EMC TEST REPORT For VCCI

Test Report No.	:	KES-EM-22T0307-R1
Date of Issue	:	Feb. 24, 2023
Product name	:	THERMAL CAMERA
Model/Type No.	:	TNM-C4940TD
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	:	Mar. 11, 2022
Test date	:	Mar. 16, 2022 ~ Mar. 17, 2022
Test Results	:	☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Tae Yeon, Kim
EMC Test Engineer

Tested by Ki Man, Kim
(Retired person)
Proxy signature : Tae Yeon, Kim

Reviewed by

Dong-Hun, Jang
EMC Technical Manager

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

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REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Apr. 04, 2022	KES-EM-22T0307	Issued
Feb. 24, 2023	KES-EM-22T0307-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:

Spec Display Name	Thermal	Visible
Video		
Imaging Device	Uncooled micro bolometer	1/1.8" CMOS
Resolution	1280x960, 1280x720, 1024x768, 800x600, 800x448, 720x576, 720x480, 640x480, 640x360	3840x2160, 3072x1728, 2592x1944, 2688x1520, 2560x1440, 2048x1536, 1920x1080, 1600x1200, 1280x1024,1280x960, 1280x720, 1024x768, 800x600, 800x448, 720x576, 720x480, 640x480, 640x360
Max. Framerate	H.265/H.264: Max. 30fps MJPEG: Max. 3fps	H.265/H.264: Max. 30fps/25fps(60Hz/50Hz) MJPEG: Max. 1fps/1fps(60Hz/50Hz)
NETD	< 60mK	None
Pixel Size	12㎛	None
Min. Illumination	None	Color: 0.06Lux(F1.3, 1/30sec) BW: 0.004Lux(F1.3, 1/30sec), 0Lux(IR LED on)
Video Out	USB : Micro USB Type B	
Lens		
Focal Length (Zoom Ratio)	9.1mm fixed focal	4.4~9.3mm(2.2x) motorized varifocal
Max. Aperture Ratio	F1.0	F1.3(Wide)~F2.15(Tele)
Angular Field of View	H: 50.0°, V: 37.0°, D: 63.8°	H:112.1°(Wide)~47.5°(Tele) / V:58.0°(Wide)~26.6°(Tele) / D:137.5°(Wide)~54.6°(Tele)
Min. Object Distance	3.5m(11.48ft)	Wide: 1.75m(5.74ft) / Tele: 5.21m(17.09ft)
Focus Control	Fixed	Simple focus
Lens Type	None	
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	None
Day & Night	None	Auto(ICR)
Backlight Compensation	None	BLC, WDR, SSDR
Wide Dynamic Range	None	WDR(120dB)
Digital Noise Reduction	None	SSNR V, WiseNR II
Digital Image Stabilization	None	Support(built-in gyro sensor)
Defog	None	None
Motion Detection	8ea, polygonal zones	
Privacy Masking	6ea, rectangle zones - Color: Gray/Black/White	
Gain Control	None	Low / Middle / High
White Balance	None	ATW / AWC / Manual / Indoor / Outdoor
LDC	None	Support
Electronic Shutter Speed	None	Minimum / Maximum / Anti flicker(1/5~1/12,000sec) Auto prefer shutter control(Based on AI engine)
Analytics	- Analytics events : Directional detection, Motion detection, Enter/Exit, Virtual line, Temperature Change detection	- Analytics events based on AI engine(NPU) : Object detection (Person/Face/Vehicle(car/truck/bus/bicycle/motorcycle)/License plate), Bestshot, IVA (Virtual line/Area, Enter/Exit, Loitering, direction, intrusion), Stopped vehicle, Traffic jam - Analytics events : Defocus detection, Motion detection, Tampering, Audio detection, Sound classification, Shock detection, Appear/Disappear
Business Intelligence	None	None
Alarm I/O	4 configurable I/O ports	
Alarm Triggers	Analytics, Network disconnect, Alarm input	

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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	
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	None	30m
Color Palettes	Whitehot, Blackhot, Rainbow, Rainbow2, Sepia, Red, Iron, Custom	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	WiseStream II	Manual(Sea area), WiseStream III
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(6 users) / Multicast Multiple streaming(Up to 3 profiles)	
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 boot, Secure firmware	
Application Programming Interface	ONVIF Profile S/T SUNAPI(HTTP API) Wisenet open platform (visible channel only)	
General		
Webpage Language	English, French, German, Spanish, Italian, Chinese, Korean, Russian, Swedish, Japanese, Portuguese, Czech, Polish, Turkish, Dutch, Hungarian, Greek	
Edge Storage	Micro SD/SDHC/SDXC 2slots 512GB	
Memory	4GB RAM, 512MB FLASH	
Environmental & Electrical		
Operating Temperature / Humidity	-40°C to +60°C(-58°F to +140°F) * Start up should be done at above -30°C less than 95% RH(non-condensing)	
Storage Temperature / Humidity	-50°C to +60°C(-58°F to +140°F) / Less than 95% RH(Non-condensing)	
Certification	IP66/IP67, IK10, NEMA4X, NEMA TS 2(2.2.8, 2.2.9)	
Input Voltage	PoE+(IEEE802.3at, Class4), $12V_{DC}$	
Power Consumption	PoE+ : Max 25.5W $12V_{DC}$: Max 21.5W	
Mechanical		
Color / Material	White / Aluminum	
RAL Code	RAL9003	
Product Dimensions / Weight	353.4 * 287.5 * 191.2mm (13.92 * 11.32 * 7.53in) / 4.533kg	
DORI (EN62676-4 standard)		
Detect (25PPM/ 8PPF)	None	Wide: 51.7m(169.94ft) / Tele: 174.5m(572.64ft)
Observe (63PPM/ 19PPF)	None	Wide: 20.7m(67.85ft) / Tele: 69.8m(229.06ft)
Recognize (125PPM/ 38PPF)	None	Wide: 10.3m(33.93ft) / Tele: 34.9m(114.53ft)
Identify (250PPM/ 76PPF)	None	Wide: 5.2m(16.96ft) / Tele: 17.5m(57.26ft)

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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 100 V, 60 Hz ☒ PoE

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
THERMAL CAMERA	TNM-C4940TD	-	HANWHA VISION VIETNAM COMPANY LIMITED	EUT

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1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
Adaptor	2ACB022F	-	Channel Well Technology (Guangzhou) Co., Ltd.	-
PoE Adaptor	PT-PSE106GBR-AH-S	-	Dongguan PROCET Network Technology Co., Ltd	-
Notebook	Latitude 5300	8C47BE45C060	DELL INC.	-
Notebook Adaptor	HA65NM130	-	Chicony Power Technology(Suzhou) Co.,Ltd.	-
MIC	MP1000	-	-	-
Headset	K550	-	Britz®	-
Alarm1	-	-	-	-
Alarm2	-	-	-	-
USB LAN Ccard	U2500	-	ipTIME	-
Micro SD Card1	-	-	SanDisk	32 GB
Micro SD Card2	-	-	SanDisk	32 GB

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1.6 External I/O Cabling

■ DC Mode

Start		END		Cable Spec.	
Description	**I/O Port**	**Description**	**I/O Port**	**Length**	**Shield**
THERMAL CAMERA (EUT)	2 Pin	Adaptor	2 Pin	1.2	U
	RJ-45	USB LAN Card	RJ-45	3.0	S
	3.5 mm	Headset	3.5 mm	1.7	U
	3.5 mm		3.5 mm	1.7	U
	SLOT	Micro SD Card1	SLOT	-	-
	SLOT	Micro SD Card2	SLOT	-	-
	2 Pin	Alarm1	2 Pin	3.0	U
	2 Pin	Alarm2	2 Pin	3.0	U
Notebook	DC Jack	Notebook Adaptor	DC Jack	1.2	U
	3.5 mm	MIC	3.5 mm	1.7	U
	USB	USB LAN Card	USB	0.1	S

* 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 Adaptor	RJ-45 (PoE)	3.0	S
	3.5 mm	Headset	3.5 mm	1.7	U
	3.5 mm		3.5 mm	1.7	U
	SLOT	Micro SD Card1	SLOT	-	-
	SLOT	Micro SD Card2	SLOT	-	-
	2 Pin	Alarm1	2 Pin	3.0	U
	2 Pin	Alarm2	2 Pin	3.0	U
Notebook	DC Jack	Notebook Adaptor	DC Jack	1.2	U
	3.5 mm	MIC	3.5 mm	1.7	U
	USB	USB LAN Card	USB	0.1	S
PoE Adaptor	RJ-45 (LAN)	USB LAN Card	RJ-45 (LAN)	3.0	S

* Unshielded=U, Shielded=S

1.7 EUT Operating Mode(s)

operating
EUT Monitoring, Ping Test After the test, the Micro SD Card was checked to see if it was recorded normally.

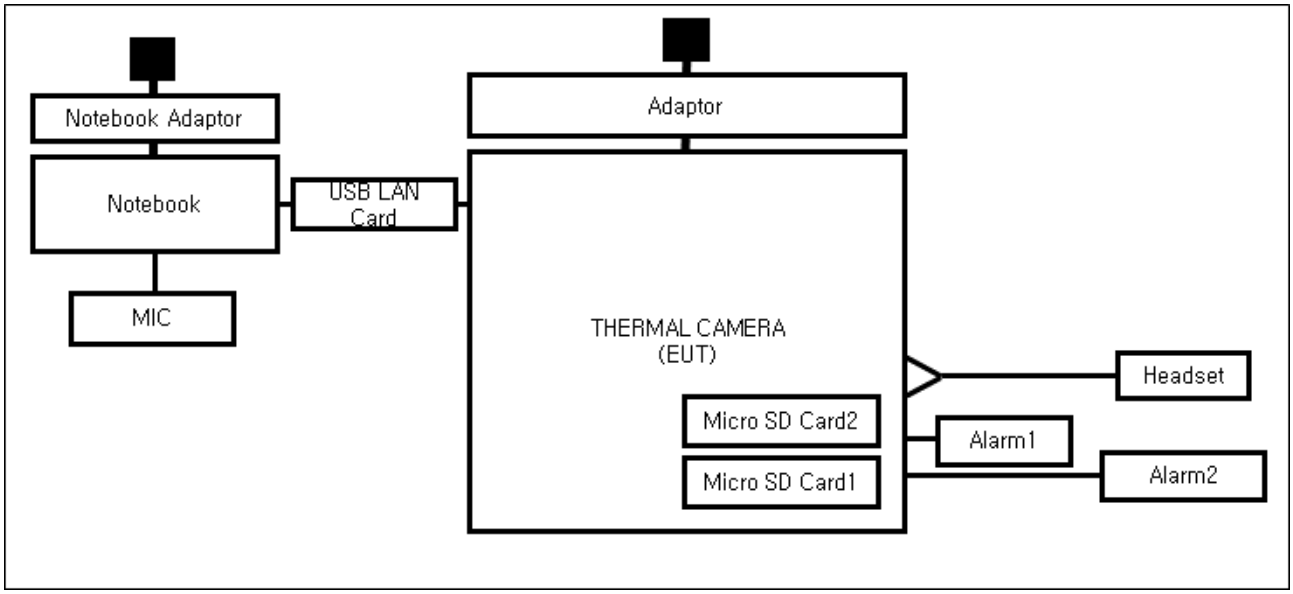
EUT Test operating S/W		
Name	**Version**	**Manufacture Company**
Web Viewer	-	Hanwha Vision Co., Ltd

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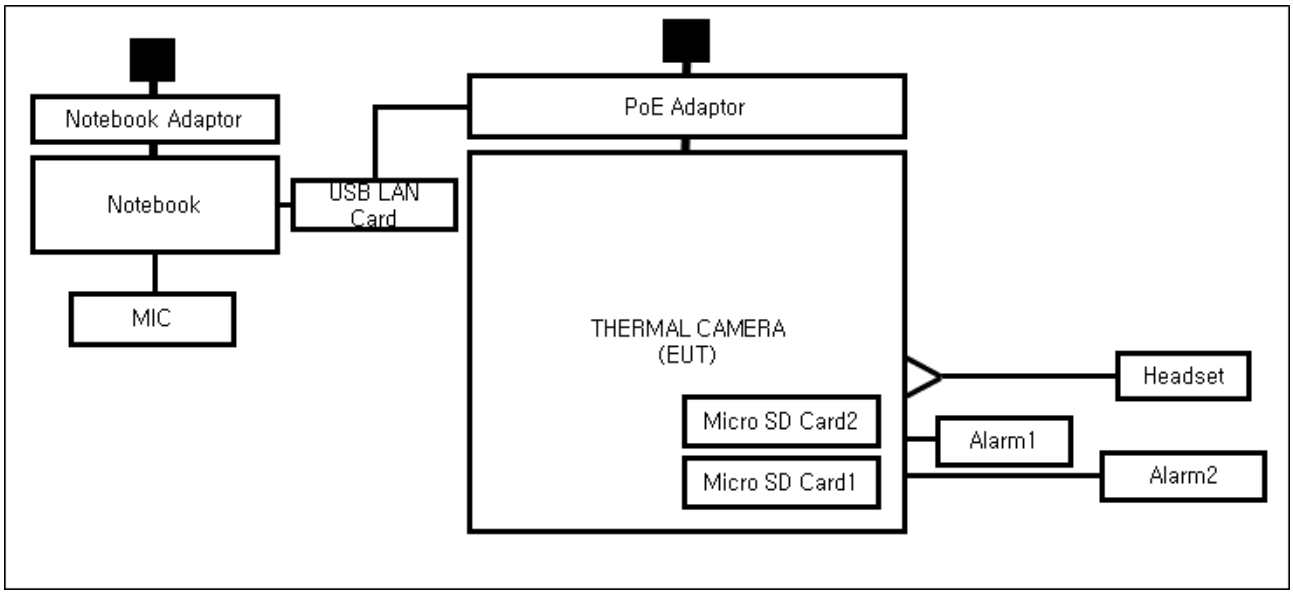
1.8 Configuration

■ AC Main
□ DC Main

■ DC Mode



■ PoE Mode



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1.9 Remarks when standards applied

USB port is not tested because it is an unused port.

