EMC TEST REPORT For CE

Test Report No.	:	KES-E1-17T0567-R1
Date of Issue	:	Oct. 23, 2017
Product name	:	CCTV CAMERA
Model/Type No.	:	HCV-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. 19, 2017 ~ Aug. 23, 2017
Test Results	:	☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Dae Hyun, Kim
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. 28, 2017	KES-E1-17T0567	Issued
Oct. 23, 2017	KES-E1-17T0567-R1	Standard Revision

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1.0 General Product Description

Main Specifications of E.U.T are:

Video		
Imaging Device	1/3" 4M CMOS	
Total Pixels	2720(H) x 1538(V)	
Effective Pixels	2688(H) x 1520(V)	
Scanning System	Progressive Scan	
Min. Illumination	Color : 0.11Lux (F 1.4) - TBD B/W : 0Lux(IR LED on) - TBD	
S / N Ratio	52dB (AGC off, Weight on)	
Video Output	BNC(AHD / CVBS Selectable), additional CVBS for installation(DIP connector type)	
Resolution	2560x1440	
Max. Framerate	30fps @ 4M	25fps @ 4M
Lens Type		
Focal Length (Zoom Ratio)	3.2 ~ 10mm (3.1x) varifocal	
Max. Aperture Ratio	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)	
Min. Object Distance	0.5m (1.64ft)	
Focus Control	Manual	
Lens Type	DC Auto Iris	
Mount Type	Board-in type	
Operational		
Viewable length	30m (98.43ft)	
On Screen Display	Multi-language Support(14) English, Spanish, French, Portuguese, German, Italian, Russian, Polish, Czech, Romanian, Serbian, Swedish, Danish, Turkish	
Camera Title	~~Off / On (Displayed 26 characters) ~ 31 ea~~	
Day & Night	Auto (ICR) / Color / B/W	
Backlight Compensation	Off / User BLC / HLC	
Wide Dynamic Range	-	
Contrast Enhancement	-	
Digital Noise Reduction	2D DNR	
~~Defog~~	~~AUTO / MANUAL / OFF~~	
Digital Image Stabilization	-	
Motion Detection	Off / On(4 zones)	
Privacy Masking	Off / On (2 zones, rectangle)	
Gain Control	Off / Low / Middle / High / Very High	
White Balance	ATW / Outdoor / Indoor / Manual / AWC (1,800K° ~ 10,500K°)	
LDC (Lens Distortion Correction)	-	
Electronic Shutter Speed	1/30sec~ 1/12,000sec	1/25sec~ 1/12,000sec
Digital Zoom	-	
Reverse	Off / H-Rev / V-Rev / HV-Rev	
Profile	-	
Alarm	MD output 1	
Remote control interface	Coaxial	
Protocol	AHD : ACP (AHD Coax Protocol), CVBS : Pelco-C (Coaxitron)	
Video Transmission Distance	500m(5C2V 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°C	
Ingress Protection	IP66	
Vandal Resistance	IK10	
Electrical		
Input Voltage/Current	Dual (24VAC±10% & 12VDC±10%)	
Power Consumption	AC 24V 5.8W 430mA DC 12V 5.8W 480mA	
Mechanical		
Color / Material	Ivory / Aluminum	
Dimension (WxHxD)	Ø137.0 x 106.1mm (Ø5.39" x 4.18")	
Weight	715g	

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	HCV-7070RP	-	Hanwha Techwin (Tianjin) Co.,Ltd	E.U.T

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
DVR	HRD-442	-	Hanwha Techwin. Co.,Ltd.	-
AC/DC Adapter	FSP040-RHAN2	-	FSP GROUP INC.	-
MONITOR	HSTND-7041-L	6CM6020YQQ	HP Inc.	-
Alarm Zig	-	-	-	-

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	Video Input	3.5	S
	Alarm	Alarm Zig	Alarm	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	DVR	Video Input	3.5	S
	Alarm	Alarm Zig	Alarm	3.0	U

* Unshielded=U, Shielded=S

1.7 E.U.T Operating Mode(s)

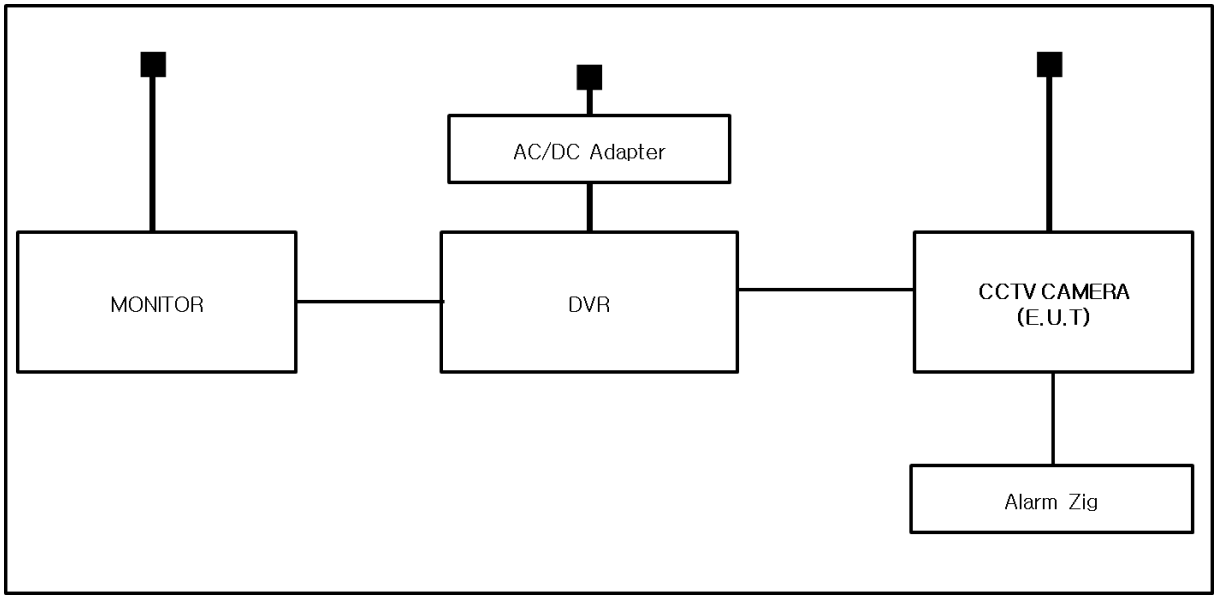
Test mode	operating
AC 24 V	E.U.T Monitoring
DC 12 V	E.U.T Monitoring

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

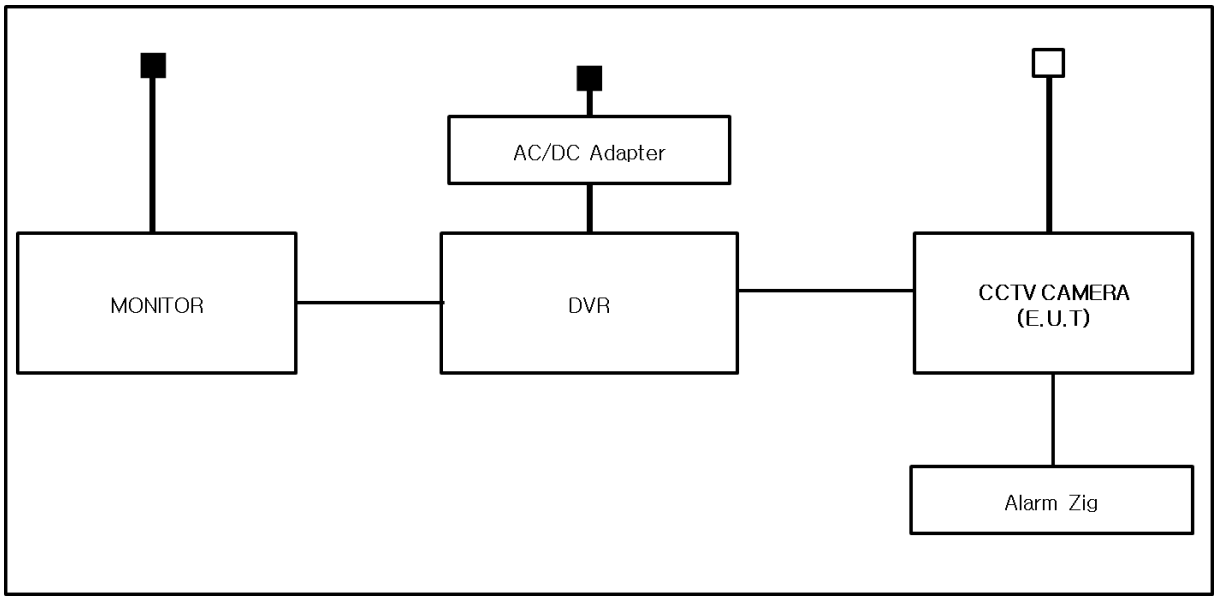
1.8 Configuration

■ 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)	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		
☐ 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. 20, 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	101781	04, 27, 2018
☒	LISN	ENV216	R & S	101787	01, 11, 2018
☒	LISN	ESH2-Z5	R & S	100450	04, 27, 2018
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	12, 13, 2017

Test Conditions
Temperature: 24,5 ℃
Relative Humidity: 53,0 %
.

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
N/A

2.3 Radiated Electric Field Emissions(Below 1 ㎓)

Test Date
Aug. 21, 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: 24,5 ℃
Relative Humidity: 52,9 %

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. 20, 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: 54,6 %

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	5.4.11.0	-
☐	DIGITAL POWER ANALYZER	DPA 500N	EM TEST	V1024106759	08, 07, 2018
☐	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	08, 07, 2018

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	5.4.11.0	-
☐	DIGITAL POWER ANALYZER	DPA 500N	EM TEST	V1024106759	08, 07, 2018
☐	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	08, 07, 2018

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. 22, 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	ESS01Z0454	10, 14, 2017
☒	HCP	-	KES	-	-
☒	VCP	-	KES	-	-

Test Conditions

Temperature:	24,9 ℃
Relative Humidity:	52,6 %
Atmospheric Pressure:	99,1 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:

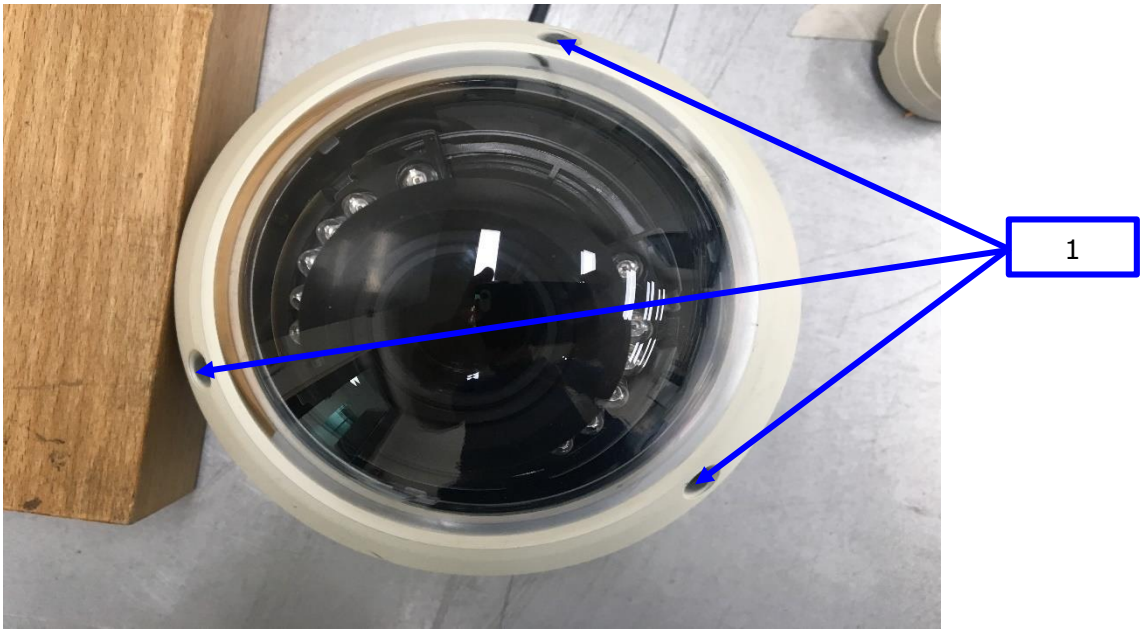
Contact	Air	HCP	VCP
☐ 2 kV	☒ 2 kV	☐ 2 kV	☐ 2 kV
☐ 4 kV	☒ 4 kV	☐ 4 kV	☐ 4 kV
☒ 6 kV	☐ 6 kV	☒ 6 kV	☒ 6 kV
☐ 8 kV	☒ 8 kV	☐ 8 kV	☐ 8 kV
☐ 15 kV	☐ 15 kV	☐ 15 kV	☐ 15 kV

