

VERIFICATION OF FCC PART 15 COMPLIANCE

*KES hereby verify that the subject product complies with all the
electromagnetic emission specified in the FCC Rule Part 15*

Product Description:	NETWORK CAMERA
Model/Brand Name:	PNP-9200RHN
Variant Model:	-
FCC Rule Part(s):	FCC 47CFR Part 15 Subpart B Class A Part 15.107(b) & Part 15.109(b)
FCC Procedure:	Verification
Applicant Name:	Hanwha Techwin Co., Ltd.
Applicant Address:	Changwon-dareri, Seongsan-gu Changwon-si, Gy eongsangn am-do
Manufacturer Name:	Tianjin Samsung Techwin Opto-Electronic Co., Ltd.
Manufacturer Address:	No.11 Weiliu Rd, Micro-Electronic Industrial Park, TEDA, Tianjin, 300385, People's Republic of China
Test Report Reference No.:	KES-E1-16T0512

NETWORK CAMERA, Model PNP-9200RHN has been tested in accordance with the measurement procedures specified in FCC 47CFR Part 15 Subpart B class A and has been shown to be complied with the electromagnetic emission limits specified in FCC Rule Part 15 Subpart B class A. A testing of the sample product has been valid for the sample tested based on the reference test report, KES-E1-16T0512

Date of Issue: 10. 13, 2016

Dong Hun, Jang
Technical Manager
Signature:



KES.Co., Ltd.

C-3701, 40, Simin-daero 365beon-gil, Dongan-gu, Anyang-si, Gyeonggi-do, 431-716, Korea
Tel: +82-31-425-6200 // Fax: +82-31-424-0450



EMC TEST REPORT For FCC

Test Report No. : KES-E1-16T0512

Date of Issue : Oct, 13, 2016

Product name : NETWORK CAMERA

Model/Type No. : PNP-9200RHN

Variant Model : -

Applicant : Hanwha Techwin Co., Ltd.

Applicant Address : Changwon-daero, Seongsan-gu Changwon-si, Gyeongsangnam-do

Manufacturer : Tianjin Samsung Techwin Opto-Electronic Co., Ltd.

Manufacturer Address : No.11 Weiliu Rd, Micro-Electronic Industrial Park, TEDA, Tianjin, 300385, People's Republic of China

Equipment authorization : ☐ Declaration of Conformity
☒ Verification
☐ Certification

Date of Receipt : Sep, 23, 2016

Test date : Oct, 05, 2016 ~ Oct, 06, 2016

Test Results : ☒ In Compliance ☐ Not in Compliance

Tested by

Dae Hyun, Kim
EMC Test Engineer

Reviewed by

Dong-Hun, Jang
EMC Technical Manager

**KES Co., Ltd.**

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

Test report No.:
KES-E1-16T0512
Page (2) of (34)

REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Oct. 13, 2016	KES-E1-16T0512	Issued

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd. This document Sep 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.



TABLE OF CONTENTS

1.0	General Product Description.....	4
1.1	Test Voltage & Frequency	6
1.2	Variant Model Differences.....	6
1.3	Device Modifications	6
1.4	Equipment Under Test.....	6
1.5	Support Equipments	6
1.6	External I/O Cabling	7
1.7	EUT Operating Mode(s)	7
1.8	Configuration.....	8
1.9	Calibration Details of Equipment Used for Measurement	9
1.10	Test Facility	9
1.11	Laboratory Accreditations and Listings	9
2.0	Test Regulations.....	10
2.1	Conducted Emissions at Mains Power Ports	12
2.2	Radiated Electric Field Emissions(Below 1 GHz)	13
2.3	Radiated Electric Field Emissions(Above 1 GHz)	14
APPENDIX A	– TEST DATA.....	15
	Conducted Emissions at Mains Power Ports.....	15
	Radiated Electric Field Emissions(Below 1 GHz)	17
	Radiated Electric Field Emissions(Above 1 GHz)	18
	Test Setup Photos and Configuration	20
	Conducted Voltage Emissions	20
	Radiated Electric Field Emissions(Below 1 GHz)	21
	Radiated Electric Field Emissions(Above 1 GHz)	22
	EUT External Photographs	23
	EUT Internal Photographs	24

1.0 General Product Description

Main Specifications of EUT are:

