



EMC TEST REPORT For CE

Test Report No. : KES-E1-17T0036-R2
Date of Issue : May, 15, 2019
Product name : CCTV CAMERA
Model/Type No. : HCP-6320HA
Variant Model : HCP-6230HP, HCP-6230H
Applicant : Hanwha Techwin Co., Ltd.
Applicant Address : 6, Pangyo-ro 319 Beon-gil, Bundang-gu, Seongnam-si,
Gyeonggi-do, 13488, KOREA
Manufacturer : 1. HANWHA TECHWIN(TIANJIN) CO., LTD
2. HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.
3. D-TECH CO.,LTD.
Manufacturer Address : 1. No.11 Weiliu Rd, Micro-Electronic Industrial Park, TEDA, Tianjin,
300385, People's Republic of China
2. Lot O-2, Que Vo Industrial Zone extended area,
Nam Son commune, Bac Ninh city, Bac Ninh province, Vietnam
3. 173-25, Saneop-ro, Gwonseon-gu, Suwon-si, Gyeonggi- do,
Korea (Suwon Industrial Complex)
Date of Receipt : Jan. 05, 2017
Test date : Jan. 09, 2017 ~ Jan. 12, 2017
Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Young Jun, Jo
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
Jan. 19, 2017	KES-E1-17T0036	Issued
May. 22, 2017	KES-E1-17T0036-R1	It is reissue Because has changed the software and manufacturer
May. 15, 2019	KES-E1-17T0036-R2	Changed model name, customer's address, factory addition, variant model addition and application standard due to customer request.

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1.0 General Product Description

Main Specifications of E.U.T 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) , 0.005 Lux(2sec, F1.6, 50IRE) B/W : 0.03 Lux (1/30sec, F1.6, 50IRE), 0.0005 Lux(2sec, F1.6, 50IRE) 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	BNC (AHD)	
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	Wide 1.4m ,Tele 1.9m
	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	Preset : 700°/sec, Manual : 0.024°/sec ~200°/sec	
	Tilt Range	210°(-15° ~195°)	
	Tilt Speed	Preset : 700°/sec, Manual : 0.024°/sec ~200°/sec	
	Preset	255ea	
	Preset Accuracy	±0.2°	
	Azimuth	Yes (E/W/S/N/NE/SE/NW/SW OSD)	
Electrical	Input Voltage / Current	AC24V±10%	
	Power Consumption	20W	24W Max(Heater Off), 65W Max(Heater On, AC24V)
Mechanical	Color / Material	Ivory / Plastic	Ivory / Plastic+Metal
	Dimension (WxHxD)	H218 x Ø152 mm	H293.6 x Ø223.4 mm
	Weight	1.7Kg	3.3Kg

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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 ☐ 220 Vac ☐ 230 Vac ☐ 240 Vac ☒ 24 Vac ☐ PoE
Frequency ☒ 50 Hz ☐ 60 Hz ☐ Hz

1.2 Variant Model Differences

Variant Model	Differences
HCP-6230HP	Change the Software
HCP-6230H	Add derivative model for vendor management

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
CCTV CAMERA	HCP-6320HA	-	Hanwha Techwin (Tianjin) Co.,Ltd.	E.U.T

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
DVR	SDR-C75300N	ZBJ96V2G40001SB	Samsung Electronics Co., Ltd.	-
DVR AC/DC Adapter	FSP060-DIBAN2	-	FSP GROUP INC.	-
Monitor	SMT-2232	C95V67VF900015Y	Weihai Daewoo Electronics Co., Ltd.	-
Mouse	MSU0846	0910020101126E	MONEUAL	-
Alarm1	SIP-1201DD D0	C53R67JZ301878 L	SAMSUNG TECHWIN CO., LTD.	-
Alarm2	-	-	-	-

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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	3.5	S
	3 PIN	Alarm1	3 PIN	3.0	U
	3 PIN	Alarm2	3 PIN	3.0	U
DVR	HDMI	Monitor	HDMI	1.5	S
	USB	Mouse	USB	1.2	U

* Unshielded=U, Shielded=S

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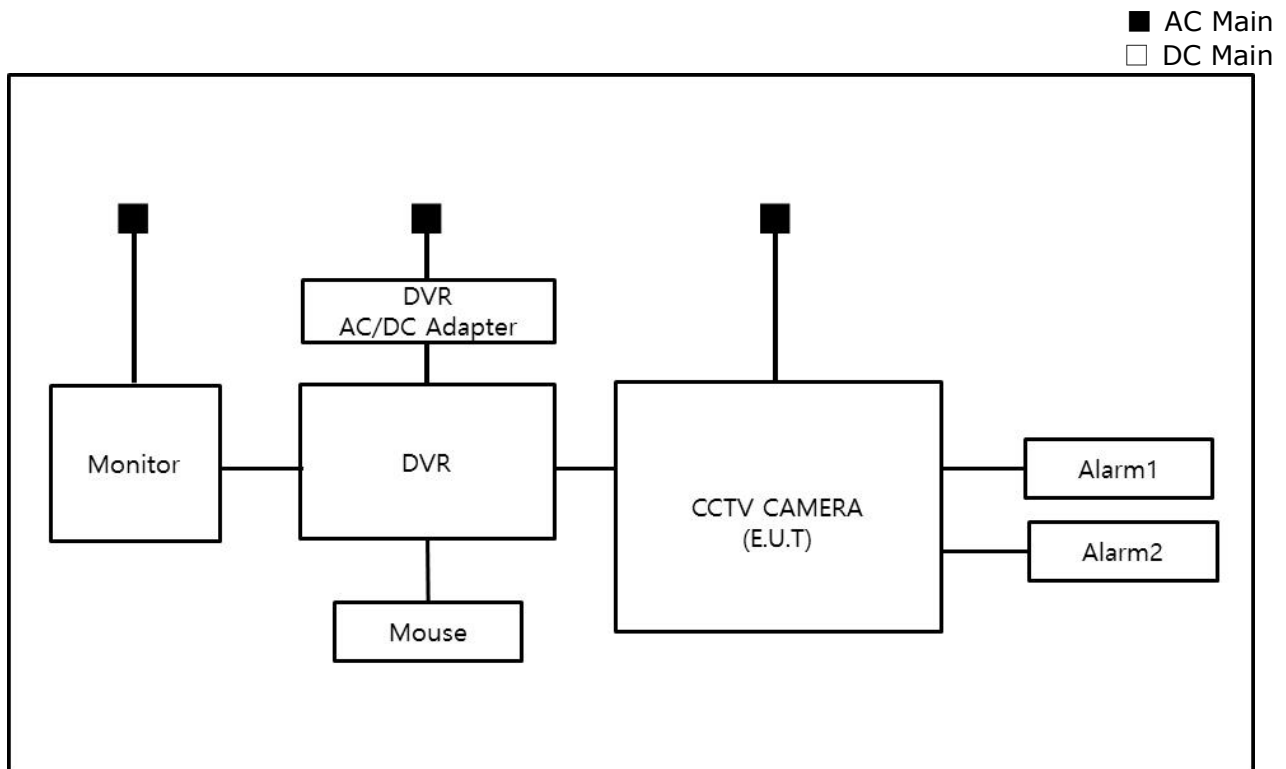
1.7 E.U.T Operating Mode(s)

Equipment under test was operated during the measurement under the following conditions:

operating
E.U.T Monitoring

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

1.8 Configuration



1.9 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.

1.10 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 16-1-4:2012

1.12 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
KOREA	RRA	EMI (3 m & 10 m Semi-Aechoic 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-Aechoic Chamber , and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 KT489
USA	FCC	3 m & 10 m Semi-Aechoic Chamber, 10 m Open Area and Conducted test site to perform FCC Part 15/18 measurements.	 KR0100
Canada	ISED	3 m & 10 m Semi-Aechoic 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-4308, C-4798, T-2311, G-914
Europe	TÜV SÜD	EMI (3 m & 10 m Semi-Aechoic Chamber , 10 m Open Area and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 CARAT 17 07 01633 001



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 61547:2009

☒ EN 55032:2012/AC:2013

☒ Class A

☐ Class B

☐ EN 55024:2010 +A1:2015

☒ 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 V-3 / 2015.04 | ☐ Class A | ☐ Class B |
| ☐ AS/NZS CISPR22:2009 +A1:2010 | ☐ 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 | | |

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2.1 Conducted Emissions at Mains Power Ports

Test Date

Jan. 09, 2017

Test Location

Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test Receiver	ESR3	R & S	101783	05, 03, 2017
☒	LISN	ENV216	R & S	101137	02, 04, 2017
☒	LISN	ENV216	R & S	101786	05, 02, 2017
☒	PULSE LIMITER	ESH3-Z2	R&S	101914	12, 13, 2017
☒	Shield Room #3	-	SEMITEC	-	-
☒	EMI Test S/W	EMC32	R&S	9.12.00	-

Test Conditions

Temperature: 18,5 °C
Relative Humidity: 39,3 %

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.



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 Receiver	ESR3	R&S	101783	05, 03, 2017
☐	LISN	ENV216	R&S	101137	02, 04, 2017
☐	LISN	ENV216	R&S	101786	05, 02, 2017
☐	8-Wire ISN CAT3	CAT3 8158	Schwarzbeck Mess	8158-0019	04, 01, 2017
☐	8-Wire ISN CAT5	CAT5 8158	Schwarzbeck Mess	8158-0030	04, 01, 2017
☐	8-Wire ISN CAT6	NTFM 8158	Schwarzbeck Mess	8158-0029	08, 11, 2017
☐	Electro wave Shieldroom	-	SEMITEC	-	-
☐	EMI Test S/W	EMC32	R&S	9.12.00	-

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 : None, Telecommunication Port. Test is not applicable



2.3 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Jan. 10, 2017

Test Location

☐ Open Area Test Site #1 ☒ Open Area Test Site #2

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI TEST Receiver	ESR3	R&S	101781	05, 03, 2017
☒	Trilog-Broadband ANT	VULB 9163	Schwarzbeck	714	11, 28, 2018
☒	Open Area Test Site	-	KES	-	-
☒	Antenna Mast	-	DAEIL EMC	-	-
☒	Turn Table	-	DAEIL EMC	-	-
☒	EMI Test S/W	-	-	-	-

Test Conditions

Temperature: 1.0 °C
Relative Humidity: 48,0 %

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.



2.4 Radiated Electric Field Emissions(Above 1 GHz)

Test Date

Jan. 10, 2017

Test Location

Semi Anechoic Chamber #2

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test Receiver	ESU26	R&S	100552	04, 24, 2017
☒	Broadband Coaxial Preamplifier	BBV 9718	Schwarzbeck Mess - Elektronik	9718-246	10, 14, 2017
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	05, 07, 2017
☒	Semi Anechoic Chamber #2	-	SEMITEC	-	-
☒	Antenna Mast	-	AUDIX	-	-
☒	Turn Table	-	AUDIX	-	-
☒	EMI Test S/W	e3	AUDIX	8.083b	-

Test Conditions

Temperature: 19,1 °C

Relative Humidity: 40,1 %

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.



