EMC TEST REPORT For CE

Test Report No.	:	KES-E1-17T0562-R1
Date of Issue	:	Oct. 23, 2017
Product name	:	CCTV CAMERA
Model/Type No.	:	HCO-7070RP
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	:	Aug. 09, 2017
Test date	:	Aug. 17, 2017 ~ Aug. 19, 2017
Test Results	:	☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Hyo Jin, Kim g
EMC Test Engineer

Reviewed by

Dong-Hun, Jang
EMC Technical Manager

This test report is not related to KOLAS.

REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Aug. 25, 2017	KES-E1-17T0562	Issued
Oct. 23, 2017	KES-E1-17T0562-R1	Standard Revision

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1.0 General Product Description

Main Specifications of E.U.T are:

	HCO-7070RN	HCO-7070RP		HCO-7070RN/DO
Video			**영상**	
Imaging Device	1/3" 4M CMOS		촬상소자	1/3"형 4메가픽셀 CMOS
Total Pixels	2720(H) x 1536(V)		총화소	2720(H) x 1536(V)
Effective Pixels	2688(H) x 1520(V)		유효화소	2688(H) x 1520(V)
Scanning System	Progressive Scan		주사방식	프로그레시브
Min. Illumination	Color : 0.11Lux (F1.4) - TBD B/W : 0Lux(IR LED on) - TBD		최저조도	TBD
S / N Ratio	52dB (AGC off, Weight on)		S/N비	52dB (AGC off, Weight on)
Video Output	BNC(AHD / CVBS Selectable), additional CVBS for installation(DIP connector type)		영상출력	BNC(AHD / CVBS Selectable), 설치용 CVBS(DIP connector type)
Resolution	2560x1440		해상도	2560x1440
Max. Framerate	30fps @ 4M	25fps @ 4M	프레임레이트	30fps @ 4M
Lens Type			**렌즈**	
Focal Length (Zoom Ratio)	3.2 ~ 10mm (3.1x) varifocal		초점거리	3.2 ~ 10mm (3.1배 전동 가변초점렌즈)
Max. Aperture Ratio	F1.6		구경비	F1.6
Angular Field of View (TBD)	H : 93.48°(Wide) ~ 29.44°(Tele) V : 50.47°(Wide) ~ 16.64°(Tele) D : 112.53°(Wide) ~ 33.7°(Tele)		화각 (TBD)	H : 93.48°(Wide) ~ 29.44°(Tele) V : 50.47°(Wide) ~ 16.64°(Tele) D : 112.53°(Wide) ~ 33.7°(Tele)
Min. Object Distance	0.5m (1.64ft)		최소 지근 거리	0.5m (1.64ft)
Focus Control	Simple focus(Motorized V/F) / Manual		포커스 제어	Simple focus(Motorized V/F) / Manual
Lens Type	DC Auto Iris		렌즈 타입	DC Auto Iris
Mount Type	Board-in type		마운트 타입	Board-in type
Operational			**Operational**	
Viewable length	30m（98.43ft）		야간 가시거리	30m（98.43ft）
On Screen Display	Multi-language Support(14) English, Spanish, French, Portuguese, German, Italian, Russian, Polish, Czech, Romanian, Serbian, Swedish, Danish, Turkish		OSD	한국어
Camera Title	Off / On (Displayed 15 characters)		카메라 타이틀	Off / On (영/숫자/기호 최대 15자)
Day & Night	Auto (ICR) / External / Color / B/W		Day & Night	Auto (ICR) / External / Color / B/W
Backlight Compensation	Off / User BLC / HLC		역광보정	Off / User BLC / HLC
Wide Dynamic Range	-		Wide Dynamic Range	-
Contrast Enhancement	-		콘트라스트 개선	-
Digital Noise Reduction	2D DNR		노이즈 제거	2D DNR
~~Defog~~	~~AUTO / MANUAL / OFF~~		~~Defog~~	~~AUTO / MANUAL / OFF~~
Digital Image Stabilization	-		영상흔들림 보정	-
Motion Detection	Off / On(4 zones)		동작탐지	Off / On(최대 4개 영역)
Privacy Masking	Off / On (2 zones rectangle)		프라이버시 기능	Off / On (최대 2개 사각형 영역 설정가능)
Gain Control	Off / Low / Middle / High		Gain Control	Off / Low / Middle / High
White Balance	ATW / Outdoor / Indoor / Manual / AWC (1,800K° ~ 10,500K°)		화이트발란스	ATW / Outdoor / Indoor / Manual / AWC (1,800K° ~ 10,500K°)
LDC (Lens Distortion Correction)	-		LDC (렌즈왜곡보정)	-
Electronic Shutter Speed	1/30sec~ 1/12,000sec	1/25sec~ 1/12,000sec	전자셔터	1/30초~ 1/12,000초
Digital Zoom	-		디지털줌	-
Reverse	Off / H-Rev / V-Rev / HV-Rev		Reverse	Off / H-Rev / V-Rev / HV-Rev
Profile	-		Profile	-
Alarm	MD output 1		알람	(MD) output 1
Remote control interface	Coaxial		원격제어	Coax
Protocol	AHD : ACP (AHD Coax Protocol), CVBS : Pelco-C (Coaxitron)		프로토콜	AHD : ACP (AHD Coax Protocol), CVBS : Pelco-C (Coaxitron)
Video Transmission Distance	500m(5C2V Coaxial Cable)		영상전송거리	500m(5C2V 동축케이블)
Environmental			**동작환경**	
Operating Temperature / Humidity	-30°C ~ +55°C (-22°F ~ +131°F) / Less than 90% RH * Start up should be done at above -10℃		동작 온/습도	-30°C ~ +55°C / 90% RH 이하
Ingress Protection	IP66		방진/방수	IP66
Vandal Resistance	IK10		충격대응	IK10
Electrical			**전원**	
Input Voltage/Current	Dual (24VAC±10% & 12VDC±10%)		사용전원/소비전류	Dual (24VAC±10% & 12VDC±10%)
Power Consumption	AC 24V 5.8W 430mA DC 12V 5.8W 480mA		소비전력	AC 24V 5.8W 430mA DC 12V 5.8W 480mA
Mechanical			**외관**	
Color / Material	Dark Gray / Aluminum		색상/ 재질	Dark Gray / Aluminum
Dimension (WxHxD)	Ø78.0 x 260.0mm (3.07" x 10.24") (Without sun shield)		외형치수 (WxHxD)	Ø78.0 x 260.0mm (3.07" x 10.24") (Without sun shield)
Weight	TBD		무게	TBD

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 ☐ 230Vac ☐ 100 Vac ☒ 24 Vac ☒ 12 Vdc ☐ PoE

Frequency ☐ 50 Hz ☐ 60 Hz ☐ Hz

1.2 Variant Model Differences

Not applicable

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
CCTV CAMERA	HCO-7070RN	-	Hanwha Techwin (Tianjin) 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.	-
Alarm	SIP-1201DD D0	-	SAMSUNG TECHWIN CO., LTD.	-
DVR	SDR-B84300	-	Hanwha Techwin (Tianjin) Co.,Ltd.	-
Adapter	FSP060-DIBAN2	-	FSP GROUP INC.	-

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	DVR	BNC	3.5	S
	Alarm	Alarm	Alarm	3.0	U
DVR	HDMI	MONITOR	HDMI	1.6	S

- DC 12 V Mode

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
	2 Pin	Alarm	2 Pin	3.0	U
DVR	HDMI	MONITOR	HDMI	1.6	S

* Unshielded=U, Shielded=S

1.7 E.U.T Operating Mode(s)

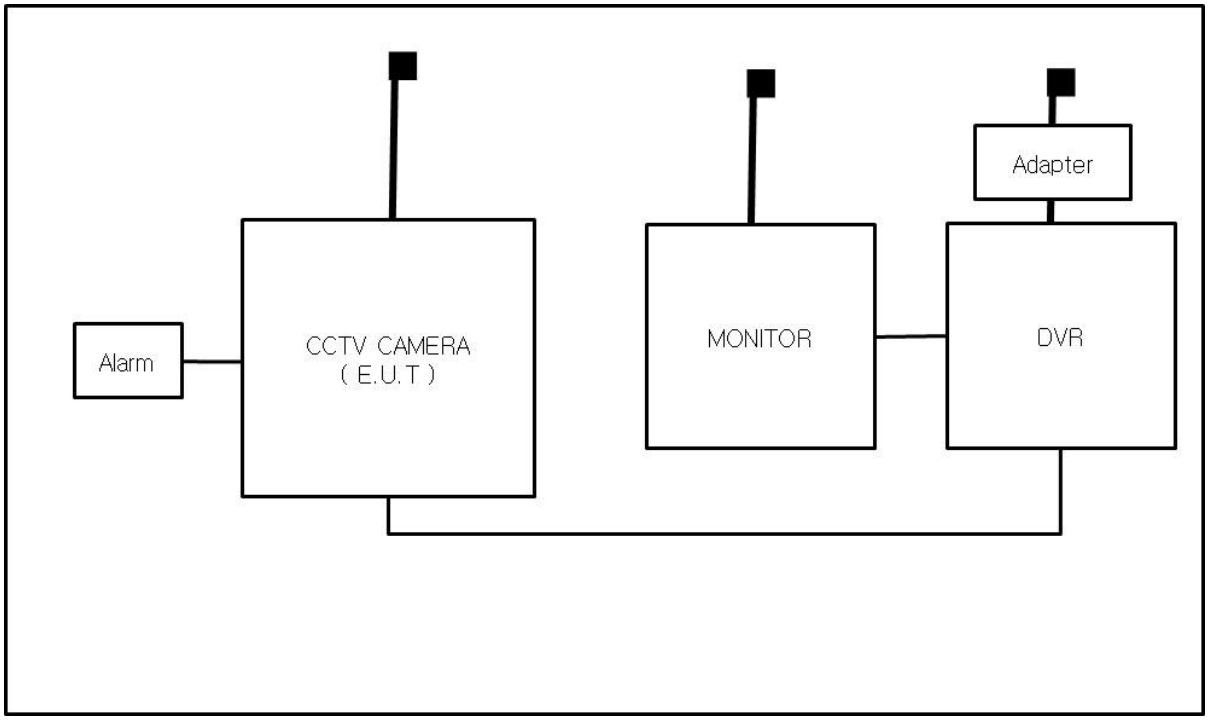
Test mode	operating
AC 24 V	E.U.T Monitoring
DC 12 V	E.U.T Monitoring

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

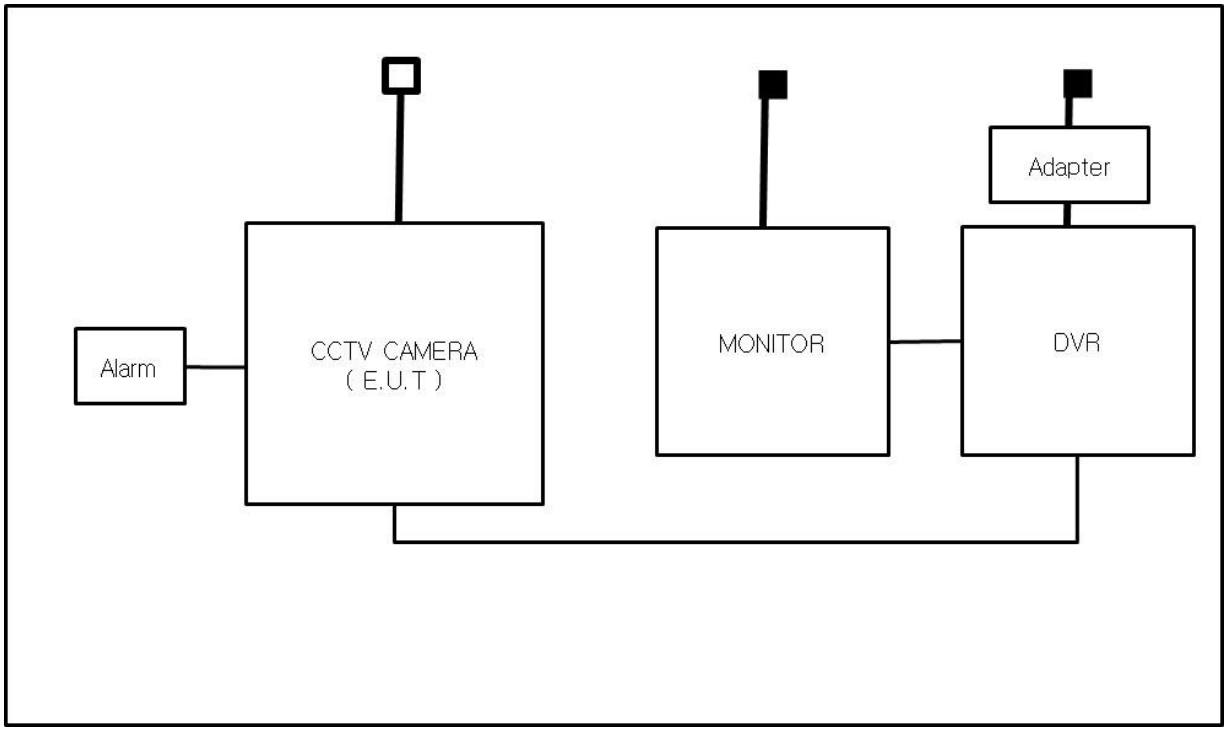
1.8 Configuration

■ AC Main
□ DC Main

- AC 24 V Mode



- DC 12 V Mode



1.9 Remarks when standards applied

- N/A

1.10 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less.

