



EMC TEST REPORT For VCCI

Test Report No. : KES-E1-17T0049
Date of Issue : Jan. 23, 2017
Product name : NETWORK CAMERA
Model/Type No. : XND-6020RN
Variant Model : -
Applicant : Hanwha Techwin Co., Ltd.
Applicant Address : 1204, 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, 2016
Test date : Jan. 12, 2017 ~ Jan. 13, 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
Jan. 23, 2017	KES-E1-17T0049	Issued

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1.0 General Product Description

Main Specifications of EUT are:

Video	
Imaging Device	1/2.8" 2M CMOS
Total Pixels	1945(H) x 1109(V) 2.16M
Effective Pixels	1945(H) x 1097(V) 2.13M
Scanning System	Progressive Scan
Min. Illumination	Color : 0.015 lux(F1.4, 1/30sec) B/W : 0Lux(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)	4mm Fixed
Max. Aperture Ratio	F1.4
Angular Field of View	H: 88.6°, V:47.5°, D: 104.8°
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	150dB
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	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, 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), Built-in MIC. Max output level : 1Vrms Supply voltage: 2.5VDC(4mA), Input impedance: approx. 2K Ohm
Audio out	Line out, Max output level: 1 Vrms
Pixel Counter	Support

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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	1920x1080, 1280x1024, 1280x960, 1280x720, 1024x768, 800x600, 800x448, 720x576, 720x480, 640x480, 640x360, 320x240
Max. Framerate	H.265/H.264 : Max. 60fps 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	HTTPS(SSL) Login Authentication Digest Login Authentication IP Address Filtering User access Log 802.1X Authentication (EAP-TLS, EAP-LEAP) - Streaming Encryption 기능 구현
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	-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	IK08
Electrical	
Input Voltage / Current	DC12V,PoE(IEEE802.3af,Class3)
Power Consumption	Max. 8W(12VDC), Max. 9W(PoE)
Mechanical	
Color / Material	Ivory / Metal
Dimension (WxHxD)	Ø110xH90mm(Ø4.33" x 3.54")
Weight	365g (0.8lb)

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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	XND-6020RN	-	Hanwha Techwin (Tianjin) Co.,LTd.	E.U.T

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
POE Adapter	KPL-060F	-	CHANNEL WELL TECHNOLOGY	-
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

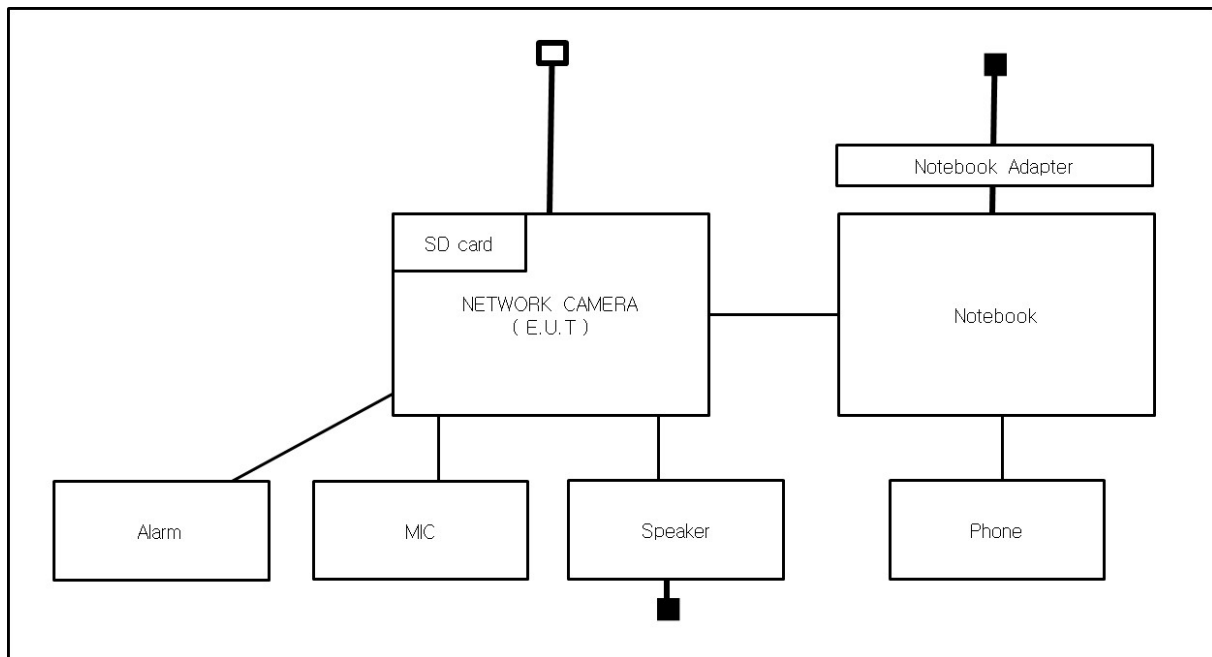
E.U.T Test operating S/W		
Name	Version	Manufacture Company
SmartViewer	-	Hanwha Techwin Co., Ltd.

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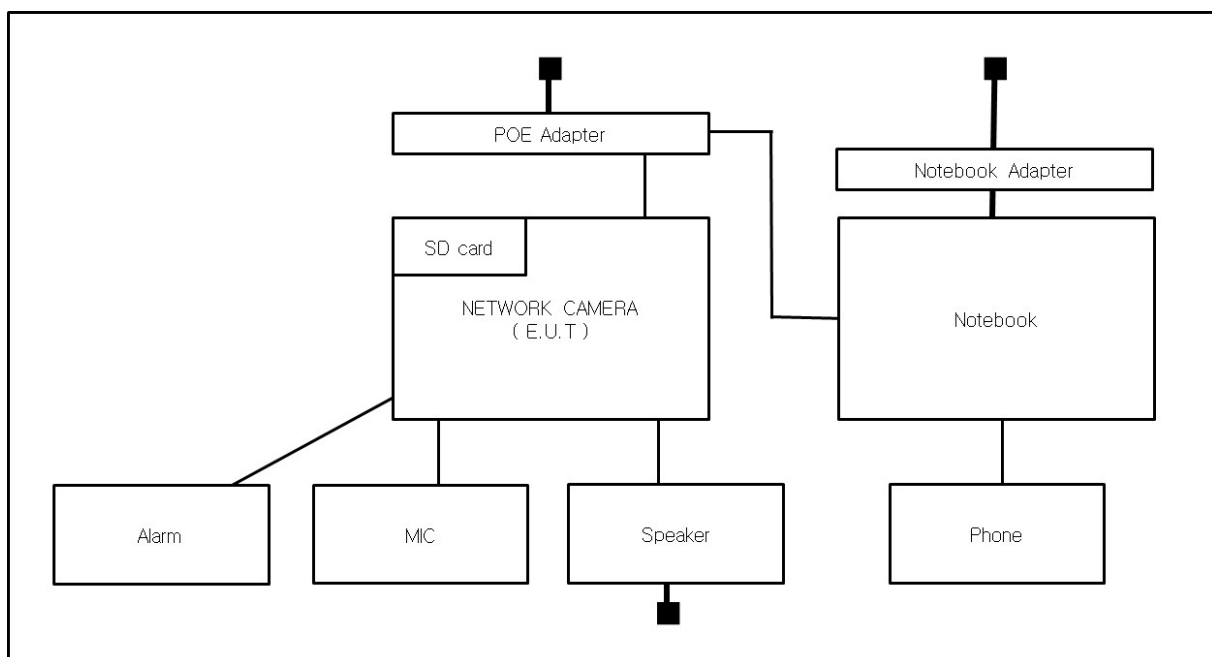
1.8 Configuration

■ 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, Yeosu-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)	



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

Jan, 12, 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: 21,2 °C

Relative Humidity: 42,0 %

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

Jan, 13, 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 ANT	VULB9163	Schwarzbeck	714	11, 28, 2018
☒	OATS	-	KES	-	-
☒	Antenna Mast	-	DAEIL EMC	-	-
☒	Turn Table	-	DAEIL EMC	-	-
☒	EMI Test S/W	-	-	-	-

Test Conditions

Temperature: 0.3 °C
Relative Humidity: 81,0 %

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

Jan, 13, 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: 21,4 °C

Relative Humidity: 40,4 %

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.



