



# Declaration of Conformity



**Type of equipment:** NETWORK CAMERA  
**Brand Name /Trade Mark:** HANWHA  
**Type designation /model:** SCO-6023RP  
**Applicant:** Hanwha Techwin Company Limited

**In accordance with the following Directives:**

2004/108/EC The Electromagnetic Compatibility Directive  
Including amendments by the CE Marking Directive 93/68/EEC

2011/65/EU Restriction of the use of certain hazardous substances in electrical and electronic equipment (recast)

**The following harmonized European standards or technical specifications have been applied:**

EN 55022:2010	Limits and methods of measurement of radio disturbance characteristics of information technology equipment
EN 50130-4:2011+A1:2014	Product family standard: Immunity requirements for components of fire, intruder and social alarm systems
EN 61000-3-3:2013	Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current $\leq 16$ A per phase and not subject to conditional connection
EN 61000-4-2:2009	Electrostatic discharge immunity test
EN 61000-4-3:2006+A2:2010	Radiated, radio-frequency, electromagnetic field immunity test
EN 61000-4-4:2012	Electrical fast transient/burst immunity test
EN 61000-4-5:2014	Surge immunity test
EN 61000-4-6:2009	Immunity to conducted disturbances, induced by radio-frequency fields

**The CE Marking on the products and/or their packaging signifies that Hanwha Techwin Company Limited holds the reference technical file available to the European Union authorities.**

**Place and date of issue:** 1204, Changwon-daero, Seongsan-gu, Changwon-si, Gyeongsangnam-do, Korea / Feb, 03, 2015

**Authorized Signatory:** Name : Jei Soon, Kang  
Title : Principal Research Engineer

Signatur :



# EMC TEST REPORT For CE

Test Report No. : KES-E1-16T0040  
Date of Issue : Feb. 03, 2016  
Product name : ANALOG CAMERA  
Model/Type No. : SCO-6023RP  
Variant Model : -  
Applicant : Hanwha Techwin Company Limited  
Applicant Address : 1204, Changwon-daero, Seongsan-gu, Changwon-si,  
Gyeongsangnam-do, korea  
Manufacturer : Tianjin Samsung Techwin Opto-Electronic Co., Ltd.  
Manufacturer Address : No.11 Weiliu Rd, Micro-Electronic Industrial Park, TEDA, Tianjin,  
300385, People's Republic of China  
Date of Receipt : Jan. 06, 2016  
Test date : Jan. 27, 2016 – Jan. 29, 2016  
Test Results :  **In Compliance**       **Not in Compliance**

Tested by

Hyo Jin, Kim  
EMC Test Engineer

Reviewed by

Dong-Hun, Jang  
EMC Technical Manager



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**REPORT REVISION HISTORY**

<b>Date</b>	<b>Test Report No.</b>	<b>Revision History</b>
Feb. 03, 2016	KES-E1-160040	Issued

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## 1.0 General Product Description

### Main Specifications of E.U.T are:

	SCO-6023RN	SCO-6023RP
<b>Video</b>		
Imaging Device	1/2.9" 2M CMOS	
Total Pixels	2,000(H) x 1,121(V) 2.24M pixels	
Effective Pixels	1,984(H) x 1,105(V) 2.19M pixels	
Scanning System	Progressive Scan	
Horizontal Resolution	1000TVL	
Min. Illumination	Color : 0.45Lux (F2.1, 50IRE); 0.25Lux (F2.1, 30IRE) B/W : 0Lux(IR LED on)	
S / N Ratio	52dB (AGC off, Weight on)	
Video Output	BNC(AHD, CVBS Selectable)	
Resolution	1920 x 1080	
Max. Framerate	30fps @1080p, 30fps@ 720p	
<b>Lens Type</b>		
Focal Length (Zoom Ratio)	4mm	
Max. Aperture Ratio	F2.1	
Angular Field of View	H : 72.2° / V : 52.9° / D : 94.3°	
Min. Object Distance	0.5m (1.64ft)	
Focus Control	Manual	
Lens Type	Fixed	
Mount Type	Board-in type	
<b>Operational</b>		
On Screen Display	Multi-language Support(16) English, Japanese, Spanish, French, Portuguese, Korean, German, Italian, Russian, Polish, Czech, Romanian, Serbian, Swedish, Danish, Turkish	
Camera Title	Off / On (Displayed 15 characters)	
Day & Night	Auto (ICR) / Color / B/W	
Backlight Compensation	Off / User BLC / HLC	
Wide Dynamic Range	D-WDR	
Digital Noise Reduction	SSNR4 ( Off / On )	
Defog	AUTO / MANUAL / OFF	



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	SCO-6023RN	SCO-6023RP
Motion Detection	Off / On(4 zones)	
Privacy Masking	Off / On (4 zones rectangle)	
Gain Control	Off / Low / Middle / High / Very High	
White Balance	ATW / Outdoor / Indoor / Manual / AWC(1,800K <sup>o</sup> ~ 10,500K <sup>o</sup> )	
Electronic Shutter Speed	1 sec ~ 1/12,000 sec	
Reverse	Off / H-Rev / V-Rev / HV-Rev	
Profile	Basic, Day & Night, Backlight, ITS, Indoor, User	
Alarm	not support	
Remote control interface	Coaxial	
Protocol	Coax : ACP	
IR Distance	30m(98.43ft)	
Video Transmission Distance	500m(75-5 Coaxial Cable)	
<b>Environmental</b>		
Operating Temperature / Humidity	-30°C ~ +55°C (-22°F ~ +131°F) / Less than 90% RH * Start up should be done at above -10°	
Ingress Protection	IP66	
Vandal Resistance	-	
<b>Electrical</b>		
Input Voltage	12VDC±10%	
Power Consumption	Max. 4.2W	
<b>Mechanical</b>		
Color / Material	Dark Gray / Plastic	
Dimension (HxØ)	165.2 x Ø58.6mm (no sunshield)	
Weight	278g	248g

\*The specification for this product may change without prior notice for product improvement.

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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    12 Vdc  
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
ANALOG CAMERA	SCO-6023RP	-	Tianjin Samsung Techwin Opto-Electronic Co., Ltd.	E.U.T

### 1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
MONITOR	SMT-2232	C95V67VF900015Y	Weihai Daewoo Electronics Co., Ltd.	-

### 1.6 External I/O Cabling

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
ANALOG CAMERA	BNC	MONITOR	BNC	4.1	S

