

EMC TEST REPORT For VCCI

Test Report No. : KES-E1-17T0751

Date of Issue : Nov. 15, 2017

Product name : THERMAL CAMERA

Model/Type No. : TNO-4050TN

Variant Model : TNO-4040TN, TNO-4030TN

Applicant : Hanwha Techwin Co., Ltd.

Applicant Address : 1204, Changwon-daero, Seongsan-gu Changwon-si,
Gyeongsangnam-do, Korea

Manufacturer : Hanwha Techwin (Tianjin) Co., Ltd.

Manufacturer Address : No.11 Weiliu Rd, Micro-Electronic Industrial Park, TEDA,
Tianjin, 300385, People's Republic of China

Equipment : ☐ Declaration of Conformity
☒ Verification
☐ Certification

Date of Receipt : Oct. 26, 2017

Test date : Nov. 05, 2017 ~ Nov. 06, 2017

Test Results : ☒ In Compliance ☐ Not in Compliance

Tested byDae Hyun, Kim
EMC Test Engineer*Reviewed by*Dong-Hun, Jang
EMC Technical Manager

This test report is not related to KOLAS.

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Test report No.:
KES-E1-17T0751
Page (2) of (53)

REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Nov. 15, 2017	KES-E1-17T0751	Issued

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TABLE OF CONTENTS

1.0	General Product Description.....	4
1.1	Test Voltage & Frequency	5
1.2	Variant Model Differences.....	5
1.3	Device Modifications	5
1.4	Equipment Under Test.....	5
1.5	Support Equipments	5
1.6	External I/O Cabling	6
1.7	EUT Operating Mode(s)	7
1.8	Configuration.....	8
1.9	Remarks when standards applied	10
1.10	Calibration Details of Equipment Used for Measurement	10
1.11	Test Facility	10
1.12	Laboratory Accreditations and Listings	10
2.0	Test Regulations.....	11
2.1	Conducted Emissions Mains Power Ports.....	13
2.2	Conducted Emissions at Telecommunication Ports.....	14
2.3	Radiated Electric Field Emissions(Below 1 GHz)	15
2.4	Radiated Electric Field Emissions(Above 1 GHz)	16
APPENDIX A – TEST DATA.....		17
Conducted Emissions at Mains Power Ports.....		17
Conducted Emissions at Telecommunication Ports		19
.....		24
Radiated Electric Field Emissions(Below 1 GHz)		25
Radiated Electric Field Emissions(Above 1 GHz)		28
Test Setup Photos and Configuration		40
Conducted Voltage Emissions		40
Conducted Telecommunication Emissions		41
Radiated Electric Field Emissions(Below 1 GHz)		42
Radiated Electric Field Emissions(Above 1 GHz)		43
EUT External Photographs		44
EUT Internal Photographs		45



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Test report No.:
KES-EI-17T0751
Page (4) of (53)

1.0 General Product Description

Main Specifications of EUT are:

Video	
Imaging Device	Uncooled Micro volometer
Pixel size	17µm
Effective Pixels	640x480(Scale up 800x600)
Sensitivity	NETD < 50mK
Video Out	CVBS : 1.0 Vp-p / 75Ω composite, 720x480(N), 720x576(P), for installation USB : Micro USB type B, 1280x720, for installation
Lens	
Focal Length (Zoom Ratio)	35mm fixed
Max. Aperture Ratio	1.0
Angular Field of View	H: 17°
Min. Object Distance	TBD
Focus Control	Fixed
Lens Type	TBD
Mount Type	Board-in type
Operational	
Camera Title	Off / On - W/W : English/Numeric/Special Characters - China : English/Numeric/Special/Chinese 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
Privacy Masking	Off / On (32ea, polygonal zones) - Color : Grey/Green/Red/Blue/Black/White - Mosaic
Gain Control	Off / Low / Middle / High
Electronic Shutter Speed	Minimum / Maximum / Anti flicker (2 ~ 1/12,000sec)
Pan/Tilt	Pelco D/P, Samsung T/E, Honeywell, Bosch, Panasonic, Sungin, AD, Vicon, GE
Flip / Mirror	Flip : On/Off Mirror : On/Off Hallway view : 90°/270°
Video & Audio Analytics	Tampering, Loitering, Directional Detection, Virtual Line, Fence detection, Enter/Exit, Appear / Disappear, Audio Detection, Motion Detection, Sound Classification, Shock detection, drastic temperature swings
Alarm I/O	Input 2ea / Output 2ea
Alarm Triggers	Alarm Input, Motion Detection, Video & Audio Analytics, Network Disconnect
Alarm events	File upload via FTP, E-Mail Notification via E-Mail local storage(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
Digital zoom	-
Remote control	-
Network	
Ethernet	RJ-45 (10/100BASE-T)
Video Compression Format	H.265/H.264 (MPEG-4 Part 10/AVC) : Main/Baseline/High , Motion JPEG
Resolution	800x600, 640x480, 640x360, 320x240
Max. Framerate	H.265/H.264 : Max. 30fps at all resolutions Motion JPEG : Max. 30fps
Smart Codec	Manual Mode (area-based : SEA)
WiseStream II	Support
Video Quality Adjustment	H.264/H.265 : Target Bitrate Level Control MJPEG : Target Bitrate Level Control
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), RTCP,RTSP, NTP, HTTP, HTTPS, SSL/TLS, DHCP, PPPoE, FTP, SMTP, ICMP, IGMP, SNMPv1/v2c/v3(MIB-2), ARP, DNS, DDNS, QoS, PIM-SM, UPnP, Bonjour
Security	HTTPS(SSL) Login Authentication Digest Login Authentication IP Address Filtering User access Log 802.1X Authentication (EAP-TLS, EAP-LEAP)
Streaming Method	Unicast / Multicast
Max. User Access	20 users at Unicast Mode SD/SDHC/SDXC (up to 256 GB)
Edge Storage	- 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 Language	English, Korean, Chinese, French, Italian, Spanish, German, Japanese, Russian, Swedish,, Portuguese, Czech, Polish, Turkish, Dutch, Hungarian, Greek
Web Viewer	TBD
Central Management Software	SmartViewer, SSM
Environmental	
Operating Temperature / Humidity	-40°C ~ +60°C (-40°F ~ +131°F) / Less than 90% RH
Storage Temperature / Humidity	-50°C ~ +60°C (-58°F ~ +140°F) / Less than 90% RH
Ingress Protection	IP66, NEMA 4X
Vandal Resistance	IK10
Electrical	
Input Voltage / Current	24VAC ± 10%, 12VDC ± 10%, PoE(IEEE802.3af)
Power Consumption	TBD
Mechanical	
Color / Material	TBD
Dimension (WxHxD)	TBD
Weight	TBD
기타	Palette 7mode

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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 ☐ 230 Vac ☐ 120 Vac ☒ 24 Vac ☒ 12 Vdc ☒ PoE

Frequency ☐ 50 Hz ☐ 60 Hz ☐ Hz

1.2 Variant Model Differences

Lens size difference

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
THERMAL CAMERA	TNO-4050TN	-	Hanwha Techwin (Tianjin) Co.,Ltd.	E.U.T

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
PoE Adapter	ANY4805C-LT1	10H300002	ANY ELECTRONICS CO., LTD	-
Notebook	ProBook4430s	-	HP	-
Notebook Adapter	SeriesPPP0009H	-	CHICONY POWER TECHNOLOGY (SUZHOU) CO.,LTD,	-
Speaker	BR10000A CUVE	-	BEIJING EDIFIER HI-TECH GROUP.	-
Alarm Jig	SIP-1201DD D0	-	SAMSUNG TECHWIN CO., LTD.	-
Phone	A1429	-	Apple	-
Micro SD Card	-	-	Sandisk	-

1.6 External I/O Cabling

■ AC 24 V , DC 12 V Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
THERMAL CAMERA (E.U.T)	RJ-45(LAN)	Notebook	RJ-45(LAN)	3.0	U
	Audio In (2 Pin)	Phone	3.5 mm	1.6	U
	Audio Out (2 Pin)	Speaker	3.5 mm	1.5	U
	Alarm (2 Pin)	Alarm Jig	Alarm	3.0	U
	Micro SD Card Slot	Micro SD Card	Micro SD Card Slot	-	-

* Unshielded=U, Shielded=S

■ PoE Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
THERMAL CAMERA (E.U.T)	RJ-45(PoE)	PoE Adapter	RJ-45(PoE)	3.0	U
PoE Adapter	RJ-45(LAN)	Notebook	RJ-45(LAN)	1.6	U
THERMAL CAMERA (E.U.T)	Audio In (2 Pin)	Phone	3.5 mm	1.6	U
	Audio Out (2 Pin)	Speaker	3.5 mm	1.5	U
	Alarm (2 Pin)	Alarm Jig	Alarm	3.0	U
	Micro SD Card Slot	Micro SD Card	Micro SD Card Slot	-	-

* Unshielded=U, Shielded=S

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Test report No.:
KES-EI-17T0751
Page (7) of (53)

1.7 EUT Operating Mode(s)

Test mode	operating
AC 24 V	E.U.T Monitoring, Ping Test
DC 12 V	
PoE	

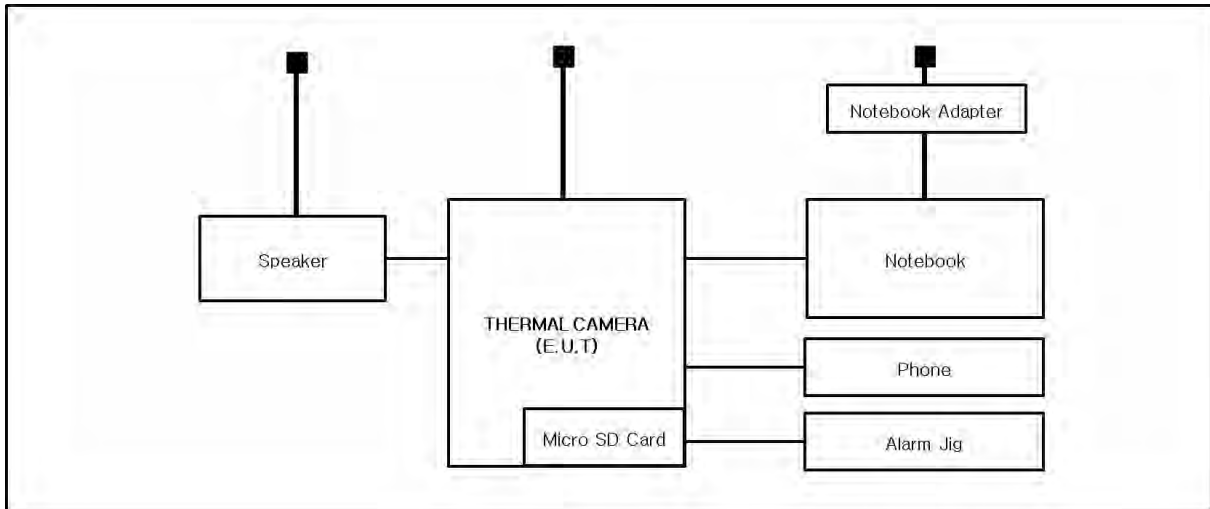
E.U.T Test operating S/W		
Name	Version	Manufacture Company
WebViewer	-	Hanwha Techwin Co., Ltd.

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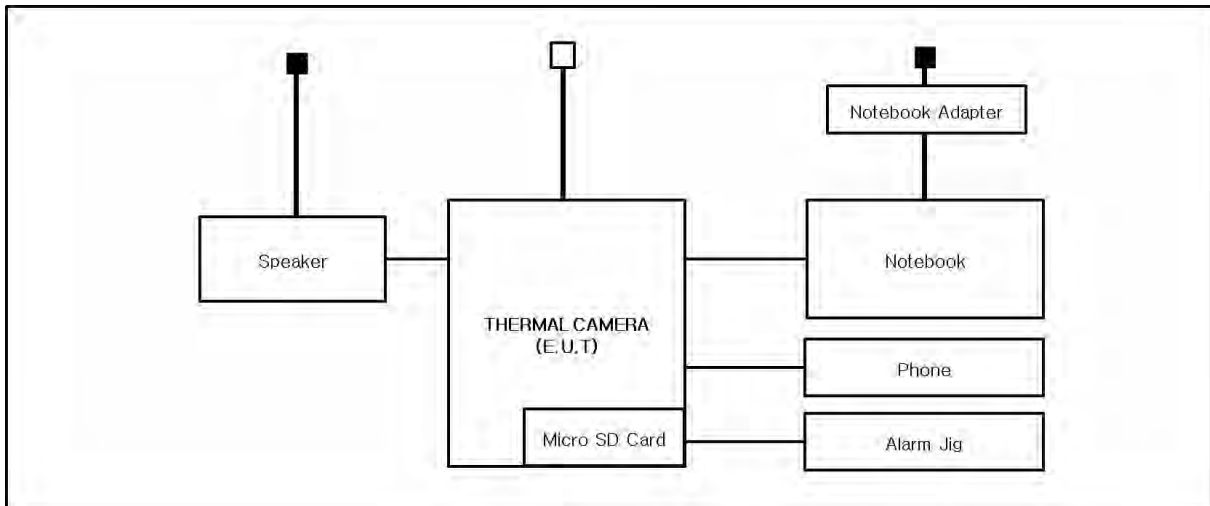
1.8 Configuration

■ AC Main
□ DC Main

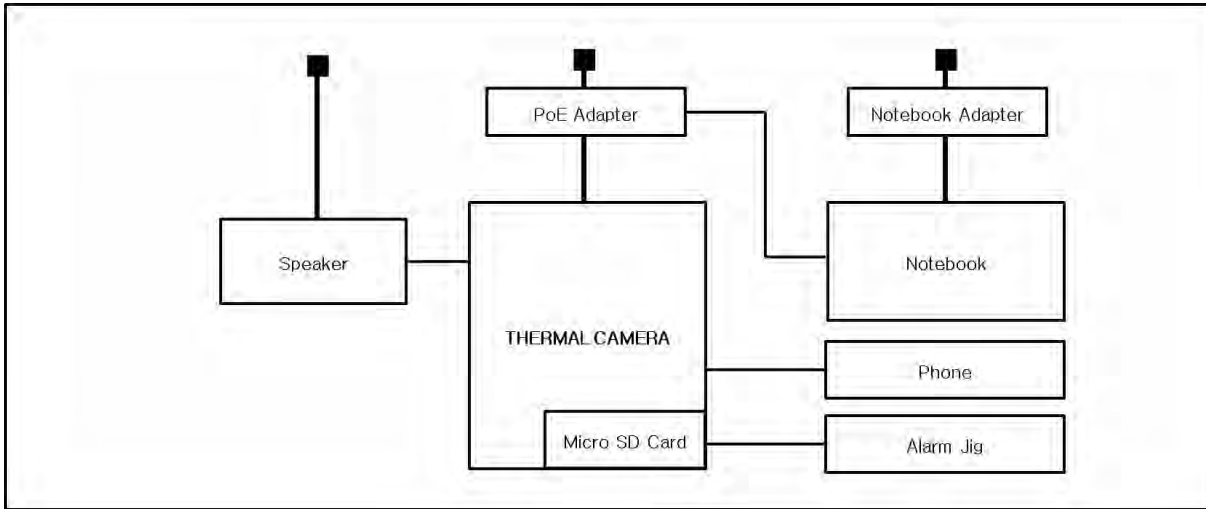
■ AC 24 V Mode



■ DC 12 V Mode



■ PoE Mode



1.9 Remarks when standards applied

N/A





1.10 Calibration Details of Equipment Used for Measurement

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

1.11 Test Facility

The measurement facility is located at 473-21 Gayeo-ro, Yeosu-si, Gyeonggi-do, 12658, Korea. The sites are constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22.

