

EMC TEST REPORT For CE

Test Report No. : KES-E1-18T0174-R1
Date of Issue : Sep. 17, 2018
Product name : PoE Switch
Model/Type No. : SPN-10080P
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. 01, 2018
Aug. 30, 2018
Test date : Feb. 09, 2018 ~ Feb. 10, 2018
Sep. 06, 2018 ~ Sep. 07, 2018
Test Results : **In Compliance** **Not in Compliance**

Tested by



Dong Il, Lee
EMC Test Engineer

Reviewed by



Dong-Hun, Jang
EMC Technical Manager

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REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Feb. 22, 2018	KES-E1-18T0174	Issued
Sep. 17, 2018	KES-E1-18T0174-R1	Additional test due to the standard update. (Radiated Electric Field Emission (Above 1 GHz), Radiated Electric Field Immunity)

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1.0 General Product Description

Main Specifications of EUT are:

PoE	
Maximum PoE Budget	64W
PoE Standard	IEEE 802.3af / 802.3at
PoE/PoE+ Ports	Port 1 ~ 8 : PoE/PoE+
Compatible Devices	
Network CCTV Devices	WiseNet Network Cameras, TRM NVR Series
Interface	
1000Base-T Interface	2 (M12, A-Code, 8P Female)
100Base-T PoE Interface	8 (M12, D-Code, 4P Female)
MDI/MDIX adjustable	Yes
Power Input	Molex 6P -> 6P Gender Included
Indicator	
LED	Power Status : 1 -> 0 Ethernet : Link 10-> 2, ACT 10 ->2 PoE Status : 8 -> PoE Link: 8
General	
Dimension (W x D x H)	270 x 134 x 93mm
Weight	TBD
Operation Temperature	-20 ~ 55°C
Operation/Storage Humidity	0% - 95% RH
Maximum Power Consumption	TBD
Power Input	9 ~ 36 VDC (Fanless)
Color/Material	Black / Al
Imgression	X



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
PoE Switch	SPN-10080P	-	Hanwha Techwin (Tianjin) Co.,Ltd	EUT

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
Notebook	LG15N54	410NZGK015231	LG ELECTRONICS CO., LTD.	-
AC/DC ADAPTER	ADP-90WH B	84ZW19F1663	DELTA ELECTRONICS (JIANGSU) LTD.	-
PoE CAMERA	SNV-6013P	-	HANWHA TECHWIN CO., LTD.	-

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Description	Model Number	Serial Number	Manufacturer	Remarks
Notebook	NT500R5M	0Q7491AJ800552B	SAMSUNG	-
AC/DC ADAPTER	A13-040N2A	AD-4019C	Chicony Power Technology Co., Ltd.	-
PoE CAMERA	SNV-6012M	-	SAMSUNG TECHWIN	-

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1.6 External I/O Cabling

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
PoE Switch (EUT)	RJ-45	Notebook	RJ-45	3.0	U
PoE Switch (EUT)	RJ-45	PoE CAMERA	RJ-45	3.0	S

* Unshielded=U, Shielded=S
 * 18T0174

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
PoE Switch (EUT)	RJ-45	Notebook	RJ-45	5.0	S
PoE Switch (EUT)	RJ-45	PoE CAMERA	RJ-45	5.0	S

* Unshielded=U, Shielded=S
 * 18T0174-R1

1.7 EUT Operating Mode(s)

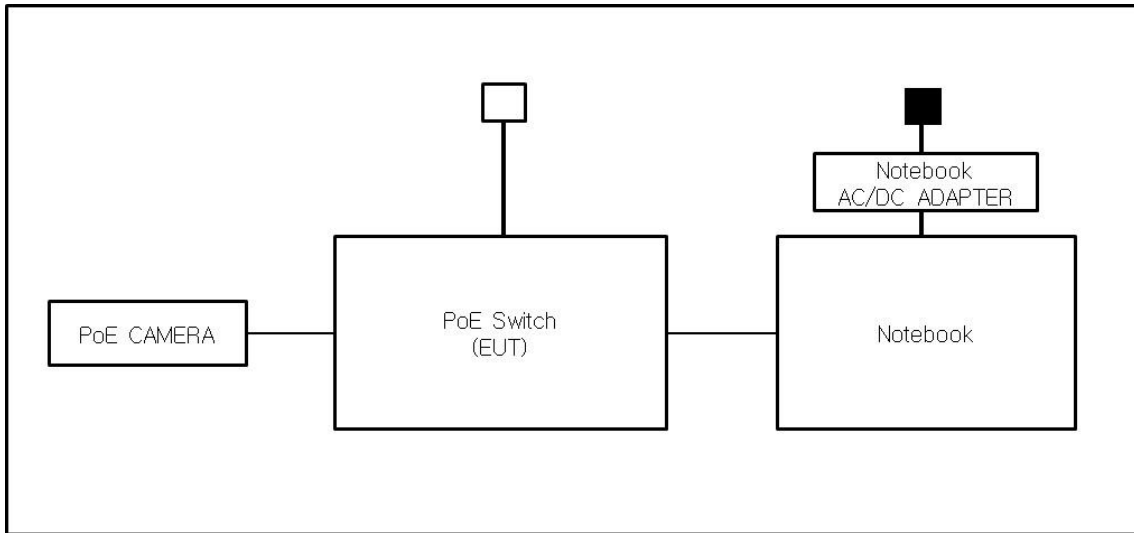
Test mode	operating
PoE	E.U.T Monitoring, Ping test

EUT Test operating S/W		
Name	Version	Manufacture Company
WebViewer	-	Hanwha Techwin Co., Ltd.

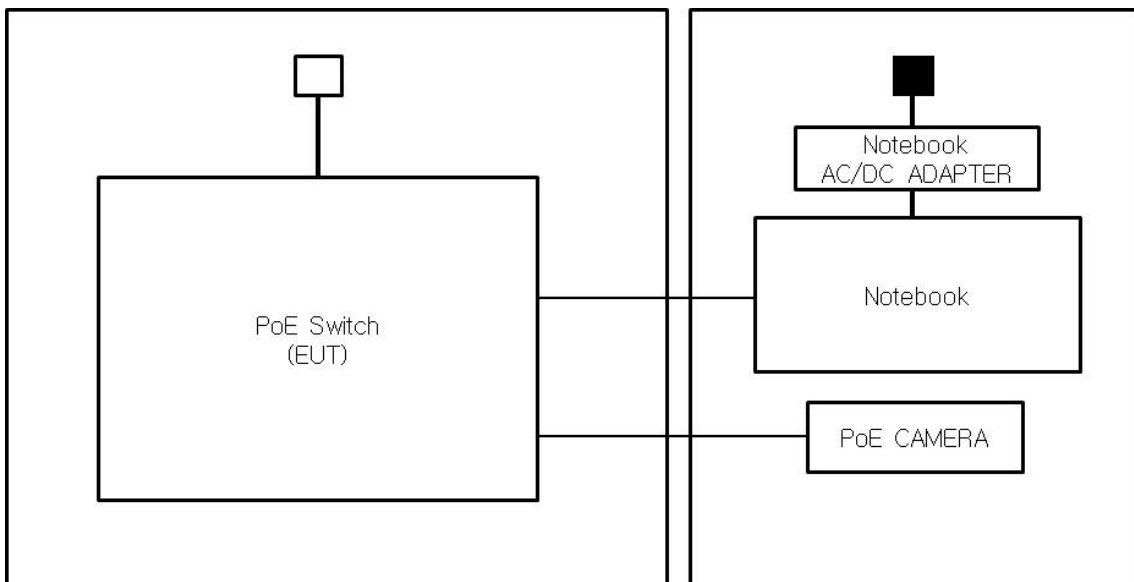
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1.8 Configuration

■ AC Main
 □ DC Main



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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. 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

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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 55011:2009/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

EN 50121-3-2:2016



-
- | | | |
|---|----------------------------------|----------------------------------|
| <input type="checkbox"/> VCCI V-3 / 2015.04 | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> AS/NZS CISPR22:2009 +A1:2010 | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> 47 CFR Part 15, Subpart B | | |
| <input type="checkbox"/> CISPR 22:2009 +A1:2010 | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> ANSI C63.4-2009 | | |
| <input type="checkbox"/> IC Regulation ICES-003 : 2016 | | |
| <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 | | |
| <input type="checkbox"/> RE- Directive 2014/53/EU | | |
| <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 | | |
| <input type="checkbox"/> EN 301 489-3 V1.6.1 | | |
| <input type="checkbox"/> EN 301 489-17 V2.2.1 | | |
| <input type="checkbox"/> EN 60945:2002 | | |

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2.1 Conducted Emissions at Mains Power Ports

Test Date

Feb. 09, 2018

Test Location

Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMI Test S/W	EMC32	R & S	9.12.00	-
<input checked="" type="checkbox"/>	EMI TEST RECEIVER	ESR3	R & S	101781	04, 27, 2018
<input checked="" type="checkbox"/>	LISN	ENV216	R & S	101787	01, 05, 2019
<input checked="" type="checkbox"/>	LISN	ESH2-Z5	R & S	100450	04, 27, 2018
<input checked="" type="checkbox"/>	PULSE LIMITER	ESH3-Z2	R & S	101915	11, 27, 2018

Test ConditionsTemperature: 22,4 °C
Relative Humidity: 42,3 % 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

RemarksSee Appendix A for test data.