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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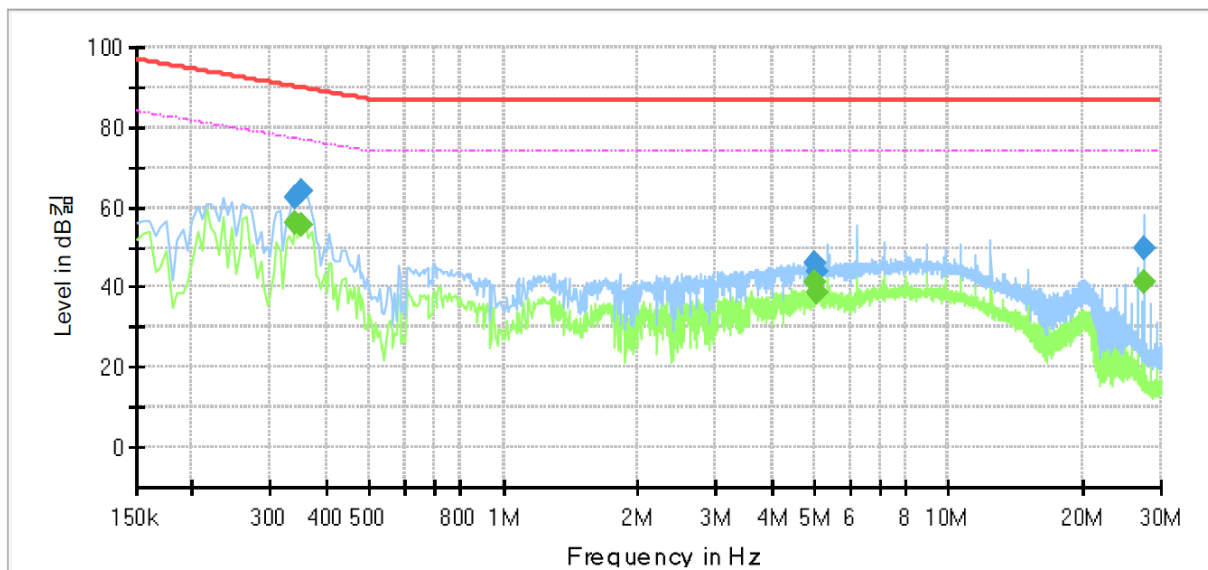
Conducted Emissions at Telecommunication Ports

- DC 12 V Mode

[10 Mbps]

Common Information

Test Description: Telecommunication Emission
Model No.: XND-6020RN
Mode: DC 12 V 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)
0.340000	---	55.93	77.20	21.27	1000.0	9.000	Single Line	21.1
0.340000	62.40	---	90.20	27.80	1000.0	9.000	Single Line	21.1
0.350000	---	55.57	76.96	21.39	1000.0	9.000	Single Line	21.1
0.350000	64.03	---	89.96	25.93	1000.0	9.000	Single Line	21.1
5.000000	---	41.09	74.00	32.91	1000.0	9.000	Single Line	19.8
5.000000	45.96	---	87.00	41.04	1000.0	9.000	Single Line	19.8
5.045000	---	38.39	74.00	35.61	1000.0	9.000	Single Line	19.8
5.045000	43.77	---	87.00	43.23	1000.0	9.000	Single Line	19.8
27.500000	---	41.38	74.00	32.62	1000.0	9.000	Single Line	20.1
27.500000	49.75	---	87.00	37.25	1000.0	9.000	Single Line	20.1

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

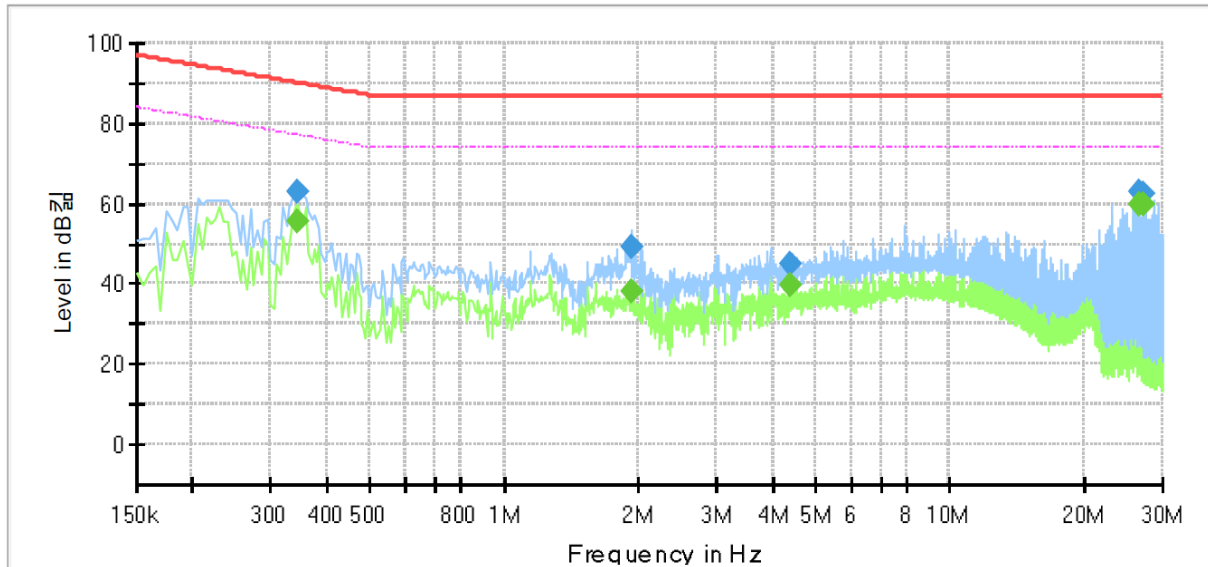
Corr. : Correction values (ISN FACTOR+ Cable Loss)



[100 Mbps]

Common Information

Test Description: Telecommunication Emission
Model No.: XNX-6020RN
Mode: DC 12 V 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)
0.345000	---	55.35	77.08	21.73	1000.0	9.000	Single Line	20.6
0.345000	62.93	---	90.08	27.15	1000.0	9.000	Single Line	20.6
1.935000	---	38.16	74.00	35.84	1000.0	9.000	Single Line	19.5
1.935000	49.08	---	87.00	37.92	1000.0	9.000	Single Line	19.5
4.380000	---	39.56	74.00	34.44	1000.0	9.000	Single Line	19.3
4.380000	44.76	---	87.00	42.24	1000.0	9.000	Single Line	19.3
26.610000	---	60.06	74.00	13.94	1000.0	9.000	Single Line	19.6
26.610000	63.06	---	87.00	23.94	1000.0	9.000	Single Line	19.6
27.160000	---	59.68	74.00	14.32	1000.0	9.000	Single Line	19.6
27.160000	62.51	---	87.00	24.49	1000.0	9.000	Single Line	19.6

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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

