



EMC TEST REPORT For VCCI

Test Report No. : KES-EM-22T0653-R1
Date of Issue : Feb. 24, 2023
Product name : NETWORK CAMERA
Model/Type No. : XNO-6083R
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 : Jul. 08, 2022
Test date : Jul. 09, 2022 ~ Jul. 12, 2022
Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Dong-Hyun, Won
EMC Test Engineer

Reviewed by

Dong-Hun, Jang
EMC Technical Manager

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

**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-22T0653-R1

Page (2) of (42)

REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Jul. 28, 2022	KES-EM-22T0653	Issued
Feb. 24, 2023	KES-EM-22T0653-R1	Change the Applicant and manufacturer at the request of the customer

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 kes@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-22T0653-R1

Page (3) of (42)

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	13
2.0	Test Regulations.....	14
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

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 kes@kes.co.kr



1.0 General Product Description

Main Specifications of EUT are:

	XNO-6083R
Video	
Imaging Device	1/2.8" progressive CMOS
Resolution	1920x1080, 1280x1024, 1280x960, 1280x720, 1024x768, 800x600, 800x448, 720x576, 720x480, 640x480, 640x360, 320x240
Max. Framerate	H.265/H.264: Max. 120fps/100fps(60Hz/50Hz)(WDR off) Max. 60fps/50fps(60Hz/50Hz)(WDR on) MJPEG: Max. 30fps/25fps(60Hz/50Hz)
NETD	None
Pixel Size	None
Min. Illumination	(TBD) Color: 0.011Lux(F1.4, 1/30sec, 30IRE) B/W : 0.0011Lux(F1.4, 1/30sec, 30IRE), 0Lux(IR LED on), 30/25fps Color: 0.022Lux(F1.4, 1/60sec, 30IRE) B/W : 0.0022Lux(F1.4, 1/60sec, 30IRE), 0Lux(IR LED on), 60/50fps Color: 0.022Lux(F1.4, 1/60sec, 30IRE) B/W : 0.0022Lux(F1.4, 1/60sec, 30IRE), 0Lux(IR LED on), 120/100fps
Video Out	CVBS: 1.0 Vp-p / 75Ω composite, 720x480(N), 720x576(P) for installation USB: Micro USB Type B, 1280x720 for installation
Video Transmission Distance	None
Lens	
Focal Length (Zoom Ratio)	2.8~12mm(4.3x) motorized varifocal
Max. Aperture Ratio	F1.4
Angular Field of View	H : 119.5°(Wide) ~ 27.9°(Tele) V : 62.8°(Wide) ~ 15.7°(Tele) D : 142.1°(Wide) ~ 32.0°(Tele)
Min. Object Distance	0.5m(1.64ft)
Focus Control	Simple focus, Manual
Lens Type	DC auto iris with hall sensor (IR corrected)
Mount Type	None
Optional Lens	None
Pan / Tilt / Rotate	
Pan / Tilt / Rotate Range	None
Pan Range	None
Pan Speed	None
Tilt Range	None
Tilt Speed	None
Rotate Range	None
Sequence	None
Preset Accuracy	None
Operational	
Camera Title	Displayed up to 85 characters
Direction Indicator	None
Day & Night	Auto(ICR)
Backlight Compensation	BLC, HLC, WDR, SDR
Wide Dynamic Range	extremeWDR (150dB)
Digital Noise Reduction	WiseNRⅡ(Based on AI engine), SSNR V
Digital Image Stabilization	Support(built-in gyro sensor)
Defog	Support
Motion Detection	8ea, 8point Polygonal zones
Privacy Masking	32ea, Quadrangle zones - Color : Gray, Green, Red, Blue, Black, White - Mosaic
Gain Control	Support
White Balance	ATW / Narrow ATW / AWC / Manual / Indoor / Outdoor
LDC	Support (Fill/stretch mode)
Electronic Shutter Speed	Minimum / Maximum / Anti flicker (2~1/12,000sec) Auto prefer shutter control(Based on AI engine)
Digital PTZ	Support
Video Rotation	Flip, Mirror, Hallway view(90°/270°)
Analytics	- Analytics events based on AI engine(NPU) : Object detection (Person/Face/Vehicle(car/truck/bus/bicycle/motorcycle)/Licence plate), IVA (Virtual line/Area, Enter/Exit, Loitering, direction, intrusion) - Analytics events : Defocus detection, Motion detection, Tampering, Fog detection, Audio detection, Sound classification, Shock detection, Appear/Disappear

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 kes@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-22T0653-R1

Page (5) of (42)

Business Intelligence	Based on AI engine(NPU) : People counting, Queue management, Heatmap
Serial Interface	None
Alarm I/O	2 configurable I/O ports, DC 12V output(Max. 50mA)
Alarm Triggers	Analytics, Network disconnect, Alarm input, App event, Time schedule
Alarm Events	When alarm trigger occurred - File upload(image) : e-mail/FTP - Notification : e-mail - Recording : SD/SDHC/SDXC or NAS recording at event triggers - Alarm output - Handover(PTZ preset, Send message by HTTP/HTTPS/TCP) - Audio clip playback - PTZ preset
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 Viewable Length	WiseIR 50m(164.04ft)(TBD)
IR Illuminator (Optional)	None
Water Removal	None
Auto Tracking	None
Coaxial Protocol	None
Color Palettes	None
Radiometry	
Temperature Detect Range	None
Temperature Accuracy	None
Temperature Detection	None
Additional	None
Network	
Ethernet	Metal shielded RJ-45(10/100/1000BASE-T)
Video Compression	H.265/H.264: Main/High, MJPEG
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
Smart Codec	Manual(Sea area), WiseStreamII, WiseStreamIII(Based on AI engine)
Video Quality Adjustment	H.264/H.265: Target bitrate level control MJPEG: Target bitrate level control
Bitrate Control	H.264/H.265: CBR or VBR MJPEG: VBR
Streaming	Unicast(20 users) / Multicast Multiple streaming(Up to 10 profiles, 3 virtual channel support)
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	TPM 2.0 (FIPS 140-2 level 2) HTTPS(SSL) Login Authentication Digest Login Authentication IP Address Filtering User access log 802.1X Authentication(EAP-TLS, EAP-LEAP, EAP-PEAP MSCHAPv2) Device Certificate(Hanwha Techwin Root CA, pre-installed) Secure by default certificate(TBD) Secure OS/Boot/Storage, Verify firmware forgery
Application Programming Interface	ONVIF Profile S/G/T SUNAPI(HTTP API) Wisenet open platform
General	
Webpage Language	English, Korean, Chinese, French, Italian, Spanish, German, Japanese, Russian, Swedish,, Portuguese, Czech, Polish, Turkish, Dutch, Greek, Hungarian
Web Viewer	None
Edge Storage	Micro SD/SDHC/SDXC 2slot Max. 1TB (512GB * 2)
Memory	2GB RAM, 512MB Flash
Environmental & Electrical	
Operating Temperature / Humidity	-50°C ~ +60°C(-58°F ~ +140°F) NEMA TS-2 : 74°C * Start up should be done at above -30°C less than 95%RH(non-condensing) Humidity control /w GORE vent
Storage Temperature / Humidity	-50°C ~ +60°C(-58°F ~ +140°F) / Less than 90% RH
Certification	IP66/IP67, NEMA4X, IK10
Input Voltage	PoE+(IEEE802.3at, Class4), 12VDC
Power Consumption	TBD Power redundancy failover

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 kes@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-22T0653-R1

Page (6) of (42)

Mechanical	
Color / Material	White / Aluminum Hard-coated window
RAL Code	RAL7022
Product Dimensions / Weight	Ø91x368.6mm(Ø3.85"x14.51"), 2.2kg(4.85 lb) (TBD)
Compatible Conduit hole / Gangbox	3/4" (M25) single, double, 4" octagon, 4" square
Hanging Mount (Dome)	None
Skin Cover (Dome)	None
Weather Cap (Dome)	None
Power Module	None
Backbox	None
DORI (EN62676-4 standard)	
Detect (25PPM/ 8PPF)	Wide: 22.4m(73.47ft) / Tele: 154.6m(507.18ft)
Observe (63PPM/ 19PPF)	Wide: 9.0m(29.39ft) / Tele: 61.8m(202.87ft)
Recognize (125PPM/ 38PPF)	Wide: 4.5m(14.69ft) / Tele: 30.9m(101.44ft)
Identify (250PPM/ 76PPF)	Wide: 2.2m(7.35ft) / Tele: 15.5m(50.72ft)

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 kes@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.

