

**KES Co., Ltd.**

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www.kes.co.kr

Report No.:

KES-EM-21T0660

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EMC TEST REPORT For RCM

Test Report No. : KES-EM-21T0660

Date of Issue : Jul. 28, 2021

Product name : NETWORK POSITIONING CAMERA

Model/Type No. : TNU-6322ER

Variant Model : -

Applicant : Hanwha Techwin Co., Ltd.

Applicant Address : 6, Pangyo-ro 319Beon-gil, Bundang-gu, Seongnam-si,
Gyeonggi-do, Republic of Korea

Manufacturer : 1. HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.
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. 29, 2021

Test date : Jul. 02, 2021

Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by

In Han, Kang
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.

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REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Jul. 28, 2021	KES-EM-21T0660	Issued

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1.0 General Product Description

Main Specifications of EUT are:

Power source(IR) - 24VAC, 6A (24VAC, 3A)↵	
Power Consumption(IR) – Max 90W (50W)↵	
Pan/Tilt range – Pan: 360 degrees limitless rotating, Tilt: -90 ~ +90 degrees↵	
Operating speed – Pan: 1~50 degrees/sec, Tilt: 1~50 degrees/sec↵	
Ambient temperature - -40°C ≤ Ta ≤ +60°C↵	
Pan/Tilt operating – Preset position feedback, Manual↵	
Housing material – Stainless steel (SUS316/304)↵	
Weight – 36Kg↵	
Dimension – 611(W) x 438(H)x 235(D)↵	
Cable entry size – NTP 3/4"↵	

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1.1 Test Voltage & Frequency

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

☒ AC 240 V, 50 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
NETWORK POSITIONING CAMERA	TNU-6322ER	-	HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.	EUT

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
AC Adapter	DRL-246000AC	-	Dream Electronics	-
Notebook	HSN-Q07C	5CD8367KND	HP	-
Notebook Adapter	HSTNN-CA40	WFTKU0ERLB4QCH	HP	-
Alarm	SLE-0001 DO	C64167JDB6012 68 F	-	-
Alarm adapter	-	-	-	-

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1.6 External I/O Cabling

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
NETWORK POSITIONING CAMERA (EUT)	2 Pin	AC Adapter	2 Pin	2.9	U
	RJ-45	Notebook	RJ-45	3.9	U
	Alarm OUT	Alarm	Alarm IN	3.0	U

* Unshielded=U, Shielded=S

1.7 EUT Operating Mode(s)

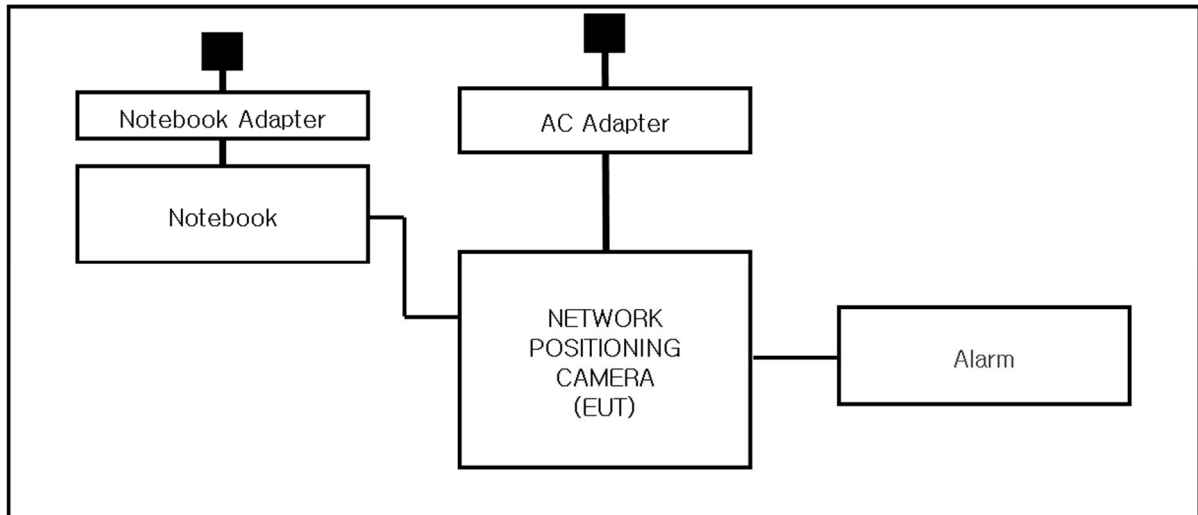
Test Mode	operating
Operation	the test was conducted while checking the camera video output from the laptop and making sure that they operate normally while performing a ping test.

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

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1.8 Configuration

■ AC Main
□ DC Main



1.9 Remarks when standards applied

The ALARM IN, WAS_COM, WAS_NO, WAS_NC, Reserved(+), Reserved(-), Speaker OUT, MIC IN port is not used and is therefore excluded from the test.

