



EMC TEST REPORT For VCCI

Test Report No. : KES-E1-16T0039
Date of Issue : Feb. 03, 2016
Product name : ANALOG CAMERA
Model/Type No. : SCO-6023RN
Variant Model : -
Applicant : Hanwha Techwin Company Limited
Applicant Address : 204, 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. 28, 2016
Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Young Suk, Song
EMC Test Engineer

Reviewed by

Dong-Hun, Jang
EMC Technical Manager

**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

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REPORT REVISION HISTORY

Date	Revision	Page No
Feb. 03, 2016	KES-E1-160039	Issued

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1.0 General Product Description

Main Specifications of EUT are:

	SCO-6023RN	SCO-6023RP
Video		
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	
Lens Type		
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	
Operational		
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° ~ 10,500K°)	
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)	
Environmental		
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	-	
Electrical		
Input Voltage	12VDC±10%	
Power Consumption	Max. 4.2W	
Mechanical		
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 ☐ 100 Vac ☐ 110 Vac ☐ 120 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-6023RN	-	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 (E.U.T)	BNC	MONITOR	BNC	4.1	S

* Unshielded=U, Shielded=S

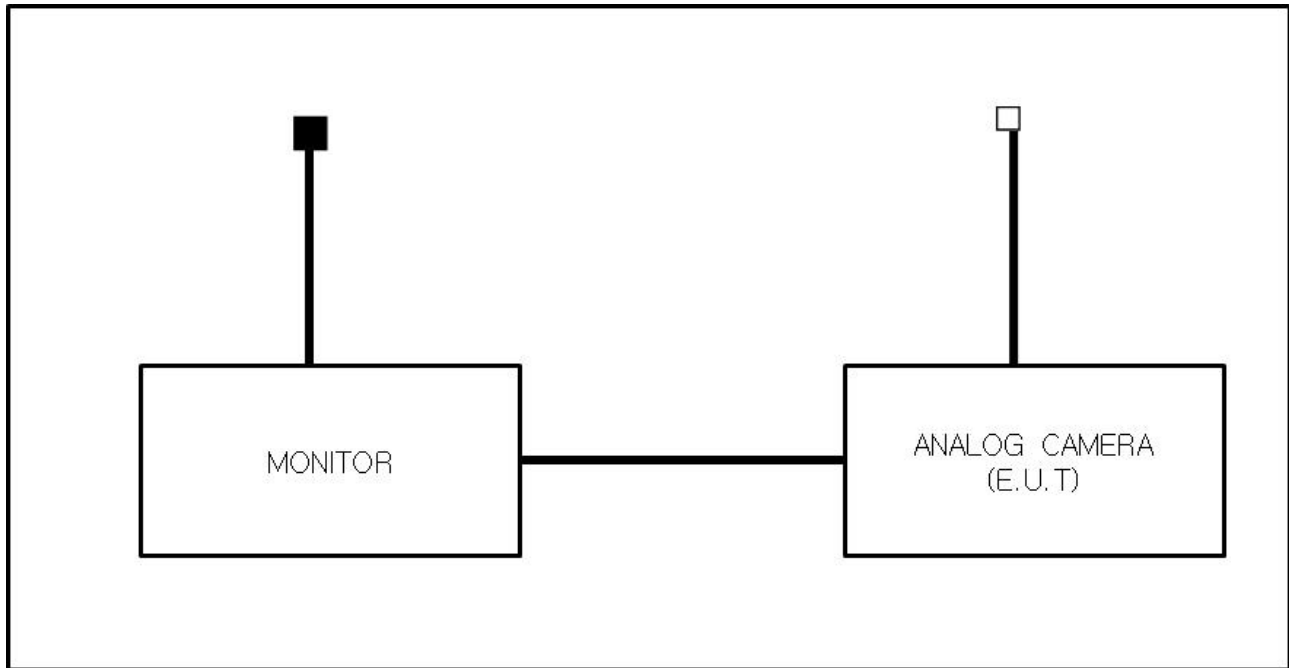
1.7 EUT Operating Mode(s)