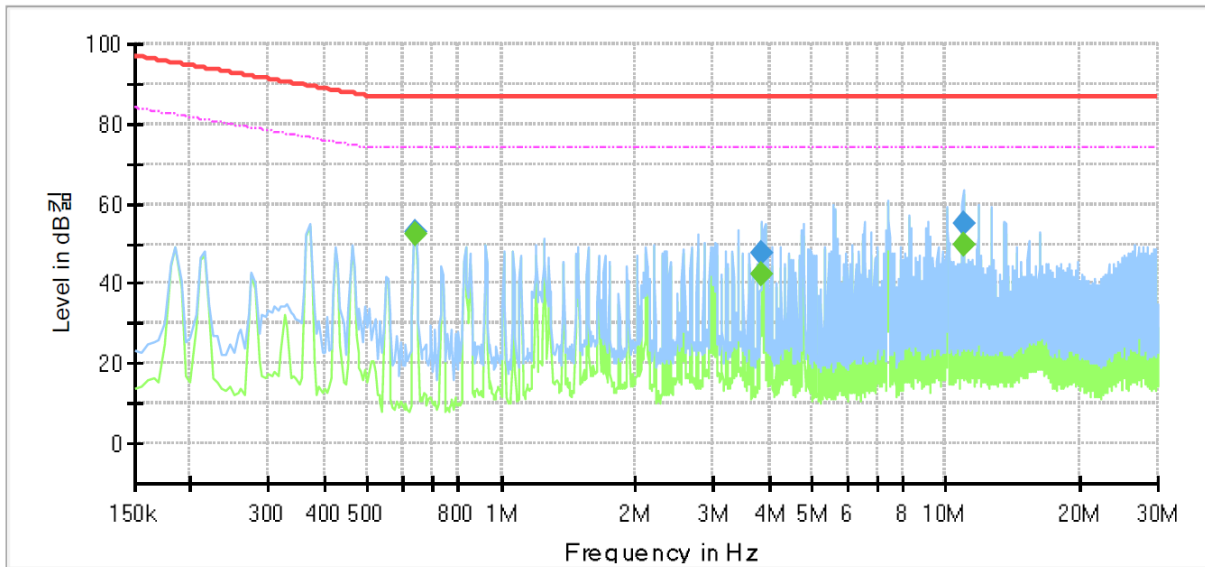


- PoE Mode

[10 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	XND-6020RN
Mode	POE 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)
0.640000	---	52.56	74.00	21.44	1000.0	9.000	Single Line	20.7
0.640000	52.87	---	87.00	34.13	1000.0	9.000	Single Line	20.7
3.860000	---	42.30	74.00	31.70	1000.0	9.000	Single Line	19.8
3.860000	47.63	---	87.00	39.37	1000.0	9.000	Single Line	19.8
10.925000	---	49.66	74.00	24.34	1000.0	9.000	Single Line	20.0
10.925000	55.30	---	87.00	31.70	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)

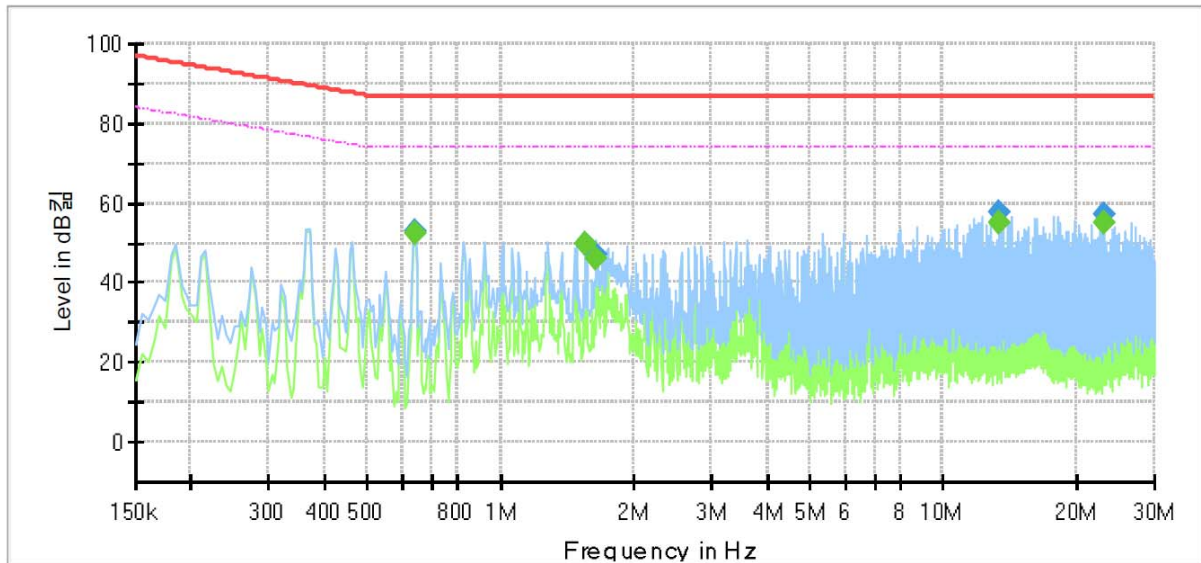
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The results shown in this test report refer only to the sample(s) tested unless otherwise stated.



[100 Mbps]

Common Information

Test Description: Telecommunication Emission
Model No.: XND-6020RN
Mode: POE 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)
0.640000	---	52.22	74.00	21.78	1000.0	9.000	Single Line	20.2
0.640000	53.11	---	87.00	33.89	1000.0	9.000	Single Line	20.2
1.560000	---	49.68	74.00	24.32	1000.0	9.000	Single Line	19.6
1.560000	49.75	---	87.00	37.25	1000.0	9.000	Single Line	19.6
1.650000	---	46.27	74.00	27.73	1000.0	9.000	Single Line	19.6
1.650000	47.22	---	87.00	39.78	1000.0	9.000	Single Line	19.6
13.420000	---	55.25	74.00	18.75	1000.0	9.000	Single Line	19.5
13.420000	57.74	---	87.00	29.26	1000.0	9.000	Single Line	19.5
23.130000	---	55.18	74.00	18.82	1000.0	9.000	Single Line	19.5
23.130000	57.23	---	87.00	29.77	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)

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**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]
140.97	7.37	H	3.12	7.58	3.46	18.41	40.00	21.59
250.21	9.91	H	3.57	12.49	4.72	27.12	47.00	19.88
300.66	8.60	V	1.00	13.43	5.16	27.19	47.00	19.81
350.12	12.68	H	2.92	14.52	5.64	32.84	47.00	14.16
488.95	7.18	V	1.34	17.16	6.96	31.30	47.00	15.70
661.51	14.18	V	1.00	19.52	8.24	41.94	47.00	5.06

* 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

- PoE 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]
59.25	20.43	V	1.13	11.93	2.23	34.59	40.00	5.41
163.96	7.82	V	1.24	8.42	3.73	19.97	40.00	20.03
250.48	9.23	H	3.57	12.50	4.72	26.45	47.00	20.55
350.12	11.92	H	3.02	14.52	5.64	32.08	47.00	14.92
413.80	10.53	H	3.78	15.85	6.35	32.73	47.00	14.27
575.37	8.36	V	1.00	18.83	7.62	34.81	47.00	12.19

* H : Horizontal, V : Vertical

◆ Calculation

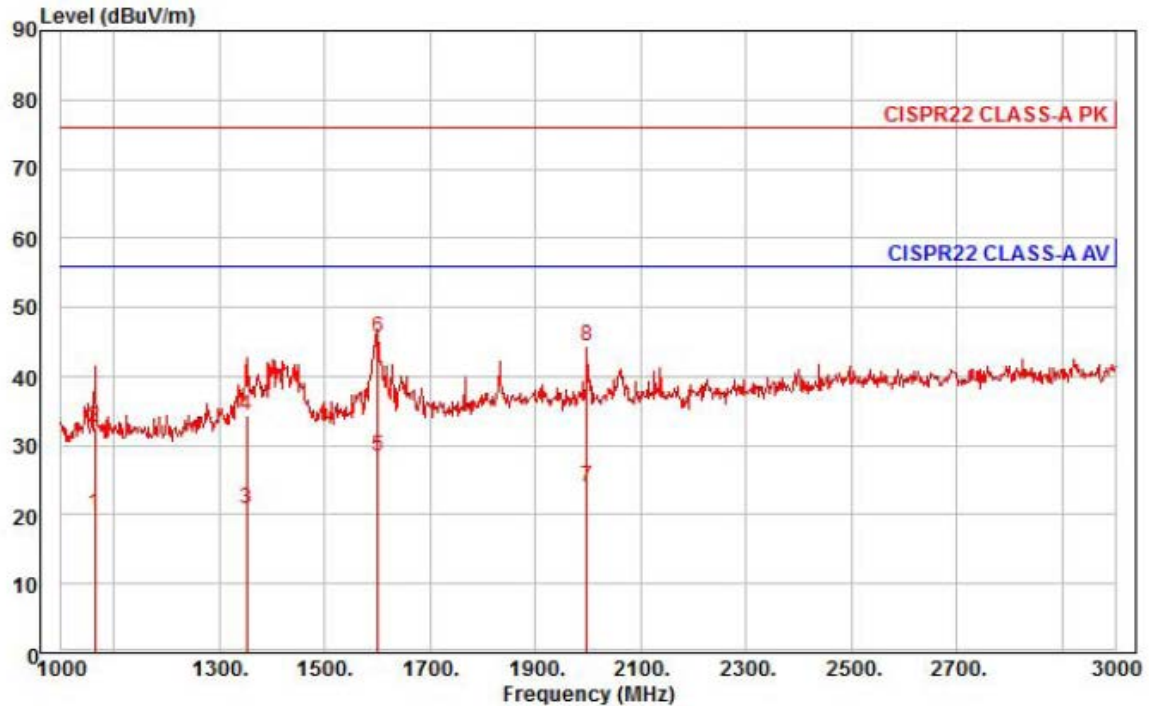
Corrected Amplitude [dB μ V] = Amplitude[dBuV] + Correction Factor [dB]