1.12 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3 & 10 meter Open Area Test Sites and one conducted site to perform FCC Part 15/18 measurements.	
JAPAN	VCCI	Mains Ports Conducted Interference Measurement, Telecommunication Ports Conducted Disturbance Measurement and Radiation 10 meter site, Facility for measuring radiated disturbance above 1 GHz	 R-4308, C-4798, T-2311, G-914
KOREA	MSIP	EMI (10 meter Open Area Test Site and two conducted sites) Radio(3 & 10 meter Open Area Test Sites and one conducted site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 KR0100
Canada	IC	3 & 10 meter Open Area Test Sites and one conducted site	 4769B-1
Europe	CE	EMI (10 meter Open Area Test Site and two conducted sites) Radio(3 & 10 meter Open Area Test Sites and one conducted site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	
International	KOLAS	EMI (10 meter Open Area Test Site and two conducted sites) Radio(3 & 10 meter Open Area Test Sites and one conducted site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	

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2.0 Test Regulations

The emissions tests were performed according to following regulations:

☐ EMC – Directive 2014/30/EU

☐ EN 61000-6-3: 2011

☐ EN 61000-6-1: 2007

☐ EN 61000-6-4: 2007 +A1: 2011

☐ EN 61000-6-2: 2005

☐ EN 55011: 2007 +A1: 2010

☐ Group 1
☐ Class A

☐ Group 2
☐ Class B

☐ EN 55014-1: 2006 +A2: 2011

☐ EN 55014-2: 1997 +A2: 2008

☐ EN 55015: 2013

☐ EN 61547 : 2009

☐ EN 55032: 2015

☐ Class A

☐ Class B

☐ EN 55024: 2010 +A1: 2015

☐ EN 50130-4: 2011 +A1: 2014

☐ EN 61000-3-2: 2014

☐ EN 61000-3-3: 2013

☐ EN 61326-1: 2013



-
- | | | |
|--|---|----------------------------------|
| <input checked="" type="checkbox"/> VCCI-CISPR 32:2016 | <input checked="" type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> AS/NZS CISPR22:2009 +A1:2010 | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> 47 CFR Part 15, Subpart B | | |
| <input type="checkbox"/> CISPR 22:2009 +A1:2010 | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> ANSI C63.4-2009 | | |
| <input type="checkbox"/> IC Regulation ICES-003 : 2016 | | |
| <input type="checkbox"/> CAN/CSA CISPR 22-10 | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> ANSI C63.4-2014 | | |
|
 | | |
| <input type="checkbox"/> RE- Directive 2014/53/EU | | |
|
 | | |
| <input type="checkbox"/> EN 301 489-1 V1.9.2 | | |
| <input type="checkbox"/> Equipment for fixed use | | |
| <input type="checkbox"/> Equipment for vehicular use | | |
| <input type="checkbox"/> Equipment for portable use | | |
| <input type="checkbox"/> EN 301 489-3 V1.6.1 | | |
| <input type="checkbox"/> EN 301 489-17 V2.2.1 | | |
| <input type="checkbox"/> EN 60945:2002 | | |

2.1 Conducted Emissions Mains Power Ports

Test Date
Nov. 06, 2017Test 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	101781	04, 27, 2018
<input checked="" type="checkbox"/>	LISN	ENV216	R & S	101787	01, 11, 2018
<input checked="" type="checkbox"/>	LISN	ESH2-Z5	R & S	100450	04, 27, 2018
<input checked="" type="checkbox"/>	PULSE LIMITER	ESH3-Z2	R & S	101915	12, 13, 2017

Test Conditions

Temperature: 20,2 °C
Relative Humidity: 42,0 %Frequency Range of Measurement
150 kHz to 30 MHzInstrument Settings
IF Band Width: 9 kHz

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.

2.2 Conducted Emissions at Telecommunication Ports

Test Date
Nov. 06, 2017Test 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	101781	04, 27, 2018
<input checked="" type="checkbox"/>	LISN	ENV216	R & S	101787	01, 11, 2018
<input checked="" type="checkbox"/>	LISN	ESH2-Z5	R & S	100450	04, 27, 2018
<input checked="" type="checkbox"/>	PULSE LIMITER	ESH3-Z2	R & S	101915	12, 13, 2017
<input checked="" type="checkbox"/>	8-WIRE ISN CAT3,5	ENY81	R & S	100174	01, 11, 2018
<input type="checkbox"/>	8-WIRE ISN CAT6	ENY81-CAT6	R & S	101665	01, 11, 2018

Test Conditions

Temperature: 20,2 °C
Relative Humidity: 42,0 %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
Nov. 05, 2017

Test Location
☐ OPEN AREA TEST SITE #1 ☒ SAC #4(10 m)

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. 18, 2018
<input checked="" type="checkbox"/>	AMPLIFIER	SCU 01	R & S	100603	12. 13, 2017
<input checked="" type="checkbox"/>	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	716	11. 28, 2018

Test Conditions
Temperature: 20,2 °C
Relative Humidity: 41,3 %

Frequency Range of Measurement
30 MHz to 1 GHz

Instrument Settings
IF Band Width: 120 kHz

Test Results
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks
See Appendix A for test data.

2.4 Radiated Electric Field Emissions(Above 1 GHz)

Test Date
Nov. 05, 2017

Test Location
SEMI ANECHOIC CHAMBER #2

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMI Test S/W	e3	AUDIX	8.083b	-
<input checked="" type="checkbox"/>	EMI TEST RECEIVER	ESU26	R & S	100552	04, 19, 2018
<input checked="" type="checkbox"/>	PREAMPLIFIER	8449B	AGILENT	3008A01729	05, 31, 2018
<input type="checkbox"/>	ATTENUATOR	8491A	HP	35496	03, 24, 2018
<input checked="" type="checkbox"/>	LOG-PERIODIC ANTENNA	STLP 9149	SCHWARZBECK	9149-255	05, 17, 2018

Test Conditions

Temperature: 19,3 °C
Relative Humidity: 52,1 %

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.

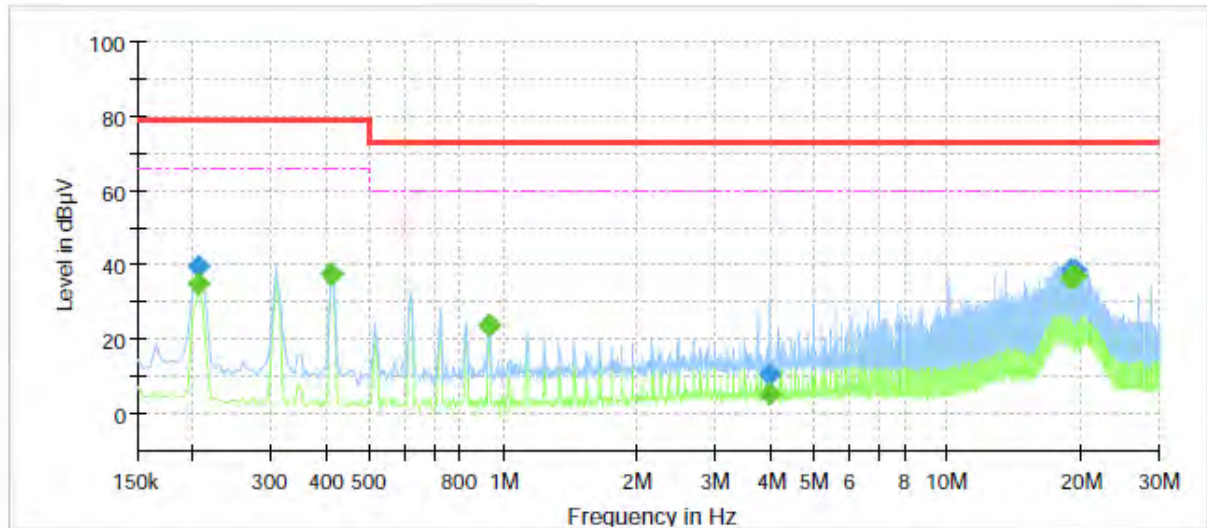
APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

■ AC 24 Mode
[HOT]

Common Information

Test Description:	Conducted Emission
Model No.:	TNO-4050TN
Mode	AC 24 V
Operator Name:	KES



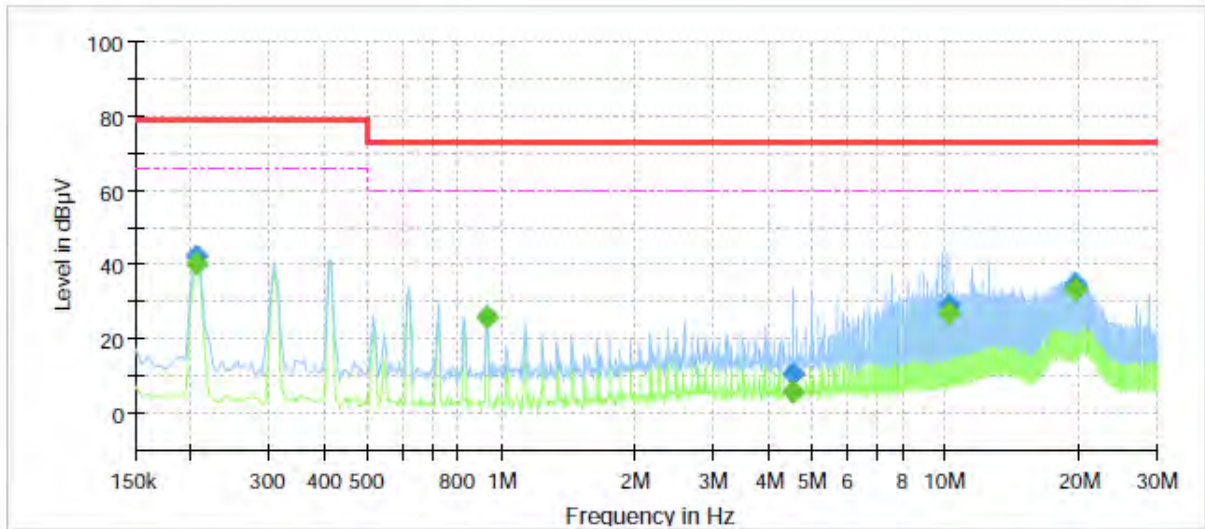
Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.205000	---	34.72	66.00	31.28	1000.0	9.000	L1	19.5
0.205000	39.89	---	79.00	39.11	1000.0	9.000	L1	19.5
0.410000	---	37.77	66.00	28.23	1000.0	9.000	L1	19.7
0.410000	37.81	---	79.00	41.19	1000.0	9.000	L1	19.7
0.925000	---	23.70	60.00	36.30	1000.0	9.000	L1	20.1
0.925000	23.68	---	73.00	49.32	1000.0	9.000	L1	20.1
3.960000	---	5.55	60.00	54.45	1000.0	9.000	L1	20.0
3.960000	10.41	---	73.00	62.59	1000.0	9.000	L1	20.0
18.960000	---	36.64	60.00	23.36	1000.0	9.000	L1	20.3
18.960000	38.41	---	73.00	34.59	1000.0	9.000	L1	20.3
19.475000	---	36.98	60.00	23.02	1000.0	9.000	L1	20.3
19.475000	38.45	---	73.00	34.55	1000.0	9.000	L1	20.3

[NEUTRAL]

Common Information

Test Description: Conducted Emission
Model No.: TNO-4050TN
Mode: AC 24 V
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	---	40.08	66.00	25.92	1000.0	9.000	N	19.5
0.205000	42.25	---	79.00	36.75	1000.0	9.000	N	19.5
0.925000	---	25.74	60.00	34.26	1000.0	9.000	N	20.0
0.925000	25.70	---	73.00	47.30	1000.0	9.000	N	20.0
4.545000	---	5.63	60.00	54.37	1000.0	9.000	N	19.9
4.545000	10.38	---	73.00	62.62	1000.0	9.000	N	19.9
10.205000	---	26.97	60.00	33.03	1000.0	9.000	N	20.1
10.205000	29.31	---	73.00	43.69	1000.0	9.000	N	20.1
19.580000	---	33.29	60.00	26.71	1000.0	9.000	N	20.4
19.580000	34.75	---	73.00	38.25	1000.0	9.000	N	20.4

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

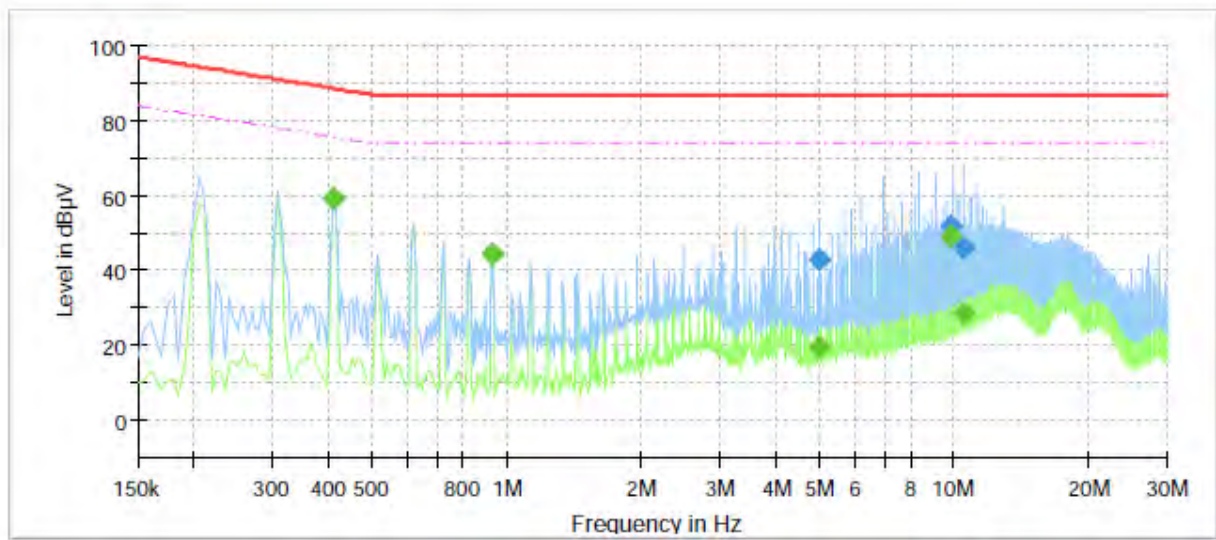
Corr. : Correction values (LISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

Conducted Emissions at Telecommunication Ports

■ AC 24 V Mode
[10 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	TNO-4050TN
Mode	AC 24 V_10 Mbps
Operator Name:	KES



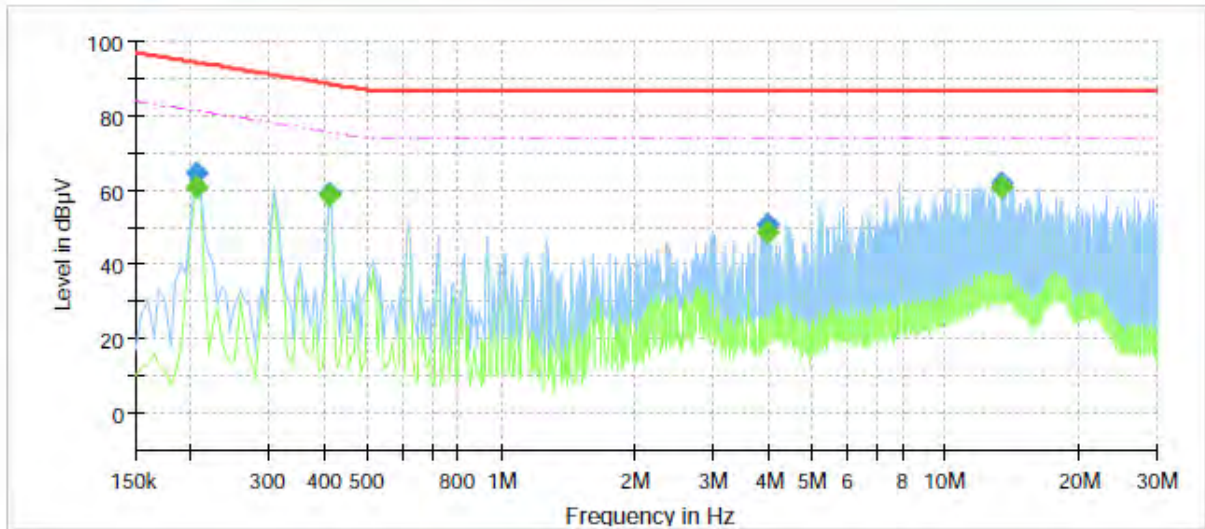
Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.410000	---	59.26	75.65	16.39	1000.0	9.000	Single Line	19.6
0.410000	59.36	---	88.65	29.29	1000.0	9.000	Single Line	19.6
0.925000	---	44.51	74.00	29.49	1000.0	9.000	Single Line	19.9
0.925000	44.52	---	87.00	42.48	1000.0	9.000	Single Line	19.9
4.995000	---	19.67	74.00	54.33	1000.0	9.000	Single Line	19.5
4.995000	42.77	---	87.00	44.23	1000.0	9.000	Single Line	19.5
9.890000	---	49.28	74.00	24.72	1000.0	9.000	Single Line	19.8
9.890000	51.84	---	87.00	35.16	1000.0	9.000	Single Line	19.8
10.500000	---	28.59	74.00	45.41	1000.0	9.000	Single Line	19.8
10.500000	46.12	---	87.00	40.88	1000.0	9.000	Single Line	19.8

