



EMC TEST REPORT For VCCI

Test Report No. : KES-E1-16T0248
Date of Issue : Jun. 09, 2016
Product name : NETWORK CAMERA
Model/Type No. : QND-6020RN
Variant Model : QND-6030RN, QND-6010RN
Applicant : Hanwha Techwin Co., Ltd.
Applicant Address : 1204, Changwon-daero, Seongsan-gu, Changwon-si,
Gyeongsangnam-do, Korea
Manufacturer : Tianjin Samsung Techwin Opto-Electronic Co., Ltd.
Manufacturer Address : No.11 Weiliu Rd, Micro-Electronic Industrial Park, TEDA,
Tianjin, 300385, People's Republic of China
Date of Receipt : May. 23, 2016
Test date : Jun. 02, 2016 - Jun. 03, 2016
Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Kyeng Sun, Min
EMC Test Engineer

Reviewed by

Dong-Hun, Jang
EMC Technical Manager

**KES Co., Ltd.**

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

Test report No.:
KES-E1-16T0248
Page (2) of (43)

REPORT REVISION HISTORY

Date	Revision	Page No
Jun. 09, 2016	KES-E1-16T0248	Issued

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd. This document Jun be altered or revised by KES Co., Ltd. personnel only, and shall be noted in the revision section of the document. Any alteration of this document not carried out by KES Co., Ltd. will constitute fraud and shall nullify the document.

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.



TABLE OF CONTENTS

1.0	General Product Description.....	4
1.1	Test Voltage & Frequency	6
1.2	Variant Model Differences.....	6
1.3	Device Modifications	6
1.4	Equipment Under Test.....	6
1.5	Support Equipments	6
1.6	External I/O Cabling	7
1.7	EUT Operating Mode(s)	7
1.8	Configuration.....	8
1.9	Calibration Details of Equipment Used for Measurement	9
1.10	Test Facility	9
1.11	Laboratory Accreditations and Listings	9
2.0	Test Regulations.....	10
2.1	Conducted Emissions at Mains Power Ports.....	12
2.2	Conducted Emissions at Telecommunication Ports.....	13
2.3	Radiated Electric Field Emissions(Below 1 GHz)	14
2.4	Radiated Electric Field Emissions(Above 1 GHz)	15
APPENDIX A – TEST DATA.....		16
Conducted Emissions at Mains Power Ports.....		16
Conducted Emissions at Telecommunication Ports		18
Radiated Electric Field Emissions(Below 1 GHz)		22
Radiated Electric Field Emissions(Above 1 GHz)		23
Test Setup Photos and Configuration		31
Conducted Voltage Emissions		31
Conducted Telecommunication Emissions		32
Radiated Electric Field Emissions(Below 1 GHz)		34
Radiated Electric Field Emissions(Above 1 GHz)		36
EUT External Photographs.....		38
EUT Internal Photographs		39



1.0 General Product Description

Main Specifications of EUT are:

	QND-6020R
Video	
Imaging Device	1/2.9" 2.19M CMOS
Total Pixels	2,000(H) x 1,121(V)
Effective Pixels	1,984(H) x 1,105(V)
Scanning System	Progressive
Min. Illumination	Color : 0.15Lux, B/W : 0Lux
Lens	
Focal Length (Zoom Ratio)	Fixed 3.6mm
Max. Aperture Ratio	F1.8
Angular Field of View	H 86.48° / V 46.22° / D 102.44°
Min. Object Distance	-
Lens Type	Fixed
Mount Type	Board type
Pan / Tilt / Rotate	
Pan Range	0~350°
Tilt Range	0~67°
Rotate Range	0~355°
Operational	
IR Viewable Length	20m
Camera Title	Off / On (Displayed up to 20 characters per line) - 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	True Day & Night
Backlight Compensation	Off / BLC
Wide Dynamic Range	120dB
Digital Noise Reduction	SSNR(Off / On)
Motion Detection	Off / On (4ea polygon zones)
Privacy Masking	Off / On (6ea rectangler zones)
Gain Control	Off / Low / Middle / High
White Balance	ATW / AWC / Manual / Indoor / Outdoor
LDC(Lens distortion control)	On/Off (5 levels with Min/Max)
Electronic Shutter Speed	Minimum / Maximum / Anti flicker
Flip / Mirror	Flip / Mirror / Hallway view
Intelligent Video Analytics	Motion Detection with metadata, Tampering, Defocus
Alarm I/O	Input 1 / Output 1
Alarm Triggers	Motion detection, Tampering Detection, SD card error, NAS error, Alarm input, Defocus detection
Alarm Events	File upload via FTP and E-Mail Local storage recording at Event Notification via E-Mail External output
Network	
Ethernet	RJ-45 (10/100BASE-T)
Video Compression Format	H.265, H.264, MJPEG
Resolution	1920x1080/ 1280x1024/ 1280x960/ 1280x720/ 1024x768/ 800x600/ 720x576/ 720x480/ 640x480/ 320x240
Max. Framerate	H.265 : Max 30fps at all resolutions H.264 : Max 30fps at all resolutions MJPEG : Max 15fps @ all resolution.
Smart codec	Wise Stream

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.



KES Co., Ltd.

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

Test report No.:

KES-E1-16T0248

Page (5) of (43)

Video Quality Ajustment	H.265 : Target Bitrate Level Control H.264 : Target Bitrate Level Control MJPEG : Quality Level Control
Bitrate control method	H.265 : CBR or VBR H.264 : CBR or VBR MJPEG : VBR
Streaming Capability	Multiple Streaming(Up to 3 Profiles)
Audio I/O	Built-in MIC
Audio Compression Format	G.711 u-law /G.726 Selectable G.726(ADPCM) : 8KHz, G.711 : 8KHz G.726 : 16Kbps, 24Kbps, 32Kbps, 40Kbps
Audio Communication	Uni-directional
IP	IPv4, IPv6
Protocol	TCP/IP, UDP/IP, RTP(UDP), RTP(TCP), RTCP,RTSP, NTP, HTTP, HTTPS, SSL/TSL, 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
Streaming Method	Unicast / Multicast
Max. User Access	6 users at Unicast Mode
Edge storage	Micro SD/SDHC/SDXC Max 128G, NAS - Motion images recorded in the SD memory card can be downloaded - Manual recording at Local PC
Application Programming Inter	ONVIF Profile S, G SUNAPI(HTTP API)
Webpage Language	English, French, German, Spanish, Italian, Chinese, Korean, Russian, Japanese, Swedish, Danish, Portuguese, Turkish, Polish, Czech, Rumanian, Serbian, Dutch, Croatia, Hungary, Greek, Finnish, Norwegian
Web Viewer	Supported OS: Windows 7, 8, 10, Mac OS X 10.8, 10.9, 10.10, 10.11 [Non-plugin Webviewer] Supported Browser: Google Chrome 47, MS Edge 20 Support Codec : Video-H.264, MJPEG (Max. 1M 15fps), Audio-G.711 [Plug-in Webviewer] Supported Browser : MS Explore 11 , Mozilla Firefox 43, Apple Safari 9 * Mac OS X only
Central Management Software	SmartViewer
Pixel Counter	Support (plug-in viewer only)
Environmental	
Operating Temperature / Humi	-10°C ~ +55°C / Less than 90% RH
Storage Temperature / Humidi	-30°C ~ +60°C (-22°F ~ +140°F) / Less than 90% RH
Ingress Protection	-
Vandal Resistance	IK08
Electrical	
Input Voltage / Current	PoE(IEEE802.3af, Class3), DC 12V
Power Consumption	Max.6.5W(PoE), Max.5.43W(DC12V)
Mechanical	
Color / Material	Ivory / Plastic
Dimension (WxHxD)	φ110xH86mm
Weight	290g

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.