2.2 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Feb. 09, 2018

Test Location

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

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.0	-
<input checked="" type="checkbox"/>	EMI TEST RECEIVER	ESU26	R & S	100551	04, 18, 2018
<input checked="" type="checkbox"/>	AMPLIFIER	SCU 01	R & S	100603	11, 27, 2018
<input checked="" type="checkbox"/>	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	716	11, 28, 2018

Test Conditions

Temperature: 21,9 °C
Relative Humidity: 42,8 % 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.

2.3 Radiated Electric Field Emissions(Above 1 GHz)

Test Date

Sep. 06, 2018

Test Location

Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.0	-
<input checked="" type="checkbox"/>	EMI TEST RECEIVER	ESR7	R & S	101190	08, 06, 2019
<input checked="" type="checkbox"/>	PREAMPLIFIER	8449B	AGILENT	3008A01967	05, 31, 2019
<input type="checkbox"/>	ATTENUATOR	8491A	HP	35496	03, 21, 2019
<input checked="" type="checkbox"/>	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	05, 02, 2019

Test Conditions

Temperature: 24,0 °C
Relative Humidity: 55,4 % 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.



2.4 Harmonic Current Emissions

Test Date

N/A

Test Location

Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input type="checkbox"/>	EMI Test S/W	dpa.control	EM TEST	5.4.11.0	-
<input type="checkbox"/>	DIGITAL POWER ANALYZER	DPA 500N	EM TEST	V1024106759	08, 09, 2018
<input type="checkbox"/>	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

Test Conditions

Relative Humidity: °C
 % 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 : Because the EUT power is less than 75 W, limits are not specified.

2.5 Voltage Fluctuations and Flicker

Test Date

N/A

Test Location

Electro wave Shieldroom#3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input type="checkbox"/>	EMI Test S/W	dpa.control	EM TEST	5.4.11.0	-
<input type="checkbox"/>	DIGITAL POWER ANALYZER	DPA 500N	EM TEST	V1024106759	08, 08, 2018
<input type="checkbox"/>	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

Test Conditions

Relative Humidity: °C
%

Test Results

The requirements are:

- PASS
 NOT PASS
 NOT APPLICABLE

RemarksN/A : Because the EUT power is DC, limits are not specified.

3.0 Criteria for compliance

Criteria for compliance was based on the following guidelines:

General performance criteria

The general principles (performance criteria) for the evaluation of the immunity test results are the following.

Performance criterion A

The apparatus shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus 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, either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

Performance criterion B

The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

Performance criterion C

Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.



3.1 Electrostatic Discharge

Reference Standard

EN 61000-4-2:2009

Test Date

Feb. 10, 2018

Test Location

EMS-ESD: Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	ESD SIMULATOR	ESS-2000	Noise Ken	ESS01Z0454	-
<input checked="" type="checkbox"/>	HCP	-	KES	-	10, 11, 2018
<input checked="" type="checkbox"/>	VCP	-	KES	-	-

Test Conditions

Temperature: 22,0 °C
Relative Humidity: 41,5 % R.H.
Atmospheric Pressure: 101,0 kPa



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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
	<input checked="" type="checkbox"/> 2 kV	<input checked="" type="checkbox"/> 2 kV	<input type="checkbox"/> 2 kV	<input type="checkbox"/> 2 kV
	<input checked="" 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

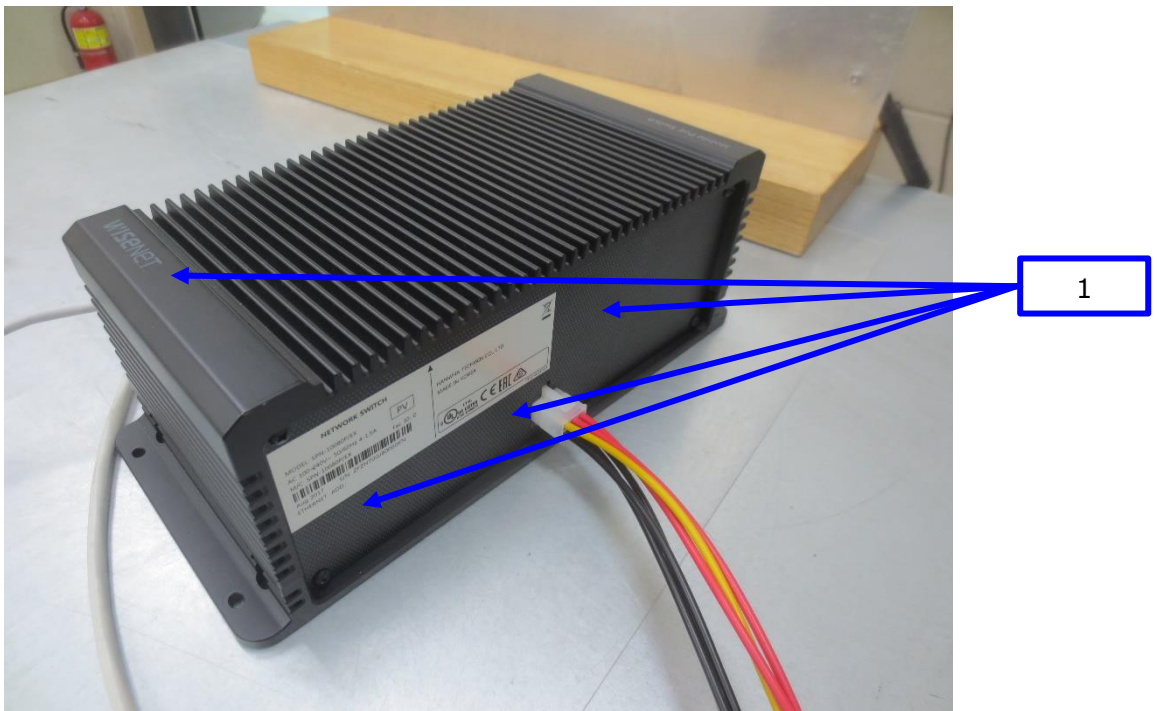
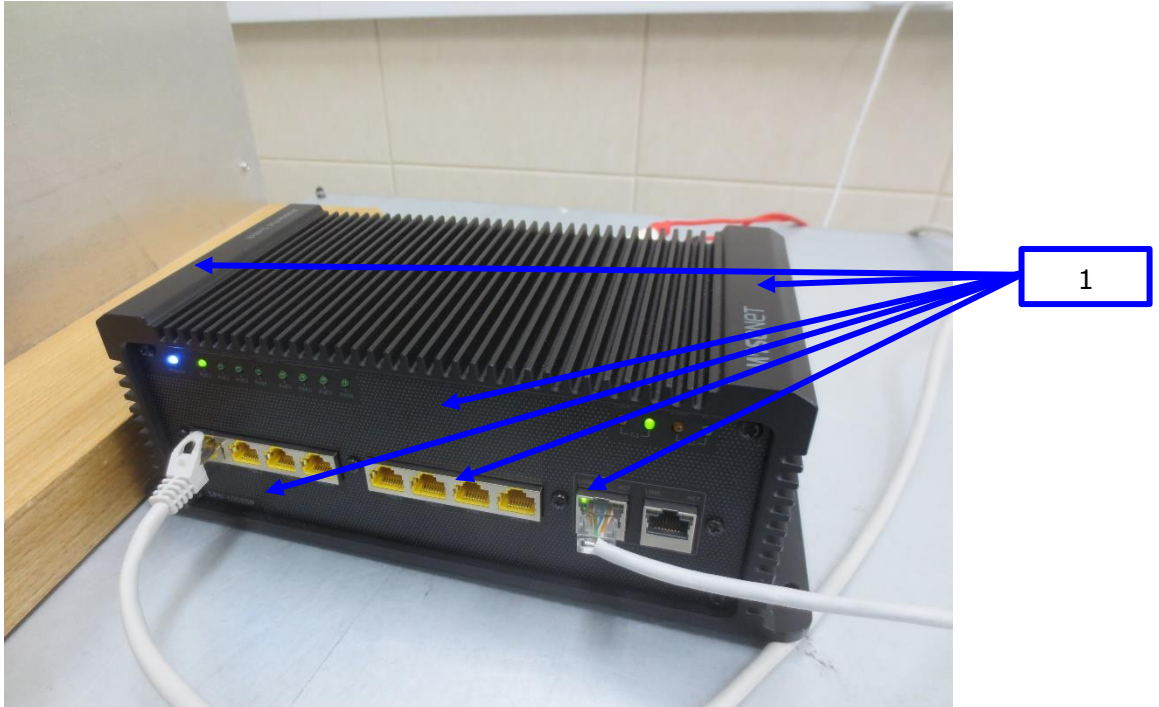
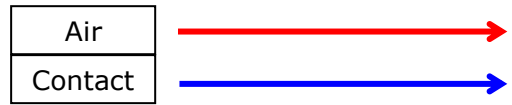
Notes: HCP: Horizontal coupling plane

