



EMC TEST REPORT For RCM

Test Report No. : KES-EM-21T0659
Date of Issue : Jul. 28, 2021
Product name : NETWORK POSITIONING CAMERA
Model/Type No. : TNU-6322E
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-21T0659	Issued

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1.0 General Product Description

Main Specifications of EUT are:

Power source - 24VAC, 6A₊

Power Consumption - Max 90W₊

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 - $-40^{\circ}\text{C} \leq T_a \leq +60^{\circ}\text{C}$ ₊

Pan/Tilt operating - Preset position feedback, Manual₊

Housing material - Stainless steel (SUS316/304)₊

Weight - 25Kg₊

Dimension - 384(W) x 402(H) x 250(D)₊

Cable entry size - NTP $\frac{3}{4}$ "₊

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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-6322E	-	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)

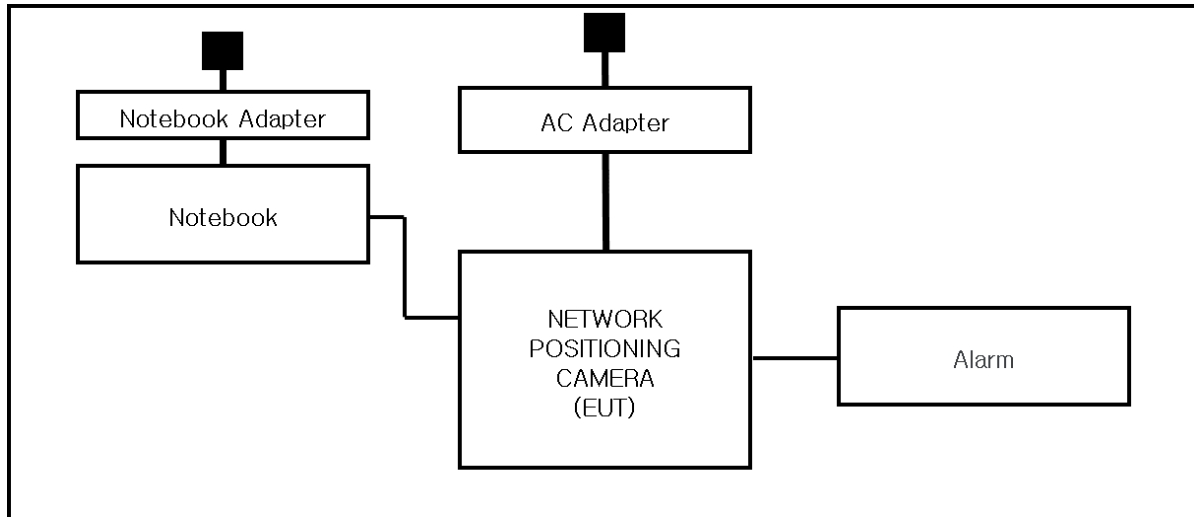
Test Mode	operating
Operation	the test was conducted while checking the camera video output from the laptop and making sure that they operate normally while performing a ping test.

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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- | | | |
|--|---|----------------------------------|
| <input type="checkbox"/> VCCI-CISPR 32:2016 | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input checked="" type="checkbox"/> AS/NZS CISPR32:2015 | <input checked="" 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 | | |
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 | | |
| <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 | | |
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| <input type="checkbox"/> RE– Directive 2014/53/EU | | |
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 | | |
| <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 | | |

