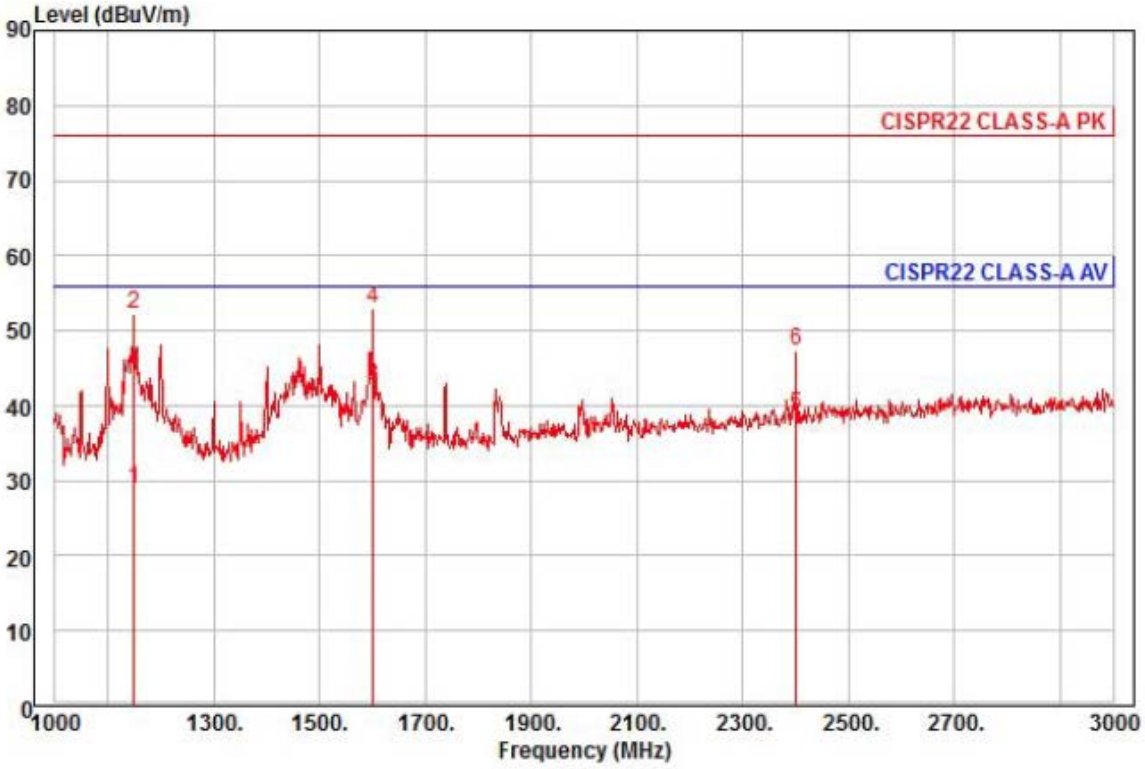
Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : XNV-8020RN
Mode : DC 12 V
Memo :

	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	3573.00	24.81	31.29	12.76	40.85	59	60.00	-31.99	vertical	Average
2	3573.00	37.19	31.29	12.76	40.85	59	80.00	-39.61	vertical	Peak
3	4449.00	24.17	34.57	14.36	40.76	213	60.00	-27.66	vertical	Average
4	4449.00	36.92	34.57	14.36	40.76	213	80.00	-34.91	vertical	Peak
5 pp	4995.00	23.33	37.69	15.31	40.28	249	60.00	-23.95	vertical	Average
6 pk	4995.00	36.32	37.69	15.31	40.28	249	80.00	-30.96	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     : XNV-8020RN
