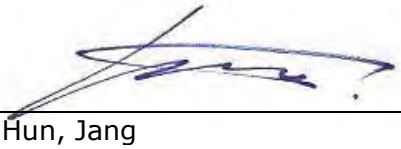
EMC TEST REPORT For CE

Test Report No.	:	KES- E2-18T0059
Date of Issue	:	Dec. 20, 2018
Product name	:	HOME CAMERA
Model/Type No.	:	SNH-P6415BN
Variant Model	:	SNH-P6416BN, SNH-C6415BN, SNH-C6415BNB
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	:	Nov. 14, 2018
Test date	:	Dec. 17, 2018 ~ Dec. 18, 2018
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
Dec. 20, 2018	KES-E2-18T0059	Issued

TABLE OF CONTENTS

1.0 General Product Description

Main Specifications of E.U.T are:

Item	Description
Wireless	WiFi 802.11a/b/g/n/ac (Dual Band) , BLE
Operating Power	AC 230 V / 50 Hz (Adapter DC 5 V / 2 A)
Video Compression Format	H.264
Audio Communication	2-way Audio with Echo Cancellation
Digital Zoom	4x(Mobile)
App viewer	Supported OS : iOS, Android
Recording	Micro SD Card
Size	(48 x 135 x 32) ㎜

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

Adding derivatives with simple color changes.

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
HOME CAMERA	SNH-P6415BN	-	Hanwha Techwin (Tianjin) Co., Ltd.	EUT
AC/DC Adapter	SLU10	-	SOLU M	-

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
Smart Phone	SM-G950	-	Samsung Electronics Co., Ltd.	-
Wireless Router	A2004plus	-	Iptime	-
Wireless Router Adapter	TY-2007	-	Zioncoin Electronics (Shenzhen) Ltd.	-
Micro SD Card	-	-	Sandisk	-

1.6 External I/O Cabling

Start		END		Cable Spec.	
Description	**I/O Port**	**Description**	**I/O Port**	**Length**	**Shield**
HOME CAMERA (EUT)	USB C Type	AC/DC Adapter	USB	3.5	U
	Micro SD Card Slot	Micro SD Card	Micro SD Card Slot	-	-
	Wireless	Wireless Router	Wireless	-	-
Wireless Router	Wireless	Smart Phone	Wireless	-	-

* Unshielded=U, Shielded=S

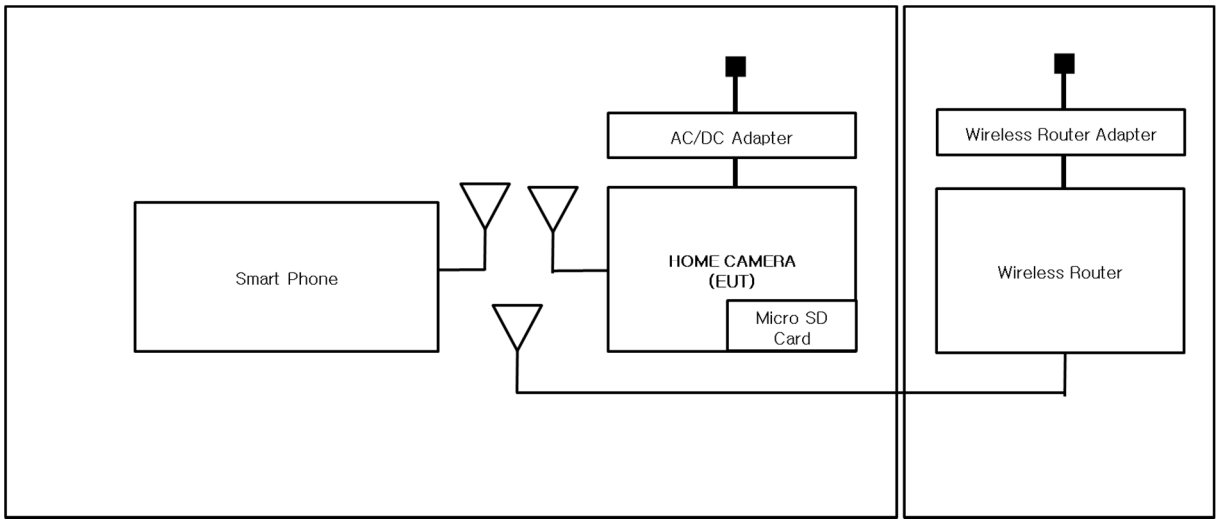
1.7 EUT Operating Mode(s)

operating
We checked the video using smartphone, confirmed the wifi connection status through Smart Cam+ program.

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, Yeoju-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-4308, C-4798, T-2311, G-914
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 17 07 01633 001

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 55032:2015	☒ Class A	☐ Class B
☒ EN 55024:2010 +A1:2015		
☐ EN 50130-4:2011+A1:2014		
☒ EN 61000-3-2:2014		
☒ EN 61000-3-3:2013		
☐ EN 61326-1:2013		

☐ **VCCI V-3 / 2015.04** ☐ Class A ☐ Class B

☐ **AS/NZS:2013** ☐ Class A ☐ Class B

☐ **47 CFR Part 15, Subpart B**

- ☐ CISPR 22:2009 +A1:2010 ☐ Class A ☐ Class B
- ☐ ANSI C63.4-2014

☐ **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
Dec. 17, 2018

Test Location
Electro wave Shieldroom #6

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, 25, 2019
☒	LISN	ENV216	R & S	101787	01, 05, 2019
☒	LISN	ESH2-Z5	R & S	100450	04, 25, 2019
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	11, 26, 2019

Test Conditions
Temperature: 20,9 ℃
Relative Humidity: 50,8 % R.H.
.

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, 25, 2019
☐	LISN	ENV216	R & S	101137	01, 31, 2019
☐	LISN	ENV216	R & S	101786	04, 25, 2019
☐	8-WIRE ISN CAT3	CAT3 8158	SCHWARZBECK	8158-0019	03, 22, 2019
☐	8-WIRE ISN CAT5	CAT5 8158	SCHWARZBECK	8158-0030	03, 22, 2019
☐	8-WIRE ISN CAT6	NTFM 8158	SCHWARZBECK	8158-0029	10, 08, 2019

Test Conditions
Temperature: ℃
Relative Humidity: % R.H.

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
Dec. 17, 2018

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

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, 11, 2019
☒	AMPLIFIER	SCU 01	R & S	100603	11, 26, 2019
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	714	11, 26, 2020

Test Conditions
Temperature: 20,1 ℃
Relative Humidity: 50,4 % R.H.

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
Dec. 17, 2018

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, 06, 2019
☒	PREAMPLIFIER	8449B	AGILENT	3008A01967	05, 31, 2019
☒	ATTENUATOR	8491A	HP	35496	03, 21, 2019
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	05, 02, 2019

Test Conditions
Temperature: 20,4 ℃
Relative Humidity: 51,0 % R.H.

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
Dec. 18, 2018

Test Location
Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	dpa.control	EM TEST	5.4.8.0	-
☒	DIGITAL POWER ANALYZER	DPA 500N	EM TEST	V1024106759	08, 08, 2019
☒	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

Test Conditions
Temperature: 20,4 ℃
Relative Humidity: 51,9 % 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
See Appendix A for test data.

2.6 Voltage Fluctuations and Flicker

Test Date
Dec. 18, 2018

Test Location
Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	dpa.control	EM TEST	5.4.8.0	-
☒	DIGITAL POWER ANALYZER	DPA 500N	EM TEST	V1024106759	08, 08, 2019
☒	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

Test Conditions
Temperature: 20,4 ℃
Relative Humidity: 51,9 % R.H.

Test Results
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks
See Appendix A for test data.