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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
<input checked="" type="checkbox"/>	EMI Test S/W	EMC32	R & S	9.12.00	-
<input checked="" type="checkbox"/>	EMI TEST RECEIVER	ESR3	R & S	101783	01, 15, 2022
<input checked="" type="checkbox"/>	LISN	ENV216	R & S	101787	12, 29, 2021
<input checked="" type="checkbox"/>	LISN	ESH2-Z5	R & S	100450	12, 29, 2021
<input checked="" type="checkbox"/>	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
<input checked="" type="checkbox"/>	EMI Test S/W	EMC32	R & S	9.12.00	-
<input checked="" type="checkbox"/>	EMI TEST RECEIVER	ESR3	R & S	101783	01, 15, 2022
<input checked="" type="checkbox"/>	LISN	ENV216	R & S	101787	12, 29, 2021
<input checked="" type="checkbox"/>	LISN	ESH2-Z5	R & S	100450	12, 29, 2021
<input checked="" type="checkbox"/>	PULSE LIMITER	ESH3-Z2	R & S	101915	12, 29, 2021
<input checked="" type="checkbox"/>	8-WIRE ISN CAT3,5	ENY81	R & S	100174	12, 30, 2021
<input type="checkbox"/>	8-WIRE ISN CAT6	ENY81-CAT6	R & S	101665	12, 30, 2021
<input type="checkbox"/>	ISN	ISN S8	SCHWARZBECK	ISN-S8-0019	12, 29, 2021
<input type="checkbox"/>	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

Remarks

See 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
<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, 01, 2022
<input checked="" type="checkbox"/>	AMPLIFIER	SCU 01	R & S	100603	11, 25, 2021
<input checked="" type="checkbox"/>	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	12, 08, 2022
<input checked="" type="checkbox"/>	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
<input checked="" type="checkbox"/>	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.0	-
<input checked="" type="checkbox"/>	EMI TEST RECEIVER	ESR7	R & S	101190	08, 05, 2021
<input checked="" type="checkbox"/>	PREAMPLIFIER	8449B	AGILENT	3008A01967	04, 07, 2022
<input type="checkbox"/>	ATTENUATOR	8491A	HP	35496	03, 10, 2022
<input checked="" type="checkbox"/>	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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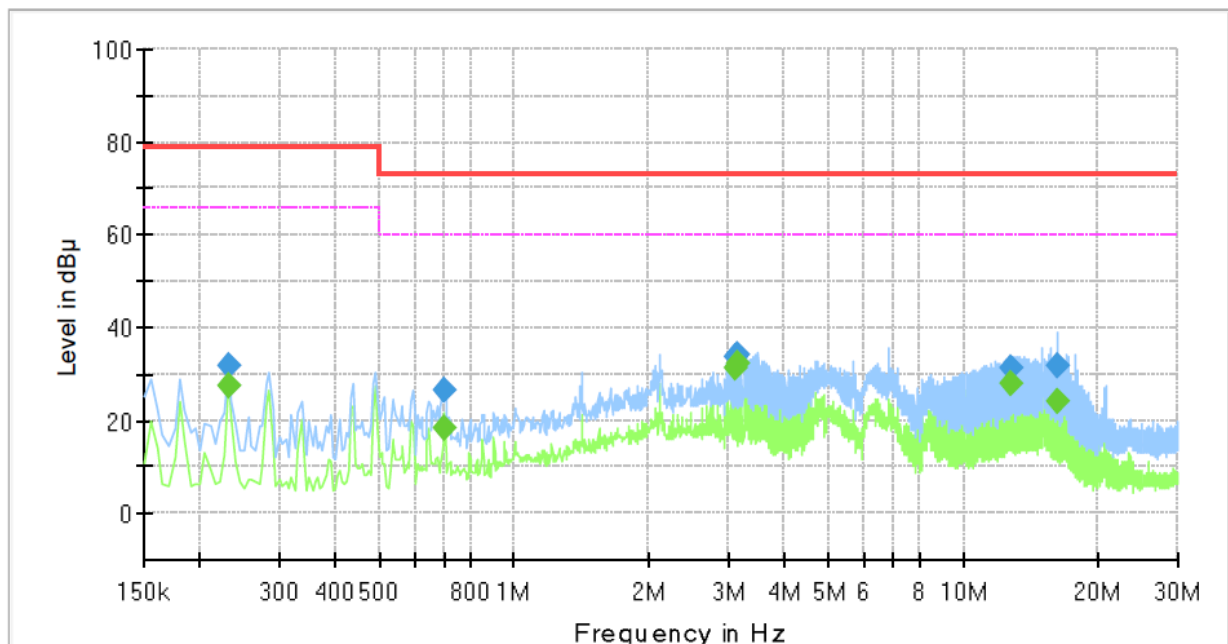
APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

