



## EMC TEST REPORT For CE

Test Report No. : KES-E1-15T0119-R1  
Date of Issue : Jul, 11, 2019  
Product name : NETWORK CAMERA  
Model/Type No. : SBP-301HF  
Variant Model : -  
Applicant : Hanwha Techwin Co., Ltd.  
Applicant Address : 6, Pangyo-ro 319 Beon-gil, Bundang-gu, Seongnam-si,  
Gyeonggi-do, 13488, KOREA  
Manufacturer : 1. Hanwha Techwin (Tianjin) Co.,Ltd.  
2. HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.  
3. D-TECH CO.,LTD.  
Manufacturer Address : 1. No.11 Weiliu Rd, Micro-Electronic Industrial Park, TEDA, Tianjin,  
300385, People's Republic of China  
2. Lot O-2, Que Vo Industrial Zone extended area,  
Nam Son commune, Bac Ninh city, Bac Ninh province, Vietnam  
3. 173-25, Saneop-ro, Gwonseon-gu, Suwon-si, Gyeonggi-do,  
Korea (Suwon Industrial Complex)  
Date of Receipt : Feb. 11, 2019  
Test date : Apr. 10, 2015 ~ Apr. 13, 2015  
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 KS Q ISO/IEC 17025 and KOLAS.

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.  
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.  
The authenticity of the test report, contact shchoi@kes.co.kr



## KES Co., Ltd.

3701, 40, Simin-daero 365beon-gil,  
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea  
Tel: +82-31-425-6200 / Fax: +82-31-424-0450  
www.kes.co.kr

Report No.:

KES-E1-15T0119-R1

Page (2) of (62)

### REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Apr. 17, 2015	KES-E1-15T0119	Issued
Jul, 11, 2019	KES-E1-15T0119-R1	Changed Applicant name/address, model name, factory change/addition and application standard due to customer request.

***This report shall not be reproduced except in full, without the written approval of KES Co., Ltd. This document may be altered or revised by KES Co., Ltd. personnel only, and shall be noted in the revision section of the document. Any alteration of this document not carried out by KES Co., Ltd. will constitute fraud and shall nullify the document.***

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.  
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.  
The authenticity of the test report, contact shchoi@kes.co.kr



## TABLE OF CONTENTS

1.0	General Product Description .....	4
1.1	Test Voltage & Frequency .....	5
1.2	Variant Model Differences.....	5
1.3	Device Modifications .....	5
1.4	Equipment Under Test.....	5
1.5	Support Equipments .....	5
1.6	External I/O Cabling .....	6
1.7	EUT Operating Mode(s) .....	6
1.8	Configuration.....	7
1.9	Remarks when standards applied .....	8
1.10	Calibration Details of Equipment Used for Measurement.....	8
1.11	Test Facility .....	8
1.12	Laboratory Accreditations and Listings .....	8
2.0	Test Regulations.....	9
2.1	Conducted Emissions at Mains Power Ports.....	11
2.2	Conducted Emissions at Telecommunication Ports .....	12
2.3	Radiated Electric Field Emissions(Below 1 GHz) .....	13
2.4	Radiated Electric Field Emissions(Above 1 GHz).....	14
2.5	Harmonic Current Emissions.....	15
2.6	Voltage Fluctuations and Flicker .....	16
3.0	Criteria for compliance .....	17
3.1	Electrostatic Discharge.....	19
3.2	Radiated Electric Field Immunity .....	22
3.3	Electrical Fast Transients/Bursts .....	24
3.4	Surge Transients .....	26
3.5	Conducted Disturbance .....	29
3.6	Voltage Dips and Short Interruptions .....	31
APPENDIX A – TEST DATA.....		33
Conducted Emissions at Mains Power Ports.....		33
Conducted Emissions at Telecommunication Ports .....		35
Radiated Electric Field Emissions(Below 1 GHz) .....		37
Radiated Electric Field Emissions(Above 1 GHz).....		38
Harmonic Current Emissions and Voltage Fluctuations and Flicker .....		42
Test Setup Photos and Configuration .....		45
Conducted Voltage Emissions .....		45
Conducted Telecommunication Emissions .....		46
Radiated Electric Field Emissions(Below 1 GHz) .....		47
Radiated Electric Field Emissions(Above 1 GHz).....		48
Harmonic Current Emissions and Voltage Fluctuations and Flicker .....		49
Electrostatic Discharge .....		50
Radiated Electric Field Immunity .....		50
Electrical Fast Transients/Bursts .....		51
Surge Transients .....		51
Conducted Disturbance.....		52
Voltage Dips and Short Interruptions .....		52
EUT External Photographs .....		53
EUT Internal Photographs .....		54



## KES Co., Ltd.

3701, 40, Simin-daero 365beon-gil,  
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea  
Tel: +82-31-425-6200 / Fax: +82-31-424-0450  
www.kes.co.kr

Report No.:

KES-E1-15T0119-R1

Page (4) of (62)

## 1.0 General Product Description

### Main Specifications of EUT are:

Compatible Model	
Camera List	SNP-6321H/5321H
External Connection	
Alarm I/O	Input 4ea / Output 2ea
Remote Control Interface	RS-485/422
Audio	Input/Output, 3.5mm type
CVBS	BNC Type, For Installation
Power Line	24V AC, 2-wire
Optical Characteristics	
Support SFP Voltage	3.3V Typical
Support SFP Current	300mA Max.
Support SFP Cage	Standard mini-SFP Cage(for 6.5mm pitch SFP)
Support SFP Port Type	LC Type
Required SFP Speed	1250Mbps(For 1000Mbps Ethernet) 155Mbps(For 100Mbps Ethernet)
Required SFP's BER(Bit Error Rate)	Max $10^{-12}$
Transmission Method(Optical)	Mode Depends on SFP Module
Optical Mode(Long/Short Wave)	Mode Depends on SFP Module
Cable Insertion Loss(dB)	Mode Depends on SFP Module
Network Characteristics	
RJ-45 : Ethernet Speed	100Mbps
RJ-45 : Ethernet Physical Layer	100 Base-T
RJ-45 : Ethernet Standard	IEEE 802.3u Support
Speed Transition(100↔1000Mbps)	External Dip Switch
Fiber : Default Speed	1000Mbps
Fiber : Ethernet Speed	100Mbps, 1000Mbps
Fiber : Ethernet Physical Layer	100 Base-FX, 1000 Base-X
Fiber : Ethernet Standard	IEEE 802.3u, IEEE 802.3z Support
Environmental	
Operating Temperature / Humidity	-50°C to +55°C Less than 90% RH, TBD
Ingress Protection	IP66
Electrical	
Power Consumption	TBD
Input Voltage / Current	24V AC
Mechanical	
Color / Material	Aluminum
Dimension (WxHxD)	Ø178 x 53mm TBD
Weight	500g TBD

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.  
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.  
The authenticity of the test report, contact shchoi@kes.co.kr



## 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
NETWORK CAMERA	SBP-301HFN	-	Hanwha Techwin (Tianjin) Co.,Ltd.	EUT
SD Card	-	-	SanDisk	-
Optical Module	SFP-LX	-	SOLTECH	-

## 1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
Notebook	NT63025JNT63025J	JK9091EF400142M	SAMSUNG	-
Adapter	A13-040N2A	CN60BA4400313AD0N843KO200	Chicony Power Technology (suzhou) Co.,Ltd.	-
Optical converter	SFC-200MF	-	SOLTECH	-
Adapter	GA0520A-1	-	Wendeng Any Electronics Co.,Ltd.	-
Optical module	SFP-LX	-	SOLTECH	-
Headset	RHS-2000	-	ROYCHE Corporation Ltd.	-



## 1.6 External I/O Cabling

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
NETWORK CAMERA	Audio In	Headset	Audio Out	1.8	U
	Audio Out	POE Switch	Audio In	1.8	U
	Optical	Optical converter	Optical	2.8	U
Optical converter	RJ-45	Notebook	RJ-45	0.8	U

\* Unshielded=U, Shielded=S

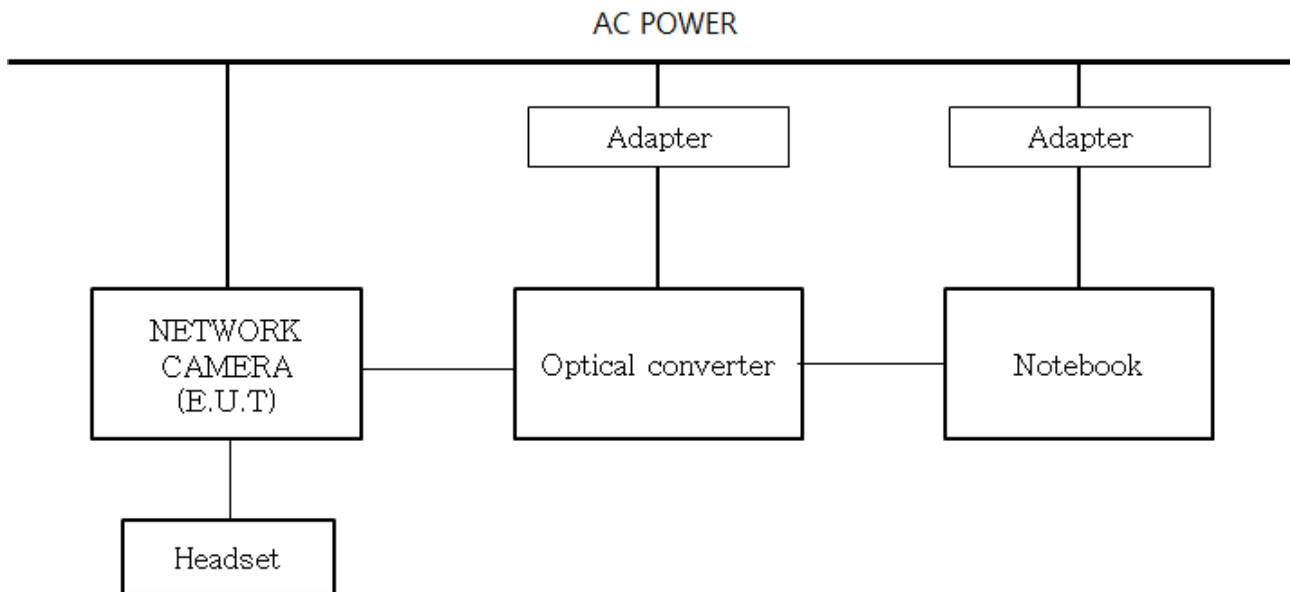
## 1.7 EUT Operating Mode(s)

Test Mode	operating
DC 24 V	EUT Monitoring

EUT Test operating S/W		
Name	Version	Manufacture Company
-	-	-

## 1.8 Configuration

■ AC Main  
□ DC Main



## 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. The sites are constructed in conformance with the requirements of ANSI C63.4:2014 and CISPR 16-1-4:2012

## 1.12 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
KOREA	RRA	EMI (3 m & 10 m Semi-Aechoic Chamber , 10 m Open Area and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 KR0100
International	KOLAS	EMI (3 m & 10 m Semi-Aechoic Chamber , and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 KT489
USA	FCC	3 m & 10 m Semi-Aechoic Chamber, 10 m Open Area and Conducted test site to perform FCC Part 15/18 measurements.	 KR0100
Canada	ISED	3 m & 10 m Semi-Aechoic Chamber and Conducted test site	 23298-1
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-20056, C-20036 T-20040, G-20057
Europe	TÜV SÜD	EMI (3 m & 10 m Semi-Aechoic Chamber , 10 m Open Area and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 CARAT 001633 0003