[100 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	TNO-4050TN
Mode	AC 24 V_100 Mbps
Operator Name:	KES



Final Result

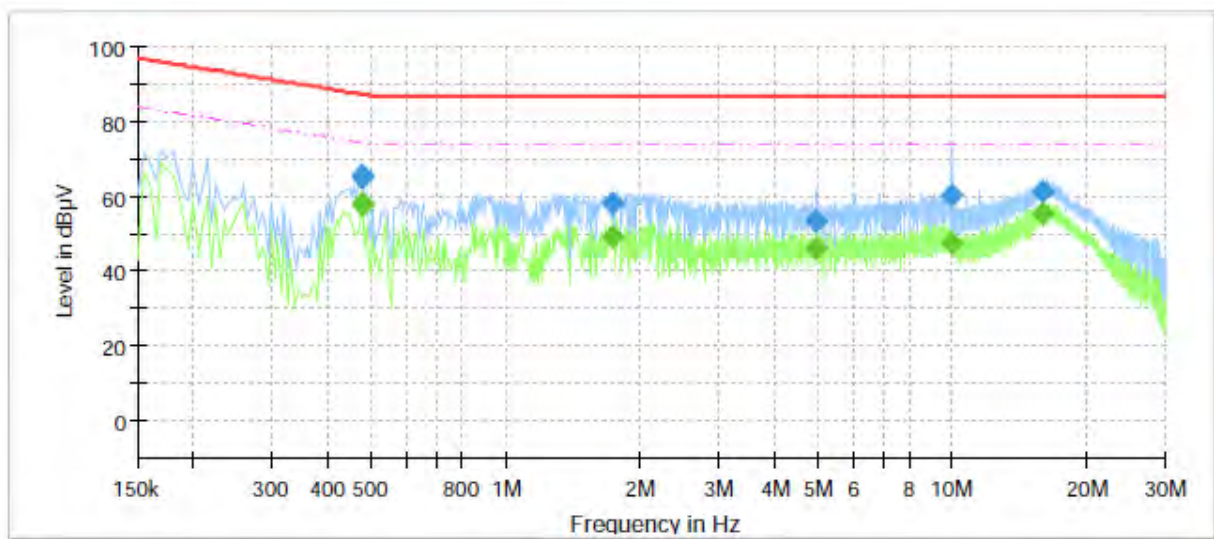
Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.205000	---	60.69	81.41	20.72	1000.0	9.000	Single Line	20.0
0.205000	64.81	---	94.41	29.60	1000.0	9.000	Single Line	20.0
0.410000	---	58.89	75.65	16.76	1000.0	9.000	Single Line	19.9
0.410000	59.18	---	88.65	29.47	1000.0	9.000	Single Line	19.9
3.955000	---	48.62	74.00	25.38	1000.0	9.000	Single Line	20.0
3.955000	50.94	---	87.00	36.06	1000.0	9.000	Single Line	20.0
13.420000	---	60.73	74.00	13.27	1000.0	9.000	Single Line	20.2
13.420000	61.86	---	87.00	25.14	1000.0	9.000	Single Line	20.2

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■ DC 12 V Mode
[10 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	TNO-4050TN
Mode	DC 12 V_10 Mbps
Operator Name:	KES



Final Result

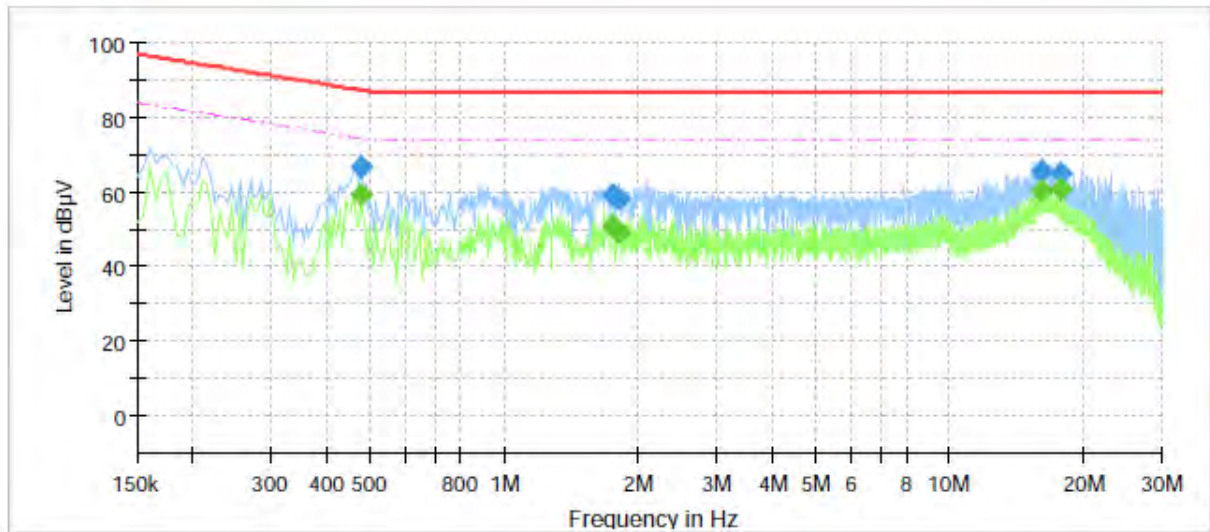
Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.475000	---	58.33	74.43	16.10	1000.0	9.000	Single Line	19.7
0.475000	65.83	---	87.43	21.60	1000.0	9.000	Single Line	19.7
0.480000	---	57.58	74.34	16.76	1000.0	9.000	Single Line	19.7
0.480000	64.97	---	87.34	22.37	1000.0	9.000	Single Line	19.7
1.735000	---	49.07	74.00	24.93	1000.0	9.000	Single Line	20.0
1.735000	58.43	---	87.00	28.57	1000.0	9.000	Single Line	20.0
4.960000	---	46.10	74.00	27.90	1000.0	9.000	Single Line	19.5
4.960000	53.72	---	87.00	33.28	1000.0	9.000	Single Line	19.5
10.005000	---	47.84	74.00	26.16	1000.0	9.000	Single Line	19.8
10.005000	60.37	---	87.00	26.63	1000.0	9.000	Single Line	19.8
15.855000	---	55.75	74.00	18.25	1000.0	9.000	Single Line	19.9
15.855000	61.14	---	87.00	25.86	1000.0	9.000	Single Line	19.9

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[100 Mbps]

Common Information

Test Description: Telecommunication Emission
Model No.: TNO-4050TN
Mode: DC 12 V_100 Mbps
Operator Name: KES



Final Result

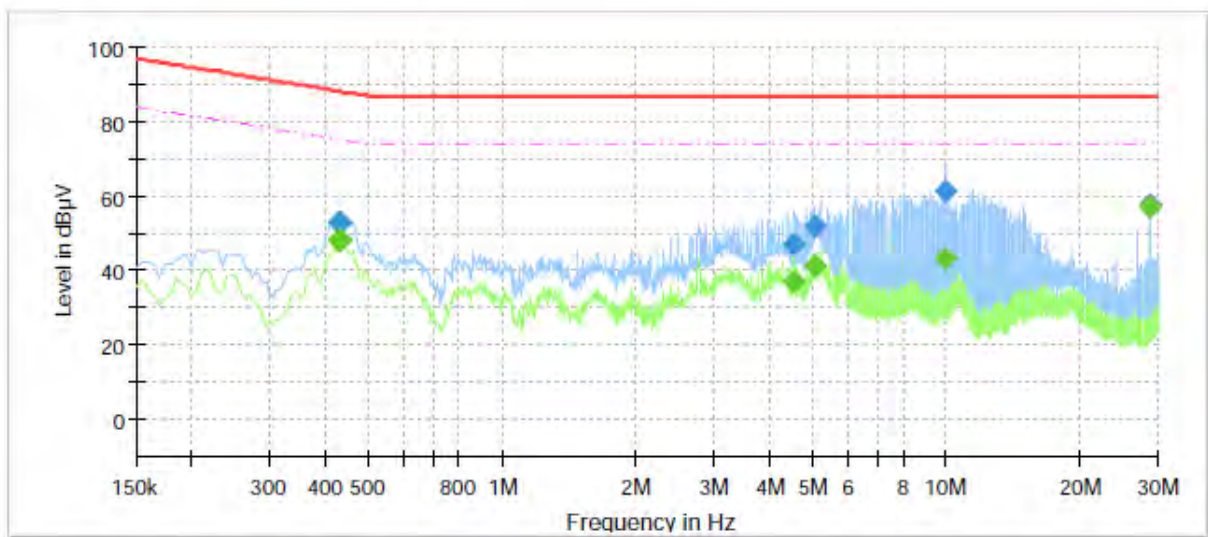
Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.475000	---	59.22	74.43	15.21	1000.0	9.000	Single Line	20.0
0.475000	66.61	---	87.43	20.82	1000.0	9.000	Single Line	20.0
1.745000	---	50.76	74.00	23.24	1000.0	9.000	Single Line	20.3
1.745000	59.09	---	87.00	27.91	1000.0	9.000	Single Line	20.3
1.805000	---	49.30	74.00	24.70	1000.0	9.000	Single Line	20.3
1.805000	58.23	---	87.00	28.77	1000.0	9.000	Single Line	20.3
16.165000	---	60.45	74.00	13.55	1000.0	9.000	Single Line	20.2
16.165000	65.51	---	87.00	21.49	1000.0	9.000	Single Line	20.2
17.695000	---	61.02	74.00	12.98	1000.0	9.000	Single Line	20.3
17.695000	65.28	---	87.00	21.72	1000.0	9.000	Single Line	20.3

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■ PoE Mode
[10 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	TNO-4050TN
Mode	PoE_10 Mbps
Operator Name:	KES



Final Result

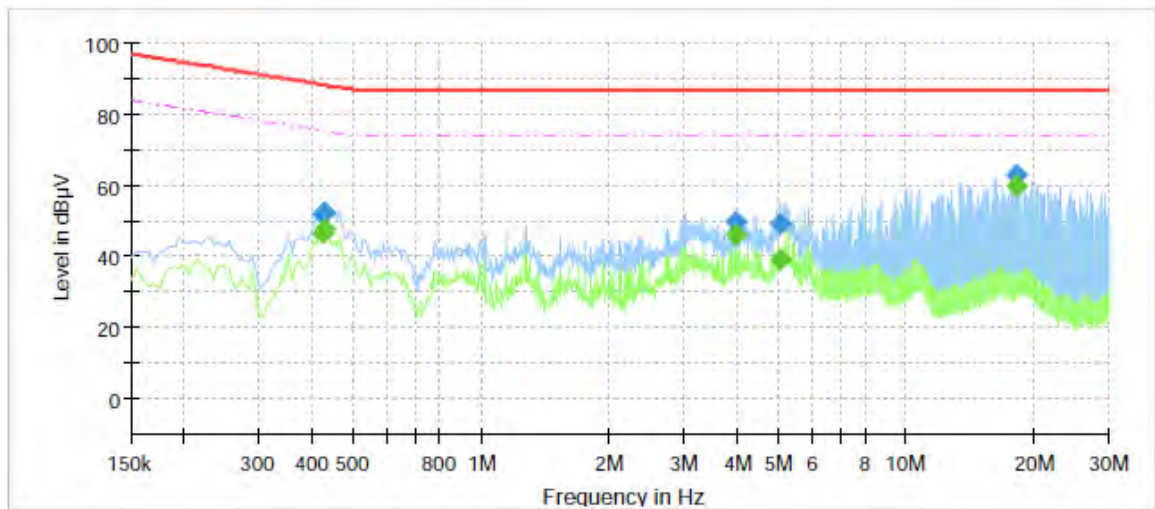
Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.430000	---	48.28	75.25	26.97	1000.0	9.000	Single Line	19.6
0.430000	53.14	---	88.25	35.11	1000.0	9.000	Single Line	19.6
0.435000	---	48.26	75.16	26.90	1000.0	9.000	Single Line	19.6
0.435000	53.06	---	88.16	35.10	1000.0	9.000	Single Line	19.6
4.515000	---	37.33	74.00	36.67	1000.0	9.000	Single Line	19.6
4.515000	47.11	---	87.00	39.89	1000.0	9.000	Single Line	19.6
5.045000	---	41.18	74.00	32.82	1000.0	9.000	Single Line	19.5
5.045000	51.90	---	87.00	35.10	1000.0	9.000	Single Line	19.5
9.995000	---	43.67	74.00	30.33	1000.0	9.000	Single Line	19.8
9.995000	61.44	---	87.00	25.56	1000.0	9.000	Single Line	19.8
28.640000	---	57.38	74.00	16.62	1000.0	9.000	Single Line	20.7
28.640000	57.84	---	87.00	29.16	1000.0	9.000	Single Line	20.7

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[100 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	TNO-4050TN
Mode	PoE_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)
0.425000	---	46.76	75.35	28.59	1000.0	9.000	Single Line	19.9
0.425000	52.01	---	88.35	36.34	1000.0	9.000	Single Line	19.9
0.430000	---	47.58	75.25	27.67	1000.0	9.000	Single Line	19.9
0.430000	52.28	---	88.25	35.97	1000.0	9.000	Single Line	19.9
3.955000	---	46.14	74.00	27.86	1000.0	9.000	Single Line	20.0
3.955000	50.02	---	87.00	36.98	1000.0	9.000	Single Line	20.0
5.040000	---	39.25	74.00	34.75	1000.0	9.000	Single Line	19.8
5.040000	49.00	---	87.00	38.00	1000.0	9.000	Single Line	19.8
18.245000	---	59.68	74.00	14.32	1000.0	9.000	Single Line	20.3
18.245000	63.09	---	87.00	23.91	1000.0	9.000	Single Line	20.3

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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



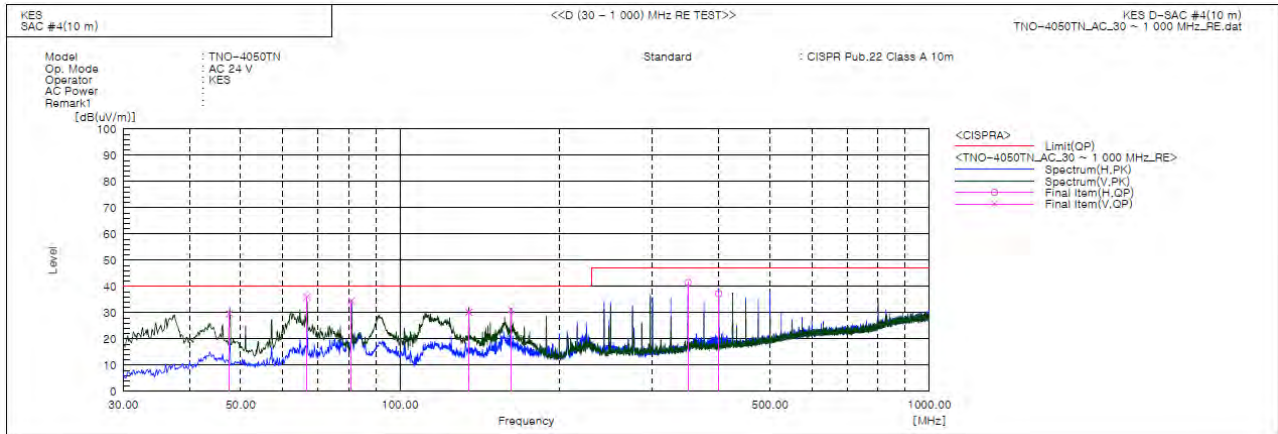
KES Co., Ltd.