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	E.U.T Enclosure	Contact Discharge	Complied	-
2	E.U.T Screw	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	E.U.T Enclosure	Contact Discharge	Complied	-
2	E.U.T Screw	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. 20, 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: 24,6 ℃
Relative Humidity: 51,8 %
Atmospheric Pressure: 99,3 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. 23, 2017

Test Location
EMS-EFT: Electro wave Shieldroom #3

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:	22,7 ℃
Relative Humidity:	53,2 %
Atmospheric Pressure:	99,0 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 kHz	☒ 100 kHz
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. 23, 2017

Test Location
EMS-Surge: Electro wave Shieldroom #3

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:	22,7 ℃
Relative Humidity:	53,2 %
Atmospheric Pressure:	99,0 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

Other supply / 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 (㎸)
-	-	-

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 (㎸)
-	-	-

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. 22, 2017

Test Location
EMS-CS: Electro wave Shieldroom #6

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: 25,1 ℃
Relative Humidity: 53,9 %
Atmospheric Pressure: 99,0 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:	☒ Complied	

Test Data

- AC 24 V Mode

☒ Input a.c. power ports

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

☐ Input d.c. power ports

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

☒ Signal ports and telecommunication ports

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

- DC 12 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)	-

☒ Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Observations
BNC	EM Injection Clamp	Complied
Alarm	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. 23, 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:	22,7 ℃
Relative Humidity:	53,2 %
Atmospheric Pressure:	99,0 kPa

Test Specifications & Observations/Remarks

- AC 24 V Mode

(Test Voltage : 50 ㎐)

Test Level	Duration [in period/ms (50 ㎐)]	Results
☒ 20 % dip	☒ 250 / 5 000	Complied
☒ 30 % dip	☒ 25 / 500	Complied
☒ 60 % dip	☒ 10 / 200	Complied
☒ 100 % dip	☒ 250 / 5 000	Complied

- Voltage cariations

☒ Unom + 10 %	☒ 253.0 V (ac)	Complied
☒ Unom - 15 %	☒ 195.5 V (ac)	Complied

Observations:
Complied – No degradation of function

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

Remarks
PASS Required Performance Criteria.

-The test has been tasted using the AC / AC Adaptor

APPENDIX A – TEST DATA

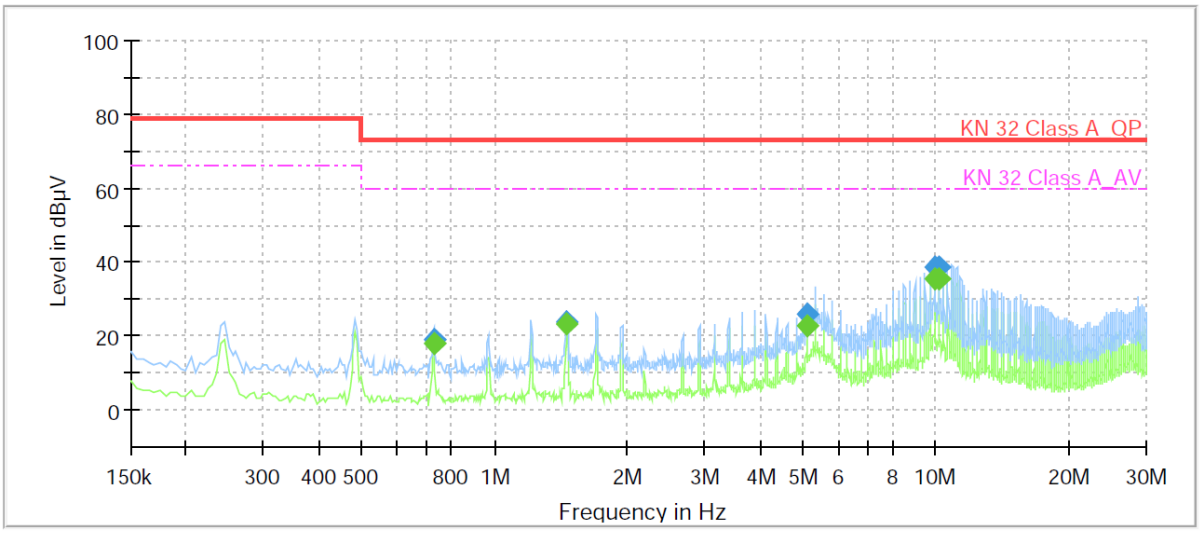
Conducted Emissions at Mains Power Ports

[HOT]

- AC 24 V Mode

Common Information

Test Description:	Conducted Emission
Model No.:	HCV-7070RP
Mode	AC 24 V
Operator Name:	KES



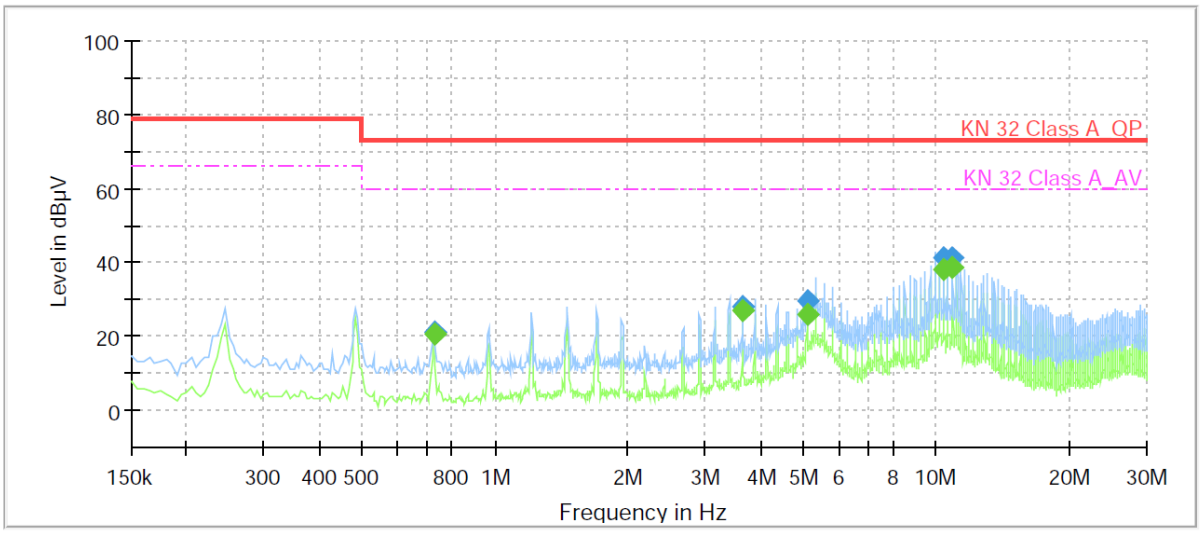
Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.730000	---	18.26	60.00	41.74	1000.0	9.000	L1	19.9
0.730000	18.85	---	73.00	54.15	1000.0	9.000	L1	19.9
1.460000	---	23.13	60.00	36.87	1000.0	9.000	L1	20.2
1.460000	23.79	---	73.00	49.21	1000.0	9.000	L1	20.2
5.095000	---	22.67	60.00	37.33	1000.0	9.000	L1	19.8
5.095000	25.93	---	73.00	47.07	1000.0	9.000	L1	19.8
9.945000	---	35.28	60.00	24.72	1000.0	9.000	L1	20.1
9.945000	38.68	---	73.00	34.32	1000.0	9.000	L1	20.1
10.190000	---	35.45	60.00	24.55	1000.0	9.000	L1	20.1
10.190000	38.87	---	73.00	34.13	1000.0	9.000	L1	20.1

[NEUTRAL]

Common Information

Test Description:	Conducted Emission
Model No.:	HCV-7070RP
Mode	AC 24 V
Operator Name:	KES



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.730000	---	20.71	60.00	39.29	1000.0	9.000	N	19.9
0.730000	21.19	---	73.00	51.81	1000.0	9.000	N	19.9
3.640000	---	26.92	60.00	33.08	1000.0	9.000	N	20.0
3.640000	27.83	---	73.00	45.17	1000.0	9.000	N	20.0
5.095000	---	25.78	60.00	34.22	1000.0	9.000	N	19.8
5.095000	29.40	---	73.00	43.60	1000.0	9.000	N	19.8
10.425000	---	38.36	60.00	21.64	1000.0	9.000	N	20.1
10.425000	41.31	---	73.00	31.69	1000.0	9.000	N	20.1
10.910000	---	38.60	60.00	21.40	1000.0	9.000	N	20.2
10.910000	41.36	---	73.00	31.64	1000.0	9.000	N	20.2

♦ Calculation
QuasiPeak[㏈uV] / CAverage [㏈uV] = Reading Value[㏈uV] + Corr. [㏈]
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

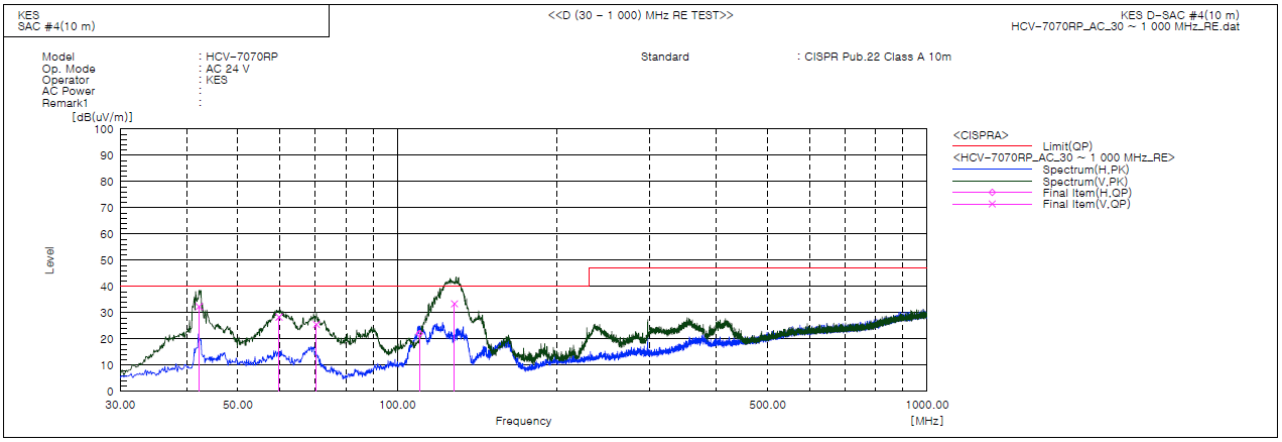
[100 Mbps]

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

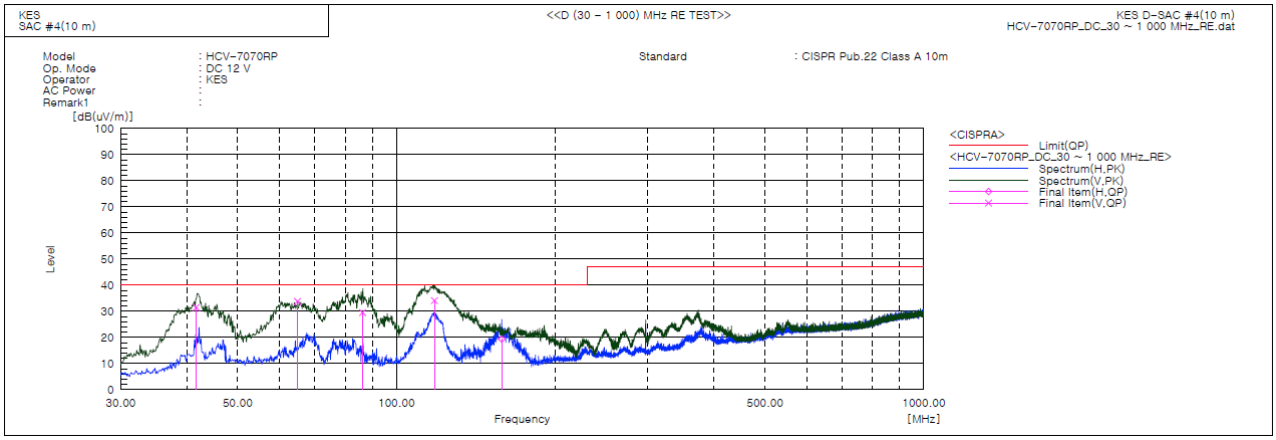


Final Result

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	42.263	V	60.9	-28.5	32.4	40.0	7.6	264.0	262.0	
2	59.828	V	57.2	-28.9	28.3	40.0	11.7	152.0	5.0	
3	70.376	V	57.4	-31.9	25.5	40.0	14.5	132.0	344.0	
4	110.146	H	51.2	-29.2	22.0	40.0	18.0	200.0	271.0	
5	128.183	V	65.1	-31.7	33.4	40.0	6.6	100.0	41.0	