\* Unshielded=U, Shielded=S

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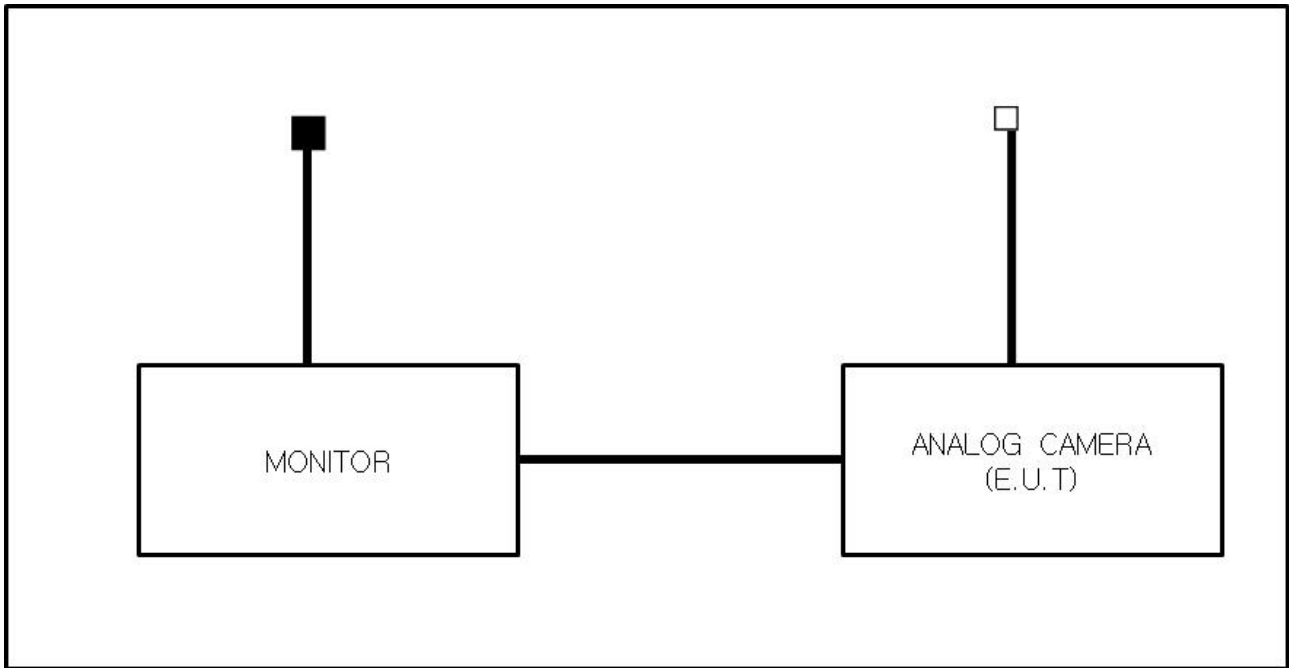
### 1.7 E.U.T Operating Mode(s)

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

Test mode	Normal operating
OP	MONITOR CHECK

### 1.8 Configuration

■ AC Main  
 □ DC Main



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## 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 473-29 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.

## 1.11 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
USA	<b>FCC</b>	3 & 10 meter Open Area Test Sites and one conducted site to perform FCC Part 15/18 measurements.	
JAPAN	<b>VCCI</b>	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	<b>MSIP</b>	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	<b>IC</b>	3 & 10 meter Open Area Test Sites and one conducted site	 4769B-1
Europe	<b>CE</b>	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	<b>KOLAS</b>	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)	

## 2.0 Test Regulations

The emissions tests were performed according to following regulations:

**EMC – Directive 2004/108/EC**

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 55022:2010

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 / 2013.04

Class A

Class B

AS / NZS CISPR22:2009 +A1:2010

Class A

Class B

47 CFR Part 15, Subpart B / ANSI C63.4-2009

Class A

Class B

IC Regulation ICES-003 : 2012  
/ ANSI C63.4-2014

Class A

Class B

CISPR 22:2009 +A1:2010

Class A

Class B



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**R&TTE – Directive 1999/5/EC**

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**

N/A

**Test Location**

Electro wave Shieldroom

**Test Equipment**

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input type="checkbox"/>	EMI Test Receiver	ESR3	R&S	101783	05, 06, 2016
<input type="checkbox"/>	LISN	ENV216	R&S	101137	02, 10, 2016
<input type="checkbox"/>	LISN	ENV216	R&S	101786	05, 06, 2016
<input type="checkbox"/>	Electro wave Shieldroom	-	SEMITEC	-	-

**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**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
<input type="checkbox"/>	EMI Test Receiver	ESR3	R&S	101783	05, 06, 2016
<input type="checkbox"/>	LISN	ENV216	R&S	101137	02, 10, 2016
<input type="checkbox"/>	LISN	ENV216	R&S	101786	05, 06, 2016
<input type="checkbox"/>	8-Wire ISN CAT3	CAT3 8158	Schwarzbeck Mess	8158-0019	04, 02, 2016
<input type="checkbox"/>	8-Wire ISN CAT5	CAT5 8158	Schwarzbeck Mess	8158-0030	04, 02, 2016
<input type="checkbox"/>	8-Wire ISN CAT6	NTFM 8158	Schwarzbeck Mess	8158-0029	08, 14, 2016
<input type="checkbox"/>	Electro wave Shieldroom	-	SEMITEC	-	-

### 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

See Appendix A for test data.

## 2.3 Radiated Electric Field Emissions(Below 1 GHz)

**Test Date**

Jan. 27, 2016

**Test Location** Open Area Test Site #1       Open Area Test Site #2**Test Equipment**

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMI Test Receiver	ESR3	R&S	101781	05, 06, 2016
<input checked="" type="checkbox"/>	Trilog-Broadband Antenna	VULB 9163	SCHWARZBECK	9168-713	05, 15, 2017
<input checked="" type="checkbox"/>	Open Area Test Site	-	KES	-	-
<input checked="" type="checkbox"/>	Antenna Mast	-	DAEIL EMC	-	-
<input checked="" type="checkbox"/>	Turn Table	-	DAEIL EMC	-	-

**Test Conditions**Temperature: 3,2 °C  
Relative Humidity: 58.0 %**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. 28, 2016

**Test Location**

Semi Anchoic Chamber #2

**Test Equipment**

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMI Test Receiver	ESU26	R&S	100552	05, 06, 2016
<input checked="" type="checkbox"/>	Broadband Coaxial Preamplifier	BBV 9718	Schwarzbeck Mess - Elektronik	9718-246	10, 23, 2016
<input checked="" type="checkbox"/>	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	05, 07, 2017
<input checked="" type="checkbox"/>	Semi Anchoic Chamber #2	-	SEMITEC	-	-
<input checked="" type="checkbox"/>	Antenna Mast	-	AUDIX	-	-
<input checked="" type="checkbox"/>	Turn Table	-	AUDIX	-	-

**Test Conditions**Temperature: 18,8 °C  
Relative Humidity: 38,2 %**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
<input type="checkbox"/>	AC Source	ACS 500 N	EM TEST	V1024106760	08, 13, 2016
<input type="checkbox"/>	Digital Power Analyzer	DPA 500 N	EM TEST	V1024106759	08, 13, 2016

**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**

Because the E.U.T power is less than 75 W, limits are not specified.  
See Appendix A for test data.





## 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
<input type="checkbox"/>	AC Source	ACS 500 N	EM test	V1024106760	08, 13, 2016
<input type="checkbox"/>	Digital Power Analyzer	DPA 500 N	EM test	V1024106759	08, 13, 2016

### Test Conditions

Temperature: °C  
Relative Humidity: %

### Test Results

The requirements are:

- PASS
- NOT PASS
- NOT APPLICABLE

### Remarks

See Appendix A for test data.