HOT LINE

Common Information

Test Description: Conducted Emission
Model No.: TNU-6322E
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)
0.230000	---	27.30	66.00	38.70	1000.0	9.000	L1	19.5
0.230000	31.69	---	79.00	47.31	1000.0	9.000	L1	19.5
0.700000	---	18.34	60.00	41.66	1000.0	9.000	L1	19.9
0.700000	26.70	---	73.00	46.30	1000.0	9.000	L1	19.9
3.090000	---	31.39	60.00	28.61	1000.0	9.000	L1	20.1
3.090000	33.55	---	73.00	39.45	1000.0	9.000	L1	20.1
3.140000	---	32.23	60.00	27.77	1000.0	9.000	L1	20.1
3.140000	34.35	---	73.00	38.65	1000.0	9.000	L1	20.1
12.720000	---	27.74	60.00	32.26	1000.0	9.000	L1	20.0
12.720000	31.13	---	73.00	41.87	1000.0	9.000	L1	20.0
16.225000	---	23.94	60.00	36.06	1000.0	9.000	L1	19.9
16.225000	31.85	---	73.00	41.15	1000.0	9.000	L1	19.9

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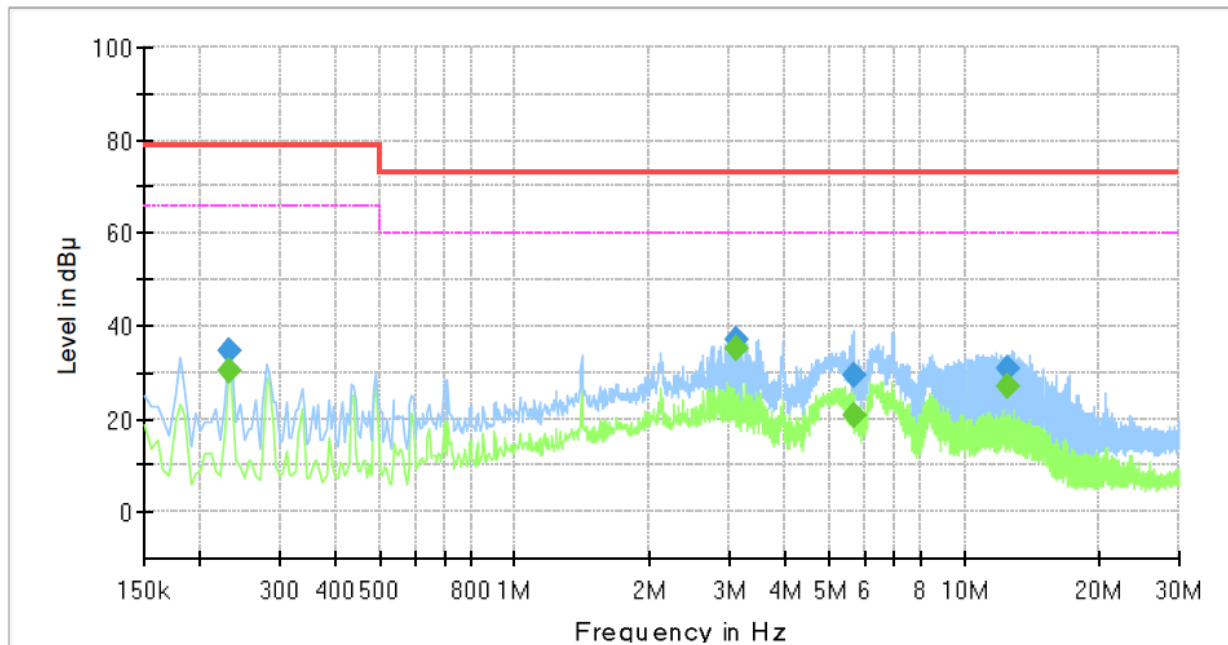
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NEUTRAL LINE

