



EMC TEST REPORT For RCM

Test Report No. : KES-E1-17T0582
Date of Issue : Aug. 29, 2017
Product name : CCTV CAMERA
Model/Type No. : HCZ-6320P
Variant Model : -
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
Date of Receipt : Jul. 31, 2017
Test date : Aug. 14, 2017 ~ Aug. 17, 2017
Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Jun Soo, Jung
EMC Test Engineer

Reviewed by

Dong-Hun, Jang
EMC Technical Manager

This test report is not related to KOLAS.

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REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Aug. 29, 2017	KES-E1-17T0582	Issued

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1.0 General Product Description

Main Specifications of EUT are:

HCZ-6320	
Video	
Imaging Device	1/2.8" 2.38M CMOS
Total Pixels	1952(H) x 1116(V), 2.18M
Effective Pixels	1044(H) x 1104(V), 2.14M
Scanning System	Progressive
Min. Illumination	Color : 0.2 Lux (1/30sec, F1.6, 30IRE), 0.003 Lux(2sec, F1.6, 30IRE) B/W : 0.01 Lux (1/30sec, F1.6, 30IRE), 0.0001 Lux(2sec, F1.6, 30IRE)
S / N Ratio	50dB
Video Out	AHD : 1080p, BNC CVBS : SD, DIP connector type
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, Tele 2m
Focus Control	Auto / Manual / One Push
Lens Type	DC Auto Iris
Mount Type	Board-in type
Preset	
Preset	255ea
Operational	
Camera Title	Off / On (Displayed up to 15 characters)
Day & Night	Auto (ICR) / Color / B/W / External
Backlight Compensation	Off / BLC / HLC / WDR
Wide Dynamic Range	120dB
Contrast Enhancement	SSDR(Off / On)
Digital Noise Reduction	SSNR(III (2D+3D Noise Filter) (Off / On)
Digital Image Stabilization	Off / On
Defog	Off/Auto/Manual
Motion Detection	Off / On (4ea Rectangle zone)
Privacy Masking	Off / On (12 Zones of Rectangle zone)
Gain Control	Off / Low / Middle / High
White Balance	ATW / AWC / Manual / Indoor / Outdoor / Mercury / Sodium
Electronic Shutter Speed	Minimum / Maximum / Anti flicker (2 ~ 1/33,000sec)
Digital Zoom	16x
Flip / Mirror	Off / On
Intelligent Video Analytics	Detection / Tracking / Fixed Moved / Tampering
Remote Control I/F	RS-485, Coaxial
Protocol	RS-485: Samsung-T/E, Pelco-D/P, Panasonic, Bosch, AD, Vicon, Honeywell Coaxial: ACP (AHD Coax Protocol)
Video Transmission Distance	500m(5C2V Coaxial Cable)
Environmental	
Operating Temperature / Humidity	-10°C ~ +55°C(+14°F ~ +131°F) / Less than 90% RH
Storage Temperature / Humidity	-10°C ~ +60°C (-22°F ~ +140°F) / Less than 90% RH
Ingress Protection	-
Vandal Resistance	-
Electrical	
Input Voltage / Current	DC12V
Power Consumption	Max. 6W
Mechanical	
Color / Material	Dark Gray / Metal
Dimension (WxHxD)	72.0x60.0x137.0mm
Weight	476g

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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 ☐ 240 Vac ☐ 100 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
CCTV CAMERA	HCZ-6320P	-	Hanwha Techwin (Tianjin) Co.,Ltd.	E.U.T

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
MONITOR	SMT-2232	C95V67VF900025B	Weihai Daewoo Electronics Co., Ltd.	-
Controller	SPC-1010	C50E67WD601003	SamSung Techwin Co.,Ltd	-
Controller adapter	RS-AB1000		Dongguan Jinhuasheng Power Technology Co.,Ltd	-
DVR	SDH-C74041	-	Hanwha Techwin (Tianjin) Co.,Ltd	-
DVR adapter	FJ-SW1202000U	-	-	
Mouse	-	-	Hanwha Techwin (Tianjin) Co.,Ltd	
Remote control	-	-	Hanwha Techwin (Tianjin) Co.,Ltd	



1.6 External I/O Cabling

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
CCTV CAMERA (E.U.T)	BNC	DVR	BNC	4.0	S
	RJ-45	Controller	2 pin	3.0	U
DVR	USB	Mouse	USB	1.4	U
	HDMI	MONITOR	HDMI	1.7	S
	-	Remote controller	-	-	-