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 C63.4:2014 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 , 10 m Open Area 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, 10 m Open Area and Conducted test site to perform FCC Part 15/18 measurements.	 KR0100
Canada	ISED	3 m & 10 m Semi-Anechoic Chamber and Conducted test site	 23298-1
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-20056, C-20036, T-20040, G-20057
Europe	TÜV SÜD	EMI (3 m & 10 m Semi-Anechoic Chamber , 10 m Open Area 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 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 55032:2015

☐ Class A

☐ Class B

☐ EN 55024:2010

☐ EN 50130-4:2011 +A1:2014

☐ EN 61000-3-2:2014

☐ EN 61000-3-3:2013

☐ EN 61326-1:2013



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-
- | | | |
|--|---|----------------------------------|
| ☐ VCCI-CISPR 32:2016 | ☐ Class A | ☐ Class B |
| ☒ AS/NZS CISPR32:2015 | ☒ Class A | ☐ Class B |
|
 | | |
| ☐ 47 CFR Part 15, Subpart B | | |
| ☐ CISPR 22:2009 +A1:2010 | ☐ Class A | ☐ Class B |
| ☐ ANSI C63.4-2009 | | |
| ☐ IC Regulation ICES-003 : 2016 | | |
| ☐ CAN/CSA CISPR 22-10 | ☐ Class A | ☐ Class B |
| ☐ ANSI C63.4-2014 | | |
| ☐ RE- Directive 2014/53/EU | | |
|
 | | |
| ☐ EN 301 489-1 V1.9.2 | | |
| ☐ Equipment for fixed use | | |
| ☐ Equipment for vehicular use | | |
| ☐ Equipment for portable use | | |
| ☐ EN 301 489-3 V1.6.1 | | |
| ☐ EN 301 489-17 V2.2.1 | | |
| ☐ EN 60945:2002 | | |

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2.1 Conducted Emissions at Mains Power Ports

Test Date

Jul. 02, 2021

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	01, 15, 2022
☒	LISN	ENV216	R & S	101787	12, 29, 2021
☒	LISN	ESH2-Z5	R & S	100450	12, 29, 2021
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	12, 29, 2021

Test Conditions

Temperature: (24,4 ± 0,1) °C

Relative Humidity: (46,9 ± 0,2) % 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.

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2.2 Conducted Emissions at Telecommunication Ports

Test Date

Jul. 02, 2021

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	01, 15, 2022
☒	LISN	ENV216	R & S	101787	12, 29, 2021
☒	LISN	ESH2-Z5	R & S	100450	12, 29, 2021
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	12, 29, 2021
☒	8-WIRE ISN CAT3,5	ENY81	R & S	100174	12, 30, 2021
☐	8-WIRE ISN CAT6	ENY81-CAT6	R & S	101665	12, 30, 2021
☐	ISN	ISN S8	SCHWARZBECK	ISN-S8-0019	12, 29, 2021
☐	CDN	CDNS502A	TESEQ	40431	

Test Conditions

Temperature: (24,4 ± 0,1) °C

Relative Humidity: (46,9 ± 0,2) % 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.

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2.3 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Jul. 02, 2021

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

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.0	-
☒	EMI TEST RECEIVER	ESU26	R & S	100551	04, 01, 2022
☒	AMPLIFIER	SCU 01	R & S	100603	11, 25, 2021
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	12, 08, 2022
☒	ATTENUATOR	8491A	HP	32173	03, 10, 2022

Test Conditions

Temperature: (24,7 ± 0,1) °C

Relative Humidity: (46,3 ± 0,2) % 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

RemarksSee Appendix A for test data.

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2.4 Radiated Electric Field Emissions(Above 1 GHz)

Test Date

Jul. 02, 2021

Test Location

SEMI ANECHOIC CHAMBER #3

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	ESR7	R & S	101190	08, 05, 2021
☒	PREAMPLIFIER	8449B	AGILENT	3008A01967	04, 07, 2022
☐	ATTENUATOR	8491A	HP	35496	03, 10, 2022
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	03, 11, 2022

Test Conditions

Temperature: (24,8 ± 0,1) °C

Relative Humidity: (46,4 ± 0,3) % 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

RemarksSee Appendix A for test data.