Items		Description
Video	Imaging Device	1/2.5" 8M CMOS
	Total Pixels	3864(H) x 2202(V), 8.51M pixels
	Effective Pixels	3840(H) x 2160(V), 8.00M pixels
	Scanning System	Progressive Scan
	Min. Illumination	Color : 0.3 Lux/F1.6 (1/30sec, F1.8, 50IRE), 0.005 Lux (2sec, F1.8, 50IRE) Color : 0.1 Lux/F1.6 (1/30sec, F1.8, 30IRE), 0.0005 Lux (2sec, F1.8, 30IRE) B/W : 0 Lux (IR LED On)
	S / N Ratio	50dB
	Video Out	CVBS : 1.0 Vp-p / 75Ω composite, 720x480(N), 720x576(P), for installation
Lens	Focal Length (Zoom Ratio)	4.8mm ~ 96mm (20x)
	Max. Aperture Ratio	F1.8(Wide) / F3.6(Tele)
	Angular Field of View	H : 65.1°(Wide) ~ 3.8°(Tele) / V : 38.4°(Wide) ~ 2.2°(Tele)
	Min. Object Distance	1.5 m (3.28ft)
	Focus Control	AF / One-Shot AF / Manual
	Lens Type	DC Auto Iris / IR Corrected Lens
	Mount Type	Board-in type
Pan / Tilt / Rotate	Pan Range	360° Endless
	Pan Speed	Preset : 400°/sec, Manual : 0.024°/sec ~ 250°/sec
	Tilt Range	190° (-5° ~ 185°)
	Tilt Speed	Preset : 300°/sec, Manual : 0.024°/sec ~ 250°/sec
	Sequence	Preset (300ea), Swing, Group (6ea), Trace, Tour, Auto Run, Schedule
	Preset Accuracy	±0.2°
	Azimuth	Yes (E/W/S/N/NE/NW/SE/SW OSD)
	Auto Tracking	Off / On
Items		Description
Operational	IR LED	2ea
	Viewable Length	200m
	Camera Title	Off / On (Displayed up to 15 characters per line) - W/W : English/Numeric/Special Characters - Common : Multi-line (Max 6), Color (Grey/Green/Red/Blue/Black/White), Transparency, Auto Scale by Resolution
	Day & Night	Auto (ICR) / Color / B/W
	Backlight Compensation	Off / BLC / WDR
	Wide Dynamic Range	120dB
	Contrast Enhancement	SSDR (Samsung Super Dynamic Range) (Off / On)
	Digital Noise Reduction	SSNRill (2D+3D Noise Filter) (Off / On)
	Digital Image Stabilization	Off / On
	Defog	Auto / Manual / Off
	Motion Detection	Off / On (4ea, Rectangular zones)
	Privacy Masking	Off / On (16ea, Rectangular zones) - Color : Grey/Green/Red/Blue/Black/White - Zoom ratio option for mask mode - Mosaic option mode
	Gain Control	Off / Low / Medium / High / Manual
	White Balance	ATW / AWC / Manual / Indoor / Outdoor / Mercury / Sodium
	Electronic Shutter Speed	Minimum / Maximum / Anti flicker (2 ~ 1/12,000sec)
	Digital Zoom	16x, area zoom function support digital zoom 2x

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.



KES Co., Ltd.

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

Test report No.:
KES-EI-16T0512
Page (5) of (34)