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 ☐ 120 Vac ☒ PoE ☒ 12 Vdc
Frequency ☐ 50 Hz ☐ 60 Hz ☐ Hz

1.2 Variant Model Differences

Variant Model	
QND-6030RN	Focus Length differences
QND-6010RN	

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
NETWORK CAMERA	QND-6020RN	-	Tianjin Samsung Techwin Opto-Electronic Co., Ltd.	E.U.T

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
PoE	PoE36U-1AT-R	-	PHIHONG	-
Notebook	NT63025	JK9091EF400142 M	SMASUNG Electronic	-
NotebookK Adapter	A13-040N2A	CN60BA4400313 AD0N843KO200	Chicony Power Technology (suzhou)Co., Ltd.	-
Alarm	SIP-12010DD	C53R67JZ301878 L	SAMSUNG TECHWIN CO., LTD.	-

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)	Alarm IN	Alarm	Alarm IN	3.0	U
	RJ-45	Notebook	RJ-45	3.0	U

- PoE Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
NETWORK CAMERA (E.U.T)	Alarm IN	Alarm	Alarm IN	3.0	U
	RJ-45	PoE	RJ-45	3.0	U
PoE	RJ-45	Notebook	RJ-45	3.3	U

* Unshielded=U, Shielded=S

1.7 EUT Operating Mode(s)

Equipment under test was operated during the measurement under the following conditions:

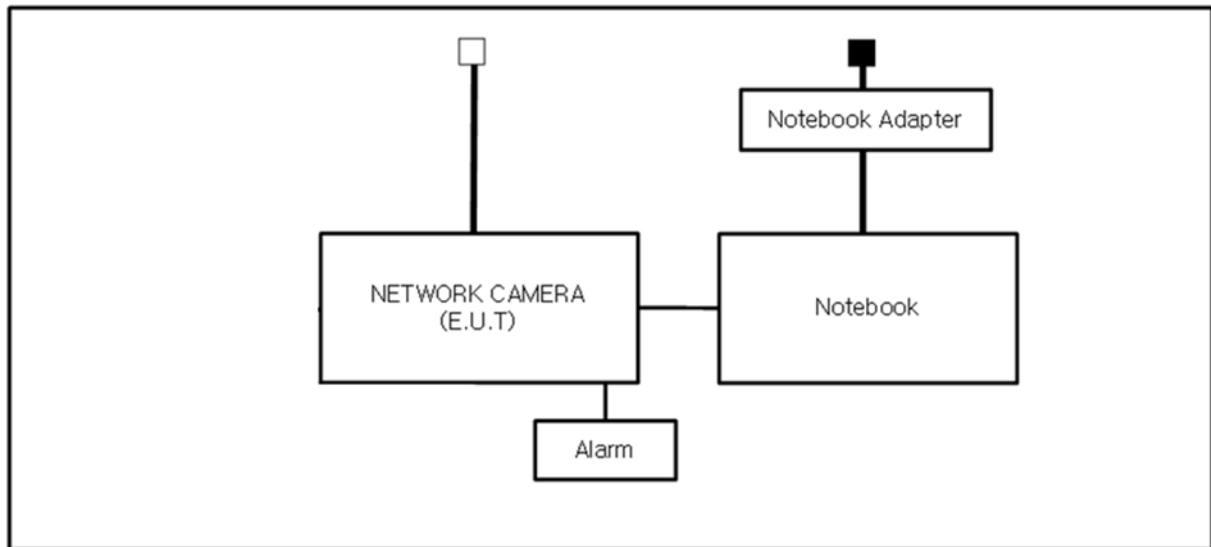
Test mode	Normal operating
OP	MONITORING Network ping test

- Input power condition during the measurements was 12 V (dc) , PoE

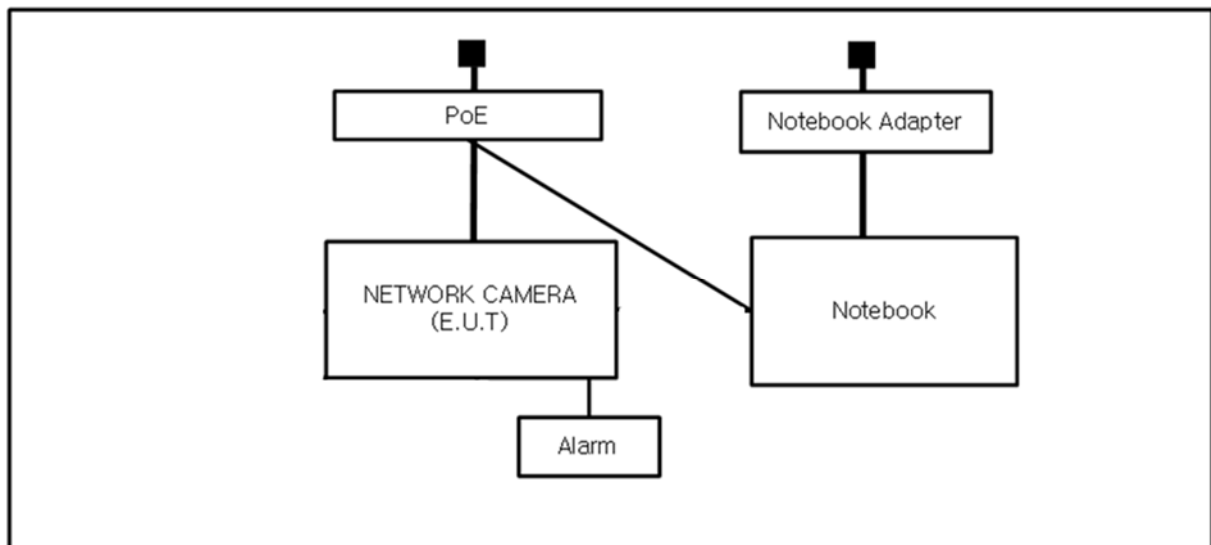
1.8 Configuration

■ AC Main
□ DC Main

- DC 12 V Mode



- PoE Mode



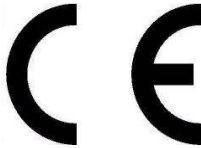
1.9 Calibration Details of Equipment Used for Measurement

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 473-29 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 55022:2010

☐ Class A

☐ Class B

☐ EN 55024:2010

☐ EN 50130-4:2011 +A1:2014

☐ EN 61000-3-2:2014

☐ EN 61000-3-3:2013

☐ EN 61326-1:2013

☒ VCCI V-3/2013.04

☒ Class A

☐ Class B

☐ AS/NZS CISPR22:2009 +A1:2010

☐ Class A

☐ Class B

☐ 47 CFR Part 15, Subpart B / ANSI C63.4-2009

☐ Class A

☐ Class B

☐ IC Regulation ICES-003 : 2012
/ ANSI C63.4-2014

☐ Class A

☐ Class B

☐ CISPR 22:2009 +A1:2010

☐ Class A

☐ Class B



KES Co., Ltd.

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

Test report No.:
KES-E1-16T0248
Page (11) of (43)

☐ **R&TTE- Directive 1999/5/EC**

☐ 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

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.



2.1 Conducted Emissions at 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	-	AONE SEMITEC	-	-

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

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

Jun. 02, 2016

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, 14, 2016
☒	Electro wave Shieldroom	-	AONE SHIELD	-	-

Test Conditions

Temperature: 27,3 °C

Relative Humidity: 46,4 %

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.



2.3 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Jun. 03, 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	VULB 9163	SCHWARZBECK	9163-713	05, 15, 2017
☒	Open Area Test Site	-	KES	-	-
☒	Antenna Mast	-	EMCO	-	-
☒	Turn Table	-	DAEIL EMC	-	-

Test Conditions

Temperature: 28,2 °C

Relative Humidity: 36,0 %

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

Jun. 03, 2016

Test Location

Semi Anchoic 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, 23, 2016
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	05, 07, 2017
☒	Semi Anchoic Chamber #2	-	SEMITEC	-	-
☒	Antenna Mast	-	AUDIX	-	-
☒	Turn Table	-	AUDIX	-	-

Test Conditions

Temperature: 27,4 °C
Relative Humidity: 44,3 %

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.



KES Co., Ltd.

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

Test report No.:
KES-E1-16T0248
Page (16) of (43)

APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

[HOT]

N/A

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.



KES Co., Ltd.

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

Test report No.:
KES-E1-16T0248
Page (17) of (43)

[NEUTRAL]

N/A

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

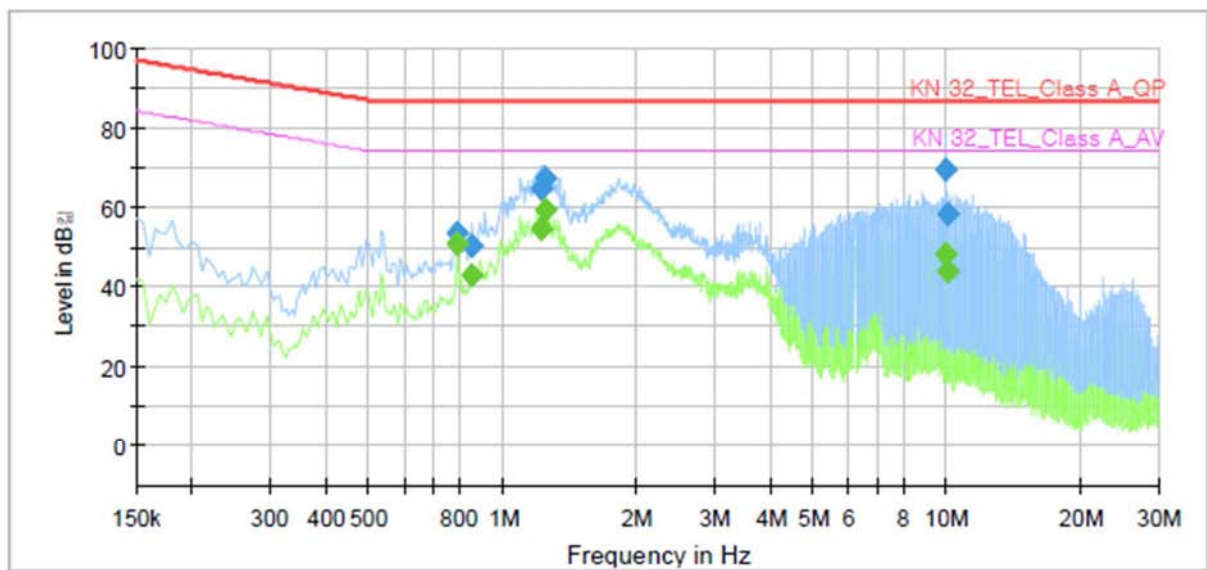
Conducted Emissions at Telecommunication Ports