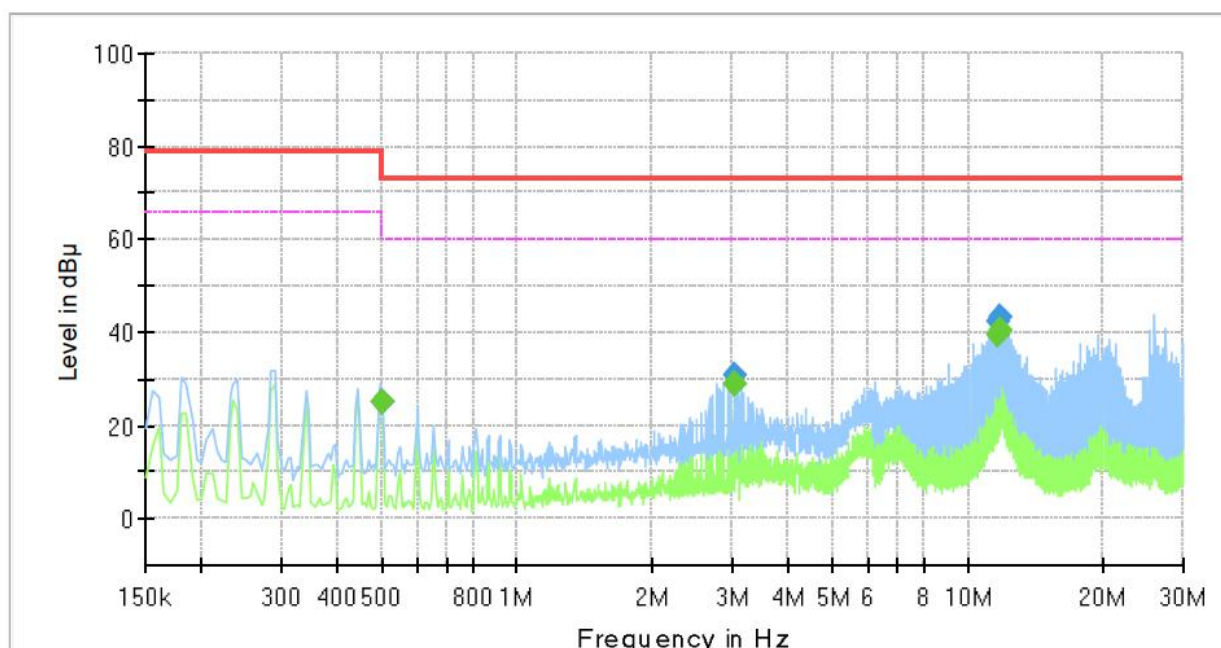
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APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports HOT LINE

Common Information

Test Description: Conducted Emission
 Model No.: TNU-6322ER
 Phase: L1
 Mode:
 Operator Name: KES



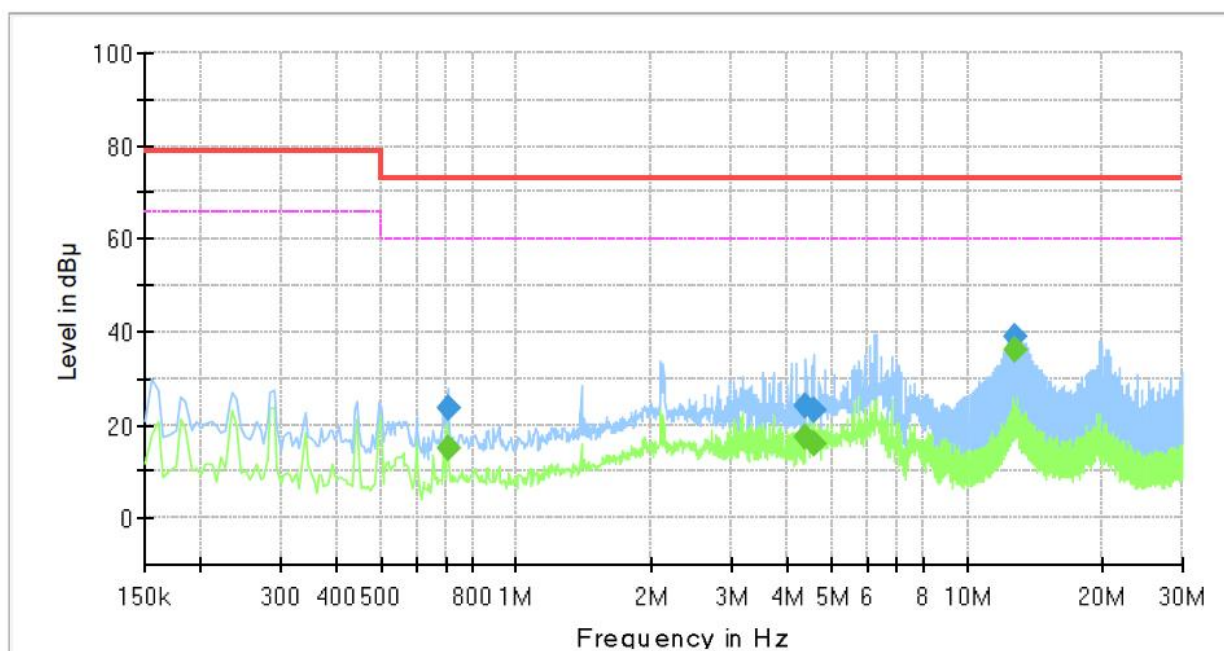
Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.500000	---	24.92	60.00	35.08	1000.0	9.000	L1	19.7
0.500000	25.01	---	79.00	53.99	1000.0	9.000	L1	19.7
3.030000	---	28.94	60.00	31.06	1000.0	9.000	L1	20.1
3.030000	30.82	---	73.00	42.18	1000.0	9.000	L1	20.1
11.655000	---	39.48	60.00	20.52	1000.0	9.000	L1	20.0
11.655000	42.38	---	73.00	30.62	1000.0	9.000	L1	20.0
11.810000	---	40.65	60.00	19.35	1000.0	9.000	L1	20.0
11.810000	43.24	---	73.00	29.76	1000.0	9.000	L1	20.0

