

EMC TEST REPORT

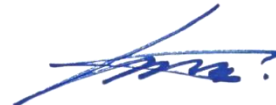
Test Report No. : KES-EM-22T0683-R1
Date of Issue : Feb. 24, 2023
Product name : Thermal Camera
Model/Type No. : TNO-4040TR
Variant Model : TNO-4030TR, TNO-L4030TR
Applicant : Hanwha Vision Co., Ltd
Applicant Address : 6, Pangyo-ro 319Beon-gil, Bundang-gu, Seongnam-si,
Gyeonggi-do, Republic of Korea
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)
Equipment authorization : **Supplier's Declaration of Conformity**
Date of Receipt : Jul. 21, 2022
Test date : Jul. 24, 2022 ~ Jul. 25, 2022
Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by



Min-Seong, 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.



REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Aug. 08, 2022	KES-EM-22T0683	Issued
Feb. 24, 2023	KES-EM-22T0683-R1	Change the Applicant and manufacturer at the request of the customer.

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1.0 General Product Description

Main Specifications of EUT are:

	TNO-4030TR	TNO-4040TR	TNO-4041TR
VIDEO			
Imaging Device	Uncooled micro bolometer		
Effective Pixels	None		
NETD	< 50mK		
Pixel Size	17μm		
Min. Illumination	None		
LENS			
Focal Length (Zoom Ratio)	13mm fixed focal	19mm fixed focal	
Max. Aperture Ratio	F1.0		
Angular Field of View	H : 48.6° / V : 36.4 / D : 61.6°	H : 32° / V : 24.3° / D : 39.2°	
Min. Object Distance	5m (16.40ft)	11m (36.09ft)	
Focus Control	Fixed		
OPERATIONAL			
Camera Title	Displayed up to 85 characters		
Digital Image Stabilization	Support (Built-in gyro sensor)		
Motion Detection	8ea, 8point polygonal zones		
Privacy Masking	32ea, polygonal zones - Color : Grey / Green / Red / Blue / Black / White - Mosaic		
Video Rotation	Flip, Mirror, Hallway view (90°/270°)		Flip, Mirror
Analytics	Directional detection, Motion detection, Appear/Disappear, Enter/Exit, Loitering, Tampering, Virtual line, Audio detection, Temperature ditionction, Sound classification, Shock detection		
Serial Interface	-		RS-485 (Samsung-T, Pelco-D/P, Panasonic, Bosch, AD, GE, Vicon, Honeywell)
Alarm I / O	Input 1ea / Output 2ea		
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 In	Selectable (mic in/line in) Supply voltage : 2.5VDC (4mA), Input impedance : 2K Ohm		
Audio out	Line out, Max.output level : 1Vrms		
RADIOMETRY			
Temperature detect range	-20°C~130°C (-4°F~266°F)		
Temperature accuracy	±5°C(≤100°C), ±20%(>100°C)		
Temperature detection	3ea rectangular		
Additional	Hybrid palettes, Spot temperature reading		
NETWORK			
Ethernet	RJ-45 (10/100BASE-T)		
Video Compression	H.265/H.264: Main/Baseline/High, MJPEG		
Resolution	640 x 480, 640 x 360, 320 x 240		
Max. Framerate	H.265/H.264 : Max. 30fps/25fps (60Hz/50Hz) MJPEG : Max. 30fps/25fps (60Hz/50Hz)		
Smart Codec	Manual (5ea area), WiseStream II		

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	TNO-4030TR	TNO-4040TR	TNO-4041TR
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)		
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, 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)		
Edge Storage	Micro SD/SDHC/SDXC 1slot 256GB		
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 7, 8.1, 10, Mac OS X 10.10, 10.11, 10.12 Recommended Browser : Google Chrome Supported Browser : MS Explorer11, MS Edge, Mozilla Firefox (Windows 64bit only), Apple Safari (Mac OS X only)		
Memory	1024MB RAM, 256MB Flash		
ENVIRONMENTAL			
Operating Temperature / Humidity	-40°C ~ +60°C (-40°F ~ +140°F) / Less than 90% RH		
Storage Temperature / Humidity	-50°C ~ +60°C (-58°F ~ +140°F) / Less than 90% RH		
Certification	IP66, IK10, NEMA4X		
ELECTRICAL			
Input Voltage	PoE (IEEE802.3af, Class3), 24VAC, 12VDC		
Power Consumption	PoE : Max. 10W, typical 8.6W 12VDC : Max. 9W, typical 7.5W 24VAC : Max. 10.5W, typical 8.9W		
MECHANICAL			
Color / Material	White / Aluminium		
RAL Code	RAL9003		
Product dimensions / weight	Φ101.97x401.8mm (4.01x15.82") / 3,124g (6.89lb)		Φ101.97x309mm (4.01x12.17") / 2,452g (5.41lb)

* The latest product information / specification can be found at hanwha-security.co.uk

* Design and specifications are subject to change without notice.

* Wisenet is the proprietary brand of Hanwha Techwin.

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1.1 Test Voltage & Frequency

Unless indicated otherwise on the individual data sheet or test results, the test voltage and frequency was as indicated below.

- ☒ AC 120 V, 60 Hz (AC Adapter Input Power)
- ☒ AC 120 V, 60 Hz (DC Adapter Input Power)
- ☒ AC 120 V, 60 Hz (PoE Adapter Input Power)

1.2 Variant Model Differences

A derivative model to the classification of customers simple.

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
Thermal Camera	TNO-4040TR	-	HANWHA VISION VIETNAM COMPANY LIMITED	EUT

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1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
AC/AC Adapter	-	-	-	-
AC/DC Adapter	2ACB022F	-	ChAnnel Well Technology (Guangzhou) Co.,Ltd.	-
PoE Adapter	MA-INJ-4	-	CHANGZHOU WUJIN HONGGUANG RADIO CO, LTD.	-
Notebook	Latitude 5300	8C47BE45C060	DELL INC.	-
Notebook Adapter	HA65NM130	-	Chicony Power Technology(Suzhou)Co.,L td.	-
Micro SD Card	-	-	SanDisk	32 GB
Headset	K550	-	Britz®	-
Alarm	PRO-SL	-	SENSOR PRO	-
Button Alarm	-	-	-	-
Smart Phone	SM-N950N	R39JB0C3FB	SAMSUNG	-

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1.6 External I/O Cabling

■ AC Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
Thermal Camera (EUT)	2 Pin	AC/AC Adapter	Line-Out (2 Pin)	1.0	U
	RJ-45	Notebook	RJ-45	3.0	U
	SLOT	Micro SD Card	SLOT	-	-
	MIC (3.5 mm)	Headset	XLR	2.0	U
	Speaker (3.5 mm)		Line-Out (3.5 mm)	1.6	U
	2 Pin	Alarm	Line-Out (2 Pin)	3.0	U
	2 Pin	Button Alarm	Line-Out (2 Pin)	3.0	U
Notebook	DC Jack	Notebook Adapter	Line-Out (DC Jack)	1.0	U
	3.5 mm	Smart Phone	3.5 mm	1.0	U

* Unshielded=U, Shielded=S

■ DC Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
Thermal Camera (EUT)	2 Pin	AC/DC Adapter	Line-Out (2 Pin)	1.0	U
	RJ-45	Notebook	RJ-45	3.0	U
	SLOT	Micro SD Card	SLOT	-	-
	MIC (3.5 mm)	Headset	XLR	2.0	U
	Speaker (3.5 mm)		Line-Out (3.5 mm)	1.6	U
	2 Pin	Alarm	Line-Out (2 Pin)	3.0	U
	2 Pin	Button Alarm	Line-Out (2 Pin)	3.0	U
Notebook	DC Jack	Notebook Adapter	Line-Out (DC Jack)	1.0	U
	3.5 mm	Smart Phone	3.5 mm	1.0	U

* Unshielded=U, Shielded=S

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■ PoE Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
Thermal Camera (EUT)	RJ-45 (PoE)	PoE Adapter	RJ-45 (PoE)	3.0	U
	SLOT	Micro SD Card	SLOT	-	-
	MIC (3.5 mm)	Headset	XLR	2.0	U
	Speaker (3.5 mm)		Line-Out (3.5 mm)	1.6	U
	2 Pin	Alarm	Line-Out (2 Pin)	3.0	U
	2 Pin	Button Alarm	Line-Out (2 Pin)	3.0	U
Notebook	RJ-45	PoE Adapter	RJ-45 (DATA)	1.0	U
	DC Jack	Notebook Adapter	Line-Out (DC Jack)	1.0	U
	3.5 mm	Smart Phone	3.5 mm	1.0	U

* Unshielded=U, Shielded=S

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1.7 EUT Operating Mode(s)

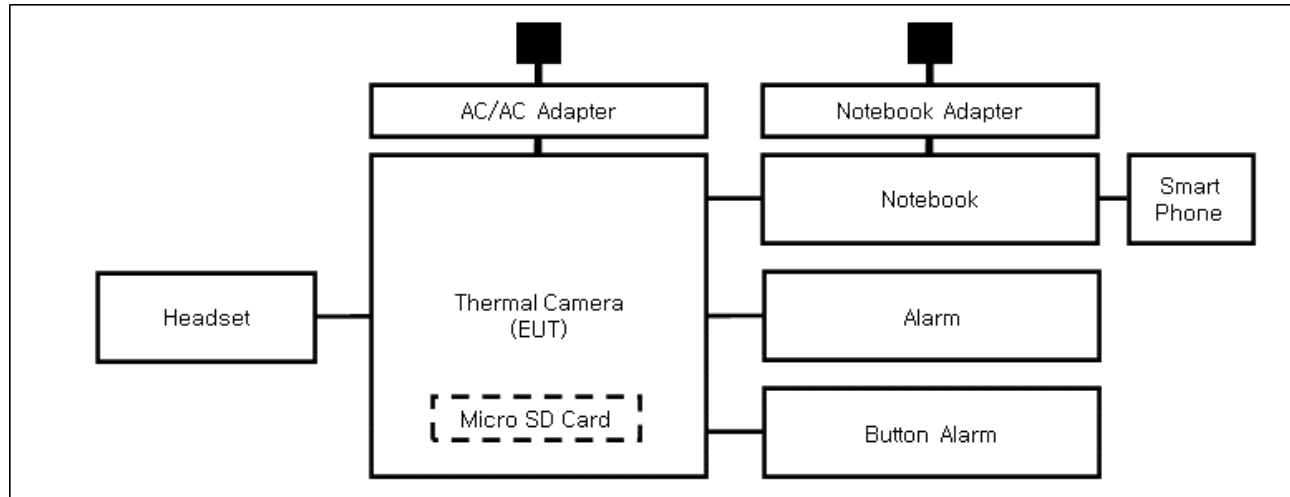
Test Mode	operating
Operation	<ul style="list-style-type: none">- By connecting to the Web Viewer, checking the video output of EUT and performing a ping test, it was confirmed that the network function is operating normally.- After the test, the Micro SD Card was checked to see if it was recorded normally.

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

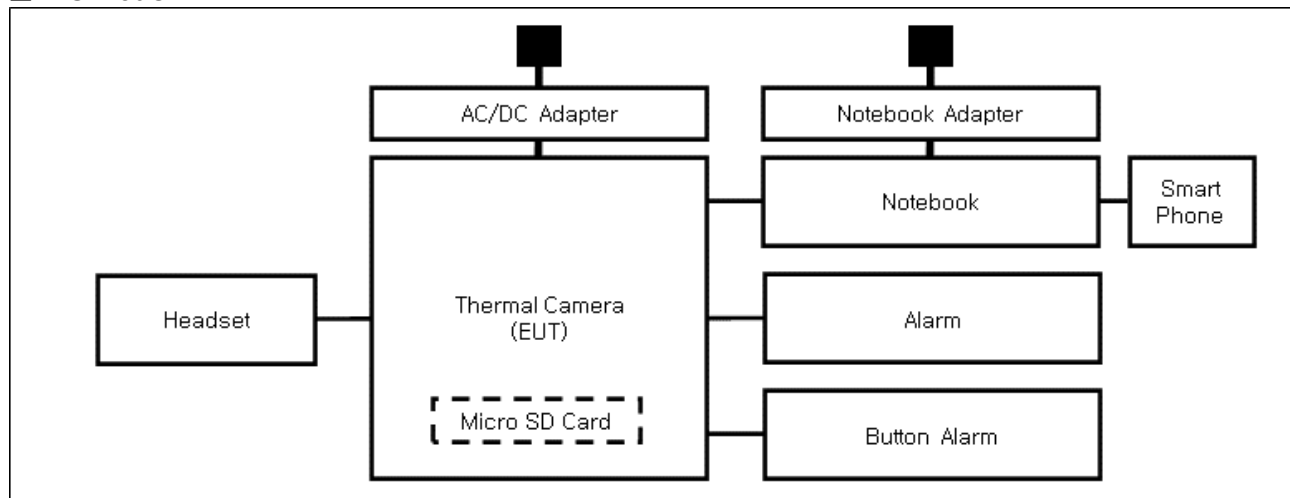
1.8 Configuration

■ AC Main
 □ DC Main

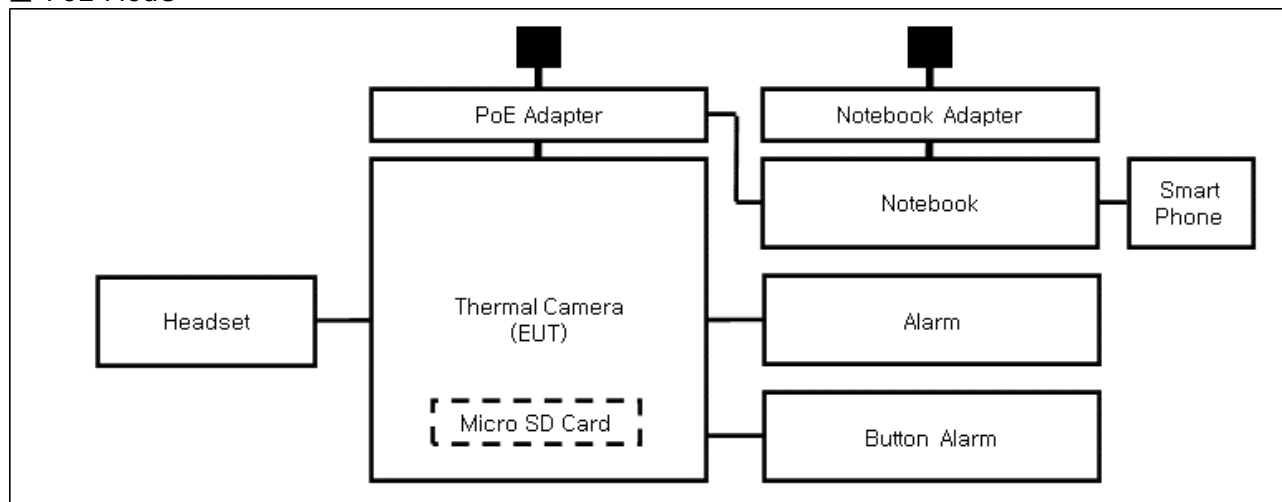
■ AC Mode



■ DC Mode



■ PoE Mode



1.9 Remarks when standards applied

- VIDEO port and USB port were excluded from testing because it is the management port.
- PoE port is considered to be wired network port, so power-related test items are excluded.







