



EMC TEST REPORT For IC

Test Report No. : KES-E1-17T0499-R2
Date of Issue : Feb. 24, 2023
Product name : CCTV CAMERA
Model/Type No. : HCB-6000
Variant Model : SCB-6005
Applicant : Hanwha Vision Co., Ltd
Applicant Address : 6, Pangyo-ro 319Beon-gil, Bundang-gu, Seongnam-si,
Gyeonggi-do, Republic of Korea
Manufacturer : 1. HANWHA VISION VIETNAM COMPANY LIMITED
2. D-TECH CO.,LTD.
Manufacturer Address : 1. Lot O-2, Que Vo Industrial Zone extended area,
Nam Son commune, Bac Ninh city, Bac Ninh province, Vietnam
2. 173-25, Saneop-ro, Gwonseon-gu, Suwon-si, Gyeonggi- do,
Korea (Suwon Industrial Complex)
Date of Receipt : Jul. 20, 2017
Test date : Jul. 27, 2017 ~ Jul. 28, 2017
Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Min Seong, Kim
EMC Test Engineer

Reviewed by

Dong-Hun, Jang
EMC Technical Manager

Tested by Young Suk, Song
(Retries person)
Proxy signature : Min Seong, Kim

This test report is not related to KS Q ISO/IEC 17025 and KOLAS.

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KES-E1-17T0499-R2

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REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Aug. 03, 2017	KES-E1-17T0499	Issued
Nov. 15, 2021	KES-E1-17T0499-R1	- Address/Manufacturer change at customer's request - IC Regulation ICES-003 Issue 7 Update ANSI C63.4-2014 or ANSI C63.4-2014 amended as per ANSI C63.4a-2017
Feb. 24, 2023	KES-E1-17T0499-R2	Change the Applicant and manufacturer at the request of the customer

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1.0 General Product Description

Main Specifications of EUT are:

Video	
Imaging Device	1/2.8" 2M CMOS
Total Pixels	1,945(H) x 1,109(V) 2.16M pixels
Effective Pixels	1,945(H) x 1,097(V) 2.13M pixels
Scanning System	Progressive Scan
Min. Illumination	Color : 0.15Lux (F1.2, 50IRE); 0.09Lux (F1.2, 30IRE) B/W : 0.015Lux (F1.2, 50IRE); 0.009Lux (F1.2, 30IRE)
S / N Ratio	52dB (AGC off, Weight on)
Video Output	BNC(AHD / TVI / CVI / CVBS Selectable)
Resolution	1920 x 1080
Max. Framerate	30fps @1080p 25fps @1080p
Lens Type	
Focal Length (Zoom Ratio)	-
Max. Aperture Ratio	-
Angular Field of View	-
Min. Object Distance	-
Focus Control	-
Lens Type	-
Mount Type	C/CS
Operational	
IR LED	-
Viewable length	-
On Screen Display	Multi-language Support(16) English, Japanese, Spanish, French, Portuguese, Korean, German, Italian, Russian, Polish, Czech, Romanian, Serbian, Swedish, Danish, Turkish
Camera Title	Off / On (Displayed 15 characters)

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Day & Night	Auto (ICR) / External / Color / B/W
Backlight Compensation	Off / User BLC / HLC
Wide Dynamic Range	120dB
Contrast Enhancement	-
Digital Noise Reduction	SSNR4 (Off / On)
Defog	AUTO / MANUAL / OFF
Digital Image Stabilization	Not support
Motion Detection	Off / On(4 zones)
Privacy Masking	Off / On (4zones rectangle)
Gain Control	Off / Low / Middle / High / Very High
White Balance	ATW / Outdoor / Indoor / Manual / AWC (1,800K° ~ 10,500K°)
LDC (Lens Distortion Correction)	Not support
Electronic Shutter Speed	1sec~ 1/12,000sec
Digital Zoom	Not support
Reverse	Off / H-Rev / V-Rev / HV-Rev
Profile	Basic, Day & Night, Backlight, ITS, Indoor, User
Intelligent Video Analytics	Not support
Alarm	(MD) output 1, External D/N 1
Remote control interface	Coaxial, RS-485
Protocol	Coax : Pelco-C(coaxitron), ACP(AHD Coax Protocol) RS-485 : Samsung T/E, Pelco D/P, Panasonic Bosch, Honeywell, Vicon, GE, AD
Video Transmission Distance	500m(5C2V Coaxial Cable)
Environmental	
Operating Temperature / Humidity	-10°C ~ +55°C (+14°F ~ +131°F) / Less than 90% RH
Ingress Protection	-
Vandal Resistance	-
Electrical	
Input Voltage/Current	Dual (24VAC±10% & 12VDC±10%)
Power Consumption	Max. 3.5W
Mechanical	
Color / Material	Ivory / Plastic
Dimension (WxHxD)	92.7*59.6*68.4
Weight	231g

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1.1 Test Voltage & Frequency

Unless indicated otherwise on the individual data sheet or test results, the test voltage and frequency was as indicated below.