NEUTRAL LINE

Common Information

Test Description:	Conducted Emission
Model No.:	TNU-6322ER
Phase:	N
Mode:	
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.705000	---	14.98	60.00	45.02	1000.0	9.000	N	19.9
0.705000	23.63	---	73.00	49.37	1000.0	9.000	N	19.9
4.385000	---	17.23	60.00	42.77	1000.0	9.000	N	19.8
4.385000	23.94	---	73.00	49.06	1000.0	9.000	N	19.8
4.555000	---	15.86	60.00	44.14	1000.0	9.000	N	19.7
4.555000	23.16	---	73.00	49.84	1000.0	9.000	N	19.7
12.800000	---	36.26	60.00	23.74	1000.0	9.000	N	19.9
12.800000	39.02	---	73.00	33.98	1000.0	9.000	N	19.9

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

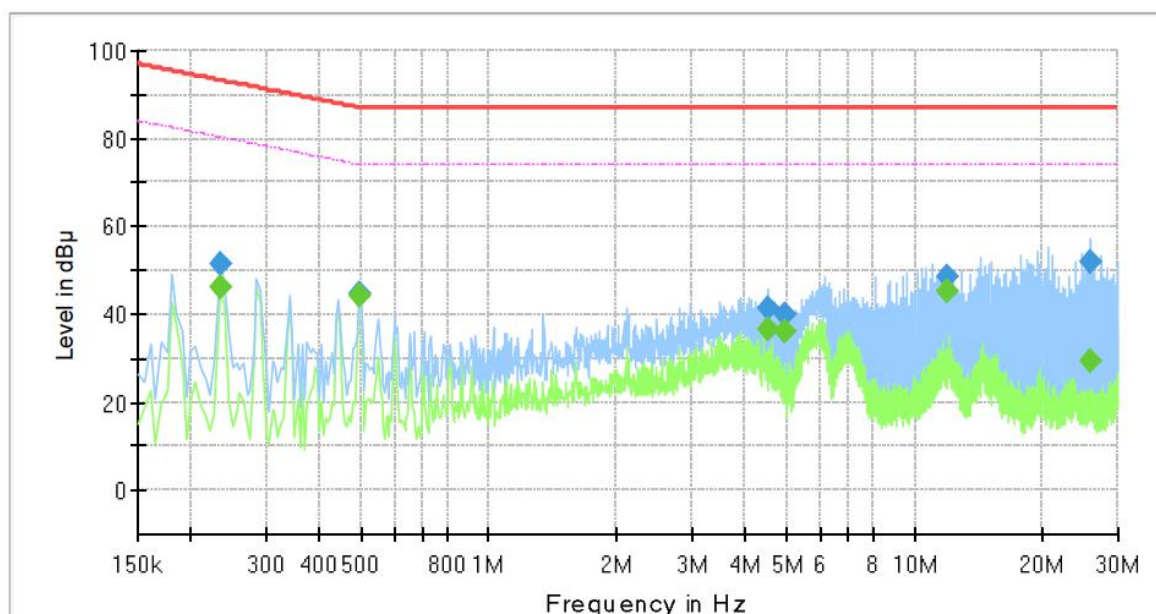
Reading Value : Not shown in the table.

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

Conducted Emissions at Telecommunication Ports [100 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	TNU-6322ER
Mode :	
Speed :	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)
0.235000	---	46.05	80.27	34.22	1000.0	9.000	Single Line	19.7
0.235000	51.36	---	93.27	41.91	1000.0	9.000	Single Line	19.7
0.495000	---	44.32	74.08	29.76	1000.0	9.000	Single Line	19.8
0.495000	44.77	---	87.08	42.31	1000.0	9.000	Single Line	19.8
4.545000	---	36.55	74.00	37.45	1000.0	9.000	Single Line	19.6
4.545000	41.18	---	87.00	45.82	1000.0	9.000	Single Line	19.6
4.965000	---	35.98	74.00	38.02	1000.0	9.000	Single Line	19.5
4.965000	39.82	---	87.00	47.18	1000.0	9.000	Single Line	19.5
11.965000	---	45.08	74.00	28.92	1000.0	9.000	Single Line	19.8
11.965000	48.39	---	87.00	38.61	1000.0	9.000	Single Line	19.8
26.015000	---	29.57	74.00	44.43	1000.0	9.000	Single Line	20.3
26.015000	52.08	---	87.00	34.92	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))