### 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. 18, 2016

**Test Location**

EMS-ESD: Electro wave Shieldroom

**Test Equipment**

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	ESD SIMULATOR	ESS-2000	Noise Ken	ESS05X4620	06, 30, 2016
<input checked="" type="checkbox"/>	HCP	-	Noise Ken	-	-
<input checked="" type="checkbox"/>	VCP	-	Noise Ken	-	-

**Test Conditions**

Temperature: 19,7 °C  
Relative Humidity: 38,2 %  
Atmospheric Pressure: 100,6 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

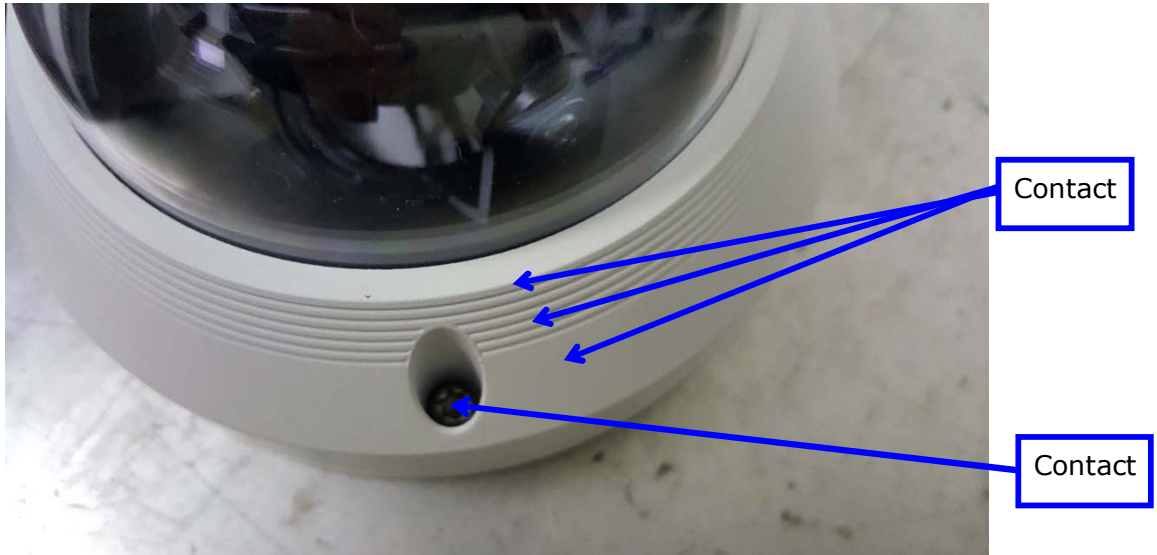
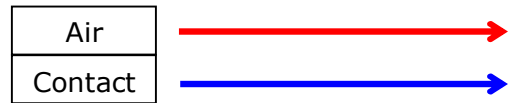
Discharge Voltage:	Contact	Air	HCP	VCP
	<input type="checkbox"/> 2 kV	<input checked="" type="checkbox"/> 2 kV	<input type="checkbox"/> 2 kV	<input type="checkbox"/> 2 kV
	<input type="checkbox"/> 4 kV	<input checked="" type="checkbox"/> 4 kV	<input type="checkbox"/> 4 kV	<input type="checkbox"/> 4 kV
	<input checked="" type="checkbox"/> 6 kV	<input type="checkbox"/> 6 kV	<input checked="" type="checkbox"/> 6 kV	<input checked="" type="checkbox"/> 6 kV
	<input type="checkbox"/> 8 kV	<input checked="" type="checkbox"/> 8 kV	<input type="checkbox"/> 8 kV	<input type="checkbox"/> 8 kV
	<input type="checkbox"/> 15 kV	<input type="checkbox"/> 15 kV	<input type="checkbox"/> 15 kV	<input type="checkbox"/> 15 kV

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

Required Performance Criteria:  Complied

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**Location of Discharge:**



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**Test Data**

Indirect Discharge

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

Direct Discharge

No.	Test Point	Discharge Method	Performance	Remarks
			Observation	
1		Contact Discharge	Complied	-
2		Contact Discharge	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.

## 3.2 Radiated Electric Field Immunity

### Reference Standard

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

### Test Date

Jan. 29, 2016

### Test Location

EMS-RS:  Semi Anchoic Chamber #1       Semi Anchoic Chamber #2

### Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input type="checkbox"/>	Integrated measurement system for EMS	IMS	R&S	100027	08, 13, 2016
<input type="checkbox"/>	Average Power Sensor	NRP-Z91	R&S	100784	08, 13, 2016
<input type="checkbox"/>	Power Amplifier	100W1000M1	AMPLIFIER RESEARCH	19510	08, 13, 2016
<input type="checkbox"/>	High Power Dual Directional Coupler	C3910	WERLATONE	30447	08, 13, 2016
<input type="checkbox"/>	Hybrid Log-Periodic Antenna	HLP-2603	EMC Automation (TDK)	100400	-
<input type="checkbox"/>	Semi Anchoic Chamber #1	-	KES	-	-
<input checked="" type="checkbox"/>	SIGNAL GENERATOR	SMB 100A	R&S	108252	08, 13, 2016
<input checked="" type="checkbox"/>	BROADBAND AMPLIFIER	BBA100	R&S	101239	08, 13, 2016
<input checked="" type="checkbox"/>	BROADBAND AMPLIFIER	100S1G6M1	AR	579931	08, 13, 2016
<input checked="" type="checkbox"/>	POWER METER	NRP2	R&S	103475	08, 13, 2016
<input checked="" type="checkbox"/>	AVG POWER SENSOR	NRP-Z91	R&S	102526	08, 13, 2016
<input checked="" type="checkbox"/>	AVG POWER SENSOR	NRP-Z91	R&S	102527	08, 13, 2016
<input checked="" type="checkbox"/>	Stacked Log-Per.Antenna	STLP 9128 D	Schwarzbeck	9128D038	-
<input checked="" type="checkbox"/>	Semi Anchoic Chamber #2		SEMITEC	-	-

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**Test Conditions**

Temperature: 18,8 °C  
Relative Humidity: 38,2 %  
Atmospheric Pressure: 101,5 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	Observation	
	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. 29, 2016

**Test Location**

EMS-EFT: Electro wave Shieldroom

**Test Equipment**

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	Ultra Compact Simulator	UCS 500 N5	EM TEST	V0936105120	07, 14, 2016
<input checked="" type="checkbox"/>	Capacitive Coupling Clamp	HFK	EM TEST	070925	07, 14, 2016
<input checked="" type="checkbox"/>	MotorVariac	MV2616	EM TEST	V0936105123	07, 14, 2016
<input type="checkbox"/>	Transient Test System	TRA3000F-S-D-V	EMC PARTNER AG	1524	04, 01, 2016
<input type="checkbox"/>	MotorVariac	VAR-EXT1000	EMC PARTNER AG	1507	04, 01, 2016
<input type="checkbox"/>	Capacitive Coupling Clamp	CN-EFT1000	EMC PARTNER AG	1528	04, 01, 2016

**Test Conditions**

Temperature: 19,1 °C  
Relative Humidity: 37,6 %  
Atmospheric Pressure: 101,2 kPa

**Test Specifications**

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

Pulse Amplitude & Polarity:  ± 0.5 kV       ± 1.0 kV  
(Signal Lines)       ± 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

Note: "Blank" = Not performed

Observations:

- A – No degradation of function
- B – Distortion/Error of function (self-recoverable)
- C – Loss 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. 2, 2016

**Test Location**

EMS-Surge: Electro wave Shieldroom

**Test Equipment**

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	Ultra Compact Simulator	UCS 500 N5	EM TEST	V0936105120	07, 14, 2016
<input checked="" type="checkbox"/>	MotorVariac	MV2616	EM TEST	V0936105123	07, 14, 2016
<input type="checkbox"/>	CDN	CNV 504N	EM TEST	V0936105121	04, 01, 2016
<input type="checkbox"/>	Transient Test System	TRA3000F-S-D-V	EMC PARTNER AG	1524	04, 01, 2016
<input type="checkbox"/>	MotorVariac	VAR-EXT1000	EMC PARTNER AG	1507	04, 01, 2016

**Test Conditions**

Temperature: 19,1 °C  
Relative Humidity: 37,6 %  
Atmospheric Pressure: 101,2 kPa

**Test Specifications**

**Signal Lines**

Source Impedance: 42ohm fa common 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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**Signal Lines**

Source Impedance: 42 ohm for common mode  
 Surge Amplitude: Common Mode  
 (0,5 / 1,0) kV  
 Number of Surges:  5 Surges  
 Polarity:  Positive & Negative  
 Repetition Rate:  1 surge per min  1 surge per 30 sec.  
 Required Performance Criteria:  Complied

**Test Data**

**Power Lines**

Line to Line – Differential Mode

Mode of Application	OBSERVATIONS	
	(+) Surge (kV)	(-) Surge (kV)
L - N		

Line to Earth – Common Mode

Mode of Application	OBSERVATIONS	
	(+) Surge (kV)	(-) Surge (kV)
L - PE		
N - PE		

**Signal Lines**

Line to Earth – Common Mode

Mode of Application	OBSERVATIONS	
	(+) Surge (kV)	(-) Surge (kV)
BNC	Complied	Complied

Note: "Blank" = Not performed

Observations:

- A – No degradation of function
- B – Distortion/Error of function (self-recoverable)
- C – Loss of function

**Test Results**

PASS Required Performance Criteria  
 NOT PASS Required Performance Criteria

**Remarks**

No any function degraded during the test.