VCP: Vertical coupling plane

Required Performance Criteria: B

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Location of Discharge:



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Test Data

Indirect Discharge

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

Direct Discharge

No.	Test Point	Discharge Method	Observations	Remarks
1	Surface	Contact Discharge	A	-

Note: "Blank" = Not performed

Observations:
Complied – No degradation of function

Test Results

- PASS Required Performance Criteria
- NOT PASS Required Performance Criteria

Remarks

PASS Required Performance Criteria.

3.2 Radiated Electric Field Immunity

Reference Standard

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

Test Date

Sep. 07, 2018

Test Location

EMS-RS: SEMI ANECHOIC CHAMBER #3 SEMI ANECHOIC CHAMBER #4

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMS Test S/W	EMC32	R & S	10.10.02	-
<input checked="" type="checkbox"/>	SIGNAL GENERATOR	SMB 100A	R & S	177586	08, 06, 2019
<input checked="" type="checkbox"/>	BROADBAND AMPLIFIER	BBA100	R & S	101239	08, 06, 2019
<input checked="" type="checkbox"/>	BROADBAND AMPLIFIER	100S1G6M1	AR	579931	08, 06, 2019
<input checked="" type="checkbox"/>	POWER METER	NRP2	R & S	103475	08, 06, 2019
<input checked="" type="checkbox"/>	AVG POWER SENSOR	NRP-Z91	R & S	102526	08, 06, 2019
<input checked="" type="checkbox"/>	AVG POWER SENSOR	NRP-Z91	R & S	102527	08, 06, 2019
<input checked="" type="checkbox"/>	STACKED DOUBLE LOG-PER- ANTENNA	STPL9128 E	Schwarzbeck	9128ES-121	-
<input checked="" type="checkbox"/>	DIRECTIONAL COUPLER	KYDC-D1070-DX40	KY TELECOM	KY150001	08, 06, 2019
<input checked="" type="checkbox"/>	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,IN C	781	05, 02, 2019
<input checked="" type="checkbox"/>	SIGNAL GENERATOR	SMB 100A	Rohde & Schwarz	108252	08, 06, 2019
<input checked="" type="checkbox"/>	HIGH POWER DUAL AMP	SSA532	SUNGSAN	SSA532-001	05, 18, 2019
<input checked="" type="checkbox"/>	POWER METER	E4419B	Agilent	GB40203000	05, 18, 2019
<input checked="" type="checkbox"/>	CW POWER SENSOR	E4412A	Agilent	US38488240	05, 18, 2019
<input checked="" type="checkbox"/>	CW POWER SENSOR	E4412A	Agilent	MY41501662	05, 18, 2019

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Test Conditions

Temperature: 23,5 °C
Relative Humidity: 55,3 % R.H.
Atmospheric Pressure: 99,1 kPa

Test Specifications

Antenna Polarization: Horizontal & vertical unless indicated otherwise

Antenna Distance: 3 m

Frequency Range: 80 MHz to 800 MHz [20V/m]
[Field Strength] 800 MHz to 1 GHz [20 V/m]
 1,4 GHz to 2,0 GHz [10 V/m]
 2,0 GHz to 2,7 GHz [5 V/m]
 5,1 GHz to 6,0 GHz [3 V/m]

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



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Test Data

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

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.

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3.3 Electrical Fast Transients/Bursts

Reference Standard

EN 61000-4-4:2012

Test Date

Feb. 10, 2018

Test Location

EMS-EFT: Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMS Test S/W	iec.control	EM TEST	5.4.7	-
<input checked="" type="checkbox"/>	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	11, 27, 2018
<input type="checkbox"/>	MOTOR VARIAC	MV2616	EM TEST	P1552169719	11, 27, 2018
<input checked="" type="checkbox"/>	CAPACITIVE COUPLING CLAMP	HFK	EM TEST	P1633183115	11, 27, 2018

Test Conditions

Temperature: 22,0 °C
Relative Humidity: 41,5 % R.H.
Atmospheric Pressure: 101,0 kPa

Test Specifications

Pulse Amplitude & Polarity: ± 1.0 kV ± 2.0 kV
(AC Power Lines) ± 4.0 kV

Pulse Amplitude & Polarity: ± 0.5 kV ± 1.0 kV
(Other supply / Signal Lines) ± 2.0 kV

Burst Period: 300 ms 2 s

Repetition Rate: 5 kHz 100 kHz

Duration of Test Voltage: ≥ 1 min

Required Performance Criteria: A

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Test Data

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

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

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

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

Signal ports and telecommunication ports – Coupling Clamp used

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
RJ-45	A	A

Note: “Blank” = Not performed

Observations:

Complied – No degradation of function

Test Results

- PASS Required Performance Criteria
- NOT PASS Required Performance Criteria

Remarks

PASS Required Performance Criteria.



3.4 Surge Transients

Reference Standard

EN 61000-4-5:2014

Test Date

Feb. 10, 2018

Test Location

EMS-Surge: Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMS Test S/W	iec.control	EM TEST	5.4.7	-
<input checked="" type="checkbox"/>	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	11, 27, 2018
<input type="checkbox"/>	MOTOR VARIAC	MV2616	EM TEST	P1552169719	11, 27, 2018
<input type="checkbox"/>	CDN	CNV 508N1	EM TEST	P1610176296	11, 28, 2018
<input checked="" type="checkbox"/>	CDN	CNV 504N7.3	EM TEST	P1744207079	12, 18, 2018

Test Conditions

Temperature: 22,0 °C
Relative Humidity: 41,5 % R.H.
Atmospheric Pressure: 101,0 kPa



Test Specifications

AC Power Lines

- Source Impedance: 42 ohm for common mode
- Surge Amplitude : Common Mode
 2 kV
Differential Mode
 1 kV
- Number of Surges: 5 surges per angle
- Angle: 0°, 90°, 180°, 270° (input a.c. DC power port)
- Polarity: Positive & Negative
- Repetition Rate: 1 surge per min 1 surge per 30 sec.
- Required Performance Criteria: B

Other supply

- Source Impedance: 42 ohm for common mode
- Surge Amplitude: Common Mode
 2 kV
Differential Mode
 1 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	Observations	
	(+) Surge (kV)	(-) Surge (kV)
L1 - L2	A	A

Line to Ground - 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

PASS Required Performance Criteria.