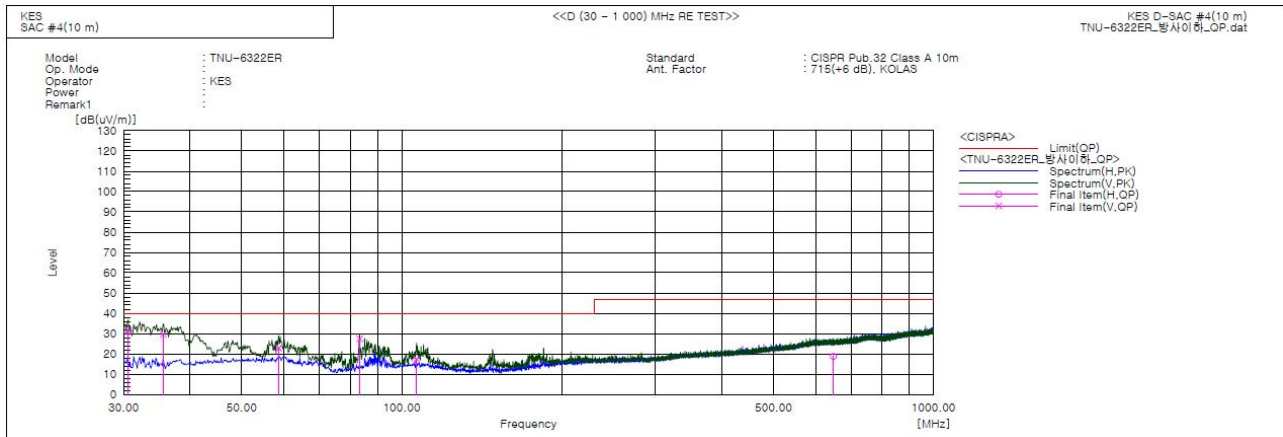
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Radiated Electric Field Emissions(Below 1 GHz)



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	30.606	V	56.8	-25.3	31.5	40.0	8.5	105.0	63.0	
2	35.578	V	54.4	-24.8	29.6	40.0	10.4	103.0	29.0	
3	58.736	V	44.7	-21.8	22.9	40.0	17.1	121.0	303.0	
4	83.350	V	54.4	-26.9	27.5	40.0	12.5	110.0	265.0	
5	106.630	V	39.8	-22.4	17.4	40.0	22.6	109.0	94.0	
6	647.890	H	26.7	-7.9	18.8	47.0	28.2	274.0	353.0	

◆ Calculation

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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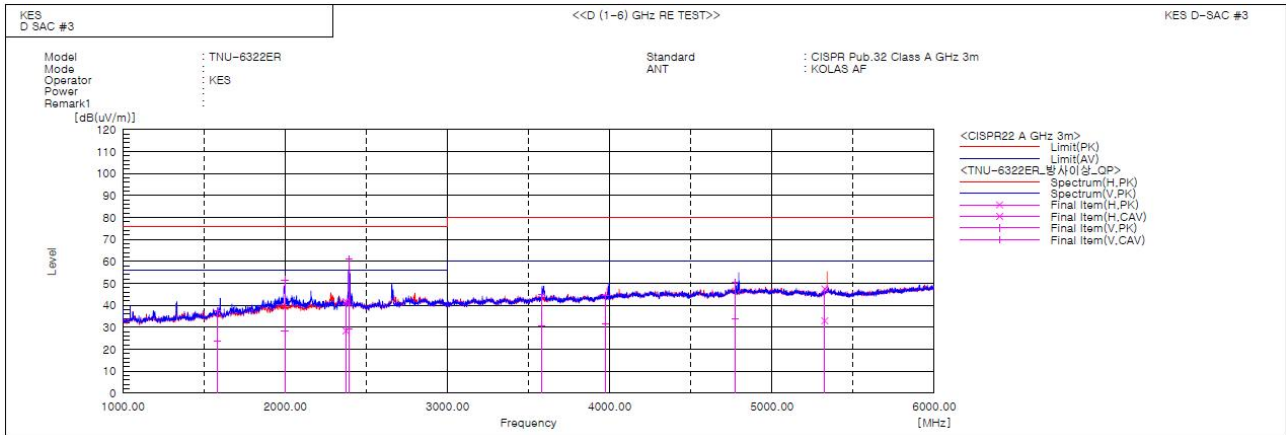
3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
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KES-EM-21T0660

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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	1580.014	V	42.8	29.1	-5.4	37.4	23.7	76.0	56.0	38.6	32.3	100.0	157.0	
2	1998.099	V	52.4	29.3	-0.8	51.6	28.5	76.0	56.0	24.4	27.5	100.0	208.0	
3	2374.613	H	41.5	28.2	0.2	41.7	28.4	76.0	56.0	34.3	27.6	100.0	353.3	
4	2392.550	V	60.9	28.9	0.2	61.1	29.1	76.0	56.0	14.9	26.9	100.0	139.8	
5	3581.942	V	40.6	26.3	4.2	44.8	30.5	80.0	60.0	35.2	29.5	100.0	170.7	
6	3973.964	V	39.0	25.9	5.5	44.5	31.4	80.0	60.0	35.5	28.6	100.0	94.5	
7	4774.943	V	42.2	25.6	8.4	50.6	34.0	80.0	60.0	29.4	26.0	100.0	169.7	
8	5325.353	H	39.2	24.7	8.3	47.5	33.0	80.0	60.0	32.5	27.0	100.0	324.1	