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

Correction Factor : ANT FACTOR + Cable loss

Radiated Electric Field Emissions(Above 1 GHz)

- DC 12 V Mode



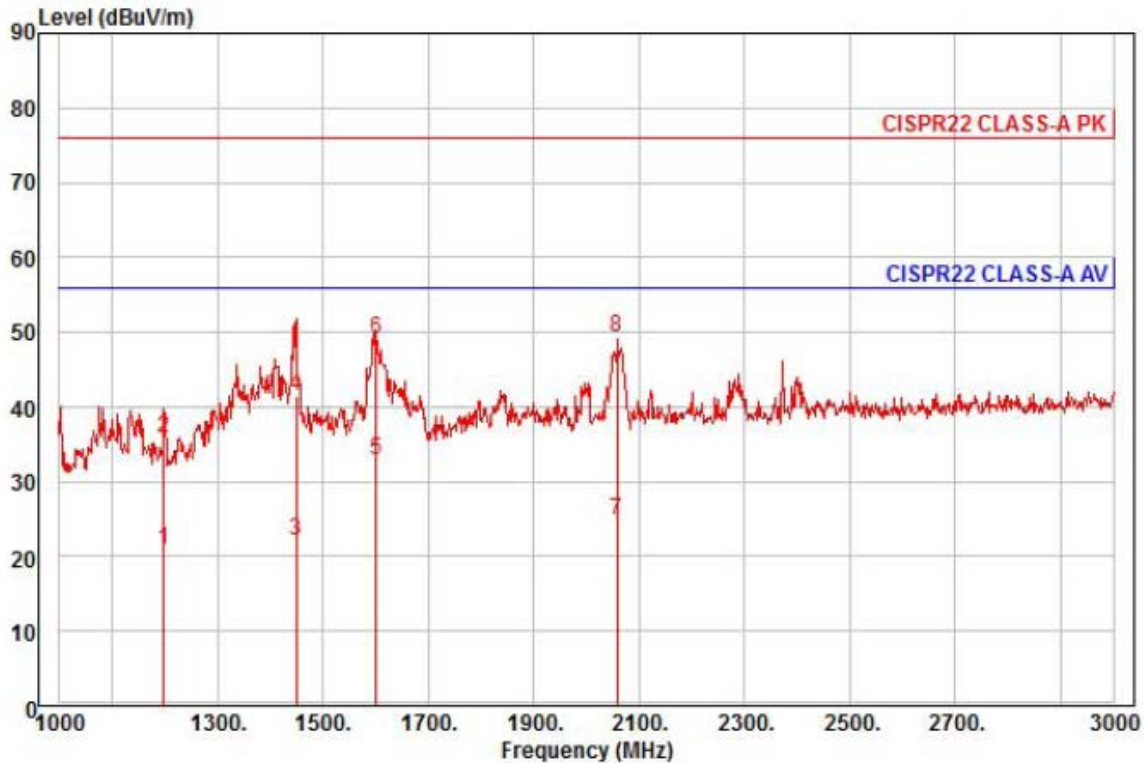
Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : XND-6020RN
Mode : DC 12 V
Memo :

	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	1064.00	29.13	24.16	6.69	39.94	185	56.00	-35.96	horizontal	Average
2	1064.00	41.63	24.16	6.69	39.94	185	76.00	-43.46	horizontal	Peak
3	1352.00	27.24	25.31	7.58	39.25	309	56.00	-35.12	horizontal	Average
4	1352.00	40.68	25.31	7.58	39.25	309	76.00	-41.68	horizontal	Peak
5 pp	1600.00	33.18	26.29	8.31	39.22	155	56.00	-27.44	horizontal	Average
6 pk	1600.00	50.22	26.29	8.31	39.22	155	76.00	-30.40	horizontal	Peak
7	1998.00	26.27	27.87	9.33	39.41	183	56.00	-31.94	horizontal	Average
8	1998.00	46.52	27.87	9.33	39.41	183	76.00	-31.69	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



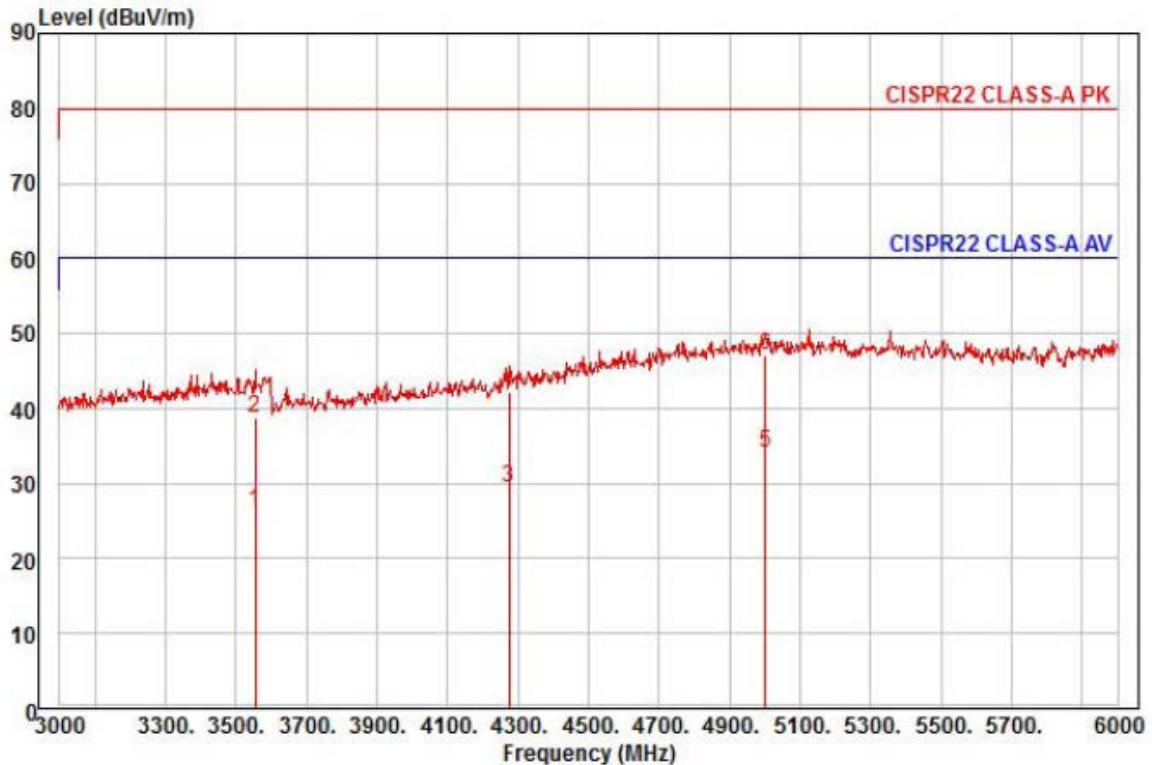
Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : XND-6020RN
Mode : DC 12 V
Memo :

	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	1198.00	28.74	24.70	7.13	39.61	339	56.00	-35.04	vertical	Average
2	1198.00	43.51	24.70	7.13	39.61	339	76.00	-40.27	vertical	Peak
3	1450.00	27.63	25.70	7.87	39.15	0	56.00	-33.95	vertical	Average
4	1450.00	46.97	25.70	7.87	39.15	0	76.00	-34.61	vertical	Peak
5 pp	1600.00	37.52	26.29	8.31	39.22	6	56.00	-23.10	vertical	Average
6	1600.00	53.71	26.29	8.31	39.22	6	76.00	-26.91	vertical	Peak
7	2058.00	26.73	28.02	9.47	39.41	309	56.00	-31.19	vertical	Average
8 pk	2058.00	51.22	28.02	9.47	39.41	309	76.00	-26.70	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



