



EMC TEST REPORT

Test Report No. : KES-E1-19T0489-R2
Date of Issue : Feb. 24, 2023
Product name : THERMAL CAMERA
Model/Type No. : TNO-3010T
Variant Mode : TNO-3020T, TNO-3030T, TNO-3010TRA, TNO-3020TRA,
TNO-L3030T
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)
Equipment authorization : **Supplier's Declaration of Conformity**
Date of Receipt : Aug. 09, 2019
Test date : Aug. 12, 2019
Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Kang Hyeon, Kim
EMC Test Engineer

Reviewed by

Dong-Hun, Jang
EMC Technical Manager

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



REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Aug. 19, 2019	KES-E1-19T0489	Issued
Jul. 07, 2022	KES-E1-19T0489-R1	- Manufacturer change at customer's request - Reissuance due to the addition of a derivative - IC Regulation ICES-003 Issue 7 Update ANSI C63.4-2014 or ANSI C63.4-2014 amended as per ANSI C63.4a-2017
Feb. 24, 2023	KES-E1-19T0489-R2	Change the Applicant and manufacturer at the request of the customer.

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd. This document may be altered or revised by KES Co., Ltd. personnel only, and shall be noted in the revision section of the document. Any alteration of this document not carried out by KES Co., Ltd. will constitute fraud and shall nullify the document.



KES Co., Ltd.

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

Report No.:
KES-E1-19T0489-R2
Page (3) of (33)

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 at Mains Power Ports	12
2.2	Radiated Electric Field Emissions(Below 1 GHz)	13
2.3	Radiated Electric Field Emissions(Above 1 GHz)	14
APPENDIX A – TEST DATA.....		15
Conducted Emissions at Mains Power Ports.....		15
Radiated Electric Field Emissions(Below 1 GHz)		17
Radiated Electric Field Emissions(Above 1 GHz).....		20
Test Setup Photos and Configuration		23
Conducted Voltage Emissions		23
Radiated Electric Field Emissions(Below 1 GHz)		24
Radiated Electric Field Emissions(Above 1 GHz).....		25
EUT External Photographs		26
EUT Internal Photographs		27

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

1.0 General Product Description

Main Specifications of EUT are:

	TNO-3010T
Video	
Imaging Device	Uncooled micro bolometer
Effective Pixels	None
NETD	< 60mK
Pixel Size	12 μ m
Min. Illumination	None
Video Out	CVBS: 1.0 Vp-p / 75 Ω composite, 720x480(N), 720x576(P) for installation USB: Micro USB Type B, 1280x720 for installation
Lens	
Max. Aperture Ratio	F1.0
Angular Field of View	H:92.0°, V:65.5°, D:125.7°
Min. Object Distance	0.3m(****ft)
Focus Control	Fixed
Operational	
Digital Image Stabilization	Support(built-in gyro sensor)
Motion Detection	8ea, 8point polygonal zones
Privacy Masking	32ea, polygonal zones - Color: Grey/Green/Red/Blue/Black/White - Mosaic
Video Rotation	Flip, Mirror, Hallway view(90°/270°)
Analytics	Directional detection, Motion detection, Appear/Disappear, Enter/Exit, Loitering, Tampering, Virtual line, Audio detection, Temperature detection, Sound classification, Shock detection
Alarm I/O	Input 1ea / Output 2ea
Alarm Triggers	Analytics, Network disconnect, Alarm input
Alarm Events	File upload via FTP and e-mail Notification via e-mail SD/SDHC/SDXC or NAS recording at event triggers Alarm output Handover

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



1.1 Test Voltage & Frequency

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

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

Frequency ☐ 50 Hz ☒ 60 Hz ☐ Hz

1.2 Variant Model Differences

TNO-3020T, TNO-3030T, TNO-3010TRA, TNO-3020TRA	Add simple derived model for management model by sales department
TNO-L3030T	Addition of derivatives due to F/W differences

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
THERMAL CAMERA	TNO-3010T	-	HANWHA VISION VIETNAM COMPANY LIMITED	EUT

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
Notebook	NT-R519	ZLT393BSB00204H	SAMSUNG	-
Notebook Adapter	ADP-60ZH D	-	DELTA ELECTRONICS, INC.	-
MIC	MP1000	-	-	-
Speaker	BR1000A Cuve Black 2	-	DONGGUAN EDIFIER TECHNOLOGY Co., Ltd	-
Button Alarm	-	-	-	-
Alarm	-	-	-	-
AC Adapter	DRL-246000AC	-	Dream TEK	-
PoE Adapter	PD-3001GC/AC	RD9356082016964 200	Power Dsine	-
Smart phone	A1303	-	APPLE .Inc	-

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

1.6 External I/O Cabling

■ AC 24 V

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
THERMAL CAMERA	RJ-45	Notebook	RJ-45	4.0	U
	Line in(2Pin)	MIC	2Pin	1.5	U
	Line Out(2Pin)	Speaker	2Pin	1.5	U
	Alarm in	Button Alarm	2Pin	4.0	U
	Alarm out	Alarm	2Pin	4.0	U
Notebook	MIC	Smart phone	Audio out	1.0	U

* Unshielded=U, Shielded=S

■ DC 12 V

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
THERMAL CAMERA	RJ-45	Notebook	RJ-45	4.0	U
	Line in(2Pin)	MIC	2Pin	1.5	U
	Line Out(2Pin)	Speaker	2Pin	1.5	U
	Alarm in	Button Alarm	2Pin	4.0	U
	Alarm out	Alarm	2Pin	4.0	U
Notebook	MIC	Smart phone	Audio out	1.0	U

* Unshielded=U, Shielded=S



■ PoE

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
THERMAL CAMERA	RJ-45	PoE Adapter	RJ-45	4.0	U
	Line in(2Pin)	MIC	2Pin	1.5	U
	Line Out(2Pin)	Speaker	2Pin	1.5	U
	Alarm in	Button Alarm	2Pin	4.0	U
	Alarm out	Alarm	2Pin	4.0	U
Notebook	MIC	Smart phone	Audio out	1.0	U
	RJ-45	PoE Adapter	RJ-45	4.0	U