Mode      : POE
Memo      :
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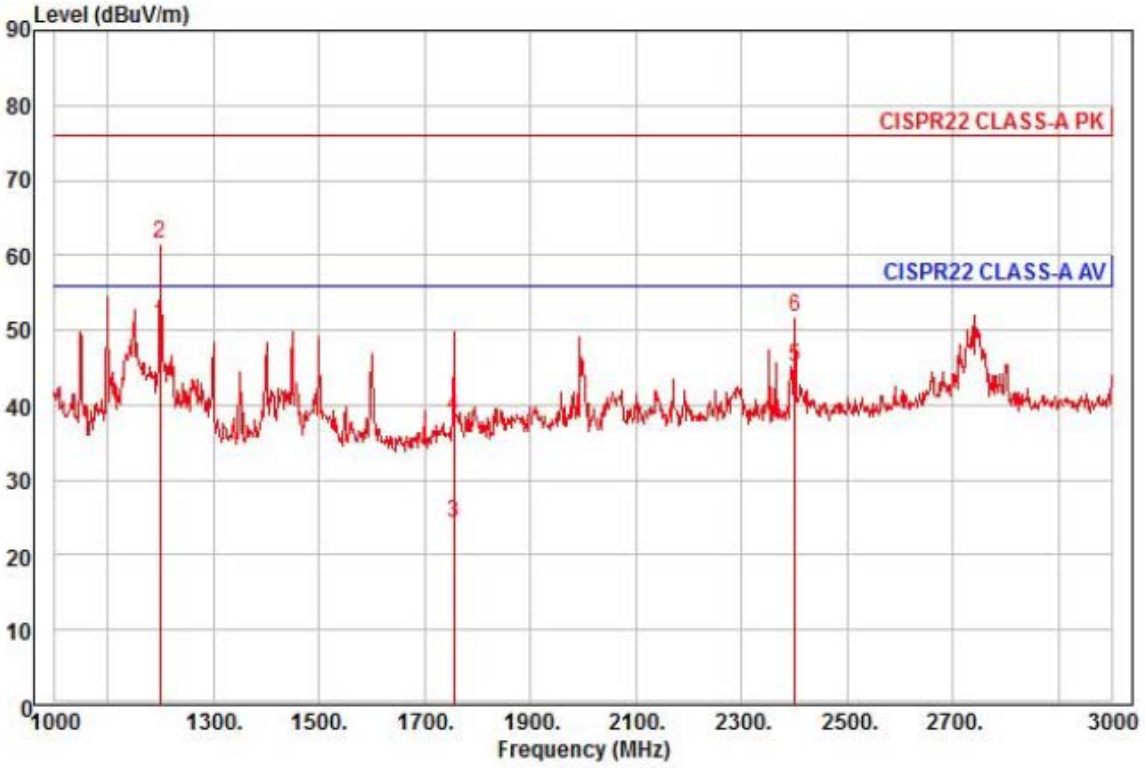
	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	1148.00	37.26	24.50	6.97	39.73	241	56.00	-27.00	horizontal	Average
2	1148.00	60.38	24.50	6.97	39.73	241	76.00	-23.88	horizontal	Peak
3 pp	1600.00	47.28	26.29	8.31	39.22	213	56.00	-13.34	horizontal	Average
4 pk	1600.00	57.54	26.29	8.31	39.22	213	76.00	-23.08	horizontal	Peak
5	2400.00	38.90	28.86	10.32	39.42	48	56.00	-17.34	horizontal	Average