Items		Description
Operational	Rotate Image	Flip : On/Off Mirror : On/Off
	Intelligent Video Analytics	Tampering, Virtual Line, Enter/Exit, Appear / Disappear, Audio Detection, Face Detection
	Alarm I/O	Input 4ea / Output 2ea (Relay type)
	Remote Control Interface	RS-485/422
	Audio In	Selectable (Mic IN/Line IN), Supply voltage: 2.5VDC(4mA), Input impedance: approx. 2K Ohm
	Audio out	Line out (3.5mm stereo mini jack), Max output Level : 1Vrms
	RS-485 Protocol	Samsung-T/E, Pelco-D/P, Panasonic, Honeywell, AD, Vicon, GE, BOSCH
	Alarm Triggers	Alarm Input, Motion Detection, Intelligent Video Analytics, Network Disconnect
	Alarm events	- File upload via FTP, E-Mail - Notification via E-Mail - Local storage(SD/SDHC/SDXC) or NAS recording at Network disconnected & Event (Alarm Triggers) - External output - PTZ preset
Network	Ethernet	RJ-45 (10/100BASE-T) SFP (*only using SBP-302HF)
	Video Compression Format	H.265/H.264 (MPEG-4 Part 10/AVC) : Main/Baseline/High, Motion JPEG
	Resolution	3840x2160 / 2592x1944 / 2592x1464 / 1920x1080 / 1280x1024 / 1280x960 / 1280x720 / 1024x768 / 800x600 / 800x450 / 720x576 / 640x480 / 640x360 / 320x240 / 320x180
	Max. Framerate	H.265/H.264 : Max. 30fps at all resolutions Motion JPEG : Max. 15fps at all resolutions
Items		Description
Network	Smart Codec	Manual Mode (area-based : 5EA) Face detection Mode
	Video Quality Adjustment	H.264/H.265 : Target Bitrate Level Control MJPEG : Target Bitrate Level Control
	Bitrate Control Method	H.264/H.265 : CBR or VBR, with WiseStream MJPEG : VBR
	Streaming Capability	Multiple Streaming (Up to 10 Profiles)
	Audio Compression Format	G.711 μ -law / G.726 Selectable G.726 (ADPCM) 8KHz, G.711 8KHz G.726 : 16Kbps, 24Kbps, 32Kbps, 40Kbps AAC-LC : 48Kbps at 16KHz
	Audio Communication	Bi-directional
	IP	IPv4, IPv6
	Protocol	TCP/IP, UDP/IP, RTP(UDP), RTP(TCP), RTCP, RTSP, NTP, HTTP, HTTPS, SSL/TLS, DHCP, PPPoE, FTP, SMTP, ICMP, IGMP, SNMPv1/v2c/v3(MIB-2), ARP, DNS, DDNS, QoS, PIM-SM, UPnP, Bonjour
	Security	HTTPS(SSL) Login Authentication Digest Login Authentication IP Address Filtering User access Log 802.1x Authentication (EAP-TLS, EAP-LEAP)
	Streaming Method	Unicast / Multicast
	Max. User Access	20 users at Unicast Mode
	Edge Storage	SD/SDHC/SDXC(up to 128G) - motion Images recorded in the SD/SDHC/SDXC memory card can be downloaded. NAS(Network Attached Storage) Local PC for Instant Recording

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.



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 ☐ 100 Vac ☐ 120 Vac ☐ 277 Vac ☒ 24 Vac ☐ 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	PNP-9200RHN	-	Tianjin Samsung Techwin Opto-Electronic Co., Ltd.	E.U.T

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
NOTEBOOK	LG15N54	410NZET022292	LG Electronics Co., Ltd.	-
NOTEBOOK Adapter	ADP-90WH B	84ZW19F1557	DELTA ELECTRONICS (JIANGSU) LTD.	-
Speaker	BR10000A CUVE	SN128458795701	BEIJING EDIFIER HI-TECH GROUP.	-
Mobile Phone	A1688	-	Apple	-
Alarm Jig	-	-	-	-

1.6 External I/O Cabling

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
NETWORK CAMERA (E.U.T)	RJ-45(LAN)	Notebook	RJ-45(LAN)	4.0	U
	Audio In	Moblie Phone	Audio Out	1.2	U
	Audio Out	Speaker	Audio In	1.4	U
	Alarm	Alarm Jig	Alarm	3.0	U

* Unshielded = U, Shielded = S

1.7 EUT Operating Mode(s)

Equipment under test was operated during the measurement under the following conditions:

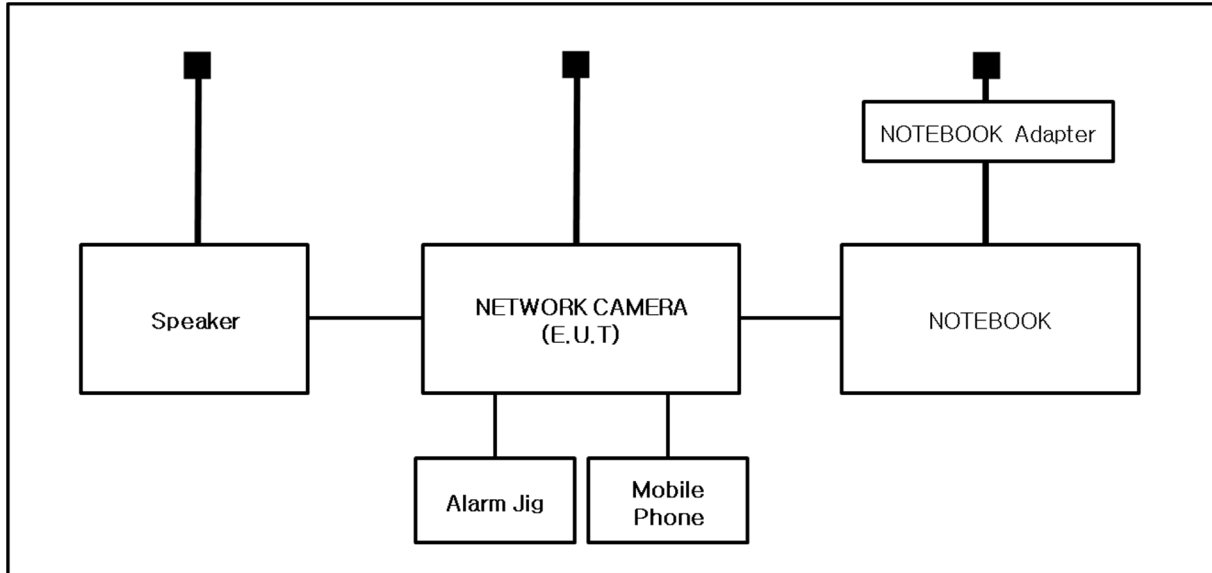
Test mode	Normal operating
OP	E.U.T Monitoring

E.U.T Test operating S/W		
Name	Version	Manufacture Company
WebViewer	5.8	Hanwha Techwin Co., Ltd.

- Input power condition during the measurements was 24 v (ac).

1.8 Configuration

■ AC Main
□ DC Main



1.9 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.

1.10 Test Facility

The measurement facility is located at 473-21 Gayeo-ro, Yeoju-si, Gyeonggi-do, 12658, Korea. The sites are constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22.

1.11 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3 & 10 meter Open Area Test Sites and one conducted site to perform FCC Part 15/18 measurements.	
JAPAN	VCCI	Mains Ports Conducted Interference Measurement, Telecommunication Ports Conducted Disturbance Measurement and Radiation 10 meter site, Facility for measuring radiated disturbance above 1 GHz	 R-4308, C-4798, T-2311, G-914
KOREA	MSIP	EMI (10 meter Open Area Test Site and two conducted sites) Radio(3 & 10 meter Open Area Test Sites and one conducted site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 KR0100
Canada	IC	3 & 10 meter Open Area Test Sites and one conducted site	 4769B-1
Europe	CE	EMI (10 meter Open Area Test Site and two conducted sites) Radio(3 & 10 meter Open Area Test Sites and one conducted site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	
International	KOLAS	EMI (10 meter Open Area Test Site and two conducted sites) Radio(3 & 10 meter Open Area Test Sites and one conducted site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	

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 55022:2010

☐ Class A

☐ Class B

☐ EN 55024:2010

☐ 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 CISPR22:2009 +A1:2010 | ☐ Class A | ☐ Class B |
| ☒ 47 CFR Part 15, Subpart B | | |
| ☒ CISPR 22:2009 +A1:2010 | ☒ Class A | ☐ Class B |
| ☐ ANSI C63.4-2009 | | |
| ☐ IC Regulation ICES-003 : 2016 | | |
| ☐ CAN/CSA CISPR 22-10 | ☐ Class A | ☐ Class B |
| ☐ ANSI C63.4-2014 | | |
| ☐ MEDICAL – Directive 93/42/EEC | | |
| ☐ EN 60601-1-2 :2007 | | |
| ☐ 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

Oct, 05, 2016

Test Location

Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test Receiver	ESR3	R & S	101783	05, 03, 2017
☒	LISN	ENV216	R & S	101137	02, 04, 2017
☒	LISN	ENV216	R & S	101786	05, 02, 2017
☒	Electro wave Shieldroom	-	SEMITEC	-	-
☒	EMI Test S/W	EMC32	R & S	9.12.00	-

Test Conditions

Temperature: 21,1 °C
Relative Humidity: 53,1 %

Frequency Range of Measurement

150 kHz to 30 MHz

Instrument Settings

IF Band Width: 9 kHz

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.



