

EMC TEST REPORT

Test Report No. : KES-E1-18T0546-R3
Date of Issue : Jun. 12, 2023
Product name : THERMAL POSITIONING CAMERA
Model/Type No. : TNU-4051T
Variant Model : -
Applicant : Hanwha Vision Co., Ltd
Applicant Address : 6, Pangyo-ro 319 Beon-gil, Bundang-gu, Seongnam-si,
Gyeonggi-do, 13488, 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 : Jun. 08, 2023
Test date : Sep. 18, 2018 ~ Sep. 21, 2018
Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Reviewed by



Min Seong, Kim
EMC Test Engineer

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
Sep. 27, 2018	KES-E1-18T0546	Issued
May. 15, 2019	KES-E1-18T0546-R1	Re-issue due to regulations update
Jun. 09, 2022	KES-E1-18T0546-R2	- Manufacturer change at customer's request - Test regulation addition on customer request.
Jun. 12, 2023	KES-E1-18T0546-R3	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:

Items		Description	
		TNU-4041T	TNU-4051T
Video	Imaging Device	Uncooled Micro bolometer	
	Pixel size	17μm	
	Effective Pixels	640x480	
	NETD	<50mK	
	Video Out	CVBS : 1.0 Vp-p / 75Ω composite, 720x480(N), 720x576(P), for installation	
Lens	Focal Length (Zoom Ratio)	19mm fixed	35mm fixed
	Max. Aperture Ratio	F1.0	
	Angular Field of View	H:32°/V:24.3°/D:39.2°	H:17.2°/V:13°/D:22°
	Focus control	Fixed	
	Min. Object Distance	11m	36m
	Mount Type	Board-in type	
Pan / Tilt / Rotate	Pan Range	360° Endless	
	Pan Speed	0.025°~120°/sec	
	Tilt Range	-90° ~40°	
	Tilt Speed	0.025°~40°/sec	
	Sequence	Preset (300 ea), Swing, Group (6 ea), Trace, Tour (1 ea), Auto Run, Schedule	
	Preset Accuracy	0.3°	
	Azimuth	Yes (E/W/S/N/NE/NW/SE/SW)	
Operational	Camera Title	Off / On - W/W : English/Numeric/Special Characters - Common : Multi-line (Max 5), Color (Grey/Green/Red/Blue/Black/White), Transparency, Auto Scale by Resolution	
	Digital Image Stabilization	Off / On(with Gyro)	
	Motion Detection	Off/ On(8ea, 8point Polygonal zones), Handover	

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Items		Description	
		TNU-4041T	TNU-4051T
Operational	Video & Audio Analytics	Tampering, Loitering, Directional Detection, Virtual Line, Fence detection, Enter/Exit, Appear / Disappear, Audio Detection, Motion Detection, Sound Classification, Shock detection, Temperature change detection	
	Alarm I/O	Input 1ea / Output 1ea	
	Alarm Triggers	Alarm Input, Motion Detection, Video & Audio Analytics, Network Disconnect	
	Alarm Events	<ul style="list-style-type: none">• File upload via FTP, E-Mail• Notification via E-Mail• local storage(Micro SD/SDHC/SDXC) or NAS recording at Event Triggers• External output	
	Audio In	Selectable (Mic IN/Line IN), Supply voltage: 2.5VDC(4mA), Input impedance: approx. 2K Ohm	
	Audio out	Line out, Max output level: 1 Vrms	
	Pixel count	support	
Network	Ethernet	RJ-45 (10/100BASE-T)	
	Video Compression	H.265/H.264 (MPEG-4 Part 10/AVC) : Main/Baseline/High, Motion JPEG	
	Resolution	640x480, 640x360, 320x240	
	Max. Framerate	H.265/H.264 : Max. 30fps at all resolutions Motion JPEG : Max. 30fps	
	WiseStream II	Support	
	Video Quality Adjustment	H.264/H.265 : Target Bitrate Level Control MJPEG : Target Bitrate Level Control	

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Items		Description	
		TNU-4041T	TNU-4051T
Network	Bitrate Control Method	H.264/H.265 : CBR or VBR MJPEG : VBR	
	Streaming Capability	Multiple Streaming (Up to 10 Profiles)	
	Audio Compression Format	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	
	Audio Communication	Bi-directional (2-Way)	
	IP	IPv4, IPv6	
	Protocol	TCP/IP, UDP/IP, RTP(UDP), RTP(TCP), RTSP, 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)	
	Streaming Method	Unicast / Multicast	
	Max. User Access	20 users at Unicast Mode	
	Edge Storage	Micro SD/SDHC/SDXC (up to 256 GB) - Motion Images recorded in the SD/SDHC/SDXC memory card can be downloaded. NAS(Network Attached Storage) Local PC for Instant Recording	
	Application Programming Interface	ONVIF Profile S/G SUNAPI(HTTP API) Open Platform	
	Webpage Multi Language	English, French, German, Italian, Spanish, Russian, Turkish, Polish, Dutch, Swedish, Czech, Portuguese, Japanese, Chinese, Korean	

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Items		Description	
		TNU-4041T	TNU-4051T
Network	Web Viewer	Supported OS : Windows 7, 8.1, 10, Mac OS X 10.10, 10.11, 10.12 Webviewer Recommended browser: Google Chrome 63 Supported browsers: IE11, MS Edge 41, Mozilla Firefox 57(Windows 64bit only), Apple Safari 11 (Mac OS X only)	
	Central Management Software	SmartViewer, SSM	
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	
	Ingress protect	IP66, NEMA 4X	
	Vandal Resistance	IK10	-
Electrical	Input Voltage/Current	24VAC(± 10%) / 6A(MAX)	
	Power Consumption	TBD	
Mechanical	Color / Material	White / Aluminum	
	Dimension (WxHxD)	(W)219 × (H)528 × (D)335	
	Weight	11.7kg	

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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.

Voltage ☐ 230Vac ☐ 100 Vac ☒ 24 Vac ☐ 12 Vdc ☐ PoE
Frequency ☐ 50 Hz ☐ 60 Hz ☐ Hz

1.2 Variant Model Differences

Not applicable

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
THERMAL POSITIONING CAMERA	TNU-4051T	-	HANWHA VISION VIETNAM COMPANY LIMITED	EUT

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
Notebook	LG15N54	410NZET022292	LG	-
Notebook Adaptor	PA-1900-08	9702591703	Dongguang Lite Power 2nd Plant	-
Monitor	SMT-2233	ZC6U67VH500194D	Weihai Daewoo Electronics Co., Ltd.	-
Speaker	BR-1000A CUVE	-	DONGGUAN EDFIER TECHNOLOGY CO, LTD	-
MIC	CMK-303	-	CAMAC	-
Alarm	SIP-1201DD D0	-	SAMSUNG TECHWIN CO., LTD.	-
Button Alarm	-	-	-	-
Micro SD Card	-	-	SanDisk	4 GB
Tablet PC	A1432	DQXJWFHDF193	APPLE .Inc	-

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1.6 External I/O Cabling

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
THERMAL POSITIONING CAMERA (EUT)	RJ-45	Notebook	RJ-45	3.0	U
	BNC	Monitor	BNC	3.0	S
	3.5 mm	Speaker	3.5 mm	1.6	U
	3.5 mm	MIC	3.5 mm	1.7	U
	3 Pin	Alarm	3 Pin	3.0	U
	2 Pin	Button Alarm	2 Pin	3.0	U
	Micro SD Slot	Micro SD Card	Micro SD Slot	-	U
Notebook	3.5 mm	Tablet PC	3.5 mm	0.8	U

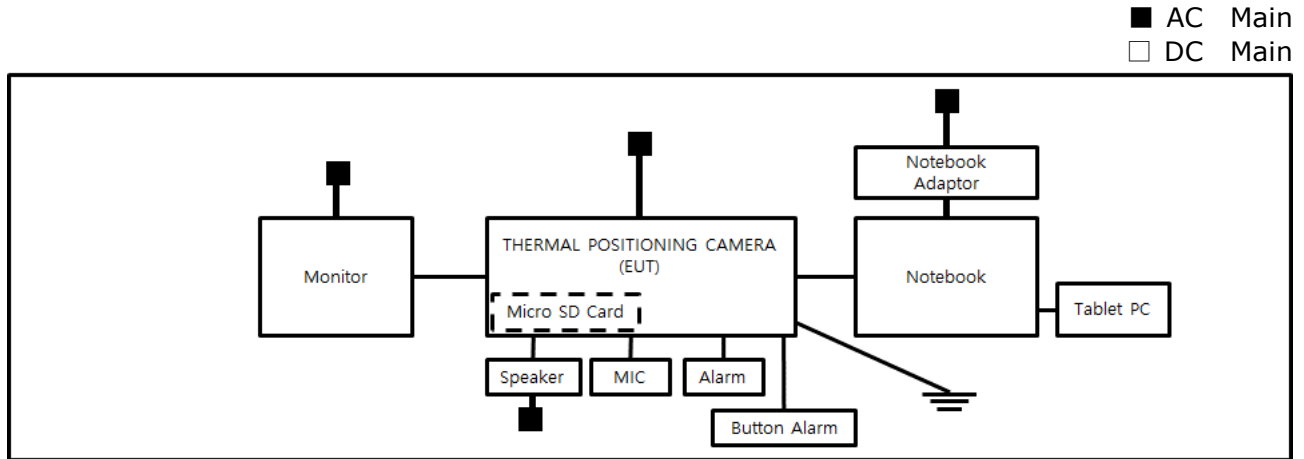
* Unshielded=U, Shielded=S

1.7 EUT Operating Mode(s)

Test Mode	operating
AC 24 V	EUT Monitoring, Ping Test

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

1.8 Configuration



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



2.0 Test Regulations

The emissions tests were performed according to following regulations:

☒ **EMC – Directive 2014/30/EU**

☒ EN 55032:2015/A11:2020

☒ Class A

☐ Class B

☒ EN 50130-4:2011

☒ EN 61000-3-2:2014

☒ EN 61000-3-3:2013

☒ **EMC – Regulations 2016**

☒ EN 55032:2015/A11:2020

☒ Class A

☐ Class B

☒ EN 50130-4:2011

☒ EN 61000-3-2:2014

☒ EN 61000-3-3:2013

2.1 Conducted Emissions at Mains Power Ports

Test Date

Sep. 18, 2018

Test Location

Electro wave Shieldroom #3

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	101781	04, 25, 2019
<input checked="" type="checkbox"/>	LISN	ENV216	R & S	101787	01, 31, 2019
<input checked="" type="checkbox"/>	LISN	ESH2-Z5	R & S	100450	04, 25, 2019

Test Conditions

Temperature: 24,1 °C
Relative Humidity: 49,5 % 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

Sep. 18, 2008

Test Location

Electro wave Shieldroom #3

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	04, 25, 2019
<input checked="" type="checkbox"/>	LISN	ENV216	R & S	101137	01, 31, 2019
<input checked="" type="checkbox"/>	LISN	ENV216	R & S	101786	04, 25, 2019
<input checked="" type="checkbox"/>	8-WIRE ISN CAT3	CAT3 8158	SCHWARZBECK	8158-0019	03, 22, 2019
<input checked="" type="checkbox"/>	8-WIRE ISN CAT5	CAT5 8158	SCHWARZBECK	8158-0030	03, 22, 2019
<input type="checkbox"/>	8-WIRE ISN CAT6	NTFM 8158	SCHWARZBECK	8158-0029	08, 10, 2019

Test Conditions

Temperature: 24,1 °C
Relative Humidity: 49,5 % 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.

2.3 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Sep. 18, 2018

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	04, 11, 2019
<input checked="" type="checkbox"/>	AMPLIFIER	SCU 01	R & S	100603	11, 27, 2018
<input checked="" type="checkbox"/>	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	714	11, 28, 2018

Test Conditions

Temperature: 23,9 °C
Relative Humidity: 52,2 % 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

Sep. 19, 2018

Test Location

SEMI ANECHOIC CHAMBER #3

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	ESR7	R & S	101190	08, 06, 2019
<input checked="" type="checkbox"/>	PREAMPLIFIER	8449B	AGILENT	3008A01967	05, 31, 2019
<input type="checkbox"/>	ATTENUATOR	8491A	HP	35496	03, 21, 2019
<input checked="" type="checkbox"/>	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	05, 02, 2019

Test Conditions

Temperature: 23,8 °C
Relative Humidity: 52,7 % 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.

