

**KES Co., Ltd.**

3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Report No.:

KES-E1-17T0068-R2

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EMC TEST REPORT For IC

Test Report No. : KES-E1-17T0068-R2
Date of Issue : Feb. 24, 2023
Product name : NETWORK CAMERA
Model/Type No. : XND-8020R
Variant Model : -
Applicant : Hanwha Vision Co., Ltd
Applicant Address : 6, Pangyo-ro 319Beon-gil, Bundang-gu, Seongnam-si,
Gyeonggi-do, Republic of Korea
Manufacturer : 1. HANWHA VISION VIETNAM COMPANY LIMITED
2. D-TECH CO.,LTD.
Manufacturer Address : 1. Lot O-2, Que Vo Industrial Zone extended area,
Nam Son commune, Bac Ninh city, Bac Ninh province, Vietnam
2. 173-25, Saneop-ro, Gwonseon-gu, Suwon-si, Gyeonggi- do,
Korea (Suwon Industrial Complex)
Date of Receipt : Jan, 10, 2017
Test date : Jan. 13, 2017
Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Young Suk, Song
EMC Test Engineer
Tested by Yung Suk, Song
(Retired person)
Proxy signature : Tae Yeon, Kim

Reviewed by

Dong-Hun, Jang
EMC Technical Manager

This test report is not related to KS Q ISO/IEC 17025 and KOLAS.

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REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Jan. 25, 2017	KES-E1-17T0068	Issued
Nov. 15, 2021	KES-E1-17T0068-R1	- model name, Address, Manufacturer change at customer's request - IC Regulation ICES-003 Issue 7 Update ANSI C63.4-2014 or ANSI C63.4-2014 amended as per ANSI C63.4a-2017
Feb. 24, 2023	KES-E1-17T0068-R2	Change the Applicant, Applicant addresss and manufacturer at the request of the customer

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1.0 General Product Description

Main Specifications of EUT are:

	XND-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), 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

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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
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	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	-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
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-6020R	-	HANWHA VISION VIETNAM COMPANY LIMITED	EUT

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
POE Adapter	KPL-060F	-	CHANNEL WELL TECHNOLOGY	-
Notebook	X56K	HN11N5151FJ0045W	HANSUNG	RE
Notebook Adapter	A12-120P1A	F180271552011758	CHICONY POWER TECHNOLOGY CO.,LTD.	RE
Notebook	LG15N54	506NZGK000615	LG	CE
Notebook Adapter	PA-1650- 43(65W)	OF58U63849302Y609	LG	CE
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 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	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
	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

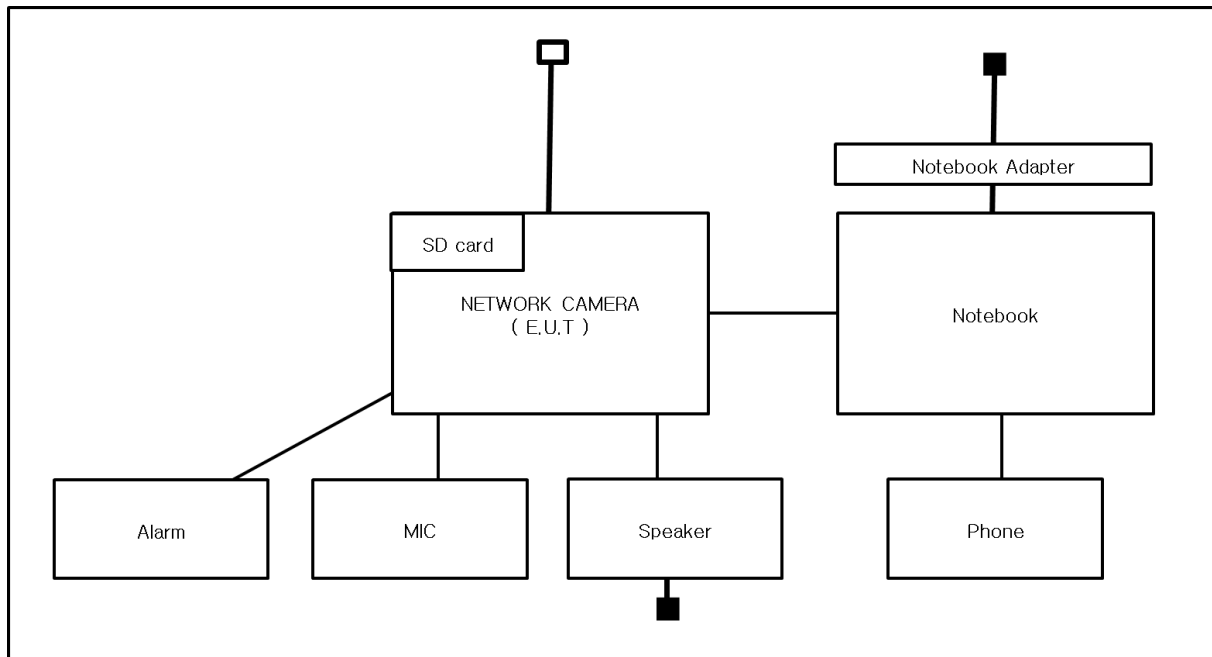
E.U.T Test operating S/W		
Name	Version	Manufacture Company
SmartViewer	-	Hanwha Vision Co., Ltd

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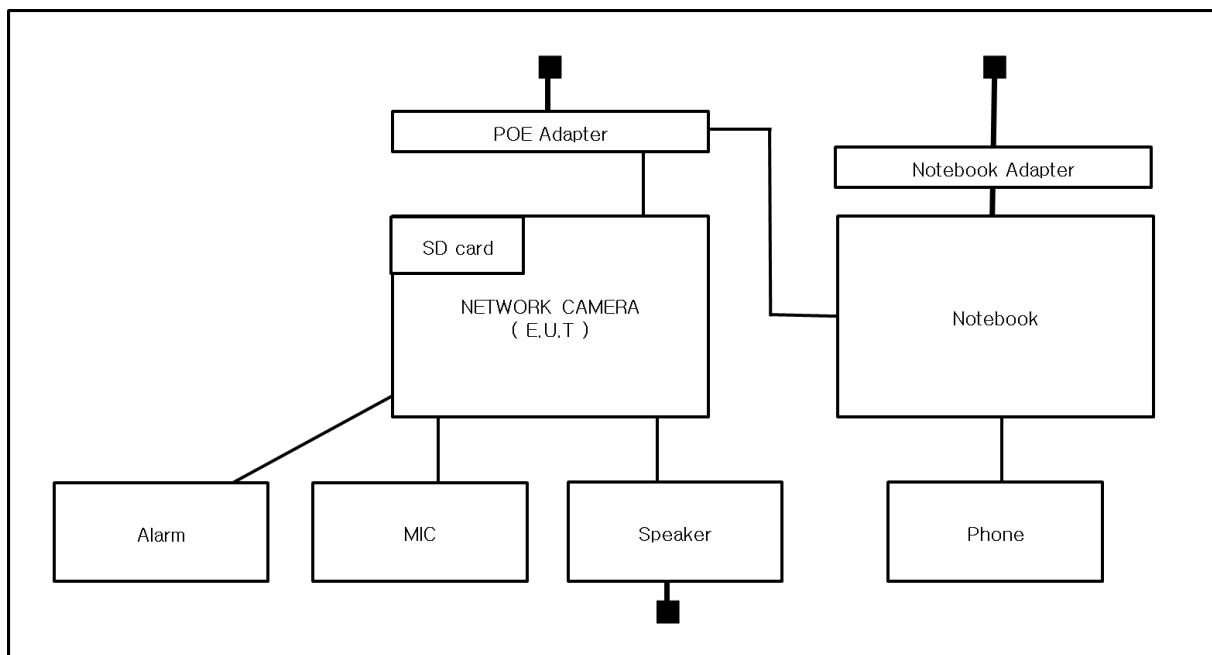
1.8 Configuration

■ AC Main
 □ DC Main

- DC 12V 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, 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:

☒ **IC Regulation ICES-003 Issue 7**

☒ CAN/CSA-CISPR 32:17

☒ Class A

☐ Class B

☐ ANSI C63.4a-2017

☐ Class A

☐ Class B



2.1 Conducted Emissions Mains Power Ports

Test Date

Jan, 13, 2016

Test Location

Electro wave Shieldroom #6

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: 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

Remarks

See Appendix A for test data.



2.2 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Jan, 13, 2016

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
☒	Open Area Test Site	-	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.

2.3 Radiated Electric Field Emissions(Above 1 GHz)

Test Date

Jan, 13, 2016

Test Location

Semi Anechoic Chamber #2

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test Receiver	ESU26	R&S	100552	04, 24, 2017
☒	Broadband Coaxial Preamplifier	BBV 9718	Schwarzbeck Mess - Elektronik	9718-246	10, 14, 2017
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	05, 07, 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

RemarksSee Appendix A for test data.

APPENDIX A – TEST DATA

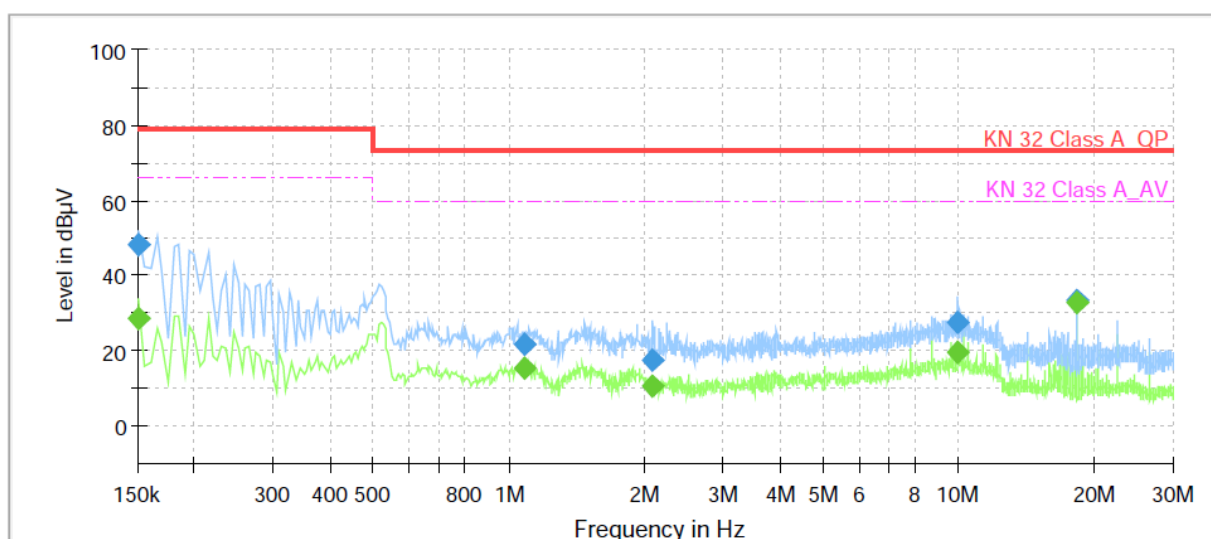
Conducted Emissions at Mains Power Ports