2.2 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Oct, 05, 2016

Test Location

☒ Open Area Test Site #1 ☐ Open Area Test Site #2

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI TEST Receiver	ESU26	R&S	100551	04, 18, 2017
☒	Trilog-Broadband ANT	VULB 9163	Schwarzbeck	9163-715	04, 14, 2018
☒	OATS	-	KES	-	-
☒	Antenna Mast	1070/1080	EMCO	-	-
☒	Turn Table	-	DAEIL EMC	-	-
☒	EMI Test S/W	-	-	-	-

Test Conditions

Temperature: 21,5 °C
Relative Humidity: 75,0 %

Frequency Range of Measurement

30 MHz to 1 GHz

Instrument Settings

IF Band Width: 120 kHz

Test Results

The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.

2.3 Radiated Electric Field Emissions(Above 1 GHz)

Test Date

Oct, 06, 2016

Test Location

Semi Anechoic Chamber #1

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	Log-Periodic Antenna	STLP 9149	SCHWARZBECK	9149-255	05, 17, 2018
☒	EMI TEST Receiver	ESU26	R&S	100551	04, 18, 2017
☒	Preamplifier	EMI TEST Receiver	R&S	102232	06, 29, 2017
☒	Semi Anechoic Chamber #1	-	KES	-	-
☒	Tilt Antenna Mast	TAM 4.0-E	maturro	18100116	-
☒	Turn Table	DT 2000-1,5T	INN-CO	-	-
☒	EMI Test S/W	-	-	-	-

Test Conditions

Temperature: 24,5 °C

Relative Humidity: 57,8 %

Frequency Range of Measurement

1 GHz to 6 GHz

Instrument Settings

IF Band Width: 1 MHz

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.

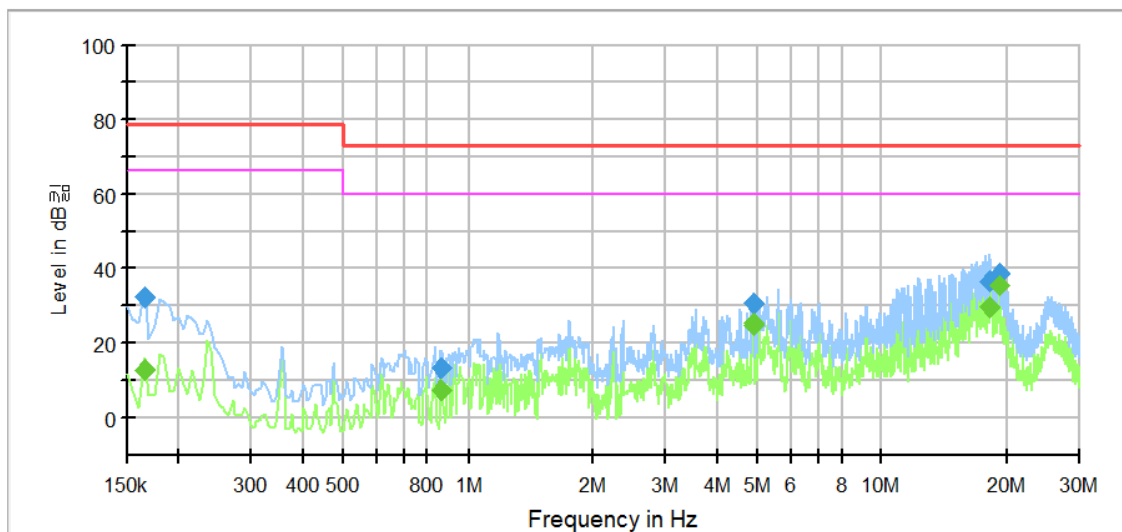
APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

[HOT]

Common Information

Test Description: Conducted Emission
Model No.: PNP-9200RHN
Mode
Operator Name: KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.165000	---	12.99	66.00	53.01	1000.0	9.000	L1	9.7
0.165000	32.26	---	79.00	46.74	1000.0	9.000	L1	9.7
0.865000	---	7.71	60.00	52.29	1000.0	9.000	L1	9.9
0.865000	13.47	---	73.00	59.53	1000.0	9.000	L1	9.9
4.880000	---	25.08	60.00	34.92	1000.0	9.000	L1	10.0
4.880000	30.63	---	73.00	42.37	1000.0	9.000	L1	10.0
4.890000	---	25.44	60.00	34.56	1000.0	9.000	L1	10.0
4.890000	30.89	---	73.00	42.11	1000.0	9.000	L1	10.0
18.075000	---	29.49	60.00	30.51	1000.0	9.000	L1	10.1
18.075000	36.78	---	73.00	36.22	1000.0	9.000	L1	10.1
19.200000	---	35.72	60.00	24.28	1000.0	9.000	L1	10.2
19.200000	38.74	---	73.00	34.26	1000.0	9.000	L1	10.2

