EMC TEST REPORT

Test Report No.	:	KES-E1-18T0117
Date of Issue	:	Jan. 22, 2018
Product name	:	Network Positioning Camera
Model/Type No.	:	TNU-6320
Variant Mode	:	-
Applicant	:	Hanwha Techwin Co., Ltd.
Applicant Address	:	1204, Changwon-daero, Seongsan-gu, Changwon-si, Gyeongsangnam-do, Korea
Manufacturer	:	KEVIS
Manufacturer Address	:	B-1307 GUNPO IT VALLY, GOSANRP 148-17 GUNPO CITY, GYUNGGI-DO, KOREA
Equipment authorization	:	☐ **Declaration of Conformity** ☒ **Verification** ☐ **Certification**
Date of Receipt	:	Jan. 08, 2018
Test date	:	Jan. 11, 2018
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 KOLAS.

REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Jan. 22, 2018	KES-E1-18T0117	Issued

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1.0 General Product Description

Main Specifications of EUT are:

Video	
Imaging Device	1/2.8" 2.38M CMOS
Total Pixels	1952(H) x 1116(V), 2.18M
Effective Pixels	1944(H) x 1104(V), 2.14M
Scanning System	Progressive
Min. Illumination	Color : 0.3 Lux (1/30sec, F1.6, 50IRE) B/W : 0.03 Lux (1/30sec, F1.6, 50IRE)
S / N Ratio	50dB
Video Out	CVBS : 1.0 Vp-p / 75Ω composite, 720x480(N), 720x576(P), for installation
Lens	
Focal Length (Zoom Ratio)	4.44 ~ 142.6mm(Optical 32X)
Max. Aperture Ratio	F1.6 (Wide) / F4.4 (Tele)
Angular Field of View	H : 62.8˚(Wide) ~ 2.23˚(Tele) / V : 36.80˚(Wide) ~ 1.26˚(Tele)
Min. Object Distance	Wide 1.5m
Focus Control	Auto / Manual / One Push
Lens Type	DC Auto Iris
Mount Type	Board-in type
Pan/Tilt/Rotate	
Pan Range	360˚ Endless
Pan Speed	0.036°~120°/sec
Tilt Range	-90˚ ~40˚
Tilt Speed	0.012°~40°/sec
Sequence	Preset (255 ea), Swing, Group (6 ea), Trace, Tour(1ea), Auto Run, Schedule
Preset Accuracy	±0.1˚
Azimuth	Yes (E/W/S/N/NE/NW/SE/SW)

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

Not applicable

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
Network Positioning Camera	TNU-6320	-	KEVIS	E.U.T

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
Notebook	LG15N54	410NZET022292	LG	-
Notebook Adaptor	DA-1900-08	9700591703	Dongguang Lite Power 2nd Plant	-
Speaker	BR10000A CUVE	-	BEIJING EDIFIER HI-TECH GROUP.	-
MIC	CMK-303	-	CAMAC	-
Alarm	-	-	-	-
Monitor	SMT-2232	C95V67VF900025B	Weihai Daewoo Electronics Co., Ltd.	-
IR illuminator	SPI-50	-	KEVIS	-

1.6 External I/O Cabling

Start		END		Cable Spec.	
Description	**I/O Port**	**Description**	**I/O Port**	**Length**	**Shield**
Network Positioning Camera (EUT)	3.5 ㎜	Speaker	3.5 ㎜	1.6	U
	3.5 ㎜	MIC	3.5 ㎜	1.7	U
	2 Pin	Alarm	2 Pin	4.0	U
	BNC	Monitor	BNC	3.5	S
	RJ-45	Notebook	RJ-45	3.0	U
	2 Pin	IR illuminator	2 Pin	0.3	U
	2 Pin		2 Pin	0.3	U

* Unshielded=U, Shielded=S

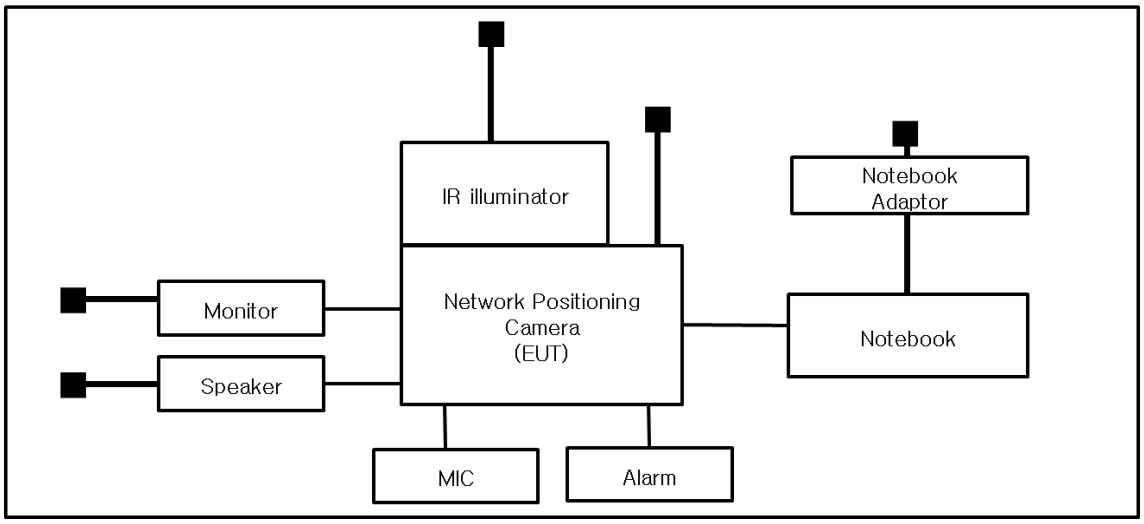
1.7 EUT Operating Mode(s)

Test mode	operating
AC 24 V	E.U.T Monitoring, Ping Test, IR sensor red light confirmation

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

1.8 Configuration

■ AC Main
□ DC Main



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, Yeoju-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)	KOREA LABORATORY ACCREDITATION SCHEME KOLAS TESTING NO. 489

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		

☐ **VCCI V-3 / 2015.04**	☐ Class A	☐ Class B
☐ **AS/NZS:2013**	☐ Class A	☐ Class B
☒ **47 CFR Part 15, Subpart B**		
☒ CISPR 22:2009 +A1:2010	☒ Class A	☐ Class B
☐ ANSI C63.4-2014	☐ Class A	☐ Class B
☒ **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

2.1 Conducted Emissions at Mains Power Ports

Test Date
Jan. 11, 2018

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	101781	04, 27, 2018
☒	LISN	ENV216	R & S	101787	01, 05, 2019
☒	LISN	ESH2-Z5	R & S	100450	04, 27, 2018
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	11, 27, 2018
☐	LISN	NNBM8124	SCHWARZBECK	8124-1002	08, 07, 2018
☐	LISN	NNBM8124	SCHWARZBECK	8124-1003	08, 07, 2018

Test Conditions
Temperature: 23,5 ℃
Relative Humidity: 43,0 % R.H.

Frequency Range of Measurement
150 ㎑ to 30 ㎒

Instrument Settings
IF Band Width: 9 ㎑

Test Results
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks
See Appendix A for test data.

2.2 Radiated Electric Field Emissions(Below 1 ㎓)

Test Date
Jan. 11, 2018

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, 18, 2018
☒	AMPLIFIER	SCU 01	R & S	100603	11, 27, 2018
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	716	11, 28, 2018

Test Conditions
Temperature: 24,0 ℃
Relative Humidity: 42,9 % R.H.

Frequency Range of Measurement
30 ㎒ to 1 ㎓

Instrument Settings
IF Band Width: 120 ㎑

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 ㎓)

Test Date
Jan. 11, 2018

Test Location
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, 17, 2018
☒	PREAMPLIFIER	8449B	AGILENT	3008A01967	05, 31, 2018
☐	ATTENUATOR	8491A	HP	32173	03, 24, 2018
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	05, 02, 2019

Test Conditions
Temperature: 24,3 ℃
Relative Humidity: 43,8 % R.H.

Frequency Range of Measurement
1 ㎓ to 6 ㎓

Instrument Settings
IF Band Width: 1 ㎒

Test Results
The requirements are:
☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks
See Appendix A for test data.