☒ AC 100 V , 60 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	XNO-6083R	-	HANWHA VISION VIETNAM COMPANY LIMITED	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-22T0653-R1

Page (8) of (42)

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
AC/DC Adapter	2ACB022F	-	ChAnnel Well Technology (Guangzhou) Co.,Ltd.	-
PoE Adapter	PT-PSE109GBRO-AH	-	Dongguan PROCET Network Technology Co.,Ltd	-
Notebook	LG15N54	503NZWY038929	LG Electronics Inc.	-
Notebook Adapter	PA-1900-14	OF2R2633487017764	LITE-ON TECHNOLOGY COPORATION	-
Alarm	PRO-SL		SENSOR PRO	-
Button Alarm	-	-	-	-
Speaker	BR1000A Cuve Black 2	-	DONGGUAN EDIFIER TECHNOLOGY Co., Ltd	-
Mic	MP1000	-	-	-
SmartPhone	iPhone 6s	-	Apple Inc.	-
Micro SD Card	-	-	SanDisk	-

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 kes@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)	2 Pin	AC/DC Adapter	2 Pin	1.6	U
	RJ-45	Notebook	RJ-45	3.0	S
	Alarm OUT	Alarm	Alarm IN	4.0	U
	Alarm IN	Button Alarm	Alarm OUT	3.5	U
	3.5 mm	Speaker	3.5 mm	1.7	U
	3.5 mm	Mic	3.5 mm	1.8	U
	Micro SD Card Slot	Micro SD Card	Micro SD Card Slot	-	-
Notebook	3.5 mm	SmartPhone	3.5 mm	1.1	U
	DC Jack	Notebook Adapter	DC Jack	1.9	S

* 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	3.0	S
	Alarm OUT	Alarm	Alarm IN	4.0	U
	Alarm IN	Button Alarm	Alarm OUT	3.5	U
	3.5 mm	Speaker	3.5 mm	1.7	U
	3.5 mm	Mic	3.5 mm	1.8	U
	Micro SD Card Slot	Micro SD Card	Micro SD Card Slot	-	-
PoE Adapter	RJ-45	Notebook	RJ-45	2.0	S
Notebook	3.5 mm	SmartPhone	3.5 mm	1.1	U
	DC Jack	Notebook Adapter	DC Jack	1.9	S

* 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-22T0653-R1

Page (10) of (42)

1.7 EUT Operating Mode(s)

■ DC, PoE MODE

Test Mode	operating
- DC Mode	Check the Normal Operation status. after testing, check if the recording is normally done on the Micro SD Card
- PoE Mode	

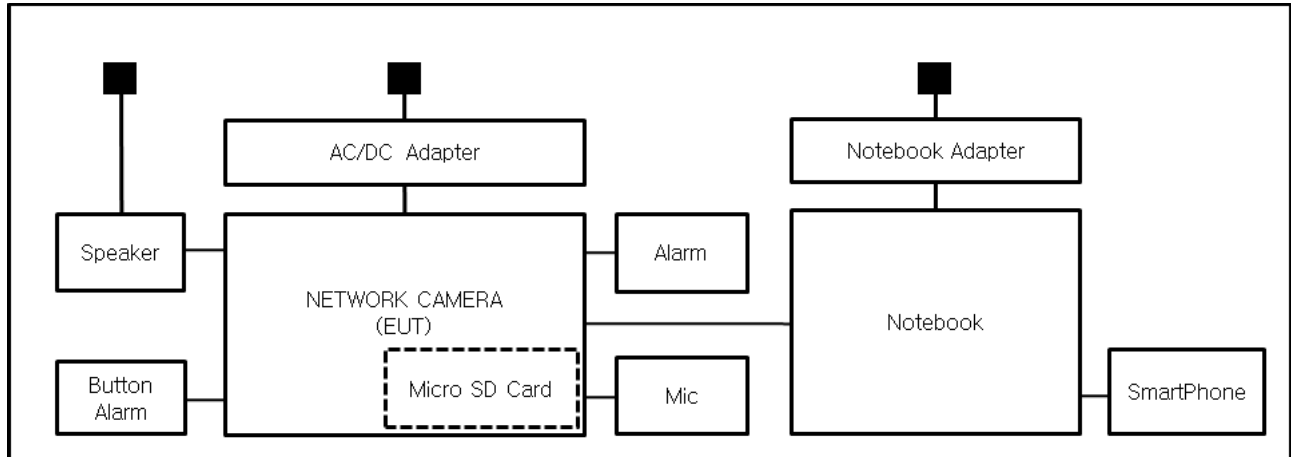
EUT Test operating S/W		
Name	Version	Manufacture Company
Web Viewer	-	Hanwha Vision Co., Ltd

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 kes@kes.co.kr

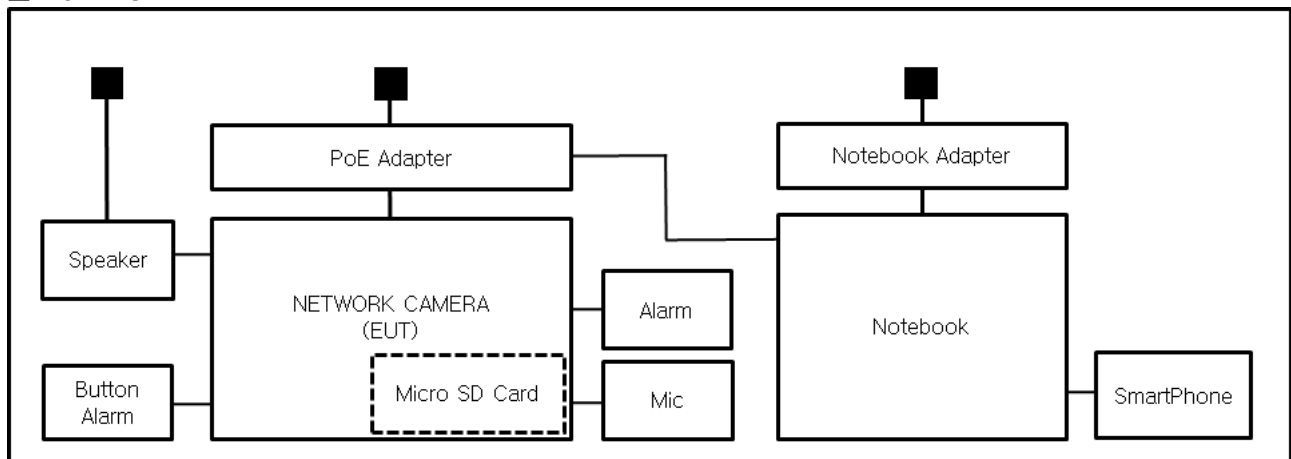
1.8 Configuration

■ AC Main
 □ DC Main

■ DC MODE



■ PoE MODE



1.9 Remarks when standards applied

The USB, VIDEO ports were excluded from the test as administrator ports.



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, Republic of. The sites are constructed in conformance with the requirements of ANSI C63.4a-2017 and CISPR 16-1-4:2019

1.12 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



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-22T0653-R1

Page (14) of (42)

2.0 Test Regulations

The emissions tests were performed according to following regulations:

☒ **VCCI-CISPR 32:2016**

☒ Class A

☐ Class B

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 kes@kes.co.kr



2.1 Conducted Emissions Mains Power Ports

Test Date

Jul. 09, 2022

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	ESR3	R & S	101783	12, 28, 2022
☒	LISN	ENV216	R & S	101787	12, 27, 2022
☒	LISN	ESH2-Z5	R & S	100450	12, 27, 2022
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	12, 27, 2022

Test Conditions

Temperature: (24,4 ± 0,1) °C

Relative Humidity: (44,7 ± 0,1) % 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

Jul. 09, 2022

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	ESR3	R & S	101783	12, 28, 2022
☒	LISN	ENV216	R & S	101787	12, 27, 2022
☒	LISN	ESH2-Z5	R & S	100450	12, 27, 2022
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	12, 27, 2022
☐	8-WIRE ISN CAT3,5	ENY81	R & S	100174	12, 28, 2022
☐	8-WIRE ISN CAT6	ENY81-CAT6	R & S	101665	12, 28, 2022
☒	ISN	ISN S8	SCHWARZBECK	ISN-S8-0019	03, 07, 2023

Test Conditions

Temperature: (24,4 ± 0,1) °C

Relative Humidity: (44,7 ± 0,1) % 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

RemarksSee 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 kes@kes.co.kr



2.3 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Jul. 09, 2022

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	03, 31, 2023
☒	AMPLIFIER	SCU 01	R & S	100603	11, 24, 2022
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	12, 08, 2022
☒	ATTENUATOR	8491A	HP	32173	03, 08, 2023

Test Conditions

Temperature: (24,3 ± 0,1) °C
Relative Humidity: (44,2 ± 0,1) % 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.

**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-22T0653-R1

Page (18) of (42)

2.4 Radiated Electric Field Emissions(Above 1 GHz)

Test Date

Jul. 11, 2022

Test Location

SEMI ANECHOIC CHAMBER #5

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	ES10/RE	TOYO Corporation	2022.01.000	-
☒	EMI TEST RECEIVER	ESU26	Rohde & Schwarz	100552	03, 31, 2023
☒	HORN ANTENNA	BBHA 9120D	SCHWARZBECK	9120D-1802	12, 16, 2022
☒	PREAMPLIFIER	8449B	HP	3008A00538	06, 02, 2023

Test Conditions

Temperature: (24,6 ± 0,2) °C

Relative Humidity: (45,5 ± 0,1) % 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

RemarksSee 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 kes@kes.co.kr

APPENDIX A – TEST DATA

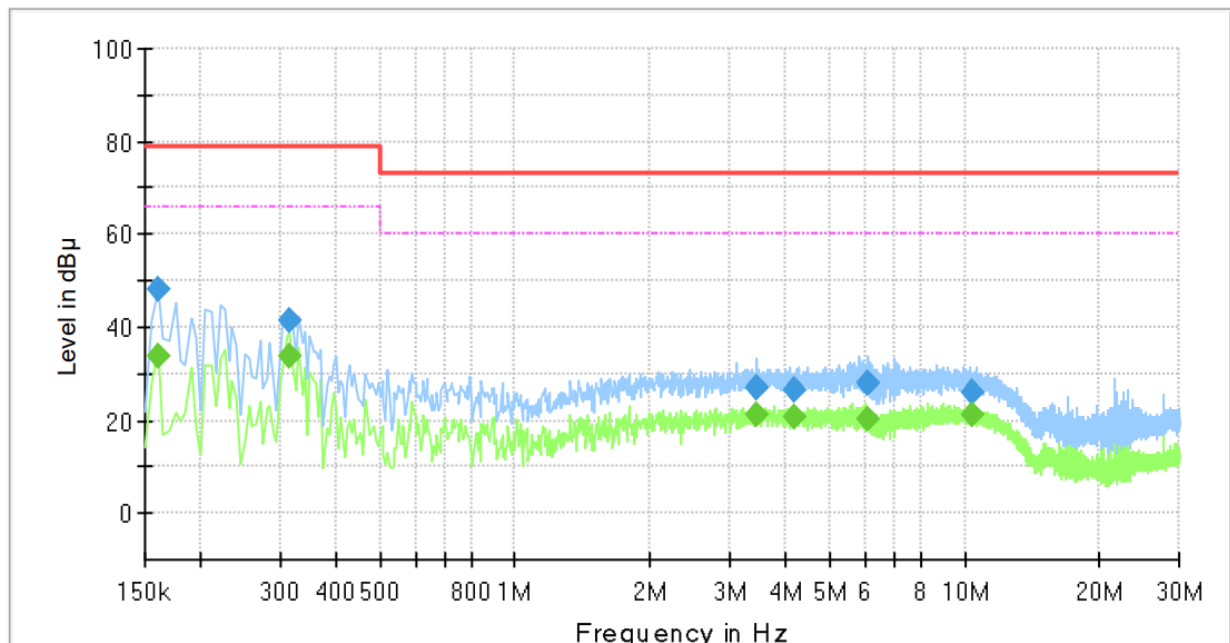
Conducted Emissions at Mains Power Ports