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

2.0 Test Regulations

The emissions tests were performed according to following regulations:

☒ **47 CFR Part 15, Subpart B**

☐ CISPR 22:2009 +A1:2010

☐ Class A

☐ Class B

☒ ANSI C63.4a-2017

☒ Class A

☐ Class B

☒ **IC Regulation ICES-003 Issue 7**

☐ CAN/CSA-CISPR 32:17

☐ Class A

☐ Class B

☒ ANSI C63.4a-2017

☒ Class A

☐ Class B

2.1 Conducted Emissions at Mains Power Ports

Test Date

Jul. 24, 2022

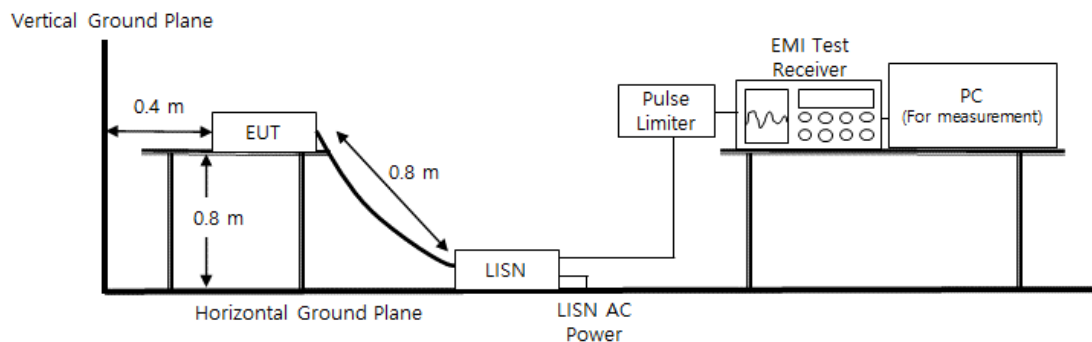
Test Location

Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMI Test S/W	EMC32	R & S	9.12.00	-
<input checked="" type="checkbox"/>	EMI TEST RECEIVER	ESR3	R & S	101783	12, 28, 2022
<input checked="" type="checkbox"/>	LISN	ENV216	R & S	101787	12, 27, 2022
<input checked="" type="checkbox"/>	LISN	ESH2-Z5	R & S	100450	12, 27, 2022
<input checked="" type="checkbox"/>	PULSE LIMITER	ESH3-Z2	R & S	101915	12, 27, 2022

Diagram of test setup





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Test Conditions

Temperature: (24,5 ± 0,2) °C
Relative Humidity: (45,2 ± 0,3) % 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.

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2.2 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Jul. 24, 2022

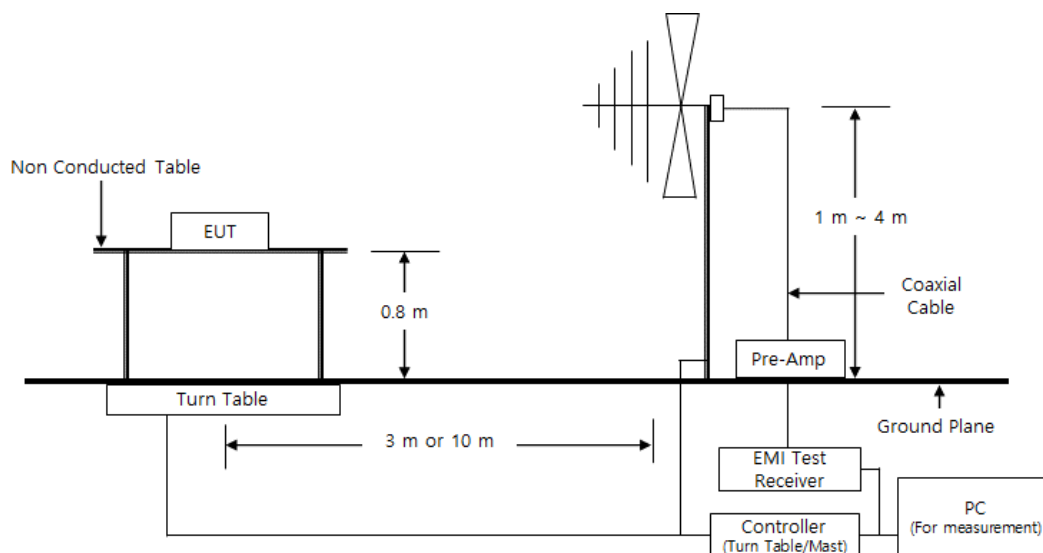
Test Location

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

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.0	-
<input checked="" type="checkbox"/>	EMI TEST RECEIVER	ESU26	R & S	100551	03, 31, 2023
<input checked="" type="checkbox"/>	AMPLIFIER	SCU 01	R & S	100603	11, 24, 2022
<input checked="" type="checkbox"/>	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	12, 08, 2022
<input checked="" type="checkbox"/>	ATTENUATOR	8491A	HP	32173	03, 08, 2023

Diagram of test setup





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Test Conditions

Temperature: (25,0 ± 0,2) °C

Relative Humidity: (45,3 ± 0,4) % 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.

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2.3 Radiated Electric Field Emissions(Above 1 GHz)

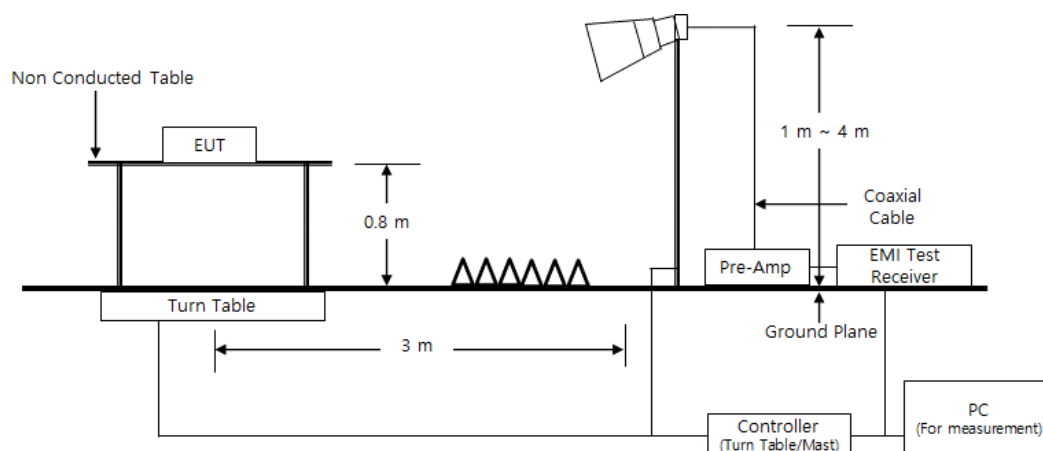
Test Date
Jul. 25, 2022

Test Location
SEMI ANECHOIC CHAMBER #5

Test Equipment

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

Diagram of test setup





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Test Conditions

Temperature: (24,5 ± 0,1) °C

Relative Humidity: (45,7 ± 0,3) % R.H.

Frequency Range of Measurement

1 GHz to 5 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.

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APPENDIX A – TEST DATA

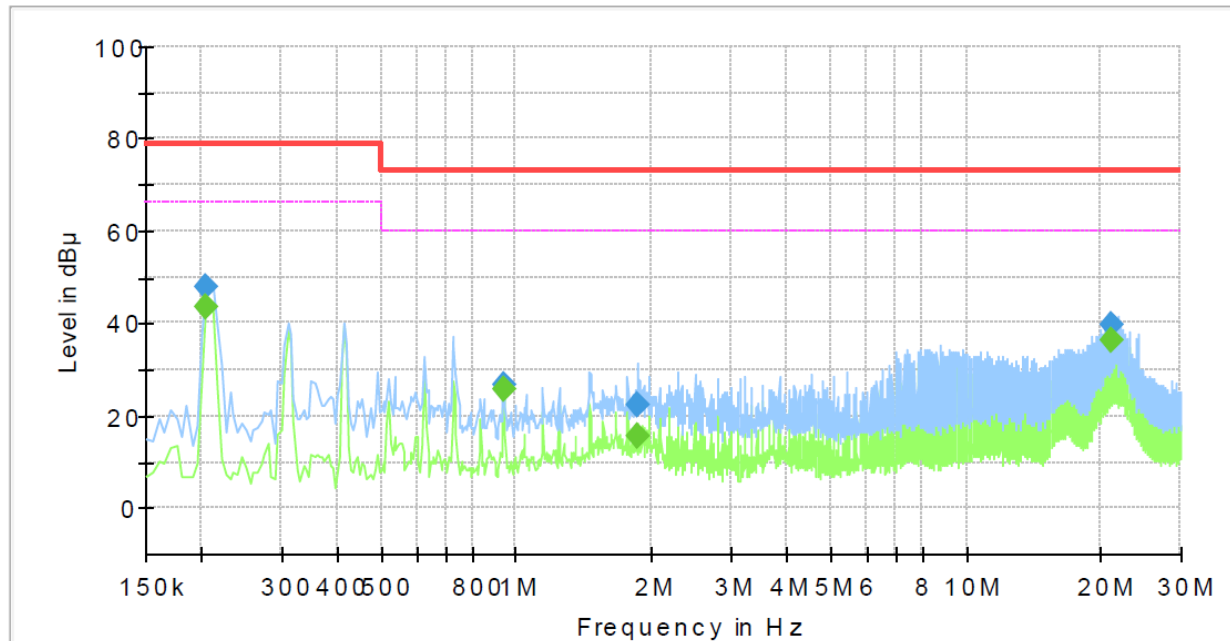
Conducted Emissions at Mains Power Ports

■ AC Mode

HOT LINE

Common Information

Test Description:	Conducted Emission
Model No.:	TNO-4040TR
Phase:	L1
Mode:	AC
Operator Name:	KES



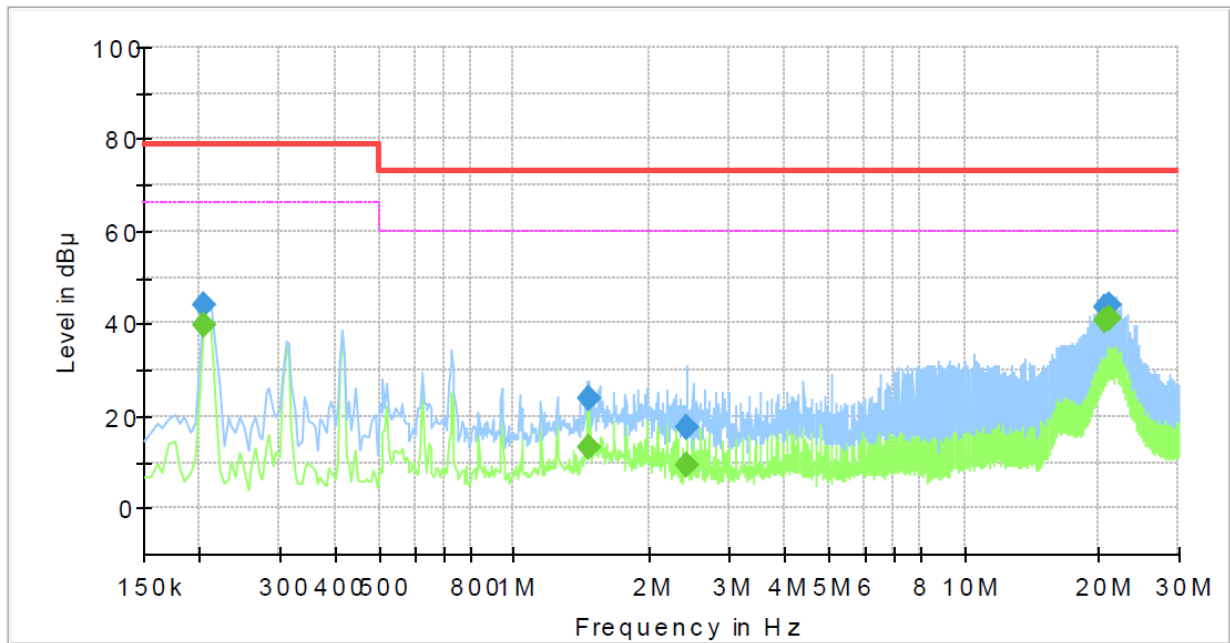
Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.205000	---	43.43	66.00	22.57	1000.0	9.000	L1	19.4
0.205000	48.10	---	79.00	30.90	1000.0	9.000	L1	19.4
0.935000	---	25.74	60.00	34.26	1000.0	9.000	L1	20.1
0.935000	26.56	---	73.00	46.44	1000.0	9.000	L1	20.1
1.865000	---	15.40	60.00	44.60	1000.0	9.000	L1	20.3
1.865000	22.27	---	73.00	50.73	1000.0	9.000	L1	20.3
21.175000	---	36.10	60.00	23.90	1000.0	9.000	L1	20.1
21.175000	39.78	---	73.00	33.22	1000.0	9.000	L1	20.1