♦ Calculation
Result(QP) [㏈(㎶/m)] = (Reading(QP)[㏈(㎶)] + c.f[㏈(1/m)]
Margin(QP)[㏈] = Limit[㏈(㎶/m)] - Result(QP) [㏈(㎶/m)]
Reading(QP) : Reading value, Result(QP) : Reading value + Factor value
Limit(QP) : Limit value, c.f : (ANT Factor + Cable Loss - Preamp Factor), Margin: Marjin value

- DC 12 V Mode



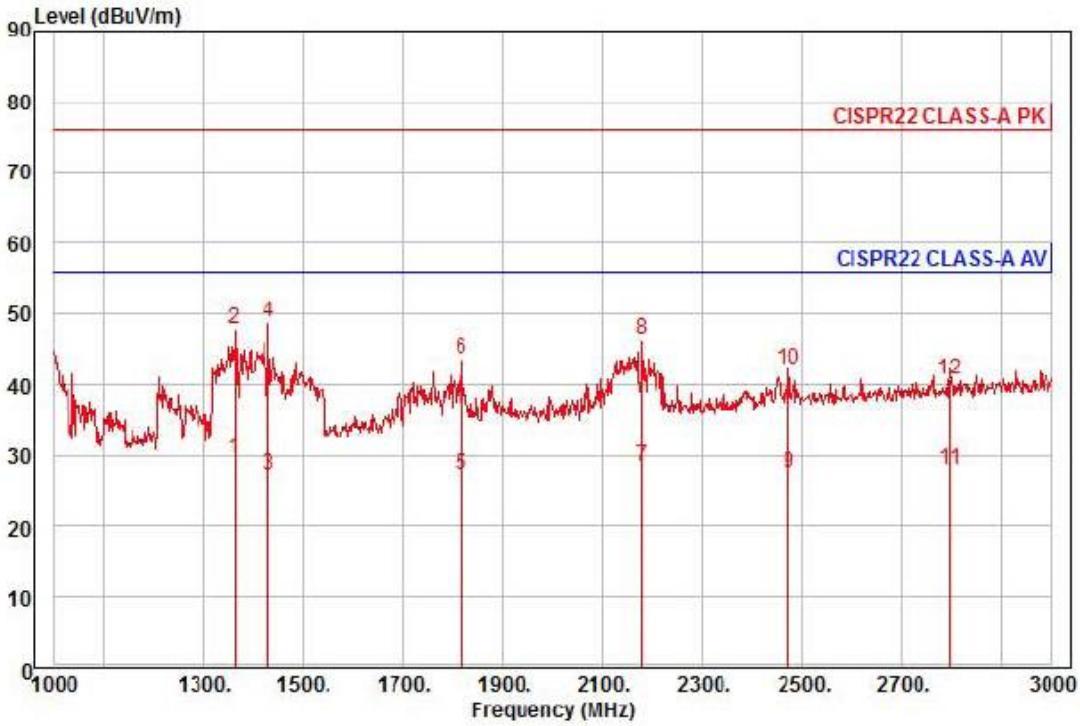
Final Result

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	41.720	V	60.2	-28.7	31.5	40.0	8.5	267.0	7.0	
2	64.920	V	64.1	-30.3	33.8	40.0	6.2	118.0	284.0	
3	86.259	V	61.5	-32.0	29.5	40.0	10.5	146.0	161.0	
4	118.090	V	64.7	-30.6	34.1	40.0	5.9	100.0	183.0	
5	158.404	H	50.2	-30.8	19.4	40.0	20.6	340.0	240.0	

♦ Calculation – SAC #4(10 m)
Result(QP) [㏈(㎶/m)] = (Reading(QP)[㏈(㎶)] + c.f[㏈(1/m)]
Margin(QP)[㏈] = Limit[㏈(㎶/m)] - Result(QP) [㏈(㎶/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

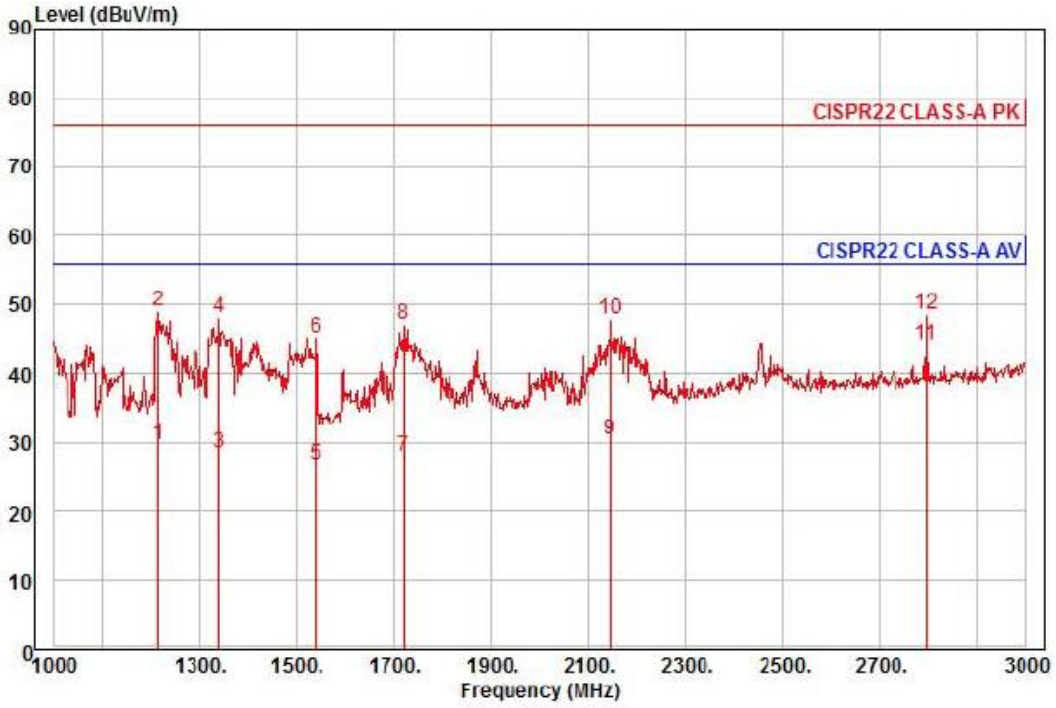
Radiated Electric Field Emissions(Above 1 ㎓)

- AC 24 V Mode



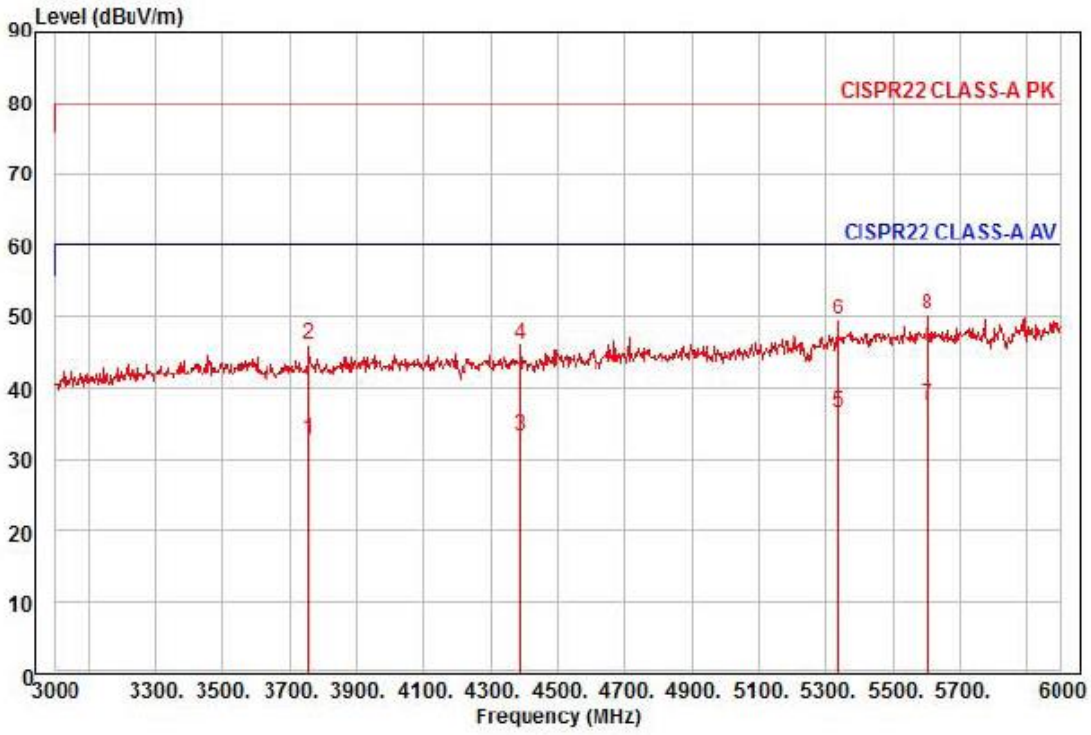
Site : chamber
Condition: CISPR22 CLASS-A PK 3m STLP9149(RRA CAL 2017-05-18) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : HCV-7070RP
Mode : AC 24 V
Memo : 1 ~ 3 GHz

	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 pp	1362.00	33.64	23.60	7.81	35.74	54	56.00	-26.69	horizontal	Average
2	1362.00	52.21	23.60	7.81	35.74	54	76.00	-28.12	horizontal	Peak
3	1430.00	31.05	23.81	8.01	35.68	66	56.00	-28.81	horizontal	Average
4 pk	1430.00	52.77	23.81	8.01	35.68	66	76.00	-27.09	horizontal	Peak
5	1818.00	28.12	25.29	9.14	35.33	45	56.00	-28.78	horizontal	Average
6	1818.00	44.66	25.29	9.14	35.33	45	76.00	-32.24	horizontal	Peak
7	2178.00	26.97	26.55	10.07	35.24	51	56.00	-27.65	horizontal	Average
8	2178.00	44.96	26.55	10.07	35.24	51	76.00	-29.66	horizontal	Peak
9	2474.00	24.67	27.45	10.77	35.35	345	56.00	-28.46	horizontal	Average
10	2474.00	39.22	27.45	10.77	35.35	345	76.00	-33.91	horizontal	Peak
11	2798.00	22.87	28.85	11.60	35.48	314	56.00	-28.16	horizontal	Average
12	2798.00	35.62	28.85	11.60	35.48	314	76.00	-35.41	horizontal	Peak