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Test report No.:
KES-E1-17T0751
Page (25) of (53)

Radiated Electric Field Emissions(Below 1 GHz)

■ AC 24 V 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	47.640	V	57.5	-27.8	29.7	40.0	10.3	115.0	108.0	
2	66.739	V	66.8	-30.8	36.0	40.0	4.0	318.0	122.0	
3	80.925	V	68.1	-33.6	34.5	40.0	5.5	228.0	158.0	
4	135.003	V	62.0	-31.8	30.2	40.0	9.8	138.0	237.0	
5	162.163	V	61.9	-30.7	31.2	40.0	8.8	197.0	353.0	
6	349.958	H	63.5	-22.0	41.5	47.0	5.5	200.0	255.0	
7	400.016	H	57.5	-20.2	37.3	47.0	9.7	200.0	129.0	

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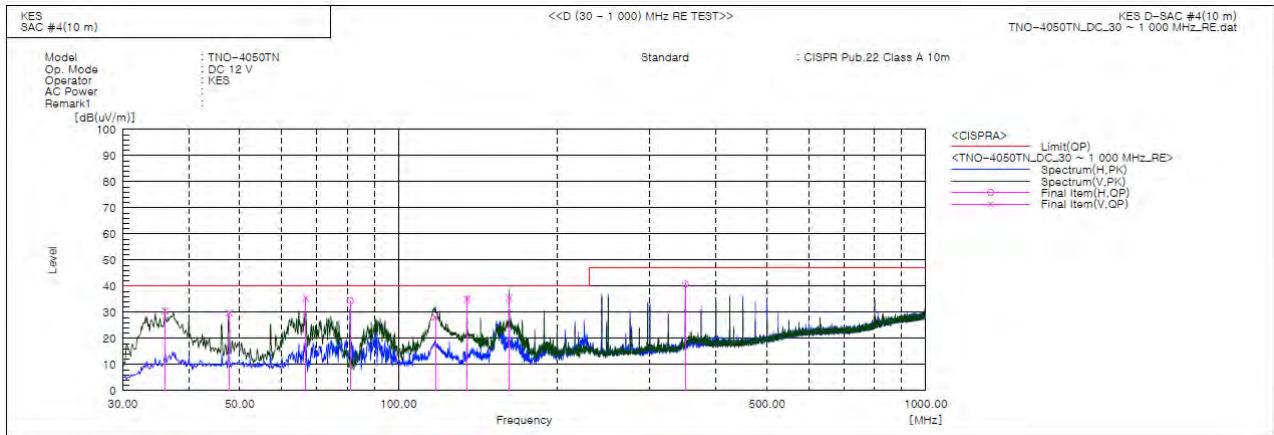


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Test report No.:
KES-E1-17T0751
Page (26) of (53)

DC 12 V 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	36.116	V	61.4	-30.9	30.5	40.0	9.5	129.0	11.0	
2	47.803	V	57.6	-27.8	29.8	40.0	10.2	150.0	20.0	
3	66.694	V	66.2	-30.8	35.4	40.0	4.6	246.0	84.0	
4	81.014	H	68.0	-33.6	34.4	40.0	5.6	375.0	225.0	
5	117.504	V	58.6	-30.5	28.1	40.0	11.9	131.0	169.0	
6	135.127	V	66.7	-31.8	34.9	40.0	5.1	138.0	323.0	
7	162.116	V	66.4	-30.7	35.7	40.0	4.3	259.0	336.0	
8	349.926	H	62.8	-22.0	40.8	47.0	6.2	283.0	233.0	

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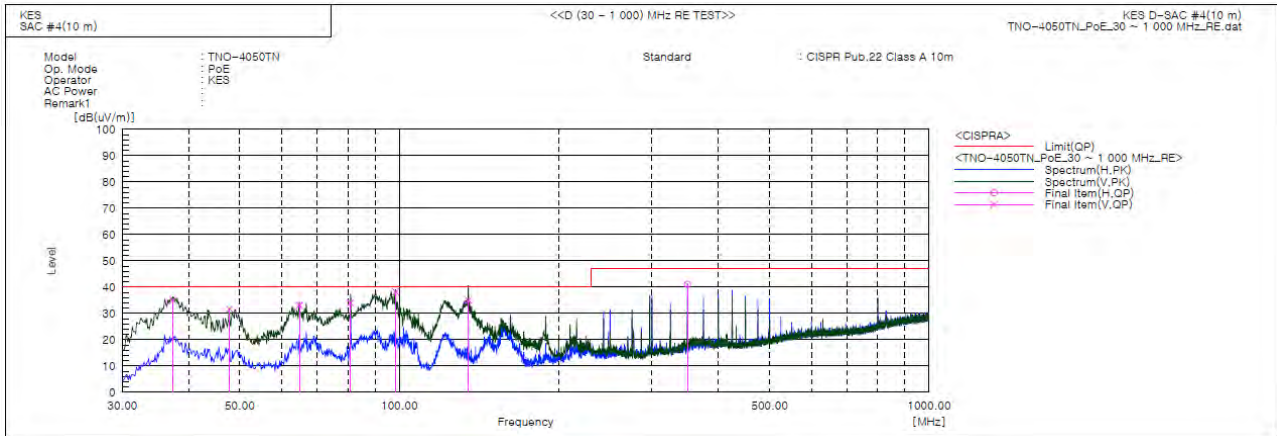


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Test report No.:
KES-EI-17T0751
Page (27) of (53)

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	37.391	V	65.4	-30.4	35.0	40.0	5.0	125.0	256.0	
2	47.854	V	59.5	-27.8	31.7	40.0	8.3	165.0	235.0	
3	64.799	V	63.2	-30.2	33.0	40.0	7.0	130.0	93.0	
4	80.925	V	67.6	-33.6	34.0	40.0	6.0	228.0	134.0	
5	98.442	V	66.6	-28.4	38.2	40.0	1.8	206.0	157.0	
6	135.024	V	66.8	-31.8	35.0	40.0	5.0	126.0	299.0	
7	349.981	H	63.1	-22.0	41.1	47.0	5.9	162.0	272.0	

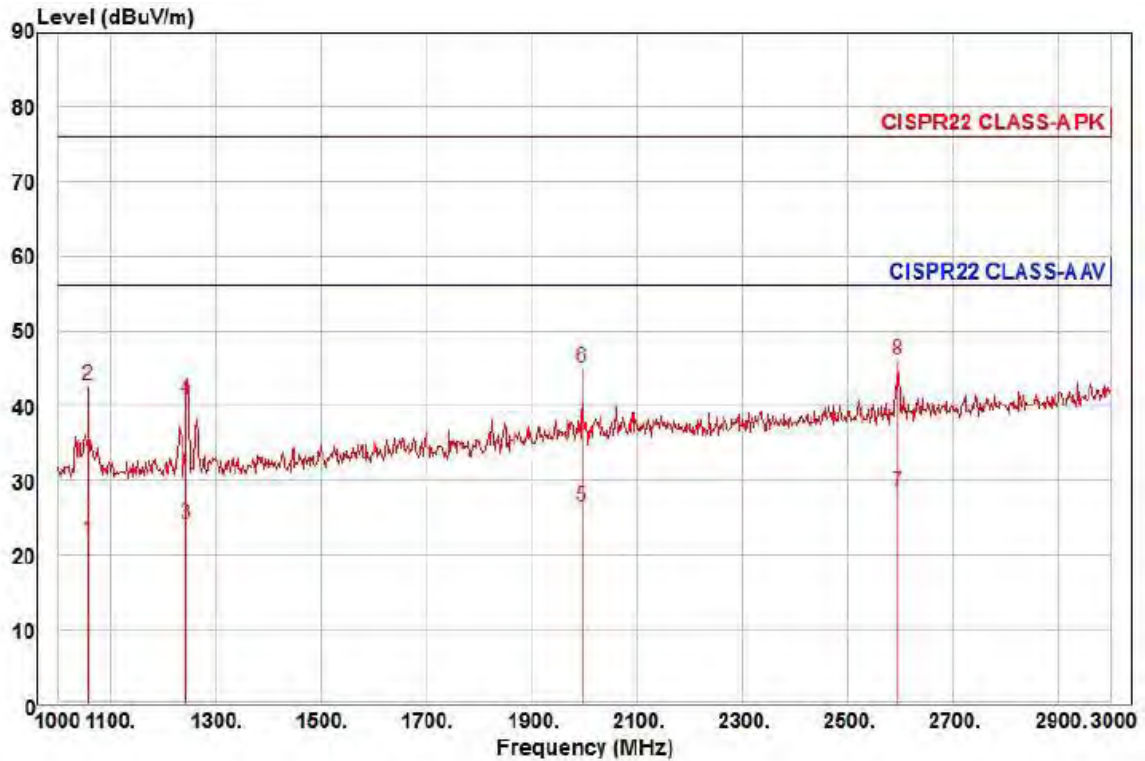
◆ Calculation

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

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Radiated Electric Field Emissions(Above 1 GHz)

■ AC 24 V Mode



Site : YEOJU_C 3 m SAC
Condition: CISPR22 CLASS-A PK 3m STLP9149(RRA CAL 2017-05-18) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : TNO-4050TN
Mode : AC 24 V
Memo : 1 ~ 3 GHz

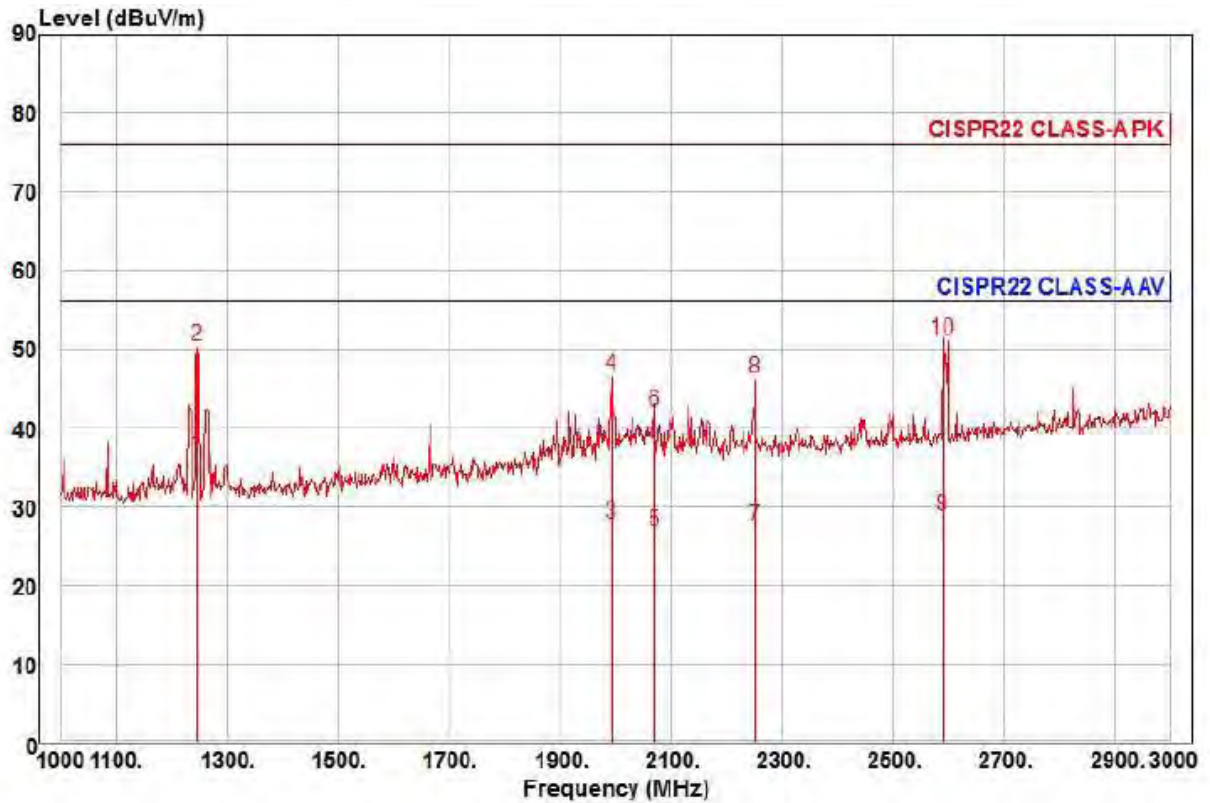
	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	1058.00	28.55	22.68	6.82	36.10	307	56.00	-34.05	horizontal	Average
2	1058.00	49.43	22.68	6.82	36.10	307	76.00	-33.17	horizontal	Peak
3	1244.00	29.29	23.24	7.42	35.79	140	56.00	-31.84	horizontal	Average
4	1244.00	45.87	23.24	7.42	35.79	140	76.00	-35.26	horizontal	Peak
5	1996.00	25.38	25.99	9.64	34.54	63	56.00	-29.53	horizontal	Average
6	1996.00	43.93	25.99	9.64	34.54	63	76.00	-30.98	horizontal	Peak
7 pp	2596.00	23.54	27.95	11.05	34.12	63	56.00	-27.58	horizontal	Average
8 pk	2596.00	41.17	27.95	11.05	34.12	63	76.00	-29.95	horizontal	Peak



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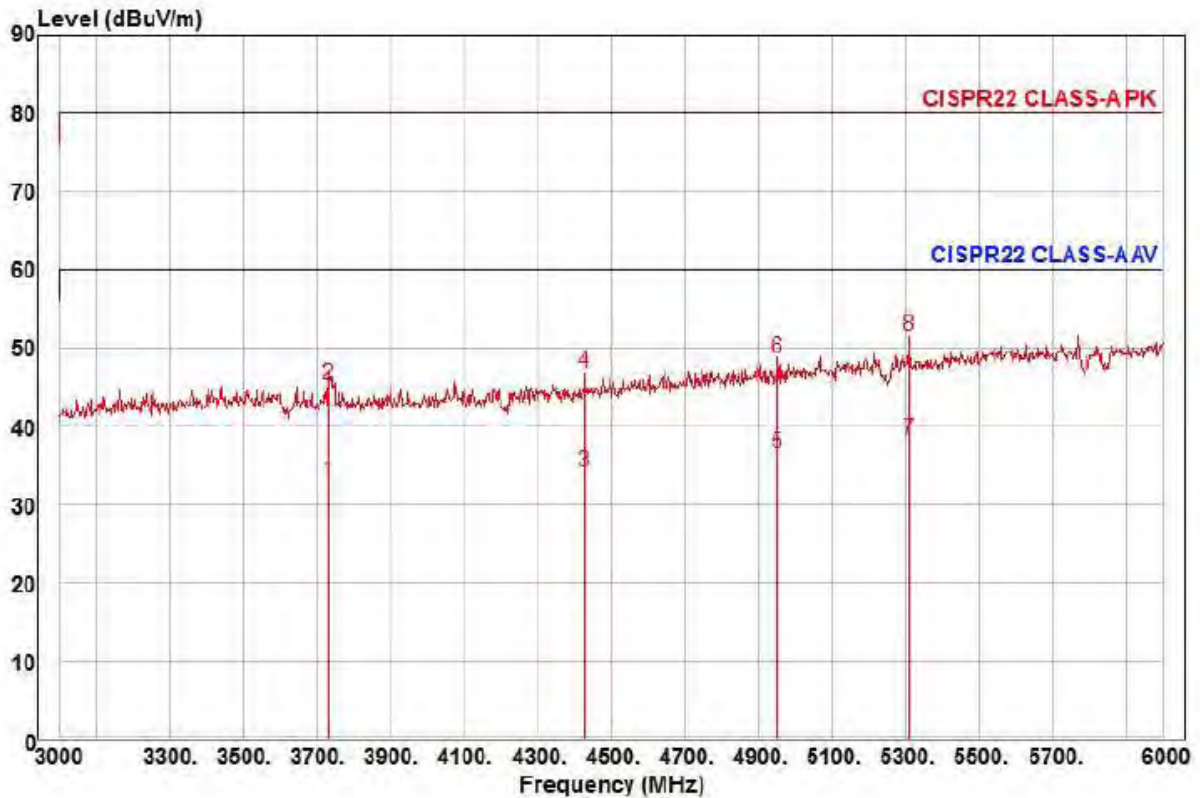
Test report No.:
KES-EI-17T0751
Page (29) of (53)