■ DC MODE

HOT LINE

Common Information

Test Description:	Conducted Emission
Model No.:	XNO-6083R
Phase:	
Mode:	DC_H
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	---	33.70	66.00	32.30	1000.0	9.000	L1	19.4
0.160000	48.12	---	79.00	30.88	1000.0	9.000	L1	19.4
0.315000	---	33.79	66.00	32.21	1000.0	9.000	L1	19.5
0.315000	41.32	---	79.00	37.68	1000.0	9.000	L1	19.5
3.455000	---	21.06	60.00	38.94	1000.0	9.000	L1	20.0
3.455000	26.80	---	73.00	46.20	1000.0	9.000	L1	20.0
4.185000	---	20.94	60.00	39.06	1000.0	9.000	L1	19.8
4.185000	26.47	---	73.00	46.53	1000.0	9.000	L1	19.8
6.105000	---	20.40	60.00	39.60	1000.0	9.000	L1	19.5
6.105000	27.93	---	73.00	45.07	1000.0	9.000	L1	19.5
10.430000	---	21.03	60.00	38.97	1000.0	9.000	L1	19.9
10.430000	26.01	---	73.00	46.99	1000.0	9.000	L1	19.9

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 kes@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.:

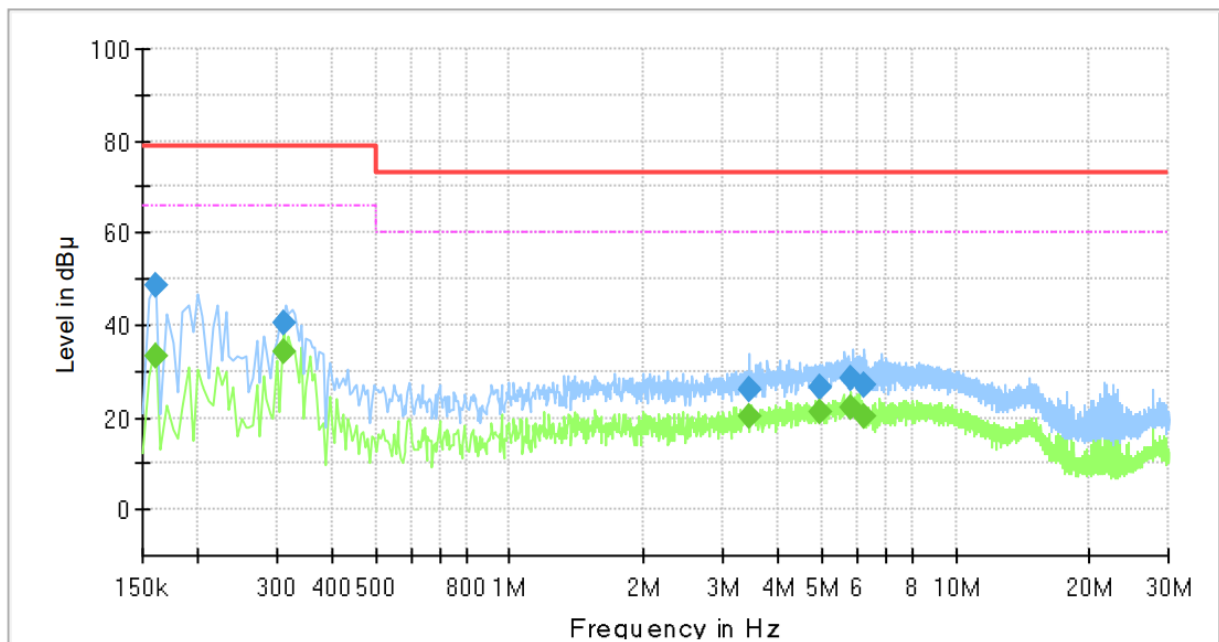
KES-EM-22T0653-R1

Page (20) of (42)

NEUTRAL LINE

Common Information

Test Description: Conducted Emission
Model No.: XNO-6083R
Phase:
Mode: DC_N
Operator Name: KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.160000	---	33.34	66.00	32.66	1000.0	9.000	N	19.4
0.160000	48.40	---	79.00	30.60	1000.0	9.000	N	19.4
0.310000	---	34.33	66.00	31.67	1000.0	9.000	N	19.5
0.310000	40.61	---	79.00	38.39	1000.0	9.000	N	19.5
3.455000	---	20.06	60.00	39.94	1000.0	9.000	N	20.0
3.455000	26.17	---	73.00	46.83	1000.0	9.000	N	20.0
4.935000	---	21.33	60.00	38.67	1000.0	9.000	N	19.6
4.935000	26.74	---	73.00	46.26	1000.0	9.000	N	19.6
5.820000	---	22.35	60.00	37.65	1000.0	9.000	N	19.5
5.820000	28.54	---	73.00	44.46	1000.0	9.000	N	19.5
6.245000	---	20.45	60.00	39.55	1000.0	9.000	N	19.5
6.245000	27.21	---	73.00	45.79	1000.0	9.000	N	19.5

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

Corr. : Correction values (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 kes@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-22T0653-R1

Page (21) of (42)

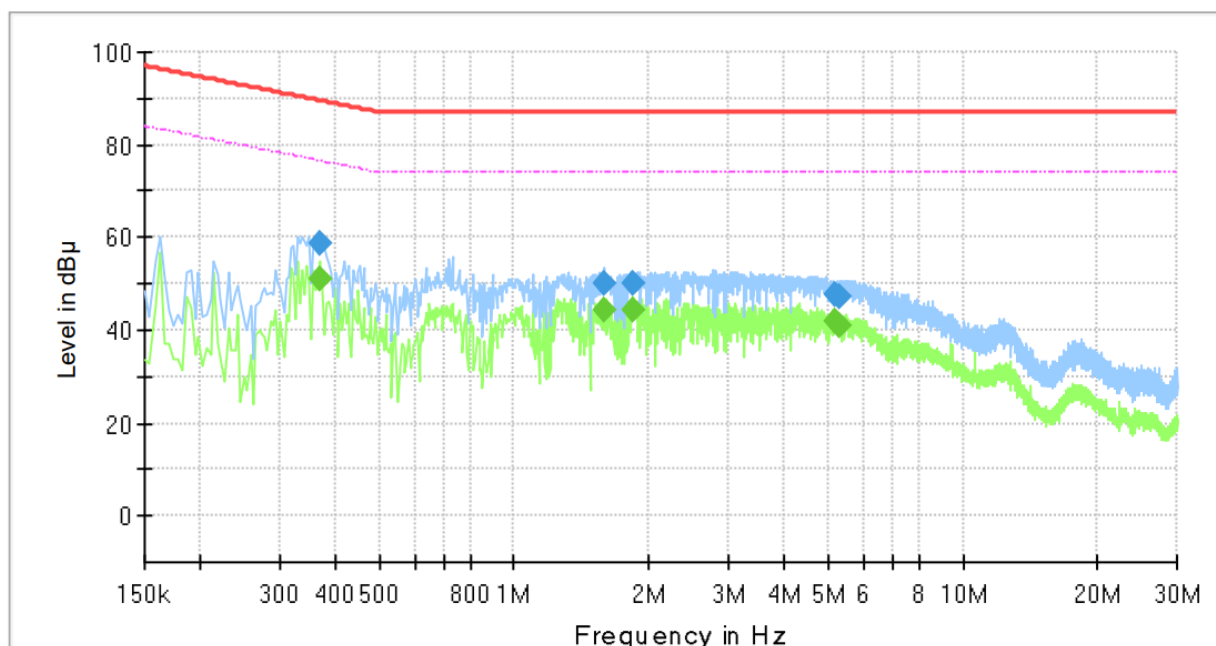
Conducted Emissions at Telecommunication Ports

■ DC MODE

[1 000 Mbps]

Common Information

Test Description: Telecommunication Emission
Model No.: XNO-6083R
Mode : DC_ 1 000 Mbps
Speed :
Operator Name: KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.370000	---	50.77	76.50	25.73	1000.0	9.000	Single Line	19.4
0.370000	58.57	---	89.50	30.93	1000.0	9.000	Single Line	19.4
1.586000	---	44.46	74.00	29.54	1000.0	9.000	Single Line	20.1
1.586000	49.94	---	87.00	37.06	1000.0	9.000	Single Line	20.1
1.850000	---	44.25	74.00	29.75	1000.0	9.000	Single Line	20.2
1.850000	49.91	---	87.00	37.09	1000.0	9.000	Single Line	20.2
5.198000	---	41.79	74.00	32.21	1000.0	9.000	Single Line	19.4
5.198000	47.47	---	87.00	39.53	1000.0	9.000	Single Line	19.4
5.310000	---	40.81	74.00	33.19	1000.0	9.000	Single Line	19.4
5.310000	47.04	---	87.00	39.96	1000.0	9.000	Single Line	19.4

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.