3.0 Criteria for compliance

Criteria for compliance was based on the following guidelines:

General performance criteria

The manufacturer has the obligation to express the performance criteria in terms which relate to the performance of his specific product when used as intended.

The following performance criteria are applicable, and shall only be evaluated when the functions referred to are implemented.

Examples of functions defined by the manufacturer to be evaluated during testing include, but are not limited to, the following:

– essential operational modes and states;

– tests of all peripheral access (hard disks, floppy disks, printers, keyboard, mouse, etc.);

– quality of software execution;

– quality of data display and transmission;

– quality of speech transmission.

Performance criterion A

During and after the test the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a minimum performance level specified by the manufacturer when the EUT is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the EUT if used as intended.

Performance criterion B

After the test, the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the EUT is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test.

If the minimum performance level (or the permissible performance loss) is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the EUT if used as intended.

Performance criterion C

During and after testing, a temporary loss of function is allowed, provided the function is self recoverable, or can be restored by the operation of the controls or cycling of the power to the Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

EUT by the user in accordance with the manufacturer’s instructions.

3.1 Electrostatic Discharge

Reference Standard
EN 61000-4-2:2009

Test Date
Dec. 18, 2018

Test Location
EMS-ESD: Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	ESD SIMULATOR	ESS-2000	Noise Ken	ESS05X4620	02, 21, 2019
☒	HCP	-	Noise Ken	-	-
☒	VCP	-	Noise Ken	-	-

Test Conditions
Temperature: 20,4 ℃
Relative Humidity: 51,9 % R.H.
Atmospheric Pressure: 101,0 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:

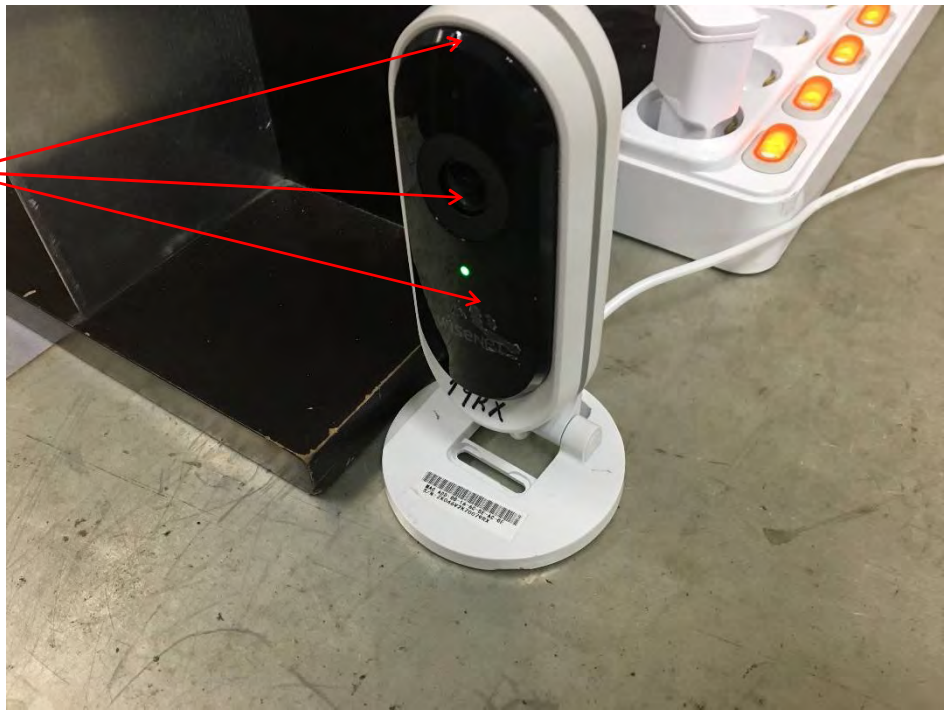
Contact	Air	HCP	VCP
☒ 2 kV	☒ 2 kV	☒ 2 kV	☒ 2 kV
☒ 4 kV	☒ 4 kV	☒ 4 kV	☒ 4 kV
☐ 6 kV	☐ 6 kV	☐ 6 kV	☐ 6 kV
☐ 8 kV	☒ 8 kV	☐ 8 kV	☐ 8 kV
☐ 15 kV	☐ 15 kV	☐ 15 kV	☐ 15 kV

Notes: HCP: Horizontal coupling plane
VCP: Vertical coupling plane
Required Performance Criteria: ☒ B

Location of Discharge:

Air →
Contact →

1



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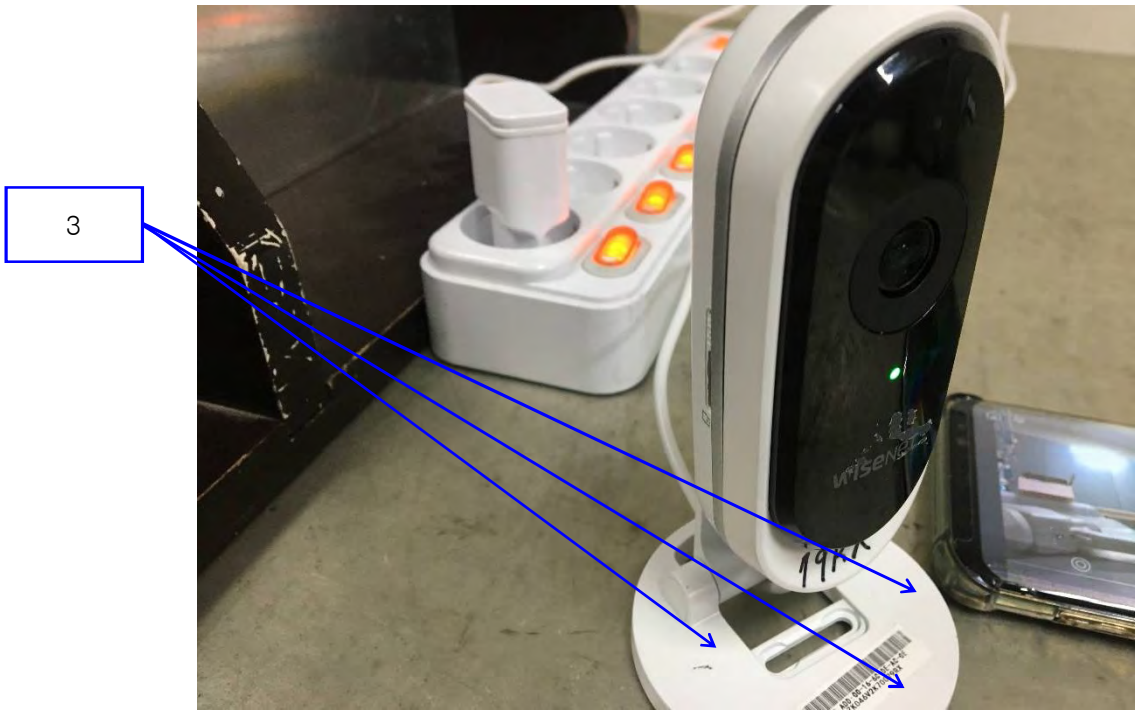


Test Data

Indirect Discharge

No.	Test Point	Discharge Method	Performance		Remarks
			Criteria	Results	
1	HCP Contact	Contact Discharge	B	A	-
2	VCP Contact	Contact Discharge	B	A	-

Direct Discharge

No.	Test Point	Discharge Method	Performance		Remarks
			Criteria	Criteria	
1	Front Enclosure	Air Discharge	B	A	-
2	Port	Air Discharge	B	A	-
3	Pedestal Enclosure	Contact Discharge	B	A	-

Note: "Blank" = Not performed

Results:
A – No degradation of function
B – Distortion/Error of function (self-recoverable)
C – Loss of function