2.5 Harmonic Current Emissions

Test Date

Sep. 18, 2018

Test Location

Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMI Test S/W	dpa.control	EM TEST	5.4.11.0	-
<input checked="" type="checkbox"/>	DIGITAL POWER ANALYZER	DPA 500N	EM TEST	V1024106759	08, 08, 2019
<input checked="" type="checkbox"/>	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

Test Conditions

Temperature: 24,1 °C
Relative Humidity: 49,5 % R.H.

Classification of Equipment for Harmonic Current Emissions

- ☒ Class A
☐ Class B
☐ Class C(Below 25 W)
☐ Class C(Above 25 W)
☐ Class D

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

The test has been tested using the AC / AC Adaptor.



2.6 Voltage Fluctuations and Flicker

Test Date

Sep. 18, 2018

Test Location

Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMI Test S/W	dpa.control	EM TEST	5.4.11.0	-
<input checked="" type="checkbox"/>	DIGITAL POWER ANALYZER	DPA 500N	EM TEST	V1024106759	08, 08, 2019
<input checked="" type="checkbox"/>	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

Test Conditions

Temperature: 24,1 °C
Relative Humidity: 49,5 % R.H.

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

The test has been tested using the AC / AC Adaptor.

3.0 Criteria for compliance

Criteria for compliance was based on the following guidelines:
EN 50130-4:2011 Alarm systems-Part 4: Electromagnetic compatibility Product family
standard: Immunity requirements for components of fire, intruder and social alarm systems

The variety and the diversity of the apparatus within the scope of this document makes it

difficult to define precise criteria for the evaluation of the immunity test results.

If as a result of the application of the tests defined in this standard, the apparatus becomes dangerous or unsafe then the apparatus shall be deemed to have failed the test.

A functional description and a definition of performance by the manufacture and noted in the test

report, based on the following criteria:

Electrostatic discharge

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the application of discharge is permissible, providing that is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change.

Radiated electromagnetic fields

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the application of discharge is permissible, providing which could be interpreted by associated equipment as a change, and no such

Flickering of indicators occurs at a field strength of 3 V/m.

For components of CCTV systems, where the picture is allowed at 10 V/m, providing.

(a) there is no permanent damage or change to EUT

(e.g. no corruption of memory or changes to programmable setting etc.)

(b) at 3 V/m, any deterioration of the picture is so minor that the system could still be used; and

(c) there is no observable deterioration of the picture at 1 V/m.

Fast transient burst / slow high energy voltage surge

There shall be no damage, malfunction or change of status due to the conditioning.
Flickering of an indicator during the application of discharge is permissible, providing
That there is no residual is permissible, providing that there is no residual change in the EUT or
any
change in outputs, which could be interpreted by associated equipment as a change.

Conducted RF immunity

There shall be no damage, malfunction or change of status due to the conditioning.
Flickering of an indicator during the application of discharge is permissible, providing
That there is no residual is permissible, providing that there is no residual change in the EUT or
any
change in outputs, which could be interpreted by associated equipment as a change,
and no such flickering of indicators oeuvres at $U = 130 \text{ dB}\mu\text{V}$.
For component of CCTV systems, where the status is monitored by observing the TV picture,
then deterioration of the picture is allowed at $U = 140 \text{ dB}\mu\text{V}$, providing:
(a) there is no permanent damage or change to the EUT
(e.g. no corruption of memory or changes to programmable settings etc.)
(b) at $U = 130 \text{ dB}\mu\text{V}$, any deterioration of the picture is so minor that the system could
still be used; and
(c) there in no observable deterioration of the picture at $U = 120 \text{ dB}\mu\text{V}$.

Voltage dip/interruption / Voltage variation

There shall be no damage, malfunction or change of status due to the conditioning.
Flickering of an indicator during the conditioning is permissible, providing that there is no
residual
change in the EUT or any change in outputs, which could be interpreted by associated
equipment
as a change. The EUT shall meet the acceptance criteria for the functional test, after the
conditioning.

3.1 Electrostatic Discharge

Reference Standard

EN 61000-4-2:2009

Test Date

Sep. 20, 2018

Test Location

EMS-ESD: Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	ESD SIMULATOR	ESS-2000	Noise Ken	ESS05X4620	02, 21, 2019
<input checked="" type="checkbox"/>	HCP	-	Noise Ken	-	-
<input checked="" type="checkbox"/>	VCP	-	Noise Ken	-	-

Test Conditions

Temperature: 23,1 °C
Relative Humidity: 55,1 % R.H.
Atmospheric Pressure: 99,5 kPa

Test Specifications

Discharge Factor: ≥ 1 s

Discharge Impedance: 330 ohm / 150 pF

Kind of Discharge: Air, Contact (direct and indirect)

Polarity: Positive and Negative

Number of Discharge: 10 at all locations for Air discharge
10 at all locations for Contact discharge

Discharge Voltage:	Contact <input type="checkbox"/> 2 kV <input type="checkbox"/> 4 kV <input checked="" type="checkbox"/> 6 kV <input type="checkbox"/> 8 kV <input type="checkbox"/> 15 kV	Air <input checked="" type="checkbox"/> 2 kV <input checked="" type="checkbox"/> 4 kV <input type="checkbox"/> 6 kV <input checked="" type="checkbox"/> 8 kV <input type="checkbox"/> 15 kV	HCP <input type="checkbox"/> 2 kV <input type="checkbox"/> 4 kV <input checked="" type="checkbox"/> 6 kV <input type="checkbox"/> 8 kV <input type="checkbox"/> 15 kV	VCP <input type="checkbox"/> 2 kV <input type="checkbox"/> 4 kV <input checked="" type="checkbox"/> 6 kV <input type="checkbox"/> 8 kV <input type="checkbox"/> 15 kV
--------------------	---	---	---	---

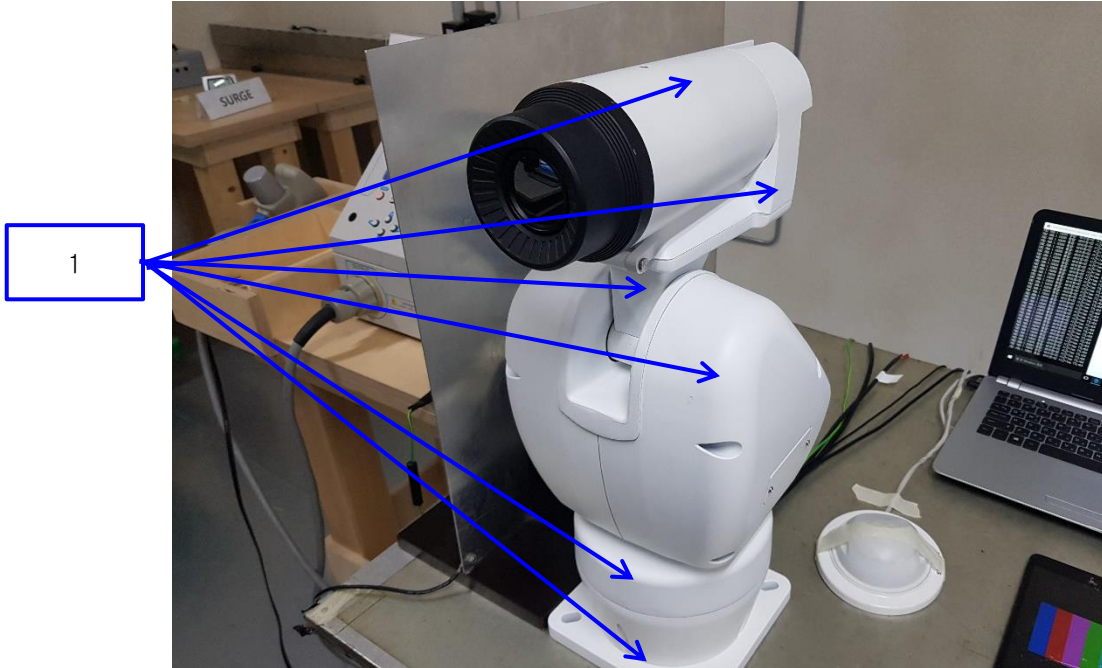
Notes: HCP: Horizontal coupling plane
VCP: Vertical coupling plane

Required Performance Criteria: ☒ Complied

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Location of Discharge:

Air
Contact



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Test Data

Indirect Discharge

No.	Test Point	Discharge Method	Observations	Remarks
1	HCP Contact	Contact Discharge	Complied	-
2	VCP Contact	Contact Discharge	Complied	-

Direct Discharge

No.	Test Point	Discharge Method	Observations	Remarks
1	Surface	Contact Discharge	Complied	-
2	Screws	Contact Discharge	Complied	-

Observations:
Complied – No degradation of function

Test Results

- ☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria

Remarks

N/A

3.2 Radiated Electric Field Immunity

Reference Standard

EN IEC 61000-4-3:2020

Test Date

Sep. 19, 2018

Test Location

EMS-RS: ☐ SEMI ANECHOIC CHAMBER #2 ☒ SEMI ANECHOIC CHAMBER #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMS Test S/W	EMC32	R & S	10.10.02	-
<input checked="" type="checkbox"/>	SIGNAL GENERATOR	SMB 100A	R & S	177586	08, 06, 2019
<input checked="" type="checkbox"/>	BROADBAND AMPLIFIER	BBA100	R & S	101239	08, 06, 2019
<input checked="" type="checkbox"/>	BROADBAND AMPLIFIER	100S1G6M1	AR	579931	08, 06, 2019
<input checked="" type="checkbox"/>	POWER METER	NRP2	R & S	103475	08, 06, 2019
<input checked="" type="checkbox"/>	AVG POWER SENSOR	NRP-Z91	R & S	102526	08, 06, 2019
<input checked="" type="checkbox"/>	AVG POWER SENSOR	NRP-Z91	R & S	102527	08, 06, 2019
<input checked="" type="checkbox"/>	STACKED DOUBLE LOG-PER- ANTENNA	STPL9128 E	Schwarzbeck	9128ES-121	-
<input checked="" type="checkbox"/>	DIRECTIONAL COUPLER	KYDC-D1070-DX40	KY TELECOM	KY150001	08, 06, 2019
<input checked="" type="checkbox"/>	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM, INC	781	05, 02, 2019

Test Conditions

Temperature: 23,8 °C
Relative Humidity: 52,7 % R.H.
Atmospheric Pressure: 100,4 kPa



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Test Specifications

Antenna Polarization: Horizontal & vertical unless indicated otherwise

Antenna Distance: ☒ 3 m

Field Strength: ☐ 1 V/m ☐ 3 V/m
☒ 10 V/m

Frequency Range: ☐ 80 MHz to 1 GHz ☐ 1,4 GHz to 2,7 GHz
☒ 80 MHz to 2,7 GHz

Modulation: ☒ AM, 80 %, 1 kHz sine wave
☒ PM, 1 Hz (0,5 s ON : 0,5 s OFF)

Frequency step: ☒ 1 % step

Dwell Time: ☒ 1 s ☐ 3 s

of Sides Radiated: ☒ 4

Required Performance Criteria: ☒ Complied

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Test Data

Side Exposed	Observations	
	Horizontal	Vertical
Front	Complied	Complied
Right	Complied	Complied
Back	Complied	Complied
Left	Complied	Complied

Note: "Blank" = Not performed

Observations:

Complied – No degradation of function

Test Results

- ☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria

Remarks

N/A

3.3 Electrical Fast Transients/Bursts

Reference Standard

EN 61000-4-4:2012

Test Date

Sep. 21, 2018

Test Location

EMS-EFT: Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMS Test S/W	iec.control	AMETEK CTS	7.1.2	-
<input checked="" type="checkbox"/>	ULTRA COMPACT SIMULATOR	UCS 500 N5	EM TEST	V0936105120	06, 26, 2019
<input checked="" type="checkbox"/>	MOTOR VARIAC	MV2616	EM TEST	V0936105123	06, 26, 2019
<input checked="" type="checkbox"/>	CAPACITIVE COUPLING CLAMP	HFK	EM TEST	070925	06, 26, 2019

Test Conditions

Temperature: 23,2 °C
Relative Humidity: 52,4 % R.H.
Atmospheric Pressure: 99,9 kPa

Test Specifications

Pulse Amplitude & Polarity:
(AC Power Lines) ☐ ± 1.0 kV ☒ ± 2.0 kV
☐ ± 4.0 kV

Pulse Amplitude & Polarity:
(Other supply / Signal Lines) ☐ ± 0.5 kV ☒ ± 1.0 kV
☐ ± 2.0 kV