1.11 Test Facility

The measurement facility is located at 473-21 Gayeo-ro, Yeoju-si, Gyeonggi-do, 12658, Korea. The sites are constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22.

1.12 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
USA	**FCC**	3 & 10 meter Open Area Test Sites and one conducted site to perform FCC Part 15/18 measurements.	
JAPAN	**VCCI**	Mains Ports Conducted Interference Measurement, Telecommunication Ports Conducted Disturbance Measurement and Radiation 10 meter site, Facility for measuring radiated disturbance above 1 GHz	R-4308, C-4798, T-2311, G-914
KOREA	**MSIP**	EMI (10 meter Open Area Test Site and two conducted sites) Radio(3 & 10 meter Open Area Test Sites and one conducted site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	KR0100
Canada	**IC**	3 & 10 meter Open Area Test Sites and one conducted site	4769B-1
Europe	**CE**	EMI (10 meter Open Area Test Site and two conducted sites) Radio(3 & 10 meter Open Area Test Sites and one conducted site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	
International	**KOLAS**	EMI (10 meter Open Area Test Site and two conducted sites) Radio(3 & 10 meter Open Area Test Sites and one conducted site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	

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		
☐ 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 at Mains Power Ports

Test Date
Aug. 17, 2017

Test Location
Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EMC32	R & S	9.12.00	-
☒	EMI TEST RECEIVER	ESR3	R & S	101783	04, 27, 2018
☒	LISN	ENV216	R & S	101137	02, 03, 2018
☒	LISN	ENV216	R & S	101786	04, 27, 2018
☒	PULSE LIMITER	ESH3-Z2	R & S	101914	12, 13, 2017

Test Conditions
Temperature: 23,1 ℃
Relative Humidity: 49,6 %
.

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 S/W	EMC32	R & S	9.12.00	-
☐	EMI TEST RECEIVER	ESR3	R & S	101783	04, 27, 2018
☐	LISN	ENV216	R & S	101137	02, 03, 2018
☐	LISN	ENV216	R & S	101786	04, 27, 2018
☐	PULSE LIMITER	ESH3-Z2	R & S	101914	12, 13, 2017
☐	8-WIRE ISN CAT3	CAT3 8158	SCHWARZBECK	8158-0019	03, 29, 2018
☐	8-WIRE ISN CAT5	CAT5 8158	SCHWARZBECK	8158-0030	03, 29, 2018
☐	8-WIRE ISN CAT6	NTFM 8158	SCHWARZBECK	8158-0029	08, 11, 2017

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
-

2.3 Radiated Electric Field Emissions(Below 1 ㎓)

Test Date
Aug. 18, 2017

Test Location
☐ OPEN AREA TEST SITE #2 ☒ SAC #4(10 m)

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.0	-
☒	EMI TEST RECEIVER	ESU26	R & S	100551	04, 18, 2018
☒	AMPLIFIER	SCU 01	R & S	100603	12, 13, 2017
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	716	11, 28, 2018

Test Conditions
Temperature: 23,8 ℃
Relative Humidity: 52,1 %

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
Aug. 18, 2017

Test Location
SEMI ANECHOIC CHAMBER #2

Test Equipment

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

Test Conditions
Temperature: 23,6 ℃
Relative Humidity: 50,2 %

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.

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
☐	EMI Test S/W	dpa.control	EM TEST	5.4.8.0	-
☐	DIGITAL POWER ANALYZER	DPA 500N	EM TEST	V1024106759	08, 08, 2017
☐	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	08, 08, 2017

Test Conditions

℃

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
-

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
☐	EMI Test S/W	dpa.control	EM TEST	5.4.8.0	-
☐	DIGITAL POWER ANALYZER	DPA 500N	EM TEST	V1024106759	08, 08, 2017
☐	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	08, 08, 2017

Test Conditions

℃

Relative Humidity: %

Test Results
The requirements are:

☐ PASS
☐ NOT PASS
☒ NOT APPLICABLE

Remarks
-

3.0 Criteria for compliance

Criteria for compliance was based on the following guidelines:
EN 50130-4:2011 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 dBμV.

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 dBμV, 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 dBμV, 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 dBμV.

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
Aug. 17, 2017

Test Location
EMS-ESD: Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	-	-	-	-
☒	ESD SIMULATOR	ESS-2000	Noise Ken	ESS05X4620	02, 24, 2018
☒	HCP	-	Noise Ken	-	-
☒	VCP	-	Noise Ken	-	-

Test Conditions

Temperature:	23,1 ℃
Relative Humidity:	49,6 %
Atmospheric Pressure:	99,3 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:

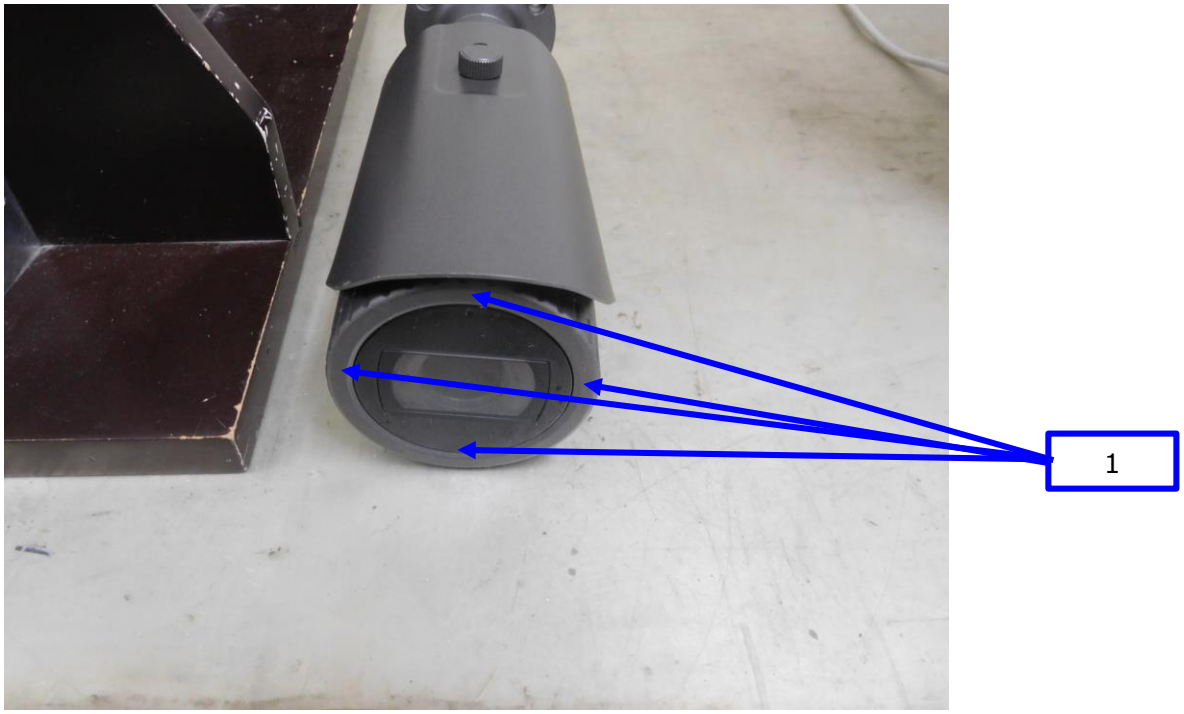
Contact	Air	HCP	VCP
☐ 2 kV	☒ 2 kV	☐ 2 kV	☐ 2 kV
☐ 4 kV	☒ 4 kV	☐ 4 kV	☐ 4 kV
☒ 6 kV	☐ 6 kV	☒ 6 kV	☒ 6 kV
☐ 8 kV	☒ 8 kV	☐ 8 kV	☐ 8 kV
☐ 15 kV	☐ 15 kV	☐ 15 kV	☐ 15 kV

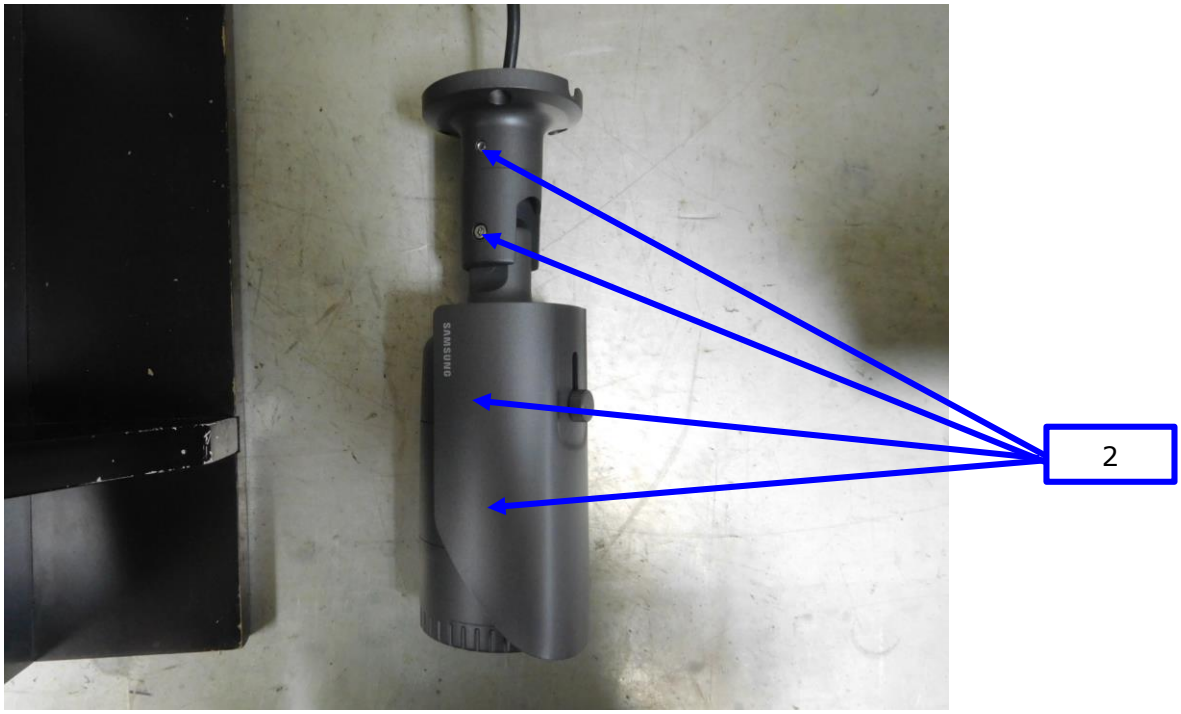
Notes: HCP: Horizontal coupling plane
VCP: Vertical coupling plane

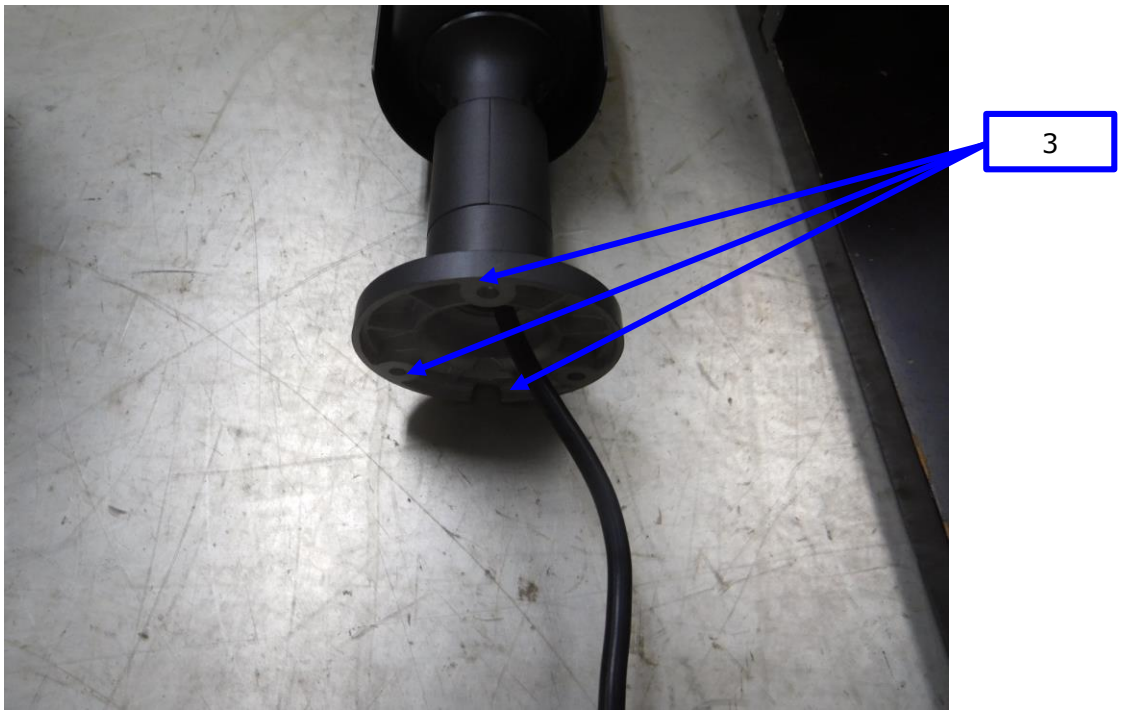
Required Performance Criteria: ☒ Complied

Location of Discharge:

Air
Contact







Test Data

- AC 24 V Mode

Indirect Discharge

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

Direct Discharge

No.	Test Point	Discharge Method	Observations	Remarks
1	Front Enclosure	Contact Discharge	Complied	-
2	Side Enclosure	Contact Discharge	Complied	-
3	Rear Enclosure	Contact Discharge	Complied	-