3.5 Conducted Disturbance

Reference Standard

EN 61000-4-6:2014

Test Date

Feb. 10, 2018

Test Location

EMS-CS: Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMS Test S/W	icd.control	EM TEST	5.3.11	-
<input checked="" type="checkbox"/>	CONTINUOUS WAVE SIMULATOR	CWS 500N1.4	EM TEST	P1602169880	11, 27, 2018
<input checked="" type="checkbox"/>	ATTENUATOR	ATT 6/80	EM TEST	P1614178148	11, 27, 2018
<input checked="" type="checkbox"/>	CDN	CDN M016	TESEQ	43694	11, 27, 2018
<input type="checkbox"/>	CDN	CDN M016	TESEQ	43697	11, 27, 2018
<input checked="" type="checkbox"/>	CDN	CDN T800	TESEQ	42800	11, 27, 2018
<input type="checkbox"/>	EM CLAMP	KEMZ 801A	TESEQ	44099	11, 28, 2018

Test Conditions

Temperature: 22,0 °C
Relative Humidity: 42,1 % R.H.
Atmospheric Pressure: 101,1 kPa

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

Frequency step: 1 % step

Dwell Time: 1 s 3 s

Required Performance Criteria: A

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Test Data

Input a.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Observations
-	CDN (<input type="checkbox"/> M2, <input type="checkbox"/> M3)	-

Input d.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Observations
L1 - L2	CDN (<input checked="" type="checkbox"/> M2, <input type="checkbox"/> M3)	A

Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Observations
RJ-45	CDN T800	A

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.

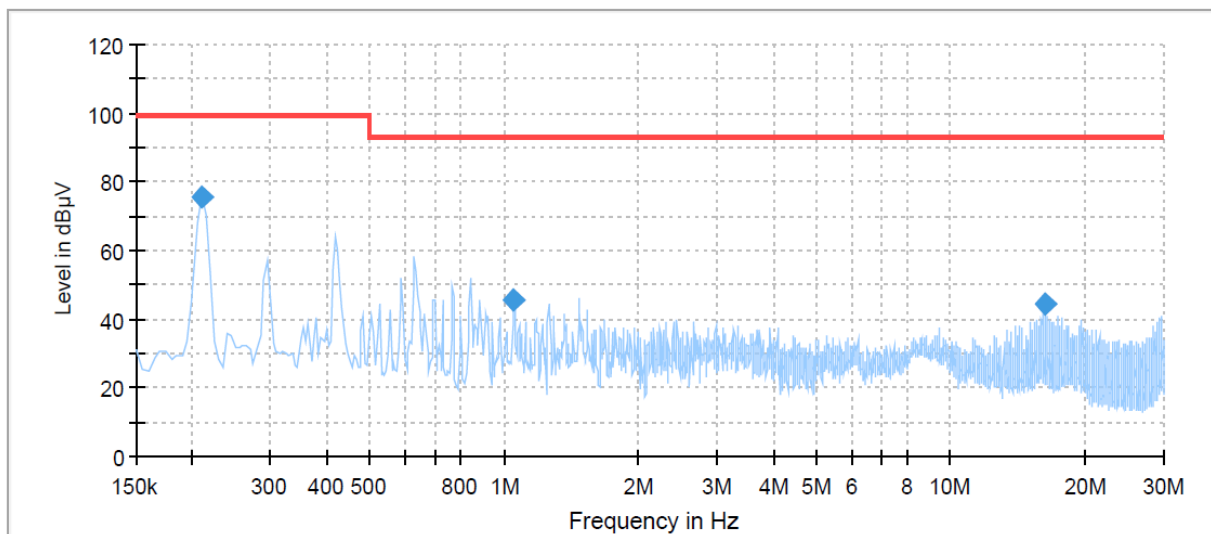
APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

[HOT]

Common Information

Test Description: Conducted Emission
 Model No.: SPN-10080P
 Mode
 Operator Name: KES



Final Result

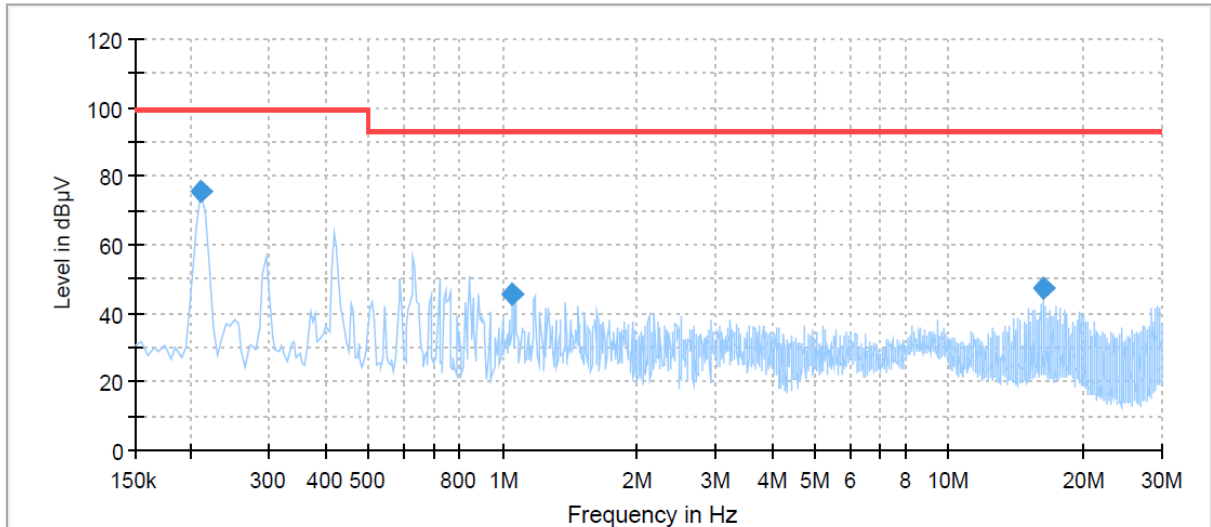
Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.210000	75.41	---	99.00	23.59	1000.0	9.000	L1	19.4
1.050000	45.71	---	93.00	47.29	1000.0	9.000	L1	20.0
16.225000	44.67	---	93.00	48.33	1000.0	9.000	L1	20.1

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[NEUTRAL]

Common Information

Test Description: Conducted Emission
 Model No.: SPN-10080P
 Mode:
 Operator Name: KES



Final Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.210000	75.37	---	99.00	23.63	1000.0	9.000	N	19.3
1.050000	45.53	---	93.00	47.47	1000.0	9.000	N	20.0
16.230000	47.07	---	93.00	45.93	1000.0	9.000	N	20.1

◆ Calculation

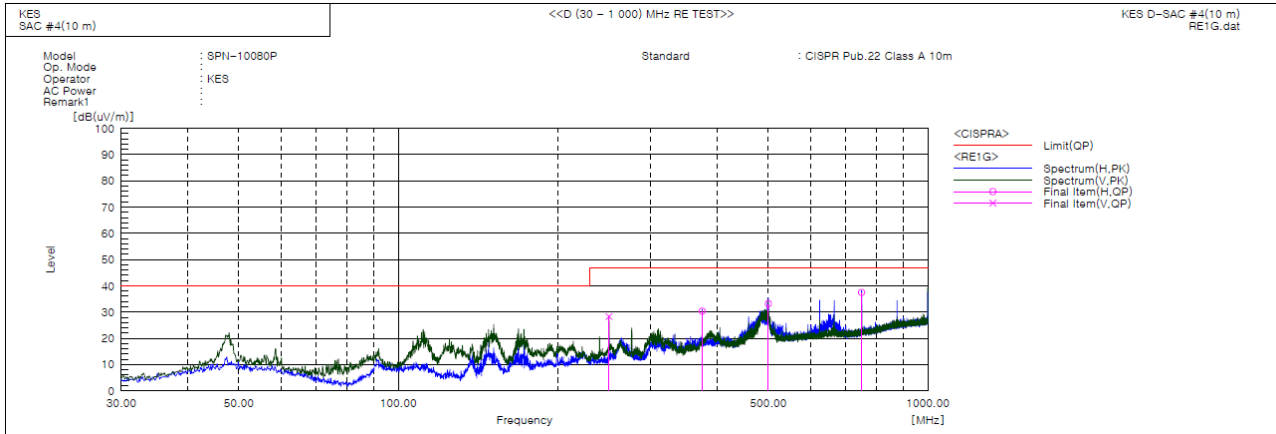
QuasiPeak [dBµV] / CAverage [dBµV] = Reading Value [dBµV] + Corr. [dB]

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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

Radiated Electric Field Emissions(Below 1 GHz)



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	249.984	V	54.5	-26.2	28.3	47.0	18.7	100.0	334.0	
2	374.998	H	52.7	-22.3	30.4	47.0	16.6	317.0	30.0	
3	500.006	H	52.0	-18.8	33.2	47.0	13.8	192.0	13.0	
4	749.985	H	52.1	-14.6	37.5	47.0	9.5	103.0	58.0	