- DC 12V Mode

[HOT]

Common Information

Test Description:	Conducted Emission
Model No.:	XND-8020R
Mode	DC 12V
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.150000	---	28.61	66.00	37.39	1000.0	9.000	L1	21.1
0.150000	48.08	---	79.00	30.92	1000.0	9.000	L1	21.1
1.080000	---	15.18	60.00	44.82	1000.0	9.000	L1	20.2
1.080000	21.85	---	73.00	51.15	1000.0	9.000	L1	20.2
2.095000	---	10.70	60.00	49.30	1000.0	9.000	L1	19.9
2.095000	17.32	---	73.00	55.68	1000.0	9.000	L1	19.9
10.000000	---	19.47	60.00	40.53	1000.0	9.000	L1	19.9
10.000000	27.78	---	73.00	45.22	1000.0	9.000	L1	19.9
18.430000	---	32.94	60.00	27.06	1000.0	9.000	L1	20.2
18.430000	33.30	---	73.00	39.70	1000.0	9.000	L1	20.2

◆ 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)

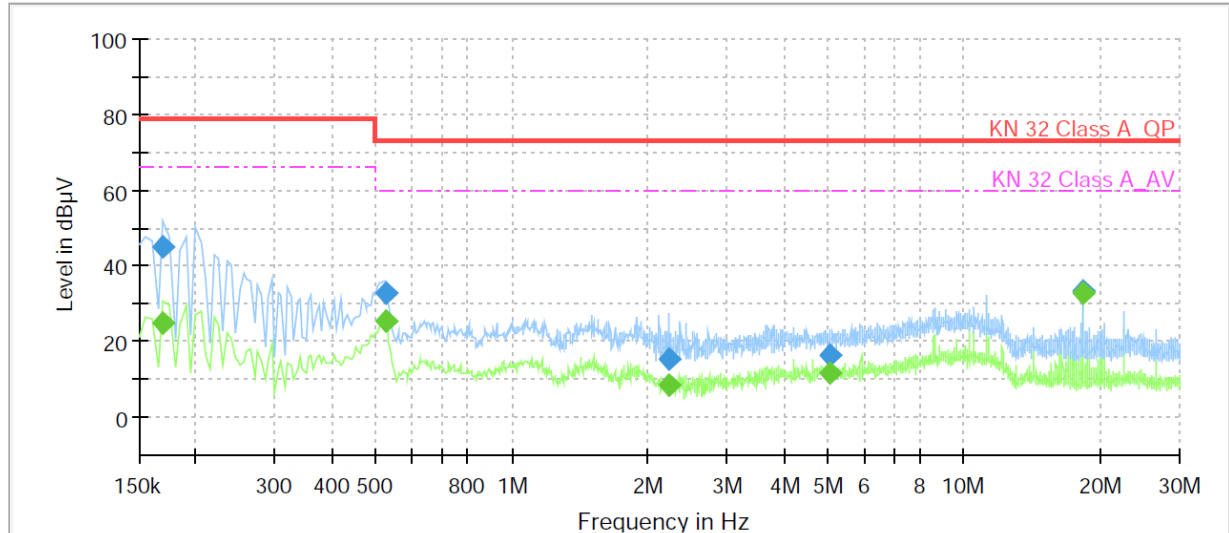
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[NEUTRAL]
Common Information

Test Description:	Conducted Emission
Model No.:	XND-8020R
Mode	DC 12V
Operator Name:	KES


Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.170000	---	24.78	66.00	41.22	1000.0	9.000	N	21.0
0.170000	45.22	---	79.00	33.78	1000.0	9.000	N	21.0
0.525000	---	25.65	60.00	34.35	1000.0	9.000	N	20.5
0.525000	32.78	---	73.00	40.22	1000.0	9.000	N	20.5
2.235000	---	8.75	60.00	51.25	1000.0	9.000	N	19.8
2.235000	15.34	---	73.00	57.66	1000.0	9.000	N	19.8
5.055000	---	11.90	60.00	48.10	1000.0	9.000	N	19.8
5.055000	16.65	---	73.00	56.35	1000.0	9.000	N	19.8
18.430000	---	32.92	60.00	27.08	1000.0	9.000	N	20.2
18.430000	33.30	---	73.00	39.70	1000.0	9.000	N	20.2

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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

- PoE Mode

[HOT]

Common Information

Test Description:

Model No.:

Mode

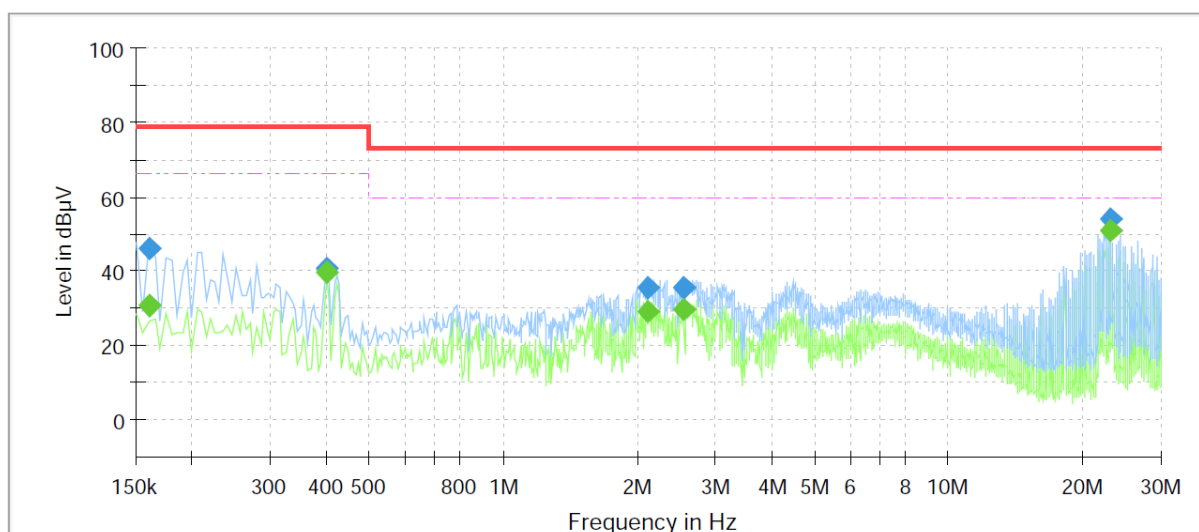
Operator Name:

Conducted Emission

XND-8020RN

PoE L1

KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.160000	---	30.62	66.00	35.38	1000.0	9.000	L1	21.0
0.160000	46.13	---	79.00	32.87	1000.0	9.000	L1	21.0
0.400000	---	39.49	66.00	26.51	1000.0	9.000	L1	20.7
0.400000	40.97	---	79.00	38.03	1000.0	9.000	L1	20.7
2.100000	---	29.02	60.00	30.98	1000.0	9.000	L1	19.8
2.100000	35.45	---	73.00	37.55	1000.0	9.000	L1	19.8
2.540000	---	29.70	60.00	30.30	1000.0	9.000	L1	19.8
2.540000	35.67	---	73.00	37.33	1000.0	9.000	L1	19.8
23.130000	---	50.60	60.00	9.40	1000.0	9.000	L1	20.4
23.130000	54.19	---	73.00	18.81	1000.0	9.000	L1	20.4

◆ Calculation

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

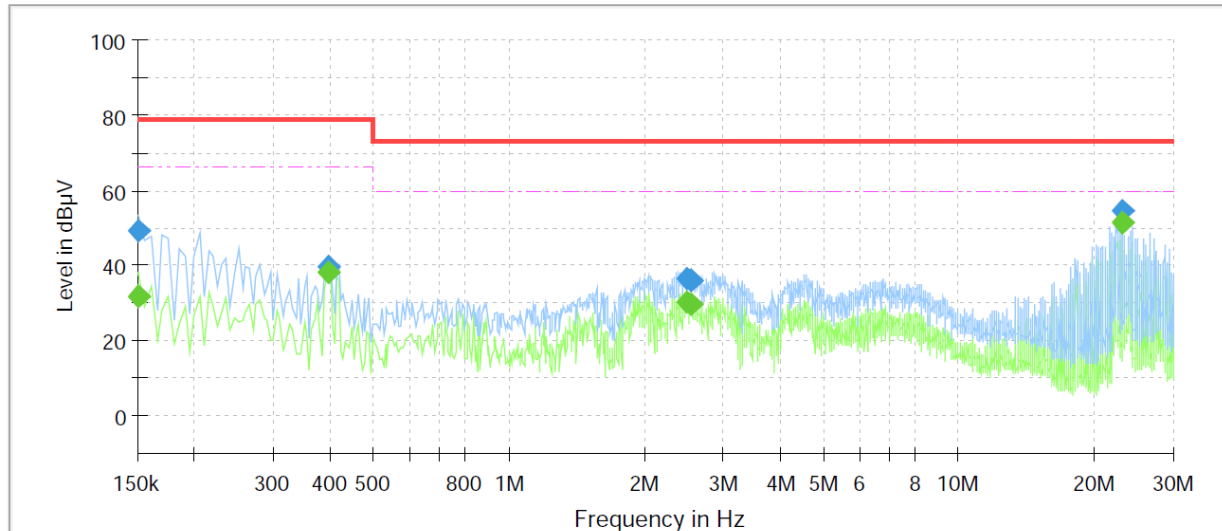
QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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

[NEUTRAL]
Common Information

Test Description:	Conducted Emission
Model No.:	XND-8020RN
Mode	PoE N
Operator Name:	KES


Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.150000	---	31.70	66.00	34.30	1000.0	9.000	N	21.1
0.150000	49.43	---	79.00	29.57	1000.0	9.000	N	21.1
0.395000	---	38.08	66.00	27.92	1000.0	9.000	N	20.7
0.395000	39.90	---	79.00	39.10	1000.0	9.000	N	20.7
2.480000	---	30.17	60.00	29.83	1000.0	9.000	N	19.8
2.480000	36.60	---	73.00	36.40	1000.0	9.000	N	19.8
2.540000	---	29.41	60.00	30.59	1000.0	9.000	N	19.8
2.540000	36.24	---	73.00	36.76	1000.0	9.000	N	19.8
23.130000	---	51.09	60.00	8.91	1000.0	9.000	N	20.2
23.130000	54.70	---	73.00	18.30	1000.0	9.000	N	20.2

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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



Radiated Electric Field Emissions(Below 1 GHz)

- DC 12V Mode

Frequency	Amplitude	ANT	ANT. Height	Correction Factor		Corrected Amplitude	Applicable Limit	Margin [dB]
[MHz]	[dBμV]	Polar. (H/V)	[m]	ANT. [dB/m]	Cable [dB]	[dBμV/m]	[dBμV/m]	
150.24	12.36	H	2.60	7.89	3.57	23.82	40.00	16.18
189.03	10.28	V	1.25	10.39	4.00	24.67	40.00	15.33
243.43	15.39	H	2.33	12.40	4.64	32.43	47.00	14.57
350.12	11.97	V	3.01	14.52	5.64	32.13	47.00	14.87
400.58	16.87	H	2.95	15.62	6.18	38.67	47.00	8.33
459.66	12.08	V	2.69	16.65	6.84	35.57	47.00	11.43
541.09	13.58	V	1.02	18.16	7.33	39.07	47.00	7.93
650.02	14.10	H	1.89	19.49	8.15	41.74	47.00	5.26

* H : Horizontal, V : Vertical

◆ Calculation

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

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

Correction Factor : ANT FACTOR + Cable loss

**KES Co., Ltd.**

3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

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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]
150.16	13.58	H	2.36	7.89	3.57	25.04	40.00	14.96
188.90	10.23	V	3.01	10.37	4.00	24.60	40.00	15.40
350.09	11.85	V	1.58	14.52	5.64	32.01	47.00	14.99
400.52	12.06	H	1.32	15.62	6.18	33.86	47.00	13.14
459.75	13.27	V	2.02	16.65	6.84	36.76	47.00	10.24
541.14	11.63	H	3.00	18.16	7.33	37.12	47.00	9.88
600.29	12.96	H	1.25	19.32	7.83	40.11	47.00	6.89
650.02	14.10	V	1.09	19.49	8.15	41.74	47.00	5.26

* H : Horizontal, V : Vertical

◆ Calculation

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

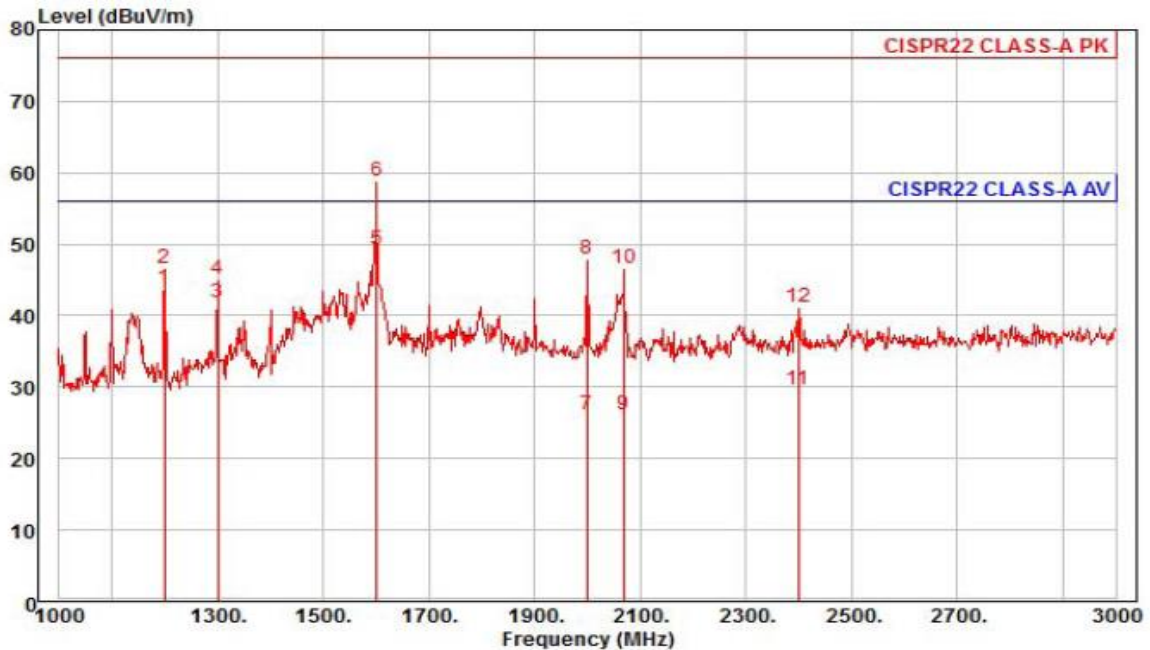
Corrected Amplitude : The Final Value, Amplitude : Reading Value,

Correction Factor : ANT FACTOR + Cable loss

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Radiated Electric Field Emissions(Above 1 GHz)

- DC 12V 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-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	1200.00	51.56	24.70	7.14	39.61	30	56.00	-12.21	horizontal	Average
2	1200.00	54.43	24.70	7.14	39.61	30	76.00	-29.34	horizontal	Peak
3	1300.00	48.79	25.10	7.43	39.37	254	56.00	-14.05	horizontal	Average
4	1300.00	51.87	25.10	7.43	39.37	254	76.00	-30.97	horizontal	Peak
5 pp	1600.00	53.91	26.29	8.31	39.22	279	56.00	-6.71	horizontal	Average
6 pk	1600.00	63.38	26.29	8.31	39.22	279	76.00	-17.24	horizontal	Peak
7	2000.00	28.33	27.88	9.34	39.41	200	56.00	-29.86	horizontal	Average
8	2000.00	50.15	27.88	9.34	39.41	200	76.00	-28.04	horizontal	Peak
9	2068.00	27.99	28.05	9.49	39.41	248	56.00	-29.88	horizontal	Average
10	2068.00	48.58	28.05	9.49	39.41	248	76.00	-29.29	horizontal	Peak
11	2400.00	29.95	28.86	10.32	39.42	180	56.00	-26.29	horizontal	Average
12	2400.00	41.48	28.86	10.32	39.42	180	76.00	-34.76	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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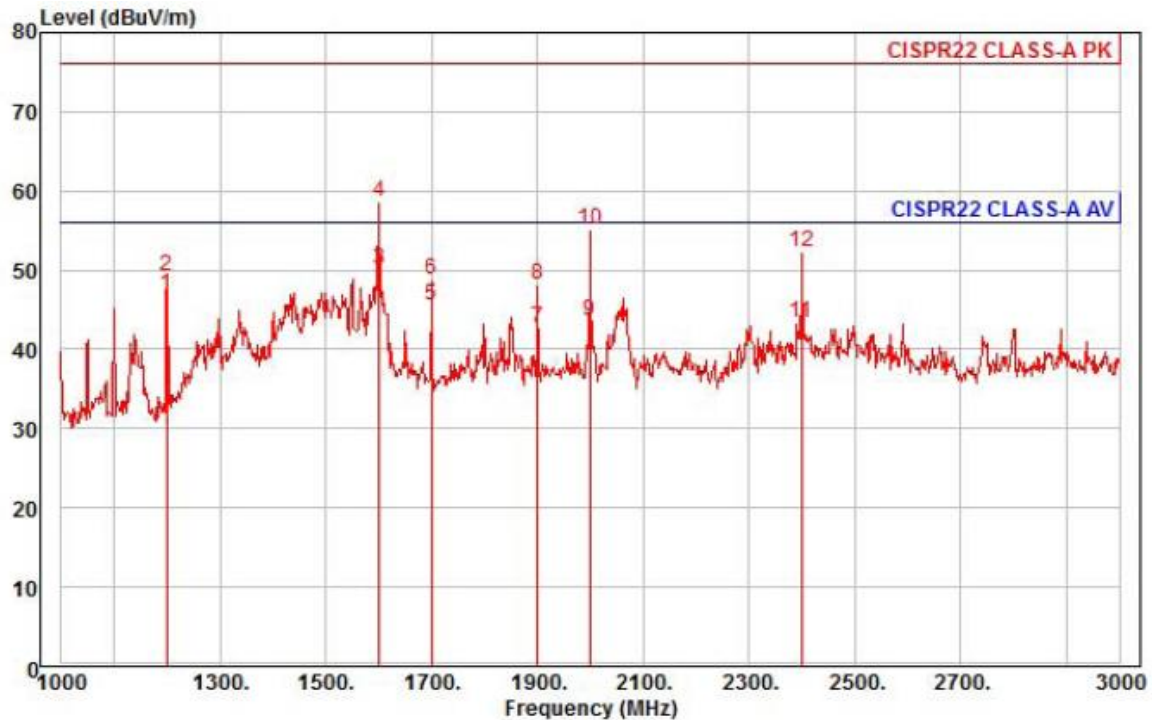
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KES Co., Ltd.