1.10 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less.

1.11 Test Facility

The measurement facility is located at 473-21, Gayeo-ro, Yeoju-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

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2.0 Test Regulations

The emissions tests were performed according to following regulations:

☒ **VCCI-CISPR 32:2016** ☒ Class A ☐ Class B

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2.1 Conducted Emissions Mains Power Ports

Test Date
Mar. 16, 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) ℃
Relative Humidity: (43,8 ± 0,2) % R.H.

Frequency Range of Measurement
150 ㎑ to 30 ㎒

Instrument Settings
IF Band Width: 9 ㎑

Test Results
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks
See Appendix A for test data.

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2.2 Conducted Emissions at Telecommunication Ports

Test Date
Mar. 16, 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
☒	ISN	ISN S8	SCHWARZBECK	ISN-S8-0019	03, 07, 2023

Test Conditions
Temperature: (24,4 ± 0,1) ℃
Relative Humidity: (43,8 ± 0,1) % R.H.

Frequency Range of Measurement
150 ㎑ to 30 ㎒

Instrument Settings
IF Band Width: 9 ㎑

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.

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2.3 Radiated Electric Field Emissions(Below 1 ㎓)

Test Date
Mar. 16, 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: (24,0 ± 0,2) ℃
Relative Humidity: (43,9 ± 0,2) % R.H.

Frequency Range of Measurement
30 ㎒ to 1 ㎓

Instrument Settings
IF Band Width: 120 ㎑

Test Results
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks
See Appendix A for test data.

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2.4 Radiated Electric Field Emissions(Above 1 ㎓)

Test Date
Mar. 17, 2022

Test Location
SEMI ANECHOIC CHAMBER #5

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.120	-
☒	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, 21, 2022

Test Conditions
Temperature: (24,7 ± 0,2) ℃
Relative Humidity: (43,9 ± 0,3) % R.H.

Frequency Range of Measurement
1 ㎓ to 6 ㎓

Instrument Settings
IF Band Width: 1 ㎒

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

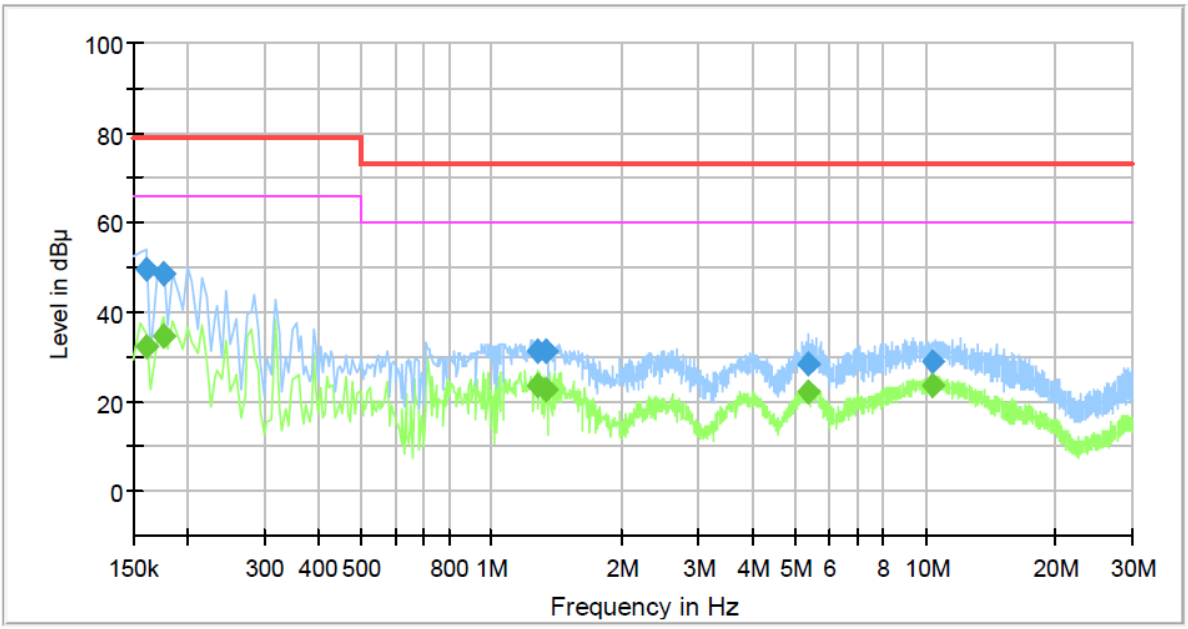
Conducted Emissions at Mains Power Ports

■ DC Mode

HOT LINE

Common Information

Test Description:	Conducted Emission
Model No.:	TNM-C4940TD
Phase:	L1
Mode:	DC
Operator Name:	KES



Final_Result

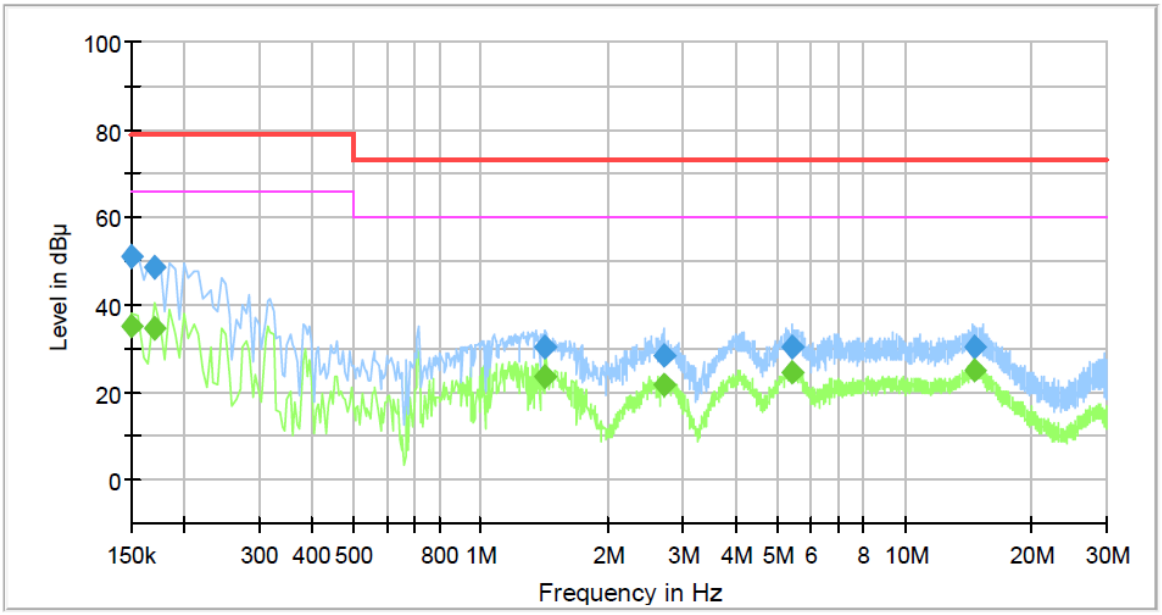
Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.160000	---	32.23	66.00	33.77	1000.0	9.000	L1	19.4
0.160000	49.51	---	79.00	29.49	1000.0	9.000	L1	19.4
0.175000	---	34.86	66.00	31.14	1000.0	9.000	L1	19.4
0.175000	48.42	---	79.00	30.58	1000.0	9.000	L1	19.4
1.275000	---	23.51	60.00	36.49	1000.0	9.000	L1	20.1
1.275000	31.39	---	73.00	41.61	1000.0	9.000	L1	20.1
1.330000	---	22.69	60.00	37.31	1000.0	9.000	L1	20.2
1.330000	31.26	---	73.00	41.74	1000.0	9.000	L1	20.2
5.390000	---	22.18	60.00	37.82	1000.0	9.000	L1	19.6
5.390000	28.59	---	73.00	44.41	1000.0	9.000	L1	19.6
10.360000	---	23.72	60.00	36.28	1000.0	9.000	L1	19.9
10.360000	28.85	---	73.00	44.15	1000.0	9.000	L1	19.9

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NEUTRAL LINE

Common Information

Test Description:	Conducted Emission
Model No.:	TNM-C4940TD
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	---	35.08	66.00	30.92	1000.0	9.000	N	19.4
0.150000	50.92	---	79.00	28.08	1000.0	9.000	N	19.4
0.170000	---	34.72	66.00	31.28	1000.0	9.000	N	19.4
0.170000	48.63	---	79.00	30.37	1000.0	9.000	N	19.4
1.420000	---	23.86	60.00	36.14	1000.0	9.000	N	20.2
1.420000	30.54	---	73.00	42.46	1000.0	9.000	N	20.2
2.695000	---	21.87	60.00	38.13	1000.0	9.000	N	20.2
2.695000	28.53	---	73.00	44.47	1000.0	9.000	N	20.2
5.435000	---	24.57	60.00	35.43	1000.0	9.000	N	19.6
5.435000	30.30	---	73.00	42.70	1000.0	9.000	N	19.6
14.680000	---	24.91	60.00	35.09	1000.0	9.000	N	19.9
14.680000	30.21	---	73.00	42.79	1000.0	9.000	N	19.9

♦ Calculation
QuasiPeak[㏈uV] / CAverage [㏈uV] = Reading Value[㏈uV] + Corr. [㏈]
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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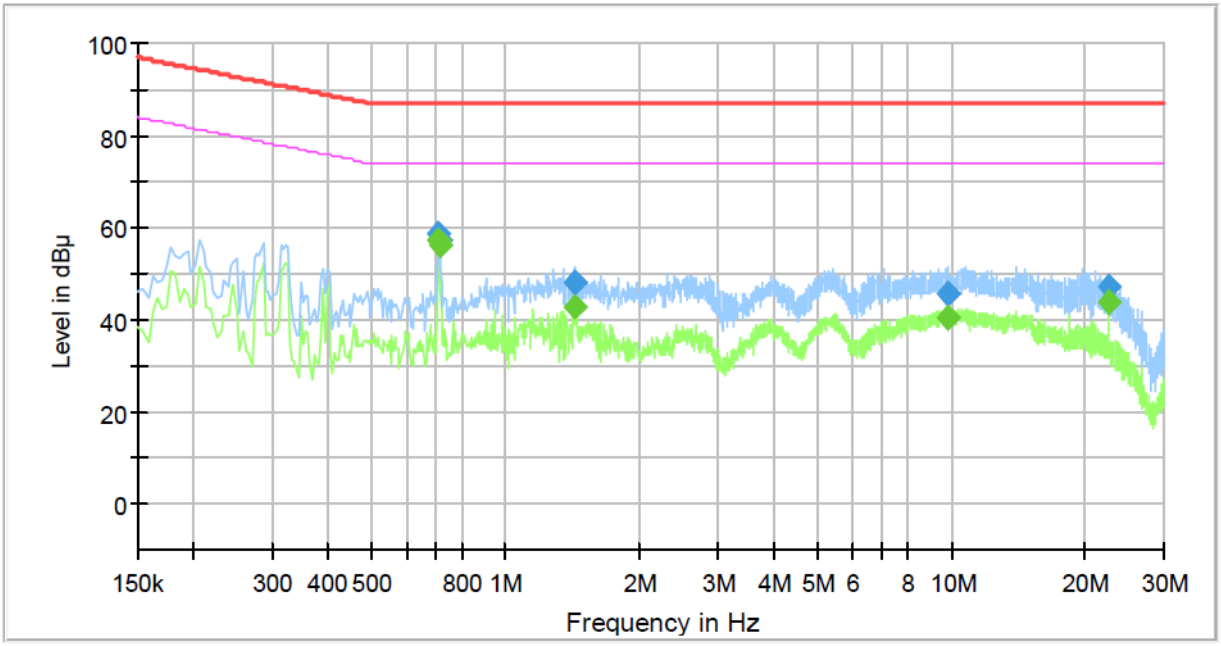
Conducted Emissions at Telecommunication Ports

■ DC Mode

[1 000 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	TNM-C4940TD
Mode :	DC
Speed :	1 000 Mbps
Operator Name:	KES



