EMC TEST REPORT For VCCI

Test Report No.	:	KES-E1-17T0172
Date of Issue	:	Feb, 27, 2017
Product name	:	CCTV CAMERA
Model/Type No.	:	HCO-6070RN
Variant Model	:	-
Applicant	:	Hanwha Techwin Co., Ltd.
Applicant Address	:	1204, Changwon-daero, Seongsan-gu Changwon-si, Gyeongsangnam-do, Korea
Manufacturer	:	Hanwha Techwin (Tianjin) Co.,Ltd.
Manufacturer Address	:	No.11 Weiliu Rd,Micro-Electronic Industrial Park, TEDA,Tianjin,300385,People's Republic of China
Date of Receipt	:	Feb, 03, 2017
Test date	:	Feb, 14, 2017
Test Results	:	☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Jin Bae, Lee
EMC Test Engineer

Reviewed by

Dong-Hun, Jang
EMC Technical Manager

REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Feb. 27, 2017	KES-E1-17T0172	Issued

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1.0 General Product Description

Main Specifications of EUT are:

Video	
Imaging Device	1/2.8" 2M CMOS
Total Pixels	1,945(H) x 1,109(V) 2.16M pixels
Effective Pixels	1,945(H) x 1,097(V) 2.13M pixels
Scanning System	Progressive Scan
Min. Illumination	Color : 0.2Lux (F1.4, 50IRE); 0.11Lux (F1.4, 30IRE) B/W : 0Lux(IR LED on)
S / N Ratio	52dB (AGC off, Weight on)
Video Output	BNC(AHD / TVI / CVI / CVBS Selectable)
Resolution	1920 x 1080
Max. Framerate	30fps @1080p 25fps @1080p
Lens Type	
Focal Length (Zoom Ratio)	2.8 ~ 12mm (4.3x) varifocal
Max. Aperture Ratio	F1.4
Angular Field of View	H : 103.8°(Wide) ~ 32.4°(Tele) / V : 53.7°(Wide) ~ 18.4°(Tele) D : 121.9°(Wide) ~ 37.1°(Tele)
Min. Object Distance	0.5m (1.64ft)
Focus Control	Manual
Lens Type	DC Auto Iris
Mount Type	Board-in type
Auto Back Focus(ABF)	-
Operational	
IR LED	
Viewable length	30m（98.43ft）
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	120dB
Contrast Enhancement	-
Digital Noise Reduction	SSNR4 (Off / On)
Defog	AUTO / MANUAL / OFF
Digital Image Stabilization	Not support
Motion Detection	Off / On(4 zones)
Privacy Masking	Off / On (4zones rectangle)
Gain Control	Off / Low / Middle / High / Very High
White Balance	ATW / Outdoor / Indoor / Manual / AWC (1,800K° ~ 10,500K°)
LDC (Lens Distortion Correction)	Not support
Electronic Shutter Speed	1sec~ 1/12,000sec
Digital Zoom	Not support
Reverse	Off / H-Rev / V-Rev / HV-Rev
Profile	Basic, Day & Night, Backlight, ITS, Indoor, User
Intelligent Video Analytics	Not support
Alarm	MD output 1
Remote control interface	Coaxial
Protocol	NTSC/PAL : Pelco-C (Coaxitron) AHD : ACP(AHD Coax Protocol)
Video Transmission Distance	500m(5C2V Coaxial Cable)
Environmental	
Operating Temperature / Humidi	-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	IK10
Electrical	
Input Voltage/Current	Dual (24VAC±10% & 12VDC±10%)
Power Consumption	Max. 6W
Mechanical	
Color / Material	Dark Gray / Aluminum
Dimension (WxHxD)	260° Ø 78 mm
Weight	922g

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 ☒ 24 Vac ☒ 12 Vdc ☐ PoE

Frequency ☒ 50 Hz ☐ 60 Hz ☐ Hz

1.2 Variant Model Differences

Not applicable

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
CCTV CAMERA	HCO-6070RN	-	Hanwha Techwin (Tianjin) Co.,Ltd.	E.U.T

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
MONITOR	M1950DM	206KCLH81256	LG Electronics Co., Ltd.	-
MONITOR Adapter	PA-1650-64	OE9FA612314103637	LITE-ON TECHNOLOGY CORPORATION	-
Alarm	-	-	-	-

1.6 External I/O Cabling

- AC 24 V Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
CCTV CAMERA (E.U.T)	BNC	MONITOR	Component	3.5	S
	2 Pin	Alarm	2 Pin	3.0	U

- DC 12 V Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
CCTV CAMERA (E.U.T)	BNC	MONITOR	Component	3.5	S
	2 Pin	Alarm	2 Pin	3.0	U

* Unshielded = U, Shielded = S

1.7 EUT Operating Mode(s)

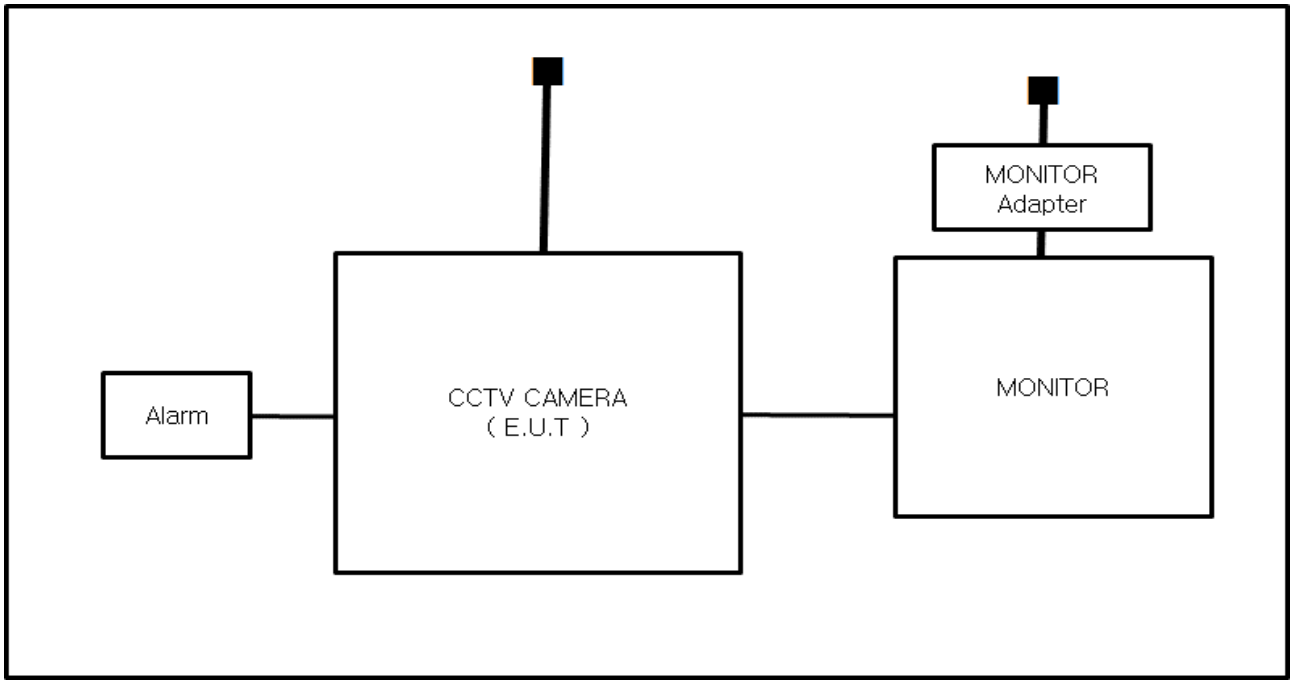
Test mode	operating
AC 24 V, DC 12 V	E.U.T Monitoring

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

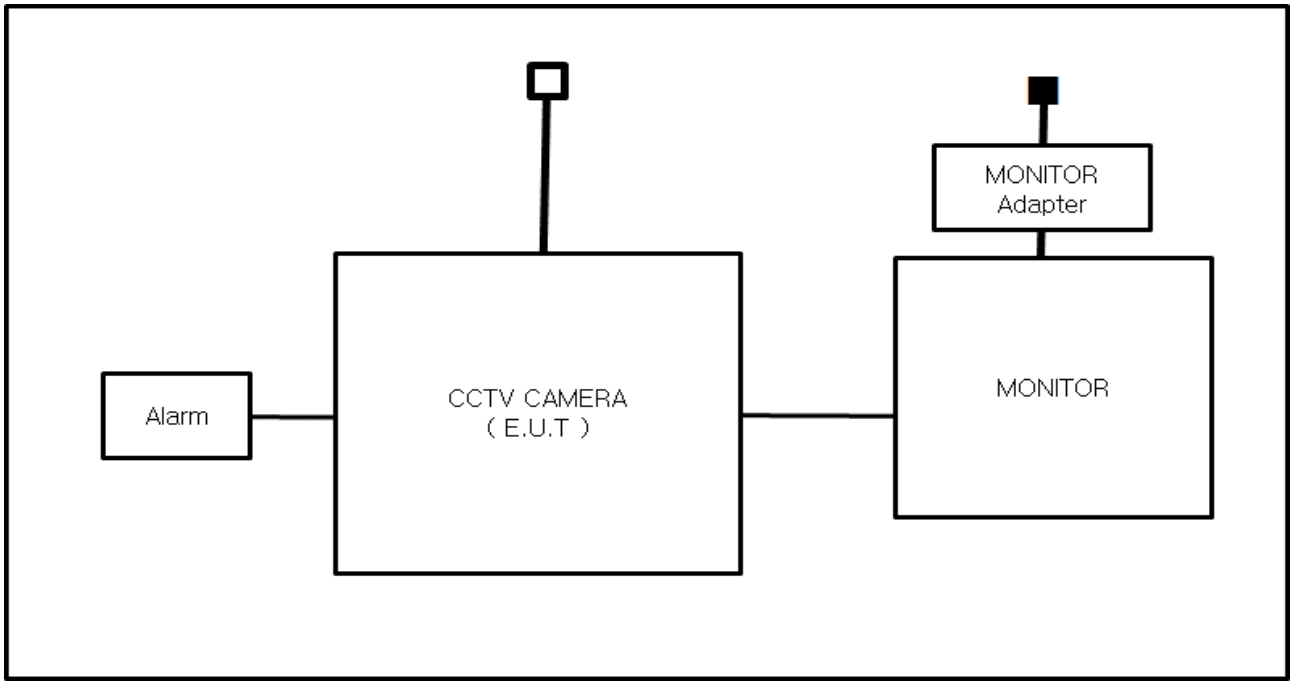
1.8 Configuration

■ AC Main
□ DC Main

- AC 24 V Mode



- DC 12 V Mode



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

2.0 Test Regulations

The emissions tests were performed according to following regulations:

☐ **EMC – Directive 2014/30/EU**

☐ EN 61000-6-3:2011

☐ EN 61000-6-1:2007

☐ EN 61000-6-4:2007 +A1:2011

☐ EN 61000-6-2:2005

☐ EN 55011:2007 +A1:2010 ☐ Group 1 ☐ Class A ☐ Group 2 ☐ Class B

☐ EN 55014-1:2006 +A2:2011

☐ EN 55014-2:1997 +A2:2008

☐ EN 55015:2013

☐ EN 61547 :2009

☐ EN 55032:2012 ☐ 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

☒ **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 C63.4-2009

☐ **IC Regulation ICES-003 : 2016**

- ☐ CAN/CSA CISPR 22-10 ☐ Class A ☐ Class B
- ☐ ANSI C63.4-2014

☐ **RE– Directive 2014/53/EU**

☐ EN 301 489-1 V1.9.2

- ☐ Equipment for fixed use
- ☐ Equipment for vehicular use
- ☐ Equipment for portable use

☐ EN 301 489-3 V1.6.1

☐ EN 301 489-17 V2.2.1

☐ EN 60945:2002

2.1 Conducted Emissions Mains Power Ports

Test Date
Feb, 14, 2017

Test Location
Electro wave Shieldroom #3

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, 03, 2018
☒	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: 22,9 ℃
Relative Humidity: 41,3 %

Frequency Range of Measurement
150 ㎑ to 30 ㎒

Instrument Settings
IF Band Width: 9 ㎑

Test Results
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks
See Appendix A for test data.

2.2 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, 03, 2018
☐	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
☐	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: ℃
Relative Humidity: %

Frequency Range of Measurement
150 ㎑ to 30 ㎒

Instrument Settings
IF Band Width: 9 ㎑

Test Results
The requirements are:

☐ PASS
☐ NOT PASS
☒ NOT APPLICABLE

Remarks
N/A.

2.3 Radiated Electric Field Emissions(Below 1 ㎓)

Test Date
Feb, 14, 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	ESU26	R & S	100551	04, 18, 2017
☒	Trilog-Broadband Antenna	VULB 9163	Schwarzbeck	715	04, 14, 2018
☒	OATS	-	KES	-	-
☒	Antenna Mast	1070/1080	EMCO	-	-
☒	Turn Table	-	DAEIL EMC	-	-
☒	EMI Test S/W	-	-	-	-

Test Conditions
Temperature: 5,1 ℃
Relative Humidity: 45,0 %

Frequency Range of Measurement
30 ㎒ to 1 ㎓

Instrument Settings
IF Band Width: 120 ㎑

Test Results
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks
See Appendix A for test data.

2.4 Radiated Electric Field Emissions(Above 1 ㎓)

Test Date
Feb, 14, 2017

Test Location
Semi Anechoic Chamber #2

Test Equipment

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

Test Conditions
Temperature: 22,9 ℃
Relative Humidity: 41,3 %

Frequency Range of Measurement
1 ㎓ to 6 ㎓

Instrument Settings
IF Band Width: 1 ㎒

Test Results
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks
See Appendix A for test data.

APPENDIX A – TEST DATA

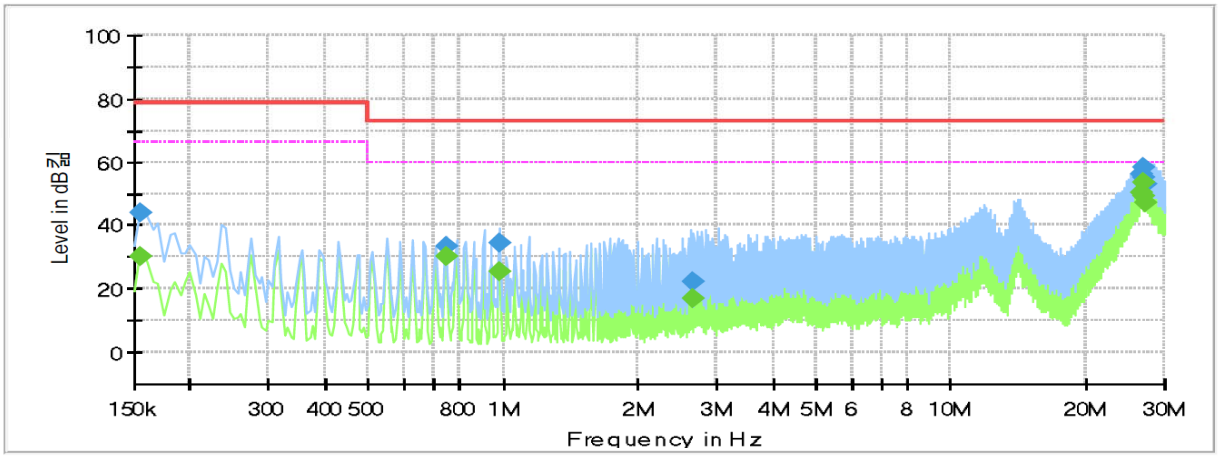
Conducted Emissions at Mains Power Ports

- AC 24 V Mode

[HOT]

Common Information

Test Description:	Conducted Emission
Model No.:	HCO-6070RN
Mode	AC 24 V_H
Operator Name:	KES



Final_Result

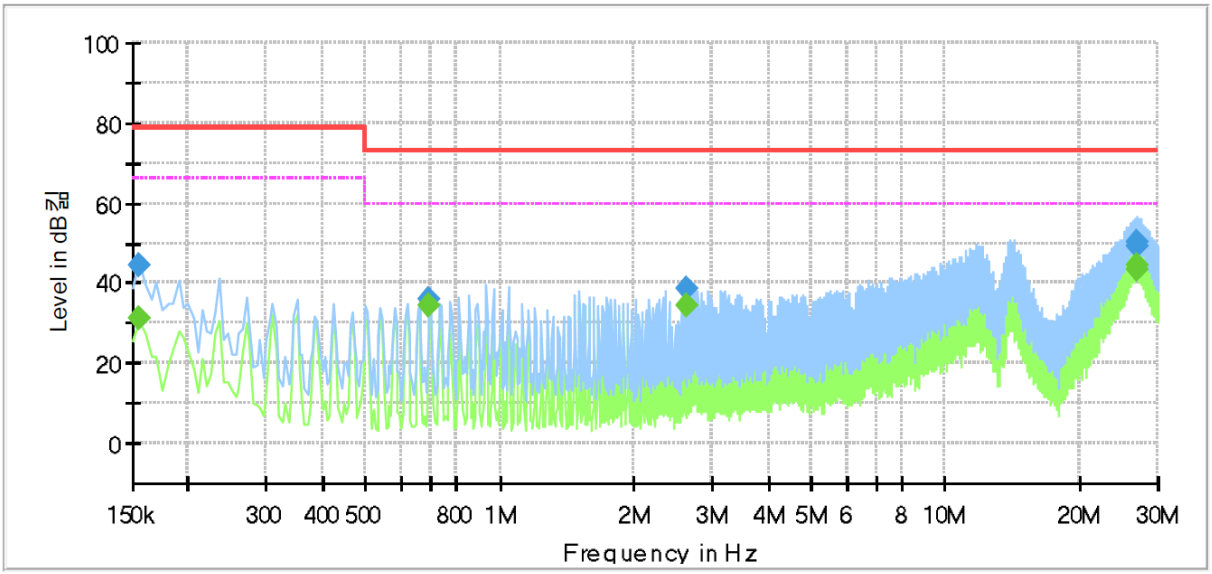
Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.155000	43.83	---	79.00	35.17	1000.0	9.000	L1	21.0
0.155000	---	30.12	66.00	35.88	1000.0	9.000	L1	21.0
0.745000	33.29	---	73.00	39.71	1000.0	9.000	L1	20.3
0.745000	---	30.33	60.00	29.67	1000.0	9.000	L1	20.3
0.980000	34.25	---	73.00	38.75	1000.0	9.000	L1	20.2
0.980000	---	25.17	60.00	34.83	1000.0	9.000	L1	20.2
2.665000	22.00	---	73.00	51.00	1000.0	9.000	L1	19.8
2.665000	---	17.07	60.00	42.93	1000.0	9.000	L1	19.8
26.705000	---	50.30	60.00	9.70	1000.0	9.000	L1	20.3
26.705000	55.91	---	73.00	17.09	1000.0	9.000	L1	20.3
26.985000	---	49.15	60.00	10.85	1000.0	9.000	L1	20.3
26.985000	55.10	---	73.00	17.90	1000.0	9.000	L1	20.3
27.025000	---	53.72	60.00	6.28	1000.0	9.000	L1	20.3
27.025000	58.17	---	73.00	14.83	1000.0	9.000	L1	20.3
27.060000	---	47.04	60.00	12.96	1000.0	9.000	L1	20.3
27.060000	53.17	---	73.00	19.83	1000.0	9.000	L1	20.3