## 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/AC:2013

☒ Class A

☐ Class B

☐ EN 55024:2010 +A1:2015

☒ EN 50130-4:2011+A1:2014

☐ EN 61000-3-2:2014

☒ EN 61000-3-3:2013

☐ EN 61326-1:2013



**KES Co., Ltd.**

3701, 40, Simin-daero 365beon-gil,  
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea  
Tel: +82-31-425-6200 / Fax: +82-31-424-0450  
www.kes.co.kr

Report No.:  
KES-EI-15T0119-R1  
Page (10) of (62)

- 
- |   |                                  |                                  |
|---|----------------------------------|----------------------------------|
| <input type="checkbox"/> <b>VCCI-CISPR 32:2016</b>            | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> <b>AS/NZS CISPR32:2015</b>           | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> <b>47 CFR Part 15, Subpart B</b>     |                                  |                                  |
| <input type="checkbox"/> CISPR 22:2009 +A1:2010               | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> ANSI C63.4-2014                      |                                  |                                  |
| <input type="checkbox"/> <b>IC Regulation ICES-003 : 2016</b> |                                  |                                  |
| <input type="checkbox"/> CAN/CSA CISPR 22-10                  | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> ANSI C63.4-2014                      |                                  |                                  |
| <br><input type="checkbox"/> <b>RE- Directive 2014/53/EU</b>  |                                  |                                  |
| <br><input type="checkbox"/> EN 301 489-1 V1.9.2              |                                  |                                  |
| <input type="checkbox"/> Equipment for fixed use              |                                  |                                  |
| <input type="checkbox"/> Equipment for vehicular use          |                                  |                                  |
| <input type="checkbox"/> Equipment for portable use           |                                  |                                  |
| <br><input type="checkbox"/> EN 301 489-3 V1.6.1              |                                  |                                  |
| <br><input type="checkbox"/> EN 301 489-17 V2.2.1             |                                  |                                  |
| <br><input type="checkbox"/> EN 60945:2002                    |                                  |                                  |

---

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.  
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.  
The authenticity of the test report, contact shchoi@kes.co.kr



## 2.1 Conducted Emissions at Mains Power Ports

### Test Date

Apr. 11. 2015

### Test Location

Electro wave Shieldroom

### Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMI Receiver/Signal Analyzer	Narda S.T.S / PMM	PMM 9010F	020WW31006	04. 01. 2016
<input checked="" type="checkbox"/>	LISN	R&S	ENV216	101137	02. 10. 2016
<input checked="" type="checkbox"/>	LISN	EMCO	3810/2	2228	-
<input type="checkbox"/>	8-Wire ISN CAT3	Schwarzbeck Mess	CAT3 8158	8158-0019	04. 02. 2016
<input type="checkbox"/>	8-Wire ISN CAT5	Schwarzbeck Mess	NTFM 8158	8158-0030	04. 02. 2016
<input type="checkbox"/>	8-Wire ISN CAT6	Schwarzbeck Mess	NTFM 8158	8158-0029	08. 15. 2015

### Test Conditions

Temperature: 21.0 °C  
Relative Humidity: 34.2 % R.H.

### 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

N/A



## 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
<input type="checkbox"/>	EMI Test S/W	EMC32	R & S	9.12.00	-
<input type="checkbox"/>	EMI TEST RECEIVER	ESR3	R & S	101781	04, 25, 2019
<input type="checkbox"/>	LISN	ENV216	R & S	101787	01, 04, 2020
<input type="checkbox"/>	LISN	ESH2-Z5	R & S	100450	04, 25, 2019
<input type="checkbox"/>	PULSE LIMITER	ESH3-Z2	R & S	101915	11, 26, 2019
<input type="checkbox"/>	8-WIRE ISN CAT3,5	ENY81	R & S	100174	01, 07, 2020
<input type="checkbox"/>	8-WIRE ISN CAT6	ENY81-CAT6	R & S	101665	01, 07, 2020

### Test Conditions

Temperature: °C  
Relative Humidity: % R.H.

### 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

N/A



## 2.3 Radiated Electric Field Emissions(Below 1 GHz)

### Test Date

Apr. 13, 2015

### Test Location

☒ OPEN AREA TEST SITE #2 ☐ SEMI ANECHOIC CHAMBER #4(10m)

### Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMI TEST Receiver	R & S	ESVS10	826008/014	04. 01. 2016
<input checked="" type="checkbox"/>	Trilog-Broadband Antenna	SCHWARZBECK	VULB 9168	9168-385	05. 09. 2015
<input checked="" type="checkbox"/>	Antenna Mast	DAEIL EMC	-	-	-
<input checked="" type="checkbox"/>	Turn Table	DAEIL EMC	-	-	-

### Test Conditions

Temperature: 14.0 °C  
Relative Humidity: 43.0 % R.H.

### Frequency Range of Measurement

30 MHz to 1 GHz

### Instrument Settings

IF Band Width: 120 kHz

### Test Results

The requirements are:

- ☒ PASS  
☐ NOT PASS  
☐ NOT APPLICABLE

### Remarks

See Appendix A for test data.



## 2.4 Radiated Electric Field Emissions(Above 1 GHz)

### Test Date

Apr. 13, 2015

### Test Location

RS Chamber (EMI 18GHz)

### Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMI TEST Receiver	R & S	ESR7	101190	08. 13. 2015
<input checked="" type="checkbox"/>	PREAMPLIFIER	8449B	H.P	3008A00538	07. 23. 2015
<input checked="" type="checkbox"/>	Double Ridged Horn Antenna	A-H-SYSTEM,INC	SAS-571	414	02. 09. 2017
<input checked="" type="checkbox"/>	Antenna Mast	AUDIX	-	-	-
<input checked="" type="checkbox"/>	Turn Table	AUDIX	-	-	-

### Test Conditions

Temperature: 19.1 °C  
Relative Humidity: 34.5 % R.H.

### 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.



## 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
<input type="checkbox"/>	AC Source	EM test	ACS 500 N	V1024106760	08. 13. 2015
<input type="checkbox"/>	Digital Power Analyzer	EM test	DPA 500 N	V1024106759	08. 13. 2015

### Test Conditions

Temperature: °C  
Relative Humidity: % R.H.

### 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

N/A



## 2.6 Voltage Fluctuations and Flicker

### Test Date

Apr. 13, 2015

### Test Location

Electro wave Shieldroom

### Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	AC Source	EM test	ACS 500 N	V1024106760	08. 13. 2015
<input checked="" type="checkbox"/>	Digital Power Analyzer	EM test	DPA 500 N	V1024106759	08. 13. 2015

### Test Conditions

Temperature: 19.1 °C  
Relative Humidity: 34.5 % R.H.

### Test Results

The requirements are:

- ☒ PASS  
☐ NOT PASS  
☐ NOT APPLICABLE

### Remarks

N/A



### **3.0 Criteria for compliance**

Criteria for compliance was based on the following guidelines:

EN 50130-4:2011+A1:2014 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  $U = 130 \text{ dB}\mu\text{V}$ .  
For component of CCTV systems, where the status is monitored by observing the TV picture,  
then deterioration of the picture is allowed at  $U = 140 \text{ dB}\mu\text{V}$ , 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  $U = 130 \text{ dB}\mu\text{V}$ , 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  $U = 120 \text{ dB}\mu\text{V}$ .

### **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

Apr. 10, 2015

#### Test Location

EMS-ESD: Electro wave Shieldroom

#### Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	ESD SIMULATOR	Noise Ken	ESS-2000	ESS05X4620	06.30.2015

#### Test Conditions

Temperature: 22.5 °C  
Relative Humidity: 37.3 % R.H.

#### Test Specifications

Discharge Factor:  $\geq 1$  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

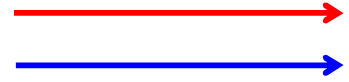
Discharge Voltage:	Contact	Air	HCP	VCP
	<input type="checkbox"/> 2 kV	<input checked="" type="checkbox"/> 2 kV	<input type="checkbox"/> 2 kV	<input type="checkbox"/> 2 kV
	<input type="checkbox"/> 4 kV	<input checked="" type="checkbox"/> 4 kV	<input type="checkbox"/> 4 kV	<input type="checkbox"/> 4 kV
	<input checked="" type="checkbox"/> 6 kV	<input type="checkbox"/> 6 kV	<input checked="" type="checkbox"/> 6 kV	<input checked="" type="checkbox"/> 6 kV
	<input type="checkbox"/> 8 kV	<input checked="" type="checkbox"/> 8 kV	<input type="checkbox"/> 8 kV	<input type="checkbox"/> 8 kV
	<input type="checkbox"/> 15 kV	<input type="checkbox"/> 15 kV	<input type="checkbox"/> 15 kV	<input type="checkbox"/> 15 kV

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

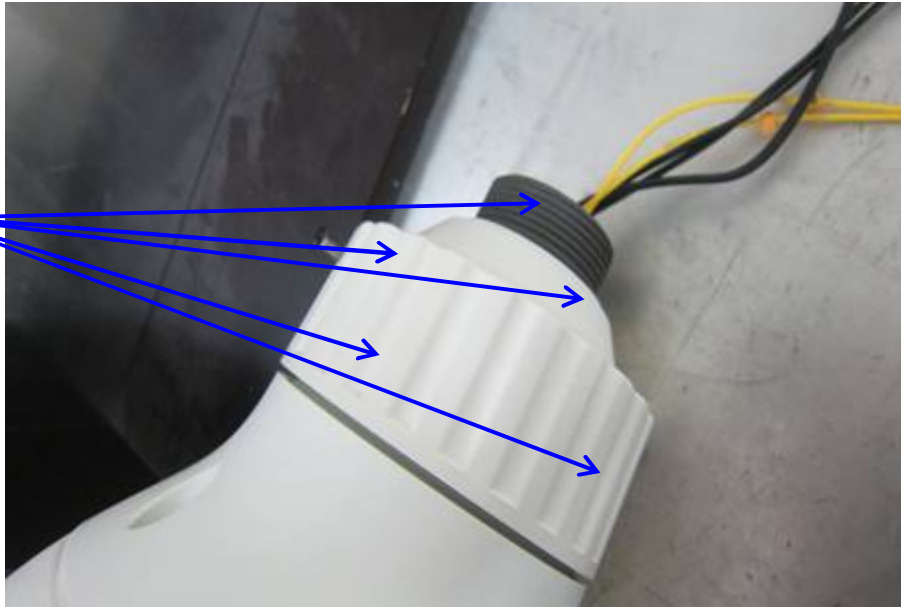
Required Performance Criteria: ☒ Complied

**Location of Discharge:**

Air
Contact



1



2



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.  
 The results shown in this test report refer only to the sample(s) tested unless otherwise stated.  
 The authenticity of the test report, contact shchoi@kes.co.kr

**KES Co., Ltd.**

3701, 40, Simin-daero 365beon-gil,  
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea  
Tel: +82-31-425-6200 / Fax: +82-31-424-0450  
www.kes.co.kr

Report No.:  
KES-EI-15T0119-R1  
Page (21) of (62)

**Test Data****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 1	Contact Discharge	Complied	-
2	E.U.T Enclosure 2	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

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.  
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.  
The authenticity of the test report, contact shchoi@kes.co.kr



## 3.2 Radiated Electric Field Immunity

### Reference Standard

EN 61000-4-3:2006 +A2:2010

### Test Date

Apr. 11, 2015

### Test Location

EMS-RS: ☒ SEMI ANECHOIC CHAMBER

### Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	Average Power Sensor	Agilent	E9301A	MY41498011	08.13.2015
<input checked="" type="checkbox"/>	Average Power Sensor	Agilent	E9301A	-	08.13.2015
<input checked="" type="checkbox"/>	Signal Generator	HP	ESG-3000A	US37040210	08.13.2015
<input checked="" type="checkbox"/>	Power Meter	Agilent	E4419B	MY45101506	08.13.2015
<input checked="" type="checkbox"/>	Power Amplifier	Infinitech	ITA0300-200	-	08.13.2015
<input checked="" type="checkbox"/>	Power Amplifier	Infinitech	ITA0750-200	-	08.13.2015
<input checked="" type="checkbox"/>	Power Amplifier	Infinitech	ITA1500-100	-	08.13.2015
<input checked="" type="checkbox"/>	Power Amplifier	Infinitech	ITA2500-100	-	08.13.2015
<input checked="" type="checkbox"/>	Stacked Log.-Per.Antenna	Schwarzbeck	STLP 9128 D	9128D038	-

### Test Conditions

Temperature: 21.0 °C  
Relative Humidity: 34.2 % R.H.