Voltage ☐ 230 Vac ☐ 120 Vac ☒ 24 Vac ☒ 12 Vdc ☐ PoE
Frequency ☐ 50 Hz ☐ 60 Hz ☐ Hz

1.2 Variant Model Differences

Addition of derivative model for distribution route classification

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
CCTV CAMERA	HCB-6000	-	HANWHA VISION VIETNAM COMPANY LIMITED	EUT

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
MONITOR	M1962DL	010NDTC5Z497	LG Electronics Nanjing Display Co., Ltd.	-
Controller	SPC-1010	C50E67WG10100F	SamSung Techwin Co.,Ltd.	-
Controller Adaptor	RS-AB1000	-	Dongguan Jinhuasheng Power Technology Co.,Ltd.	-
LENS	AG3Z3112FCS- MPIR	-	computar	-



1.6 External I/O Cabling

- AC 24 V Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
CCTV CAMERA (E.U.T)	BNC	MONITOR	Component	3.0	S
	IRIS	LENS	IRIS	0.1	U
	2 Pin	Controller	2 Pin	3.0	U

- DC 12 V Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
CCTV CAMERA (E.U.T)	BNC	MONITOR	Component	3.0	S
	IRIS	LENS	IRIS	0.1	U
	2 Pin	Controller	2 Pin	3.0	U

* Unshielded = U, Shielded = S

1.7 EUT Operating Mode(s)

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

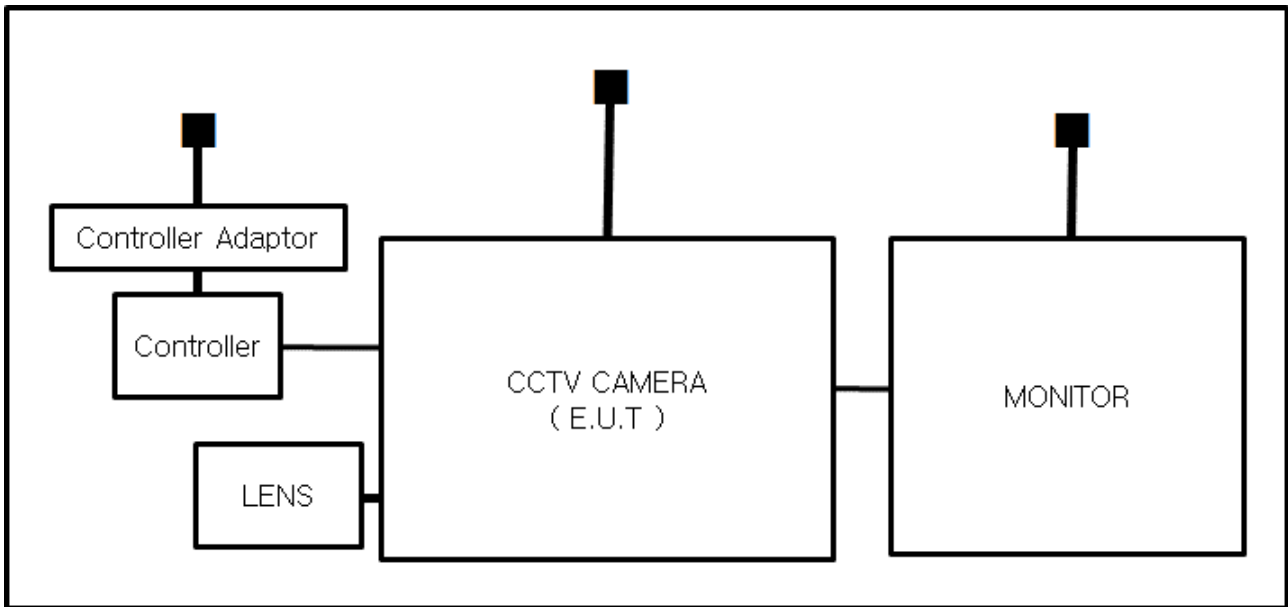
E.U.T Test operating S/W		
Name	Version	Manufacture Company
-	-	-