3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
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Report No.:
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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 : XND-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	1200.00	54.54	24.70	7.14	39.61	121	56.00	-9.23	vertical	Average
2	1200.00	56.95	24.70	7.14	39.61	121	76.00	-26.82	vertical	Peak
3 pp	1600.00	54.73	26.29	8.31	39.22	45	56.00	-5.89	vertical	Average
4 pk	1600.00	63.29	26.29	8.31	39.22	45	76.00	-17.33	vertical	Peak
5	1700.00	49.63	26.69	8.57	39.27	183	56.00	-10.38	vertical	Average
6	1700.00	52.78	26.69	8.57	39.27	183	76.00	-27.23	vertical	Peak
7	1900.00	45.46	27.48	9.08	39.36	330	56.00	-13.34	vertical	Average
8	1900.00	51.00	27.48	9.08	39.36	330	76.00	-27.80	vertical	Peak
9	2000.00	45.86	27.88	9.34	39.41	327	56.00	-12.33	vertical	Average
10	2000.00	57.37	27.88	9.34	39.41	327	76.00	-20.82	vertical	Peak
11	2400.00	43.54	28.86	10.32	39.42	262	56.00	-12.70	vertical	Average
12	2400.00	52.65	28.86	10.32	39.42	262	76.00	-23.59	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

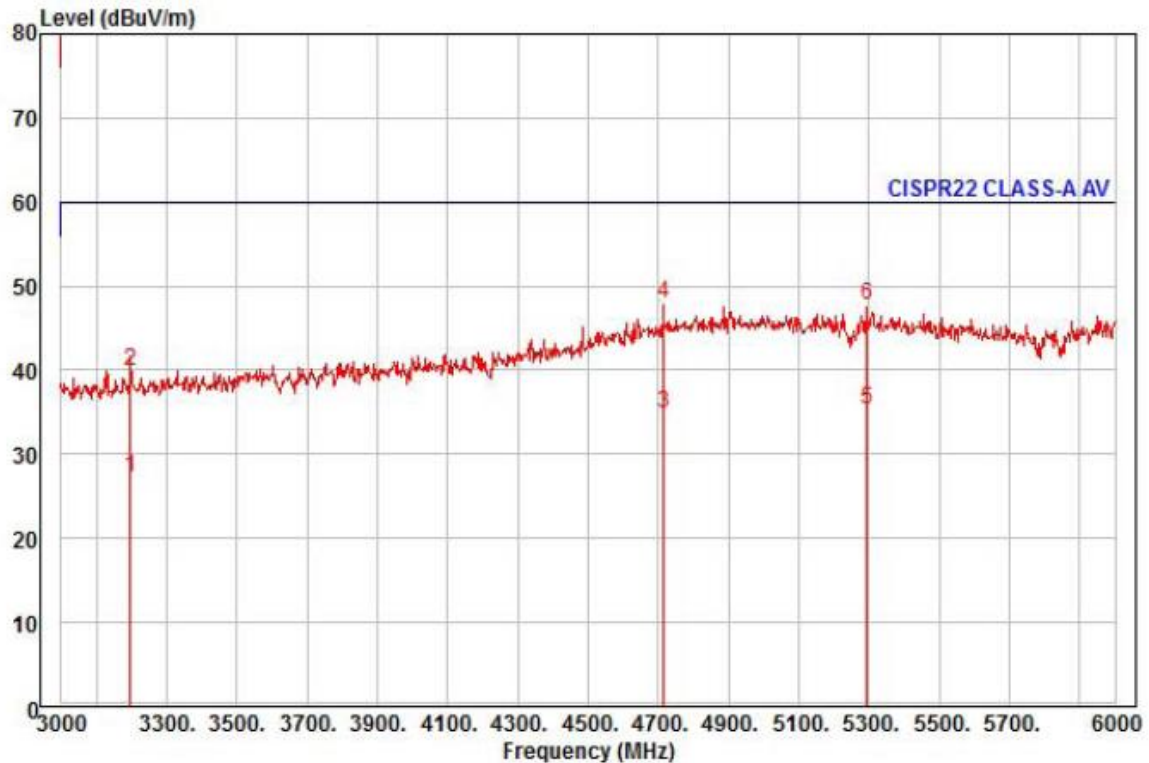
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3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
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Report No.:
KES-E1-17T0068-R2
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Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : XND-8020RN
Mode : DC 12V
Memo : 3 ~ 6 GHz

	Read Freq	Ant 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	24.91	30.66	12.05	40.41	99	60.00	-32.79	horizontal	Average
2	3198.00	37.62	30.66	12.05	40.41	99	80.00	-40.08	horizontal	Peak
3	4716.00	24.32	36.10	14.91	40.55	173	60.00	-25.22	horizontal	Average
4 pk	4716.00	37.40	36.10	14.91	40.55	173	80.00	-32.14	horizontal	Peak
5 pp	5295.00	23.12	37.12	15.86	40.76	152	60.00	-24.66	horizontal	Average
6	5295.00	35.52	37.12	15.86	40.76	152	80.00	-32.26	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

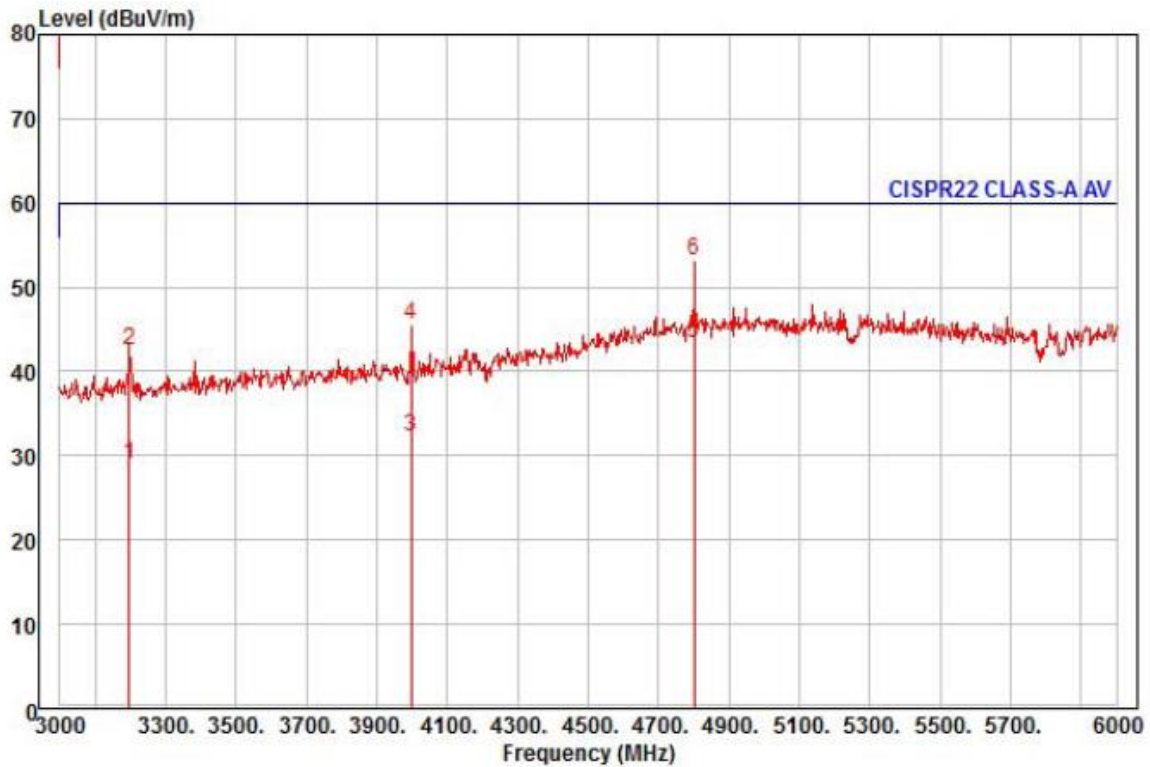
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Report No.:
KES-E1-17T0068-R2
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Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : XND-8020RN
Mode : DC 12V
Memo : 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	26.78	30.66	12.05	40.41	46	60.00	-30.92	vertical	Average
2	3198.00	40.17	30.66	12.05	40.41	46	80.00	-37.53	vertical	Peak
3	3999.00	27.43	32.01	13.56	40.70	214	60.00	-27.70	vertical	Average
4	3999.00	40.71	32.01	13.56	40.70	214	80.00	-34.42	vertical	Peak
5 pp	4800.00	32.24	36.58	15.10	40.47	243	60.00	-16.55	vertical	Average
6 pk	4800.00	41.90	36.58	15.10	40.47	243	80.00	-26.89	vertical	Peak

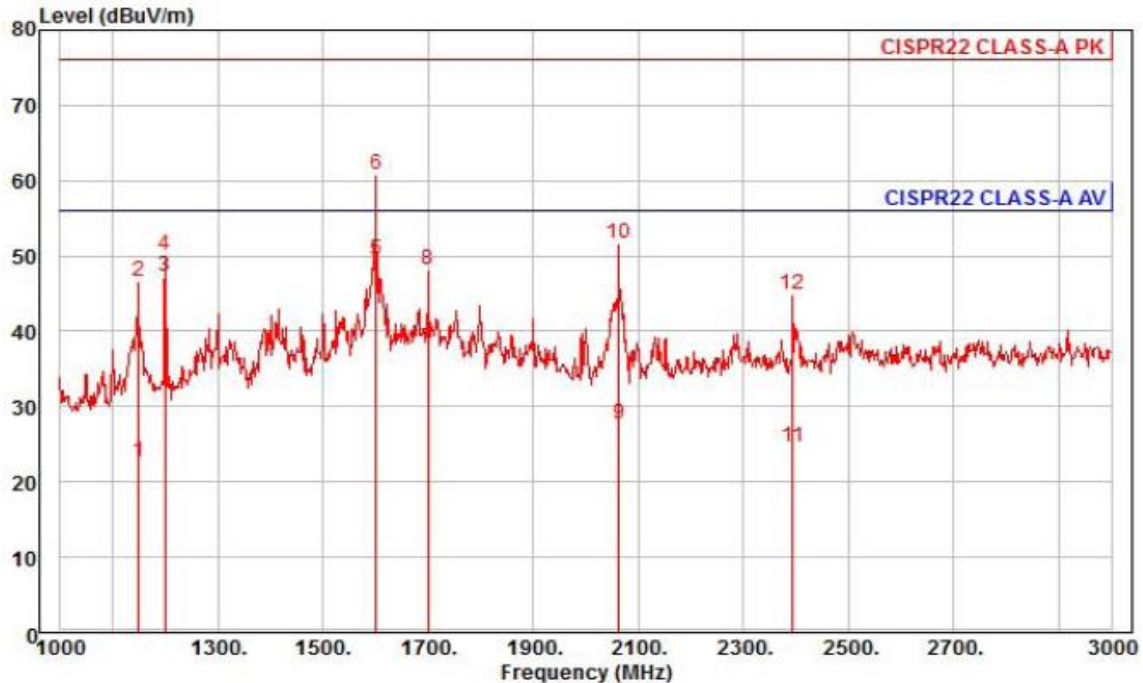
◆ Calculation

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 : XND-8020RN
Mode : POE
Memo : 1 ~ 3 GHz