* Unshielded=U, Shielded=S

1.7 EUT Operating Mode(s)

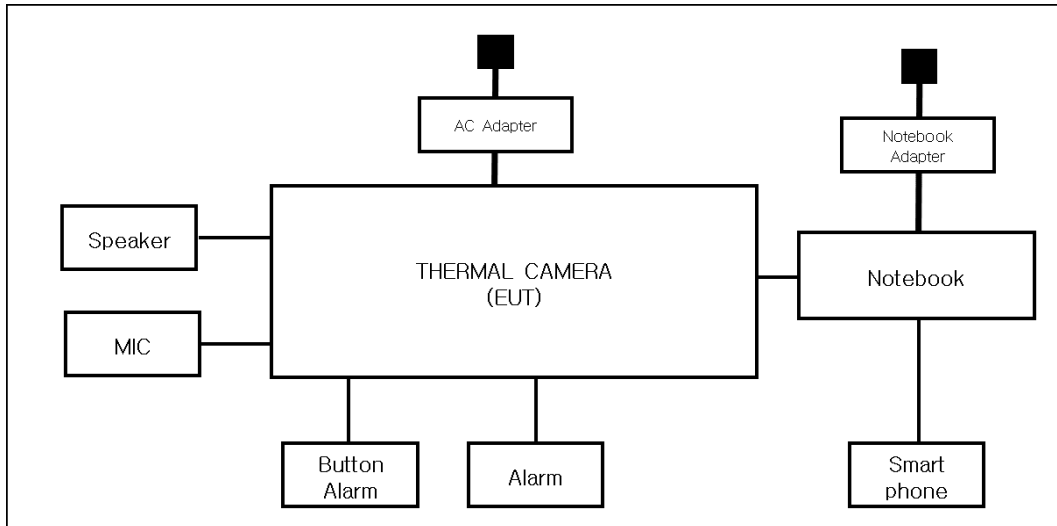
Test mode	operating
AC24V DC12V PoE	EUT Monitoring, Ping Test

EUT Test operating S/W		
Name	Version	Manufacture Company
WebView	-	-

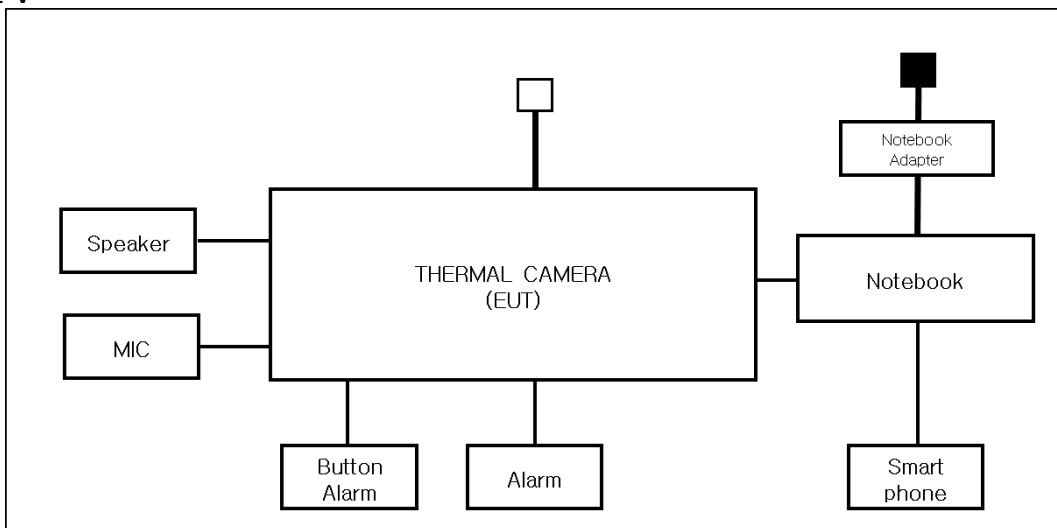
1.8 Configuration

■ AC Main
 □ DC Main

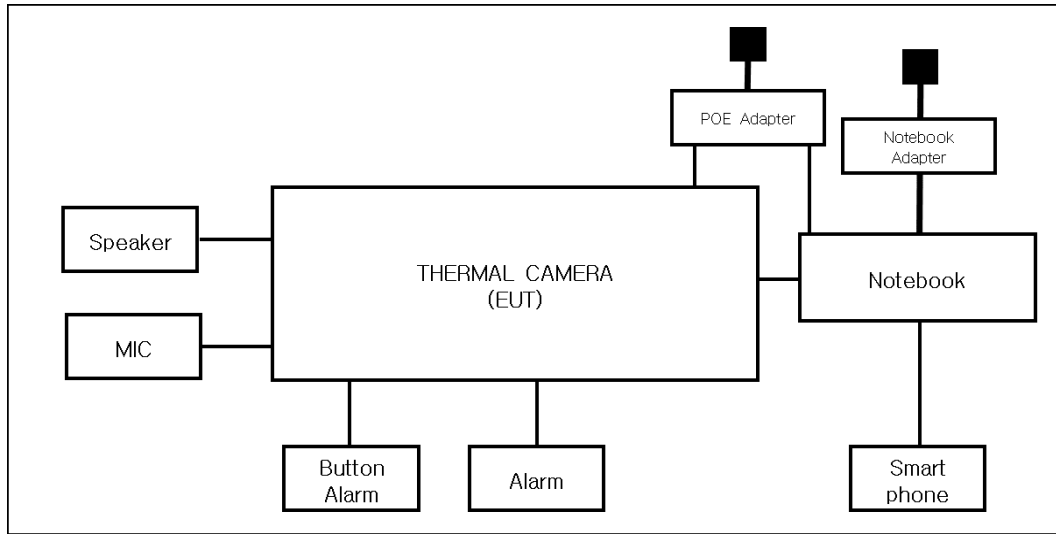
■ AC 24 V



■ DC 12 V



■ PoE



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:

☒ **47 CFR Part 15, Subpart B**

☐ CISPR 22:2009 +A1:2010

☐ Class A

☐ Class B

☒ ANSI C63.4a-2017

☒ Class A

☐ Class B

☒ **IC Regulation ICES-003 Issue 7**

☐ CAN/CSA-CISPR 32:17

☐ Class A

☐ Class B

☒ ANSI C63.4a-2017

☒ Class A

☐ Class B

2.1 Conducted Emissions at Mains Power Ports

Test Date

Aug. 12, 2019

Test Location

Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EMC32	R & S	9.12.00	-
☒	EMI TEST RECEIVER	ESR3	R & S	101783	04, 22, 2020
☒	LISN	ENV216	R & S	101137	01, 25, 2020
☒	LISN	ENV216	R & S	101786	01, 25, 2020

Test ConditionsTemperature: 23,7 °C
Relative Humidity: 54,0 % 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

RemarksSee Appendix A for test data.The test has been tested using the AC / AC adaptor.(DC and PoE are not applicable.)

2.2 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Aug. 12, 2019

Test Location

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

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.0	-
☒	EMI TEST RECEIVER	ESU26	R & S	100551	04, 09, 2020
☒	AMPLIFIER	SCU 01	R & S	100603	11, 26, 2019
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	11, 29, 2020
☒	ATTENUATOR	8491A	HP	32173	03, 11, 2020

Test Conditions

Temperature: 23,9 °C
Relative Humidity: 54,1 % 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.

2.3 Radiated Electric Field Emissions(Above 1 GHz)

Test Date

Aug. 12, 2019

Test Location

SEMI ANECHOIC CHAMBER #4(10 m)

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.0	-
☒	EMI TEST RECEIVER	ESU26	R & S	100551	04, 09, 2020
☒	PREAMPLIFIER	8449B	AGILENT	3008A01742	01, 08, 2020
☐	ATTENUATOR	8491A	HP	35496	03, 11, 2020
☒	HORN ANTENNA	BBHA 9120D	SCHWARZBECK	9120D-1802	03, 12, 2020

Test ConditionsTemperature: 23,9 °C
Relative Humidity: 54,1 % R.H.**Frequency Range of Measurement**

1 GHz to 5 GHz

Instrument Settings

IF Band Width: 1 MHz

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

RemarksSee Appendix A for test data.

APPENDIX A – TEST DATA

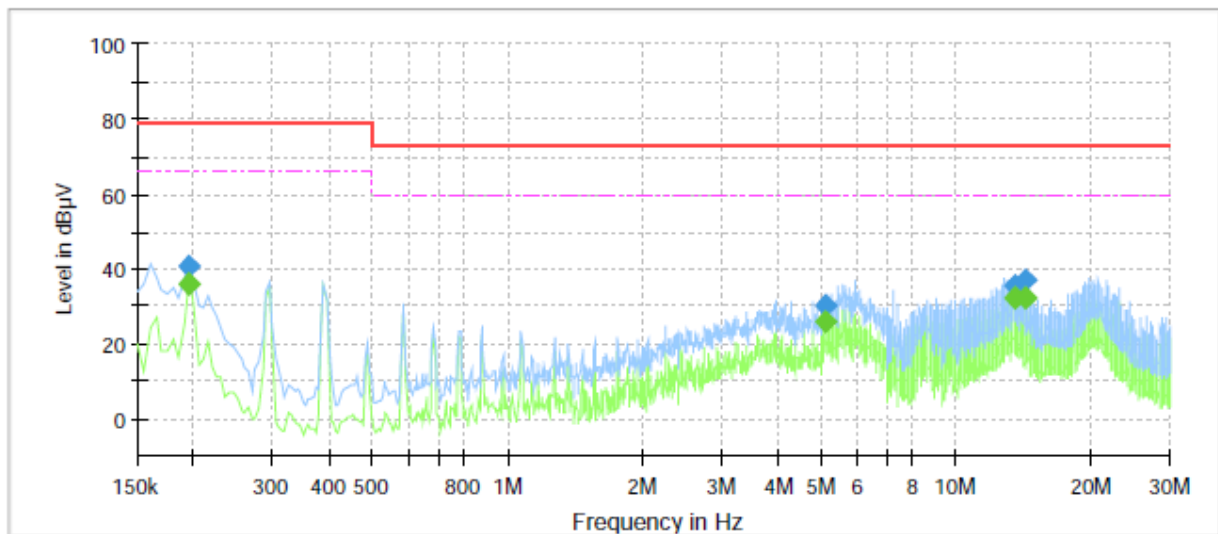
Conducted Emissions at Mains Power Ports

■ AC 24 V

HOT LINE

Common Information

Test Description:	Conducted Emission
Model No.:	TNO-3010T
Mode	FCC
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.195000	---	35.99	66.00	30.01	1000.0	9.000	L1	10.0
0.195000	40.69	---	79.00	38.31	1000.0	9.000	L1	10.0
5.085000	---	25.94	60.00	34.06	1000.0	9.000	L1	10.0
5.085000	30.42	---	73.00	42.58	1000.0	9.000	L1	10.0
13.495000	---	32.33	60.00	27.67	1000.0	9.000	L1	10.6
13.495000	35.50	---	73.00	37.50	1000.0	9.000	L1	10.6
14.275000	---	32.55	60.00	27.45	1000.0	9.000	L1	10.6
14.275000	37.01	---	73.00	35.99	1000.0	9.000	L1	10.6