- DC 12 V Mode

Indirect Discharge

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

Direct Discharge

No.	Test Point	Discharge Method	Observations	Remarks
1	Front Enclosure	Contact Discharge	Complied	-
2	Side Enclosure	Contact Discharge	Complied	-
3	Rear Enclosure	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
Aug. 19, 2017

Test Location
EMS-RS: ☐ SEMI ANECHOIC CHAMBER #2 ☒ SEMI ANECHOIC CHAMBER #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	EMC32	R & S	10.10.02	-
☒	SIGNAL GENERATOR	SMB 100A	R & S	177586	08, 07, 2018
☒	BROADBAND AMPLIFIER	BBA100	R & S	101239	08, 07, 2018
☒	BROADBAND AMPLIFIER	100S1G6M1	AR	579931	08, 07, 2018
☒	POWER METER	NRP2	R & S	103475	08, 07, 2018
☒	AVG POWER SENSOR	NRP-Z91	R & S	102526	08, 07, 2018
☒	AVG POWER SENSOR	NRP-Z91	R & S	102527	08, 07, 2018
☒	STACKED DOUBLE LOG-PER- ANTENNA	STPL9128 E	Schwarzbeck	9128ES-121	-
☒	DIRECTIONAL COUPLER	KYDC-D1070-DX40	KY TELECOM	KY150001	08, 07, 2018
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	05, 02, 2019

Test Conditions

Temperature: 24,1 ℃
Relative Humidity: 52,1 %
Atmospheric Pressure: 99,7 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

- AC 24 V Mode

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

- DC 12 V Mode

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
Aug. 19, 2017

Test Location
EMS-EFT: Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	iec.control	EM TEST	5.3.9	-
☒	ULTRA COMPACT SIMULATOR	UCS 500N5T	EM TEST	P1317117973	02, 08, 2018
☒	MOTOR VARIAC	MV2616	EM TEST	V0936105123	02, 08, 2018
☒	CAPACITIVE COUPLING CLAMP	HFK	EM TEST	070925	06, 26, 2018

Test Conditions

Temperature:	24,4 ℃
Relative Humidity:	57,7 %
Atmospheric Pressure:	99,4 kPa

Test Specifications

Pulse Amplitude & Polarity: (AC Power Lines)	☐ ± 1.0 kV ☐ ± 4.0 kV	☒ ± 2.0 kV
Pulse Amplitude & Polarity: (Other supply / Signal Lines)	☐ ± 0.5 kV ☐ ± 2.0 kV	☒ ± 1.0 kV
Burst Period:	☒ 300 ms	☐ 2 s
Repetition Rate:	☐ 5 ㎑	☒ 100 ㎑
Duration of Test Voltage:	☒ ≥ 1 min	
Required Performance Criteria:	☒ Complied	

Test Data

- AC 24 V Mode

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

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

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

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

☒ Signal ports and telecommunication ports – Coupling Clamp used

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

- DC 12 V Mode

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

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

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

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

☒ Signal ports and telecommunication ports – Coupling Clamp used

Mode of Application	Observations	
	(+) Burst (㎸)	(-) Burst (㎸)
BNC	Complied	Complied
Alarm	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
Aug. 19, 2017

Test Location
EMS-Surge: Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	iec.control	EM TEST	5.3.9	-
☒	ULTRA COMPACT SIMULATOR	UCS 500N5T	EM TEST	P1317117973	02, 08, 2018
☒	MOTOR VARIAC	MV2616	EM TEST	V0936105123	02, 08, 2018
☒	CDN	CNV 508N1	EM TEST	P1551168979	04, 26, 2018
☐	CDN	CNV 508T5	EM TEST	P1549168422	04, 26, 2018

Test Conditions

Temperature:	24,4 ℃
Relative Humidity:	57,7 %
Atmospheric Pressure:	99,4 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

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

- AC 24 V Mode

☒ Line to Line – Differential Mode

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

☒ Line to Earth – Common Mode

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

Signal Lines

☒ Line to Earth – Common Mode

Mode of Application	Observations	
	(+) Surge (㎸)	(-) Surge (㎸)
BNC	Complied	Complied
Alarm	Complied	Complied

- DC 12 V Mode

☒ Line to Line – Differential Mode

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

☒ Line to Earth – Common Mode

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

Signal Lines

☒ Line to Earth – Common Mode

Mode of Application	Observations	
	(+) Surge (㎸)	(-) Surge (㎸)
BNC	Complied	Complied
Alarm	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.

3.5 Conducted Disturbance

Reference Standard
EN 61000-4-6:2014

Test Date
Aug. 19, 2017

Test Location
EMS-CS: Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	icd.control	EM TEST	5.3.11	-
☒	CONTINUOUS WAVE SIMULATOR	CWS 500N1.4	EM TEST	P1602169880	11, 28, 2017
☒	ATTENUATOR	ATT 6/80	EM TEST	P1614178148	11, 28, 2017
☒	CDN	CDN M016	TESEQ	43694	11, 28, 2017
☐	CDN	CDN M016	TESEQ	43697	11, 28, 2017
☐	CDN	CDN T800	TESEQ	42800	11, 28, 2017
☒	EM CLAMP	KEMZ 801A	TESEQ	44099	11, 30, 2017

Test Conditions
Temperature: 24,1 ℃
Relative Humidity: 52,9 %
Atmospheric Pressure: 98,7 kPa

Test Specifications

Frequency range:	☒ 150 ㎑ to 100 ㎒	☐ 150 ㎑ to 80 ㎒
Voltage Level:	☐ 1 Vrms ☒ 10 Vrms	☐ 3 Vrms
Modulation:	☒ AM, 80 %, 1 ㎑ sine wave ☒ PM, 1 ㎐ (0,5 s ON : 0,5 s OFF)	
Frequency step:	☒ 1 % step	
Dwell Time:	☒ 1 s	☐ 3 s
Required Performance Criteria:	☒ A	

Test Data

- AC 24 V Mode

☒ Input a.c. power ports

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

☐ Input d.c. power ports

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

☒ Signal ports and telecommunication ports

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

- DC 12 V Mode

☐ Input a.c. power ports

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

☒ Input d.c. power ports

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

☒ Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Observations
BNC	EM Injection Clamp	Complied
Alarm	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
Aug. 19, 2017

Test Location
EMS-Voltage dip: Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	iec.control	EM TEST	5.3.9	-
☒	ULTRA COMPACT SIMULATOR	UCS 500N5T	EM TEST	P1317117973	02, 08, 2018
☒	MOTOR VARIAC	MV2616	EM TEST	V0936105123	02, 08, 2018

Test Conditions

Temperature:	24,4 ℃
Relative Humidity:	57,7 %
Atmospheric Pressure:	99,4 kPa

Test Specifications & Observations/Remarks

(Test Voltage : 50 ㎐)

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

- Voltage cariations

☐ Unom + 10 %	☐ 253.0 V (ac)	_____
☐ Unom - 15 %	☐ 195.5 V (ac)	_____

Observations:
Complied – No degradation of function

Test Results
☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria
☐ NOT APPLICABLE

Remarks
PASS Required Performance Criteria.

APPENDIX A – TEST DATA

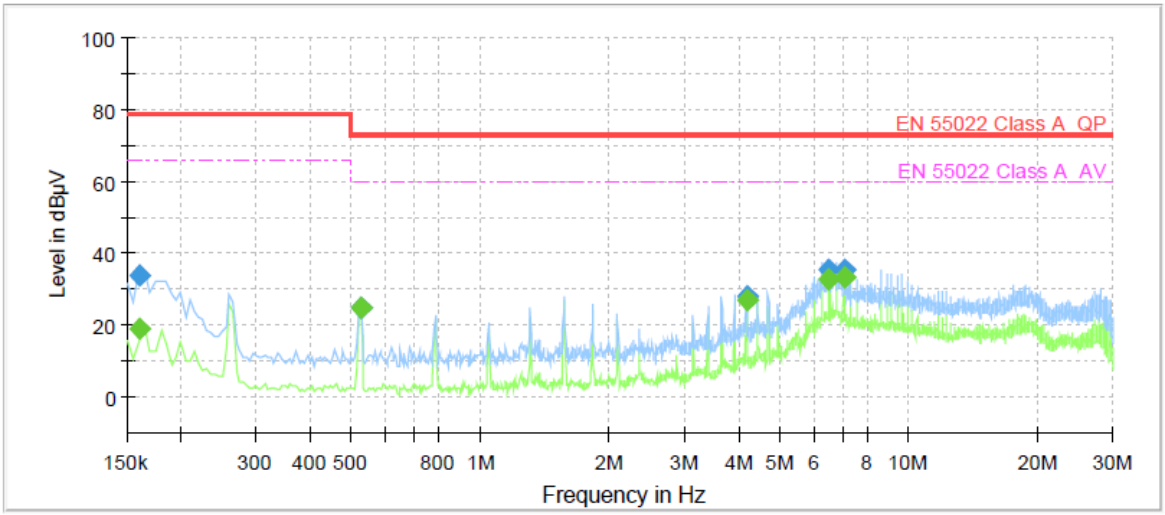
Conducted Emissions at Mains Power Ports

- AC 24 V Mode

[HOT]

Common Information

Test Description:	Conducted Emission
Model No.:	HCO-7070RP
Mode	AC
Operator Name:	KES



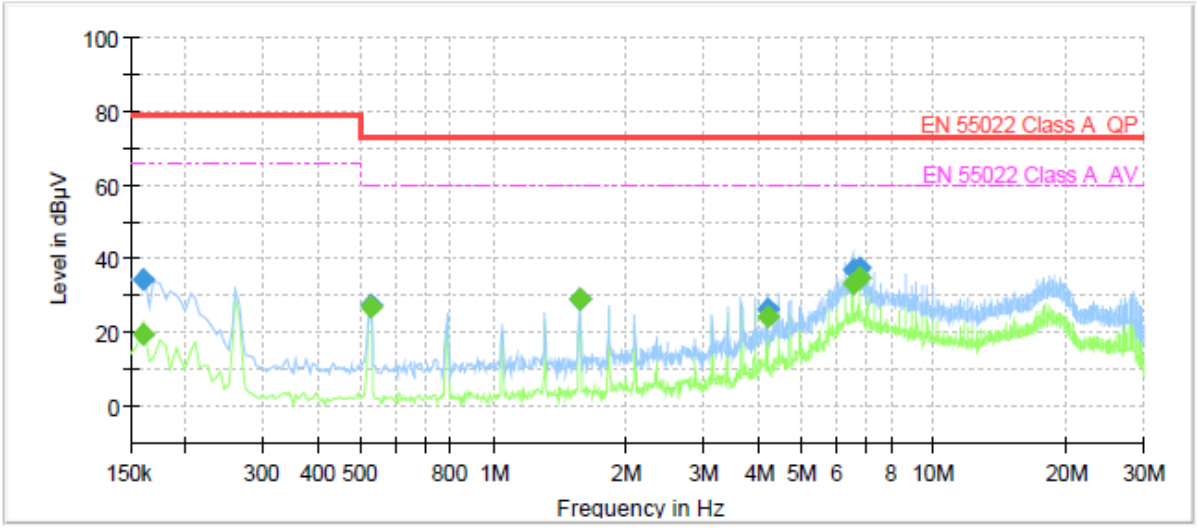
Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.160000	---	19.17	66.00	46.83	1000.0	9.000	L1	19.4
0.160000	33.95	---	79.00	45.05	1000.0	9.000	L1	19.4
0.525000	---	24.71	60.00	35.29	1000.0	9.000	L1	19.6
0.525000	24.90	---	73.00	48.10	1000.0	9.000	L1	19.6
4.185000	---	27.12	60.00	32.88	1000.0	9.000	L1	19.9
4.185000	27.89	---	73.00	45.11	1000.0	9.000	L1	19.9
6.535000	---	32.70	60.00	27.30	1000.0	9.000	L1	19.8
6.535000	35.45	---	73.00	37.55	1000.0	9.000	L1	19.8
7.060000	---	33.34	60.00	26.66	1000.0	9.000	L1	19.7
7.060000	35.38	---	73.00	37.62	1000.0	9.000	L1	19.7

[NEUTRAL]

Common Information

Test Description:	Conducted Emission
Model No.:	HCO-7070RP
Mode	AC
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	---	19.37	66.00	46.63	1000.0	9.000	N	19.4
0.160000	34.56	---	79.00	44.44	1000.0	9.000	N	19.4
0.525000	---	27.09	60.00	32.91	1000.0	9.000	N	19.6
0.525000	27.29	---	73.00	45.71	1000.0	9.000	N	19.6
1.570000	---	28.90	60.00	31.10	1000.0	9.000	N	19.9
1.570000	29.02	---	73.00	43.98	1000.0	9.000	N	19.9
4.180000	---	24.54	60.00	35.46	1000.0	9.000	N	19.9
4.180000	26.44	---	73.00	46.56	1000.0	9.000	N	19.9
6.540000	---	33.37	60.00	26.63	1000.0	9.000	N	19.8
6.540000	36.83	---	73.00	36.17	1000.0	9.000	N	19.8
6.800000	---	35.05	60.00	24.95	1000.0	9.000	N	19.8
6.800000	37.38	---	73.00	35.62	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 + Pulse Limiter FACTOR))

Conducted Emissions at Telecommunication Ports

[10 Mbps]