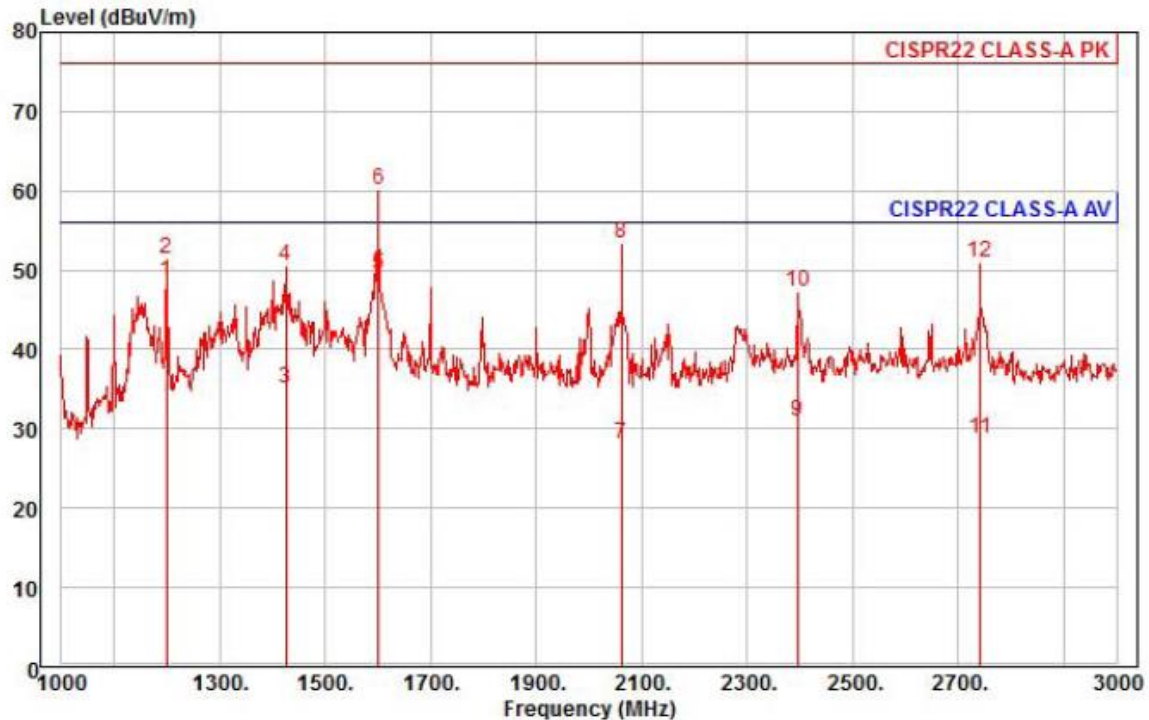
	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	1148.00	31.02	24.50	6.97	39.73	250	56.00	-33.24	horizontal	Average
2	1148.00	54.82	24.50	6.97	39.73	250	76.00	-29.44	horizontal	Peak
3	1200.00	55.09	24.70	7.14	39.61	134	56.00	-8.68	horizontal	Average
4	1200.00	57.99	24.70	7.14	39.61	134	76.00	-25.78	horizontal	Peak
5 pp	1600.00	54.05	26.29	8.31	39.22	247	56.00	-6.57	horizontal	Average
6 pk	1600.00	65.48	26.29	8.31	39.22	247	76.00	-15.14	horizontal	Peak
7	1700.00	41.61	26.69	8.57	39.27	224	56.00	-18.40	horizontal	Average
8	1700.00	52.15	26.69	8.57	39.27	224	76.00	-27.86	horizontal	Peak
9	2064.00	29.61	28.04	9.48	39.41	219	56.00	-28.28	horizontal	Average
10	2064.00	53.58	28.04	9.48	39.41	219	76.00	-24.31	horizontal	Peak
11	2394.00	24.98	28.85	10.31	39.42	60	56.00	-31.28	horizontal	Average
12	2394.00	45.19	28.85	10.31	39.42	60	76.00	-31.07	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 : XND-8020RN
Mode : POE
Memo : 1 ~ 3 GHz

	Read Freq	Ant 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	1200.00	56.36	24.70	7.14	39.61	117	56.00	-7.41	vertical	Average
2	1200.00	59.14	24.70	7.14	39.61	117	76.00	-24.63	vertical	Peak
3	1426.00	40.88	25.60	7.80	39.14	355	56.00	-20.86	vertical	Average
4	1426.00	56.22	25.60	7.80	39.14	355	76.00	-25.52	vertical	Peak
5 pp	1600.00	54.19	26.29	8.31	39.22	15	56.00	-6.43	vertical	Average
6 pk	1600.00	64.83	26.29	8.31	39.22	15	76.00	-15.79	vertical	Peak
7	2062.00	30.01	28.03	9.48	39.41	358	56.00	-27.89	vertical	Average
8	2062.00	55.33	28.03	9.48	39.41	358	76.00	-22.57	vertical	Peak
9	2396.00	31.15	28.85	10.31	39.42	254	56.00	-25.11	vertical	Average
10	2396.00	47.53	28.85	10.31	39.42	254	76.00	-28.73	vertical	Peak
11	2742.00	27.71	29.70	11.09	39.81	188	56.00	-27.31	vertical	Average
12	2742.00	49.98	29.70	11.09	39.81	188	76.00	-25.04	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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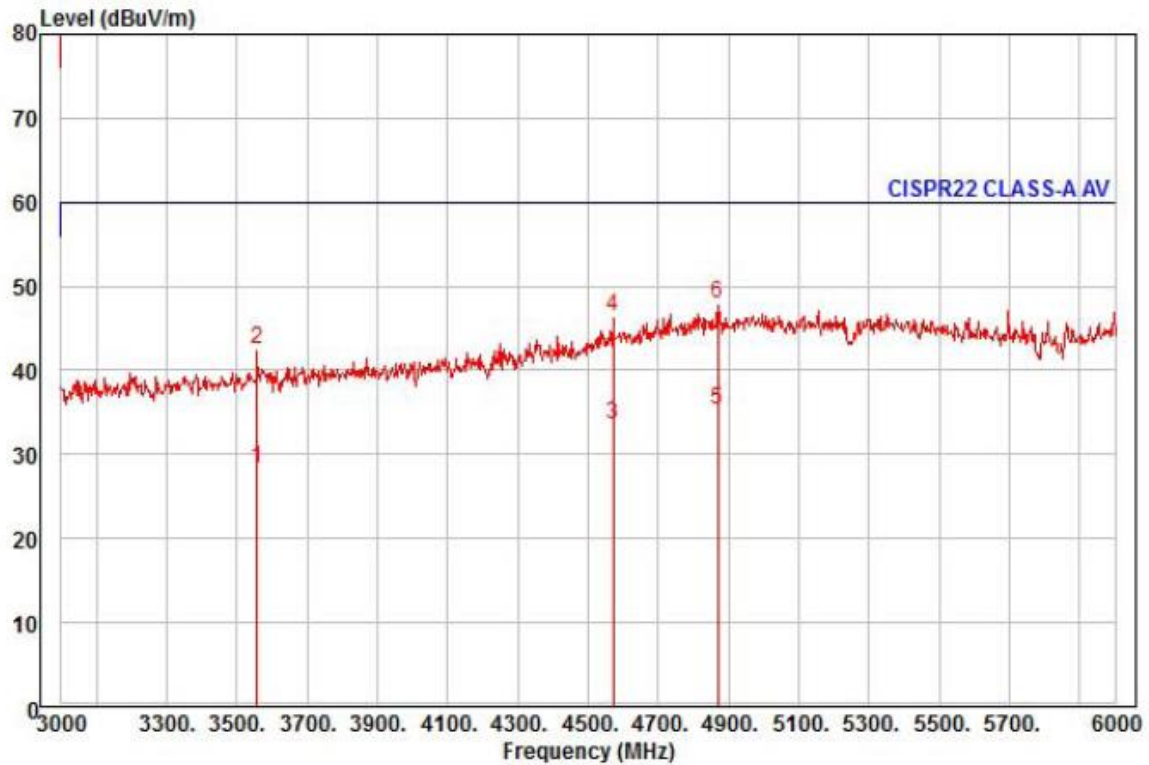
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KES Co., Ltd.

3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
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Report No.:
KES-E1-17T0068-R2
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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 : XND-8020RN
Mode : POE
Memo : 3 ~ 6 GHz

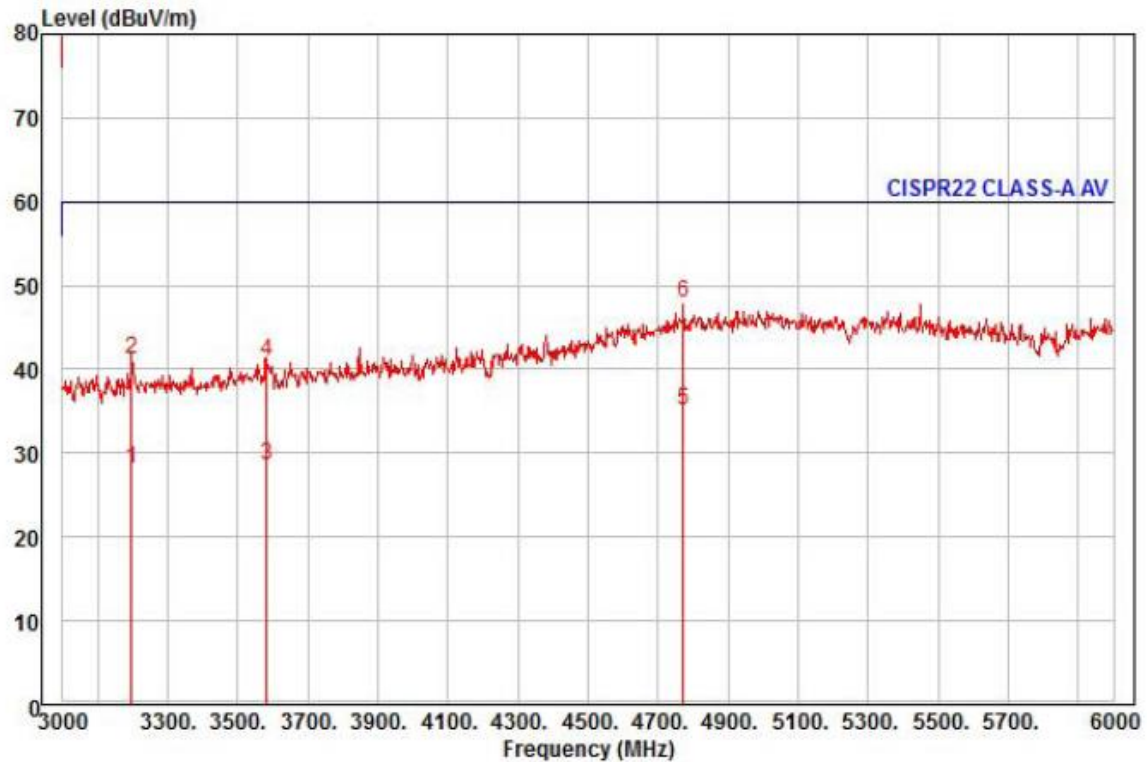
	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	3558.00	25.30	31.27	12.73	40.86	143	60.00	-31.56	horizontal	Average
2	3558.00	39.38	31.27	12.73	40.86	143	80.00	-37.48	horizontal	Peak
3	4572.00	24.32	35.28	14.60	40.70	127	60.00	-26.50	horizontal	Average
4	4572.00	37.31	35.28	14.60	40.70	127	80.00	-33.51	horizontal	Peak
5 pp	4869.00	23.65	36.97	15.17	40.40	238	60.00	-24.61	horizontal	Average
6 pk	4869.00	36.12	36.97	15.17	40.40	238	80.00	-32.14	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 : XND-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	3198.00	25.88	30.66	12.05	40.41	38	60.00	-31.82	vertical	Average
2	3198.00	38.96	30.66	12.05	40.41	38	80.00	-38.74	vertical	Peak
3	3582.00	25.43	31.31	12.77	40.85	75	60.00	-31.34	vertical	Average
4	3582.00	37.81	31.31	12.77	40.85	75	80.00	-38.96	vertical	Peak
5 pp	4773.00	24.12	36.42	15.04	40.50	336	60.00	-24.92	vertical	Average
6 pk	4773.00	36.94	36.42	15.04	40.50	336	80.00	-32.10	vertical	Peak

