

**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-21T1159-R1

Page (1) of (37)

EMC TEST REPORT For RCM

Test Report No. : KES-EM-21T1159-R1

Date of Issue : Feb. 24, 2023

Product name : NETWORK CAMERA

Model/Type No. : TNV-7011RC

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 : Nov. 15, 2021

Test date : Nov. 18, 2021 ~ Nov. 19, 2021

Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Dae Hyun, Kim
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.

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-21T1159-R1

Page (2) of (37)

REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Dec. 01, 2021	KES-EM-21T1159	Issued
Feb. 24, 2023	KES-EM-21T1159-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



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	7
1.6	External I/O Cabling	8
1.7	EUT Operating Mode(s)	9
1.8	Configuration.....	10
1.9	Remarks when standards applied	11
1.10	Calibration Details of Equipment Used for Measurement	11
1.11	Test Facility	11
1.12	Laboratory Accreditations and Listings	11
2.0	Test Regulations.....	12
2.1	Conducted Emissions at Mains Power Ports	13
2.2	Conducted Emissions at Telecommunication Ports.....	14
2.3	Radiated Electric Field Emissions(Below 1 GHz)	15
2.4	Radiated Electric Field Emissions(Above 1 GHz)	16
APPENDIX A – TEST DATA.....		17
Conducted Emissions at Mains Power Ports.....		17
Conducted Emissions at Telecommunication Ports		19
Radiated Electric Field Emissions(Below 1 GHz)		21
Radiated Electric Field Emissions(Above 1 GHz).....		23
Test Setup Photos and Configuration		25
Conducted Emissions at Mains Power Ports.....		25
Conducted Emissions at Telecommunication Ports		26
Radiated Electric Field Emissions(Below 1 GHz)		28
Radiated Electric Field Emissions(Above 1 GHz).....		30
EUT External Photographs		32
EUT Internal Photographs		33



1.0 General Product Description

Main Specifications of EUT are:

	TNV-7011RC
Video	
Imaging Device	1/2.8" CMOS
Resolution	2048x1536, 1920x1080, 1600x1200, 1280x1024, 1280x960, 1280x720, 1024x768, 800x600, 800x448, 720x576, 720x480, 640x480, 640x360, 320x240
Max. Framerate	H.265/H.264/MJPEG: Max. 30fps at all resolutions
Min. Illumination	Color: 0.3 lux (F2.0, 1/30sec) B/W: 0 lux (F2.0, 1/30sec)
Video Out	CVBS: 1.0 Vp-p / 75Ω composite, 720x480(N), 720x576(P) for installation
Lens	
Focal Length (Zoom Ratio)	2.8mm fixed focal
Max. Aperture Ratio	F2.0
Angular Field of View	H: 102° / V: 75° / D: 129°
Min. Object Distance	0.4m(1.31ft)
Focus Control	Manual
Pan / Tilt / Rotate	
Pan / Tilt / Rotate Range	- / 30°~60° / -
Operational	
Camera Title	Displayed up to 85 characters
Day & Night	Auto(ICR)
Backlight Compensation	BLC, HLC, WDR, SSDR
Wide Dynamic Range	120dB
Digital Noise Reduction	SSNR V
Digital Image Stabilization	Support
Defog	Support
Motion Detection	8ea, 8point polygonal zones
Privacy Masking	32ea, polygonal zones - Color: Grey/Green/Red/Blue/Black/White - Mosaic
Gain Control	Low / Middle / High
White Balance	ATW / AWC / Manual / Indoor / Outdoor
LDC	Support
Electronic Shutter Speed	Minimum / Maximum / Anti flicker (2~1/12,000sec)
Video Rotation	Flip, Mirror, Hallway view(90°/270°)
Analytics	Tampering, Loitering, Directional detection, Defocus detection, Fog detection, Virtual line, Enter/Exit, Appear/Disappear, Audio detection, Face detection, Motion detection, Digital auto tracking, Sound classification, Shock detection
Alarm I/O	Input 1ea / Output 1ea
Alarm Triggers	Analytics, Network disconnect, Alarm input, Motion detection
Alarm Events	File upload via FTP and e-mail Notification via e-mail SD/SDHC/SDXC or NAS recording at event triggers Alarm output DPTZ 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	10m(32.8ft)

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-21T1159-R1

Page (5) of (37)

Network	
Ethernet	RJ-45(10/100BASE-T)
Video Compression	H.265/H.264: Main/Baseline/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 8/16/32/48KHz
Smart Codec	Manual(Sea area), WiseStream II
Bitrate Control	H.264/H.265: CBR or VBR MJPEG: VBR
Streaming	Unicast(20 users) / Multicast Multiple streaming(Up to 10 profiles)
Protocol	IPv4, IPv6, TCP/IP, UDP/IP, RTP(UDP), RTP(TCP), RTCP, RTSP, NTP, HTTP, HTTPS, SSL/TLS, DHCP, PPPoE, FTP, SMTP, ICMP, IGMP, SNMPv1/v2c/v3(MIB-2), ARP, DNS, DDNS, QoS, PIM-SM, UPnP, Bonjour
Security	HTTPS(SSL) Login Authentication Digest Login Authentication IP Address Filtering User access log 802.1X Authentication(EAP-TLS, EAP-LEAP)
Application Programming Interface	SUNAPI(HTTP API) Wisenet open platform
General	
Webpage Language	English, Korean, Chinese, French, Italian, Spanish, German, Japanese, Russian, Swedish, Portuguese, Czech, Polish, Turkish, Dutch, Hungarian, Greek
Edge Storage	Micro SD/SDHC/SDXC 1slot 256GB
Environmental & Electrical	
Operating Temperature / Humidity	-10°C~+55°C(+14°F~+131°F) / Less than 90% RH
Storage Temperature / Humidity	-50°C~+60°C(-58°F~+140°F) / Less than 90% RH
Certification	IP66, IP6K9K, IK10+
Input Voltage	PoE(IEEE802.3af, Class2), 12VDC
Power Consumption	PoE: Max 12W, typical 10.1W, 12VDC: Max. 11W, typical 8.6W
Mechanical	
Color / Material	White / Aluminium
RAL Code	RAL9003
Product dimensions / weight	Ø295.5x113.5mm(11.6x4.47") / 2.1kg (4.63lb)
DORI	
Detect	33.2m(108.82ft)
Observe	13.3m(43.53ft)
Recognize	6.6m(21.76ft)
Identify	3.3m(10.88ft)

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 240 V, 50 Hz (DC Adapter) ☒ PoE (PoE Adapter)

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	TNV-7011RC	-	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-21T1159-R1

Page (7) of (37)

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
Notebook	P95G001	9JM8HT2	DELL INC.	-
Notebook Adapter	LA65NS2-01	-	LITE-ON TECHNOLOGY (CHANGZHOU)CO.,LTD.	-
DC Adapter	2ACB022F	-	ChAnnel Well Technology (Guangzhou) Co.,Ltd.	-
PoE Adapter	PT-PSE109GBRO-AH	-	Dongguan PROCET Network Technology Co., Ltd	-
Button Alarm	-	-	-	-
LED Alarm	PRO-SL	-	SENSOR PRO	-
LED Alarm Adapter	CS-1202000	-	-	-
Speaker	BR1000A Cuve Black 2	-	DONGGUAN EDIFIER TECHNOLOGY Co., Ltd	-
SmartPhone	A1429	-	Apple	-
Micro SD Card	-	-	Sandisk	-
Mic	MP1000	-	-	-