* Unshielded=U, Shielded=S

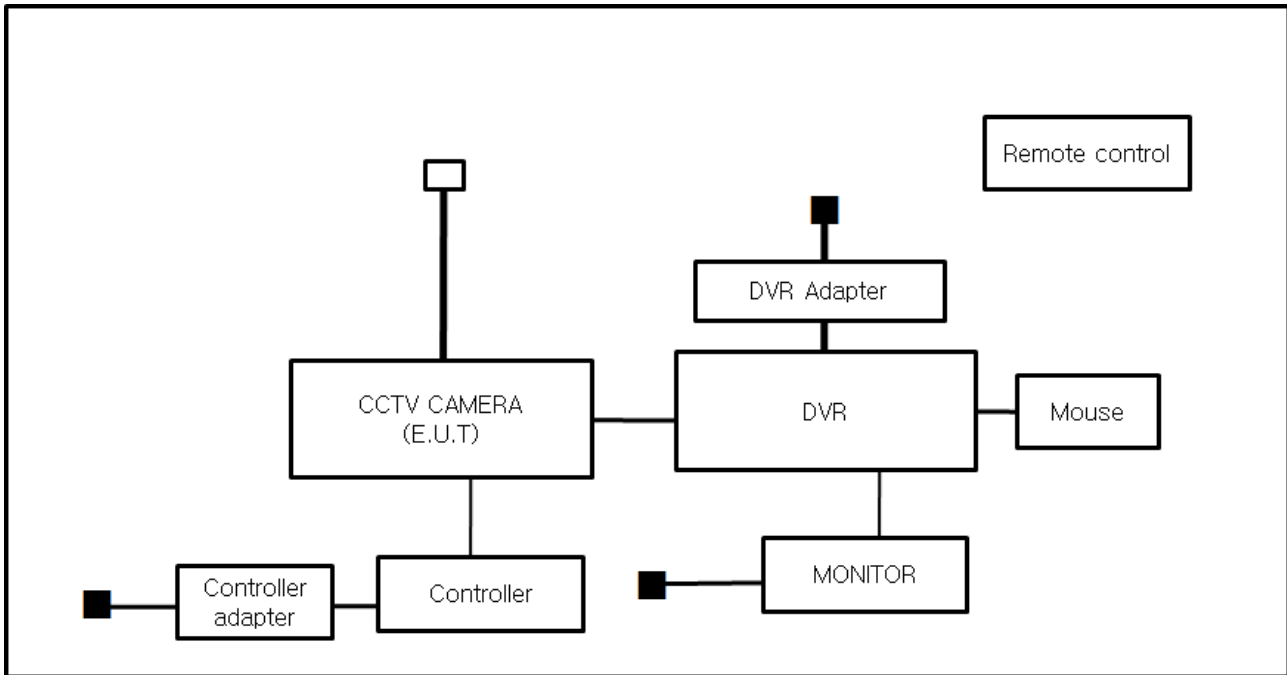
1.7 EUT Operating Mode(s)

Test mode	operating
OP	E.U.T Monitoring

E.U.T Test operating S/W		
Name	Version	Manufacture Company
-	-	-

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, 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 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 CISPR 32:2013**

☒ 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



2.1 Conducted Emissions at Mains Power Ports

Test Date

N/A

Test Location

Electro wave Shieldroom

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, 11, 2018
☐	LISN	ESH2-Z5	R & S	100450	04, 27, 2018
☐	PULSE LIMITER	ESH3-Z2	R & S	101915	12, 13, 2017

Test Conditions

Temperature: °C
Relative Humidity: %

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

N/A



2.2 Conducted Emissions at Telecommunication Ports

Test Date

N/A

Test Location

Electro wave Shieldroom

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, 11, 2018
☐	LISN	ESH2-Z5	R & S	100450	04, 27, 2018
☐	PULSE LIMITER	ESH3-Z2	R & S	101915	12, 13, 2017
☐	8-WIRE ISN CAT3,5	ENY81	R & S	100174	01, 11, 2018
☐	8-WIRE ISN CAT6	ENY81-CAT6	R & S	101665	01, 11, 2018

Test Conditions

Temperature: °C

Relative Humidity: %

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

N/A

2.3 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Aug. 14, 2017

Test Location☐ OPEN AREA TEST SITE #1 ☒ SAC #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	12, 13, 2017
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	716	11, 28, 2018

Test Conditions

Temperature: 24,5 °C

Relative Humidity: 57,2 %

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.



2.4 Radiated Electric Field Emissions(Above 1 GHz)

Test Date

Aug. 17, 2017

Test Location

SEMI ANECHOIC CHAMBER #2

Test Equipment

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

Test Conditions

Temperature: 23,1 °C

Relative Humidity: 49,6 %

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.



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APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

[HOT]

N/A

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[NEUTRAL]

N/A

◆ 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))

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Conducted Emissions at Telecommunication Ports

[10 Mbps]

N/A

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[100 Mbps]