♦ Calculation
QuasiPeak[dBuV] / CAverage [dBuV] = Reading Value[dBuV] + Corr. [dB]
QuasiPeak / CAverage : The Final Value
Reading Value : Not shown in the table.
Corr. : Correction values (LISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

[NEUTRAL]

Common Information

Test Description:	Conducted Emission
Model No.:	HCO-6070RN
Mode	AC 24 V_N
Operator Name:	KES



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.155000	---	31.14	66.00	34.86	1000.0	9.000	N	21.0
0.155000	44.56	---	79.00	34.44	1000.0	9.000	N	21.0
0.695000	---	34.35	60.00	25.65	1000.0	9.000	N	20.4
0.695000	35.93	---	73.00	37.07	1000.0	9.000	N	20.4
2.630000	---	34.48	60.00	25.52	1000.0	9.000	N	19.8
2.630000	38.85	---	73.00	34.15	1000.0	9.000	N	19.8
26.990000	---	44.37	60.00	15.63	1000.0	9.000	N	20.3
26.990000	50.21	---	73.00	22.79	1000.0	9.000	N	20.3
27.030000	---	43.42	60.00	16.58	1000.0	9.000	N	20.3
27.030000	49.43	---	73.00	23.57	1000.0	9.000	N	20.3

♦ Calculation
QuasiPeak[dBuV] / CAverage [dBuV] = Reading Value[dBuV] + Corr. [dB]
QuasiPeak / CAverage : The Final Value
Reading Value : Not shown in the table.
Corr. : Correction values (LISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

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 + Pulse Limiter FACTOR))

[100 Mbps]

N/A

♦ Calculation
QuasiPeak[㏈uV] / CAverage [㏈uV] = Reading Value[㏈uV] + Corr. [㏈]
QuasiPeak / CAverage : The Final Value
Reading Value : Not shown in the table.
Corr. : Correction values (ISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

Radiated Electric Field Emissions(Below 1 ㎓)

- AC 24 V Mode

Frequency	Amplitude	ANT Polar. (H/V)	ANT. Height	Correction Factor		Corrected Amplitude	Applicable Limit	Margin [dB]
[㎒]	[dBμV]		[m]	ANT. [dB/m]	Cable [dB]	[dBμV/m]	[dBμV/m]	
129.84	17.68	V	2.84	8.81	2.58	29.07	40.00	10.93
163.41	9.88	H	1.37	8.65	2.95	21.48	40.00	18.52
244.83	10.76	H	3.17	12.44	3.64	26.84	47.00	20.16
295.98	10.35	V	2.15	13.33	4.07	27.75	47.00	19.25
372.61	9.94	V	3.84	14.98	4.41	29.33	47.00	17.67
548.10	10.64	H	1.68	18.25	5.59	34.48	47.00	12.52

* H : Horizontal, V : Vertical

♦ Calculation
Corrected Amplitude [㏈uV] = Amplitude[㏈uV] + Correction Factor [㏈]
Corrected Amplitude : The Final Value, Amplitude : Reading Value,
Correction Factor : ANT FACTOR + Cable loss

- DC 12 V Mode

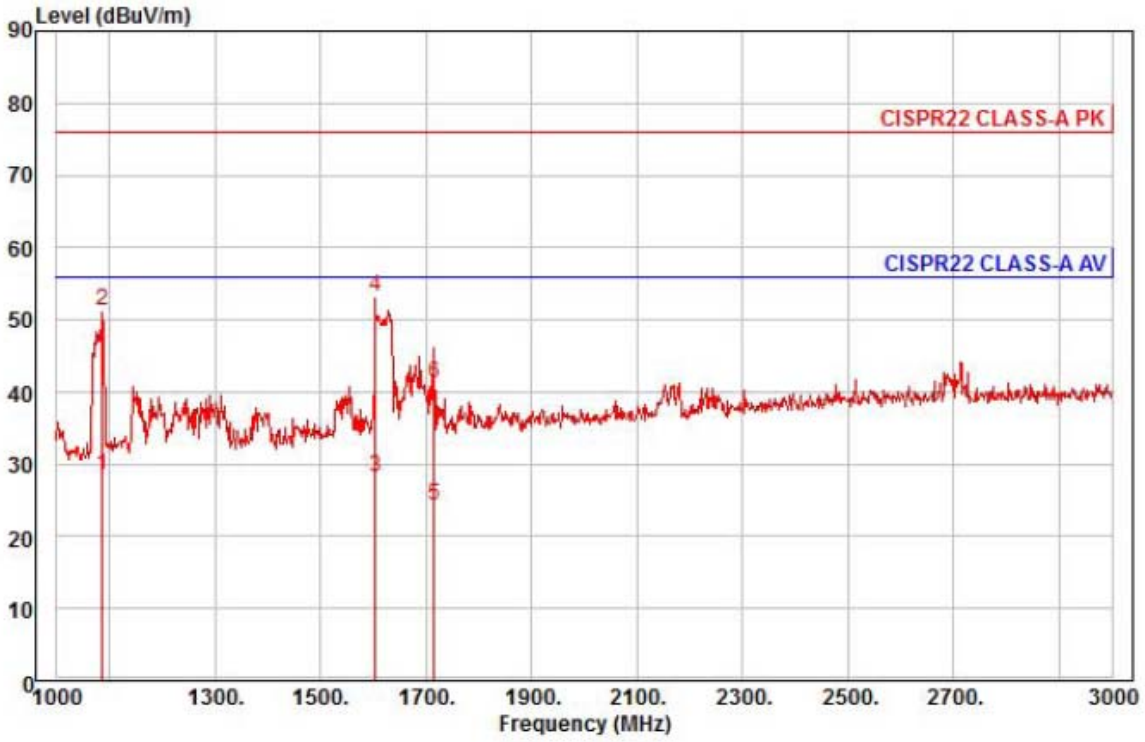
Frequency	Amplitude	ANT Polar. (H/V)	ANT. Height	Correction Factor		Corrected Amplitude	Applicable Limit	Margin [dB]
[㎒]	[dBμV]		[m]	ANT. [dB/m]	Cable [dB]	[dBμV/m]	[dBμV/m]	
45.68	11.69	V	1.68	13.29	1.61	26.59	40.00	13.41
159.45	10.51	H	2.94	8.47	2.92	21.90	40.00	18.10
206.94	9.96	H	1.98	11.62	3.23	24.81	40.00	15.19
298.68	16.98	V	3.12	13.38	4.09	34.45	47.00	12.55
370.94	10.18	H	3.14	14.94	4.39	29.51	47.00	17.49
546.19	9.96	V	2.61	18.21	5.57	33.74	47.00	13.26

* H : Horizontal, V : Vertical

♦ Calculation
Corrected Amplitude [㏈uV] = Amplitude[㏈uV] + Correction Factor [㏈]
Corrected Amplitude : The Final Value, Amplitude : Reading Value,
Correction Factor : ANT FACTOR + Cable loss

Radiated Electric Field Emissions(Above 1 ㎓)

- AC 24 V Mode



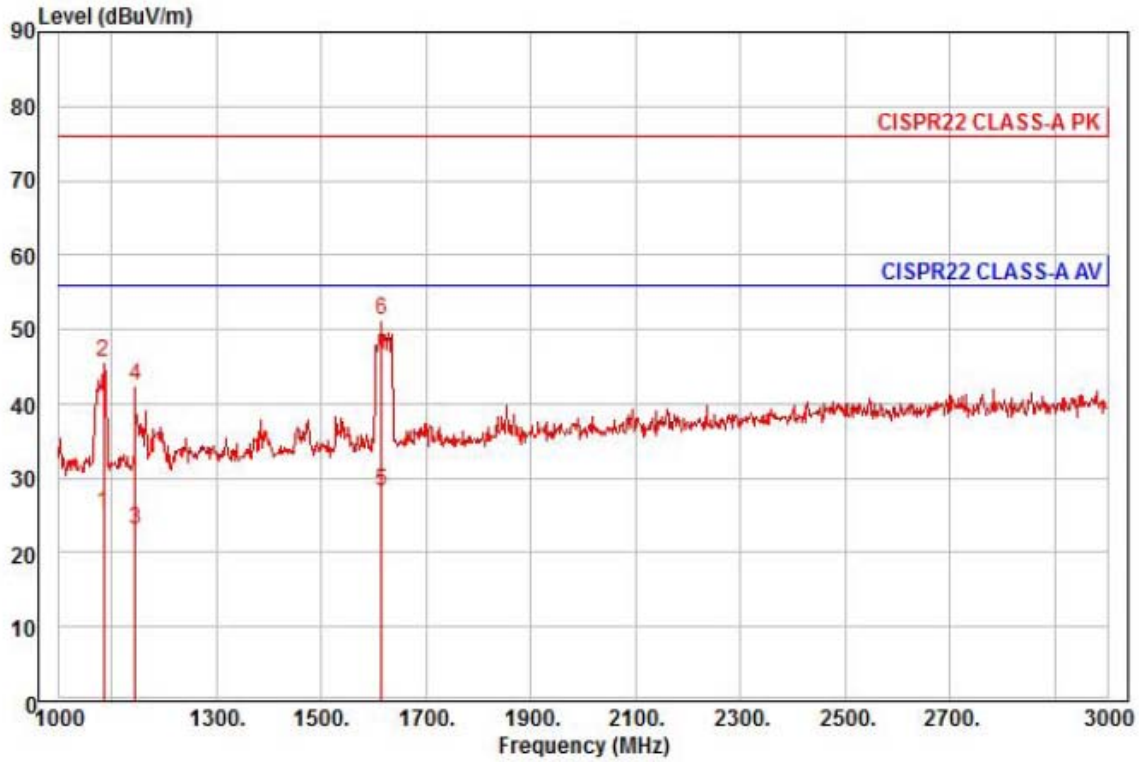
Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : HCO-6070RN
Mode : AC 24 V
Memo : 1 ~ 3 GHz