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

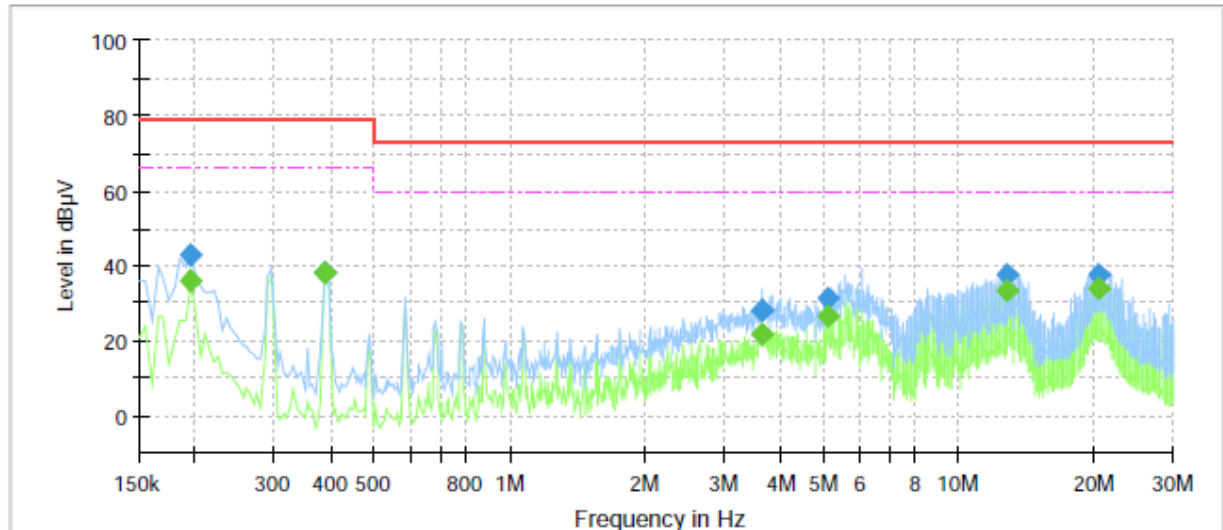
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

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

NEUTRAL LINE

Common Information

Test Description: Conducted Emission
 Model No.: TNO-3010T
 Mode: FCC
 Operator Name: KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.195000	---	36.18	66.00	29.82	1000.0	9.000	N	10.0
0.195000	42.89	---	79.00	36.11	1000.0	9.000	N	10.0
0.390000	---	37.94	66.00	28.06	1000.0	9.000	N	10.7
0.390000	38.02	---	79.00	40.98	1000.0	9.000	N	10.7
3.630000	---	21.70	60.00	38.30	1000.0	9.000	N	10.2
3.630000	28.25	---	73.00	44.75	1000.0	9.000	N	10.2
5.085000	---	26.70	60.00	33.30	1000.0	9.000	N	10.0
5.085000	31.06	---	73.00	41.94	1000.0	9.000	N	10.0
12.810000	---	33.53	60.00	26.47	1000.0	9.000	N	10.5
12.810000	37.81	---	73.00	35.19	1000.0	9.000	N	10.5
20.380000	---	33.73	60.00	26.27	1000.0	9.000	N	10.8
20.380000	37.73	---	73.00	35.27	1000.0	9.000	N	10.8

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

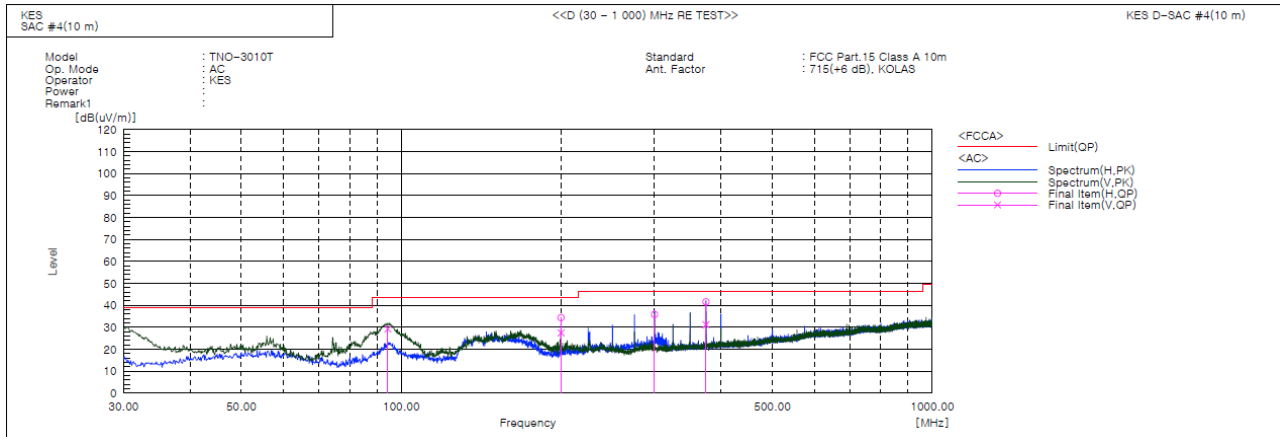
Reading Value : Not shown in the table.

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



Radiated Electric Field Emissions(Below 1 GHz)

■ AC 24 V



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	94.384	V	52.7	-23.5	29.2	43.5	14.3	400.0	348.0	
2	199.993	H	56.2	-21.8	34.4	43.5	9.1	400.0	234.0	
3	199.993	V	49.3	-21.8	27.5	43.5	16.0	100.0	173.0	
4	300.024	H	54.5	-18.6	35.9	46.5	10.6	200.0	208.0	
5	374.956	H	57.3	-15.7	41.6	46.5	4.9	200.0	168.0	
6	374.956	V	46.9	-15.7	31.2	46.5	15.3	100.0	69.0	