2.5 Harmonic Current Emissions

Test Date

N/A

Test Location

Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☐	AC Source	ACS 500 N	EM TEST	V1024106760	08, 08, 2017
☐	Digital Power Analyzer	DPA 500 N	EM TEST	V1024106759	08, 08, 2017
☐	EMI Test S/W	dpa.control	EM TEST AG	5.4.8.0	-

Test Conditions

Temperature: °C

Relative Humidity: %

Classification of Equipment for Harmonic Current Emissions

- ☐ Class A
- ☐ Class B
- ☐ Class C(Below 25 W)
- ☐ Class C(Above 25 W)
- ☐ Class D

Test Results

The requirements are:

- ☐ PASS
- ☐ NOT PASS
- ☒ NOT APPLICABLE

Remarks

N/A : Because the E.U.T power is less than 75 W, limits are not specified.



2.6 Voltage Fluctuations and Flicker

Test Date

N/A

Test Location

Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☐	AC Source	ACS 500 N	EM test	V1024106760	08, 08, 2017
☐	Digital Power Analyzer	DPA 500 N	EM test	V1024106759	08, 08, 2017
☐	EMI Test S/W	dpa.control	EM TEST AG	5.4.8.0	-

Test Conditions

Temperature: °C

Relative Humidity: %

Test Results

The requirements are:

- ☐ PASS
☐ NOT PASS
☒ NOT APPLICABLE

Remarks

N/A

3.0 Criteria for compliance

Criteria for compliance was based on the following guidelines:

EN 50130-4:2011 +A1:2014 Alarm systems-Part 4: Electromagnetic compatibility Product family standard: Immunity requirements for components of fire, intruder and social alarm systems

The variety and the diversity of the apparatus within the scope of this document makes it difficult to define precise criteria for the evaluation of the immunity test results.

If as a result of the application of the tests defined in this standard, the apparatus becomes dangerous or unsafe then the apparatus shall be deemed to have failed the test.

A functional description and a definition of performance by the manufacture and noted in the test report, based on the following criteria:

Electrostatic discharge

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the application of discharge is permissible, providing that is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change.

Radiated electromagnetic fields

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the application of discharge is permissible, providing which could be interpreted by associated equipment as a change, and no such

Flickering of indicators occurs at a field strength of 3 V/m.

For components of CCTV systems, where the picture is allowed at 10 V/m, providing.

(a) there is no permanent damage or change to EUT

(e.g. no corruption of memory or changes to programmable setting etc.)

(b) at 3 V/m, any deterioration of the picture is so minor that the system could still be used; and

(c) there is no observable deterioration of the picture at 1 V/m.



Fast transient burst / slow high energy voltage surge

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the application of discharge is permissible, providing

That there is no residual is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change.

Conducted RF immunity

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the application of discharge is permissible, providing

That there is no residual is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change,
and no such flickering of indicators oeuvres at $U = 130 \text{ dB}\mu\text{V}$.

For component of CCTV systems, where the status is monitored by observing the TV picture,
then deterioration of the picture is allowed at $U = 140 \text{ dB}\mu\text{V}$, providing:

- (a) there is no permanent damage or change to the EUT
(e.g. no corruption of memory or changes to programmable settings etc.)
- (b) at $U = 130 \text{ dB}\mu\text{V}$, any deterioration of the picture is so minor that the system could still be used; and
- (c) there in no observable deterioration of the picture at $U = 120 \text{ dB}\mu\text{V}$.

Voltage dip/interruption / Voltage variation

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the conditioning is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change. The EUT shall meet the acceptance criteria for the functional test, after the conditioning.

3.1 Electrostatic Discharge

Reference Standard

EN 61000-4-2:2009

Test Date

Jan. 11, 2017

Test Location

EMS-ESD: Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	ESD SIMULATOR	ESS-2000	Noise Ken	ESS05X4620	02, 24, 2017
☒	HCP	-	Noise Ken	-	-
☒	VCP	-	Noise Ken	-	-
☒	EMS Test S/W	N/A	N/A	N/A	-

Test Conditions

Temperature: 20,0 °C
Relative Humidity: 41,5 %
Atmospheric Pressure: 100,7 kPa

Test Specifications

Discharge Factor: ≥ 1 s

Discharge Impedance: 330 ohm / 150 pF

Kind of Discharge: Air, Contact (direct and indirect)

Polarity: Positive and Negative

Number of Discharge: 10 at all locations for Air discharge
10 at all locations for Contact discharge

Discharge Voltage:	Contact ☐ 2 kV ☐ 4 kV ☒ 6 kV ☐ 8 kV ☐ 15 kV	Air ☒ 2 kV ☒ 4 kV ☐ 6 kV ☒ 8 kV ☐ 15 kV	HCP ☐ 2 kV ☐ 4 kV ☒ 6 kV ☐ 8 kV ☐ 15 kV	VCP ☐ 2 kV ☐ 4 kV ☒ 6 kV ☐ 8 kV ☐ 15 kV
--------------------	---	---	---	---

Notes: HCP: Horizontal coupling plane
VCP: Vertical coupling plane

Required Performance Criteria: ☒ Complied

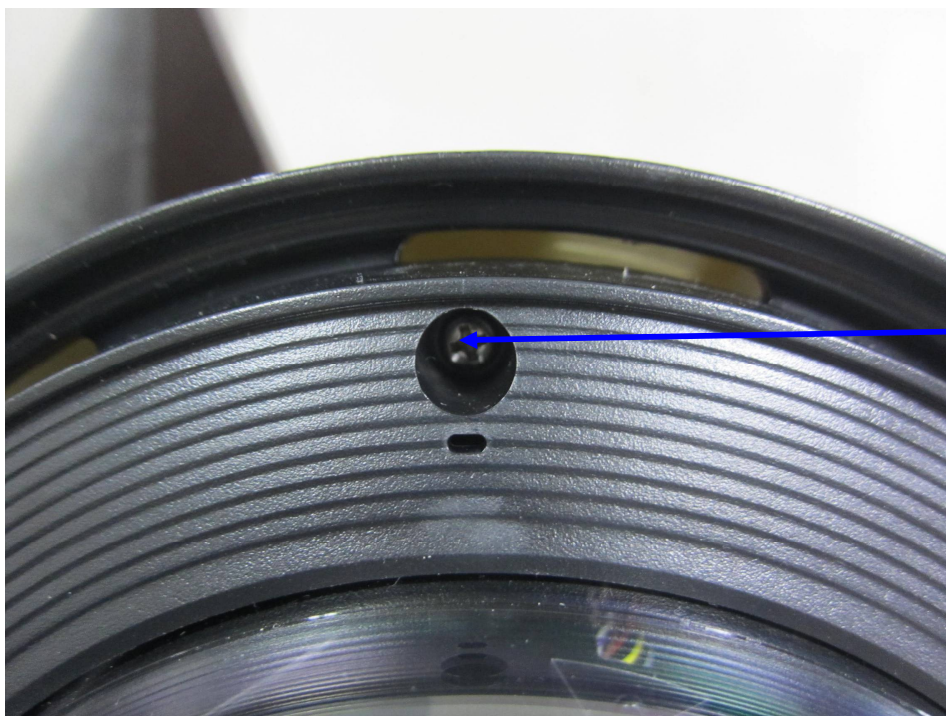
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Location of Discharge:

Air
Contact



1



2

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Indirect Discharge

No.	Test Point	Discharge Method	Performance Criteria	Results	Remarks
1	HCP Contact	Contact Discharge	Complied	Complied	-
2	VCP Contact	Contact Discharge	Complied	Complied	-

Direct Discharge

No.	Test Point	Discharge Method	Performance Criteria	Results	Remarks
1	Surface	Contact Discharge	Complied	Complied	-
2	Screw	Contact Discharge	Complied	Complied	-

Note: "Blank" = Not performed

Observations:

Complied – No degradation of function

Test Results

- ☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria

Remarks

PASS Required Performance Criteria.

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3.2 Radiated Electric Field Immunity

Reference Standard

EN 61000-4-3:2006 +A2:2010

Test Date

Jan. 12, 2017

Test Location

EMS-RS: ☐ Semi Anechoic Chamber #1 ☒ Semi Anechoic Chamber #2

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	Signal Generator	ESG-3000A	HP	US37040210	11, 01, 2017
☒	Amplifier	ITA0300-200	Infinitech	-	11, 01, 2017
☒	Amplifier	ITA0750-200	Infinitech	-	11, 01, 2017
☒	Amplifier	ITA1500-100	Infinitech	-	11, 01, 2017
☒	Amplifier	ITA2500-100	Infinitech	-	11, 01, 2017
☒	GPIO INTERFACE CONTROL	SYSTEM CONTROL UNIT	Infinitech	-	-
☒	POWER SUPPLY	SYSTEM POWER SUPPLY	Infinitech	-	-
☒	Power Meter	E4419B	Agilent	MY45101506	06, 27, 2017
☒	Average Power Sensor	E9301A	Agilent	-	06, 27, 2017
☒	Average Power Sensor	E9301A	Agilent	MY41495698	11, 17, 2017
☒	Stacked Double Log-Per-Antenna	STPL9128 D	SCHWARZBECK	9128D038	-
☒	Semi Anechoic Chamber #2	-	SEMITEC	-	-
☒	EMS Test S/W	KTI_RS2012	KOREA TECHNOLOGY INSTITUTE CO., LTD	2.1.1	-



Test Conditions

Temperature: 21,2 °C
Relative Humidity: 42,0 %
Atmospheric Pressure: 99,9 kPa

Test Specifications

Antenna Polarization: Horizontal & vertical unless indicated otherwise

Antenna Distance: ☒ 3 m

Field Strength: ☐ 1 V/m ☐ 3 V/m
☒ 10 V/m

Frequency Range: ☐ 80 MHz to 1 GHz ☐ 1,4 GHz to 2,7 GHz
☒ 80 MHz to 2,7 GHz

Modulation: ☒ AM, 80 %, 1 kHz sine wave
☒ PM, 1 Hz (0,5 s ON : 0,5 s OFF)

Frequency step: ☒ 1 % step

Dwell Time: ☐ 1 s ☒ 3 s

of Sides Radiated: ☒ 4

Required Performance Criteria: ☒ Complied

Test Data

Side Exposed	Observations	
	Horizontal	Vertical
Front	Complied	Complied
Right	Complied	Complied
Back	Complied	Complied
Left	Complied	Complied

Note: "Blank" = Not performed

Observations:
Complied – No degradation of function

Test Results

☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria

Remarks

PASS Required Performance Criteria.