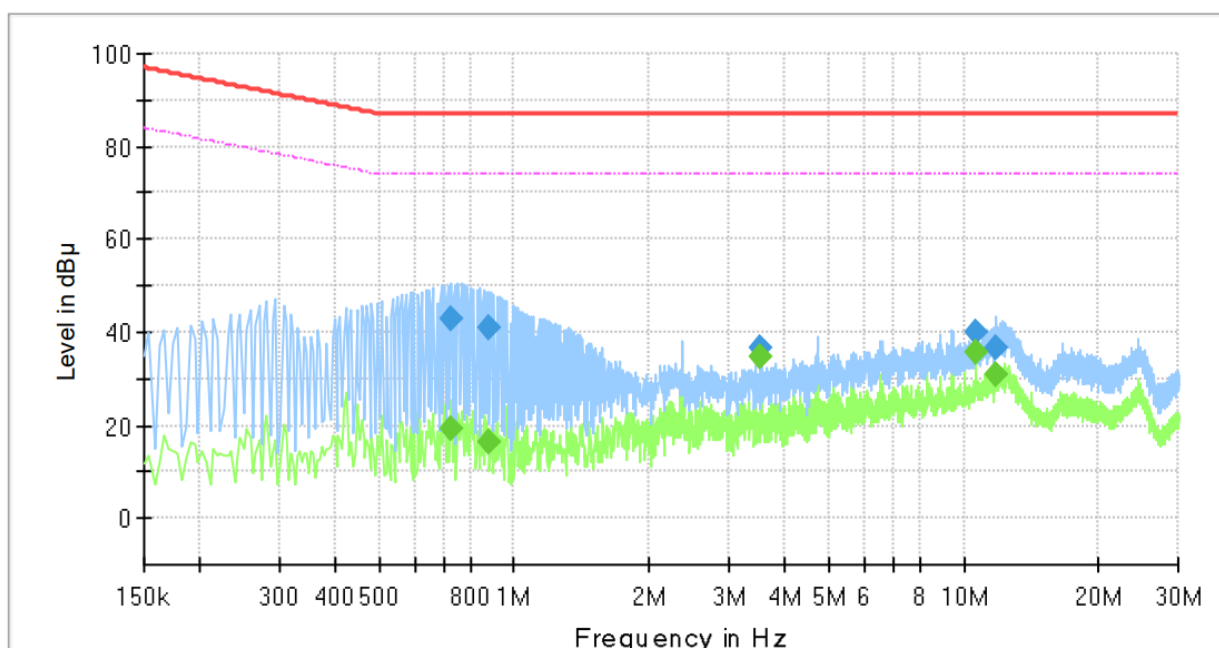
The authenticity of the test report, contact kes@kes.co.kr

■ PoE MODE

[1 000 Mbps]

Common Information

Test Description: Telecommunication Emission
 Model No.: XNO-6083R
 Mode : PoE_1 000 Mbps
 Speed :
 Operator Name: KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.726000	---	19.25	74.00	54.75	1000.0	9.000	Single Line	19.8
0.726000	42.77	---	87.00	44.23	1000.0	9.000	Single Line	19.8
0.878000	---	16.36	74.00	57.64	1000.0	9.000	Single Line	20.0
0.878000	40.93	---	87.00	46.07	1000.0	9.000	Single Line	20.0
3.538000	---	34.71	74.00	39.29	1000.0	9.000	Single Line	19.9
3.538000	36.37	---	87.00	50.63	1000.0	9.000	Single Line	19.9
10.614000	---	35.60	74.00	38.40	1000.0	9.000	Single Line	19.8
10.614000	39.81	---	87.00	47.19	1000.0	9.000	Single Line	19.8
11.790000	---	30.96	74.00	43.04	1000.0	9.000	Single Line	19.9
11.790000	36.78	---	87.00	50.22	1000.0	9.000	Single Line	19.9

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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



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

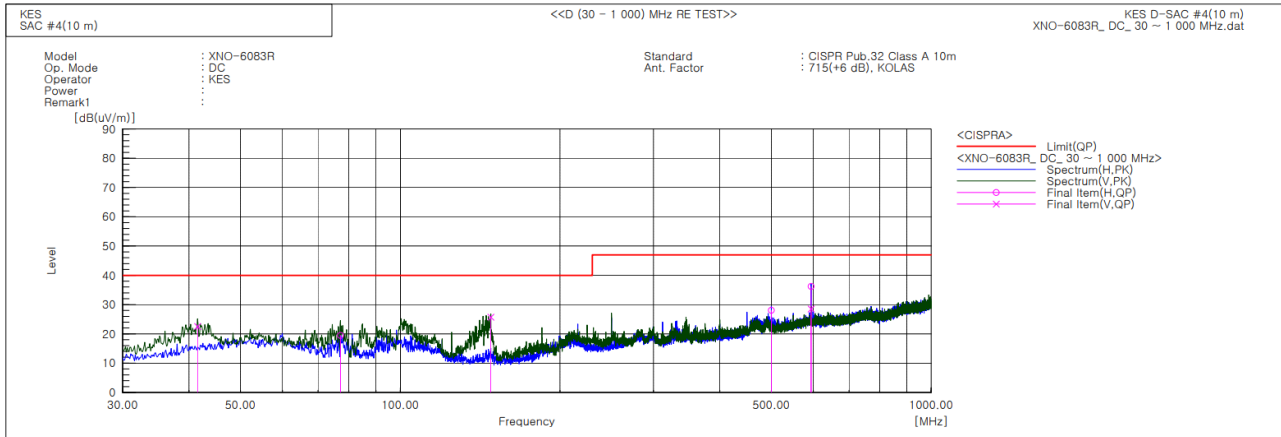
Report No.:

KES-EM-22T0653-R1

Page (23) of (42)

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	41.519	V	44.5	-22.0	22.5	40.0	17.5	116.0	301.7	
2	77.166	H	46.9	-27.4	19.5	40.0	20.5	354.0	350.7	
3	148.098	V	51.0	-25.3	25.7	40.0	14.3	109.0	324.3	
4	500.086	H	39.6	-11.5	28.1	47.0	18.9	282.0	106.5	
5	594.055	H	44.8	-8.6	36.2	47.0	10.8	400.0	145.6	
6	594.126	V	37.1	-8.6	28.5	47.0	18.5	100.0	357.5	

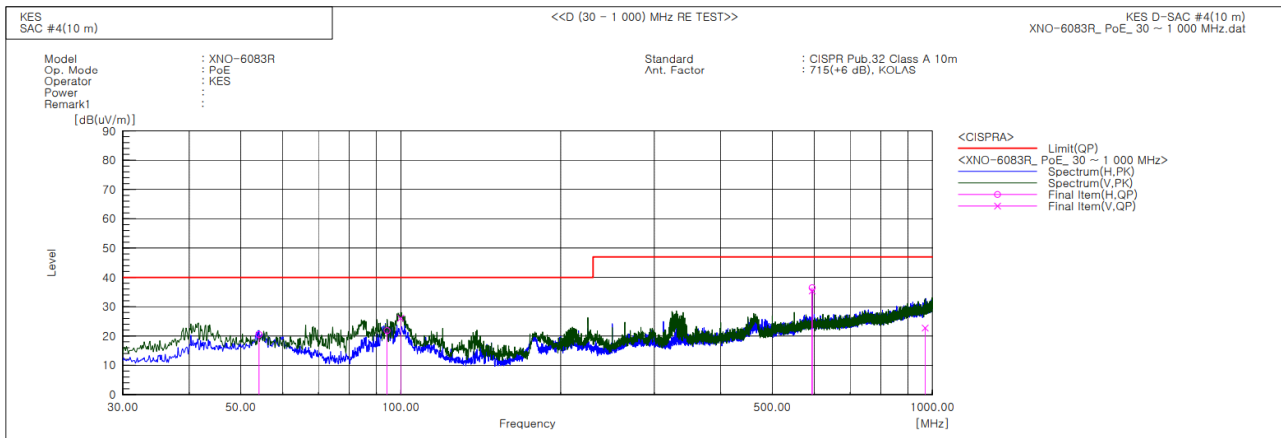
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.