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



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	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)	

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



☐ **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



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 Receiver	ESR3	R&S	101783	05. 06. 2016
☐	LISN	ENV216	R&S	101137	02. 10. 2016
☐	LISN	ENV216	R&S	101786	05. 06. 2016
☐	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
☐	EMI Test Receiver	ESR3	R&S	101783	05. 06. 2016
☐	LISN	ENV216	R&S	101137	02. 10. 2016
☐	LISN	ENV216	R&S	101786	05. 06. 2016
☐	8-Wire ISN CAT3	CAT3 8158	Schwarzbeck Mess	8158-0019	04. 02. 2016
☐	8-Wire ISN CAT5	CAT5 8158	Schwarzbeck Mess	8158-0030	04. 02. 2016
☐	8-Wire ISN CAT6	NTFM 8158	Schwarzbeck Mess	8158-0029	08. 14. 2016
☐	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

TestResults

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
☒	EMI Test Receiver	ESR7	R&S	101190	08. 13. 2016
☒	Trilog-Broadband Antenna	VULB 9163	SCHWARZBECK	9168-713	05. 15. 2017
☒	Open Area Test Site	-	KES	-	-
☒	Antenna Mast	-	EMCO	-	-
☒	Turn Table	-	DAEIL EMC	-	-

Test Conditions

Temperature: 0.9 °C

Relative Humidity: 55.0 %

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
☒	EMI Test Receiver	ESU26	R&S	100552	05. 06. 2016
☒	Broadband Coaxial Preamplifier	BBV 9718	Schwarzbeck Mess - Elektronik	9718-246	10. 23. 2016
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	05. 07. 2017
☒	Semi Anchoic Chamber #2	-	SEMITEC	-	-
☒	Antenna Mast	-	AUDIX	-	-
☒	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.



APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

[HOT]

N/A



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C-3701, Simin-daero 365-40,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
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[NEUTRAL]

N/A

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C-3701, Simin-daero 365-40,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
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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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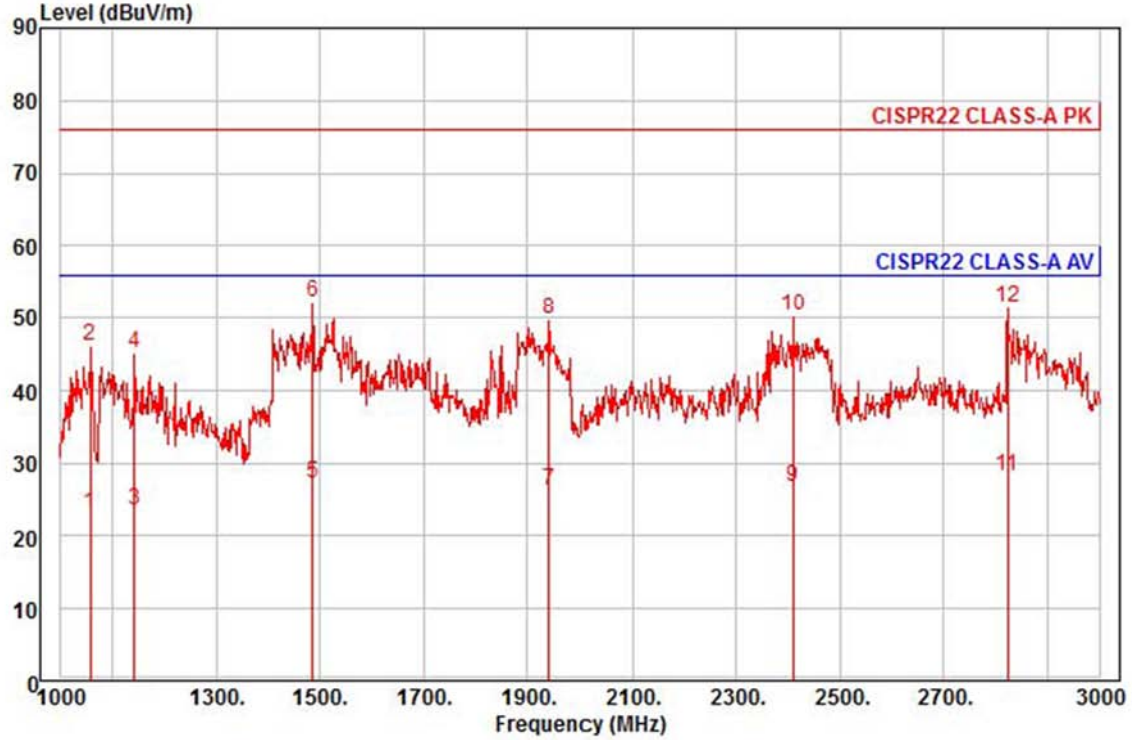
Radiated Electric Field Emissions(Below 1 GHz)