6	2400.00	47.65	28.86	10.32	39.42	48	76.00	-28.59	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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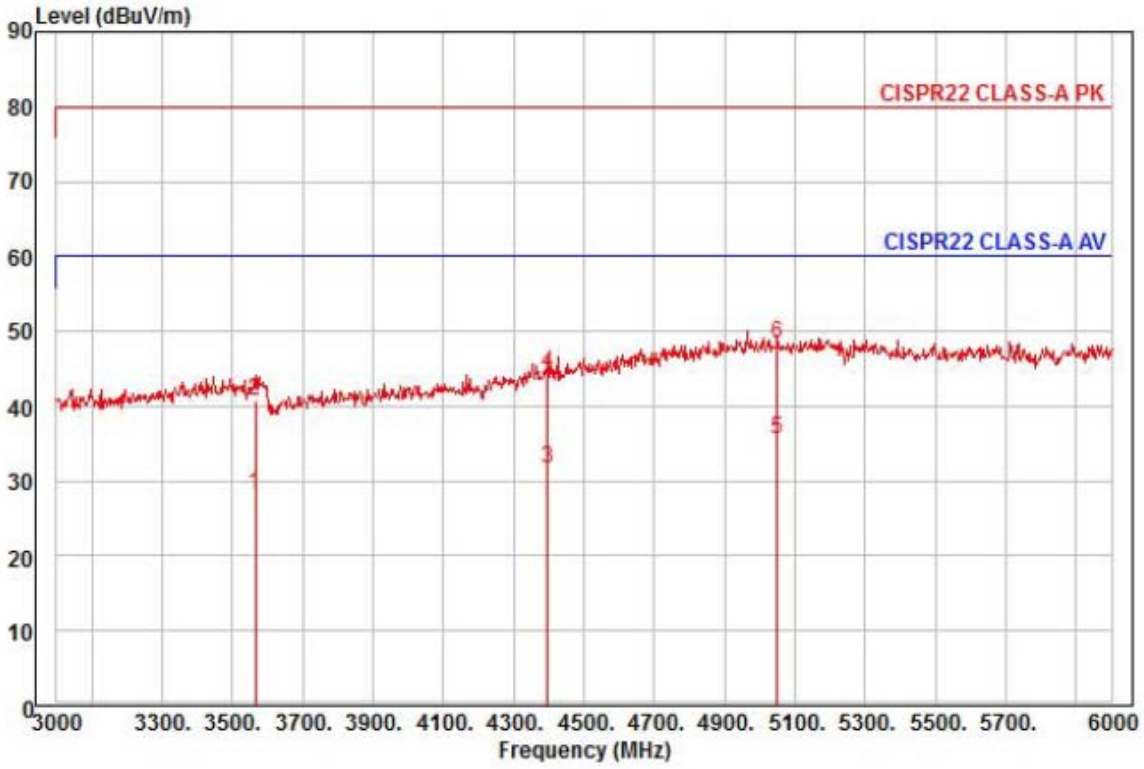


Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : XNV-8020RN
Mode : POE
Memo :

	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 pp	1200.00	58.65	24.70	7.14	39.61	15	56.00	-5.12	vertical	Average
2 pk	1200.00	69.25	24.70	7.14	39.61	15	76.00	-14.52	vertical	Peak
3	1756.00	28.08	26.91	8.71	39.30	98	56.00	-31.60	vertical	Average
4	1756.00	42.16	26.91	8.71	39.30	98	76.00	-37.52	vertical	Peak
5	2400.00	45.48	28.86	10.32	39.42	4	56.00	-10.76	vertical	Average
