



EMC TEST REPORT For VCCI

Test Report No. : KES-EM-20T0275
Date of Issue : Apr. 16, 2020
Product name : NETWORK CAMERA
Model/Type No. : XND-9082RF
Variant Model : XND-8082RF
Applicant : Hanwha Techwin Co., Ltd.
Applicant Address : 6, Pangyo-ro 319Beon-gil, Bundang-gu, Seongnam-si,
Gyeonggi-do, Republic of Korea
Manufacturer : 1. HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.
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 : Apr. 03, 2020
Test date : Apr. 13, 2020
Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Hyo Jin, Kim
EMC Test Engineer

Reviewed by

Dong-Hun, Jang
EMC Technical Manager

**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-EM-20T0275
Page (2) of (40)

REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Apr. 16, 2020	KES-EM-20T0275	Issued

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd. This document may 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.
The authenticity of the test report, contact shchoi@kes.co.kr



TABLE OF CONTENTS

1.0	General Product Description.....	4
1.1	Test Voltage & Frequency	7
1.2	Variant Model Differences.....	7
1.3	Device Modifications	7
1.4	Equipment Under Test.....	7
1.5	Support Equipments	8
1.6	External I/O Cabling	9
1.7	EUT Operating Mode(s)	10
1.8	Configuration.....	11
1.9	Remarks when standards applied	12
1.10	Calibration Details of Equipment Used for Measurement.....	12
1.11	Test Facility	12
1.12	Laboratory Accreditations and Listings	12
2.0	Test Regulations.....	13
2.1	Conducted Emissions Mains Power Ports.....	15
2.2	Conducted Emissions at Telecommunication Ports.....	16
2.3	Radiated Electric Field Emissions(Below 1 GHz)	17
2.4	Radiated Electric Field Emissions(Above 1 GHz)	18
APPENDIX A – TEST DATA.....		19
Conducted Emissions at Mains Power Ports.....		19
Conducted Emissions at Telecommunication Ports		21
Radiated Electric Field Emissions(Below 1 GHz)		23
Radiated Electric Field Emissions(Above 1 GHz).....		25
Test Setup Photos and Configuration		27
Conducted Emissions at Mains Power Ports.....		27
Conducted Emissions at Telecommunication Ports		28
Radiated Electric Field Emissions(Below 1 GHz)		30
Radiated Electric Field Emissions(Above 1 GHz).....		32
EUT External Photographs		34
EUT Internal Photographs		35



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-EM-20T0275
Page (4) of (40)

1.0 General Product Description

Main Specifications of EUT are:

Video	XND-9082RF
Imaging Device	1/2.8" 8.46M CMOS
Effective Pixels	3864(H)x2192(V)
NETD	None
Pixel Size	None
Min. Illumination	Color: 0.05Lux(F1.2, 1/30sec) B/W: 0Lux(IR LED On)
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)	2.8~8.4mm(3x) motorized varifocal
Max. Aperture Ratio	F1.2(Wide)~F2.8(Tele)
Angular Field of View	H: 114°(Wide)~40.2°(Tele) / V: 62.0°(Wide)~22.5°(Tele) / D: 133.0°(Wide)~46.3°(Tele)
Min. Object Distance	0.7m (2.23ft)
Focus Control	Simple focus
Lens Type	DC Auto Iris, P iris
Mount Type	None
Optional Lens	None
Pan / Tilt / Rotate	
Pan / Tilt / Rotate Range	0°~360° / -45°~85° / 0°~355°
Pan Range	None
Pan Speed	None
Tilt Range	None
Tilt Speed	None
Rotate Range	None
Sequence	None
Preset Accuracy	None
Azimuth	None
Auto Tracking	None
Operational	
IR Viewable Length	40m(131.23ft)
Camera Title	Off / On (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), Auto scale by resolution
Day & Night	Auto(ICR)/Color/BW/External/Schedule
Backlight Compensation	BLC, HLC, WDR
Wide Dynamic Range	150dB
Contrast Enhancement	SSDR (Off / On)
Digital Noise Reduction	SSNR V
Digital Image Stabilization	Support(built-in gyro sensor)
Defog	Support
Motion Detection	8ea, 8point Polygonal zones
Privacy Masking	32ea, polygonal zones - Color : Gray, Green, Red, Blue, Black, White - Mosaic
Gain Control	Support
White Balance	ATW / Narrow ATW / AWC / Manual / Indoor / Outdoor
LDC	Support
Electronic Shutter Speed	Minimum / Maximum / Anti flicker (1/5~1/12,000sec)
Digital PTZ	Support(Preset, Group)
Video Rotation	Flip, Mirror, Hallway view(90°/270°)

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



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-EM-20T0275
Page (5) of (40)

Analytics	Defocus detection, Directional detection, Motion detection, Digital auto tracking, Appear/Disappear, Enter/Exit, Loitering, Tampering, Virtual line, Audio detection, Sound classification, Shock detection, Face/upper body detection
Business Intelligence	People counting, Queue management, Heatmap
Serial Interface	None
Alarm I/O	2 configurable I/O ports
Alarm Triggers	Analytics, Network disconnect, Alarm input
Alarm Events	File upload via FTP and e-mail Notification via e-mail SD/SDHC/SDXC or NAS recording at event triggers Alarm output Handover Audio playback
Audio In	Selectable(mic in/line in) Supply voltage: 2.5VDC(4mA), Input impedance: 2K Ohm
Audio Out	Line out, Max.output level: 1Vrms
IR Illuminator (Optional)	None
Wiper	None
Coaxial Protocol	None
Video Transmission Distance	None
Radiometry	
Temperature detect range	None
Temperature accuracy	None
Temperature detection	None
Additional	None
Network	
Ethernet	RJ-45(10/100/1000BASE-T)
Video Compression	H.265/H.264: Main/High, MJPEG
Resolution	3840x2160, 3328x1872, 3072x1728, 2592x1944, 2688x1520, 1920x1080, 1600x1200, 1280x1024, 1280x960, 1280x720, 1024x768, 800x600, 800x448, 720x576, 720x480, 640x480, 640x360, 320x240
Max. Framerate	H.265/H.264: Max. 30fps/25fps(60Hz/50Hz) MJPEG: Max. 15fps/12fps(60Hz/50Hz)
Smart Codec	Manual(Sea area), WiseStreamII
Video Quality Adjustment	H.264/H.265: Target bitrate level control MJPEG: Quality level control
Bitrate Control	H.264/H.265: CBR or VBR MJPEG: VBR
Streaming	Unicast(20 users) / Multicast Multiple streaming(Up to 3 profiles)
Audio Compression	G.711 u-law /G.726 Selectable G.726(ADPCM) 8KHz, G.711 8KHz G.726: 16Kbps, 24Kbps, 32Kbps, 40Kbps AAC-LC: 48Kbps at 16KHz
Protocol	IPv4, IPv6, TCP/IP, UDP/IP, RTP(UDP), RTP(TCP), RTCP,RTSP, NTP, HTTP, HTTPS, SSL/TLS, DHCP, FTP, SMTP, ICMP, IGMP, SNMPv1/v2c/v3(MIB-2), ARP, DNS, DDNS, QoS, UPnP, Bonjour, LLDP, SRTP (TCP, UDP Unicast)
Security	HTTPS(SSL) Login Authentication Digest Login Authentication IP Address Filtering User access log 802.1X Authentication(EAP-TLS, EAP-LEAP) Device Certificate(Hanwha Techwin Root CA)
Edge Storage	Micro SD/SDHC/SDXC 2slot 512GB(256Gx2)