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-21T1159-R1

Page (8) of (37)

1.6 External I/O Cabling

■ DC Adapter Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
NETWORK CAMERA (EUT)	DC Jack (2 Pin)	DC Adapter	DC Jack (2 Pin)	1.2	U
	RJ-45 (LAN)	Notebook	RJ-45	3.0	U
	Alarm In (2 Pin)	Button Alarm	2 Pin	3.0	U
	Alarm Out (2 Pin)	LED Alarm	2 Pin	3.0	U
	Audio In (3.5 mm)	Mic	3.5 mm	1.5	U
	Audio Out (3.5 mm)	Speaker	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	1.3	U
Notebook	DC Jack	Notebook Adapter	DC Jack	2.3	S
LED Alarm	DC Jack	LED Alarm Adapter	DC Jack	1.5	U

* Unshielded=U, Shielded=S

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 Adapter Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
NETWORK CAMERA (EUT)	RJ-45 (PoE)	PoE Adapter	RJ-45	3.0	U
	Alarm In (2 Pin)	Button Alarm	2 Pin	3.0	U
	Alarm Out (2 Pin)	LED Alarm	2 Pin	3.0	U
	Audio In (3.5 mm)	Mic	3.5 mm	1.5	U
	Audio Out (3.5 mm)	Speaker	3.5 mm	1.8	U
	Micro SD Card Slot	Micro SD Card	Micro SD Card Slot	-	-
PoE Adapter	RJ-45 (LAN)	Notebook	RJ-45	1.0	U
Notebook	3.5 mm	SmartPhone	3.5 mm	1.3	U
Notebook	DC Jack	Notebook Adapter	DC Jack	2.3	S
LED Alarm	DC Jack	LED Alarm Adapter	DC Jack	1.5	U

* Unshielded=U, Shielded=S

1.7 EUT Operating Mode(s)

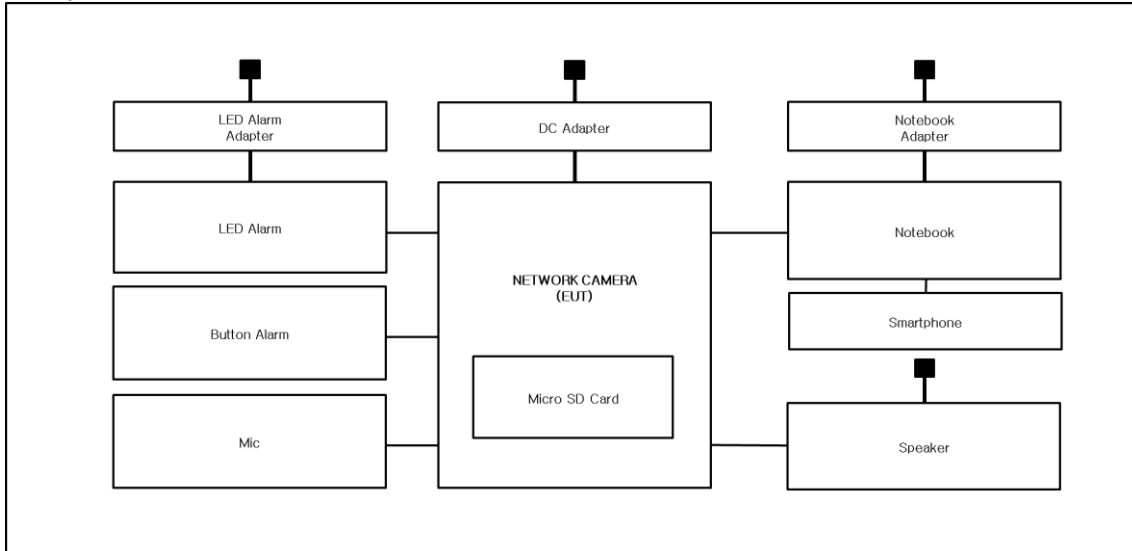
Test Mode	operating
DC Adapter / PoE Adapter	Checked that the camera video output was working properly in the web viewer and used the ping test to verify that the network behavior was working properly. Check the normal operation of Button Alarm, LED Alarm through Web Viewer, Checked whether speaker to 1 kHz Tone is output normally.

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

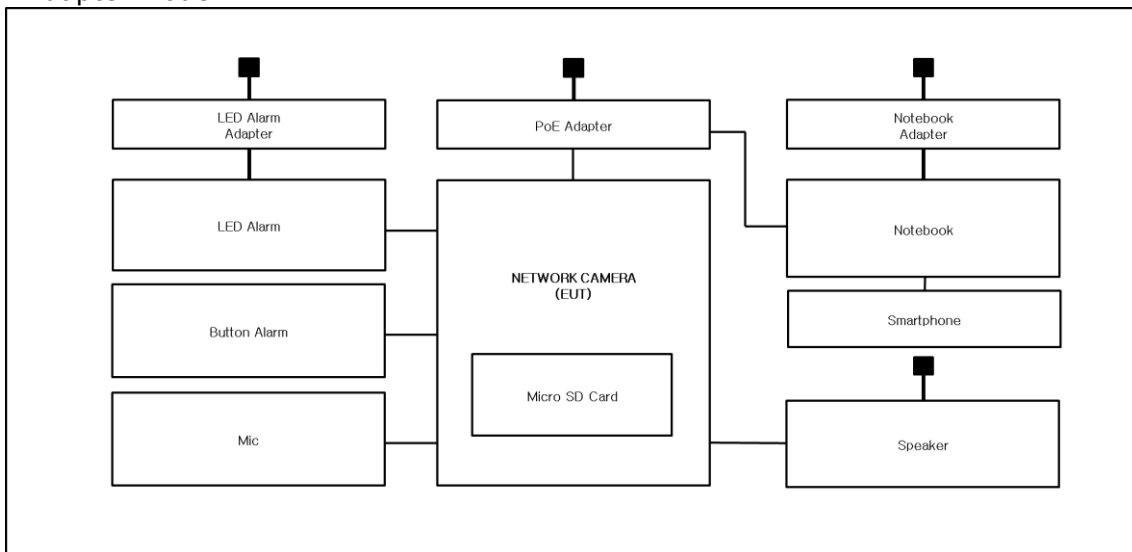
1.8 Configuration

■ AC Main
 □ DC Main

■ DC Adapter Mode



■ PoE Adapter Mode



1.9 Remarks when standards applied

N/A

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-21T1159-R1

Page (12) of (37)

2.0 Test Regulations

The emissions tests were performed according to following regulations:

☒ **AS/NZS CISPR32:2015**

☒ 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 at Mains Power Ports

Test Date

Nov. 18, 2021

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	01, 15, 2022
☒	LISN	ENV216	R & S	101787	12, 29, 2021
☒	LISN	ESH2-Z5	R & S	100450	12, 29, 2021
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	12, 29, 2021

Test Conditions

Temperature: (22,9 ± 0,1) °C

Relative Humidity: (43,9 ± 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

Nov. 18, 2021

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	01, 15, 2022
☒	LISN	ENV216	R & S	101787	12, 29, 2021
☒	LISN	ESH2-Z5	R & S	100450	12, 29, 2021
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	12, 29, 2021
☒	8-WIRE ISN CAT3,5	ENY81	R & S	100174	12, 30, 2021
☐	ISN	ISN S8	SCHWARZBECK	ISN-S8-0019	03, 10, 2022
☐	CDN	CDNS502A	TESEQ	40431	12, 29, 2021

Test Conditions

Temperature: (22,9 ± 0,1) °C

Relative Humidity: (43,9 ± 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.
- For Ethernet interfaces, measurements are required at the highest data rate supported by the interface.