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.710000	---	57.14	74.00	16.86	1000.0	9.000	Single Line	19.8
0.710000	58.90	---	87.00	28.10	1000.0	9.000	Single Line	19.8
0.714000	---	56.49	74.00	17.51	1000.0	9.000	Single Line	19.8
0.714000	57.25	---	87.00	29.75	1000.0	9.000	Single Line	19.8
1.426000	---	43.02	74.00	30.98	1000.0	9.000	Single Line	20.1
1.426000	47.93	---	87.00	39.07	1000.0	9.000	Single Line	20.1
9.850000	---	40.33	74.00	33.67	1000.0	9.000	Single Line	19.7
9.850000	45.87	---	87.00	41.13	1000.0	9.000	Single Line	19.7
22.526000	---	43.91	74.00	30.09	1000.0	9.000	Single Line	20.2
22.526000	46.96	---	87.00	40.04	1000.0	9.000	Single Line	20.2

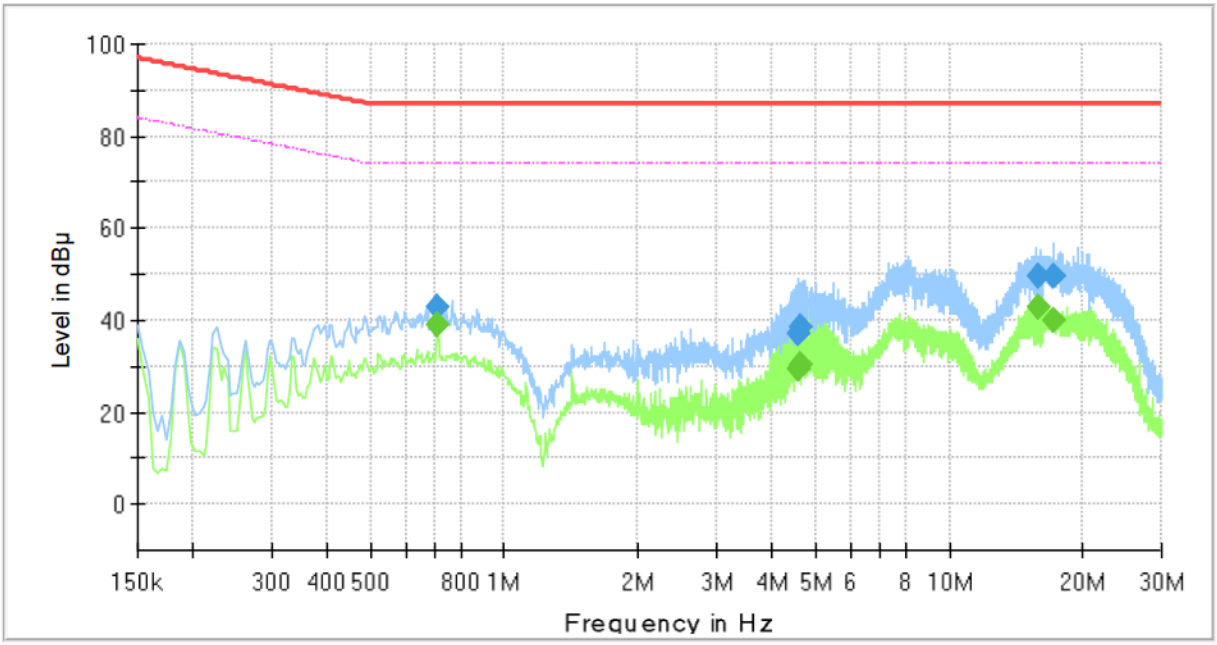
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■ PoE Mode

[1 000 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	TNM-C4940TD
Mode :	PoE
Speed :	1 000 Mbps
Operator Name:	KES



Final_Result

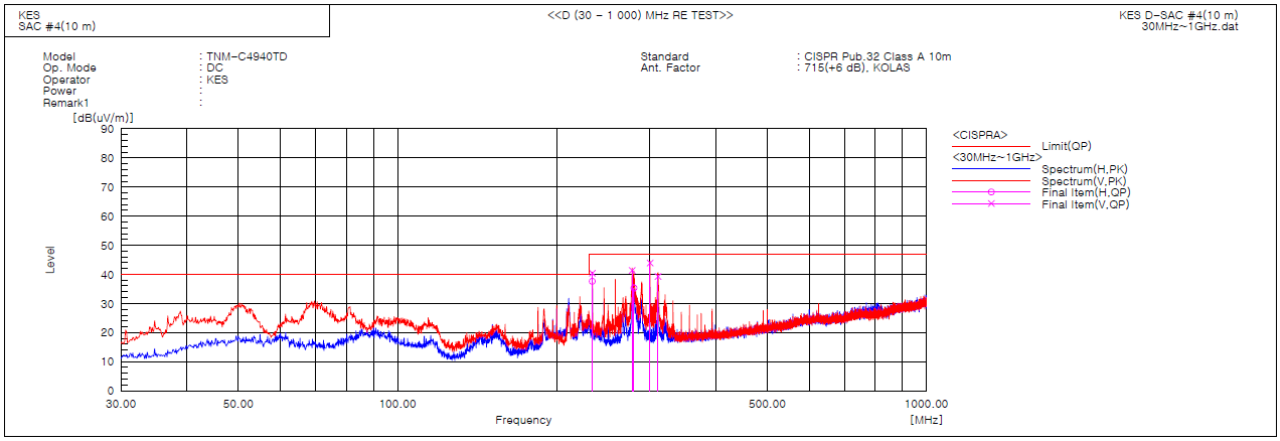
Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.710000	---	38.86	74.00	35.14	1000.0	9.000	Single Line	19.8
0.710000	42.69	---	87.00	44.31	1000.0	9.000	Single Line	19.8
4.590000	---	29.45	74.00	44.55	1000.0	9.000	Single Line	19.6
4.590000	37.01	---	87.00	49.99	1000.0	9.000	Single Line	19.6
4.626000	---	30.55	74.00	43.45	1000.0	9.000	Single Line	19.6
4.626000	38.28	---	87.00	48.72	1000.0	9.000	Single Line	19.6
15.810000	---	42.86	74.00	31.14	1000.0	9.000	Single Line	19.8
15.810000	49.60	---	87.00	37.40	1000.0	9.000	Single Line	19.8
17.134000	---	40.17	74.00	33.83	1000.0	9.000	Single Line	19.9
17.134000	49.60	---	87.00	37.40	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))

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Radiated Electric Field Emissions(Below 1 ㎓)

■ DC Mode

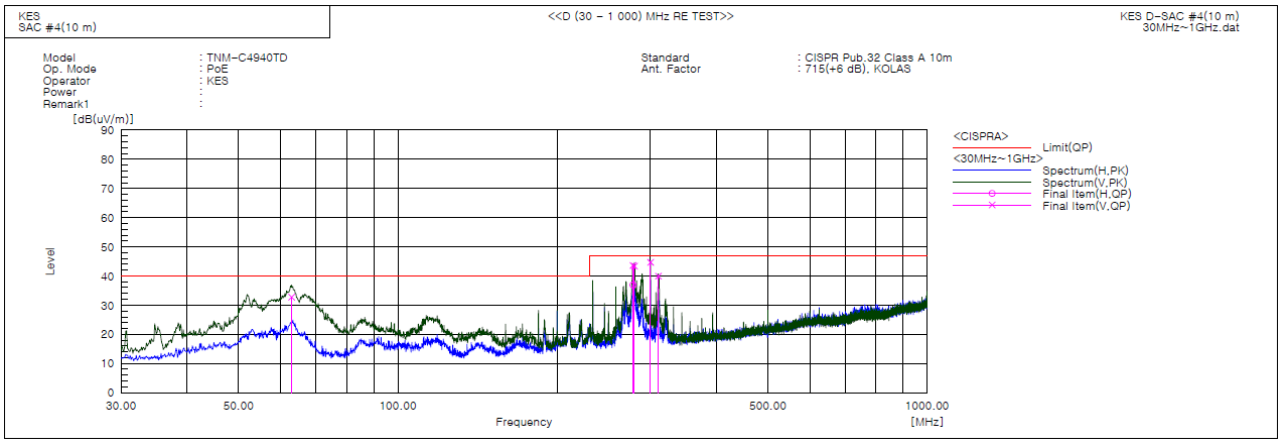


Final Result

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	233.458	V	60.3	-19.9	40.4	47.0	6.6	112.0	171.0	
2	233.467	H	57.5	-19.9	37.6	47.0	9.4	367.0	263.0	
3	277.593	V	60.1	-18.7	41.4	47.0	5.6	100.0	179.0	
4	279.775	H	53.9	-18.6	35.3	47.0	11.7	215.0	241.0	
5	300.024	V	61.9	-18.0	43.9	47.0	3.1	105.0	217.0	
6	310.694	V	56.7	-17.4	39.3	47.0	7.7	122.0	202.0	

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■ PoE Mode



Final Result

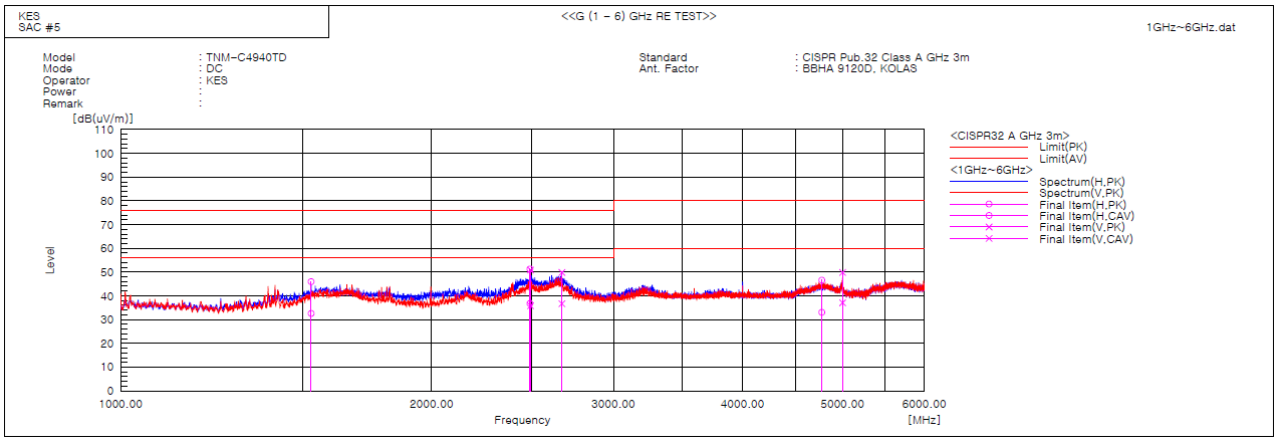
No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	62.980	V	55.5	-22.7	32.8	40.0	7.2	112.0	241.0	
2	277.956	H	55.6	-18.7	36.9	47.0	10.1	389.0	359.0	
3	277.968	V	62.3	-18.7	43.6	47.0	3.4	134.0	173.0	
4	279.896	V	62.0	-18.6	43.4	47.0	3.6	110.0	181.0	
5	300.024	V	62.7	-18.0	44.7	47.0	2.3	144.0	165.0	
6	310.573	V	57.4	-17.4	40.0	47.0	7.0	100.0	195.0	

♦ Calculation
Corrected Amplitude [㏈uV] = Amplitude[㏈uV] + Correction Factor [㏈]
Corrected Amplitude : The Final Value, Amplitude : Reading Value,
Correction Factor : ANT FACTOR + Cable loss

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Radiated Electric Field Emissions(Above 1 ㎓)

■ DC Mode

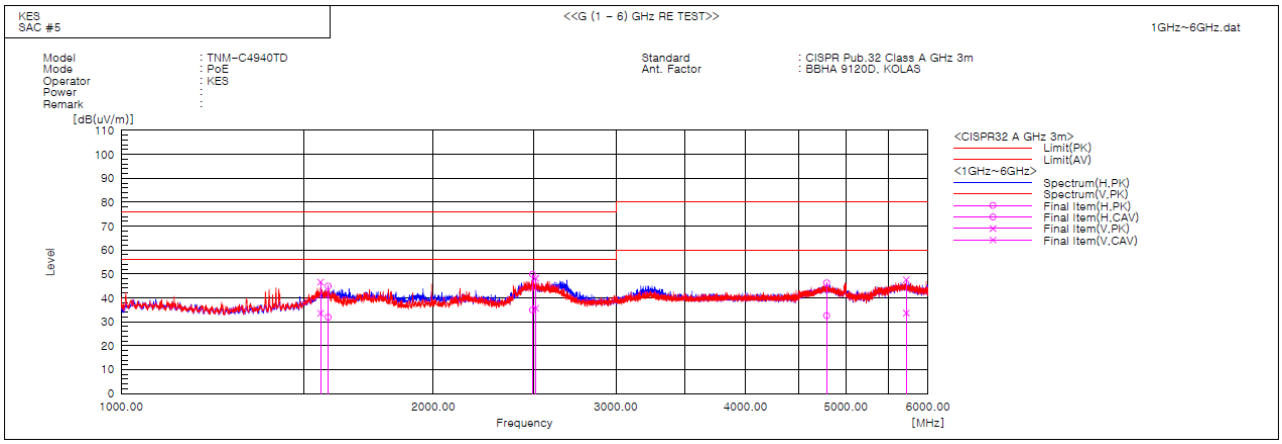


Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB(1/m)]	Result PK [dB(uV/m)]	Result CAV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin CAV [dB]	Height [cm]	Angle [deg]	Remark
1	1529.375	H	50.8	37.4	-4.8	46.0	32.6	76.0	56.0	30.0	23.4	100.0	180.3	
2	2490.000	H	52.4	37.9	-1.1	51.3	36.8	76.0	56.0	24.7	19.2	100.0	58.2	
3	2493.125	V	52.0	37.0	-1.1	50.9	35.9	76.0	56.0	25.1	20.1	100.0	282.8	
4	2673.750	V	50.1	36.9	-0.2	49.9	36.7	76.0	56.0	26.1	19.3	100.0	275.5	
5	4773.125	H	40.1	26.6	6.5	46.6	33.1	80.0	60.0	33.4	26.9	100.0	303.8	
6	5000.000	V	43.0	30.2	6.9	49.9	37.1	80.0	60.0	30.1	22.9	100.0	93.3	