NEUTRAL LINE

Common Information

Test Description:	Conducted Emission
Model No.:	TNO-4040TR
Phase:	N
Mode:	AC
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.205000	---	39.62	66.00	26.38	1000.0	9.000	N	19.4
0.205000	43.92	---	79.00	35.08	1000.0	9.000	N	19.4
1.465000	---	13.33	60.00	46.67	1000.0	9.000	N	20.2
1.465000	23.85	---	73.00	49.15	1000.0	9.000	N	20.2
2.420000	---	9.21	60.00	50.79	1000.0	9.000	N	20.3
2.420000	17.51	---	73.00	55.49	1000.0	9.000	N	20.3
20.660000	---	40.84	60.00	19.16	1000.0	9.000	N	20.2
20.660000	43.63	---	73.00	29.37	1000.0	9.000	N	20.2
21.075000	---	41.38	60.00	18.62	1000.0	9.000	N	20.2
21.075000	44.21	---	73.00	28.79	1000.0	9.000	N	20.2

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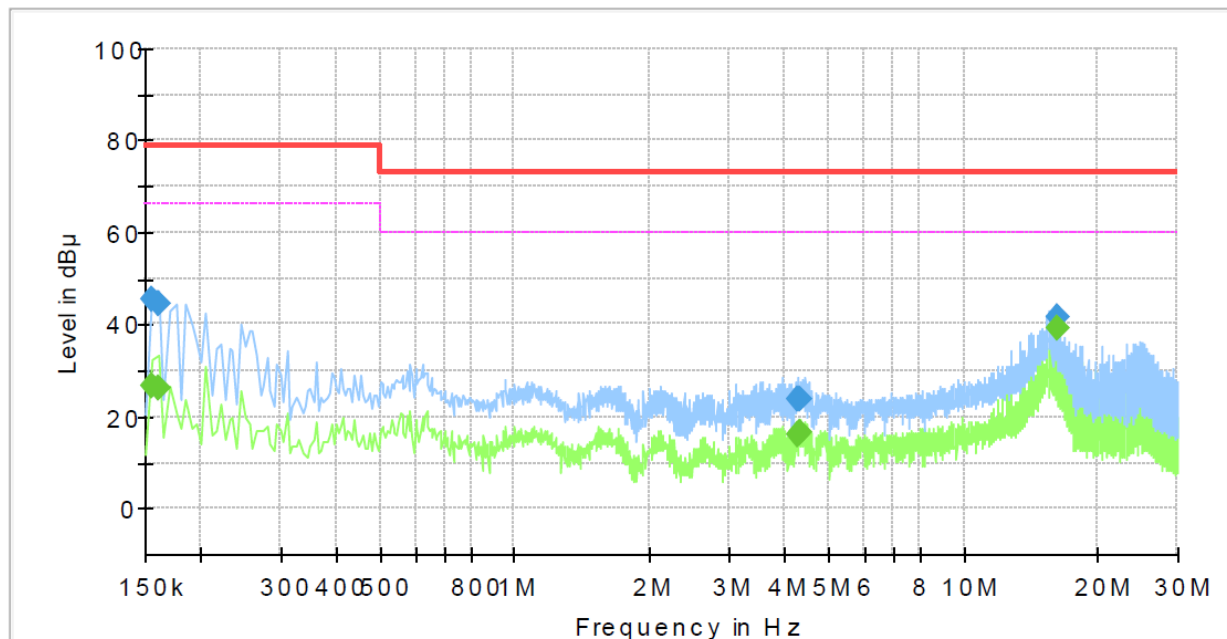
The authenticity of the test report, contact kes@kes.co.kr

DC Mode

HOT LINE

Common Information

Test Description:	Conducted Emission
Model No.:	TNO-4040TR
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)
0.155000	---	26.44	66.00	39.56	1000.0	9.000	L1	19.4
0.155000	45.50	---	79.00	33.50	1000.0	9.000	L1	19.4
0.160000	---	25.98	66.00	40.02	1000.0	9.000	L1	19.4
0.160000	44.48	---	79.00	34.52	1000.0	9.000	L1	19.4
4.290000	---	16.15	60.00	43.85	1000.0	9.000	L1	19.8
4.290000	23.87	---	73.00	49.13	1000.0	9.000	L1	19.8
4.330000	---	16.53	60.00	43.47	1000.0	9.000	L1	19.8
4.330000	23.96	---	73.00	49.04	1000.0	9.000	L1	19.8
16.230000	---	39.02	60.00	20.98	1000.0	9.000	L1	19.9
16.230000	41.66	---	73.00	31.34	1000.0	9.000	L1	19.9

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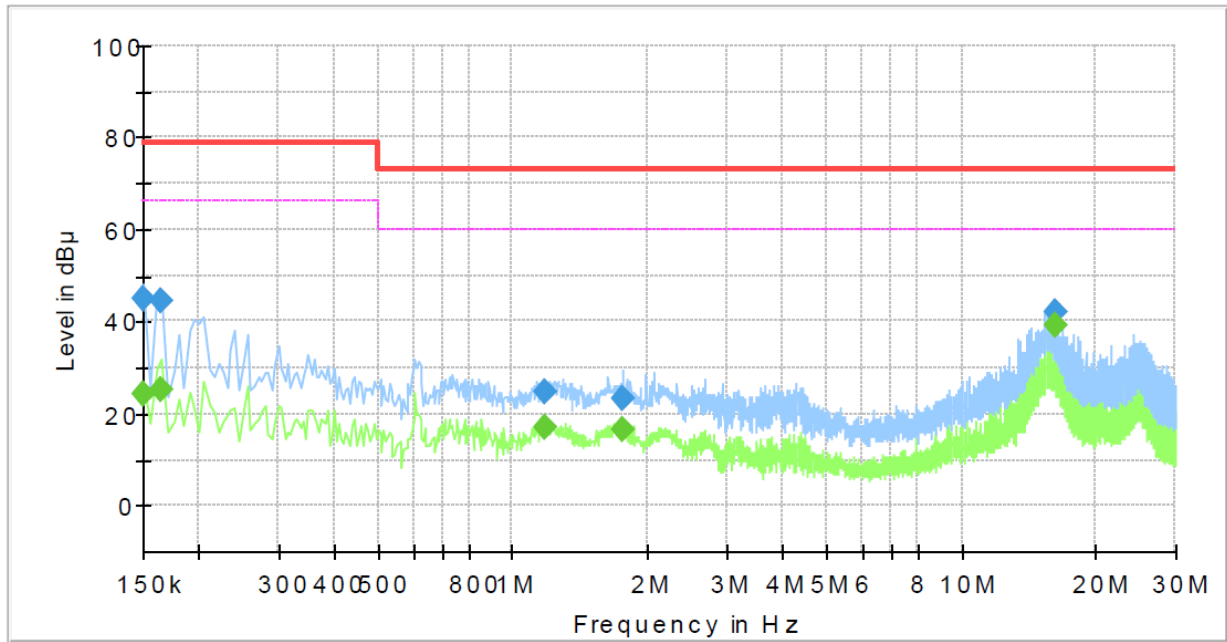
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NEUTRAL LINE

Common Information

Test Description:	Conducted Emission
Model No.:	TNO-4040TR
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)
0.150000	---	24.42	66.00	41.58	1000.0	9.000	N	19.4
0.150000	45.22	---	79.00	33.78	1000.0	9.000	N	19.4
0.165000	---	25.04	66.00	40.96	1000.0	9.000	N	19.4
0.165000	44.72	---	79.00	34.28	1000.0	9.000	N	19.4
1.175000	---	16.88	60.00	43.12	1000.0	9.000	N	20.1
1.175000	24.50	---	73.00	48.50	1000.0	9.000	N	20.1
1.760000	---	16.36	60.00	43.64	1000.0	9.000	N	20.3
1.760000	23.23	---	73.00	49.77	1000.0	9.000	N	20.3
16.230000	---	39.38	60.00	20.62	1000.0	9.000	N	19.9
16.230000	41.99	---	73.00	31.01	1000.0	9.000	N	19.9

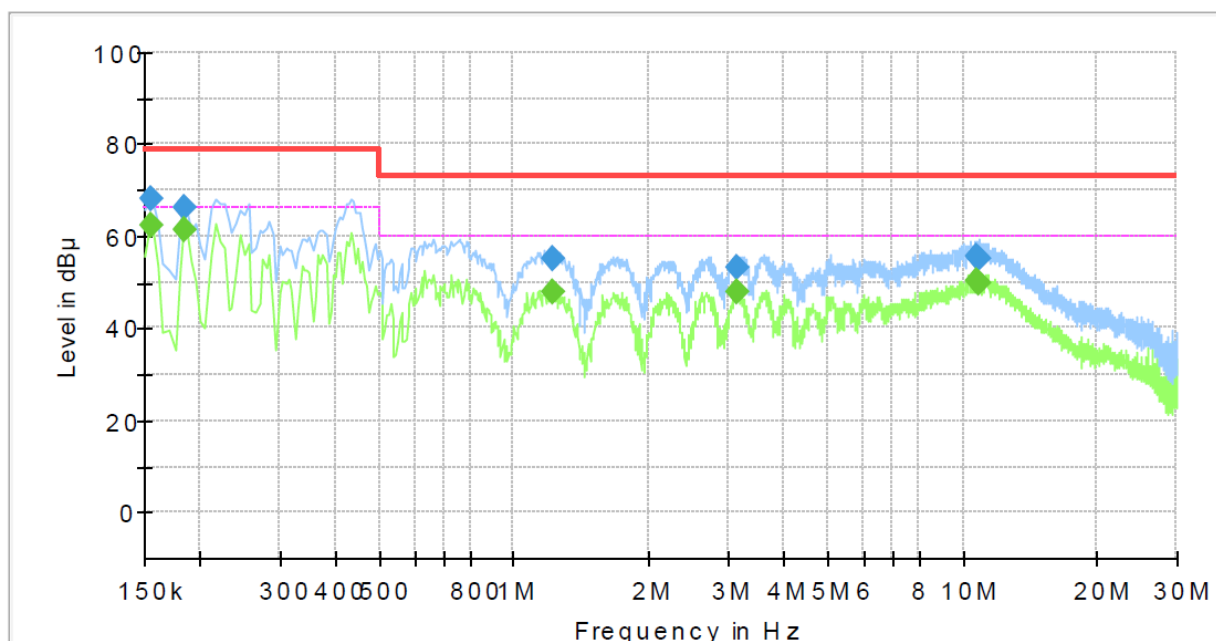
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PoE Mode
HOT LINE
Common Information

Test Description:	Conducted Emission
Model No.:	TNO-4040TR
Phase:	L1
Mode:	PoE
Operator Name:	KES

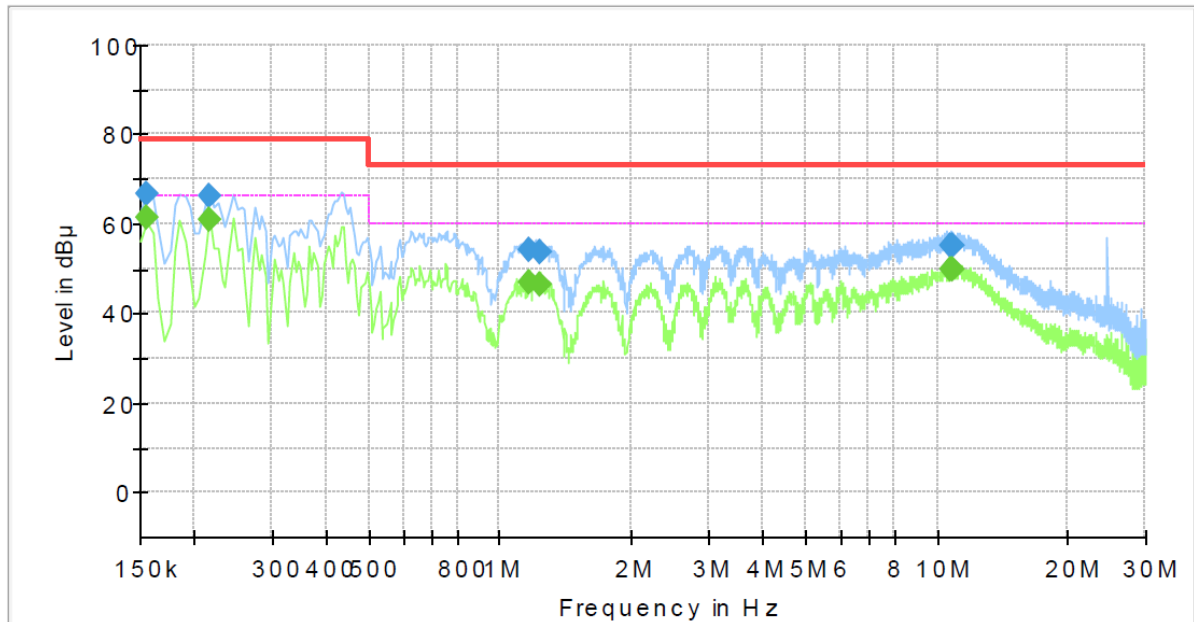

Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.155000	---	62.57	66.00	3.43	1000.0	9.000	L1	19.4
0.155000	68.05	---	79.00	10.95	1000.0	9.000	L1	19.4
0.185000	---	61.60	66.00	4.40	1000.0	9.000	L1	19.4
0.185000	66.43	---	79.00	12.57	1000.0	9.000	L1	19.4
1.225000	---	48.04	60.00	11.96	1000.0	9.000	L1	20.1
1.225000	55.07	---	73.00	17.93	1000.0	9.000	L1	20.1
3.135000	---	47.67	60.00	12.33	1000.0	9.000	L1	20.1
3.135000	53.27	---	73.00	19.73	1000.0	9.000	L1	20.1
10.820000	---	50.44	60.00	9.56	1000.0	9.000	L1	19.9
10.820000	55.70	---	73.00	17.30	1000.0	9.000	L1	19.9
10.935000	---	50.01	60.00	9.99	1000.0	9.000	L1	19.9
10.935000	55.35	---	73.00	17.65	1000.0	9.000	L1	19.9