### 3.5 Conducted Disturbance

**Reference Standard**

EN 61000-4-6:2009

**Test Date**

Jan. 29, 2016

**Test Location**

EMS-CS: Electro wave Shieldroom

**Test Equipment**

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	Continuous Wave Generator	CWS 500N1	EM TEST	V0936105119	09, 25, 2016
<input checked="" type="checkbox"/>	6dB Attenuator	ATT6	EM TEST	1208-34	08, 13, 2016
<input checked="" type="checkbox"/>	CDN	CDN-M2/M3N	EM TEST	0909-06	08, 13, 2016
<input type="checkbox"/>	CDN	CDN-T2-RJ11	EM TEST	0909-07	08, 13, 2016
<input type="checkbox"/>	CDN	CDN-T4	EM TEST	0909-08	08, 13, 2016
<input type="checkbox"/>	CDN	CDN-T8RJ45	EM TEST	0909-09	08, 13, 2016
<input type="checkbox"/>	CDN	CDN-AF2	EM TEST	0909-10	08, 13, 2016
<input type="checkbox"/>	CDN	CDN-AF4	EM TEST	0909-11	08, 13, 2016
<input checked="" type="checkbox"/>	EM Injection Clamp	EM 101	Liithi	35943	02, 11, 2016
<input type="checkbox"/>	Continuous Wave Generator	CWS 500 N1	EM TEST	P1251106910	04, 01, 2016
<input type="checkbox"/>	6 dB Attenuator	ATT6/75	EM TEST	1012-35	04, 01, 2016
<input type="checkbox"/>	CDN	CDN-M2/M3N	EM TEST	0213-10	04, 01, 2016
<input type="checkbox"/>	EM Injection Clamp	EM 101	Liithi	36152	04, 06, 2016

**Test Conditions**

Temperature: 19,1 °C  
 Relative Humidity: 37,6 %  
 Atmospheric Pressure: 101,2 kPa

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**Test Specifications**

- Frequency range:  150 kHz to 80 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	Observation
Input d.c. power port	CDN ( <input checked="" type="checkbox"/> M2, <input type="checkbox"/> M3)	Complied

Input d.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Observation
-	-	-

Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Observation
BNC	EM Injection Clamp	Complied

Notes: CDN = Coupling Decoupling Network  
 EMC = Electro Magnetic Clamp  
 "blank" = Not performed

Observations:

- A - No degradation of function
- B - Distortion/Error of function (self-recoverable)
- C - Loss of function

**Test Results**

- PASS Required Performance Criteria  
 NOT PASS Required Performance Criteria

**Remarks**

No any function degraded during the test.



### 3.6 Power Frequency Magnetic Field Immunity

#### Reference Standard

EN 61000-4-8:2010

#### Test Date

N/A

#### Test Location

EMS-Magnetic: Electro wave Shieldroom

#### Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input type="checkbox"/>	Magnetic coil	MS100	EM TEST	0809-10	08, 13, 2016
<input type="checkbox"/>	MotorVariac	MV2616	EM TEST	V0936105123	07, 14, 2016
<input type="checkbox"/>	Ultra Compact Simulator	UCS 500 N5	EM TEST	V0936105120	07, 14, 2016
<input type="checkbox"/>	Current Transformer	MC2630	EM TEST	0307-46	08, 13, 2016

#### Test Conditions

Temperature: °C  
Relative Humidity: %  
Atmospheric Pressure: kPa

#### Test Specifications

Field Strength:  1 A/m  3 A/m  
 30 A/m

Frequency:  50 Hz  60 Hz

Required Performance Criteria:  A



**Test Data**

Immersion method

Coil orientation	Observation
X - axis	
Y - axis	
Z - axis	

Proximity method

Coil orientation	Observation

Note: "blank" = Not performed

Observations:

- A - No degradation of function
- B - Distortion/Error of function (self-recoverable)
- C - Loss of function

**Test Results**

- PASS Required Performance Criteria
- NOT PASS Required Performance Criteria

**Remarks**

NOT APPLICABLE

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### 3.7 Voltage Dips and Short Interruptions

**Reference Standard**

EN 61000-4-11:2004

**Test Date**

N/A

**Test Location**

EMS-Voltage dip: Electro wave Shieldroom

**Test Equipment**

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input type="checkbox"/>	Ultra Compact Simulator	UCS 500 N5	EM TEST	V0936105120	07, 14, 2016
<input type="checkbox"/>	Capacitive Coupling Clamp	HFK	EM TEST	070925	07, 14, 2016
<input type="checkbox"/>	MotorVariac	MV2616	EM TEST	V0936105123	07, 14, 2016
<input type="checkbox"/>	Transient Test System	TRA3000F-S-D-V	EMC PARTNER AG	1524	04, 01, 2016
<input type="checkbox"/>	MotorVariac	VAR-EXT1000	EMC PARTNER AG	1507	04, 01, 2016
<input type="checkbox"/>	Capacitive Coupling Clamp	CN-EFT1000	EMC PARTNER AG	1528	04, 01, 2016

**Test Conditions**

Temperature: °C  
Relative Humidity: %  
Atmospheric Pressure: kPa



### Test Specifications & Observations/Remarks

Test Level	Duration [in period/ms (50 Hz)]	Criteria	Results
<input type="checkbox"/> 0 %Ut (100 % dip)	<input type="checkbox"/> 0,5 /10	—	—
	<input type="checkbox"/> 1,0 /20	—	—
	<input type="checkbox"/> 5,0 /100	—	—
	<input type="checkbox"/> 10 /200	—	—
	<input type="checkbox"/> 25 /500	—	—
	<input type="checkbox"/> 50 /1 000	—	—
	<input type="checkbox"/> 250 /5 000	—	—
<input type="checkbox"/> 40 %Ut (60 % dip)	<input type="checkbox"/> 0,5 /10	—	—
	<input type="checkbox"/> 1,0 /20	—	—
	<input type="checkbox"/> 5,0 /100	—	—
	<input type="checkbox"/> 10 /200	—	—
	<input type="checkbox"/> 25 /500	—	—
	<input type="checkbox"/> 50 /1 000	—	—
<input type="checkbox"/> 70 %Ut (30 % dip)	<input type="checkbox"/> 0,5 /10	—	—
	<input type="checkbox"/> 1,0 /20	—	—
	<input type="checkbox"/> 5,0 /100	—	—
	<input type="checkbox"/> 10 /200	—	—
	<input type="checkbox"/> 25 /500	—	—
	<input type="checkbox"/> 50 /1 000	—	—

**Observations:**

- A - No response observed from E.U.T
- B - Unit shuts down then automatically restarts when full voltage is restored.
- C - Unit shuts down then manually restarts when full voltage is restored or Loss of function.