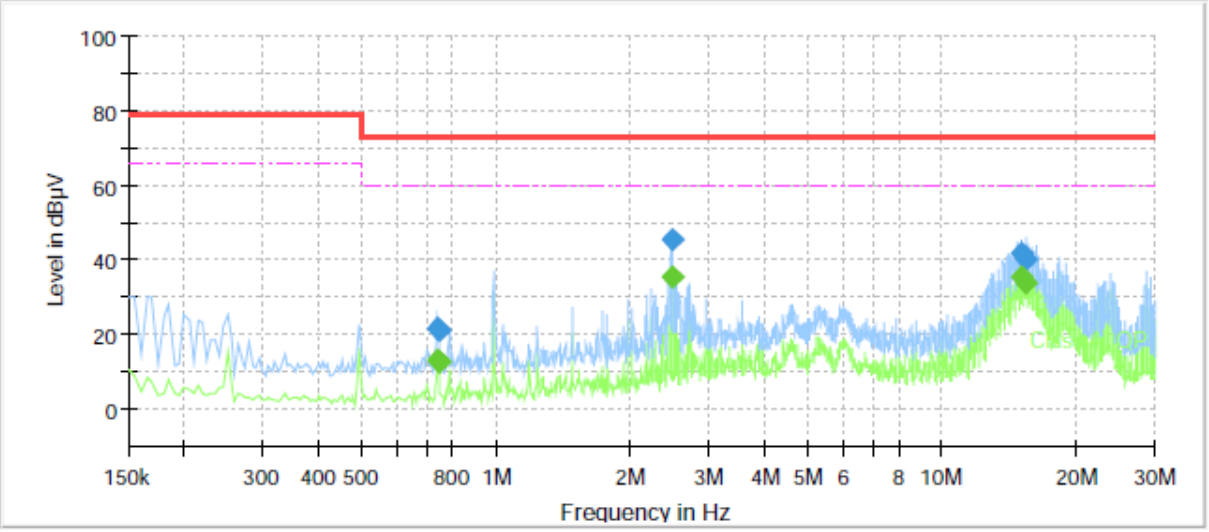
APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

HOT LINE

Common Information

Test Description:	Conducted Emission
Model No.:	TNU-6320
Mode	
Operator Name:	KES



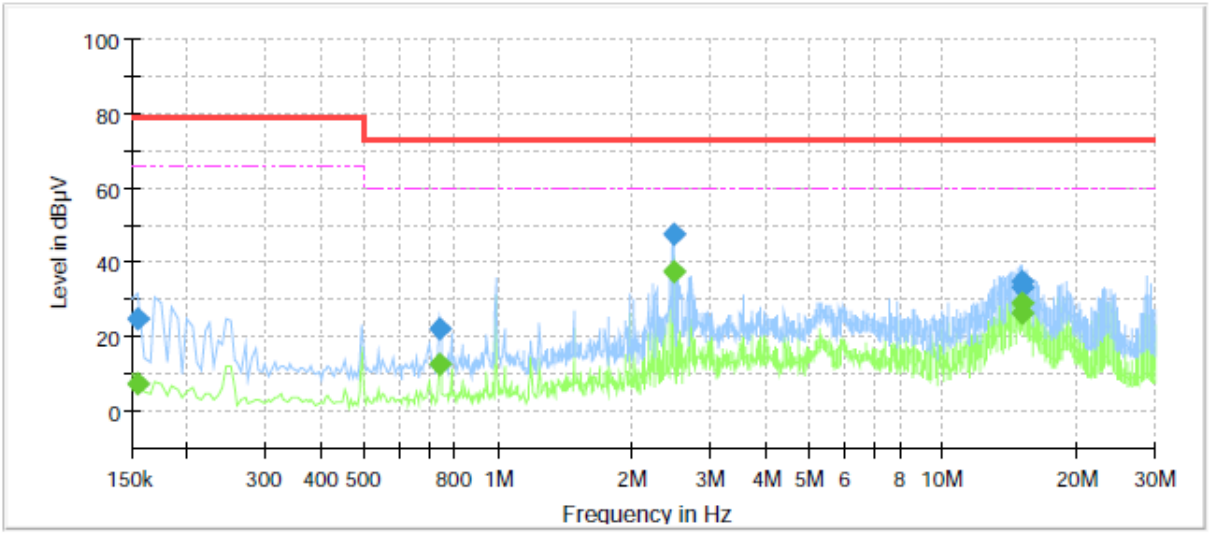
Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.740000	---	13.21	60.00	46.79	1000.0	9.000	L1	19.9
0.740000	21.74	---	73.00	51.26	1000.0	9.000	L1	19.9
0.745000	---	12.95	60.00	47.05	1000.0	9.000	L1	19.9
0.745000	21.31	---	73.00	51.69	1000.0	9.000	L1	19.9
2.475000	---	35.40	60.00	24.60	1000.0	9.000	L1	20.2
2.475000	45.46	---	73.00	27.54	1000.0	9.000	L1	20.2
15.085000	---	35.57	60.00	24.43	1000.0	9.000	L1	20.1
15.085000	41.88	---	73.00	31.12	1000.0	9.000	L1	20.1
15.375000	---	33.72	60.00	26.28	1000.0	9.000	L1	20.1
15.375000	40.17	---	73.00	32.83	1000.0	9.000	L1	20.1

NEUTRAL LINE

Common Information

Test Description:	Conducted Emission
Model No.:	TNU-6320
Mode	
Operator Name:	KES

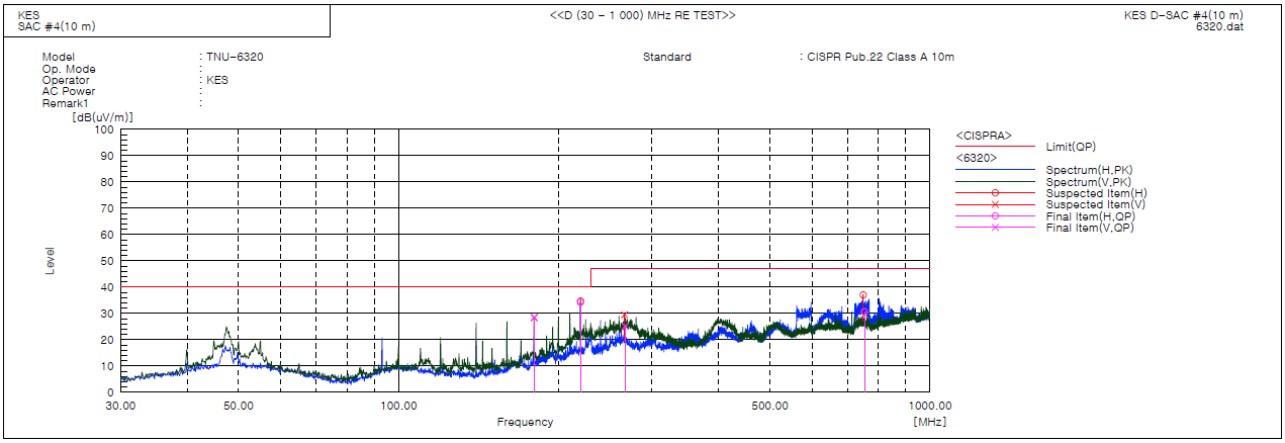


Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.155000	---	7.70	66.00	58.30	1000.0	9.000	N	19.4
0.155000	24.99	---	79.00	54.01	1000.0	9.000	N	19.4
0.740000	---	12.83	60.00	47.17	1000.0	9.000	N	19.9
0.740000	22.03	---	73.00	50.97	1000.0	9.000	N	19.9
2.475000	---	37.86	60.00	22.14	1000.0	9.000	N	20.2
2.475000	47.78	---	73.00	25.22	1000.0	9.000	N	20.2
15.000000	---	26.24	60.00	33.76	1000.0	9.000	N	20.2
15.000000	33.47	---	73.00	39.53	1000.0	9.000	N	20.2
15.110000	---	29.25	60.00	30.75	1000.0	9.000	N	20.2
15.110000	34.81	---	73.00	38.19	1000.0	9.000	N	20.2

◆ 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 ㎓)

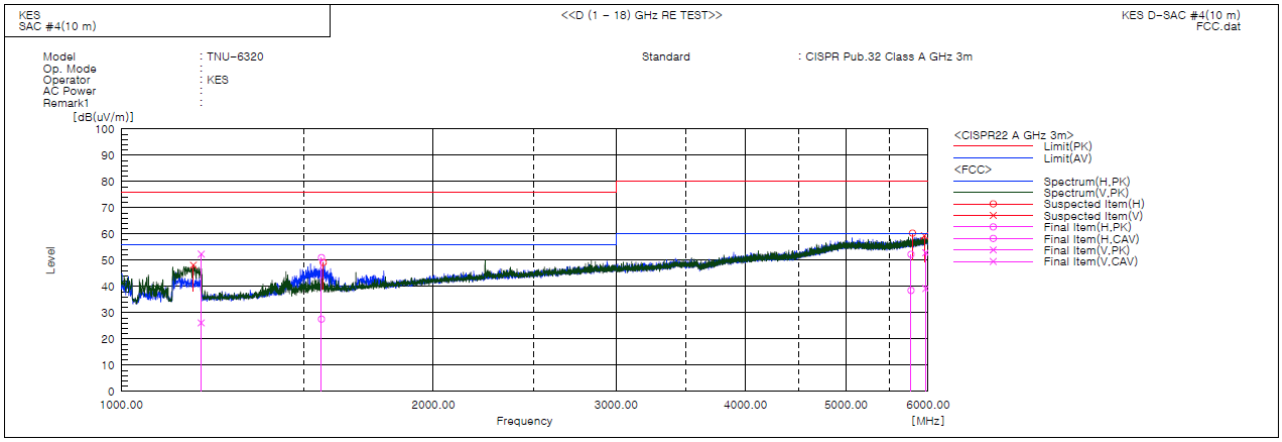


Final Result

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	180.002	V	58.2	-29.6	28.6	40.0	11.4	150.0	199.0	
2	220.005	H	60.6	-26.3	34.3	40.0	5.7	400.0	59.0	
3	266.867	V	49.9	-24.8	25.1	47.0	21.9	100.0	192.0	
4	752.580	H	43.6	-13.0	30.6	47.0	16.4	100.0	307.0	