- DC 12V Mode

[10 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	QND-6020RN
Mode	12 V (dc) 10 Mbps
Operator Name:	KES



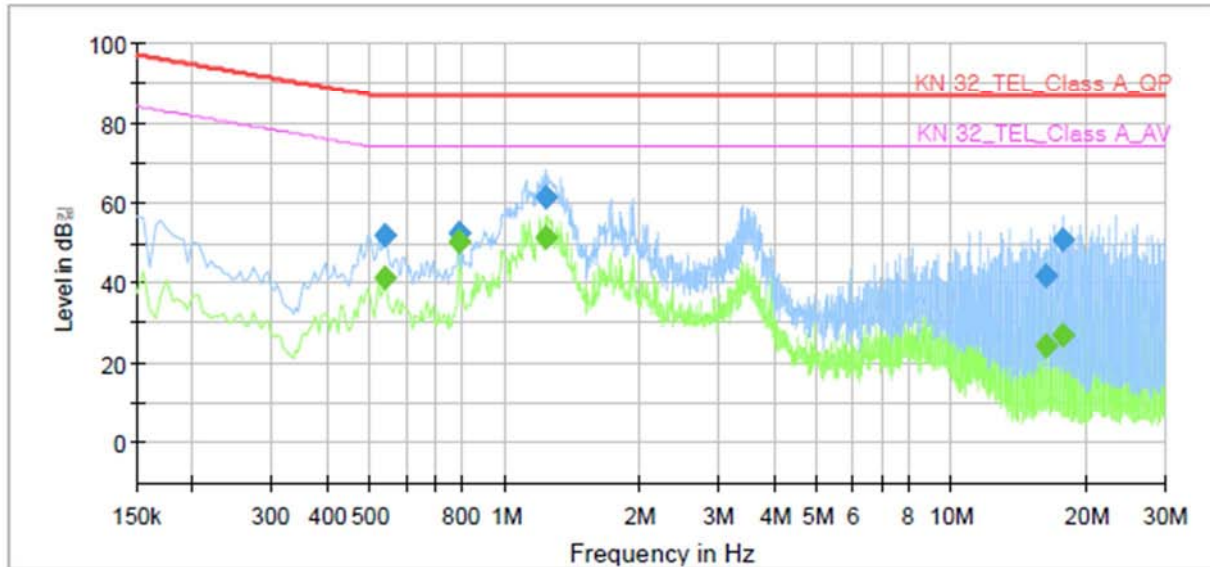
Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.790000	---	50.59	74.00	23.41	1000.0	9.000	Single Line	9.9
0.790000	53.37	---	87.00	33.63	1000.0	9.000	Single Line	9.9
0.855000	---	43.11	74.00	30.89	1000.0	9.000	Single Line	9.9
0.855000	50.46	---	87.00	36.54	1000.0	9.000	Single Line	9.9
1.220000	---	54.55	74.00	19.45	1000.0	9.000	Single Line	9.8
1.220000	64.79	---	87.00	22.21	1000.0	9.000	Single Line	9.8
1.250000	---	59.21	74.00	14.79	1000.0	9.000	Single Line	9.8
1.250000	67.04	---	87.00	19.96	1000.0	9.000	Single Line	9.8
10.000000	---	47.97	74.00	26.03	1000.0	9.000	Single Line	10.1
10.000000	69.42	---	87.00	17.58	1000.0	9.000	Single Line	10.1
10.035000	---	43.96	74.00	30.04	1000.0	9.000	Single Line	10.1
10.035000	58.09	---	87.00	28.91	1000.0	9.000	Single Line	10.1

[100 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	QND-6020RN
Mode	12 V (dc) 100 Mbps
Operator Name:	KES



Final Result

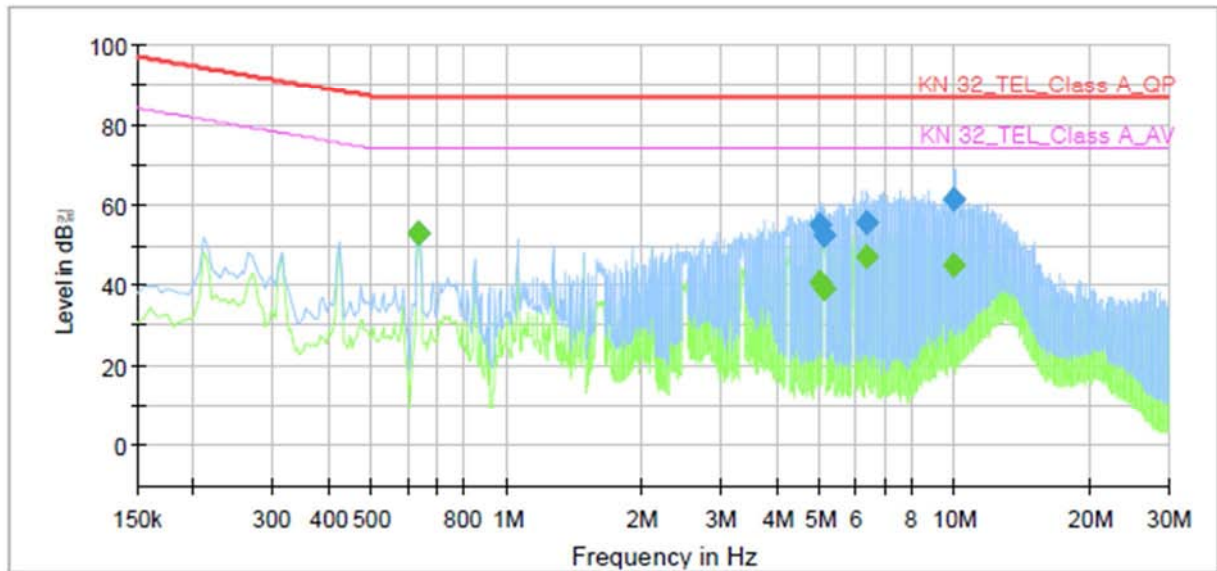
Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.540000	---	41.43	74.00	32.57	1000.0	9.000	Single Line	9.5
0.540000	51.71	---	87.00	35.29	1000.0	9.000	Single Line	9.5
0.790000	---	50.27	74.00	23.73	1000.0	9.000	Single Line	9.4
0.790000	52.21	---	87.00	34.79	1000.0	9.000	Single Line	9.4
1.230000	---	51.58	74.00	22.42	1000.0	9.000	Single Line	9.3
1.230000	61.61	---	87.00	25.39	1000.0	9.000	Single Line	9.3
16.185000	---	24.17	74.00	49.83	1000.0	9.000	Single Line	9.6
16.185000	41.97	---	87.00	45.03	1000.0	9.000	Single Line	9.6
17.770000	---	27.25	74.00	46.75	1000.0	9.000	Single Line	9.5
17.770000	50.91	---	87.00	36.09	1000.0	9.000	Single Line	9.5

- PoE Mode

[10 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	QND-6020RN
Mode	POE 10Mbps
Operator Name:	KES