Site : YEOJU_C 3 m SAC
Condition: CISPR22 CLASS-A PK 3m STLP9149(RRA CAL 2017-05-18) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : TNO-4050TN
Mode : AC 24 V
Memo : 1 ~ 3 GHz

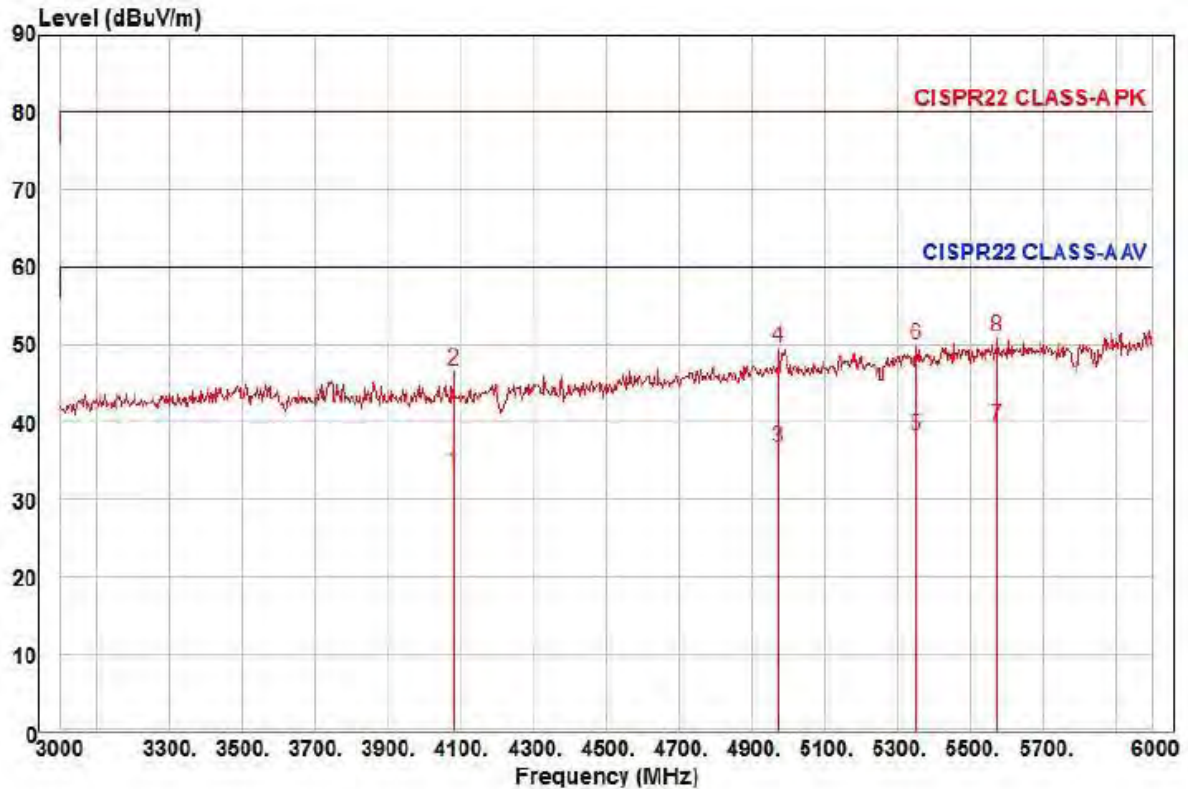
	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1 pp	1246.00	41.49	23.25	7.43	35.79	185	56.00	-19.62	vertical	Average
2	1246.00	55.46	23.25	7.43	35.79	185	76.00	-25.65	vertical	Peak
3	1992.00	26.77	25.98	9.62	34.54	337	56.00	-28.17	vertical	Average
4	1992.00	45.63	25.98	9.62	34.54	337	76.00	-29.31	vertical	Peak
5	2070.00	25.35	26.22	9.81	34.48	211	56.00	-29.10	vertical	Average
6	2070.00	40.70	26.22	9.81	34.48	211	76.00	-33.75	vertical	Peak
7	2250.00	24.82	26.77	10.24	34.36	161	56.00	-28.53	vertical	Average
8	2250.00	43.65	26.77	10.24	34.36	161	76.00	-29.70	vertical	Peak
9	2590.00	23.97	27.93	11.04	34.12	211	56.00	-27.18	vertical	Average
10 pk	2590.00	46.27	27.93	11.04	34.12	211	76.00	-24.88	vertical	Peak

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Site : YEOJU_C 3 m SAC
Condition: CISPR22 CLASS-A PK 3m STLP9149(RRA CAL 2017-05-18) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : TNO-4050TN
Mode : AC 24 V
Memo : 3 ~ 6 GHz

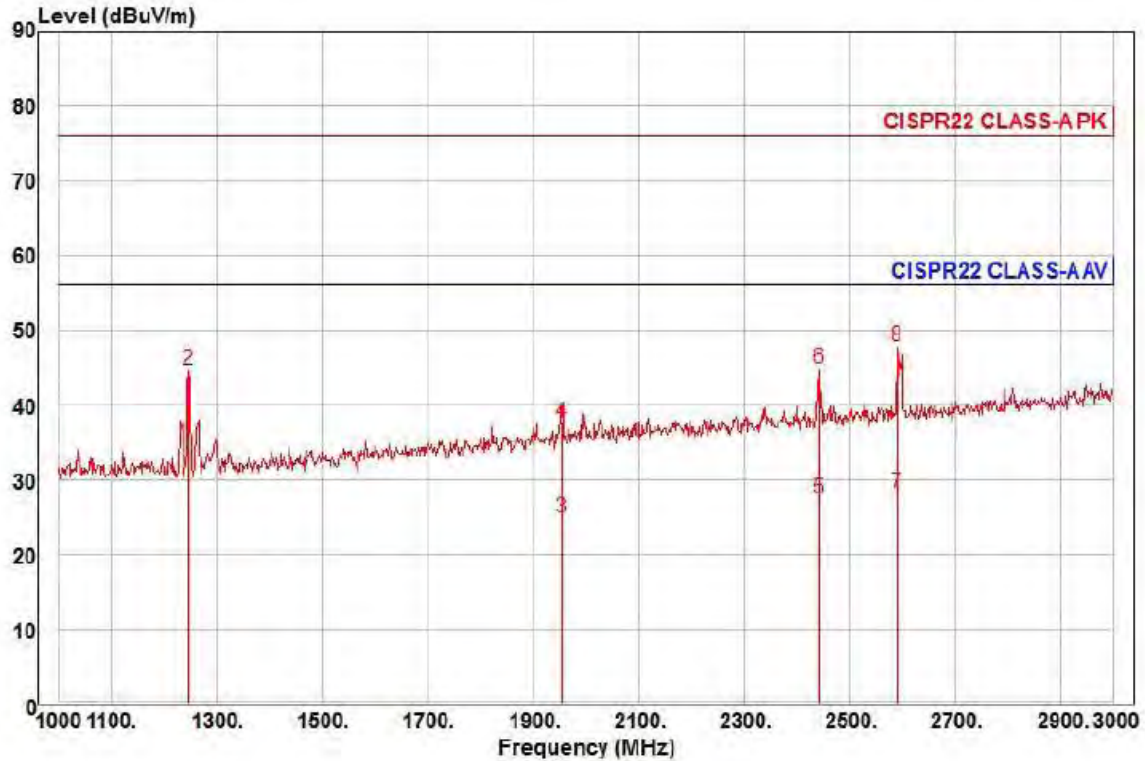
	Freq	Read Level	Ant Factor	Cable Loss	Preamplifier Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	3732.00	22.32	31.78	13.51	34.67	153	60.00	-27.06	horizontal	Average
2	3732.00	34.69	31.78	13.51	34.67	153	80.00	-34.69	horizontal	Peak
3	4428.00	21.13	32.38	14.85	34.22	310	60.00	-25.86	horizontal	Average
4	4428.00	33.90	32.38	14.85	34.22	310	80.00	-33.09	horizontal	Peak
5	4953.00	20.84	33.31	15.70	33.29	313	60.00	-23.44	horizontal	Average
6	4953.00	32.97	33.31	15.70	33.29	313	80.00	-31.31	horizontal	Peak
7 pp	5310.00	20.61	34.63	16.28	33.25	69	60.00	-21.73	horizontal	Average
8 pk	5310.00	33.83	34.63	16.28	33.25	69	80.00	-28.51	horizontal	Peak



Site : YEOJU_C 3 m SAC
Condition: CISPR22 CLASS-A PK 3m STLP9149(RRA CAL 2017-05-18) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : TNO-4050TN
Mode : AC 24 V
Memo : 3 ~ 6 GHz

	Freq	Read Level	Ant Factor	Cable Loss	Preamplifier Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	4080.00	21.62	32.48	14.20	34.83	234	60.00	-26.53	vertical	Average
2	4080.00	34.87	32.48	14.20	34.83	234	80.00	-33.28	vertical	Peak
3	4971.00	20.86	33.35	15.73	33.26	261	60.00	-23.32	vertical	Average
4	4971.00	33.82	33.35	15.73	33.26	261	80.00	-30.36	vertical	Peak
5	5352.00	20.39	34.79	16.36	33.26	153	60.00	-21.72	vertical	Average
6	5352.00	32.06	34.79	16.36	33.26	153	80.00	-30.05	vertical	Peak
7 pp	5574.00	20.51	35.48	16.73	33.29	311	60.00	-20.57	vertical	Average
8 pk	5574.00	31.97	35.48	16.73	33.29	311	80.00	-29.11	vertical	Peak

■ DC 12 V Mode



Site : YEOJU_C 3 m SAC
Condition: CISPR22 CLASS-A PK 3m STLP9149(RRA CAL 2017-05-18) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : TNO-4050TN
Mode : DC 12 V
Memo : 1 ~ 3 GHz

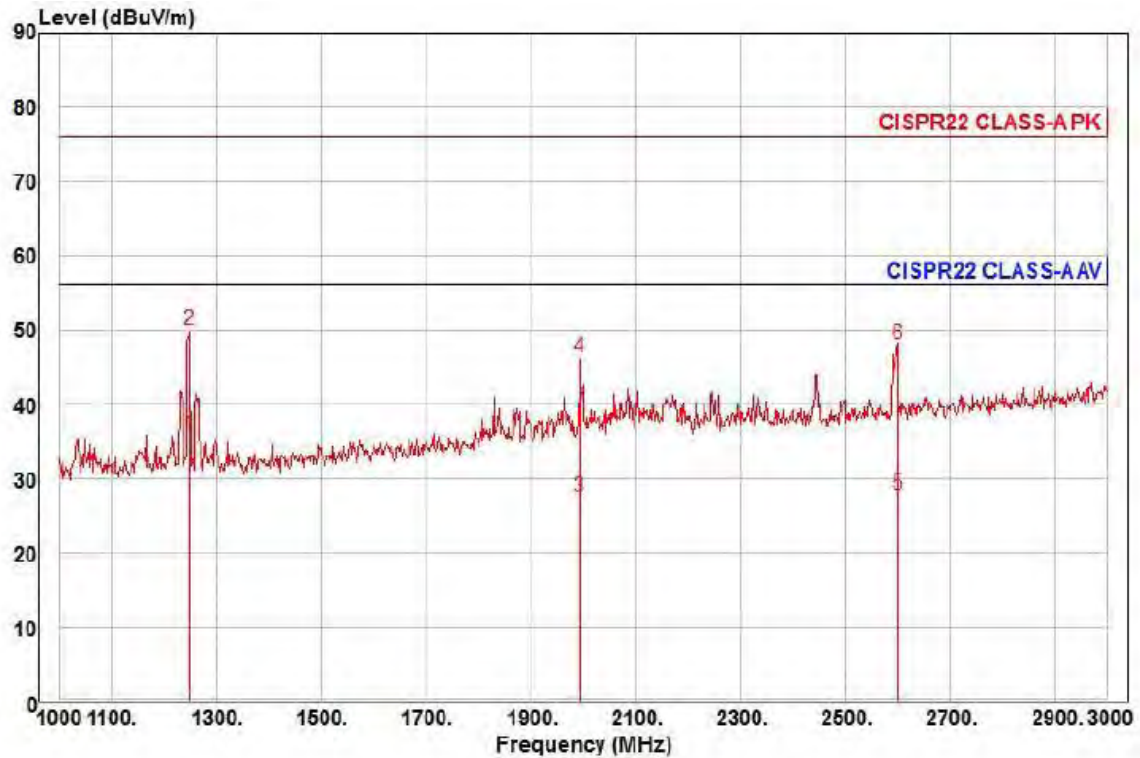
	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1 pp	1246.00	35.99	23.25	7.43	35.79	226	56.00	-25.12	horizontal	Average
2	1246.00	49.90	23.25	7.43	35.79	226	76.00	-31.21	horizontal	Peak
3	1954.00	24.14	25.83	9.52	34.61	182	56.00	-31.12	horizontal	Average
4	1954.00	36.92	25.83	9.52	34.61	182	76.00	-38.34	horizontal	Peak
5	2442.00	23.59	27.35	10.69	34.23	170	56.00	-28.60	horizontal	Average
6	2442.00	41.12	27.35	10.69	34.23	170	76.00	-31.07	horizontal	Peak
7	2590.00	23.44	27.93	11.04	34.12	220	56.00	-27.71	horizontal	Average
8 pk	2590.00	42.93	27.93	11.04	34.12	220	76.00	-28.22	horizontal	Peak



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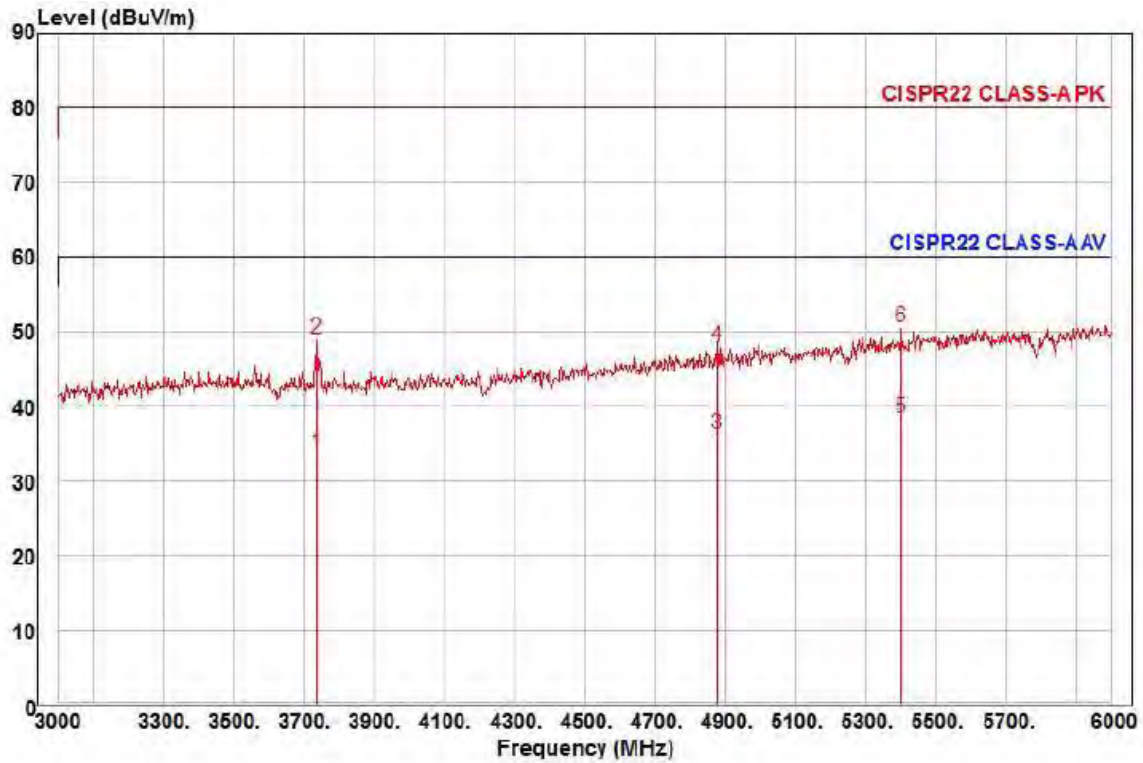
Test report No.:
KES-EI-17T0751
Page (33) of (53)