◆ Calculation – SAC #4(10 m)

$$\text{Result(QP)} [\text{dB}(\mu\text{V}/\text{m})] = (\text{Reading(QP)}[\text{dB}(\mu\text{V})] + \text{c.f}[\text{dB}(1/\text{m})])$$

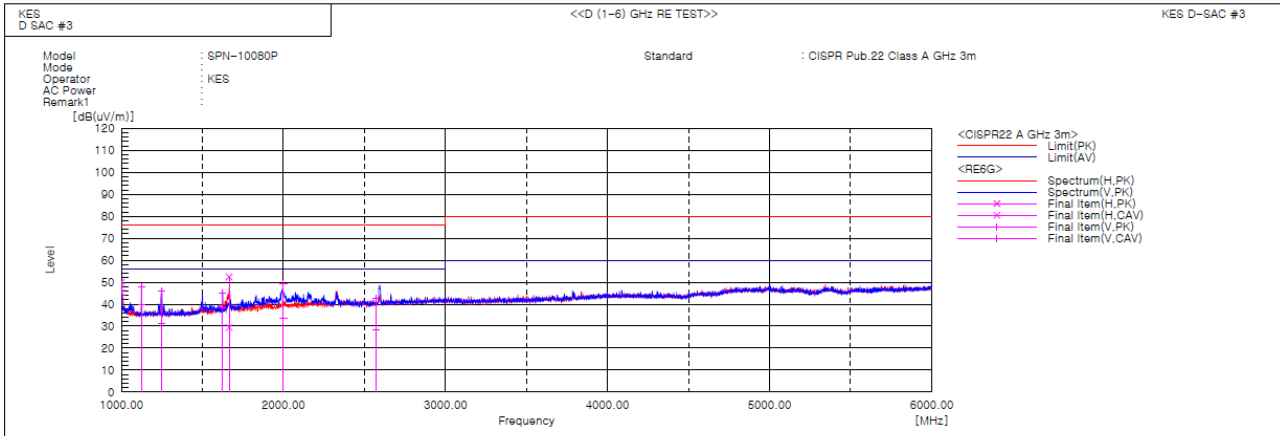
$$\text{Margin(QP)}[\text{dB}] = \text{Limit}[\text{dB}(\mu\text{V}/\text{m})] - \text{Result(QP)} [\text{dB}(\mu\text{V}/\text{m})]$$

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 GHz)



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	1000.000	H	58.0	53.2	-7.9	50.1	45.3	76.0	56.0	25.9	10.7	100.0	113.2	
2	1124.500	V	55.5	47.5	-7.5	48.0	40.0	76.0	56.0	28.0	16.0	100.0	192.5	
3	1245.651	V	52.8	38.3	-7.0	45.8	31.3	76.0	56.0	30.2	24.7	100.0	207.8	
4	1624.540	V	50.0	43.3	-4.8	45.2	38.5	76.0	56.0	30.8	17.5	100.0	175.0	
5	1665.280	H	56.9	33.9	-4.5	52.4	29.4	76.0	56.0	23.6	26.6	100.0	280.0	
6	1999.959	V	51.2	35.6	-2.1	49.1	33.5	76.0	56.0	26.9	22.5	100.0	352.5	
7	2572.345	V	42.4	28.3	0.2	42.6	28.5	76.0	56.0	33.4	27.5	100.0	66.8	

◆ Calculation

Over Limit [dB] = (Read Level [dB,μV] + Ant Factor [dB/m] + Cable Loss [dB] – Preamp Factor [dB]) – Limit Line [dB,μV]

Over Limit : Margin, Read Level : Reading value, Ant Factor : ANT Factor,
Cable Loss : Cable loss, Preamp Factor : Preamp Factor

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Harmonic Current Emissions and Voltage Fluctuations and Flicker

Average harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
N/A				

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

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Test report No.:
KES-E1-18T0174-R1
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Test Data - Harmonics (continued)

Maximum harmonic current results				
Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
		N/A		

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

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Test Data - Voltage Fluctuations

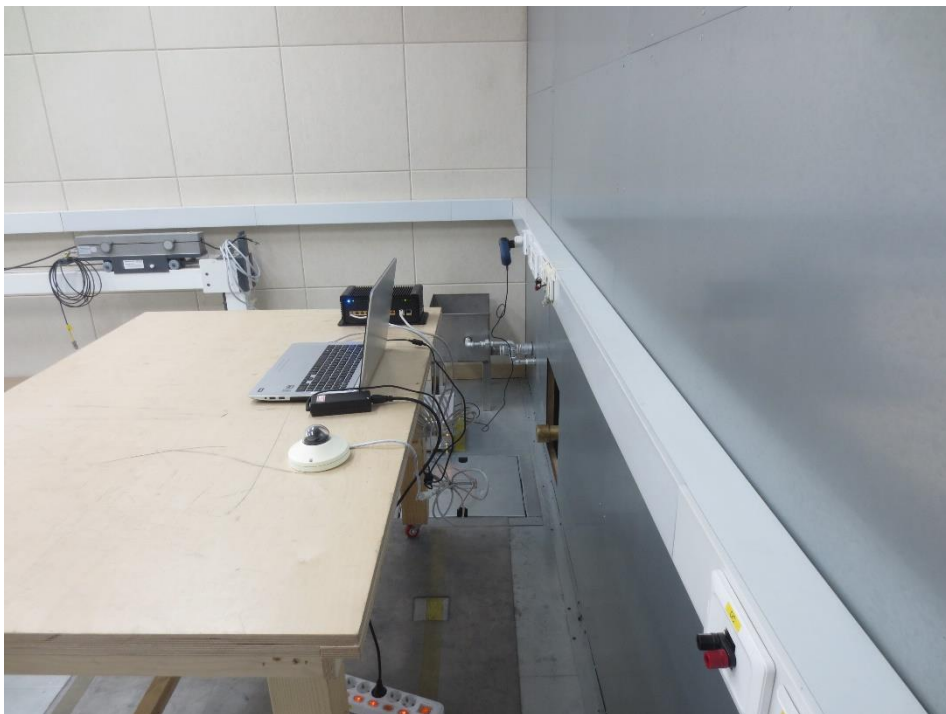
Maximum Flicker results

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

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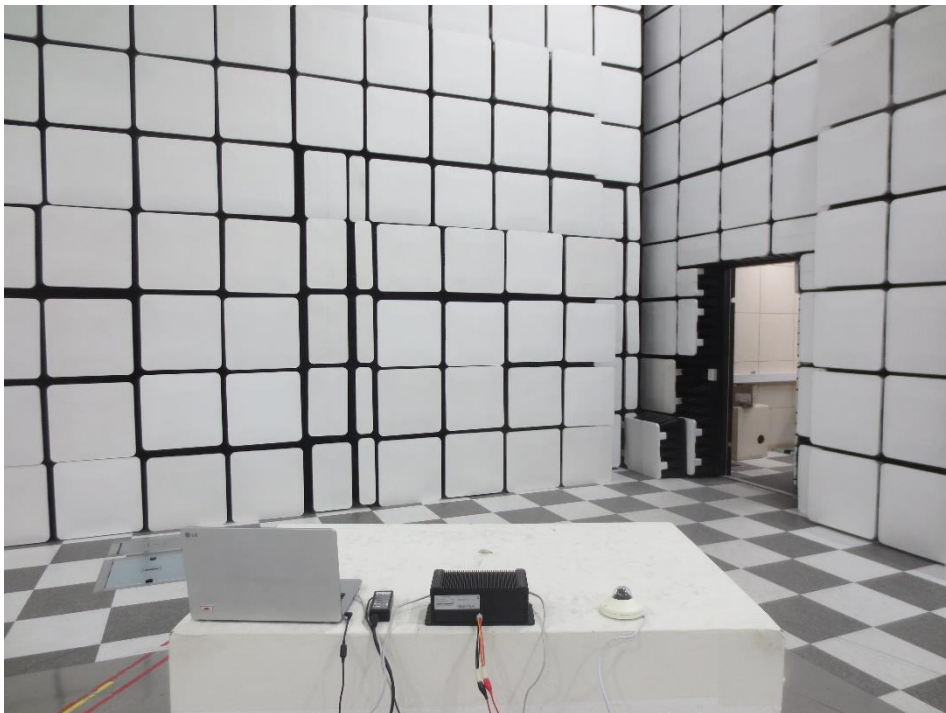
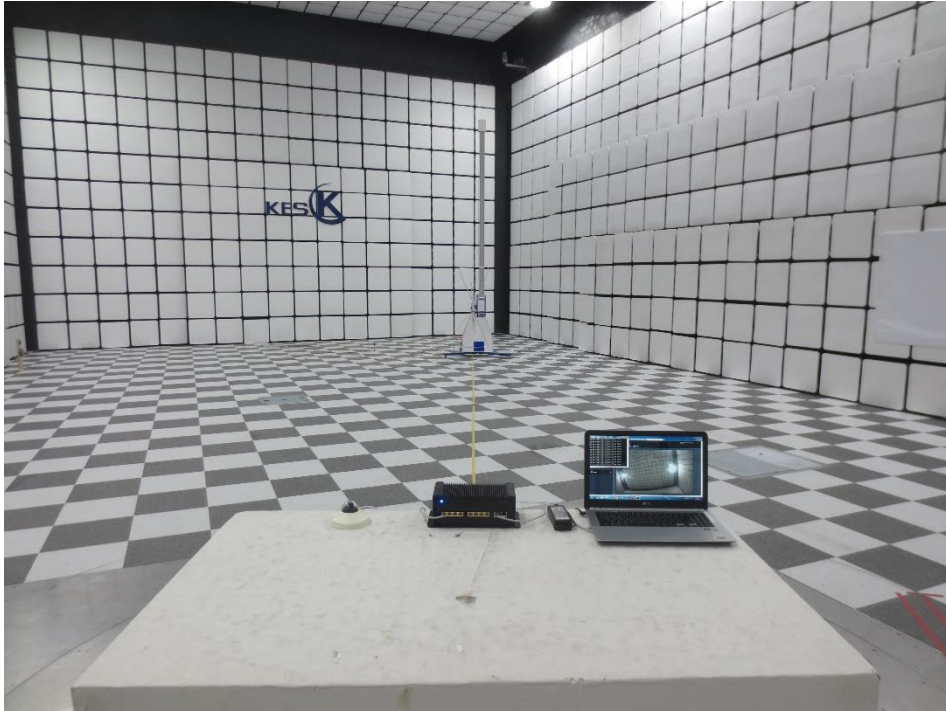
Test Setup Photos and Configuration