Test Results

☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria

Remarks

N/A

3.2 Radiated Electric Field Immunity

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

Test Date
Dec. 17, 2018

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, 06, 2019
☒	BROADBAND AMPLIFIER	BBA100	R & S	101239	08, 06, 2019
☒	BROADBAND AMPLIFIER	100S1G6M1	AR	579931	08, 06, 2019
☒	POWER METER	NRP2	R & S	103475	08, 06, 2019
☒	AVG POWER SENSOR	NRP-Z91	R & S	102526	08, 06, 2019
☒	AVG POWER SENSOR	NRP-Z91	R & S	102527	08, 06, 2019
☒	STACKED DOUBLE LOG-PER- ANTENNA	STPL9128 E	Schwarzbeck	9128ES-121	-
☐	DIRECTIONAL COUPLER	KYDC-D1070-DX40	KY TELECOM	KY150001	08, 06, 2019
☐	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	05, 02, 2019

Test Conditions

Temperature: 20,4 ℃
Relative Humidity: 51,0 % R.H.
Atmospheric Pressure: 100,8 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: ☒ A

Test Data

Side Exposed	Performance Criteria	Results	
		Horizontal	Vertical
Front	A	A	A
Right	A	A	A
Back	A	A	A
Left	A	A	A

Note: "Blank" = Not performed

Results:
A – No degradation of function
B – Distortion/Error of function (self-recoverable)
C – Loss of function

Test Results

☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria

Remarks

N/A

3.3 Electrical Fast Transients/Bursts

Reference Standard
EN 61000-4-4:2012

Test Date
Dec. 18, 2018

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	AMETEK CTS	7.1.2	-
☒	ULTRA COMPACT SIMULATOR	UCS 500 N5	EM TEST	V0936105120	06, 26, 2019
☒	MOTOR VARIAC	MV2616	EM TEST	V0936105123	06, 26, 2019
☐	CAPACITIVE COUPLING CLAMP	HFK	EM TEST	070925	06, 26, 2019

Test Conditions

Temperature:	20,4 ℃
Relative Humidity:	51,9 % R.H.
Atmospheric Pressure:	101,0 ㎪

Test Specifications

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

Test Data

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

Mode of Application	Performance Criteria	Results	
		(+) Burst (㎸)	(-) Burst (㎸)
L	B	A	A
N	B	A	A
L – N	B	A	A

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

Mode of Application	Performance Criteria	Results	
		(+) Burst (㎸)	(-) Burst (㎸)
-	B	-	-

☐ Signal ports and telecommunication ports – Coupling Clamp used

Mode of Application	Performance Criteria	Results	
		(+) Burst (㎸)	(-) Burst (㎸)
-	B	-	-

Note: "Blank" = Not performed
Results:
A – No degradation of function
B – Distortion/Error of function (self-recoverable)
C – Loss of function

Test Results

☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria

Remarks

N/A

3.4 Surge Transients

Reference Standard
EN 61000-4-5:2014

Test Date
Dec. 18, 2018

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	AMETEK CTS	7.1.2	-
☒	ULTRA COMPACT SIMULATOR	UCS 500 N5	EM TEST	V0936105120	06, 26, 2019
☒	MOTOR VARIAC	MV2616	EM TEST	V0936105123	06, 26, 2019
☐	CDN	CNV 508N1	EM TEST	P1551168979	04, 25, 2019
☐	CDN	CNV 508T5	EM TEST	P1549168422	04, 25, 2019

Test Conditions
Temperature: 20,4 ℃
Relative Humidity: 51,9 % R.H.
Atmospheric Pressure: 101,0 ㎪

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: ☒ B

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: ☐ B

Test Data

☒ Line to Line – Differential Mode

Mode of Application	Performance Criteria	Results	
		(+) Surge (kV)	(-) Surge (kV)
L - N	B	A	A

☐ Line to Earth – Common Mode

Mode of Application	Performance Criteria	Results	
		(+) Surge (kV)	(-) Surge (kV)
-	B	-	-

Signal Lines

☐ Line to Earth – Common Mode

Mode of Application	Performance Criteria	Results	
		(+) Surge (kV)	(-) Surge (kV)
-	B	-	-

Note: "Blank" = Not performed

Results:
A – No degradation of function
B – Distortion/Error of function (self-recoverable)
C – Loss 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
Dec. 18, 2018

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, 26, 2019
☒	ATTENUATOR	ATT 6/80	EM TEST	P1614178148	11, 26, 2019
☒	CDN	CDN M016	TESEQ	43694	11, 26, 2019

Test Conditions

Temperature:	21,4 ℃
Relative Humidity:	50,2 % R.H.
Atmospheric Pressure:	100,9 kPa

Test Specifications

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

Test Data

☒ Input a.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Performance Criteria	Results
L – N	CDN	A	A

☐ Input d.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Performance Criteria	Results
-	-	-	-

☐ Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Performance Criteria	Results
-	-	-	-

Notes: CDN = Coupling Decoupling Network
EMC = Electro Magnetic Clamp
"blank" = Not performed

Results:
A – No degradation of function
B – Distortion/Error of function (self-recoverable)
C – Loss of function

Test Results

☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria

Remarks

N/A

3.6 Voltage Dips and Short Interruptions

Reference Standard
EN 61000-4-11:2004

Test Date
Dec. 18, 2018

Test Location
EMS-Voltage dip: Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	iec.control	AMETEK CTS	7.1.2	-
☒	ULTRA COMPACT SIMULATOR	UCS 500 N5	EM TEST	V0936105120	06, 26, 2019
☒	MOTOR VARIAC	MV2616	EM TEST	V0936105123	06, 26, 2019

Test Conditions

Temperature:	20,4 ℃
Relative Humidity:	51,9 % R.H.
Atmospheric Pressure:	101,0 kPa

Test Specifications & Observations/Remarks

Voltage Dips

NO	Depth	Duration	Performance		Remarks
			Criteria	Results	
1	>95 %	0.5	B	A	-
2	30 %	25	C	A	-
3	>95 %	250	C	B	-

Observations:
A – No response observed from E.U.T
B – Unit shuts down then automatically restarts when full voltage is restored.
C – Unit shuts down then manually restarts when full voltage is restored or Loss of function.

Test Results

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

Remarks

During the interruption test (95%, 300T), EUT was turned off but after the test, it was recovered by operator is intenrention.

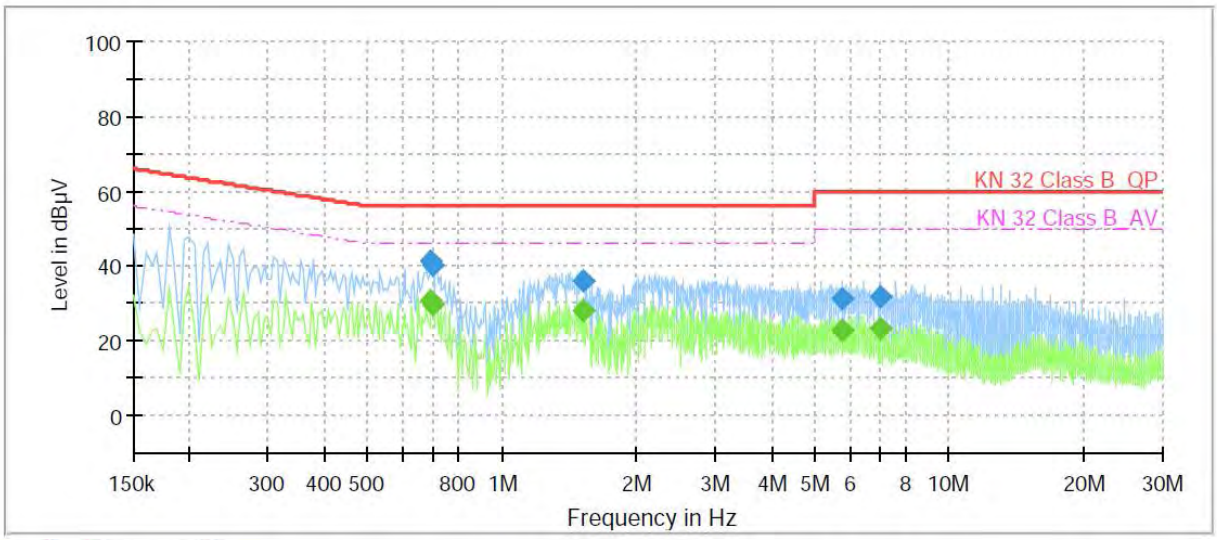
APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