◆ 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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Test Setup Photos and Configuration

Conducted Emissions at Mains Power Ports



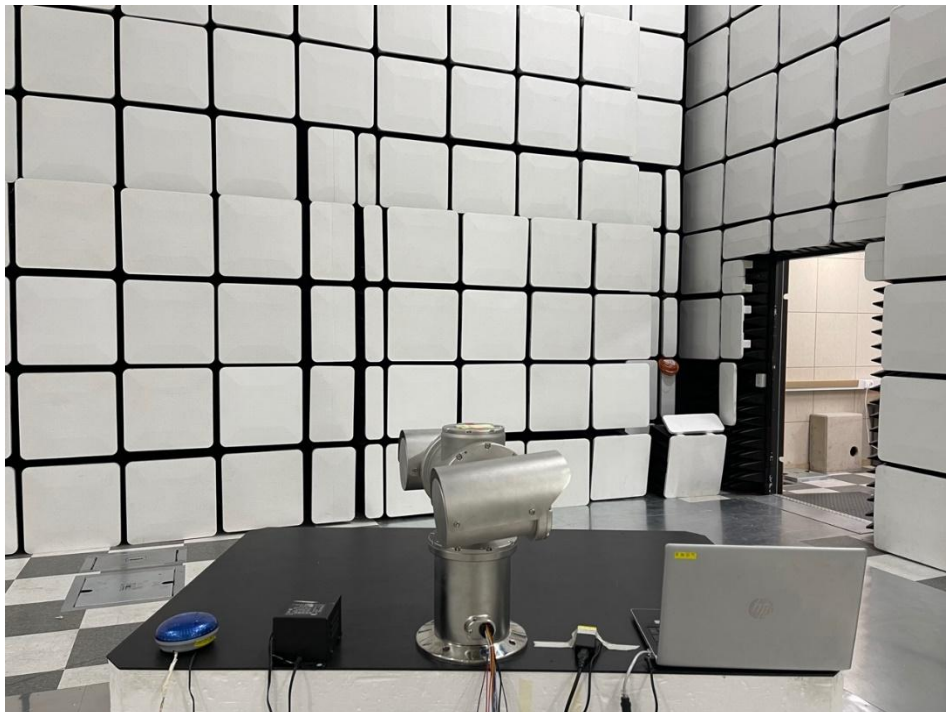
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Conducted Emissions at Telecommunication Ports



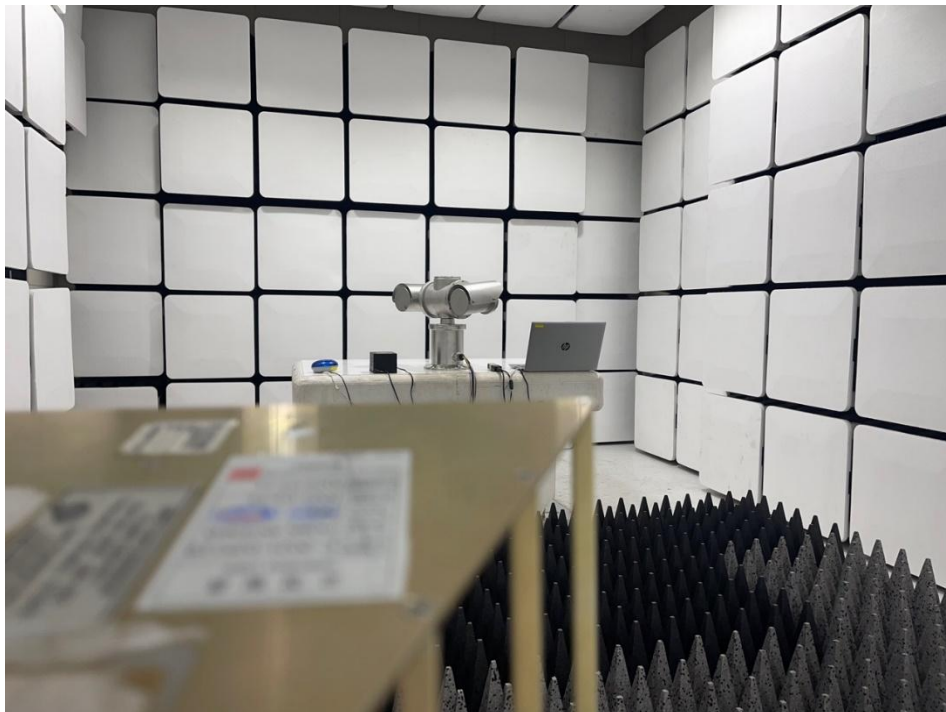
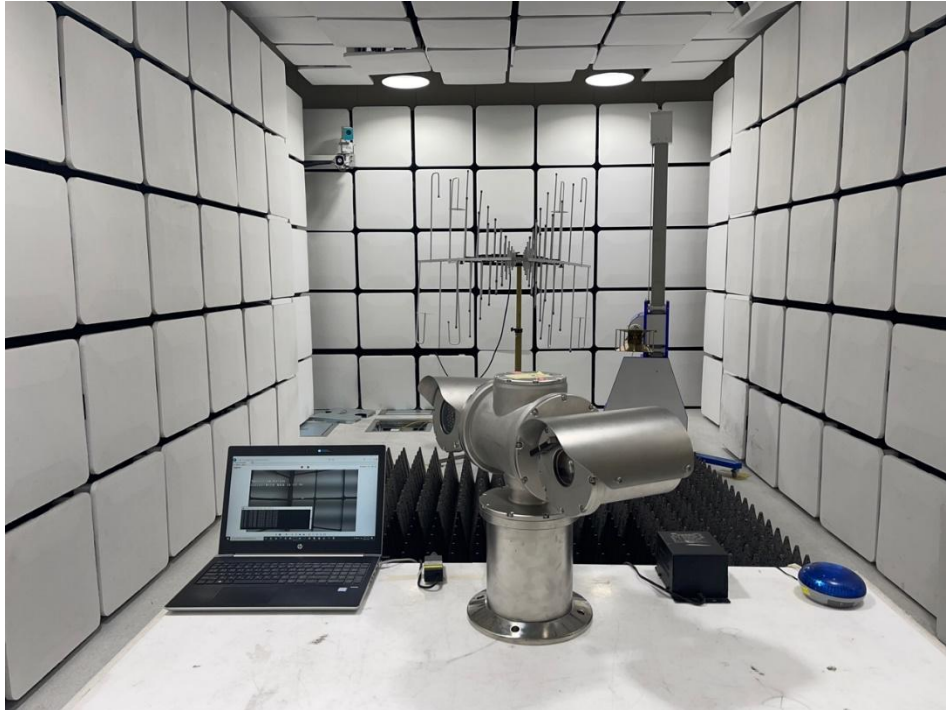
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Radiated Electric Field Emissions(Below 1 GHz)