Frequency	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]
50.11	12.39	V	2.52	13.94	2.66	28.99	40.00	11.01
223.23	7.54	V	1.91	11.82	4.39	23.75	40.00	16.25
223.61	15.69	H	1.32	11.82	4.39	31.90	40.00	8.10
296.13	16.17	H	3.51	13.30	4.99	34.46	47.00	12.54
296.80	10.16	V	1.21	13.32	5.00	28.48	47.00	18.52
445.38	12.57	V	3.86	16.34	5.91	34.82	47.00	12.18
445.55	19.51	H	3.74	16.34	5.91	41.76	47.00	5.24
817.61	8.36	H	3.24	21.04	7.77	37.17	47.00	9.83

* H : Horizontal, V : Vertical

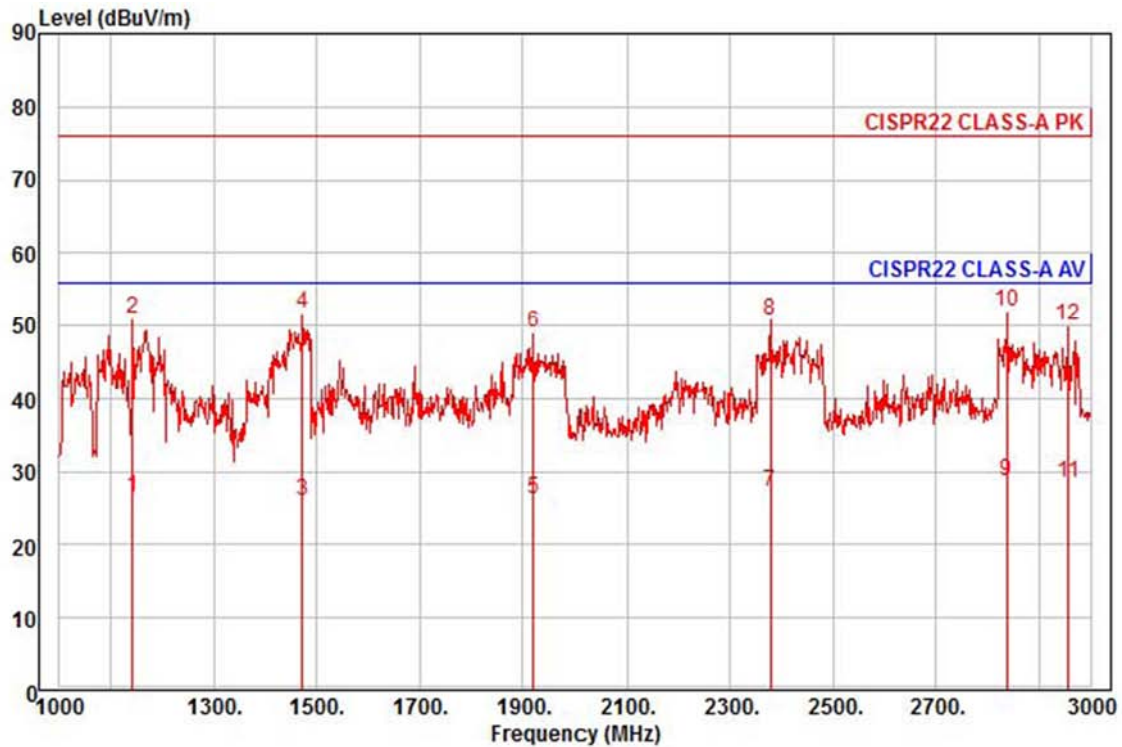
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Radiated Electric Field Emissions(Above 1 GHz)