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

Nov. 19, 2021

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, 2022
☒	AMPLIFIER	SCU 01	R & S	100603	11, 24, 2022
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	12, 08, 2022
☒	ATTENUATOR	8491A	HP	32173	03, 10, 2022

Test Conditions

Temperature: (22,9 ± 0,1) °C

Relative Humidity: (43,6 ± 0,2) % 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

Nov. 19, 2021

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, 03, 2022
☒	PREAMPLIFIER	8449B	AGILENT	3008A01967	04, 07, 2022
☐	ATTENUATOR	8491A	HP	35496	03, 10, 2022
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	03, 11, 2022

Test Conditions

Temperature: (23,1 ± 0,2) °C

Relative Humidity: (44,8 ± 0,2) % 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.



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-21T1159-R1

Page (17) of (37)

APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

■ DC Adapter Mode

HOT LINE

Common Information

Test Description:

Conducted Emission

Model No.:

TNV-7011RC

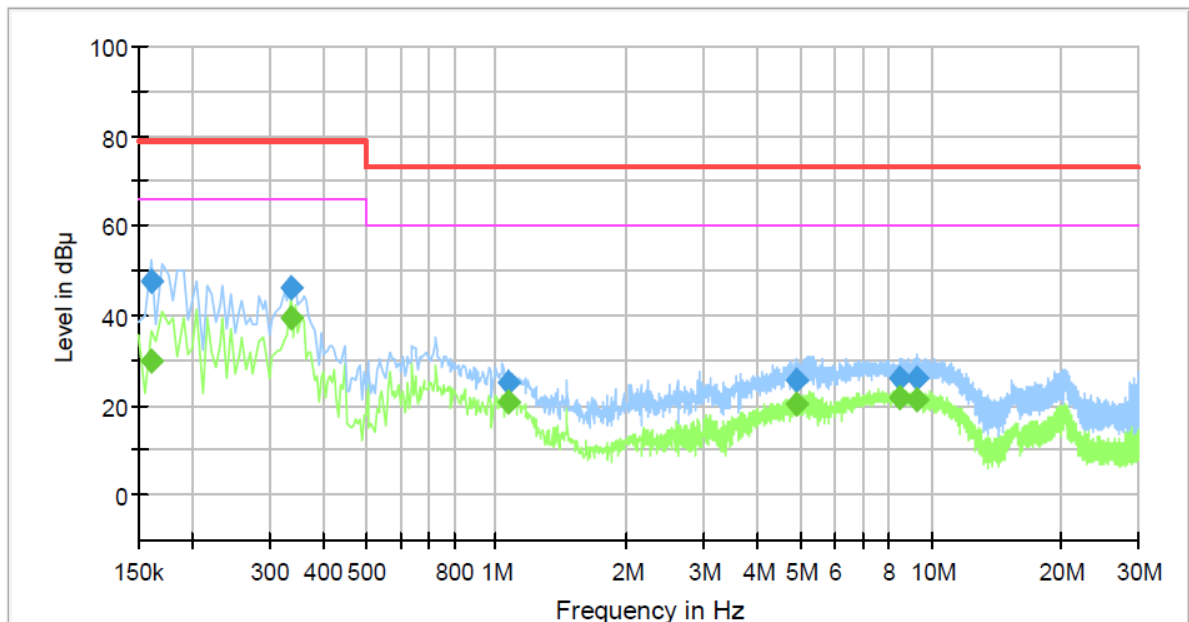
Phase:

Mode:

DC Adapter

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	---	29.93	66.00	36.07	1000.0	9.000	L1	19.5
0.160000	47.46	---	79.00	31.54	1000.0	9.000	L1	19.5
0.335000	---	39.39	66.00	26.61	1000.0	9.000	L1	19.6
0.335000	46.21	---	79.00	32.79	1000.0	9.000	L1	19.6
1.065000	---	20.91	60.00	39.09	1000.0	9.000	L1	20.1
1.065000	24.95	---	73.00	48.05	1000.0	9.000	L1	20.1
4.915000	---	20.12	60.00	39.88	1000.0	9.000	L1	19.7
4.915000	25.39	---	73.00	47.61	1000.0	9.000	L1	19.7
8.505000	---	21.62	60.00	38.38	1000.0	9.000	L1	19.7
8.505000	25.99	---	73.00	47.01	1000.0	9.000	L1	19.7
9.255000	---	21.24	60.00	38.76	1000.0	9.000	L1	19.8
9.255000	26.02	---	73.00	46.98	1000.0	9.000	L1	19.8

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

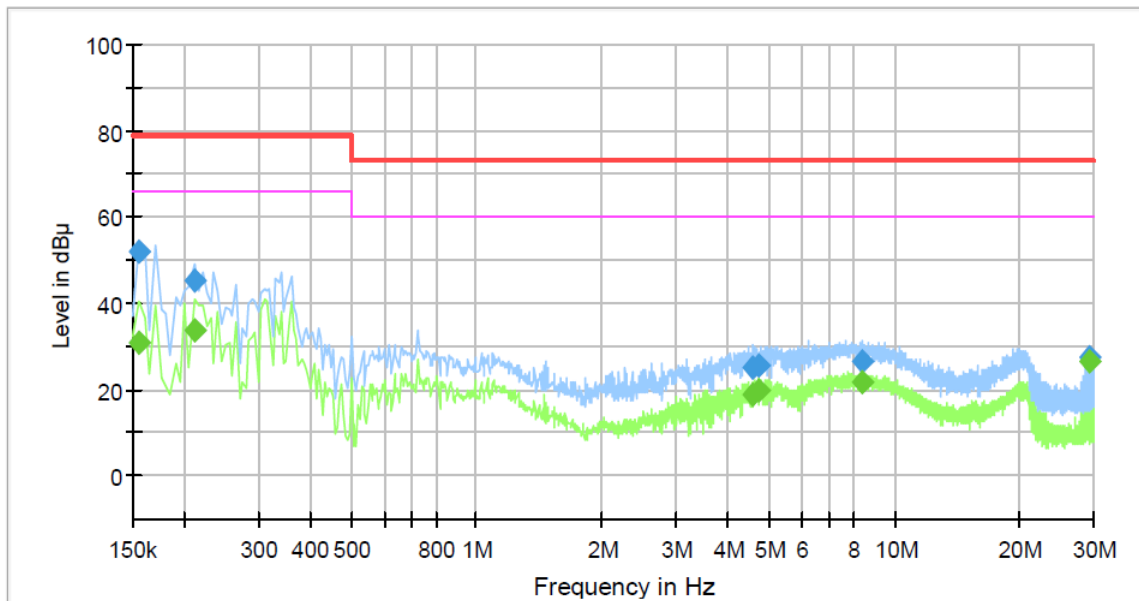
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