N/A

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

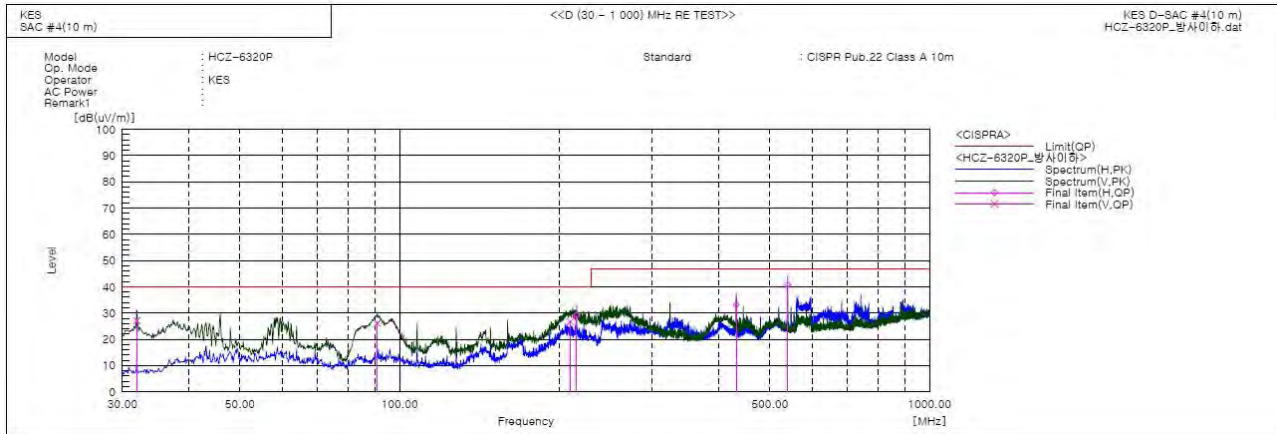
Reading Value : Not shown in the table.

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(μV)]	c.f [dB(1/m)]	Result QP [dB(μV/m)]	Limit QP [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remai
1	31.940	V	59.1	-32.0	27.1	40.0	12.9	150.0	316.0	
2	90.868	V	56.2	-30.1	26.1	40.0	13.9	150.0	77.0	
3	210.062	V	53.3	-26.5	26.8	40.0	13.2	141.0	201.0	
4	215.998	H	55.5	-26.4	29.1	40.0	10.9	400.0	355.0	
5	432.065	H	52.5	-19.4	33.1	47.0	13.9	200.0	350.0	
6	539.996	H	56.8	-16.0	40.8	47.0	6.2	231.0	264.0	

◆ Calculation – SAC #4(10 m)

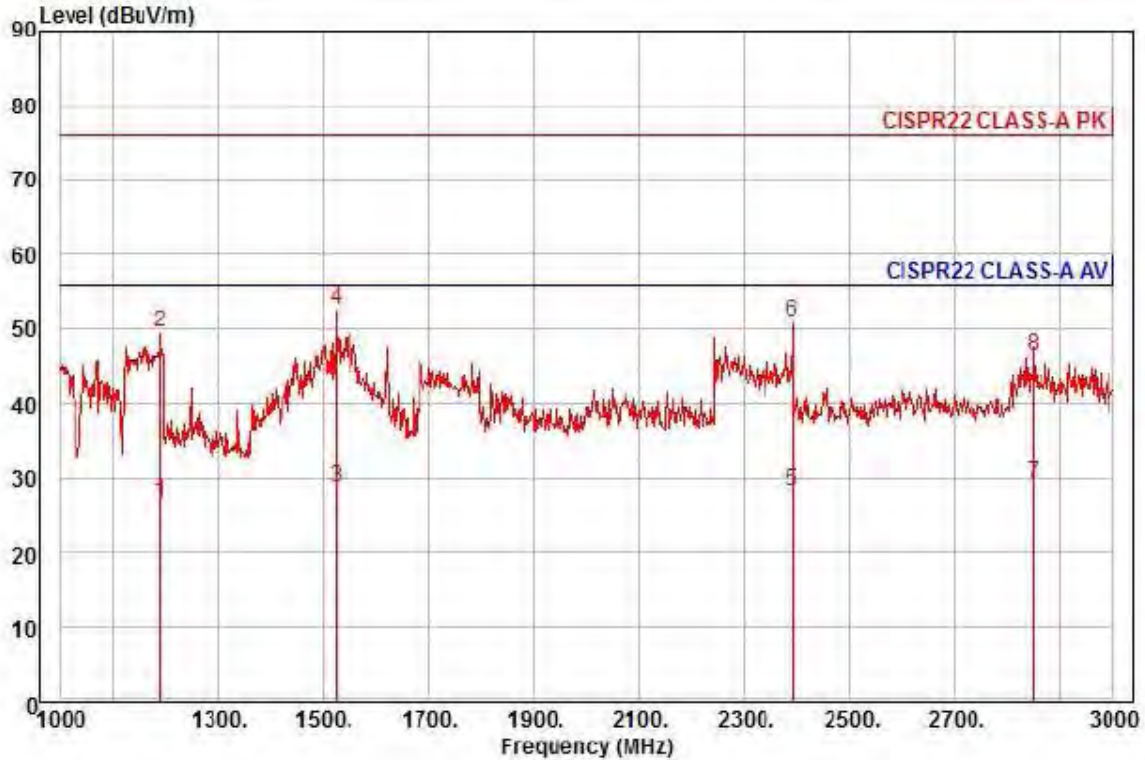
Result(QP) [dB(μV/m)] = (Reading(QP)[dB(μV)] + c.f[dB(1/m)]