N/A

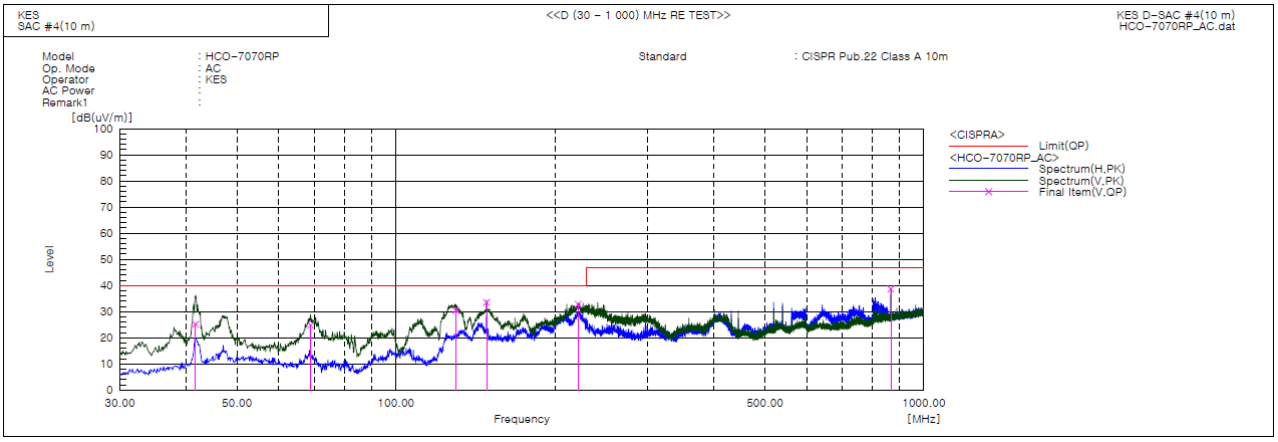
[100 Mbps]

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 ㎓)

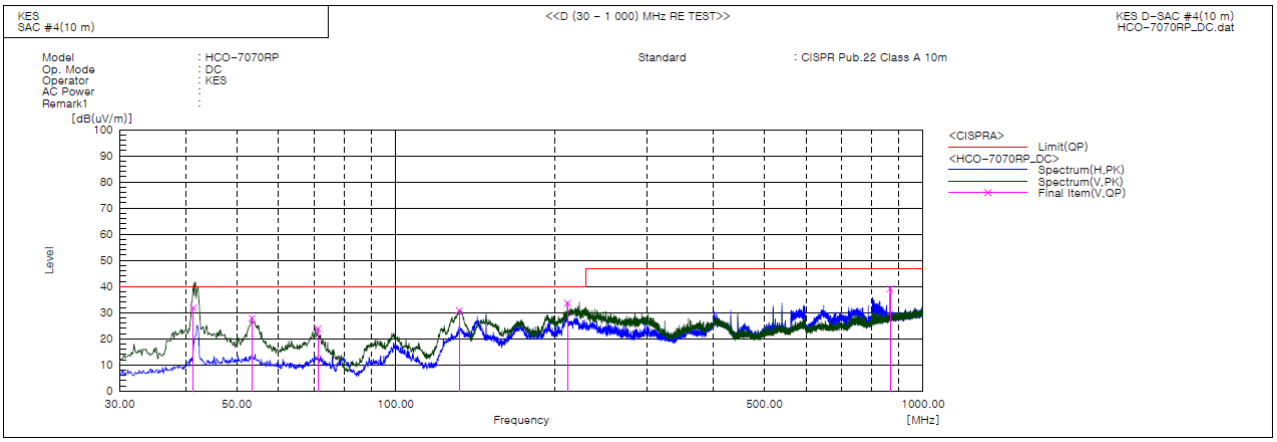
- AC 24 V Mode



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	41.743	V	53.9	-28.7	25.2	40.0	14.8	391.0	41.0	
2	68.921	V	56.3	-31.5	24.8	40.0	15.2	150.0	49.0	
3	129.910	V	62.2	-31.7	30.5	40.0	9.5	100.0	258.0	
4	148.511	V	64.9	-31.4	33.5	40.0	6.5	137.0	168.0	
5	221.454	V	59.0	-26.2	32.8	40.0	7.2	100.0	211.0	
6	866.019	V	48.7	-10.1	38.6	47.0	8.4	150.0	205.0	

- DC 12 V Mode



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	41.389	V	60.7	-28.8	31.9	40.0	8.1	312.0	11.0	
2	53.401	V	55.7	-27.8	27.9	40.0	12.1	400.0	91.0	
3	71.225	V	56.0	-32.1	23.9	40.0	16.1	150.0	106.0	
4	131.971	V	62.6	-31.8	30.8	40.0	9.2	150.0	242.0	
5	211.754	V	60.1	-26.5	33.6	40.0	6.4	100.0	144.0	
6	866.019	V	49.2	-10.1	39.1	47.0	7.9	150.0	202.0	

♦ Calculation

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

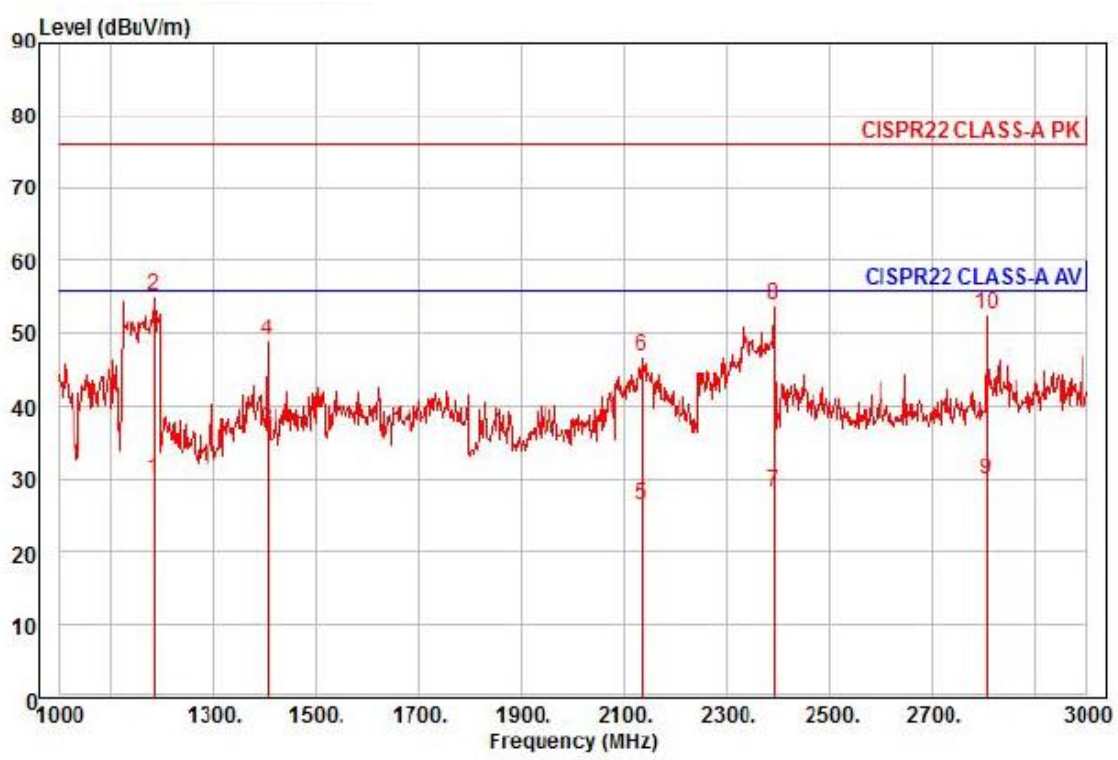
Margin(QP)[dB] = Limit[dB(μV/m)] - Result(QP) [dB(μV/m)]

Reading(QP) : Reading value, Result(QP) : Reading value + Factor value

Limit(QP) : Limit value, c.f : (ANT Factor + Cable Loss - Preamp Factor), Margin: Margin value

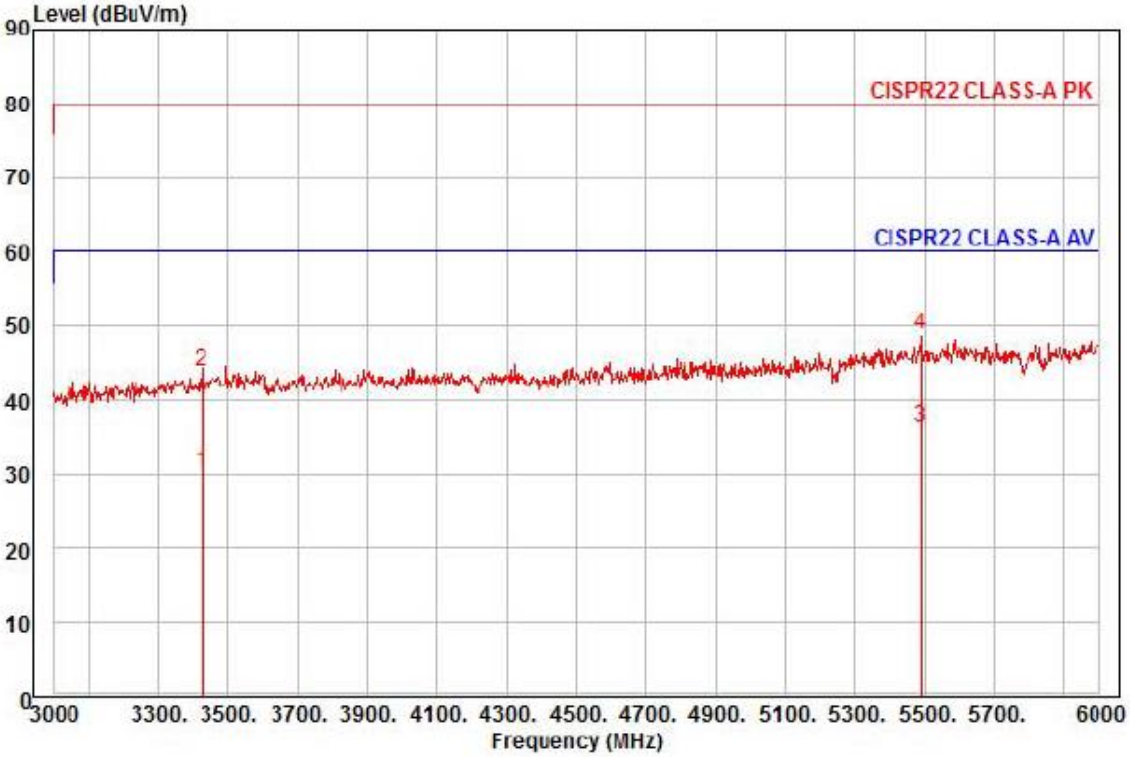
Radiated Electric Field Emissions(Above 1 ㎓)

- AC 24 V Mode



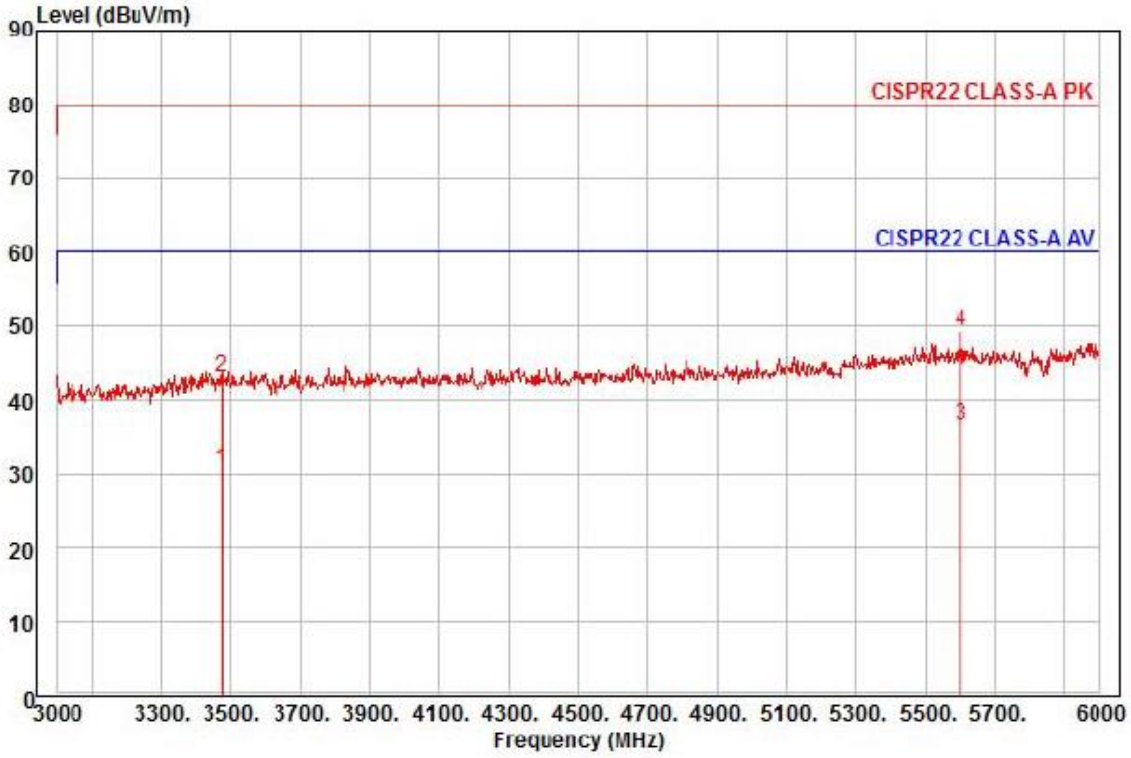
Site : chamber
Condition: CISPR22 CLASS-A PK 3m STLP9149(RRA CAL 2017-05-18) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : HCO-7070RP
Mode : AC
Memo : 1 ~ 3 GHz