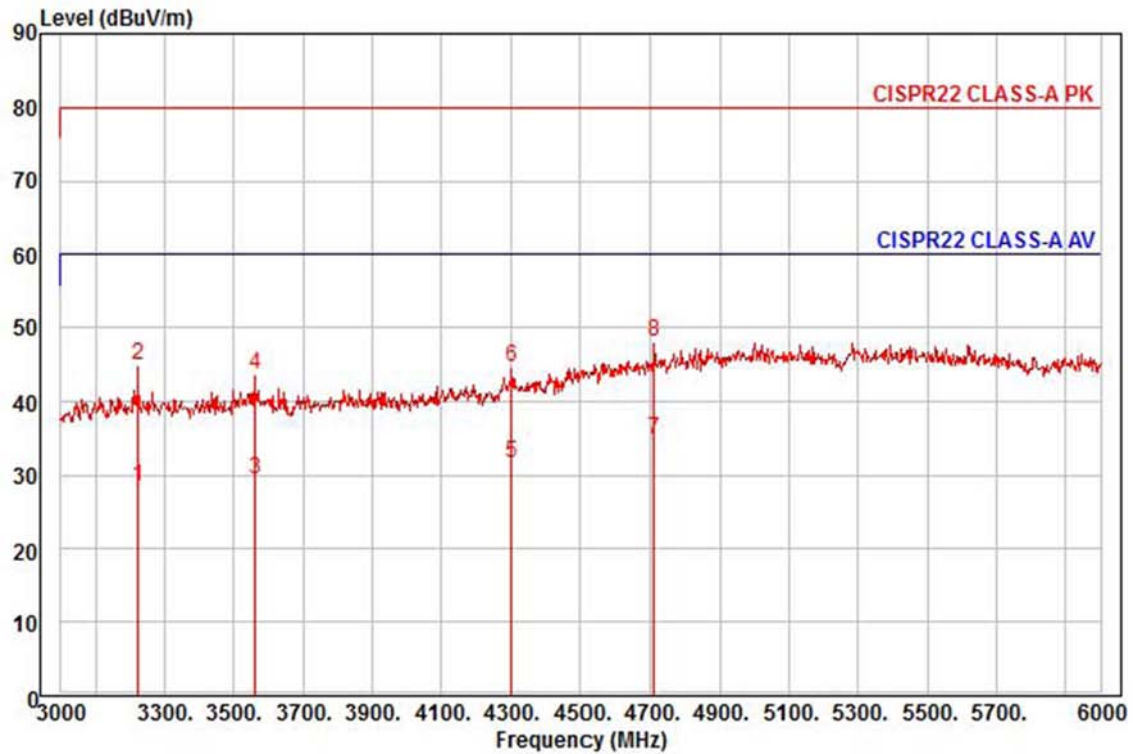
Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : SCO-6023RN
Mode : VCCI
Memo : 1 ~ 3 GHz

		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	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



Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : SCO-6023RN
Mode : VCCI
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	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