[HOT]

Common Information

Test Description:	Conducted Emission
Model No.:	SNH-P6415BN
Mode	EN 55032
Operator Name:	KES



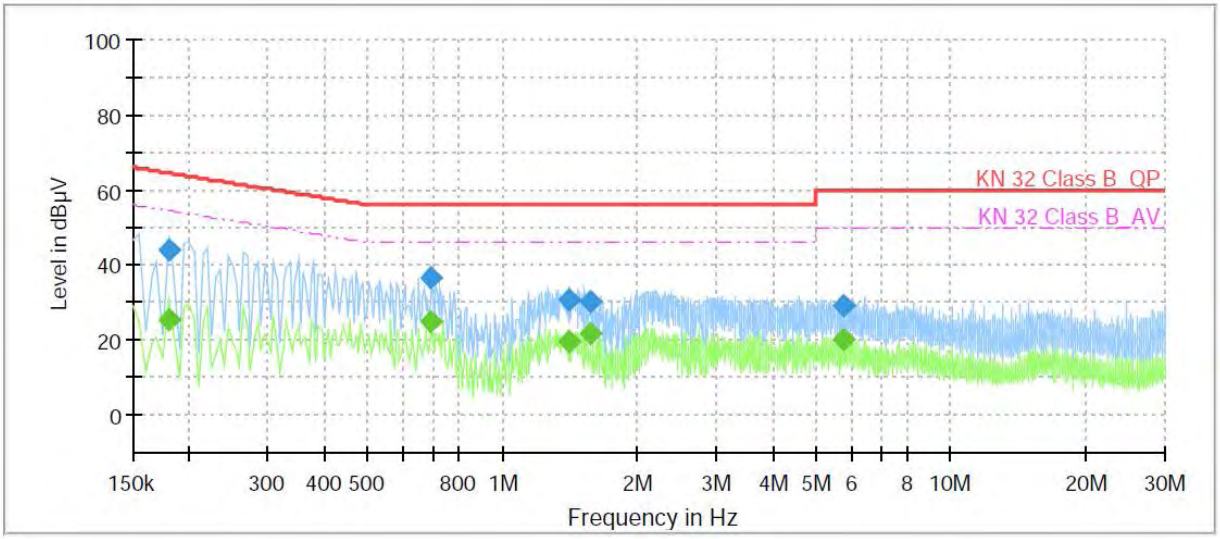
Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.695000	---	30.88	46.00	15.12	1000.0	9.000	L1	19.9
0.695000	41.14	---	56.00	14.86	1000.0	9.000	L1	19.9
0.700000	---	29.63	46.00	16.37	1000.0	9.000	L1	19.9
0.700000	40.26	---	56.00	15.74	1000.0	9.000	L1	19.9
1.525000	---	28.32	46.00	17.68	1000.0	9.000	L1	20.2
1.525000	36.25	---	56.00	19.75	1000.0	9.000	L1	20.2
5.785000	---	22.56	50.00	27.44	1000.0	9.000	L1	19.7
5.785000	31.37	---	60.00	28.63	1000.0	9.000	L1	19.7
7.005000	---	23.51	50.00	26.49	1000.0	9.000	L1	19.7
7.005000	31.78	---	60.00	28.22	1000.0	9.000	L1	19.7

[NEUTRAL]

Common Information

Test Description:	Conducted Emission
Model No.:	SNH-P6415BN
Mode	EN 55032
Operator Name:	KES



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.180000	---	25.44	54.49	29.05	1000.0	9.000	N	19.5
0.180000	44.07	---	64.49	20.42	1000.0	9.000	N	19.5
0.695000	---	25.13	46.00	20.87	1000.0	9.000	N	19.9
0.695000	36.45	---	56.00	19.55	1000.0	9.000	N	19.9
1.410000	---	19.54	46.00	26.46	1000.0	9.000	N	20.2
1.410000	30.70	---	56.00	25.30	1000.0	9.000	N	20.2
1.570000	---	21.63	46.00	24.37	1000.0	9.000	N	20.2
1.570000	30.13	---	56.00	25.87	1000.0	9.000	N	20.2
5.790000	---	20.29	50.00	29.71	1000.0	9.000	N	19.7
5.790000	28.95	---	60.00	31.05	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))

Conducted Emissions at Telecommunication Ports

[10 Mbps]

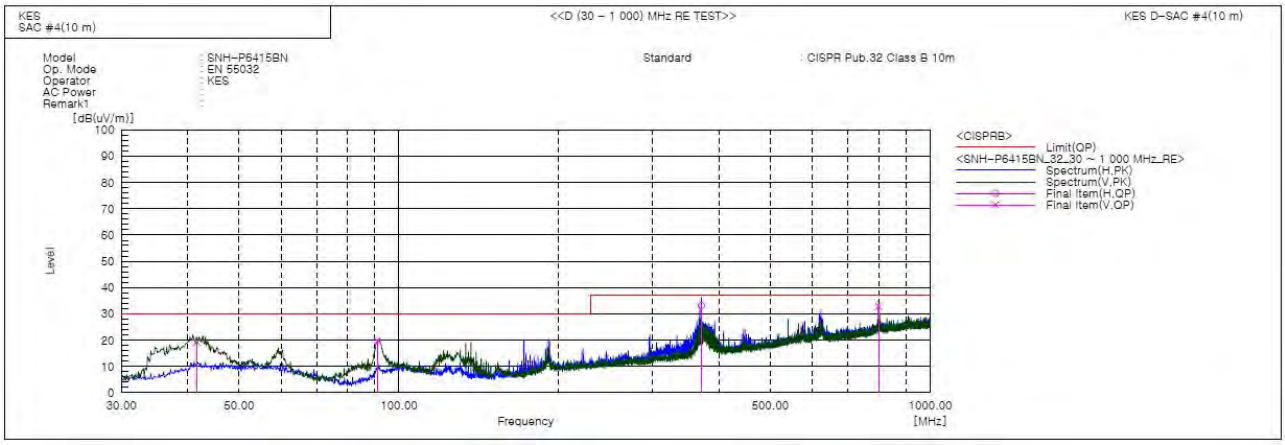
N/A

[1 000 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))

Radiated Electric Field Emissions(Below 1 ㎓)