6	2400.00	52.00	28.86	10.32	39.42	4	76.00	-24.24	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     : XNV-8020RN
Mode      : POE
Memo      :
```

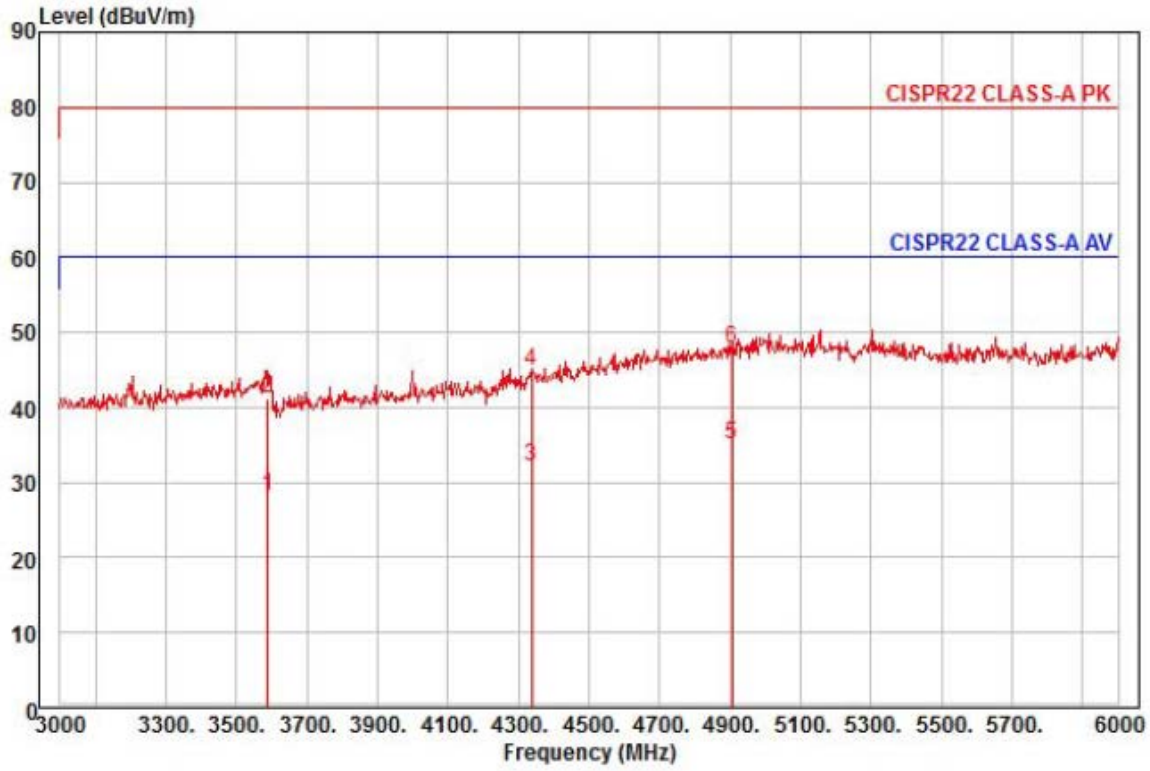
	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	3564.00	25.03	31.28	12.74	40.86	263	60.00	-31.81	horizontal	Average
2	3564.00	37.56	31.28	12.74	40.86	263	80.00	-39.28	horizontal	Peak
3	4398.00	23.83	34.28	14.27	40.76	7	60.00	-28.38	horizontal	Average
4	4398.00	36.62	34.28	14.27	40.76	7	80.00	-35.59	horizontal	Peak
5 pp	5049.00	22.90	37.62	15.41	40.35	162	60.00	-24.42	horizontal	Average