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

NEUTRAL LINE

Common Information

Test Description:	Conducted Emission
Model No.:	TNV-7011RC
Phase:	
Mode:	DC Adapter
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.155000	---	30.65	66.00	35.35	1000.0	9.000	N	19.4
0.155000	51.94	---	79.00	27.06	1000.0	9.000	N	19.4
0.210000	---	33.52	66.00	32.48	1000.0	9.000	N	19.5
0.210000	45.20	---	79.00	33.80	1000.0	9.000	N	19.5
4.595000	---	18.94	60.00	41.06	1000.0	9.000	N	19.8
4.595000	24.91	---	73.00	48.09	1000.0	9.000	N	19.8
4.740000	---	19.79	60.00	40.21	1000.0	9.000	N	19.7
4.740000	25.40	---	73.00	47.60	1000.0	9.000	N	19.7
8.380000	---	21.90	60.00	38.10	1000.0	9.000	N	19.7
8.380000	26.57	---	73.00	46.43	1000.0	9.000	N	19.7
29.235000	---	26.74	60.00	33.26	1000.0	9.000	N	20.4
29.235000	27.54	---	73.00	45.46	1000.0	9.000	N	20.4

◆ 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

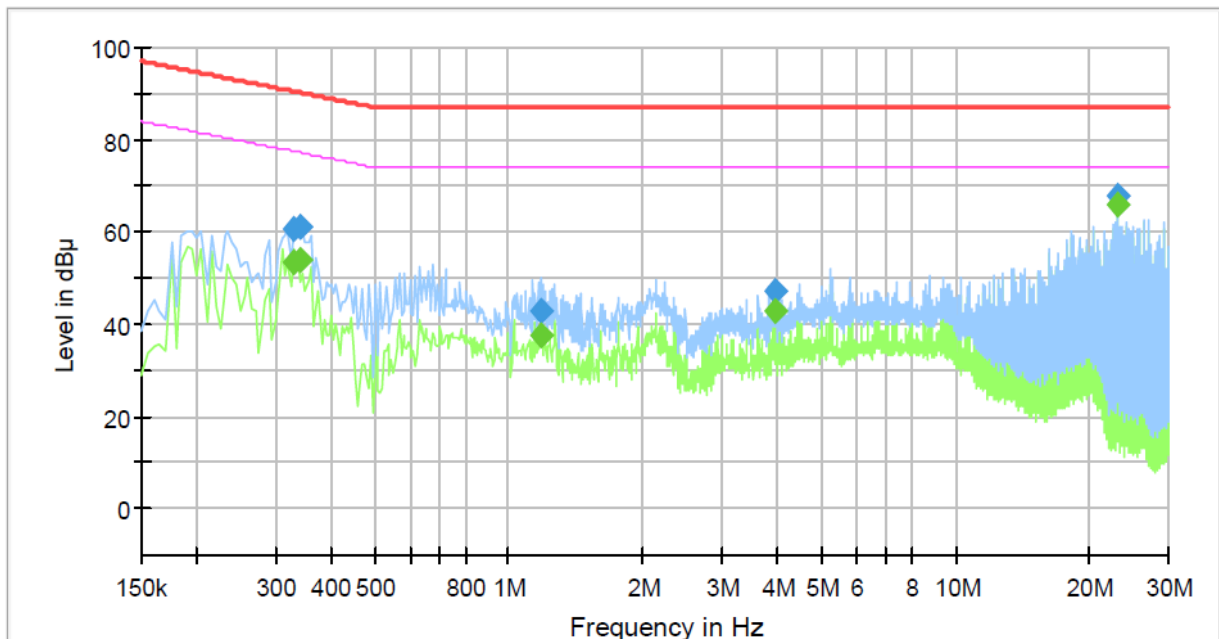
Conducted Emissions at Telecommunication Ports

■ DC Adapter Mode

[100 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	TNV-7011RC
Mode :	DC Adapter
Speed :	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)
0.330000	---	53.28	77.45	24.17	1000.0	9.000	Single Line	19.7
0.330000	60.60	---	90.45	29.85	1000.0	9.000	Single Line	19.7
0.340000	---	54.02	77.20	23.18	1000.0	9.000	Single Line	19.7
0.340000	61.29	---	90.20	28.91	1000.0	9.000	Single Line	19.7
1.175000	---	37.39	74.00	36.61	1000.0	9.000	Single Line	20.1
1.175000	42.62	---	87.00	44.38	1000.0	9.000	Single Line	20.1
3.955000	---	42.83	74.00	31.17	1000.0	9.000	Single Line	19.8
3.955000	46.94	---	87.00	40.06	1000.0	9.000	Single Line	19.8
23.130000	---	66.10	74.00	7.90	1000.0	9.000	Single Line	20.2
23.130000	68.01	---	87.00	18.99	1000.0	9.000	Single Line	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.

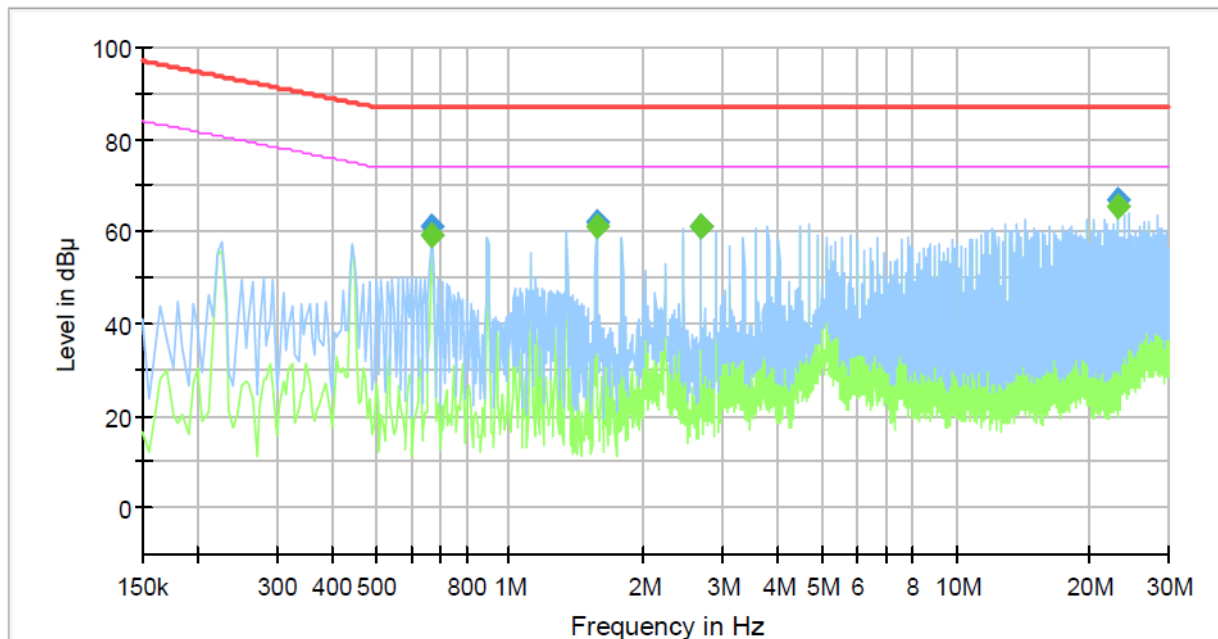
The authenticity of the test report, contact kes@kes.co.kr

■ PoE Adapter Mode

[100 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	TNV-7011RC
Mode :	PoE Adapter
Speed :	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)
0.670000	---	59.39	74.00	14.61	1000.0	9.000	Single Line	20.0
0.670000	60.89	---	87.00	26.11	1000.0	9.000	Single Line	20.0
1.560000	---	61.13	74.00	12.87	1000.0	9.000	Single Line	20.2
1.560000	61.97	---	87.00	25.03	1000.0	9.000	Single Line	20.2
2.675000	---	60.86	74.00	13.14	1000.0	9.000	Single Line	20.1
2.675000	61.03	---	87.00	25.97	1000.0	9.000	Single Line	20.1
23.130000	---	65.23	74.00	8.77	1000.0	9.000	Single Line	20.2
23.130000	66.65	---	87.00	20.35	1000.0	9.000	Single Line	20.2