NEUTRAL LINE

Common Information

Test Description:	Conducted Emission
Model No.:	TNO-4040TR
Phase:	N
Mode:	PoE
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	---	61.17	66.00	4.83	1000.0	9.000	N	19.4
0.155000	66.50	---	79.00	12.50	1000.0	9.000	N	19.4
0.215000	---	60.88	66.00	5.12	1000.0	9.000	N	19.4
0.215000	65.99	---	79.00	13.01	1000.0	9.000	N	19.4
1.170000	---	46.83	60.00	13.17	1000.0	9.000	N	20.1
1.170000	54.05	---	73.00	18.95	1000.0	9.000	N	20.1
1.235000	---	46.55	60.00	13.45	1000.0	9.000	N	20.1
1.235000	53.75	---	73.00	19.25	1000.0	9.000	N	20.1
10.735000	---	49.89	60.00	10.11	1000.0	9.000	N	19.9
10.735000	55.20	---	73.00	17.80	1000.0	9.000	N	19.9
10.935000	---	49.69	60.00	10.31	1000.0	9.000	N	19.9
10.935000	54.94	---	73.00	18.06	1000.0	9.000	N	19.9

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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

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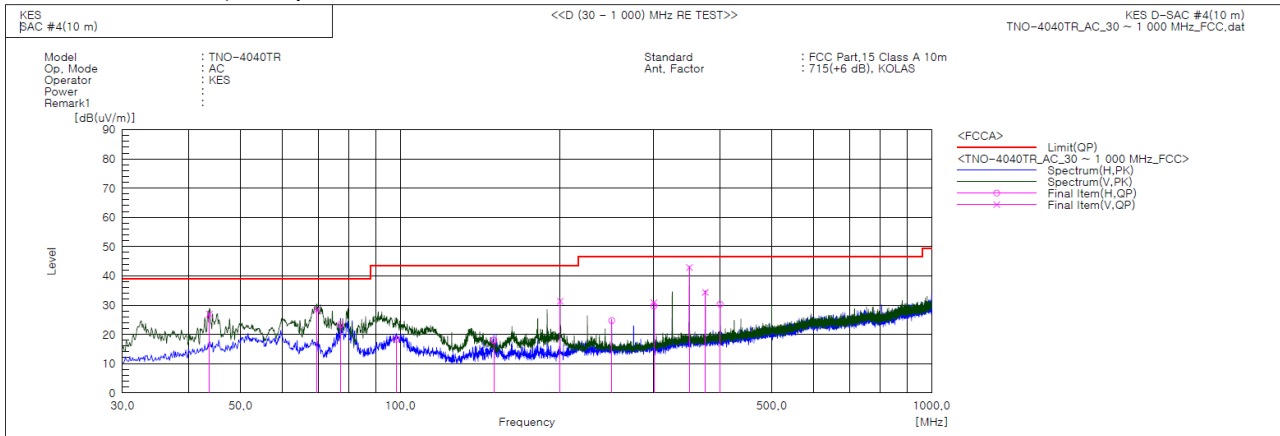
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Radiated Electric Field Emissions(Below 1 GHz)

■ AC Mode

- 47 CFR Part 15, Subpart B

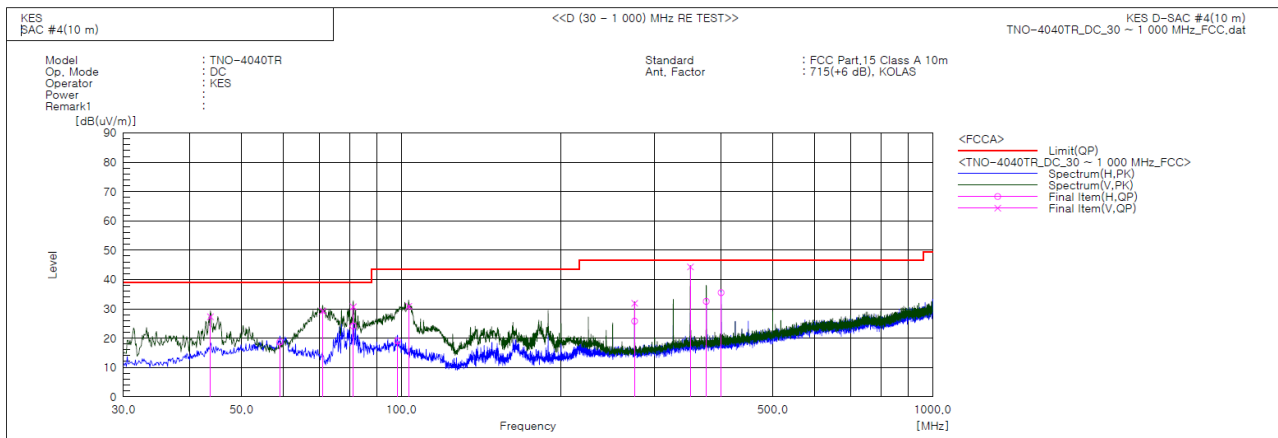


Final Result

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	43.701	V	48.5	-21.6	26.9	39.0	12.1	130.0	16.0	
2	69.649	V	53.1	-24.7	28.4	39.0	10.6	121.0	69.0	
3	77.166	H	50.8	-27.4	23.4	39.0	15.6	368.0	278.0	
4	98.385	H	41.0	-22.7	18.3	43.5	25.2	383.0	168.0	
5	149.916	H	43.3	-25.3	18.0	43.5	25.5	400.0	278.0	
6	199.993	V	52.3	-21.0	31.3	43.5	12.2	113.0	160.0	
7	249.948	H	44.0	-19.3	24.7	46.5	21.8	335.0	186.0	
8	300.024	V	48.8	-18.0	30.8	46.5	15.7	164.0	16.0	
9	300.029	H	47.7	-18.0	29.7	46.5	16.8	326.0	61.0	
10	349.979	V	58.2	-15.3	42.9	46.5	3.6	100.0	289.0	
11	374.956	V	49.2	-14.8	34.4	46.5	12.1	100.0	324.0	
12	400.055	H	44.5	-14.2	30.3	46.5	16.2	334.0	133.0	

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DC Mode

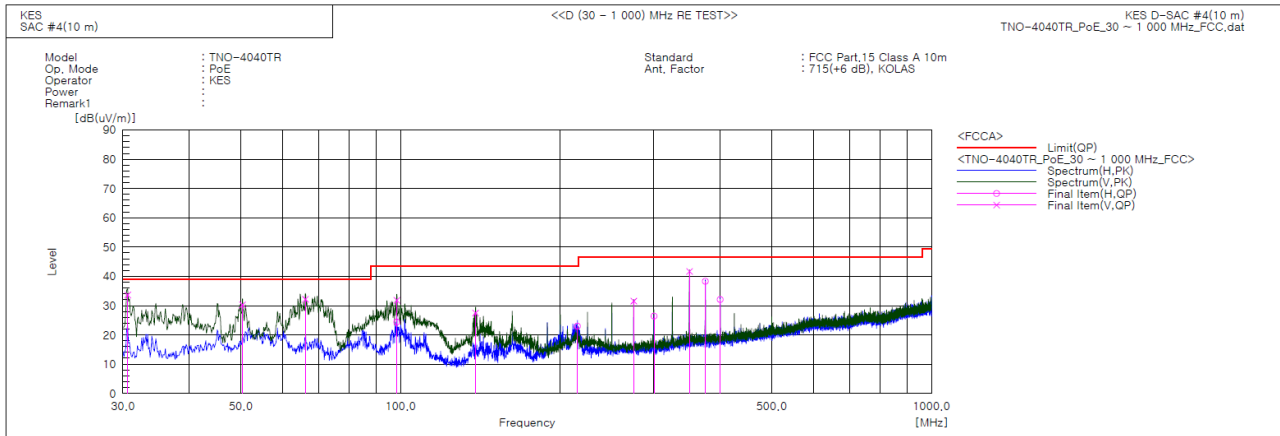


Final Result

No.	Frequency	(P)	Reading	c.f	Result	Limit	Margin	Height	Angle	Remark
	[MHz]		QP [dB(uV)]	[dB(1/m)]	QP [dB(uV/m)]	QP [dB(uV/m)]	QP [dB]	[cm]	[deg]	
1	43.701	V	48.9	-21.6	27.3	39.0	11.7	100.0	213.0	
2	59.100	H	40.5	-21.8	18.7	39.0	20.3	400.0	188.0	
3	71.104	V	54.5	-25.3	29.2	39.0	9.8	124.0	204.0	
4	81.163	V	58.3	-27.6	30.7	39.0	8.3	116.0	296.0	
5	81.168	H	51.7	-27.6	24.1	39.0	14.9	331.0	151.0	
6	98.385	H	41.7	-22.7	19.0	43.5	24.5	400.0	3.0	
7	103.235	V	53.4	-22.5	30.9	43.5	12.6	143.0	50.0	
8	274.925	V	50.6	-18.7	31.9	46.5	14.6	100.0	2.0	
9	274.925	H	44.5	-18.7	25.8	46.5	20.7	354.0	279.0	
10	349.979	V	59.6	-15.3	44.3	46.5	2.2	100.0	213.0	
11	374.956	H	47.3	-14.8	32.5	46.5	14.0	317.0	297.0	
12	400.055	H	49.7	-14.2	35.5	46.5	11.0	336.0	113.0	



PoE Mode



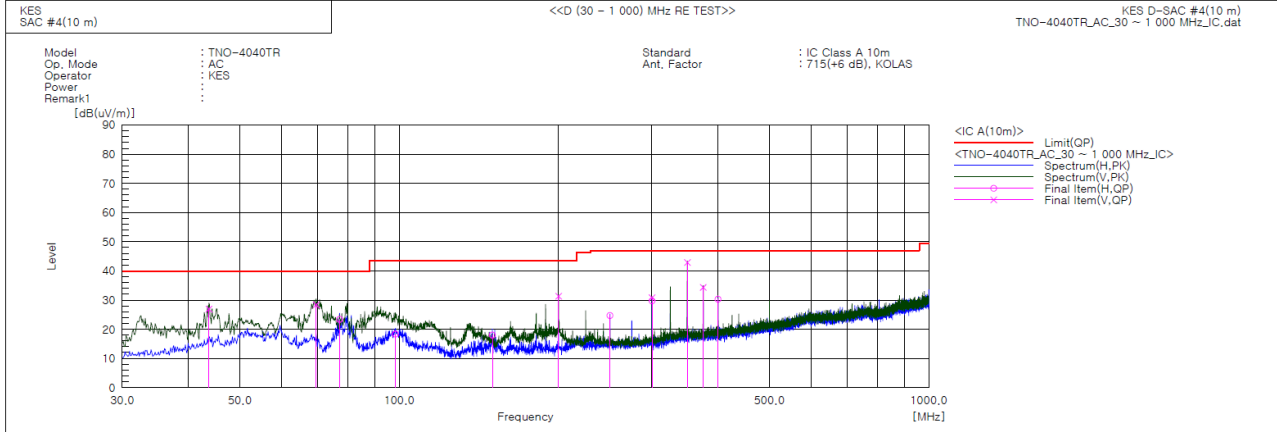
Final Result

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	30.606	V	58.9	-25.2	33.7	39.0	5.3	100.0	34.0	
2	50.370	V	51.3	-21.0	30.3	39.0	8.7	142.0	98.0	
3	66.133	V	55.8	-23.6	32.2	39.0	6.8	137.0	242.0	
4	98.383	V	54.5	-22.7	31.8	43.5	11.7	121.0	170.0	
5	98.385	H	47.1	-22.7	24.4	43.5	19.1	376.0	332.0	
6	138.398	V	53.0	-25.5	27.5	43.5	16.0	135.0	270.0	
7	215.270	H	43.6	-20.6	23.0	43.5	20.5	400.0	261.0	
8	274.925	V	50.3	-18.7	31.6	46.5	14.9	100.0	270.0	
9	300.024	H	44.4	-18.0	26.4	46.5	20.1	339.0	262.0	
10	349.979	V	57.0	-15.3	41.7	46.5	4.8	100.0	34.0	
11	374.956	H	53.1	-14.8	38.3	46.5	8.2	364.0	116.0	
12	400.055	H	46.3	-14.2	32.1	46.5	14.4	371.0	80.0	