**Test Results**

- PASS Required Performance Criteria
- NOT PASS Required Performance Criteria

**Remarks**

Refer to the results



**KES Co., Ltd.**

C-3701, Simin-daero 365-40,  
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-E1-16T0040  
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## **APPENDIX A – TEST DATA**

### **Conducted Emissions at Mains Power Ports**

**[HOT]**

N/A

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**[NEUTRAL]**

N/A

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## **Conducted Emissions at Telecommunication Ports**

**[10 Mbps]**

N/A

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**[100 Mbps]**

N/A

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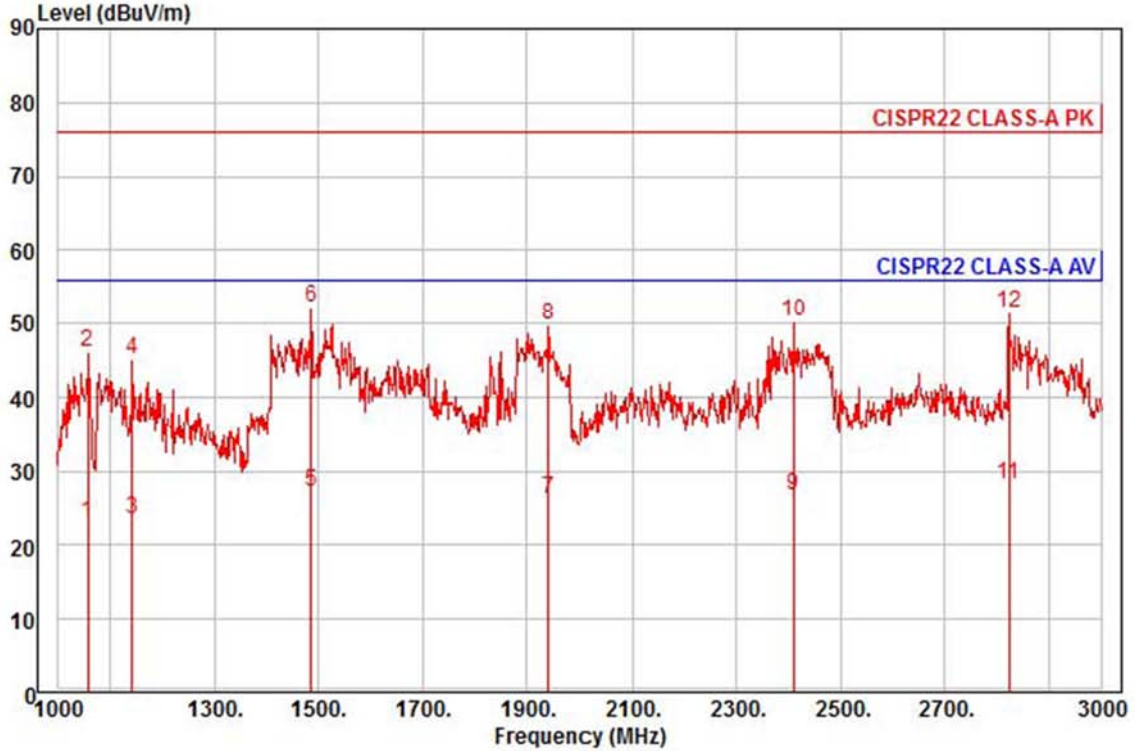


### Radiated Electric Field Emissions(Below 1 GHz)

Frequency [MHz]	Amplitude [dB $\mu$ V]	ANT Polar. (H/V)	ANT. Height [m]	Correction Factor		Corrected Amplitude [dB $\mu$ V/m]	Applicable Limit [dB $\mu$ V/m]	Margin [dB]
				ANT. [dB/m]	Cable [dB]			
50.11	12.39	V	2.52	13.94	1.75	28.08	40.00	11.92
223.23	7.54	V	1.91	11.82	4.08	23.44	40.00	16.56
223.61	15.69	H	1.32	11.82	4.08	31.59	40.00	8.41
296.13	16.17	H	3.51	13.30	4.88	34.35	47.00	12.65
296.80	10.16	V	1.21	13.32	4.89	28.37	47.00	18.63
445.38	12.57	V	3.86	16.34	6.14	35.05	47.00	11.95
445.55	19.51	H	3.74	16.34	6.14	41.99	47.00	5.01
817.61	8.36	H	3.24	21.04	9.06	38.46	47.00	8.54

\* H : Horizontal, V : Vertical

### Radiated Electric Field Emissions(Above 1 GHz)

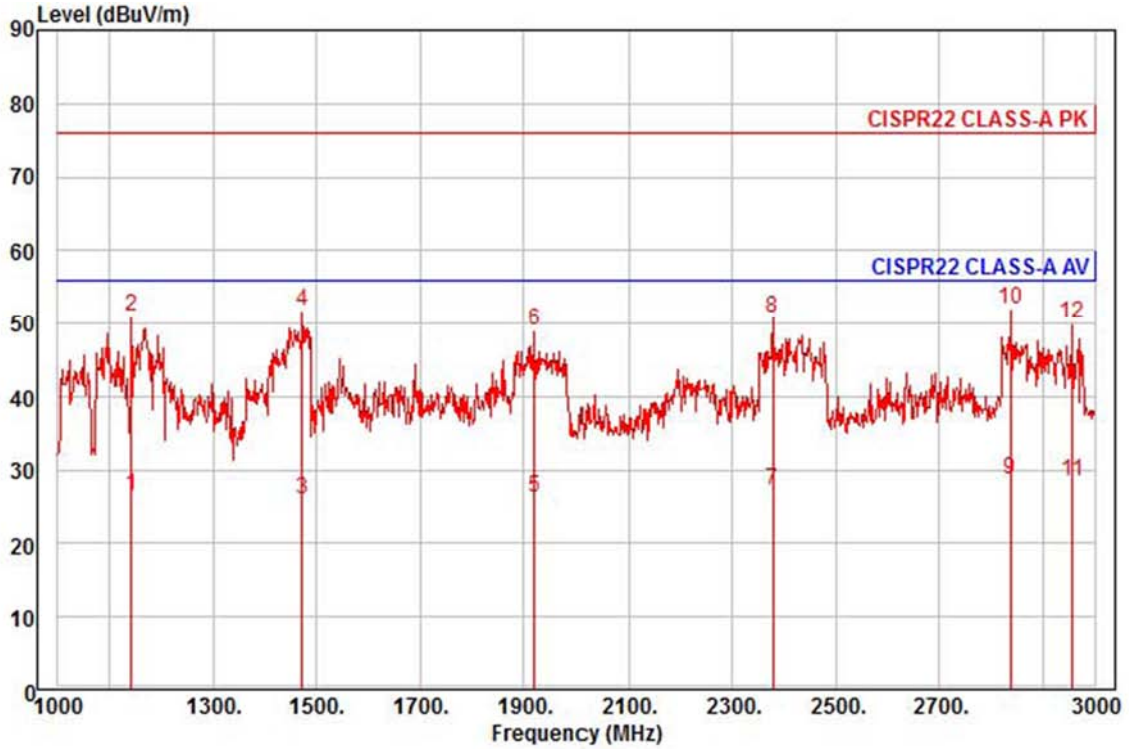


Site : chamber  
 Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) horizontal  
 : RBW:1000.000kHz VBW:1000.000kHz SWT:Auto  
 Project :  
 Model : SCO-6023RP  
 Mode : CE  
 Memo : 1 ~ 3 GHz