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

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



■ 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	54.129	H	41.8	-21.3	20.5	40.0	19.5	368.0	287.5	
2	94.263	H	45.4	-23.6	21.8	40.0	18.2	329.0	140.3	
3	99.961	V	48.6	-22.5	26.1	40.0	13.9	146.0	170.6	
4	593.986	V	44.0	-8.6	35.4	47.0	11.6	106.0	215.4	
5	594.125	H	45.1	-8.6	36.5	47.0	10.5	400.0	287.5	
6	969.081	V	26.1	-3.4	22.7	47.0	24.3	100.0	358.3	

◆ Calculation

Corrected Amplitude [dBuV] = 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

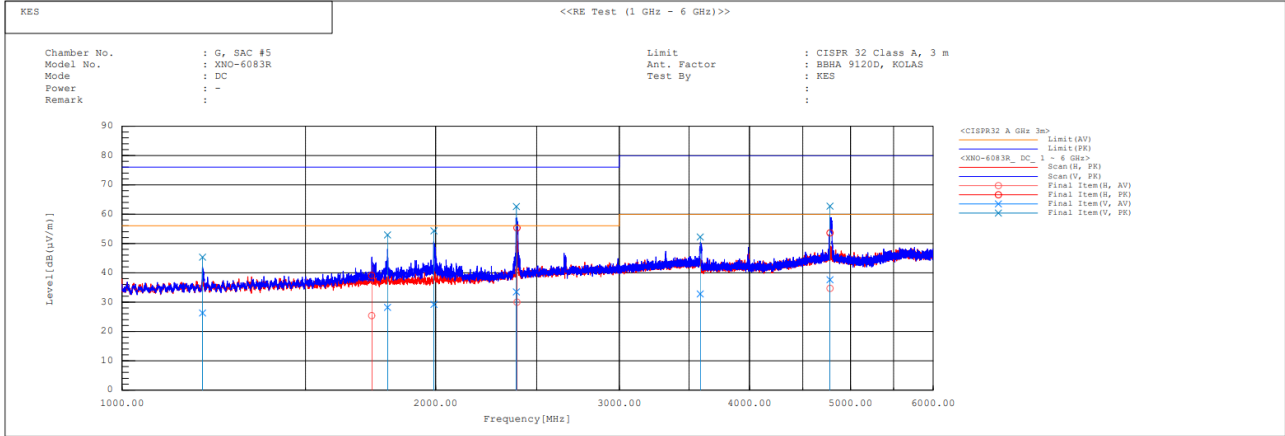
Report No.:

KES-EM-22T0653-R1

Page (25) of (42)

Radiated Electric Field Emissions(Above 1 GHz)

DC MODE



Final Result

No.	Frequency [MHz]	Pol	Reading AV [$\text{dB}(\mu\text{V})$]	Reading PK [$\text{dB}(\mu\text{V})$]	c.f [$\text{dB}(1/\text{m})$]	Result AV [$\text{dB}(\mu\text{V/m})$]	Result PK [$\text{dB}(\mu\text{V/m})$]	Limit AV [$\text{dB}(\mu\text{V/m})$]	Limit PK [$\text{dB}(\mu\text{V/m})$]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]
1	1194.754	V	33.0	52.0	-6.7	26.3	45.3	56.0	76.0	29.7	30.7	100.0	199.2
2	1736.431	H	29.4	43.1	-4.0	25.4	39.1	56.0	76.0	30.6	36.9	100.0	209.2
3	1798.025	V	31.9	56.6	-3.7	28.2	52.9	56.0	76.0	27.8	23.1	100.0	222.7
4	1992.728	V	32.0	57.1	-2.8	29.2	54.3	56.0	76.0	26.8	21.7	100.0	216.6
5	2390.306	V	35.0	64.1	-1.5	33.5	62.6	56.0	76.0	22.5	13.4	100.0	142.4
6	2393.487	H	31.5	56.8	-1.5	30.0	55.3	56.0	76.0	26.0	20.7	100.0	310.1
7	3587.877	V	30.8	50.2	2.0	32.8	52.2	60.0	80.0	27.2	27.8	100.0	138.8
8	4778.582	H	28.3	47.2	6.4	34.7	53.6	60.0	80.0	25.3	26.4	100.0	289.3
9	4779.466	V	31.2	56.3	6.4	37.6	62.7	60.0	80.0	22.4	17.3	100.0	162.4

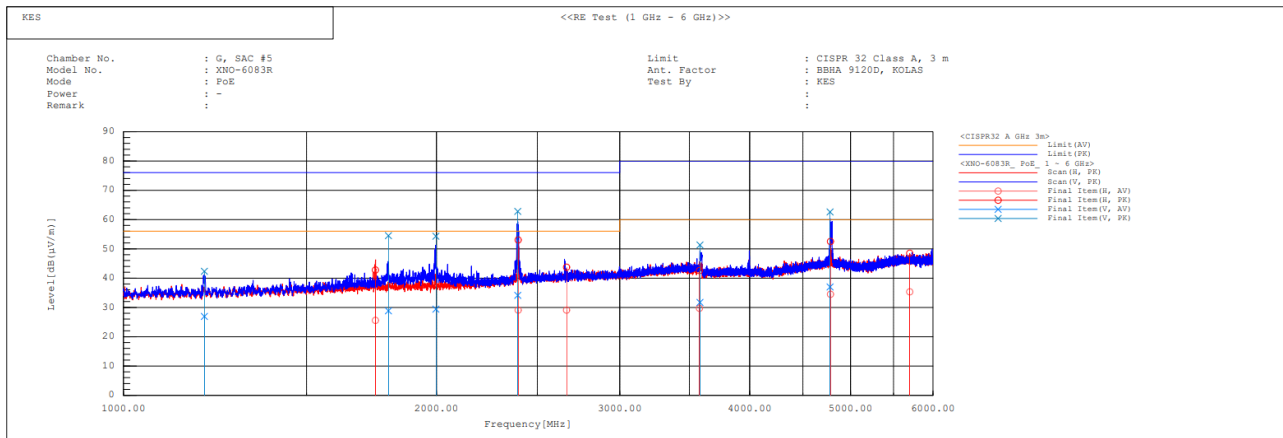
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.

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

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



PoE MODE



Final Result

No.	Frequency [MHz]	Pol	Reading AV [dB(μV)]	Reading PK [dB(μV)]	c.f [dB(1/m)]	Result AV [dB(μV/m)]	Result PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Limit PK [dB(μV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]
1	1196.615	V	33.6	49.0	-6.7	26.9	42.3	56.0	76.0	29.1	33.7	100.0	11.5
2	1747.243	H	29.5	46.7	-3.9	25.6	42.8	56.0	76.0	30.4	33.2	100.0	10.8
3	1798.189	V	32.5	58.2	-3.7	28.8	54.5	56.0	76.0	27.2	21.5	100.0	213.3
4	1996.970	V	32.1	57.0	-2.7	29.4	54.3	56.0	76.0	26.6	21.7	100.0	209.7
5	2394.510	V	35.6	64.3	-1.5	34.1	62.8	56.0	76.0	21.9	13.2	100.0	138.1
6	2395.626	H	30.6	54.5	-1.5	29.1	53.0	56.0	76.0	26.9	23.0	100.0	327.4
7	2666.793	H	29.4	44.0	-0.3	29.1	43.7	56.0	76.0	26.9	32.3	100.0	318.2
8	3579.292	H	27.7	40.6	2.0	29.7	42.6	60.0	80.0	30.3	37.4	100.0	147.0
9	3583.271	V	29.7	49.3	2.0	31.7	51.3	60.0	80.0	28.3	28.7	100.0	128.2
10	4777.854	V	30.6	56.2	6.4	37.0	62.6	60.0	80.0	23.0	17.4	100.0	166.5
11	4782.774	H	28.1	46.1	6.4	34.5	52.5	60.0	80.0	25.5	27.5	100.0	313.9
12	5700.941	H	27.1	40.3	8.2	35.3	48.5	60.0	80.0	24.7	31.5	100.0	328.6

◆ Calculation

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

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

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 kes@kes.co.kr

Conducted Emissions at Telecommunication Ports

■ DC MODE

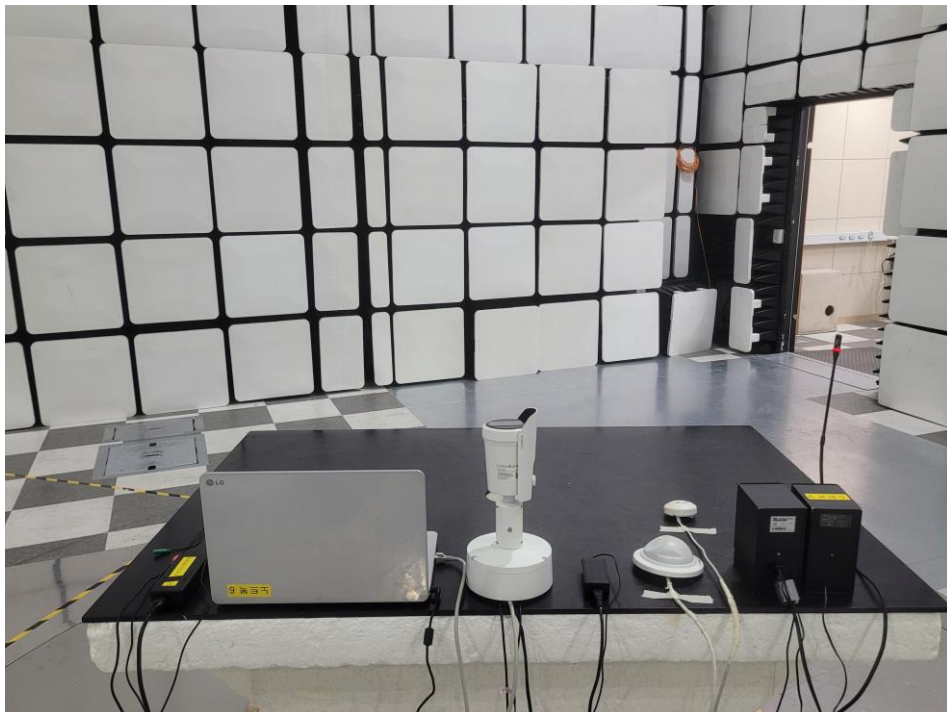
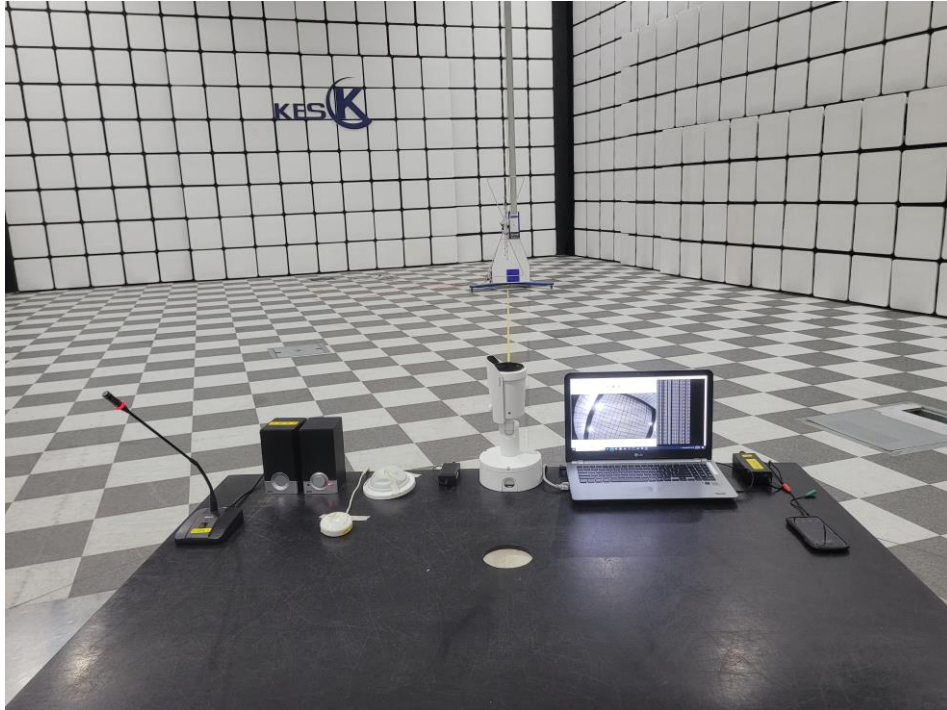