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

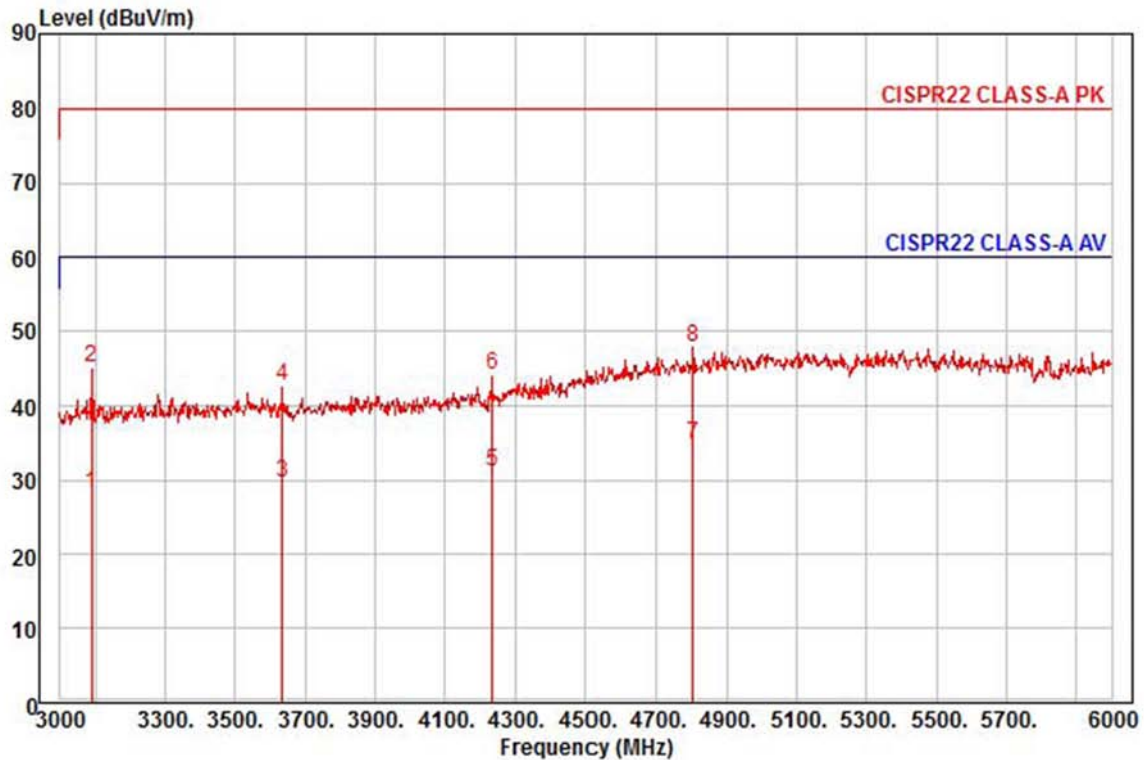
	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	3222.00	26.01	30.70	12.00	40.25	79	60.00	-31.54	horizontal	Average
2	3222.00	42.31	30.70	12.00	40.25	79	80.00	-35.24	horizontal	Peak
3	3561.00	26.08	31.27	12.45	40.32	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-6023RN
Mode : VCCI
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	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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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

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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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EUT External Photographs

(Top)



(Bottom)



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EUT Internal Photographs

(Internal View)



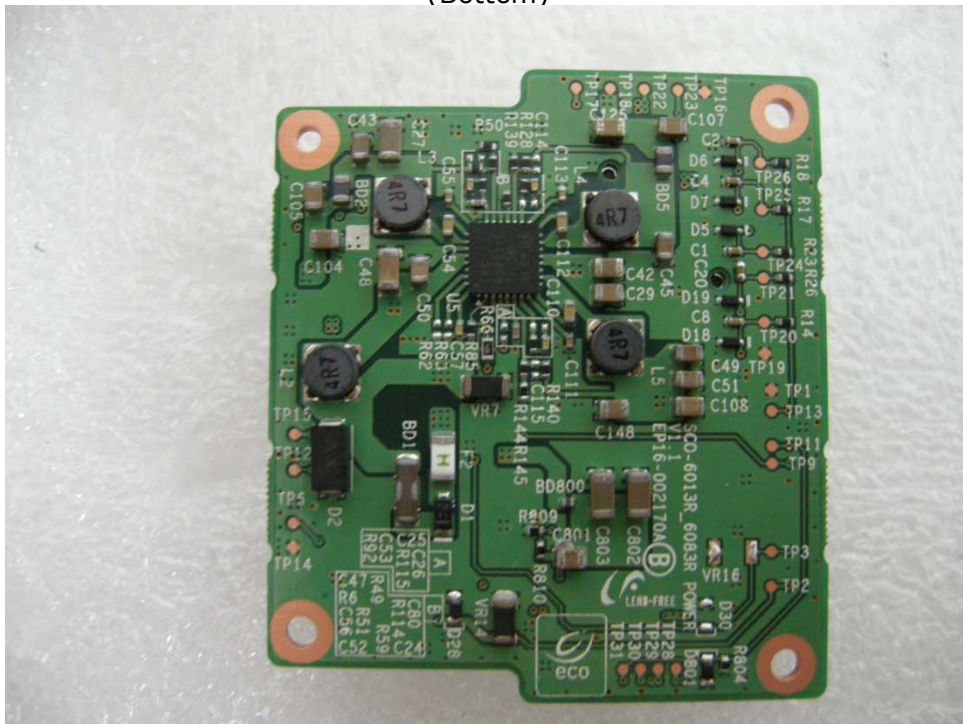
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Main Board EUT Internal View – Main Board