	Read 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	1056.00	32.90	24.13	6.21	40.09	324	56.00	-32.85	horizontal	Average
2	1056.00	55.78	24.13	6.21	40.09	324	76.00	-29.97	horizontal	Peak
3	1142.00	32.58	24.47	6.46	40.05	14	56.00	-32.54	horizontal	Average
4	1142.00	54.20	24.47	6.46	40.05	14	76.00	-30.92	horizontal	Peak
5	1486.00	33.79	25.84	7.44	39.88	344	56.00	-28.81	horizontal	Average
6 pp	1486.00	58.76	25.84	7.44	39.88	344	76.00	-23.84	horizontal	Peak
7	1942.00	29.47	27.65	8.75	39.66	10	56.00	-29.79	horizontal	Average
8	1942.00	52.98	27.65	8.75	39.66	10	76.00	-26.28	horizontal	Peak
9	2410.00	27.74	28.88	10.06	39.87	10	56.00	-29.19	horizontal	Average
10	2410.00	51.17	28.88	10.06	39.87	10	76.00	25.76	horizontal	Peak
11 av	2824.00	27.11	29.90	11.21	40.11	321	56.00	-27.89	horizontal	Average
12	2824.00	50.53	29.90	11.21	40.11	321	76.00	-24.47	horizontal	Peak

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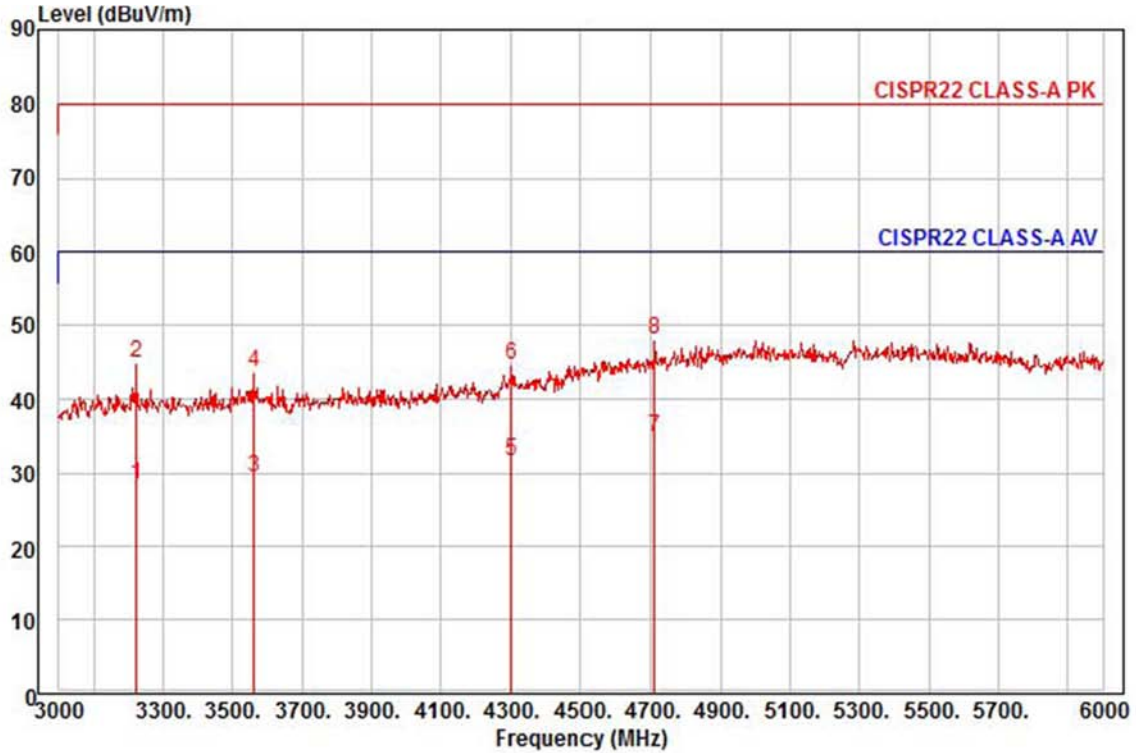




Site : chamber  
 Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) vertical  
 : RBW:1000.000kHz VBW:1000.000kHz SWT:Auto  
 Project :  
 Model : SCO-6023RP  
 Mode : CE  
 Memo : 1 ~ 3 GHz

	Read Freq	Ant 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	1142.00	35.68	24.47	6.46	40.05	360	56.00	-29.44	vertical	Average
2	1142.00	60.18	24.47	6.46	40.05	360	76.00	-24.94	vertical	Peak
3	1472.00	32.59	25.78	7.40	39.89	320	56.00	-30.12	vertical	Average
4	1472.00	58.57	25.78	7.40	39.89	320	76.00	-24.14	vertical	Peak
5	1920.00	29.70	27.56	8.69	39.67	317	56.00	-29.72	vertical	Average
6	1920.00	52.57	27.56	8.69	39.67	317	76.00	-26.85	vertical	Peak
7	2378.00	28.36	28.81	9.97	39.85	29	56.00	-28.71	vertical	Average
8	2378.00	51.81	28.81	9.97	39.85	29	76.00	-25.26	vertical	Peak
9 av	2838.00	27.65	29.93	11.25	40.12	20	56.00	-27.29	vertical	Average
10 pp	2838.00	51.00	29.93	11.25	40.12	20	76.00	-23.94	vertical	Peak
11	2958.00	26.77	30.23	11.58	40.19	340	56.00	-27.61	vertical	Average
12	2958.00	48.41	30.23	11.58	40.19	340	76.00	-25.97	vertical	Peak

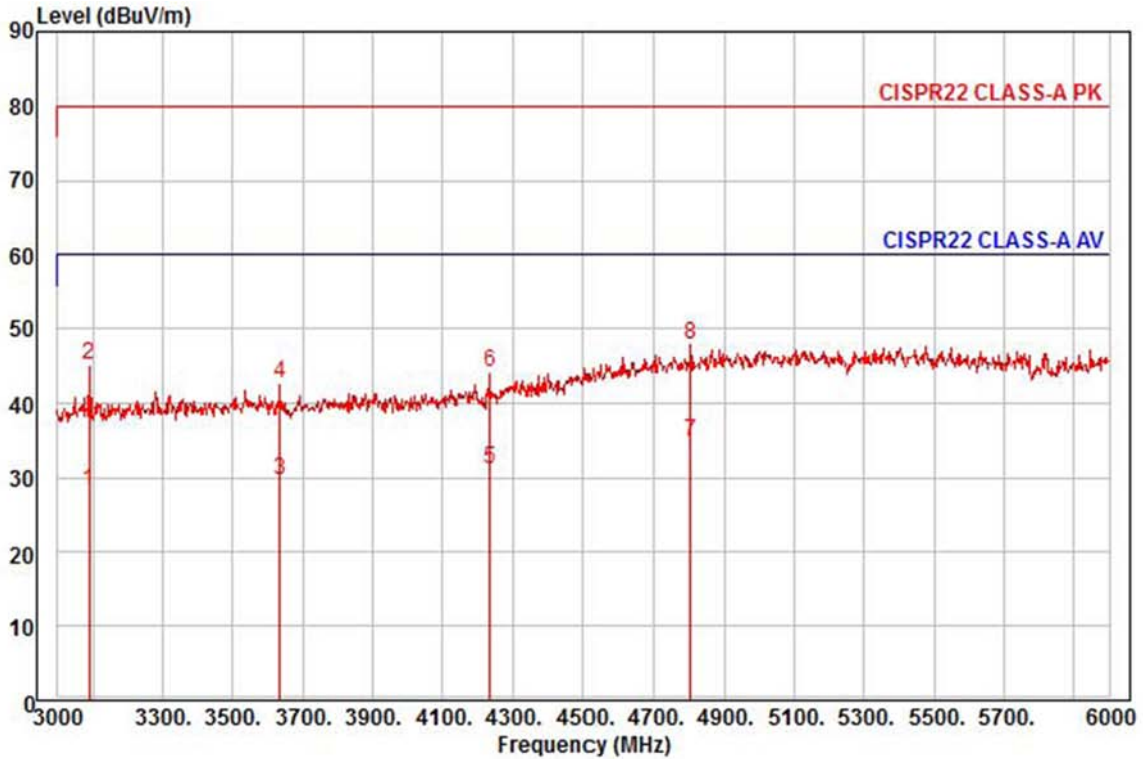
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Site : chamber  
 Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) horizontal  
 : RBW:1000.000kHz VBW:1000.000kHz SWT:Auto  
 Project :  
 Model : SCO-6023RP  
 Mode : CE  
 Memo : 3 ~ 6 GHz