3.3 Electrical Fast Transients/Bursts

Reference Standard

EN 61000-4-4:2012

Test Date

Jan. 11, 2017

Test Location

EMS-EFT: Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	Ultra Compact Simulator	UCS 500 N5	EM TEST	V0936105120	06, 27, 2017
☒	Capacitive Coupling Clamp	HFK	EM TEST	070925	06, 27, 2017
☒	Motor Variac	MV2616	EM TEST	V0936105123	06, 27, 2017
☒	EMS Test S/W	iec.control	EM TEST AG	5.0.9.0	-

Test Conditions

Temperature: 20,0 °C
Relative Humidity: 41,5 %
Atmospheric Pressure: 100,7 kPa

Test Specifications

Pulse Amplitude & Polarity:
(AC Power Lines) ☐ ± 1.0 kV ☒ ± 2.0 kV
☐ ± 4.0 kV

Pulse Amplitude & Polarity:
(Other supply / Signal Lines) ☐ ± 0.5 kV ☒ ± 1.0 kV
☐ ± 2.0 kV

Burst Period: ☒ 300 ms ☐ 2 s

Repetition Rate: ☐ 5 kHz ☒ 100 kHz

Duration of Test Voltage: ☒ ≥ 1 min

Required Performance Criteria: ☒ Complied

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Test Data☒ Input a.c. power ports – Coupling/Decoupling Network used

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
L – N	Complied	Complied

☐ Input d.c. power ports – Coupling/Decoupling Network used

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
-	-	-

☒ Signal ports and telecommunication ports – Coupling Clamp used

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
BNC	Complied	Complied
RS485 (Alarm 1)	Complied	Complied
RS485 (Alarm 2)	Complied	Complied

Note: “Blank” = Not performed

Observations:

Complied – No degradation of function

Test Results☒ PASS Required Performance Criteria☐ NOT PASS Required Performance Criteria**Remarks**

PASS Required Performance Criteria.

3.4 Surge Transients

Reference Standard

EN 61000-4-5:2014

Test Date

Jan. 11, 2017

Test Location

EMS-Surge: Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	ULTRA COMPACT SIMULATOR	UCS 500 N5	EM TEST	V0936105120	06, 27, 2017
☒	MOTOR VARIAC	MV2616	EM TEST	V0936105123	06, 27, 2017
☒	CDN	CNV 508N1	EM TEST	P1551168979	04, 27, 2017
☐	CDN	CNV 508T5	EM TEST	P1549168422	04, 27, 2017
☒	EMS Test S/W	iec.control	EM TEST	5.0.9.0	-

Test Conditions

Temperature: 20,0 °C
Relative Humidity: 41,5 %
Atmospheric Pressure: 100,7 kPa

Test Specifications

AC Power Lines

Source Impedance: 12 ohm for common mode and 2 ohm for differential mode

Surge Amplitude :

Common Mode

☐ (0,5 / 1,0 / 2,0) kV

Differential Mode

☒ (0,5 / 1,0) kV

Number of Surges:

☒ 5 surges per angle

Angle:

☒ 0°, 90°, 180°, 270° (input a.c. power port)

Polarity:

☒ Positive & Negative

Repetition Rate:

☒ 1 surge per min ☐ 1 surge per 30 sec.

Required Performance Criteria: ☒ Complied

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Other supply / Signal Lines

Source Impedance: 42 ohm for common mode

Surge Amplitude: Common Mode
☒ (0,5 / 1,0) kVNumber of Surges: ☒ 5 SurgesPolarity: ☒ Positive & NegativeRepetition Rate: ☒ 1 surge per min ☐ 1 surge per 30 sec.Required Performance Criteria: ☒ Complied**Test Data**☒ Line to Line – Differential Mode

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
L – N	Complied	Complied

☐ Line to Earth – Common Mode

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
-	-	-

Signal Lines☒ Line to Earth – Common Mode

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
BNC	Complied	Complied
RS485 (Alarm1)	Complied	Complied
RS485 (Alarm2)	Complied	Complied

Note: "Blank" = Not performed

Observations:

Complied – No degradation of function

Test Results☒ PASS Required Performance Criteria☐ NOT PASS Required Performance Criteria**Remarks**

PASS Required Performance Criteria.

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3.5 Conducted Disturbance

Reference Standard

EN 61000-4-6:2014

Test Date

Jan. 11, 2017

Test Location

EMS-CS: Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	Continuous Wave Generator	CWS 500N1	EM TEST	V0936105119	08, 08, 2017
☒	6 dB Attenuator	ATT6	EM TEST	1208-34	08, 08, 2017
☒	CDN	CDN-M2/M3N	EM TEST	0909-06	08, 08, 2017
☐	CDN	CDN-T2-RJ11	EM TEST	0909-07	08, 08, 2017
☐	CDN	CDN-T4	EM TEST	0909-08	08, 08, 2017
☐	CDN	CDN-T8RJ45	EM TEST	0909-09	08, 08, 2017
☐	CDN	CDN-AF2	EM TEST	0909-10	08, 08, 2017
☐	CDN	CDN-AF4	EM TEST	0909-11	08, 08, 2017
☒	EM Injection Clamp	EM 101	Liithi	35943	02, 04, 2017
☒	EMS Test S/W	icd.control	EM TEST AG	5.3.7	-

Test Conditions

Temperature: 20,0 °C
Relative Humidity: 41,5 %
Atmospheric Pressure: 100,7 kPa



Test Specifications

Frequency range: ☒ 150 kHz to 100 MHz ☐ 10 kHz to 30 MHz
☐ 150 kHz to 230 MHz ☐ 10 kHz to 100 MHz

Voltage Level: ☐ 1 Vrms ☐ 3 Vrms
☒ 10 Vrms

Modulation: ☒ AM, 80 %, 1 kHz sine wave
☒ PM, 1 Hz (0,5 s ON : 0,5 s OFF)

Frequency step: ☒ 1 % step

Dwell Time: ☒ 1 s ☐ 3 s

Required Performance Criteria: ☒ Complied

Test Data

☒ Input a.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Observations
L - N	CDN (☒ M2, ☐ M3)	Complied

☐ Input d.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Observations
-	CDN (☐ M2, ☐ M3)	-

☒ Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Observations
BNC	EM Injection Clamp	Complied
RS485 (Alarm1)	EM Injection Clamp	Complied
RS485 (Alarm2)	EM Injection Clamp	Complied

Notes: CDN = Coupling Decoupling Network
"blank" = Not performed

Observations:

Complied – No degradation of function

Test Results

☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria

Remarks

PASS Required Performance Criteria.



3.6 Voltage Dips and Short Interruptions

Reference Standard

EN 61000-4-11:2004

Test Date

Jan. 11, 2017

Test Location

EMS-Voltage dip: Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	Ultra Compact Simulator	UCS 500 N5	EM TEST	V0936105120	06, 27, 2017
☒	Motor Variac	MV2616	EM TEST	V0936105123	06, 27, 2017
☒	EMS Test S/W	iec.control	EM TEST AG	5.0.9.0	-

Test Conditions

Temperature: 20,0 °C
Relative Humidity: 41,5 %
Atmospheric Pressure: 100,7 kPa



Test Specifications & Observations/Remarks

(Test Voltage : AC 24 V)

<u>Test Level</u>	<u>Duration [in period/ms (50 Hz)]</u>	<u>Results</u>
☒ 20 % dip	☒ 250 /5000	<u>Complied</u>
☒ 30 % dip	☒ 25 /500	<u>Complied</u>
☒ 60 % dip	☒ 10 /200	<u>Complied</u>
☒ 100 % dip	☒ 250 /5000	<u>Complied</u>

- Voltage variations

☒ Unom + 10 %	☒ 253.0 V (ac)	<u>Complied</u>
☒ Unom - 15 %	☒ 195.5 V (ac)	<u>Complied</u>

Observations:

Complied – Shutdown during the short interruption test. But self-recovered after test.

Test Results

- ☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria
☐ NOT APPLICABLE

Remarks

PASS Required Performance Criteria.

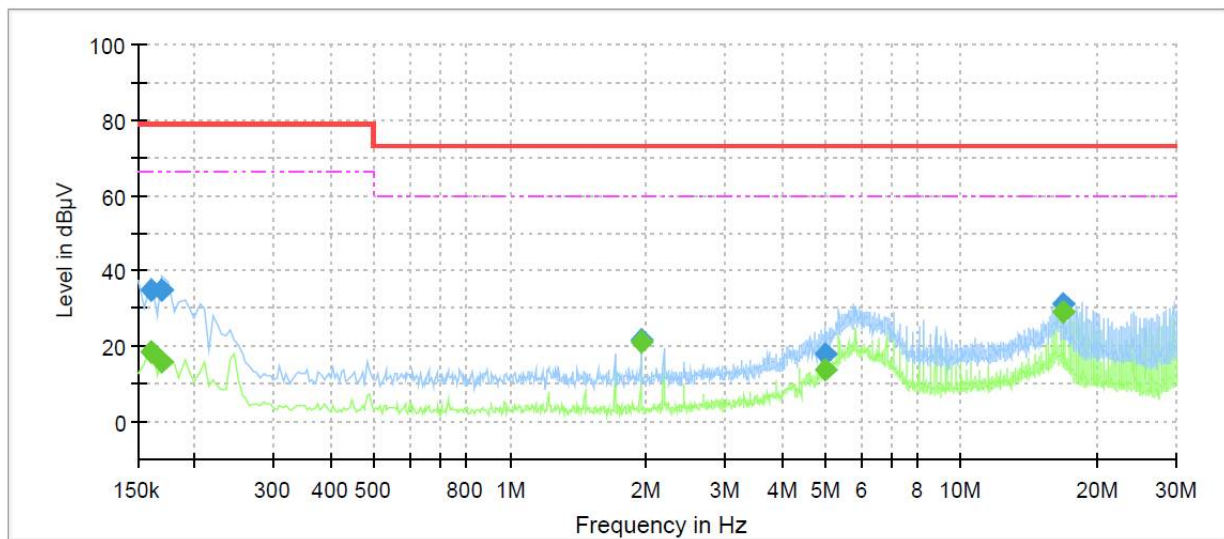
APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

[HOT]

Common Information

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



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.160000	---	18.79	66.00	47.21	1000.0	9.000	L1	21.1
0.160000	34.94	---	79.00	44.06	1000.0	9.000	L1	21.1
0.170000	---	16.09	66.00	49.91	1000.0	9.000	L1	21.0
0.170000	35.17	---	79.00	43.83	1000.0	9.000	L1	21.0
1.950000	---	21.42	60.00	38.58	1000.0	9.000	L1	19.9
1.950000	21.66	---	73.00	51.34	1000.0	9.000	L1	19.9
4.980000	---	13.65	60.00	46.35	1000.0	9.000	L1	19.8
4.980000	18.26	---	73.00	54.74	1000.0	9.000	L1	19.8
16.830000	---	29.37	60.00	30.63	1000.0	9.000	L1	20.1
16.830000	30.99	---	73.00	42.01	1000.0	9.000	L1	20.1