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

**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-EM-20T0275
Page (6) of (40)

Application Programming Interface	ONVIF Profile S/G/T SUNAPI(HTTP API) Wisenet 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 8.1 or later, Mac OS X 10.13 or later Recommended Browser: Google Chrome Supported Browser: MS Explore11, MS Edge, Mozilla Firefox(Window 64bit only), Apple Safari(Mac OS X only)
Memory	4GB RAM, 512MB Flash
Environmental	
Operating Temperature / Humidity	-25°C ~ +60°C (-13°F ~ +140°F) / Less than 95% RH (non condensing)
Storage Temperature / Humidity	-50°C ~ +60°C(-58°F ~ +140°F) / Less than 90% RH
Certification	IP52, Plenum rate, IK10
Electrical	
Input Voltage	PoE(IEEE802.3af), 12VDC
Power Consumption	PoE : typ 10.7W, max 12.95W 12VDC : typ 9.0W, max 11.5W
Mechanical	
Color / Material	White / Aluminum
RAL Code	RAL9003
Product dimensions / weight	Ø205x163mm(8.07x6.42"), Weight : 1.95kg
Conduit hole	-
Hanging mount(Dome)	-
Skin cover(Dome)	-
Weather cap(Dome)	-
Power module	-
Backbox	-

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



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 ☐ 230 Vac ☒ 100 Vac ☐ 24 Vac ☐ 12 Vdc ☐ PoE

Frequency ☒ 50 Hz ☐ 60 Hz ☐ Hz

1.2 Variant Model Differences

Added a simple variant model for the purpose of the vendor management and a country of origin for the dualization.

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
NETWORK CAMERA	XND-9082RF	-	HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.	EUT

**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-EM-20T0275
Page (8) of (40)

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
AC/DC Adapter	SW48-12003500-W	-	SHENZHEN RIHUIDA ELECTRONICS CO.,LTD.	-
PoE Adapter	PT-PSE109GBRO-AH	-	Dongguan PROCET Network Technology Co.,Ltd	-
Notebook	ProBook4430s	-	HP	-
Notebook Adapter	SeriesPPP0009H	-	CHICONY POWER TECHNOLOGY (SUZHOU) CO.,LTD,	-
Speaker	BR1000A Cuve Black 2	-	DONGGUAN EDIFIER TECHNOLOGY Co., Ltd	-
MIC	MP1000	-	-	-
Alarm	-	-	-	-
Button Alarm	-	-	-	-
Smartphone	SHV-E210L	R33D713KA3F	SAMSUNG TECHWIN CO., LTD.	-
Micro SD Card	-	-	SanDisk	4 GB

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



1.6 External I/O Cabling

■ DC Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
NETWORK CAMERA (EUT)	RJ-45	Notebook	RJ-45	3.5	U
	Audio Out	Speaker	3.5 mm	1.4	U
	Audio In	MIC	3.5 mm	1.4	U
	Alarm Out	Alarm	Alarm In	3.0	U
	Alarm In	Button Alarm	Alarm Out	3.0	U
	SLOT	Micro SD Card	SLOT	-	-
Notebook	3.5 mm	Smartphone	3.5 mm	0.5	U

* Unshielded=U, Shielded=S

■ PoE Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
NETWORK CAMERA (EUT)	RJ-45	PoE Adapter	RJ-45	3.5	S
	Audio Out	Speaker	3.5 mm	1.4	U
	Audio In	MIC	3.5 mm	1.4	U
	Alarm Out	Alarm	Alarm In	3.0	U
	Alarm In	Button Alarm	Alarm Out	3.0	U
	SLOT	Micro SD Card	SLOT	-	-
Notebook	RJ-45	PoE Adapter	RJ-45	3.0	S
	3.5 mm	Smartphone	3.5 mm	0.5	U

* Unshielded=U, Shielded=S



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-EM-20T0275
Page (10) of (40)

1.7 EUT Operating Mode(s)

Test mode	operating
DC Mode, PoE Mode	After placing the test equipment and peripheral devices as shown in the layout below, the tests were conducted while checking the 1KHz output from the smartphone, the camera video output from the notebook and verifying that they were operating normally while PING TEST.

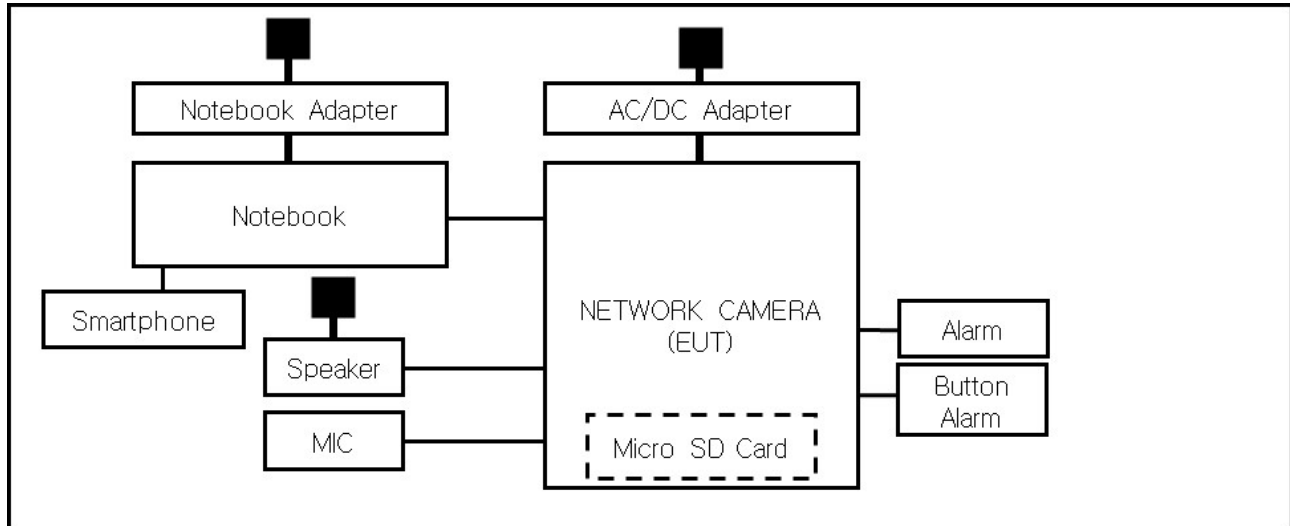
EUT Test operating S/W		
Name	Version	Manufacture Company
Web Viewer	-	-

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

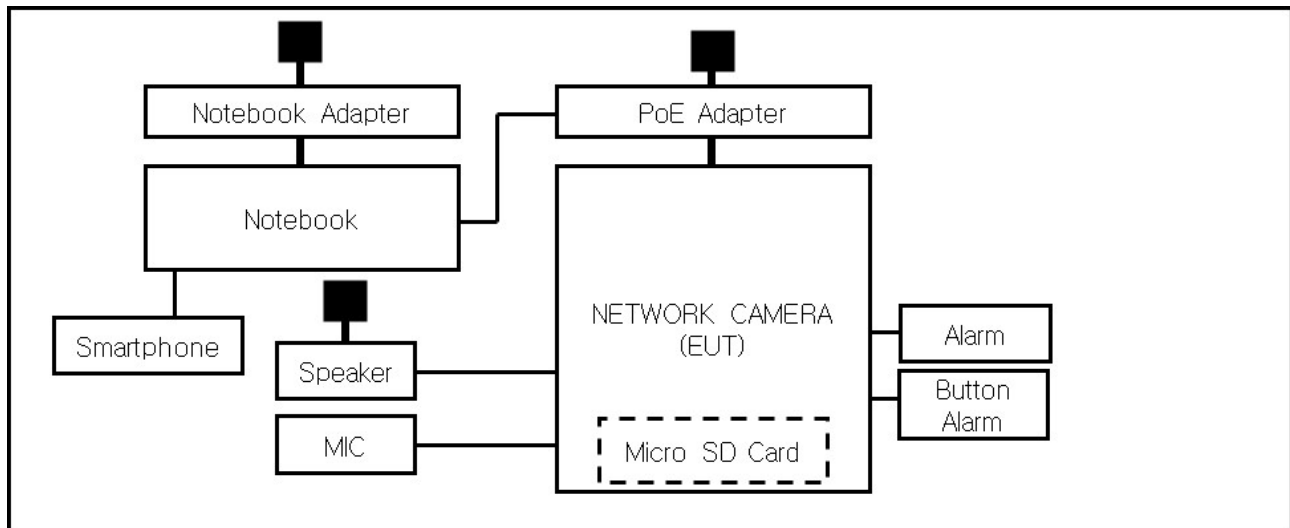
1.8 Configuration

■ AC Main
 □ DC Main

■ DC Mode



■ PoE Mode



1.9 Remarks when standards applied

The USB port and VIDEO port are excluded for testing as the manager port.