	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	1186.00	35.52	23.07	7.24	35.89	33	56.00	-26.06	horizontal	Average
2 pk	1186.00	60.84	23.07	7.24	35.89	33	76.00	-20.74	horizontal	Peak
3 pp	1404.00	40.78	23.73	7.94	35.70	322	56.00	-19.25	horizontal	Average
4	1404.00	52.98	23.73	7.94	35.70	322	76.00	-27.05	horizontal	Peak
5	2134.00	25.39	26.42	9.97	35.22	82	56.00	-29.44	horizontal	Average
6	2134.00	45.55	26.42	9.97	35.22	82	76.00	-29.28	horizontal	Peak
7	2392.00	25.67	27.20	10.58	35.32	30	56.00	-27.87	horizontal	Average
8	2392.00	51.61	27.20	10.58	35.32	30	76.00	-21.93	horizontal	Peak
9	2806.00	24.88	28.88	11.62	35.48	50	56.00	-26.10	horizontal	Average
10	2806.00	47.67	28.88	11.62	35.48	50	76.00	-23.31	horizontal	Peak



Site : chamber
Condition: CISPR22 CLASS-A PK 3m STLP9149(RRA CAL 2017-05-18) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : HCO-7070RP
Mode : AC
Memo : 3 ~ 6 GHz

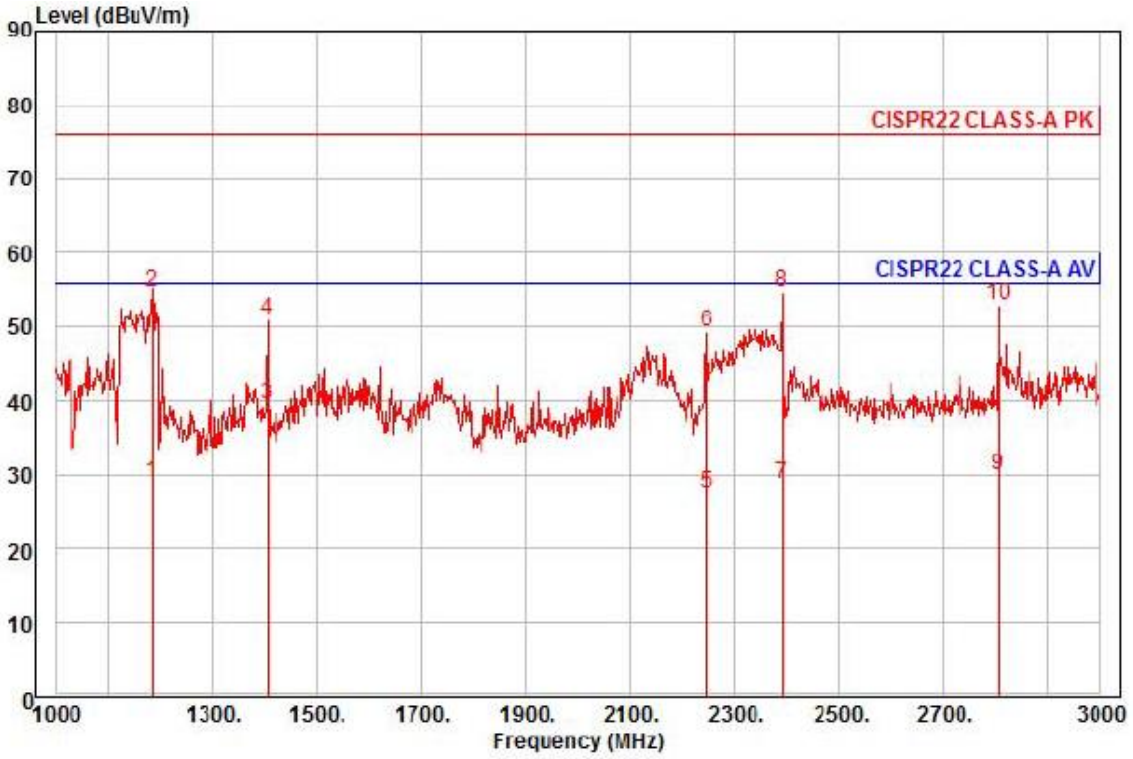
	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	3423.00	21.73	30.93	13.05	35.44	323	60.00	-29.73	horizontal	Average
2	3423.00	35.32	30.93	13.05	35.44	323	80.00	-36.14	horizontal	Peak
3 pp	5490.00	20.04	35.33	16.59	35.66	38	60.00	-23.70	horizontal	Average
4 pk	5490.00	32.53	35.33	16.59	35.66	38	80.00	-31.21	horizontal	Peak



Site : chamber
Condition: CISPR22 CLASS-A PK 3m STLP9149(RRA CAL 2017-05-18) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : HCO-7070RP
Mode : AC
Memo : 3 ~ 6 GHz

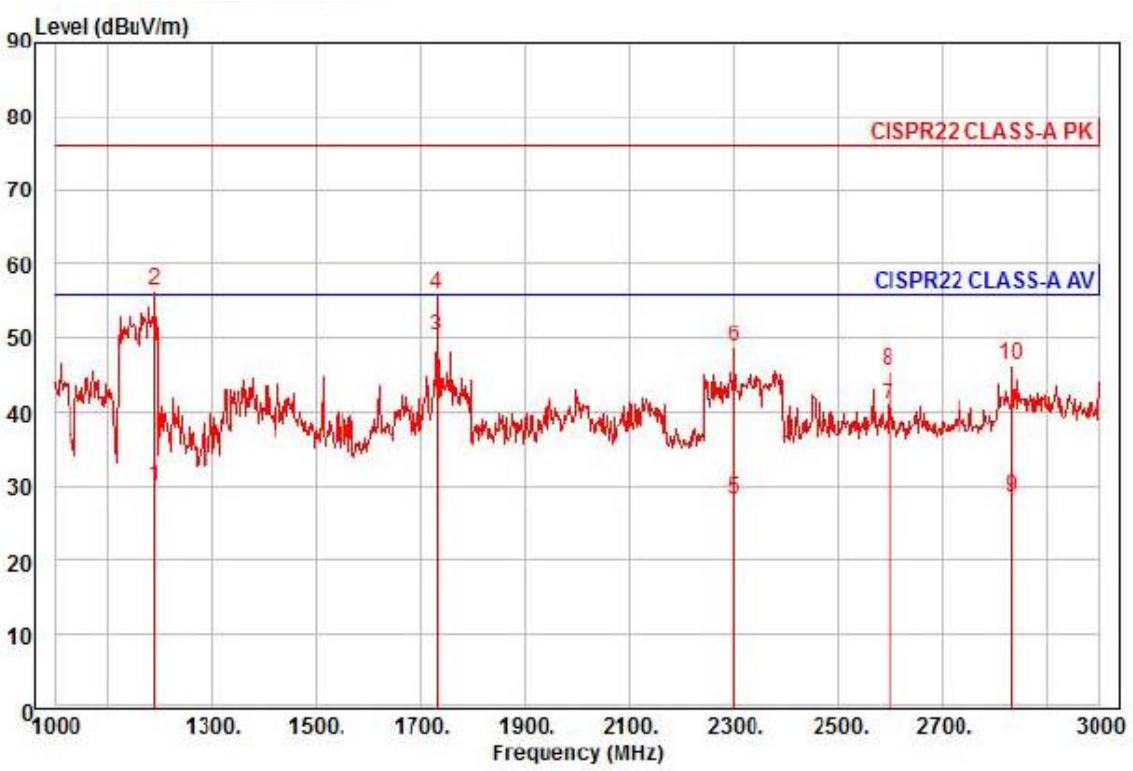
	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	3477.00	21.86	31.09	13.12	35.43	165	60.00	-29.36	vertical	Average
2	3477.00	34.39	31.09	13.12	35.43	165	80.00	-36.83	vertical	Peak
3 pp	5601.00	19.97	35.52	16.77	35.67	124	60.00	-23.41	vertical	Average
4 pk	5601.00	32.75	35.52	16.77	35.67	124	80.00	-30.63	vertical	Peak

- DC 12 V Mode



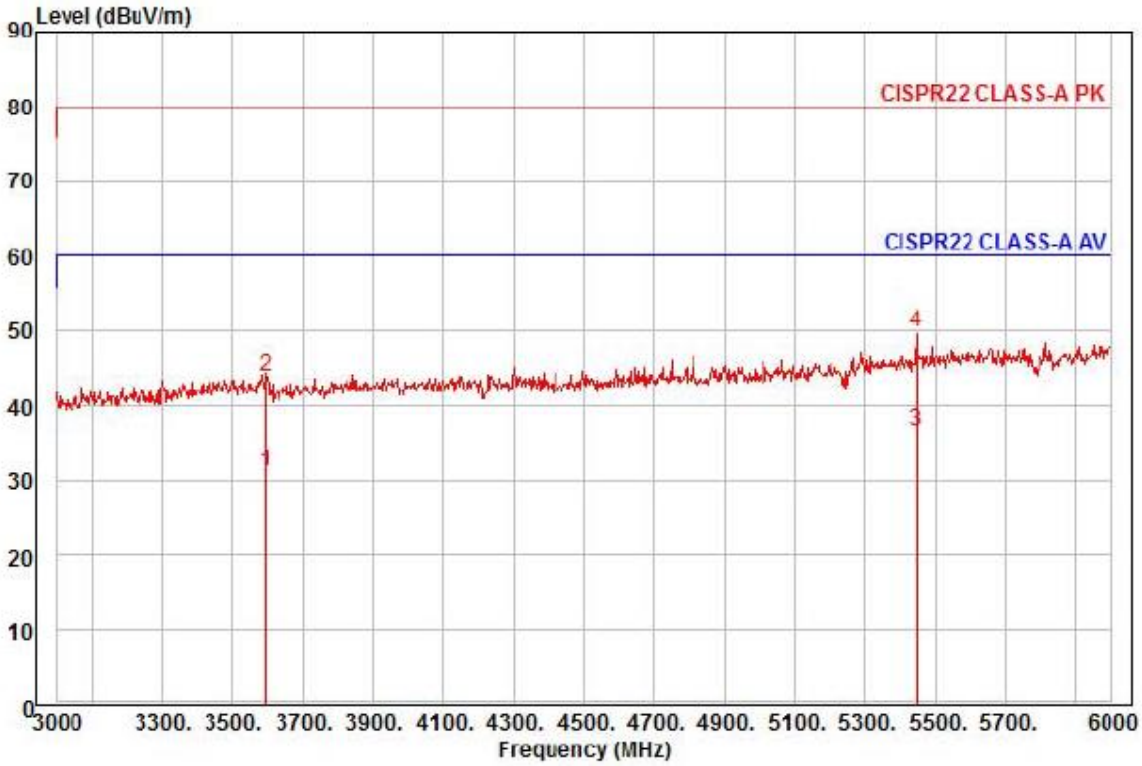
Site : chamber
Condition: CISPR22 CLASS-A PK 3m STLP9149(RRA CAL 2017-05-18) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : HCO-7070RP
Mode : DC
Memo : 1 ~ 3 GHz

	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	1186.00	34.61	23.07	7.24	35.89	36	56.00	-26.97	horizontal	Average
2	1186.00	60.32	23.07	7.24	35.89	36	76.00	-21.26	horizontal	Peak
3 pp	1404.00	43.46	23.73	7.94	35.70	313	56.00	-16.57	horizontal	Average
4	1404.00	55.03	23.73	7.94	35.70	313	76.00	-25.00	horizontal	Peak
5	2248.00	25.84	26.76	10.24	35.27	30	56.00	-28.43	horizontal	Average
6	2248.00	47.52	26.76	10.24	35.27	30	76.00	-26.75	horizontal	Peak
7	2392.00	26.20	27.20	10.58	35.32	36	56.00	-27.34	horizontal	Average
8 pk	2392.00	52.31	27.20	10.58	35.32	36	76.00	-21.23	horizontal	Peak
9	2806.00	24.98	28.88	11.62	35.48	50	56.00	-26.00	horizontal	Average
10	2806.00	47.83	28.88	11.62	35.48	50	76.00	-23.15	horizontal	Peak