◆ 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)



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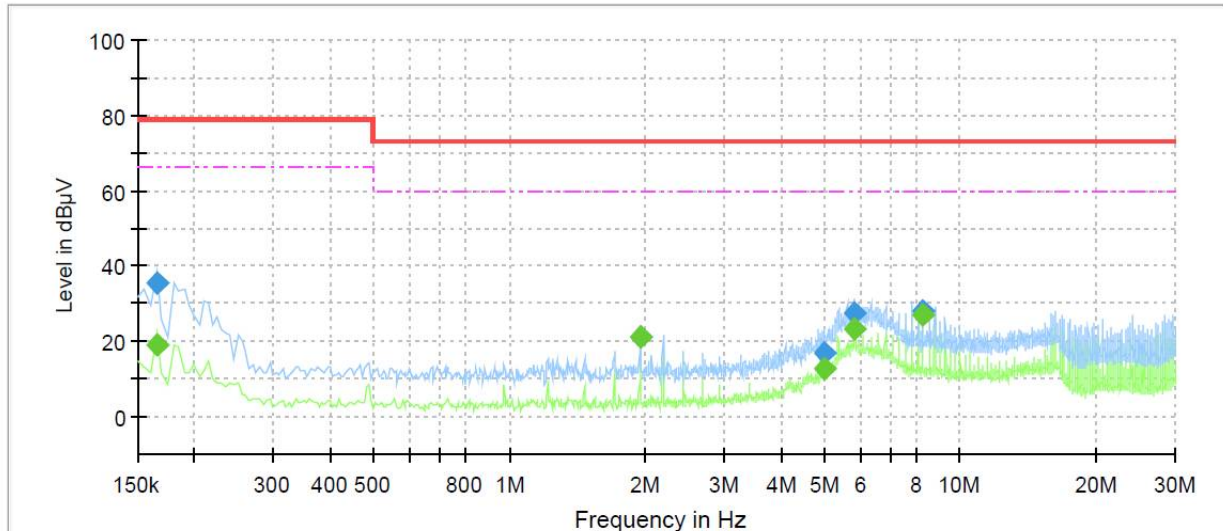
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[NEUTRAL]

Common Information

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



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.165000	---	19.26	66.00	46.74	1000.0	9.000	N	21.0
0.165000	35.26	---	79.00	43.74	1000.0	9.000	N	21.0
1.950000	---	21.13	60.00	38.87	1000.0	9.000	N	19.9
1.950000	21.39	---	73.00	51.61	1000.0	9.000	N	19.9
5.005000	---	12.57	60.00	47.43	1000.0	9.000	N	19.8
5.005000	17.06	---	73.00	55.94	1000.0	9.000	N	19.8
5.855000	---	23.49	60.00	36.51	1000.0	9.000	N	19.8
5.855000	27.52	---	73.00	45.48	1000.0	9.000	N	19.8
8.295000	---	26.79	60.00	33.21	1000.0	9.000	N	19.8
8.295000	27.91	---	73.00	45.09	1000.0	9.000	N	19.8

◆ 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)

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Conducted Emissions at Telecommunication Ports

[10 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)

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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)

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Radiated Electric Field Emissions(Below 1 GHz)

Frequency	Amplitude	ANT	ANT. Height	Correction Factor		Corrected Amplitude	Applicable Limit	Margin
[MHz]	[dB μ V]	Polar. (H/V)	[m]	ANT. [dB/m]	Cable [dB]	[dB μ V/m]	[dB μ V/m]	[dB]
148.49	25.14	H	4.00	7.83	3.55	36.52	40.00	3.48
148.50	23.20	V	1.02	7.83	3.55	34.58	40.00	5.42
222.74	12.05	H	3.75	12.12	4.39	28.56	40.00	11.44
222.77	17.78	V	1.14	12.12	4.39	34.29	40.00	5.71
297.00	24.33	H	4.00	13.36	5.13	42.82	47.00	4.18
297.00	24.14	V	1.35	13.36	5.13	42.63	47.00	4.37
445.50	14.72	H	3.77	16.40	6.74	37.86	47.00	9.14
445.50	15.27	V	1.00	16.40	6.74	38.41	47.00	8.59
594.03	15.76	H	4.00	19.20	7.78	42.74	47.00	4.26
594.40	15.91	V	1.03	19.21	7.78	42.90	47.00	4.10

* H : Horizontal, V : Vertical

◆ Calculation

Corrected Amplitude [dB μ V] = Amplitude[dBuV] + Correction Factor [dB]

Corrected Amplitude : The Final Value, Amplitude : Reading Value,

Correction Factor : ANT FACTOR + Cable loss



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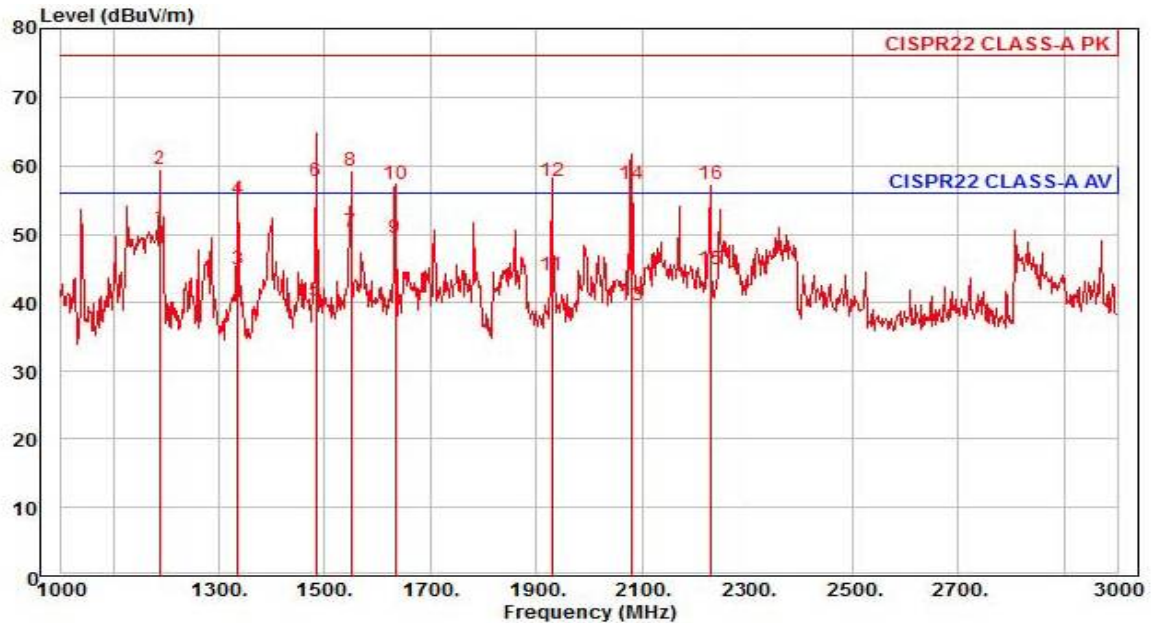
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Radiated Electric Field Emissions(Above 1 GHz)



Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : HCP-6320HAP
Mode :
Memo : 1 - 3 GHz

	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	pp	1188.00	58.83	24.66	7.10	39.64	40	56.00	-5.05	horizontal Average
2	pk	1188.00	67.41	24.66	7.10	39.64	40	76.00	-16.47	horizontal Peak
3		1336.00	51.38	25.24	7.54	39.28	35	56.00	-11.12	horizontal Average
4		1336.00	61.74	25.24	7.54	39.28	35	76.00	-20.76	horizontal Peak
5		1484.00	45.72	25.83	7.97	39.17	310	56.00	-15.65	horizontal Average
6		1484.00	63.18	25.83	7.97	39.17	310	76.00	-18.19	horizontal Peak
7		1550.00	55.28	26.09	8.16	39.20	29	56.00	-5.67	horizontal Average
8		1550.00	64.23	26.09	8.16	39.20	29	76.00	-16.72	horizontal Peak
9		1634.00	53.83	26.43	8.40	39.24	87	56.00	-6.58	horizontal Average
10		1634.00	61.73	26.43	8.40	39.24	87	76.00	-18.68	horizontal Peak
11		1930.00	46.56	27.60	9.16	39.38	43	56.00	-12.06	horizontal Average
12		1930.00	60.49	27.60	9.16	39.38	43	76.00	-18.13	horizontal Peak
13		2080.00	41.41	28.08	9.52	39.41	307	56.00	-16.40	horizontal Average
14		2080.00	59.04	28.08	9.52	39.41	307	76.00	-18.77	horizontal Peak
15		2228.00	45.97	28.44	9.87	39.42	49	56.00	-11.14	horizontal Average
16		2228.00	58.46	28.44	9.87	39.42	49	76.00	-18.65	horizontal Peak

◆ Calculation

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

Over Limit : Margin Value, Read Level : Reading Value, Ant Factor : Ant Factor,
Cable Loss : Cable loss, Preamp Factor : Preamp Factor

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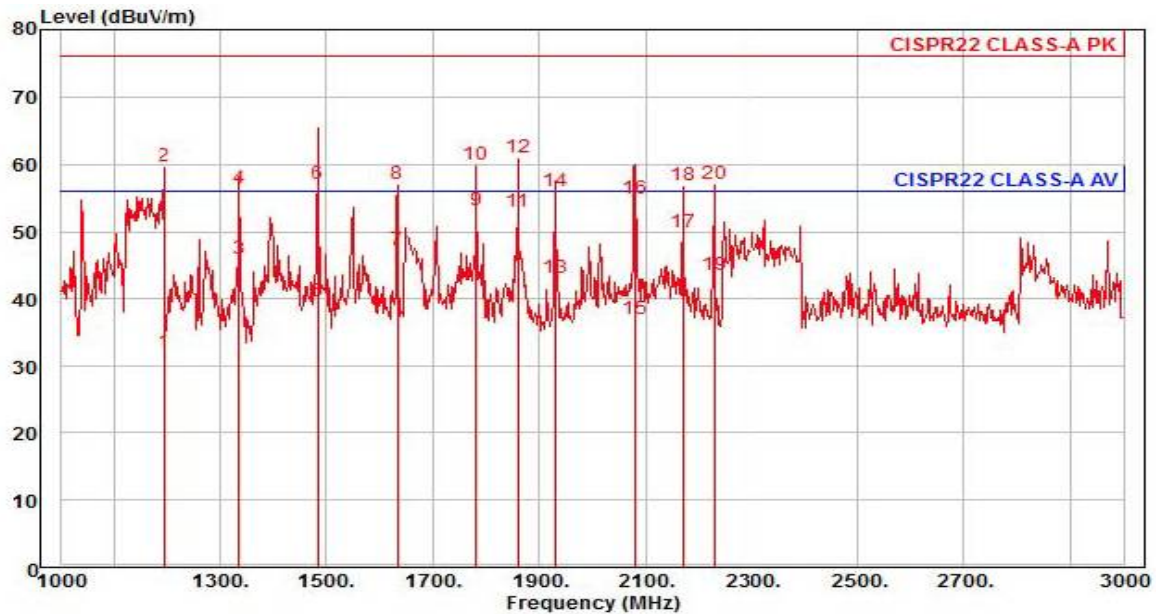
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Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : HCP-6320HAP
Mode :
Memo : 1 - 3 GHz