■ AC Mode

- IC Regulation ICES-003 Issue 7

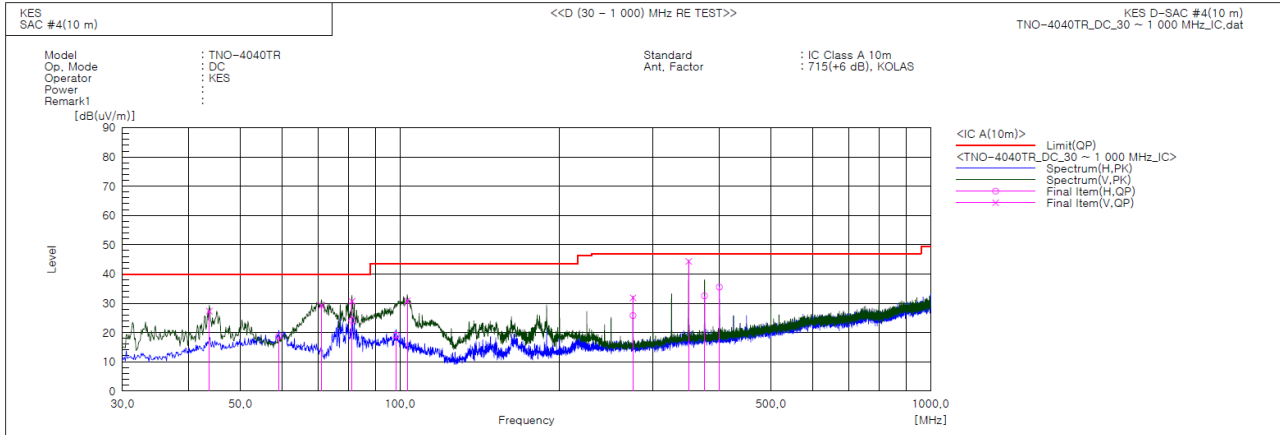


Final Result

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	43.701	V	48.5	-21.6	26.9	40.0	13.1	130.0	16.0	
2	69.649	V	53.1	-24.7	28.4	40.0	11.6	121.0	69.0	
3	77.166	H	50.8	-27.4	23.4	40.0	16.6	368.0	278.0	
4	98.385	H	41.0	-22.7	18.3	43.5	25.2	383.0	168.0	
5	149.916	H	43.3	-25.3	18.0	43.5	25.5	400.0	278.0	
6	199.993	V	52.3	-21.0	31.3	43.5	12.2	113.0	160.0	
7	249.948	H	44.0	-19.3	24.7	47.0	22.3	335.0	186.0	
8	300.024	V	48.8	-18.0	30.8	47.0	16.2	164.0	16.0	
9	300.029	H	47.7	-18.0	29.7	47.0	17.3	326.0	61.0	
10	349.979	V	58.2	-15.3	42.9	47.0	4.1	100.0	289.0	
11	374.956	V	49.2	-14.8	34.4	47.0	12.6	100.0	324.0	
12	400.055	H	44.5	-14.2	30.3	47.0	16.7	334.0	133.0	

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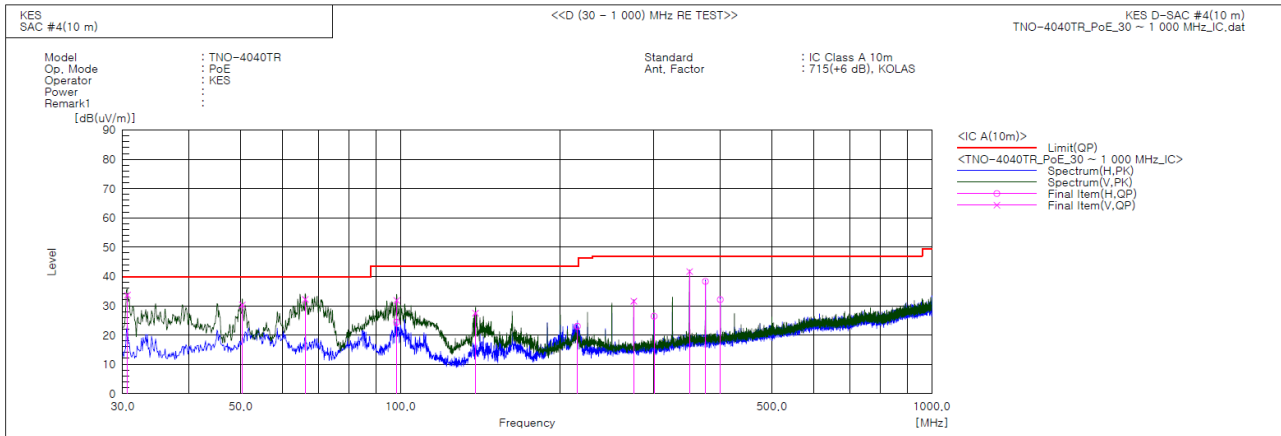
DC Mode



Final Result

No.	Frequency	(P)	Reading	c.f	Result	Limit	Margin	Height	Angle	Remark
	[MHz]		QP [dB(uV)]	[dB(1/m)]	QP [dB(uV/m)]	QP [dB(uV/m)]	QP [dB]	[cm]	[deg]	
1	43.701	V	48.9	-21.6	27.3	40.0	12.7	100.0	213.0	
2	59.100	H	40.5	-21.8	18.7	40.0	21.3	400.0	188.0	
3	71.104	V	54.5	-25.3	29.2	40.0	10.8	124.0	204.0	
4	81.163	V	58.3	-27.6	30.7	40.0	9.3	116.0	296.0	
5	81.168	H	51.7	-27.6	24.1	40.0	15.9	331.0	151.0	
6	98.385	H	41.7	-22.7	19.0	43.5	24.5	400.0	3.0	
7	103.235	V	53.4	-22.5	30.9	43.5	12.6	143.0	50.0	
8	274.925	V	50.6	-18.7	31.9	47.0	15.1	100.0	2.0	
9	274.925	H	44.5	-18.7	25.8	47.0	21.2	354.0	279.0	
10	349.979	V	59.6	-15.3	44.3	47.0	2.7	100.0	213.0	
11	374.956	H	47.3	-14.8	32.5	47.0	14.5	317.0	297.0	
12	400.055	H	49.7	-14.2	35.5	47.0	11.5	336.0	113.0	

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	30.606	V	58.9	-25.2	33.7	40.0	6.3	100.0	34.0	
2	50.370	V	51.3	-21.0	30.3	40.0	9.7	142.0	98.0	
3	66.133	V	55.8	-23.6	32.2	40.0	7.8	137.0	242.0	
4	98.383	V	54.5	-22.7	31.8	43.5	11.7	121.0	170.0	
5	98.385	H	47.1	-22.7	24.4	43.5	19.1	376.0	332.0	
6	138.398	V	53.0	-25.5	27.5	43.5	16.0	135.0	270.0	
7	215.270	H	43.6	-20.6	23.0	43.5	20.5	400.0	261.0	
8	274.925	V	50.3	-18.7	31.6	47.0	15.4	100.0	270.0	
9	300.024	H	44.4	-18.0	26.4	47.0	20.6	339.0	262.0	
10	349.979	V	57.0	-15.3	41.7	47.0	5.3	100.0	34.0	
11	374.956	H	53.1	-14.8	38.3	47.0	8.7	364.0	116.0	
12	400.055	H	46.3	-14.2	32.1	47.0	14.9	371.0	80.0	

◆ Calculation – SAC #4(10 m)

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

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

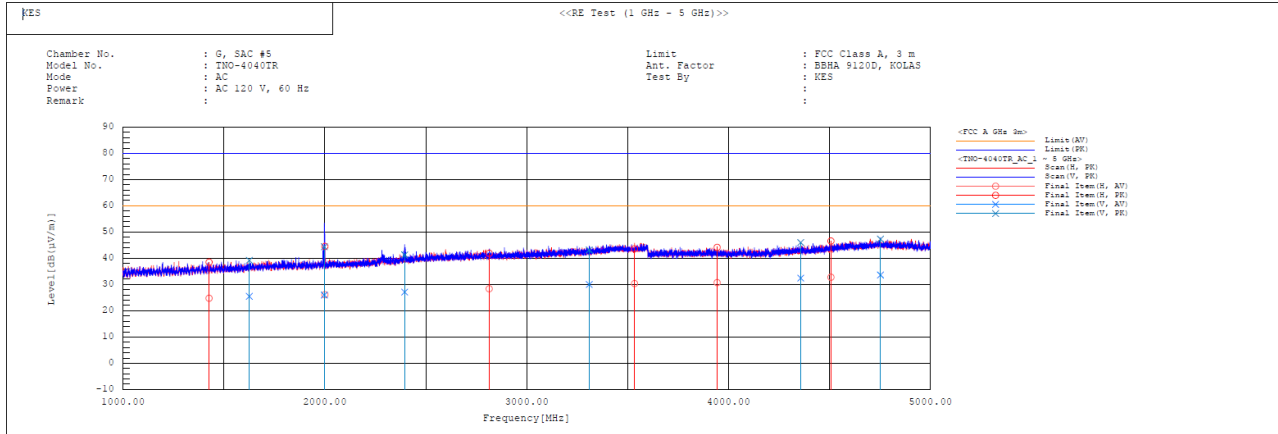
Reading(QP) : Reading value, Result(QP) : Reading value + Factor value

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



Radiated Electric Field Emissions(Above 1 GHz)

■ AC Mode



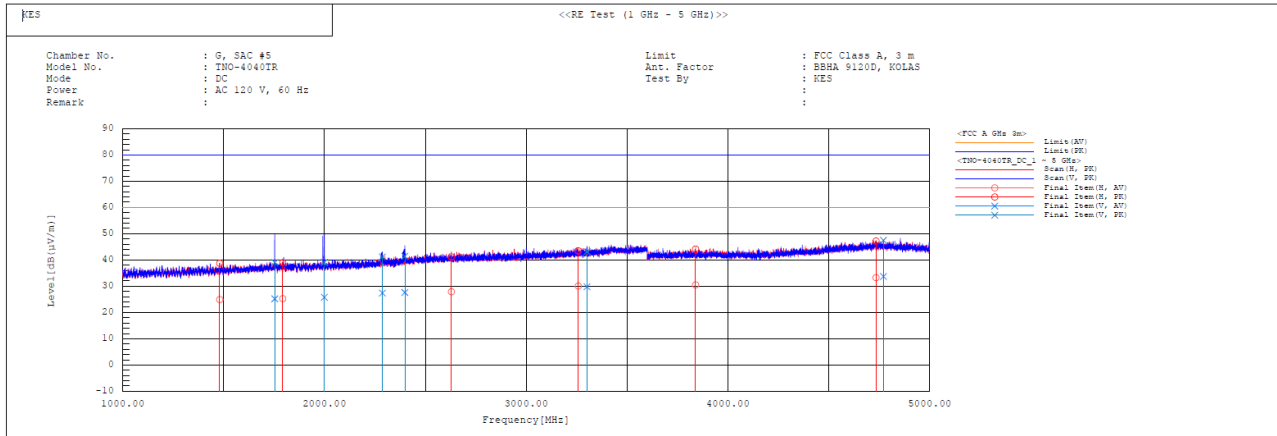
Final Result

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	1194.442	V	32.1	51.8	-6.7	25.4	45.1	60.0	80.0	34.6	34.9	126.0	215.8
2	1706.482	H	33.7	49.6	-4.1	29.6	45.5	60.0	80.0	30.4	34.5	344.0	335.8
3	1997.638	V	28.9	47.2	-2.7	26.2	44.5	60.0	80.0	33.8	35.5	162.0	207.9
4	2392.842	V	31.6	46.8	-1.5	30.1	45.3	60.0	80.0	29.9	34.7	126.0	101.9
5	2910.858	H	33.8	47.2	0.6	34.4	47.8	60.0	80.0	25.6	32.2	392.0	0.9
6	2992.458	V	32.6	48.0	0.9	33.5	48.9	60.0	80.0	26.5	31.1	108.0	101.9
7	3351.284	H	34.0	48.7	1.7	35.7	50.4	60.0	80.0	24.3	29.6	391.0	67.7
8	3569.272	V	32.9	47.4	2.0	34.9	49.4	60.0	80.0	25.1	30.6	138.0	139.9
9	3697.658	H	34.1	48.1	2.3	36.4	50.4	60.0	80.0	23.6	29.6	346.0	0.1
10	4468.124	H	28.1	42.7	5.2	33.3	47.9	60.0	80.0	26.7	32.1	358.0	0.9
11	4654.428	V	24.3	40.2	5.9	30.2	46.1	60.0	80.0	29.8	33.9	158.0	172.8
12	4816.842	H	25.1	40.8	6.5	31.6	47.3	60.0	80.0	28.4	32.7	389.0	51.9