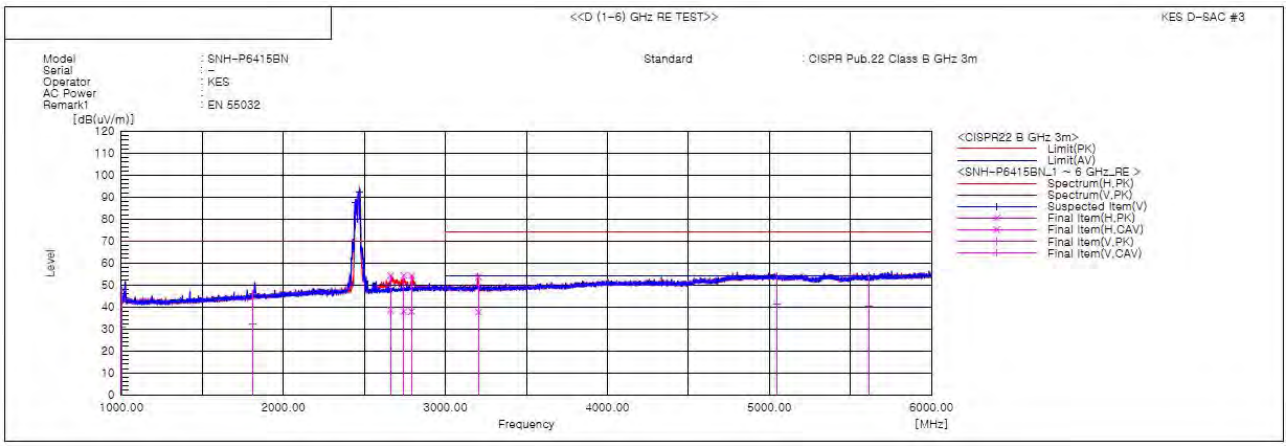


Final Result

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	41.637	V	48.0	-28.8	19.2	30.0	10.8	138.0	225.0	
2	91.316	V	50.0	-30.4	19.6	30.0	10.4	119.0	22.0	
3	371.186	H	55.5	-22.3	33.2	37.0	3.8	400.0	177.0	
4	800.060	V	46.2	-13.4	32.8	37.0	4.2	154.0	54.0	

♦ Calculation – SEMI ANECHOIC CHAMBER #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 ㎓)



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB(1/m)]	Result PK [dB(uV/m)]	Result CAV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin CAV [dB]	Height [cm]	Angle [deg]	Remark
1	1004.144	V	49.6	32.7	-1.9	47.7	30.8	70.0	50.0	22.3	19.2	100.0	246.1	
2	1810.173	V	43.5	29.9	2.6	46.1	32.5	70.0	50.0	23.9	17.5	100.0	352.7	
3	2660.411	H	47.7	31.9	6.6	54.3	38.5	70.0	50.0	15.7	11.5	100.0	19.1	
4	2743.827	H	47.4	31.0	6.9	54.3	37.9	70.0	50.0	15.7	12.1	100.0	4.5	
5	2789.992	H	47.2	30.8	7.1	54.3	37.9	70.0	50.0	15.7	12.1	100.0	9.0	
6	3204.939	H	45.9	30.0	7.7	53.6	37.7	74.0	54.0	20.4	16.3	100.0	8.0	
7	5045.428	V	39.8	26.6	14.5	54.3	41.1	74.0	54.0	19.7	12.9	100.0	72.8	
8	5612.109	V	39.9	26.0	14.5	54.4	40.5	74.0	54.0	19.6	13.5	100.0	315.6	
9	2441.000	V	--------	--------	5.8	--------	--------	70.0	50.0	--------	--------	100.0	71.1	
10	2467.000	V	--------	--------	5.9	--------	--------	70.0	50.0	--------	--------	100.0	66.0	

♦ Calculation
Result(PK/CAV) [㏈(㎶/m)] = (Reading(PK/CAV)[㏈(㎶)] + c.f[㏈(1/m)]
Margin(PK/CAV)[㏈] = Limit[㏈(㎶/m)] - Result(PK/CAV) [㏈(㎶/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

* Exclusion Band : 2.4 ㎓

Harmonic Current Emissions and Voltage Fluctuations and Flicker

Average harmonic current results

Hn	Ieff [A]	% of Limit	Limit [A]	Result
1	11.221E-3			
2	1.250E-3			PASS
3	9.367E-3	0.407	2.30	PASS
4	1.423E-3			PASS
5	9.207E-3	0.808	1.14	PASS
6	1.349E-3			PASS
7	8.691E-3	1.129	770.00E-3	PASS
8	1.138E-3			PASS
9	8.308E-3	2.077	400.00E-3	PASS
10	1.353E-3			PASS
11	7.868E-3	2.384	330.00E-3	PASS
12	968.998E-6			PASS
13	7.389E-3	3.519	210.00E-3	PASS
14	1.174E-3			PASS
15	6.789E-3	4.526	150.00E-3	PASS
16	897.890E-6			PASS
17	6.177E-3	4.667	132.35E-3	PASS
18	860.014E-6			PASS
19	5.586E-3	4.717	118.42E-3	PASS
20	833.043E-6			PASS
21	4.844E-3			PASS
22	815.960E-6			PASS
23	4.170E-3			PASS
24	1.090E-3			PASS
25	3.536E-3			PASS
26	810.526E-6			PASS
27	2.894E-3			PASS
28	840.168E-6			PASS
29	2.372E-3			PASS
30	847.404E-6			PASS
31	1.776E-3			PASS
32	841.657E-6			PASS
33	1.388E-3			PASS
34	986.430E-6			PASS
35	1.087E-3			PASS
36	841.244E-6			PASS
37	947.944E-6			PASS
38	847.278E-6			PASS
39	1.037E-3			PASS
40	846.913E-6			PASS

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
1	11.591E-3			
2	1.433E-3			PASS
3	9.604E-3	0.278	3.45	PASS
4	1.615E-3			PASS
5	9.382E-3	0.549	1.71	PASS
6	1.497E-3			PASS
7	8.925E-3	0.773	1.15	PASS
8	1.274E-3			PASS
9	8.444E-3	1.407	600.00E-3	PASS
10	1.530E-3			PASS
11	8.005E-3	1.617	495.00E-3	PASS
12	1.089E-3			PASS
13	7.501E-3	2.381	315.00E-3	PASS
14	1.408E-3			PASS
15	6.976E-3	3.101	225.00E-3	PASS
16	1.066E-3			PASS
17	6.331E-3	3.189	198.52E-3	PASS
18	986.831E-6			PASS
19	5.737E-3	3.230	177.63E-3	PASS
20	986.820E-6			PASS
21	4.998E-3			PASS
22	945.533E-6			PASS
23	4.318E-3			PASS
24	1.272E-3			PASS
25	3.705E-3			PASS
26	985.668E-6			PASS
27	3.043E-3			PASS
28	960.331E-6			PASS
29	2.704E-3			PASS
30	993.550E-6			PASS
31	1.948E-3			PASS
32	984.213E-6			PASS
33	1.517E-3			PASS
34	1.217E-3			PASS
35	1.294E-3			PASS
36	963.537E-6			PASS
37	1.087E-3			PASS
38	1.030E-3			PASS
39	1.222E-3			PASS
40	1.029E-3			PASS

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	0.028	1.00	PASS
Plt	0.028	0.65	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.114	4.00	PASS
Tmax [s]	0.000	0.50	PASS