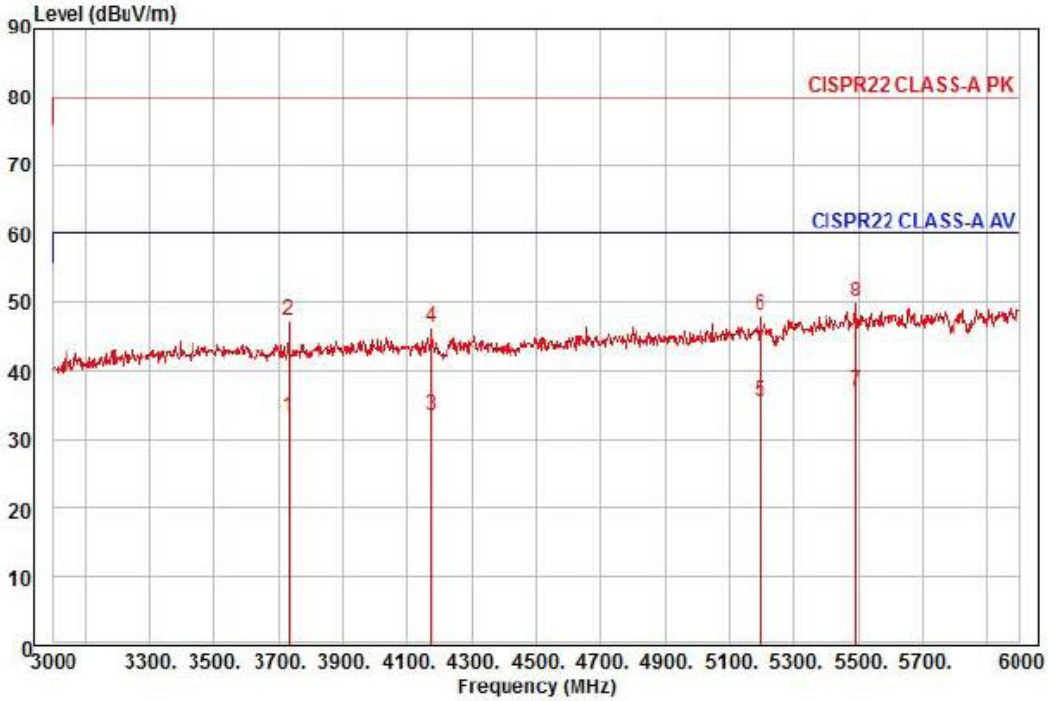
Site : chamber
Condition: CISPR22 CLASS-A PK 3m STLP9149(RRA CAL 2017-05-18) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : HCV-7070RP
Mode : AC 24 V
Memo : 1 ~ 3 GHz

	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	1214.00	35.12	23.15	7.33	35.87	26	56.00	-26.27	vertical	Average
2 pk	1214.00	54.55	23.15	7.33	35.87	26	76.00	-26.84	vertical	Peak
3	1340.00	32.93	23.53	7.73	35.76	344	56.00	-27.57	vertical	Average
4	1340.00	52.48	23.53	7.73	35.76	344	76.00	-28.02	vertical	Peak
5	1538.00	29.89	24.17	8.33	35.58	14	56.00	-29.19	vertical	Average
6	1538.00	48.26	24.17	8.33	35.58	14	76.00	-30.82	vertical	Peak
7	1720.00	29.67	24.90	8.86	35.42	38	56.00	-27.99	vertical	Average
8	1720.00	48.78	24.90	8.86	35.42	38	76.00	-28.88	vertical	Peak
9	2146.00	29.22	26.45	9.99	35.23	8	56.00	-25.57	vertical	Average
10	2146.00	46.53	26.45	9.99	35.23	8	76.00	-28.26	vertical	Peak
11 pp	2796.00	39.23	28.84	11.59	35.48	124	56.00	-11.82	vertical	Average
12	2796.00	43.66	28.84	11.59	35.48	124	76.00	-27.39	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 : HCV-7070RP
Mode : AC 24 V
Memo : 3 ~ 6 GHz

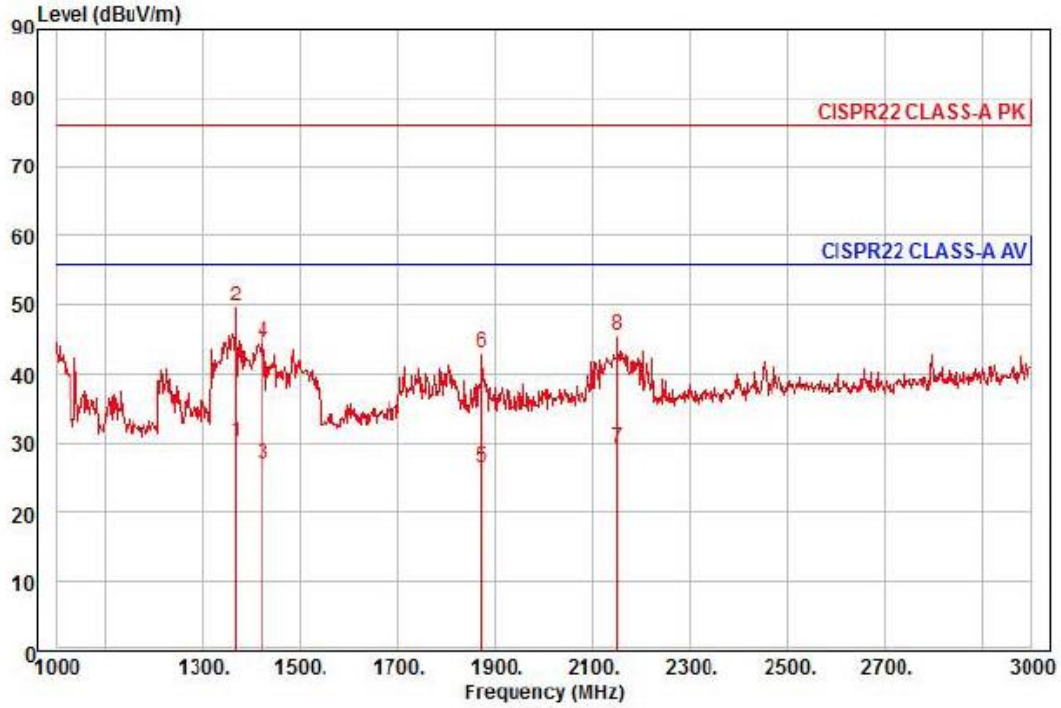
	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	3756.00	22.80	31.84	13.56	35.35	332	60.00	-27.15	horizontal	Average
2	3756.00	36.15	31.84	13.56	35.35	332	80.00	-33.80	horizontal	Peak
3	4386.00	21.63	32.39	14.77	35.42	89	60.00	-26.63	horizontal	Average
4	4386.00	34.40	32.39	14.77	35.42	89	80.00	-33.86	horizontal	Peak
5	5337.00	21.04	34.73	16.33	35.65	360	60.00	-23.55	horizontal	Average
6	5337.00	34.21	34.73	16.33	35.65	360	80.00	-30.38	horizontal	Peak
7 pp	5604.00	20.83	35.53	16.77	35.67	128	60.00	-22.54	horizontal	Average
8 pk	5604.00	33.70	35.53	16.77	35.67	128	80.00	-29.67	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 : HCV-7070RP
Mode : AC 24 V
Memo : 3 ~ 6 GHz

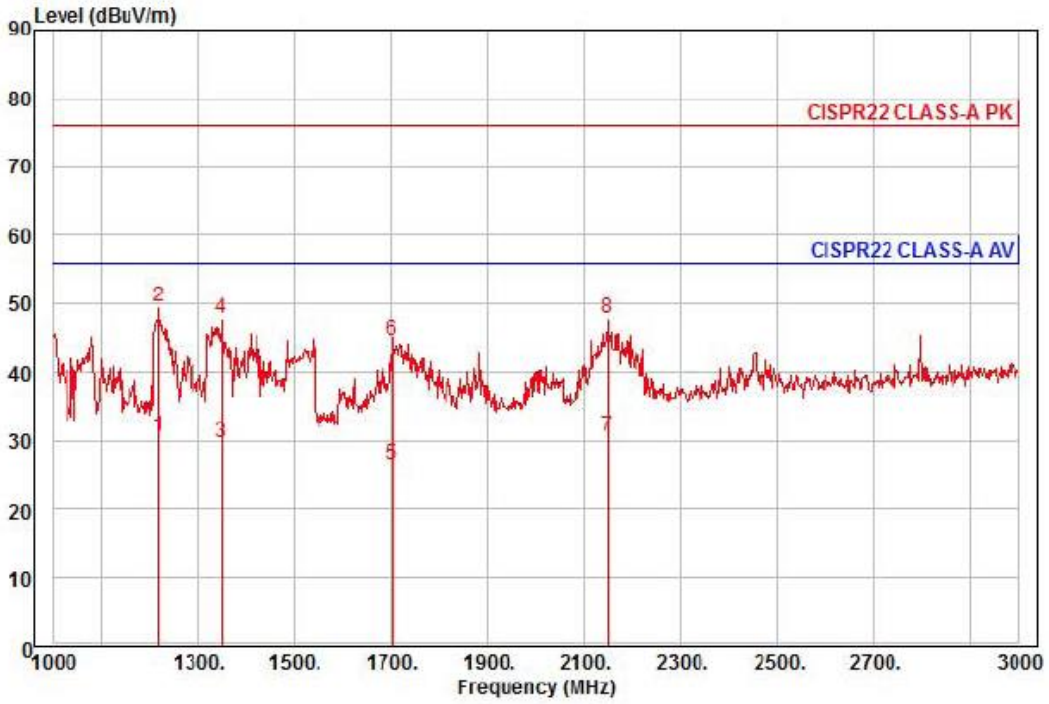
	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	3732.00	23.49	31.78	13.51	35.36	318	60.00	-26.58	vertical	Average
2	3732.00	37.43	31.78	13.51	35.36	318	80.00	-32.64	vertical	Peak
3	4173.00	22.04	32.45	14.36	35.34	107	60.00	-26.49	vertical	Average
4	4173.00	34.89	32.45	14.36	35.34	107	80.00	-33.64	vertical	Peak
5	5196.00	21.03	34.18	16.06	35.64	262	60.00	-24.37	vertical	Average
6	5196.00	33.57	34.18	16.06	35.64	262	80.00	-31.83	vertical	Peak
7 pp	5493.00	20.82	35.34	16.60	35.66	221	60.00	-22.90	vertical	Average
8 pk	5493.00	33.67	35.34	16.60	35.66	221	80.00	-30.05	vertical	Peak

- DC 12 V Mode



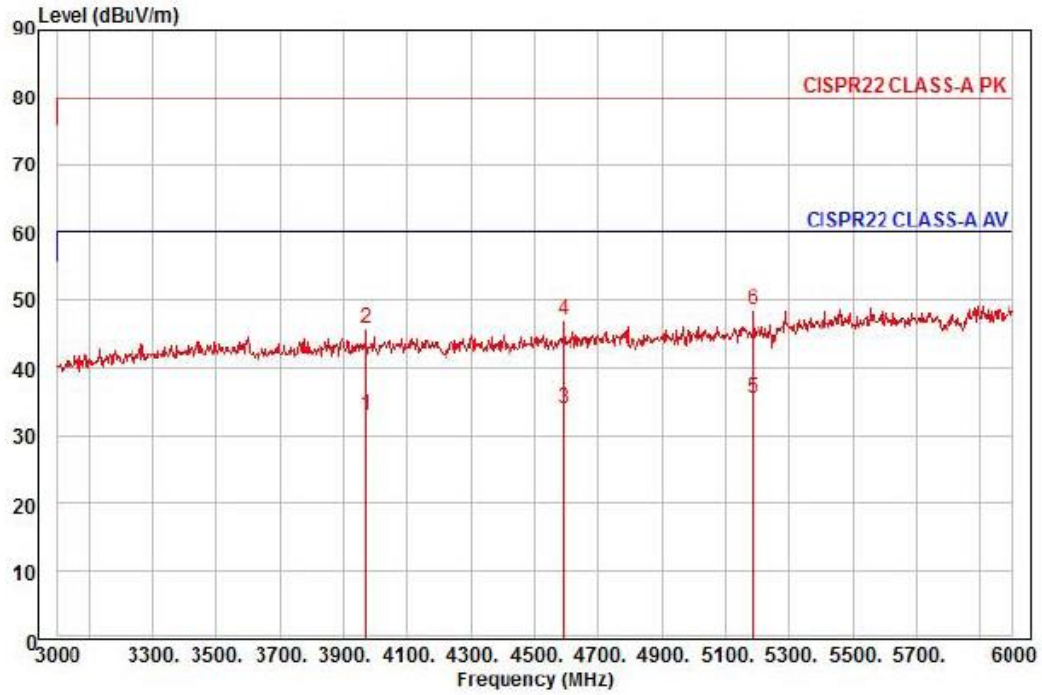

```
Site      : chamber
Condition: CISPR22 CLASS-A PK 3m STLP9149(RRA CAL 2017-05-18) horizontal
         : RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project   :
Model     : HCV-7070RP
Mode      : DC 12 V
Memo      : 1 ~ 3 GHz
```