♦ Calculation – SAC #4(10 m)
Result(QP) [㏈(㎶/m)] = (Reading(QP)[㏈(㎶)] + c.f[㏈(1/m)]
Margin(QP)[㏈] = Limit[㏈(㎶/m)] - Result(QP) [㏈(㎶/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

Radiated Electric Field Emissions(Above 1 ㎓)



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	1194.300	V	57.4	31.3	-5.1	52.3	26.2	76.0	56.0	23.7	29.8	100.0	98.0	
2	1559.981	H	52.6	29.1	-1.6	51.0	27.5	76.0	56.0	25.0	28.5	100.0	30.0	
3	5776.731	H	33.8	20.1	18.4	52.2	38.5	80.0	60.0	27.8	21.5	100.0	35.0	
4	5969.375	V	33.5	19.8	19.4	52.9	39.2	80.0	60.0	27.1	20.8	100.0	138.0	

♦ Calculation

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

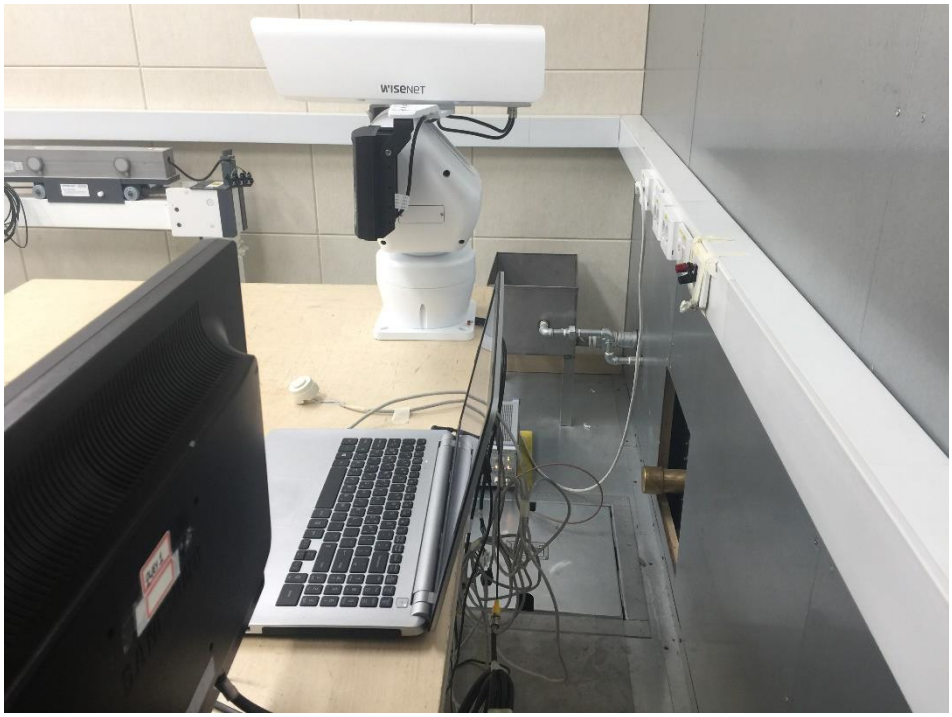
Margin(PK/CAV)[dB] = Limit[dB(㎶/m)] - Result(PK/CAV) [dB(㎶/m)]

Reading(PK/CAV) : Reading value, Result(PK/CAV) : Reading value + Factor value

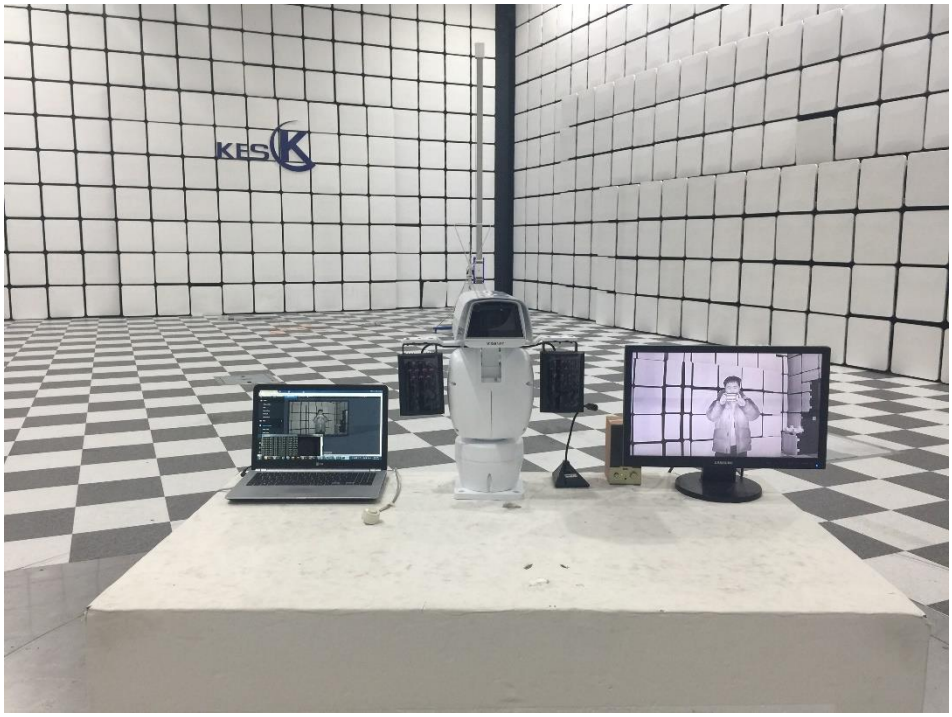
Limit(QP) : Limit value, c.f : (ANT Factor + Cable Loss - Preamp Factor), Margin: Margin value