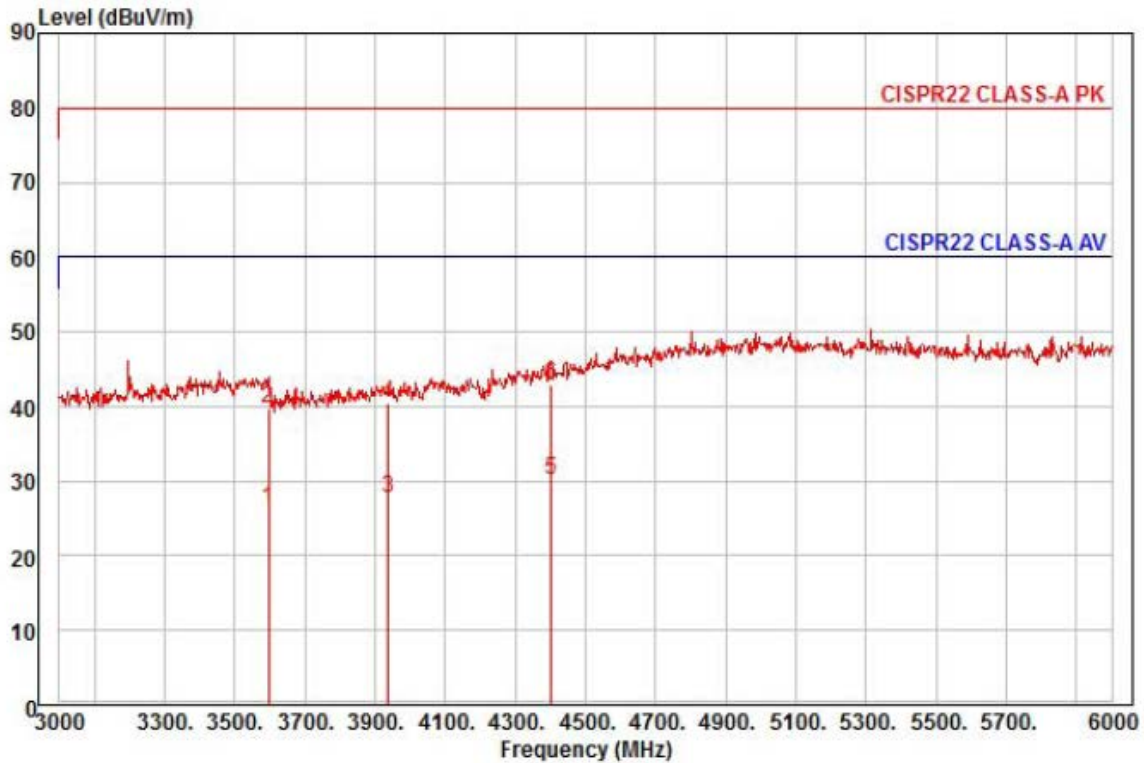
Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : XND-6020RN
Mode : DC 12 V
Memo :

	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	3555.00	23.12	31.26	12.72	40.86	22	60.00	-33.76	horizontal	Average
2	3555.00	35.69	31.26	12.72	40.86	22	80.00	-41.19	horizontal	Peak
3	4275.00	22.50	33.58	14.06	40.74	146	60.00	-30.60	horizontal	Average
4	4275.00	35.16	33.58	14.06	40.74	146	80.00	-37.94	horizontal	Peak
5 pp	5001.00	21.43	37.72	15.32	40.27	111	60.00	-25.80	horizontal	Average
6 pk	5001.00	34.41	37.72	15.32	40.27	111	80.00	-32.82	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



Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : XND-6020RN
Mode : DC 12 V
Memo :

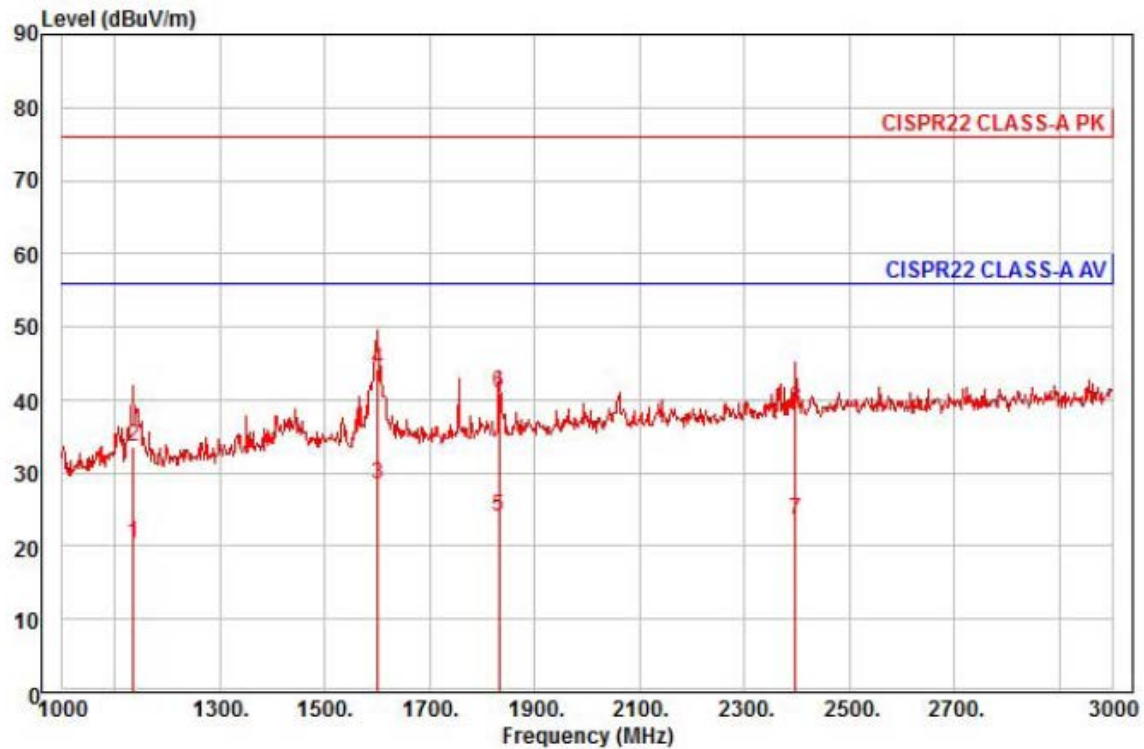
	Read	Ant	Cable	Preamp	TPos	Limit	Over		
Freq	Level	Factor	Loss	Factor		Line	Limit	Pol/Phase	Remark
MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	3597.00	23.02	31.33	12.80	40.85	86	60.00	-33.70	vertical
2	3597.00	36.47	31.33	12.80	40.85	86	80.00	-40.25	vertical
3	3939.00	23.12	31.91	13.45	40.72	158	60.00	-32.24	vertical
4	3939.00	35.83	31.91	13.45	40.72	158	80.00	-39.53	vertical
5 pp	4401.00	22.29	34.30	14.27	40.76	108	60.00	-29.90	vertical
6 pk	4401.00	35.04	34.30	14.27	40.76	108	80.00	-37.15	vertical