Burst Period: ☒ 300 ms ☐ 2 s

Repetition Rate: ☐ 5 kHz ☒ 100 kHz

Duration of Test Voltage: ☒ ≥ 1 min

Required Performance Criteria: ☒ Complied

Test Data

☒ Input a.c. power ports – Coupling/Decoupling Network used

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
L - N	Complied	Complied

☐ Input d.c. power ports – Coupling/Decoupling Network used

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
-	-	-

☒ Signal ports and telecommunication ports – Coupling Clamp used

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
RJ-45	Complied	Complied
BNC	Complied	Complied
Alarm (3Pin)	Complied	Complied
Button Alarm (2Pin)	Complied	Complied

Note: “Blank” = Not performed

Observations:

Complied – No degradation of function

Test Results

- ☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria

Remarks

N/A

3.4 Surge Transients

Reference Standard

EN 61000-4-5:2014/A1:2017

Test Date

Sep. 21, 2018

Test Location

EMS-Surge: Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMS Test S/W	iec.control	AMETEK CTS	7.1.2	-
<input checked="" type="checkbox"/>	ULTRA COMPACT SIMULATOR	UCS 500 N5	EM TEST	V0936105120	06, 26, 2019
<input checked="" type="checkbox"/>	MOTOR VARIAC	MV2616	EM TEST	V0936105123	06, 26, 2019
<input checked="" type="checkbox"/>	CDN	CNV 508N1	EM TEST	P1551168979	04, 25, 2019
<input type="checkbox"/>	CDN	CNV 508T5	EM TEST	P1549168422	04, 25, 2019

Test Conditions

Temperature: 23,2 °C
Relative Humidity: 52,4 % R.H.
Atmospheric Pressure: 99,9 kPa

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KES-E1-18T0546-R3

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Test Specifications**AC Power Lines**

Source Impedance: 12 ohm for common Mode and 2 ohm for differential Mode

Surge Amplitude :

Common Mode☒ (0,5 / 1,0 / 2,0) kVDifferential Mode☒ (0,5 / 1,0) kV

Number of Surges:

☒ 5 surges per angle

Angle:

☒ 0°, 90°, 180°, 270° (input a.c. power port)

Polarity:

☒ Positive & Negative

Repetition Rate:

☐ 1 surge per min ☒ 1 surge per 30 sec.Required Performance Criteria: ☒ Complied**Other supply / Signal Lines**

Source Impedance:

42 ohm for common Mode

Surge Amplitude:

Common Mode☒ (0,5 / 1,0) kV

Number of Surges:

☒ 5 Surges

Polarity:

☒ Positive & Negative

Repetition Rate:

☐ 1 surge per min ☒ 1 surge per 30 sec.Required Performance Criteria: ☒ Complied

Test Data

☒ Line to Line – Differential Mode

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
L - N	Complied	Complied
L - PE	Complied	Complied
N - PE	Complied	Complied

☐ Line to Earth – Common Mode

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
-	-	-
-	-	-

Signal Lines

☒ Line to Earth – Common Mode

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
RJ-45	Complied	Complied
BNC	Complied	Complied
Alarm (3Pin)	Complied	Complied
Button Alarm (2Pin)	Complied	Complied

Note: "Blank" = Not performed

Observations:

Complied – No degradation of function

Test Results

- ☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria

Remarks

N/A

3.5 Conducted Disturbance

Reference Standard

EN 61000-4-6:2014

Test Date

Sep. 20, 2018

Test Location

EMS-CS: Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMS Test S/W	icd.control	EM TEST	5.3.7	-
<input checked="" type="checkbox"/>	CONTINUOUS WAVE SIMULATOR	CWS 500N1	EM TEST	V0936105119	08, 09, 2019
<input checked="" type="checkbox"/>	ATTENUATOR	ATT6	EM TEST	1208-34	08, 08, 2019
<input checked="" type="checkbox"/>	CDN	CDN-M2/M3N	EM TEST	0909-06	08, 06, 2019
<input type="checkbox"/>	CDN	CDN T8RJ45	EM TEST	0909-09	08, 06, 2019
<input checked="" type="checkbox"/>	EM INJECTION CLAMP	EM 101	Liithi	35943	02, 02, 2019

Test Conditions

Temperature: 23,1 °C
Relative Humidity: 55,1 % R.H.
Atmospheric Pressure: 99,5 kPa

Test Specifications

Frequency range: ☒ 150 kHz to 100 MHz ☐ 150 kHz to 80 MHz

Voltage Level: ☐ 1 Vrms ☐ 3 Vrms
☒ 10 Vrms

Modulation: ☒ AM, 80 %, 1 kHz sine wave
☒ PM, 1 Hz (0,5 s ON : 0,5 s OFF)

Frequency step: ☒ 1 % step

Dwell Time: ☒ 1 s ☐ 3 s

Required Performance Criteria: ☒ Complied

Test Data

☒ Input a.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Observations
L - N	CDN	Complied

☐ Input d.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Observations
-	-	-

☒ Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Observations
RJ-45	CDN	Complied
BNC	Clamp	Complied
Alarm (3Pin)	Clamp	Complied
Button Alarm (2Pin)	Clamp	Complied

Notes: CDN = Coupling Decoupling Network
"blank" = Not performed

Observations:
Complied – No degradation of function

Test Results

- ☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria

Remarks

N/A



3.6 Voltage Dips and Short Interruptions

Reference Standard
EN IEC 61000-4-11:2020

Test Date
Sep. 21, 2018

Test Location
EMS-Voltage dip: Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMS Test S/W	iec.control	AMETEK CTS	7.1.2	-
<input checked="" type="checkbox"/>	ULTRA COMPACT SIMULATOR	UCS 500 N5	EM TEST	V0936105120	06, 26, 2019
<input checked="" type="checkbox"/>	MOTOR VARIAC	MV2616	EM TEST	V0936105123	06, 26, 2019

Test Conditions
Temperature: 23,2 °C
Relative Humidity: 52,4 % R.H.
Atmospheric Pressure: 99,9 kPa



Test Specifications & Observations/Remarks

(Test Voltage :)

<u>Test Level</u>	<u>Duration [in period/ms (50 Hz)]</u>	<u>Results</u>
<input checked="" type="checkbox"/> 20 % dip	<input checked="" type="checkbox"/> 250 / 5 000	<u>Complied</u>
<input checked="" type="checkbox"/> 30 % dip	<input checked="" type="checkbox"/> 25 / 500	<u>Complied</u>
<input checked="" type="checkbox"/> 60 % dip	<input checked="" type="checkbox"/> 10 / 200	<u>Complied</u>
<input checked="" type="checkbox"/> 100 % dip	<input checked="" type="checkbox"/> 250 / 5 000	<u>Complied</u>

- Voltage variations

<input checked="" type="checkbox"/> Unom + 10 %	<input checked="" type="checkbox"/> 253.0 V (ac)	<u>Complied</u>
<input checked="" type="checkbox"/> Unom - 15 %	<input checked="" type="checkbox"/> 195.5 V (ac)	<u>Complied</u>

Observations:

Complied – No degradation of function

Test Results

- ☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria
☐ NOT APPLICABLE

Remarks

The test has been tested using the AC / AC Adaptor.

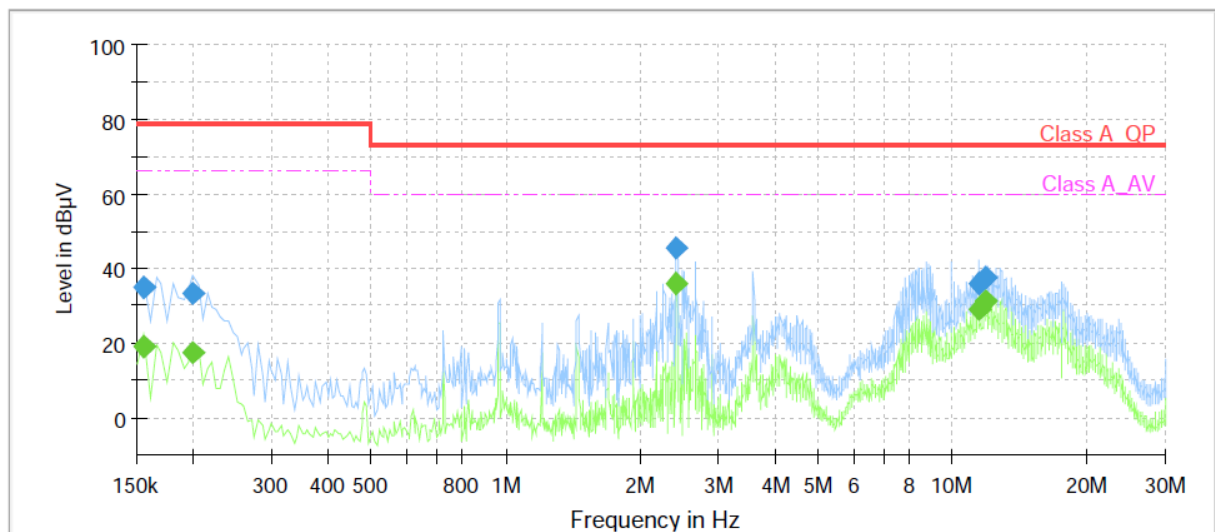
APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

[HOT]

Common Information

Test Description:	Conducted Emission
Model No.:	TNU-4051T
Mode	H
Operator Name:	KES



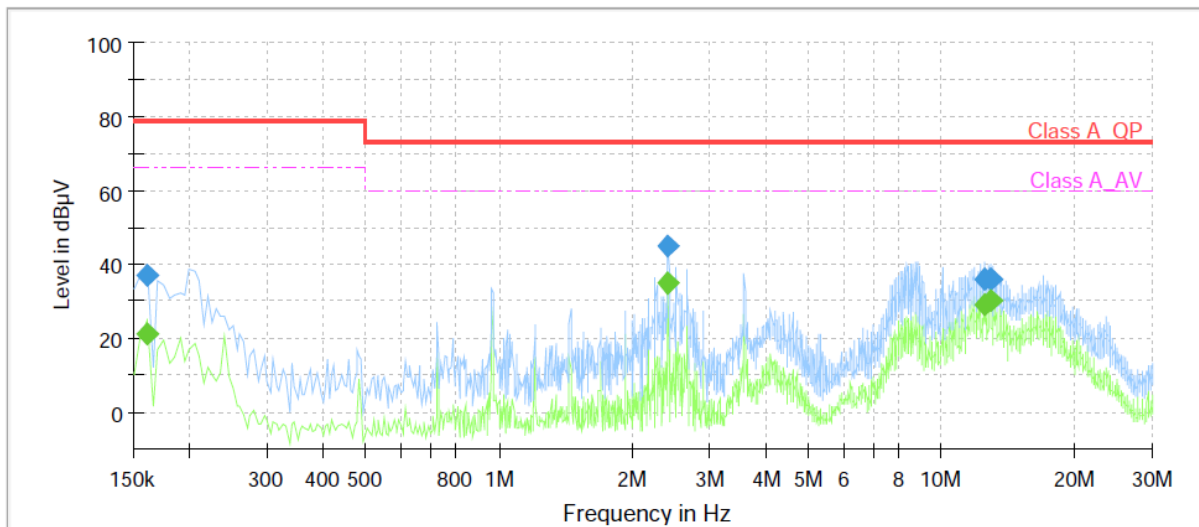
Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.155000	---	19.11	66.00	46.89	1000.0	9.000	L1	9.6
0.155000	34.80	---	79.00	44.20	1000.0	9.000	L1	9.6
0.200000	---	17.56	66.00	48.44	1000.0	9.000	L1	9.7
0.200000	33.18	---	79.00	45.82	1000.0	9.000	L1	9.7
2.415000	---	35.76	60.00	24.24	1000.0	9.000	L1	10.2
2.415000	45.31	---	73.00	27.69	1000.0	9.000	L1	10.2
11.455000	---	29.13	60.00	30.87	1000.0	9.000	L1	9.8
11.455000	35.95	---	73.00	37.05	1000.0	9.000	L1	9.8
11.800000	---	31.27	60.00	28.73	1000.0	9.000	L1	9.8
11.800000	37.43	---	73.00	35.57	1000.0	9.000	L1	9.8

[NEUTRAL]

Common Information

Test Description: Conducted Emission
 Model No.: TNU-4051T
 Mode: N
 Operator Name: KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.160000	---	21.13	66.00	44.87	1000.0	9.000	N	9.7
0.160000	37.10	---	79.00	41.90	1000.0	9.000	N	9.7
2.415000	---	35.12	60.00	24.88	1000.0	9.000	N	10.2
2.415000	44.75	---	73.00	28.25	1000.0	9.000	N	10.2
12.510000	---	28.98	60.00	31.02	1000.0	9.000	N	9.9
12.510000	35.97	---	73.00	37.03	1000.0	9.000	N	9.9
12.885000	---	30.32	60.00	29.68	1000.0	9.000	N	9.9
12.885000	36.25	---	73.00	36.75	1000.0	9.000	N	9.9