Test Setup Photos and Configuration

Conducted Voltage Emissions

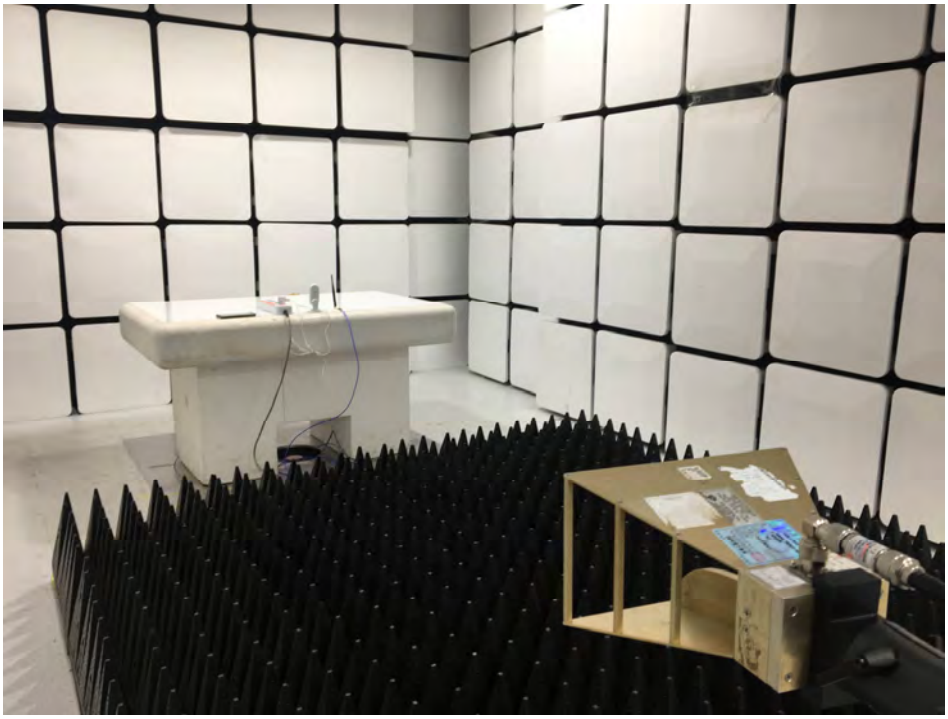
Conducted Telecommunication Emissions

N/A

N/A

Radiated Electric Field Emissions(Below 1 ㎓)

Radiated Electric Field Emissions(Above 1 ㎓)



Harmonic Current Emissions and Voltage Fluctuations and Flicker

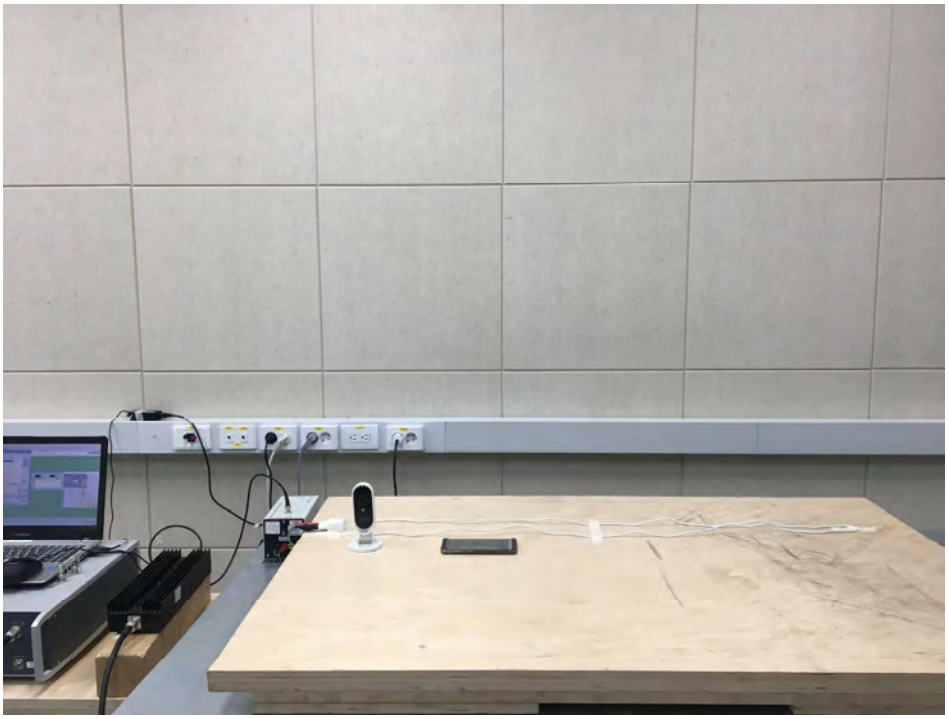
Electrostatic Discharge

Radiated Electric Field Immunity

Electrical Fast Transients/Bursts

Surge Transients

Conducted Disturbance



Voltage Dips and Short Interruptions

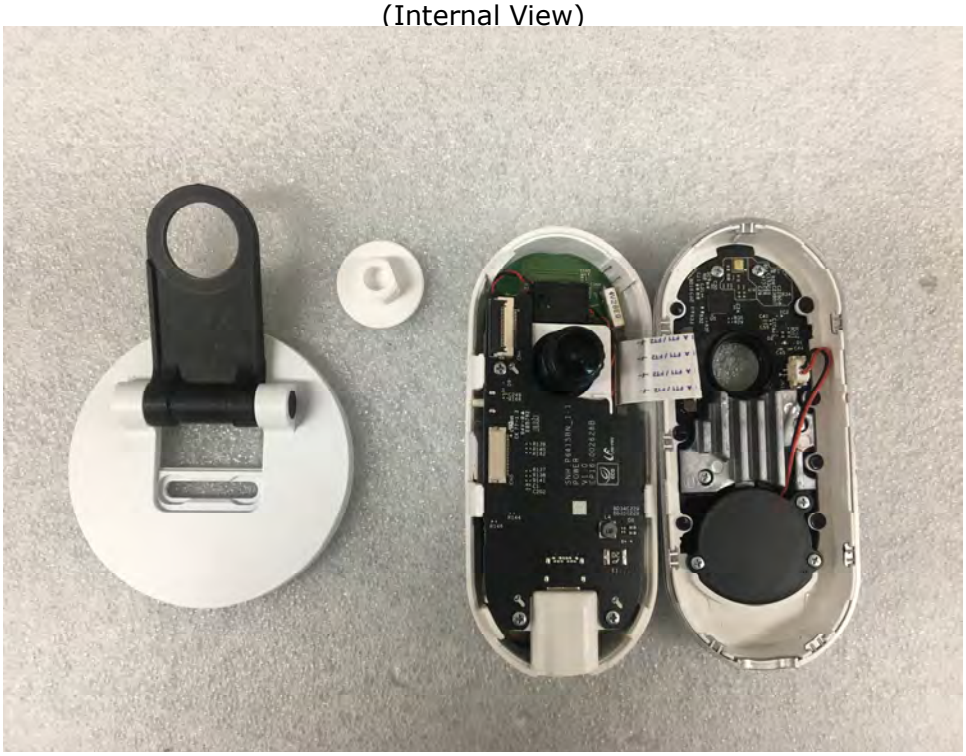
EUT External Photographs

(Top)

(Bottom)

EUT Internal Photographs

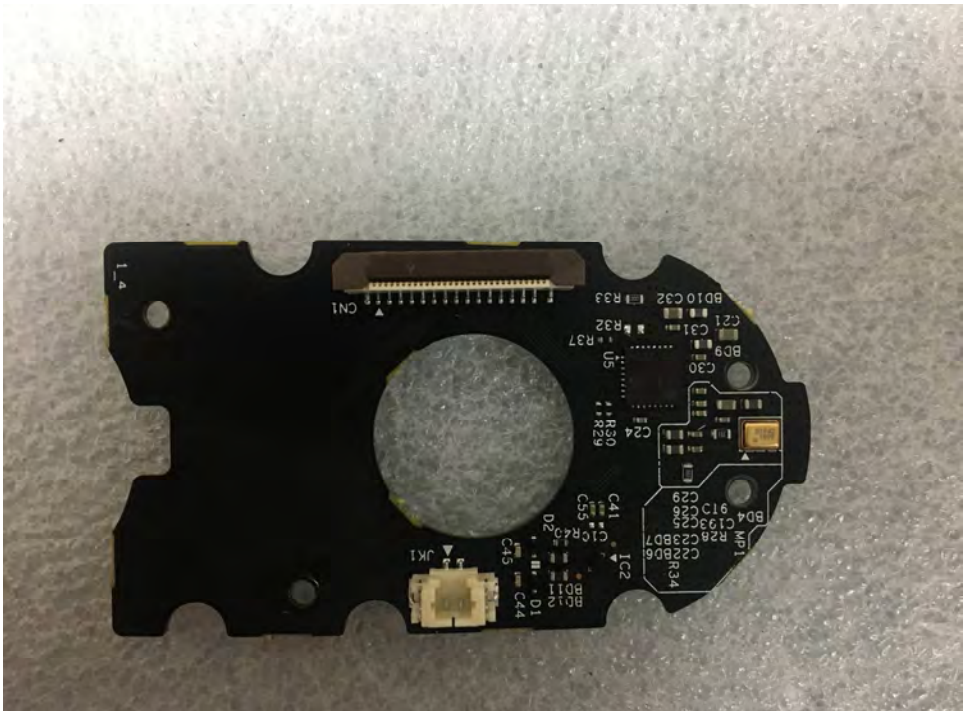
(Internal View)