	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 av	1086.00	37.37	24.25	6.76	39.88	333	56.00	-27.50	horizontal	Average
2	1086.00	60.02	24.25	6.76	39.88	333	76.00	-24.85	horizontal	Peak
3	1604.00	32.75	26.31	8.32	39.23	27	56.00	-27.85	horizontal	Average
4 pp	1604.00	57.71	26.31	8.32	39.23	27	76.00	-22.89	horizontal	Peak
5	1716.00	28.22	26.75	8.61	39.28	15	56.00	-31.70	horizontal	Average
6	1716.00	45.08	26.75	8.61	39.28	15	76.00	-34.84	horizontal	Peak

♦ Calculation

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

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



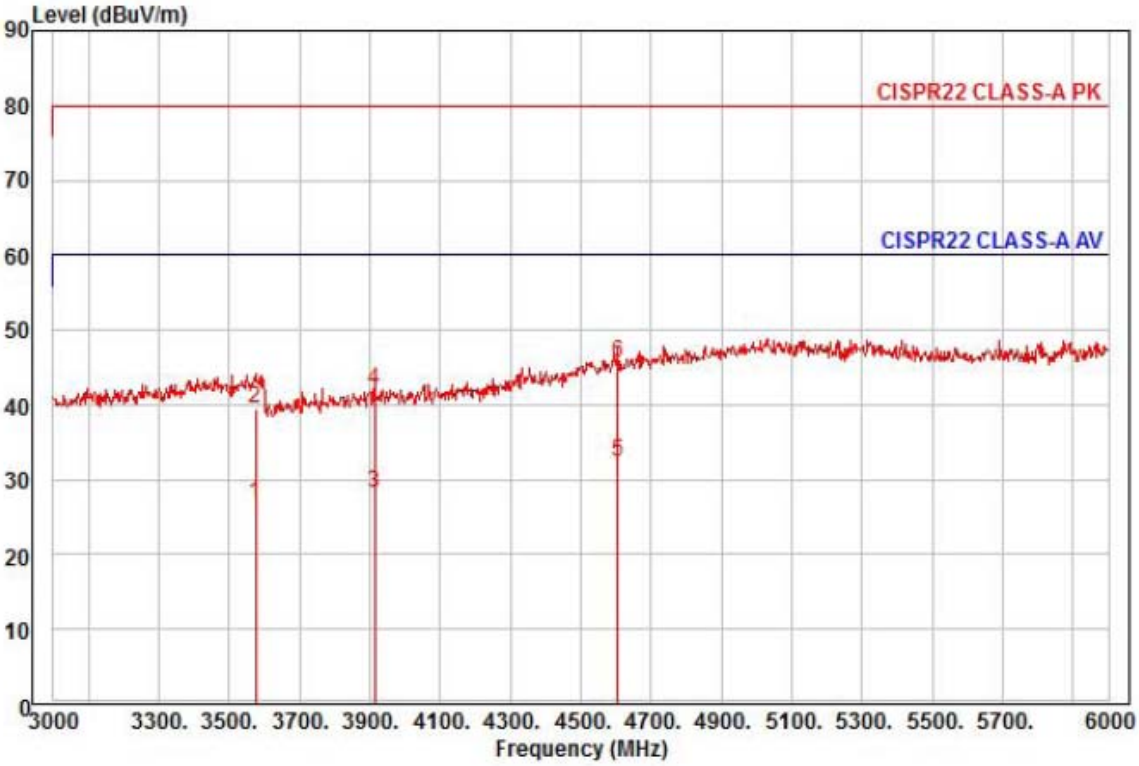
Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : HCO-6070RN
Mode : AC 24 V
Memo : 1 ~ 3 GHz

	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	1084.00	34.12	24.24	6.76	39.89	353	56.00	-30.77	vertical	Average
2	1084.00	54.54	24.24	6.76	39.89	353	76.00	-30.35	vertical	Peak
3	1146.00	31.27	24.49	6.96	39.74	11	56.00	-33.02	vertical	Average
4	1146.00	50.63	24.49	6.96	39.74	11	76.00	-33.66	vertical	Peak
5 av	1614.00	32.75	26.35	8.35	39.23	2	56.00	-27.78	vertical	Average
6 pp	1614.00	55.71	26.35	8.35	39.23	2	76.00	-24.82	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



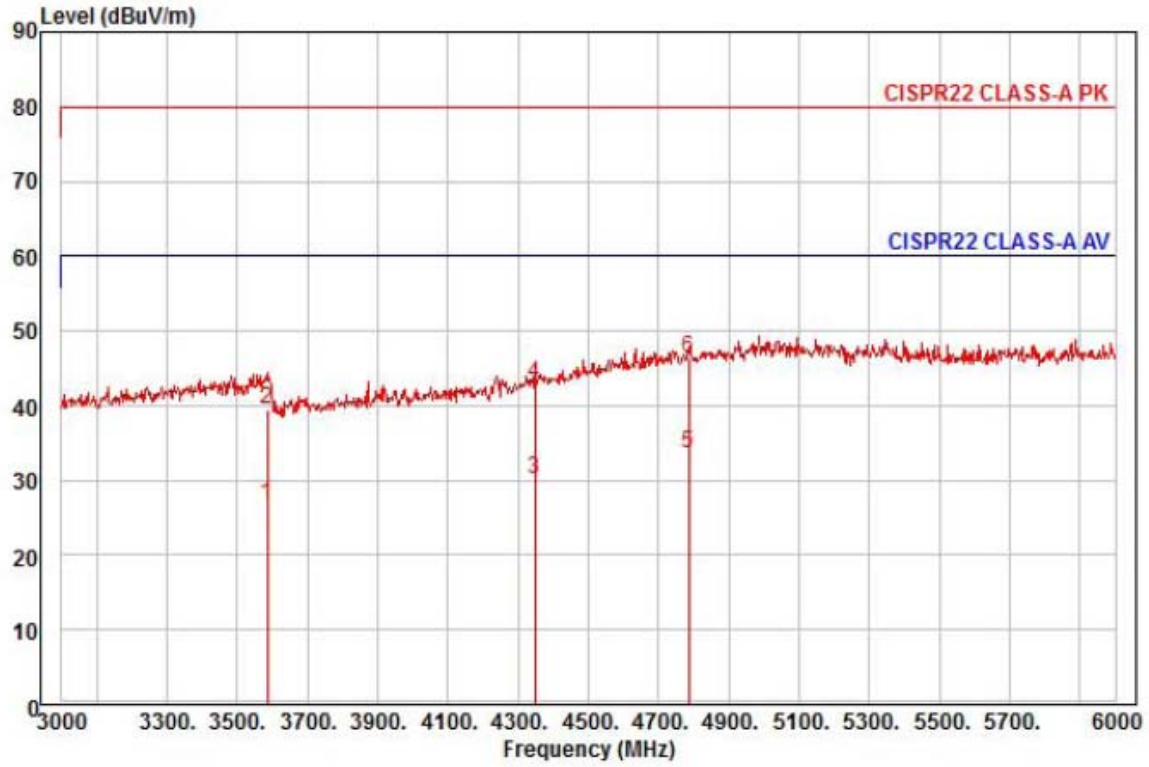
Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : HCO-6070RN
Mode : AC 24 V
Memo : 3 ~ 6 GHz

	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	3576.00	23.40	31.30	12.76	40.85	316	60.00	-33.39	horizontal	Average
2	3576.00	36.16	31.30	12.76	40.85	316	80.00	-40.63	horizontal	Peak
3	3915.00	23.78	31.87	13.40	40.73	310	60.00	-31.68	horizontal	Average
4	3915.00	37.51	31.87	13.40	40.73	310	80.00	-37.95	horizontal	Peak
5 pp	4605.00	22.89	35.46	14.67	40.67	3	60.00	-27.65	horizontal	Average
6 pk	4605.00	36.26	35.46	14.67	40.67	3	80.00	-34.28	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



Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : HCO-6070RN
Mode : AC 24 V
Memo : 3 ~ 6 GHz