1.8 Configuration

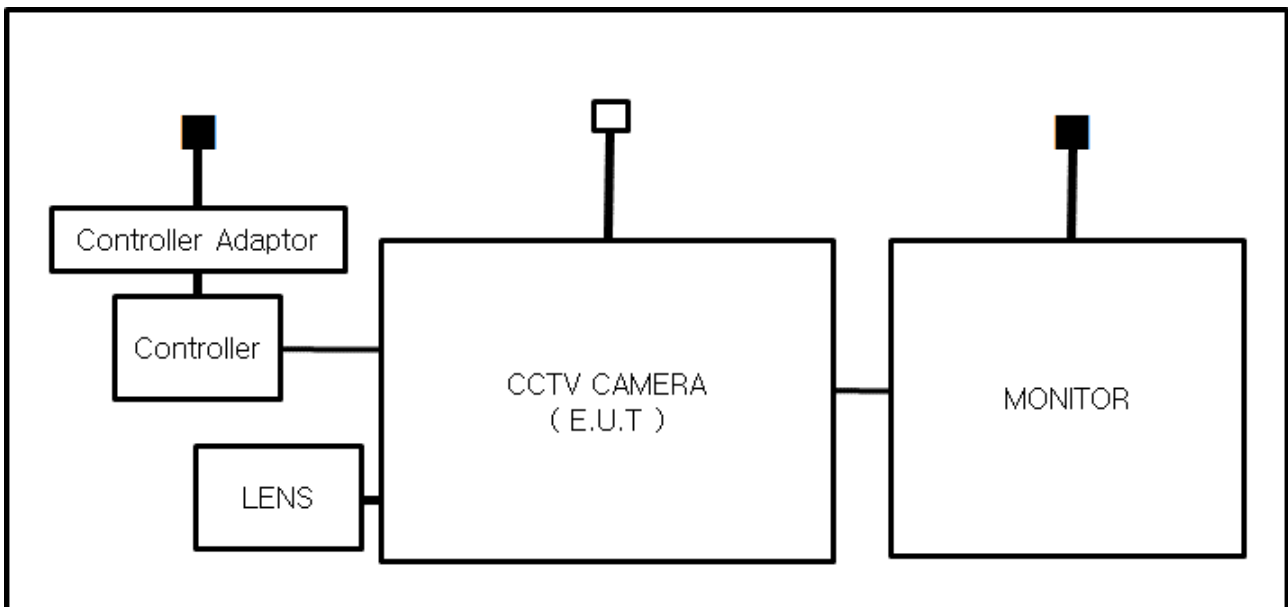
■ AC Main

□ DC Main

- AC 24 V Mode



- DC 12 V Mode



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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, Yeosu-si, Gyeonggi-do, 12658, Korea, Republic of. The sites are constructed in conformance with the requirements of ANSI C63.4a-2017 and CISPR 16-1-4:2019

1.12 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
KOREA	RRA	EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 KR0100
International	KOLAS	EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 KT489
USA	FCC	3 m & 10 m Semi-Anechoic Chamber Conducted test site to perform FCC Part 15/18 measurements.	 KR0100
Canada	ISED	3 m & 10 m Semi-Anechoic Chamber and Conducted test site	 23298
JAPAN	VCCI	EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site)	 C-20136, T-20137, R-20181, G-20176
Europe	TÜV SÜD	EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 CARAT 001633 0004



2.0 Test Regulations

The emissions tests were performed according to following regulations:

☒ **IC Regulation ICES-003 Issue 7**

☒ CAN/CSA-CISPR 32:17

☒ Class A

☐ Class B

☐ ANSI C63.4a-2017

☐ Class A

☐ Class B



2.1 Conducted Emissions Mains Power Ports

Test Date

Jul. 27, 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: 24,0 °C
Relative Humidity: 53,4 %

Frequency Range of Measurement

150 kHz to 30 MHz

Instrument Settings

IF Band Width: 9 kHz

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.



2.2 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Jul. 27, 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	-	-	-	-
☒	EMI TEST RECEIVER	ESVS10	R & S	826008/014	04, 18, 2018
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	714	11, 28, 2018

Test Conditions

Temperature: 28,7 °C

Relative Humidity: 55,0.%

Frequency Range of Measurement

30 MHz to 1 GHz

Instrument Settings

IF Band Width: 120 kHz

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.



2.3 Radiated Electric Field Emissions(Above 1 GHz)

Test Date

Jul. 28, 2017

Test Location

SEMI ANECHOIC CHAMBER #3

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	ESR7	R & S	101190	08, 08, 2017
☒	PREAMPLIFIER	8449B	AGILENT	3008A01967	05, 31, 2018
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	05, 02, 2019

Test Conditions

Temperature: 24,9 °C
Relative Humidity: 48,4 %

Frequency Range of Measurement

1 GHz to 6 GHz

Instrument Settings

IF Band Width: 1 MHz

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.

APPENDIX A – TEST DATA

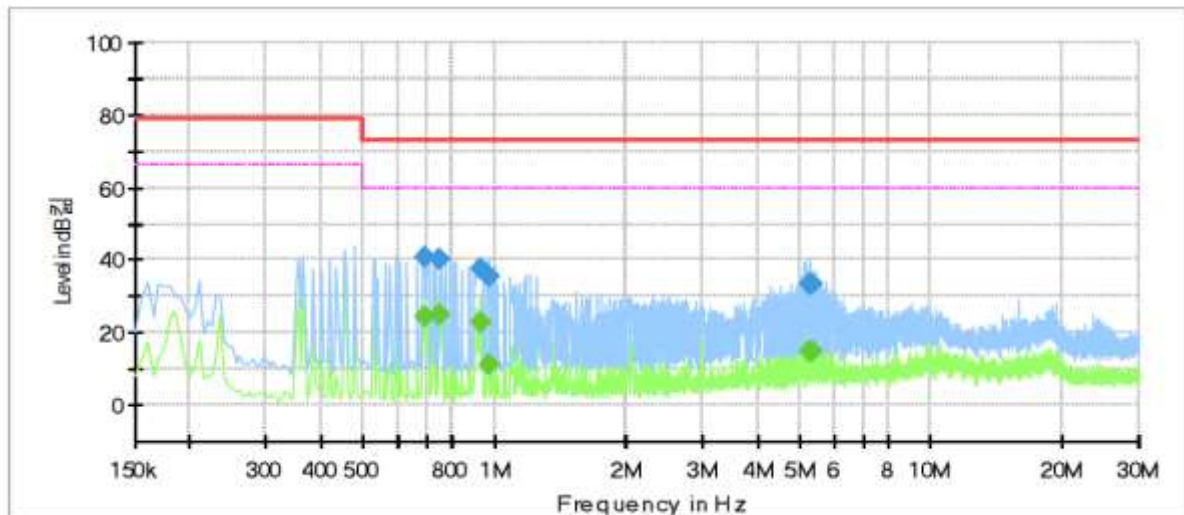
Conducted Emissions at Mains Power Ports

- AC 24 V Mode

[HOT]