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

Corr. : Correction values (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

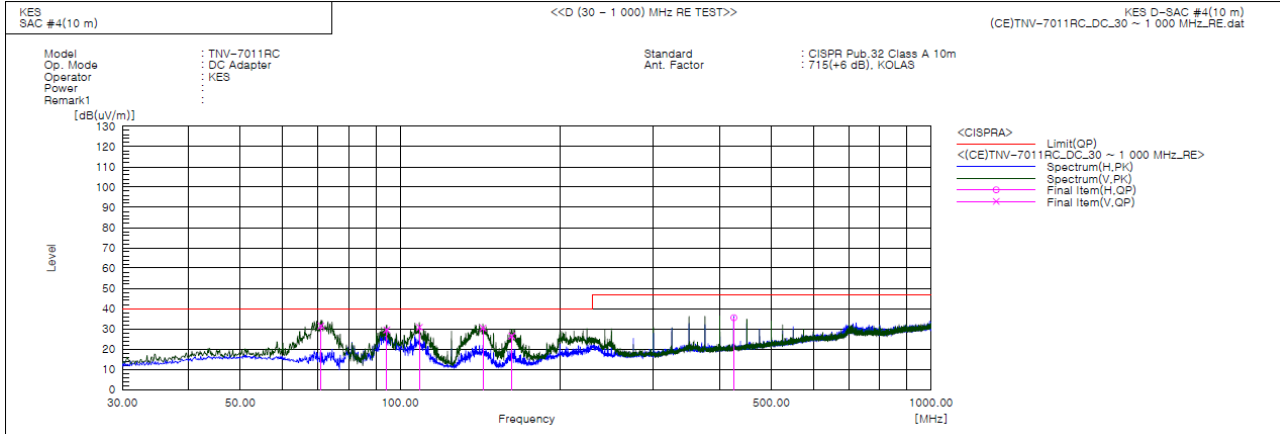
Report No.:

KES-EM-21T1159-R1

Page (21) of (37)

Radiated Electric Field Emissions(Below 1 GHz)

■ DC Adapter Mode



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c.f [dB(1/m)]	Result QP [dB(μV/m)]	Limit QP [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	70.983	V	56.7	-25.3	31.4	40.0	8.6	117.0	79.0	
2	94.384	V	53.2	-23.7	29.5	40.0	10.5	100.0	125.0	
3	108.813	V	53.2	-22.4	30.8	40.0	9.2	105.0	118.0	
4	143.248	V	55.7	-25.3	30.4	40.0	9.6	128.0	234.0	
5	162.284	V	51.0	-24.5	26.5	40.0	13.5	100.0	263.0	
6	425.033	H	49.3	-13.8	35.5	47.0	11.5	400.0	238.0	

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 kes@kes.co.kr



KES Co., Ltd.

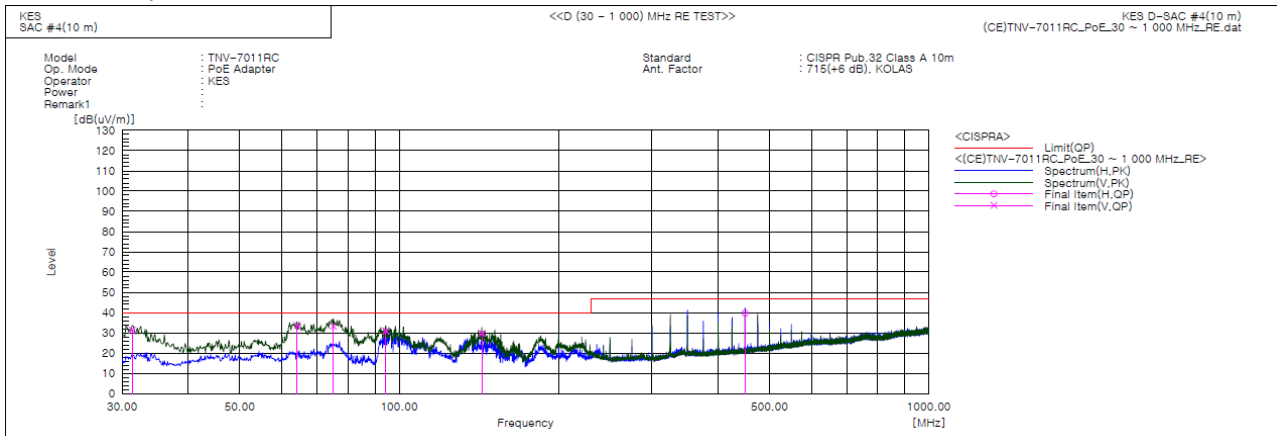
3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Report No.:

KES-EM-21T1159-R1

Page (22) of (37)

■ PoE Adapter Mode



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c.f [dB(1/m)]	Result QP [dB(μV/m)]	Limit QP [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	31.334	V	56.6	-25.2	31.4	40.0	8.6	100.0	282.0	
2	64.193	V	56.8	-23.1	33.7	40.0	6.3	112.0	125.0	
3	75.105	V	60.3	-27.0	33.3	40.0	6.7	104.0	57.0	
4	94.384	V	54.7	-23.7	31.0	40.0	9.0	132.0	94.0	
5	143.248	V	55.1	-25.3	29.8	40.0	10.2	100.0	204.0	
6	450.010	H	52.9	-13.2	39.7	47.0	7.3	392.0	94.0	

◆ Calculation

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

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

Reading(QP) : Reading value, Result(QP) : 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 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

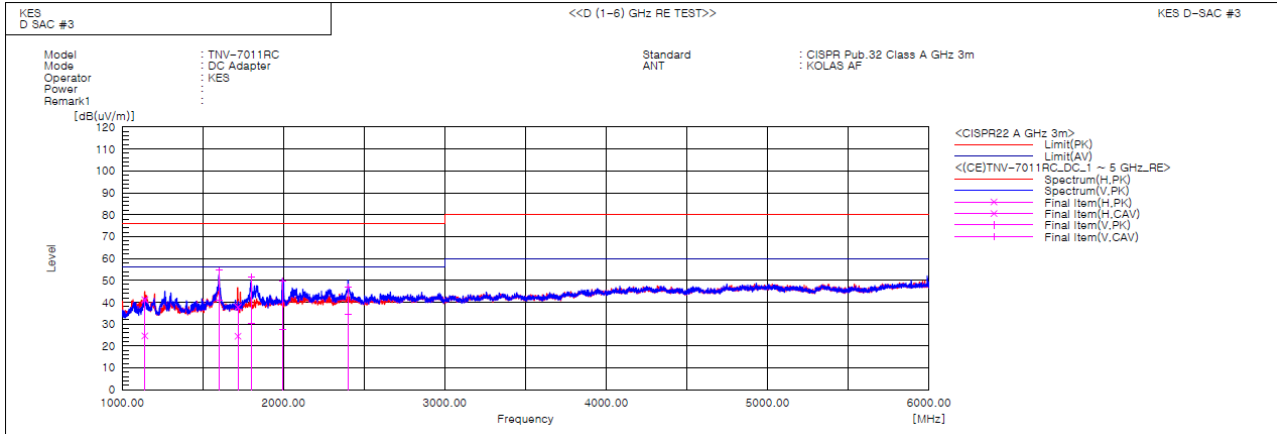
Report No.:

KES-EM-21T1159-R1

Page (23) of (37)

Radiated Electric Field Emissions(Above 1 GHz)

■ DC Adapter 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	1140.105	H	50.2	33.6	-9.0	41.2	24.6	76.0	56.0	34.8	31.4	100.0	24.5	
2	1600.337	V	60.2	46.2	-5.3	54.9	40.9	76.0	56.0	21.1	15.1	100.0	3.4	
3	1716.981	H	41.8	28.5	-4.1	37.7	24.4	76.0	56.0	38.3	31.6	100.0	337.7	
4	1799.066	V	54.5	33.2	-3.1	51.4	30.1	76.0	56.0	24.6	25.9	100.0	18.9	
5	1993.794	V	50.6	28.5	-1.1	49.5	27.4	76.0	56.0	26.5	28.6	100.0	352.8	
6	2400.228	V	46.5	34.0	0.2	46.7	34.2	76.0	56.0	29.3	21.8	100.0	351.8	

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 kes@kes.co.kr



KES Co., Ltd.