Site : YEOJU_C 3 m SAC
Condition: CISPR22 CLASS-A PK 3m STLP9149(RRA CAL 2017-05-18) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : TNO-4050TN
Mode : DC 12 V
Memo : 1 ~ 3 GHz

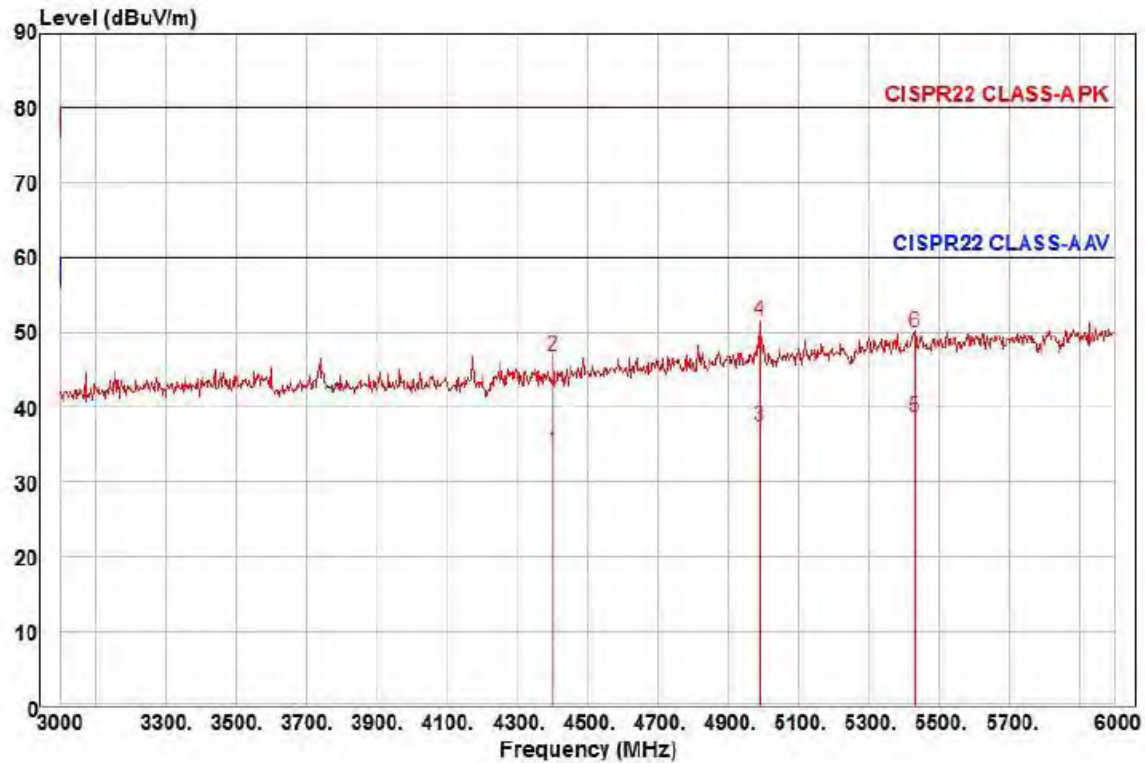
		Read	Ant	Cable	Preamp	TPos	Limit	Over		
	Freq	Level	Factor	Loss	Factor		Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1 pp	1248.00	40.94	23.25	7.44	35.79	171	56.00	-20.16	vertical	Average
2 pk	1248.00	55.18	23.25	7.44	35.79	171	76.00	-25.92	vertical	Peak
3	1992.00	26.49	25.98	9.62	34.54	345	56.00	-28.45	vertical	Average
4	1992.00	45.19	25.98	9.62	34.54	345	76.00	-29.75	vertical	Peak
5	2600.00	23.02	27.97	11.06	34.12	59	56.00	-28.07	vertical	Average
6	2600.00	43.15	27.97	11.06	34.12	59	76.00	-27.94	vertical	Peak

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Site : YEOJU_C 3 m SAC
Condition: CISPR22 CLASS-A PK 3m STLP9149(RRA CAL 2017-05-18) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : TNO-4050TN
Mode : DC 12 V
Memo : 1 ~ 3 GHz

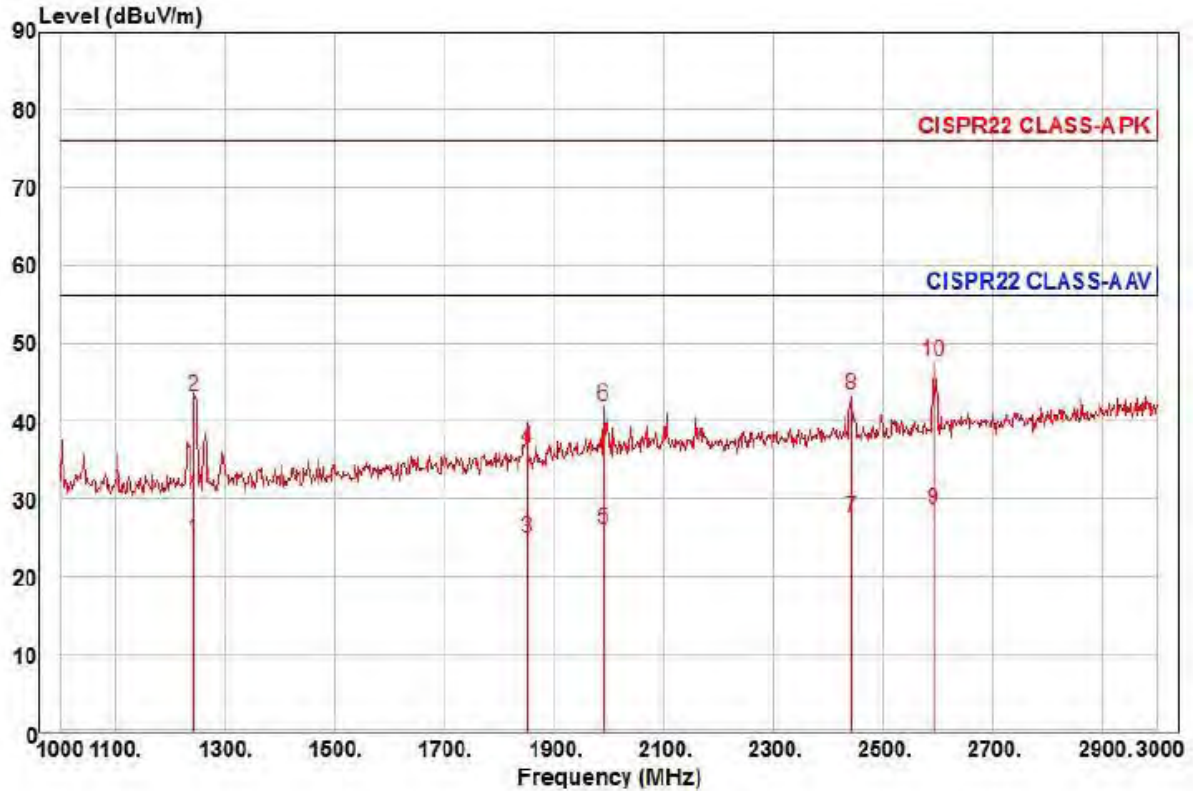
	Freq	Read Level	Ant Factor	Cable Loss	Preamplifier Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	3735.00	23.09	31.78	13.52	34.67	112	60.00	-26.28	horizontal	Average
2	3735.00	38.38	31.78	13.52	34.67	112	80.00	-30.99	horizontal	Peak
3	4878.00	20.85	33.15	15.61	33.42	9	60.00	-23.81	horizontal	Average
4	4878.00	32.68	33.15	15.61	33.42	9	80.00	-31.98	horizontal	Peak
5 pp	5400.00	20.31	34.98	16.45	33.27	214	60.00	-21.53	horizontal	Average
6 pk	5400.00	32.34	34.98	16.45	33.27	214	80.00	-29.50	horizontal	Peak



Site : YEOJU_C 3 m SAC
Condition: CISPR22 CLASS-A PK 3m STLP9149(RRA CAL 2017-05-18) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : TNO-4050TN
Mode : DC 12 V
Memo : 1 ~ 3 GHz

		Read	Ant	Cable	Preamp	TPos	Limit	Over		
	Freq	Level	Factor	Loss	Factor		Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	4404.00	21.09	32.39	14.81	34.26	199	60.00	-25.97	vertical	Average
2	4404.00	33.91	32.39	14.81	34.26	199	80.00	-33.15	vertical	Peak
3	4989.00	21.49	33.39	15.75	33.23	257	60.00	-22.60	vertical	Average
4 pk	4989.00	35.67	33.39	15.75	33.23	257	80.00	-28.42	vertical	Peak
5 pp	5430.00	20.35	35.10	16.50	33.27	4	60.00	-21.32	vertical	Average
6	5430.00	31.65	35.10	16.50	33.27	4	80.00	-30.02	vertical	Peak

■ PoE Mode



Site : YEOJU_C 3 m SAC
Condition: CISPR22 CLASS-A PK 3m STLP9149(RRA CAL 2017-05-18) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : TNO-4050TN
Mode : PoE
Memo : 1 ~ 3 GHz

	Freq	Read Level	Ant Factor	Cable Loss	Preamplifier Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	1244.00	29.93	23.24	7.42	35.79	228	56.00	-31.20	horizontal	Average
2	1244.00	48.28	23.24	7.42	35.79	228	76.00	-32.85	horizontal	Peak
3	1850.00	25.02	25.41	9.23	34.78	195	56.00	-31.12	horizontal	Average
4	1850.00	36.57	25.41	9.23	34.78	195	76.00	-39.57	horizontal	Peak
5	1990.00	25.00	25.97	9.62	34.55	308	56.00	-29.96	horizontal	Average
6	1990.00	40.90	25.97	9.62	34.55	308	76.00	-34.06	horizontal	Peak
7	2442.00	23.65	27.35	10.69	34.23	44	56.00	-28.54	horizontal	Average
8	2442.00	39.52	27.35	10.69	34.23	44	76.00	-32.67	horizontal	Peak
9 pp	2592.00	23.87	27.94	11.04	34.12	216	56.00	-27.27	horizontal	Average
10 pk	2592.00	42.84	27.94	11.04	34.12	216	76.00	-28.30	horizontal	Peak

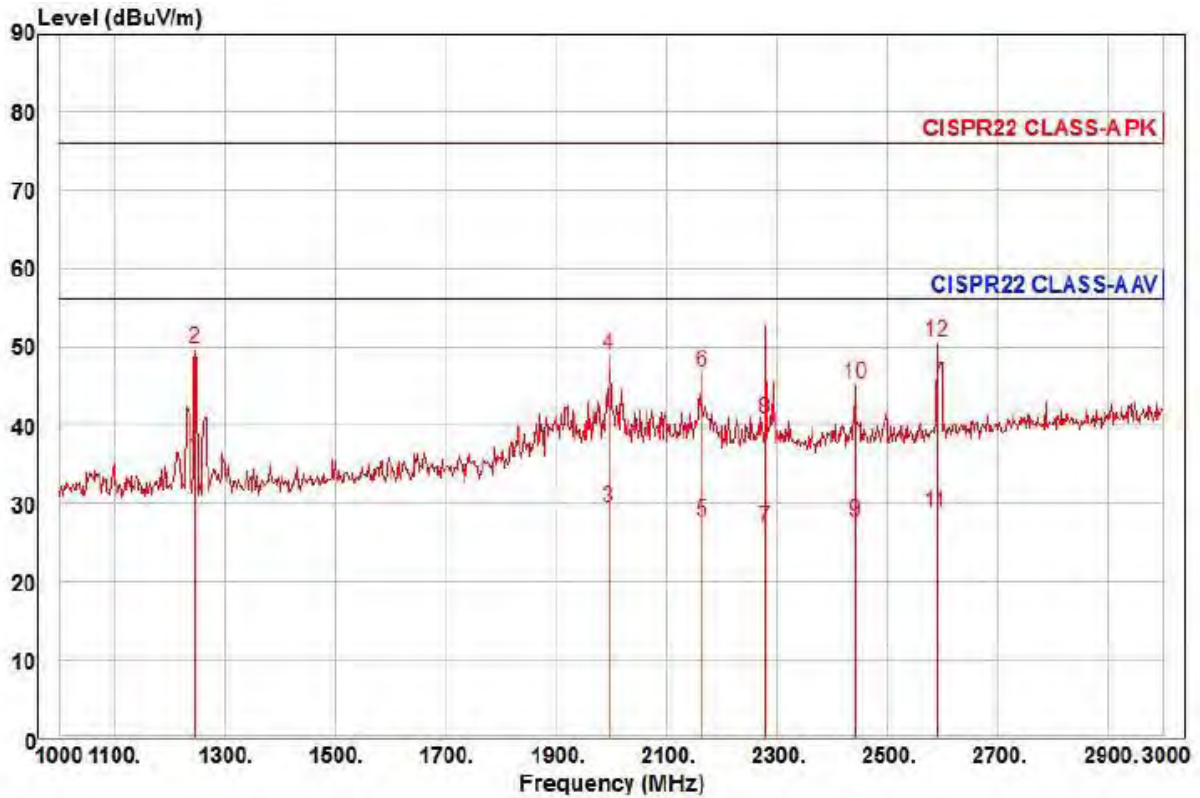
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Test report No.:
KES-EI-17T0751
Page (37) of (53)



Site : YEOJU_C 3 m SAC
Condition: CISPR22 CLASS-A PK 3m STLP9149(RRA CAL 2017-05-18) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : TNO-4050TN
Mode : PoE
Memo : 1 ~ 3 GHz

	Read	Ant	Cable	Preamp	TPOS	Limit	Over		
Freq	Level	Factor	Loss	Factor		Line	Limit	Pol/Phase	Remark
MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1 pp	1246.00	40.98	23.25	7.43	35.79	174	56.00	-20.13 vertical	Average
2	1246.00	54.95	23.25	7.43	35.79	174	76.00	-26.16 vertical	Peak
3	1996.00	28.26	25.99	9.64	34.54	25	56.00	-26.65 vertical	Average
4	1996.00	47.91	25.99	9.64	34.54	25	76.00	-27.00 vertical	Peak
5	2164.00	25.52	26.51	10.04	34.42	75	56.00	-28.35 vertical	Average
6	2164.00	44.66	26.51	10.04	34.42	75	76.00	-29.21 vertical	Peak
7	2280.00	23.98	26.86	10.31	34.34	246	56.00	-29.19 vertical	Average
8	2280.00	37.92	26.86	10.31	34.34	246	76.00	-35.25 vertical	Peak
9	2442.00	23.78	27.35	10.69	34.23	171	56.00	-28.41 vertical	Average
10	2442.00	41.42	27.35	10.69	34.23	171	76.00	-30.77 vertical	Peak
11	2590.00	23.95	27.93	11.04	34.12	43	56.00	-27.20 vertical	Average
12 pk	2590.00	45.65	27.93	11.04	34.12	43	76.00	-25.50 vertical	Peak