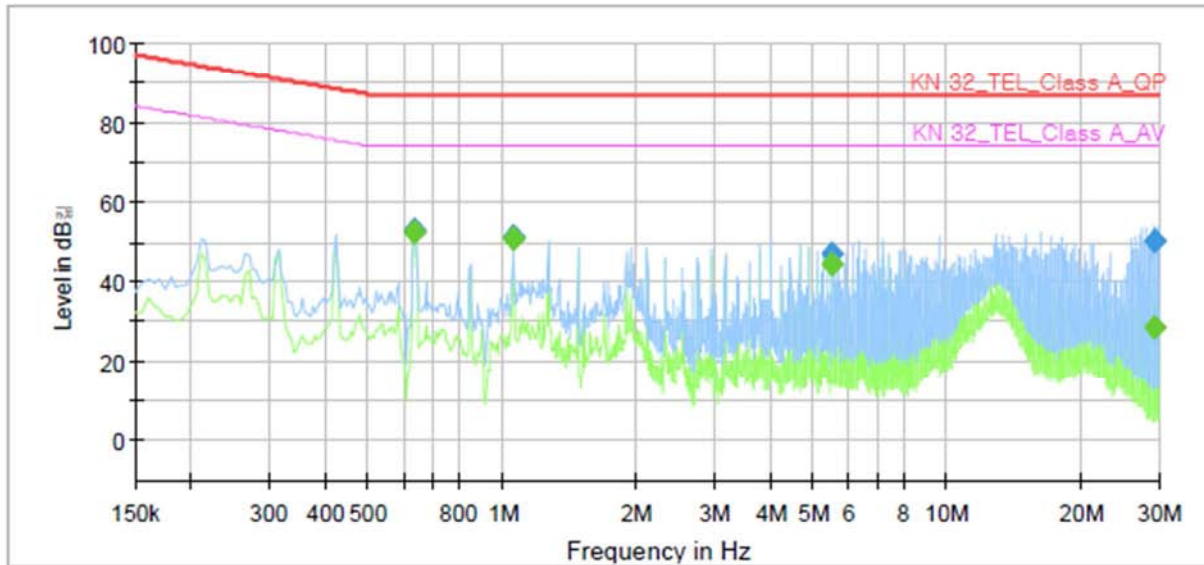
Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.635000	---	52.71	74.00	21.29	1000.0	9.000	Single Line	9.9
0.635000	53.00	---	87.00	34.00	1000.0	9.000	Single Line	9.9
5.010000	---	40.60	74.00	33.40	1000.0	9.000	Single Line	9.9
5.010000	55.27	---	87.00	31.73	1000.0	9.000	Single Line	9.9
5.105000	---	39.02	74.00	34.98	1000.0	9.000	Single Line	9.9
5.105000	52.17	---	87.00	34.83	1000.0	9.000	Single Line	9.9
6.360000	---	47.31	74.00	26.69	1000.0	9.000	Single Line	9.9
6.360000	55.57	---	87.00	31.43	1000.0	9.000	Single Line	9.9
9.990000	---	44.76	74.00	29.24	1000.0	9.000	Single Line	10.1
9.990000	61.51	---	87.00	25.49	1000.0	9.000	Single Line	10.1

[100 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	QND-6020RN
Mode	POE 100Mbps
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dB _{μV})	CAverage (dB _{μV})	Limit (dB _{μV})	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.635000	---	52.47	74.00	21.53	1000.0	9.000	Single Line	9.4
0.635000	52.79	---	87.00	34.21	1000.0	9.000	Single Line	9.4
1.060000	---	50.58	74.00	23.42	1000.0	9.000	Single Line	9.4
1.060000	51.33	---	87.00	35.67	1000.0	9.000	Single Line	9.4
5.515000	---	44.45	74.00	29.55	1000.0	9.000	Single Line	9.4
5.515000	46.87	---	87.00	40.13	1000.0	9.000	Single Line	9.4
29.235000	---	28.61	74.00	45.39	1000.0	9.000	Single Line	9.4
29.235000	50.06	---	87.00	36.94	1000.0	9.000	Single Line	9.4

**Radiated Electric Field Emissions(Below 1 GHz)**

- DC 12V 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]
148.55	12.89	V	1.10	8.15	3.35	24.39	40.00	15.61
186.68	12.49	H	4.00	10.04	3.75	26.28	40.00	13.72
186.93	13.54	V	1.70	10.06	3.75	27.35	40.00	12.65
351.61	14.33	H	4.00	14.58	4.61	33.52	47.00	13.48
445.21	11.83	V	2.90	16.33	5.38	33.54	47.00	13.46
444.77	11.96	H	3.30	16.33	5.38	33.67	47.00	13.33

* H : Horizontal, V : Vertical

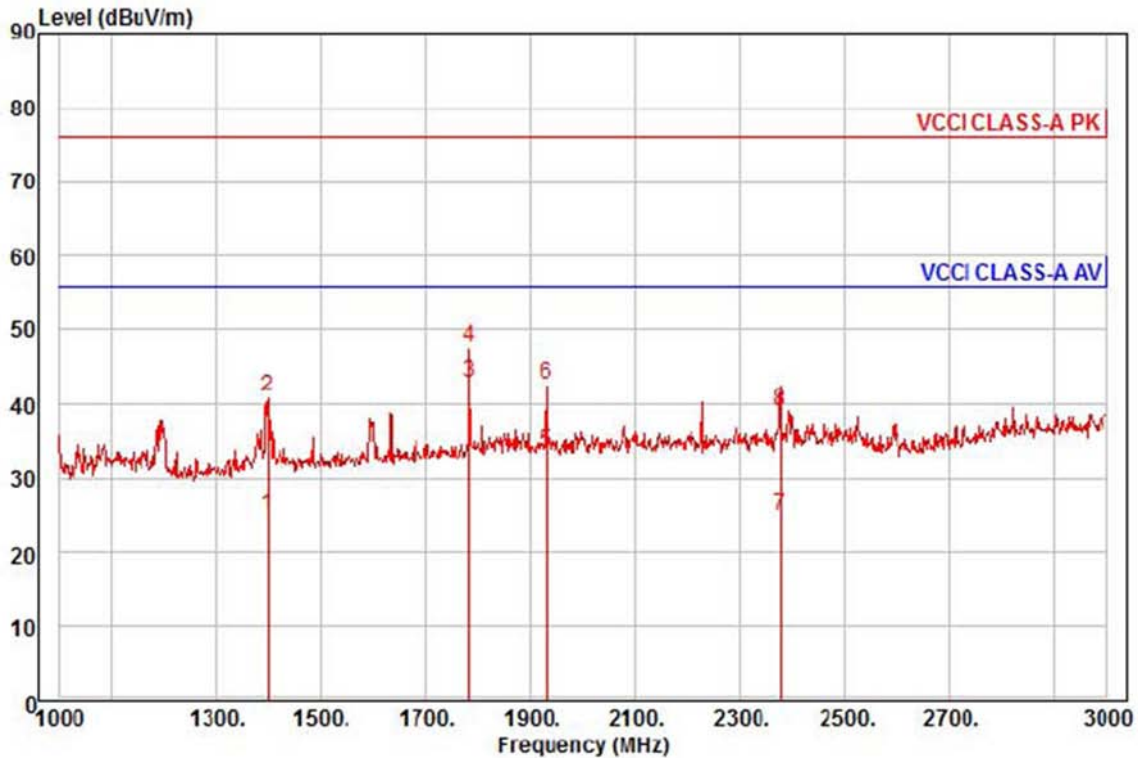
- PoE Mode

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]
47.73	11.14	V	1.20	13.85	2.26	27.25	40.00	12.75
148.99	14.46	V	1.20	8.16	3.35	25.97	40.00	14.03
350.09	13.59	H	3.30	14.54	4.59	32.72	47.00	14.28
400.62	14.31	H	3.40	15.71	5.17	35.19	47.00	11.81
445.50	15.85	V	2.50	16.34	5.38	37.57	47.00	9.43
445.13	12.27	H	3.00	16.33	5.38	33.98	47.00	13.02

* H : Horizontal, V : Vertical

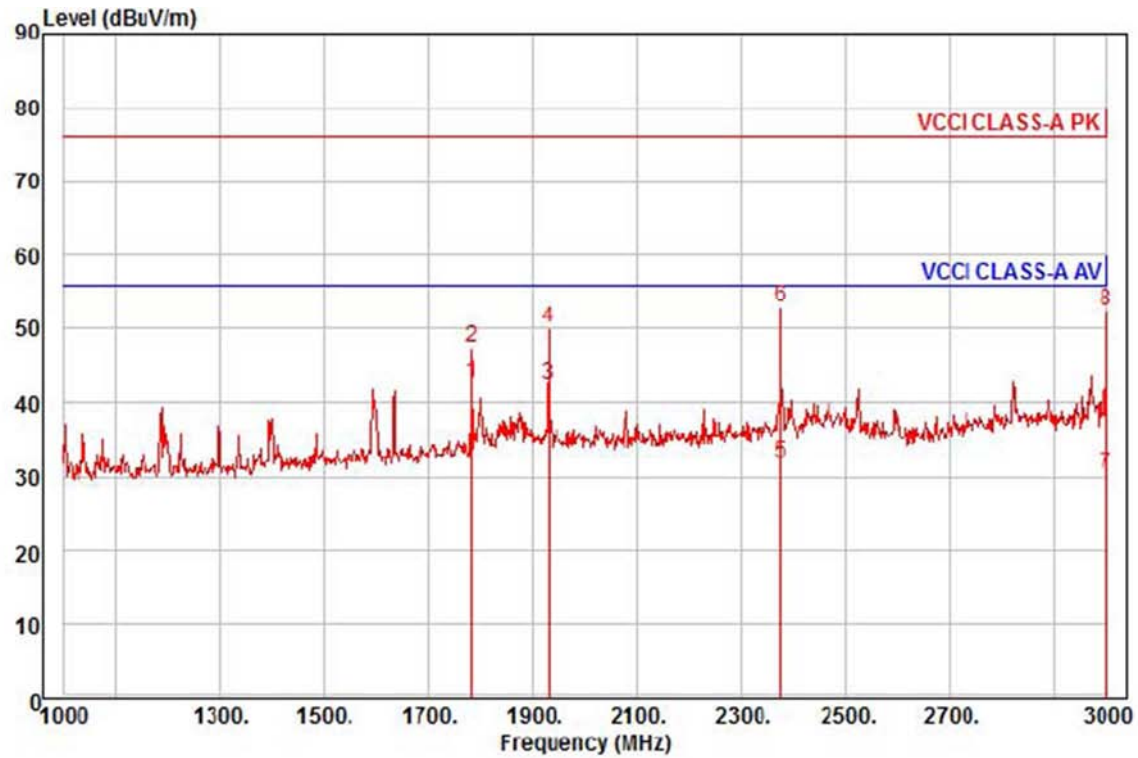
Radiated Electric Field Emissions(Above 1 GHz)