(Top)



(Bottom)



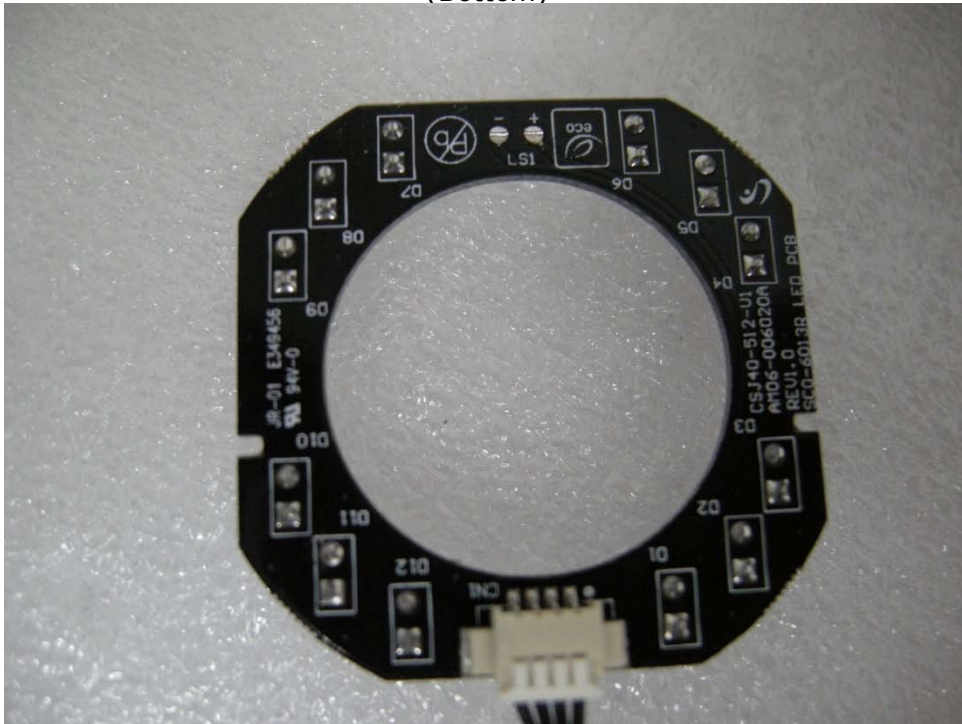
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Main Board EUT Internal View – LED Board

(Top)