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

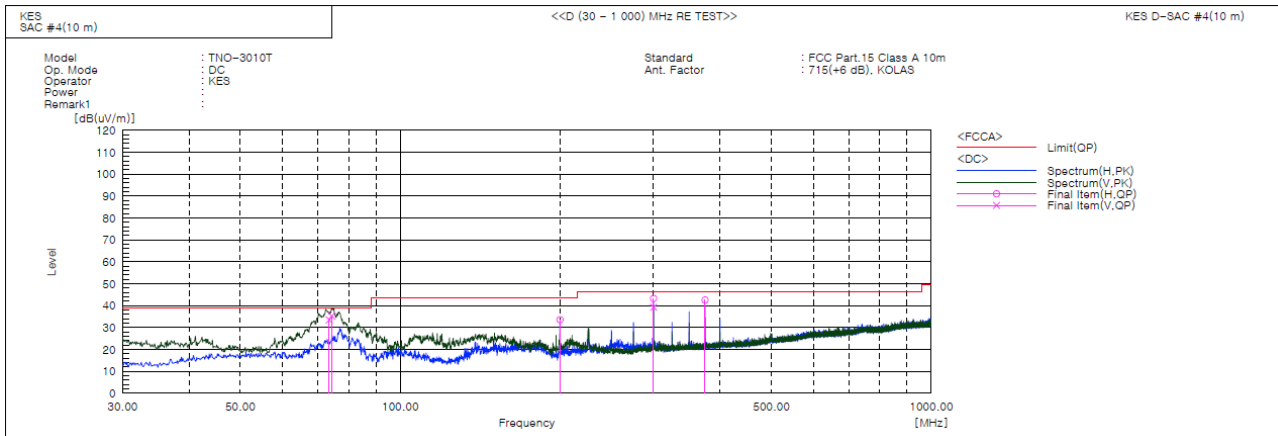


KES Co., Ltd.

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

Report No.:
KES-E1-19T0489-R2
Page (18) of (33)

■ DC 12 V



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	73.491	V	59.7	-26.2	33.5	39.0	5.5	141.0	217.0	
2	74.301	V	61.8	-26.5	35.3	39.0	3.7	227.0	245.0	
3	199.991	H	55.4	-21.8	33.6	43.5	9.9	381.0	71.0	
4	299.984	H	61.9	-18.6	43.3	46.5	3.2	291.0	221.0	
5	299.985	V	57.9	-18.6	39.3	46.5	7.2	100.0	150.0	
6	374.962	H	58.3	-15.7	42.6	46.5	3.9	249.0	177.0	

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

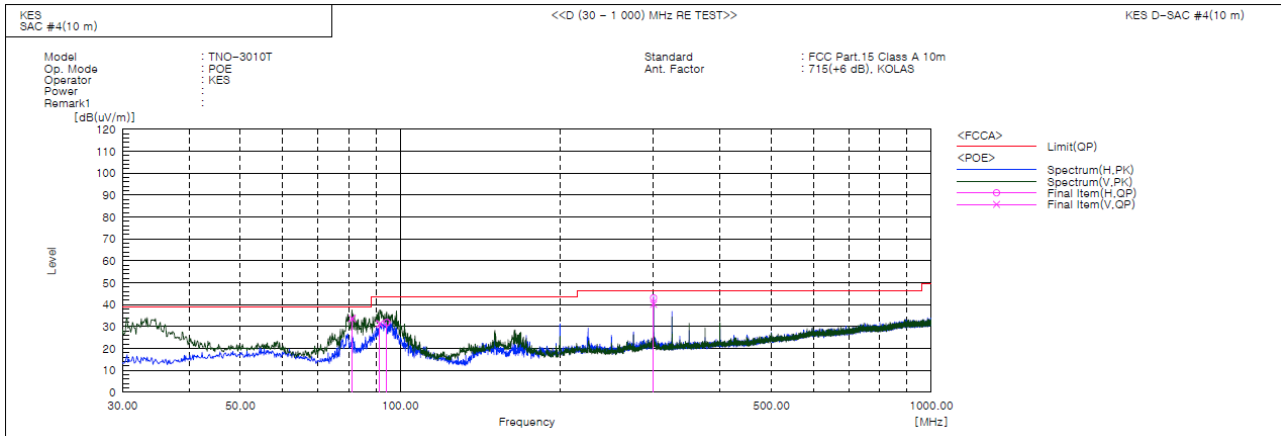


KES Co., Ltd.

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

Report No.:
KES-E1-19T0489-R2
Page (19) of (33)

■ PoE



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	81.168	V	61.1	-27.4	33.7	39.0	5.3	150.0	230.0	
2	91.474	V	55.7	-24.4	31.3	43.5	12.2	150.0	222.0	
3	94.384	H	55.4	-23.5	31.9	43.5	11.6	400.0	80.0	
4	300.024	H	61.7	-18.6	43.1	46.5	3.4	200.0	247.0	
5	300.024	V	58.8	-18.6	40.2	46.5	6.3	100.0	176.0	

◆ Calculation – SAC #4(10 m)

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

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

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

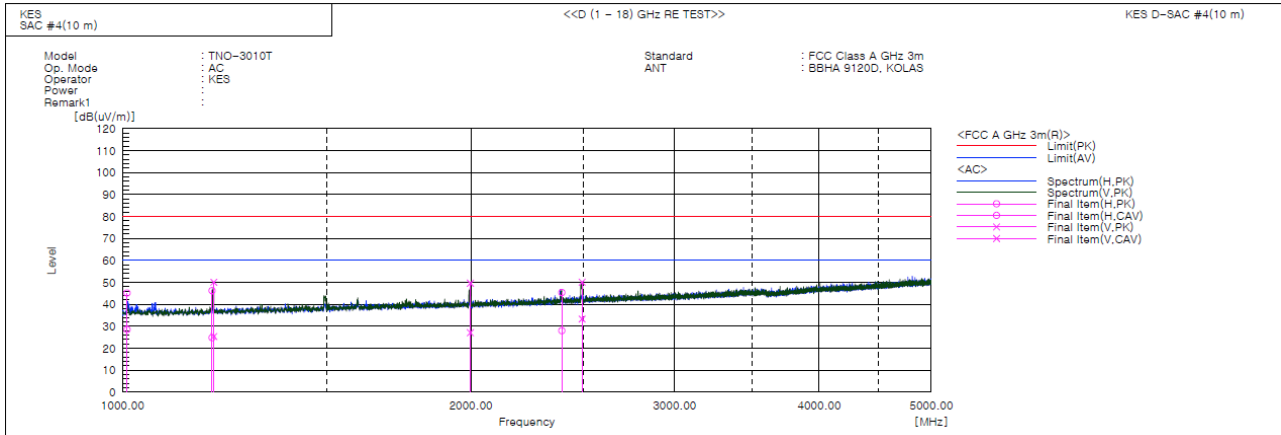
Limit(QP) : Limit value, c.f : (ANT Factor + Cable Loss - Preamp Factor), Margin: Margin value