- DC 12V Mode



Site : chamber
Condition: VCCI CLASS-A PK 3m HORN781(2015.05.07) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : QND-6020RN
Mode : 12 V (dc)
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	1398.00	31.70	25.49	7.66	39.92	274	56.00	-31.07	horizontal	Average
2	1398.00	47.84	25.49	7.66	39.92	274	76.00	-34.93	horizontal	Peak
3 pp	1782.00	46.94	27.01	8.75	39.74	10	56.00	-13.04	horizontal	Average
4 pk	1782.00	51.58	27.01	8.75	39.74	10	76.00	-28.40	horizontal	Peak
5	1930.00	36.38	27.60	9.16	39.66	326	56.00	-22.52	horizontal	Average
6	1930.00	45.61	27.60	9.16	39.66	326	76.00	-33.29	horizontal	Peak
7	2378.00	26.11	28.81	9.93	39.85	132	56.00	-31.00	horizontal	Average
8	2378.00	40.16	28.81	9.93	39.85	132	76.00	-36.95	horizontal	Peak



Site : chamber

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

Project :

Model : QND-6020RN

Mode : 12 V (dc)

Memo : (1 ~ 3) GHz

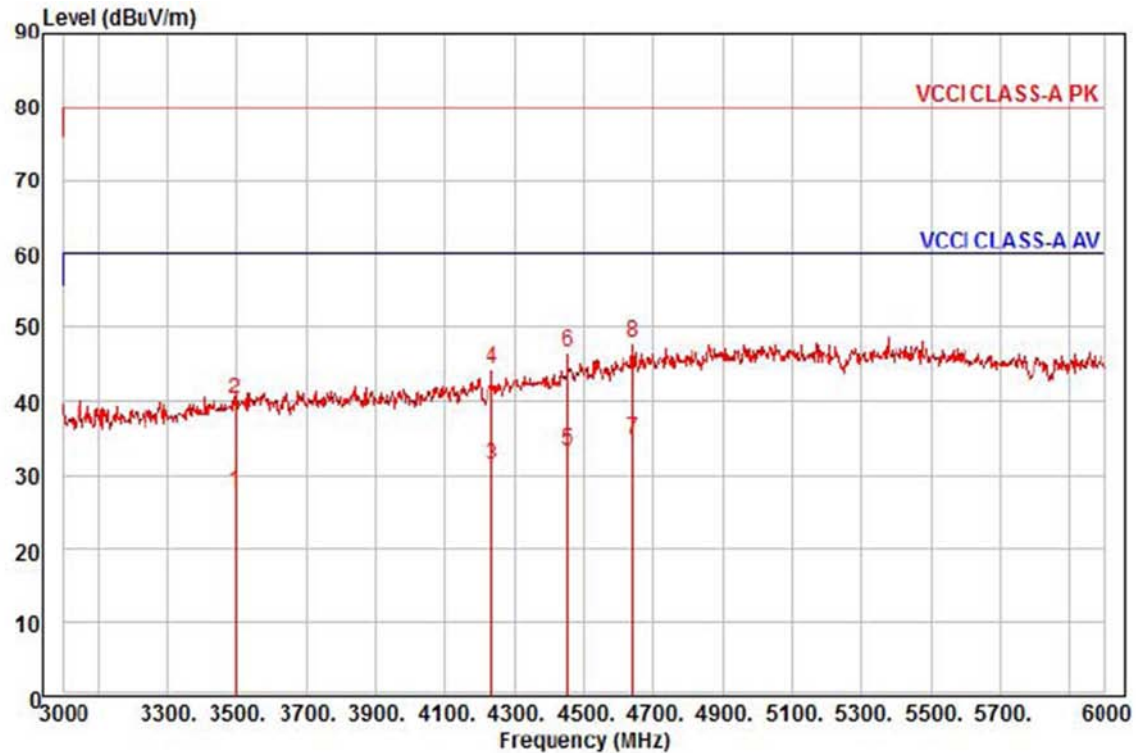
		Read	Ant	Cable	Preamp	TPos	Limit	Over		
	Freq	Level	Factor	Loss	Factor		Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1 pp	1782.00	46.64	27.01	8.75	39.74	89	56.00	-13.34	vertical	Average
2	1782.00	51.37	27.01	8.75	39.74	89	76.00	-28.61	vertical	Peak
3	1930.00	45.36	27.60	9.16	39.66	326	56.00	-13.54	vertical	Average
4	1930.00	52.81	27.60	9.16	39.66	326	76.00	-26.09	vertical	Peak
5	2376.00	33.06	28.80	9.93	39.85	110	56.00	-24.06	vertical	Average
6 pk	2376.00	54.06	28.80	9.93	39.85	110	76.00	-23.06	vertical	Peak
7	3000.00	29.00	30.33	11.22	40.21	28	56.00	-25.66	vertical	Average
8	3000.00	51.08	30.33	11.22	40.21	28	76.00	-23.58	vertical	Peak



KES Co., Ltd.

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

Test report No.:
KES-E1-16T0248
Page (25) of (43)



Site : chamber
Condition: VCCI CLASS-A PK 3m HORN781(2015.05.07) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : QND-6020RN
Mode : 12 V (dc)
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	3498.00	24.41	31.17	12.50	40.31	248	60.00	-32.23	horizontal	Average
2	3498.00	36.95	31.17	12.50	40.31	248	80.00	-39.69	horizontal	Peak
3	4236.00	24.59	33.36	13.94	40.41	287	60.00	-28.52	horizontal	Average
4	4236.00	37.40	33.36	13.94	40.41	287	80.00	-35.71	horizontal	Peak
5	4455.00	24.79	34.61	14.35	40.41	22	60.00	-26.66	horizontal	Average
6	4455.00	38.09	34.61	14.35	40.41	22	80.00	-33.36	horizontal	Peak
7 pp	4641.00	25.00	35.67	14.68	40.41	110	60.00	-25.06	horizontal	Average
8 pk	4641.00	37.94	35.67	14.68	40.41	110	80.00	-32.12	horizontal	Peak

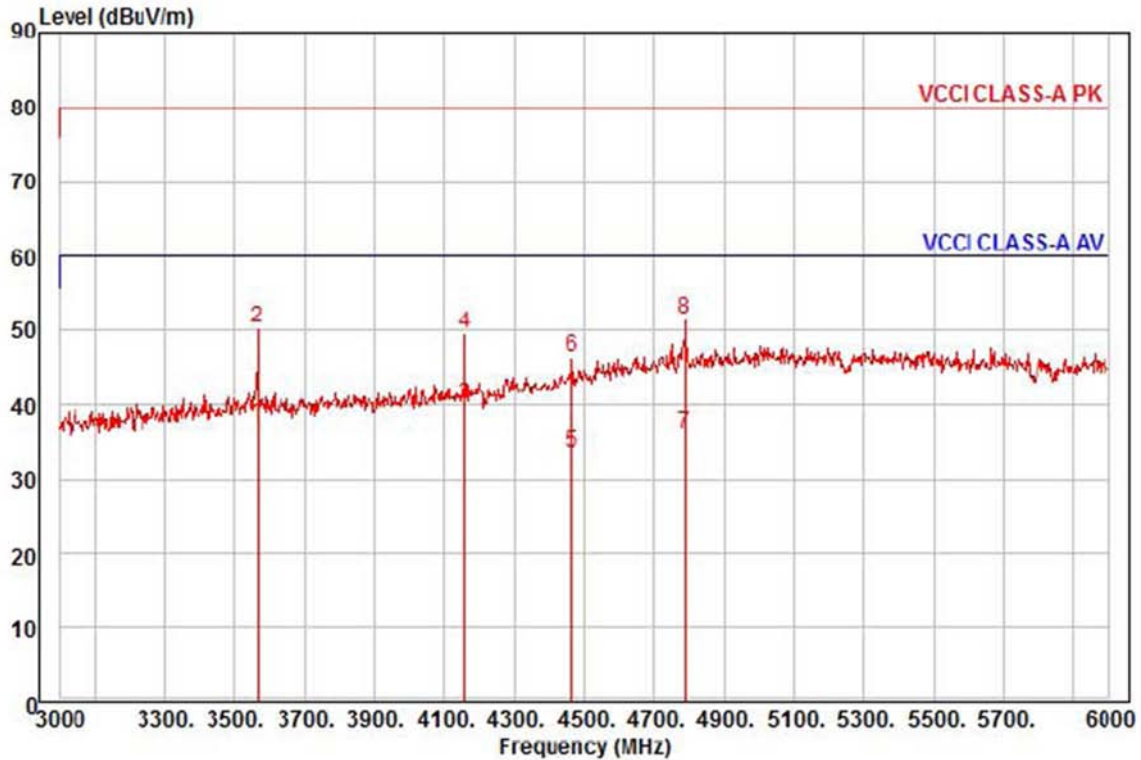
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.