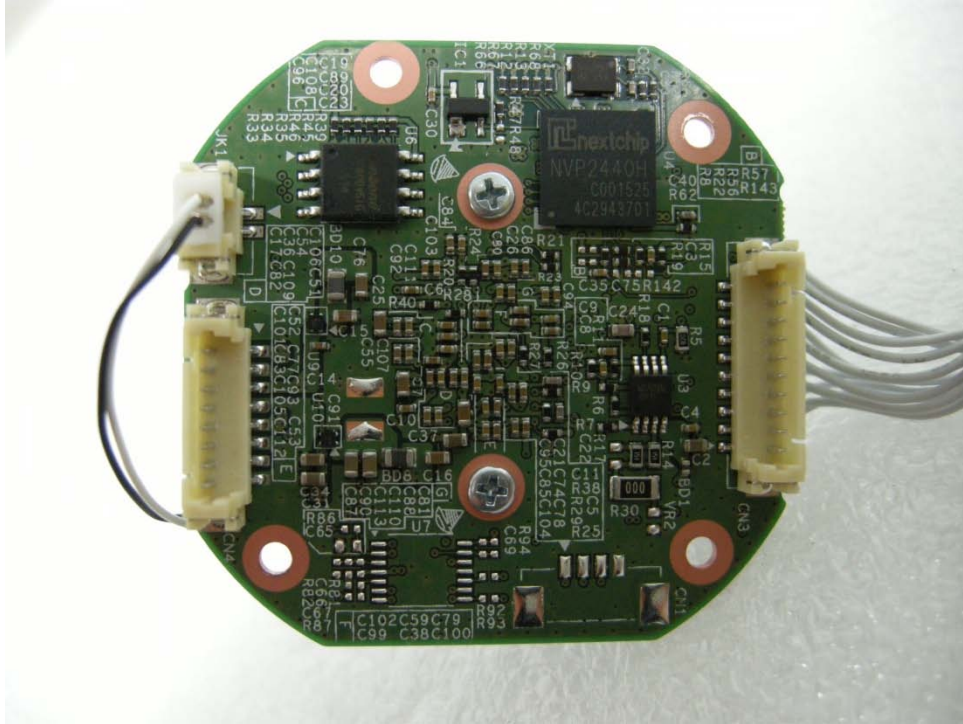
(Bottom)



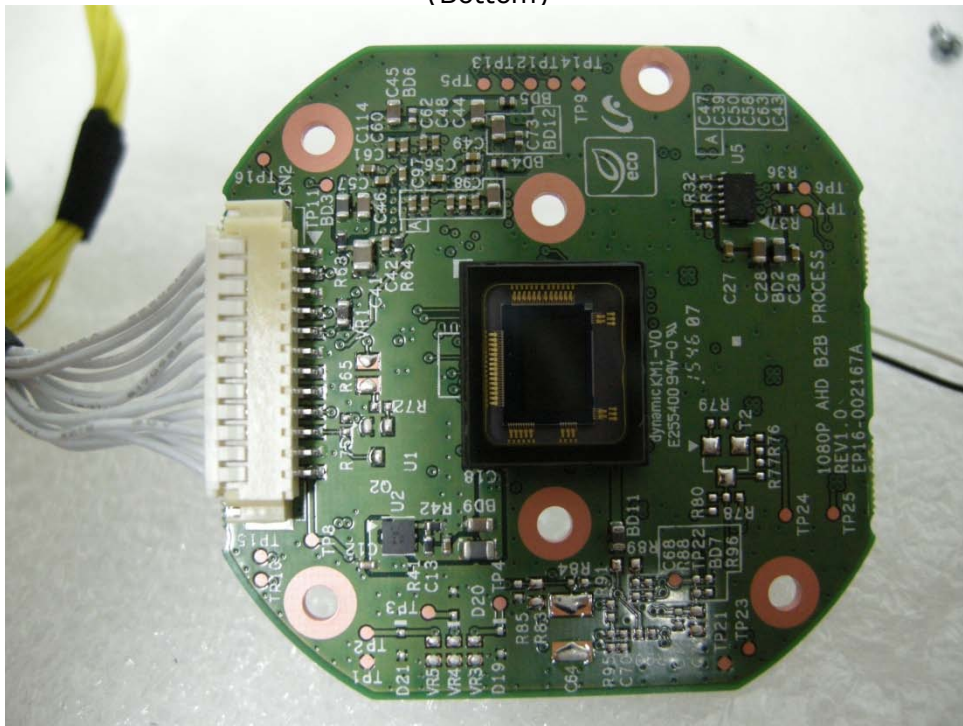
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Main Board EUT Internal View – Lens Board

(Top)



(Bottom)



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Main Board EUT Internal View – Lens

(Top)



(Bottom)



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