Common Information

Test Description:	Conducted Emission
Model No.:	TNU-6322E
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)
0.230000	---	30.58	66.00	35.42	1000.0	9.000	N	19.4
0.230000	34.48	---	79.00	44.52	1000.0	9.000	N	19.4
3.090000	---	35.26	60.00	24.74	1000.0	9.000	N	20.1
3.090000	37.23	---	73.00	35.77	1000.0	9.000	N	20.1
5.655000	---	20.69	60.00	39.31	1000.0	9.000	N	19.5
5.655000	29.19	---	73.00	43.81	1000.0	9.000	N	19.5
12.515000	---	27.12	60.00	32.88	1000.0	9.000	N	20.0
12.515000	31.05	---	73.00	41.95	1000.0	9.000	N	20.0

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

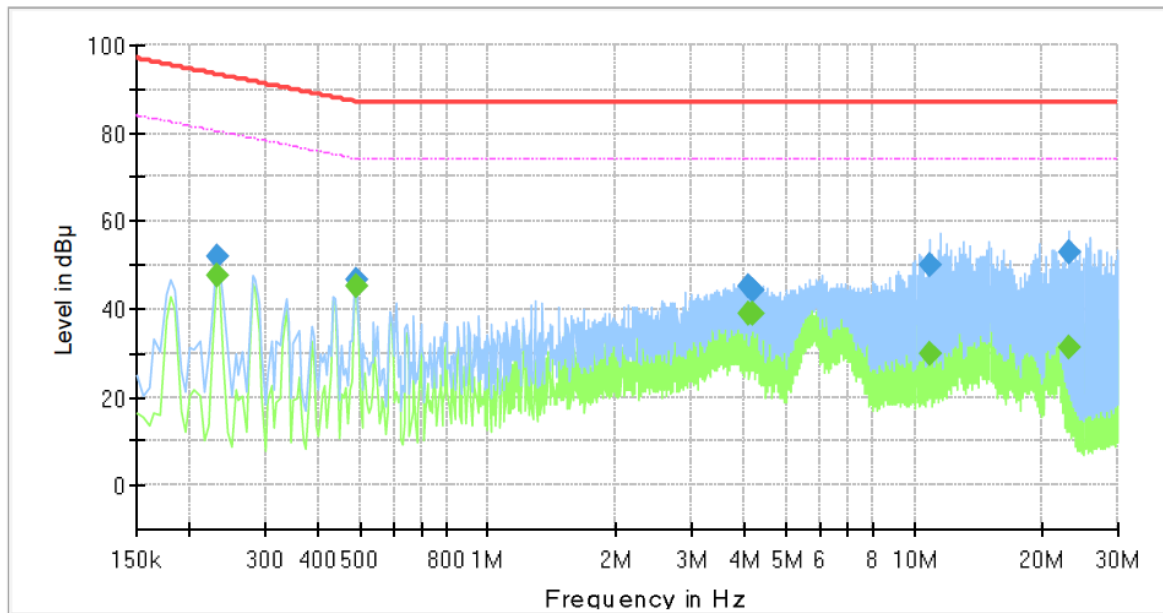
Reading Value : Not shown in the table.

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

Conducted Emissions at Telecommunication Ports [100 Mbps]

Common Information

Test Description: Telecommunication Emission
 Model No.: TNU-6322E
 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)
0.230000	---	47.70	80.45	32.75	1000.0	9.000	Single Line	19.7
0.230000	51.83	---	93.45	41.62	1000.0	9.000	Single Line	19.7
0.490000	---	45.38	74.17	28.79	1000.0	9.000	Single Line	19.8
0.490000	46.57	---	87.17	40.60	1000.0	9.000	Single Line	19.8
4.095000	---	39.23	74.00	34.77	1000.0	9.000	Single Line	19.7
4.095000	45.38	---	87.00	41.62	1000.0	9.000	Single Line	19.7
4.170000	---	39.12	74.00	34.88	1000.0	9.000	Single Line	19.7
4.170000	44.29	---	87.00	42.71	1000.0	9.000	Single Line	19.7
10.930000	---	29.85	74.00	44.15	1000.0	9.000	Single Line	19.7
10.930000	50.03	---	87.00	36.97	1000.0	9.000	Single Line	19.7
23.130000	---	31.43	74.00	42.57	1000.0	9.000	Single Line	20.1
23.130000	52.85	---	87.00	34.15	1000.0	9.000	Single Line	20.1