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■ PoE Mode



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB(1/m)]	Result PK [dB(uV/m)]	Result CAV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin CAV [dB]	Height [cm]	Angle [deg]	Remark
1	1556.875	V	51.3	38.3	-4.7	46.6	33.6	76.0	56.0	29.4	22.4	100.0	323.3	
2	1583.750	H	49.5	36.5	-4.6	44.9	31.9	76.0	56.0	31.1	24.1	100.0	0.2	
3	2493.750	H	51.0	36.0	-1.1	49.9	34.9	76.0	56.0	26.1	21.1	100.0	258.5	
4	2510.625	V	49.2	36.6	-1.0	48.2	35.6	76.0	56.0	27.8	20.4	100.0	358.7	
5	4791.250	H	39.7	26.0	6.6	46.3	32.6	80.0	60.0	33.7	27.4	100.0	105.9	
6	5717.500	V	39.5	25.6	8.1	47.6	33.7	80.0	60.0	32.4	26.3	100.0	106.3	

♦ Calculation

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

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

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

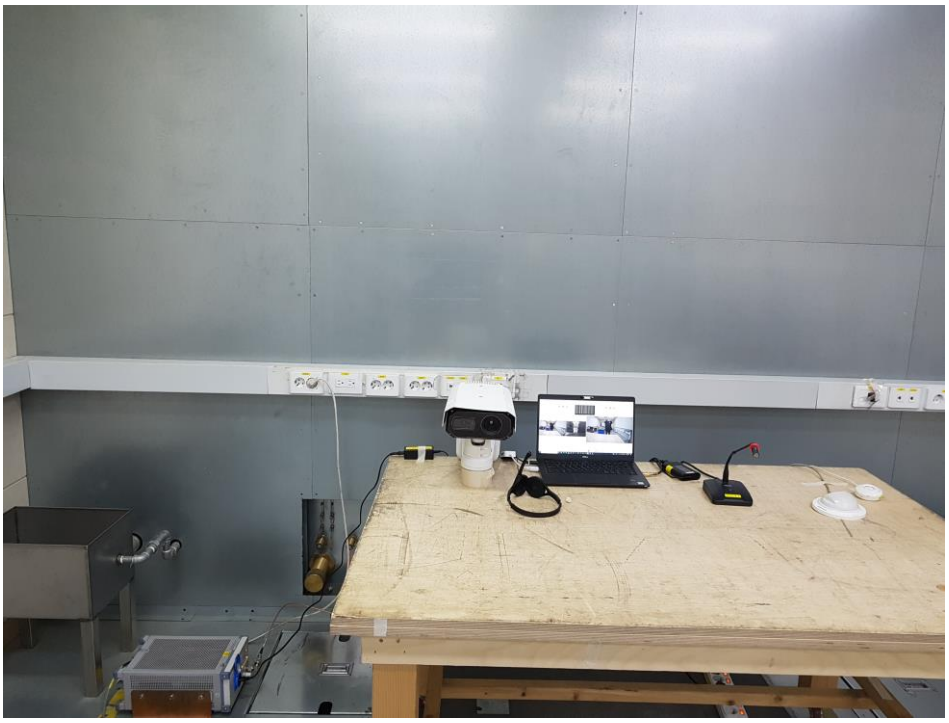
Limit(QP) : Limit value, c.f : (ANT Factor + Cable Loss - Preamp Factor), Margin: Margin value

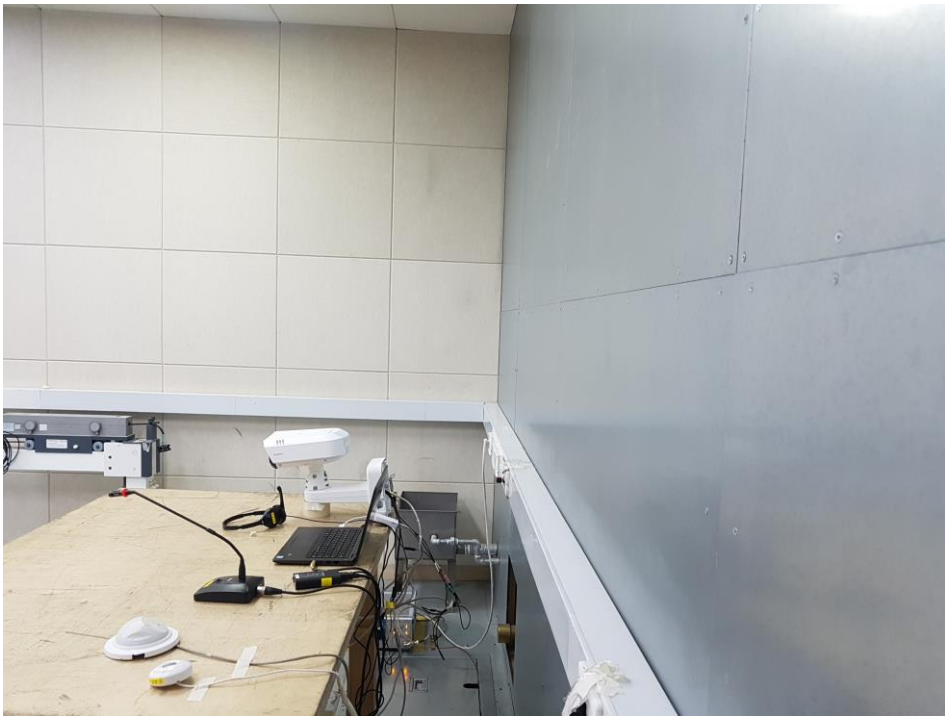
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Test Setup Photos and Configuration

Conducted Emissions at Mains Power Ports

■ DC Mode

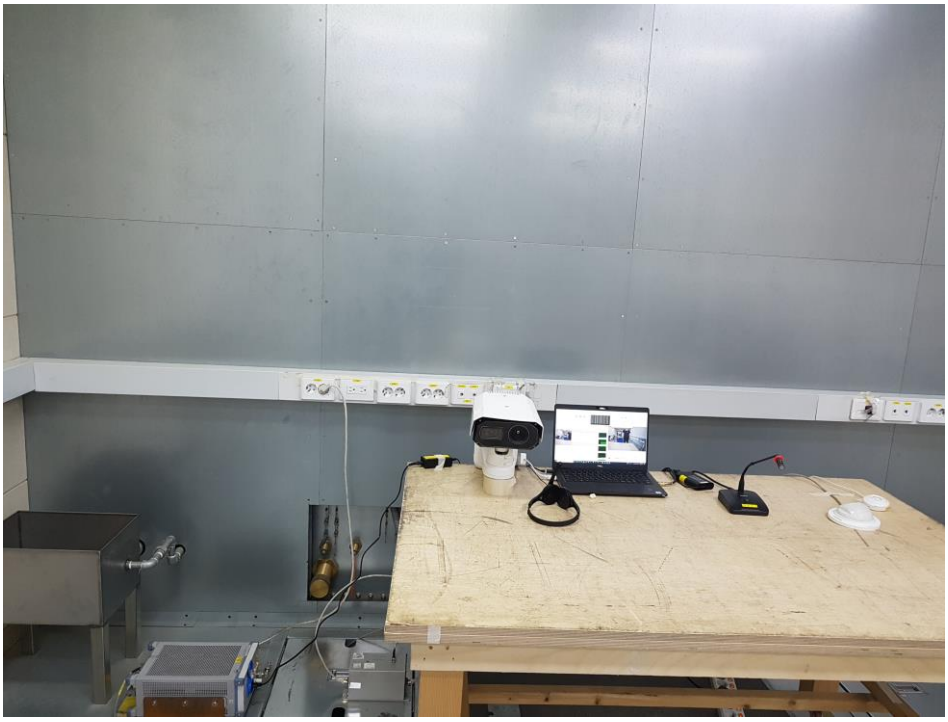




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Conducted Emissions at Telecommunication Ports

■ DC Mode





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■ PoE Mode

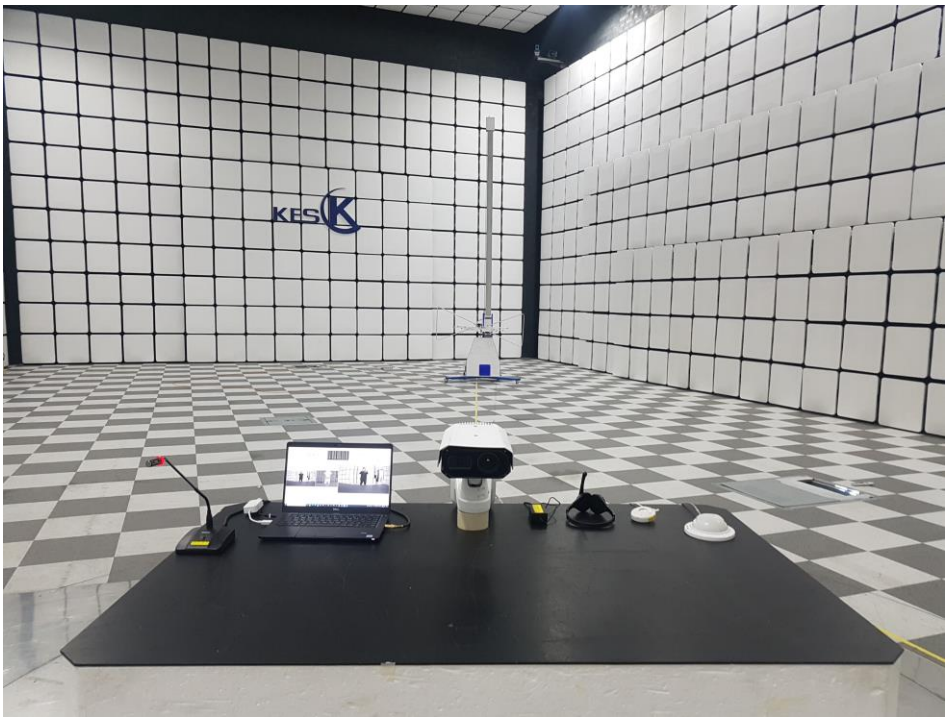




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Radiated Electric Field Emissions(Below 1 ㎓)