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

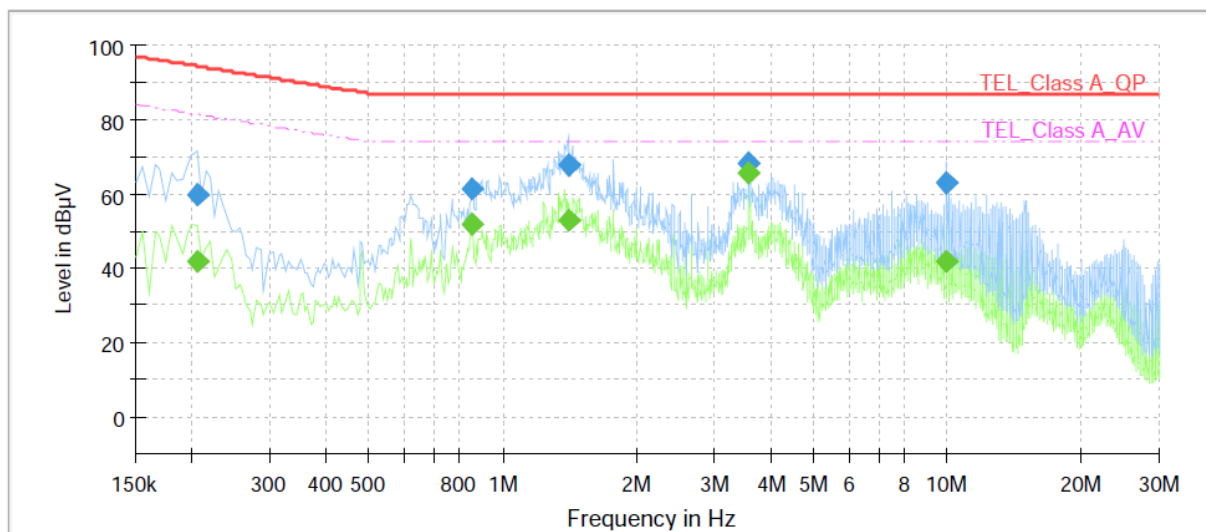
Corr. : Correction values (LISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

Conducted Emissions at Telecommunication Ports

[10 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	TNU-4051T
Mode	10 Mbps
Operator Name:	KES



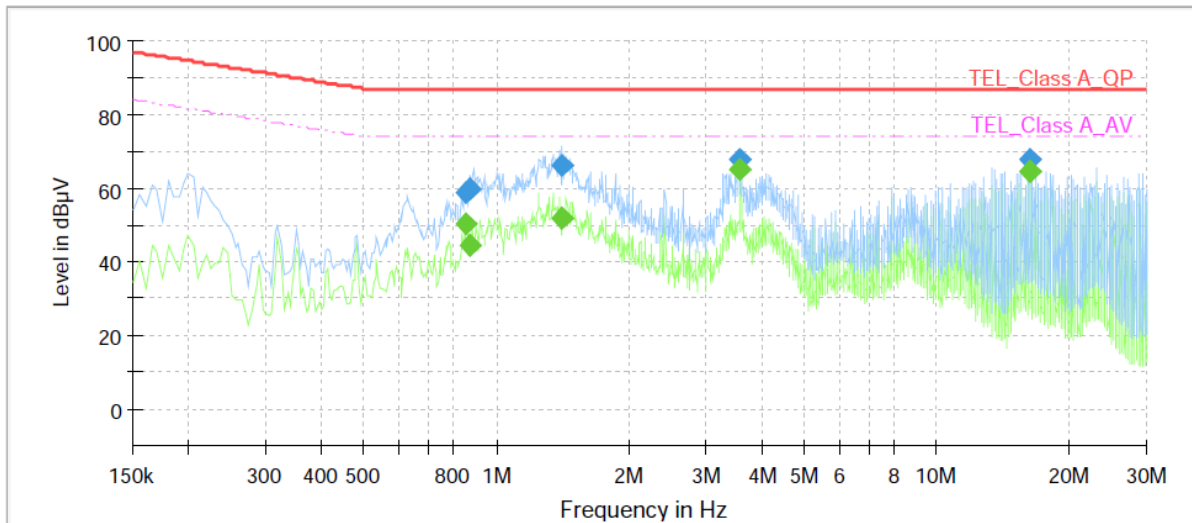
Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.205000	---	41.97	81.41	39.44	1000.0	9.000	Single Line	10.2
0.205000	59.74	---	94.41	34.67	1000.0	9.000	Single Line	10.2
0.855000	---	51.65	74.00	22.35	1000.0	9.000	Single Line	10.2
0.855000	61.63	---	87.00	25.37	1000.0	9.000	Single Line	10.2
1.405000	---	53.13	74.00	20.87	1000.0	9.000	Single Line	10.3
1.405000	67.53	---	87.00	19.47	1000.0	9.000	Single Line	10.3
3.580000	---	65.50	74.00	8.50	1000.0	9.000	Single Line	10.3
3.580000	68.10	---	87.00	18.90	1000.0	9.000	Single Line	10.3
10.005000	---	41.76	74.00	32.24	1000.0	9.000	Single Line	9.9
10.005000	63.19	---	87.00	23.81	1000.0	9.000	Single Line	9.9

[100 Mbps]

Common Information

Test Description: Telecommunication Emission
 Model No.: TNU-4051T
 Mode: 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)
0.850000	---	50.49	74.00	23.51	1000.0	9.000	Single Line	9.7
0.850000	58.80	---	87.00	28.20	1000.0	9.000	Single Line	9.7
0.875000	---	44.48	74.00	29.52	1000.0	9.000	Single Line	9.7
0.875000	59.60	---	87.00	27.40	1000.0	9.000	Single Line	9.7
1.410000	---	51.88	74.00	22.12	1000.0	9.000	Single Line	9.8
1.410000	66.05	---	87.00	20.95	1000.0	9.000	Single Line	9.8
3.580000	---	65.30	74.00	8.70	1000.0	9.000	Single Line	9.7
3.580000	67.49	---	87.00	19.51	1000.0	9.000	Single Line	9.7
16.230000	---	64.36	74.00	9.64	1000.0	9.000	Single Line	9.7
16.230000	67.67	---	87.00	19.33	1000.0	9.000	Single Line	9.7

◆ Calculation

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

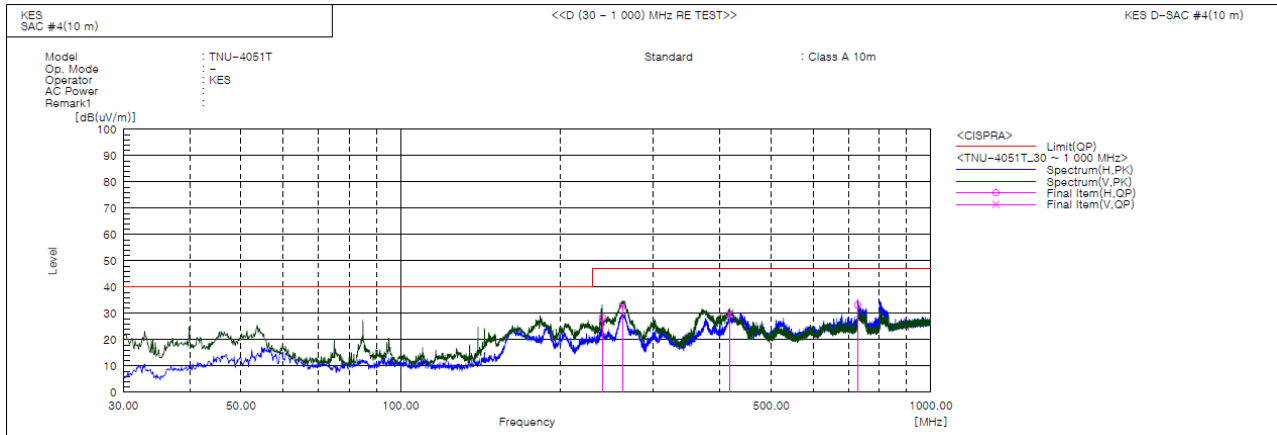
QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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



Radiated Electric Field Emissions(Below 1 GHz)



Final Result

No.	Frequency	(P)	Reading	c.f	Result	Limit	Margin	Height	Angle	Remark
	[MHz]		QP		QP	QP	QP			
			[dB(uV)]	[dB(1/m)]	[dB(uV/m)]	[dB(uV/m)]	[dB]	[cm]	[deg]	
1	240.005	H	55.0	-26.6	28.4	47.0	18.6	279.0	85.0	
2	261.951	V	58.7	-25.9	32.8	47.0	14.2	100.0	337.0	
3	417.636	V	50.8	-21.0	29.8	47.0	17.2	100.0	318.0	
4	727.673	H	47.9	-14.7	33.2	47.0	13.8	318.0	332.0	

◆ Calculation – SEMI ANECHOIC CHAMBER #4(10 m)

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



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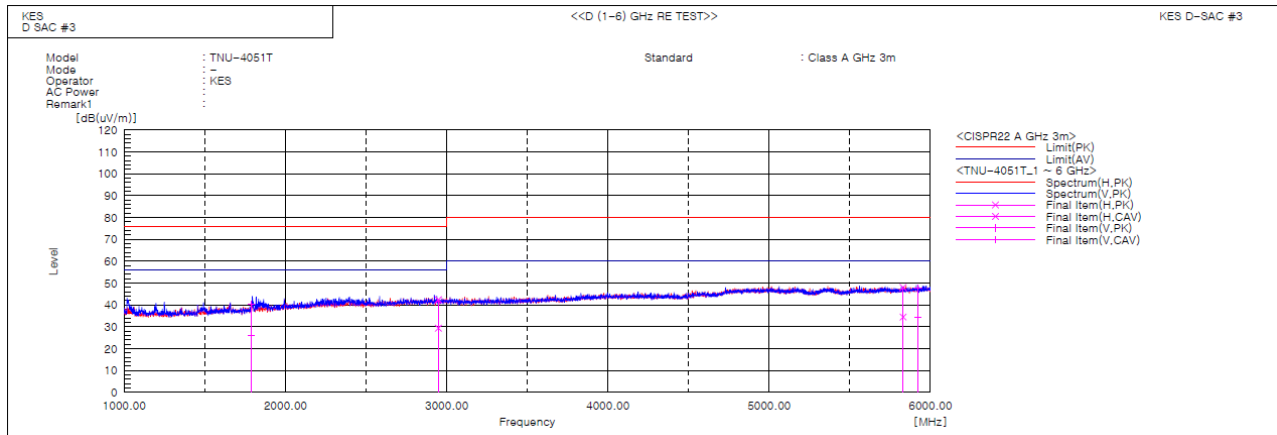
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Report No.:

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Radiated Electric Field Emissions(Above 1 GHz)



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	1786.512	V	43.8	29.9	-3.6	40.2	26.3	76.0	56.0	35.8	29.7	100.0	265.4	
2	2948.708	H	40.9	27.9	1.5	42.4	29.4	76.0	56.0	33.6	26.6	100.0	266.8	
3	5830.534	H	39.0	25.5	9.0	48.0	34.5	80.0	60.0	32.0	25.5	100.0	29.9	
4	5922.278	V	38.4	24.9	9.3	47.7	34.2	80.0	60.0	32.3	25.8	100.0	6.5	

◆ 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

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Harmonic Current Emissions and Voltage Fluctuations and Flicker

Average harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	210.863E-3			
2	1.711E-3			PASS
3	122.433E-3	5.323	2.30	PASS
4	1.563E-3			PASS
5	90.916E-3	7.975	1.14	PASS
6	665.615E-6			PASS
7	35.229E-3	4.575	770.00E-3	PASS
8	600.644E-6			PASS
9	10.370E-3	2.592	400.00E-3	PASS
10	707.757E-6			PASS
11	11.490E-3	3.482	330.00E-3	PASS
12	727.122E-6			PASS
13	7.933E-3	3.777	210.00E-3	PASS
14	733.180E-6			PASS
15	4.319E-3			PASS
16	607.920E-6			PASS
17	4.461E-3			PASS
18	854.054E-6			PASS
19	3.608E-3			PASS
20	861.568E-6			PASS
21	2.521E-3			PASS
22	575.383E-6			PASS
23	2.549E-3			PASS
24	1.087E-3			PASS
25	2.166E-3			PASS
26	605.227E-6			PASS
27	1.784E-3			PASS
28	642.166E-6			PASS
29	1.867E-3			PASS
30	743.067E-6			PASS
31	1.349E-3			PASS
32	741.042E-6			PASS
33	1.706E-3			PASS
34	674.853E-6			PASS
35	1.382E-3			PASS
36	785.866E-6			PASS
37	764.486E-6			PASS
38	648.109E-6			PASS
39	759.380E-6			PASS
40	621.786E-6			PASS

Harmonic currents less than 0.6% of the input current measured under the test conditions, or less than 5 mA, whichever is greater, are disregarded.