	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	1196.00	39.78	24.69	7.13	326	56.00	-24.02	vertical	Average
2	1196.00	67.58	24.69	7.13	326	76.00	-16.22	vertical	Peak
3	1336.00	52.48	25.24	7.54	22	56.00	-10.02	vertical	Average
4	1336.00	62.94	25.24	7.54	22	76.00	-19.56	vertical	Peak
5	1484.00	45.05	25.83	7.97	332	56.00	-16.32	vertical	Average
6	1484.00	62.55	25.83	7.97	332	76.00	-18.82	vertical	Peak
7	1634.00	51.78	26.43	8.40	354	56.00	-8.63	vertical	Average
8	1634.00	61.43	26.43	8.40	354	76.00	-18.98	vertical	Peak
9 pp	1782.00	56.81	27.01	8.78	186	56.00	-2.71	vertical	Average
10	1782.00	63.43	27.01	8.78	186	76.00	-16.09	vertical	Peak
11	1860.00	55.95	27.32	8.98	162	56.00	-3.09	vertical	Average
12 pk	1860.00	64.01	27.32	8.98	162	76.00	-15.03	vertical	Peak
13	1930.00	45.72	27.60	9.16	359	56.00	-12.90	vertical	Average
14	1930.00	58.65	27.60	9.16	359	76.00	-19.97	vertical	Peak
15	2080.00	38.86	28.08	9.52	290	56.00	-18.95	vertical	Average
16	2080.00	56.73	28.08	9.52	290	76.00	-21.08	vertical	Peak
17	2170.00	51.31	28.30	9.73	128	56.00	-6.07	vertical	Average
18	2170.00	58.26	28.30	9.73	128	76.00	-19.12	vertical	Peak
19	2228.00	44.81	28.44	9.87	183	56.00	-12.30	vertical	Average
20	2228.00	58.17	28.44	9.87	183	76.00	-18.94	vertical	Peak

◆ Calculation

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

Over Limit : Margin Value, Read Level : Reading Value, Ant Factor : Ant Factor,
Cable Loss : Cable loss, Preamp Factor : Preamp Factor

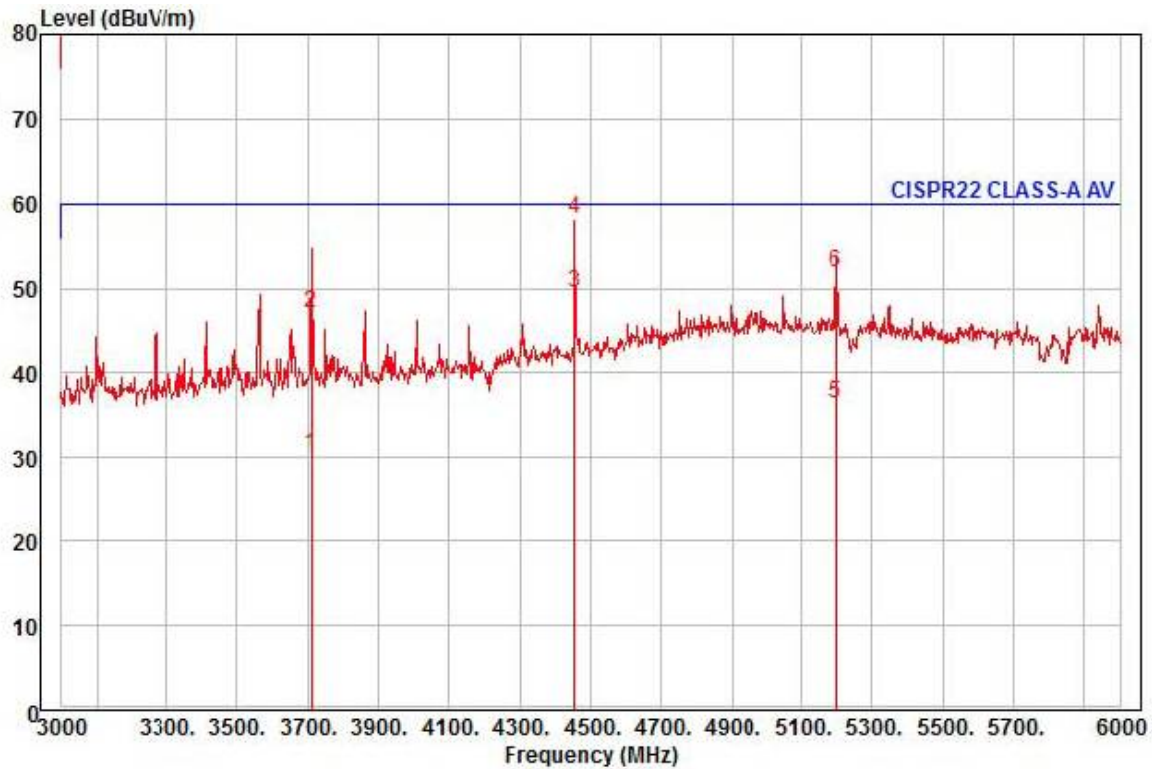
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Test report No.:
KES-E1-17T0036-R2
Page (39) of (62)



Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : HCP-6320HAP
Mode :
Memo : 3 - 6 GHz

		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	3711.00	26.59	31.52	13.01	40.80	317	60.00	-29.68	horizontal	Average
2	3711.00	43.27	31.52	13.01	40.80	317	80.00	-33.00	horizontal	Peak
3 pp	4455.00	41.16	34.61	14.38	40.76	5	60.00	-10.61	horizontal	Average
4 pk	4455.00	50.06	34.61	14.38	40.76	5	80.00	-21.71	horizontal	Peak
5	5199.00	24.08	37.32	15.71	40.60	63	60.00	-23.49	horizontal	Average
6	5199.00	39.38	37.32	15.71	40.60	63	80.00	-28.19	horizontal	Peak

◆ Calculation

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

Over Limit : Margin Value, Read Level : Reading Value, Ant Factor : Ant Factor,
Cable Loss : Cable loss, Preamp Factor : Preamp Factor

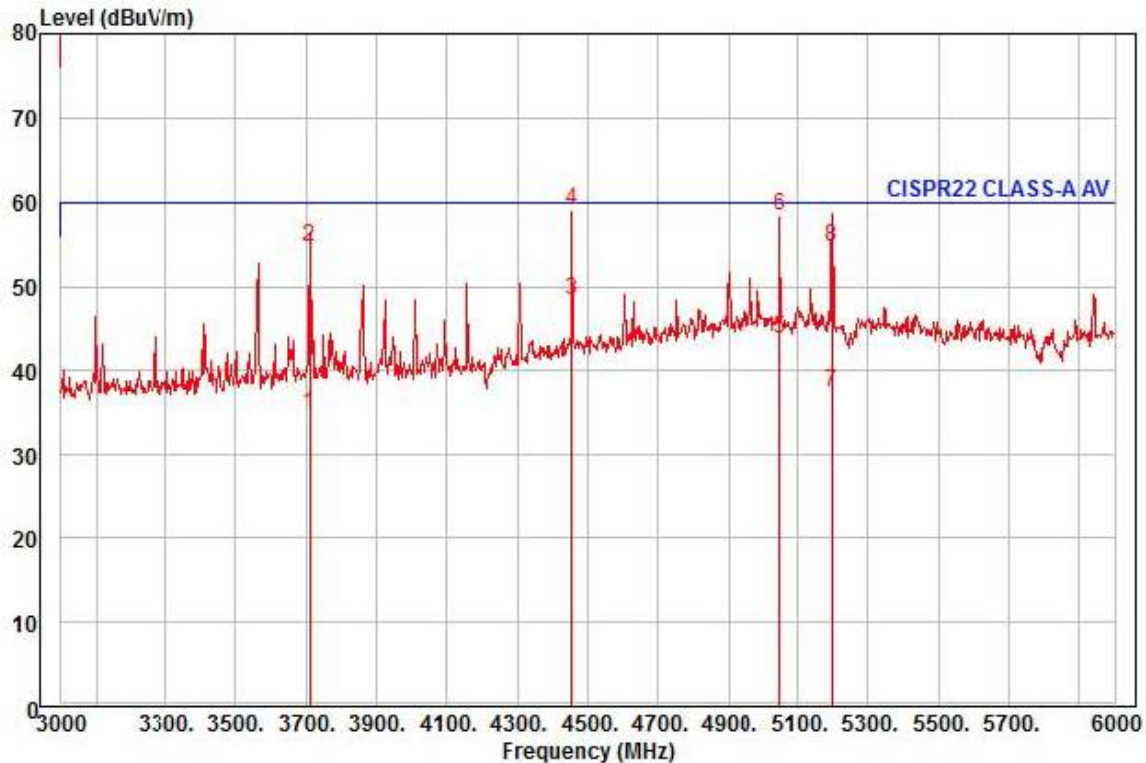
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Test report No.:
KES-E1-17T0036-R2
Page (40) of (62)



Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : HCP-6320HAP
Mode :
Memo : 3 - 6 GHz

	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPns	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	3711.00	31.15	31.52	13.01	40.80	175	60.00	-25.12	vertical	Average
2	3711.00	51.00	31.52	13.01	40.80	175	80.00	-25.27	vertical	Peak
3 pp	4455.00	40.13	34.61	14.38	40.76	1	60.00	-11.64	vertical	Average
4 pk	4455.00	50.74	34.61	14.38	40.76	1	80.00	-21.03	vertical	Peak
5	5049.00	31.07	37.62	15.41	40.35	360	60.00	-16.25	vertical	Average
6	5049.00	45.82	37.62	15.41	40.35	360	80.00	-21.50	vertical	Peak
7	5199.00	25.10	37.32	15.71	40.60	1	60.00	-22.47	vertical	Average
8	5199.00	42.34	37.32	15.71	40.60	1	80.00	-25.23	vertical	Peak

◆ Calculation

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

Over Limit : Margin Value, Read Level : Reading Value, Ant Factor : Ant Factor,
Cable Loss : Cable loss, Preamp Factor : Preamp Factor

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Test report No.:
KES-E1-17T0036-R2
Page (43) of (62)

Test Data - Voltage Fluctuations**Maximum Flicker results**

	EUT values	Limit	Result
Pst		N/A	
Plt			
dc [%]			
dmax [%]			
Tmax [s]			