Test Setup Photos and Configuration

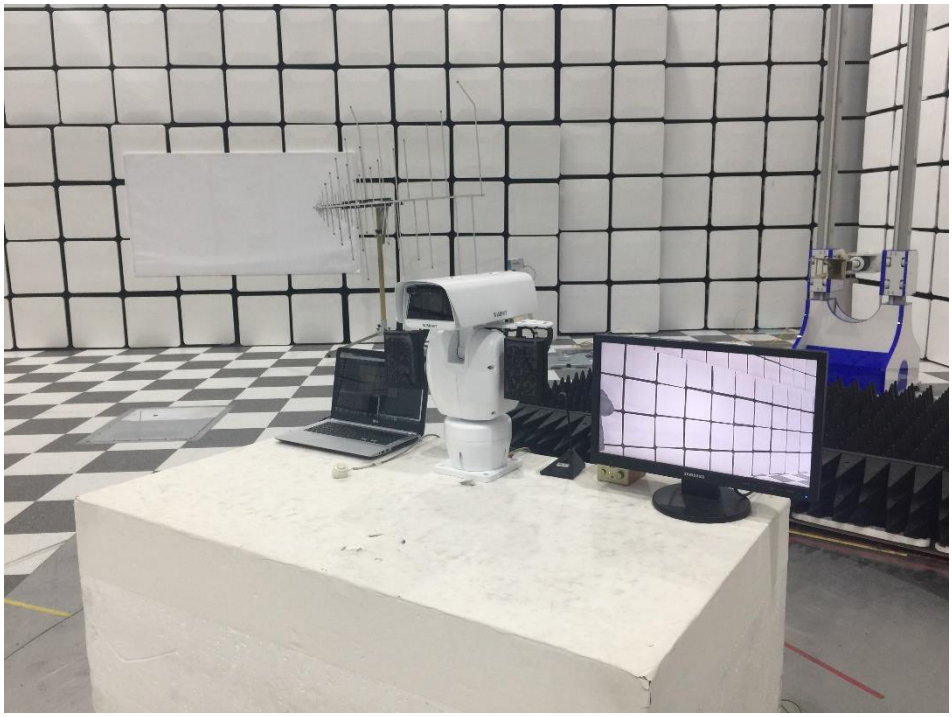
Conducted Voltage Emissions

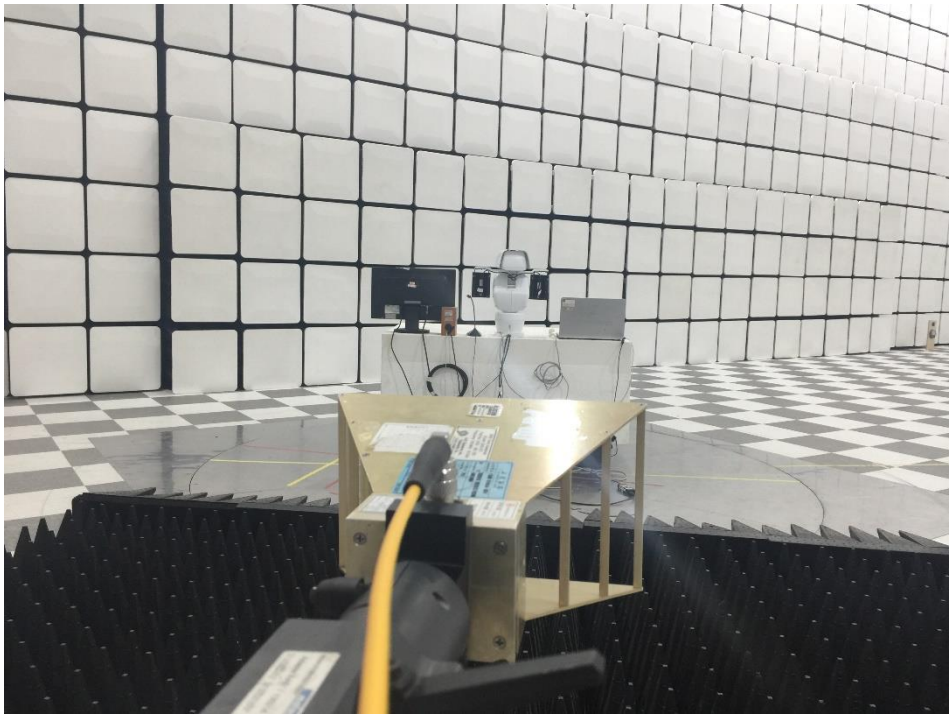


Radiated Electric Field Emissions(Below 1 ㎓)



Radiated Electric Field Emissions(Above 1 ㎓)





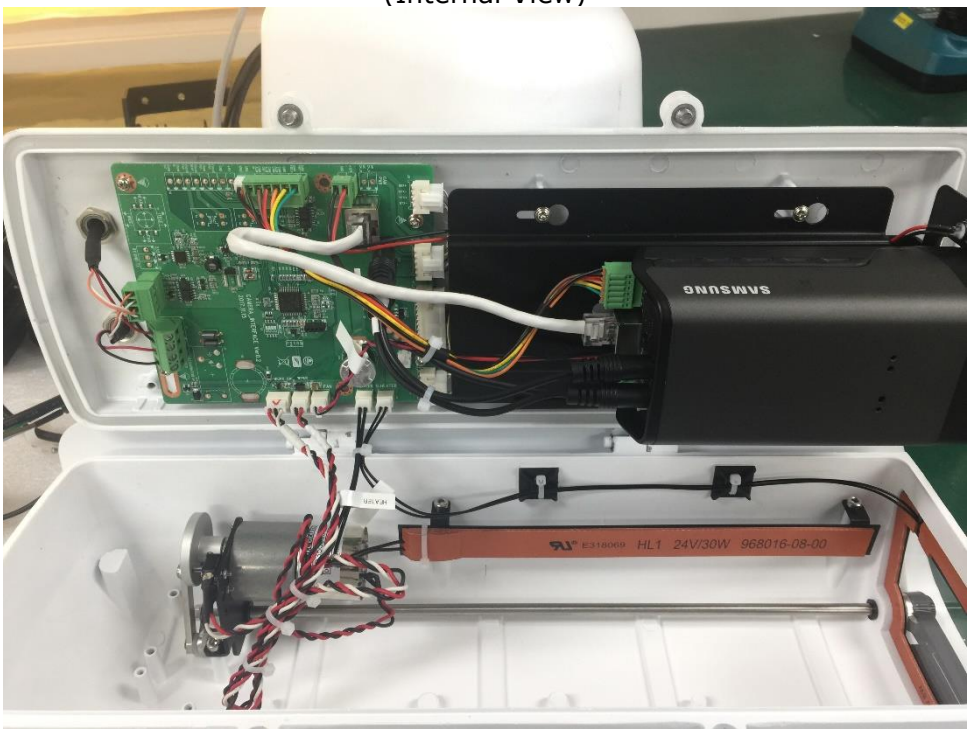
EUT External Photographs

(Top)

(Bottom)

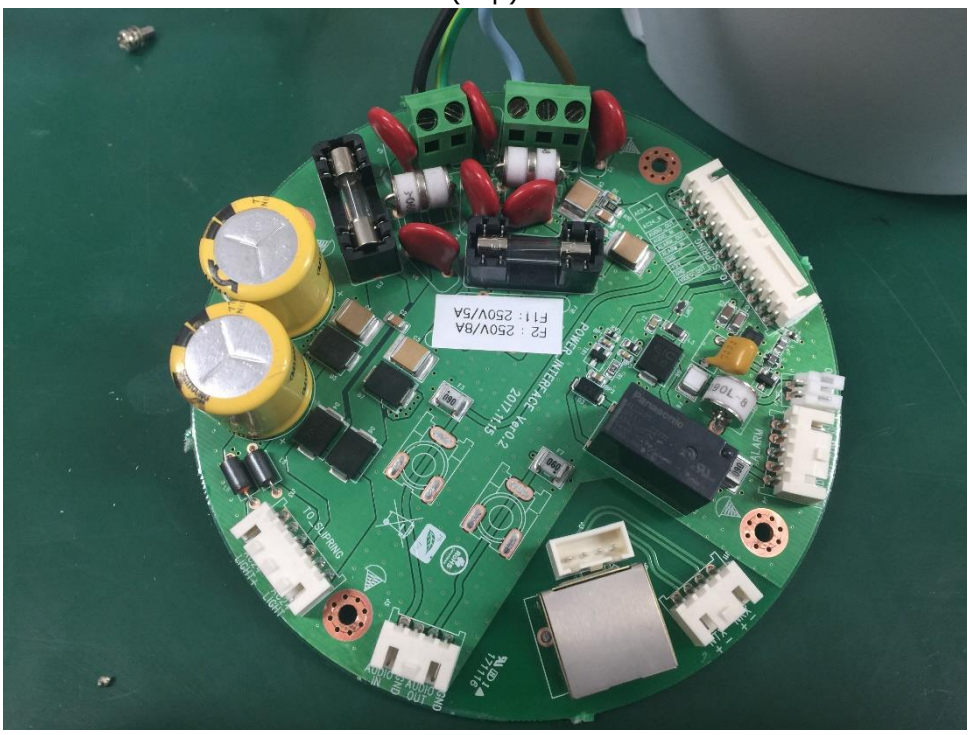
EUT Internal Photographs

(Internal View)



EUT Internal View – board 1

(Top)