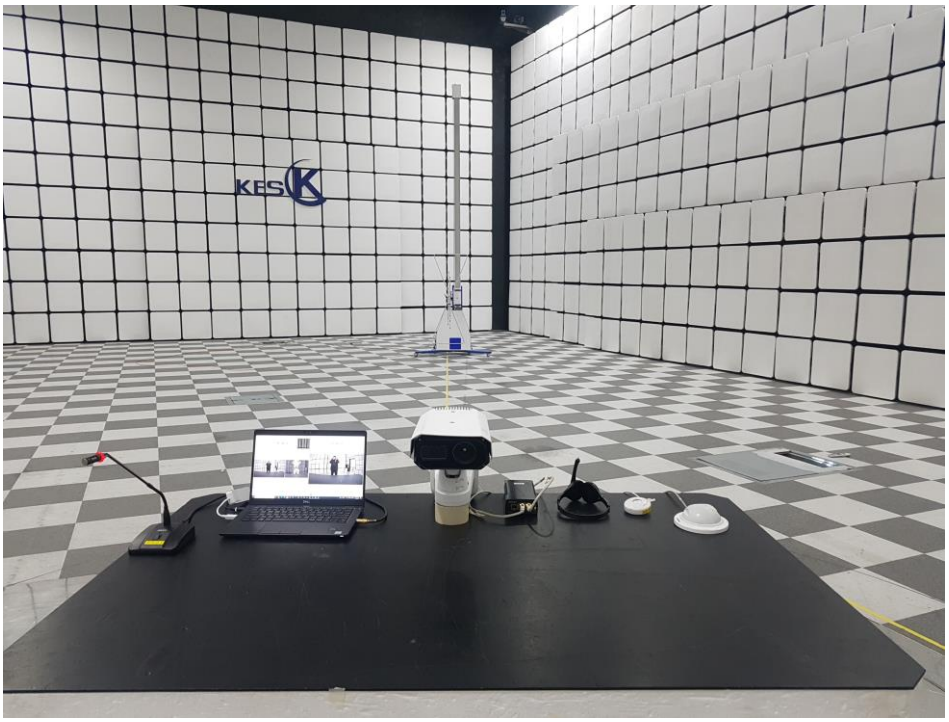
■ DC Mode





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■ PoE Mode

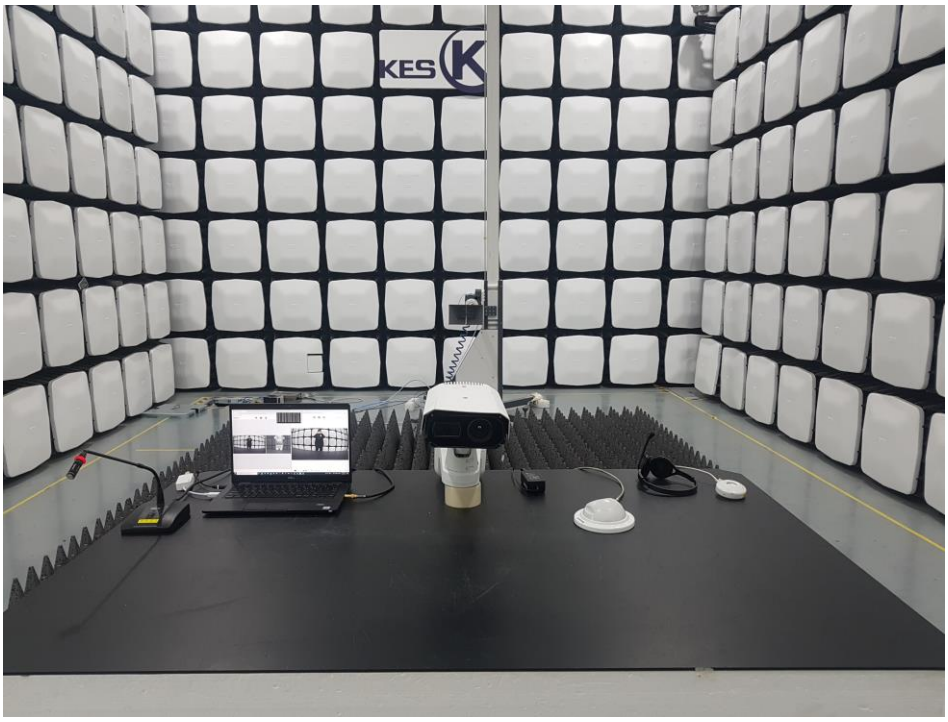




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Radiated Electric Field Emissions(Above 1 ㎓)

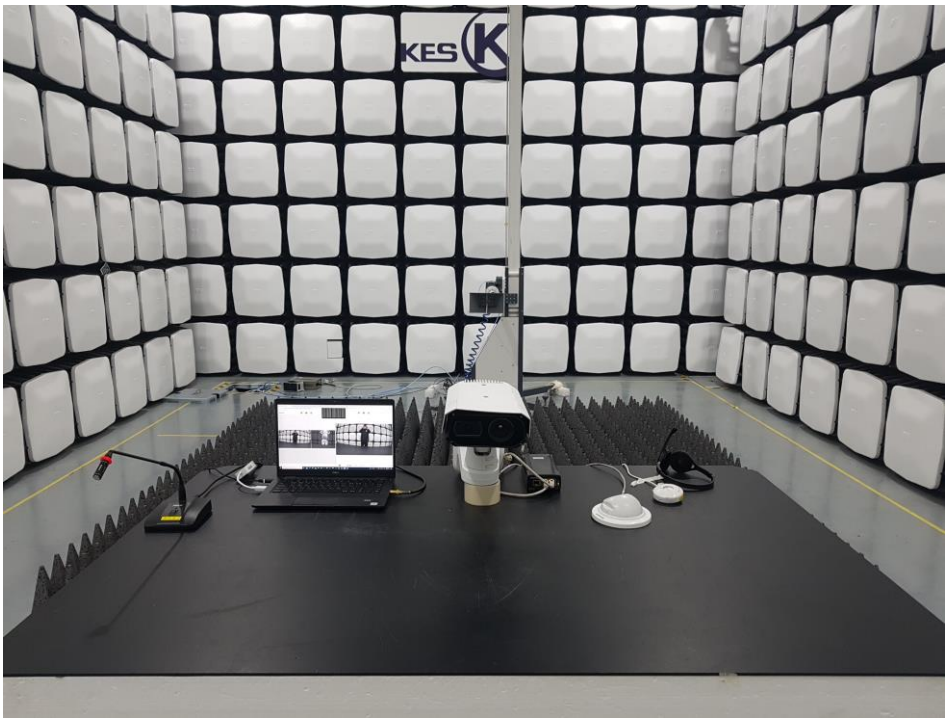
■ DC Mode

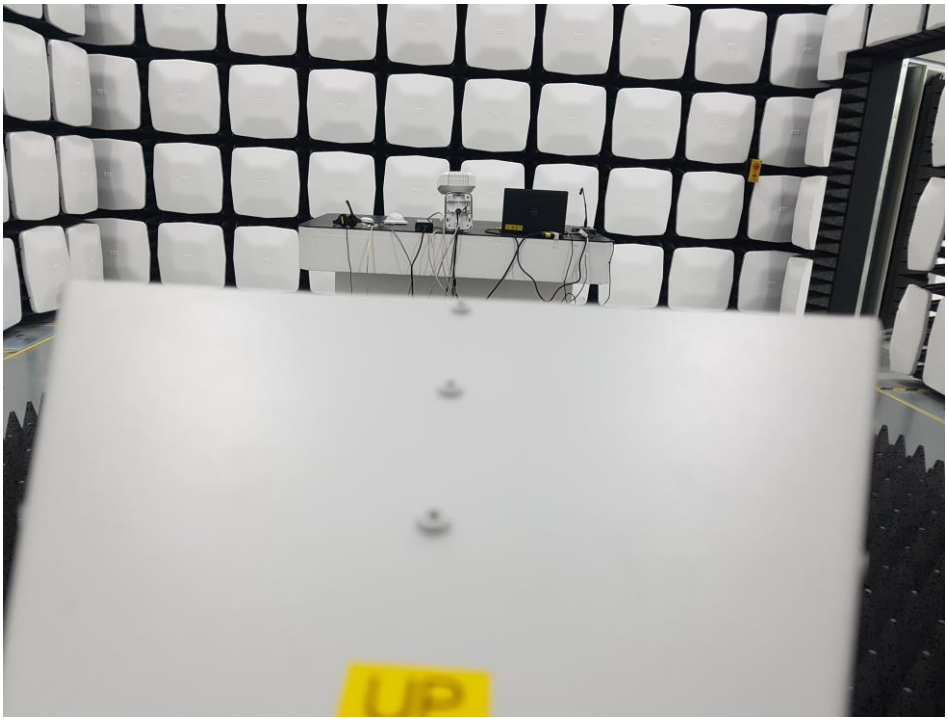




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■ PoE Mode





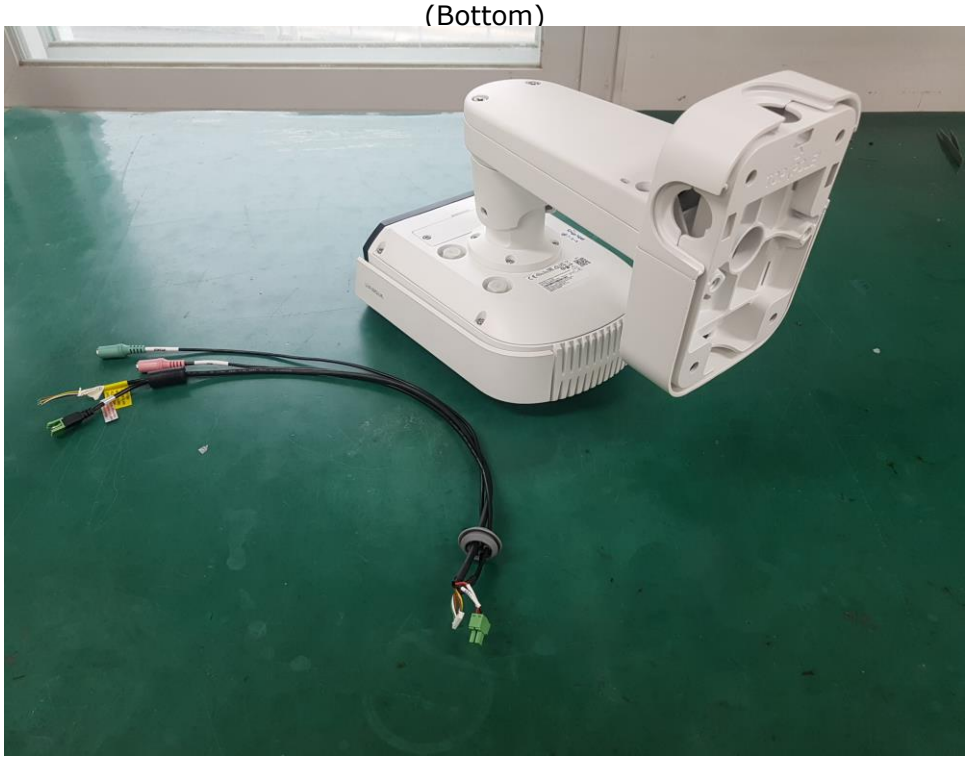
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EUT External Photographs

(Top)



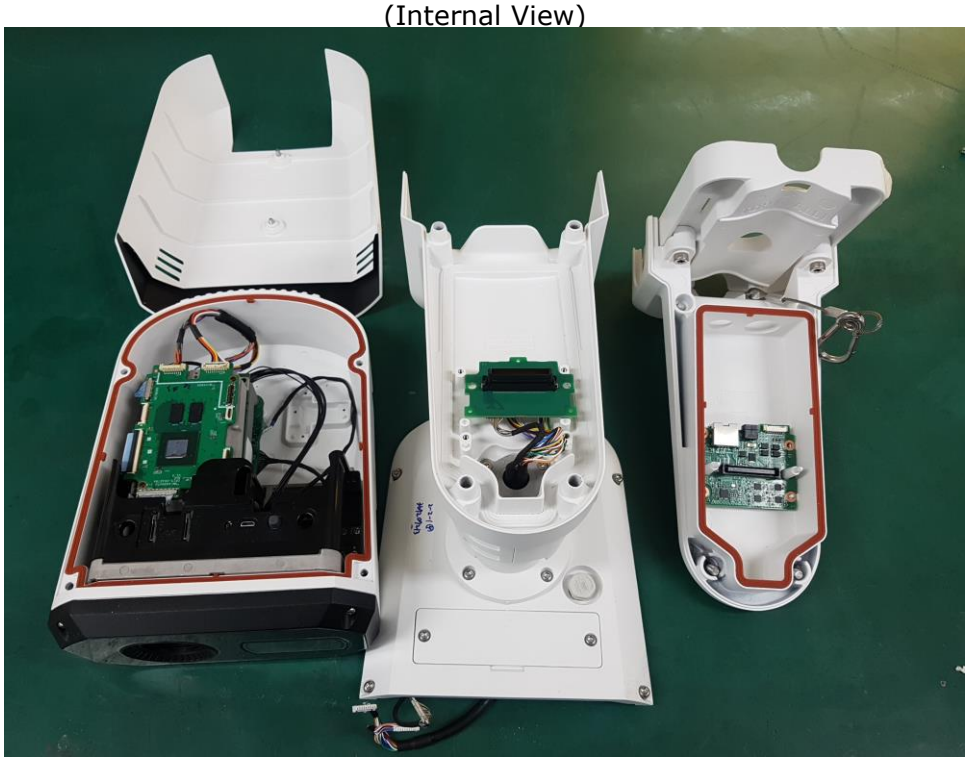
(Bottom)



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EUT Internal Photographs

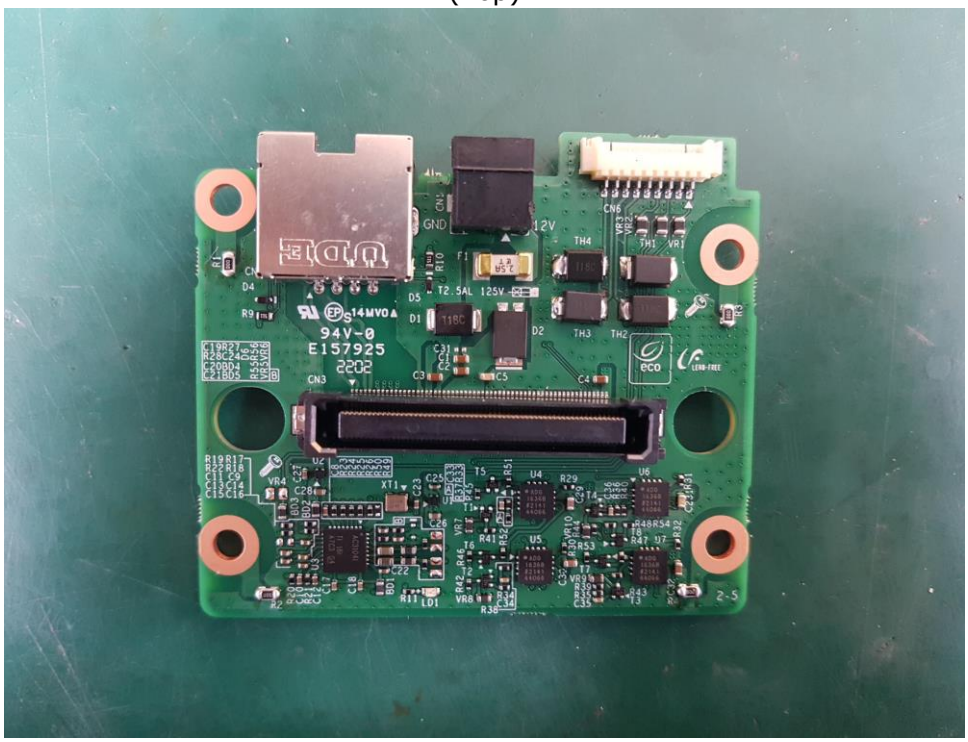
(Internal View)