Conducted Voltage Emissions



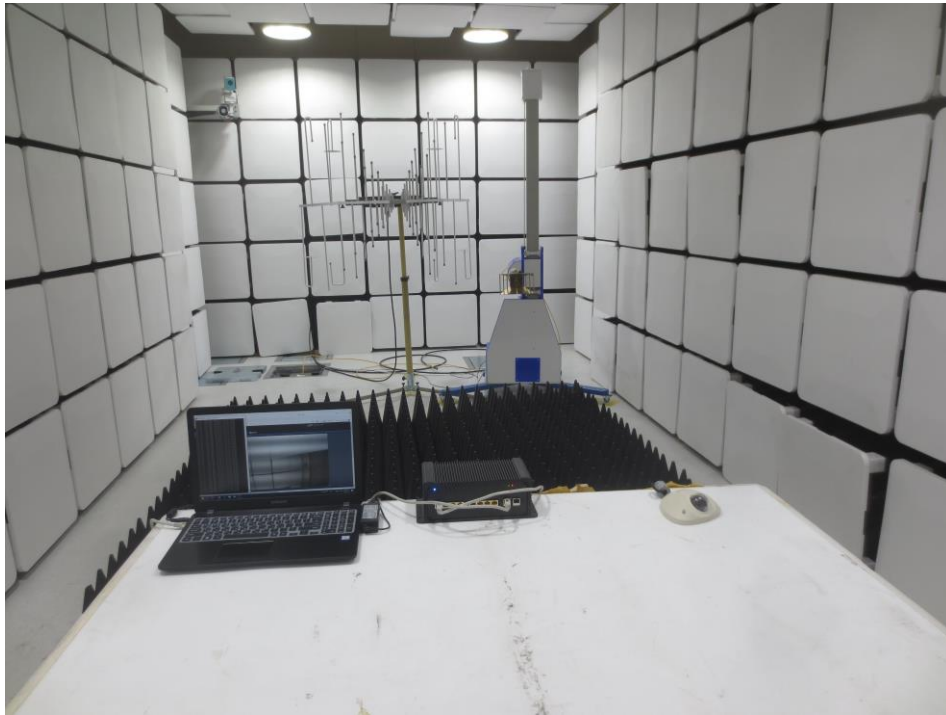
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Radiated Electric Field Emissions(Below 1 GHz)



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Radiated Electric Field Emissions(Above 1 GHz)



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KES-E1-18T0174-R1
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Harmonic Current Emissions and Voltage Fluctuations and Flicker

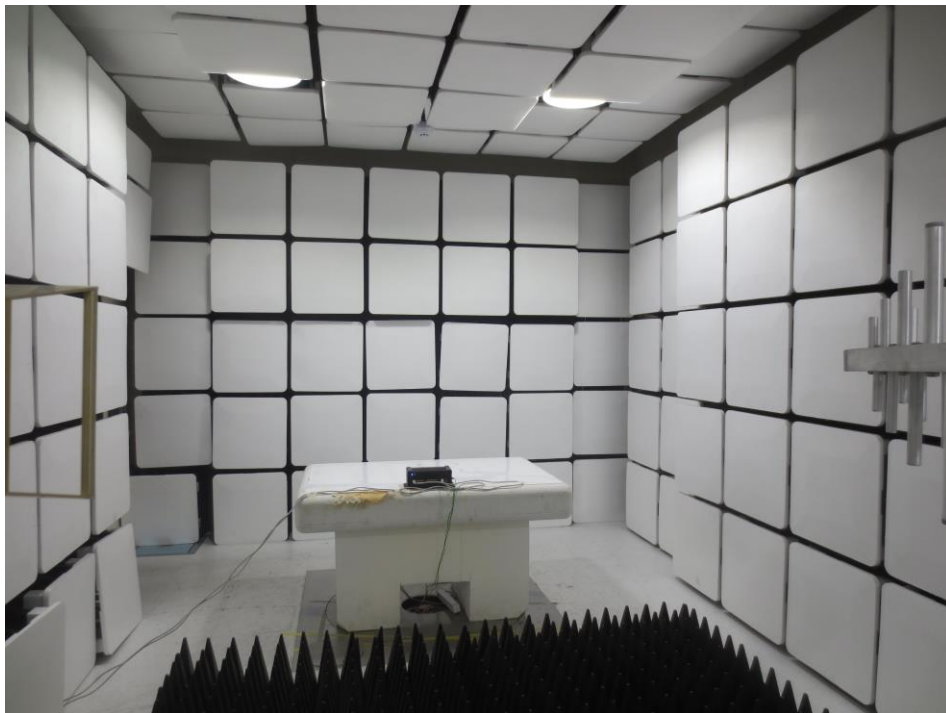
N/A

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Electrostatic Discharge

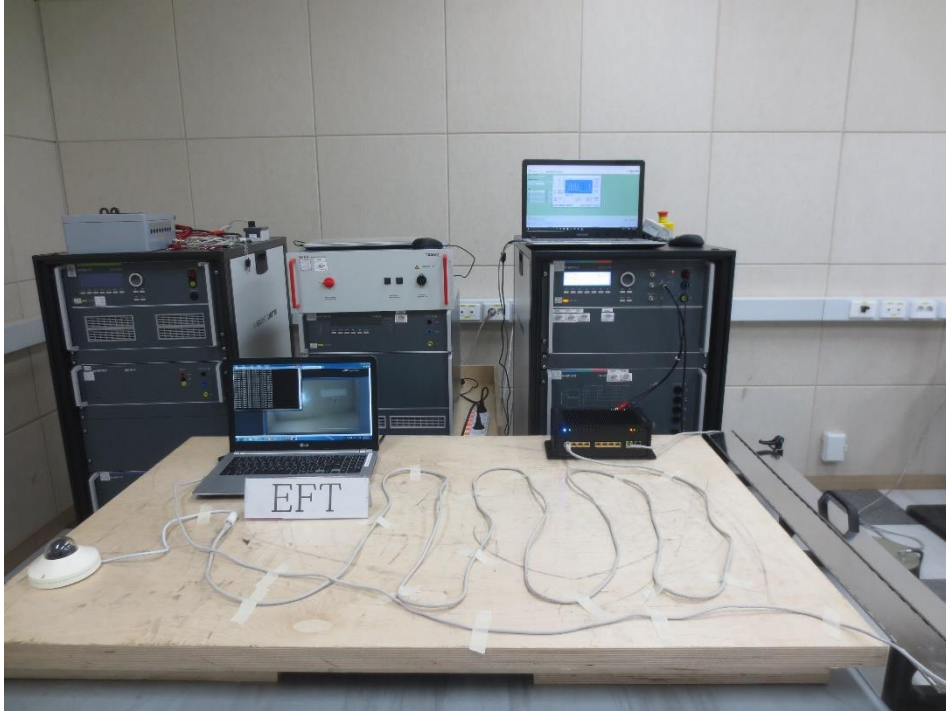


Radiated Electric Field Immunity



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Electrical Fast Transients/Bursts