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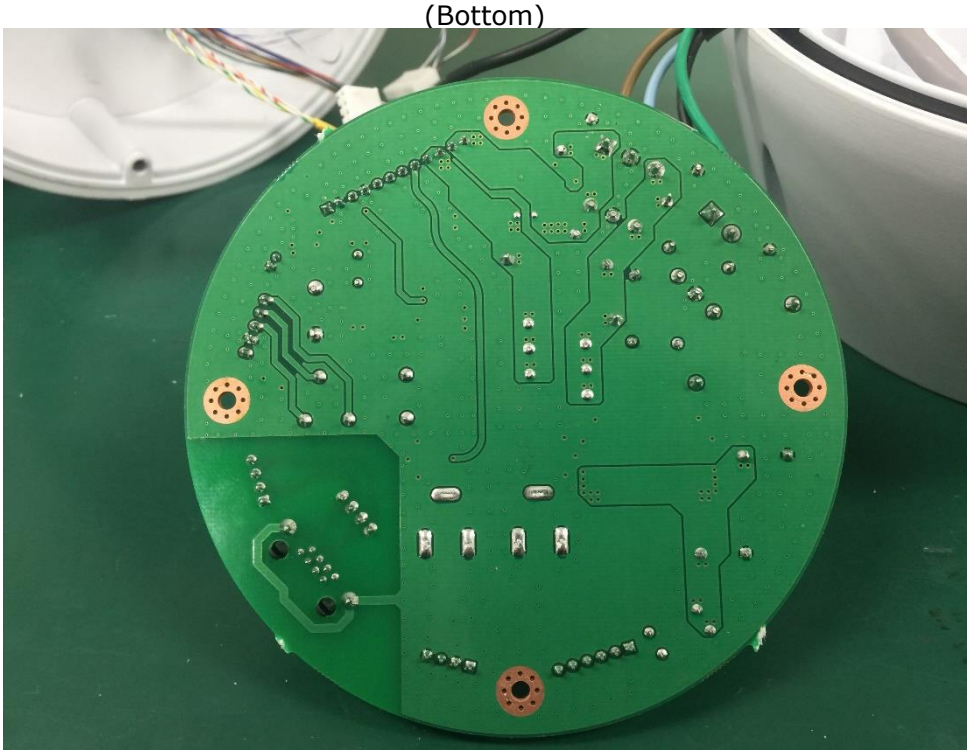
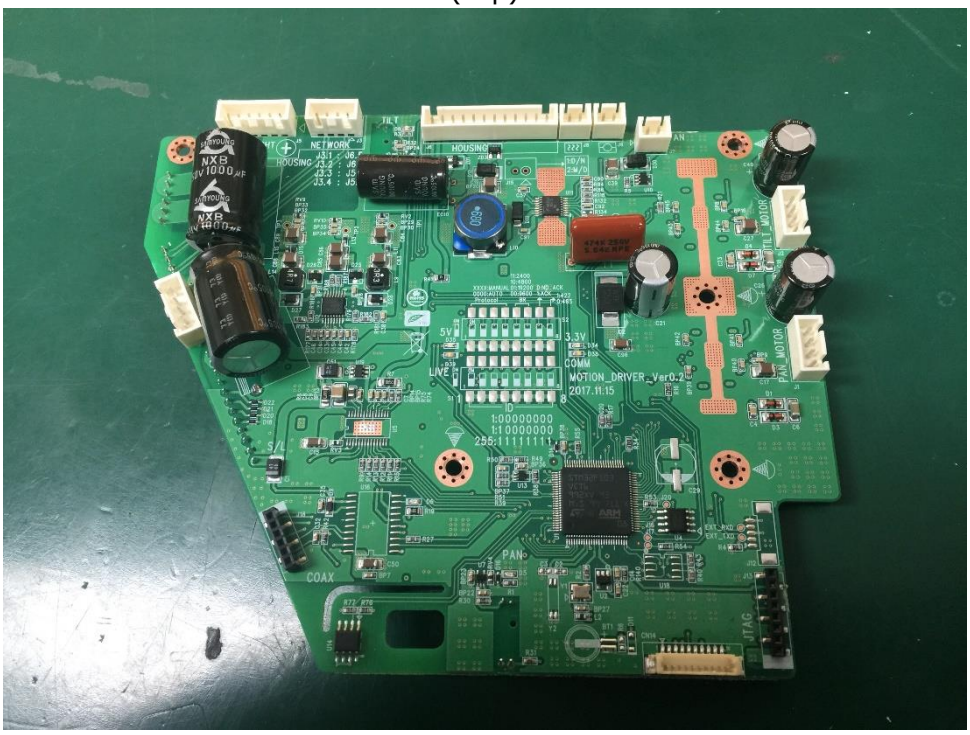


EUT Internal View – board 2

(Top)



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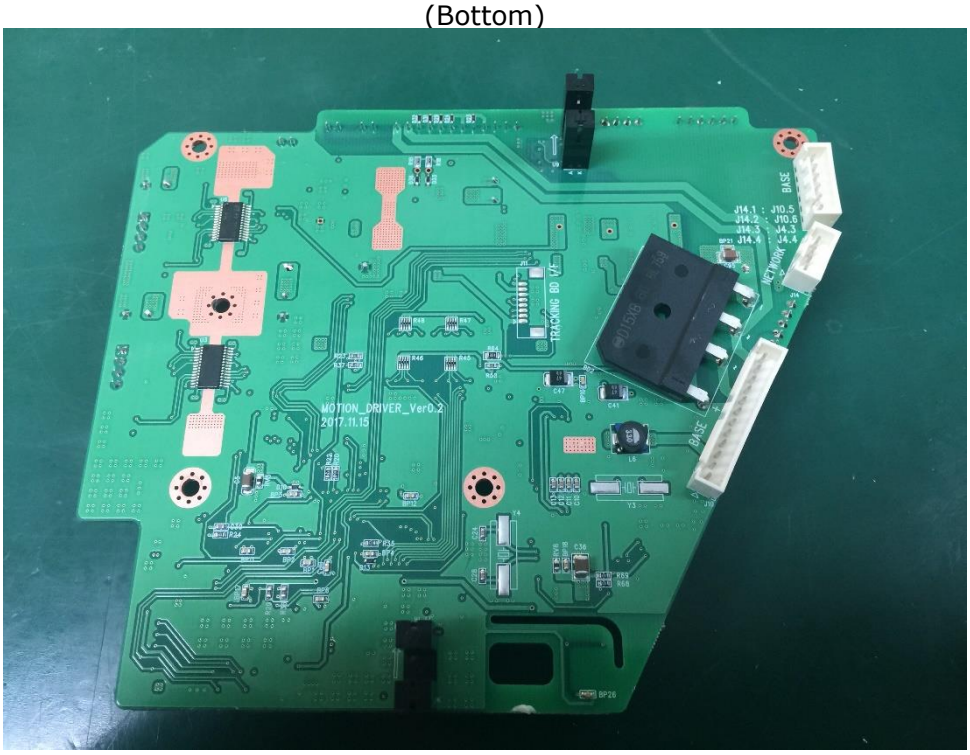

EUT Internal View – board 3

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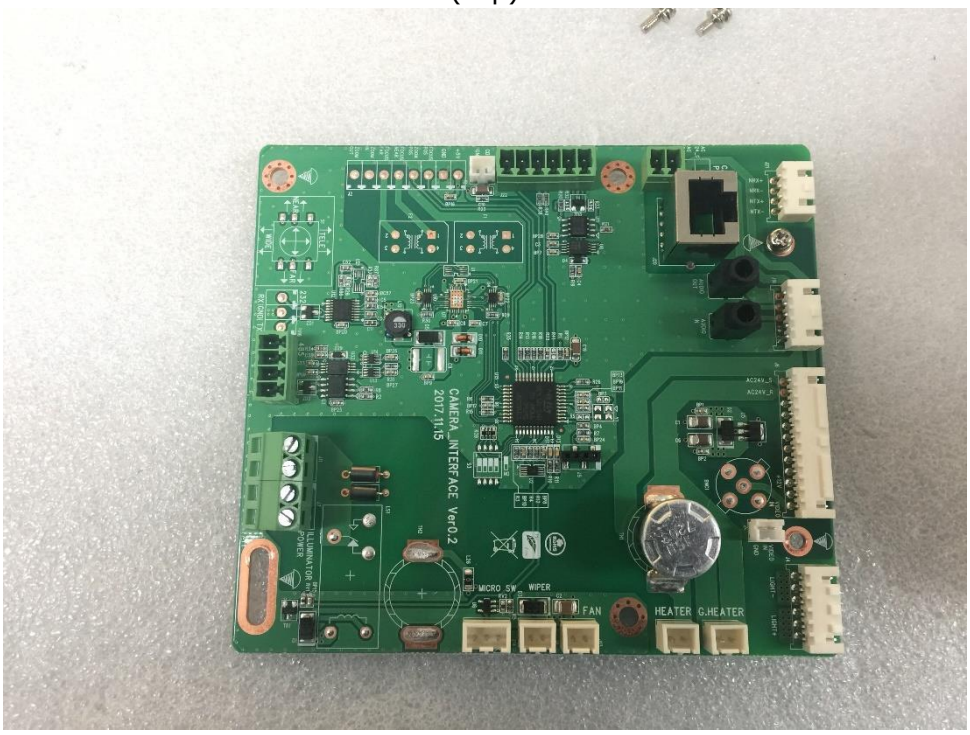

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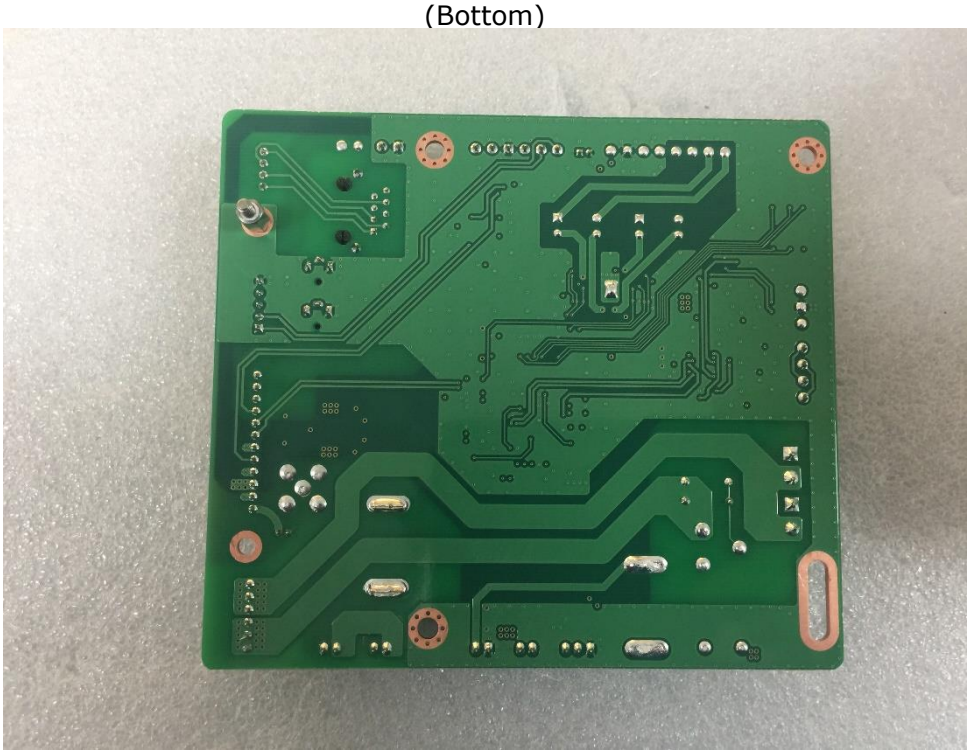