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

Radiated Electric Field Emissions(Above 1 GHz)



Site : chamber
Condition: CISPR22 CLASS-A PK 3m STLP9149(RRA CAL 2017-05-18) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : HCZ-6320P
Mode :
Memo :

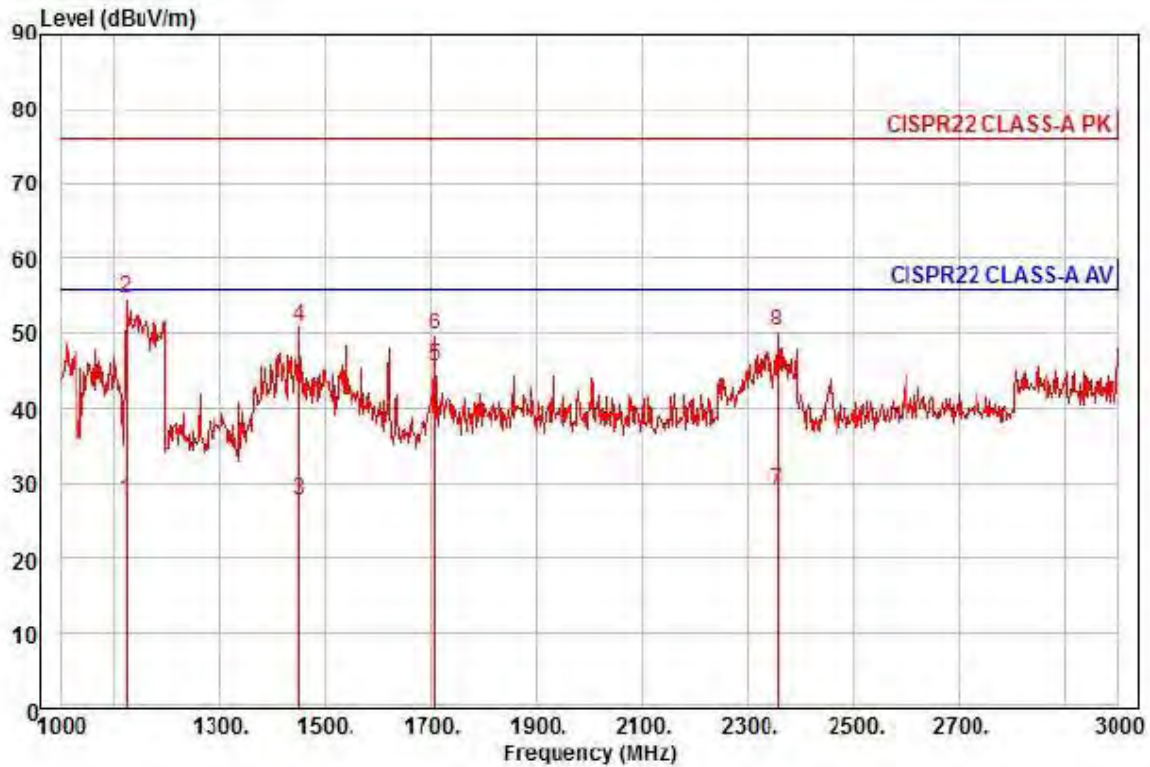
	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	1190.00	32.37	23.08	7.25	35.89	54	56.00	-29.19	horizontal	Average
2	1190.00	55.16	23.08	7.25	35.89	54	76.00	-26.40	horizontal	Peak
3	1524.00	31.97	24.12	8.29	35.59	26	56.00	-27.21	horizontal	Average
4 pp	1524.00	56.02	24.12	8.29	35.59	26	76.00	-23.16	horizontal	Peak
5	2392.00	25.65	27.20	10.58	35.32	46	56.00	-27.89	horizontal	Average
6	2392.00	48.58	27.20	10.58	35.32	46	76.00	-24.96	horizontal	Peak
7 av	2850.00	23.76	29.08	11.74	35.50	354	56.00	-26.92	horizontal	Average
8	2850.00	40.93	29.08	11.74	35.50	354	76.00	-29.75	horizontal	Peak



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Site : chamber
Condition: CISPR22 CLASS-A PK 3m STLP9149(RRA CAL 2017-05-18) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : HCZ-6320P
Mode :
Memo :

	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	1122.00	33.82	22.87	7.03	35.95	13	56.00	-28.23	vertical	Average
2 pk	1122.00	60.65	22.87	7.03	35.95	13	76.00	-21.40	vertical	Peak
3	1452.00	31.45	23.87	8.08	35.66	16	56.00	-28.26	vertical	Average
4	1452.00	54.64	23.87	8.08	35.66	16	76.00	-25.07	vertical	Peak
5 pp	1708.00	47.29	24.85	8.82	35.43	176	56.00	-10.47	vertical	Average
6	1708.00	51.55	24.85	8.82	35.43	176	76.00	-26.21	vertical	Peak
7	2358.00	26.64	27.10	10.50	35.31	35	56.00	-27.07	vertical	Average
8	2358.00	47.97	27.10	10.50	35.31	35	76.00	-25.74	vertical	Peak