◆ 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

- PoE Mode



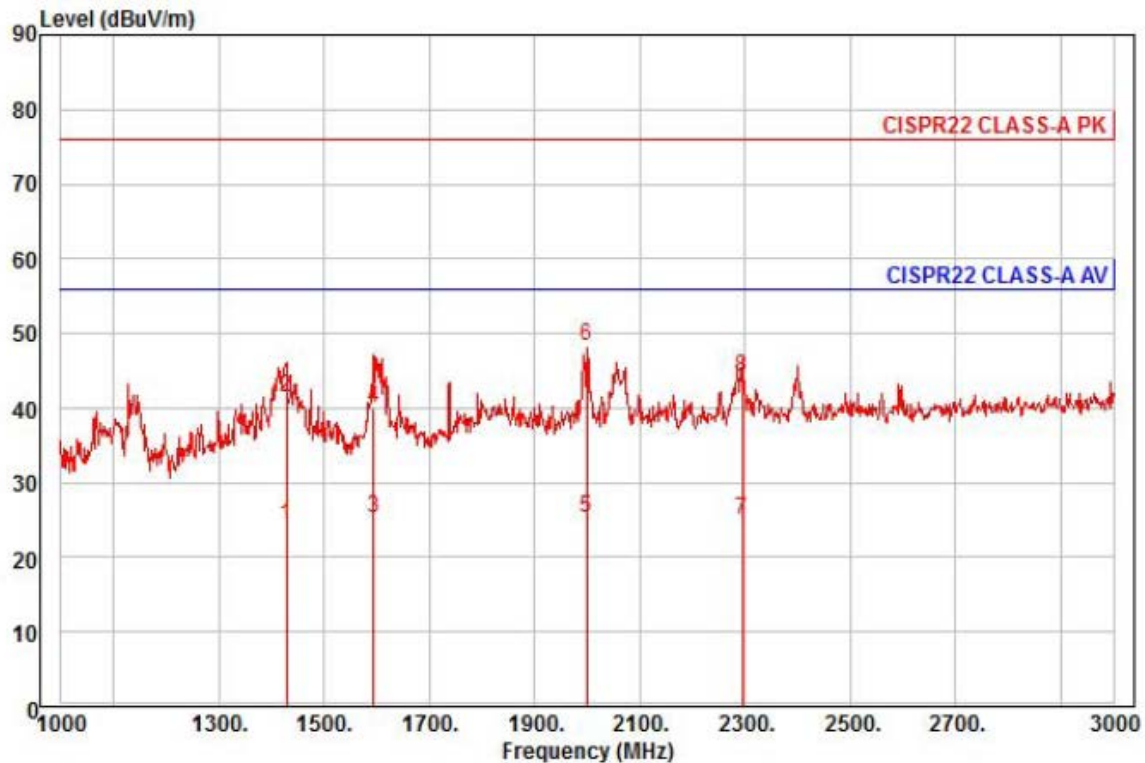
Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : XND-6020RN
Mode : POE
Memo :

	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	1134.00	28.77	24.44	6.92	39.77	141	56.00	-35.64	horizontal	Average
2	1134.00	41.90	24.44	6.92	39.77	141	76.00	-42.51	horizontal	Peak
3 pp	1600.00	33.00	26.29	8.31	39.22	180	56.00	-27.62	horizontal	Average
4 pk	1600.00	48.71	26.29	8.31	39.22	180	76.00	-31.91	horizontal	Peak
5	1832.00	27.32	27.21	8.91	39.33	106	56.00	-31.89	horizontal	Average
6	1832.00	44.15	27.21	8.91	39.33	106	76.00	-35.06	horizontal	Peak
7	2398.00	23.85	28.86	10.32	39.42	265	56.00	-32.39	horizontal	Average
8	2398.00	39.04	28.86	10.32	39.42	265	76.00	-37.20	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



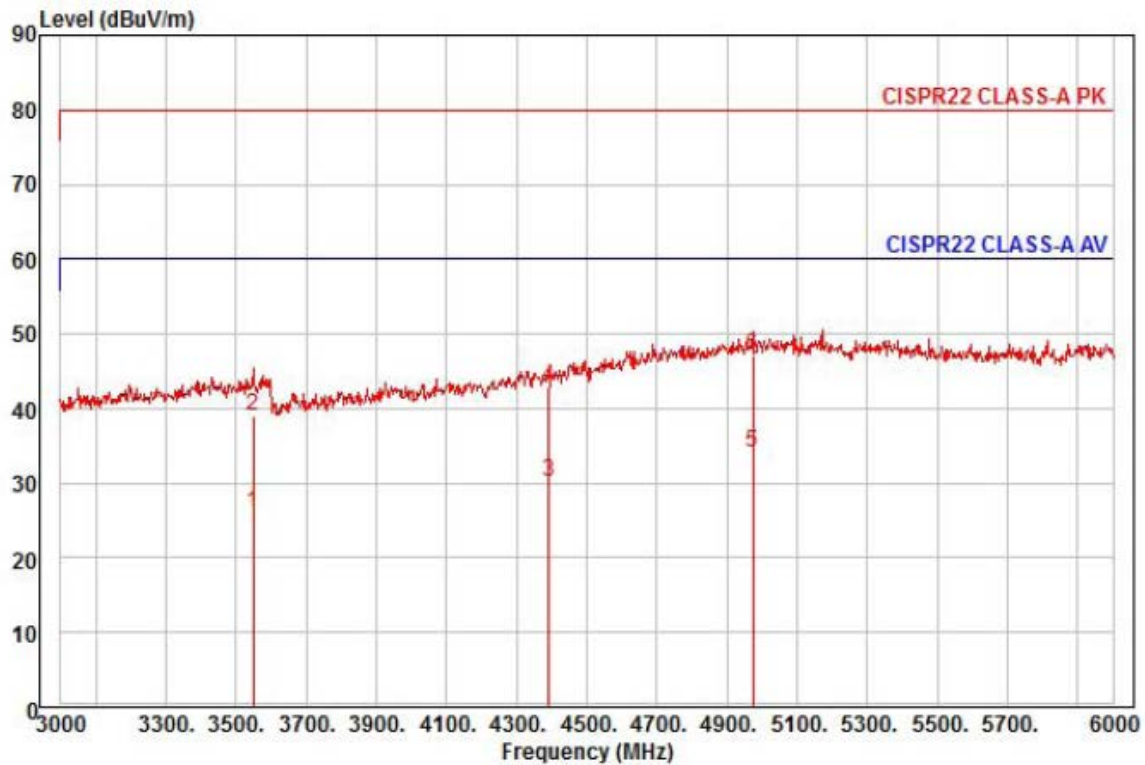
Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : XND-6020RN
Mode : POE
Memo :

	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	1428.00	30.06	25.61	7.81	39.14	15	56.00	-31.66	vertical	Average
2	1428.00	47.21	25.61	7.81	39.14	15	76.00	-34.51	vertical	Peak
3 av	1594.00	30.00	26.27	8.29	39.22	31	56.00	-30.66	vertical	Average
4	1594.00	44.69	26.27	8.29	39.22	31	76.00	-35.97	vertical	Peak
5	2000.00	27.46	27.88	9.34	39.41	4	56.00	-30.73	vertical	Average
6 pp	2000.00	50.47	27.88	9.34	39.41	4	76.00	-27.72	vertical	Peak
7	2294.00	25.68	28.60	10.05	39.42	26	56.00	-31.09	vertical	Average
8	2294.00	44.90	28.60	10.05	39.42	26	76.00	-31.87	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



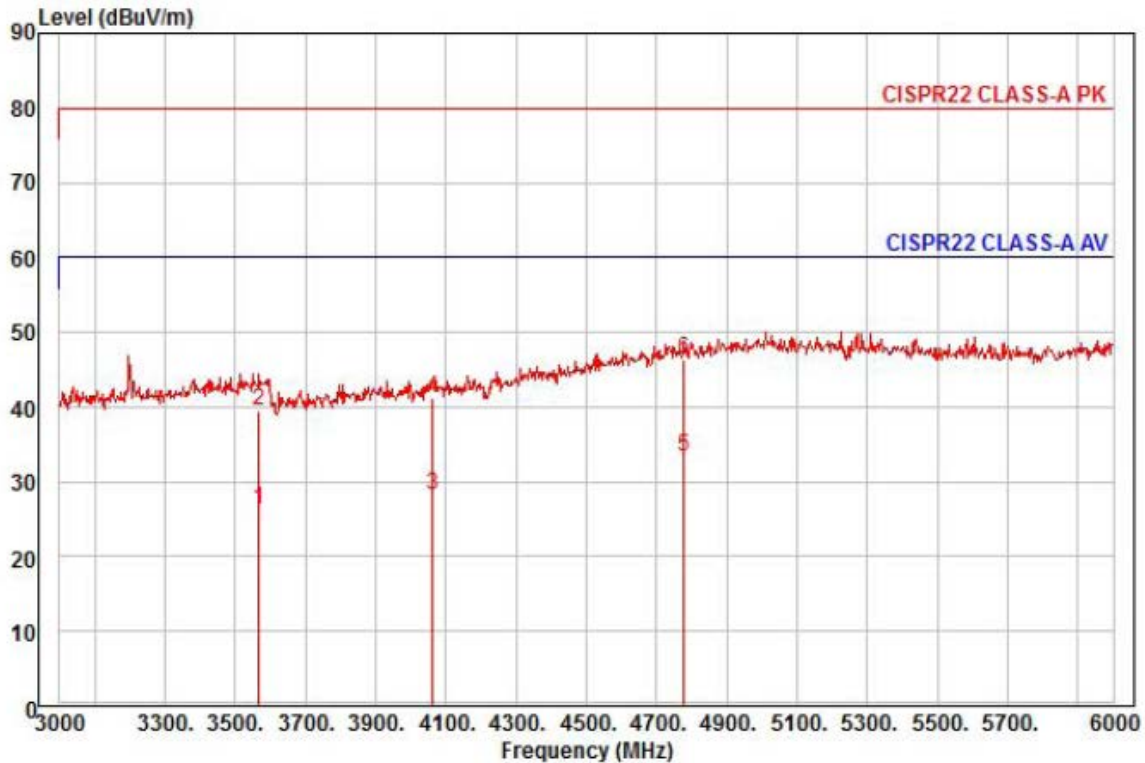
Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : XND-6020RN
Mode : POE
Memo :