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Radiated Electric Field Emissions(Above 1 GHz)



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EUT External Photographs

(Top)



(Bottom)



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EUT Internal Photographs

(Internal View)



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EUT Internal View – Main Board

(Top)



(Bottom)



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EUT Internal View – Board 1

(Top)



(Bottom)

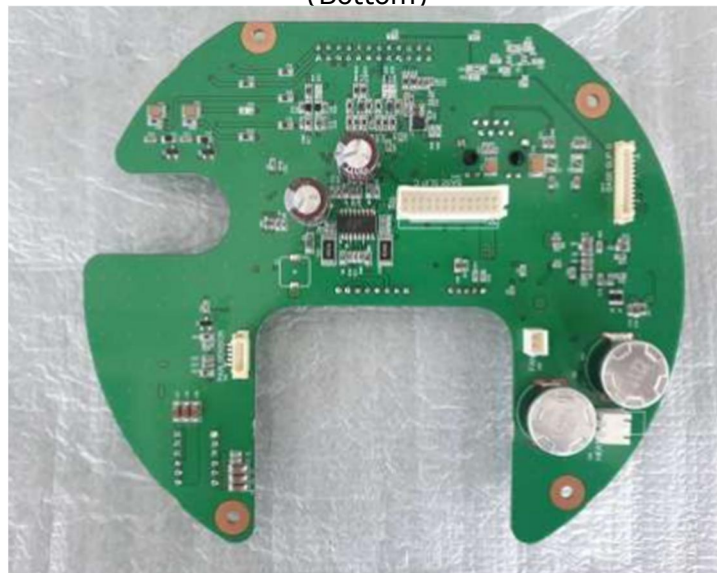


EUT Internal View – Board 2

(Top)



(Bottom)

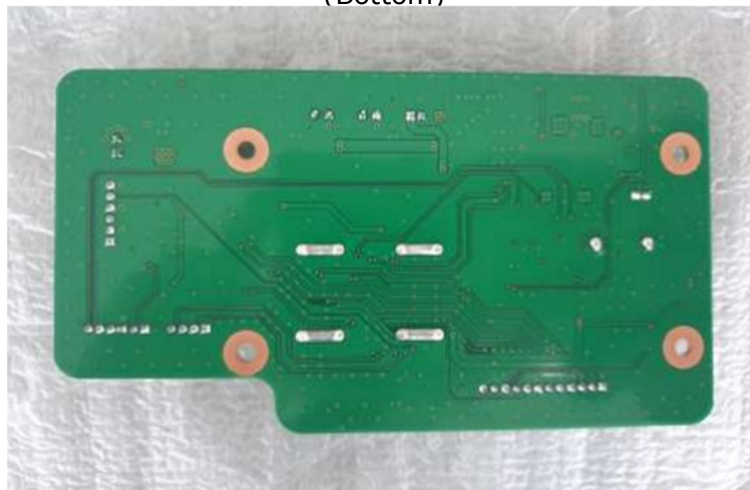


EUT Internal View – Board 3

(Top)



(Bottom)