**KES Co., Ltd.**

3701, 40, Simin-daero 365beon-gil,  
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea  
Tel: +82-31-425-6200 / Fax: +82-31-424-0450  
www.kes.co.kr

Report No.:

KES-E1-15T0119-R1

Page (23) of (62)

**Test Specifications**

Antenna Polarization: Horizontal &amp; vertical unless indicated otherwise

Antenna Distance: ☒ 3 mField Strength: ☐ 1 V/m ☐ 3 V/m  
☒ 10 V/mFrequency Range: ☐ 80 MHz to 1 GHz ☐ 1,4 GHz to 2,7 GHz  
☒ 80 MHz to 2,7 GHzModulation: ☒ AM, 80 %, 1 kHz sine wave  
☒ PM, 1 Hz (0,5 s ON : 0,5 s OFF)Frequency step: ☒ 1 % stepDwell Time: ☒ 1 s ☐ 3 s# of Sides Radiated: ☒ 4Required Performance Criteria: ☒ Complied**Test Data**

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

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.  
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.  
The authenticity of the test report, contact shchoi@kes.co.kr



### 3.3 Electrical Fast Transients/Bursts

#### Reference Standard

EN 61000-4-4:2012

#### Test Date

Apr. 09, 2015

#### Test Location

EMS-EFT: Electro wave Shieldroom

#### Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	Ultra Compact Simulator	EM TEST	UCS 500 N5	V0936105120	08. 13. 2015
<input type="checkbox"/>	Capacitive Coupling Clamp	EM TEST	HFK	070925	08. 14. 2015
<input checked="" type="checkbox"/>	MotorVariac	EM TEST	MV2616	V0936105123	08. 13. 2015

#### Test Conditions

Temperature: 19.7 °C  
Relative Humidity: 39.2 % R.H.

#### Test Specifications

Pulse Amplitude & Polarity: (AC Power Lines)	<input type="checkbox"/> ± 1.0 kV <input type="checkbox"/> ± 4.0 kV	<input checked="" type="checkbox"/> ± 2.0 kV
Pulse Amplitude & Polarity: (Other supply / Signal Lines)	<input type="checkbox"/> ± 0.5 kV <input type="checkbox"/> ± 2.0 kV	<input type="checkbox"/> ± 1.0 kV
Burst Period:	<input checked="" type="checkbox"/> 300 ms	<input type="checkbox"/> 2 s
Repetition Rate:	<input type="checkbox"/> 5 klz	<input checked="" type="checkbox"/> 100 klz
Duration of Test Voltage:	<input checked="" type="checkbox"/> ≥ 1 min	
Required Performance Criteria:	<input checked="" type="checkbox"/> Complied	



**KES Co., Ltd.**

3701, 40, Simin-daero 365beon-gil,  
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea  
Tel: +82-31-425-6200 / Fax: +82-31-424-0450  
www.kes.co.kr

Report No.:

KES-E1-15T0119-R1

Page (25) of (62)

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

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
L1	Complied	Complied
L2	Complied	Complied
L1 – L2	Complied	Complied

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

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
L1	-	-
L2	-	-
L1 – L2	-	-

☐ Signal ports and telecommunication ports – Coupling Clamp used

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

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

**KES Co., Ltd.**

3701, 40, Simin-daero 365beon-gil,  
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea  
Tel: +82-31-425-6200 / Fax: +82-31-424-0450  
www.kes.co.kr

Report No.:

KES-EI-15T0119-R1

Page (26) of (62)

### 3.4 Surge Transients

**Reference Standard**

EN 61000-4-5:2014

**Test Date**

Apr. 10, 2015

**Test Location**

EMS-Surge: Electro wave Shieldroom

**Test Equipment**

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	Ultra Compact Simulator	EM TEST	UCS 500 N5	V0936105120	08. 14. 2015
<input checked="" type="checkbox"/>	MotorVariac	EM TEST	MV2616	V0936105123	08. 13. 2015
<input type="checkbox"/>	CDN	EM TEST	CNV 504N	V0936105121	-

**Test Conditions**

Temperature: 22.5 °C  
Relative Humidity: 37.3 % R.H.

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.  
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.  
The authenticity of the test report, contact shchoi@kes.co.kr



## KES Co., Ltd.

3701, 40, Simin-daero 365beon-gil,  
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea  
Tel: +82-31-425-6200 / Fax: +82-31-424-0450  
www.kes.co.kr

Report No.:  
KES-EI-15T0119-R1  
Page (27) of (62)

### 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

**KES Co., Ltd.**

3701, 40, Simin-daero 365beon-gil,  
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea  
Tel: +82-31-425-6200 / Fax: +82-31-424-0450  
www.kes.co.kr

Report No.:  
KES-E1-15T0119-R1  
Page (28) of (62)

**Test Data**

☒ Line to Line – Differential Mode

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
L1 – L2	Complied	Complied

☐ Line to Earth – Common Mode

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

**Signal Lines**

☐ Line to Earth – Common Mode

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

Note: "Blank" = Not performed

Observations:

Complied – No degradation of function

**Test Results**

☒ PASS Required Performance Criteria

☐ NOT PASS Required Performance Criteria

**Remarks**

N/A



## 3.5 Conducted Disturbance

### Reference Standard

EN 61000-4-6:2014

### Test Date

Apr. 10, 2015

### Test Location

EMS-CS: Electro wave Shieldroom

### Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	Continuous Wave Simulator	EM TEST	CWS 500N1	V0936105119	08. 14. 2015
<input checked="" type="checkbox"/>	6dB Attenuator	EM TEST	ATT6	1208-34	08. 13. 2015
<input checked="" type="checkbox"/>	CDN	EM TEST	CDN-M2/M3N	0909-06	08. 13. 2015

### Test Conditions

Temperature: 22.5 °C  
Relative Humidity: 37.3 % R.H.

### Test Specifications

Frequency range: ☒ 150 kHz to 100 MHz ☐ 150 kHz to 80 MHz  
Voltage Level: ☐ 1 Vrms ☐ 3 Vrms  
☒ 10 Vrms  
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  
Required Performance Criteria: ☒ Complied

**KES Co., Ltd.**

3701, 40, Simin-daero 365beon-gil,  
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea  
Tel: +82-31-425-6200 / Fax: +82-31-424-0450  
www.kes.co.kr

Report No.:  
KES-EI-15T0119-R1  
Page (30) of (62)

**Test Data**

☒ Input a.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Observations
L1 – L2	CDN	Complied

☐ Input d.c. power ports

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

☐ Signal ports and telecommunication ports

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

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

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.  
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.  
The authenticity of the test report, contact shchoi@kes.co.kr



### 3.6 Voltage Dips and Short Interruptions

#### Reference Standard

EN 61000-4-11:2004

#### Test Date

Apr. 10, 2015

#### Test Location

EMS-Voltage dip: Electro wave Shieldroom

#### Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	Ultra Compact Simulator	EM TEST	UCS 500 N5	V0936105120	08.13.2015
<input checked="" type="checkbox"/>	MotorVariac	EM TEST	MV2616	V0936105123	08.13.2015

#### Test Conditions

Temperature: 21.0 °C  
Relative Humidity: 34.2 % R.H.



## Test Specifications & Observations/Remarks

(Test Voltage : 230 V )

<u>Test Level</u>	<u>Duration [in period/ms (50 Hz)]</u>	<u>Results</u>
<input checked="" type="checkbox"/> 20 % dip	<input checked="" type="checkbox"/> 250 / 5 000	<u>Complied</u>
<input checked="" type="checkbox"/> 30 % dip	<input checked="" type="checkbox"/> 25 / 500	<u>Complied</u>
<input checked="" type="checkbox"/> 60 % dip	<input checked="" type="checkbox"/> 10 / 200	<u>Complied</u>
<input checked="" type="checkbox"/> 100 % dip	<input checked="" type="checkbox"/> 250 / 5 000	<u>Complied</u>

- Voltage variations

<input checked="" type="checkbox"/> Unom + 10 %	<input checked="" type="checkbox"/> 253.0 V (ac)	<u>Complied</u>
<input checked="" type="checkbox"/> Unom - 15 %	<input checked="" type="checkbox"/> 195.5 V (ac)	<u>Complied</u>

Observations:

Complied – No degradation of function

### Test Results

- ☒ PASS Required Performance Criteria  
☐ NOT PASS Required Performance Criteria  
☐ NOT APPLICABLE