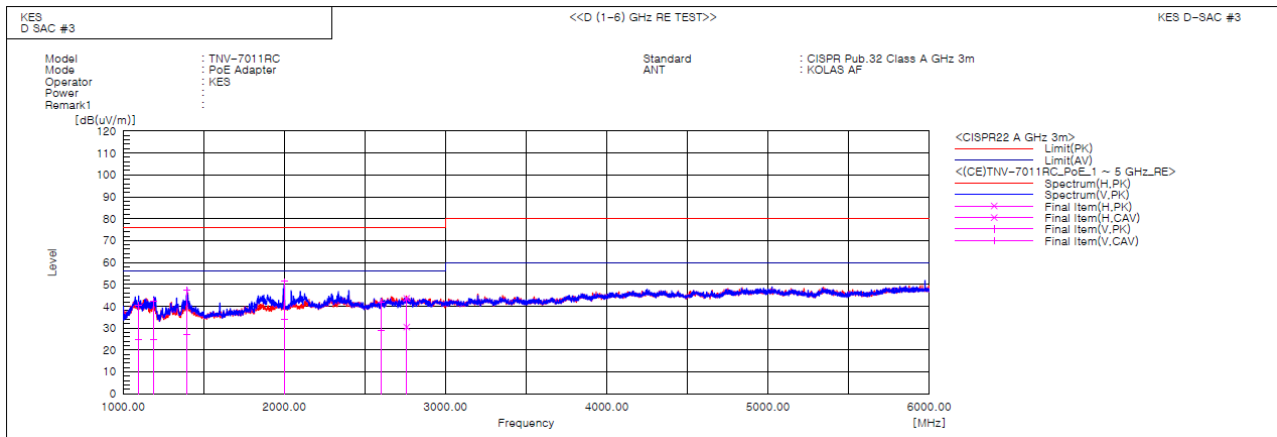
3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Report No.:

KES-EM-21T1159-R1

Page (24) of (37)

PoE Adapter Mode



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	1097.199	V	49.6	33.9	-9.2	40.4	24.7	76.0	56.0	35.6	31.3	100.0	27.9	
2	1191.224	V	50.7	33.5	-8.6	42.1	24.9	76.0	56.0	33.9	31.1	100.0	207.3	
3	1397.802	V	54.1	33.5	-6.7	47.4	26.8	76.0	56.0	28.6	29.2	100.0	20.0	
4	1999.732	V	52.3	34.8	-1.0	51.3	33.8	76.0	56.0	24.7	22.2	100.0	352.1	
5	2600.112	V	41.8	28.6	0.2	42.0	28.8	76.0	56.0	34.0	27.2	100.0	14.9	
6	2758.718	H	42.1	29.0	1.5	43.6	30.5	76.0	56.0	32.4	25.5	100.0	358.9	