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DC Mode

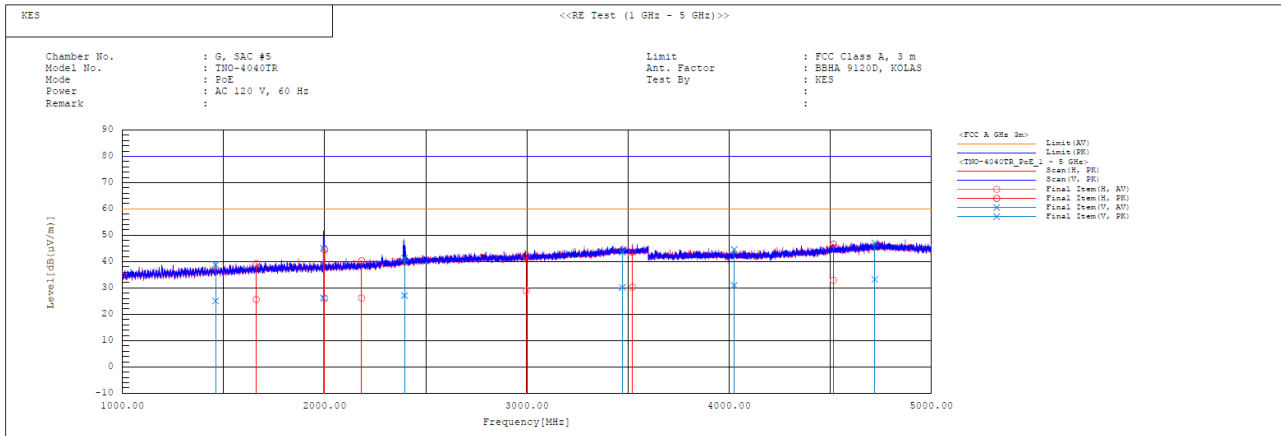


Final Result

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	1480.011	H	30.0	43.8	-5.1	24.9	38.7	60.0	80.0	35.1	41.3	342.0	170.1
2	1753.957	V	29.1	42.9	-3.9	25.2	39.0	60.0	80.0	34.8	41.0	121.0	331.2
3	1793.200	H	29.0	42.7	-3.7	25.3	39.0	60.0	80.0	34.7	41.0	400.0	193.2
4	1999.436	V	28.5	41.8	-2.7	25.8	39.1	60.0	80.0	34.2	40.9	126.0	18.9
5	2286.800	V	29.2	42.9	-1.8	27.4	41.1	60.0	80.0	32.6	38.9	100.0	21.3
6	2398.447	V	29.0	42.8	-1.4	27.6	41.4	60.0	80.0	32.4	38.6	106.0	88.0
7	2629.247	H	28.4	41.7	-0.5	27.9	41.2	60.0	80.0	32.1	38.8	349.0	193.2
8	3258.070	H	28.5	41.9	1.6	30.1	43.5	60.0	80.0	29.9	36.5	333.0	359.9
9	3301.200	V	28.2	41.6	1.6	29.8	43.2	60.0	80.0	30.2	36.8	141.0	113.8
10	3839.319	H	27.8	41.5	2.7	30.5	44.2	60.0	80.0	29.5	35.8	400.0	217.2
11	4734.101	H	27.1	41.0	6.2	33.3	47.2	60.0	80.0	26.7	32.8	337.0	356.8
12	4770.881	V	27.3	41.1	6.4	33.7	47.5	60.0	80.0	26.3	32.5	100.0	359.8



PoE Mode



Final Result

No.	Frequency [MHz]	Pol	Reading AV [dB (μV/m)]	Reading PK [dB (μV/m)]	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	1460.421	V	30.2	43.9	-5.1	25.1	38.8	60.0	80.0	34.9	41.2	132.0	105.5
2	1661.386	H	30.0	43.6	-4.4	25.6	39.2	60.0	80.0	34.4	40.8	362.0	137.1
3	1994.340	V	29.0	47.8	-2.8	26.2	45.0	60.0	80.0	33.8	35.0	147.0	177.6
4	1999.632	H	28.7	47.2	-2.7	26.0	44.5	60.0	80.0	34.0	35.5	337.0	258.1
5	2182.069	H	28.4	42.5	-2.2	26.2	40.3	60.0	80.0	33.8	39.7	348.0	50.6
6	2394.625	V	28.6	42.8	-1.5	27.1	41.3	60.0	80.0	32.9	38.7	112.0	90.8
7	2996.448	H	28.0	41.5	0.9	28.9	42.4	60.0	80.0	31.1	37.6	368.0	61.8
8	3470.893	V	28.4	41.8	1.8	30.2	43.6	60.0	80.0	29.8	36.4	125.0	88.9
9	3522.066	H	28.4	41.7	1.9	30.3	43.6	60.0	80.0	29.7	36.4	329.0	255.1
10	4024.478	V	27.7	41.3	3.3	31.0	44.6	60.0	80.0	29.0	35.4	109.0	359.2
11	4515.669	H	27.5	41.2	5.4	32.9	46.6	60.0	80.0	27.1	33.4	336.0	232.9
12	4720.433	V	27.2	41.0	6.1	33.3	47.1	60.0	80.0	26.7	32.9	100.0	76.2

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



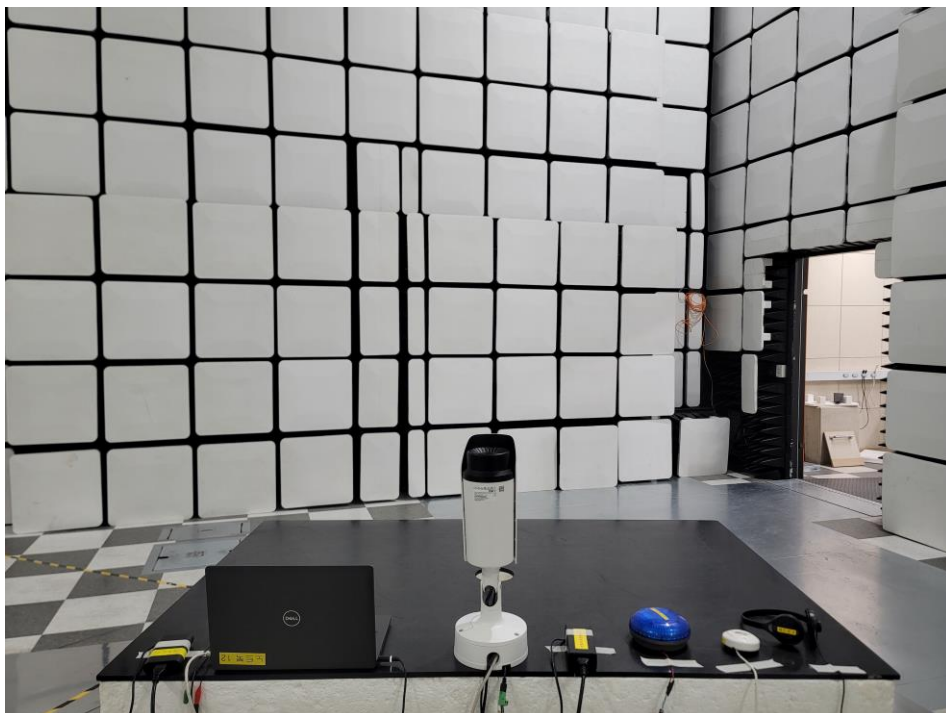
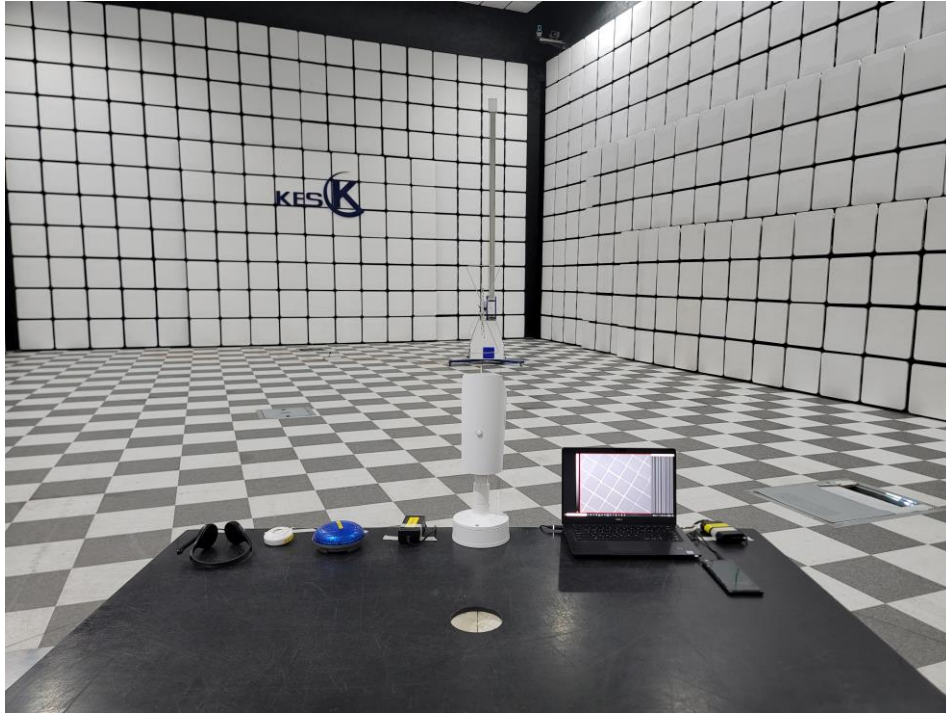
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■ PoE Mode

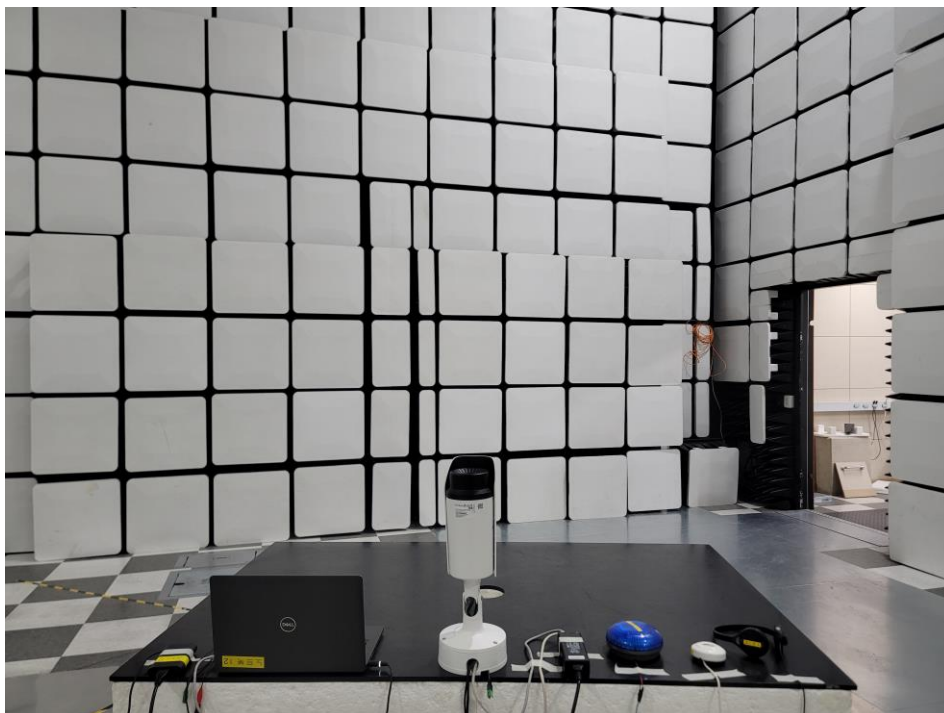


Radiated Electric Field Emissions(Below 1 GHz)