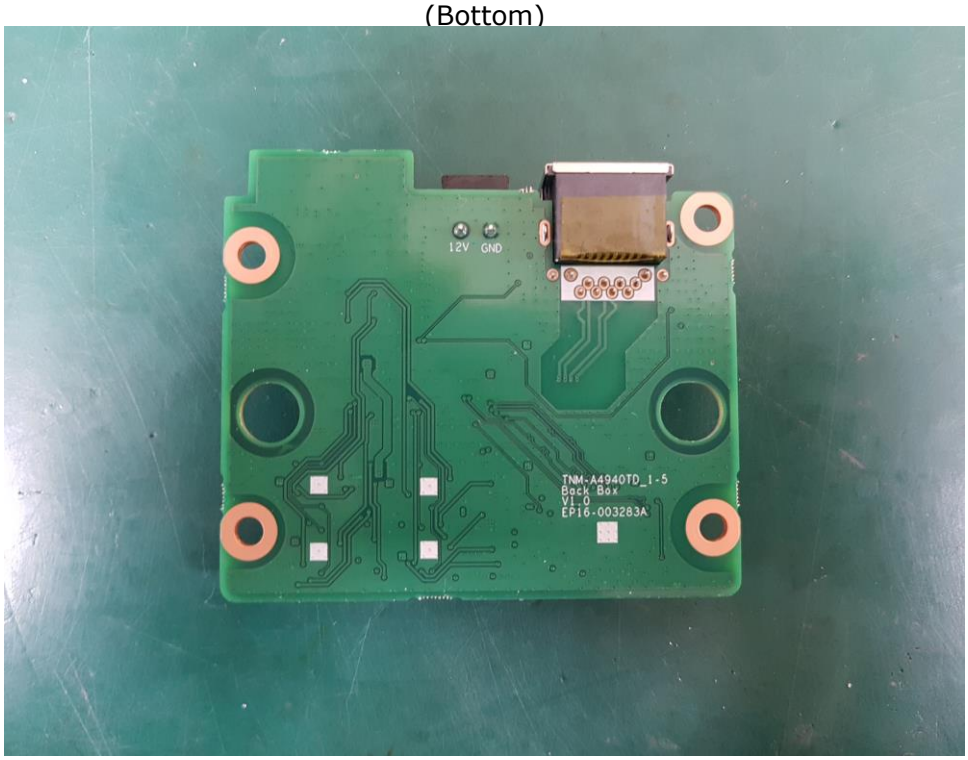
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EUT Internal View – Board 1

(Top)



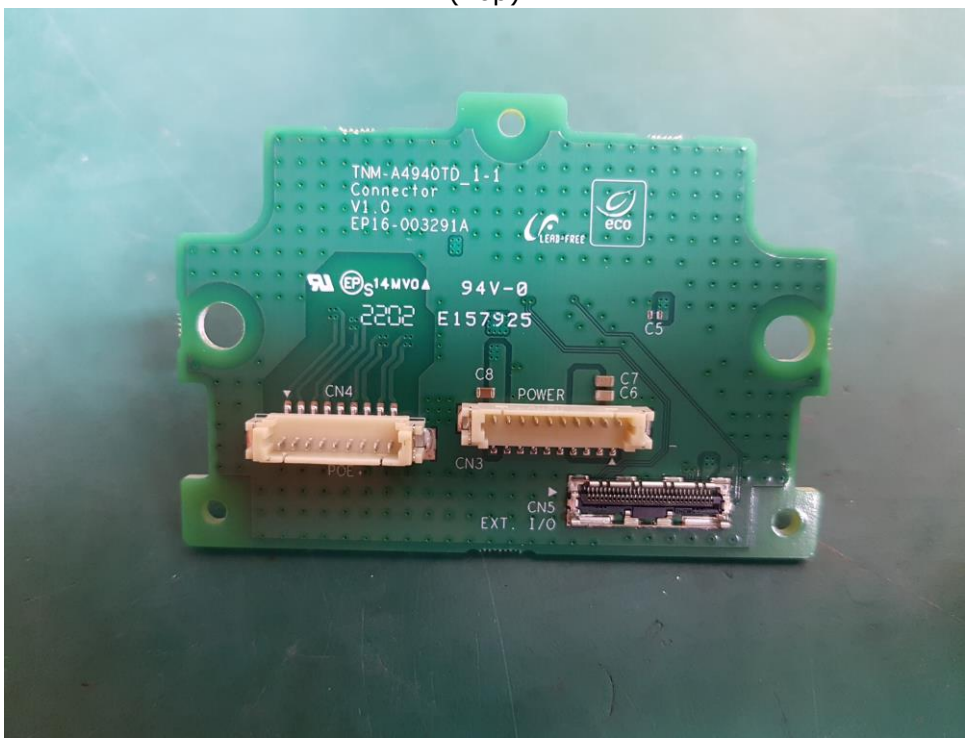
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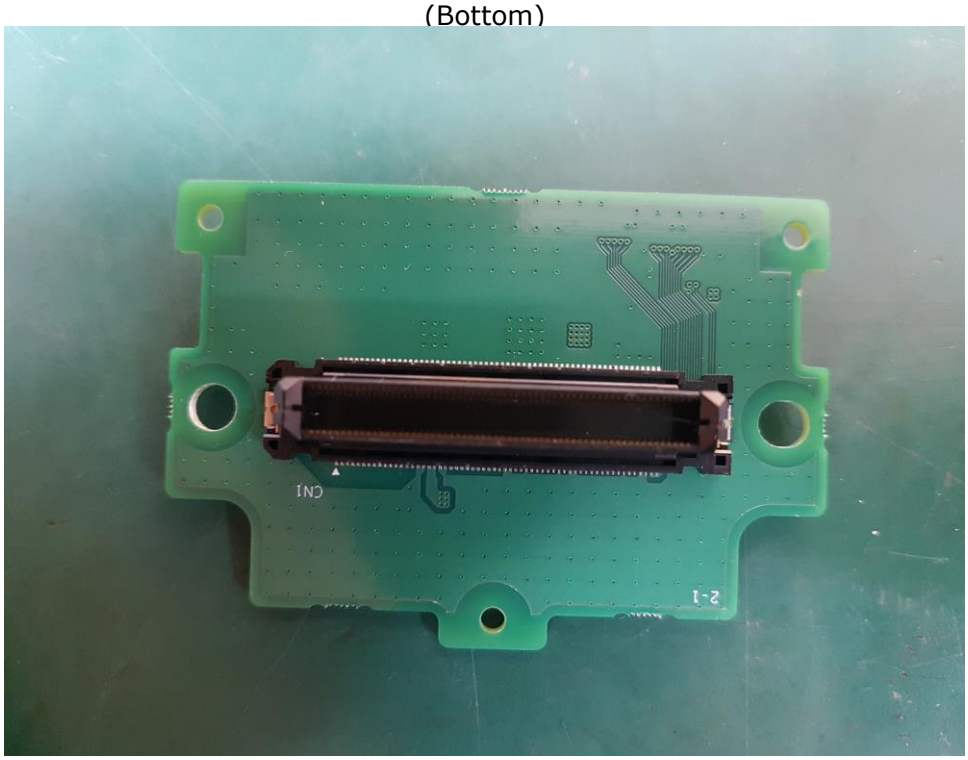
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EUT Internal View – Board 2

(Top)



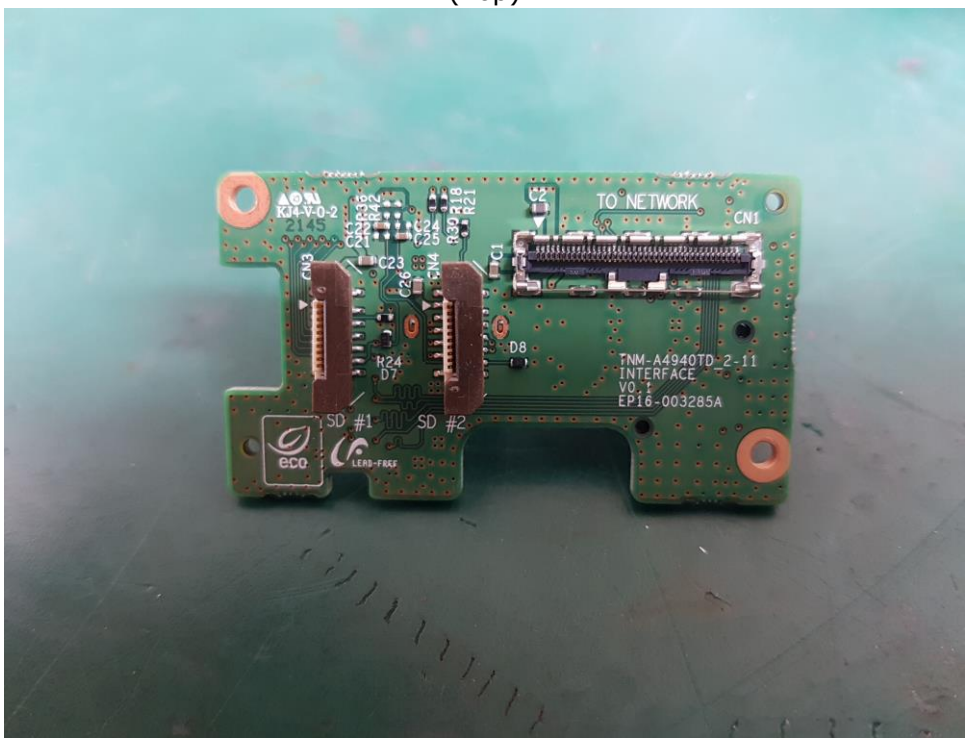
(Bottom)



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EUT Internal View – Board 3

(Top)



(Bottom)



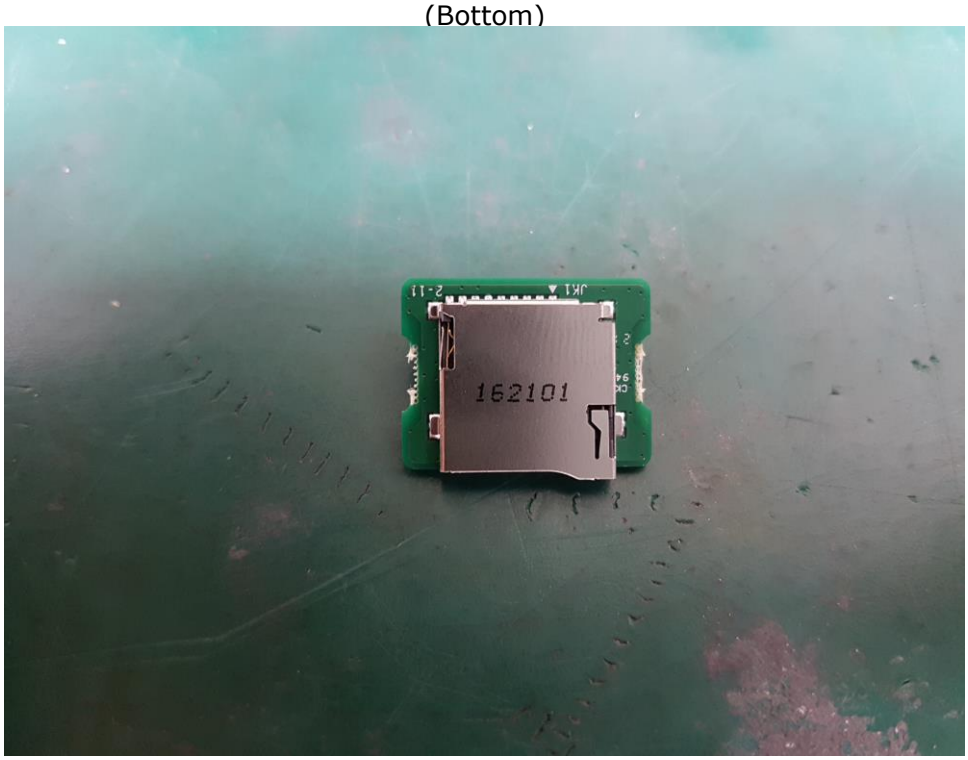
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EUT Internal View – Board 4

(Top)



(Bottom)