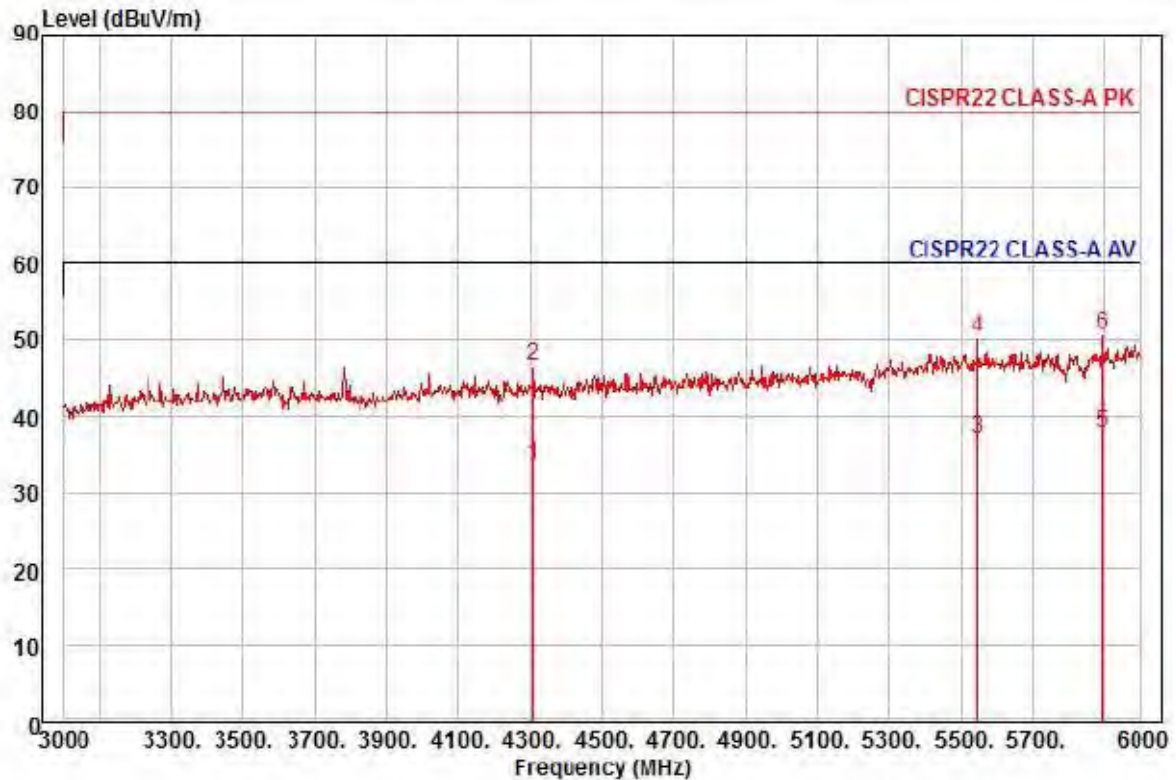
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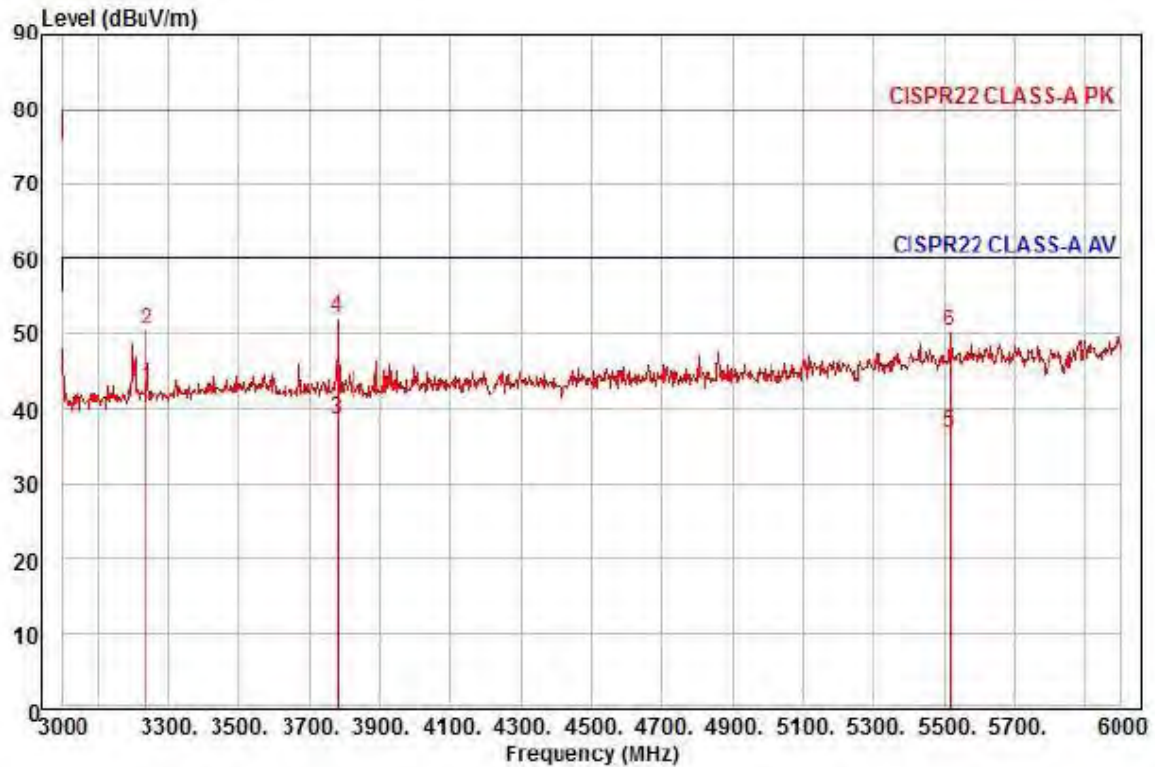
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Site : chamber
Condition: CISPR22 CLASS-A PK 3m STLP9149(RRA CAL 2017-05-18) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : HCZ-6320P
Mode :
Memo :