◆ Calculation

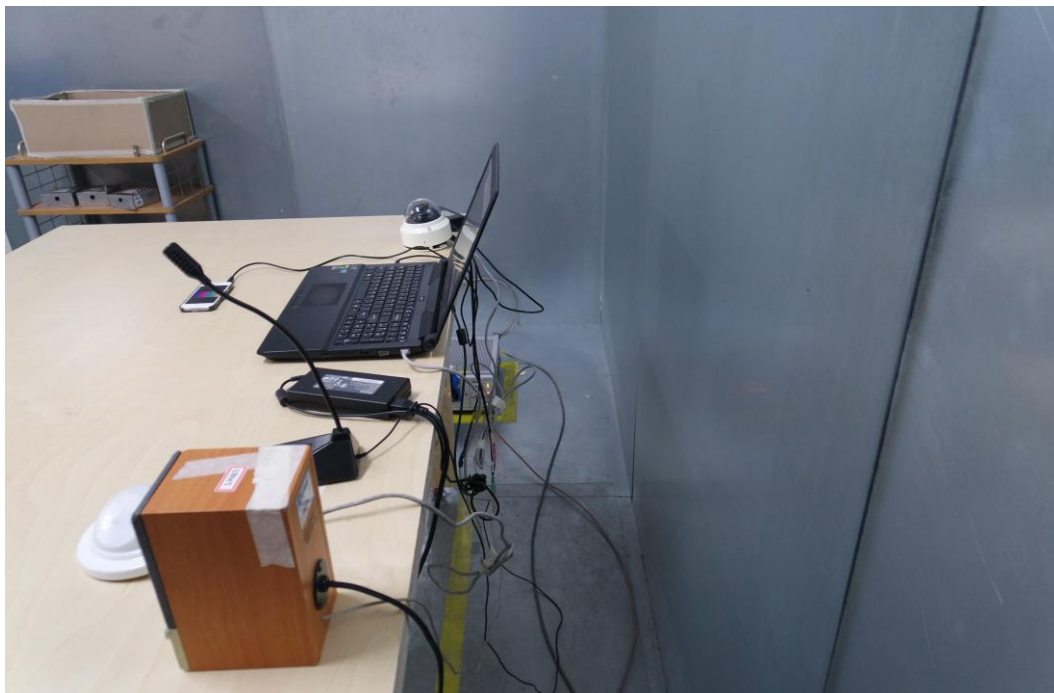
Over Limit [dB] = (Read Level[dBuV] + Ant Factor[dB/m] + Cable Loss [dB] - Preamp Factor [dB]) - Limit Line[dBuV]

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

- DC 12V Mode



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- PoE Mode



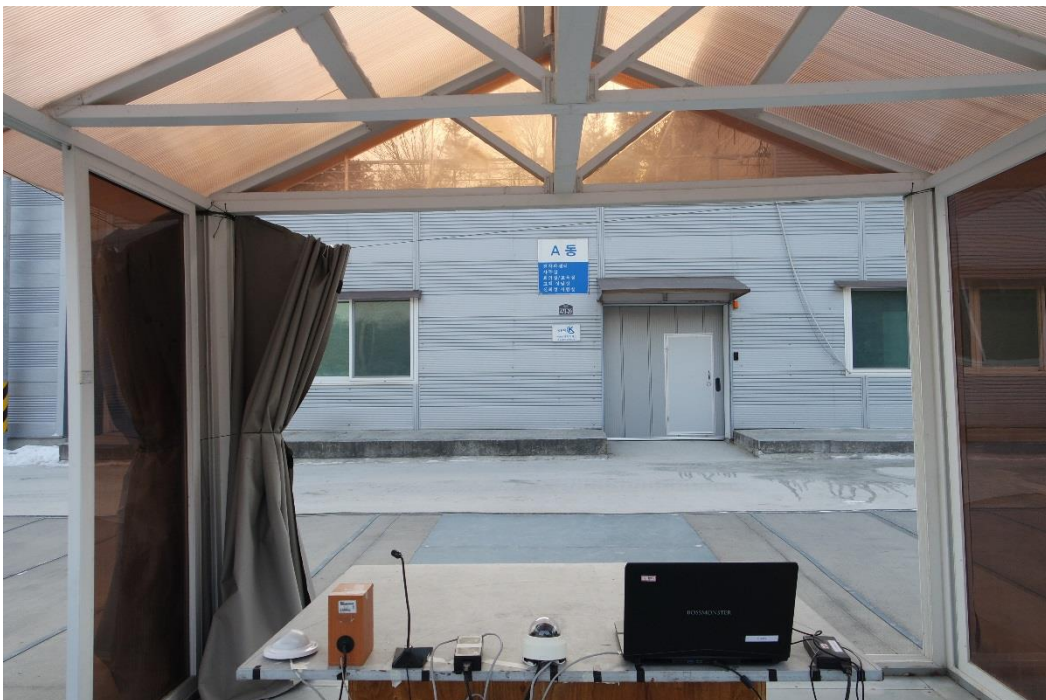
Radiated Electric Field Emissions(Below 1 GHz)

- DC 12V Mode



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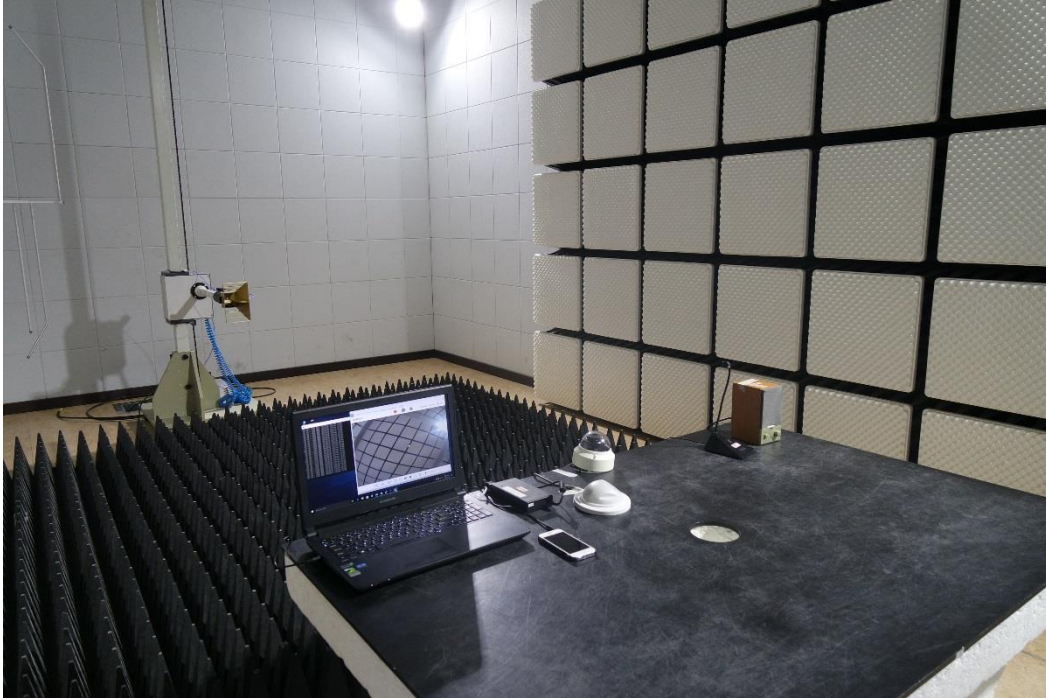
- PoE Mode