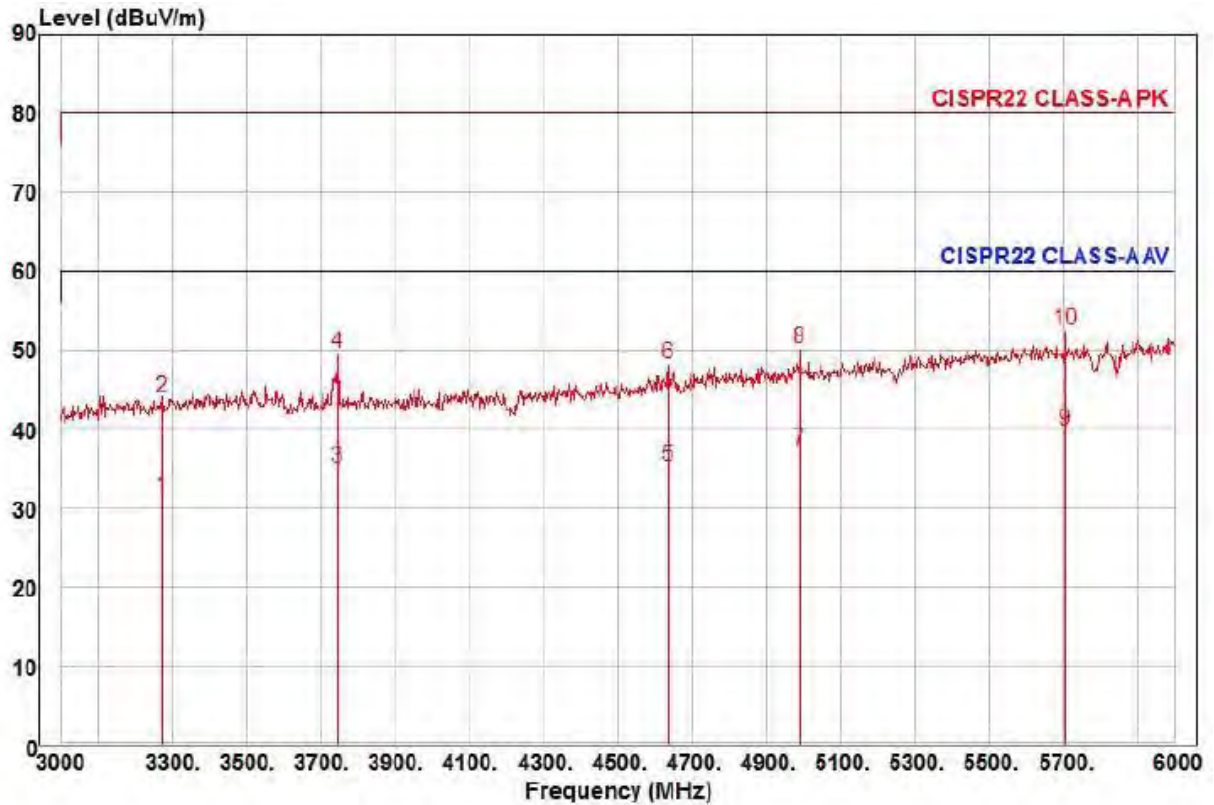
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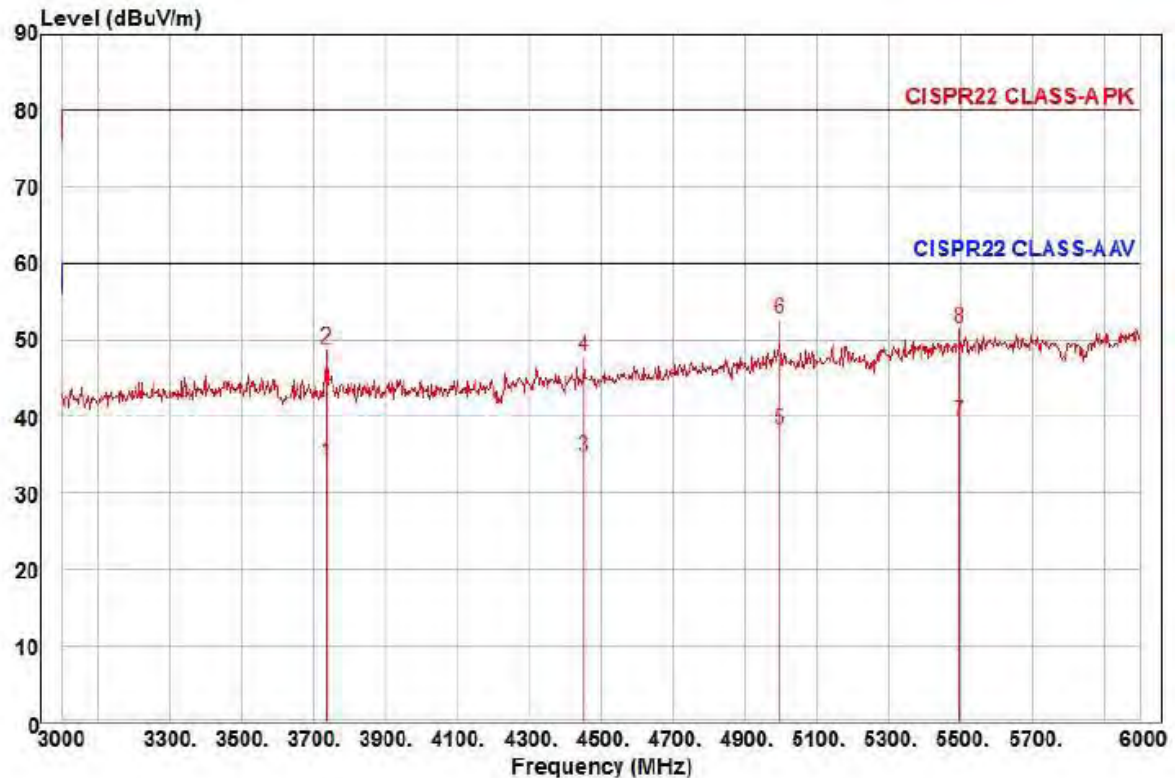
Test report No.:
KES-EI-17T0751
Page (38) of (53)



Site : YEOJU_C 3 m SAC
Condition: CISPR22 CLASS-A PK 3m STLP9149(RRA CAL 2017-05-18) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : TNO-4050TN
Mode : PoE
Memo : 3 ~ 6 GHz

	Freq	Read Level	Ant Factor	Cable Loss	Preamplifier Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	3273.00	22.28	30.51	12.79	34.15	147	60.00	-28.57	horizontal	Average
2	3273.00	34.87	30.51	12.79	34.15	147	80.00	-35.98	horizontal	Peak
3	3744.00	24.41	31.81	13.54	34.68	109	60.00	-24.92	horizontal	Average
4	3744.00	39.02	31.81	13.54	34.68	109	80.00	-30.31	horizontal	Peak
5	4635.00	21.37	32.64	15.19	33.85	147	60.00	-24.65	horizontal	Average
6	4635.00	34.35	32.64	15.19	33.85	147	80.00	-31.67	horizontal	Peak
7	4989.00	21.28	33.39	15.75	33.23	129	60.00	-22.81	horizontal	Average
8	4989.00	34.22	33.39	15.75	33.23	129	80.00	-29.87	horizontal	Peak
9 pp	5706.00	20.44	35.68	16.91	33.31	198	60.00	-20.28	horizontal	Average
10 pk	5706.00	33.20	35.68	16.91	33.31	198	80.00	-27.52	horizontal	Peak

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Site : YEOJU_C 3 m SAC
Condition: CISPR22 CLASS-A PK 3m STLP9149(RRA CAL 2017-05-18) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : TNO-4050TN
Mode : PoE
Memo : 3 ~ 6 GHz

	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	3735.00	23.28	31.78	13.52	34.67	36	60.00	-26.09	vertical	Average
2	3735.00	38.26	31.78	13.52	34.67	36	80.00	-31.11	vertical	Peak
3	4452.00	21.65	32.37	14.89	34.17	304	60.00	-25.26	vertical	Average
4	4452.00	34.69	32.37	14.89	34.17	304	80.00	-32.22	vertical	Peak
5	4998.00	22.35	33.41	15.76	33.21	260	60.00	-21.69	vertical	Average
6 pk	4998.00	36.83	33.41	15.76	33.21	260	80.00	-27.21	vertical	Peak
7 pp	5499.00	20.46	35.37	16.61	33.28	318	60.00	-20.84	vertical	Average
8	5499.00	32.97	35.37	16.61	33.28	318	80.00	-28.33	vertical	Peak

◆ Calculation

Over Limit [dB] = (Read Level[μ V] + Ant Factor[μ V/m] + Cable Loss [dB] - Preamp Factor [dB])
- Limit Line[μ V]

Over Limit : Margin, Read Level : Reading value, Ant Factor : ANT Factor,
Cable Loss : Cable loss, Preamp Factor : Preamp Factor

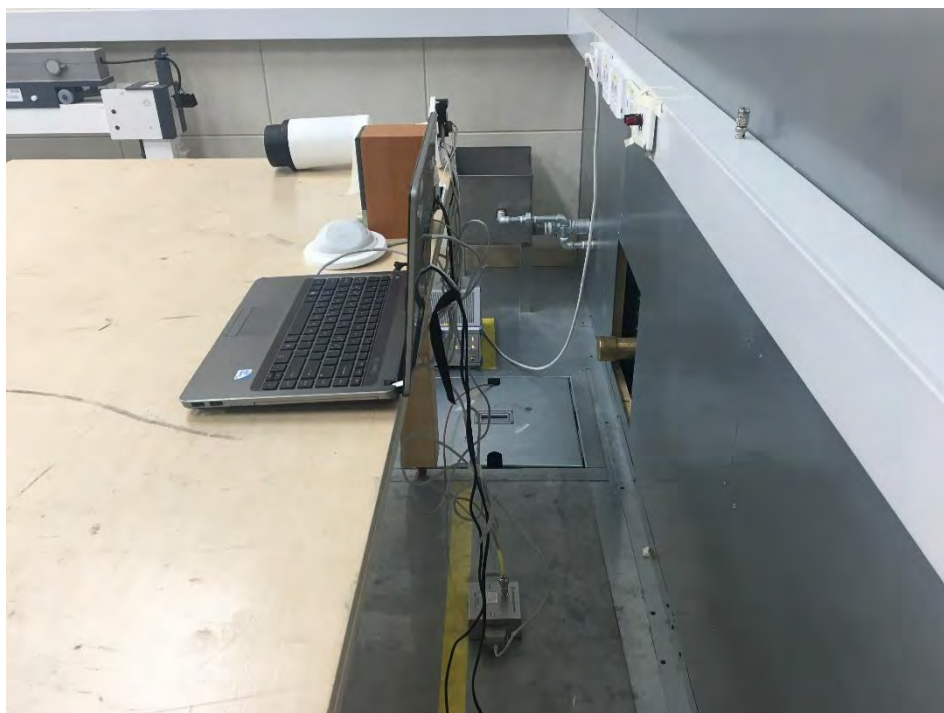
Test Setup Photos and Configuration

Conducted Voltage Emissions



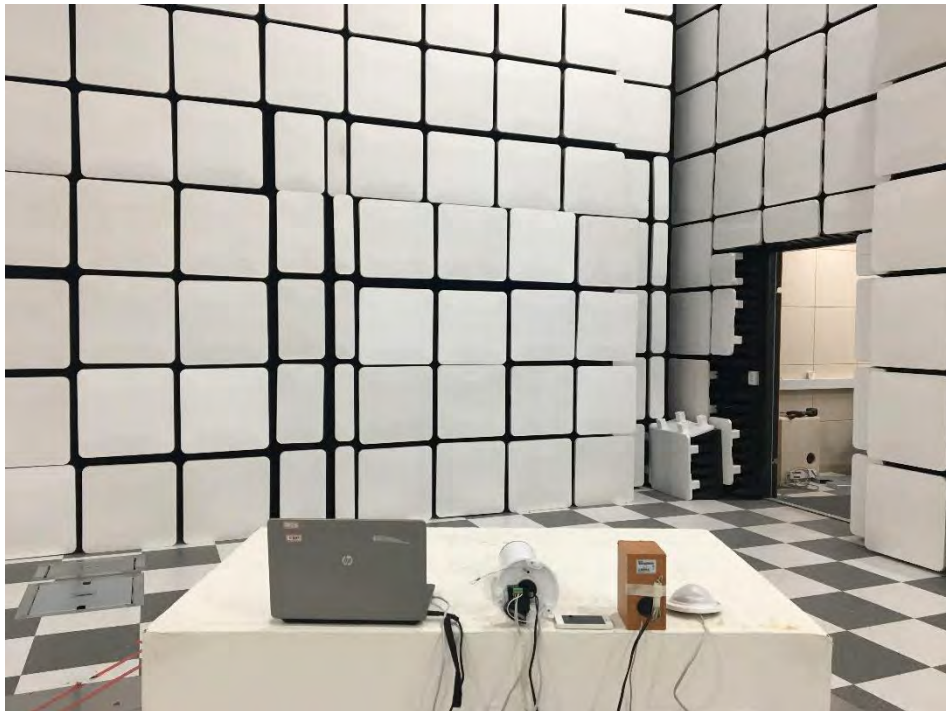
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Conducted Telecommunication Emissions



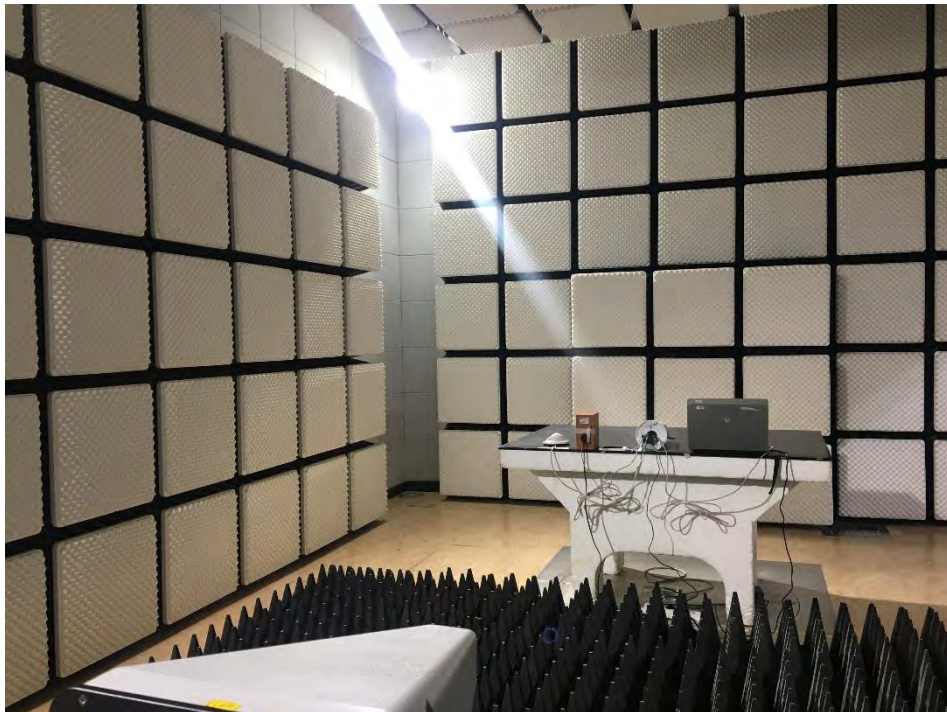
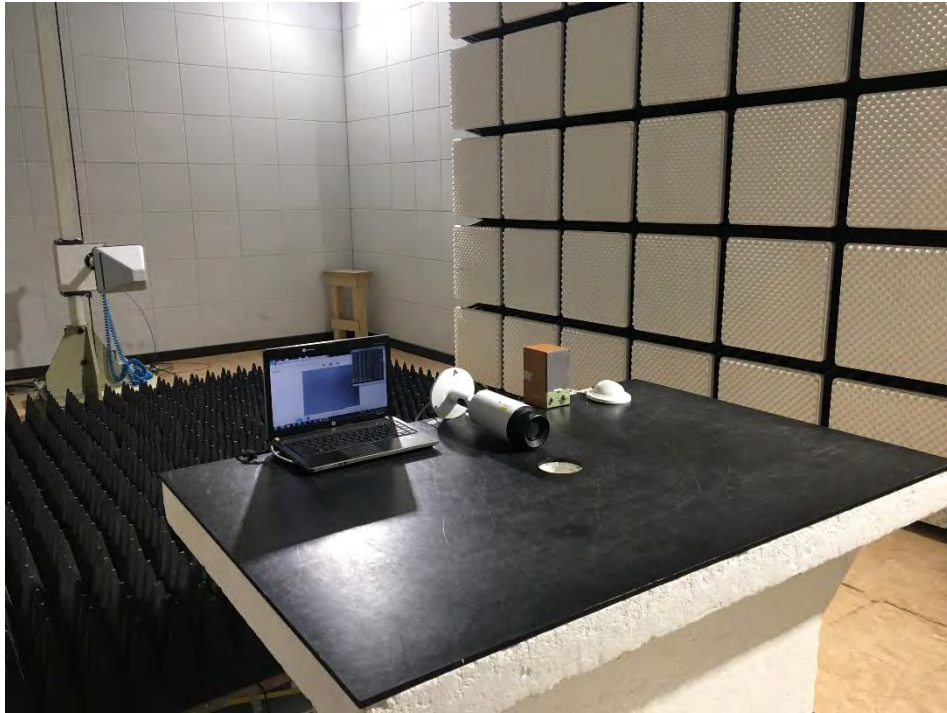
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adiated Electric Field Emissions(Below 1 GHz)