Common Information

Test Description:	Conducted Emission
Model No.:	HCB-6000N
Mode	AC 24 V_H
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.690000	---	24.16	60.00	35.84	1000.0	9.000	L1	19.7
0.690000	40.57	---	73.00	32.43	1000.0	9.000	L1	19.7
0.745000	---	24.87	60.00	35.13	1000.0	9.000	L1	19.7
0.745000	40.09	---	73.00	32.91	1000.0	9.000	L1	19.7
0.925000	---	22.98	60.00	37.02	1000.0	9.000	L1	19.8
0.925000	37.38	---	73.00	35.62	1000.0	9.000	L1	19.8
0.970000	---	11.18	60.00	48.82	1000.0	9.000	L1	19.8
0.970000	35.62	---	73.00	37.38	1000.0	9.000	L1	19.8
5.295000	---	14.81	60.00	45.19	1000.0	9.000	L1	19.9
5.295000	33.53	---	73.00	39.47	1000.0	9.000	L1	19.9
5.350000	---	14.88	60.00	45.12	1000.0	9.000	L1	19.9
5.350000	33.55	---	73.00	39.45	1000.0	9.000	L1	19.9

Calculation

QuasiPeak[dBuV] / CAverage [dBuV] = Reading Value[dBuV] + Corr. [dB]

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

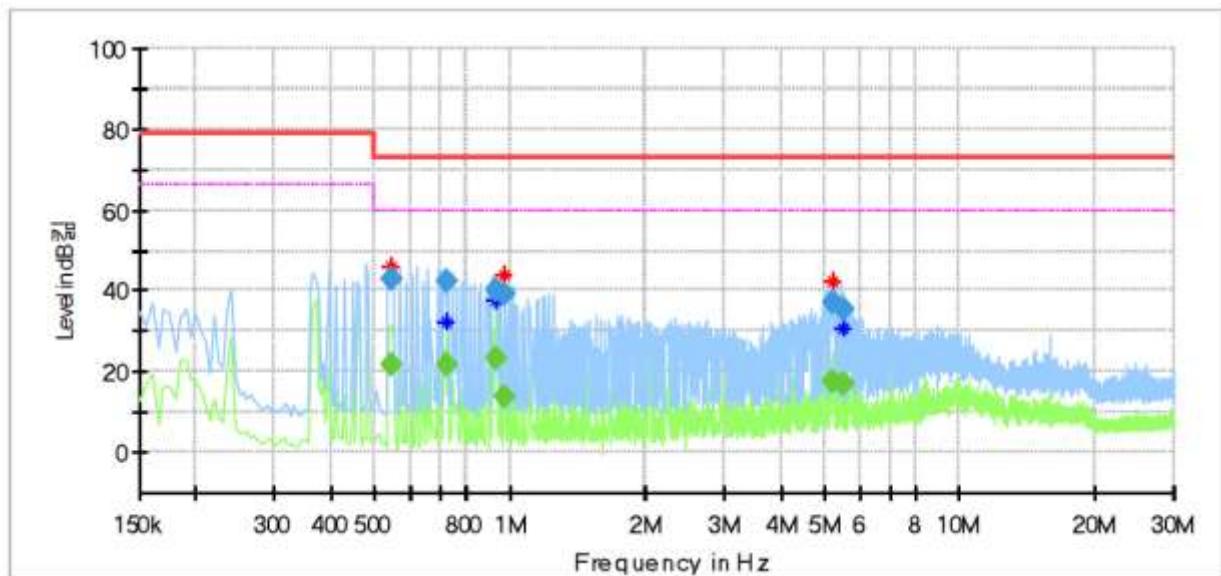
Corr. : Correction values (LISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

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[NEUTRAL]

Common Information

Test Description: Conducted Emission
 Model No.: HCB-6000N
 Mode: AC 24 V_N
 Operator Name: KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.545000	---	21.77	60.00	38.23	1000.0	9.000	N	19.6
0.545000	42.66	---	73.00	30.34	1000.0	9.000	N	19.6
0.725000	---	21.78	60.00	38.22	1000.0	9.000	N	19.7
0.725000	42.43	---	73.00	30.57	1000.0	9.000	N	19.7
0.930000	---	23.18	60.00	36.82	1000.0	9.000	N	19.8
0.930000	40.25	---	73.00	32.75	1000.0	9.000	N	19.8
0.975000	---	13.83	60.00	46.17	1000.0	9.000	N	19.8
0.975000	39.12	---	73.00	33.88	1000.0	9.000	N	19.8
5.200000	---	17.57	60.00	42.43	1000.0	9.000	N	19.9
5.200000	36.83	---	73.00	36.17	1000.0	9.000	N	19.9
5.530000	---	17.15	60.00	42.85	1000.0	9.000	N	19.8
5.530000	35.40	---	73.00	37.60	1000.0	9.000	N	19.8

◆ Calculation

QuasiPeak [dBμV] / CAverage [dBμV] = Reading Value [dBμV] + Corr. [dB]

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

Corr. : Correction values (LISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

- DC 12 V Mode

[HOT]

Common Information

Test Description:

Model No.:

Mode

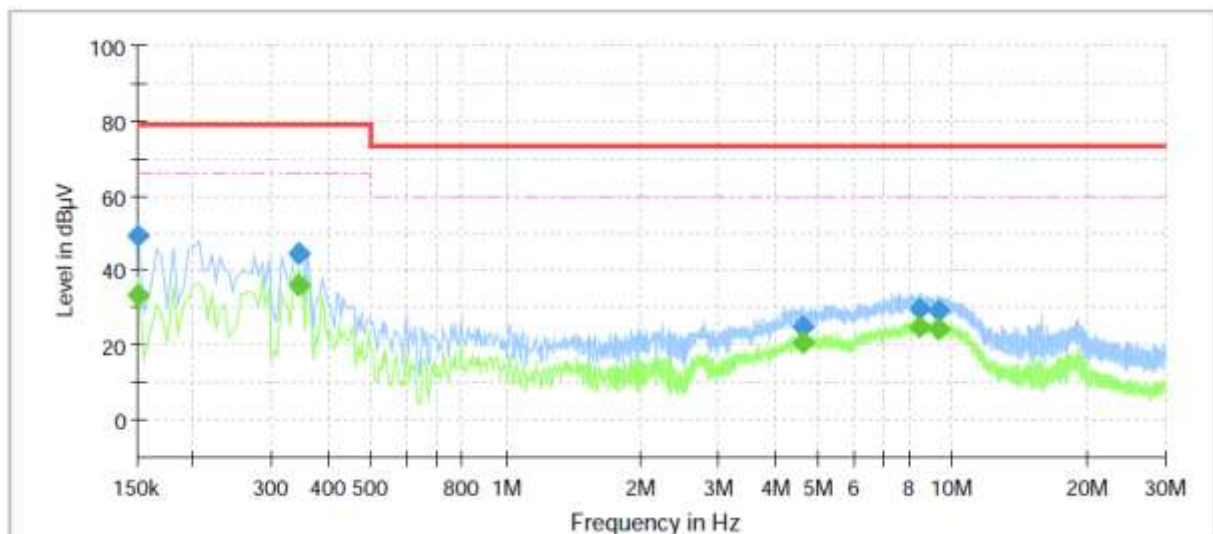
Operator Name:

Conducted Emission

HCB-6000

AC / DC Adaptor_H

KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.150000	---	33.54	66.00	32.46	1000.0	9.000	L1	19.4
0.150000	49.30	---	79.00	29.70	1000.0	9.000	L1	19.4
0.345000	---	35.96	66.00	30.04	1000.0	9.000	L1	19.5
0.345000	44.38	---	79.00	34.62	1000.0	9.000	L1	19.5
4.610000	---	20.47	60.00	39.53	1000.0	9.000	L1	19.9
4.610000	25.16	---	73.00	47.84	1000.0	9.000	L1	19.9
8.455000	---	24.70	60.00	35.30	1000.0	9.000	L1	19.7
8.455000	29.41	---	73.00	43.59	1000.0	9.000	L1	19.7
9.345000	---	24.33	60.00	35.67	1000.0	9.000	L1	19.7
9.345000	29.02	---	73.00	43.98	1000.0	9.000	L1	19.7

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))

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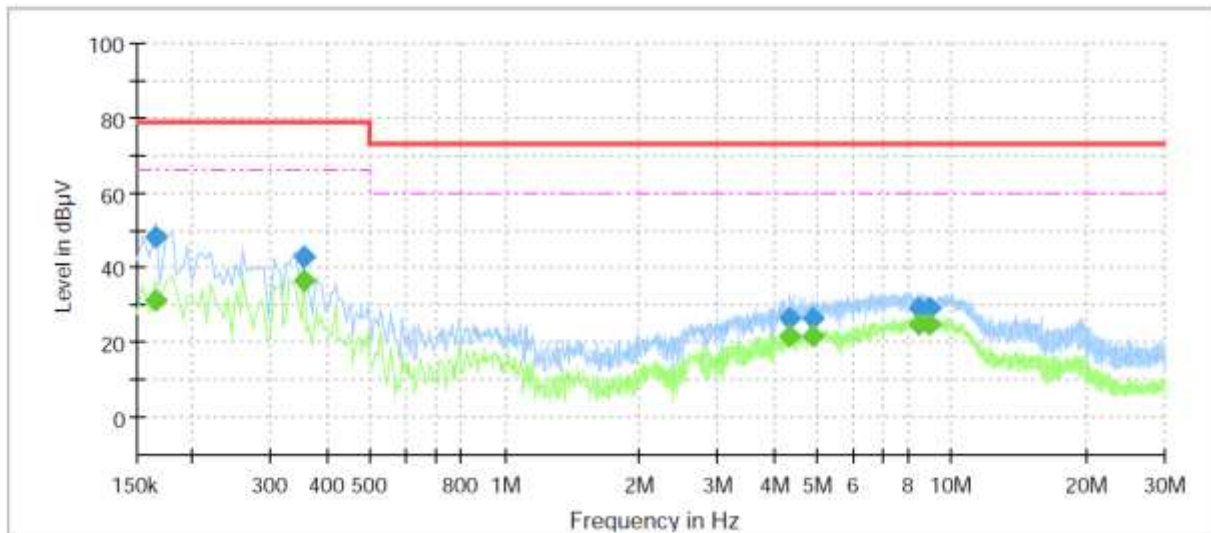
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[NEUTRAL]

Common Information

Test Description:	Conducted Emission
Model No.:	HCB-6000
Mode	AC / DC Adaptor_N
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.165000	---	31.07	66.00	34.93	1000.0	9.000	N	19.4
0.165000	48.01	---	79.00	30.99	1000.0	9.000	N	19.4
0.355000	---	36.51	66.00	29.49	1000.0	9.000	N	19.5
0.355000	42.92	---	79.00	36.08	1000.0	9.000	N	19.5
4.355000	---	21.47	60.00	38.53	1000.0	9.000	N	19.9
4.355000	26.35	---	73.00	46.65	1000.0	9.000	N	19.9
4.870000	---	21.84	60.00	38.16	1000.0	9.000	N	19.9
4.870000	26.72	---	73.00	46.28	1000.0	9.000	N	19.9
8.465000	---	24.94	60.00	35.06	1000.0	9.000	N	19.7
8.465000	29.29	---	73.00	43.71	1000.0	9.000	N	19.7
8.950000	---	24.83	60.00	35.17	1000.0	9.000	N	19.7
8.950000	29.10	---	73.00	43.90	1000.0	9.000	N	19.7