KES Co., Ltd.

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

Test report No.:
KES-E1-16T0248
Page (26) of (43)

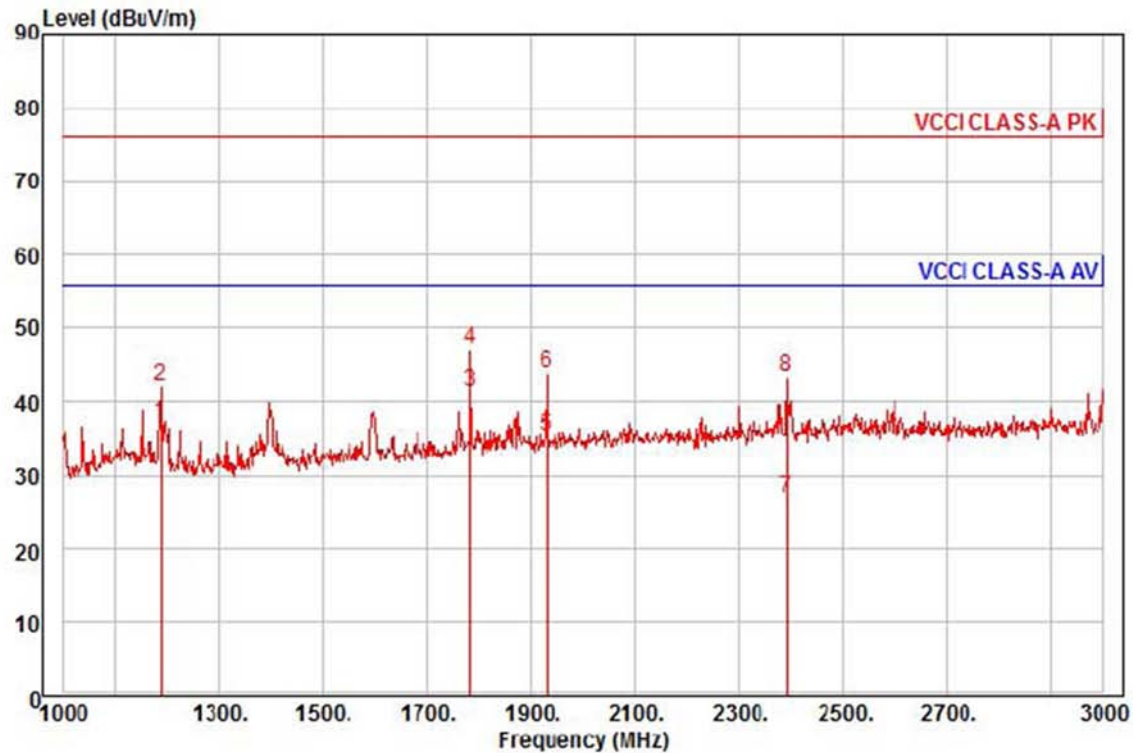


Site : chamber
Condition: VCCI CLASS-A PK 3m HORN781(2015.05.07) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : QND-6020RN
Mode : 12 V (dc)
Memo : (3 ~ 6) GHz

		Read	Ant	Cable	Preamp	TPos	Limit	Over		
	Freq	Level	Factor	Loss	Factor		Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/n	dB		
1	3564.00	33.64	31.28	12.64	40.32	266	60.00	-22.76	vertical	Average
2	3564.00	46.79	31.28	12.64	40.32	266	80.00	-29.61	vertical	Peak
3 pp	4158.00	33.79	32.91	13.80	40.41	220	60.00	-19.91	vertical	Average
4	4158.00	43.20	32.91	13.80	40.41	220	80.00	-30.50	vertical	Peak
5	4464.00	24.91	34.66	14.36	40.41	136	60.00	-26.48	vertical	Average
6	4464.00	37.84	34.66	14.36	40.41	136	80.00	-33.55	vertical	Peak
7	4785.00	25.00	36.49	14.94	40.41	353	60.00	-23.98	vertical	Average
8 pk	4785.00	40.48	36.49	14.94	40.41	353	80.00	-28.50	vertical	Peak

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

- PoE Mode



Site : chamber
Condition: VCCI CLASS-A PK 3m HORN781(2015.05.07) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : QND-6020RN
Mode : POE
Memo : (1 ~ 3) GHz

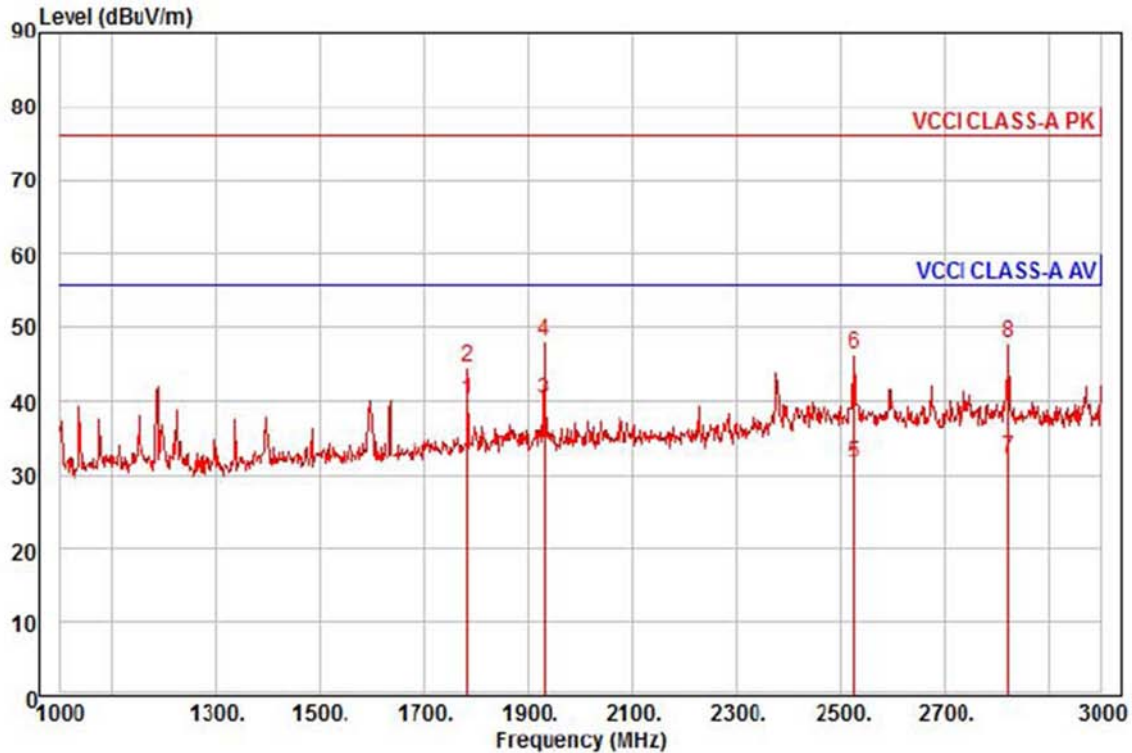
	Freq	Read Level	Ant Factor	Cable Loss	Preamplifier Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	1188.00	45.44	24.66	7.06	40.03	223	56.00	-18.87	horizontal	Average
2	1188.00	50.50	24.66	7.06	40.03	223	76.00	-33.81	horizontal	Peak
3 pp	1782.00	45.44	27.01	8.75	39.74	322	56.00	-14.54	horizontal	Average
4 pk	1782.00	51.17	27.01	8.75	39.74	322	76.00	-28.81	horizontal	Peak
5	1930.00	38.18	27.60	9.16	39.66	316	56.00	-20.72	horizontal	Average
6	1930.00	46.91	27.60	9.16	39.66	316	76.00	-31.99	horizontal	Peak
7	2392.00	28.02	28.84	9.95	39.86	89	56.00	-29.05	horizontal	Average
8	2392.00	44.41	28.84	9.95	39.86	89	76.00	-32.66	horizontal	Peak



KES Co., Ltd.