1.10 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.

1.11 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 C63.4:2014 and CISPR 16-1-4:2012

1.12 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
KOREA	RRA	EMI (3 m & 10 m Semi-Anechoic Chamber , 10 m Open Area 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, 10 m Open Area and Conducted test site to perform FCC Part 15/18 measurements.	 KR0100
Canada	ISED	3 m & 10 m Semi-Anechoic Chamber and Conducted test site	 23298-1
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-20056, C-20036, T-20040, G-20057
Europe	TÜV SÜD	EMI (3 m & 10 m Semi-Anechoic Chamber , 10 m Open Area and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 CARAT 001633 0003

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 55032:2015

☐ 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



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-EM-20T0275
Page (14) of (40)

-
- | | | |
|---|---|----------------------------------|
| ☒ VCCI-CISPR 32:2016 | ☒ Class A | ☐ Class B |
| ☐ AS/NZS CISPR32:2015 | ☐ 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 | | |

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



2.1 Conducted Emissions Mains Power Ports

Test Date

Apr. 13, 2020

Test Location

Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EMC32	R & S	9.12.00	-
☒	EMI TEST RECEIVER	ESU26	R & S	100552	04, 01, 2021
☒	LISN	ENV216	R & S	101787	01, 02, 2021
☒	LISN	ESH2-Z5	R & S	100450	01, 02, 2021
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	01, 02, 2021

Test Conditions

Temperature: 22,5 °C
Relative Humidity: 45,8 % R.H.

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 Conducted Emissions at Telecommunication Ports

Test Date

Apr. 13, 2020

Test Location

Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EMC32	R & S	9.12.00	-
☒	EMI TEST RECEIVER	ESU26	R & S	100552	04, 01, 2021
☒	LISN	ENV216	R & S	101787	01, 02, 2021
☒	LISN	ESH2-Z5	R & S	100450	01, 02, 2021
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	01, 02, 2021
☐	8-WIRE ISN CAT3,5	ENY81	R & S	100174	01, 07, 2021
☒	8-WIRE ISN CAT6	ENY81-CAT6	R & S	101665	01, 07, 2021
☐	ISN	ISN S8	SCHWARZBECK	ISN-S8-0019	03, 10, 2021
☐	CDN	CDNS502A	TESEQ	40431	01, 02, 2021

Test Conditions

Temperature: 22,5 °C
Relative Humidity: 45,8 % R.H.

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.

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



2.3 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Apr. 13, 2020

Test Location

☐ OPEN AREA TEST SITE #2 ☒ SEMI ANECHOIC CHAMBER #4(10m)

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.0	-
☒	EMI TEST RECEIVER	ESU26	R & S	100551	04, 01, 2021
☒	AMPLIFIER	SCU 01	R & S	100603	11, 25, 2020
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	11, 29, 2020
☒	ATTENUATOR	8491A	HP	32173	03, 10, 2021

Test Conditions

Temperature: 23,6 °C
Relative Humidity: 45,5 % R.H.

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

Apr. 13, 2020

Test Location

SEMI ANECHOIC CHAMBER #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.0	-
☒	EMI TEST RECEIVER	ESR7	R & S	101190	08, 06, 2020
☒	PREAMPLIFIER	8449B	AGILENT	3008A01967	05, 27, 2020
☐	ATTENUATOR	8491A	HP	35496	03, 10, 2021
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	03, 11, 2021

Test Conditions

Temperature: 23,3 °C
Relative Humidity: 46,1 % R.H.

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

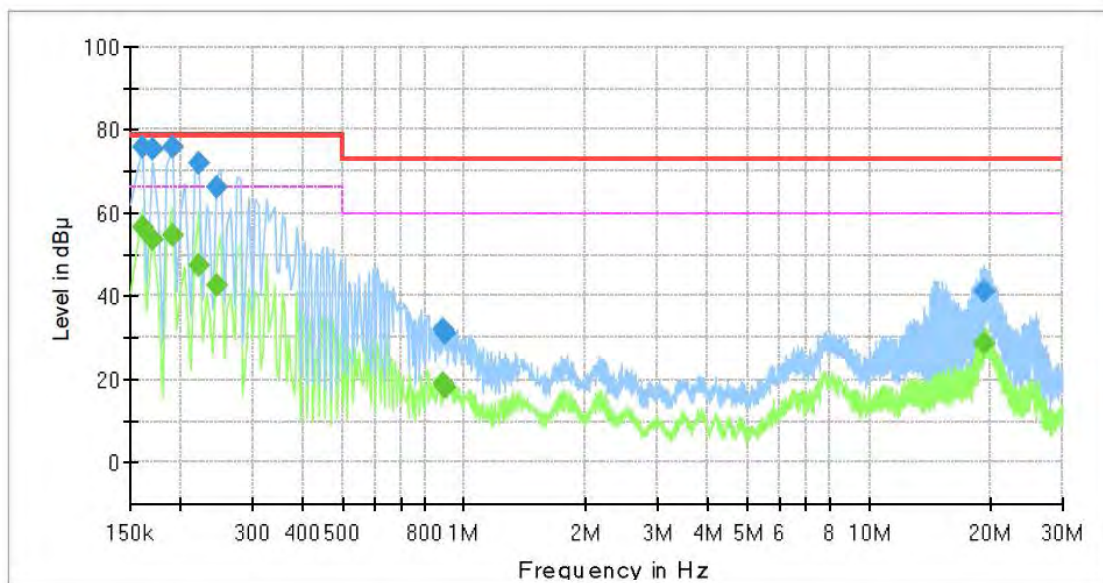
Conducted Emissions at Mains Power Ports

■ DC Mode

HOT LINE

Common Information

Test Description:	Conducted Emission
Model No.:	XND-9082RF
Phase:	L1
Mode:	DC
Operator Name:	KES