	Read Freq	Ant 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	3222.00	26.01	30.70	12.00	40.25	79	60.00	-31.54	horizontal	Average
2	3222.00	42.31	30.70	12.00	40.25	79	80.00	-35.24	horizontal	Peak
3	3561.00	26.08	31.27	12.45	40.32	23	60.00	-30.52	horizontal	Average
4	3561.00	40.24	31.27	12.45	40.32	23	80.00	-36.36	horizontal	Peak
5	4302.00	24.84	33.73	13.59	40.41	7	60.00	-28.25	horizontal	Average
6	4302.00	37.81	33.73	13.59	40.41	7	80.00	-35.28	horizontal	Peak
7 pp	4710.00	24.71	36.06	14.34	40.41	310	60.00	-25.30	horizontal	Average
8 pk	4710.00	38.19	36.06	14.34	40.41	310	80.00	-31.82	horizontal	Peak

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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 : SCO-6023RP  
 Mode : CE  
 Memo : 3 ~ 6 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	3090.00	26.25	30.48	11.82	40.23	321	60.00	-31.68	vertical	Average
2	3090.00	43.08	30.48	11.82	40.23	321	80.00	-34.85	vertical	Peak
3	3636.00	26.05	31.40	12.55	40.34	339	60.00	-30.34	vertical	Average
4	3636.00	39.04	31.40	12.55	40.34	339	80.00	-37.35	vertical	Peak
5	4236.00	24.81	33.36	13.46	40.41	1	60.00	-28.78	vertical	Average
6	4236.00	37.84	33.36	13.46	40.41	1	80.00	-35.75	vertical	Peak
7 pp	4803.00	24.18	36.60	14.51	40.41	167	60.00	-25.12	vertical	Average
8 pk	4803.00	37.14	36.60	14.51	40.41	167	80.00	-32.16	vertical	Peak

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www.kes.co.kr

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KES-E1-16T0040  
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## Harmonic Current Emissions and Voltage Fluctuations and Flicker

N/A

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Test report No.:  
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## **Test Setup Photos and Configuration**

### **Conducted Voltage Emissions**

N/A

N/A

---

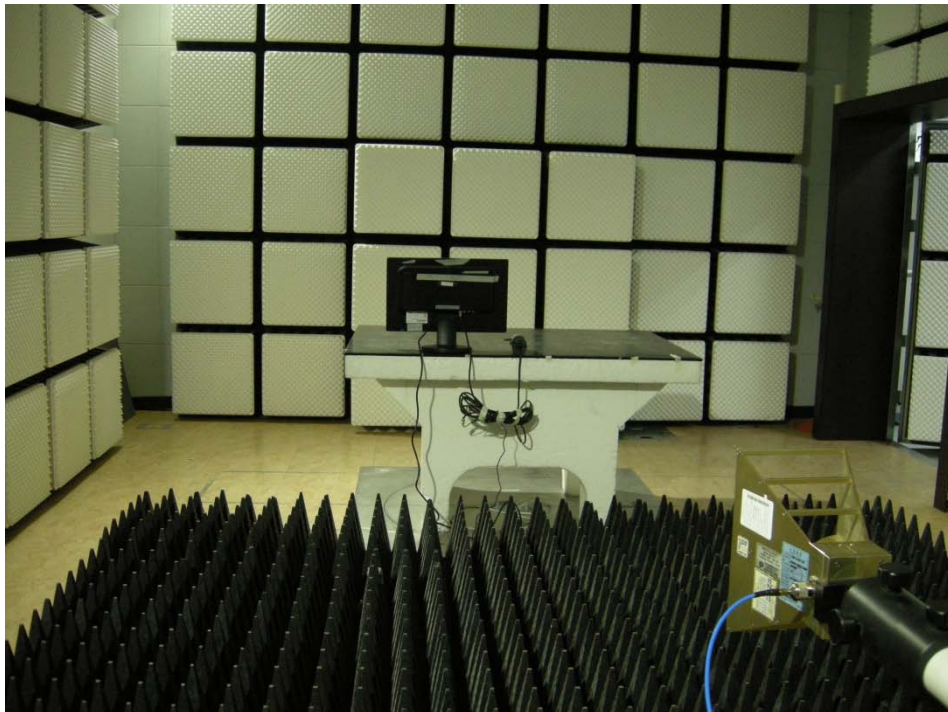
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## Radiated Electric Field Emissions(Below 1 GHz)



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## Radiated Electric Field Emissions(Above 1 GHz)



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## **Harmonic Current Emissions and Voltage Fluctuations and Flicker**

N/A

---

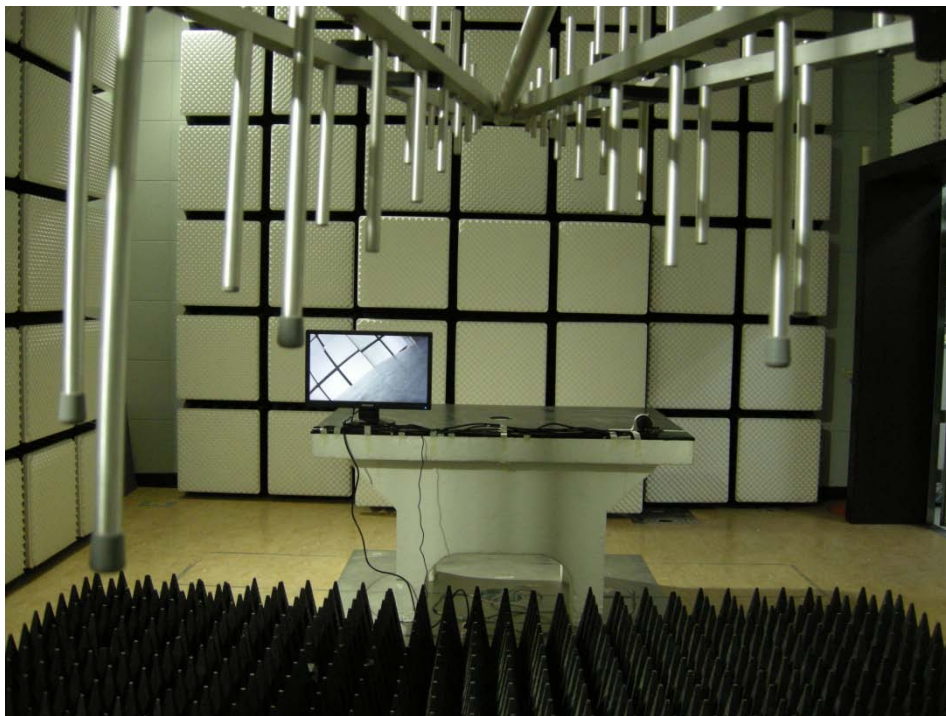
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## Electrostatic Discharge