	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 pp	1368.00	34.42	23.62	7.82	35.73	31	56.00	-25.87	horizontal	Average
2 pk	1368.00	54.18	23.62	7.82	35.73	31	76.00	-26.11	horizontal	Peak
3	1424.00	30.77	23.79	8.00	35.68	0	56.00	-29.12	horizontal	Average
4	1424.00	48.56	23.79	8.00	35.68	0	76.00	-31.33	horizontal	Peak
5	1872.00	27.02	25.50	9.29	35.28	49	56.00	-29.47	horizontal	Average
6	1872.00	43.62	25.50	9.29	35.28	49	76.00	-32.87	horizontal	Peak
7	2150.00	27.93	26.47	10.00	35.23	49	56.00	-26.83	horizontal	Average
8	2150.00	44.46	26.47	10.00	35.23	49	76.00	-30.30	horizontal	Peak



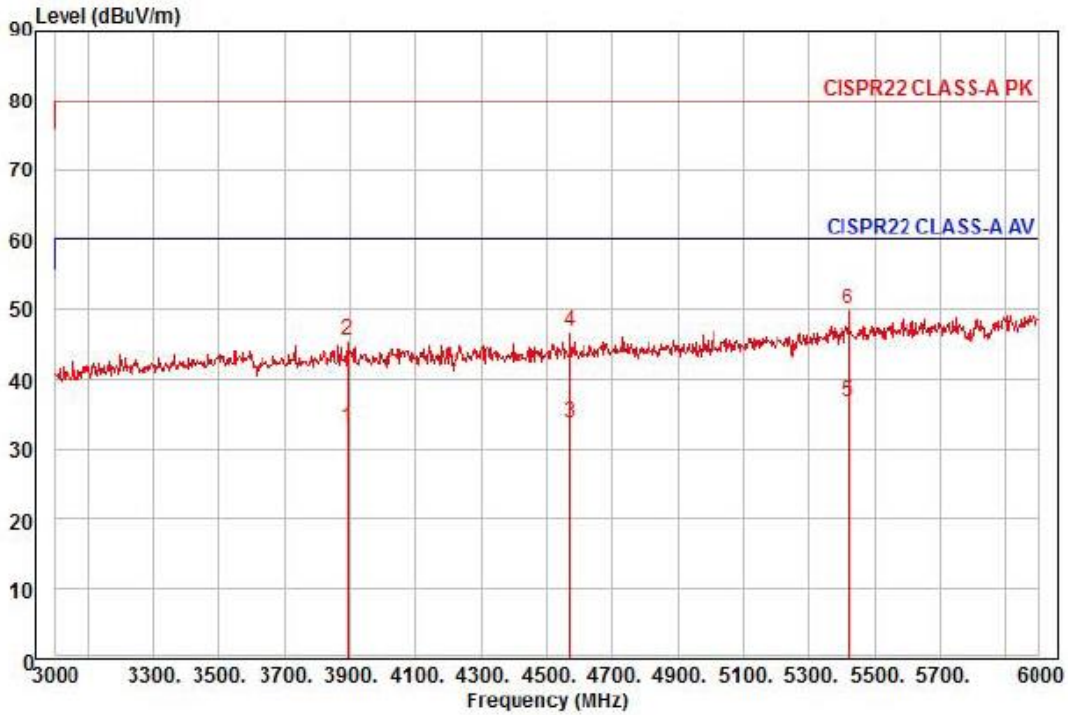
Site : chamber
Condition: CISPR22 CLASS-A PK 3m STLP9149(RRA CAL 2017-05-18) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : HCV-7070RP
Mode : DC 12 V
Memo : 1 ~ 3 GHz

	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	1218.00	36.06	23.16	7.34	35.87	13	56.00	-25.31	vertical	Average
2 pk	1218.00	55.01	23.16	7.34	35.87	13	76.00	-26.36	vertical	Peak
3	1348.00	34.06	23.56	7.76	35.75	48	56.00	-26.37	vertical	Average
4	1348.00	52.20	23.56	7.76	35.75	48	76.00	-28.23	vertical	Peak
5	1704.00	28.31	24.83	8.81	35.43	42	56.00	-29.48	vertical	Average
6	1704.00	46.48	24.83	8.81	35.43	42	76.00	-31.31	vertical	Peak
7 pp	2148.00	29.54	26.46	10.00	35.23	7	56.00	-25.23	vertical	Average
8	2148.00	46.60	26.46	10.00	35.23	7	76.00	-28.17	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 : HCV-7070RP
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	3969.00	21.88	32.42	14.00	35.29	195	60.00	-26.99	horizontal	Average
2	3969.00	34.72	32.42	14.00	35.29	195	80.00	-34.15	horizontal	Peak
3	4590.00	21.86	32.55	15.11	35.49	320	60.00	-25.97	horizontal	Average
4	4590.00	35.02	32.55	15.11	35.49	320	80.00	-32.81	horizontal	Peak
5 pp	5184.00	21.01	34.13	16.04	35.64	206	60.00	-24.46	horizontal	Average
6 pk	5184.00	33.91	34.13	16.04	35.64	206	80.00	-31.56	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 : HCV-7070RP
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	3894.00	22.27	32.21	13.84	35.31	163	60.00	-26.99	vertical	Average
2	3894.00	34.99	32.21	13.84	35.31	163	80.00	-34.27	vertical	Peak
3	4569.00	21.81	32.50	15.07	35.48	90	60.00	-26.10	vertical	Average
4	4569.00	34.64	32.50	15.07	35.48	90	80.00	-33.27	vertical	Peak
5 pp	5421.00	20.80	35.06	16.49	35.66	24	60.00	-23.31	vertical	Average
6 pk	5421.00	34.10	35.06	16.49	35.66	24	80.00	-30.01	vertical	Peak