6 pk	5049.00	35.51	37.62	15.41	40.35	162	80.00	-31.81	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 : XNV-8020RN
Mode : POE
Memo :

	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	3588.00	24.92	31.32	12.78	40.85	326	60.00	-31.83	vertical	Average
2	3588.00	37.84	31.32	12.78	40.85	326	80.00	-38.91	vertical	Peak
3	4338.00	24.68	33.94	14.17	40.75	315	60.00	-27.96	vertical	Average
4	4338.00	37.62	33.94	14.17	40.75	315	80.00	-35.02	vertical	Peak
5 pp	4905.00	23.11	37.18	15.21	40.37	195	60.00	-24.87	vertical	Average
6 pk	4905.00	35.81	37.18	15.21	40.37	195	80.00	-32.17	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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Test Setup Photos and Configuration

Conducted Voltage Emissions

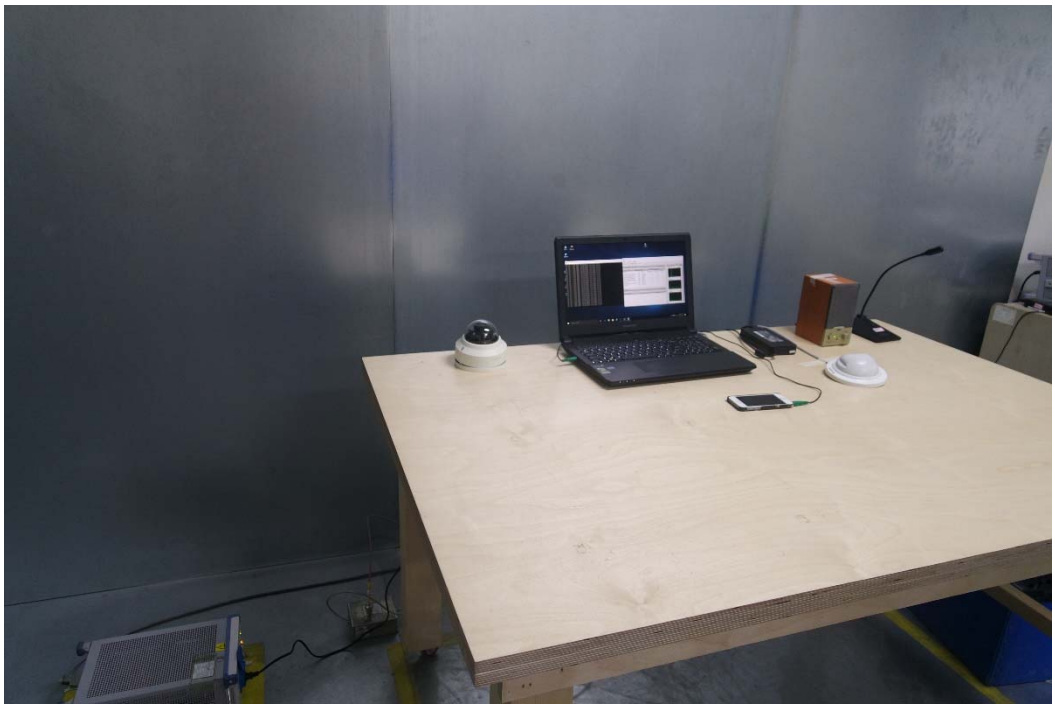
N/A

N/A

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Conducted Telecommunication Emissions

- DC 12 V Mode





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- PoE Mode





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Radiated Electric Field Emissions(Below 1 ㎓)

- DC 12 V Mode





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- PoE Mode

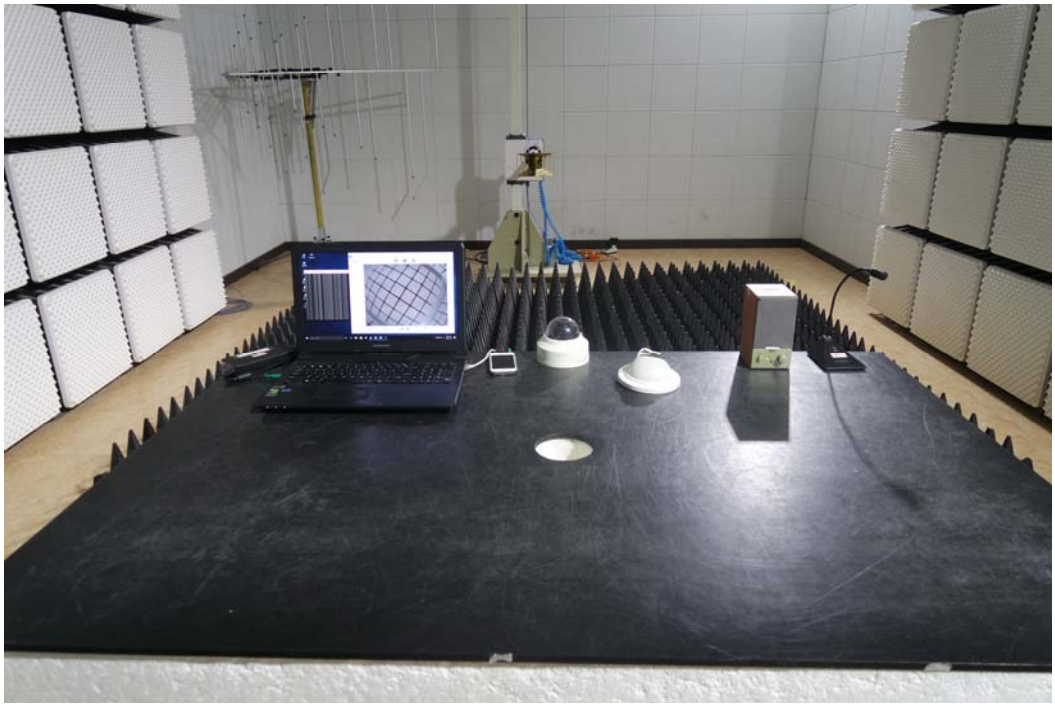