	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	3549.00	22.89	31.25	12.71	40.86	26	60.00	-34.01	horizontal	Average
2	3549.00	35.90	31.25	12.71	40.86	26	80.00	-41.00	horizontal	Peak
3	4392.00	22.38	34.25	14.26	40.75	108	60.00	-29.86	horizontal	Average
4	4392.00	35.26	34.25	14.26	40.75	108	80.00	-36.98	horizontal	Peak
5 pp	4974.00	21.57	37.57	15.29	40.30	242	60.00	-25.87	horizontal	Average
6 pk	4974.00	34.63	37.57	15.29	40.30	242	80.00	-32.81	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



Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : XND-6020RN
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	3567.00	23.00	31.28	12.75	40.86	318	60.00	-33.83	vertical	Average
2	3567.00	36.26	31.28	12.75	40.86	318	80.00	-40.57	vertical	Peak
3	4062.00	22.94	32.36	13.68	40.71	302	60.00	-31.73	vertical	Average
4	4062.00	35.86	32.36	13.68	40.71	302	80.00	-38.81	vertical	Peak
5 pp	4779.00	22.26	36.46	15.05	40.49	204	60.00	-26.72	vertical	Average
6 pk	4779.00	35.25	36.46	15.05	40.49	204	80.00	-33.73	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

Test report No.:
KES-E1-17T0049
Page (32) of (44)

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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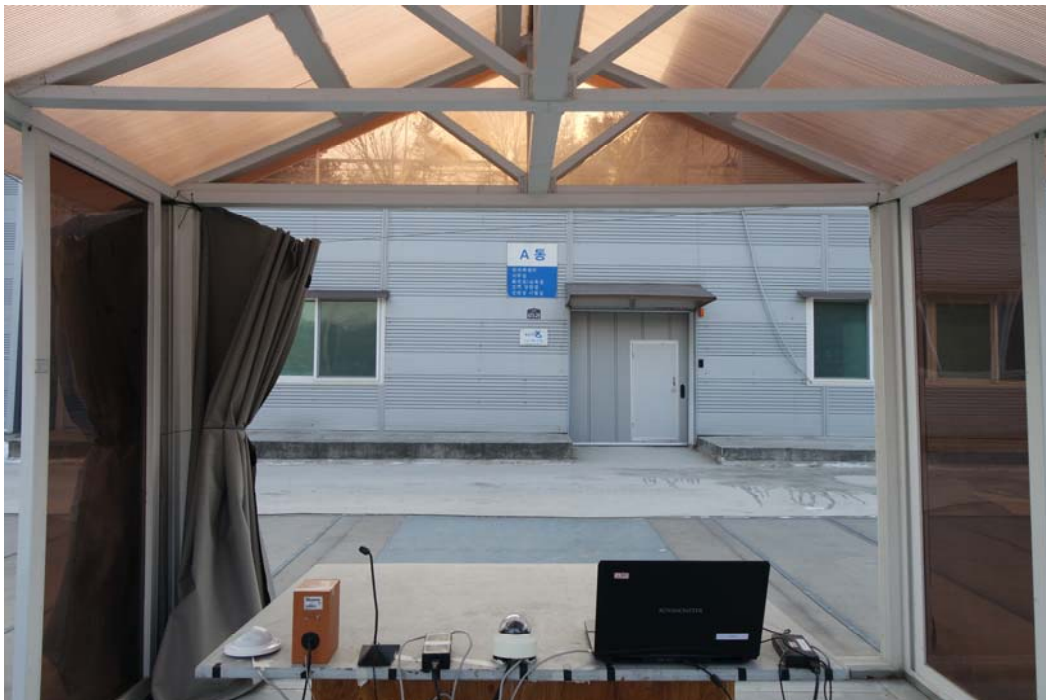
Radiated Electric Field Emissions(Below 1 GHz)

- DC 12 V Mode



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- PoE Mode



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The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

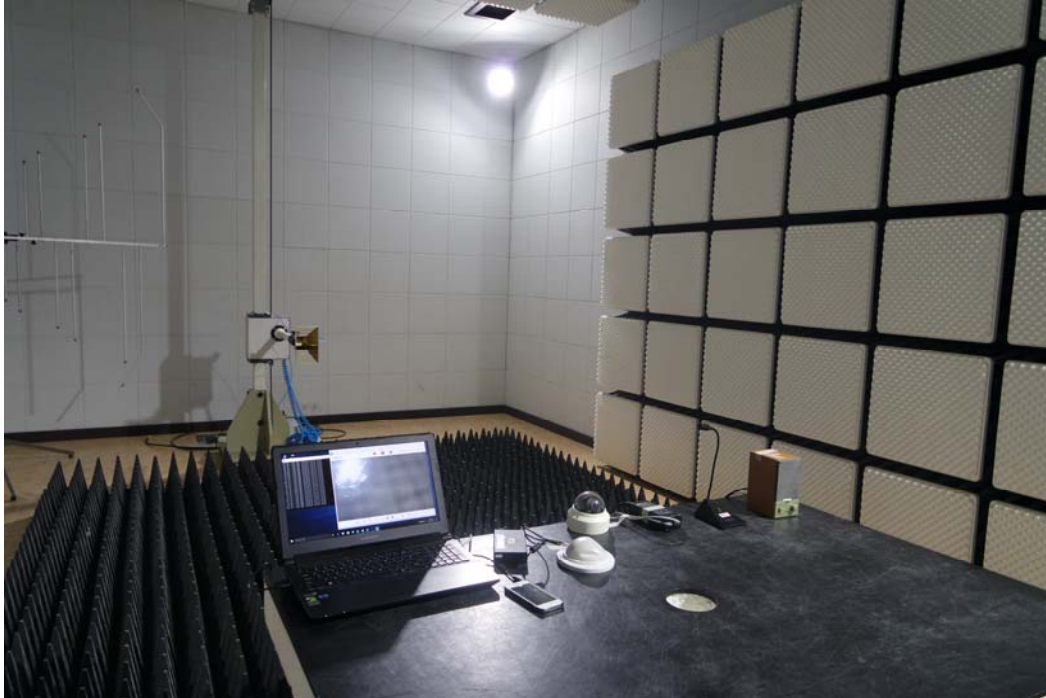
Radiated Electric Field Emissions(Above 1 GHz)

- 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 – Board 1

(Top)