◆ 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))



Radiated Electric Field Emissions(Below 1 GHz)

- AC 24 V Mode

Frequency	Amplitude	ANT	ANT. Height	Correction Factor		Corrected Amplitude	Applicable Limit	Margin
[MHz]	[dB μ V]	Polar. (H/V)	[m]	ANT. [dB/m]	Cable [dB]	[dB μ V/m]	[dB μ V/m]	[dB]
30.03	12.30	V	1.02	9.21	1.33	22.84	40.00	17.16
167.65	8.70	H	3.98	8.60	3.65	20.95	40.00	19.05
212.37	11.40	V	1.00	11.98	4.15	27.53	40.00	12.47
301.44	15.00	V	1.01	13.45	5.03	33.48	47.00	13.52
320.53	9.90	H	3.99	13.87	5.23	29.00	47.00	18.00
940.82	9.20	H	4.00	23.70	10.11	43.01	47.00	3.99

* H : Horizontal, V : Vertical

◆ Calculation

Corrected Amplitude [dB μ V] = Amplitude[dBuV] + Correction Factor [dB]

Corrected Amplitude : The Final Value, Amplitude : Reading Value,

Correction Factor : ANT FACTOR + Cable loss

- DC 12 V Mode

Frequency	Amplitude	ANT	ANT. Height	Correction Factor		Corrected Amplitude	Applicable Limit	Margin
[MHz]	[dB μ V]	Polar. (H/V)	[m]	ANT. [dB/m]	Cable [dB]	[dB μ V/m]	[dB μ V/m]	[dB]
31.82	22.80	V	1.00	9.47	1.39	33.66	40.00	6.34
148.62	17.80	V	1.01	7.84	3.41	29.05	40.00	10.95
191.36	8.20	H	3.99	10.69	3.90	22.79	40.00	17.21
301.81	16.90	V	1.02	13.46	5.03	35.39	47.00	11.61
320.96	10.30	H	3.98	13.88	5.24	29.42	47.00	17.58
940.03	9.50	H	4.00	23.68	10.11	43.29	47.00	3.71

* H : Horizontal, V : Vertical

◆ Calculation

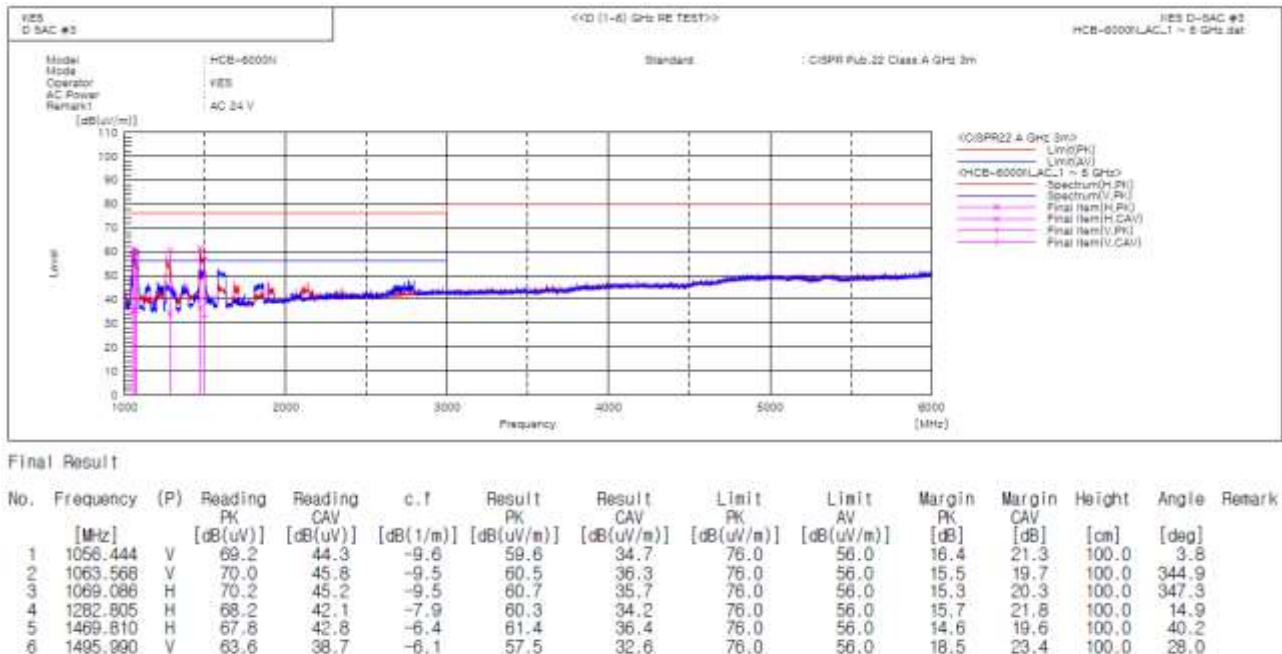
Corrected Amplitude [dB μ V] = Amplitude[dBuV] + Correction Factor [dB]

Corrected Amplitude : The Final Value, Amplitude : Reading Value,

Correction Factor : ANT FACTOR + Cable loss

Radiated Electric Field Emissions(Above 1 GHz)

- AC 24 V Mode



◆ Calculation

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

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

Reading(PK/CAV) : Reading value, Result(PK/CAV) : Reading value + Factor value

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



KES Co., Ltd.