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Test Setup Photos and Configuration

Conducted Voltage Emissions



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Test report No.:
KES-E1-17T0036-R2
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Conducted Telecommunication Emissions

N/A

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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Test report No.:
KES-E1-17T0036-R2
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Harmonic Current Emissions and Voltage Fluctuations and Flicker

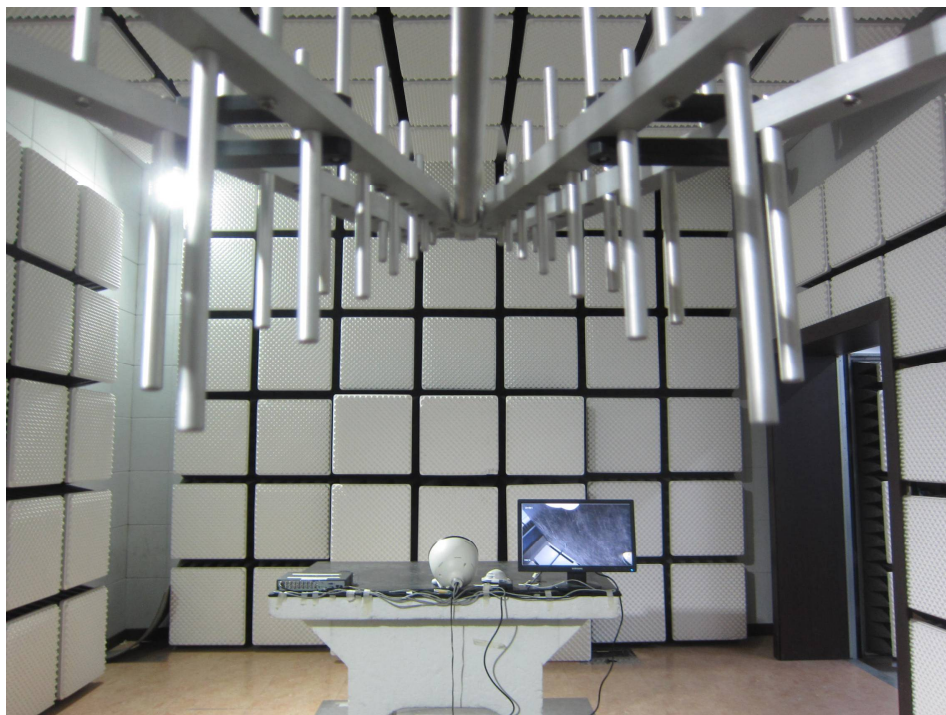
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Electrostatic Discharge



Radiated Electric Field Immunity



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Electrical Fast Transients/Bursts



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Surge Transients



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Conducted Disturbance



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Voltage Dips and Short Interruptions



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EUT External Photographs

(Top)



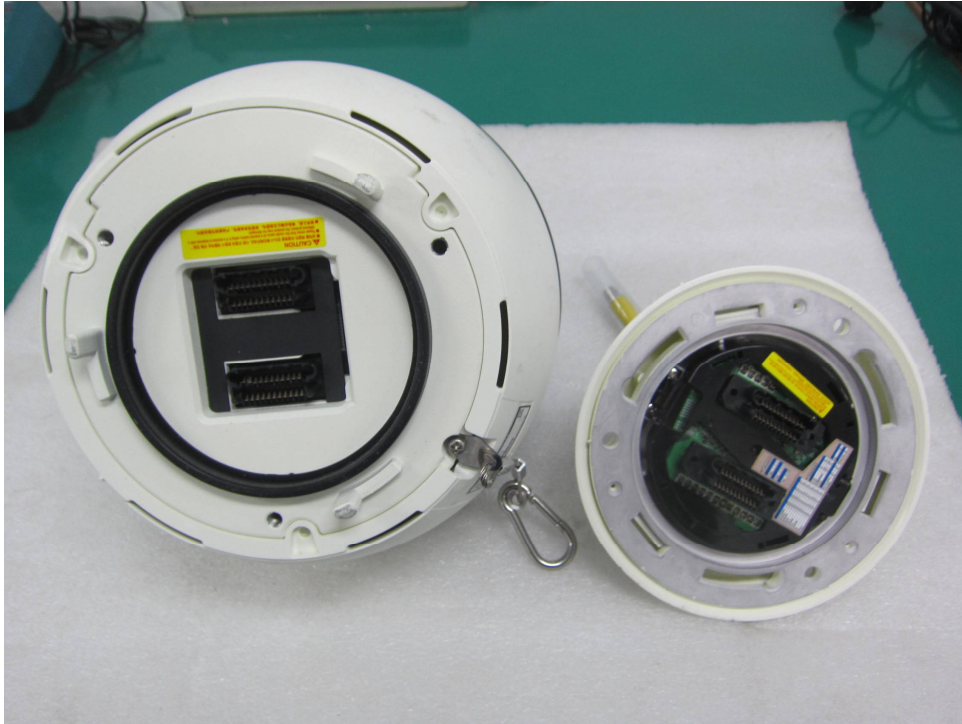
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EUT Internal Photographs

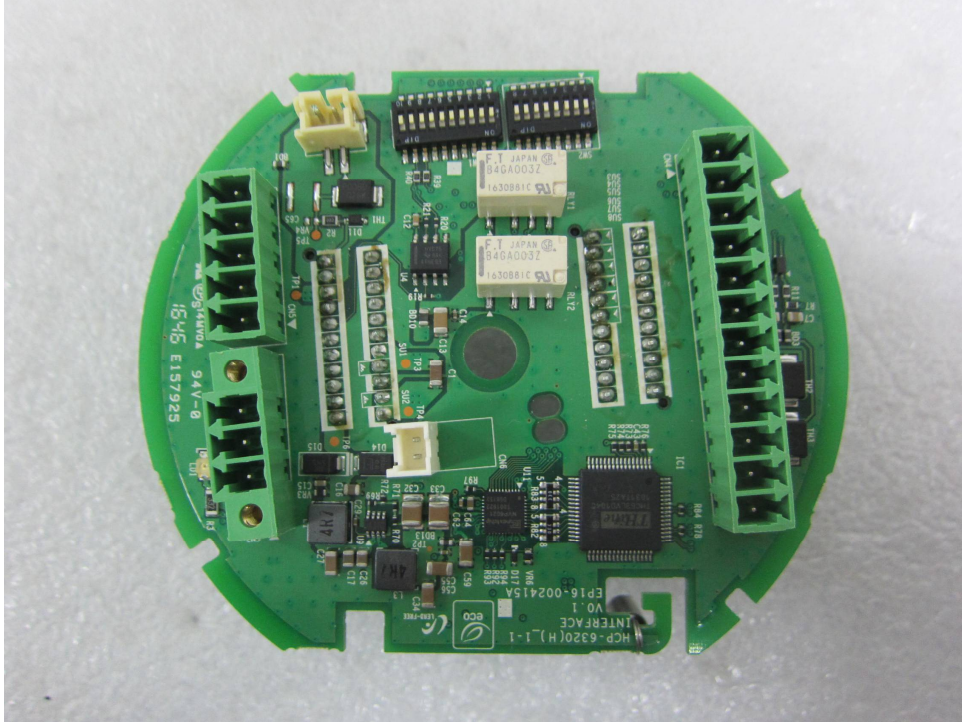
(Internal View)



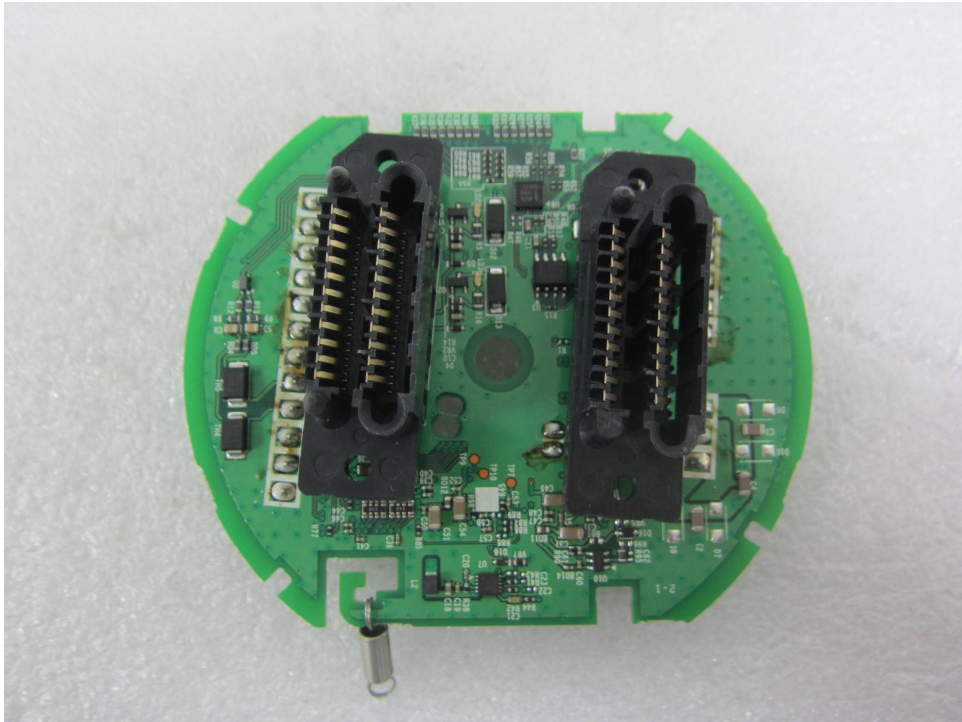
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EUT Internal View – Board 1

(Top)