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 kes@kes.co.kr

Test Setup Photos and Configuration

Conducted Emissions at Mains Power Ports

■ DC Adapter 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 Adapter Mode

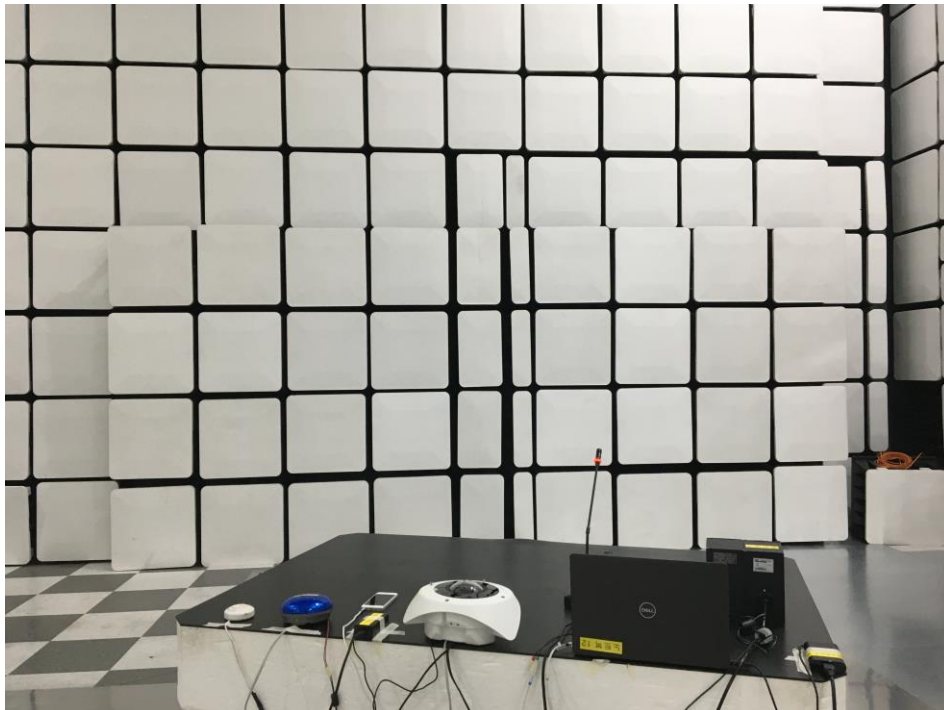


This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

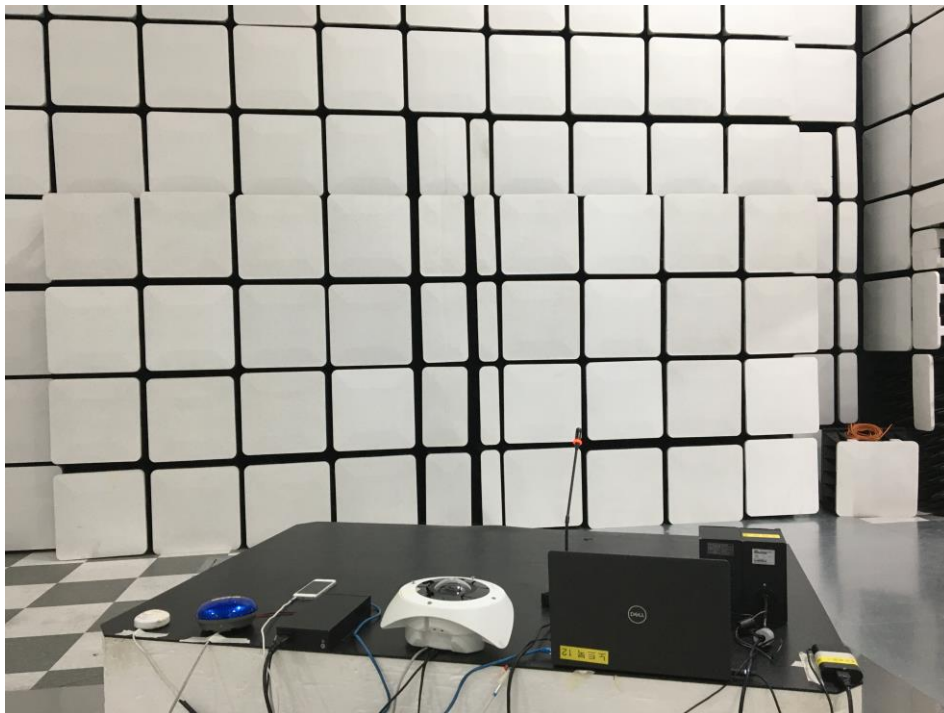
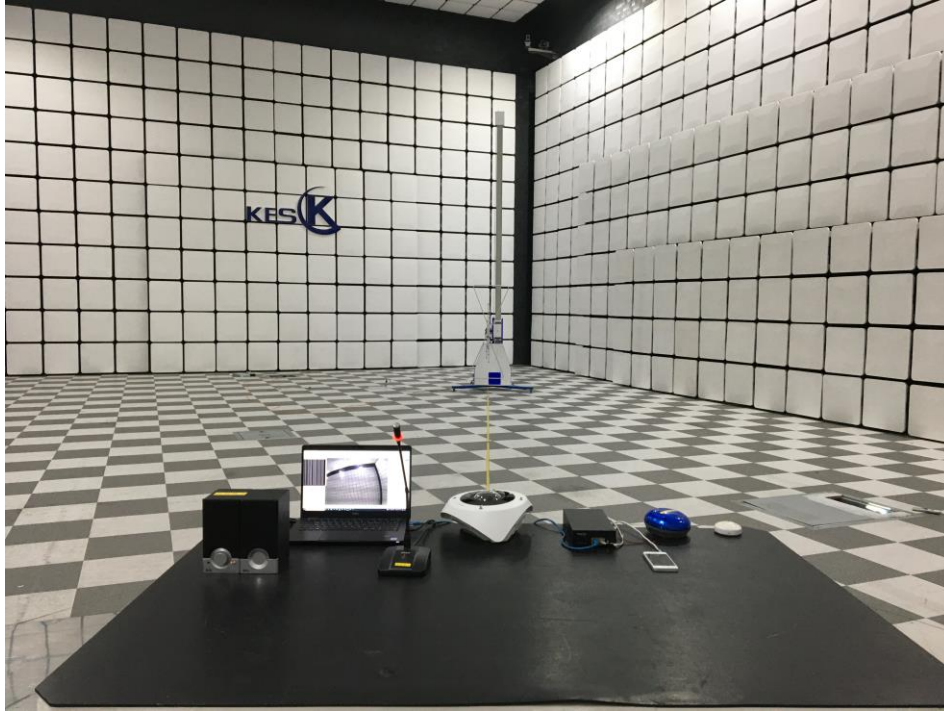
■ PoE Adapter Mode

Radiated Electric Field Emissions(Below 1 GHz)

■ DC Adapter 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 Adapter Mode

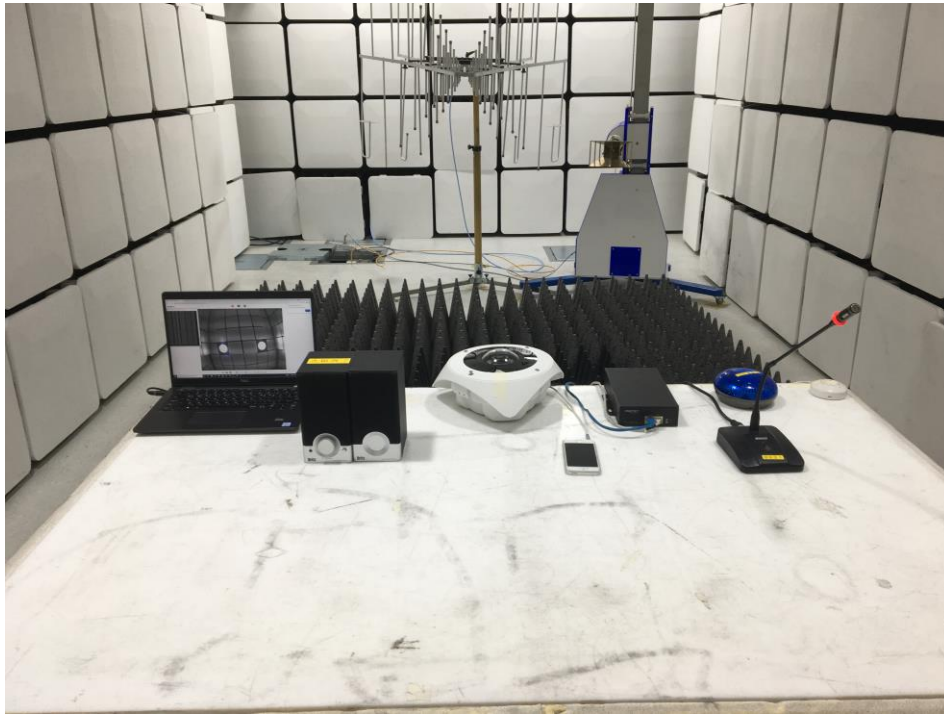
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

Radiated Electric Field Emissions(Above 1 GHz)

■ DC Adapter 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 Adapter 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)

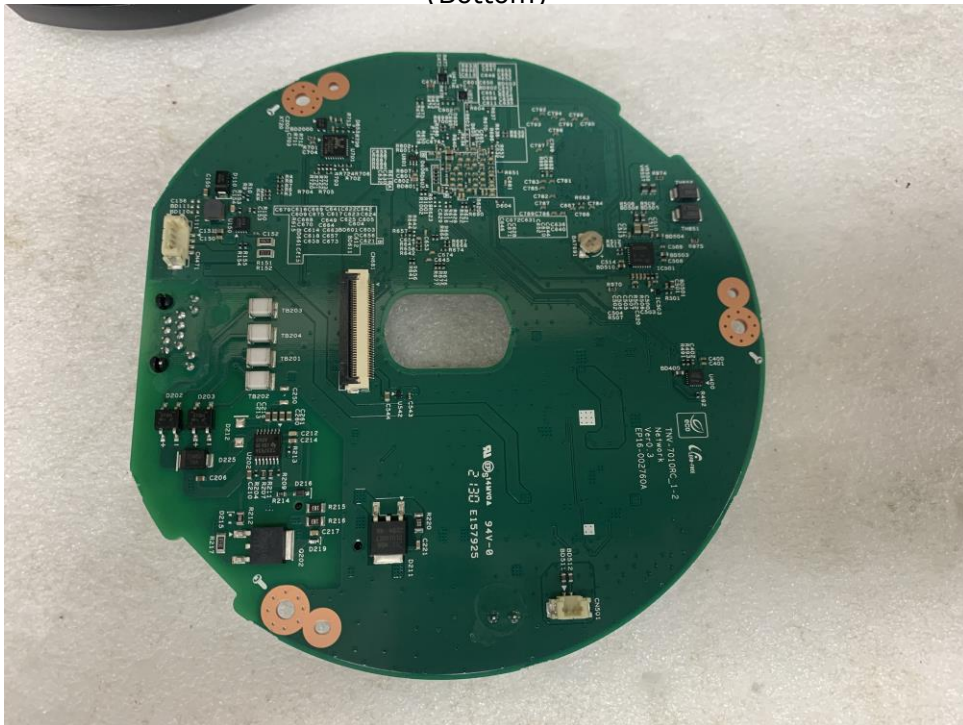


EUT Internal View – Board 1

(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 kes@kes.co.kr

EUT Internal View – Board 2

(Top)