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

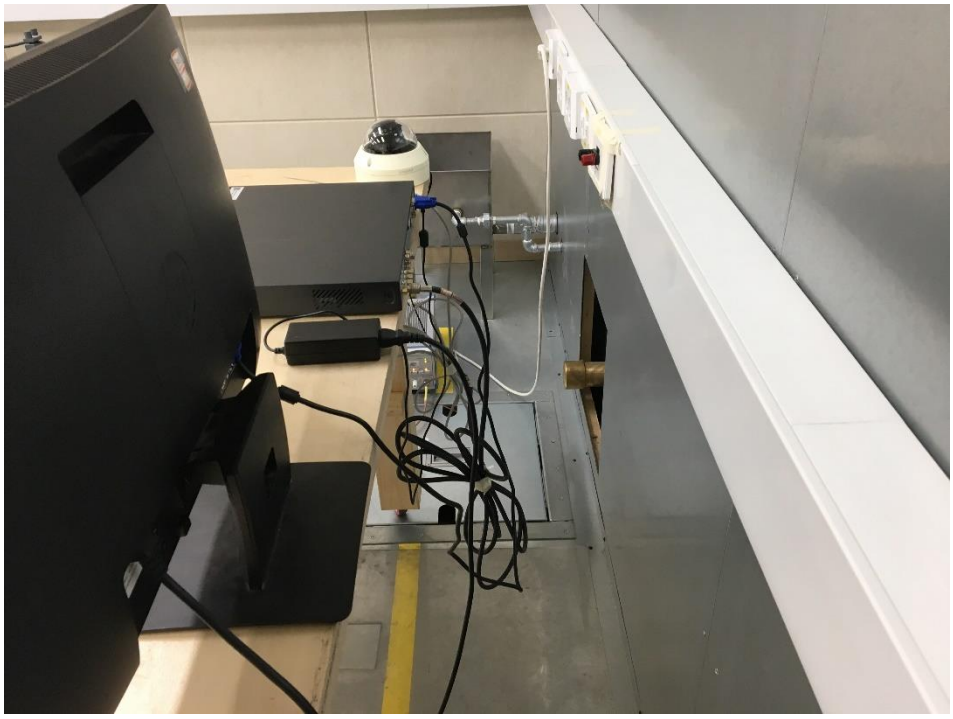
Test Data - Voltage Fluctuations

Maximum Flicker results

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

Test Setup Photos and Configuration

Conducted Voltage Emissions

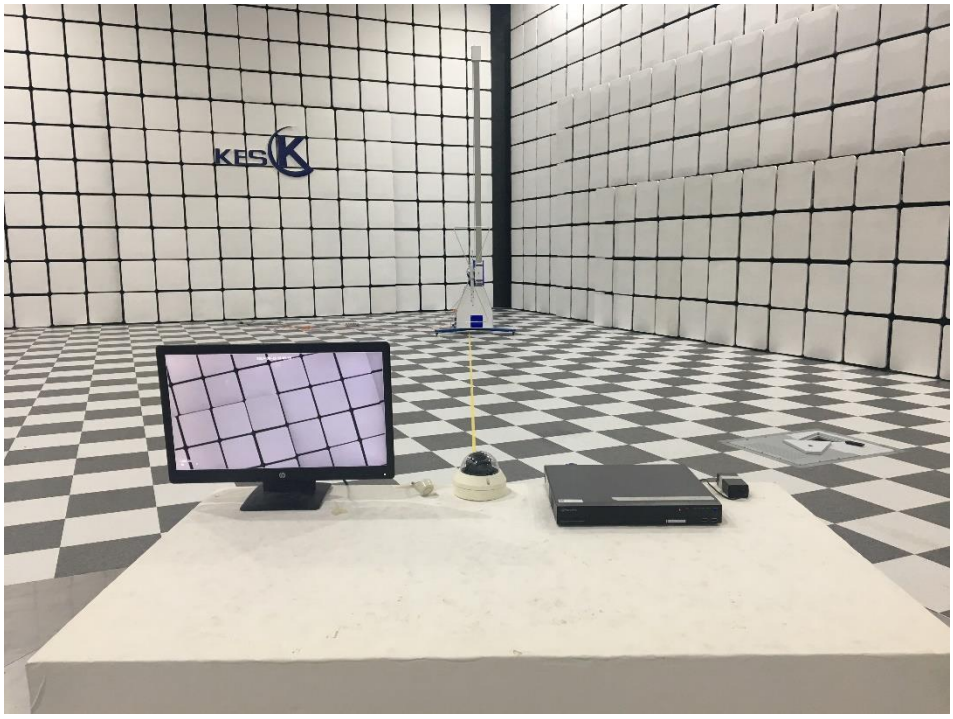


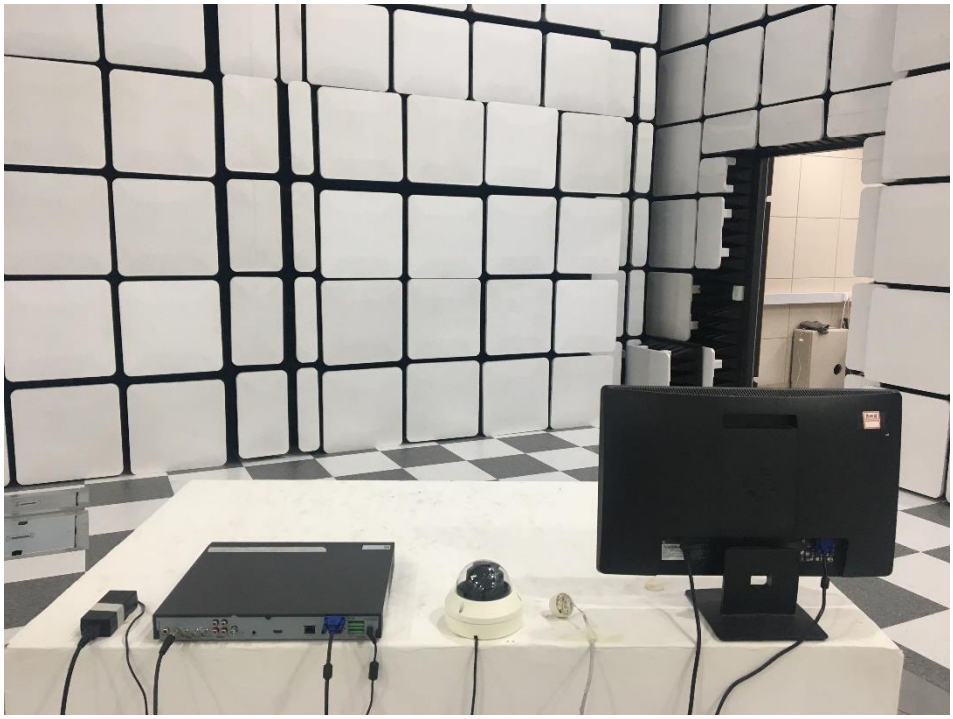
Conducted Telecommunication Emissions

N/A

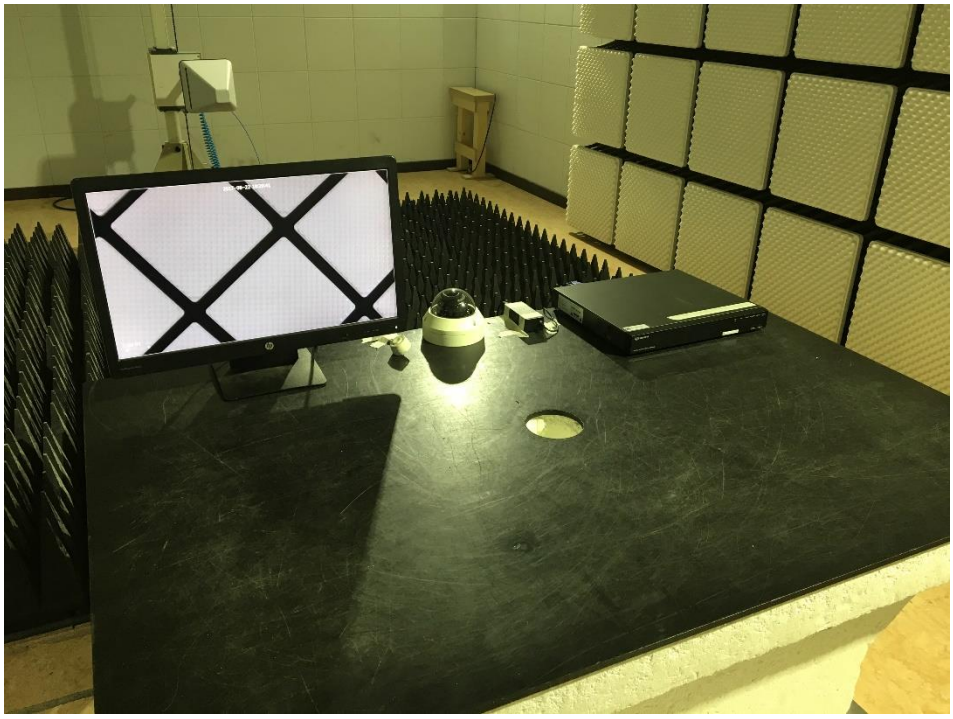
N/A

Radiated Electric Field Emissions(Below 1 ㎓)





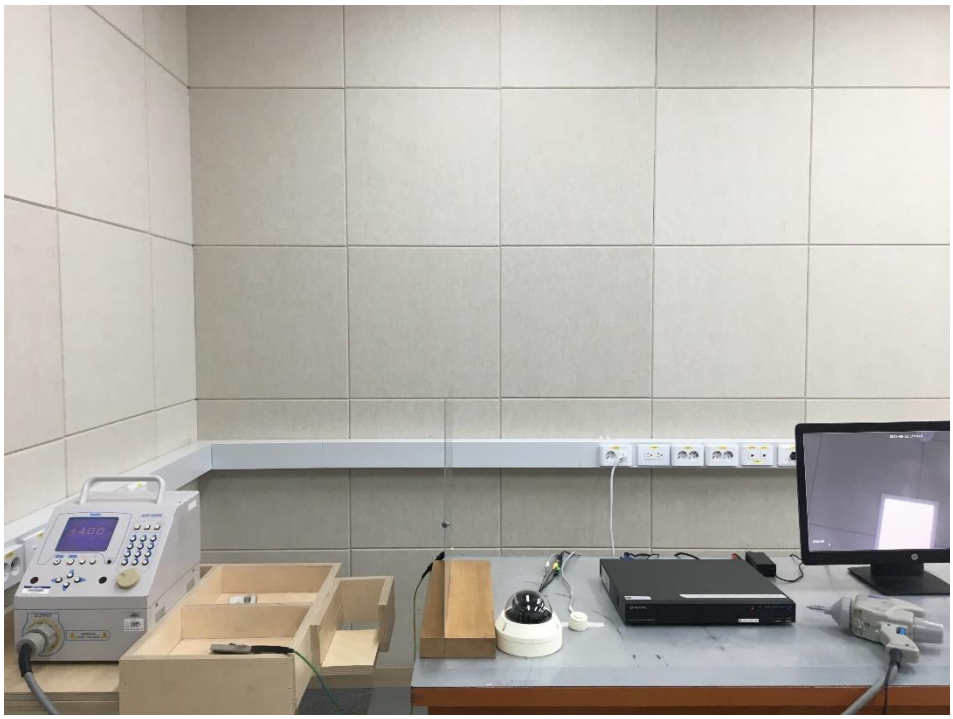
Radiated Electric Field Emissions(Above 1 ㎓)



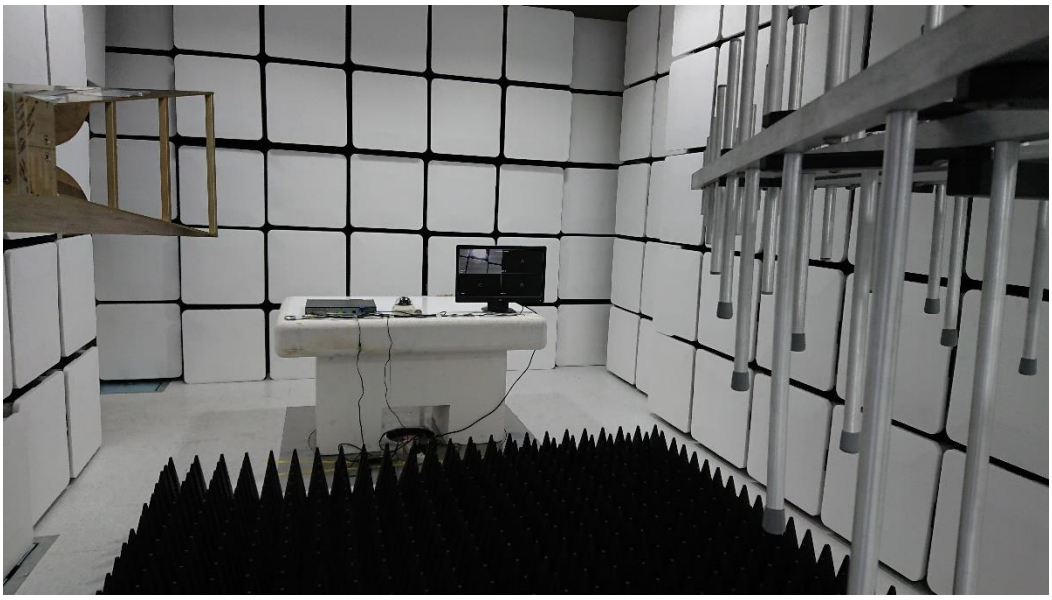
Harmonic Current Emissions and Voltage Fluctuations and Flicker