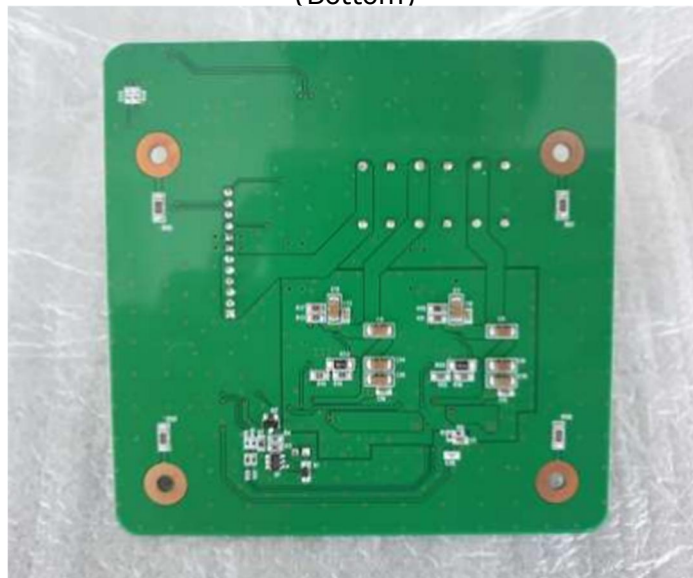
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EUT Internal View – Board 4

(Top)



(Bottom)



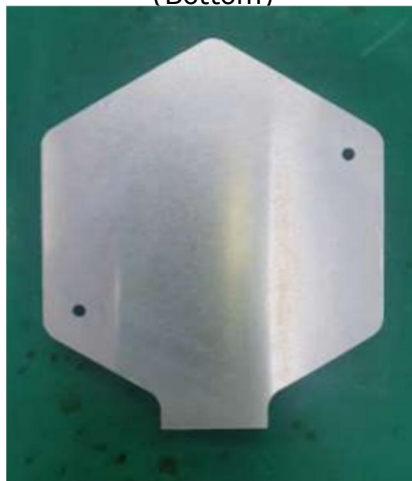
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EUT Internal View – Board 5

(Top)



(Bottom)



EUT Internal View – Board 6

(Top)



(Bottom)



EUT Internal View – Board 7

(Top)



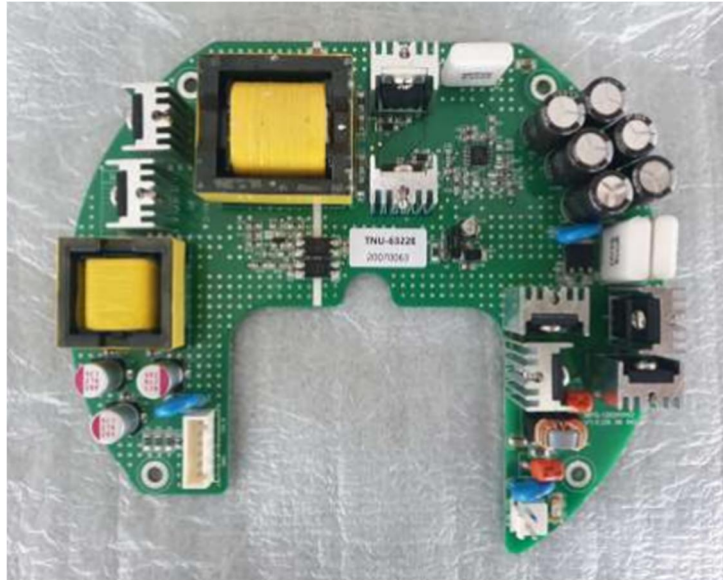
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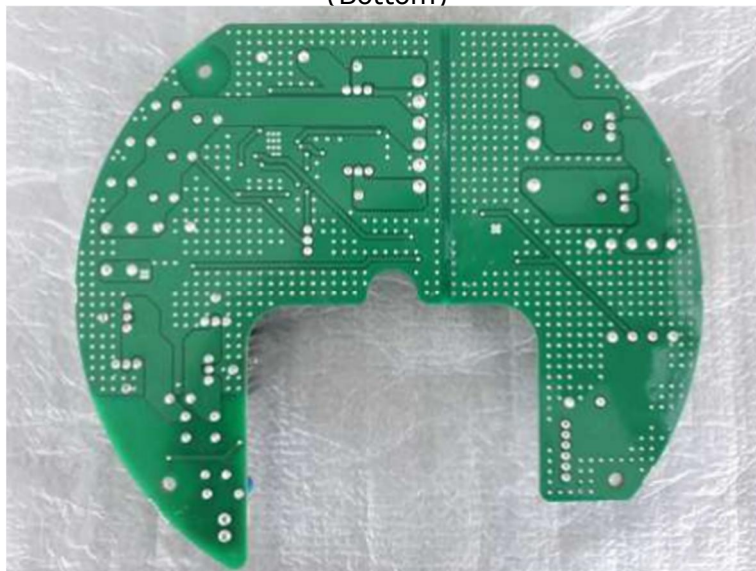
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EUT Internal View – Board 8

(Top)



(Bottom)



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