◆ 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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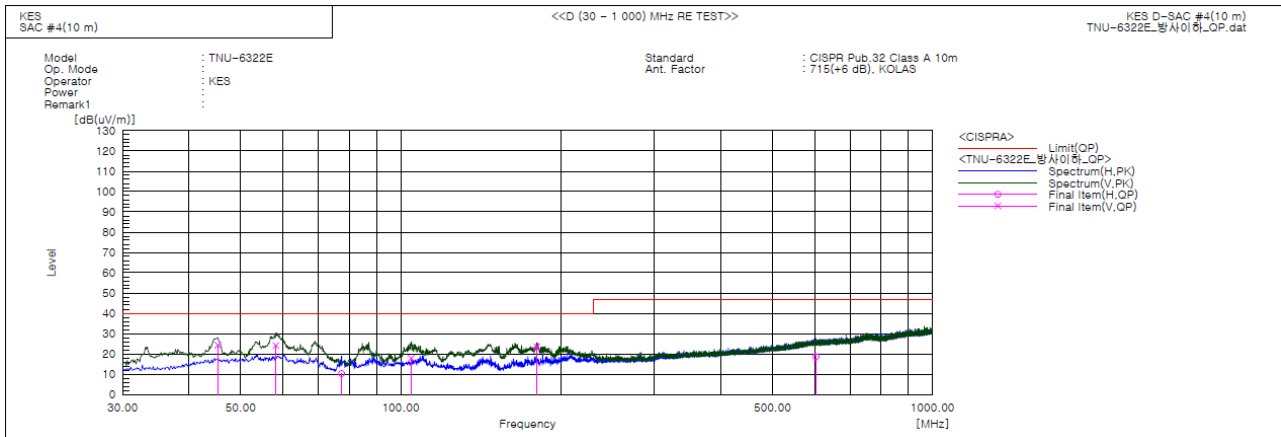
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Radiated Electric Field Emissions(Below 1 GHz)



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	45.278	V	45.8	-21.4	24.4	40.0	15.6	112.0	285.0	
2	58.251	V	45.9	-21.7	24.2	40.0	15.8	102.0	323.0	
3	77.409	H	37.8	-27.5	10.3	40.0	29.7	396.0	34.0	
4	104.690	V	40.3	-22.4	17.9	40.0	22.1	105.0	82.0	
5	180.229	V	46.9	-23.3	23.6	40.0	16.4	103.0	198.0	
6	603.513	H	27.1	-8.5	18.6	47.0	28.4	257.0	329.0	

◆ 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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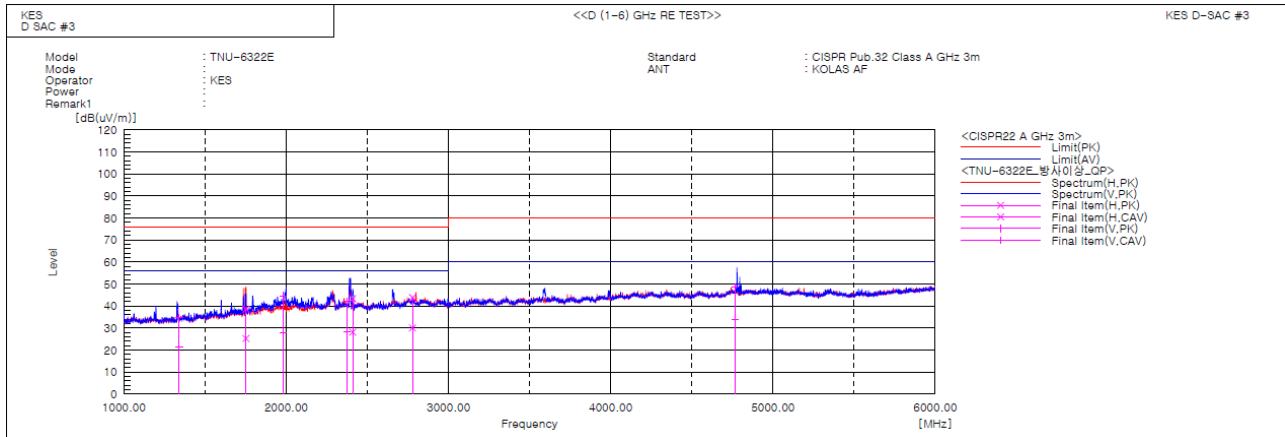
3701, 40, Simin-daero 365beon-gil,
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Report No.:

KES-EM-21T0659

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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	1341.157	V	42.1	28.9	-7.4	34.7	21.5	76.0	56.0	41.3	34.5	100.0	245.2	
2	1752.310	H	42.1	28.8	-3.5	38.6	25.3	76.0	56.0	37.4	30.7	100.0	2.7	
3	1981.934	V	45.6	28.6	-0.9	44.7	27.7	76.0	56.0	31.3	28.3	100.0	139.4	
4	2373.155	V	41.9	28.2	0.2	42.1	28.4	76.0	56.0	33.9	27.6	100.0	210.1	
5	2410.027	H	43.1	27.9	0.2	43.3	28.1	76.0	56.0	32.7	27.9	100.0	338.6	
6	2778.784	H	41.5	27.8	2.3	43.8	30.1	76.0	56.0	32.2	25.9	100.0	49.9	
7	4768.422	V	40.2	25.6	8.4	48.6	34.0	80.0	60.0	31.4	26.0	100.0	173.7	

◆ Calculation

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

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



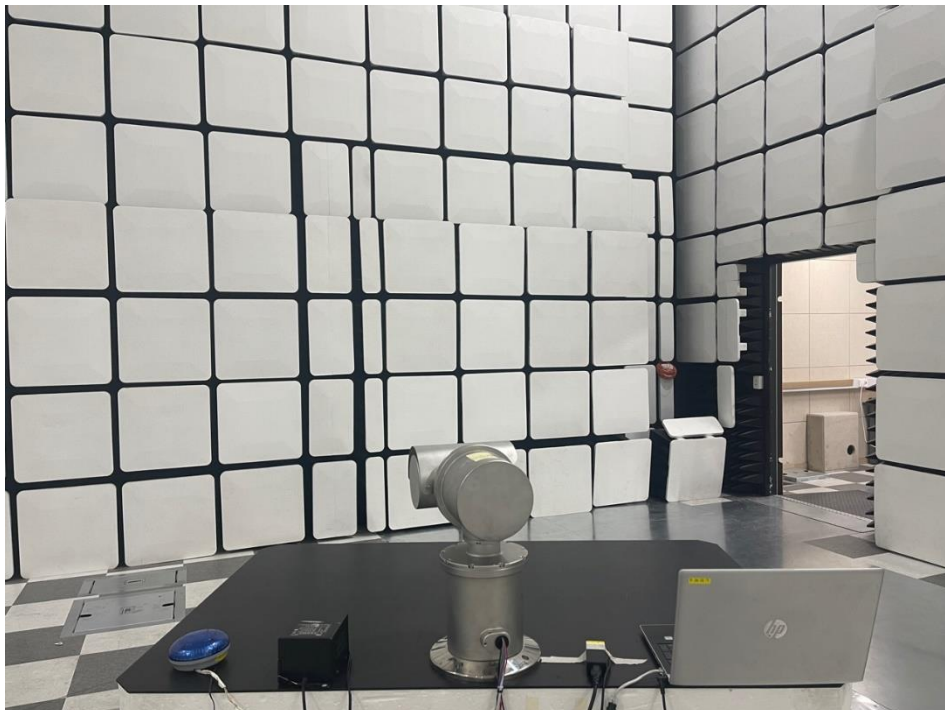
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Conducted Emissions at Telecommunication Ports