EUT Internal View – Board 1

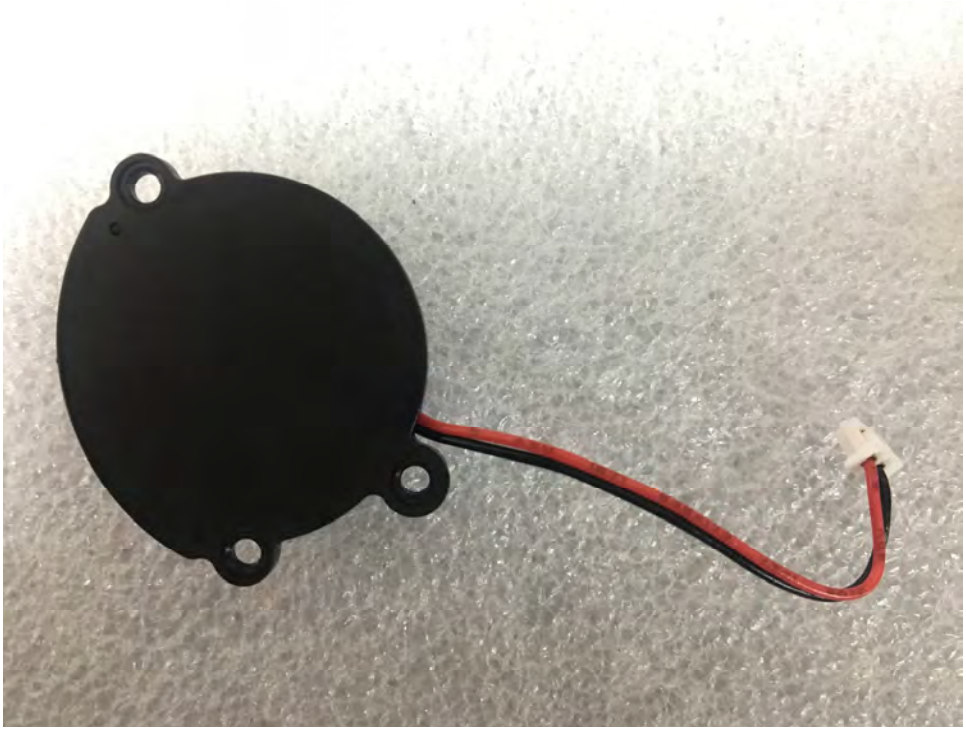
(Top)

(Bottom)



EUT Internal View – Board 2

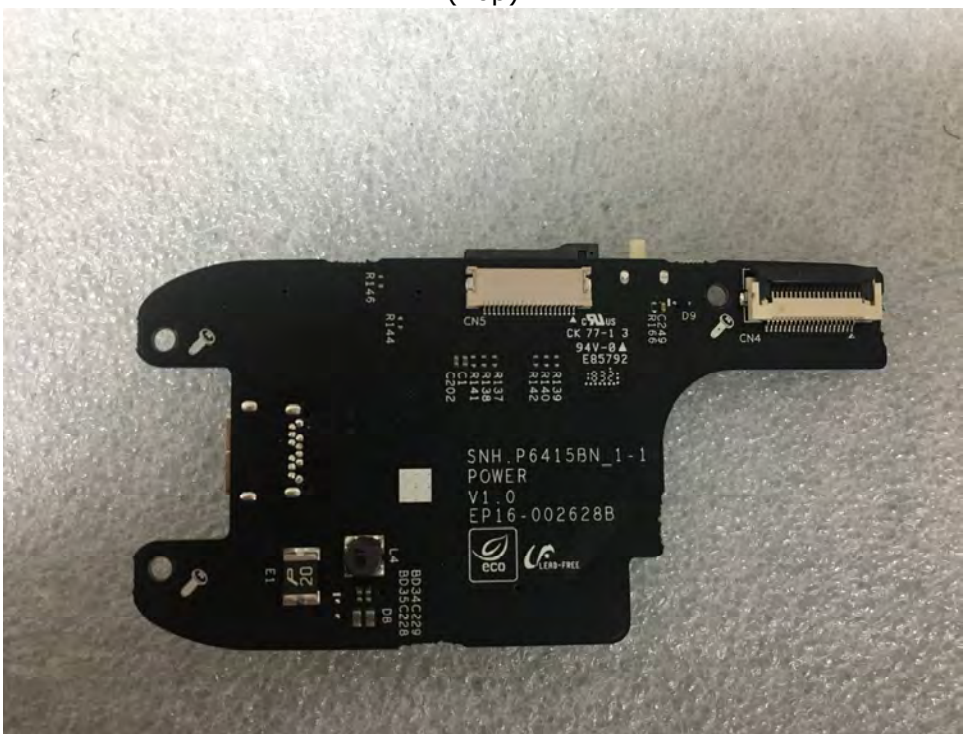
(Top)



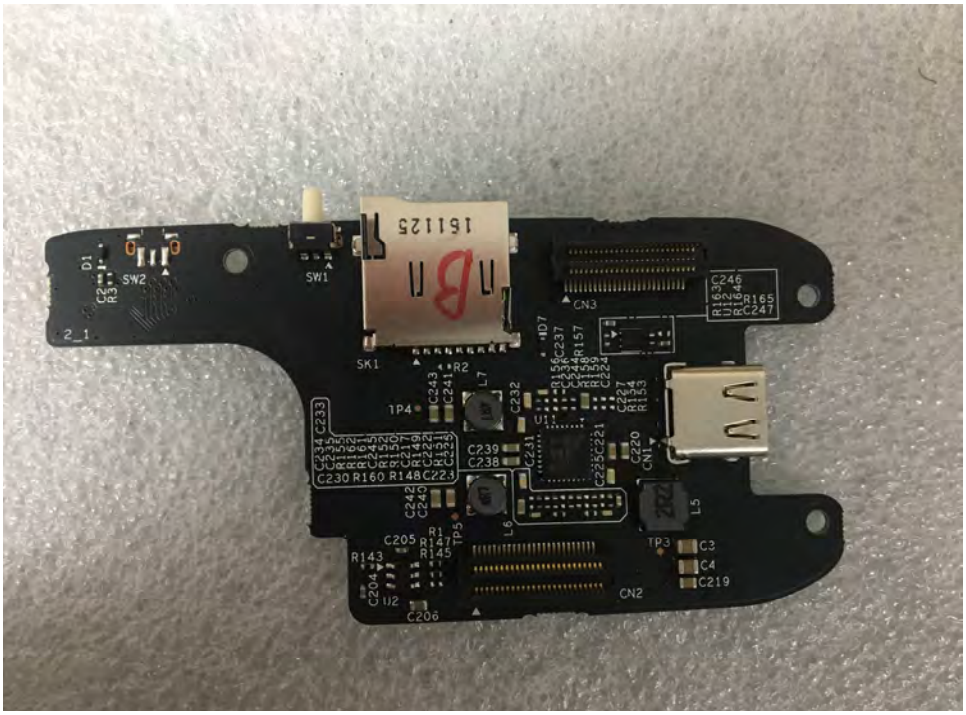
(Bottom)