	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	4308.00	22.06	32.41	14.62	35.39	136	60.00	-26.30	horizontal	Average
2	4308.00	34.88	32.41	14.62	35.39	136	80.00	-33.48	horizontal	Peak
3	5544.00	20.66	35.44	16.68	35.66	287	60.00	-22.88	horizontal	Average
4	5544.00	33.90	35.44	16.68	35.66	287	80.00	-29.64	horizontal	Peak
5 pp	5895.00	20.18	35.96	17.33	35.68	223	60.00	-22.21	horizontal	Average
6 pk	5895.00	33.05	35.96	17.33	35.68	223	80.00	-29.34	horizontal	Peak

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Site : chamber
Condition: CISPR22 CLASS-A PK 3m STLP9149(RRA CAL 2017-05-18) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : HCZ-6320P
Mode :
Memo :

	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 3240.00	35.25	30.42	12.73	35.49	190	60.00	-17.09	vertical	Average
2 3240.00	42.85	30.42	12.73	35.49	190	80.00	-29.49	vertical	Peak
3 3780.00	28.45	31.91	13.60	35.34	193	60.00	-21.38	vertical	Average
4 pk 3780.00	42.03	31.91	13.60	35.34	193	80.00	-27.80	vertical	Peak
5 5517.00	20.52	35.40	16.64	35.66	351	60.00	-23.10	vertical	Average
6 5517.00	33.82	35.40	16.64	35.66	351	80.00	-29.80	vertical	Peak

◆ Calculation

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

Over Limit : Margin, Read Level : Reading value, Ant Factor : ANT Factor,

Cable Loss : Cable loss, Preamp Factor : Preamp Factor, ATT : Attenuator Factor



KES Co., Ltd.

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Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Test report No.:
KES-E1-17T0582
Page (24) of (32)

Test Setup Photos and Configuration

Conducted Voltage Emissions

N/A

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Test report No.:
KES-E1-17T0582
Page (25) of (32)

Conducted Telecommunication Emissions

N/A

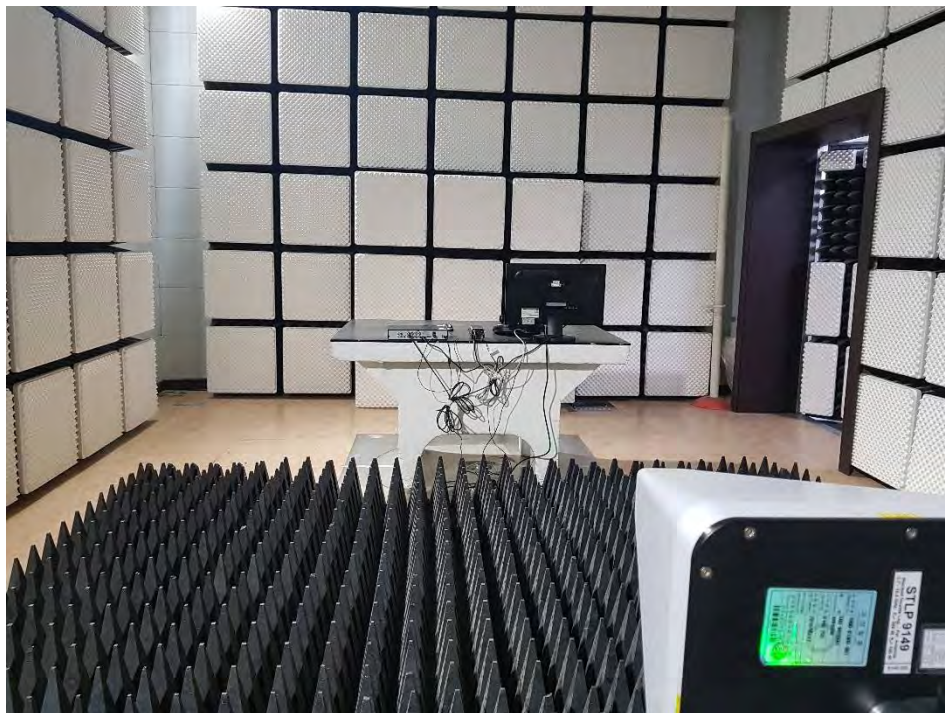
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Radiated Electric Field Emissions(Below 1 GHz)