### Remarks

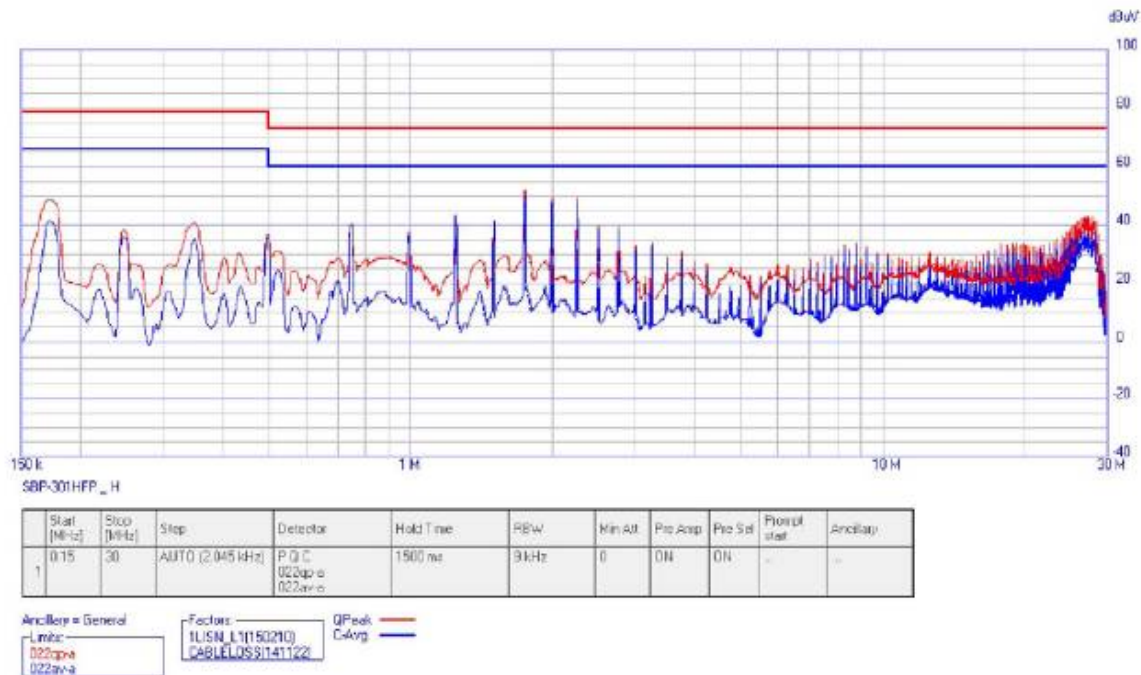
N/A



## APPENDIX A – TEST DATA

### Conducted Emissions at Mains Power Ports

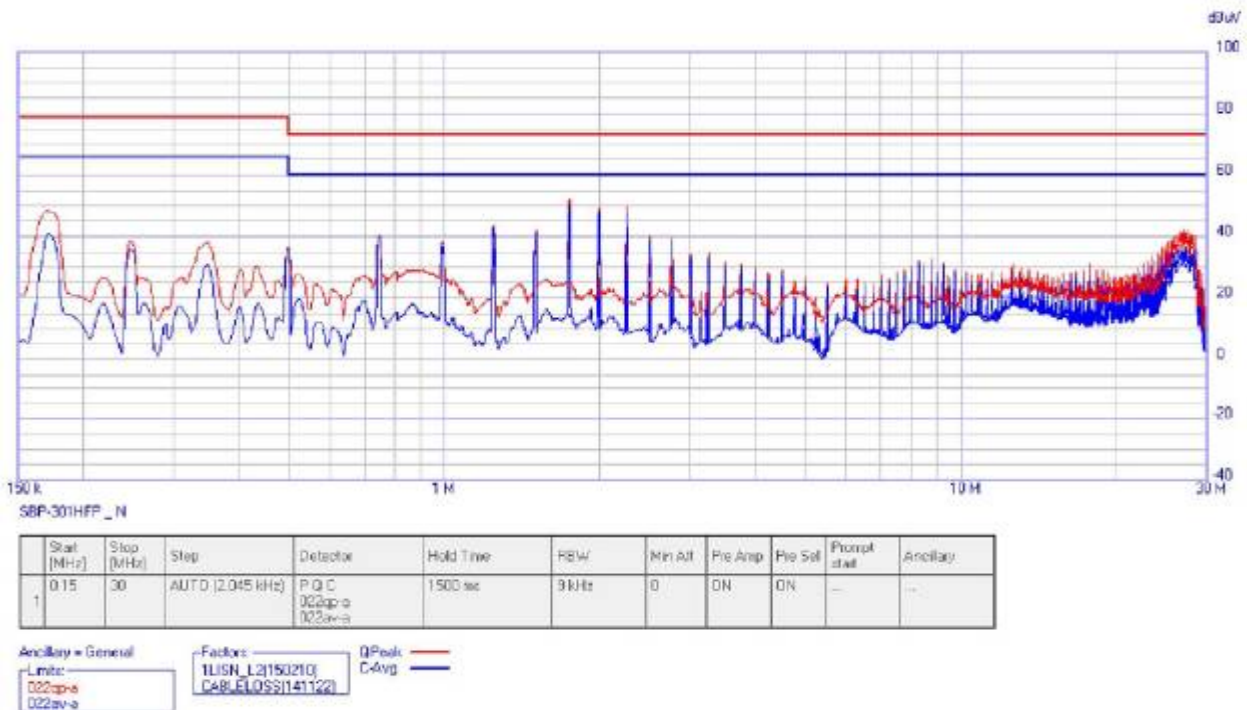
[HOT]



Frequency [MHz]	Q-Peak [dBμV]	Limit [dBμV]	Margin [dB]	C-Avg [dBμV]	Limit [dBμV]	Margin [dB]	Factor (LISN) [dB]	Factor (Cable Loss) [dB]
0.172	48.690	79.000	-30.310	41.640	66.000	-24.360	9.650	0.030
0.246	38.290	79.000	-40.710	35.980	66.000	-30.020	9.650	0.030
0.348	40.720	79.000	-38.280	35.020	66.000	-30.980	9.650	0.030
0.500	36.950	79.000	-42.050	35.950	66.000	-30.050	9.650	0.030
1.246	43.640	73.000	-29.360	43.060	60.000	-16.940	9.650	0.050
1.743	51.810	73.000	-21.190	50.170	60.000	-9.830	9.660	0.060
1.749	51.810	73.000	-21.190	50.170	60.000	-9.830	9.660	0.060
1.997	49.220	73.000	-23.780	47.950	60.000	-12.050	9.660	0.070
2.244	49.390	73.000	-23.610	47.270	60.000	-12.730	9.660	0.080

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.  
 The results shown in this test report refer only to the sample(s) tested unless otherwise stated.  
 The authenticity of the test report, contact shchoi@kes.co.kr

[ NEUTRAL ]



Frequency [MHz]	Q-Peak [dBμV]	Limit [dBμV]	Margin [dB]	C-Avg [dBμV]	Limit [dBμV]	Margin [dB]	Factor (LISN) [dB]	Factor (Cable Loss) [dB]
0.170	48.240	79.000	-30.760	40.300	66.000	-25.700	9.650	0.030
0.248	38.350	79.000	-40.650	35.770	66.000	-30.230	9.650	0.030
0.348	37.960	79.000	-41.040	30.680	66.000	-35.320	9.650	0.030
0.496	36.540	79.000	-42.460	35.860	66.000	-30.140	9.650	0.030
1.246	43.560	73.000	-29.440	42.860	60.000	-17.140	9.650	0.050
1.743	51.850	73.000	-21.150	50.010	60.000	-9.990	9.660	0.060
1.749	51.850	73.000	-21.150	50.010	60.000	-9.990	9.660	0.060
1.997	49.190	73.000	-23.810	47.920	60.000	-12.080	9.660	0.070
2.244	49.410	73.000	-23.590	47.230	60.000	-12.770	9.660	0.080

◆ 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))

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.  
 The results shown in this test report refer only to the sample(s) tested unless otherwise stated.  
 The authenticity of the test report, contact shchoi@kes.co.kr



---

## **Conducted Emissions at Telecommunication Ports**

**[10 Mbps]**

N/A



**KES Co., Ltd.**

3701, 40, Simin-daero 365beon-gil,  
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea  
Tel: +82-31-425-6200 / Fax: +82-31-424-0450  
www.kes.co.kr

Report No.:  
KES-E1-15T0119-R1  
Page (36) of (62)

---

**[100 Mbps]**

N/A

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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

---

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.  
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.  
The authenticity of the test report, contact shchoi@kes.co.kr

**KES Co., Ltd.**

3701, 40, Simin-daero 365beon-gil,  
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea  
Tel: +82-31-425-6200 / Fax: +82-31-424-0450  
www.kes.co.kr

Report No.:

KES-E1-15T0119-R1

Page (37) of (62)

**Radiated Electric Field Emissions(Below 1 GHz)**

Frequency (MHz)	Amplitude (dB $\mu$ V/m)	Antenna		Correction Factor		Corrected Amplitude (dB $\mu$ V/m)	Applicable Limit (dB $\mu$ V/m)	Margin (dB)
		Polar. (H/V)	Height (m)	Ant. (dB)	Cable (dB)			
41.218	19.100	V	1.000	13.270	1.440	33.810	40.000	6.190
69.230	19.200	V	1.000	11.750	1.960	32.910	40.000	7.090
124.992	16.200	H	4.000	11.710	2.660	30.570	40.000	9.430
124.992	14.300	V	1.000	11.710	2.660	28.670	40.000	11.330
464.418	14.300	H	3.000	16.980	5.640	36.920	47.000	10.080
500.326	15.900	H	3.500	17.760	5.910	39.570	47.000	7.430
500.326	13.600	V	2.000	17.760	5.910	37.270	47.000	9.730

## ◆ Calculation – SEMI ANECHOIC CHAMBER #4(10 m)

Result(QP) [dB( $\mu$ V/m)] = (Reading(QP)[dB( $\mu$ V)] + c.f[dB(1/m)]Margin(QP)[dB] = Limit[dB( $\mu$ V/m)] - Result(QP) [dB( $\mu$ V/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

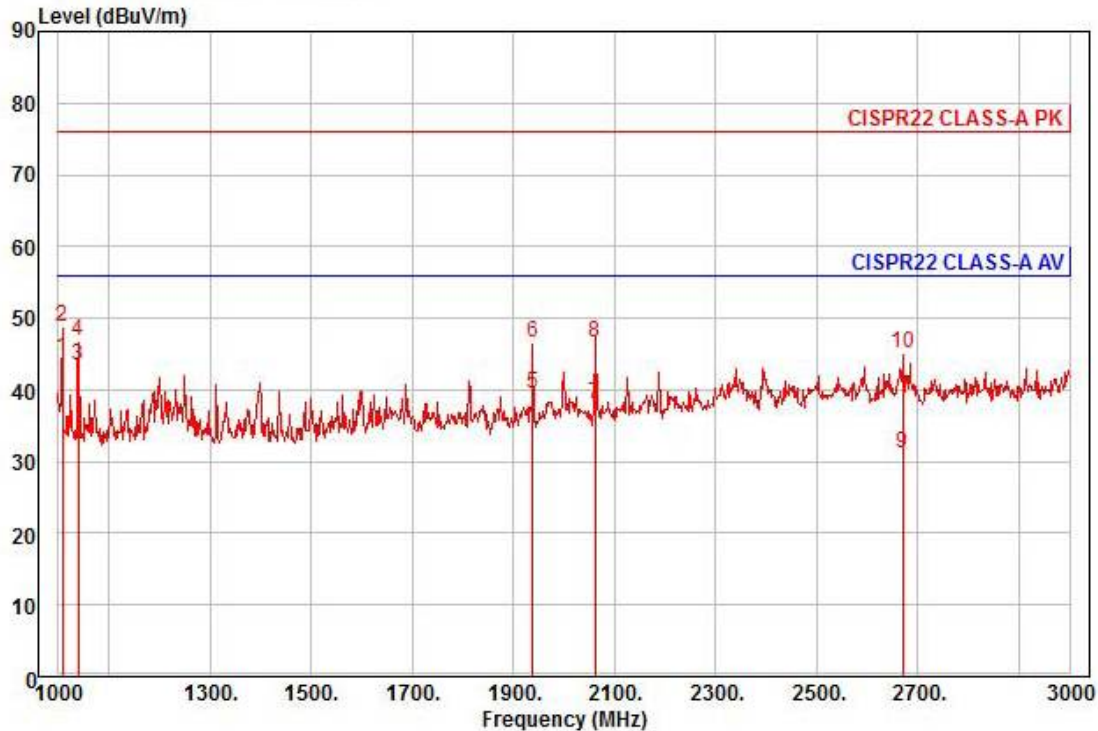


## KES Co., Ltd.

3701, 40, Simin-daero 365beon-gil,  
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea  
Tel: +82-31-425-6200 / Fax: +82-31-424-0450  
www.kes.co.kr

Report No.:  
KES-E1-15T0119-R1  
Page (38) of (62)

### Radiated Electric Field Emissions(Above 1 GHz)



Site : chamber  
Condition: CISPR22 CLASS-A PK 3m HORN-414(15.02.09) horizontal  
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto  
Project : NETWORK CAMERA  
Model : SBP-301HFP  
Mode : 1 ~ 3 GHz  
Memo :

		Read	Ant	Cable	Preamp	TPos	Limit	Over		
	Freq	Level	Factor	Loss	Factor		Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1 pp	1008.00	51.19	23.88	5.46	36.19	225	56.00	-11.66	horizontal	Average
2 pk	1008.00	55.60	23.88	5.46	36.19	225	76.00	-27.25	horizontal	Peak
3	1040.00	50.17	23.95	5.54	36.13	192	56.00	-12.47	horizontal	Average
4	1040.00	53.47	23.95	5.54	36.13	192	76.00	-29.17	horizontal	Peak
5	1938.00	38.63	27.76	7.71	34.63	40	56.00	-16.53	horizontal	Average
6	1938.00	45.81	27.76	7.71	34.63	40	76.00	-29.35	horizontal	Peak
7	2062.00	36.26	28.33	7.99	34.49	168	56.00	-17.91	horizontal	Average
8	2062.00	44.87	28.33	7.99	34.49	168	76.00	-29.30	horizontal	Peak
9	2670.00	25.99	29.89	9.27	34.07	179	56.00	-24.92	horizontal	Average
10	2670.00	40.13	29.89	9.27	34.07	179	76.00	-30.78	horizontal	Peak