EUT Internal View – board 4

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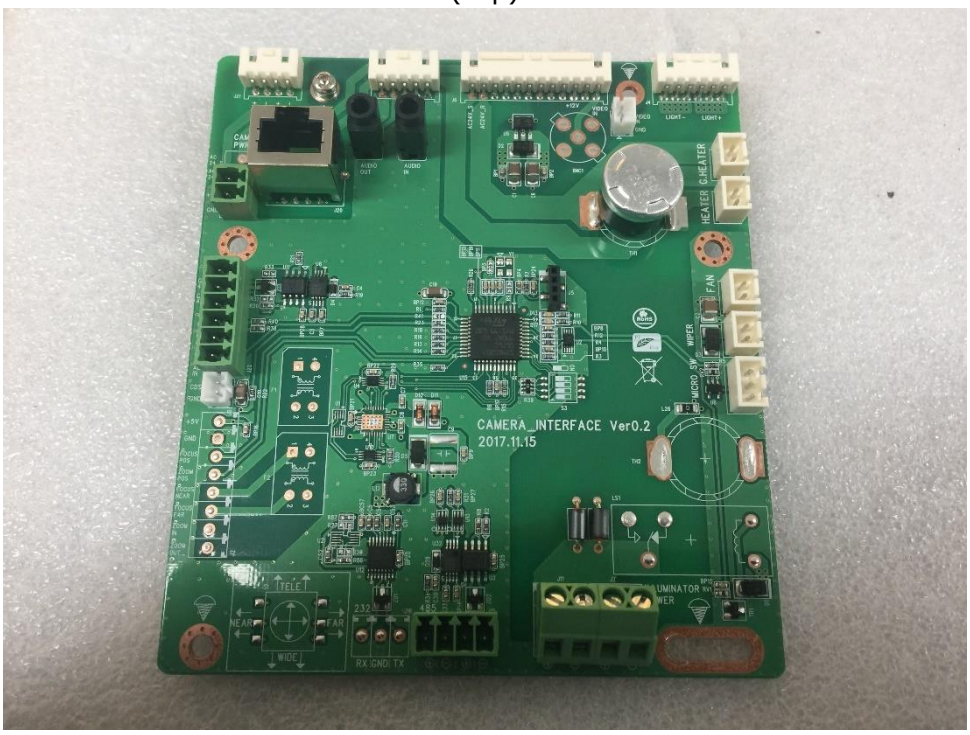

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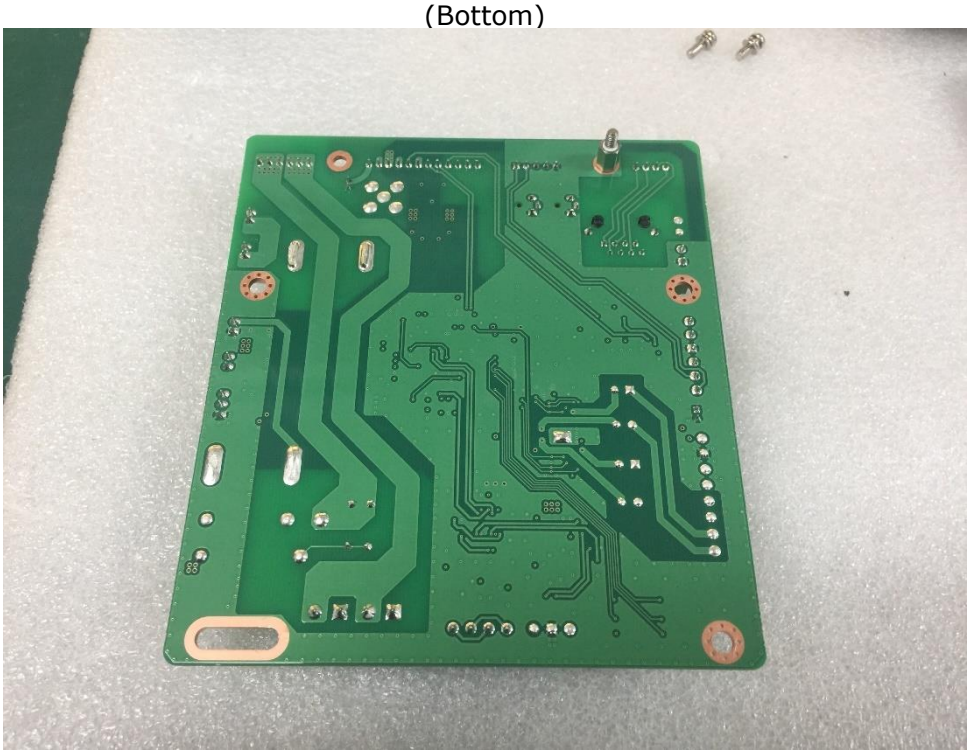

EUT Internal View – Camera board 1

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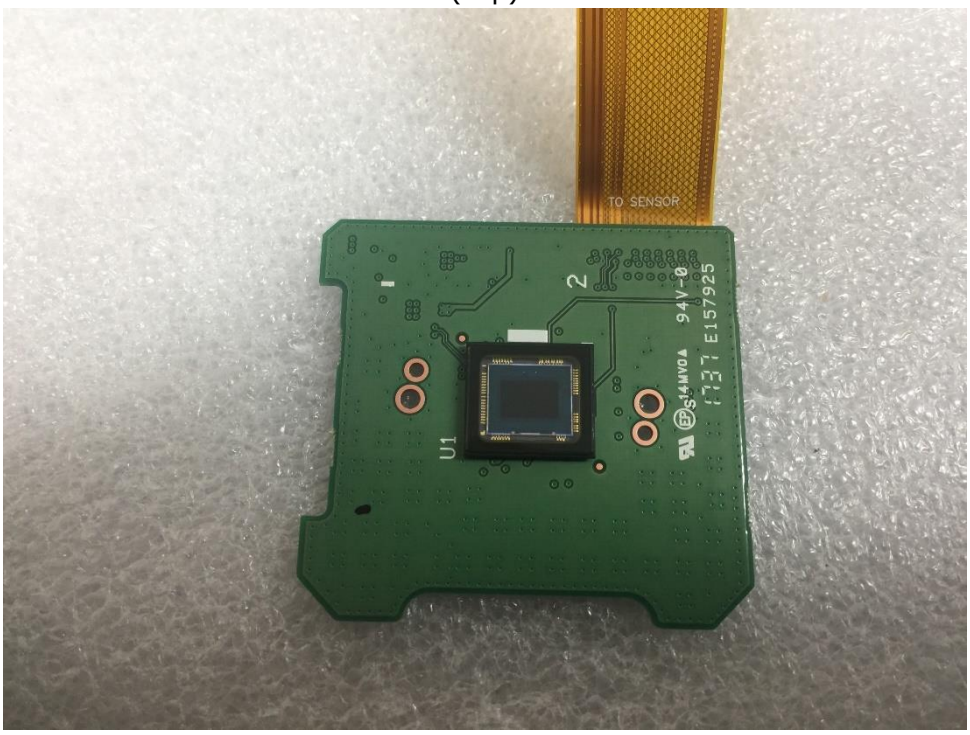