This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

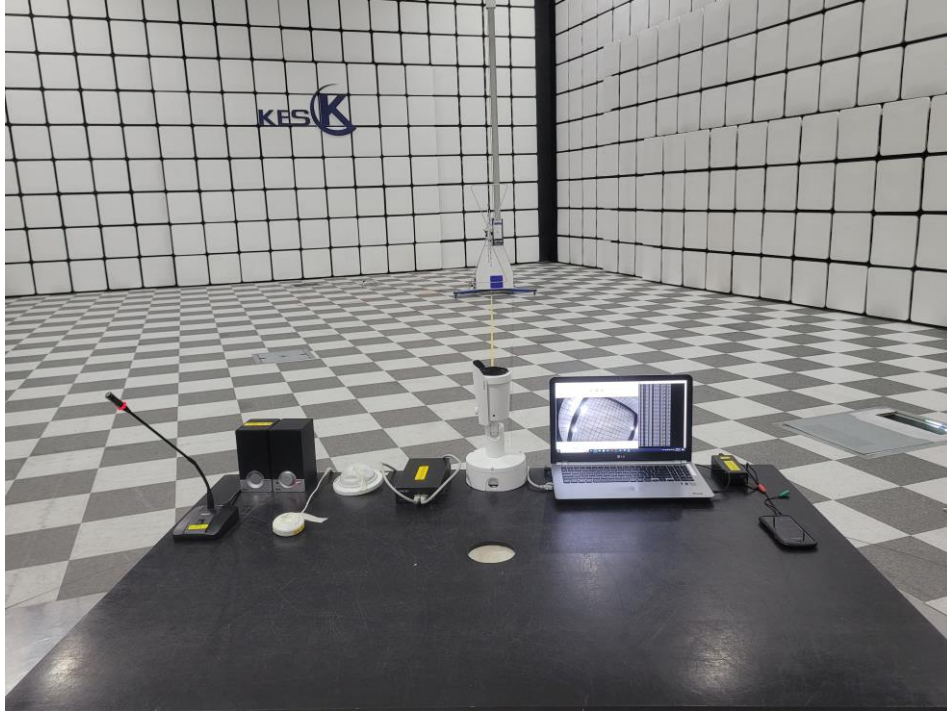
■ PoE MODE

Radiated Electric Field Emissions(Below 1 GHz)

■ DC MODE



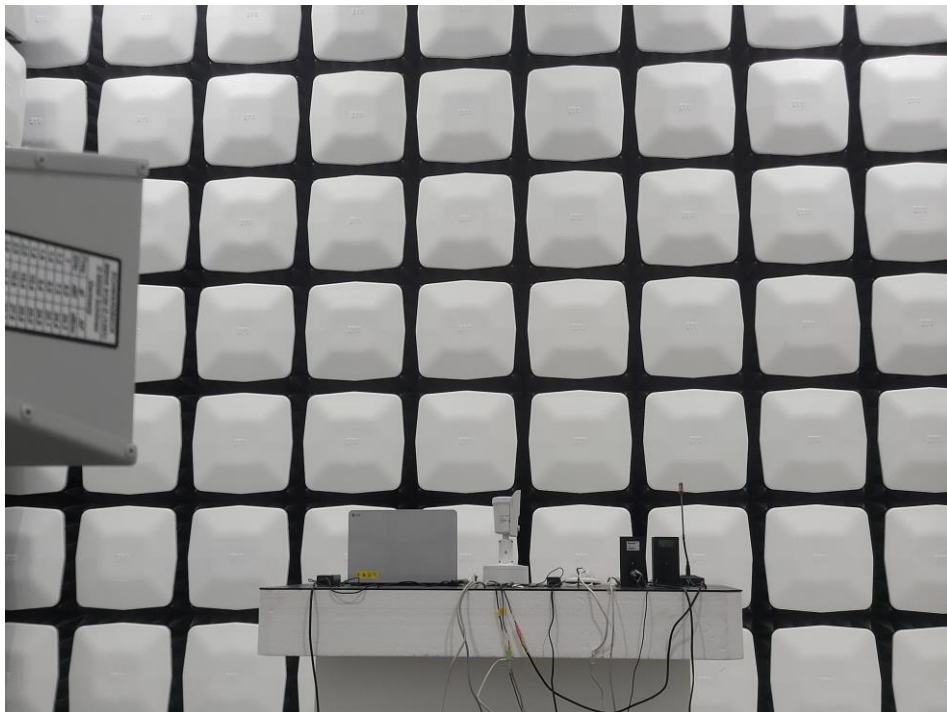
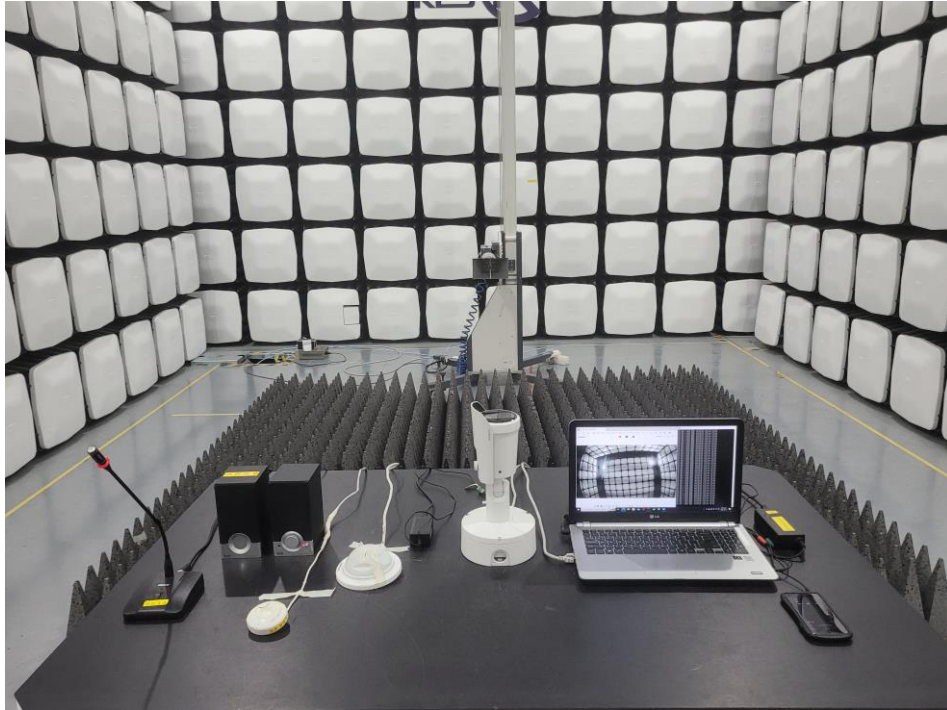
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