■ DC Mode



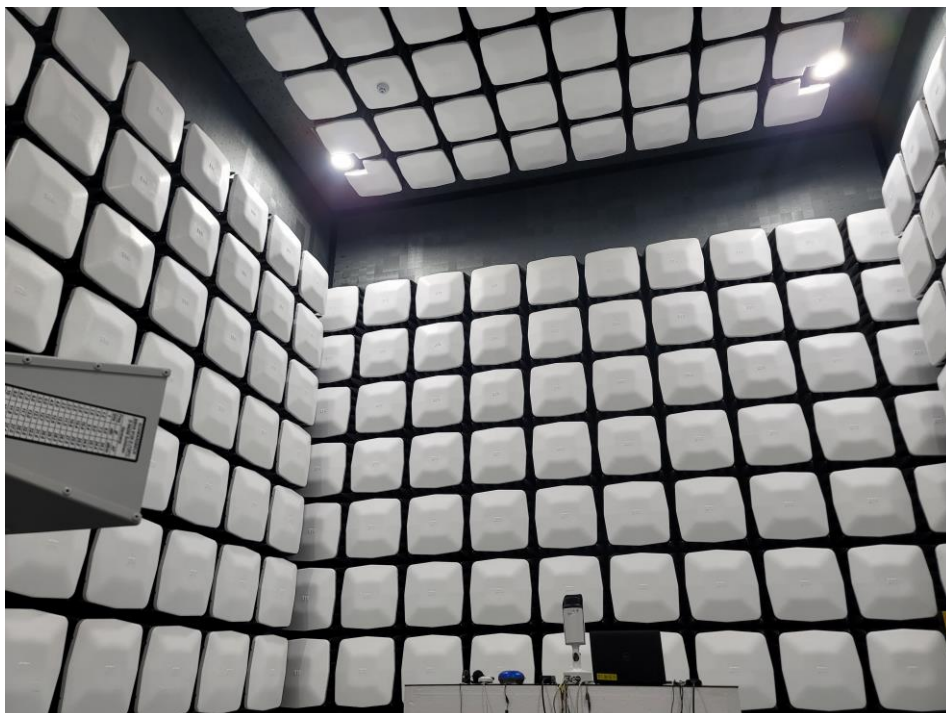
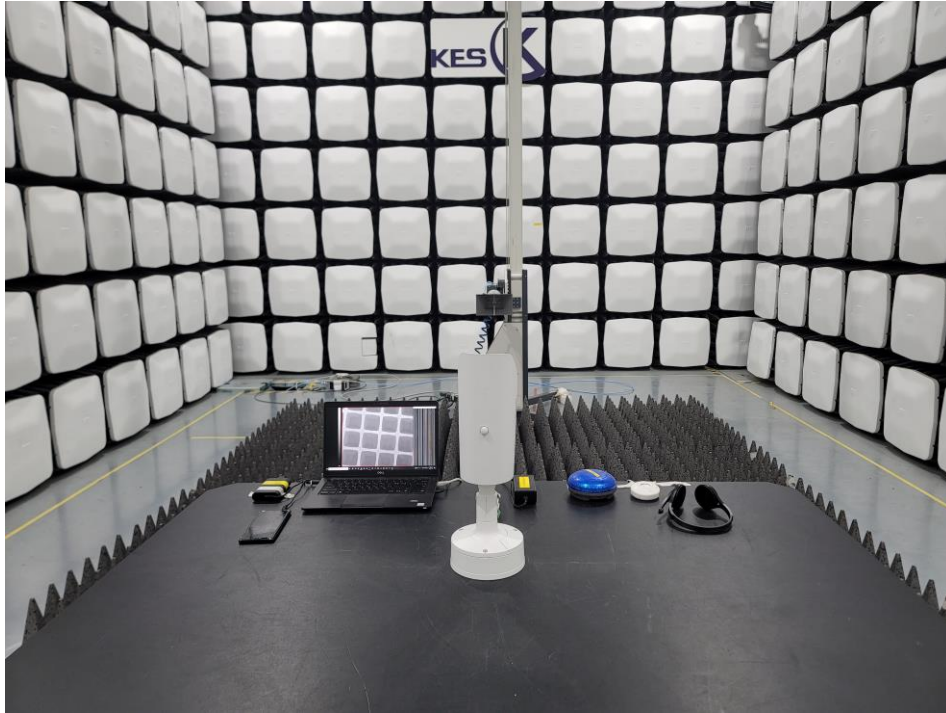
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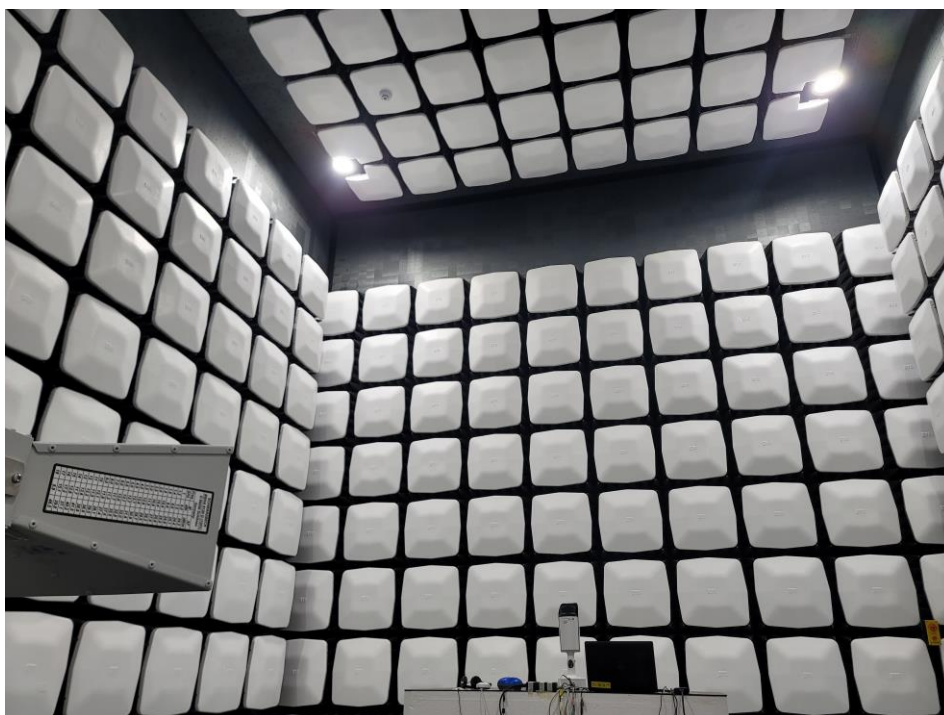
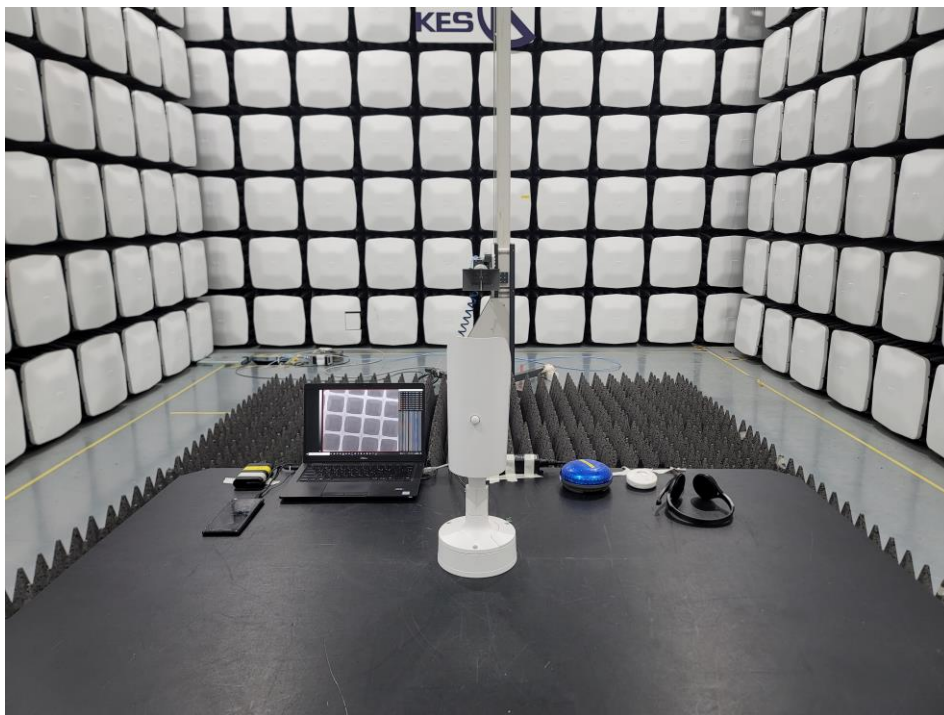
Radiated Electric Field Emissions(Above 1 GHz)

■ DC Mode



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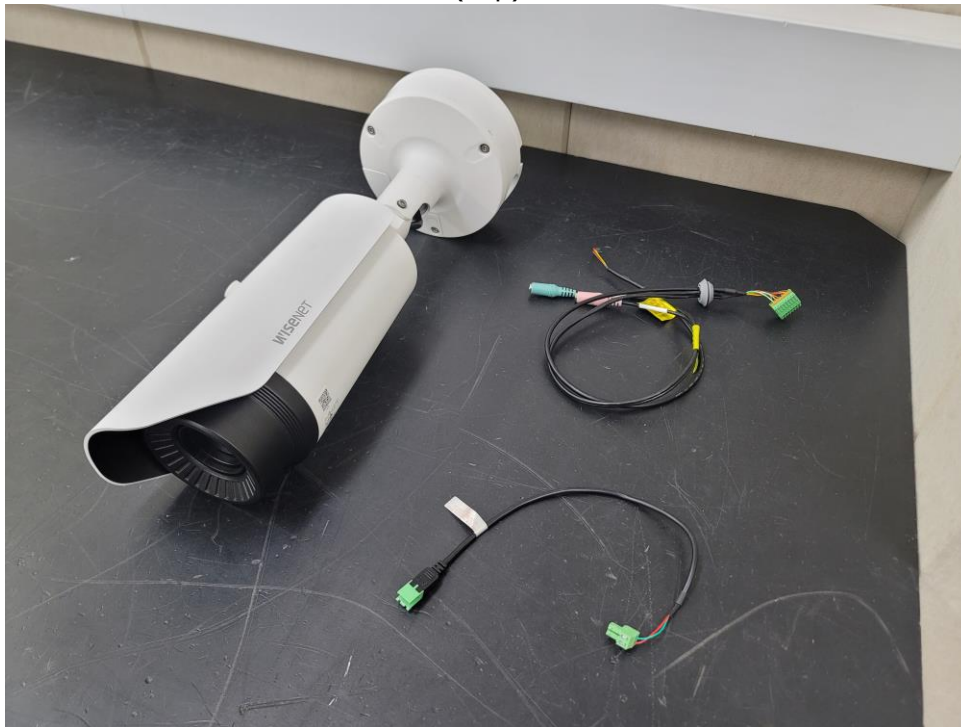
■ PoE Mode



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EUT External Photographs

(Top)



(Bottom)



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EUT Internal Photographs

(Internal View)



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EUT Internal View – NUC Board

(Top)



(Bottom)



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EUT Internal View – PRE AMP Board

(Top)



(Bottom)



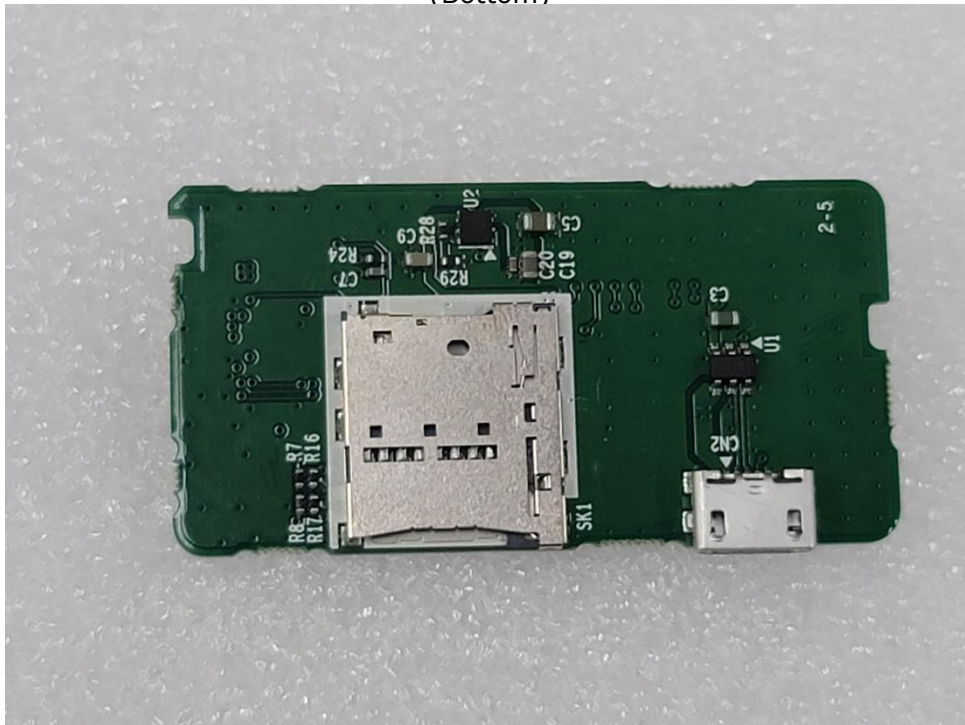
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EUT Internal View – SD Card Board

(Top)



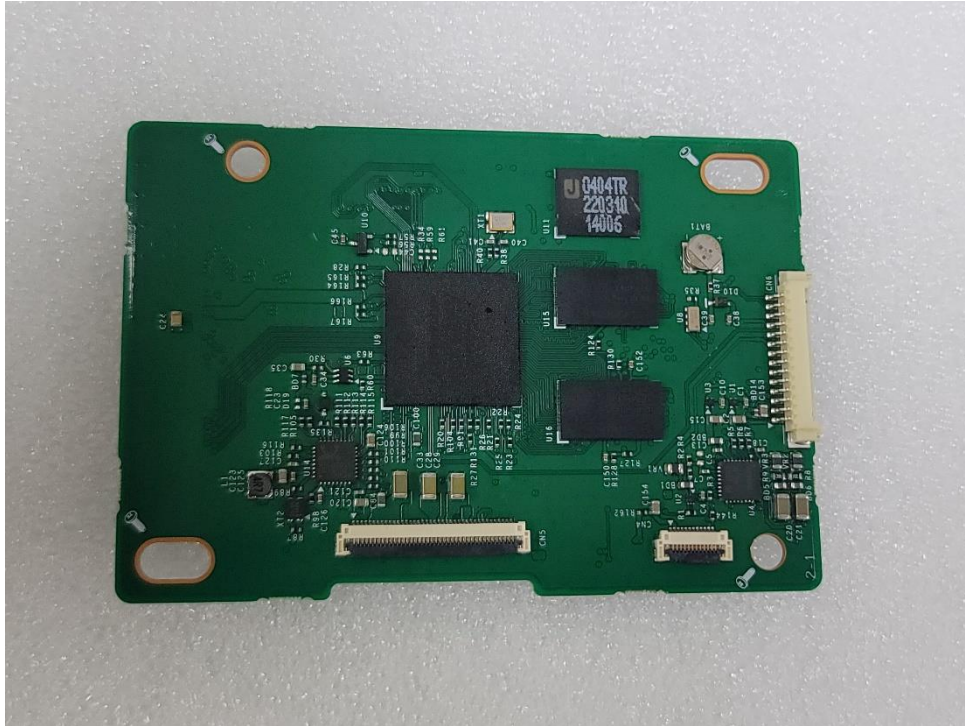
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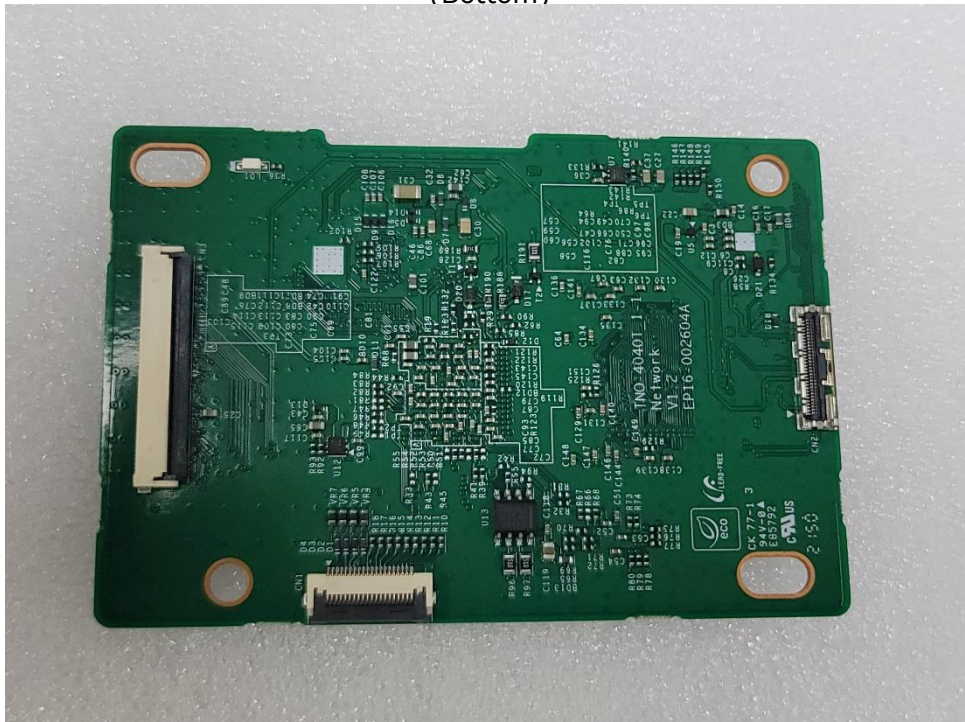
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EUT Internal View – Network Board