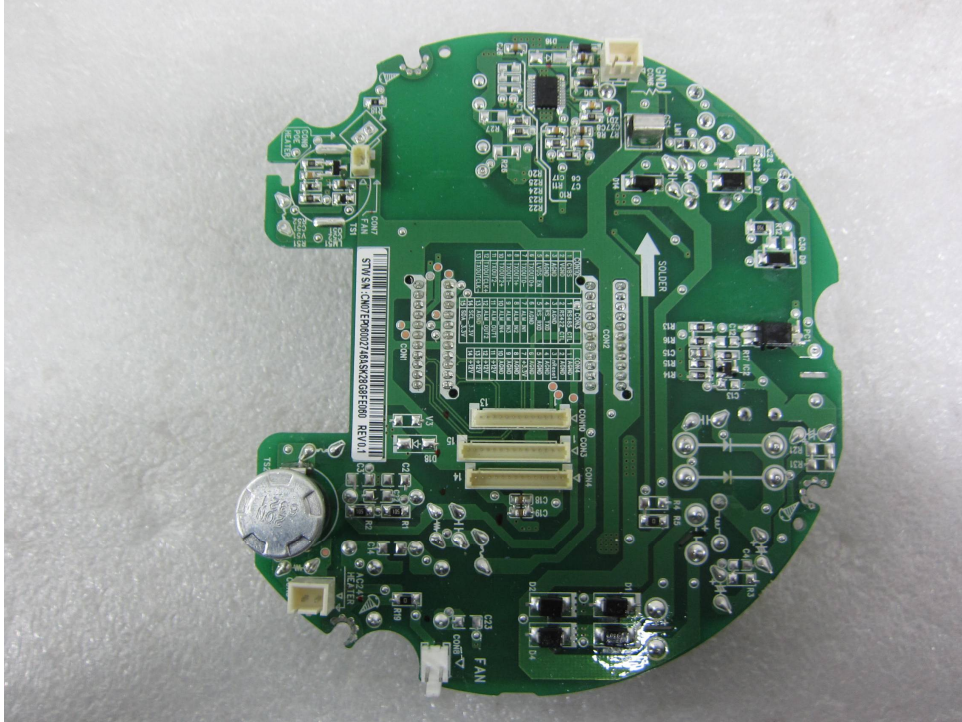
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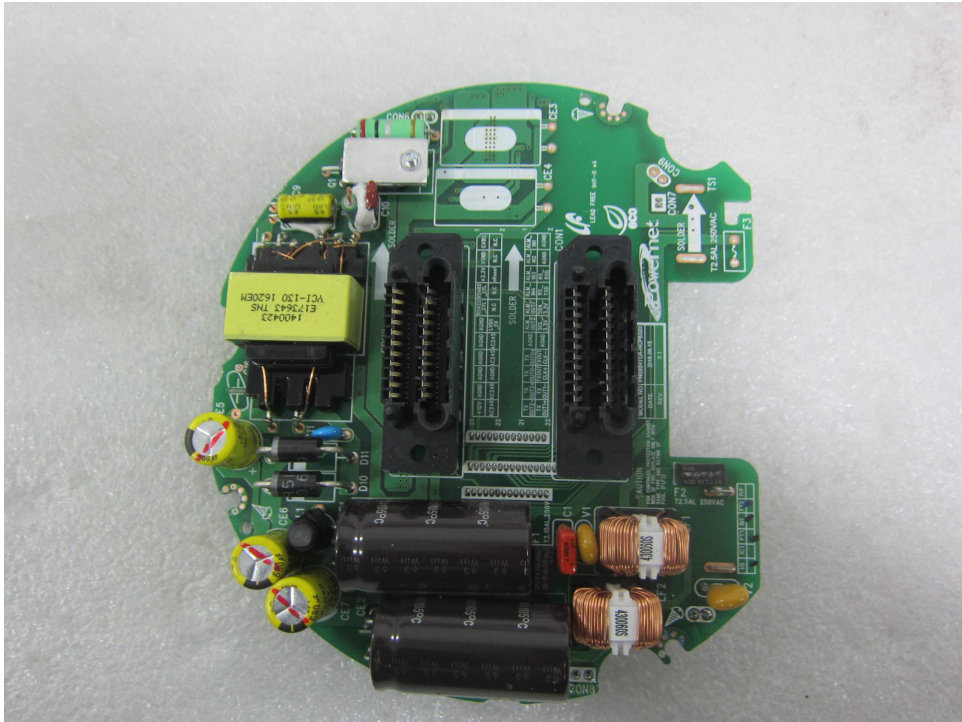
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EUT Internal View – Board 2

(Top)



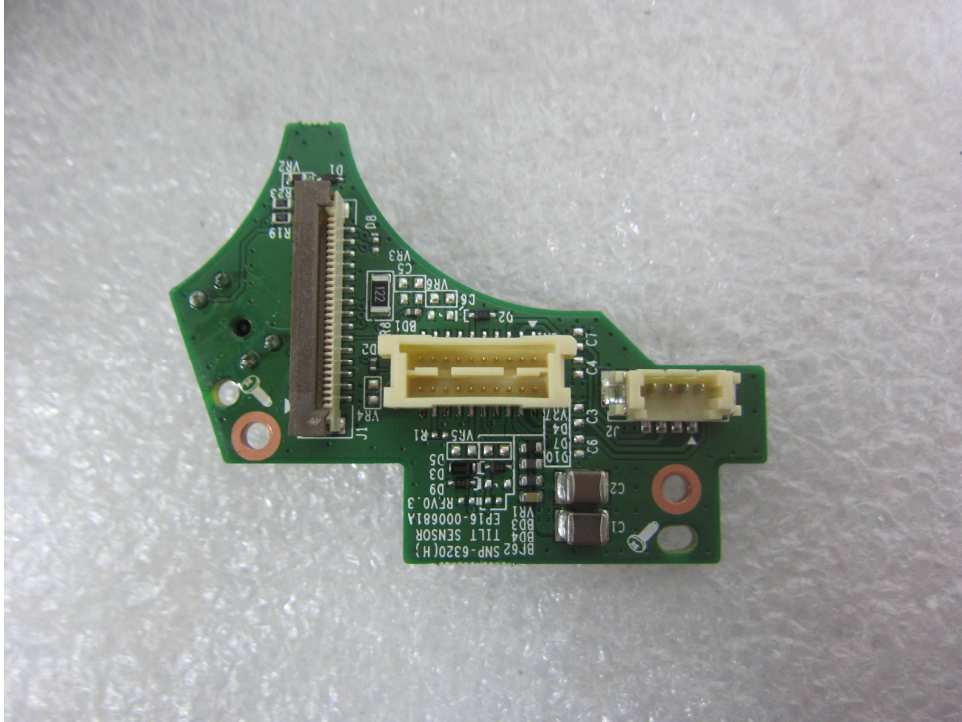
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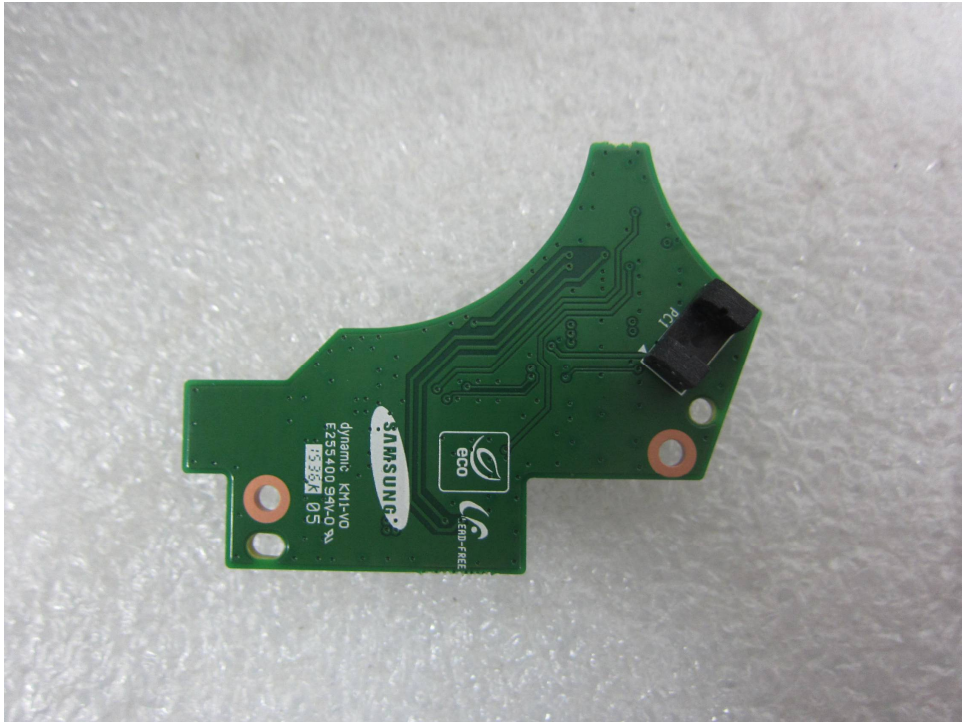
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EUT Internal View – Board 3

(Top)



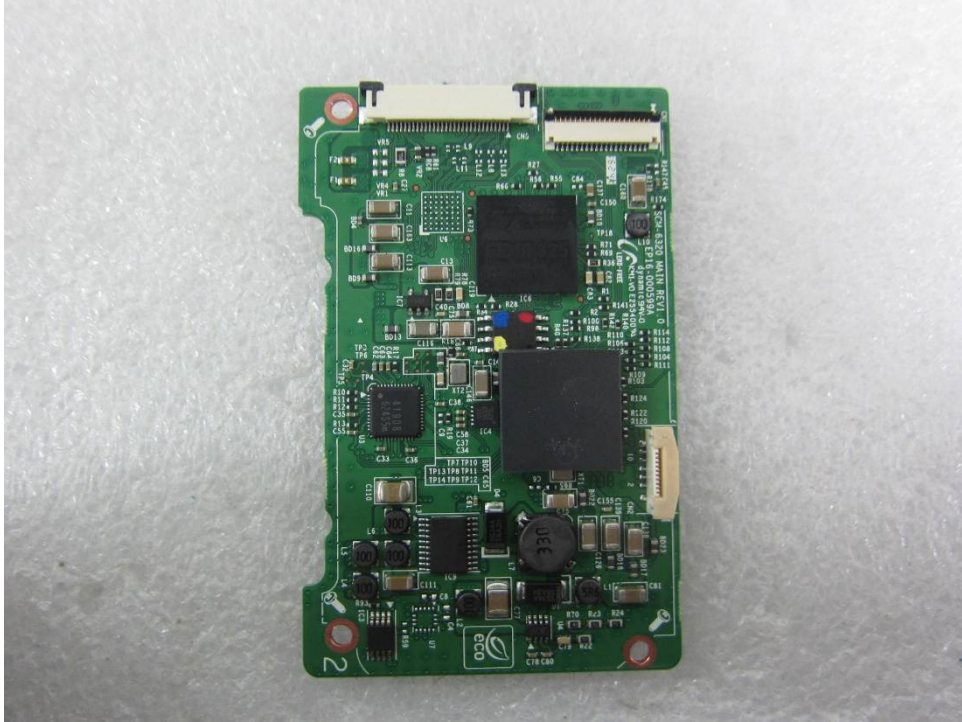
(Bottom)