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Radiated Electric Field Emissions(Above 1 ㎓)

- DC 12 V Mode

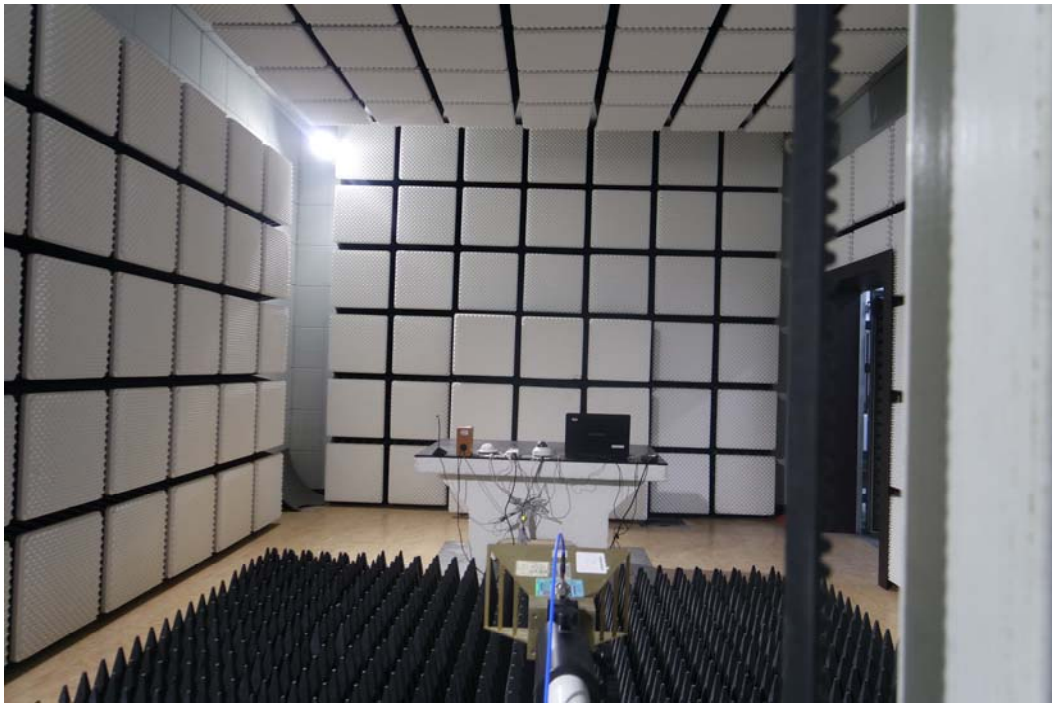




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- PoE Mode





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EUT External Photographs

(Top)



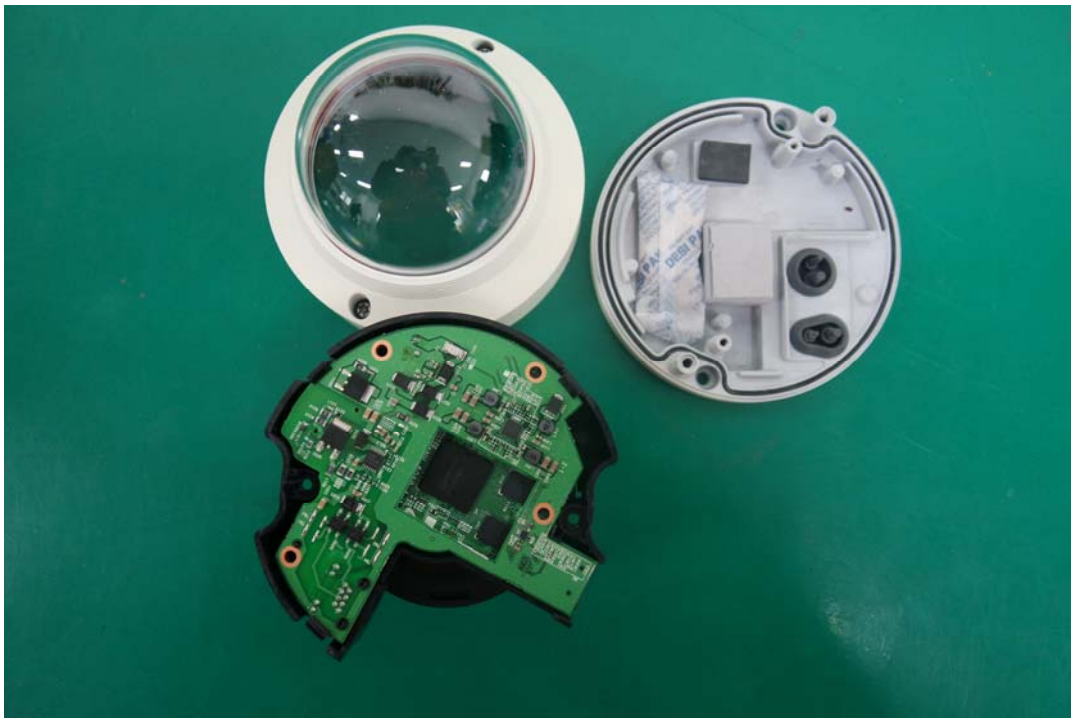
(Bottom)



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EUT Internal Photographs

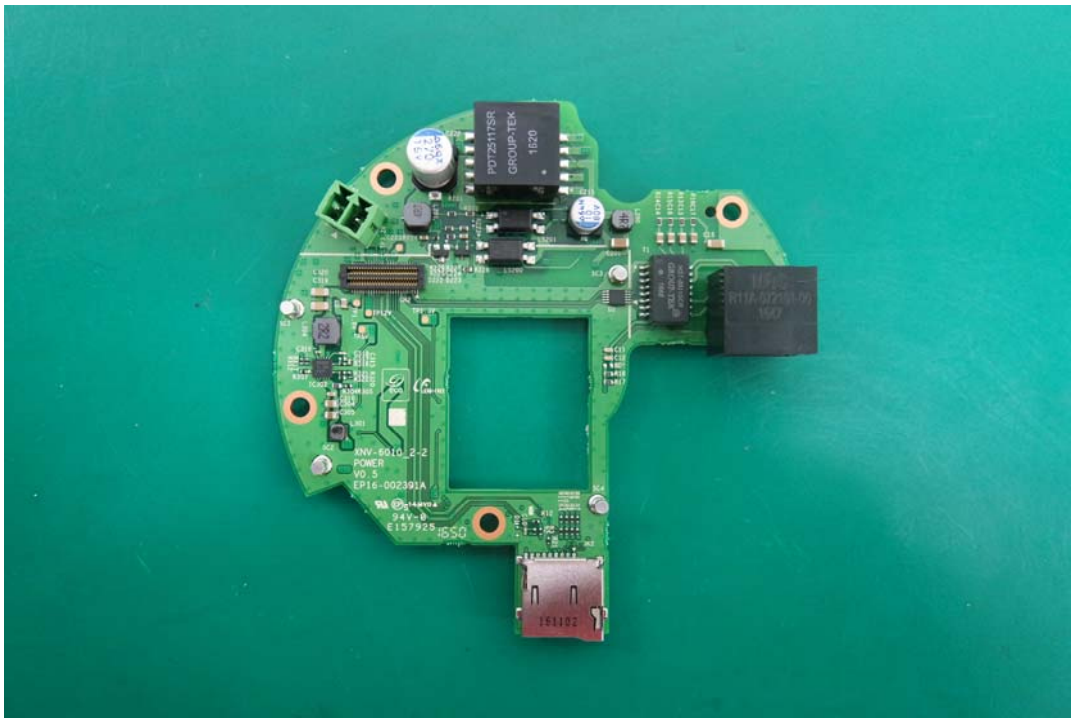
(Internal View)



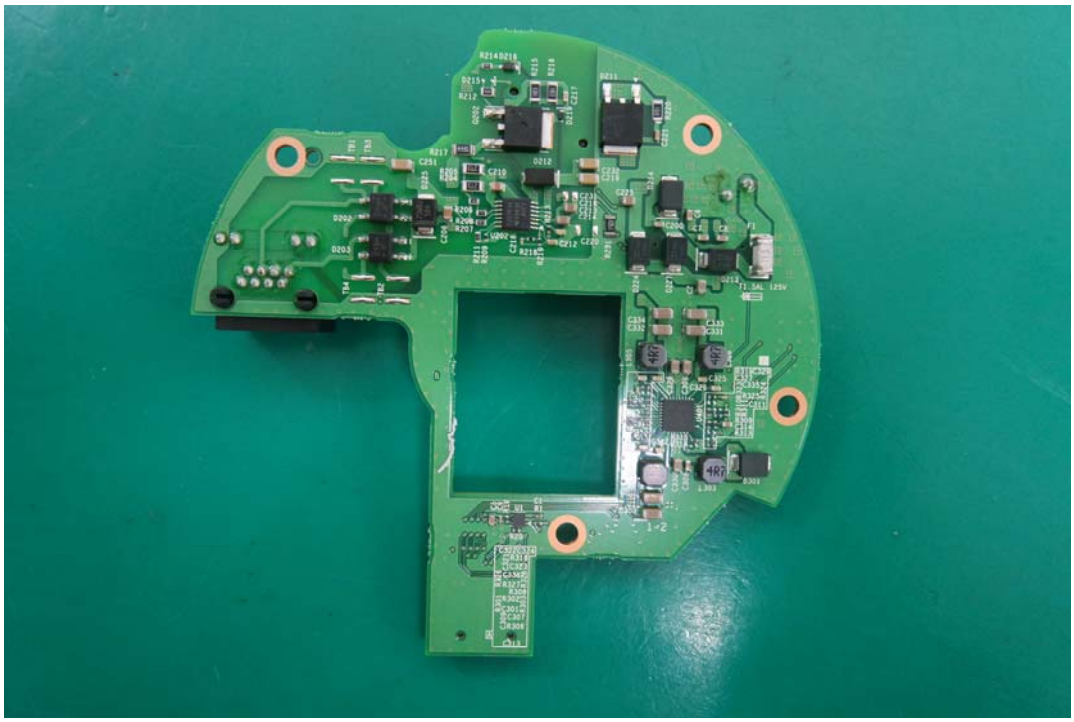