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.  
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.  
The authenticity of the test report, contact shchoi@kes.co.kr

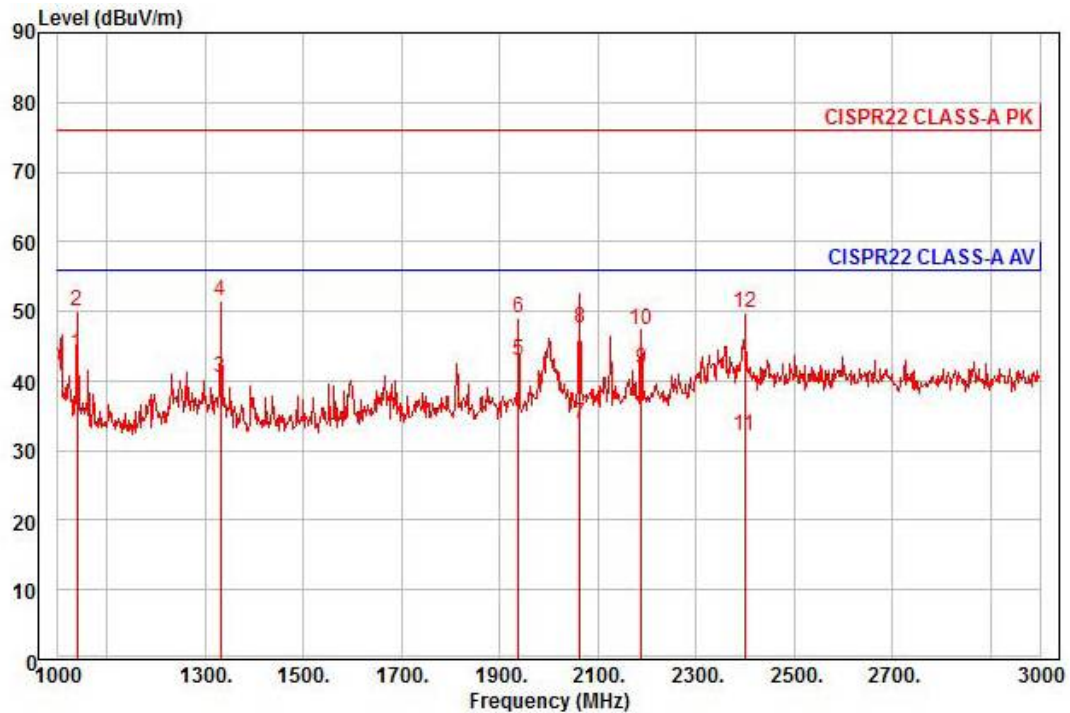




# KES Co., Ltd.

3701, 40, Simin-daero 365beon-gil,  
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea  
Tel: +82-31-425-6200 / Fax: +82-31-424-0450  
www.kes.co.kr

Report No.:  
KES-E1-15T0119-R1  
Page (39) of (62)



Site : chamber  
Condition: CISPR22 CLASS-A PK 3m HORN-414(15.02.09) vertical  
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto  
Project : NETWORK CAMERA  
Model : SBP-301HFP  
Mode : 1 ~ 3 GHz  
Memo :

	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	1040.00	50.55	23.95	5.54	36.13	181	56.00	-12.09	vertical	Average
2	1040.00	56.74	23.95	5.54	36.13	181	76.00	-25.90	vertical	Peak
3	1332.00	45.21	24.64	6.24	35.65	200	56.00	-15.56	vertical	Average
4 pk	1332.00	56.19	24.64	6.24	35.65	200	76.00	-24.58	vertical	Peak
5	1938.00	42.04	27.76	7.71	34.63	205	56.00	-13.12	vertical	Average
6	1938.00	48.24	27.76	7.71	34.63	205	76.00	-26.92	vertical	Peak
7	2064.00	32.09	28.34	7.99	34.49	186	56.00	-22.07	vertical	Average
8	2064.00	45.72	28.34	7.99	34.49	186	76.00	-28.44	vertical	Peak
9	2188.00	39.12	28.70	8.25	34.40	202	56.00	-14.33	vertical	Average
10	2188.00	44.88	28.70	8.25	34.40	202	76.00	-28.57	vertical	Peak
11	2400.00	28.36	29.33	8.70	34.25	173	56.00	-23.86	vertical	Average
12	2400.00	46.06	29.33	8.70	34.25	173	76.00	-26.16	vertical	Peak

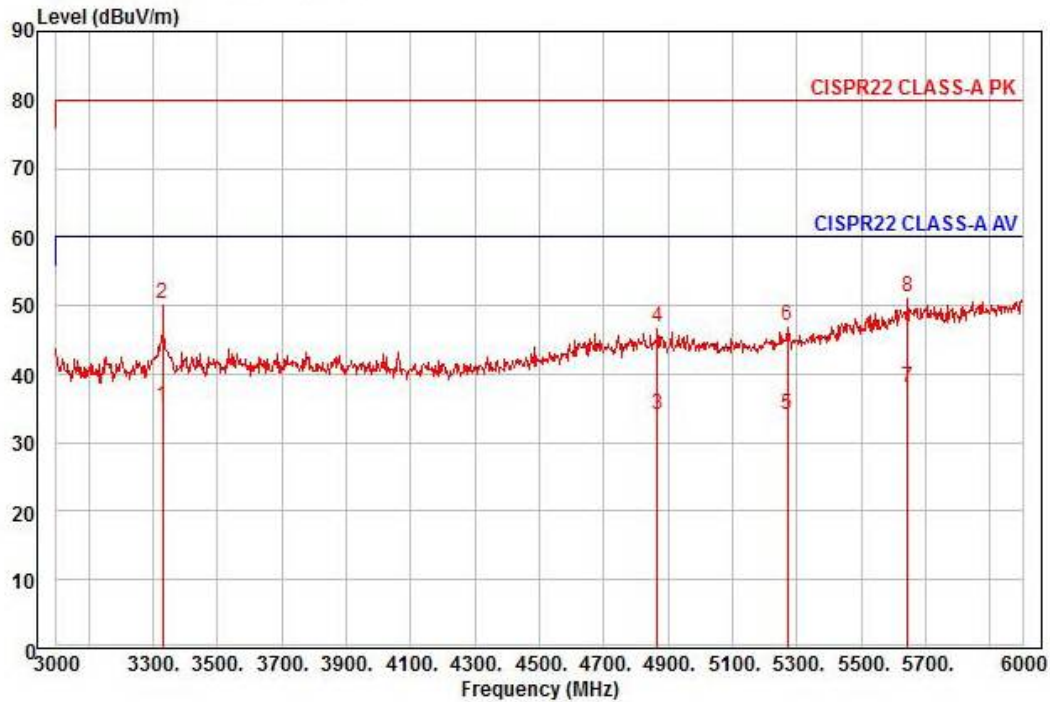
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.  
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.  
The authenticity of the test report, contact shchoi@kes.co.kr



# KES Co., Ltd.

3701, 40, Simin-daero 365beon-gil,  
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea  
Tel: +82-31-425-6200 / Fax: +82-31-424-0450  
www.kes.co.kr

Report No.:  
KES-EI-15T0119-R1  
Page (40) of (62)



Site : chamber  
Condition: CISPR22 CLASS-A PK 3m HORN-414(15.02.09) horizontal  
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto  
Project : NETWORK CAMERA  
Model : SBP-301HFP  
Mode : 3 ~ 6 GHz  
Memo :

	Freq	Read Level	Ant Factor	Cable Loss	Preamplifier Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	3330.00	28.21	30.79	10.47	34.21	271	60.00	-24.74	horizontal	Average
2	3330.00	43.29	30.79	10.47	34.21	271	80.00	-29.66	horizontal	Peak
3	4866.00	21.17	33.42	12.95	33.45	140	60.00	-25.91	horizontal	Average
4	4866.00	33.94	33.42	12.95	33.45	140	80.00	-33.14	horizontal	Peak
5	5271.00	19.10	33.77	14.38	33.25	126	60.00	-26.00	horizontal	Average
6	5271.00	32.17	33.77	14.38	33.25	126	80.00	-32.93	horizontal	Peak
7 pp	5643.00	21.08	34.07	16.04	33.30	248	60.00	-22.11	horizontal	Average
8 pk	5643.00	34.39	34.07	16.04	33.30	248	80.00	-28.80	horizontal	Peak

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.  
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.  
The authenticity of the test report, contact shchoi@kes.co.kr

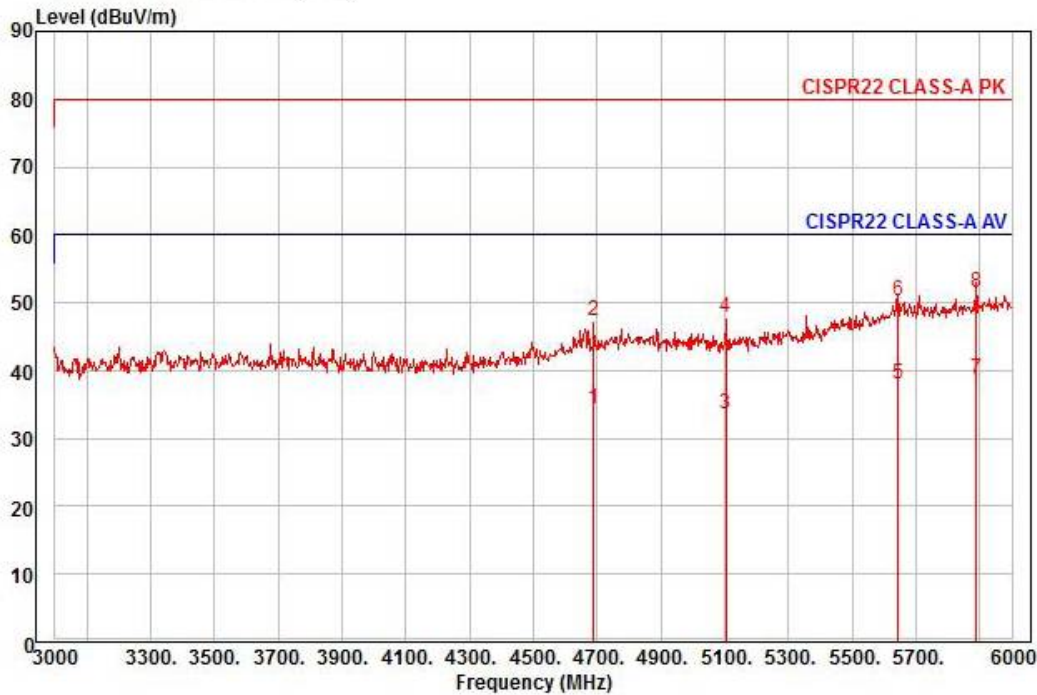




# KES Co., Ltd.

3701, 40, Simin-daero 365beon-gil,  
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea  
Tel: +82-31-425-6200 / Fax: +82-31-424-0450  
www.kes.co.kr

Report No.:  
KES-E1-15T0119-R1  
Page (41) of (62)



Site : chamber  
Condition: CISPR22 CLASS-A PK 3m HORN-414(15.02.09) vertical  
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto  
Project : NETWORK CAMERA  
Model : SBP-301HFP  
Mode : 3 ~ 6 GHz  
Memo :

	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	4689.00	22.69	32.77	12.66	33.76	215	60.00	-25.64	vertical	Average
2	4689.00	35.71	32.77	12.66	33.76	215	80.00	-32.62	vertical	Peak
3	5103.00	19.25	33.86	13.63	33.22	117	60.00	-26.48	vertical	Average
4	5103.00	33.45	33.86	13.63	33.22	117	80.00	-32.28	vertical	Peak
5	5643.00	21.09	34.07	16.04	33.30	66	60.00	-22.10	vertical	Average
6	5643.00	33.53	34.07	16.04	33.30	66	80.00	-29.66	vertical	Peak
7 pp	5889.00	20.14	34.79	17.14	33.33	273	60.00	-21.26	vertical	Average
8 pk	5889.00	32.94	34.79	17.14	33.33	273	80.00	-28.46	vertical	Peak