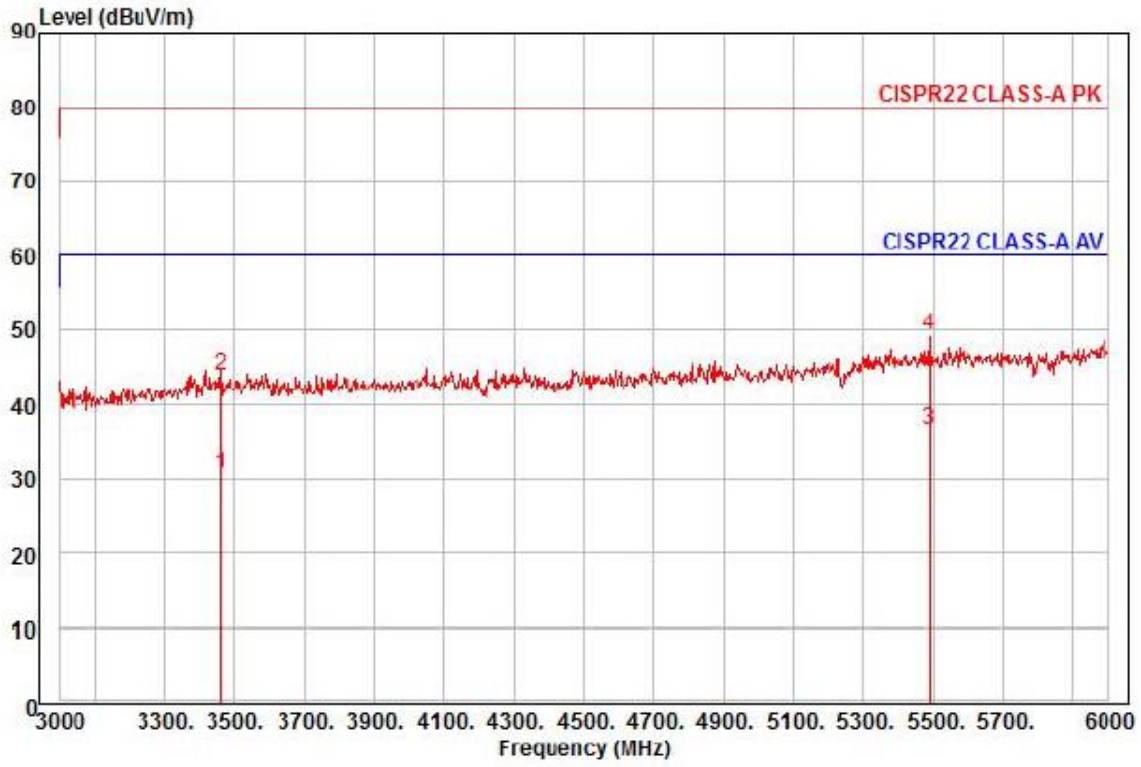
Site : chamber
Condition: CISPR22 CLASS-A PK 3m STLP9149(RRA CAL 2017-05-18) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : HCO-7070RP
Mode : DC
Memo : 1 ~ 3 GHz

	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	1190.00	35.38	23.08	7.25	35.89	23	56.00	-26.18	vertical	Average
2 pk	1190.00	61.95	23.08	7.25	35.89	23	76.00	-19.61	vertical	Peak
3 pp	1732.00	51.88	24.94	8.89	35.41	212	56.00	-5.70	vertical	Average
4	1732.00	57.39	24.94	8.89	35.41	212	76.00	-20.19	vertical	Peak
5	2300.00	26.24	26.92	10.36	35.29	31	56.00	-27.77	vertical	Average
6	2300.00	46.89	26.92	10.36	35.29	31	76.00	-27.12	vertical	Peak
7	2598.00	37.29	27.96	11.06	35.40	249	56.00	-15.09	vertical	Average
8	2598.00	41.96	27.96	11.06	35.40	249	76.00	-30.42	vertical	Peak
9	2832.00	23.24	29.00	11.69	35.49	60	56.00	-27.56	vertical	Average
10	2832.00	41.17	29.00	11.69	35.49	60	76.00	-29.63	vertical	Peak



Site : chamber
Condition: CISPR22 CLASS-A PK 3m STLP9149(RRA CAL 2017-05-18) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : HCO-7070RP
Mode : DC
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	21.78	31.40	13.26	35.39	85	60.00	-28.95	horizontal	Average
2	3594.00	34.73	31.40	13.26	35.39	85	80.00	-36.00	horizontal	Peak
3 pp	5448.00	20.53	35.17	16.53	35.66	216	60.00	-23.43	horizontal	Average
4 pk	5448.00	33.64	35.17	16.53	35.66	216	80.00	-30.32	horizontal	Peak



Site : chamber
Condition: CISPR22 CLASS-A PK 3m STLP9149(RRA CAL 2017-05-18) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : HCO-7070RP
Mode : DC
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	3462.00	21.91	31.04	13.10	35.43	210	60.00	-29.38	vertical	Average
2	3462.00	35.13	31.04	13.10	35.43	210	80.00	-36.16	vertical	Peak
3 pp	5490.00	20.23	35.33	16.59	35.66	77	60.00	-23.51	vertical	Average
4 pk	5490.00	33.07	35.33	16.59	35.66	77	80.00	-30.67	vertical	Peak

♦ Calculation
Over Limit [㏈] = (Read Level[㏈㎶] + Ant Factor[㏈/m] + Cable Loss [㏈] – Preamp Factor [㏈]+ ATT[㏈]) – Limit Line[㏈㎶]
Over Limit : Marjin, Read Level : Reading value, Ant Factor : ANT Factor,
Cable Loss : Cable loss, Preamp Factor : Preamp Factor, ATT : Attenuator Factor

Harmonic Current Emissions and Voltage Fluctuations and Flicker

Average harmonic current results

Hn	Ieff [A]	% of Limit	Limit [A]	Result
		N/A		

Harmonic currents less than 0.6% of the input current measured under the test conditions, or less than 5 mA, whichever is greater, are disregarded.

Test Data - Harmonics (continued)

Maximum harmonic current results

Hn	Ieff [A]	% of Limit	Limit [A]	Result
N/A				

Harmonic currents less than 0.6% of the input current measured under the test conditions, or less than 5 mA, whichever is greater, are disregarded.