Final Result

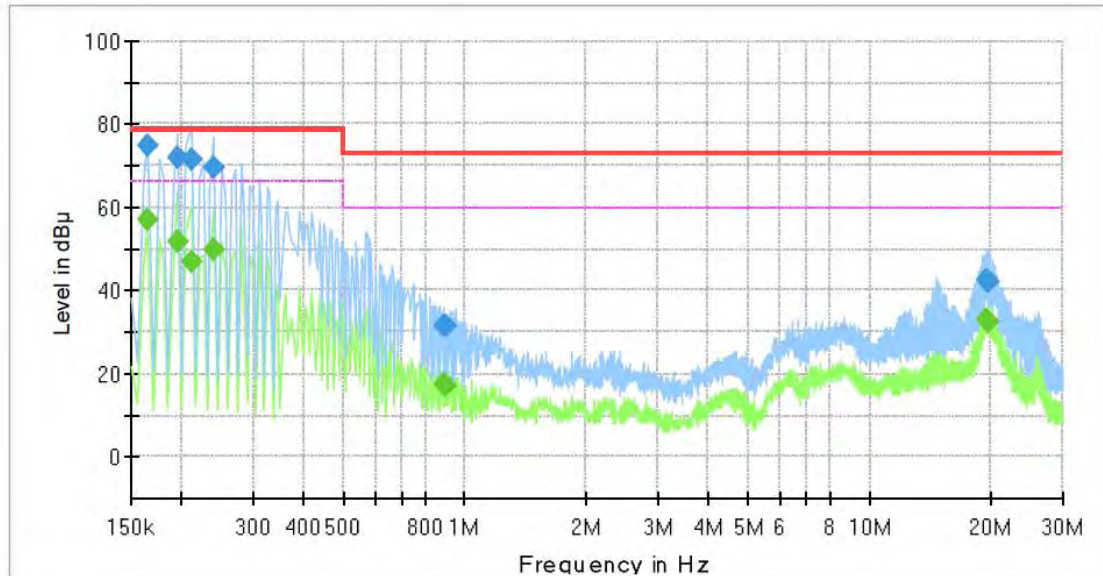
Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.160000	76.09	---	79.00	2.91	1000.0	9.000	L1	19.5
0.160000	---	56.59	66.00	9.41	1000.0	9.000	L1	19.5
0.170000	---	53.55	66.00	12.45	1000.0	9.000	L1	19.5
0.170000	75.62	---	79.00	3.38	1000.0	9.000	L1	19.5
0.190000	76.02	---	79.00	2.98	1000.0	9.000	L1	19.5
0.190000	---	54.70	66.00	11.30	1000.0	9.000	L1	19.5
0.220000	---	47.28	66.00	18.72	1000.0	9.000	L1	19.6
0.220000	72.15	---	79.00	6.85	1000.0	9.000	L1	19.6
0.245000	---	42.63	66.00	23.37	1000.0	9.000	L1	19.6
0.245000	66.17	---	79.00	12.83	1000.0	9.000	L1	19.6
0.890000	31.94	---	73.00	41.06	1000.0	9.000	L1	19.6
0.890000	---	18.95	60.00	41.05	1000.0	9.000	L1	19.6
0.900000	31.12	---	73.00	41.88	1000.0	9.000	L1	19.6
0.900000	---	18.08	60.00	41.92	1000.0	9.000	L1	19.6
19.225000	---	28.81	60.00	31.19	1000.0	9.000	L1	20.2
19.225000	41.07	---	73.00	31.93	1000.0	9.000	L1	20.2

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

NEUTRAL LINE

Common Information

Test Description:	Conducted Emission
Model No.:	XND-9082RF
Phase:	N
Mode:	DC
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.165000	---	56.85	66.00	9.15	1000.0	9.000	N	19.5
0.165000	74.97	---	79.00	4.03	1000.0	9.000	N	19.5
0.195000	72.19	---	79.00	6.81	1000.0	9.000	N	19.5
0.195000	---	51.80	66.00	14.20	1000.0	9.000	N	19.5
0.210000	---	46.78	66.00	19.22	1000.0	9.000	N	19.5
0.210000	71.41	---	79.00	7.59	1000.0	9.000	N	19.5
0.240000	69.71	---	79.00	9.29	1000.0	9.000	N	19.6
0.240000	---	50.06	66.00	15.94	1000.0	9.000	N	19.6
0.890000	31.65	---	73.00	41.35	1000.0	9.000	N	19.6
0.890000	---	17.69	60.00	42.31	1000.0	9.000	N	19.6
0.900000	31.40	---	73.00	41.60	1000.0	9.000	N	19.6
0.900000	---	17.05	60.00	42.95	1000.0	9.000	N	19.6
19.565000	42.73	---	73.00	30.27	1000.0	9.000	N	20.3
19.565000	---	32.75	60.00	27.25	1000.0	9.000	N	20.3
19.780000	---	32.53	60.00	27.47	1000.0	9.000	N	20.3
19.780000	41.96	---	73.00	31.04	1000.0	9.000	N	20.3

◆ 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 + Pulse Limiter FACTOR))

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.

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

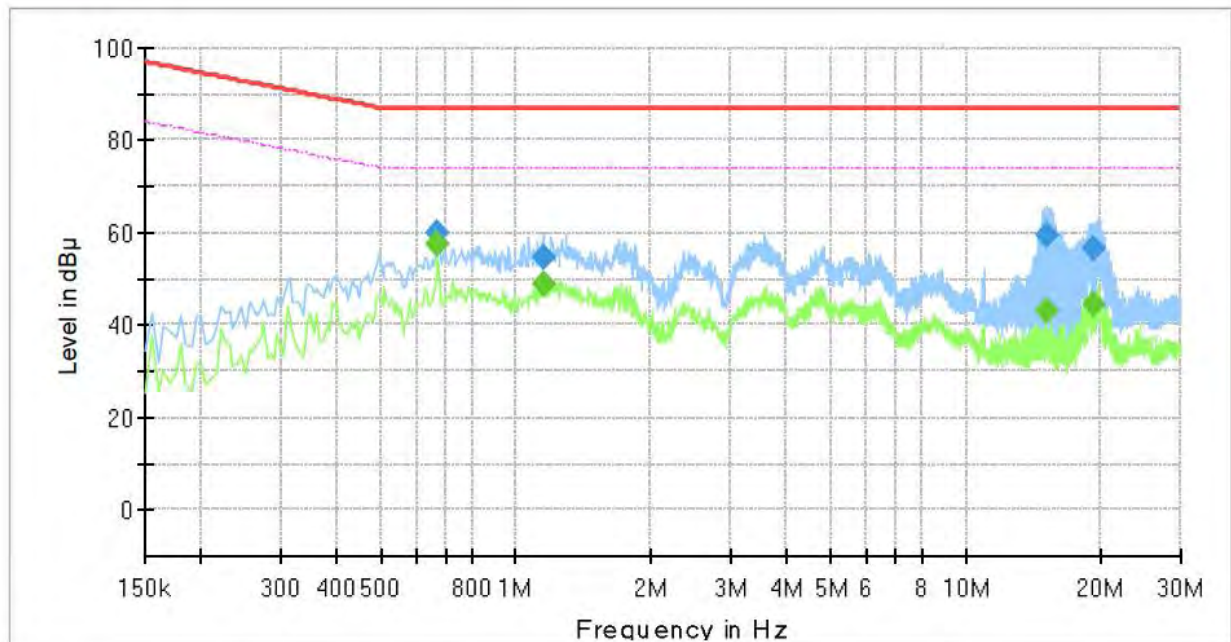
Conducted Emissions at Telecommunication Ports

■ DC Mode

[1 000 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	XND-9082RF
Mode :	DC
Speed :	1 000 Mbps
Operator Name:	KES