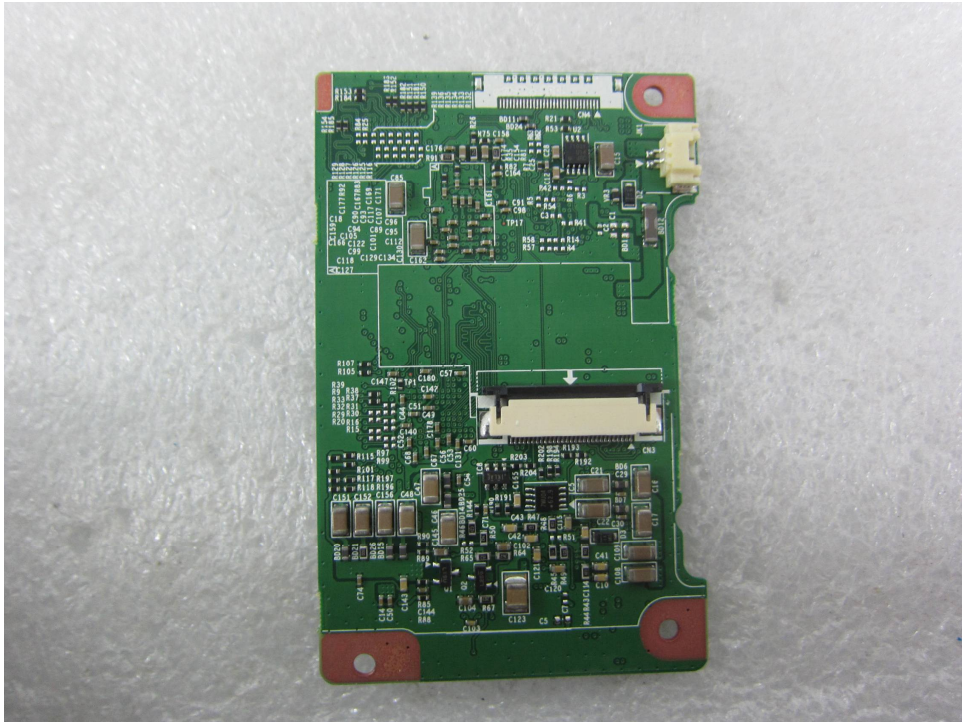
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EUT Internal View – Board 4

(Top)



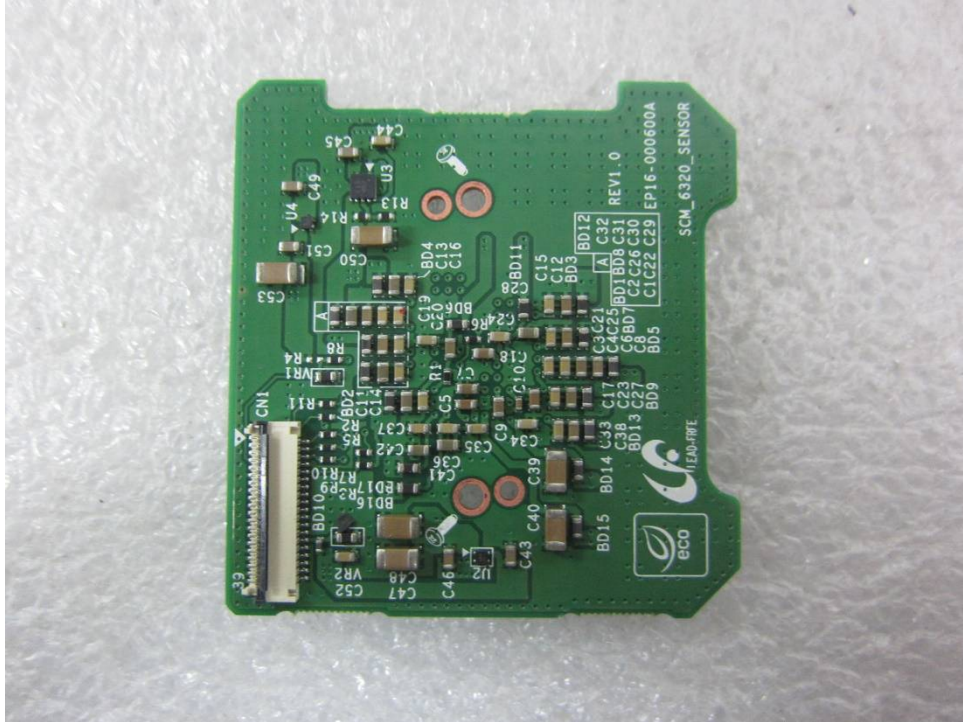
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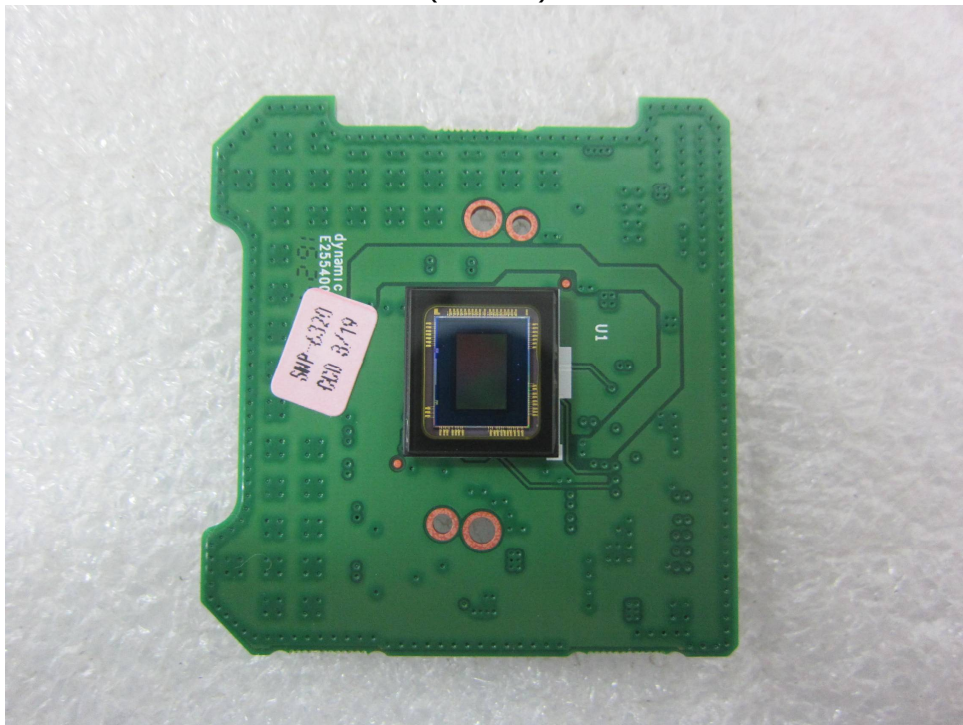
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EUT Internal View – Board 5

(Top)

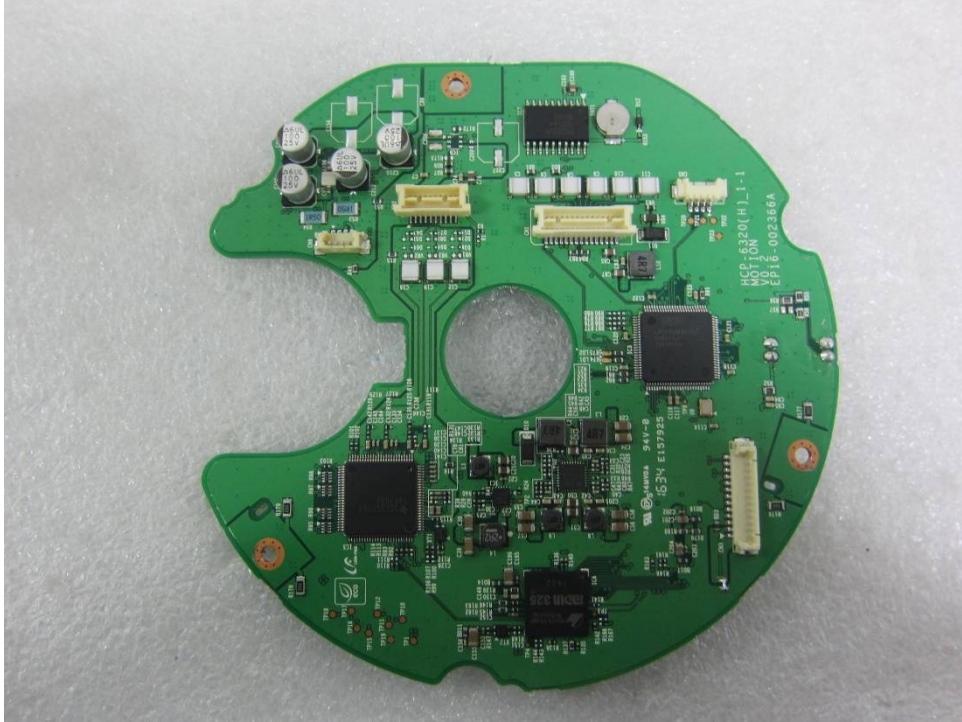


(Bottom)

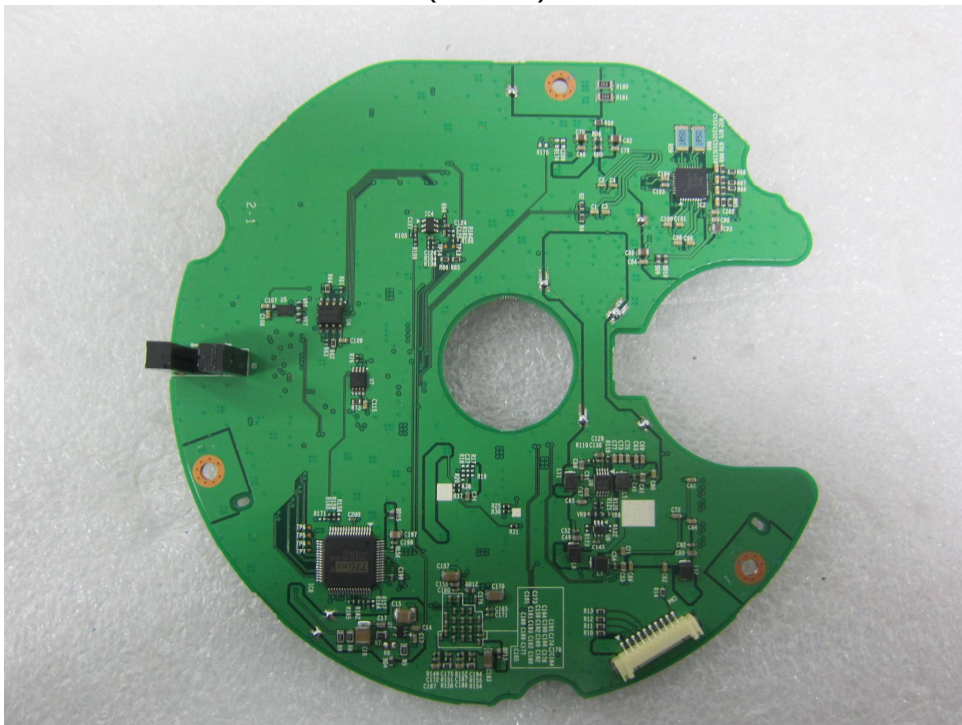


EUT Internal View – Main Board

(Top)



(Bottom)



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Label and Location



CCTV CAMERA

Model No : HCP-6320HA

Manufacturer : Hanwha Techwin (Tianjin) Co.,Ltd.

Made in China