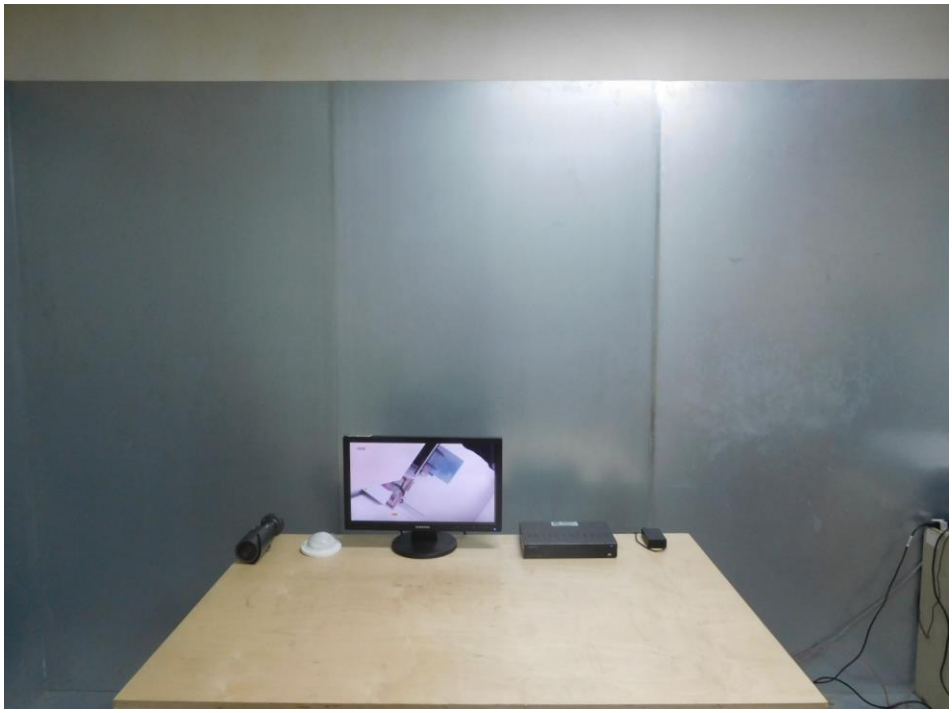
Test Data - Voltage Fluctuations

Maximum Flicker results

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

Test Setup Photos and Configuration

Conducted Voltage Emissions

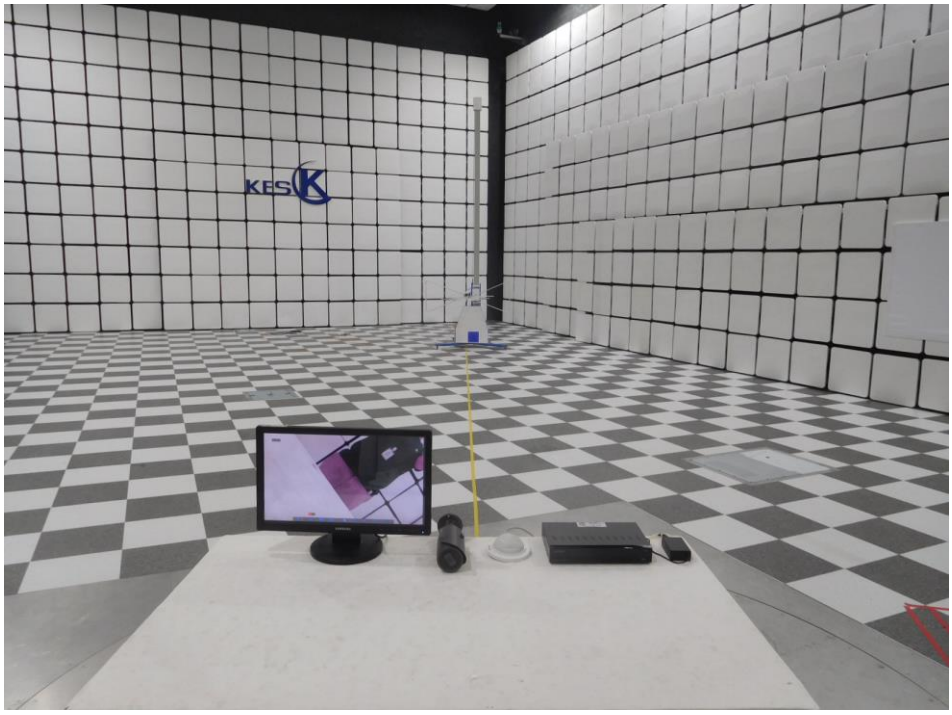


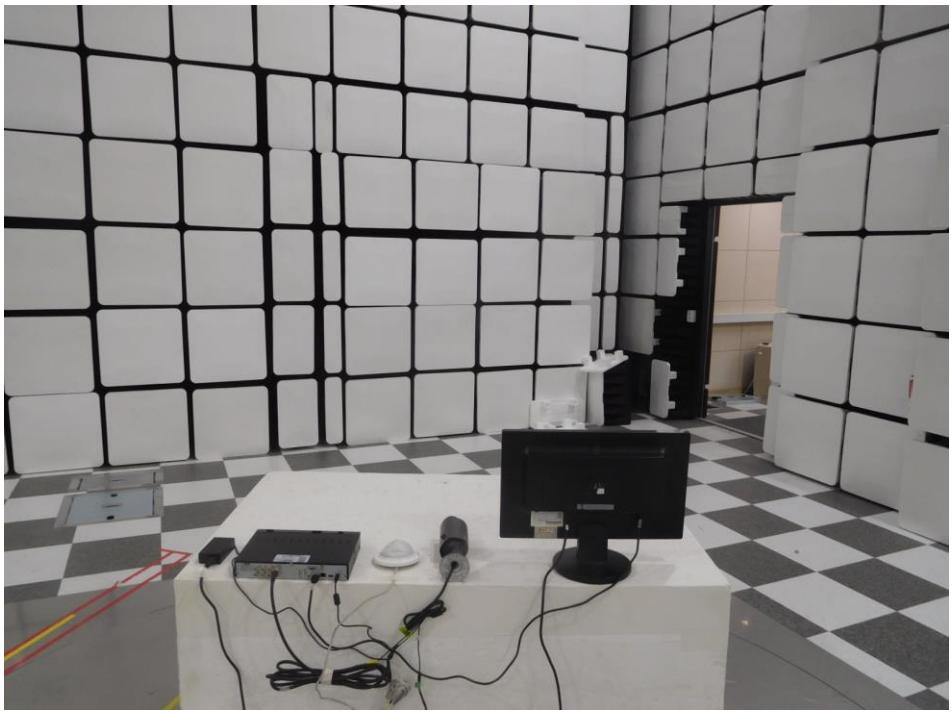
Conducted Telecommunication Emissions

N/A

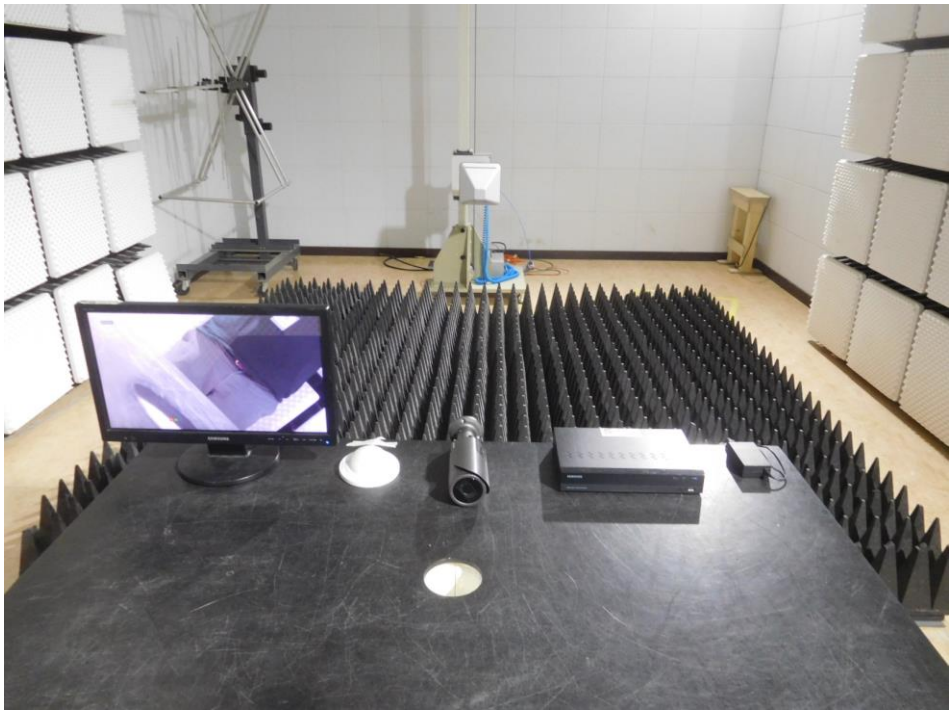
N/A

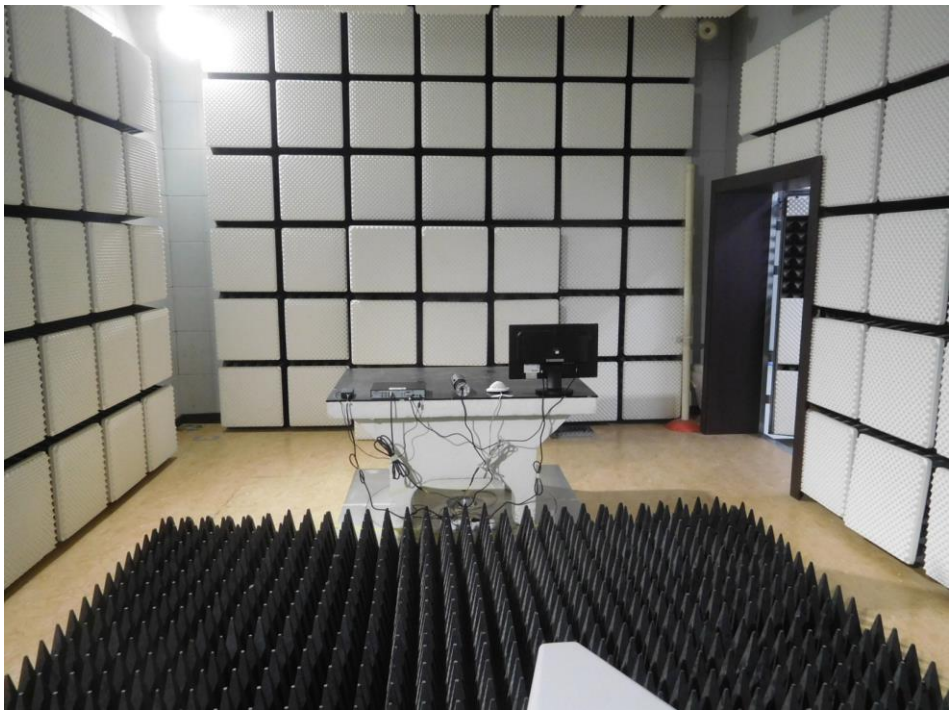
Radiated Electric Field Emissions(Below 1 ㎓)





Radiated Electric Field Emissions(Above 1 ㎓)





Harmonic Current Emissions and Voltage Fluctuations and Flicker

N/A

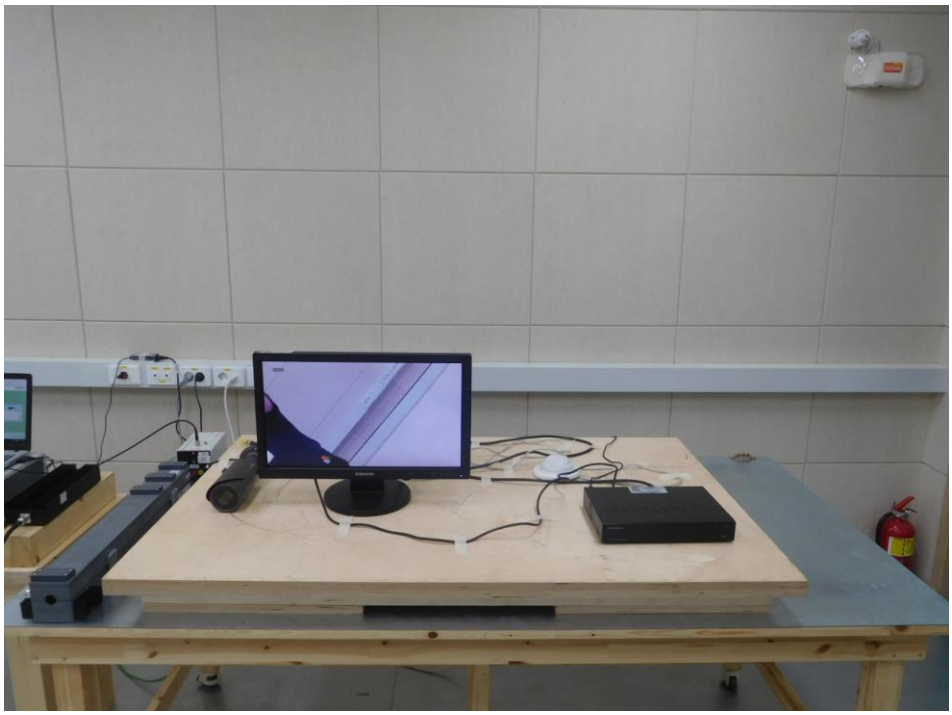
Electrostatic Discharge

Radiated Electric Field Immunity

Electrical Fast Transients/Bursts

Surge Transients

Conducted Disturbance



Voltage Dips and Short Interruptions

EUT External Photographs

(Top)

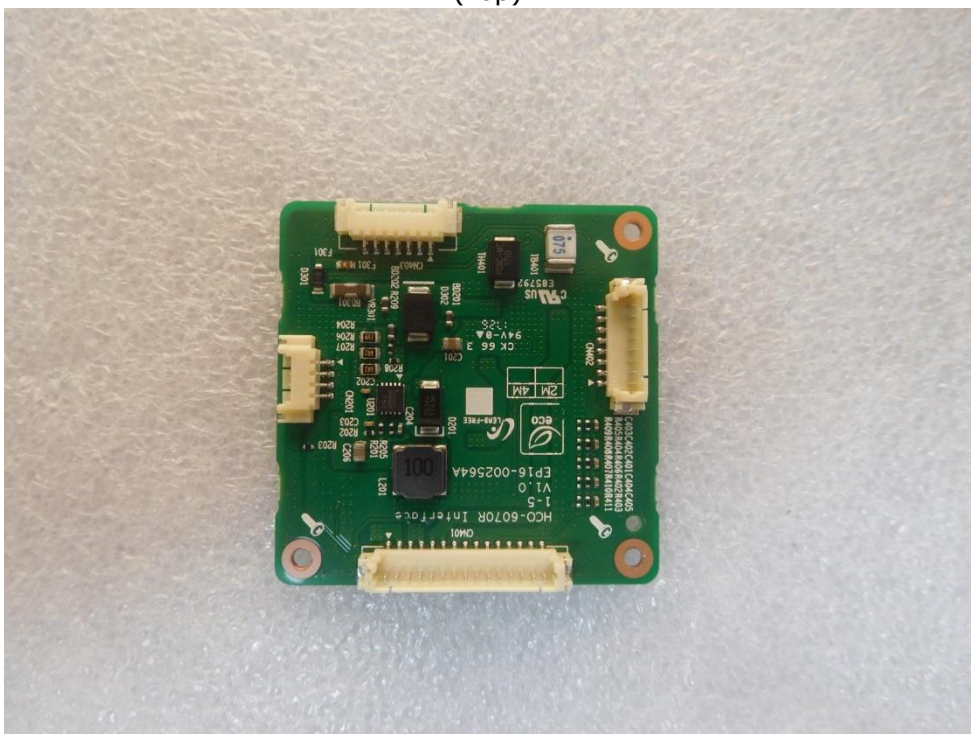
(Bottom)

EUT Internal Photographs

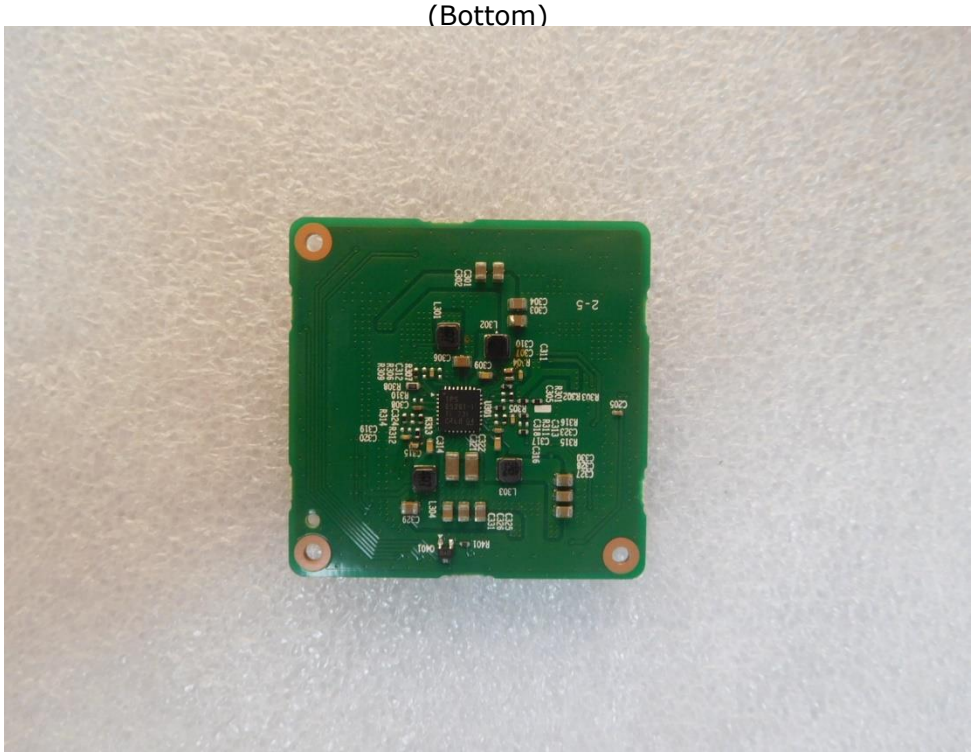
(Internal View)

EUT Internal View – Main Board

(Top)



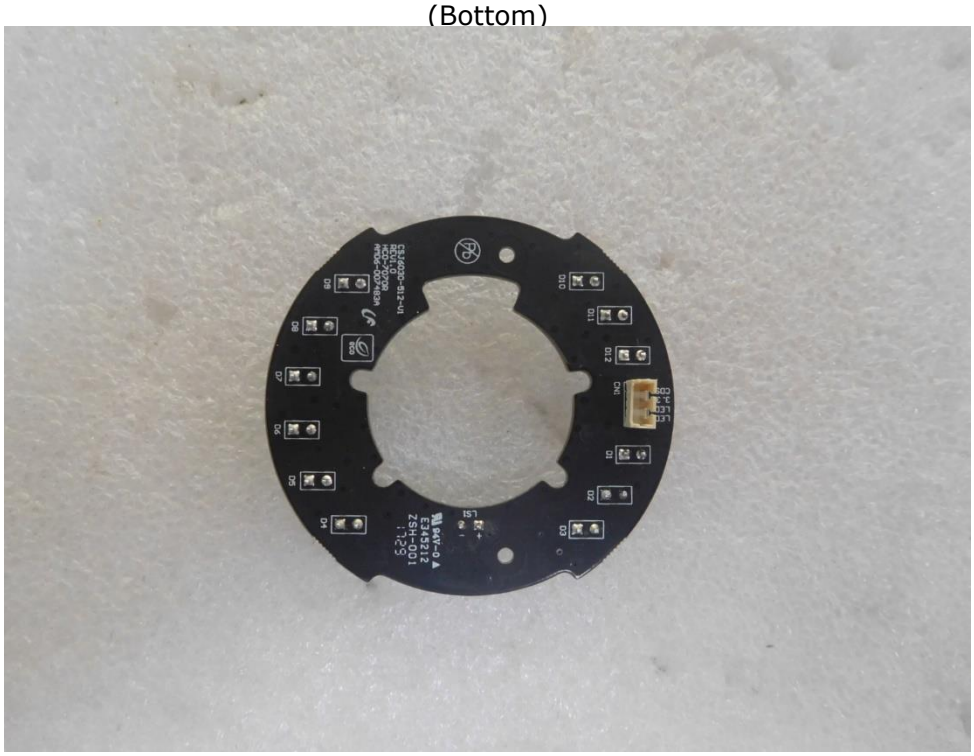
(Bottom)



EUT Internal View – IR Board

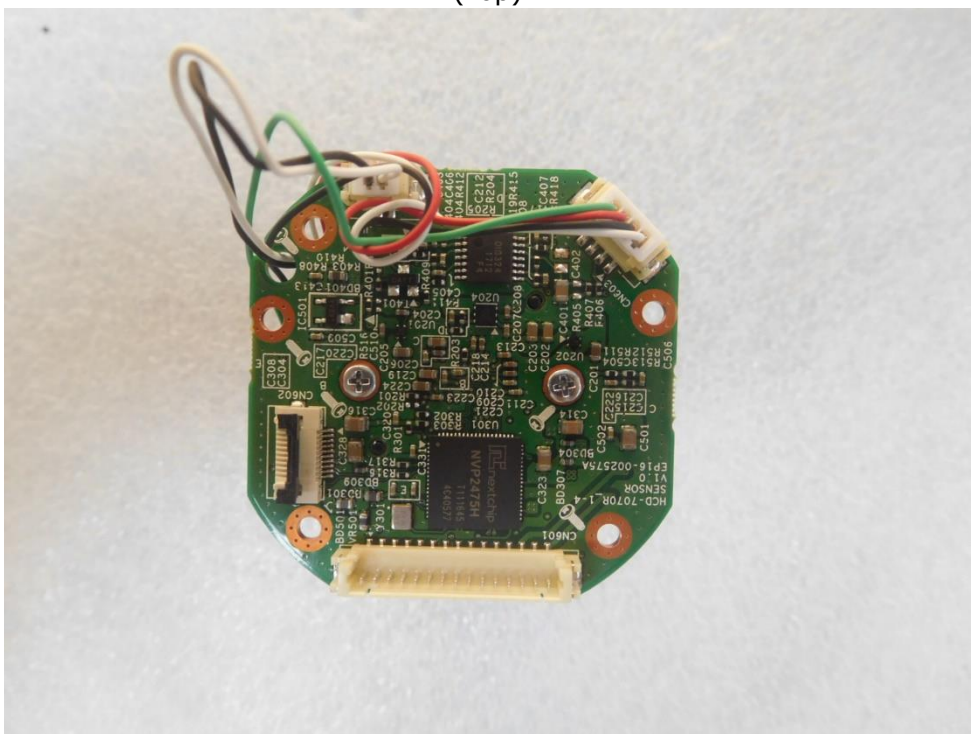
(Top)