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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

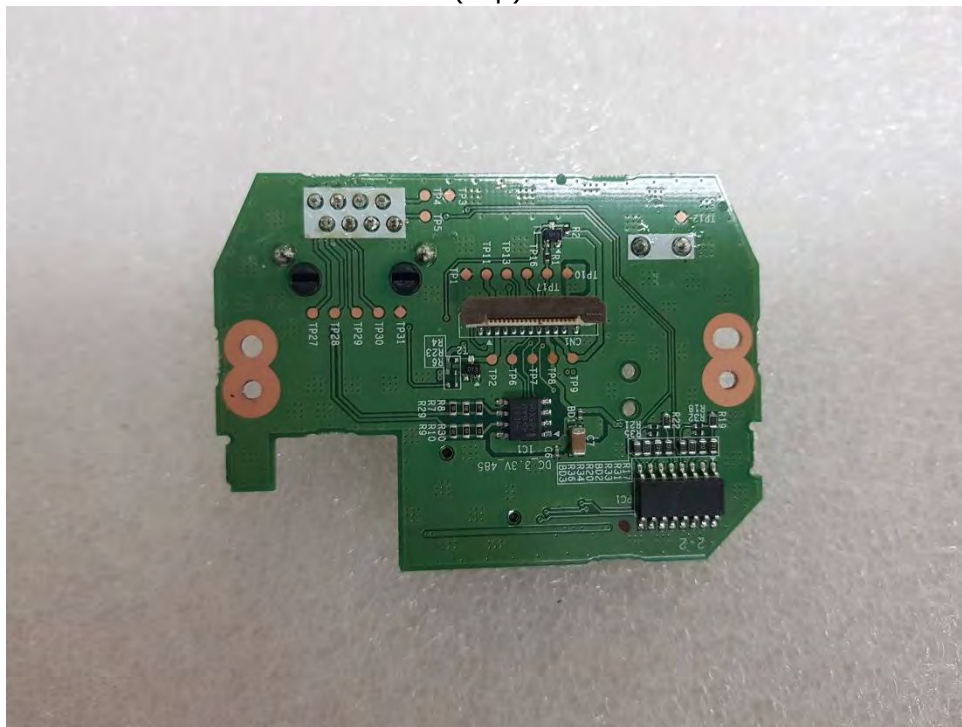
(Internal View)



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EUT Internal View – board 1

(Top)



(Bottom)



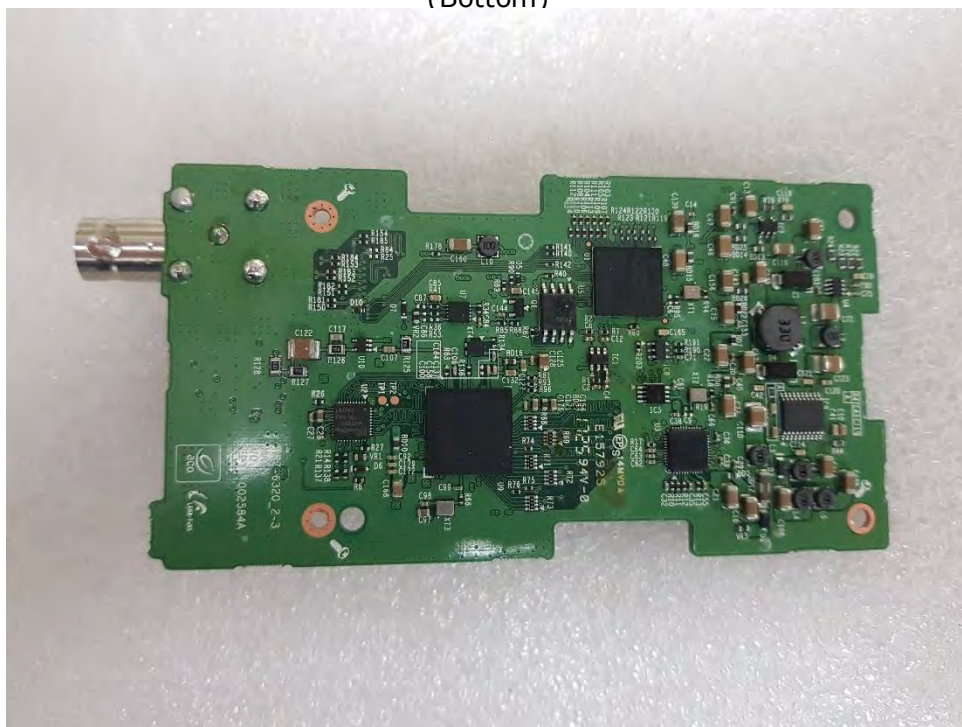
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EUT Internal View – board 2