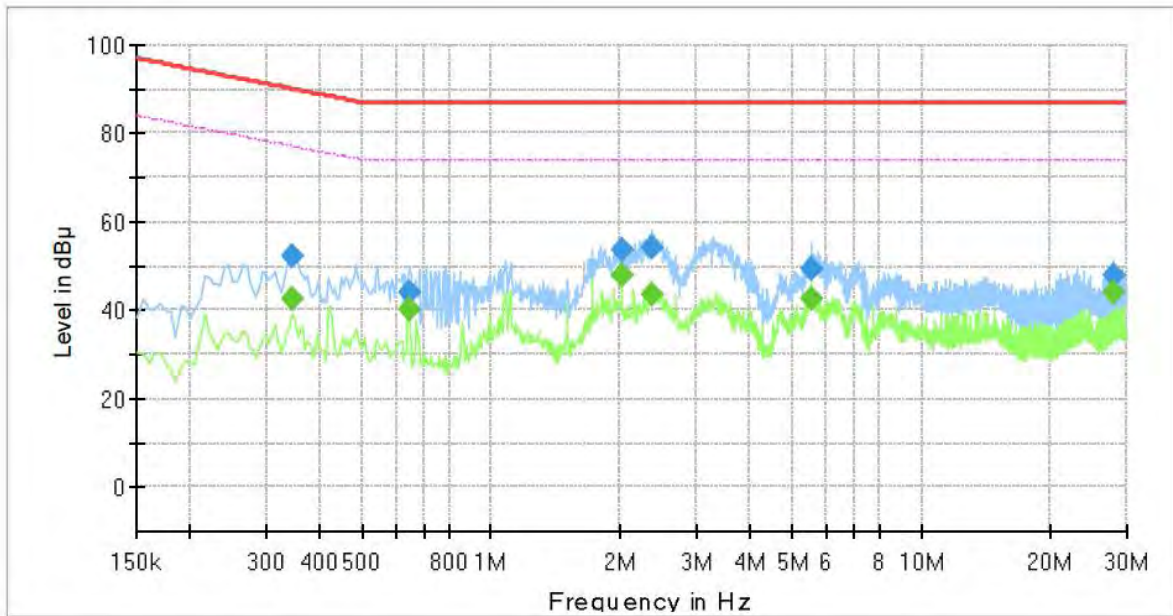


Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.670000	---	57.43	74.00	16.57	1000.0	9.000	Single Line	19.6
0.670000	60.04	---	87.00	26.96	1000.0	9.000	Single Line	19.6
1.150000	---	48.63	74.00	25.37	1000.0	9.000	Single Line	19.5
1.150000	54.75	---	87.00	32.25	1000.0	9.000	Single Line	19.5
15.185000	---	42.90	74.00	31.10	1000.0	9.000	Single Line	19.9
15.185000	59.52	---	87.00	27.48	1000.0	9.000	Single Line	19.9
19.145000	---	44.35	74.00	29.65	1000.0	9.000	Single Line	19.9
19.145000	56.82	---	87.00	30.18	1000.0	9.000	Single Line	19.9

PoE Mode
[1 000 Mbps]
Common Information

Test Description:	Telecommunication Emission
Model No.:	XND-9082RF
Mode :	PoE
Speed :	1 000 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	---	42.49	77.08	34.59	1000.0	9.000	Single Line	19.7
0.345000	52.17	---	90.08	37.91	1000.0	9.000	Single Line	19.7
0.645000	---	40.35	74.00	33.65	1000.0	9.000	Single Line	19.6
0.645000	43.85	---	87.00	43.15	1000.0	9.000	Single Line	19.6
2.010000	---	47.76	74.00	26.24	1000.0	9.000	Single Line	19.5
2.010000	53.47	---	87.00	33.53	1000.0	9.000	Single Line	19.5
2.365000	---	43.49	74.00	30.51	1000.0	9.000	Single Line	19.4
2.365000	54.08	---	87.00	32.92	1000.0	9.000	Single Line	19.4
5.530000	---	42.63	74.00	31.37	1000.0	9.000	Single Line	19.6
5.530000	49.17	---	87.00	37.83	1000.0	9.000	Single Line	19.6
27.875000	---	44.04	74.00	29.96	1000.0	9.000	Single Line	20.0
27.875000	47.86	---	87.00	39.14	1000.0	9.000	Single Line	20.0

♦ 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 (ISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))



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

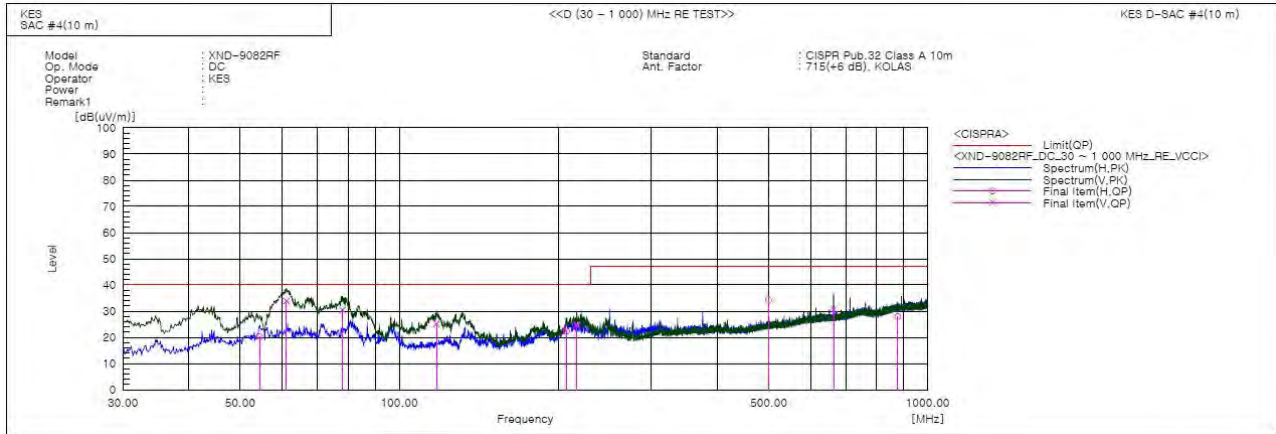
Report No.:

KES-EM-20T0275

Page (23) of (40)

Radiated Electric Field Emissions(Below 1 GHz)

■ DC Mode



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	54.487	H	42.1	-21.7	20.4	40.0	19.6	382.0	159.0	
2	61.184	V	56.6	-22.7	33.9	40.0	6.1	129.0	99.0	
3	78.028	V	57.9	-27.4	30.5	40.0	9.5	142.0	143.0	
4	117.672	V	48.8	-23.6	25.2	40.0	14.8	100.0	255.0	
5	207.378	H	43.5	-21.1	22.4	40.0	17.6	365.0	75.0	
6	216.718	V	45.3	-20.6	24.7	40.0	15.3	100.0	2.0	
7	499.977	H	46.8	-12.5	34.3	47.0	12.7	361.0	15.0	
8	663.547	V	39.6	-8.9	30.7	47.0	16.3	122.0	359.0	
9	877.912	H	33.5	-5.6	27.9	47.0	19.1	373.0	154.0	

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

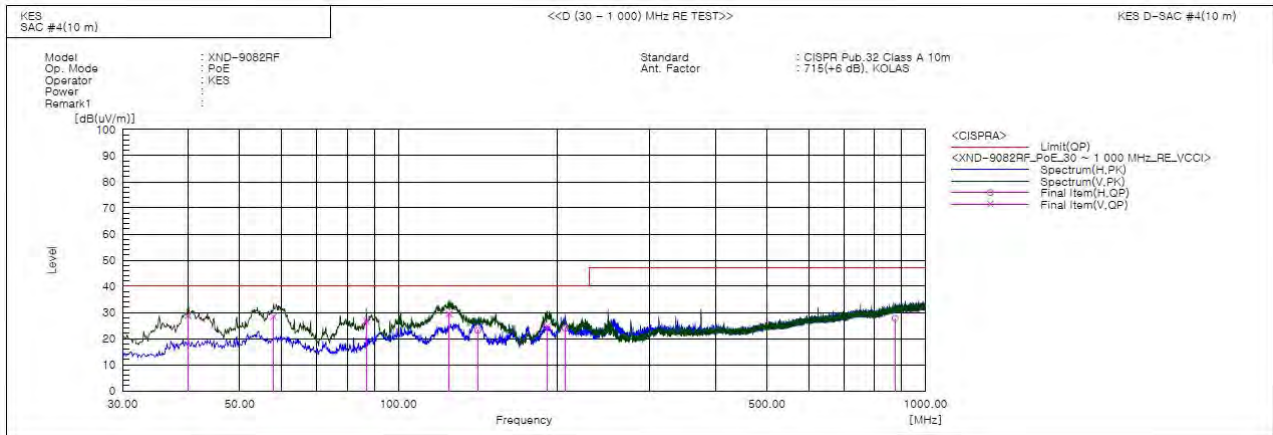


KES Co., Ltd.