## ◆ Calculation

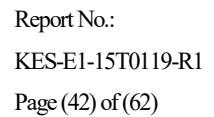
Result(PK/CAV) [dB(μV/m)] = (Reading(PK/CAV)[dB(μV)] + c.f[dB(1/m)])

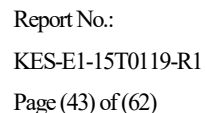
Margin(PK/CAV)[dB] = Limit[dB(μV/m)] - Result(PK/CAV) [dB(μV/m)]

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

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.  
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.  
The authenticity of the test report, contact shchoi@kes.co.kr





**KES Co., Ltd.**

3701, 40, Simin-daero 365beon-gil,  
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea  
Tel: +82-31-425-6200 / Fax: +82-31-424-0450  
www.kes.co.kr

Report No.:  
KES-E1-15T0119-R1  
Page (44) of (62)

**Test Data - Voltage Fluctuations****Maximum Flicker results**

	<b>EUT values</b>	<b>Limit</b>	<b>Result</b>
Pst	0.028	1.00	PASS
Plt	0.028	0.65	PASS
dc [%]	0.008	3.30	PASS
dmax [%]	0.275	4.00	PASS
Tmax [s]	0.000	0.50	PASS

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.  
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.  
The authenticity of the test report, contact shchoi@kes.co.kr

## Test Setup Photos and Configuration

### Conducted Voltage Emissions



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.  
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.  
The authenticity of the test report, contact [shchoi@kes.co.kr](mailto:shchoi@kes.co.kr)



---

## Conducted Telecommunication Emissions

N/A

N/A



## Radiated Electric Field Emissions(Below 1 GHz)



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.  
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.  
The authenticity of the test report, contact shchoi@kes.co.kr

## Radiated Electric Field Emissions(Above 1 GHz)



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.  
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.  
The authenticity of the test report, contact [shchoi@kes.co.kr](mailto:shchoi@kes.co.kr)





---

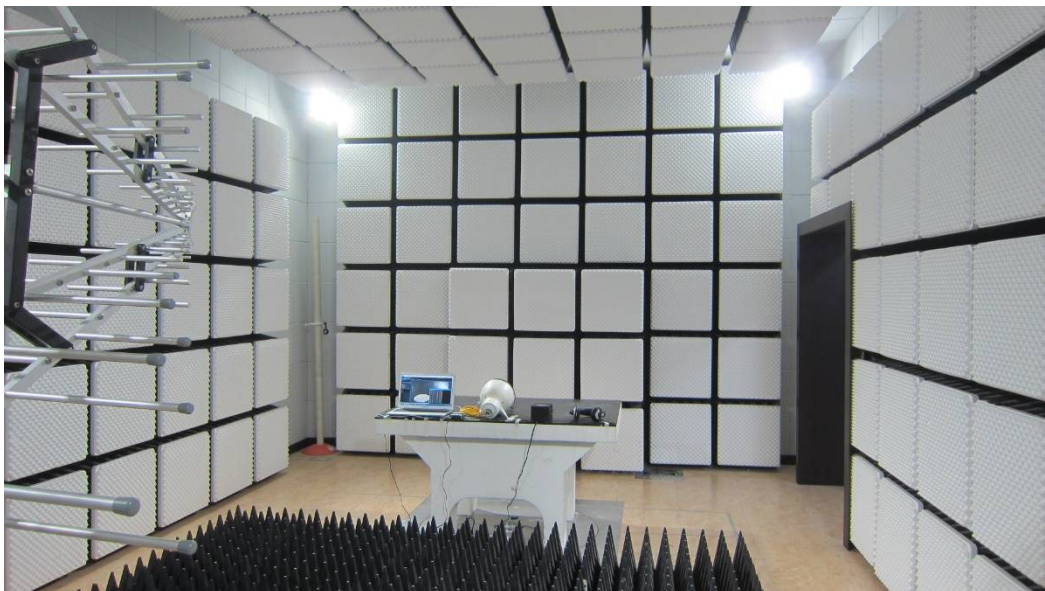
## Harmonic Current Emissions and Voltage Fluctuations and Flicker

N/A

## Electrostatic Discharge



## Radiated Electric Field Immunity



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.  
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.  
The authenticity of the test report, contact shchoi@kes.co.kr

## Electrical Fast Transients/Bursts



## Surge Transients



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.  
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.  
The authenticity of the test report, contact shchoi@kes.co.kr

## Conducted Disturbance



## Voltage Dips and Short Interruptions



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.  
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.  
The authenticity of the test report, contact [shchoi@kes.co.kr](mailto:shchoi@kes.co.kr)



## EUT External Photographs

(Top)



(Bottom)



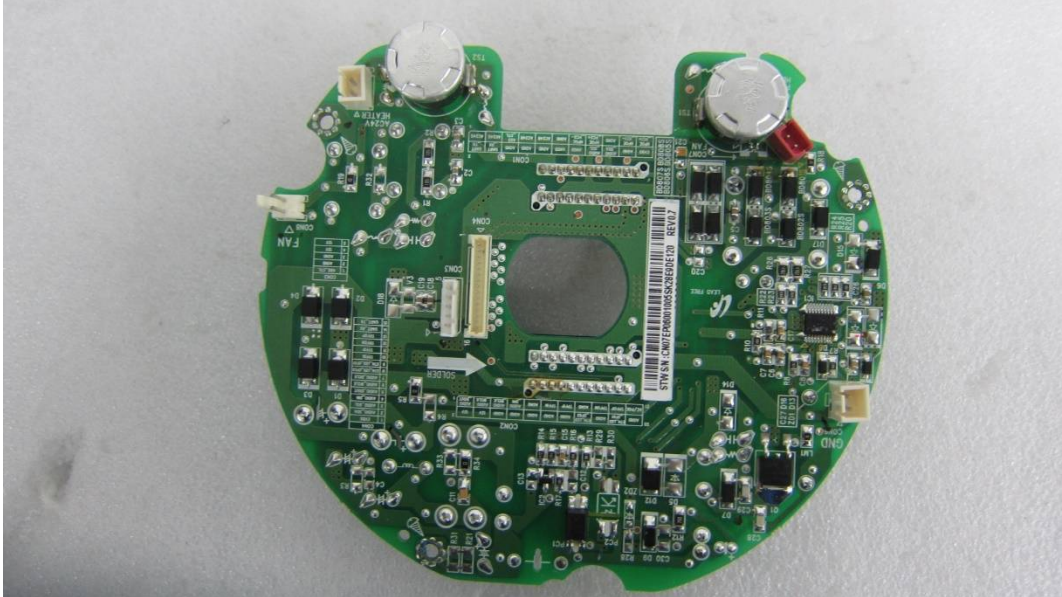
## EUT Internal Photographs

(Internal View)

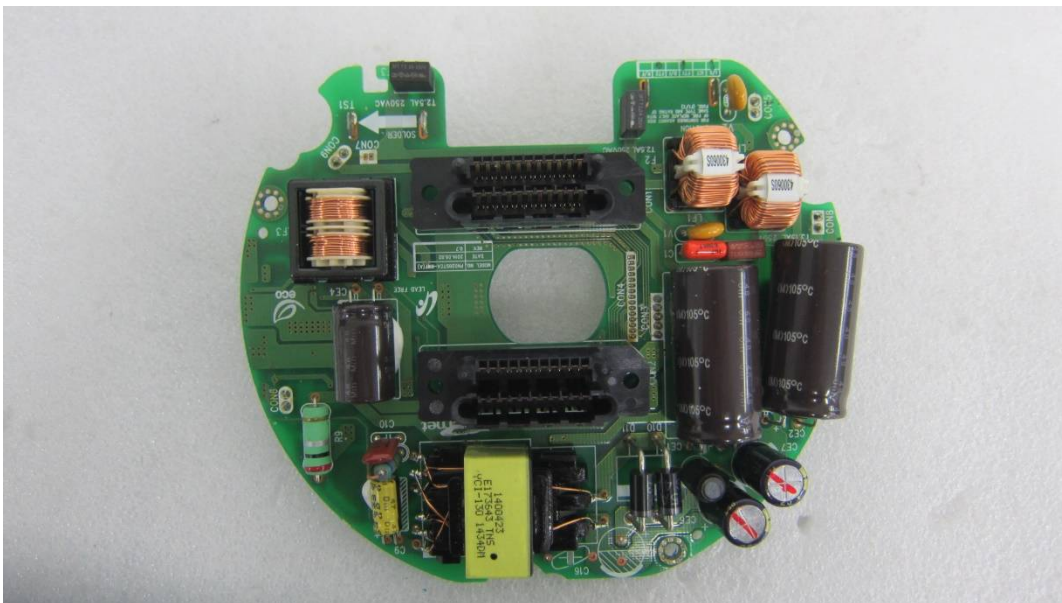


## EUT Internal View – Main Board

(Top)



(Bottom)

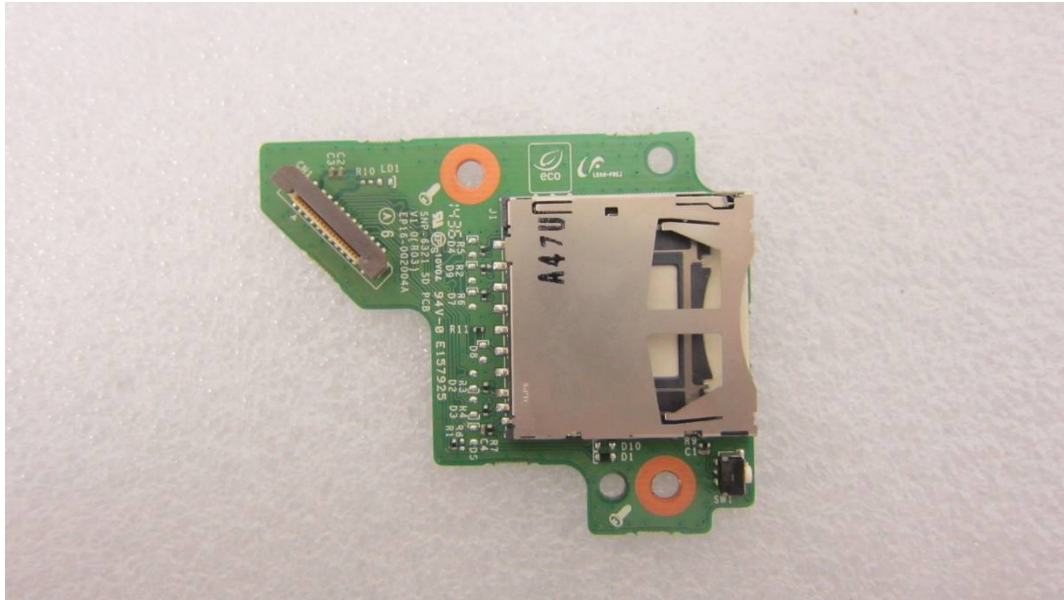


This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.  
 The results shown in this test report refer only to the sample(s) tested unless otherwise stated.  
 The authenticity of the test report, contact shchoi@kes.co.kr