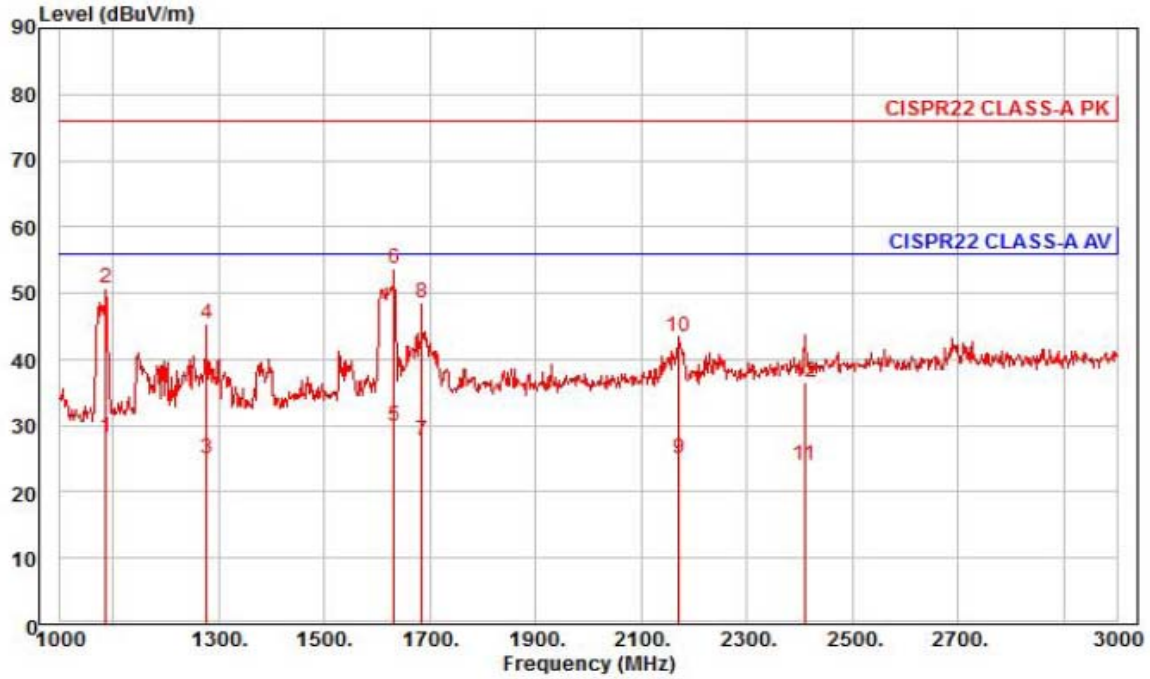
	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	3585.00	23.50	31.31	12.78	40.85	288	60.00	-33.26	vertical	Average
2	3585.00	36.21	31.31	12.78	40.85	288	80.00	-40.55	vertical	Peak
3	4347.00	22.84	33.99	14.18	40.75	119	60.00	-29.74	vertical	Average
4	4347.00	35.55	33.99	14.18	40.75	119	80.00	-37.03	vertical	Peak
5 pp	4785.00	22.47	36.49	15.06	40.49	113	60.00	-26.47	vertical	Average
6 pk	4785.00	35.39	36.49	15.06	40.49	113	80.00	-33.55	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

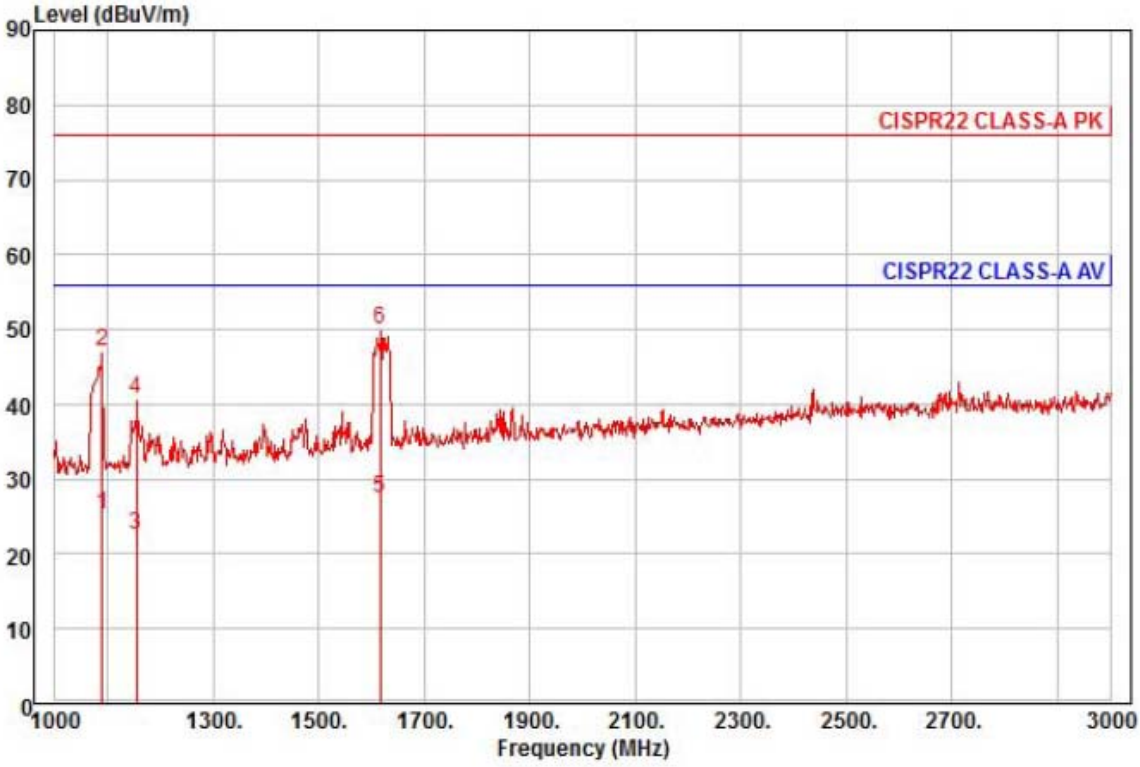
- DC 12 V Mode



Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : HCO-6070RN
Mode : DC 12 V
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	1086.00	37.10	24.25	6.76	39.88	336	56.00	-27.77	horizontal	Average
2	1086.00	59.68	24.25	6.76	39.88	336	76.00	-25.19	horizontal	Peak
3	1278.00	31.97	25.01	7.37	39.42	319	56.00	-31.07	horizontal	Average
4	1278.00	52.52	25.01	7.37	39.42	319	76.00	-30.52	horizontal	Peak
5 av	1632.00	34.30	26.42	8.39	39.24	15	56.00	-26.13	horizontal	Average
6 pp	1632.00	58.23	26.42	8.39	39.24	15	76.00	-22.20	horizontal	Peak
7	1684.00	31.72	26.63	8.53	39.26	15	56.00	-28.38	horizontal	Average
8	1684.00	52.58	26.63	8.53	39.26	15	76.00	-27.52	horizontal	Peak
9	2172.00	26.44	28.30	9.74	39.41	319	56.00	-30.93	horizontal	Average
10	2172.00	44.75	28.30	9.74	39.41	319	76.00	-32.62	horizontal	Peak
11	2410.00	24.18	28.88	10.34	39.43	359	56.00	-32.03	horizontal	Average
12	2410.00	36.80	28.88	10.34	39.43	359	76.00	-39.41	horizontal	Peak

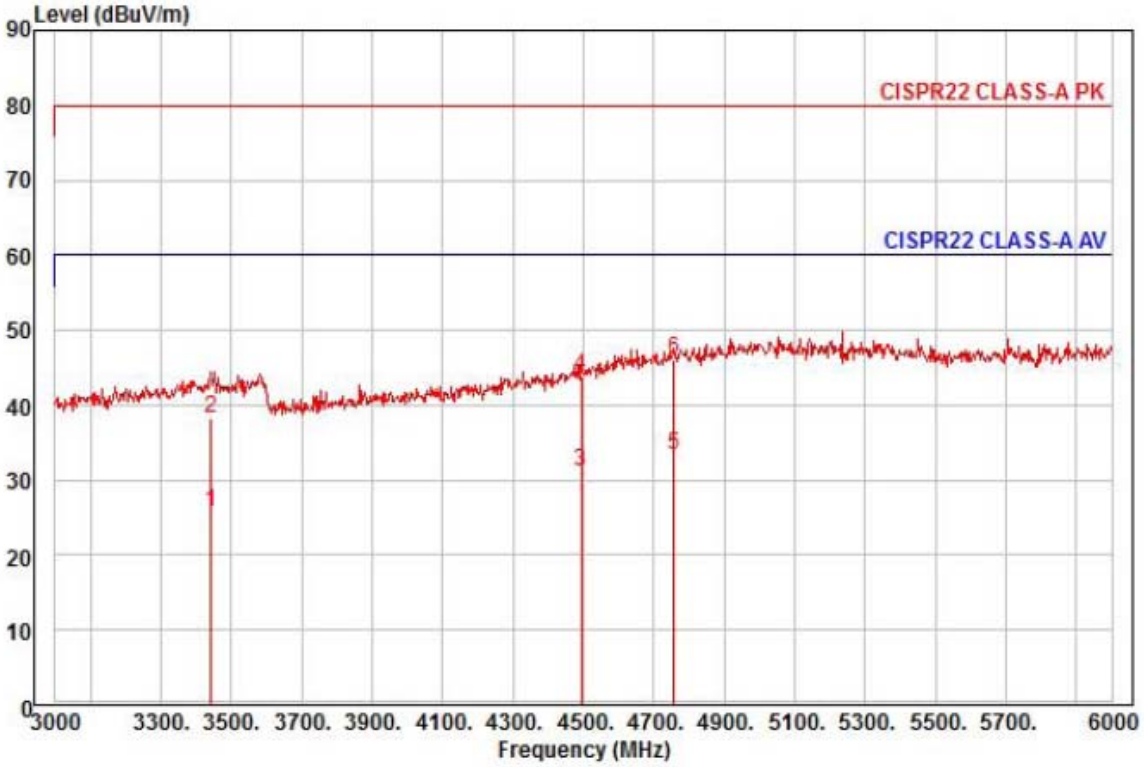
♦ Calculation
Over Limit [㏈] = (Read Level[㏈uV] + Ant Factor[㏈/m] + Cable Loss [㏈] − Preamp Factor [㏈]) − Limit Line[㏈uV]
Over Limit : Margin Value, Read Level : Reading Value, Ant Factor : Ant Factor,
Cable Loss : Cable loss, Preamp Factor : Preamp Factor



Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : HCO-6070RN
Mode : DC 12 V
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	1090.00	33.98	24.27	6.78	39.87	331	56.00	-30.84	vertical	Average
2	1090.00	55.97	24.27	6.78	39.87	331	76.00	-28.85	vertical	Peak
3	1154.00	30.85	24.52	6.99	39.72	14	56.00	-33.36	vertical	Average
4	1154.00	48.95	24.52	6.99	39.72	14	76.00	-35.26	vertical	Peak
5 av	1616.00	31.89	26.36	8.35	39.23	20	56.00	-28.63	vertical	Average
6 pp	1616.00	54.58	26.36	8.35	39.23	20	76.00	-25.94	vertical	Peak

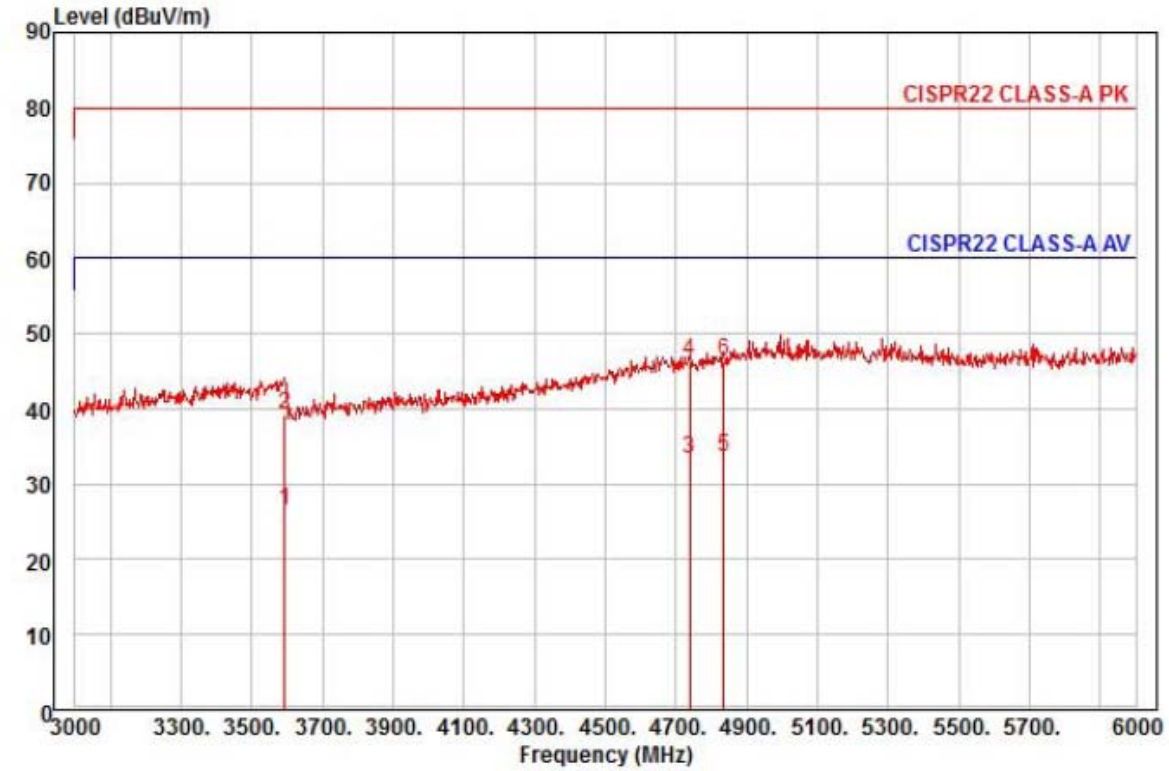
♦ Calculation
Over Limit [dB] = (Read Level[dBuV] + Ant Factor[dB/m] + Cable Loss [dB] − Preamp Factor [dB]) − Limit Line[dBuV]
Over Limit : Margin Value, Read Level : Reading Value, Ant Factor : Ant Factor,
Cable Loss : Cable loss, Preamp Factor : Preamp Factor



Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : HCO-6070RN
Mode : DC 12 V
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	3441.00	22.88	31.07	12.52	40.79	50	60.00	-34.32	horizontal	Average
2	3441.00	35.55	31.07	12.52	40.79	50	80.00	-41.65	horizontal	Peak
3	4494.00	22.53	34.83	14.45	40.77	283	60.00	-28.96	horizontal	Average
4	4494.00	35.44	34.83	14.45	40.77	283	80.00	-36.05	horizontal	Peak
5 pp	4758.00	22.60	36.34	15.01	40.51	214	60.00	-26.56	horizontal	Average
6 pk	4758.00	35.38	36.34	15.01	40.51	214	80.00	-33.78	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



Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : HCO-6070RN
Mode : DC 12 V
Memo : 3 ~ 6 GHz

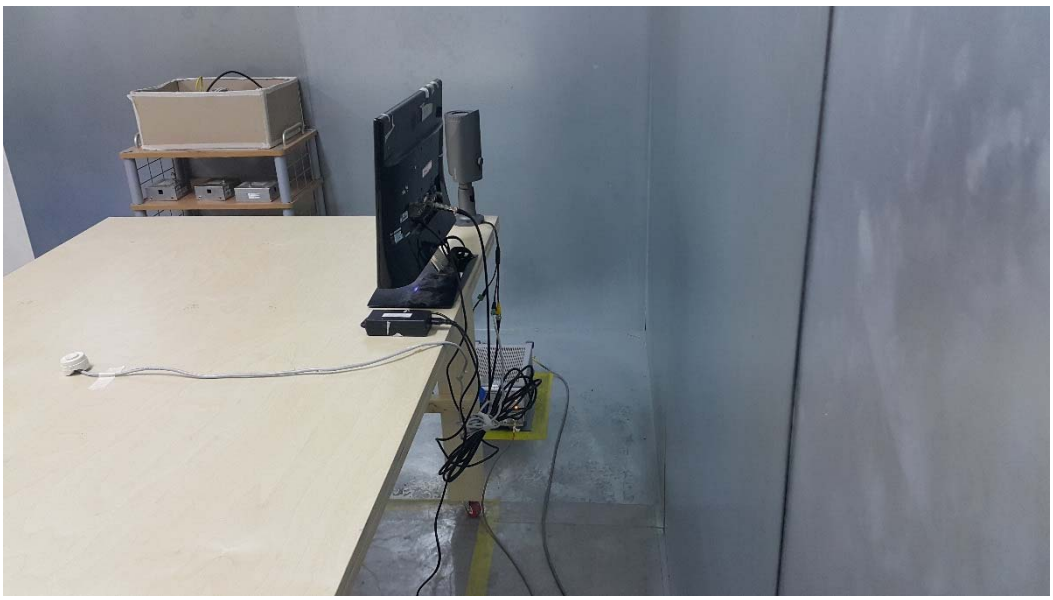
	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	3594.00	23.24	31.33	12.79	40.85	108	60.00	-33.49	vertical	Average
2	3594.00	35.97	31.33	12.79	40.85	108	80.00	-40.76	vertical	Peak
3	4740.00	22.76	36.24	14.97	40.53	8	60.00	-26.56	vertical	Average
4	4740.00	35.64	36.24	14.97	40.53	8	80.00	-33.68	vertical	Peak
5 pp	4836.00	22.15	36.78	15.14	40.43	219	60.00	-26.36	vertical	Average
6 pk	4836.00	34.95	36.78	15.14	40.43	219	80.00	-33.56	vertical	Peak

♦ Calculation
Over Limit [㏈] = (Read Level[㏈uV] + Ant Factor[㏈/m] + Cable Loss [㏈] − Preamp Factor [㏈]) − Limit Line[㏈uV]
Over Limit : Margin Value, Read Level : Reading Value, Ant Factor : Ant Factor, Cable Loss : Cable loss, Preamp Factor : Preamp Factor