Test Data - Harmonics (continued)

Maximum harmonic current results				
Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	212.356E-3			
2	1.980E-3			PASS
3	123.533E-3	3.581	3.45	PASS
4	1.696E-3			PASS
5	91.663E-3	5.360	1.71	PASS
6	766.927E-6			PASS
7	35.459E-3	3.070	1.15	PASS
8	670.074E-6			PASS
9	10.612E-3	1.769	600.00E-3	PASS
10	774.038E-6			PASS
11	11.817E-3	2.387	495.00E-3	PASS
12	858.987E-6			PASS
13	8.191E-3	2.600	315.00E-3	PASS
14	845.510E-6			PASS
15	4.612E-3			PASS
16	681.711E-6			PASS
17	4.752E-3			PASS
18	949.154E-6			PASS
19	3.884E-3			PASS
20	1.012E-3			PASS
21	2.705E-3			PASS
22	664.379E-6			PASS
23	2.675E-3			PASS
24	1.195E-3			PASS
25	2.307E-3			PASS
26	711.514E-6			PASS
27	1.901E-3			PASS
28	718.594E-6			PASS
29	2.002E-3			PASS
30	835.974E-6			PASS
31	1.544E-3			PASS
32	913.018E-6			PASS
33	1.921E-3			PASS
34	785.825E-6			PASS
35	1.460E-3			PASS
36	1.037E-3			PASS
37	1.094E-3			PASS
38	762.359E-6			PASS
39	927.037E-6			PASS
40	749.139E-6			PASS

Harmonic currents less than 0.6% of the input current measured under the test conditions, or less than 5 mA, whichever is greater, are disregarded.

**KES Co., Ltd.**

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www.kes.co.kr

Report No.:

KES-E1-18T0546-R3

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Test Data - Voltage Fluctuations

Maximum Flicker results

	EUT values	Limit	Result
Pst	0.028	1.00	PASS
Plt	0.028	0.65	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.056	4.00	PASS
Tmax [s]	0.000	0.50	PASS

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Test Setup Photos and Configuration

Conducted Voltage Emissions



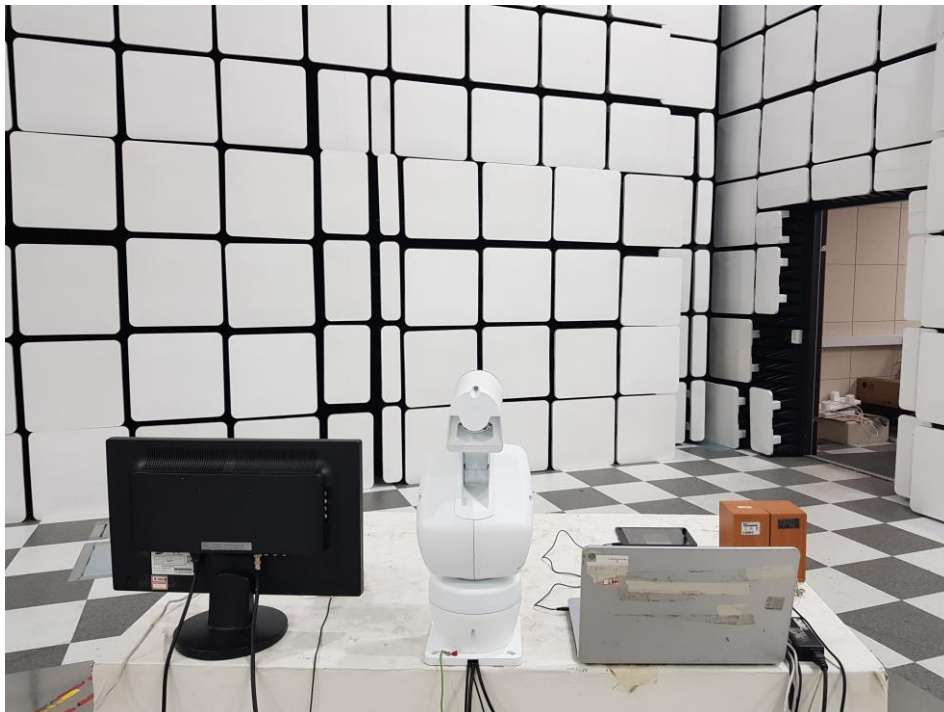
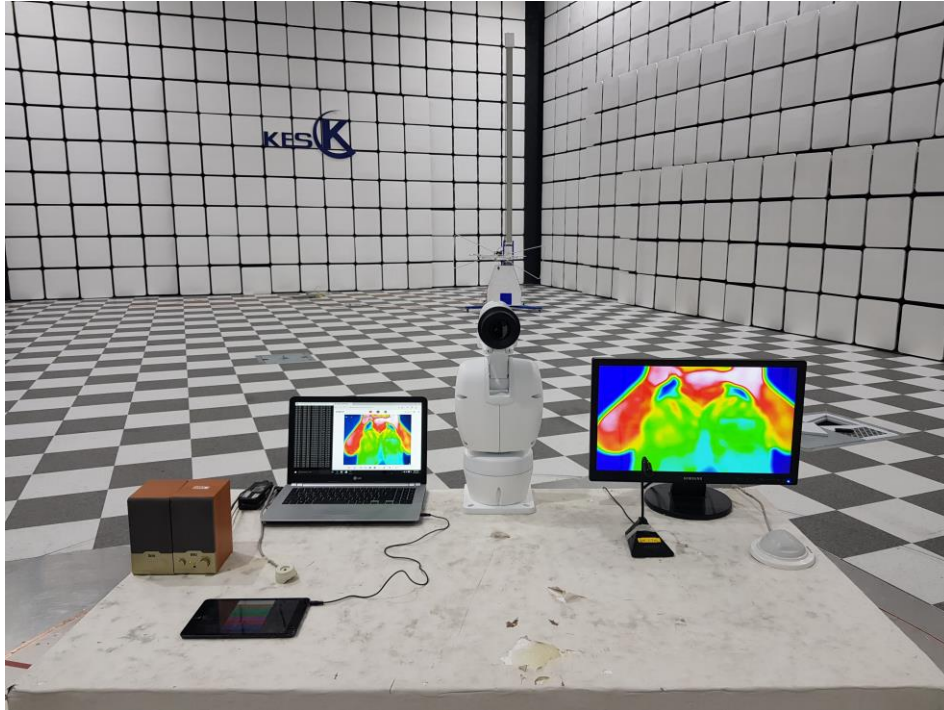
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Conducted Telecommunication Emissions



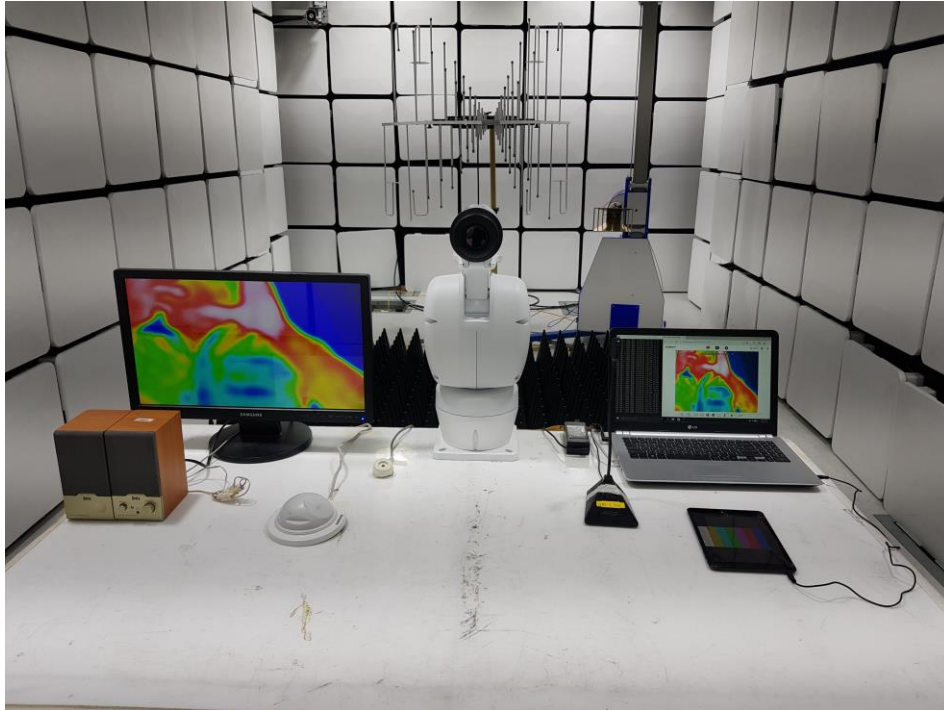
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Radiated Electric Field Emissions(Below 1 GHz)



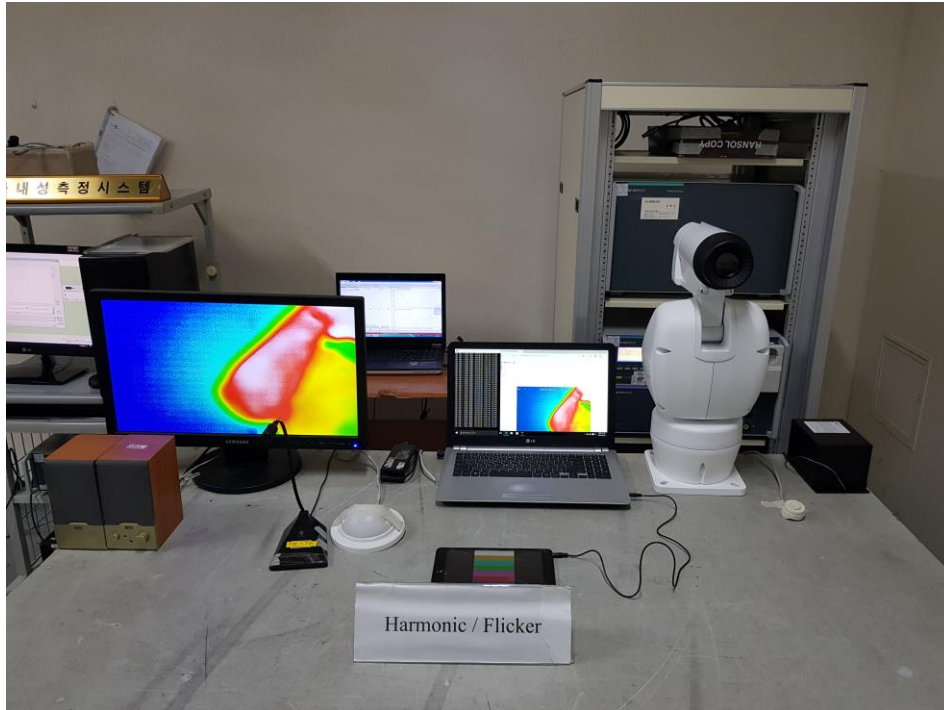
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Radiated Electric Field Emissions(Above 1 GHz)



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Harmonic Current Emissions and Voltage Fluctuations and Flicker



Electrostatic Discharge



Radiated Electric Field Immunity



Electrical Fast Transients/Bursts



Surge Transients

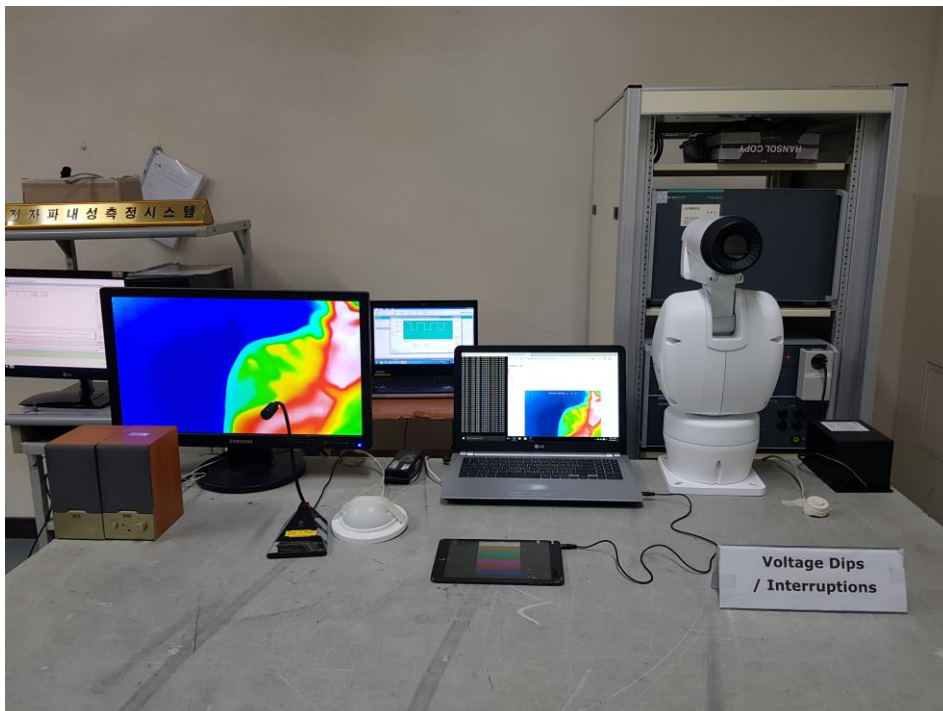


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Conducted Disturbance



Voltage Dips and Short Interruptions



EUT External Photographs

(Top)