(Top)



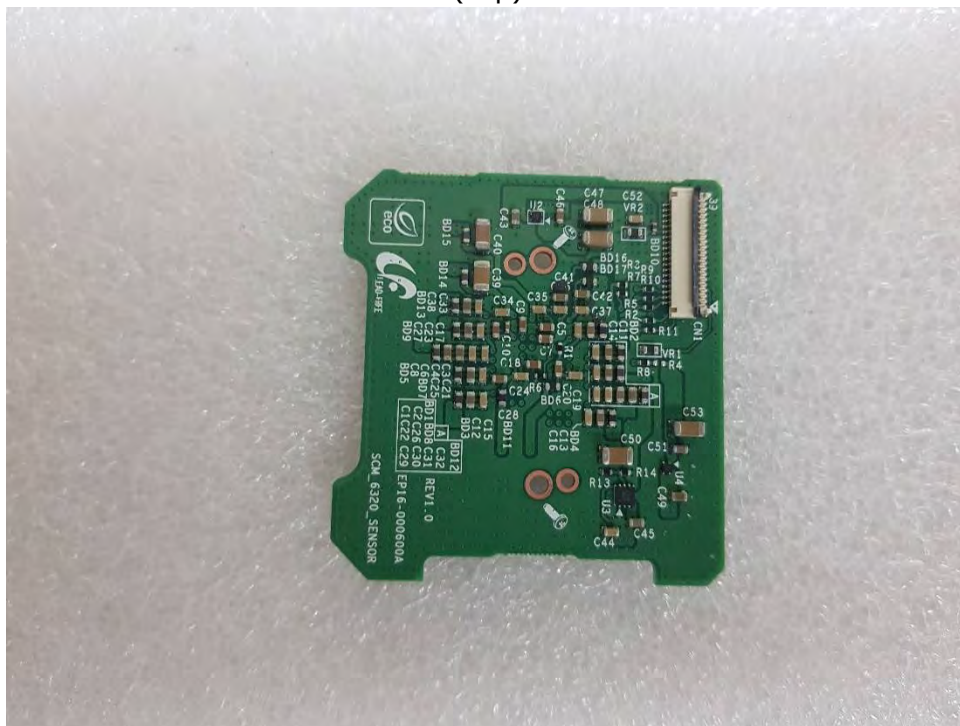
(Bottom)



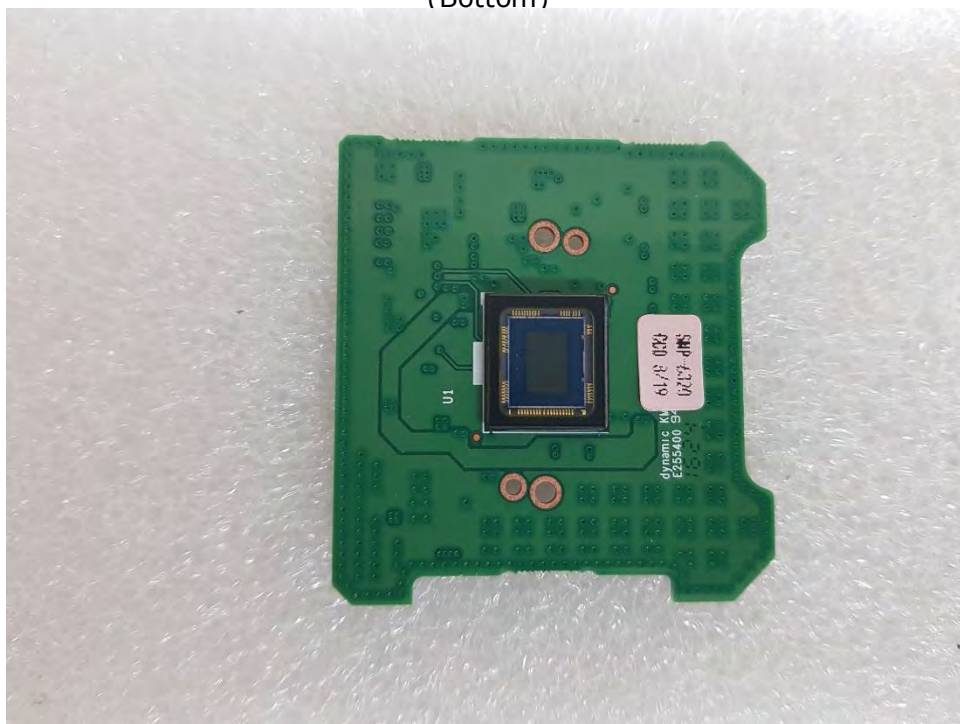
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EUT Internal View – board 3

(Top)



(Bottom)



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