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

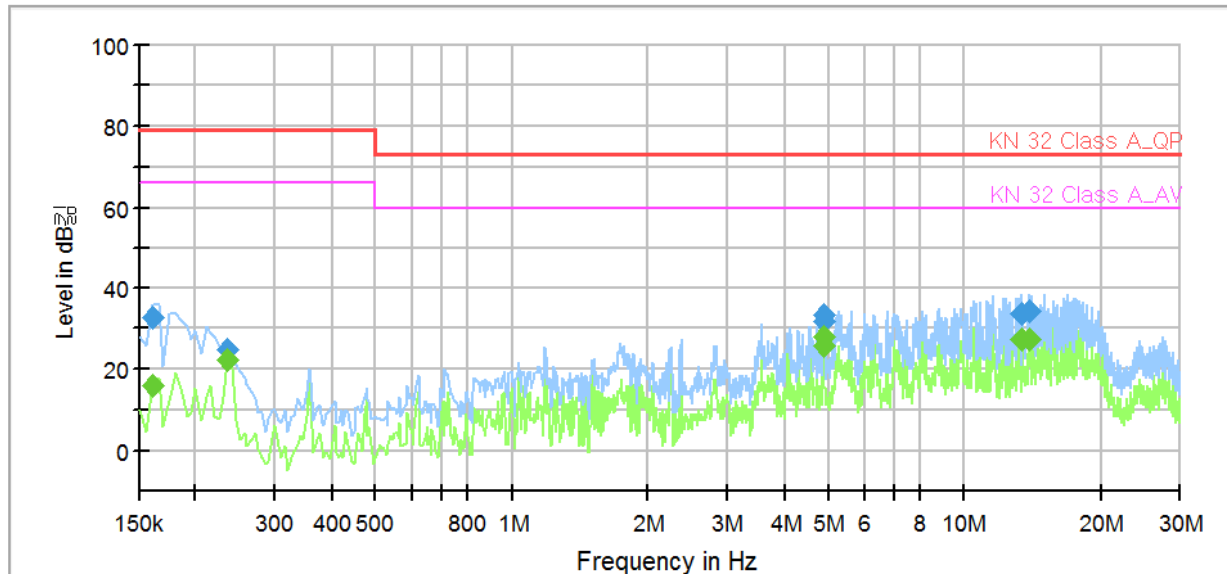
Reading Value : Not shown in the table.

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

[NEUTRAL]

Common Information

Test Description: Conducted Emission
Model No.: PNP-9200RHN
Mode
Operator Name: KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.160000	---	15.92	66.00	50.08	1000.0	9.000	N	9.7
0.160000	32.58	---	79.00	46.42	1000.0	9.000	N	9.7
0.235000	---	22.39	66.00	43.61	1000.0	9.000	N	9.7
0.235000	25.02	---	79.00	53.98	1000.0	9.000	N	9.7
4.875000	---	25.75	60.00	34.25	1000.0	9.000	N	10.0
4.875000	31.92	---	73.00	41.08	1000.0	9.000	N	10.0
4.885000	---	28.33	60.00	31.67	1000.0	9.000	N	10.0
4.885000	33.36	---	73.00	39.64	1000.0	9.000	N	10.0
13.350000	---	27.39	60.00	32.61	1000.0	9.000	N	9.9
13.350000	33.91	---	73.00	39.09	1000.0	9.000	N	9.9
14.030000	---	27.48	60.00	32.52	1000.0	9.000	N	9.9
14.030000	34.16	---	73.00	38.84	1000.0	9.000	N	9.9

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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



Radiated Electric Field Emissions(Below 1 GHz)