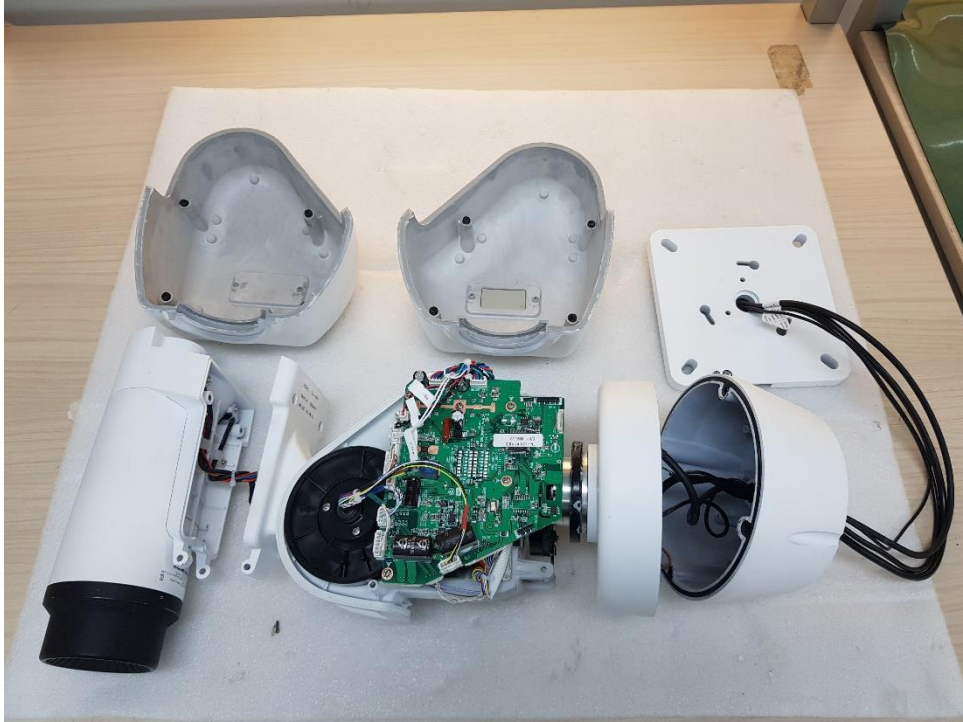


(Bottom)



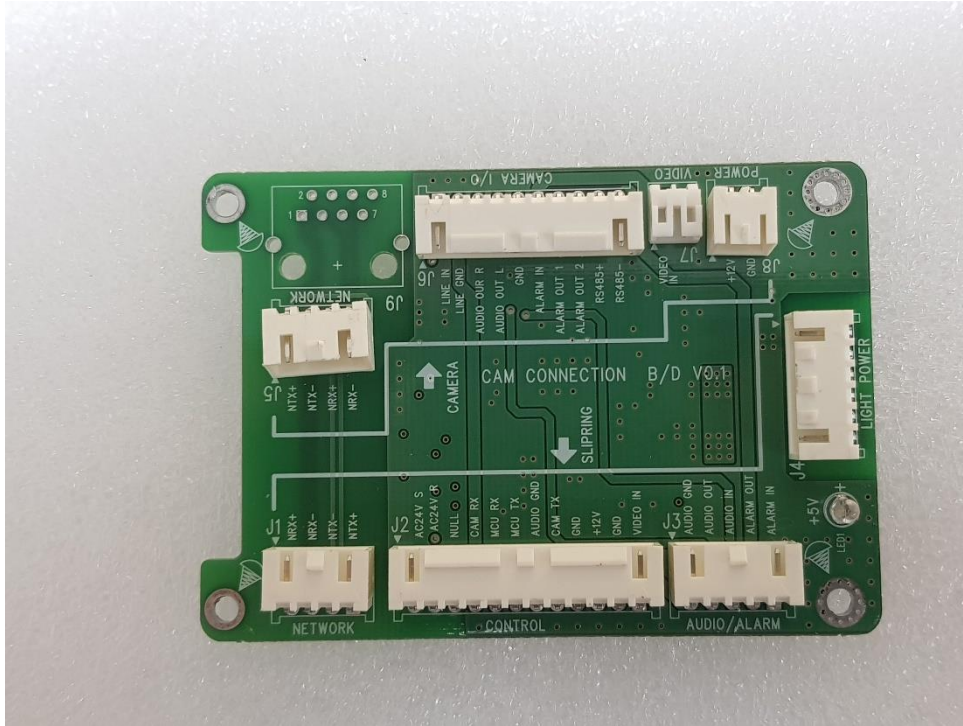
EUT Internal Photographs

(Internal View)

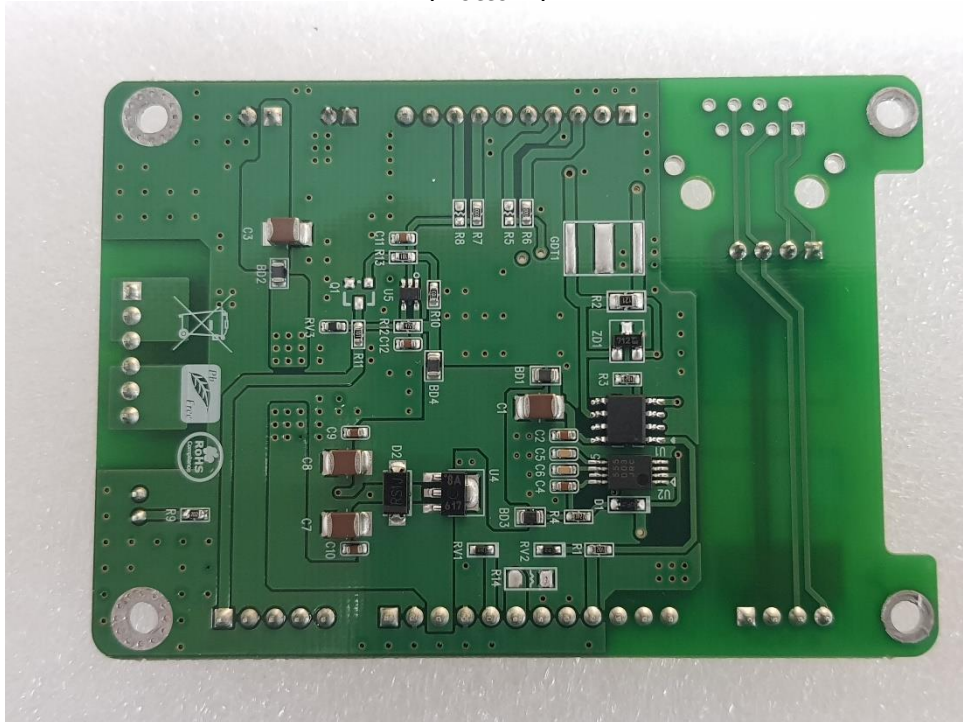


EUT Internal View – CAM Connection Board

(Top)



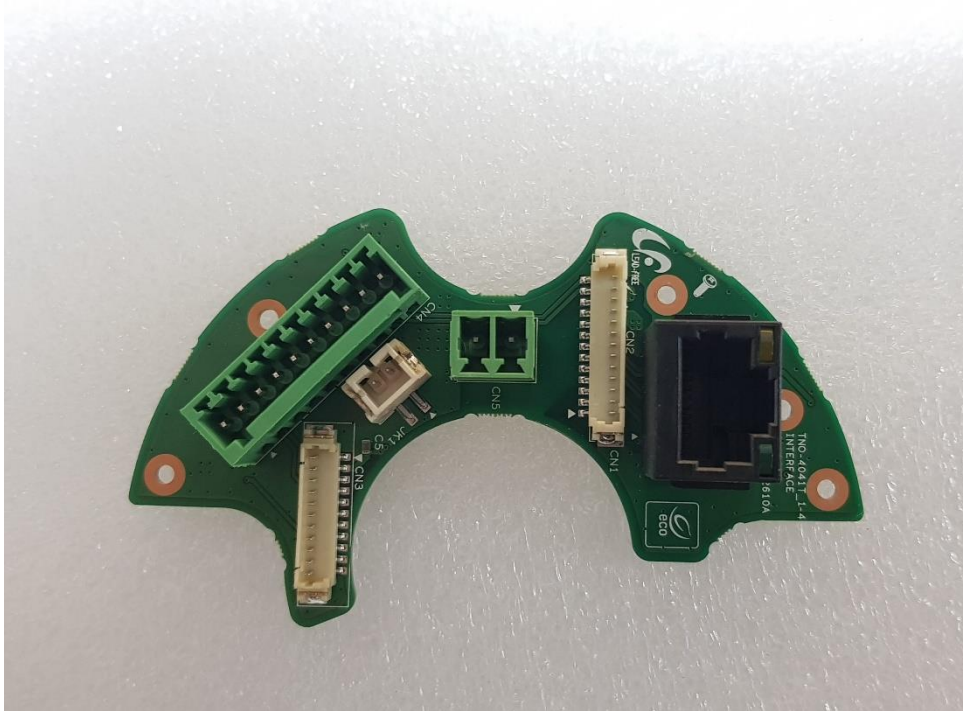
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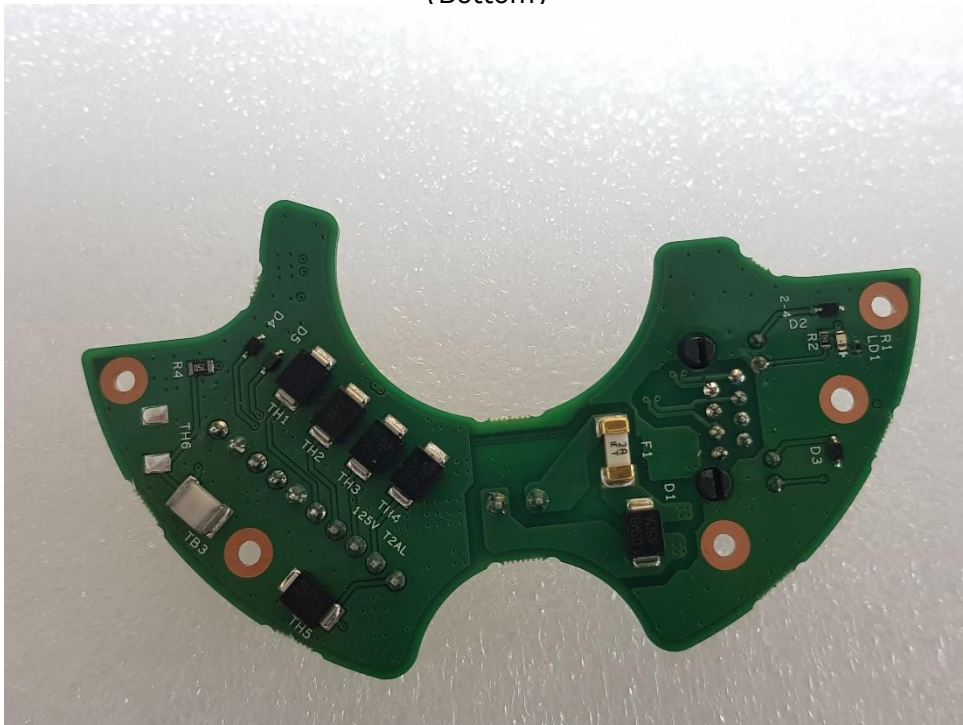
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EUT Internal View – Camera Interface Board

(Top)