Test Setup Photos and Configuration

Conducted Voltage Emissions

- AC 24 V Mode



Conducted Telecommunication Emissions

N/A

N/A

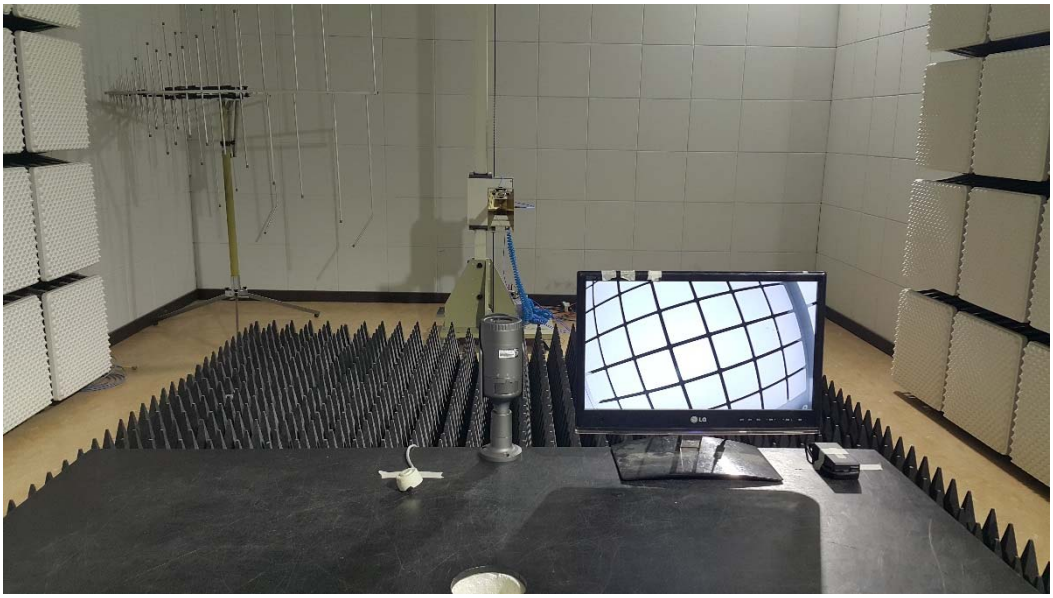
Radiated Electric Field Emissions(Below 1 ㎓)

- AC 24 V Mode

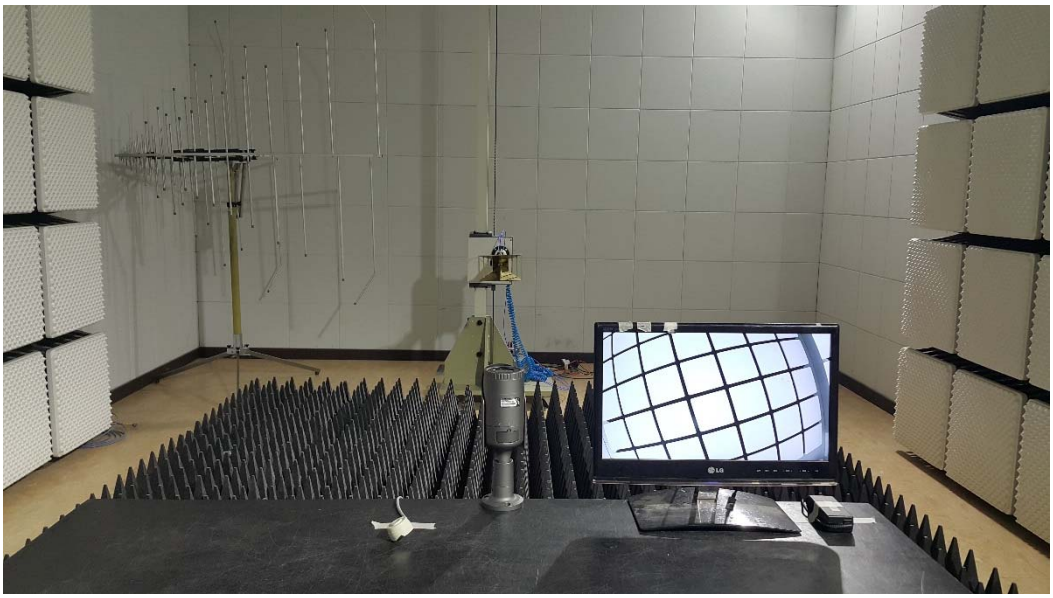
- DC 12 V Mode

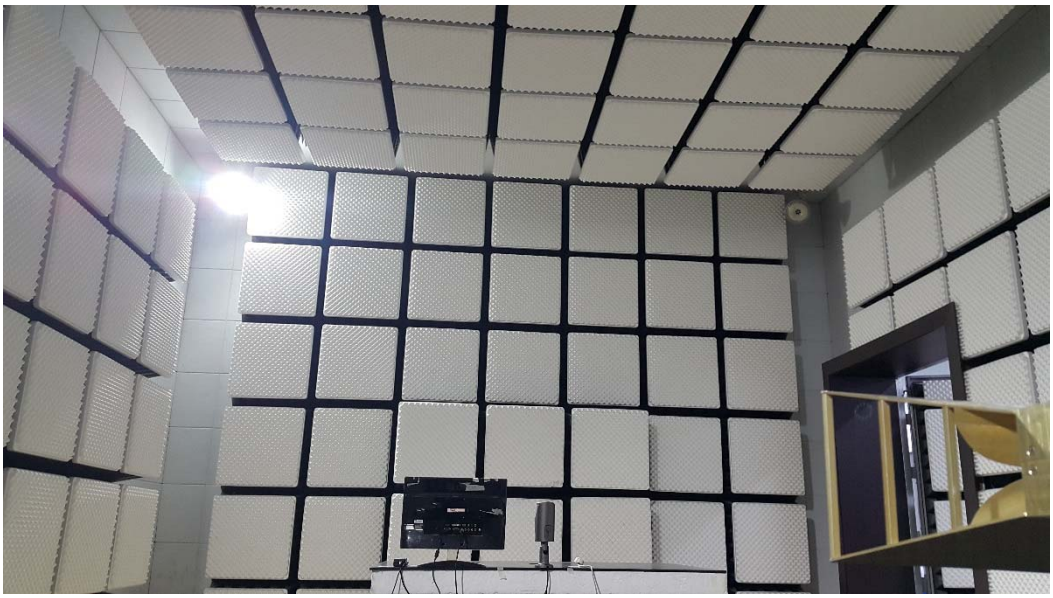
Radiated Electric Field Emissions(Above 1 ㎓)

- AC 24 V Mode



- DC 12 V Mode





EUT External Photographs

(Top)

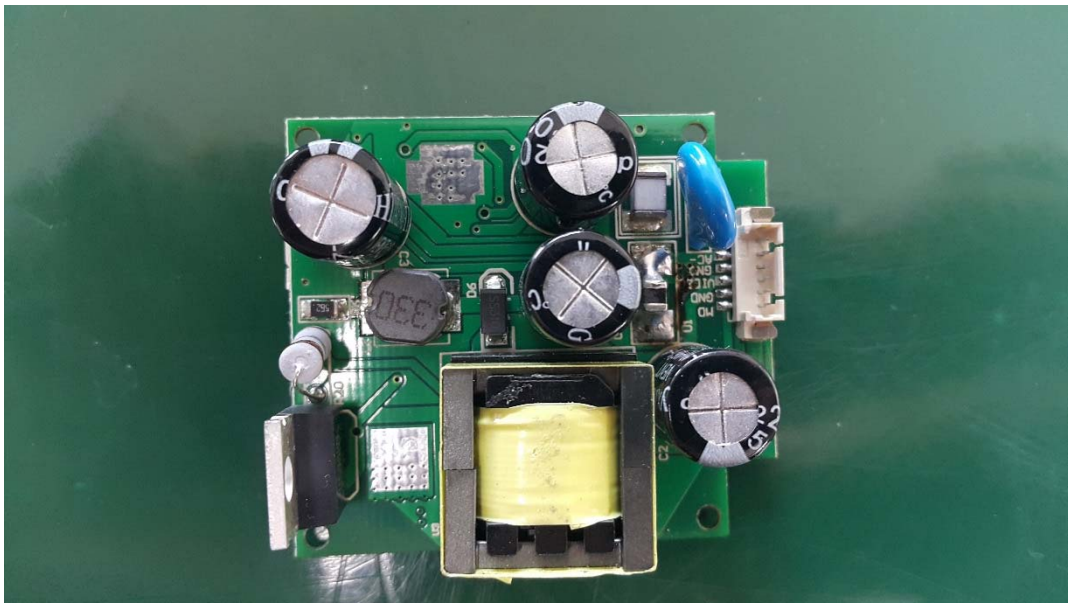
(Bottom)

EUT Internal Photographs

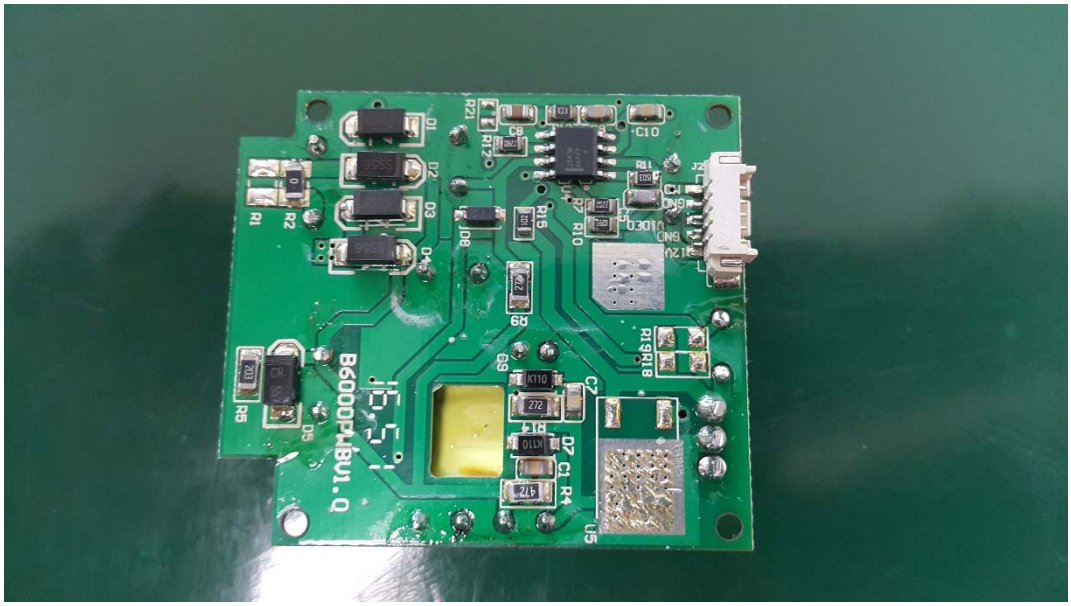
(Internal View)