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EUT Internal View – Main Board

(Top)



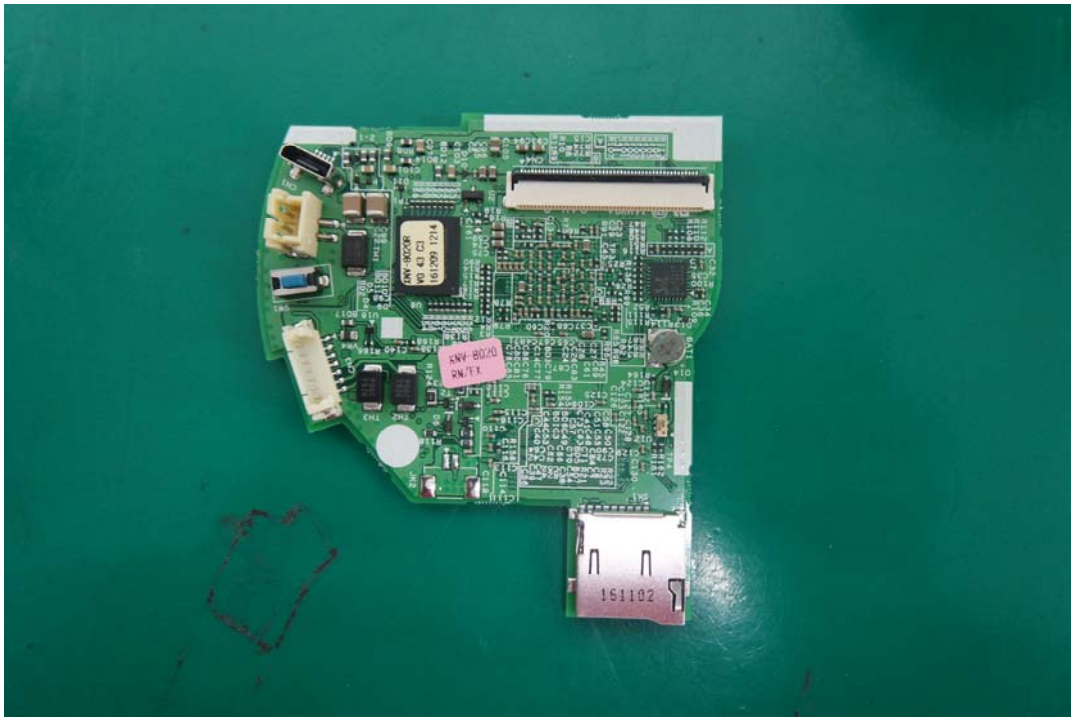
(Bottom)



EUT Internal View – Sub Board

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(Top)



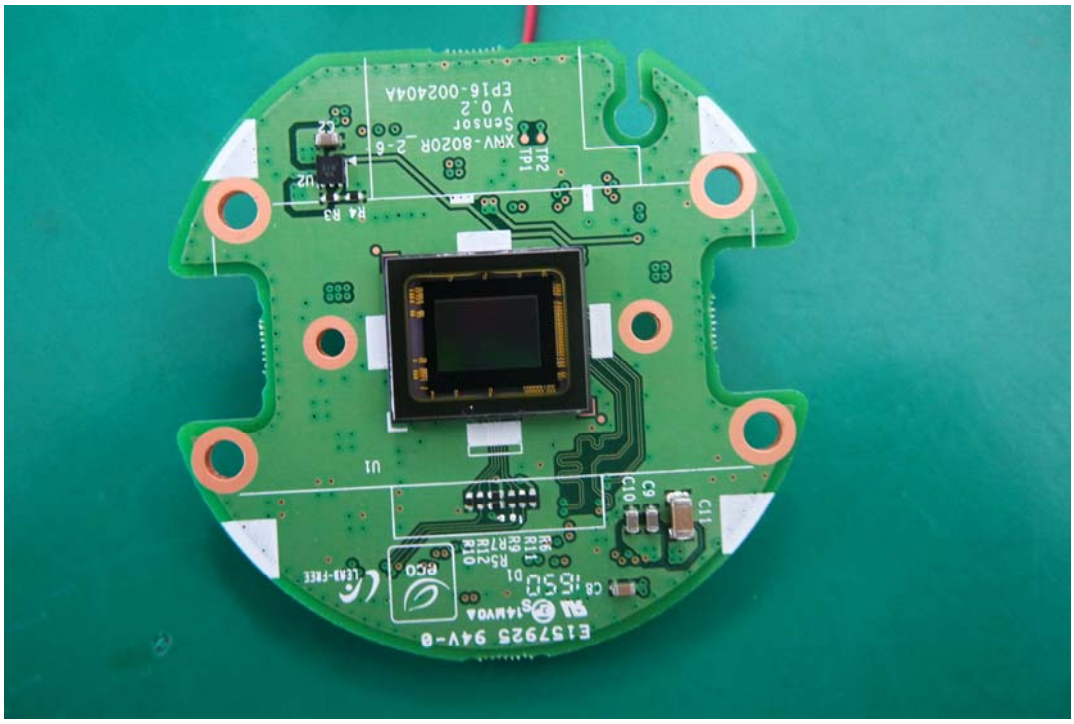
(Bottom)



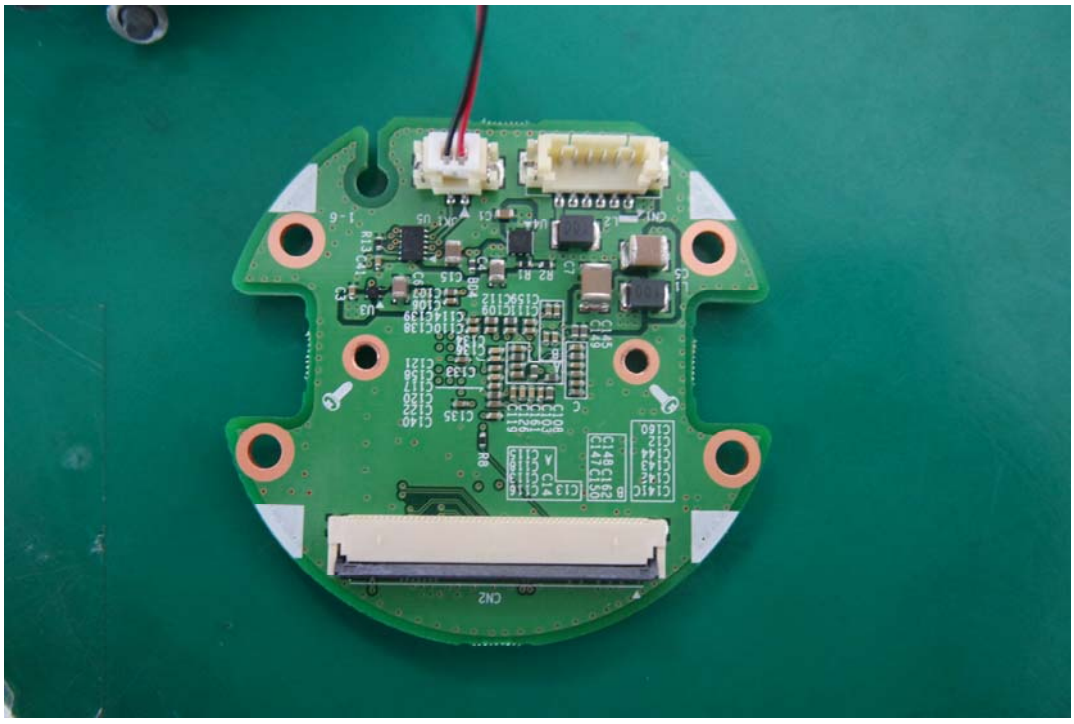
EUT Internal View – Lens Board

(Top)

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(Bottom)



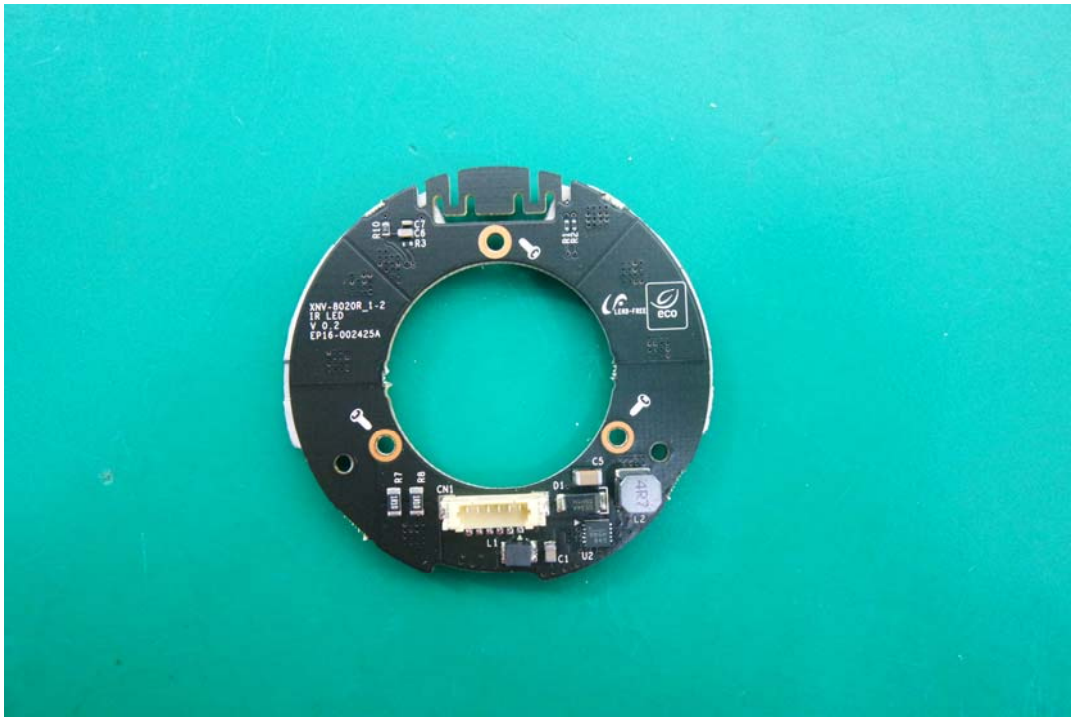
EUT Internal View – LED Board

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(Top)



(Bottom)



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