(Bottom)

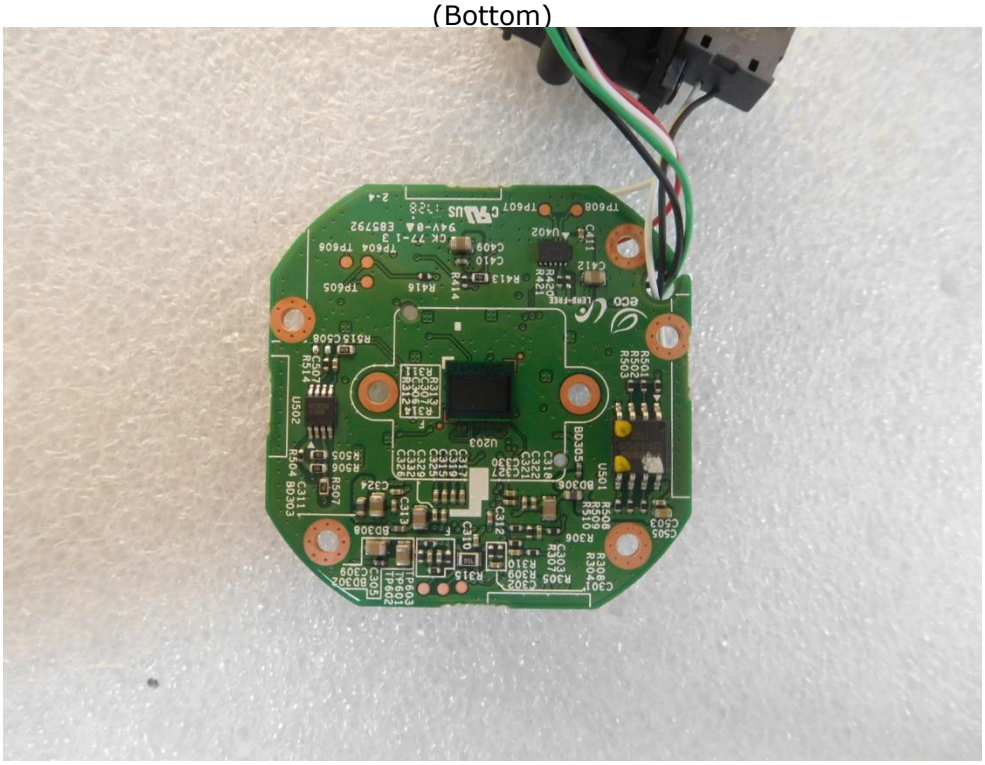


EUT Internal View – Camera Board

(Top)

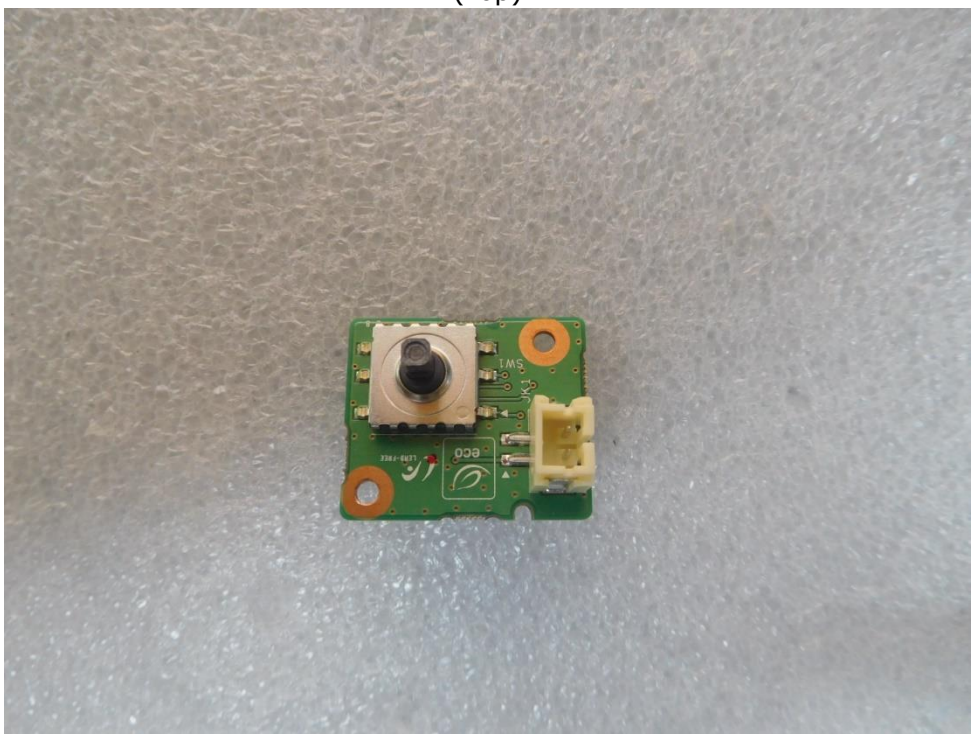


(Bottom)

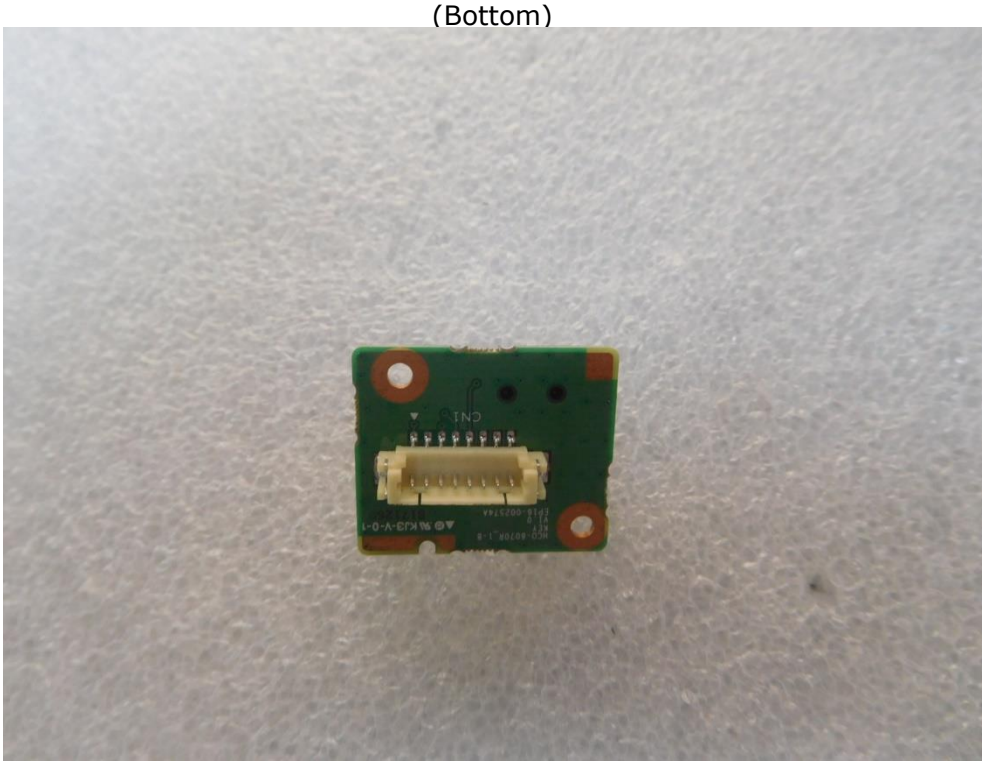


EUT Internal View – Button Board

(Top)



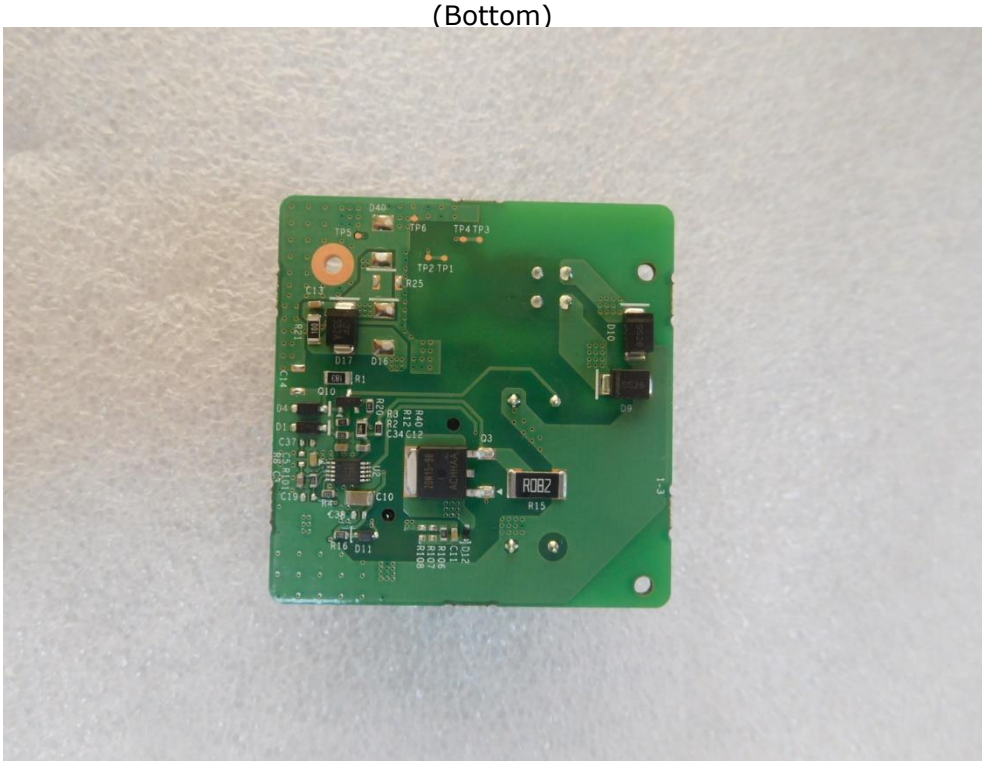
(Bottom)



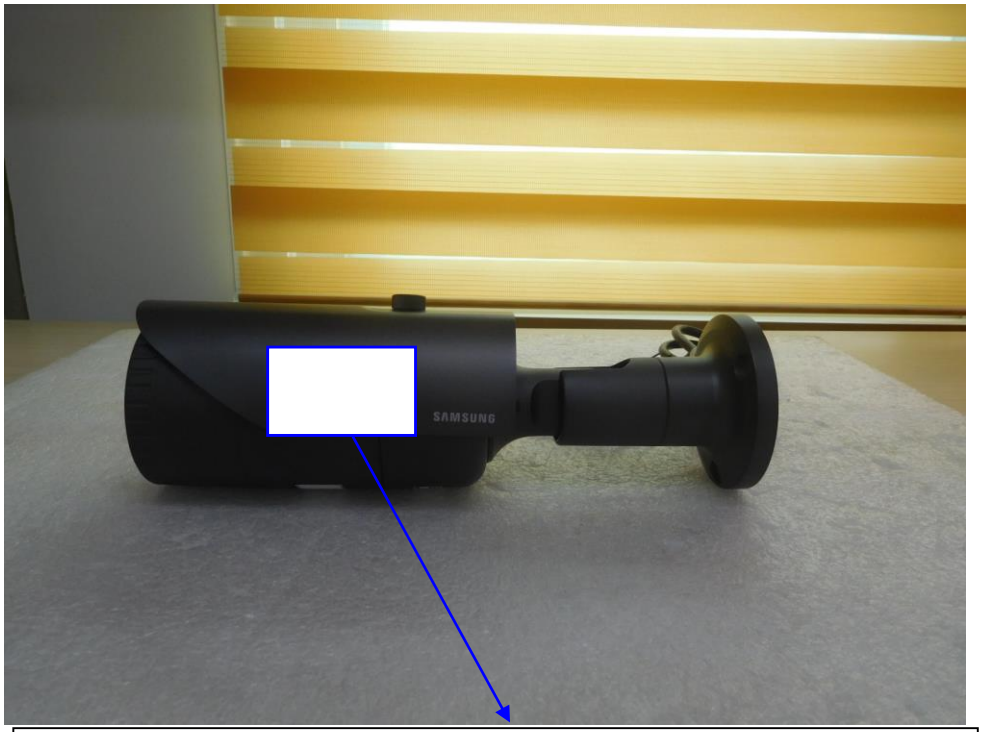
EUT Internal View – Power Board

(Top)

(Bottom)



Label and Location



NETWORK CAMERA

Model No : HCO-7070RP

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

Made in China