■ PoE MODE

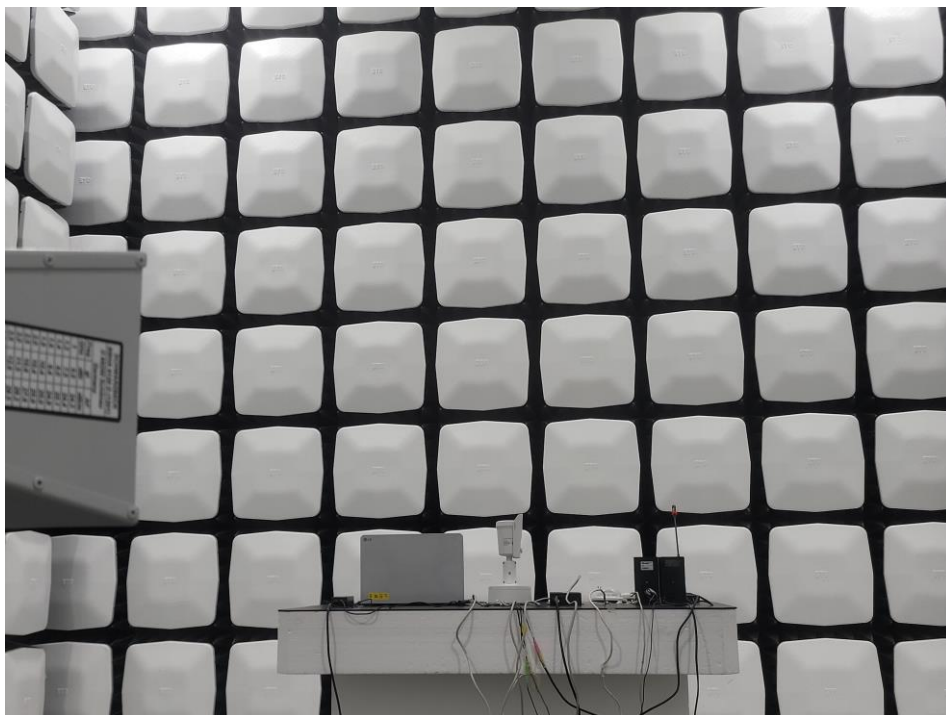
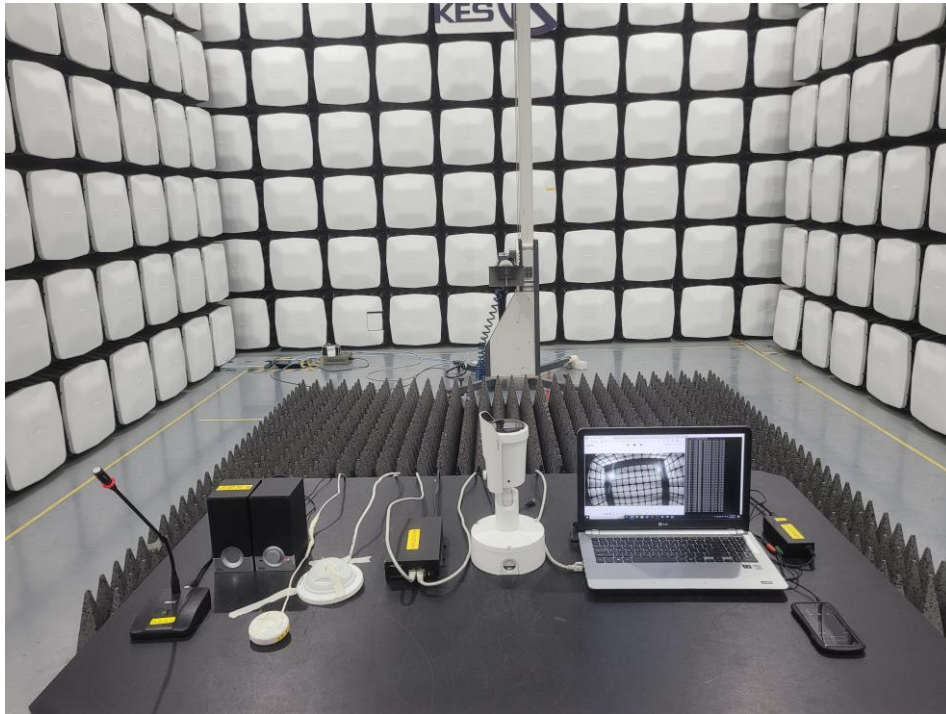
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

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 kes@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 kes@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 kes@kes.co.kr

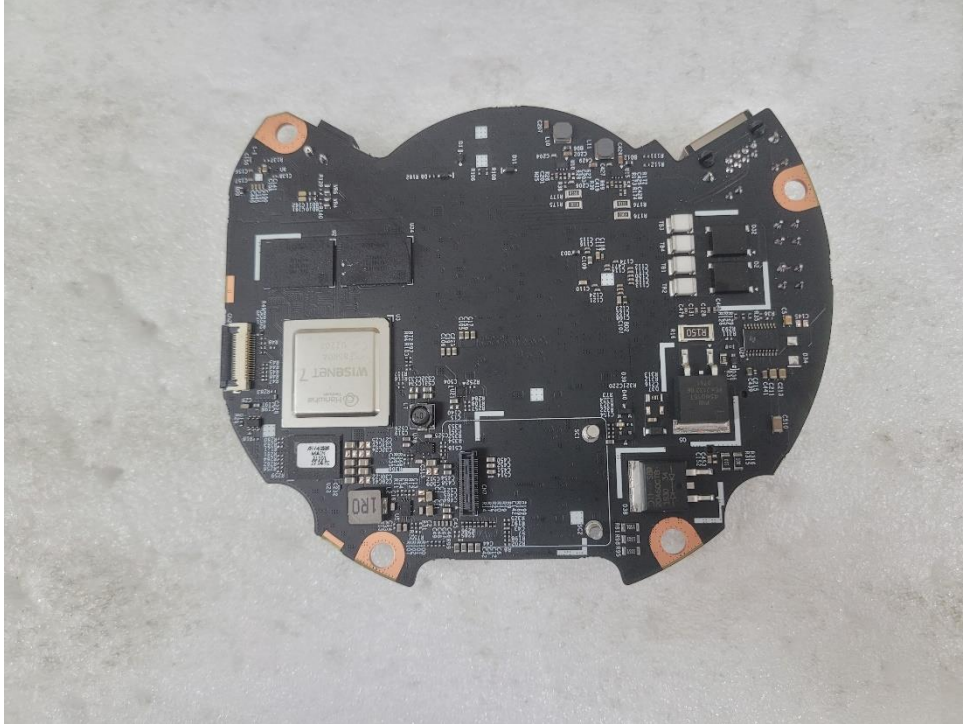
EUT Internal Photographs

(Internal View)

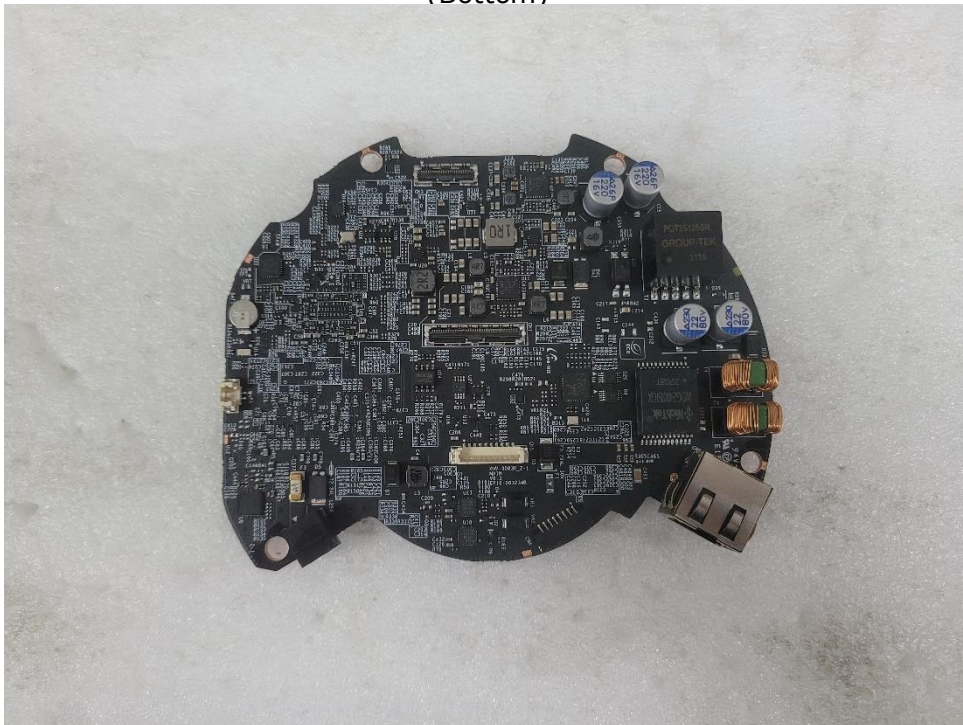


EUT Internal View –Main Board

(Top)



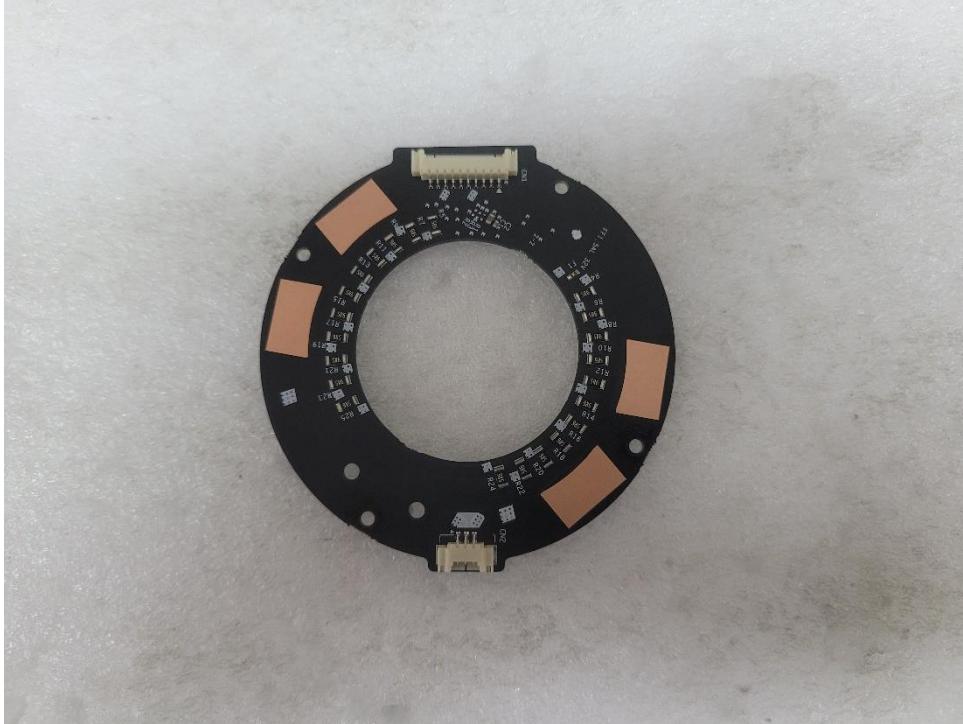
(Bottom)