N/A

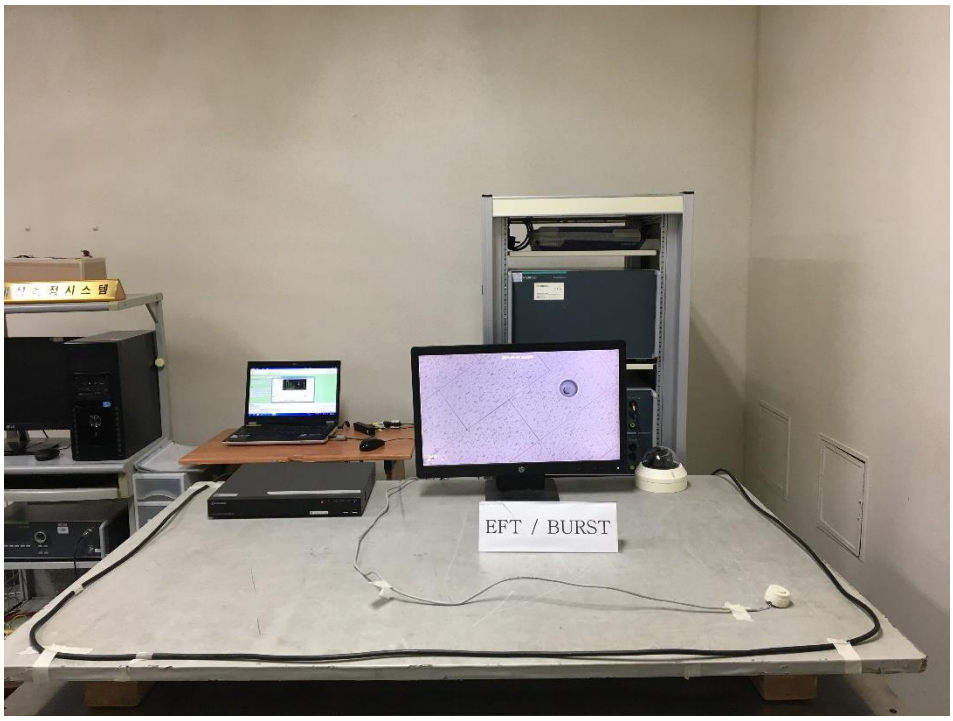
Electrostatic Discharge

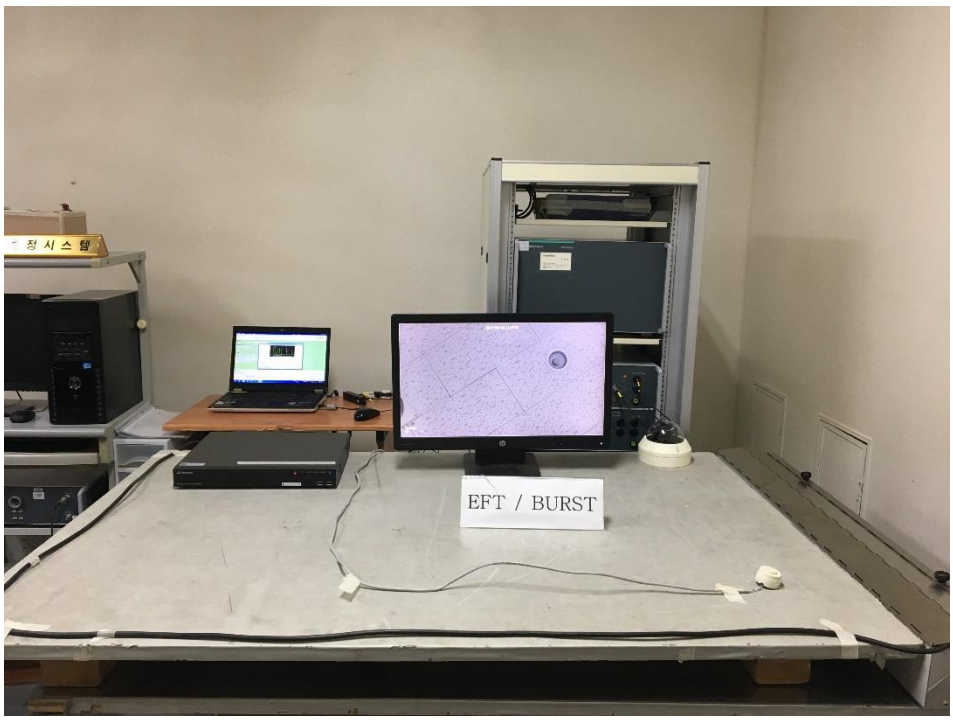


Radiated Electric Field Immunity



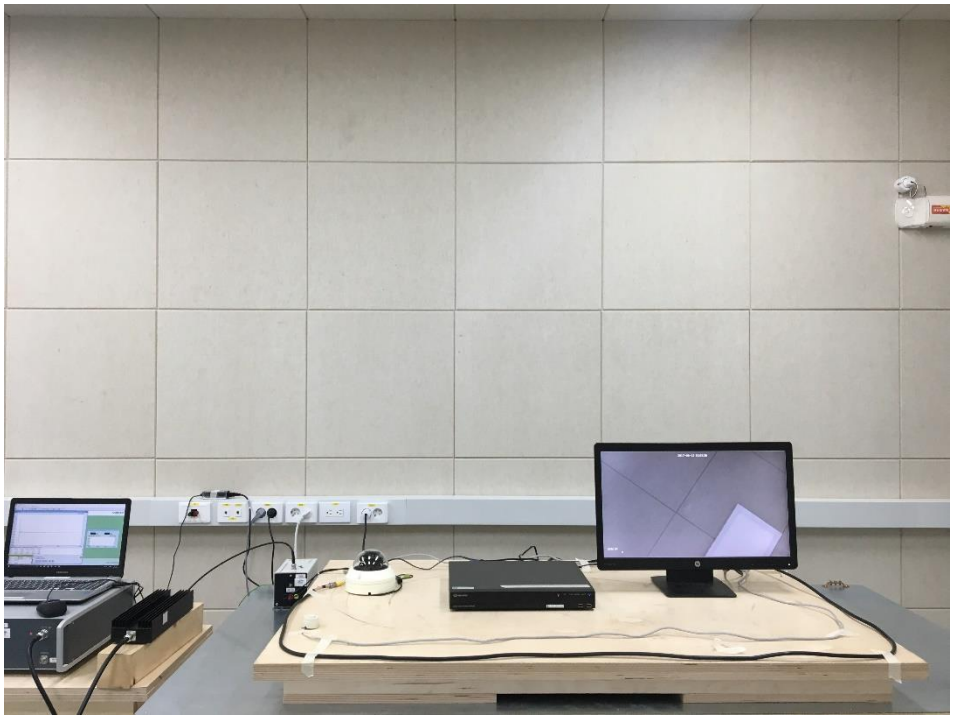
Electrical Fast Transients/Bursts

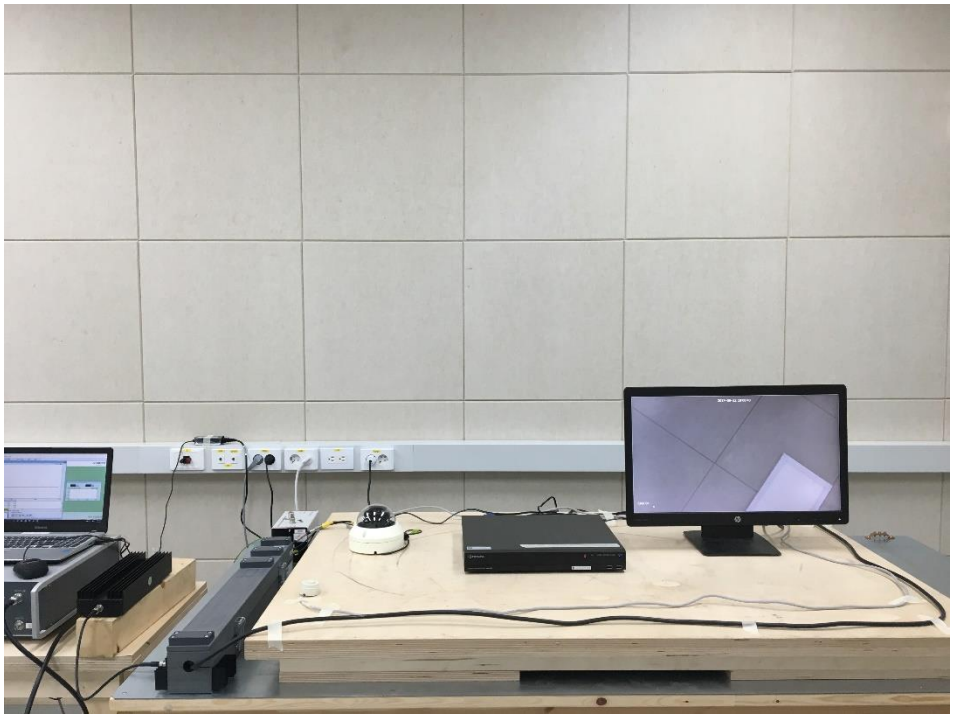




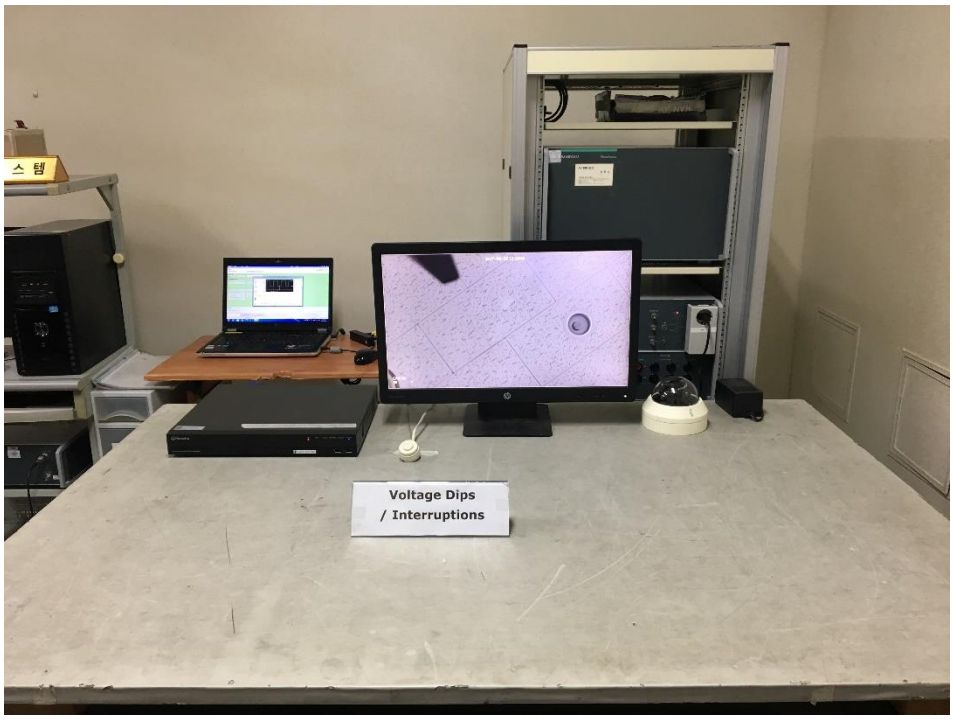
Surge Transients

Conducted Disturbance





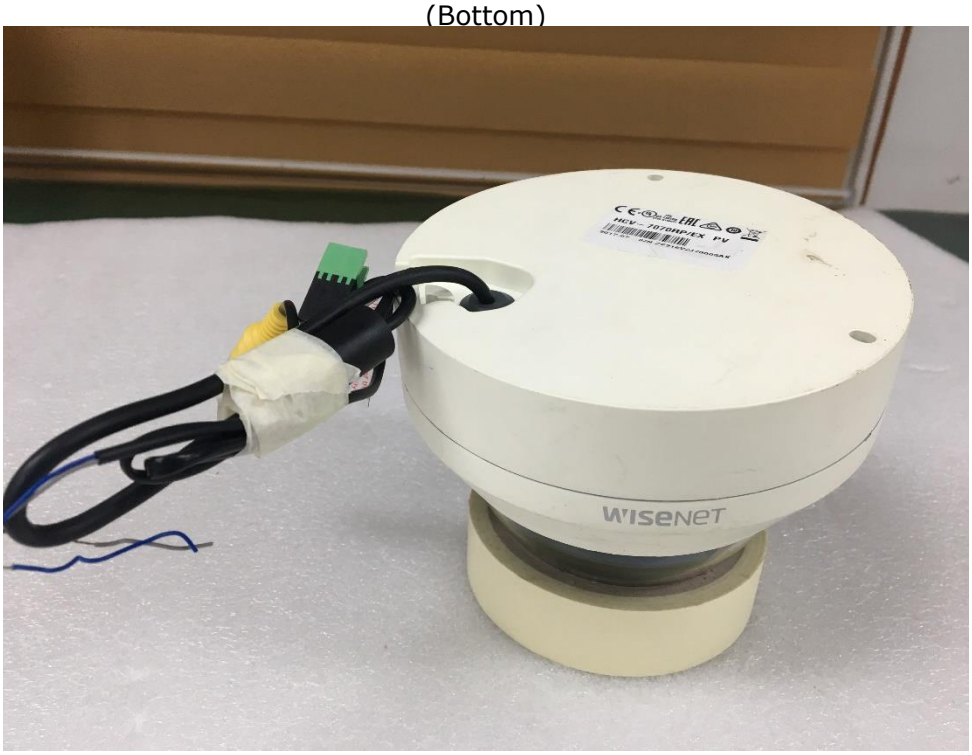
Voltage Dips and Short Interruptions



EUT External Photographs

(Top)

(Bottom)

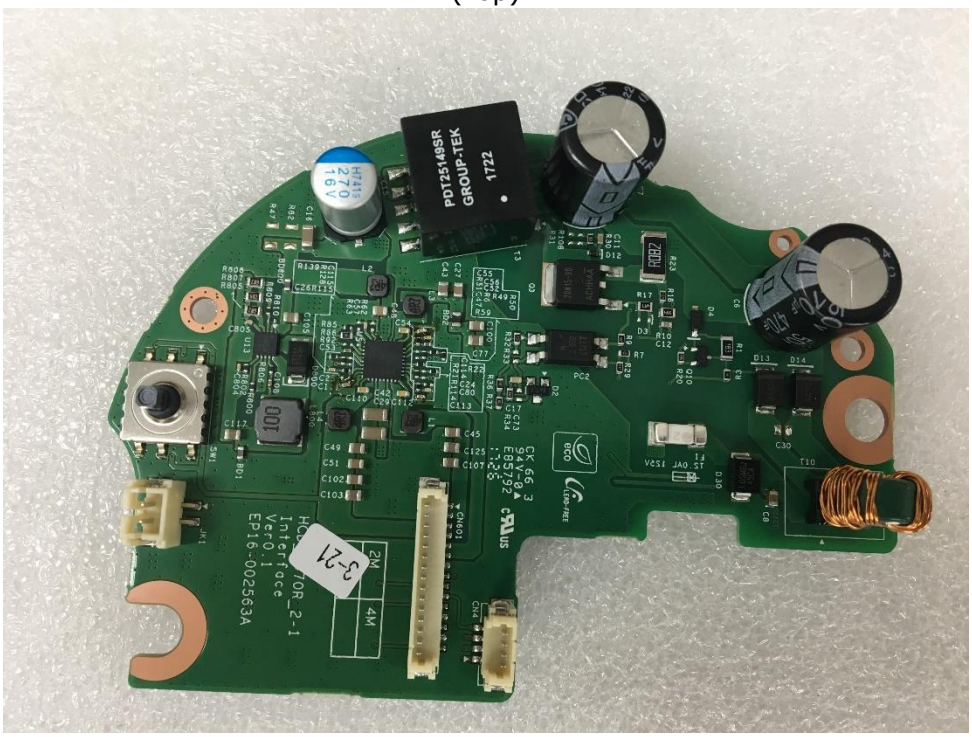


EUT Internal Photographs

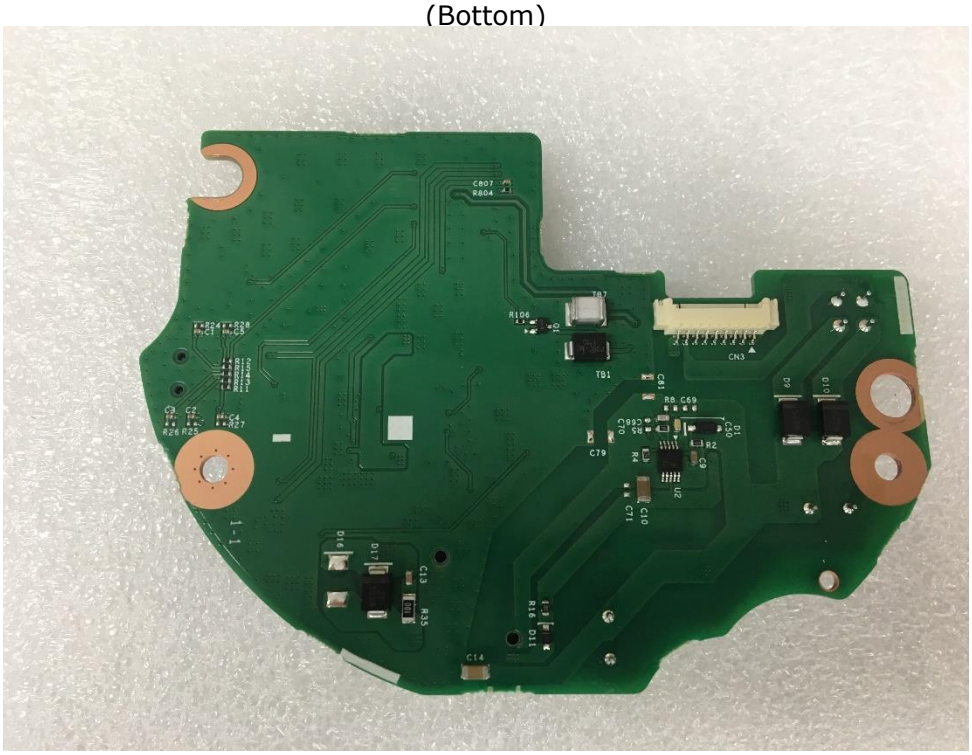
(Internal View)