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Radiated Electric Field Emissions(Above 1 GHz)



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EUT External Photographs

(Top)



(Bottom)



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EUT Internal Photographs

(Internal View)



EUT Internal View – Board 1

(Top)



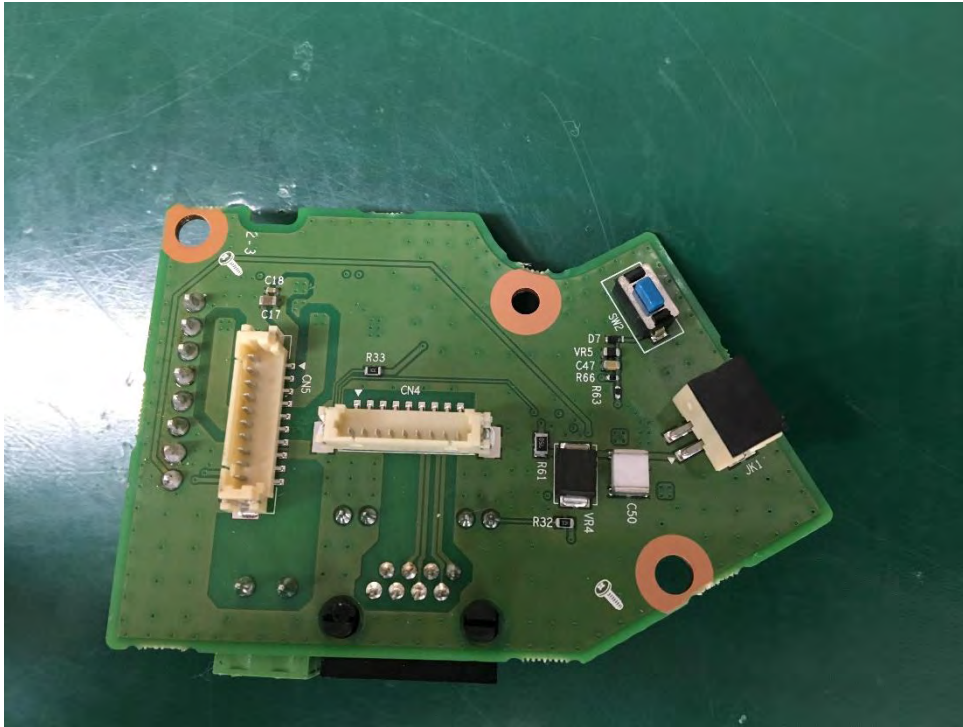
(Bottom)



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EUT Internal View – Board 2

(Top)



(Bottom)



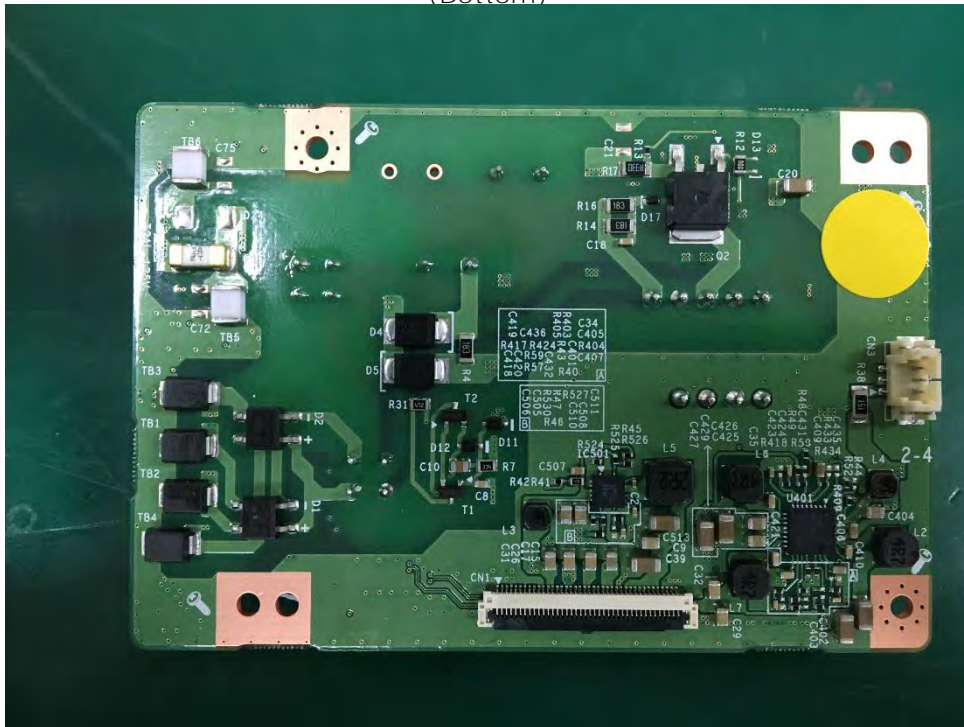
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EUT Internal View – Board 3

(Top)



(Bottom)



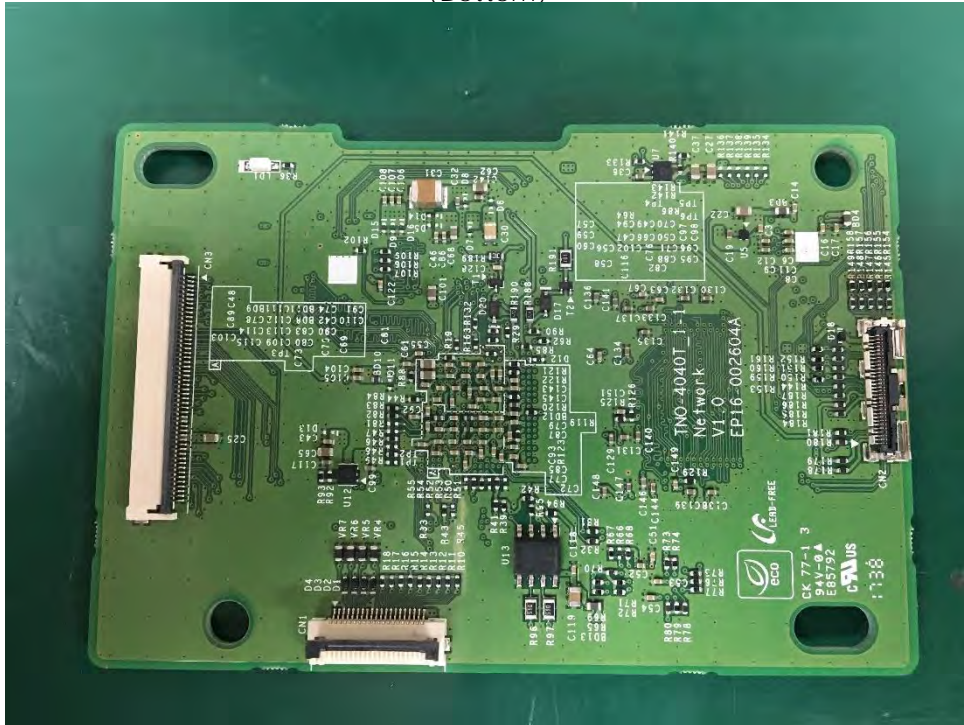
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EUT Internal View – Board 4

(Top)



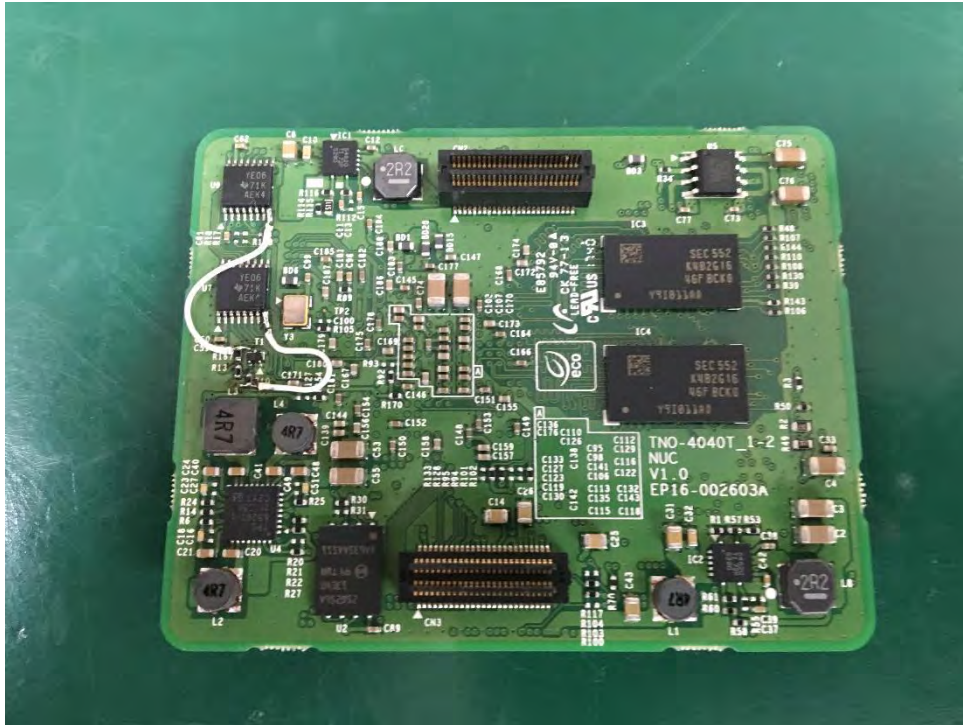
(Bottom)



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EUT Internal View – Board 5

(Top)



(Bottom)



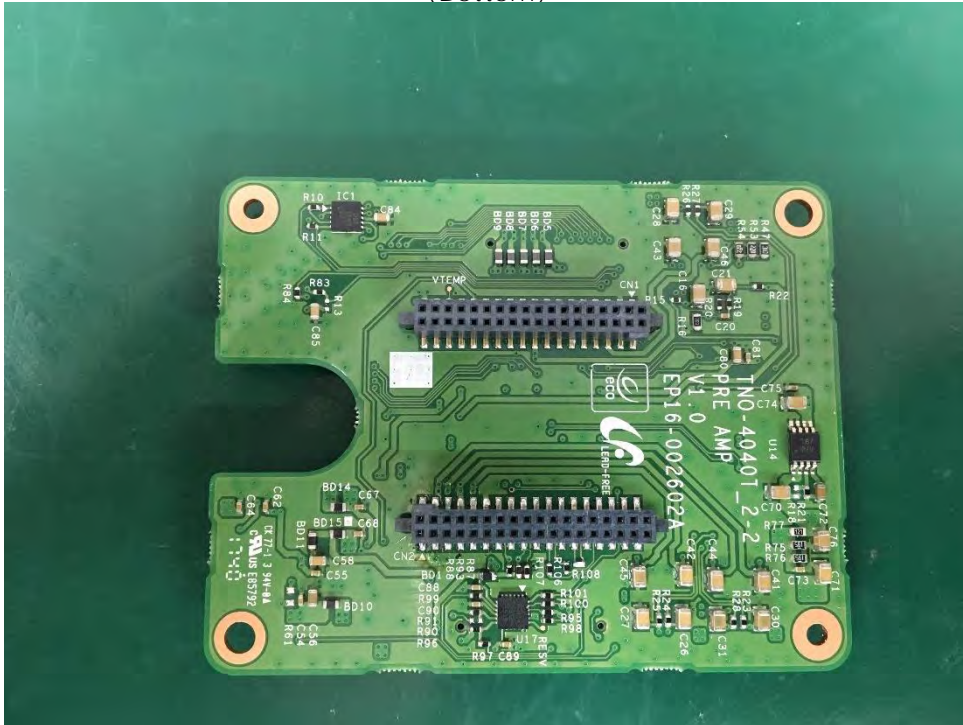
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EUT Internal View – Board 6

(Top)



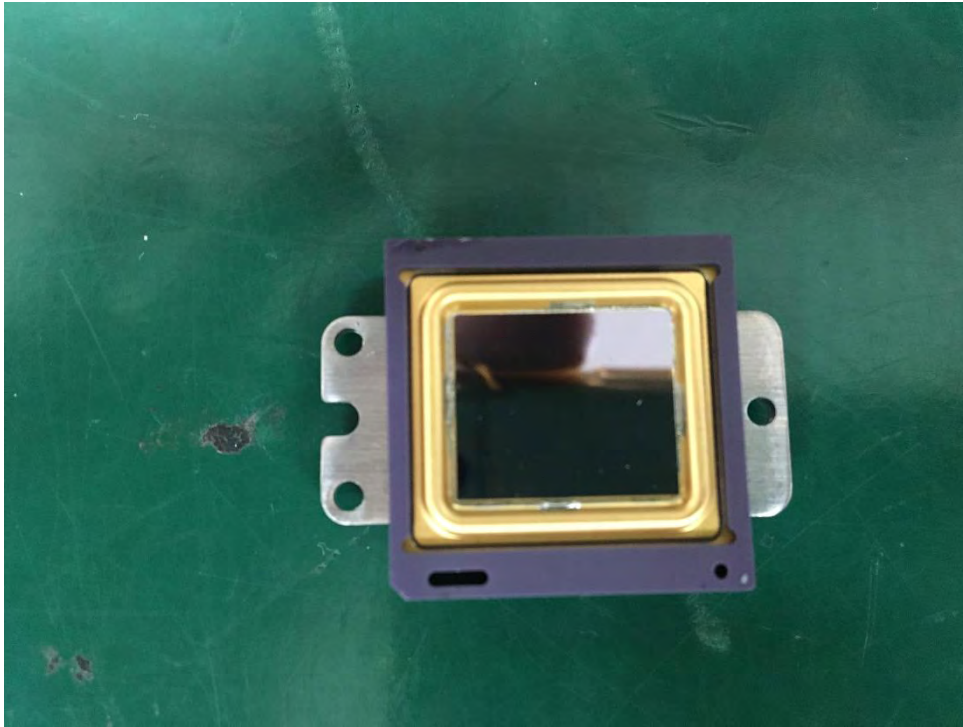
(Bottom)



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EUT Internal View – Lens 1

(Top)



(Bottom)



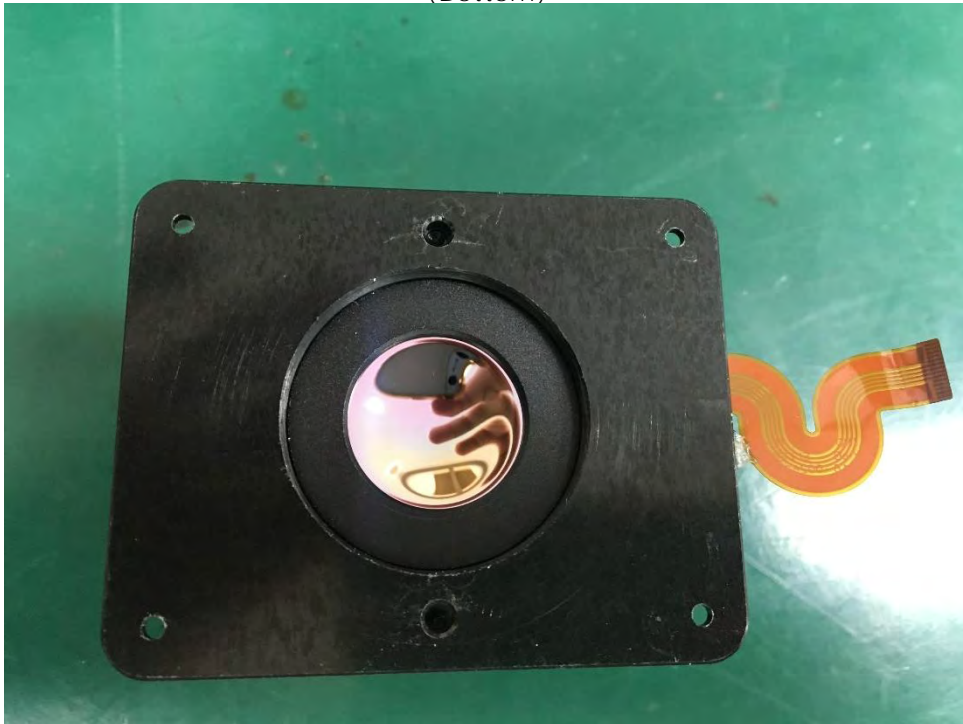
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EUT Internal View – Lens 2

(Top)



(Bottom)



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