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



Radiated Electric Field Emissions(Above 1 GHz)

■ AC 24 V



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	1009.025	H	51.6	35.0	-6.4	45.2	28.6	80.0	60.0	34.8	31.4	100.0	280.0	
2	1194.975	H	51.1	29.8	-4.9	46.2	24.9	80.0	60.0	33.8	35.1	100.0	347.0	
3	1199.270	V	54.9	30.3	-4.9	50.0	25.4	80.0	60.0	30.0	34.6	100.0	282.0	
4	1997.880	V	50.1	27.6	-0.5	49.6	27.1	80.0	60.0	30.4	32.9	100.0	318.0	
5	2397.095	H	44.0	26.6	1.4	45.4	28.0	80.0	60.0	34.6	32.0	100.0	289.0	
6	2495.375	V	48.3	31.5	1.8	50.1	33.3	80.0	60.0	29.9	26.7	100.0	225.0	

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

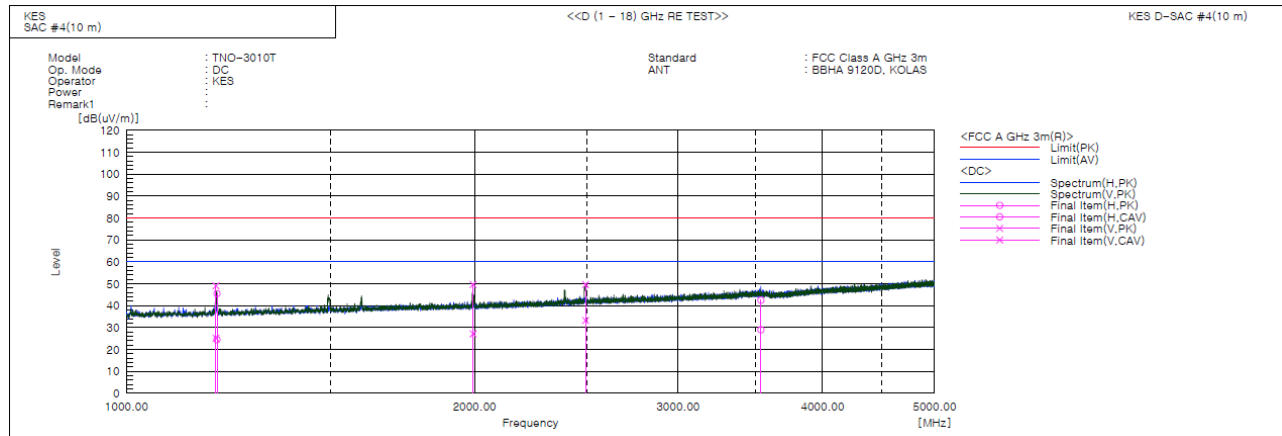


KES Co., Ltd.

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

Report No.:
KES-E1-19T0489-R2
Page (21) of (33)

■ DC 12 V



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	1195.095	V	54.0	30.1	-4.9	49.1	25.2	80.0	60.0	30.9	34.8	100.0	284.0	
2	1197.685	H	50.4	29.4	-4.9	45.5	24.5	80.0	60.0	34.5	35.5	100.0	354.0	
3	1994.815	V	50.1	27.6	-0.5	49.6	27.1	80.0	60.0	30.4	32.9	100.0	316.0	
4	2495.620	V	47.9	31.4	1.8	49.7	33.2	80.0	60.0	30.3	26.8	100.0	223.0	
5	3538.040	H	37.2	23.7	5.3	42.5	29.0	80.0	60.0	37.5	31.0	100.0	0.0	

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

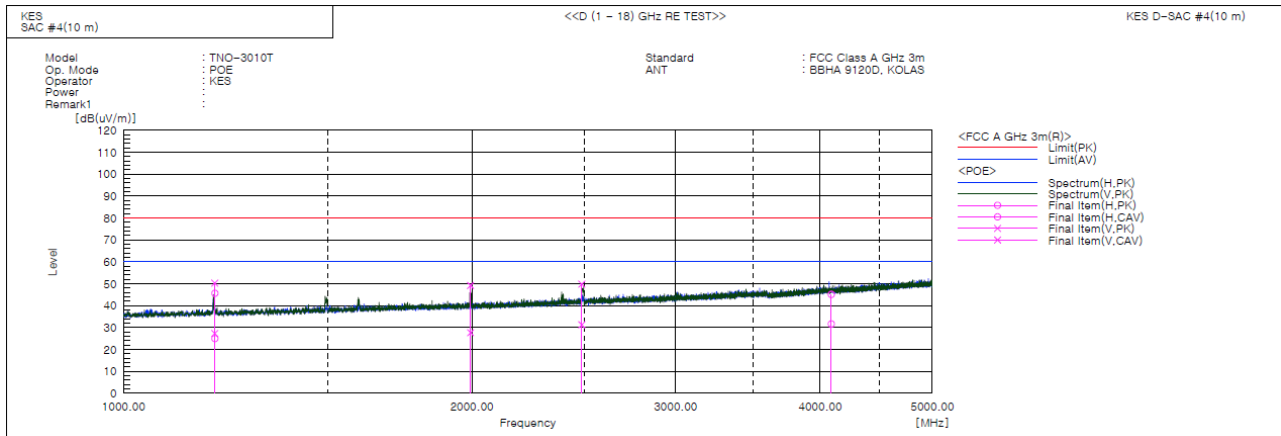


KES Co., Ltd.