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-EM-20T0275
Page (24) of (40)

■ PoE Mode



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	39.938	V	51.8	-23.0	28.8	40.0	11.2	129.0	32.0	
2	58.012	V	50.6	-22.2	28.4	40.0	11.6	100.0	47.0	
3	86.978	V	52.4	-25.6	26.8	40.0	13.2	142.0	115.0	
4	124.942	V	54.2	-24.7	29.5	40.0	10.5	135.0	266.0	
5	141.432	H	49.1	-26.0	23.1	40.0	16.9	396.0	24.0	
6	191.652	V	47.3	-22.5	24.8	40.0	15.2	100.0	222.0	
7	207.172	H	45.0	-21.1	23.9	40.0	16.1	366.0	250.0	
8	875.135	H	33.4	-5.7	27.7	47.0	19.3	372.0	134.0	

◆ Calculation

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

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

Correction Factor : ANT FACTOR + Cable loss

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



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

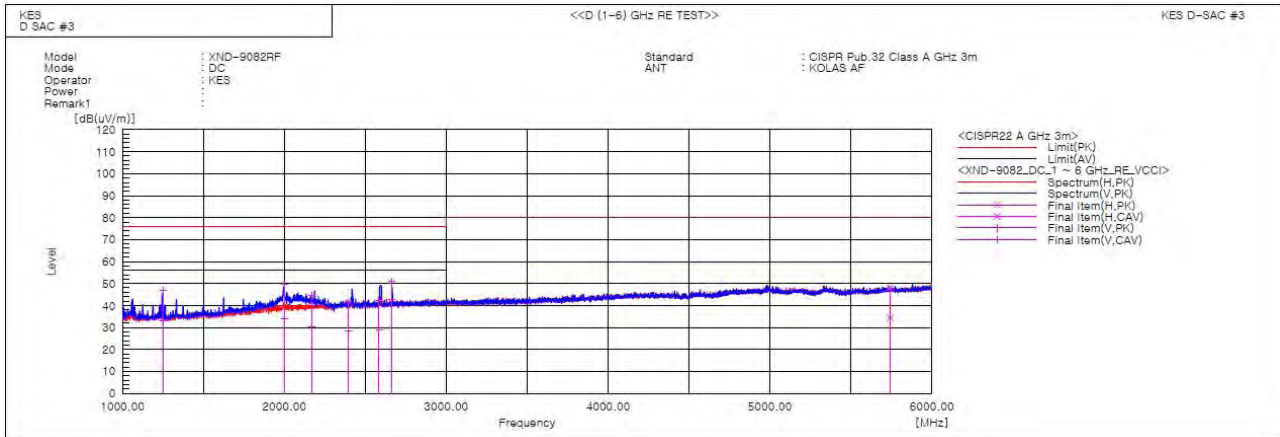
Report No.:

KES-EM-20T0275

Page (25) of (40)

Radiated Electric Field Emissions(Above 1 GHz)

■ DC Mode



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB(1/m)]	Result PK [dB(uV/m)]	Result CAV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin CAV [dB]	Height [cm]	Angle [deg]	Remark
1	1250.120	V	54.9	40.9	-8.0	46.9	32.9	76.0	56.0	29.1	23.1	100.0	198.9	
2	1999.440	V	51.8	35.8	-2.0	49.8	33.8	76.0	56.0	26.2	22.2	100.0	5.9	
3	2167.884	V	46.1	31.8	-1.5	44.6	30.3	76.0	56.0	31.4	25.7	100.0	33.4	
4	2395.454	V	41.9	28.7	-0.3	41.6	28.4	76.0	56.0	34.4	27.6	100.0	311.3	
5	2585.011	V	41.9	28.6	0.4	42.3	29.0	76.0	56.0	33.7	27.0	100.0	73.5	
6	2665.840	V	50.3	42.1	0.6	50.9	42.7	76.0	56.0	25.1	13.3	100.0	204.1	
7	5742.790	H	38.8	25.2	9.3	48.1	34.5	80.0	60.0	31.9	25.5	100.0	304.8	

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



KES Co., Ltd.

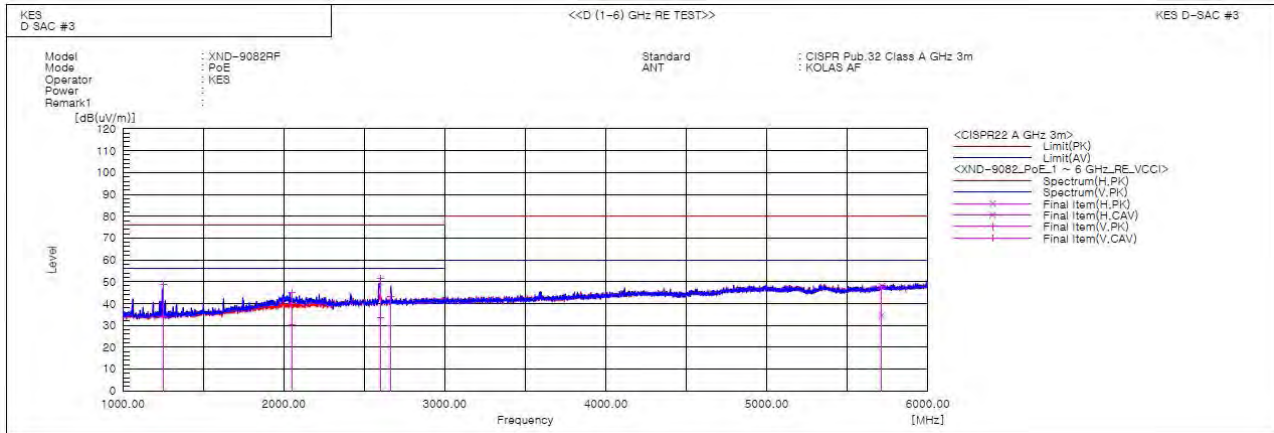
3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Report No.:

KES-EM-20T0275

Page (26) of (40)

PoE Mode



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB(1/m)]	Result PK [dB(uV/m)]	Result CAV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin CAV [dB]	Height [cm]	Angle [deg]	Remark
1	1249.910	V	56.7	42.1	-8.0	48.7	34.1	76.0	56.0	27.3	21.9	100.0	207.9	
2	2053.157	V	46.7	32.1	-1.8	44.9	30.3	76.0	56.0	31.1	25.7	100.0	357.1	
3	2597.940	V	51.2	33.0	0.5	51.7	33.5	76.0	56.0	24.3	22.5	100.0	280.7	
4	2663.121	V	42.7	29.1	0.6	43.3	29.7	76.0	56.0	32.7	26.3	100.0	60.2	
5	5714.212	H	38.9	25.5	9.1	48.0	34.6	80.0	60.0	32.0	25.4	100.0	309.4	

◆ Calculation

Result(PK/CAV) [dB(μ V/m)] = (Reading(PK/CAV)[dB(μ V)] + c.f[dB(1/m)])

Margin(PK/CAV)[dB] = Limit[dB(μ V/m)] - Result(PK/CAV) [dB(μ V/m)]

Reading(PK/CAV) : Reading value, Result(PK/CAV) : Reading value + Factor value

Limit(QP) : Limit value, c.f : (ANT Factor + Cable Loss - Preamp Factor), Margin: Margin value

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

Test Setup Photos and Configuration

Conducted Emissions at Mains Power Ports

■ DC 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.
The authenticity of the test report, contact shchoi@kes.co.kr