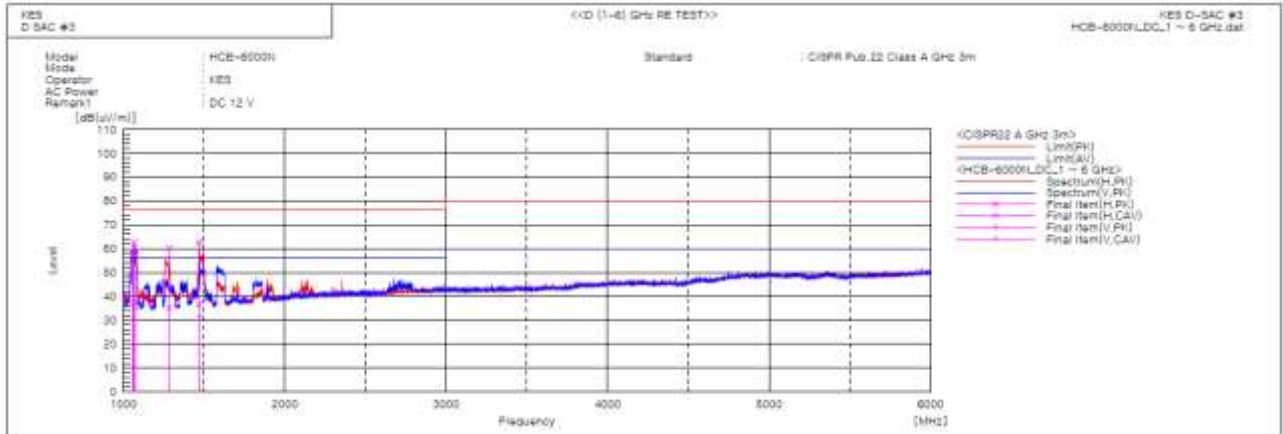
3701, 40, Simin-daero 365beon-gil,
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- DC 12 V Mode



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(μV)]	Reading CAV [dB(μV)]	c.f [dB(1/m)]	Result PK [dB(μV/m)]	Result CAV [dB(μV/m)]	Limit PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Margin PK [dB]	Margin CAV [dB]	Height [cm]	Angle [deg]	Remark
1	1062.333	V	69.5	45.9	-9.5	60.0	36.4	76.0	56.0	16.0	19.6	100.0	344.1	
2	1068.666	H	72.1	46.7	-9.5	62.6	37.2	76.0	56.0	13.4	18.8	100.0	353.2	
3	1076.765	V	69.3	44.3	-9.4	59.9	34.9	76.0	56.0	16.1	21.1	100.0	355.7	
4	1282.580	H	68.2	42.9	-7.9	60.3	35.0	76.0	56.0	15.7	21.0	100.0	54.7	
5	1470.100	H	69.0	43.1	-6.4	62.6	36.7	76.0	56.0	13.4	19.3	100.0	338.5	
6	1472.885	V	60.4	38.1	-6.4	54.0	31.7	76.0	56.0	22.0	24.3	100.0	331.1	

◆ Calculation

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

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

Reading(PK/CAV) : Reading value, Result(PK/CAV) : Reading value + Factor value

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

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Test Setup Photos and Configuration

Conducted Voltage Emissions



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Radiated Electric Field Emissions(Below 1 GHz)



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Radiated Electric Field Emissions(Above 1 GHz)



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EUT External Photographs

(Top)



(Bottom)



EUT Internal Photographs

(Internal View)

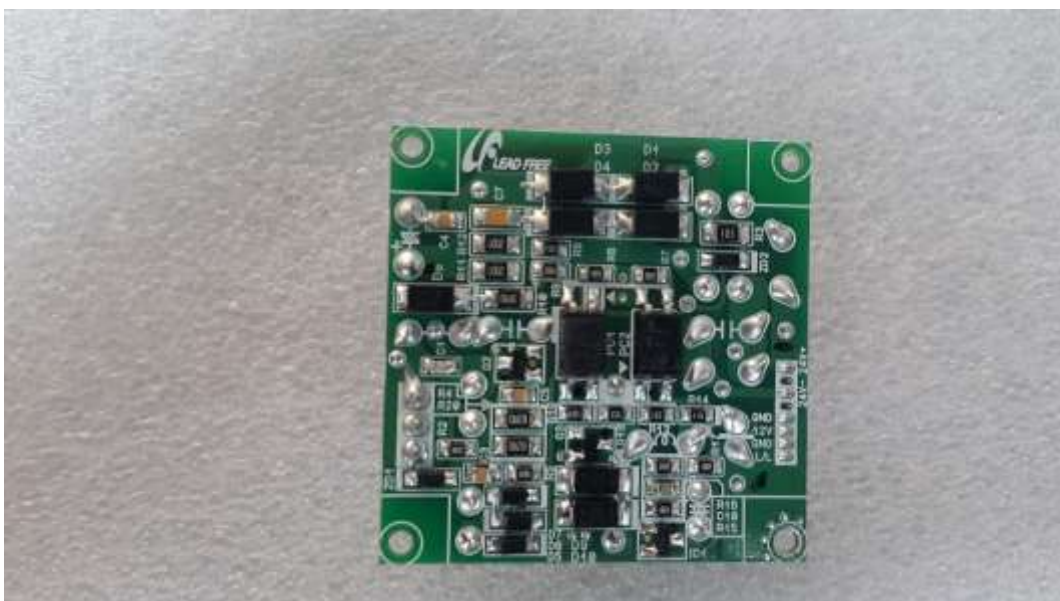


EUT Internal View – board

(Top)