Frequency	Amplitude	ANT	ANT. Height	Correction Factor		Corrected Amplitude	Applicable Limit	Margin
[MHz]	[dB μ V]	Polar. (H/V)	[m]	ANT. [dB/m]	Cable [dB]	[dB μ V/m]	[dB μ V/m]	[dB]
144.09	16.52	H	3.90	8.04	2.46	27.02	43.50	16.48
155.11	14.16	V	1.10	8.35	2.58	25.09	43.50	18.41
216.10	14.07	H	4.00	11.82	3.04	28.93	46.40	17.47
504.23	16.56	H	3.20	17.38	5.07	39.01	46.40	7.39
648.79	9.71	V	1.00	19.48	5.99	35.18	46.40	11.22
792.00	16.21	H	1.20	20.81	6.91	43.93	46.40	2.47

* H : Horizontal, V : Vertical

◆ Calculation

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

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

Correction Factor : ANT FACTOR + Cable loss

**KES Co., Ltd.**

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

Test report No.:
KES-E1-16T0512
Page (18) of (34)

Radiated Electric Field Emissions(Above 1 GHz)

- PK

Frequency	Amplitude	ANT Polar. (H/V)	ANT. Height	Correction Factor			Corrected Amplitude	Applicable Limit	Margin
[MHz]	[dB μ V]		[m]	ANT. [dB /m]	Cable [dB]	AMP [dB]	[dB μ V/m]	[dB μ V/m]	[dB]
1 072.000	47.140	V	1.000	20.860	3.210	43.640	27.570	76.000	48.430
1 080.000	61.110	H	1.000	20.900	3.220	43.640	41.590	76.000	34.410
1 224.000	61.140	H	1.000	21.630	3.410	43.640	42.540	76.000	33.460
1 224.000	45.880	V	1.000	21.630	3.410	43.640	27.280	76.000	48.720
1 512.000	55.100	H	1.000	23.110	3.770	43.630	38.350	76.000	37.650
1 512.000	40.840	V	1.000	23.110	3.770	43.630	24.090	76.000	51.910
1 592.000	55.590	H	1.000	23.520	3.850	43.660	39.300	76.000	36.700
1 793.000	57.350	H	1.000	24.540	4.280	43.720	42.450	76.000	33.550
2 113.000	43.560	V	1.000	26.070	4.620	43.830	30.420	76.000	45.580
2 378.000	43.340	V	1.000	27.180	4.890	43.950	31.460	76.000	44.540
5 895.000	46.750	H	1.000	36.200	7.770	44.450	46.270	80.000	33.730
5 991.000	34.960	V	1.000	36.520	7.830	44.430	34.880	80.000	45.120

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.

**KES Co., Ltd.**

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

Test report No.:
KES-E1-16T0512
Page (19) of (34)

- AV

Frequency [MHz]	Amplitude [dBμV]	ANT Polar. (H/V)	ANT. Height [m]	Correction Factor			Corrected Amplitude [dBμV/m]	Applicable Limit [dBμV/m]	Margin [dB]
				ANT. [dB /m]	Cable [dB]	AMP [dB]			
1 000.000	64.820	H	1.000	20.490	3.110	43.640	44.780	56.000	11.220
1 072.000	48.810	V	1.000	20.860	3.210	43.640	29.240	56.000	26.760
1 192.000	61.010	H	1.000	21.470	3.370	43.640	42.210	56.000	13.790
1 512.000	56.290	H	1.000	23.110	3.770	43.630	39.540	56.000	16.460
1 512.000	41.910	V	1.000	23.110	3.770	43.630	25.160	56.000	30.840
1 625.000	57.040	H	1.000	23.680	3.920	43.670	40.970	56.000	15.030
1 625.000	44.100	V	1.000	23.680	3.920	43.670	28.030	56.000	27.970
1 793.000	58.660	H	1.000	24.540	4.280	43.720	43.760	56.000	12.240
1 993.000	45.290	V	1.000	25.560	4.400	43.780	31.470	56.000	24.530
2 394.000	43.360	V	1.000	27.250	4.900	43.960	31.550	56.000	24.450
5 951.000	46.030	H	1.000	36.390	7.800	44.440	45.780	60.000	14.220
5 975.000	35.010	V	1.000	36.470	7.820	44.430	34.870	60.000	25.130