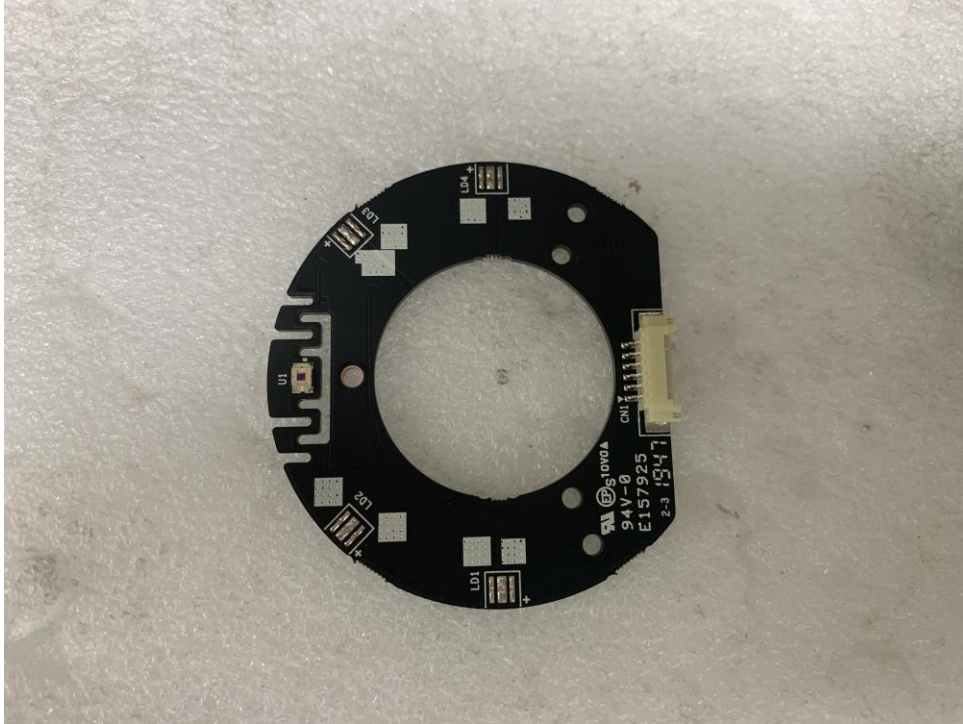
(Bottom)



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 kes@kes.co.kr

EUT Internal View – Board 3

(Top)



(Bottom)



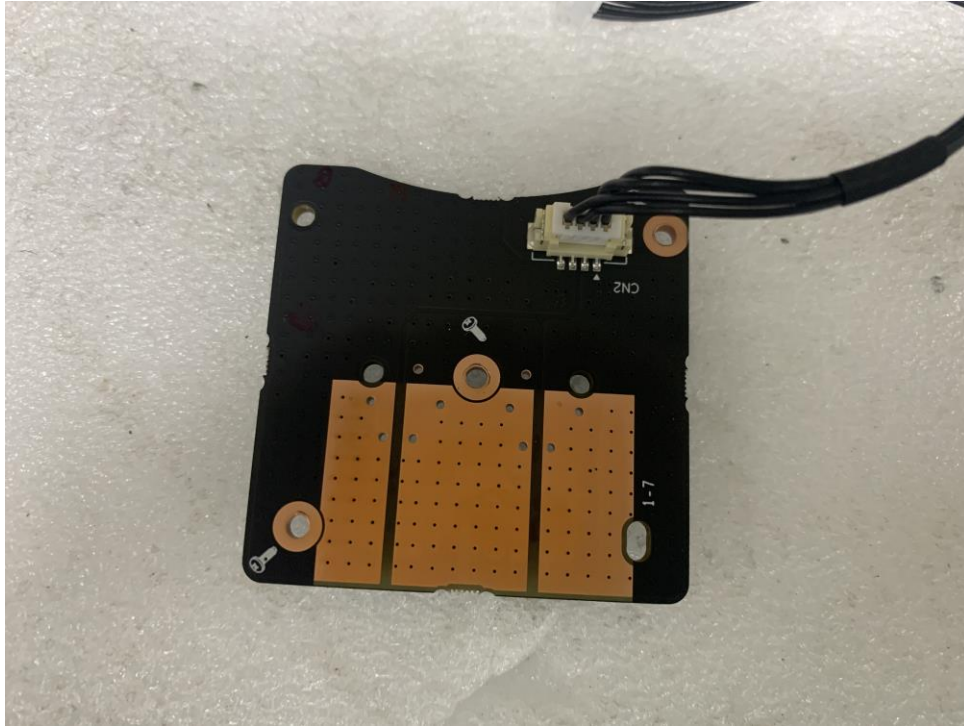
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.

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

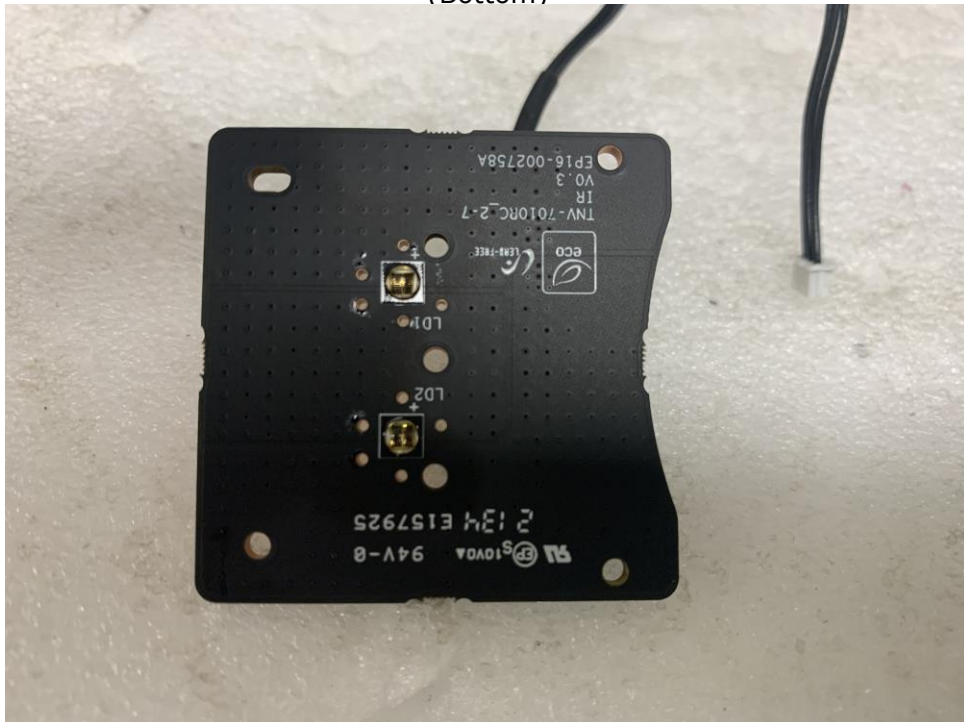
The authenticity of the test report, contact kes@kes.co.kr

EUT Internal View – Board 4

(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