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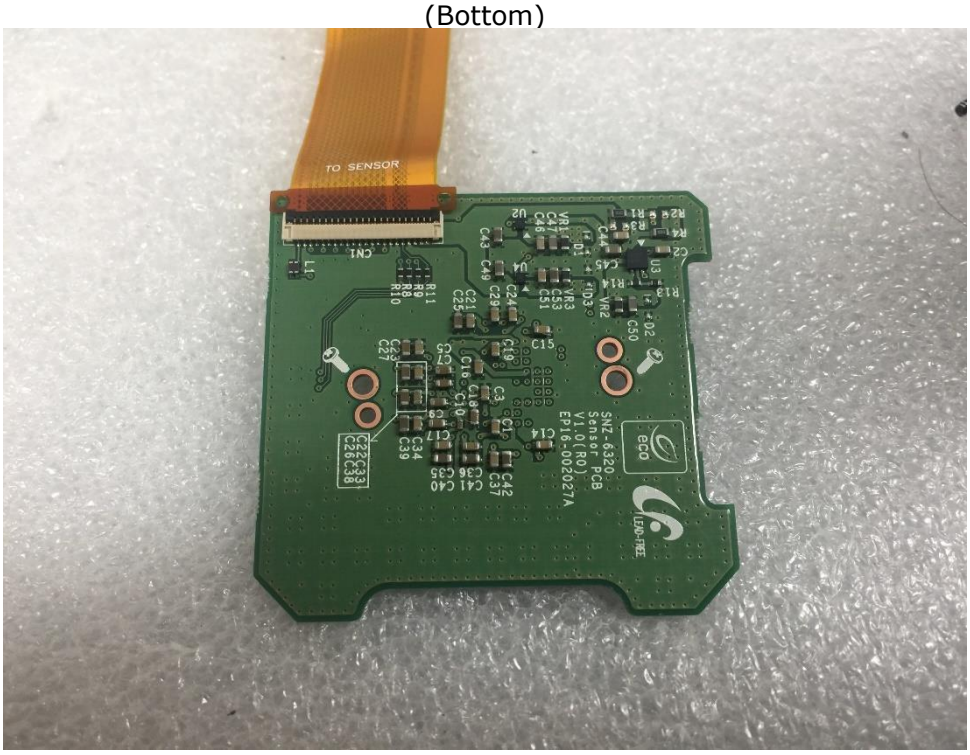
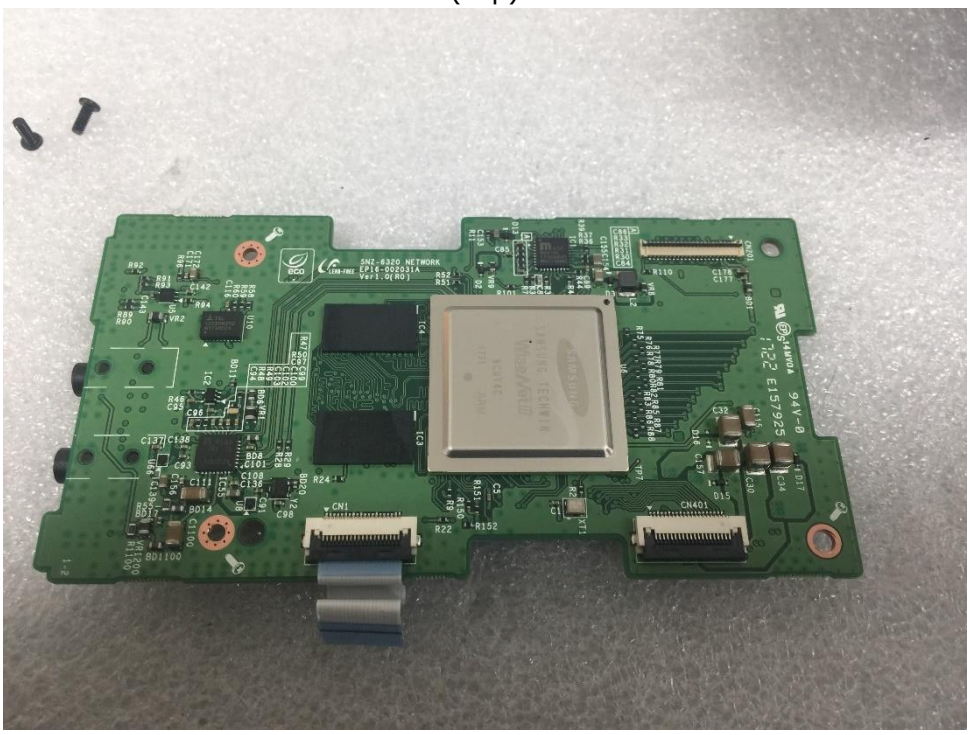


EUT Internal View – Camera board 2

(Top)



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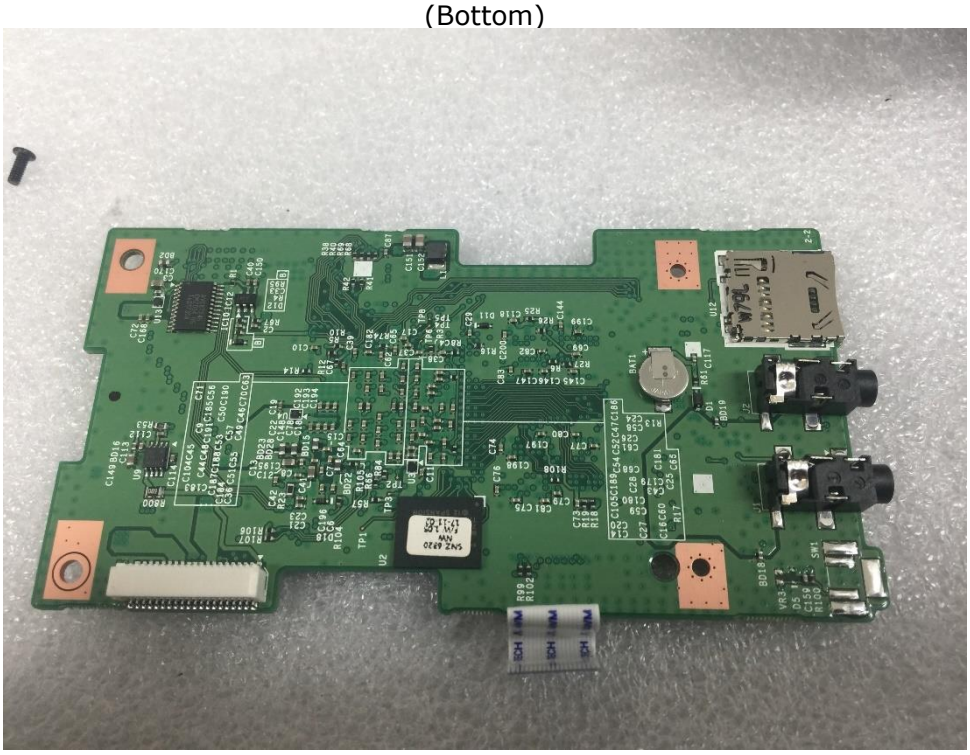
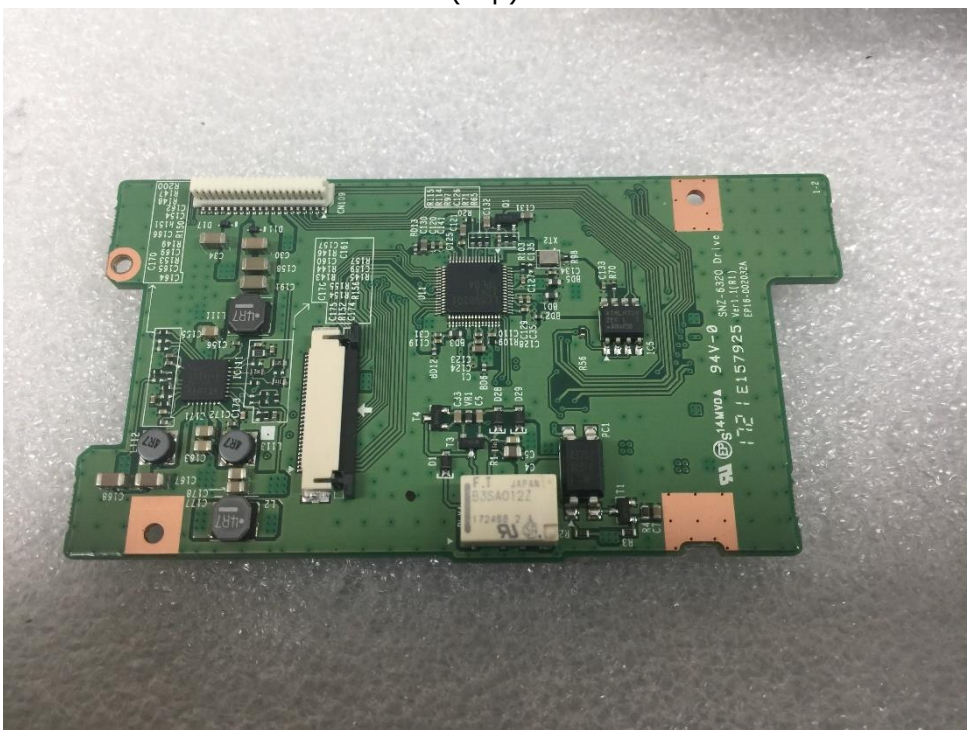
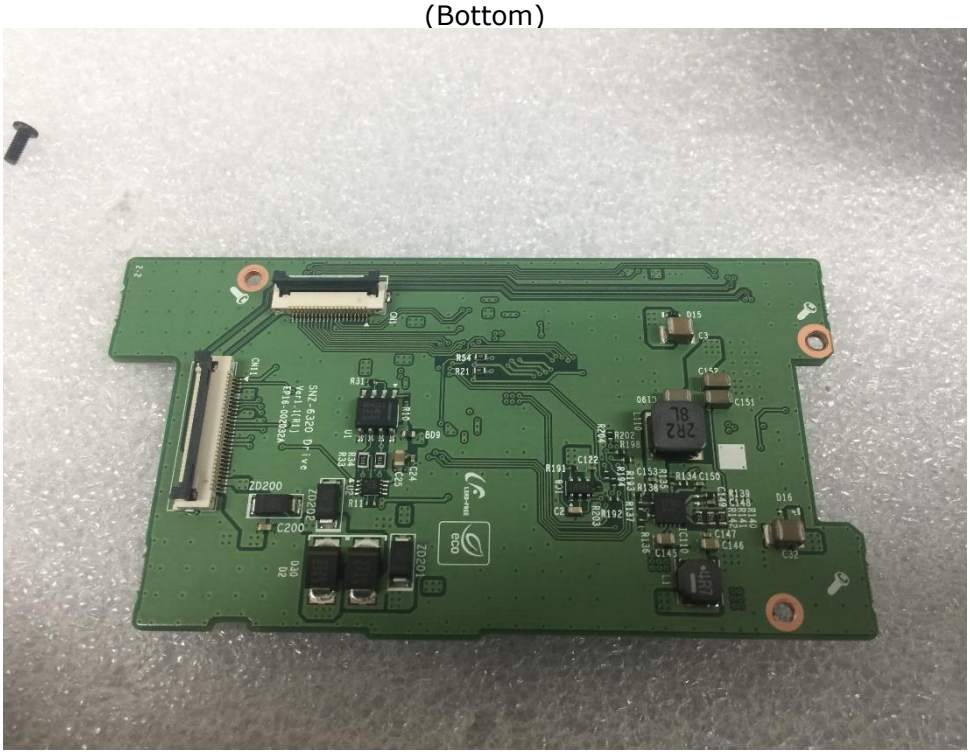