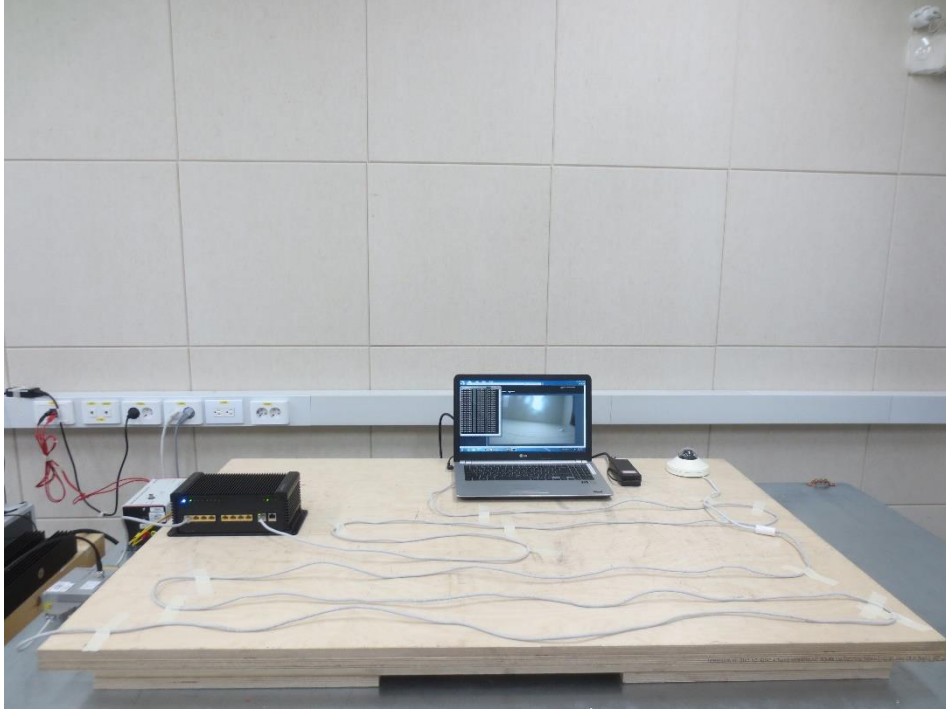


Surge Transients



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Conducted Disturbance



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EUT External Photographs

(Top)



(Bottom)



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EUT Internal Photographs

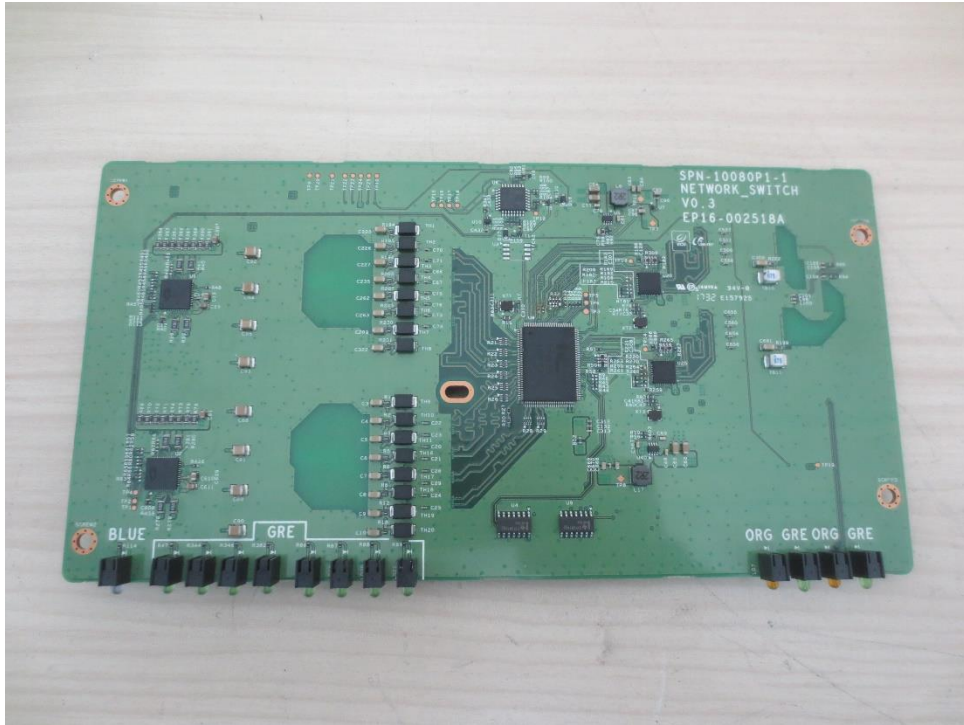
(Internal View)



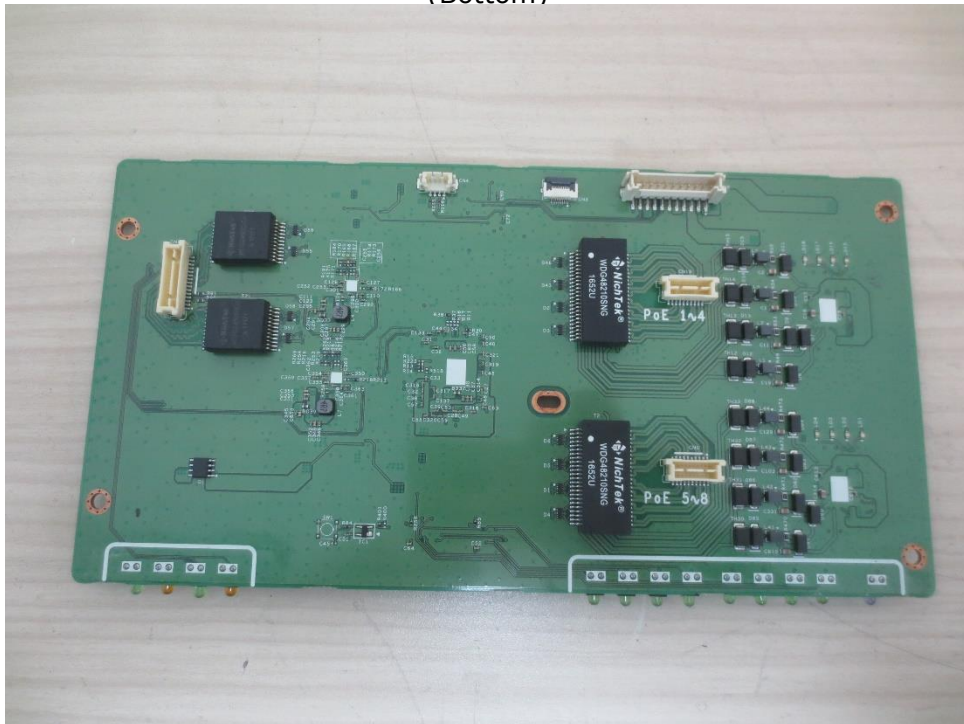
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EUT Internal View – Main board

(Top)