EUT Internal View – Main board

(Top)



(Bottom)



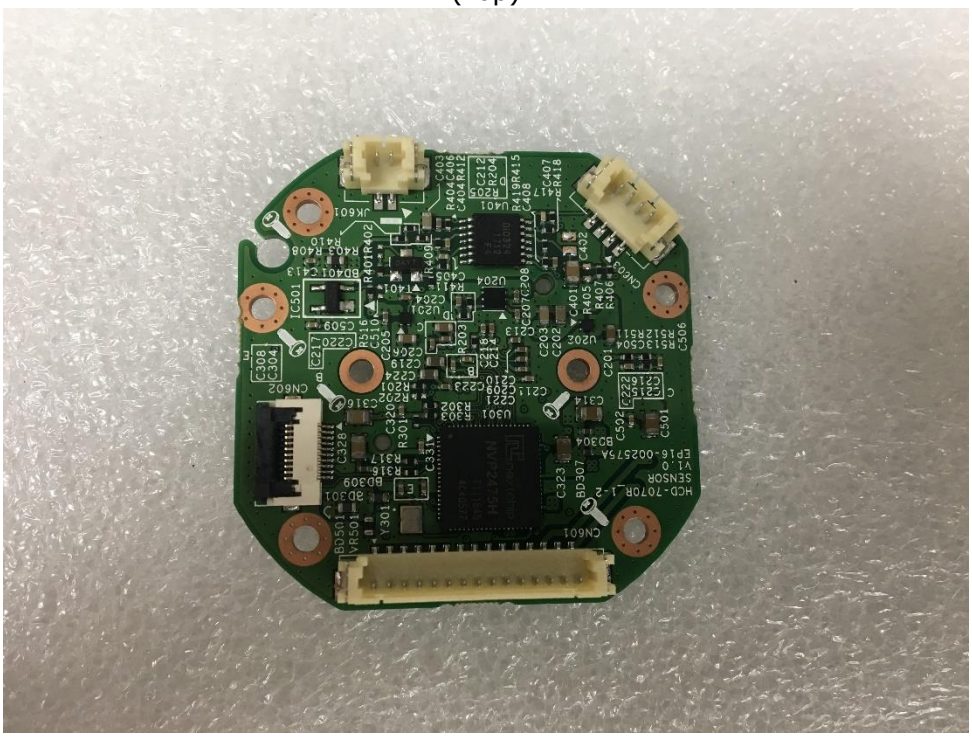
EUT Internal View – IR board

(Top)

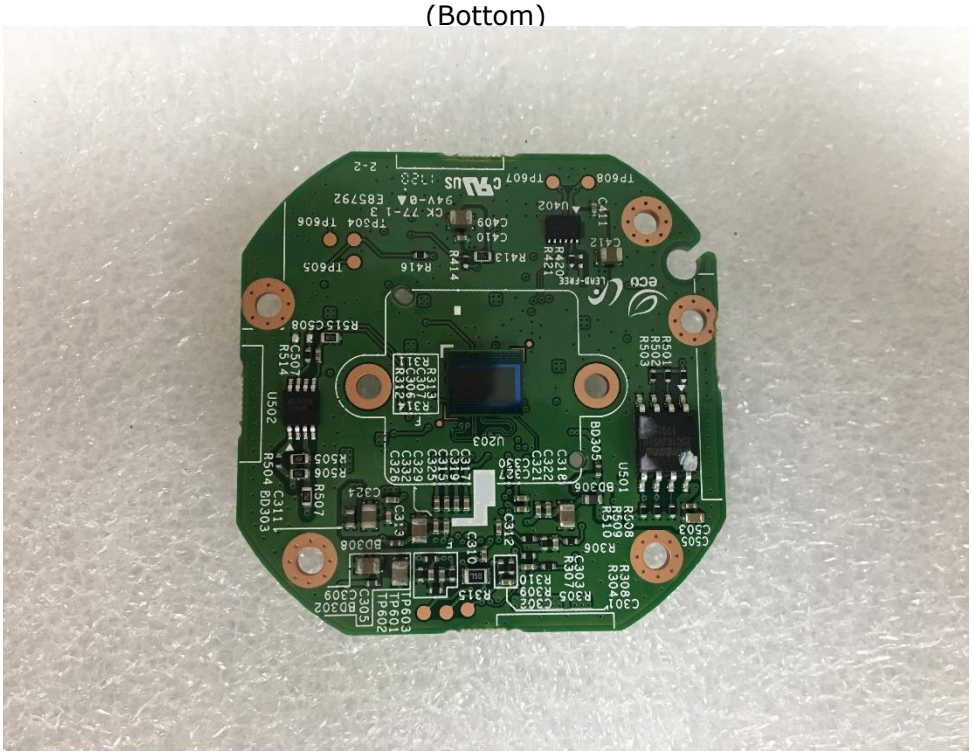
(Bottom)

EUT Internal View – Serve board

(Top)

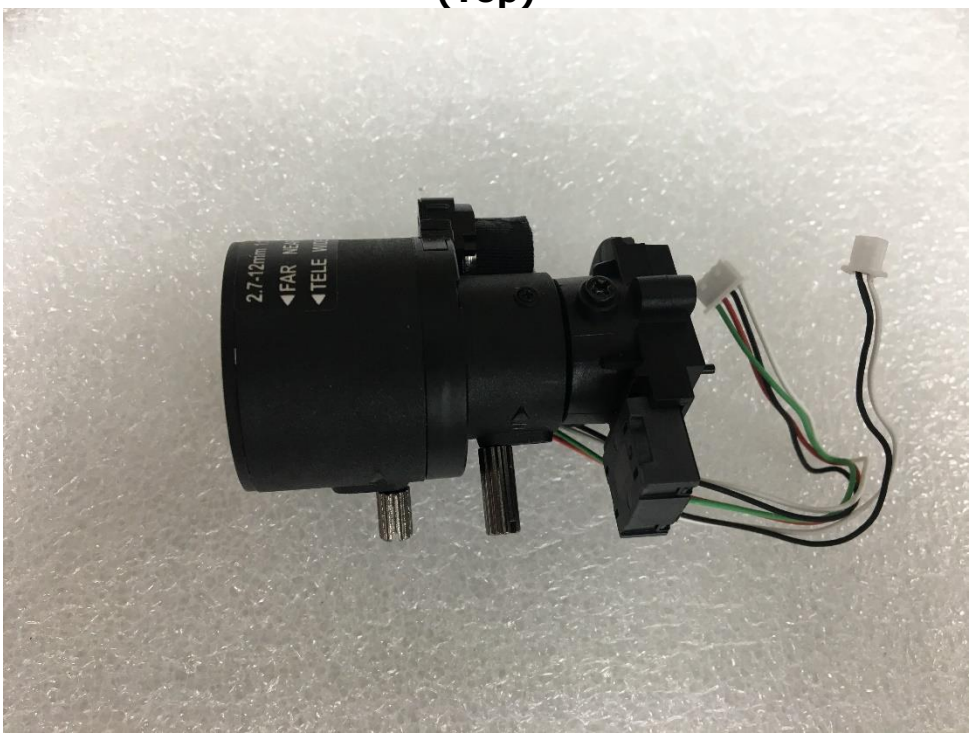


(Bottom)

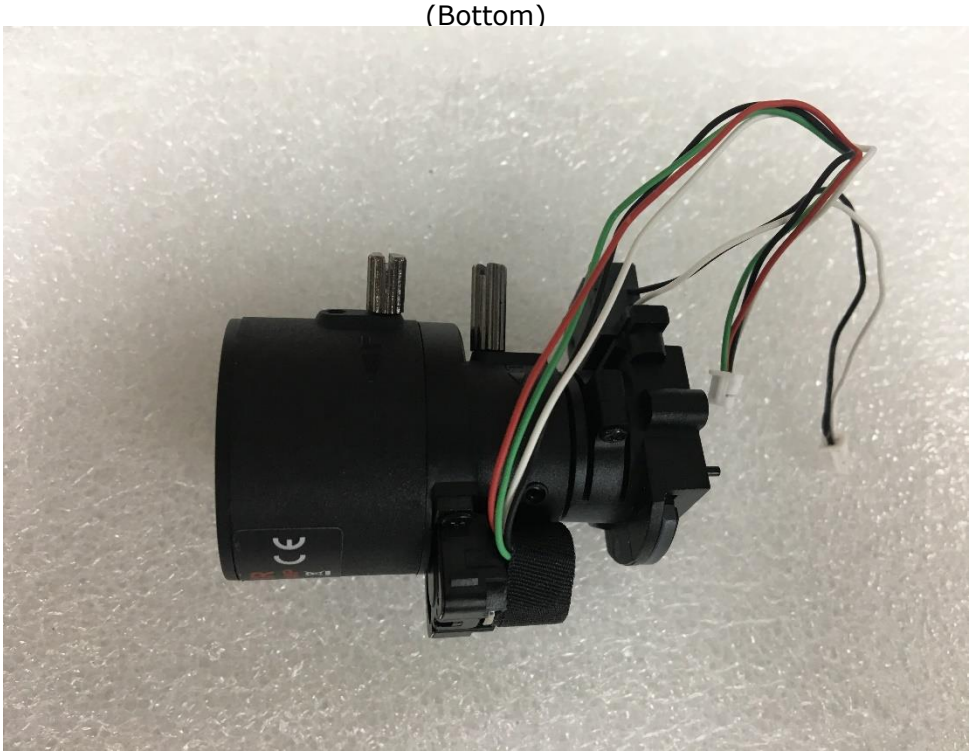


EUT Internal View – Lens

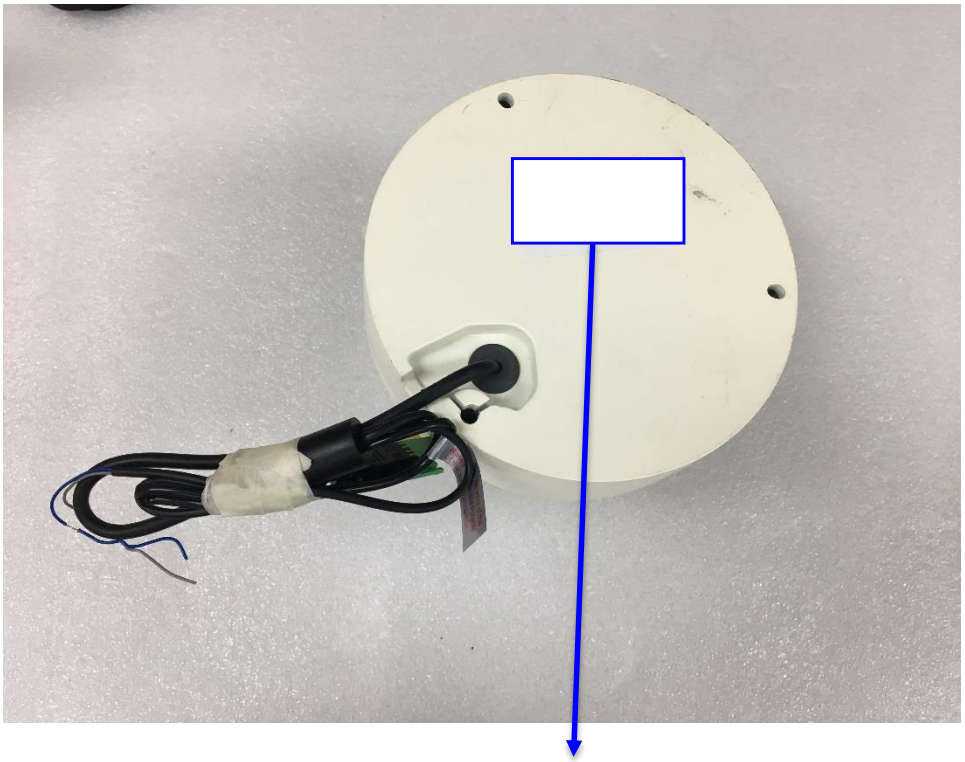
(Top)



(Bottom)



Label and Location



CCTV CAMERA

Model No : HCV-7070RP

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

Made in China

CE