EUT Internal View – Board 3

(Top)

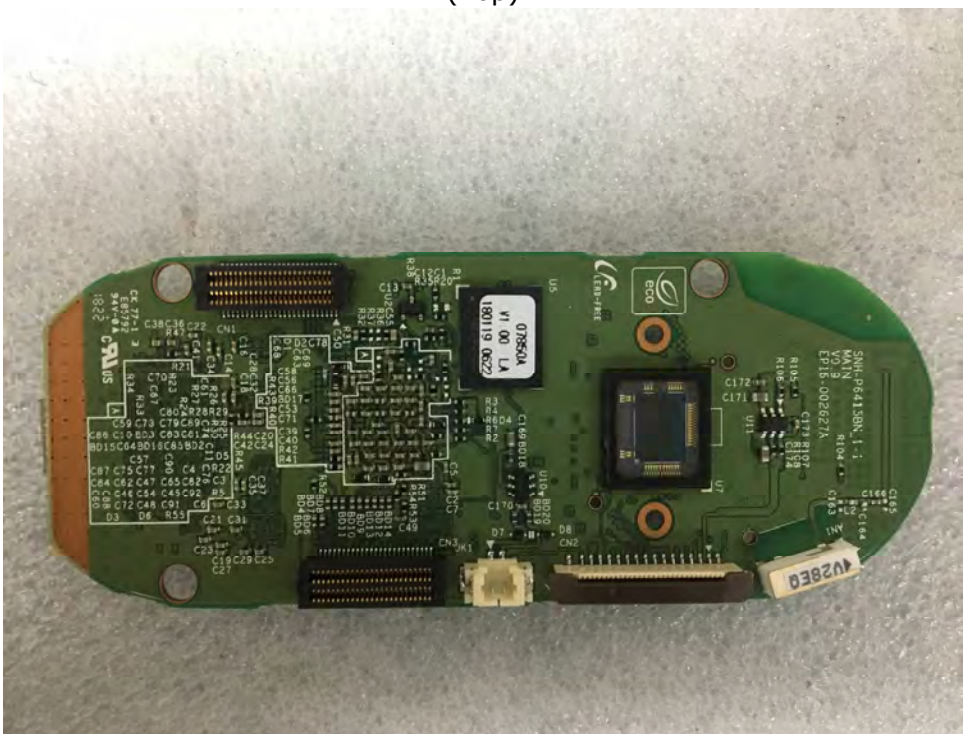


(Bottom)

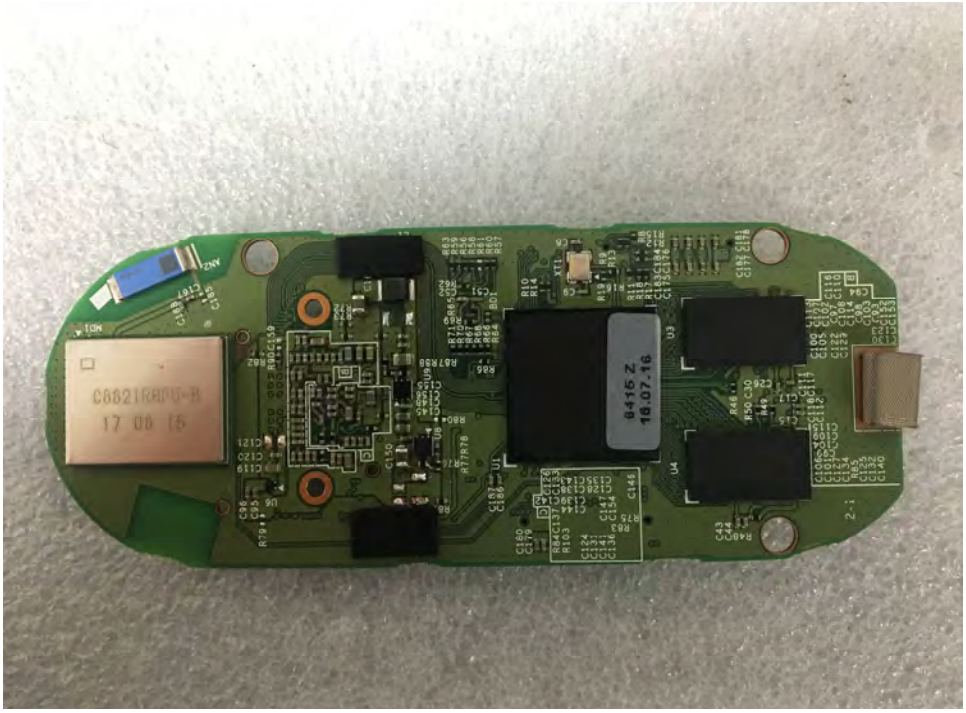


EUT Internal View – Board 4

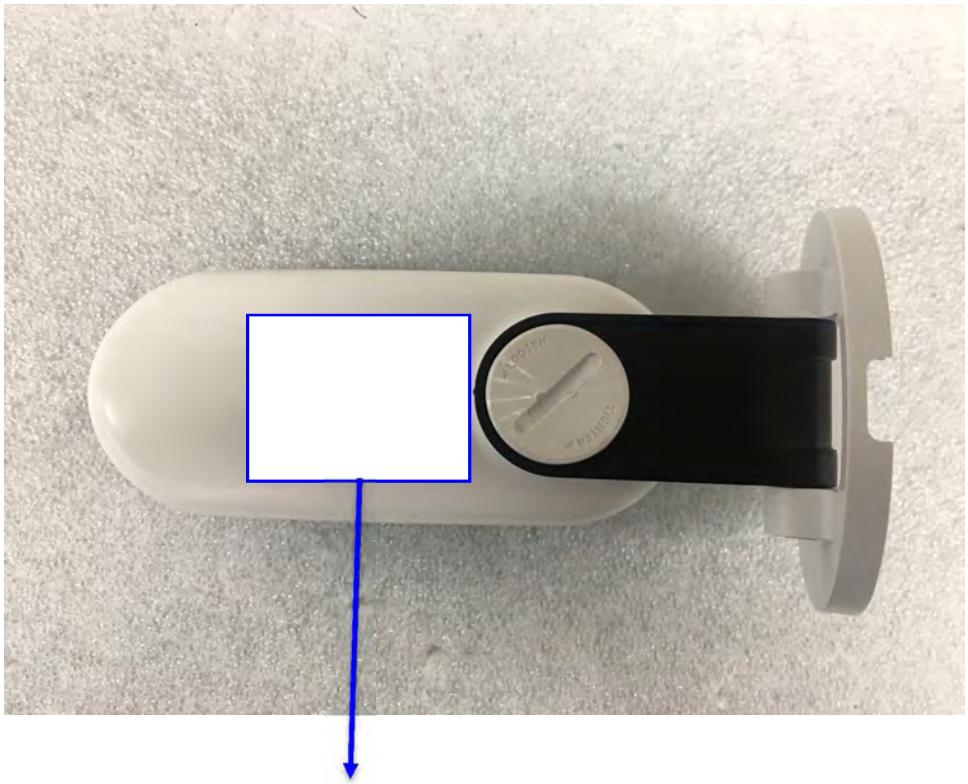
(Top)



(Bottom)



Label and Location



HOME CAMERA

Model No : SNH-P6415BN

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

Made in Korea

CE