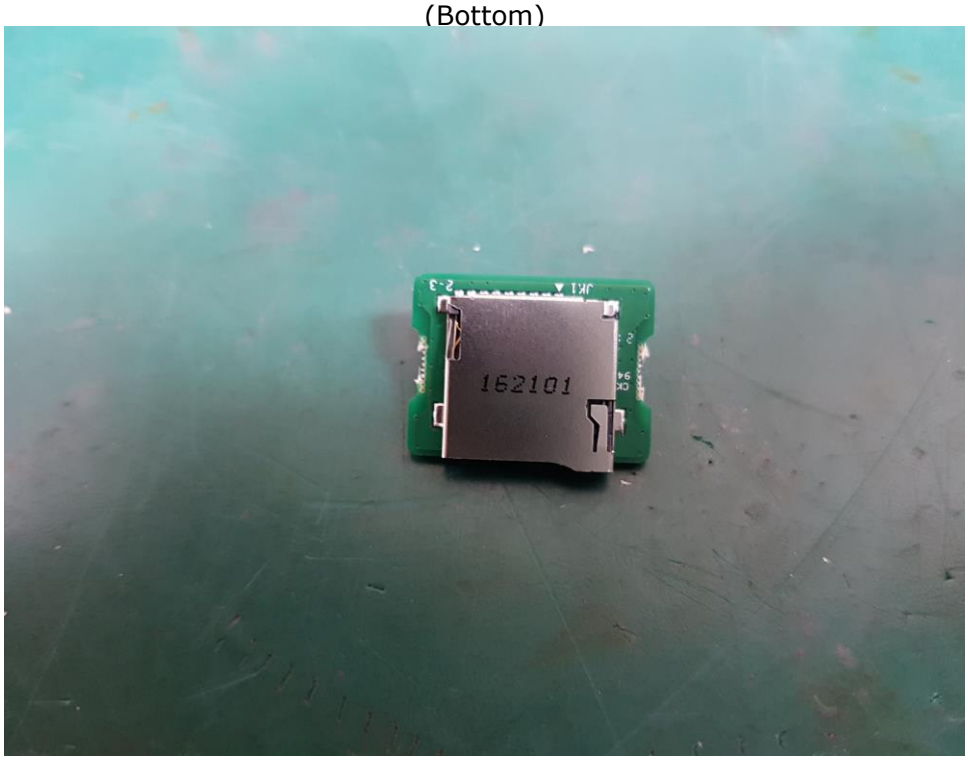
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EUT Internal View – Board 5

(Top)



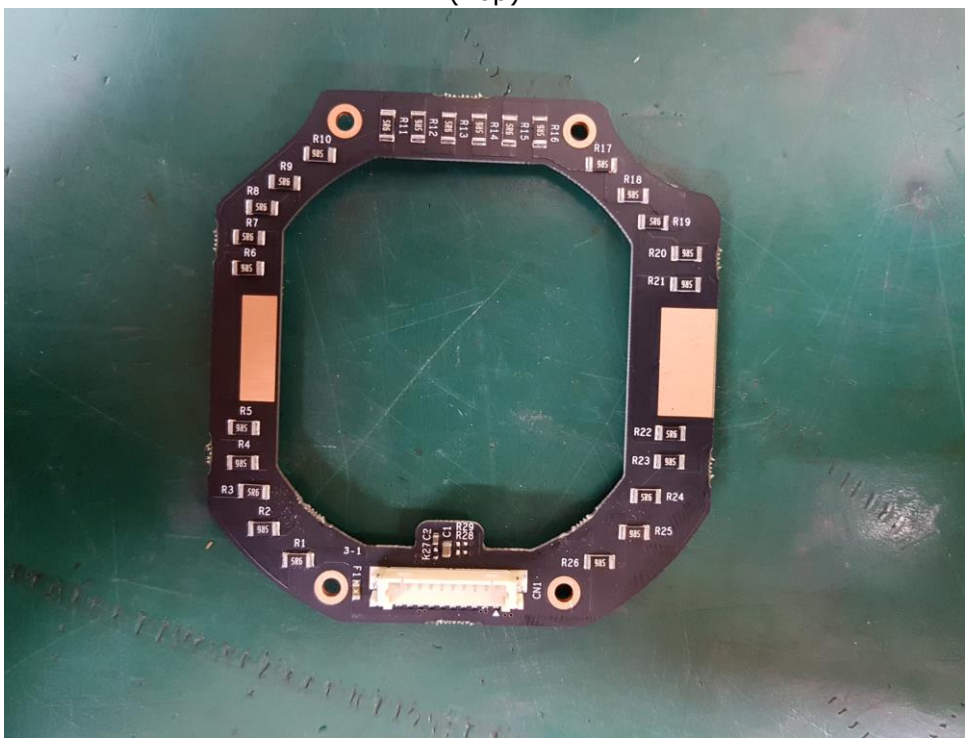
(Bottom)



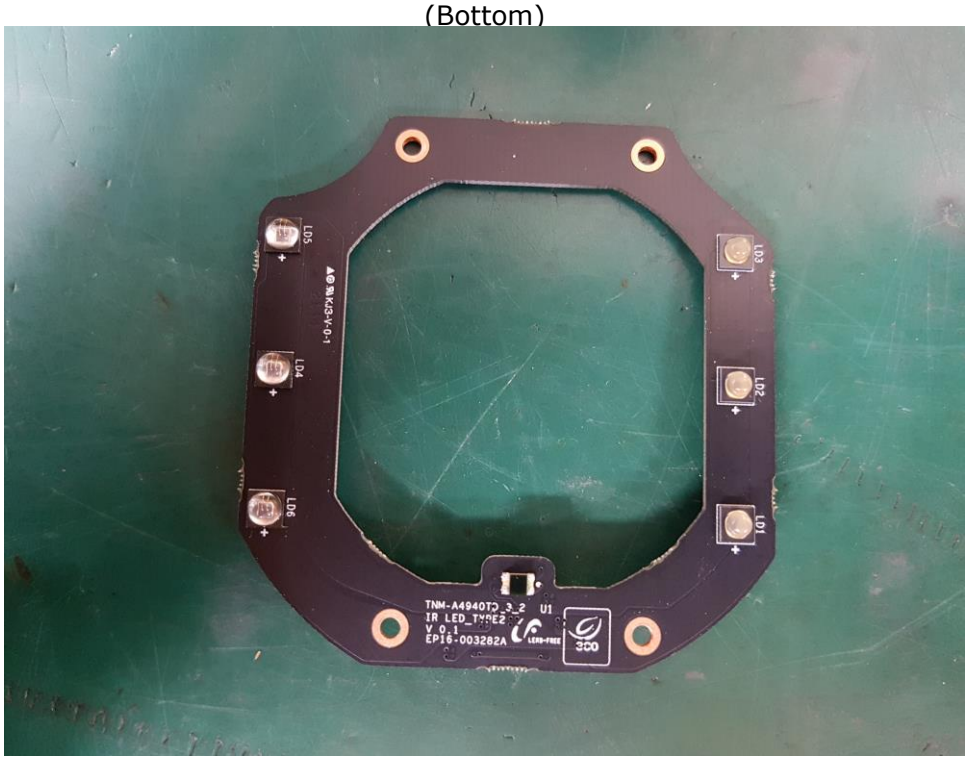
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EUT Internal View – Board 6

(Top)



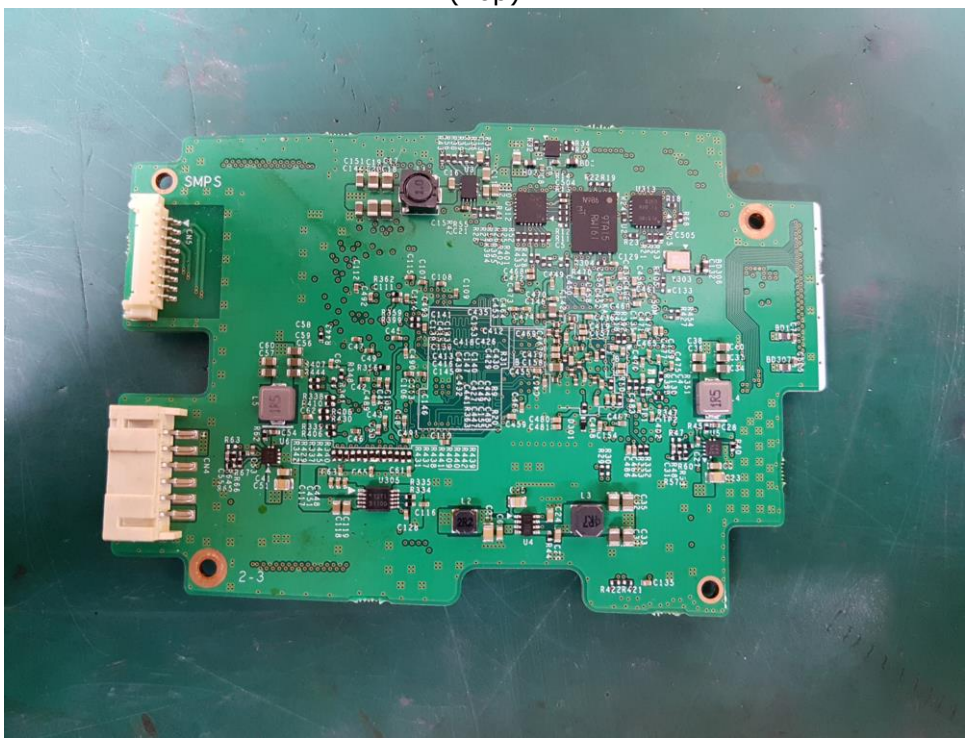
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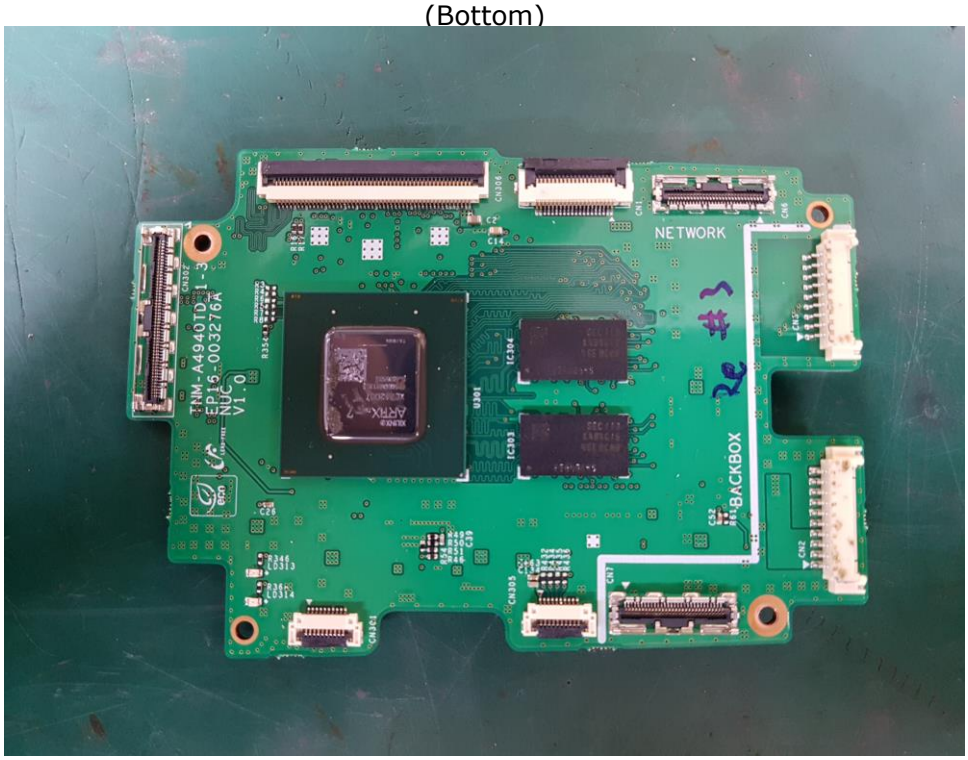
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EUT Internal View – Board 7

(Top)



(Bottom)



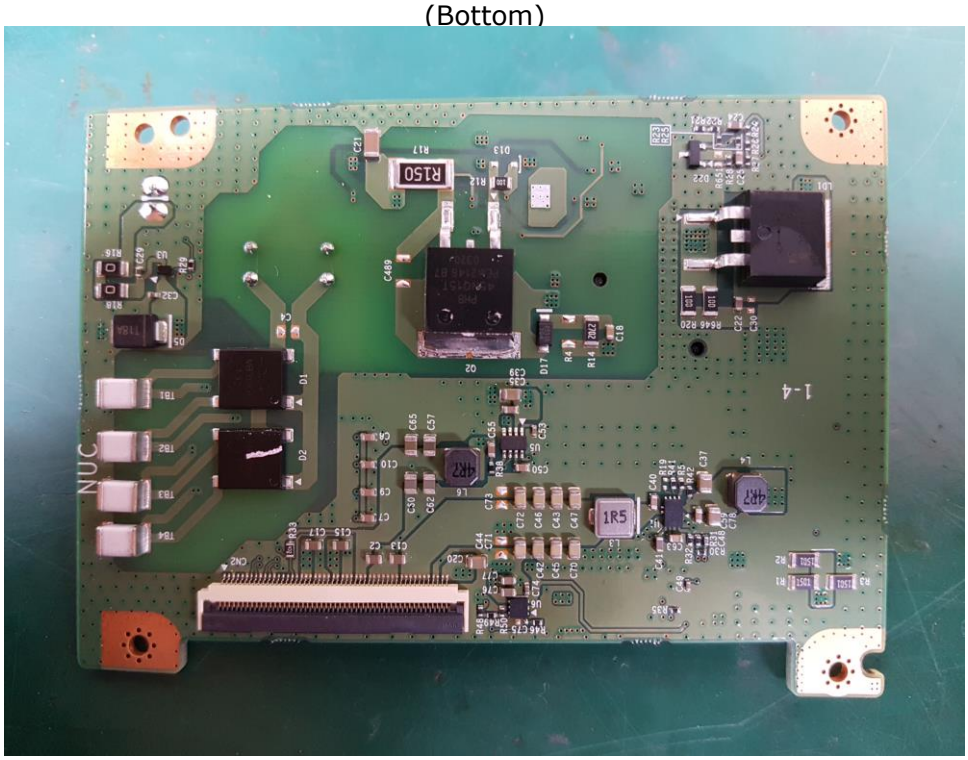
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EUT Internal View – Board 8