EUT Internal View – Main Board

(Top)

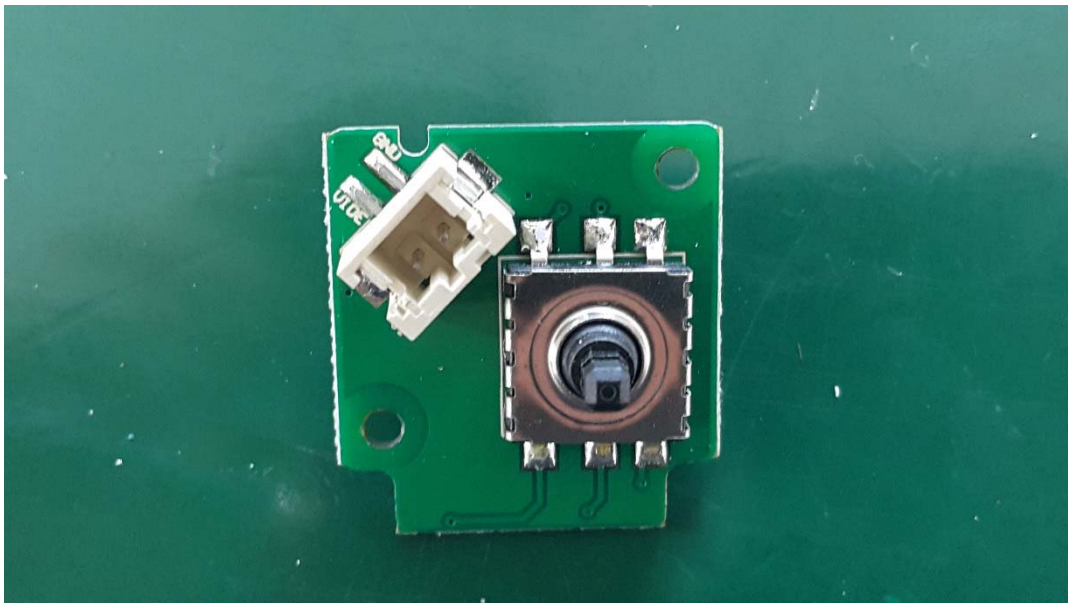


(Bottom)

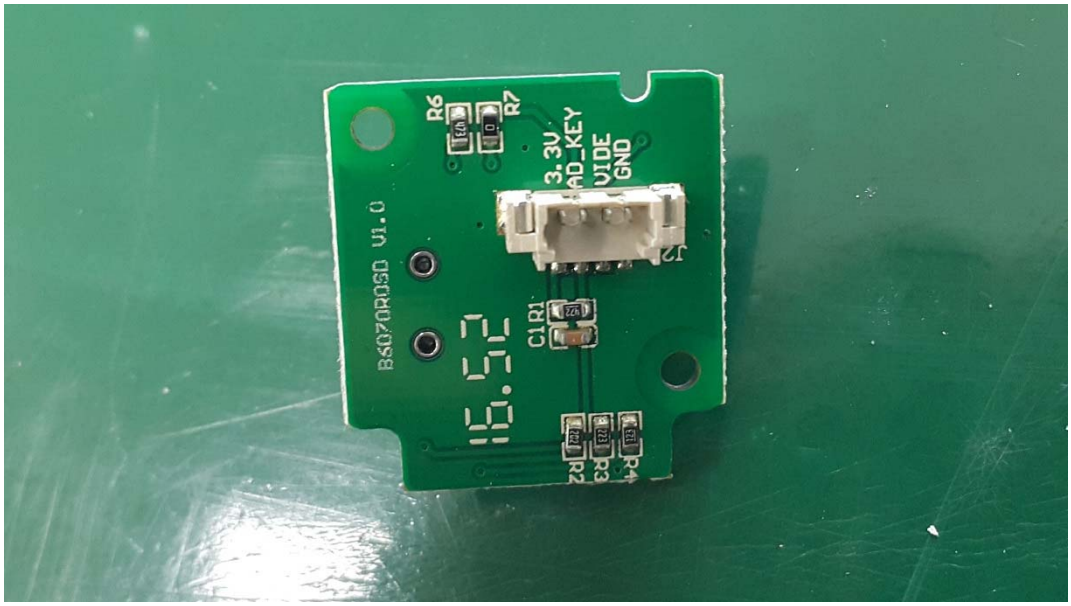


EUT Internal View – Sub Board

(Top)

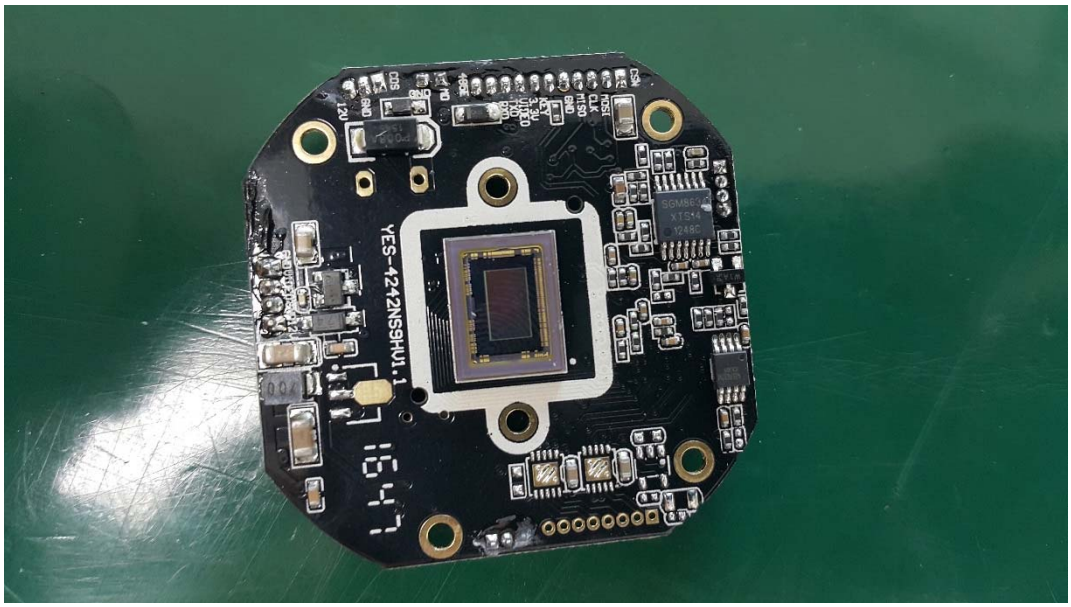


(Bottom)

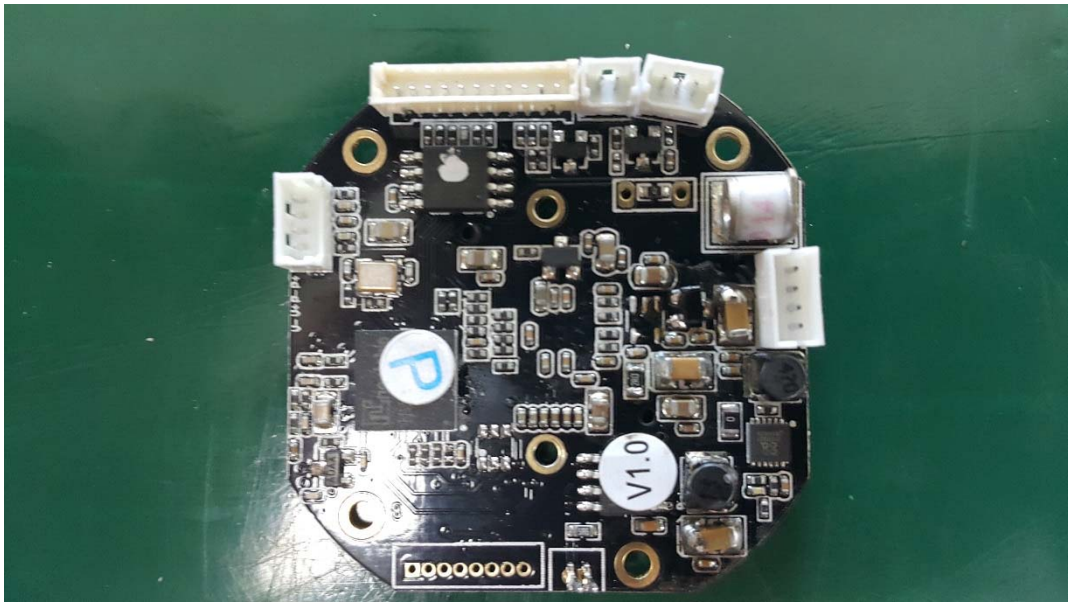


EUT Internal View – Lens Board

(Top)



(Bottom)



EUT Internal View – LED Board

(Top)

(Bottom)