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

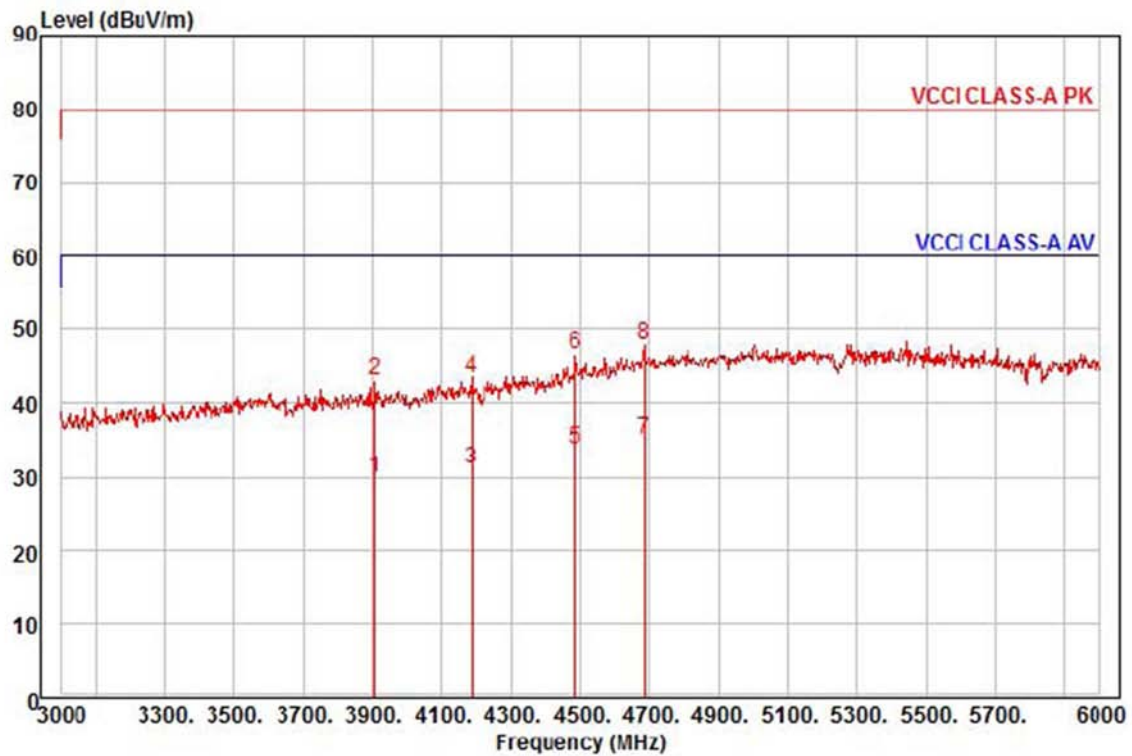
Test report No.:
KES-E1-16T0248
Page (28) of (43)



Site : chamber
Condition: VCCI CLASS-A PK 3m HORN781(2015.05.07) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : QND-6020RN
Mode : POE
Memo : (1 ~ 3) GHz

	Freq	Read Level	Ant Factor	Cable Loss	Preamplifier Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1 pp	1782.00	44.27	27.01	8.75	39.74	311	56.00	-15.71	vertical	Average
2	1782.00	48.65	27.01	8.75	39.74	311	76.00	-31.33	vertical	Peak
3	1930.00	43.16	27.60	9.16	39.66	334	56.00	-15.74	vertical	Average
4 pk	1930.00	50.97	27.60	9.16	39.66	334	76.00	-27.93	vertical	Peak
5	2526.00	32.35	29.17	10.16	39.94	265	56.00	-24.26	vertical	Average
6	2526.00	47.01	29.17	10.16	39.94	265	76.00	-29.60	vertical	Peak
7	2822.00	31.76	29.89	10.80	40.11	277	56.00	-23.66	vertical	Average
8	2822.00	47.16	29.89	10.80	40.11	277	76.00	-28.26	vertical	Peak

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.



Site : chamber
Condition: VCCI CLASS-A PK 3m HORN781(2015.05.07) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : QND-6020RN
Mode : POE
Memo : (3 ~ 6) GHz

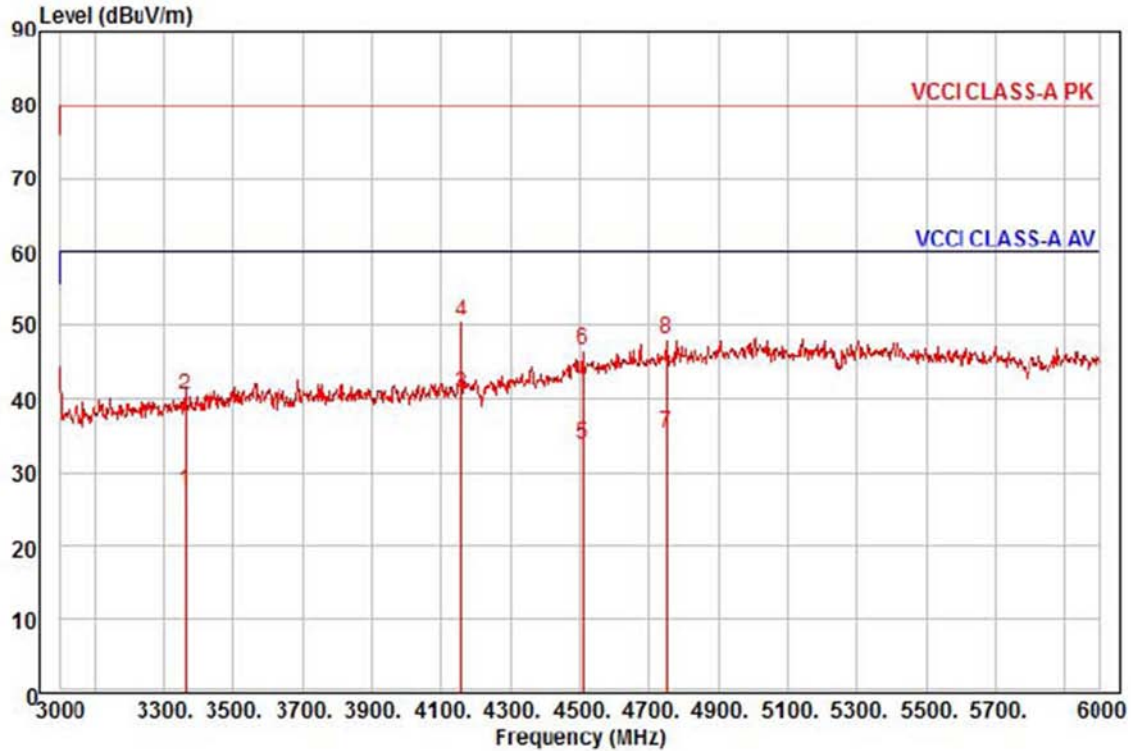
	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	3906.00	25.14	31.85	13.32	40.39	95	60.00	-30.08	horizontal	Average
2	3906.00	38.48	31.85	13.32	40.39	95	80.00	-36.74	horizontal	Peak
3	4185.00	24.70	33.07	13.85	40.41	173	60.00	-28.79	horizontal	Average
4	4185.00	36.93	33.07	13.85	40.41	173	80.00	-36.56	horizontal	Peak
5	4485.00	25.08	34.78	14.40	40.41	341	60.00	-26.15	horizontal	Average
6	4485.00	37.87	34.78	14.40	40.41	341	80.00	-33.36	horizontal	Peak
7 pp	4686.00	24.71	35.93	14.76	40.41	341	60.00	-25.01	horizontal	Average
8 pk	4686.00	37.52	35.93	14.76	40.41	341	80.00	-32.20	horizontal	Peak



KES Co., Ltd.

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

Test report No.:
KES-E1-16T0248
Page (30) of (43)



Site : chamber
Condition: VCCI CLASS-A PK 3m HORN781(2015.05.07) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : QND-6020RN
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	3360.00	24.61	30.93	12.15	40.28	84	60.00	-32.59	vertical	Average
2	3360.00	37.66	30.93	12.15	40.28	84	80.00	-39.54	vertical	Peak
3 pp	4158.00	34.47	32.91	13.80	40.41	220	60.00	-19.23	vertical	Average
4 pk	4158.00	44.31	32.91	13.80	40.41	220	80.00	-29.39	vertical	Peak
5	4509.00	24.95	34.92	14.45	40.41	60	60.00	-26.09	vertical	Average
6	4509.00	37.63	34.92	14.45	40.41	60	80.00	-33.41	vertical	Peak
7	4749.00	24.61	36.29	14.88	40.41	84	60.00	-24.63	vertical	Average
8	4749.00	37.41	36.29	14.88	40.41	84	80.00	-31.83	vertical	Peak

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.