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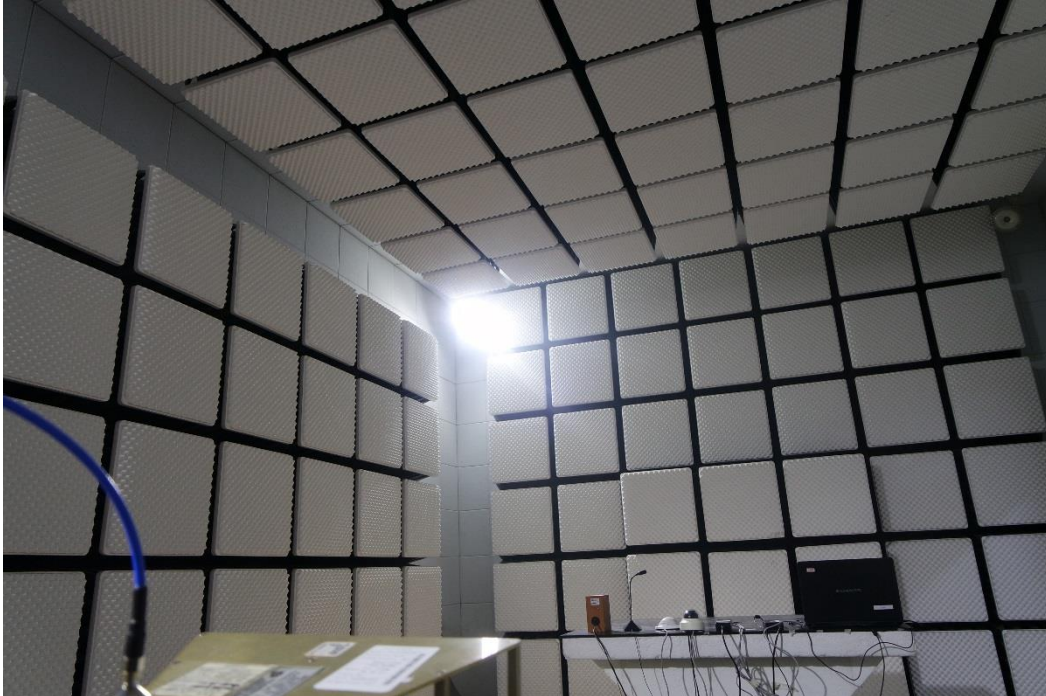
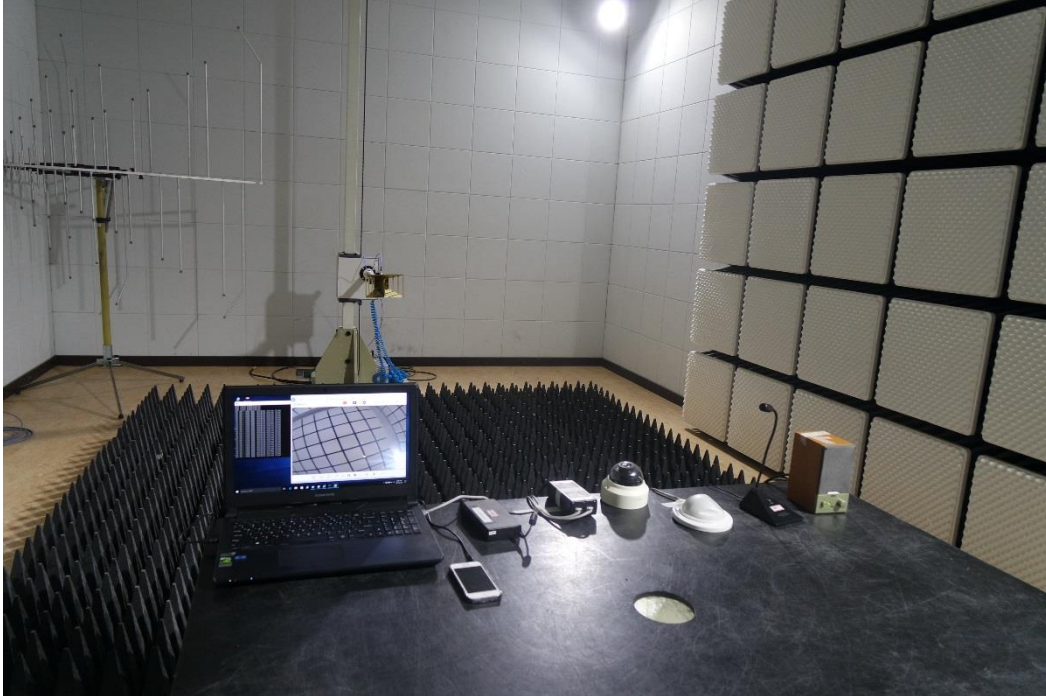
Radiated Electric Field Emissions(Above 1 GHz)

- DC 12V Mode



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- PoE Mode



EUT External Photographs

(Top)



(Bottom)



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EUT Internal Photographs

(Internal View)

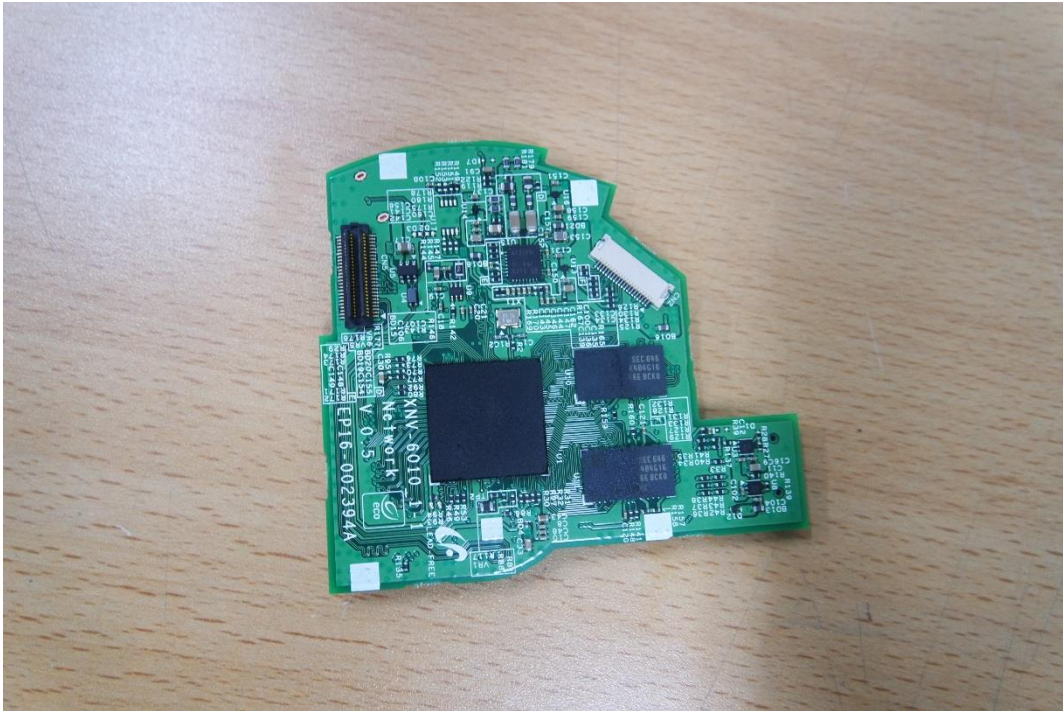


EUT Internal View – Main Board

(Top)



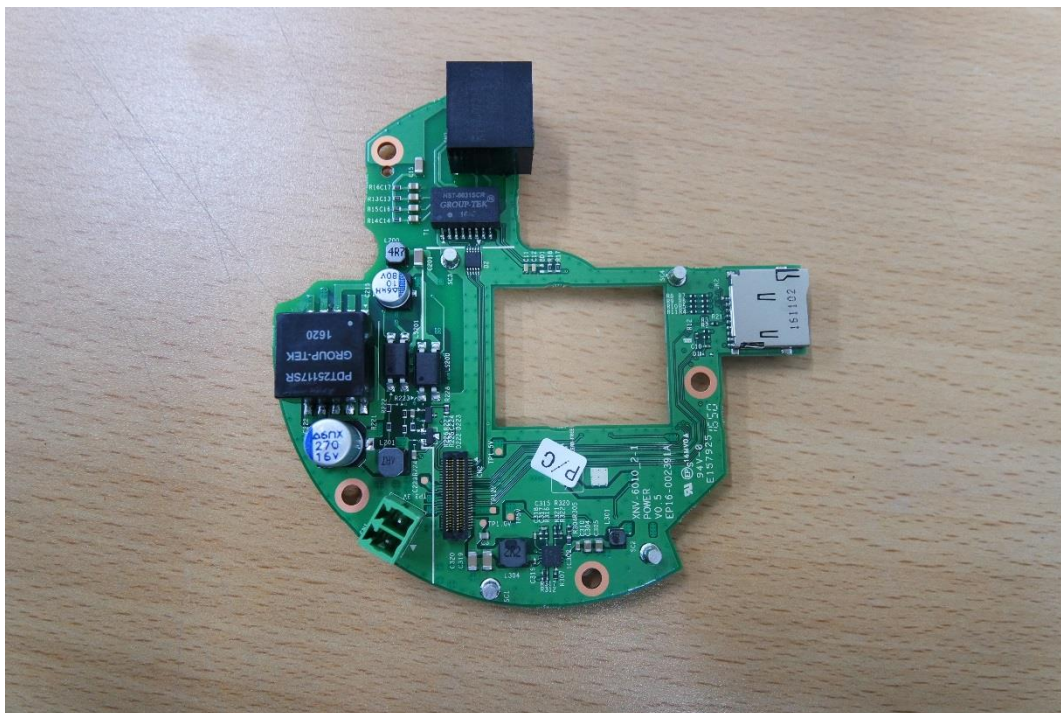
(Bottom)



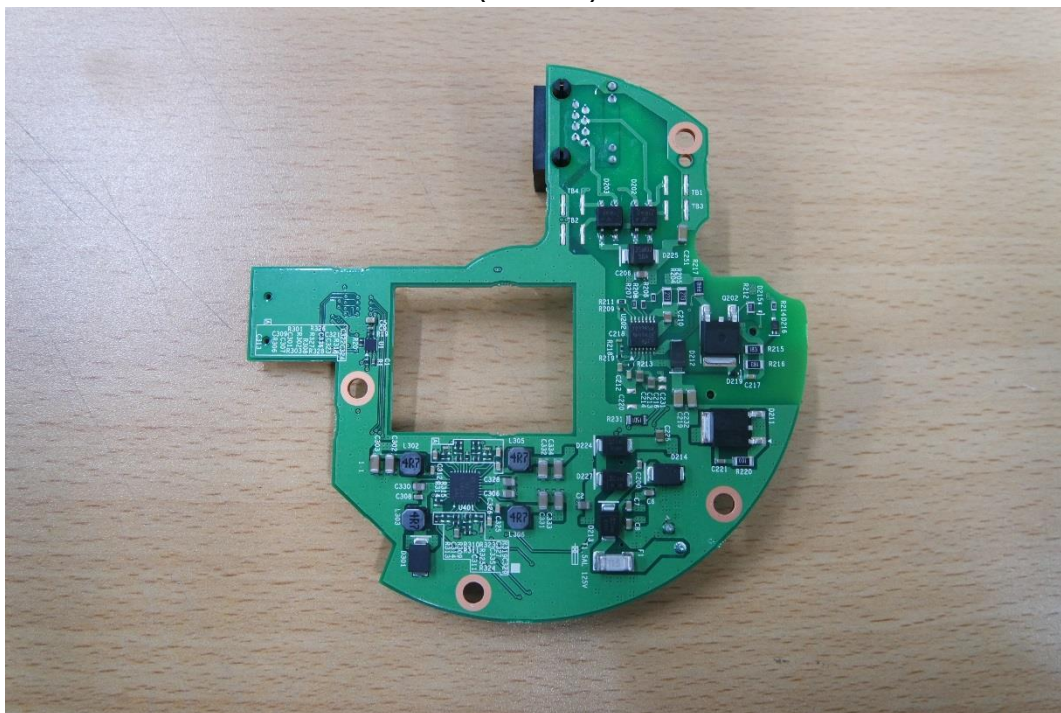
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EUT Internal View – Sub Board