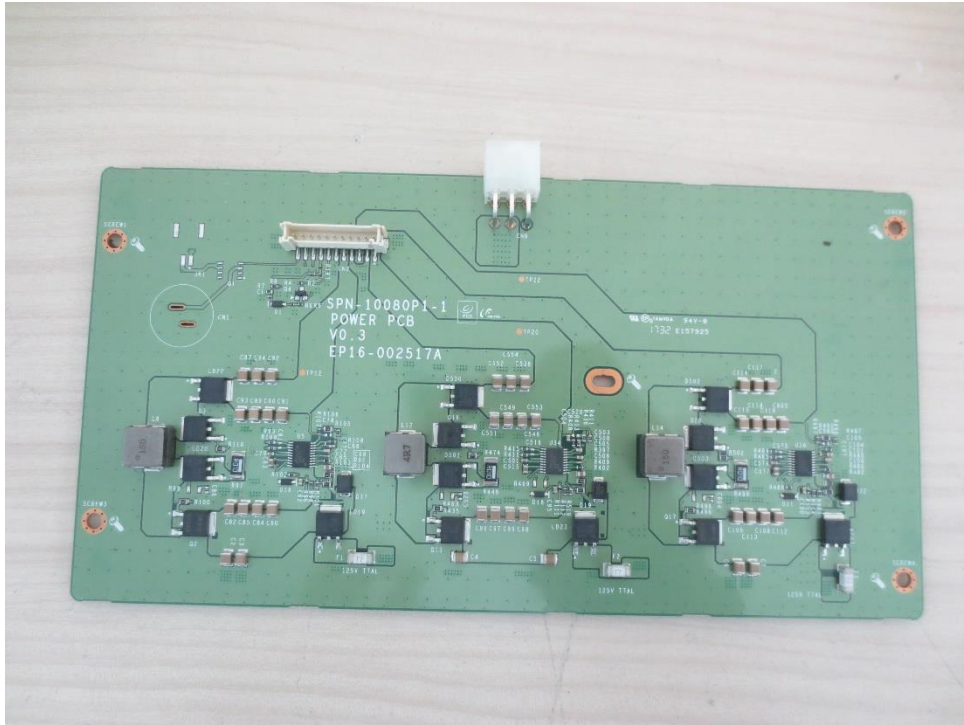
(Bottom)



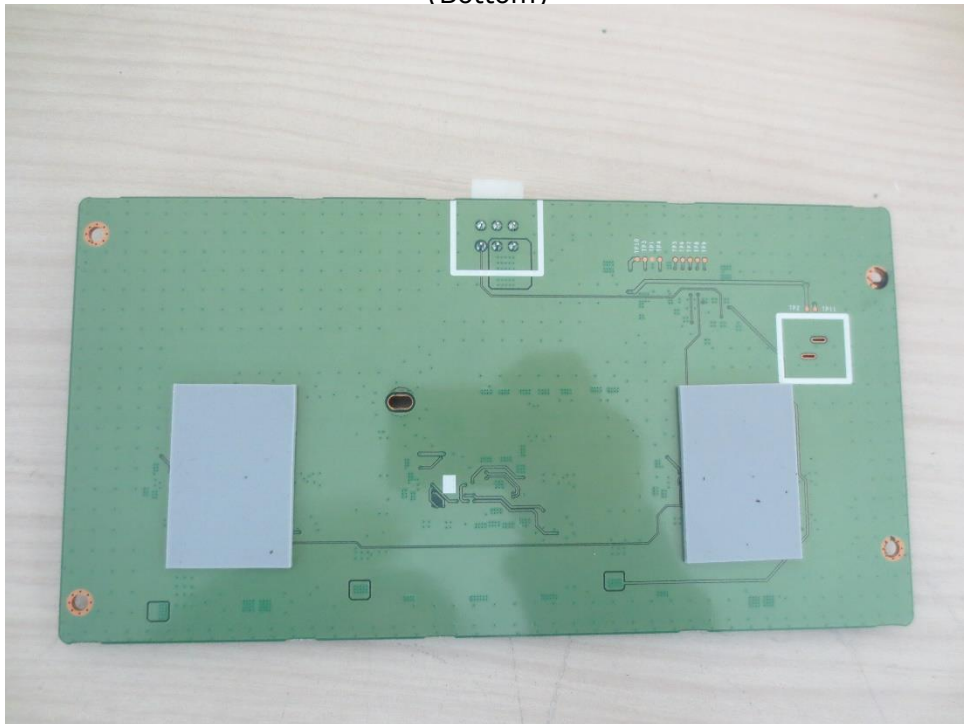
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EUT Internal View – Sub board 1

(Top)



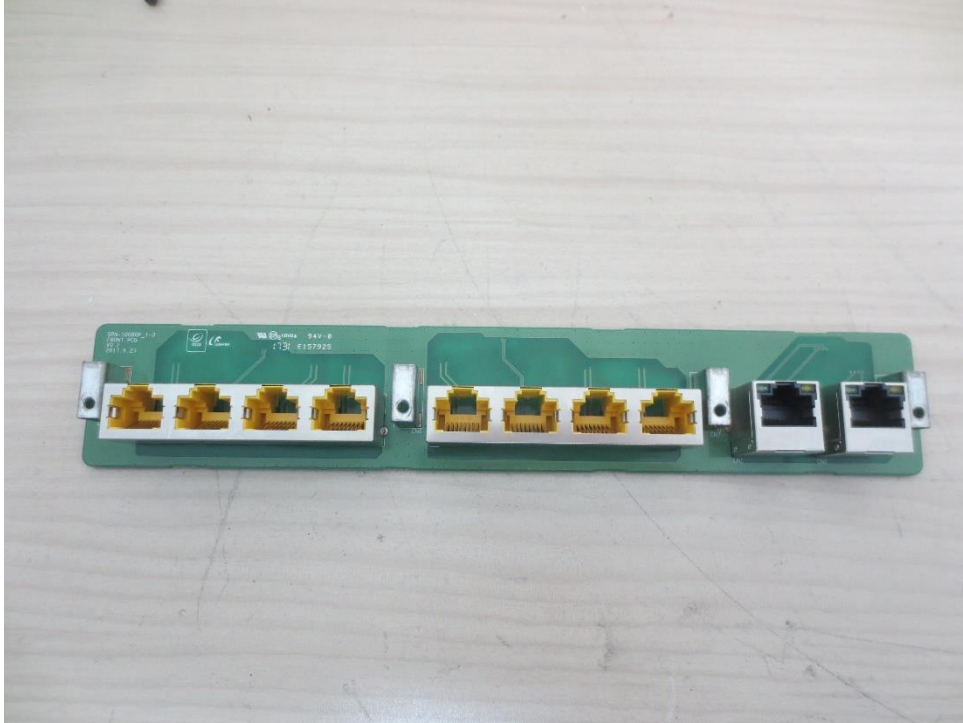
(Bottom)



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EUT Internal View – Sub board 2

(Top)

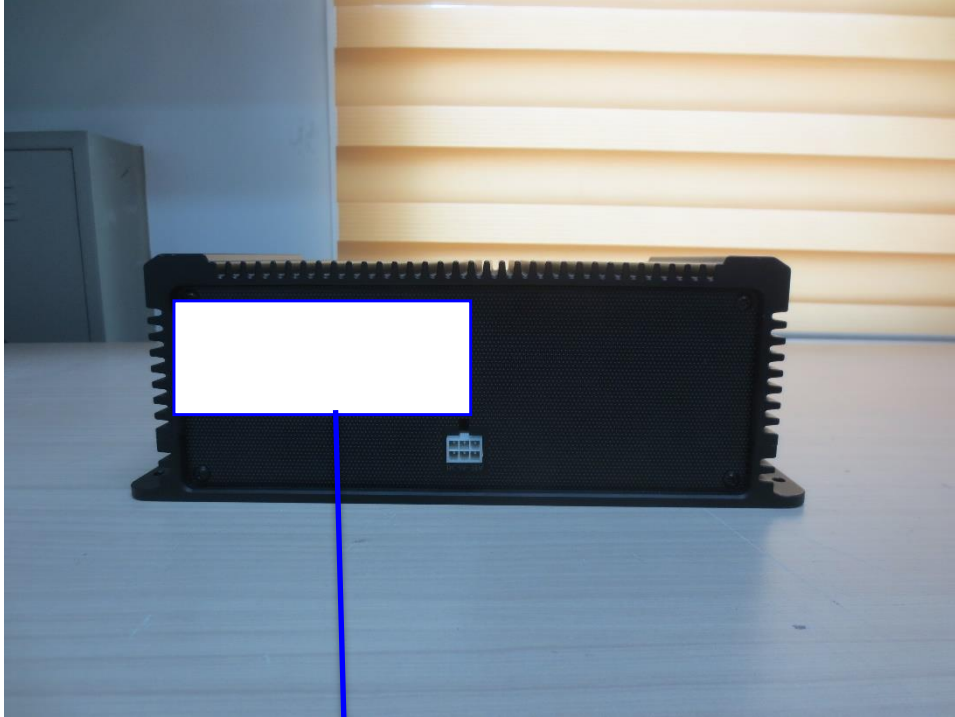


(Bottom)



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Label and Location



PoE Switch

Model No : SPN-10080P

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

Made in China