Test Setup Photos and Configuration

Conducted Voltage Emissions

N/A

N/A

Conducted Telecommunication Emissions

- DC 12V Mode



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

- PoE Mode



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

Radiated Electric Field Emissions(Below 1 GHz)

- DC 12V Mode



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

- PoE Mode



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

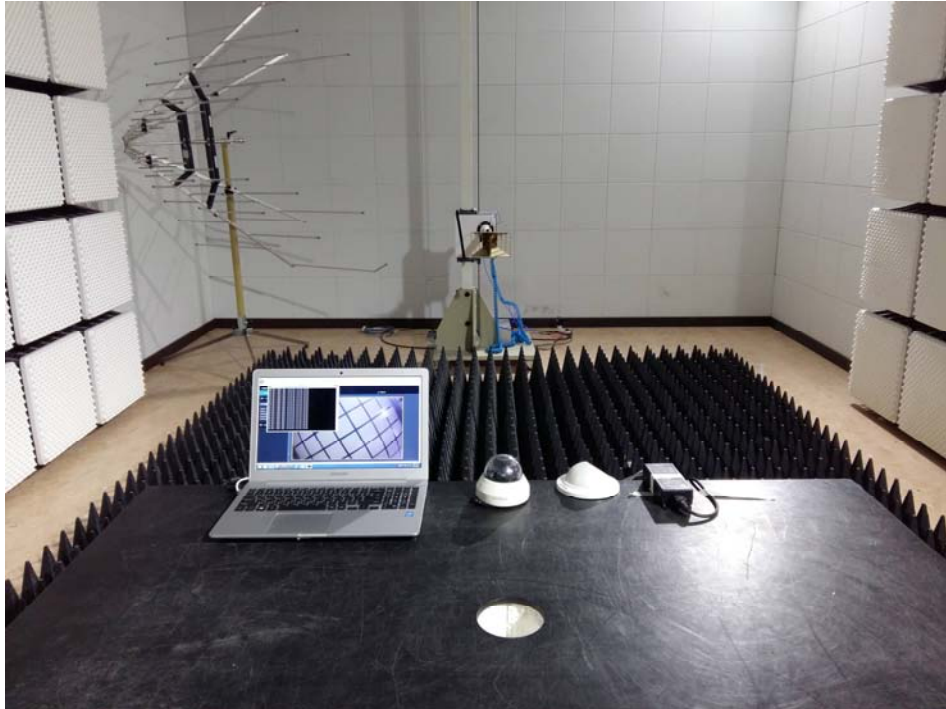
Radiated Electric Field Emissions(Above 1 GHz)

- DC 12V Mode



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

- PoE Mode



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

EUT External Photographs

(Top)



(Bottom)



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

EUT Internal Photographs

(Internal View)

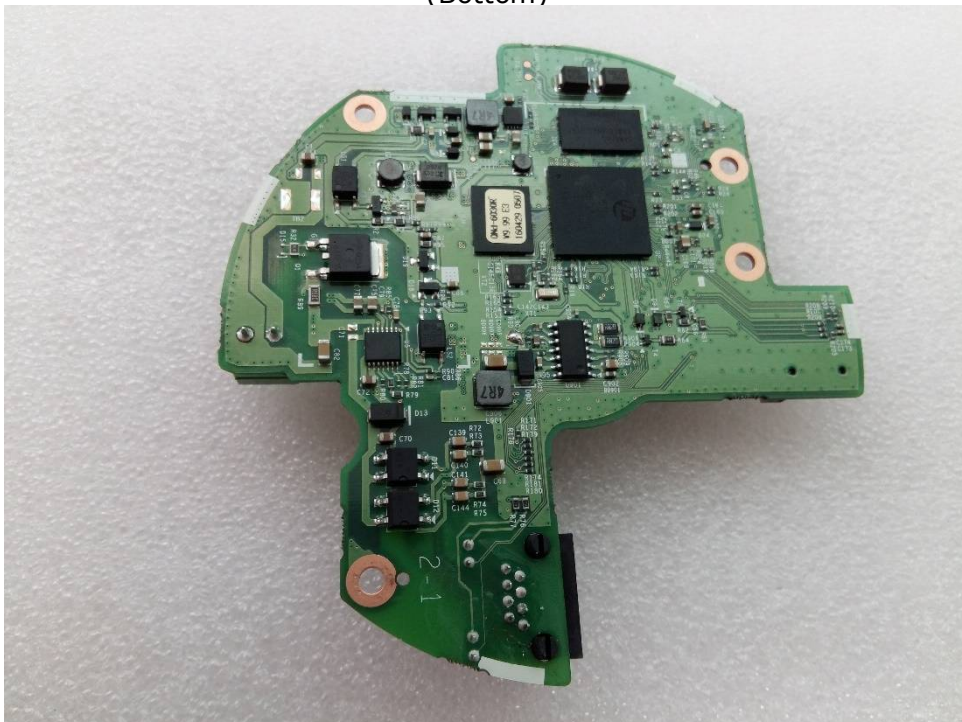


Main Board EUT Internal View – Main Board

(Top)



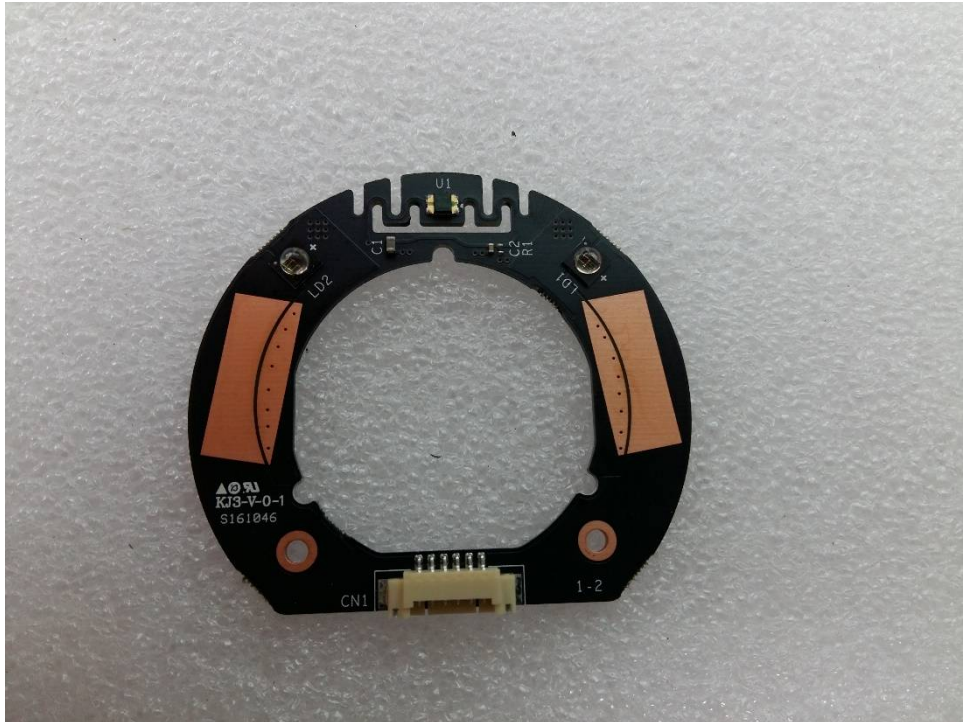
(Bottom)



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

Main Board EUT Internal View – Sub Board

(Top)



(Bottom)



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
 The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

Main Board EUT Internal View – Camera Board

(Top)



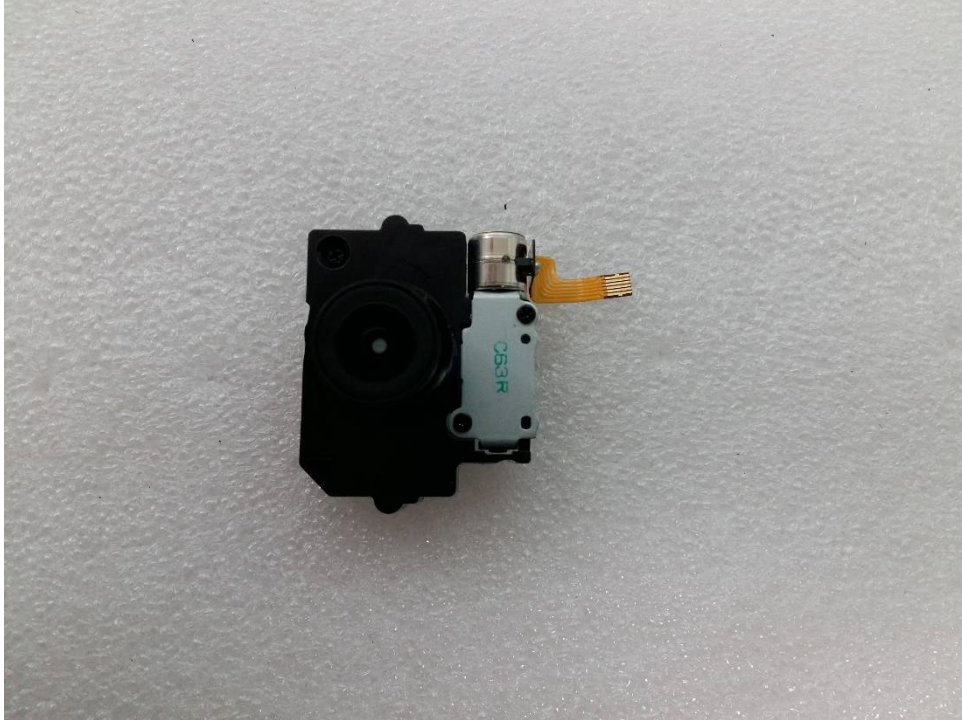
(Bottom)



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

Main Board EUT Internal View – Camera Lens

(Top)



(Bottom)



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.