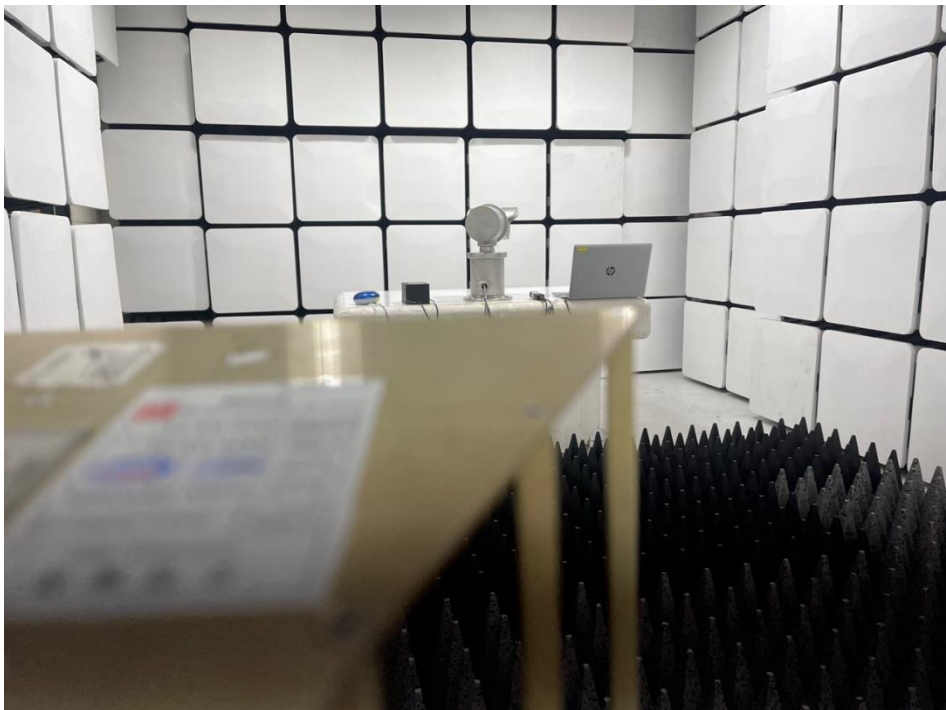
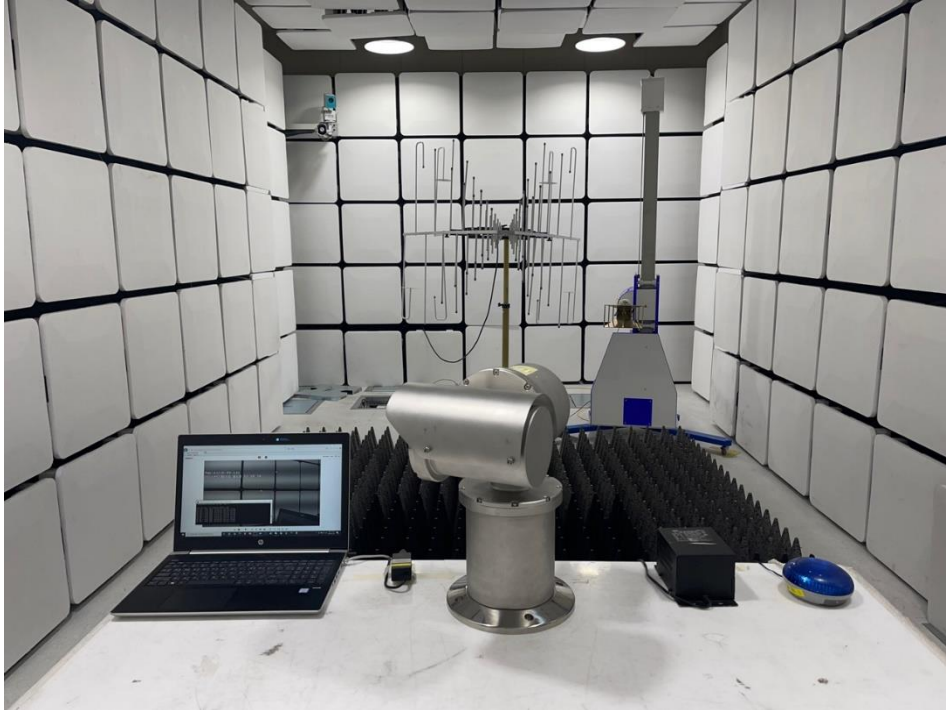
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Radiated Electric Field Emissions(Below 1 GHz)



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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)