(Top)



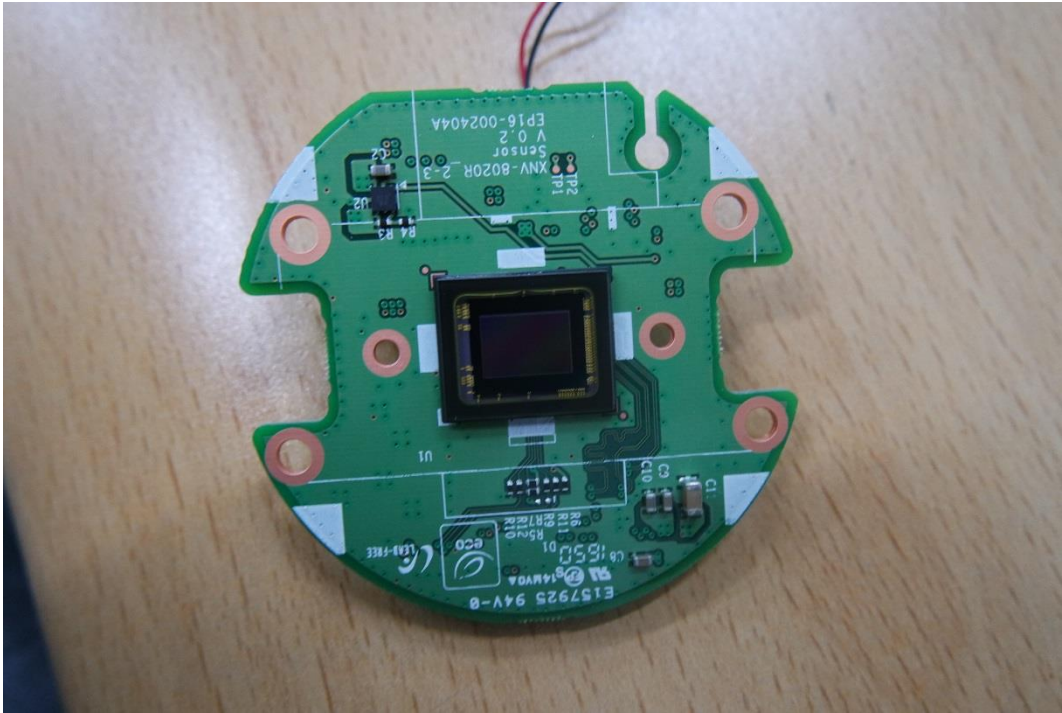
(Bottom)



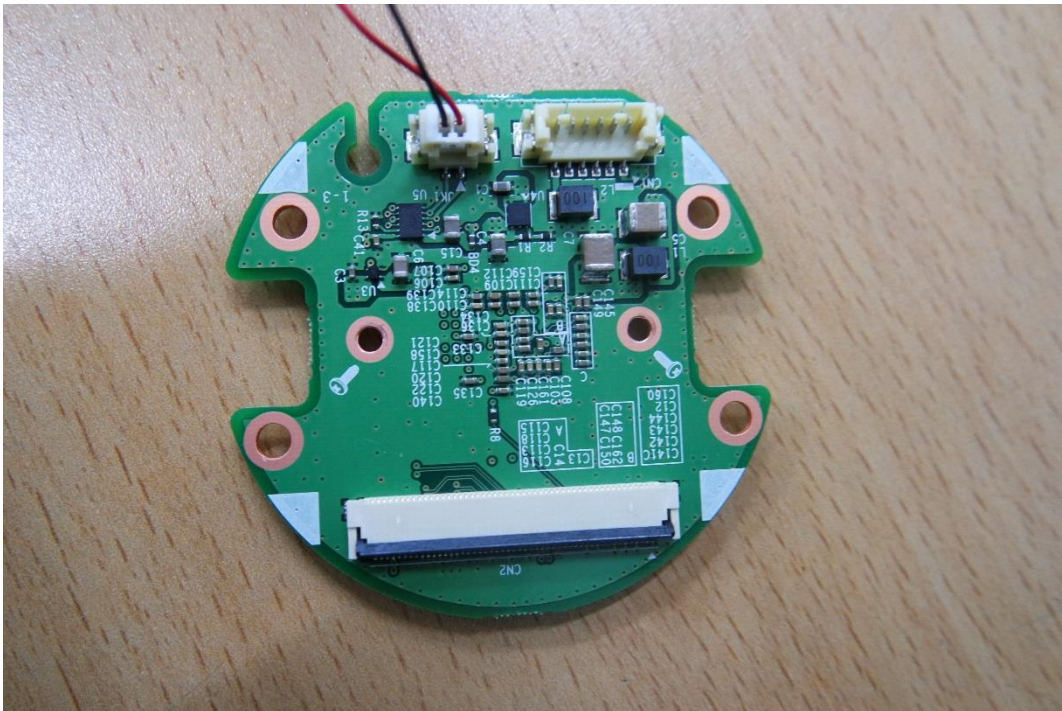
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EUT Internal View – Lens Board

(Top)



(Bottom)



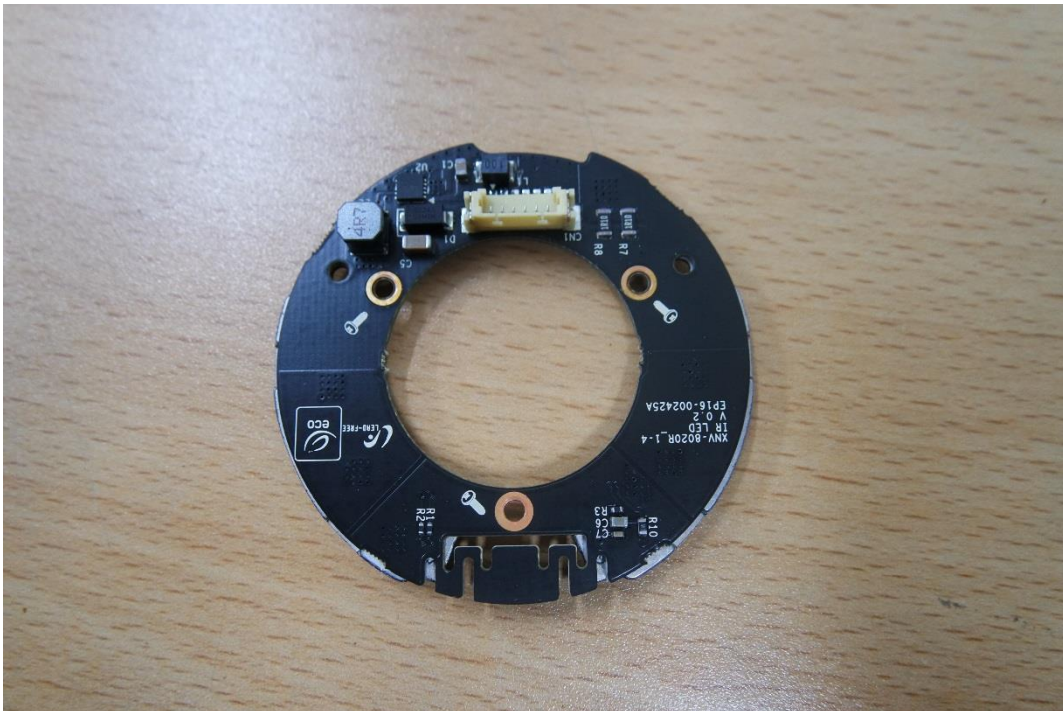
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EUT Internal View – LED Board

(Top)

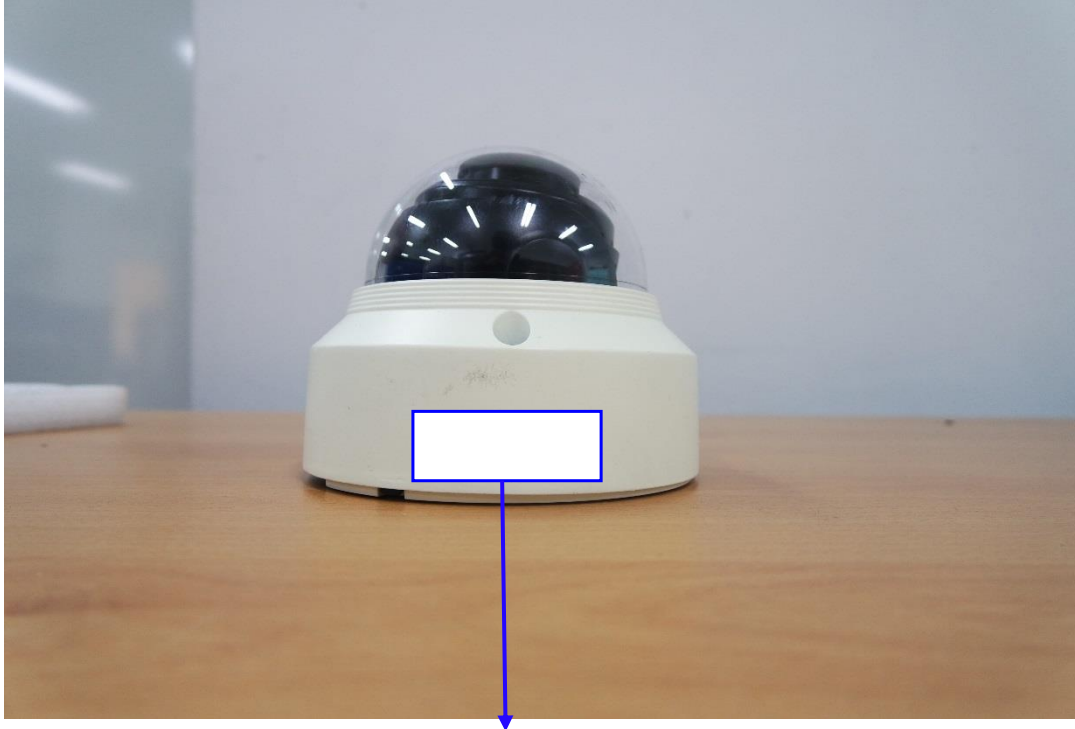


(Bottom)



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Label Photographs



CAN ICES-3 (A)/NMB-3(A)

[LABEL VIEW]