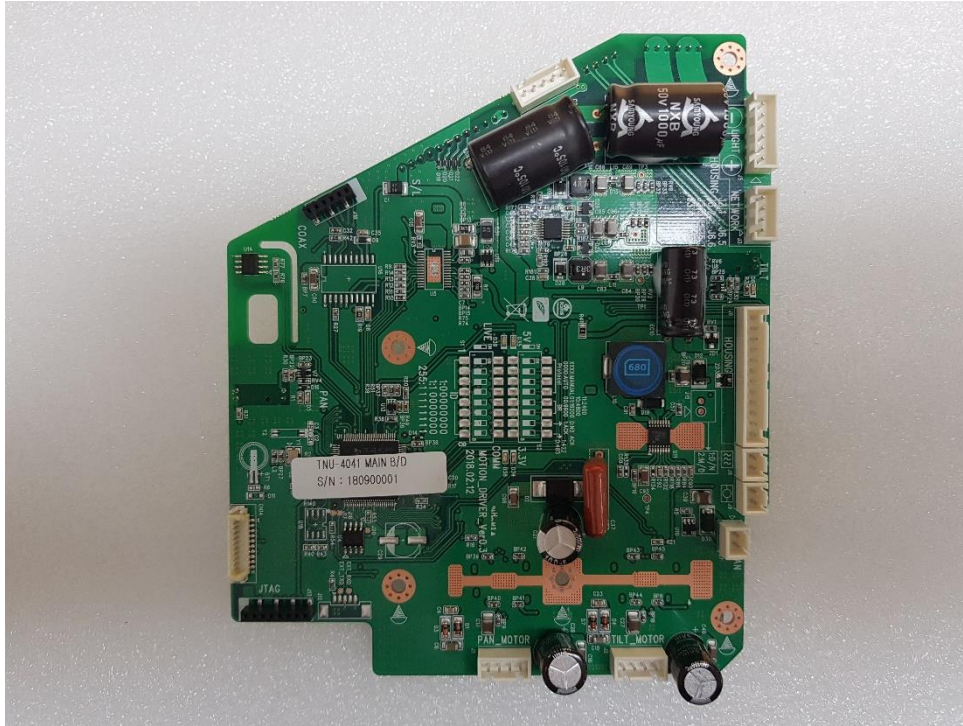
(Bottom)



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EUT Internal View – Main Board

(Top)



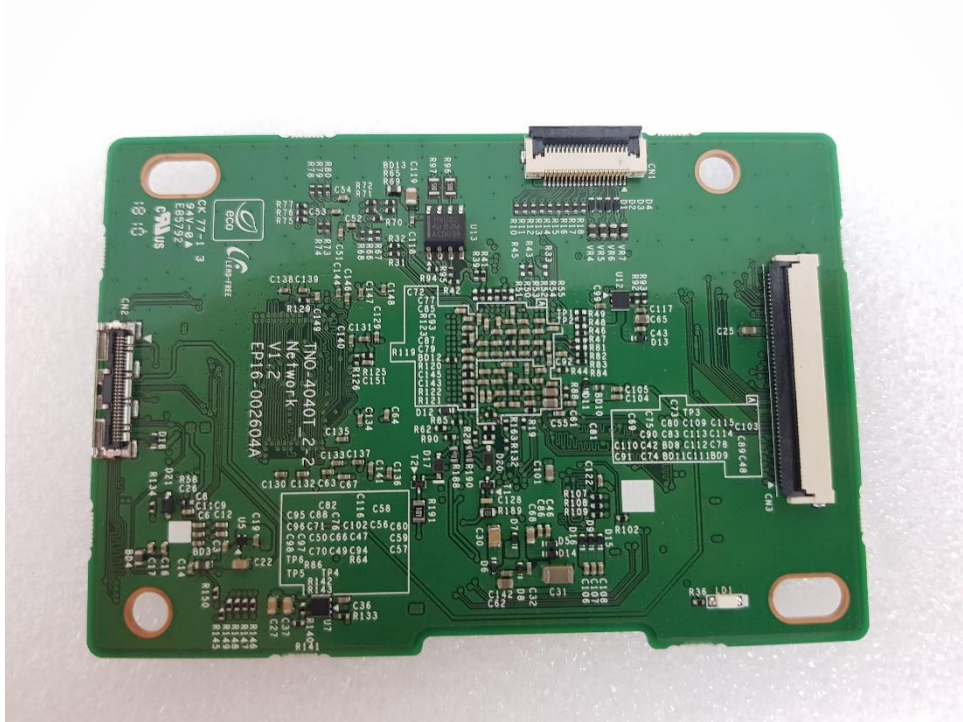
(Bottom)



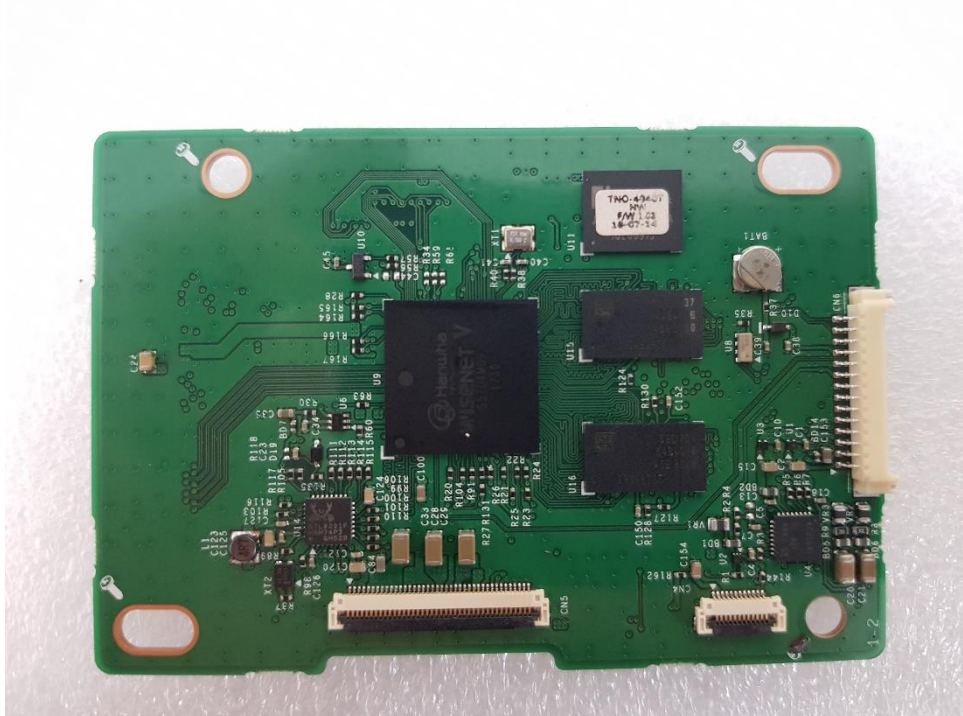
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EUT Internal View – Network Board

(Top)



(Bottom)



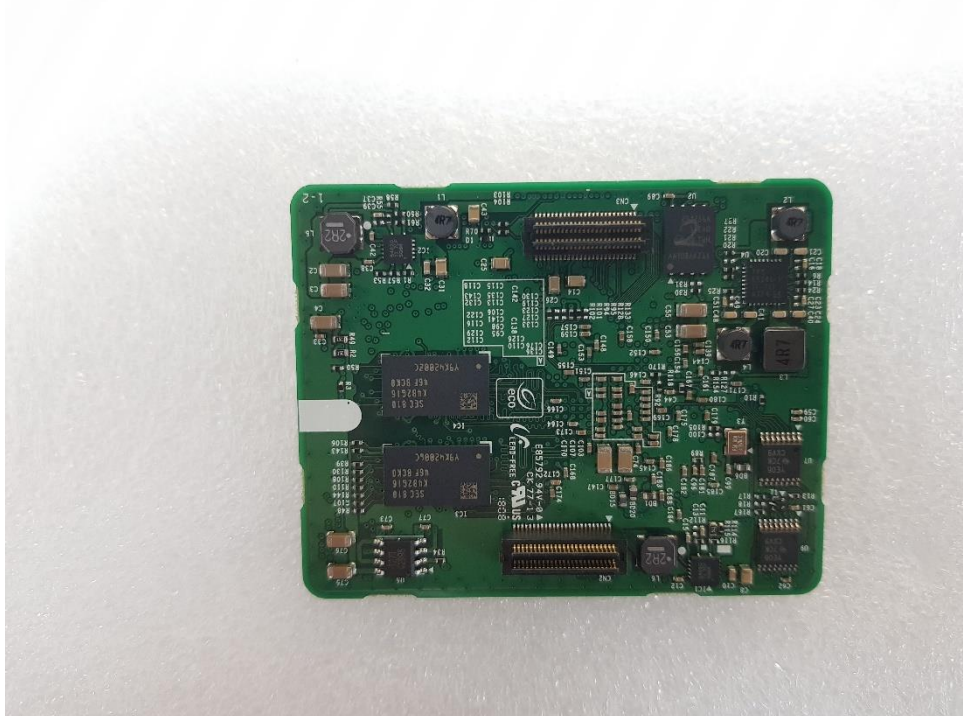
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EUT Internal View – NUC Board

(Top)



(Bottom)



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EUT Internal View – Power Board

(Top)



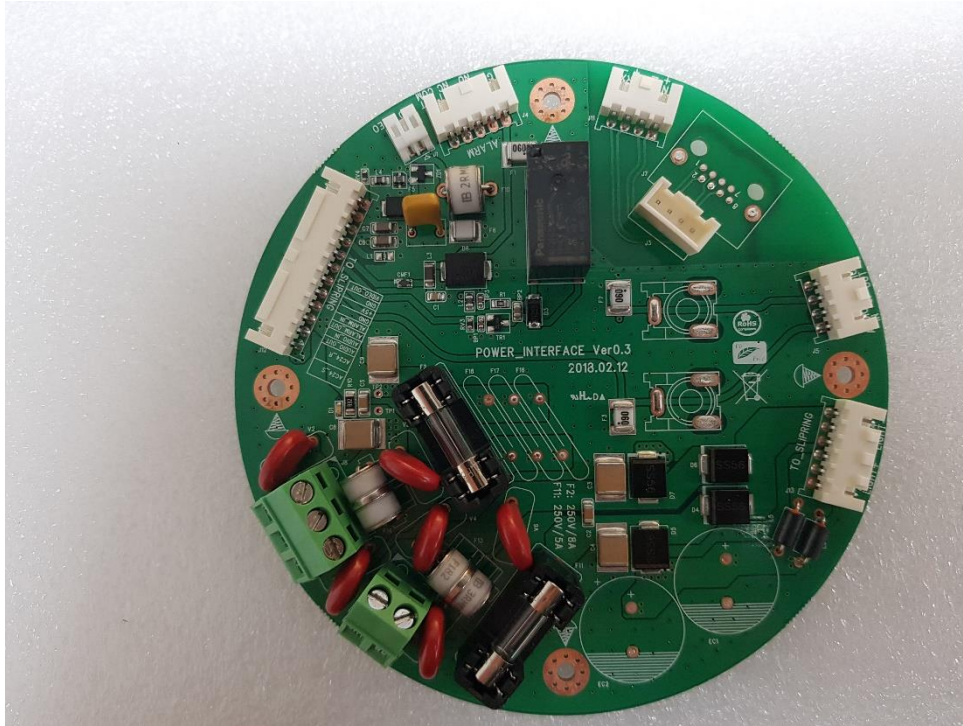
(Bottom)



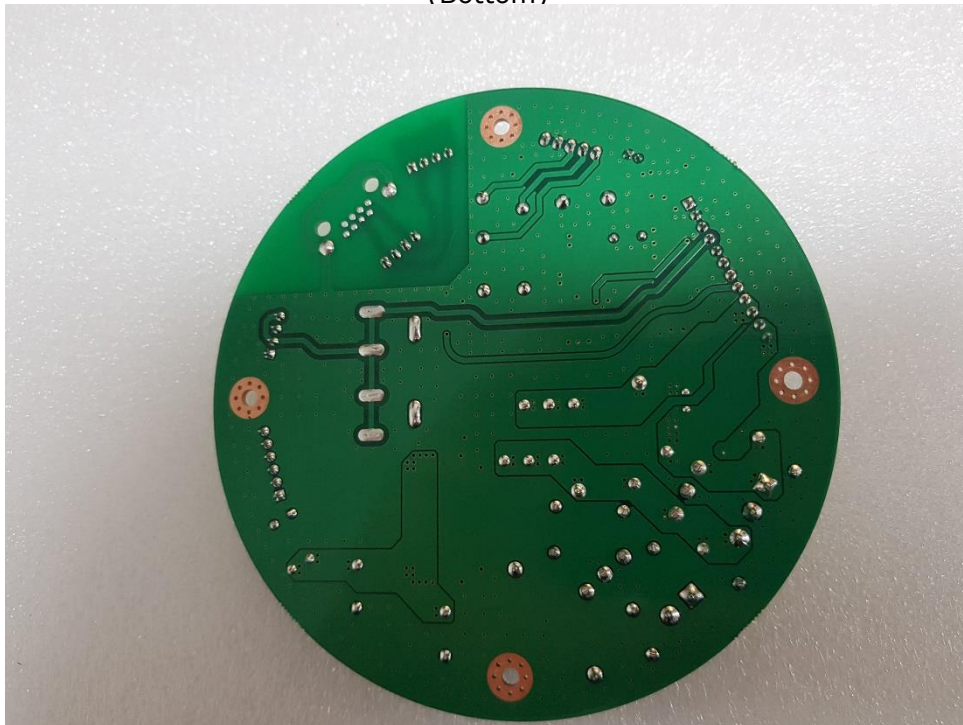
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EUT Internal View – Power_Interface Board