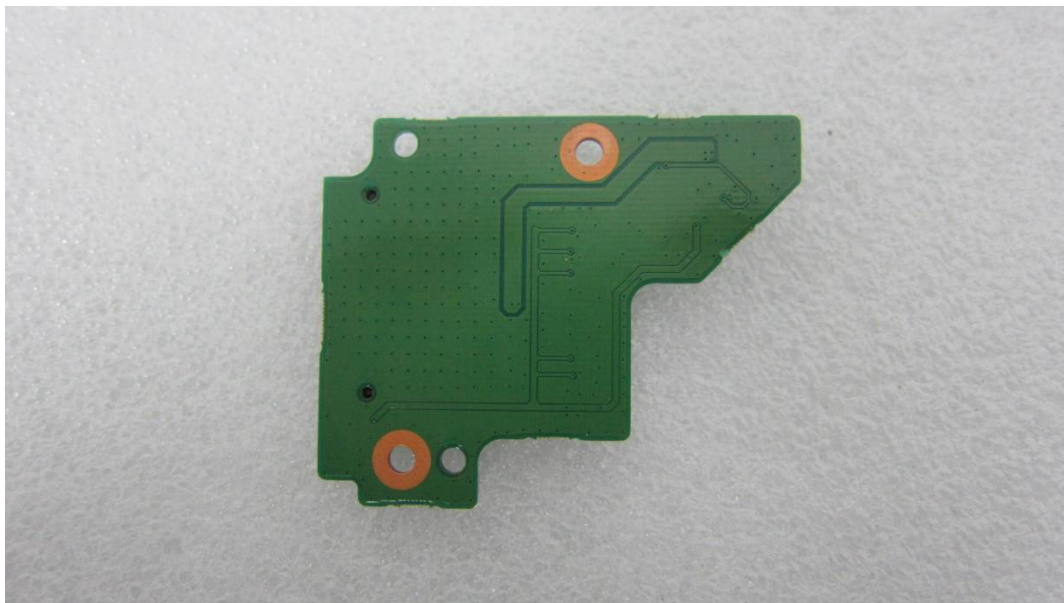


## EUT Internal View – Sub Board1

(Top)



(Bottom)

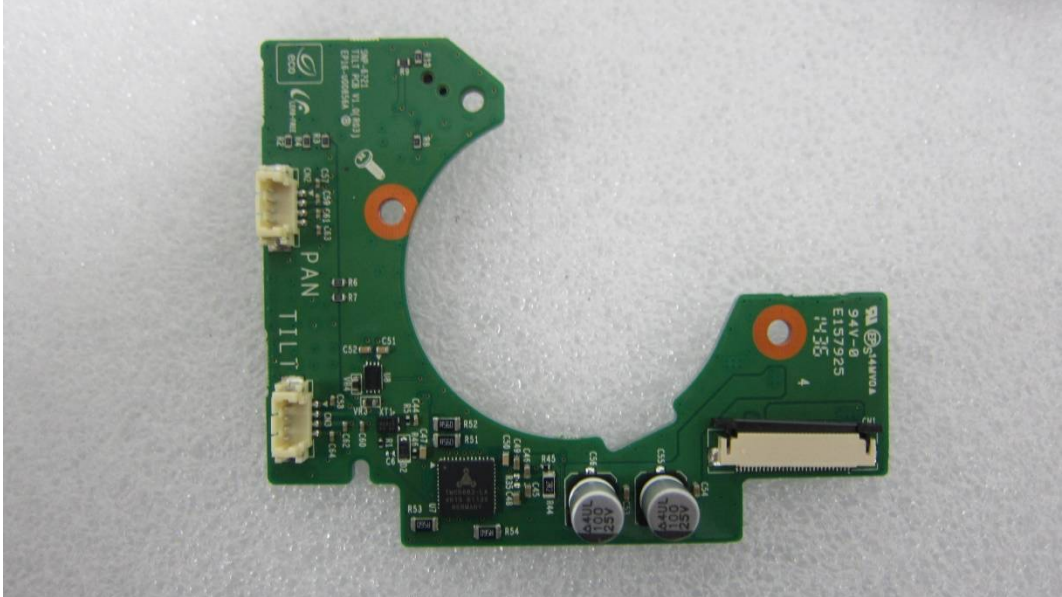


This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.  
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.  
The authenticity of the test report, contact shchoi@kes.co.kr

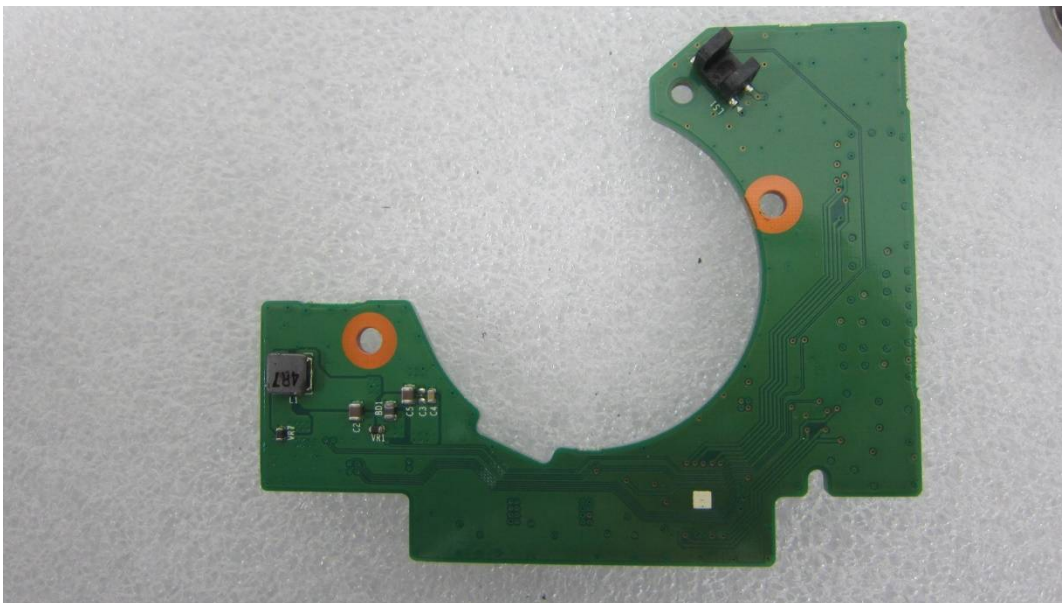


## EUT Internal View – Sub Board2

(Top)



(Bottom)

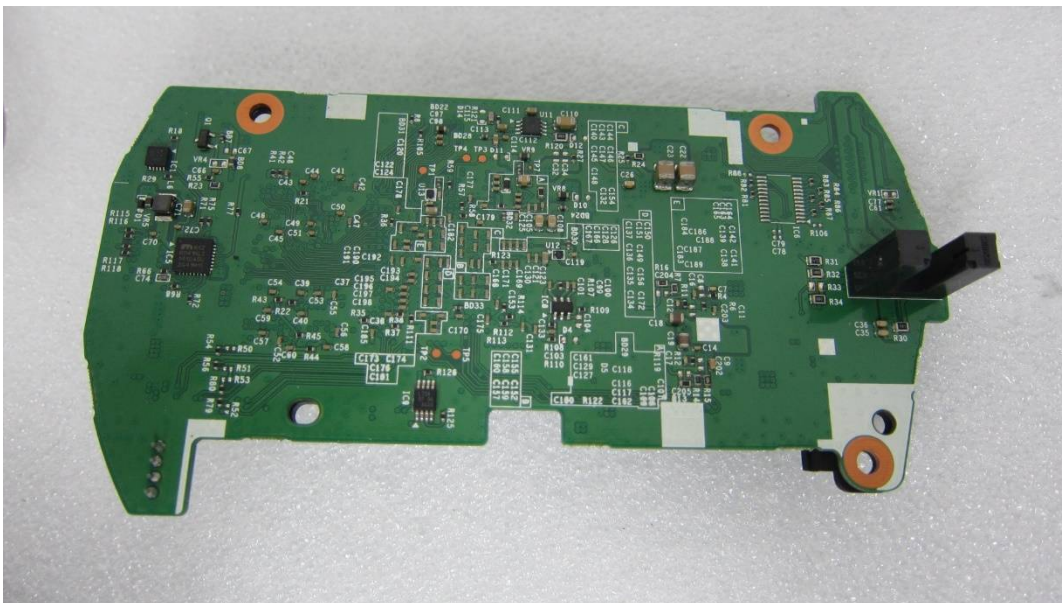


## EUT Internal View – Sub Board3

(Top)



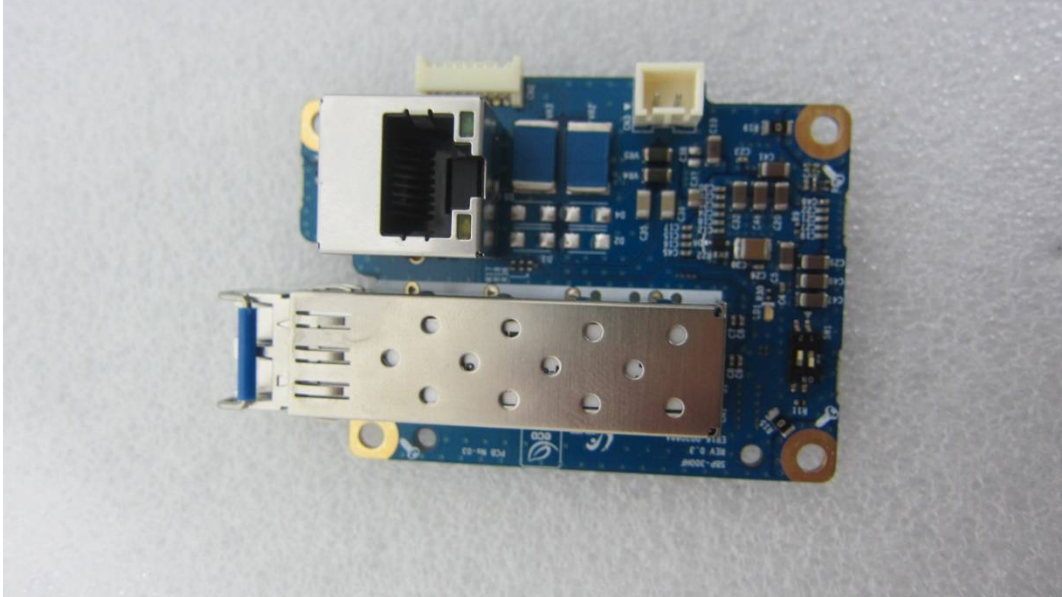
(Bottom)



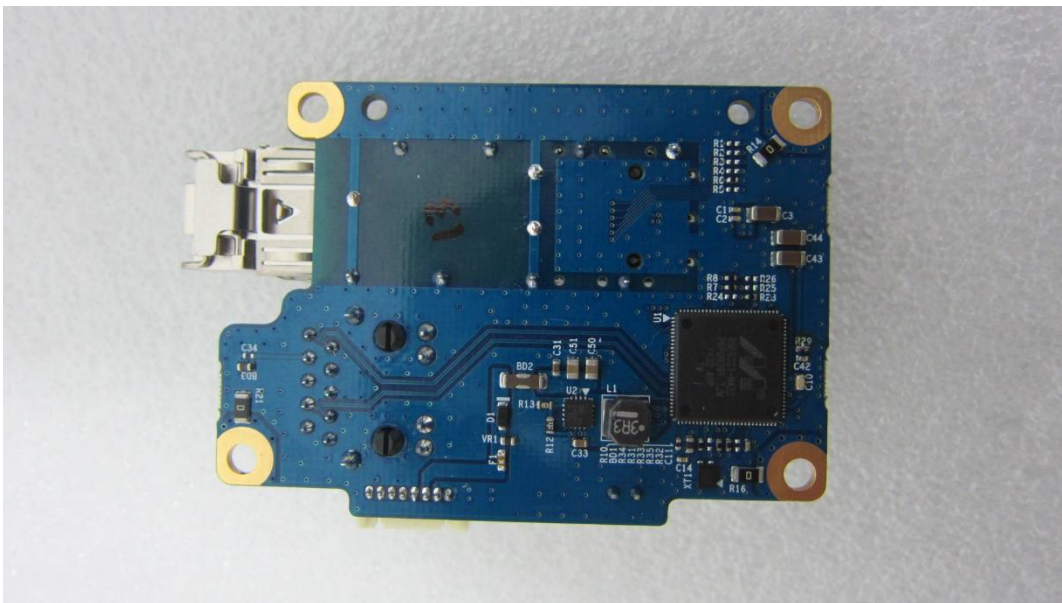


## EUT Internal View – Sub Board4

(Top)