(Top)



(Bottom)



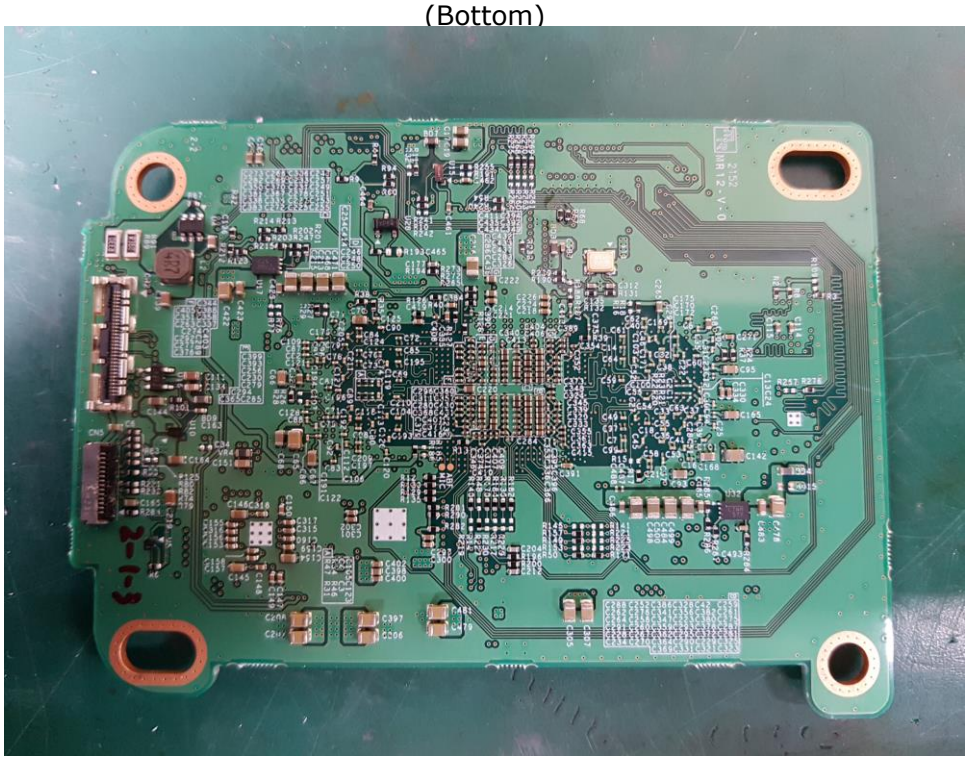
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EUT Internal View – Board 9

(Top)



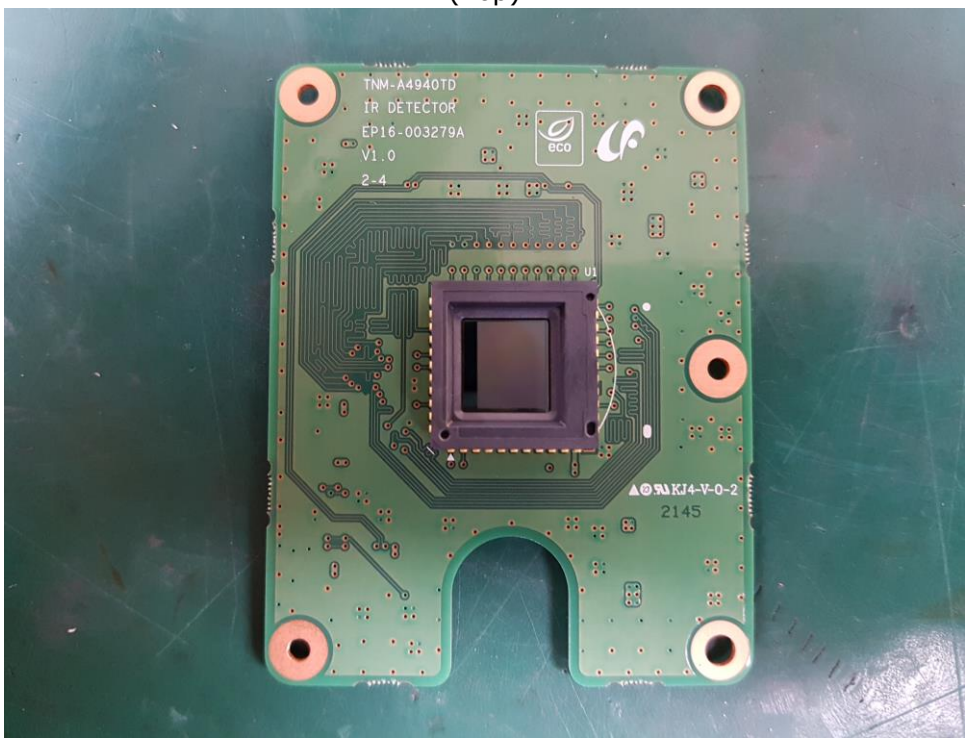
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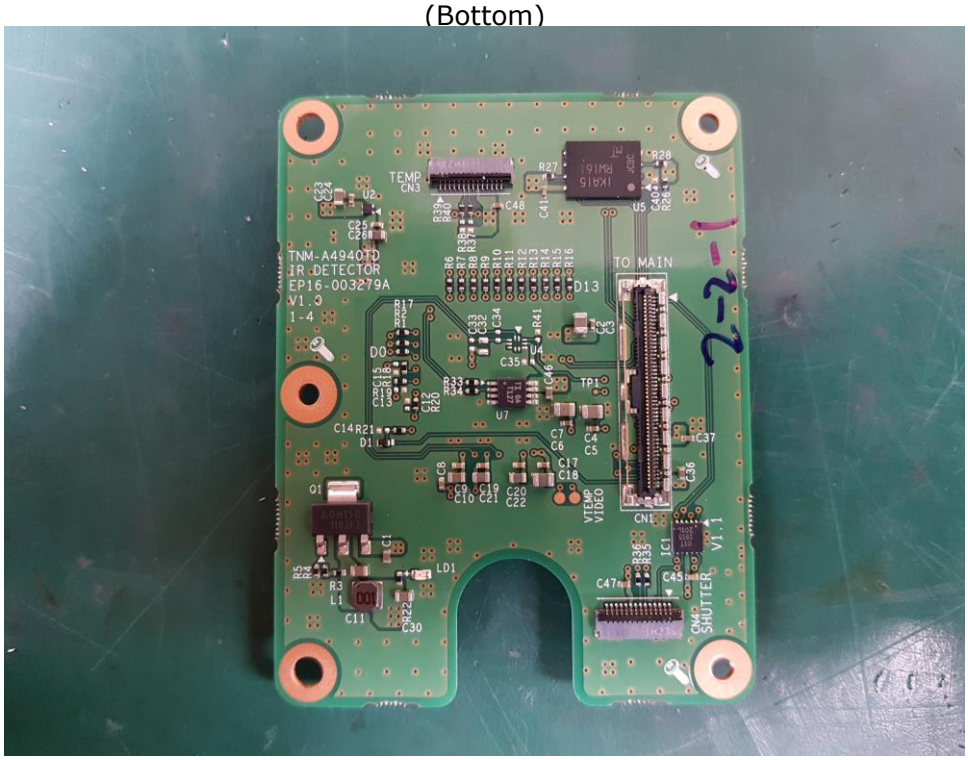
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EUT Internal View – Board 10

(Top)



(Bottom)



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EUT Internal View – Lens 1

(Top)



(Bottom)



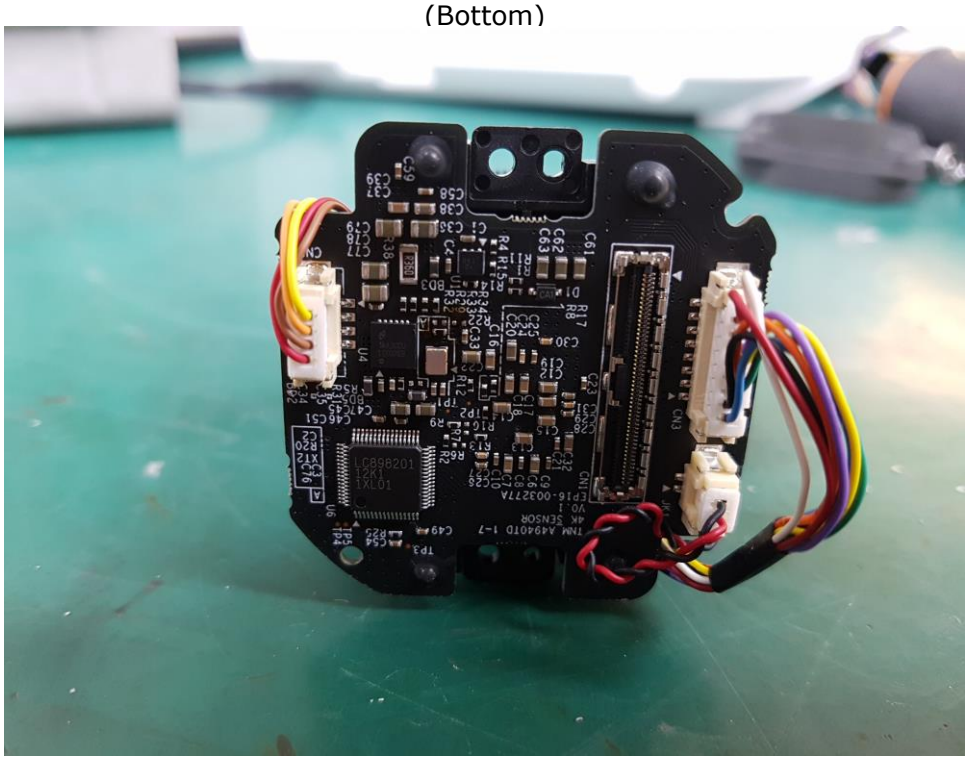
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EUT Internal View – Lens 2

(Top)

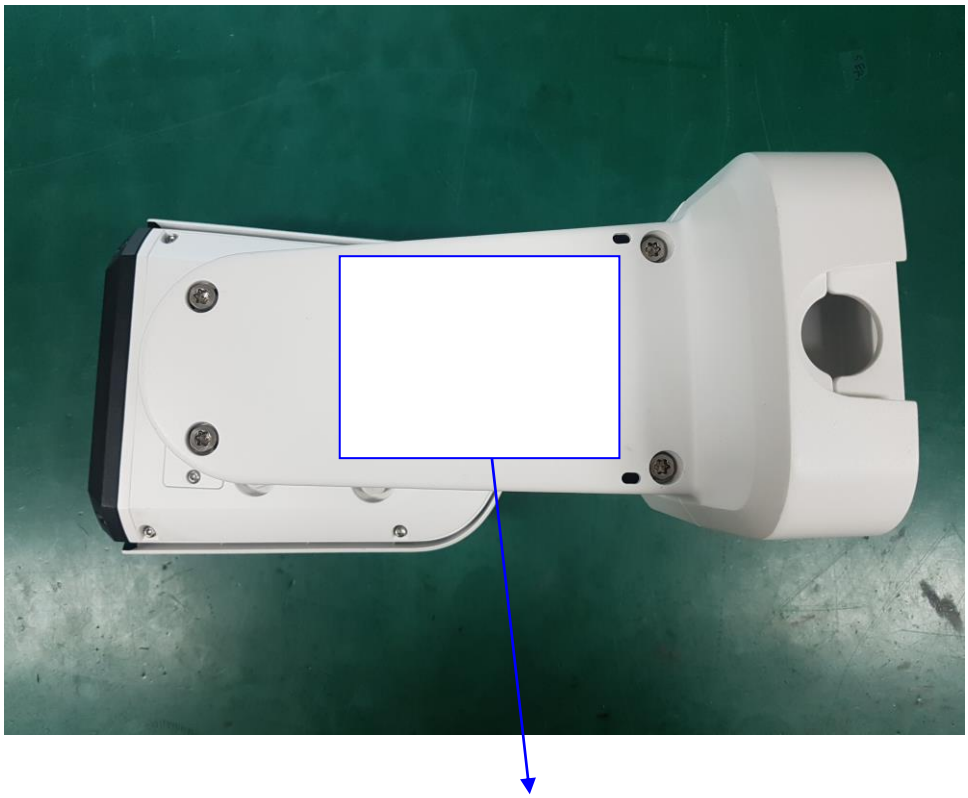


(Bottom)



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