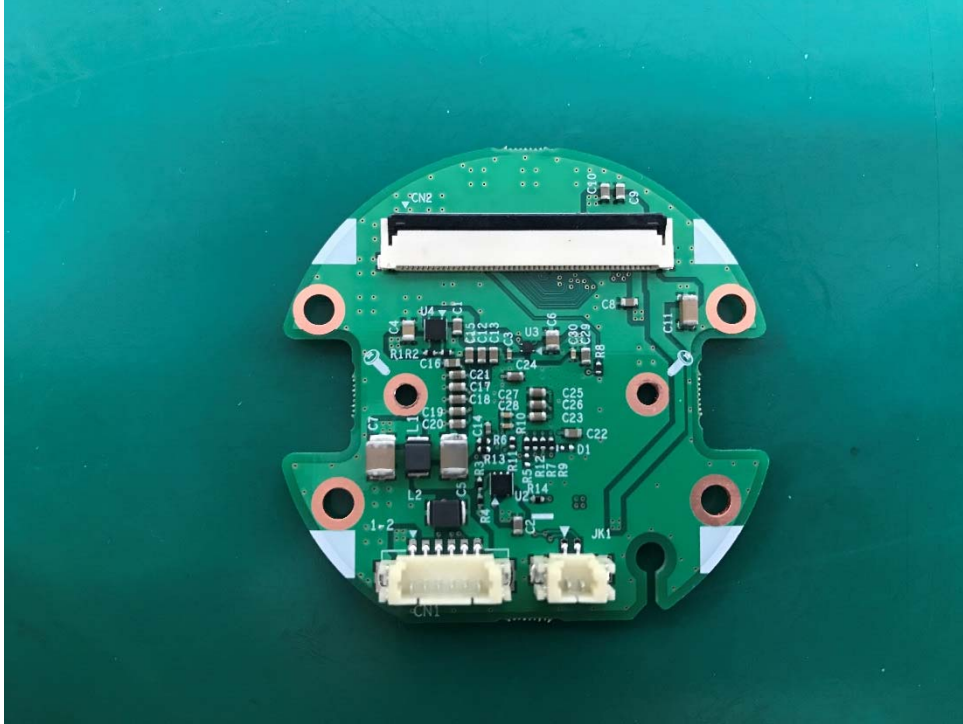
(Bottom)



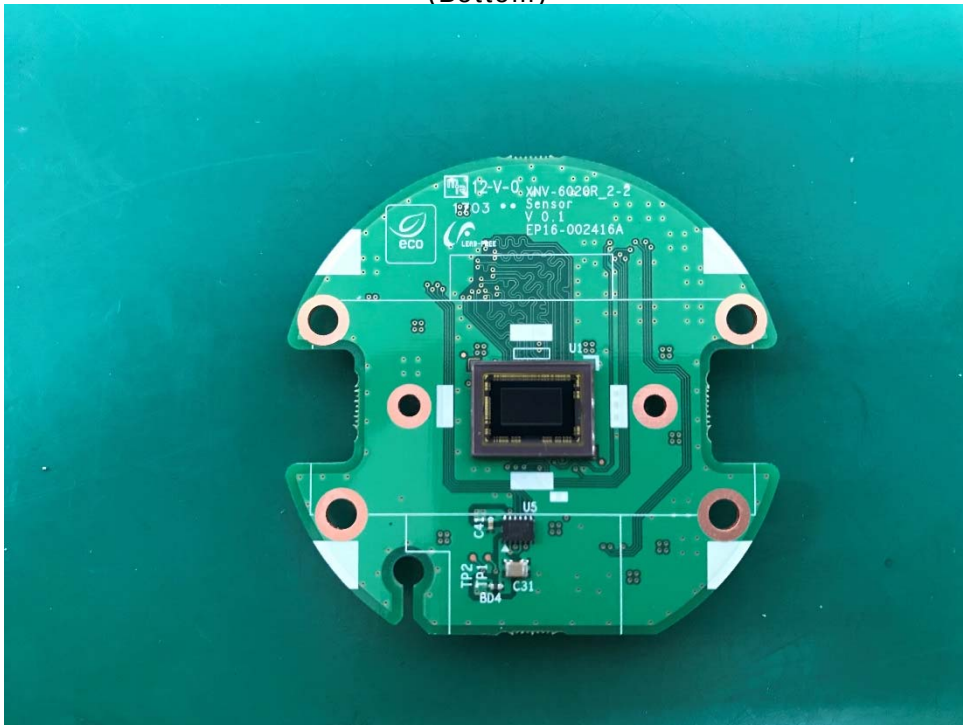
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The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

EUT Internal View – Board 2

(Top)



(Bottom)



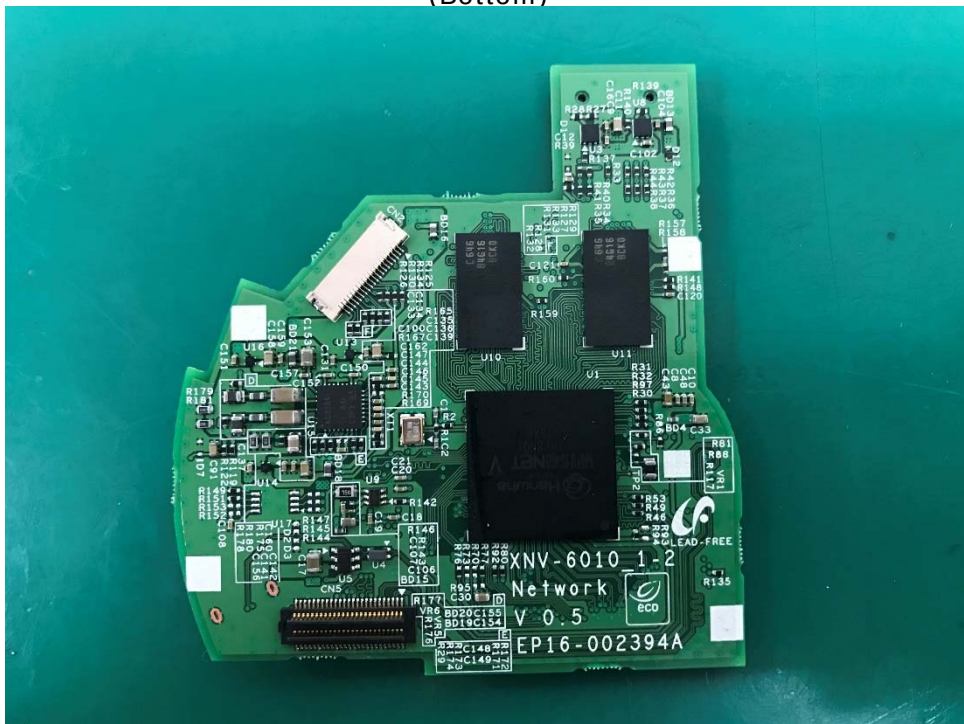
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The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

EUT Internal View – Board 3

(Top)



(Bottom)



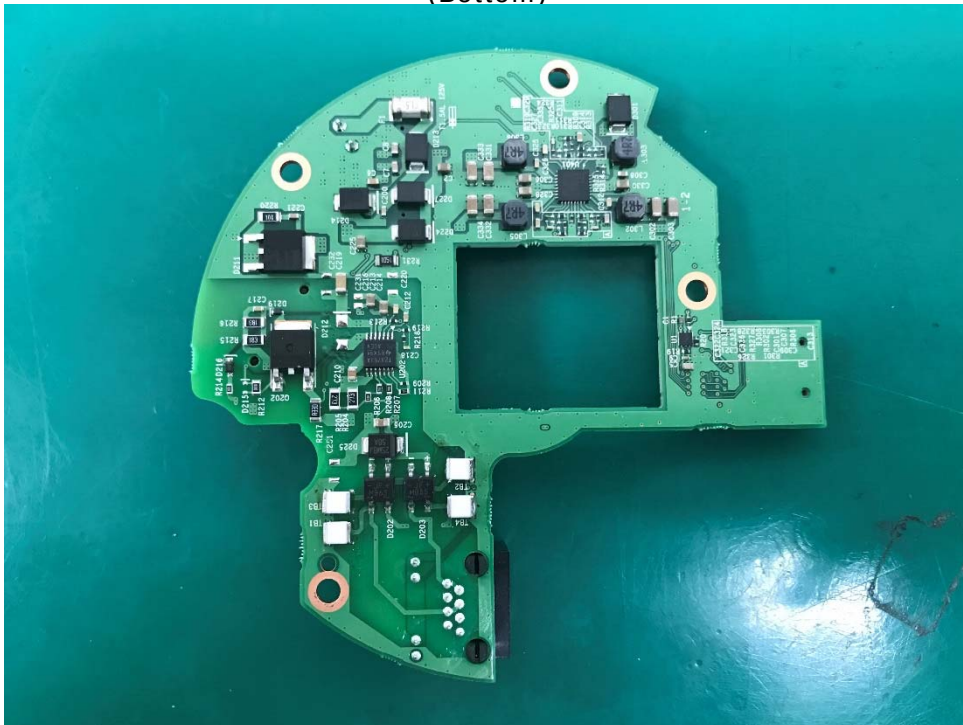
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EUT Internal View – Board 4

(Top)



(Bottom)



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