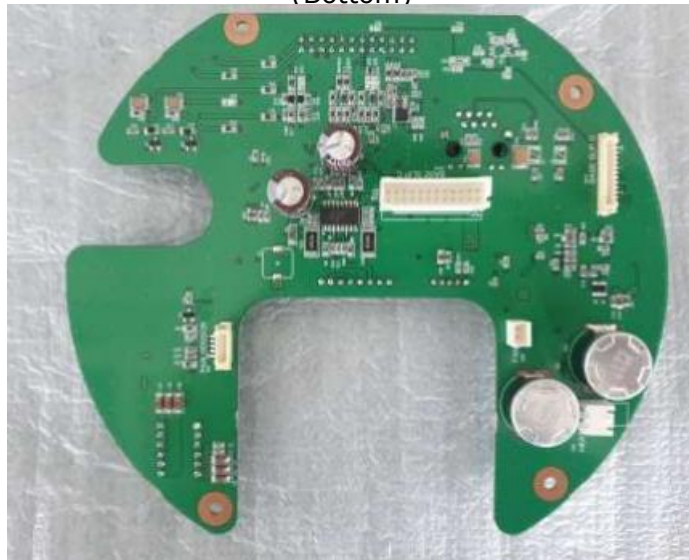
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EUT Internal View – Main Board

(Top)



(Bottom)



EUT Internal View – Sub Board 1

(Top)



(Bottom)

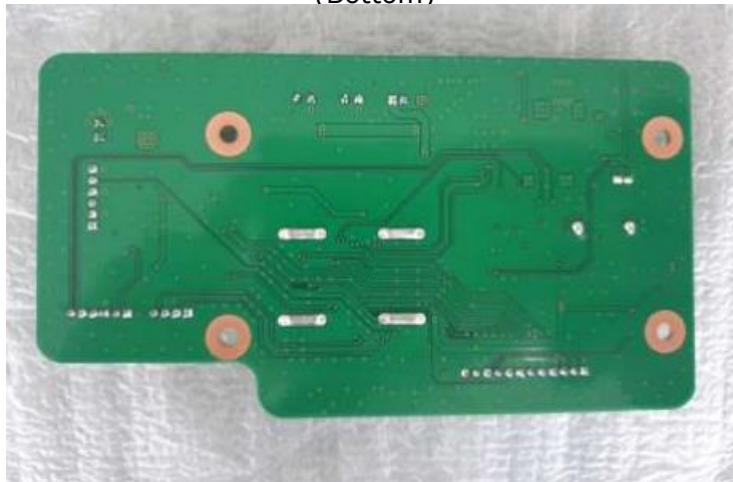


EUT Internal View – Sub Board 2

(Top)



(Bottom)

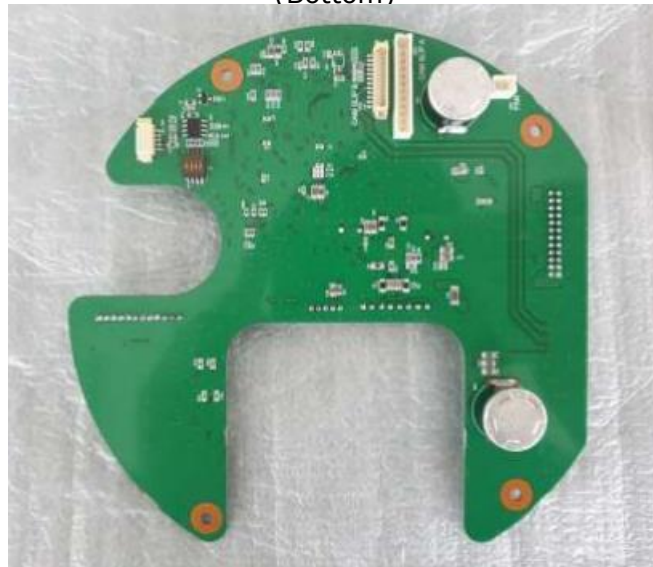


EUT Internal View – Sub Board 3

(Top)



(Bottom)



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EUT Internal View – Sub Board 4

(Top)



(Bottom)



EUT Internal View – Sub Board 5

(Top)



(Bottom)



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EUT Internal View – Sub Board 6

(Top)



(Bottom)