Conducted Emissions at Telecommunication Ports

■ DC Mode



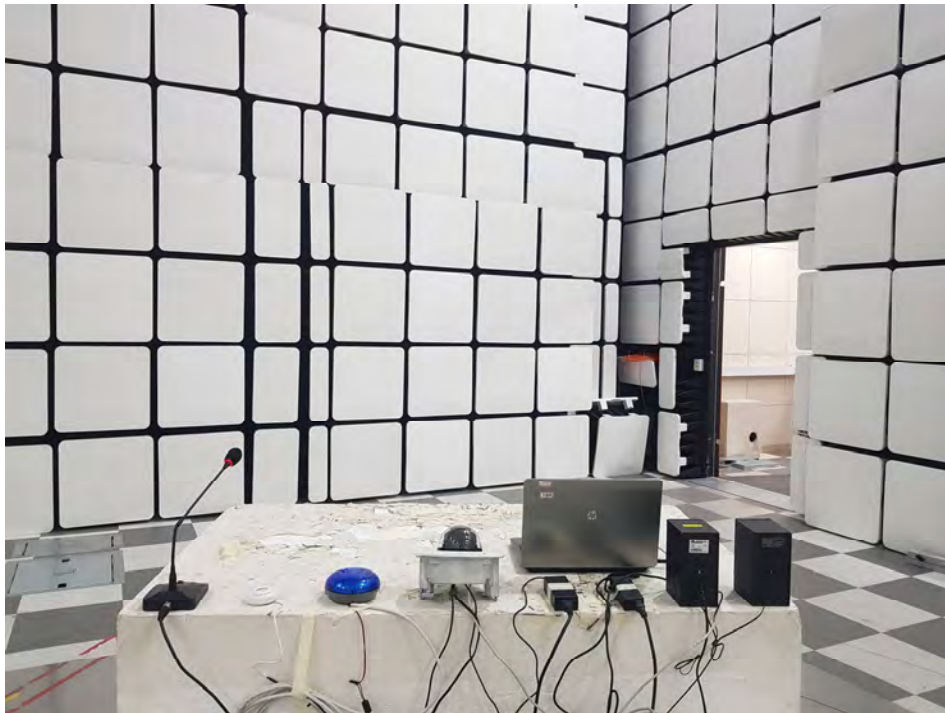
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact shchoi@kes.co.kr

■ PoE Mode

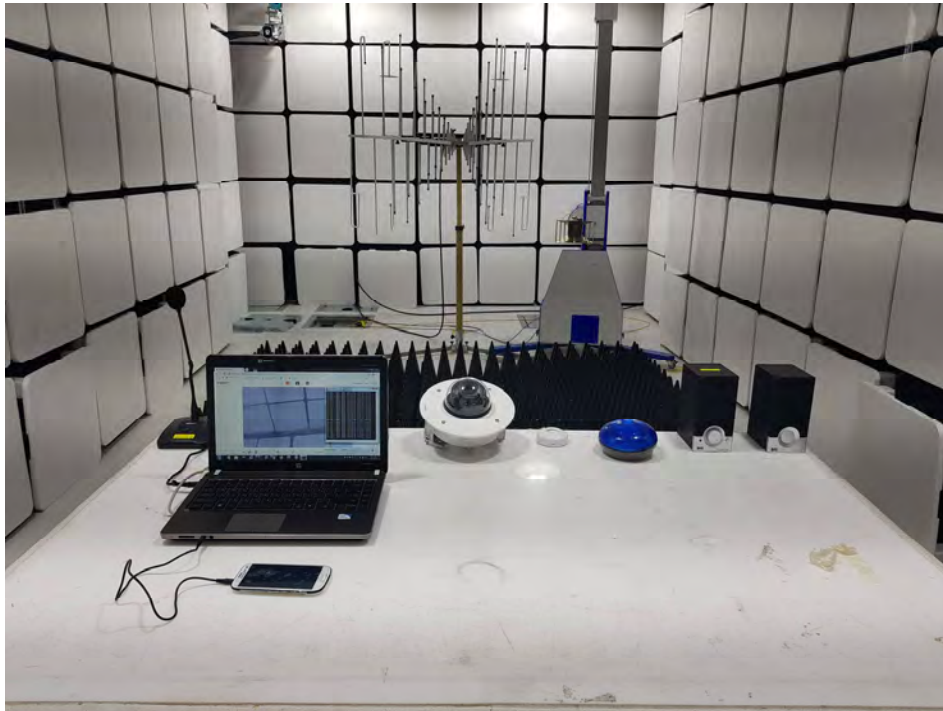
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact shchoi@kes.co.kr

Radiated Electric Field Emissions(Below 1 GHz)

■ DC Mode



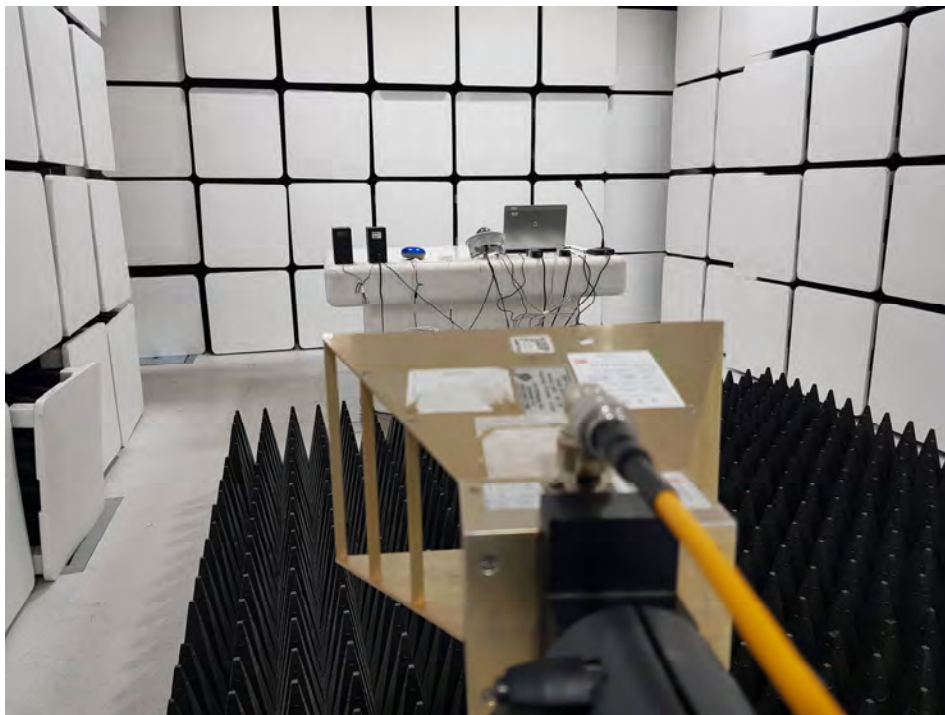
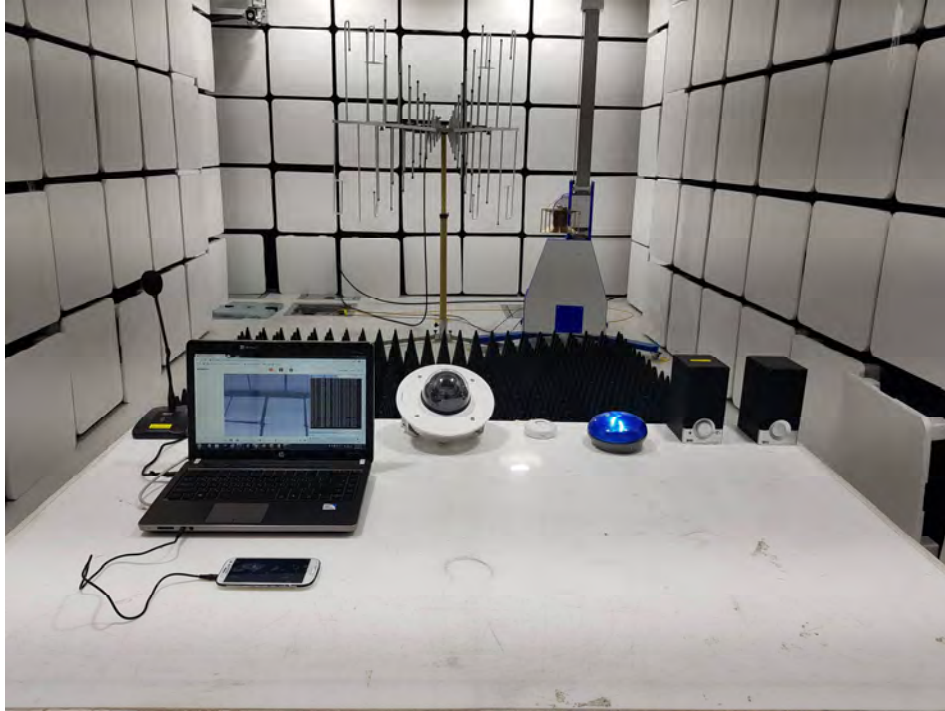
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact shchoi@kes.co.kr