(Bottom)



EUT Internal View – Port board

(Top)

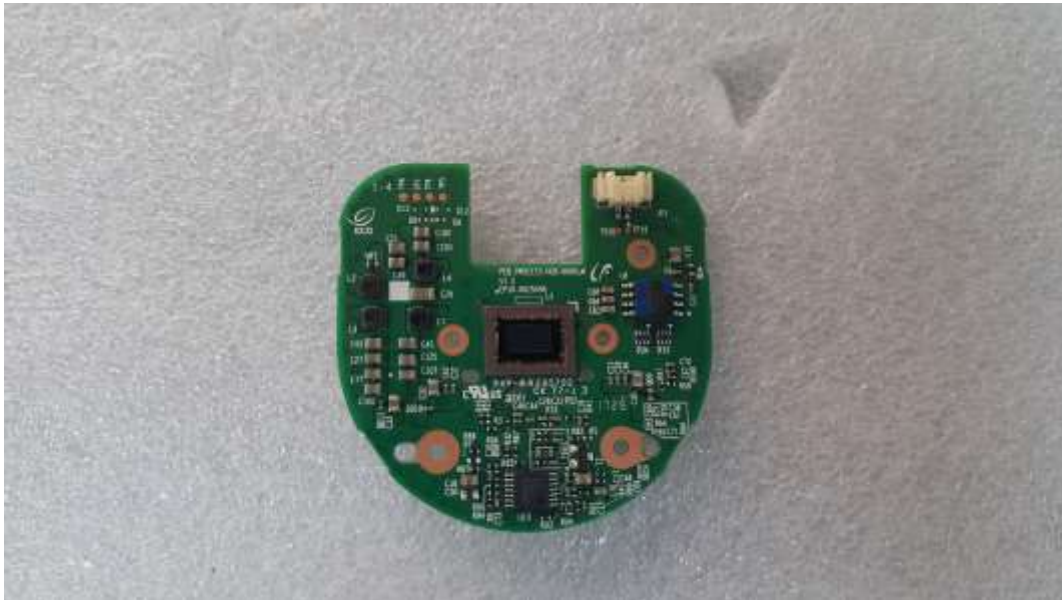


(Bottom)



EUT Internal View – Lens board

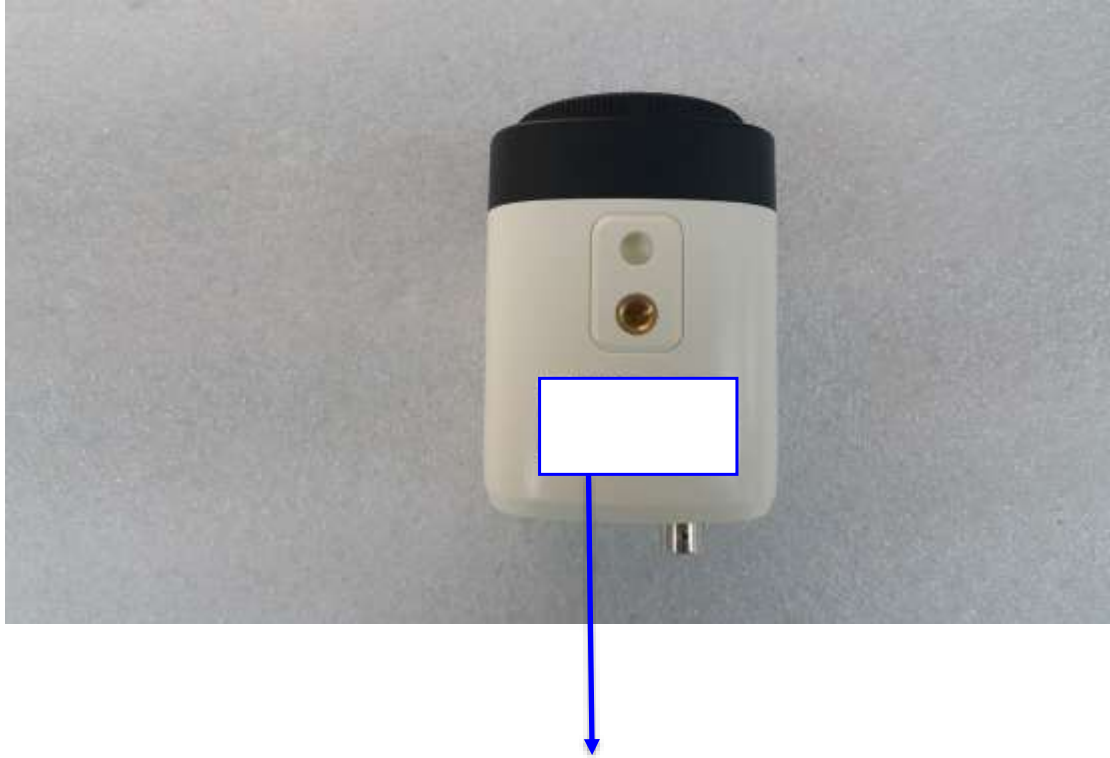
(Top)



(Bottom)



Label Photographs



CAN ICES-3 (A)/NMB-3(A)

[LABEL VIEW]