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

Report No.:
KES-E1-19T0489-R2
Page (22) of (33)

■ PoE



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	1199.075	V	55.2	32.2	-4.9	50.3	27.3	80.0	60.0	29.7	32.7	100.0	276.0	
2	1199.355	H	50.5	29.9	-4.9	45.6	25.0	80.0	60.0	34.4	35.0	100.0	348.0	
3	1994.640	V	49.7	28.2	-0.5	49.2	27.7	80.0	60.0	30.8	32.3	100.0	316.0	
4	2488.885	V	48.0	29.5	1.8	49.8	31.3	80.0	60.0	30.2	28.7	100.0	271.0	
5	4089.545	H	37.1	23.7	8.0	45.1	31.7	80.0	60.0	34.9	28.3	100.0	120.0	

◆ 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

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

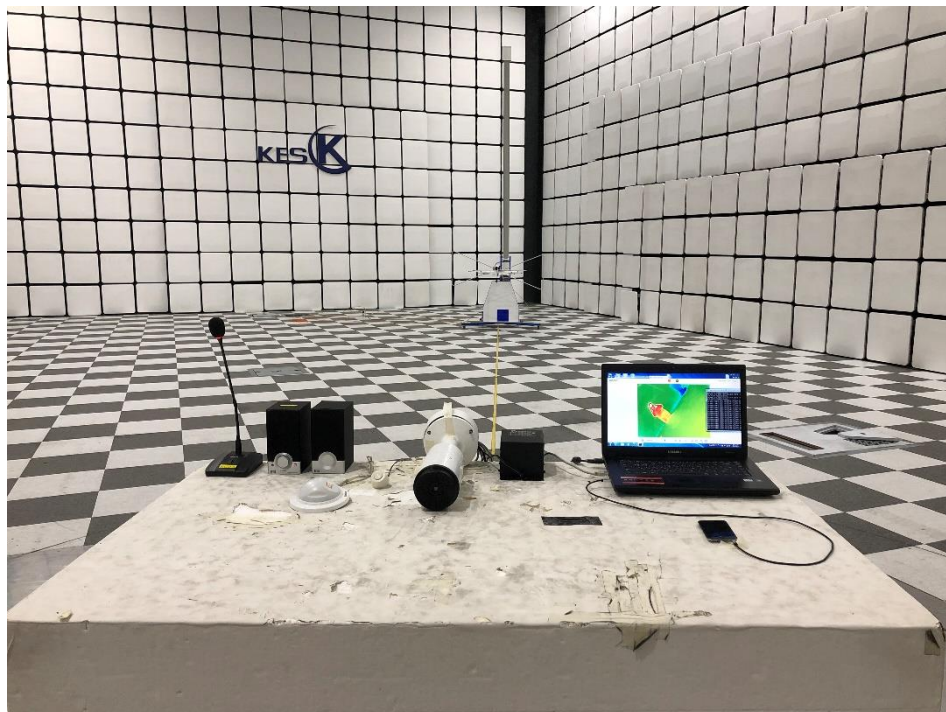
Test Setup Photos and Configuration

Conducted Voltage Emissions



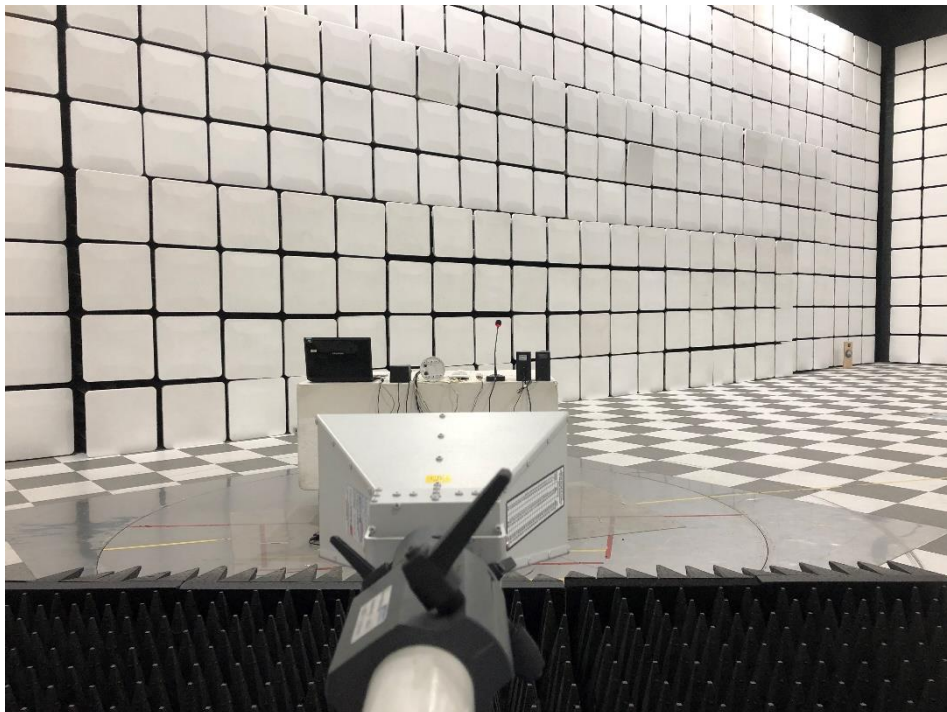
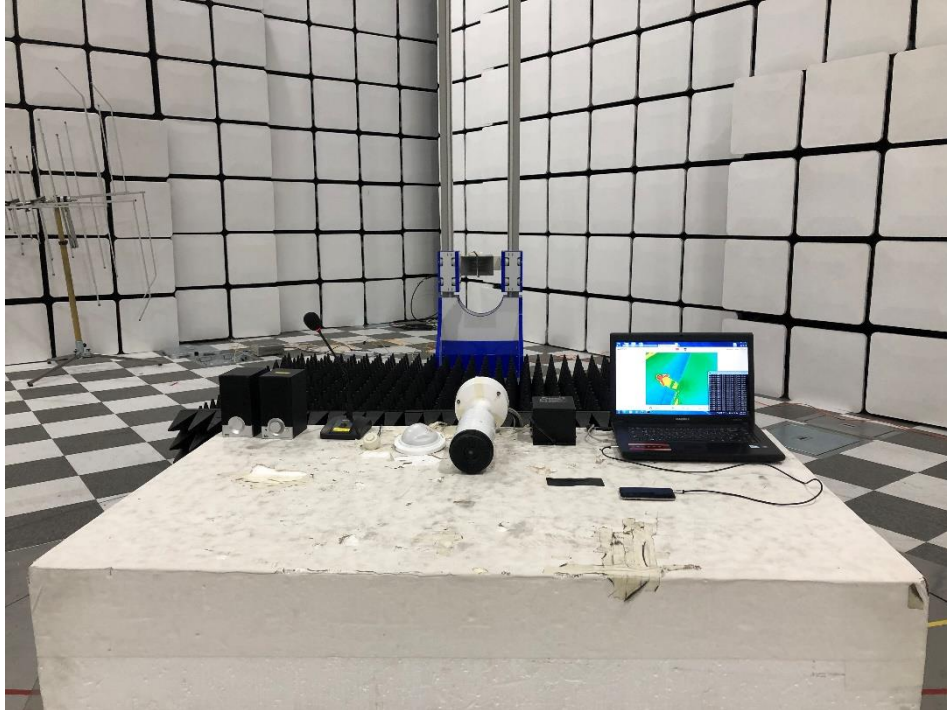
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