■ PoE Mode

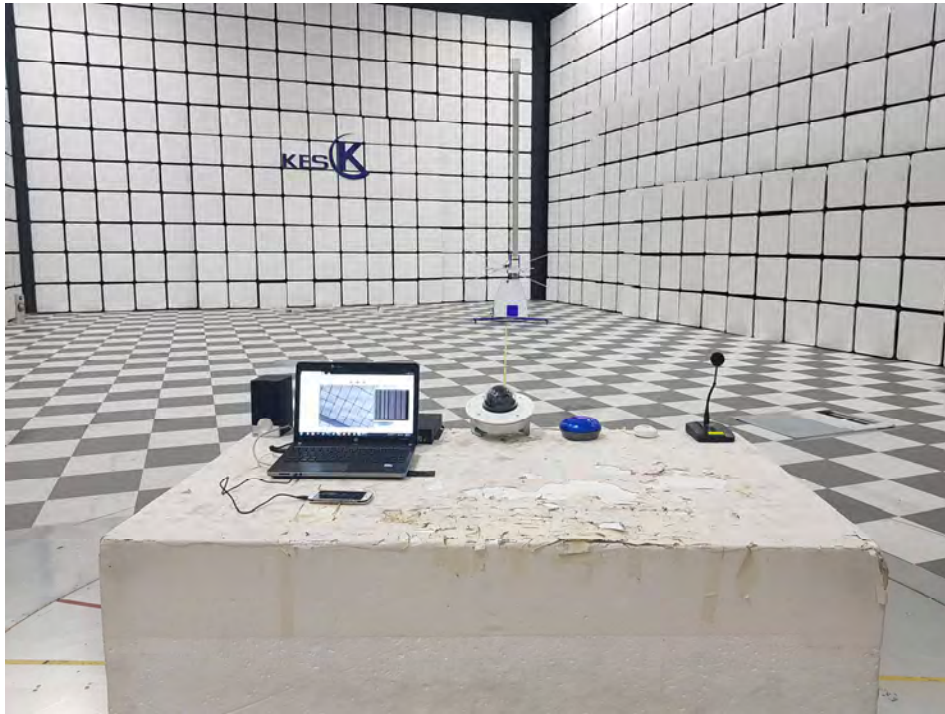
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact shchoi@kes.co.kr

Radiated Electric Field Emissions(Above 1 GHz)

■ DC 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.
The authenticity of the test report, contact shchoi@kes.co.kr

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

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

EUT Internal Photographs

(Internal View)



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

EUT Internal View – Board 1

(Top)



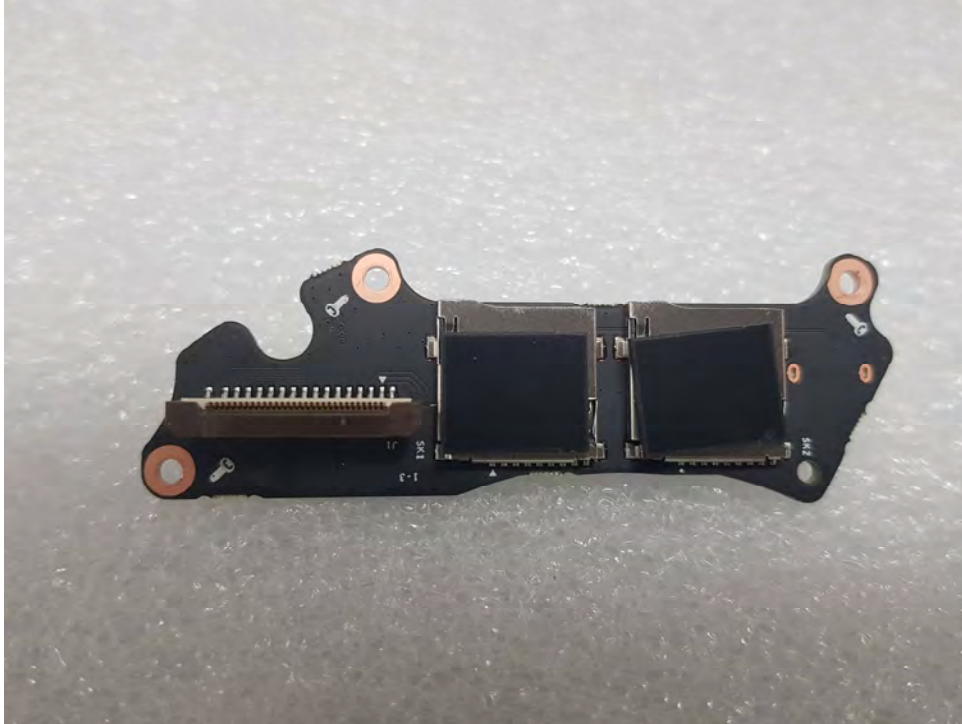
(Bottom)



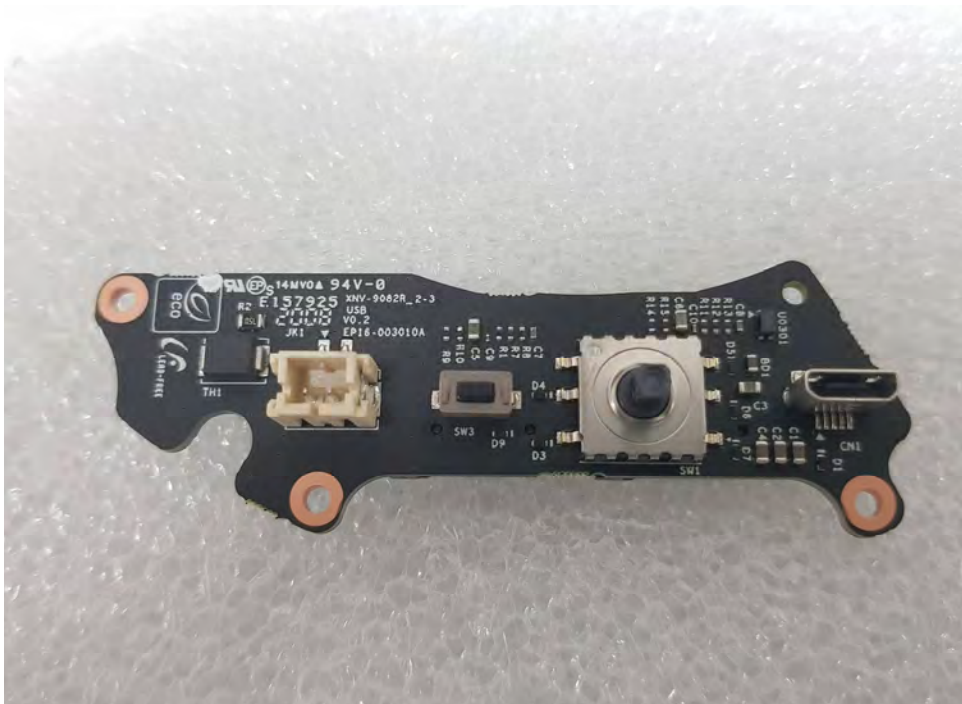
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
 The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
 The authenticity of the test report, contact shchoi@kes.co.kr

EUT Internal View – Board 2

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

EUT Internal View – Board 3

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

EUT Internal View – LENS

(Top)



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

Label Photographs



この装置は、クラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

VCCI-A