EUT Internal View – Camera board 3

(Top)

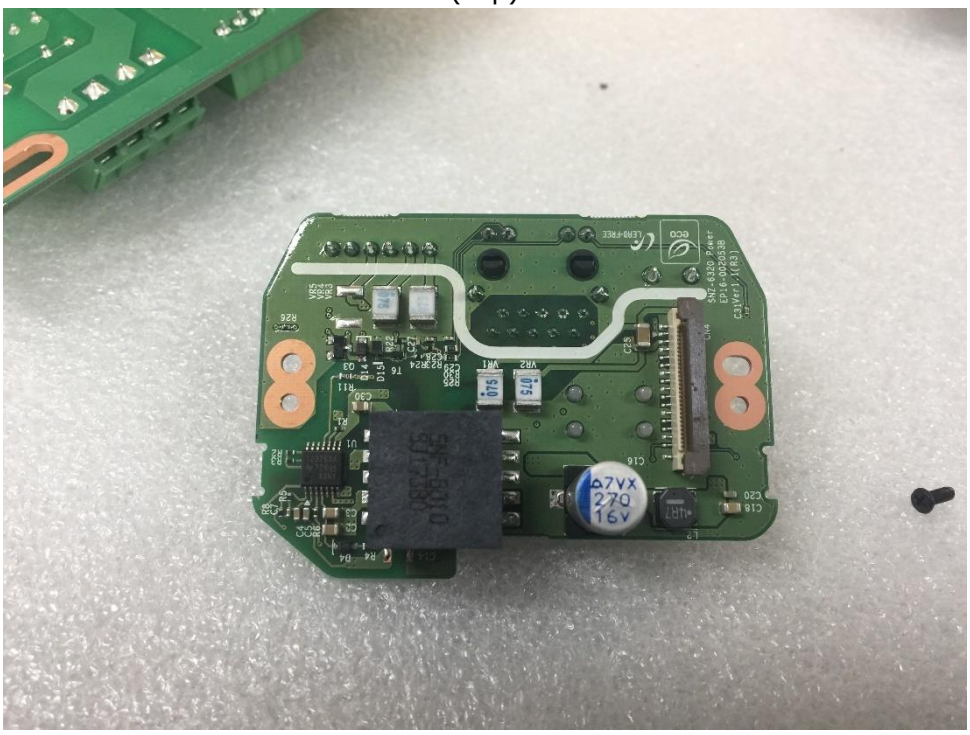


(Bottom)



EUT Internal View – Camera board 4

(Top)



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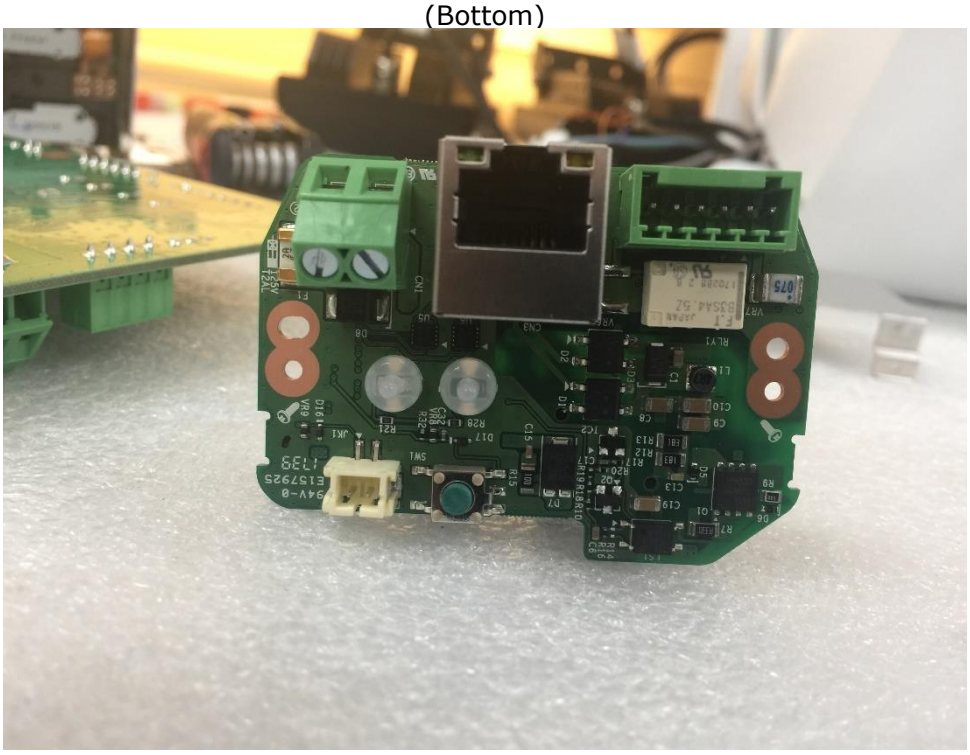
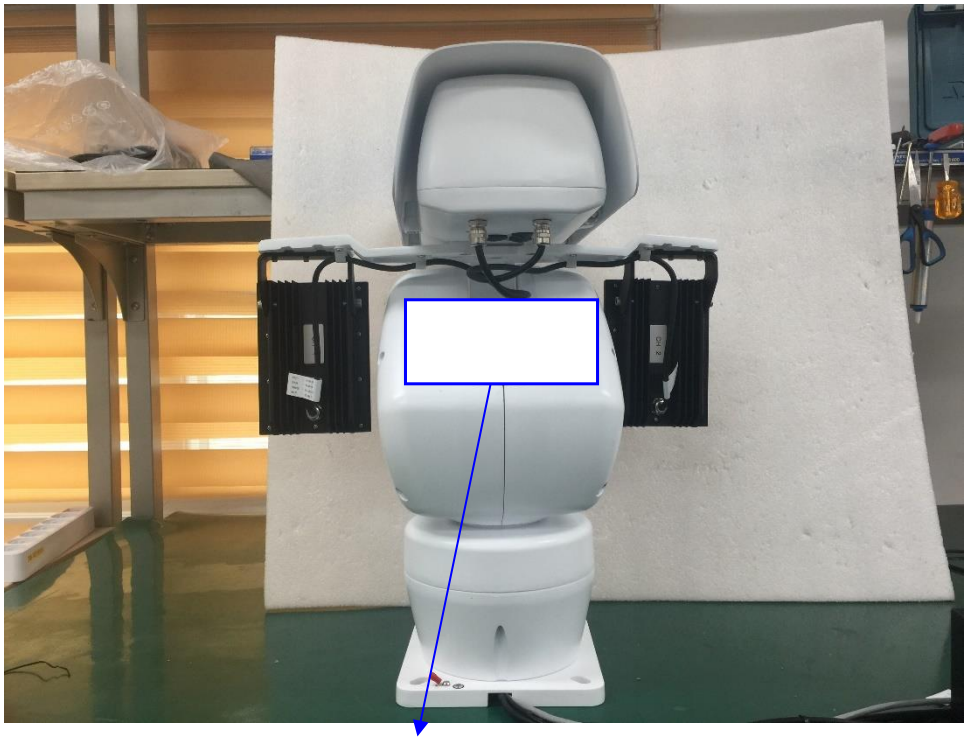


Label Photographs



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

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