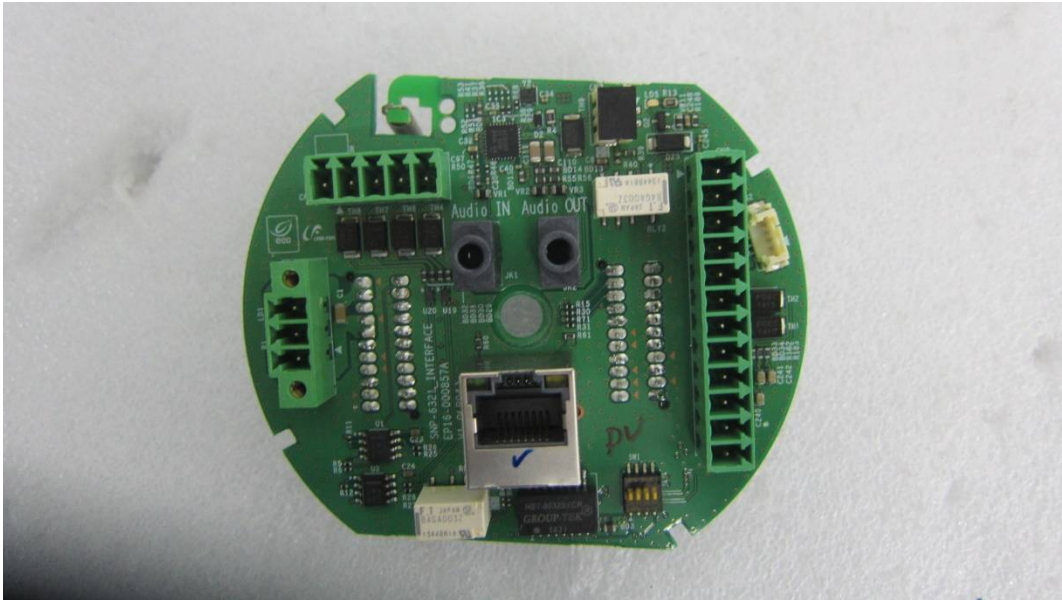
(Bottom)



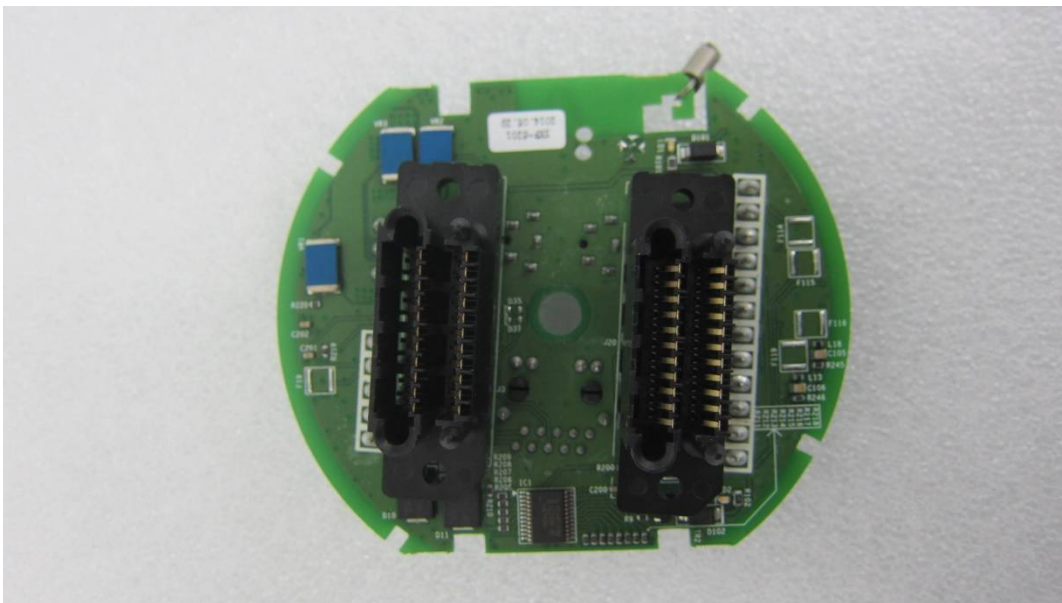
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.  
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.  
The authenticity of the test report, contact [shchoi@kes.co.kr](mailto:shchoi@kes.co.kr)

## EUT Internal View – Sub Board5

(Top)



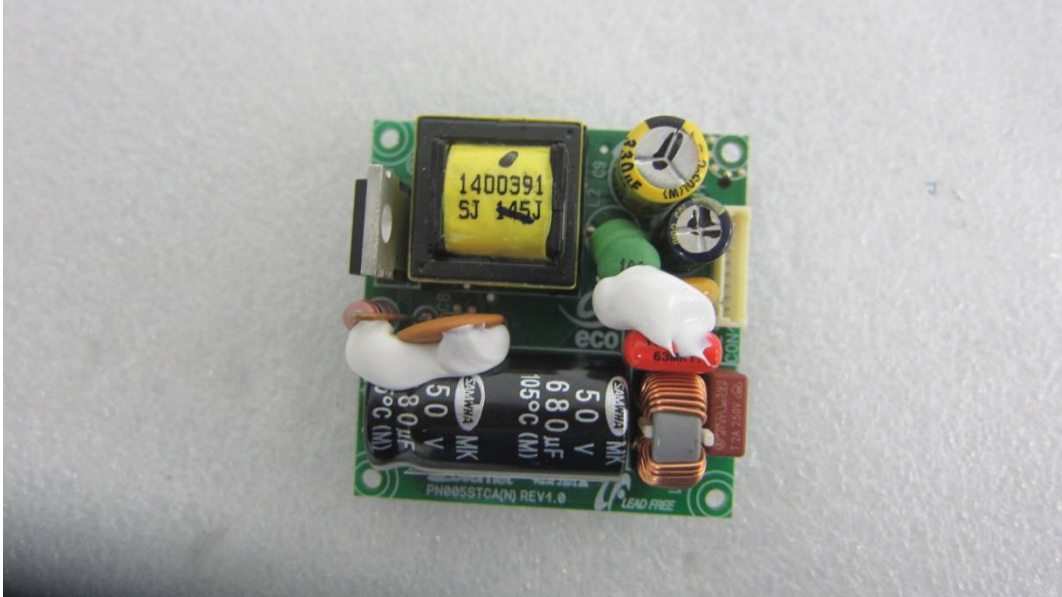
(Bottom)



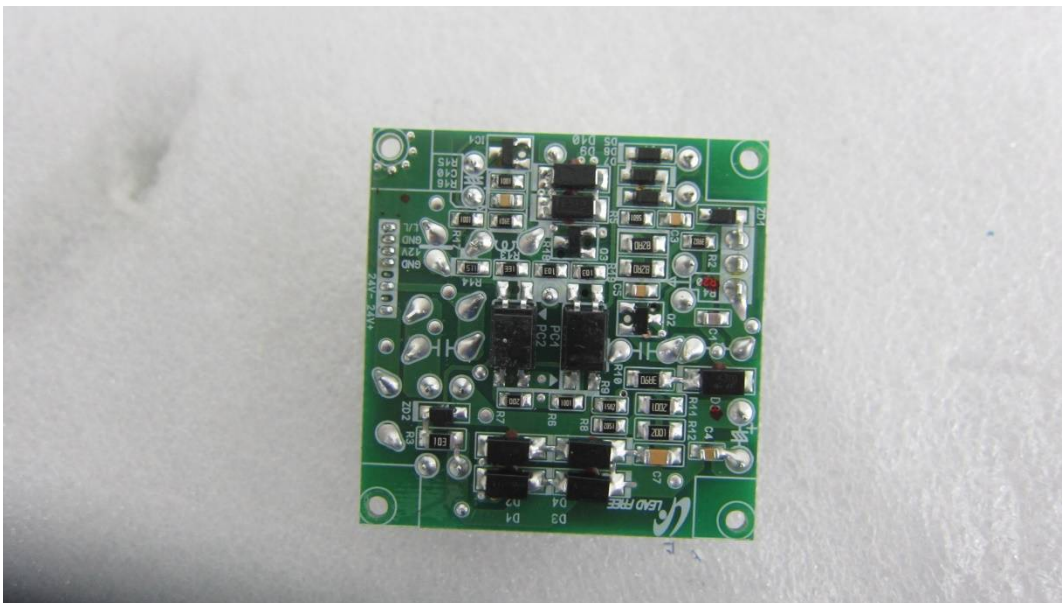
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.  
 The results shown in this test report refer only to the sample(s) tested unless otherwise stated.  
 The authenticity of the test report, contact shchoi@kes.co.kr

## EUT Internal View – Sub Board6

(Top)

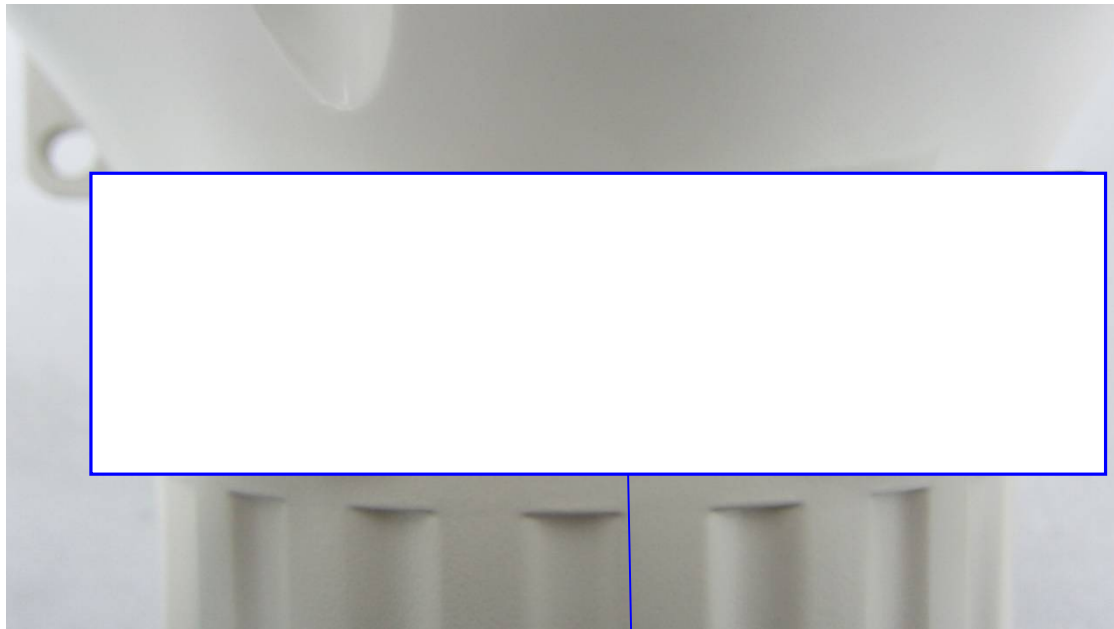


(Bottom)



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.  
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.  
The authenticity of the test report, contact shchoi@kes.co.kr

## Label and Location



### **NETWORK CAMERA**

Model No : SBP-301HF

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

Made in China