## 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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## **Power Frequency Magnetic Field Immunity**

N/A

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## **Voltage Dips and Short Interruptions**

N/A

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## E.U.T External Photographs

(Top)



(Bottom)



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## E.U.T Internal Photographs

(Internal View)



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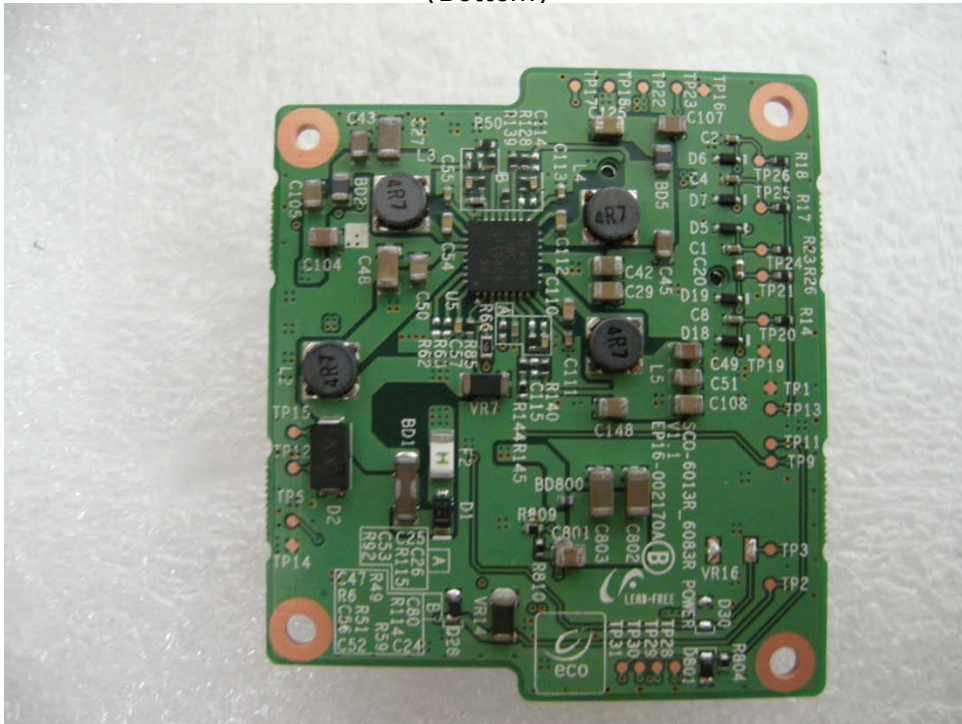


## Main Board EUT Internal View – Main Board

(Top)



(Bottom)



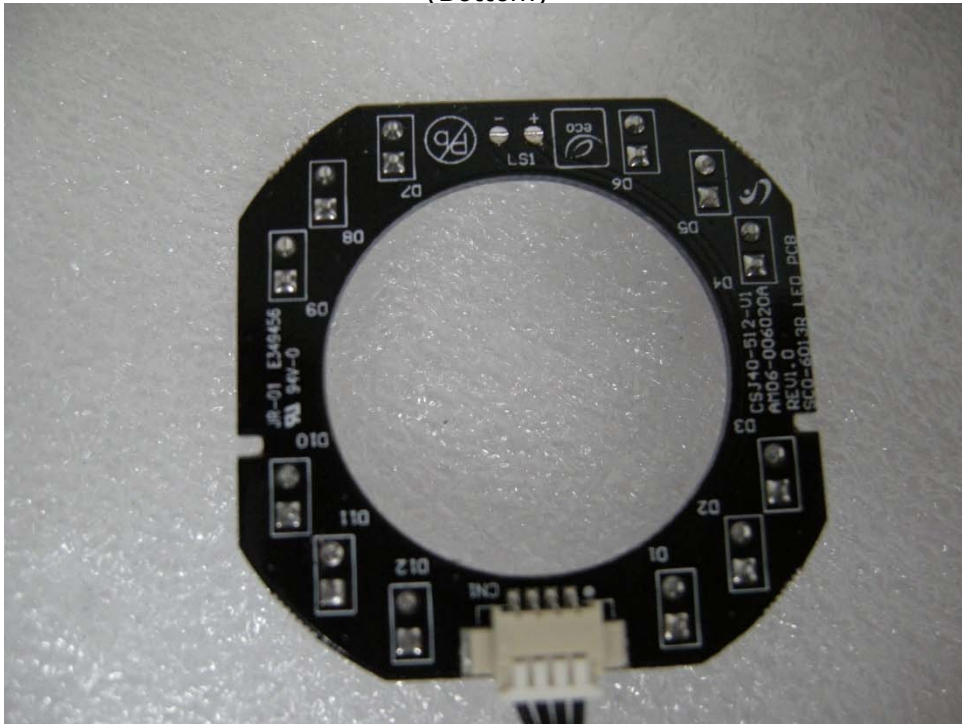
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## Main Board EUT Internal View – LED Board

(Top)



(Bottom)



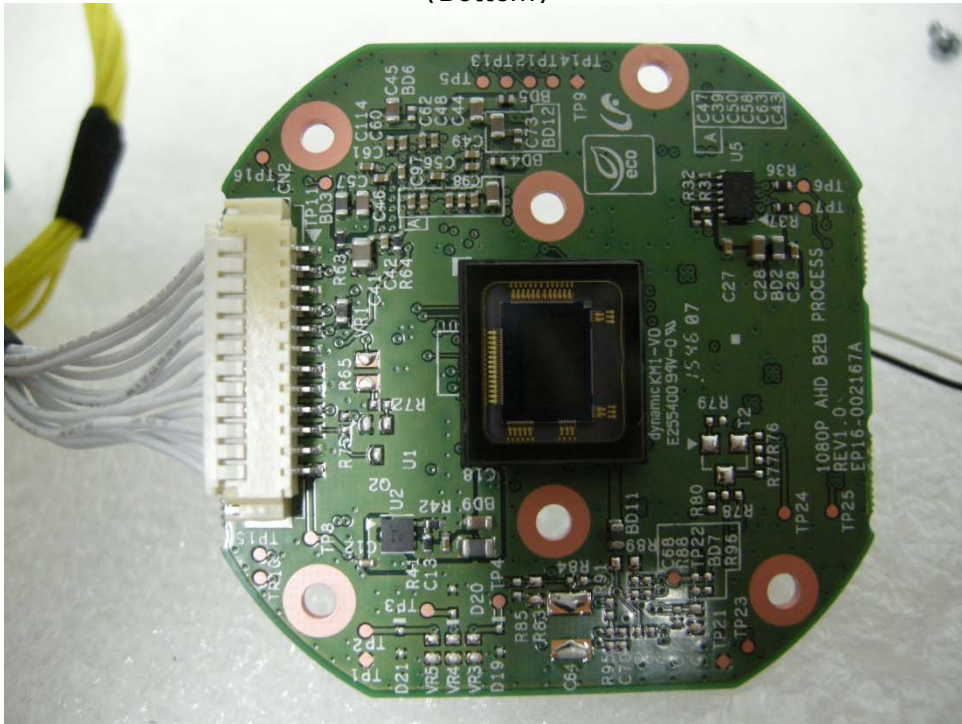
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### Main Board EUT Internal View – Lens Board

(Top)



(Bottom)



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---

## Main Board EUT Internal View – Lens

(Top)



(Bottom)



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## Label and Location



### **ANALOG CAMERA**

Model No : SCO-6023RP

Manufacturer : Tianjin Samsung Techwin Opto-Electronic Co., Ltd.

Made in of China