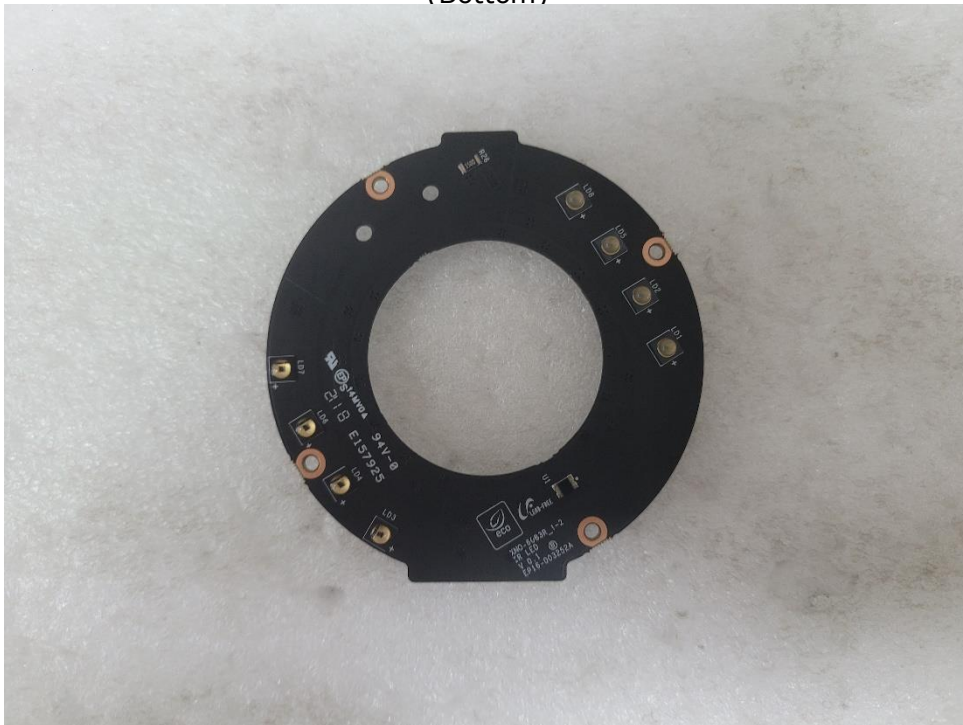
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

EUT Internal View – LED 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.
The authenticity of the test report, contact kes@kes.co.kr

EUT Internal View – Module Board

(Top)



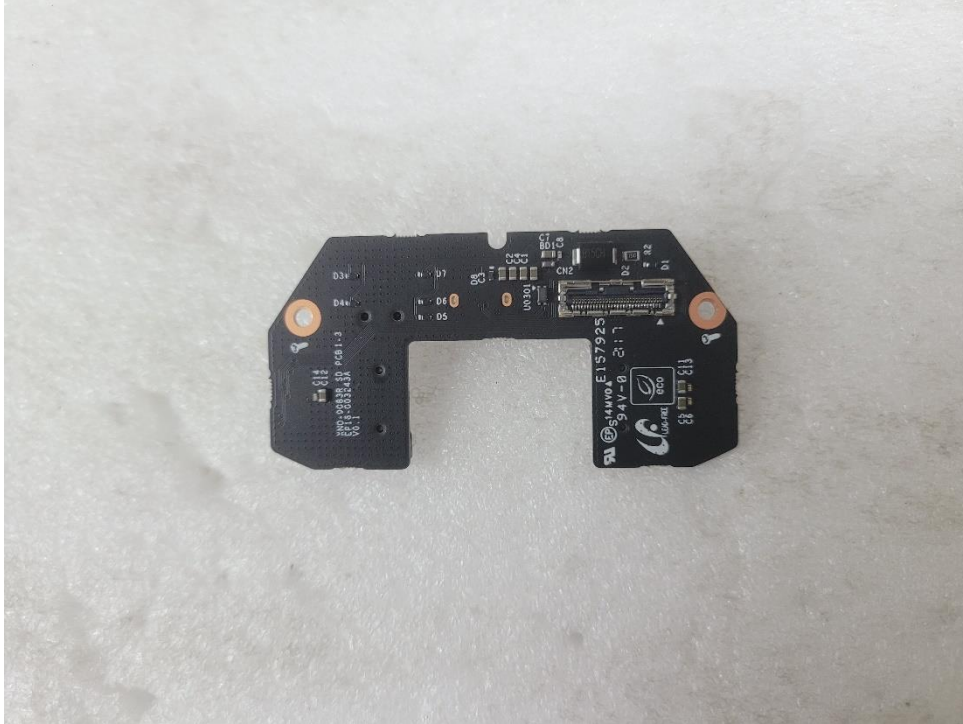
(Bottom)



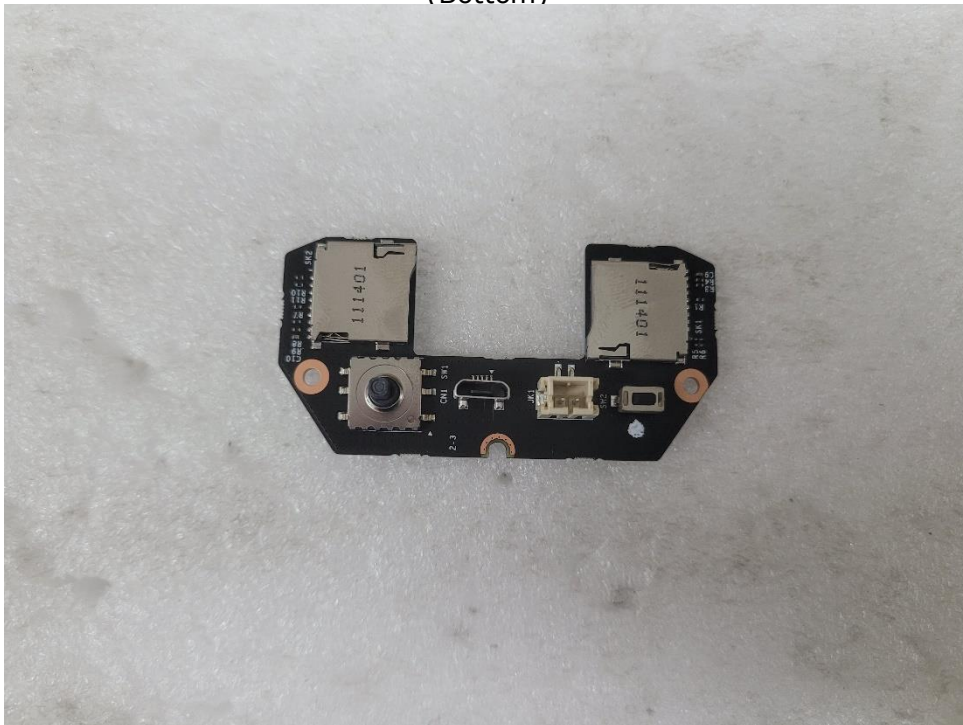
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

EUT Internal View – Port Board

(Top)



(Bottom)



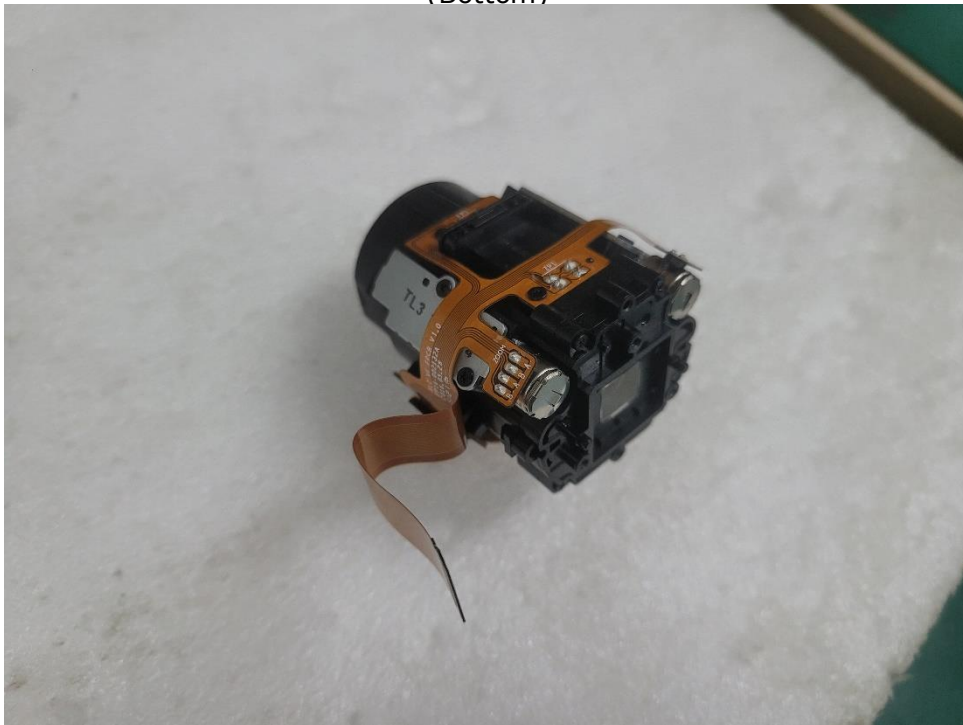
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

EUT EUT Internal View – 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.
The authenticity of the test report, contact kes@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