Radiated Electric Field Emissions(Below 1 GHz)



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

Radiated Electric Field Emissions(Above 1 GHz)



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

EUT External Photographs

(Top)



(Bottom)



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

EUT Internal Photographs

(Internal View)



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

EUT Internal View – Board 1

(Top)



(Bottom)



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

EUT Internal View – Board 2

(Top)



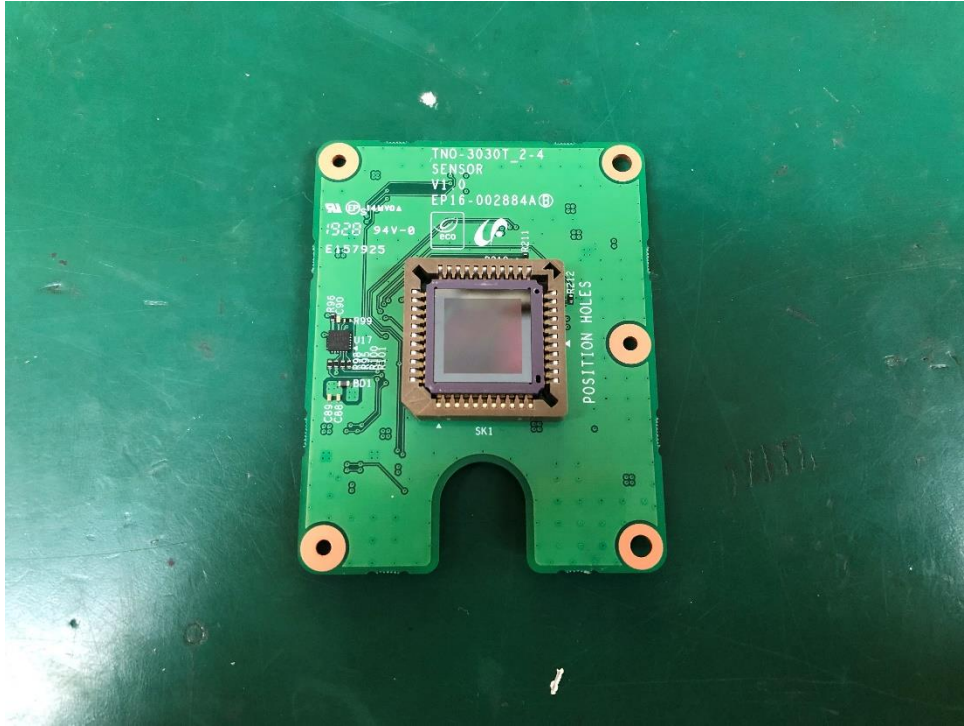
(Bottom)



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

EUT Internal View – Board 3

(Top)



(Bottom)



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

EUT Internal View – Board 4

(Top)



(Bottom)



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

EUT Internal View – Board 5

(Top)

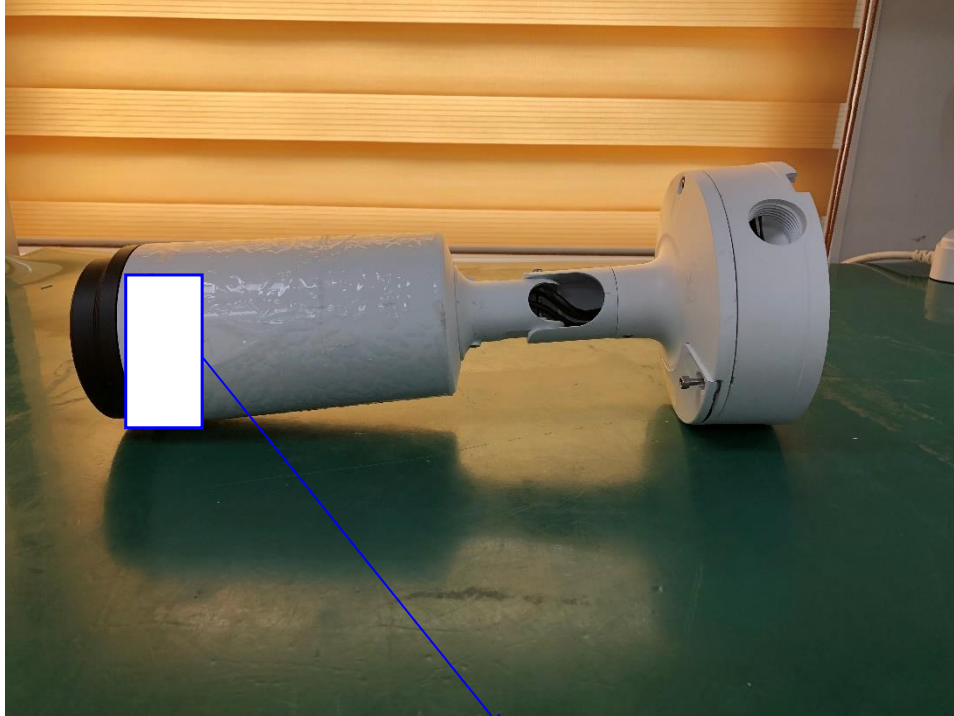


(Bottom)



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

Label Photographs



CAN ICES-3(A) / NMB-3(A)

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation

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

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

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