(Top)



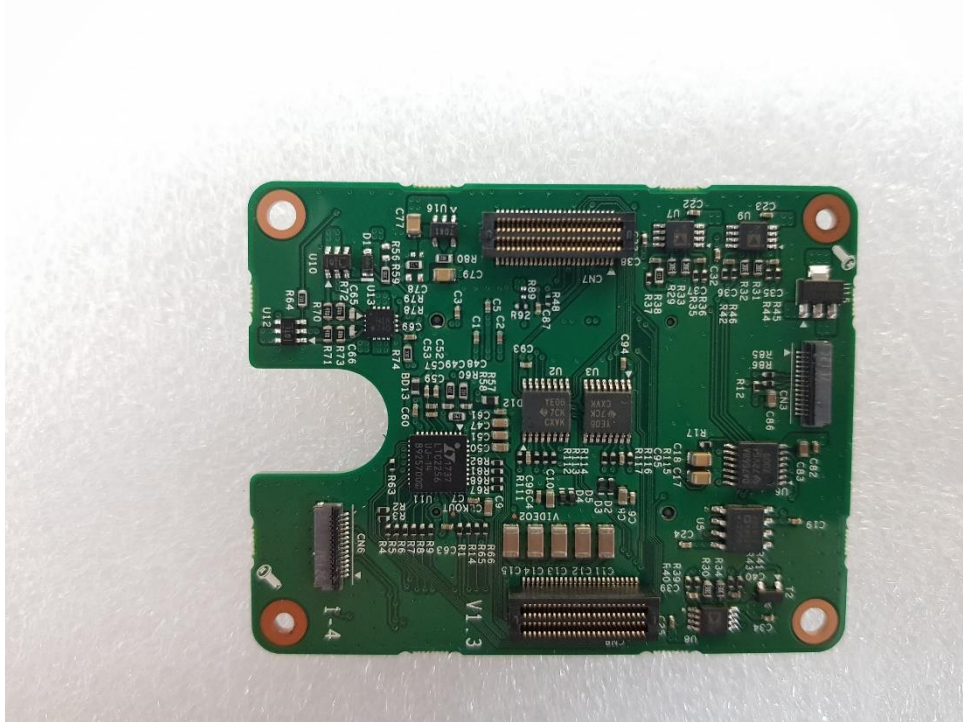
(Bottom)



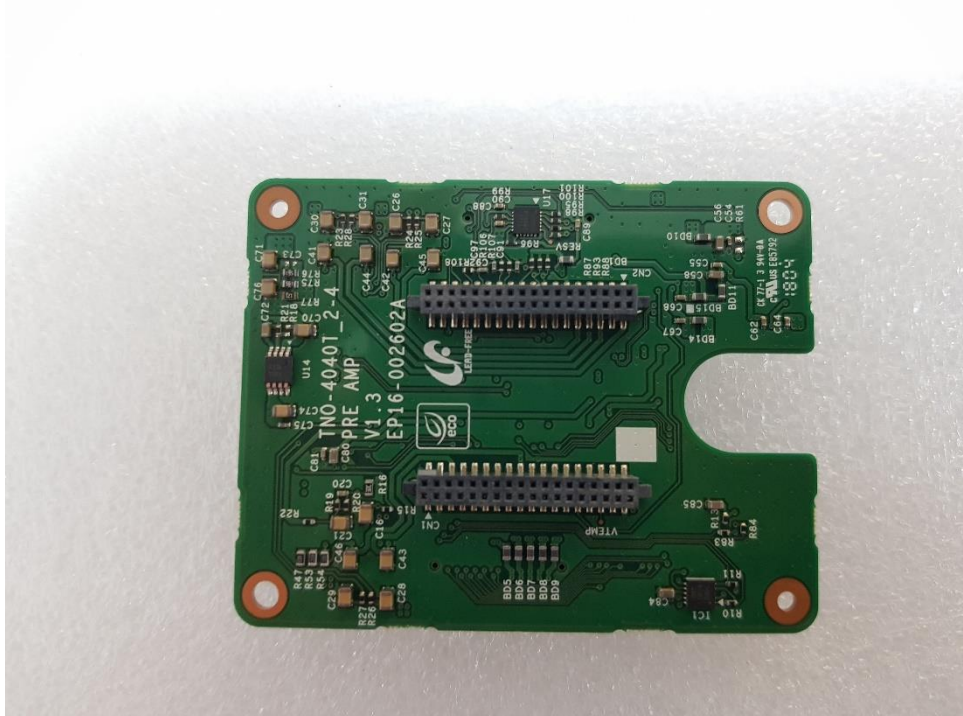
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EUT Internal View – PRE AMP Board

(Top)



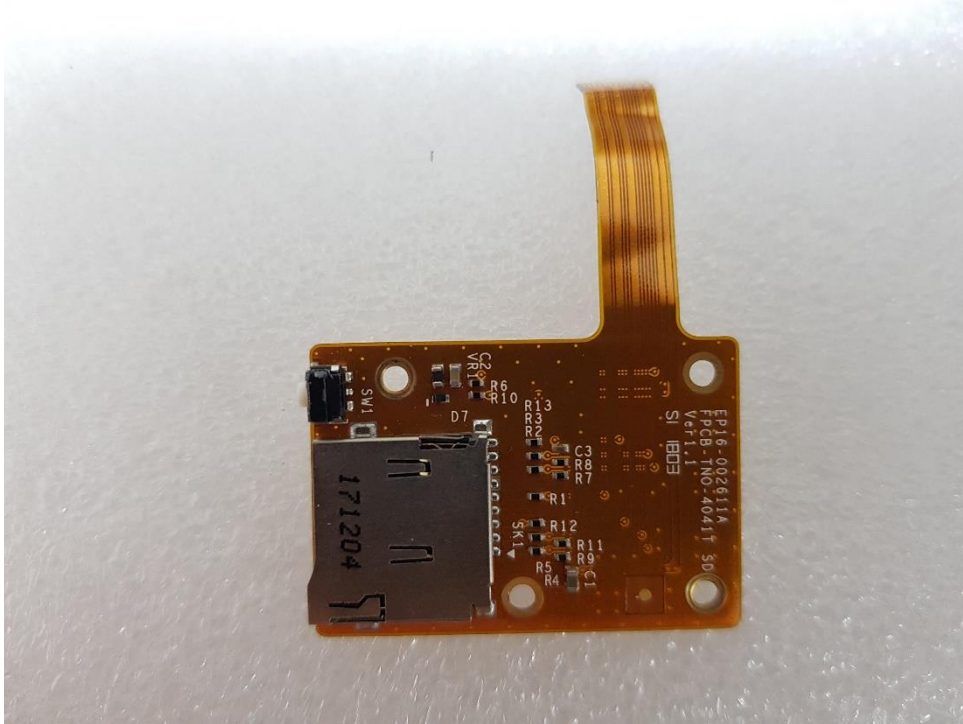
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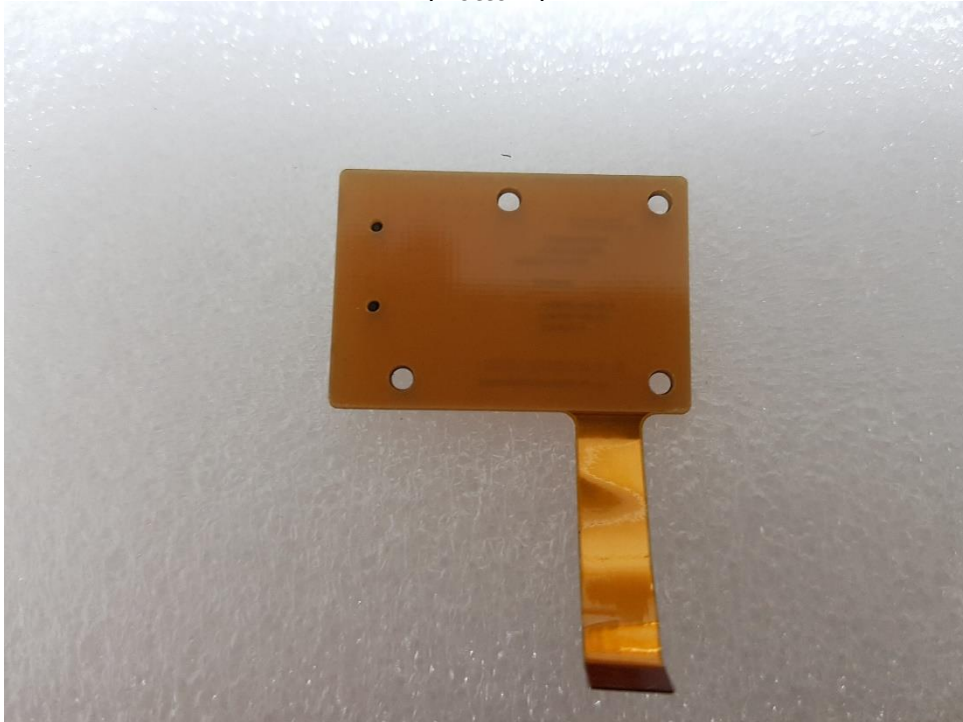
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EUT Internal View – SD Board

(Top)



(Bottom)



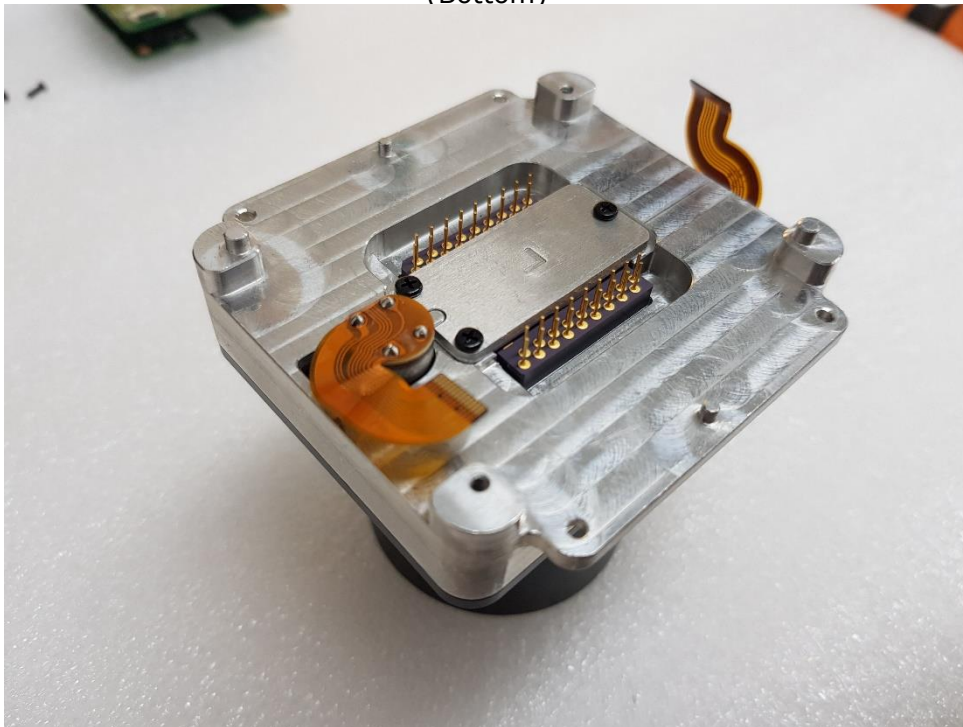
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EUT Internal View – LENS

(Top)



(Bottom)



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Label and Location



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Model No : TNU-4051T

Manufacturer : HANWHA VISION VIETNAM COMPANY LIMITED

Made in Vietnam