(Top)



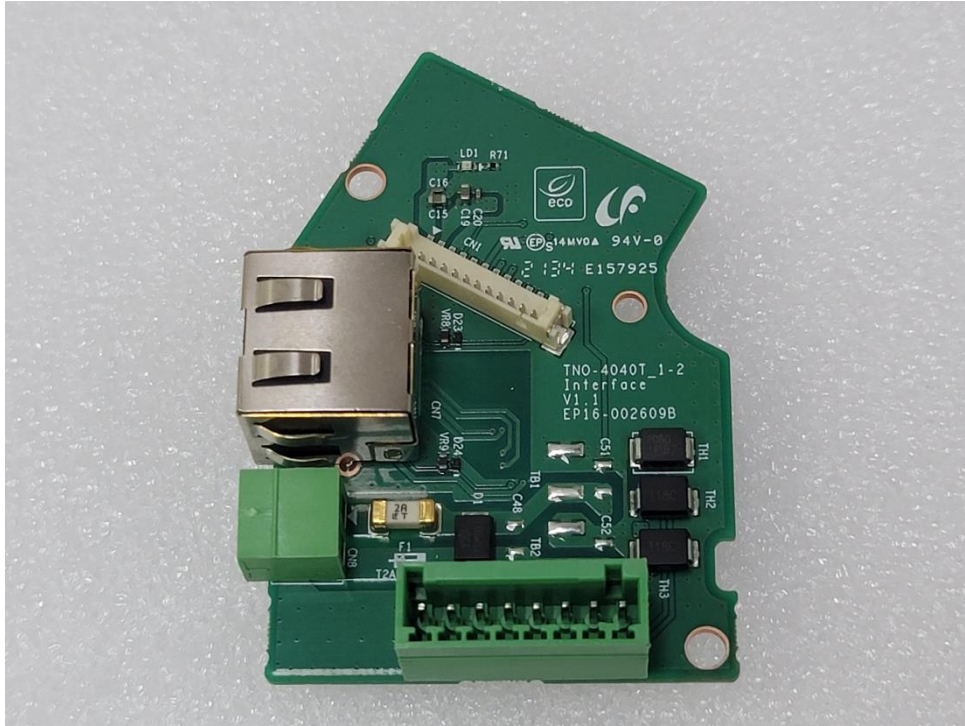
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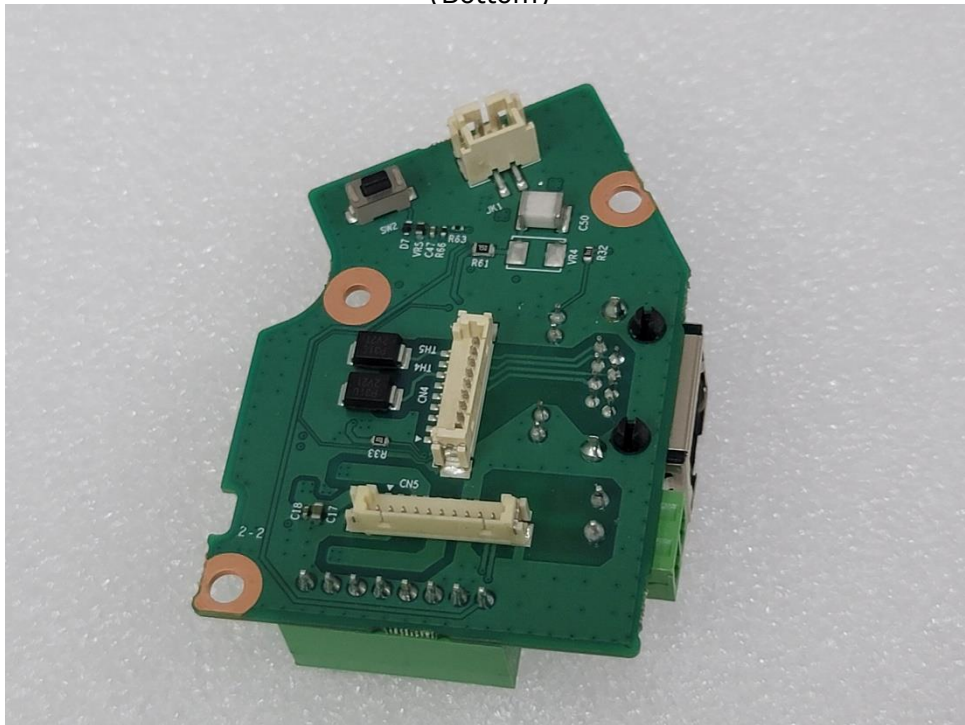
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EUT Internal View – Interface Board

(Top)



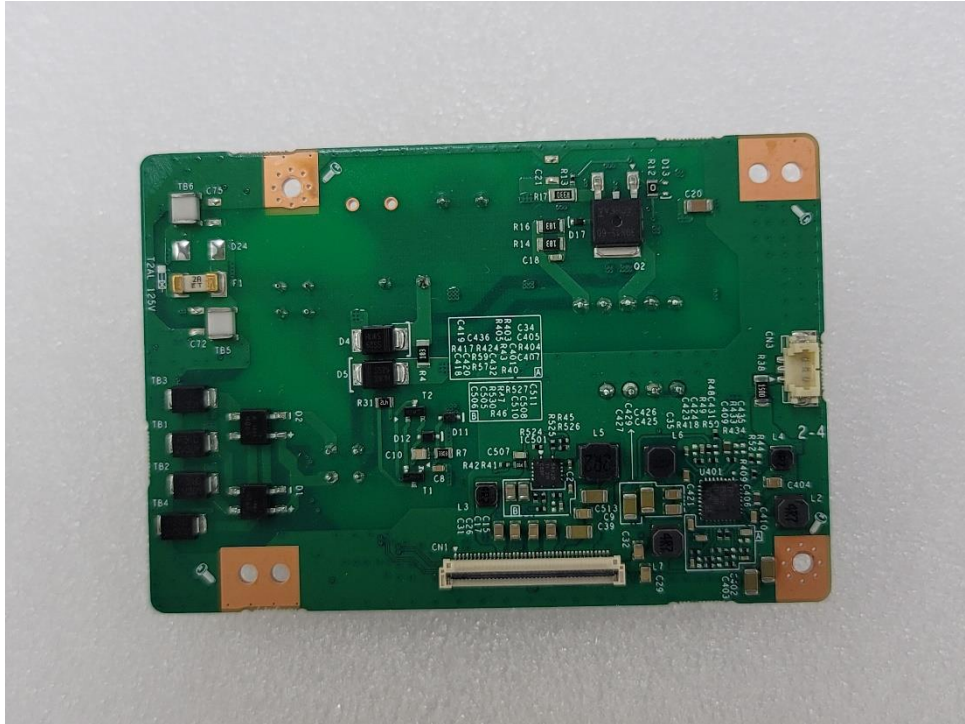
(Bottom)



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EUT Internal View – Power Board

(Top)



(Bottom)



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EUT Internal View – Lens

(Top)



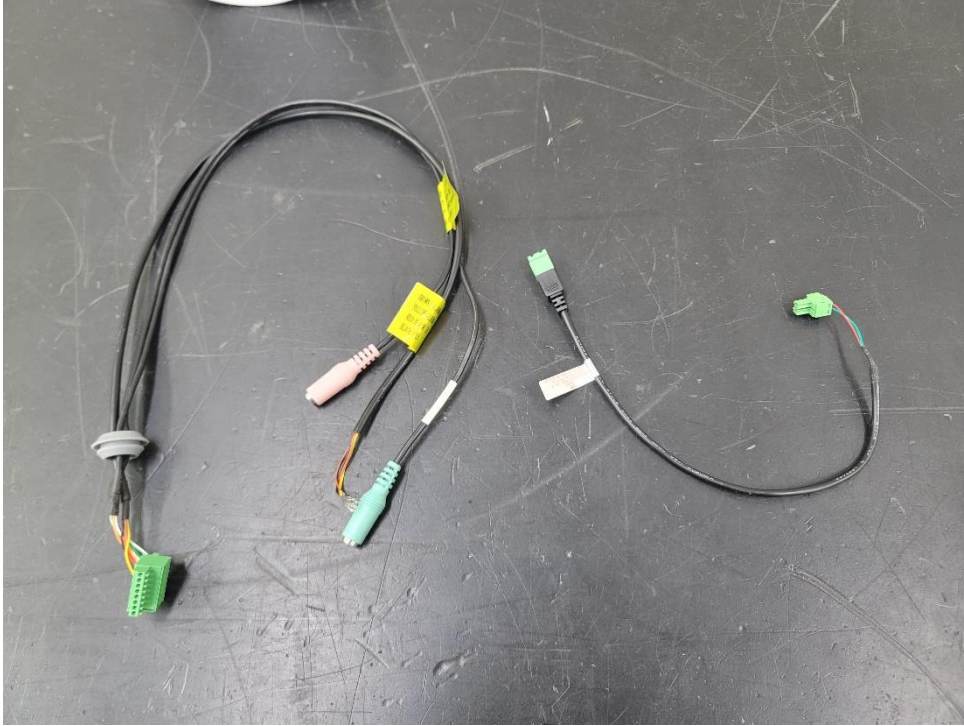
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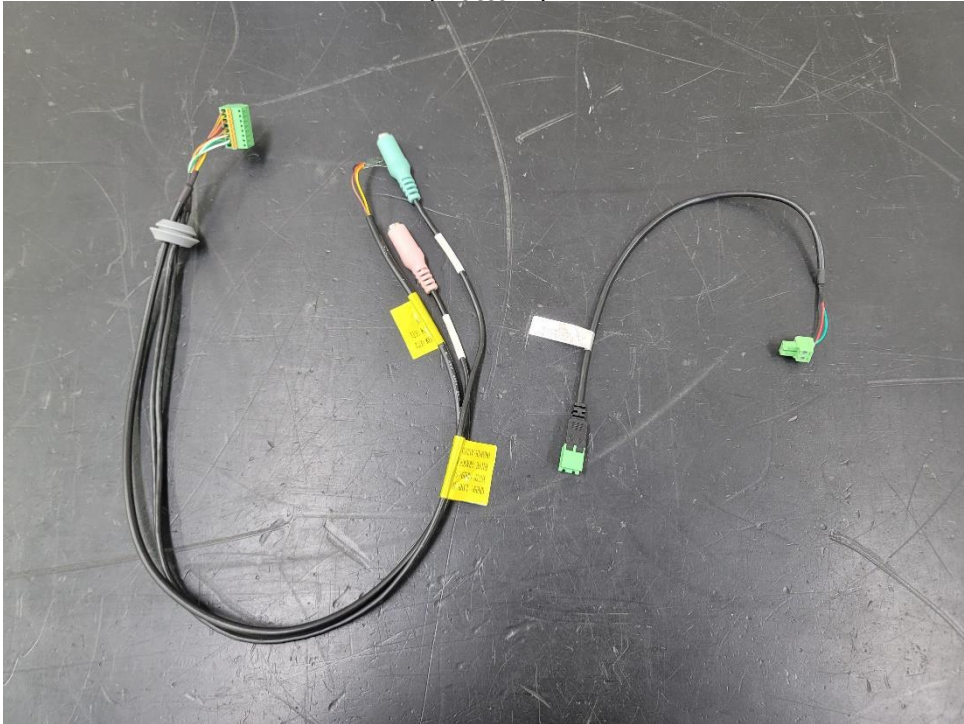
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EUT Internal View – Cable

(Top)



(Bottom)



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Label Photographs

FCC Label



Hanwha Vision Co., Ltd

TNO-4040TR

IC Label

CAN ICES-003(A) / NMB-003(A)

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions:
(1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

(1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.