◆ Calculation

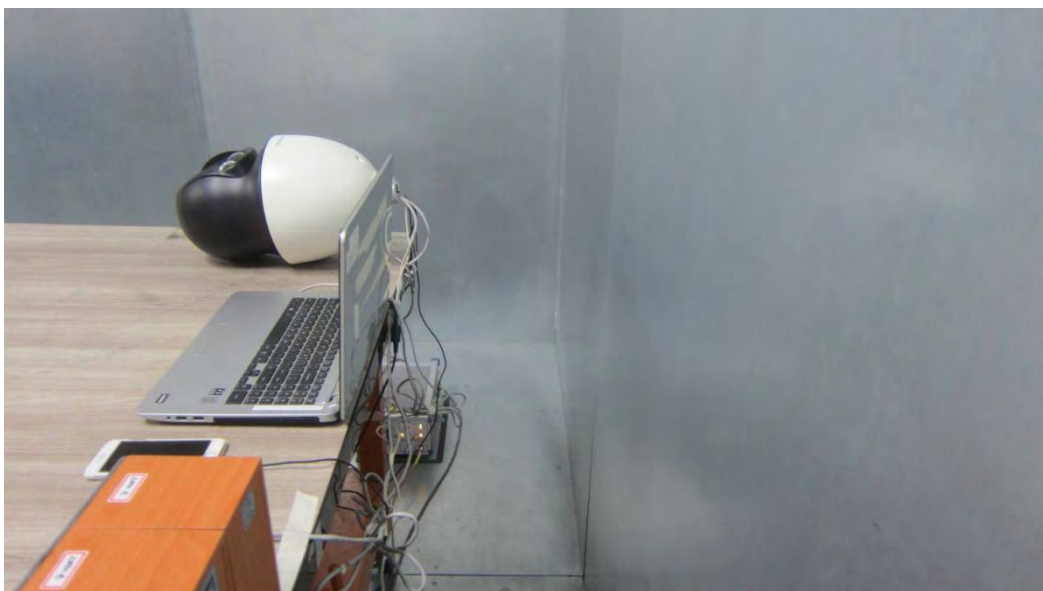
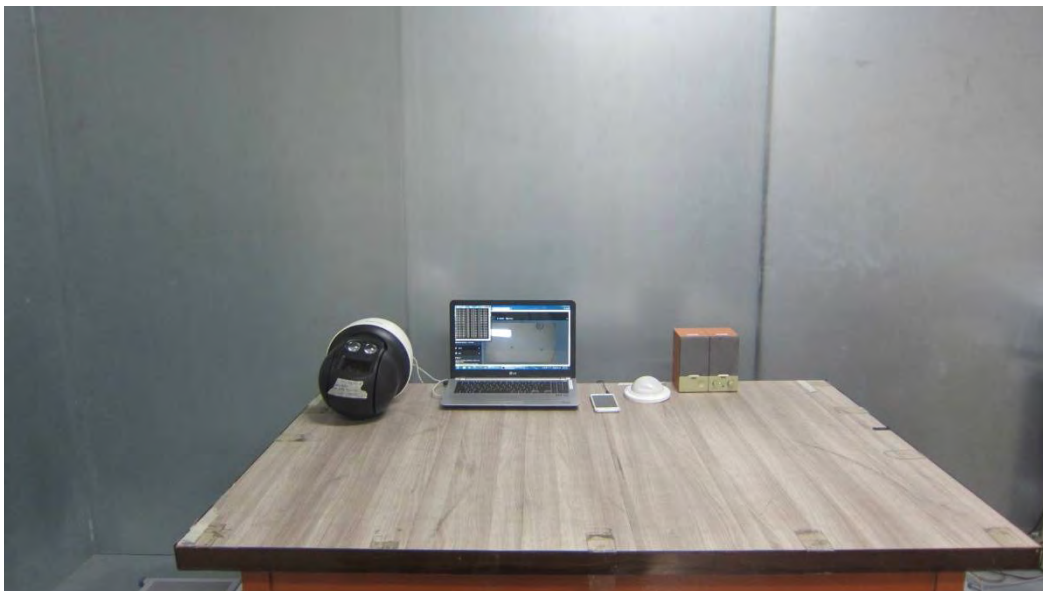
Over Limit [dB] = (Read Level[dBuV] + Ant Factor[dB/m] + Cable Loss [dB] - Preamp Factor
[dB]) - Limit Line[dBuV]

Over Limit : Margin Value, Read Level : Reading Value, Ant Factor : Ant Factor,
Cable Loss : Cable loss, Preamp Factor : Preamp 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.

Test Setup Photos and Configuration

Conducted Voltage Emissions



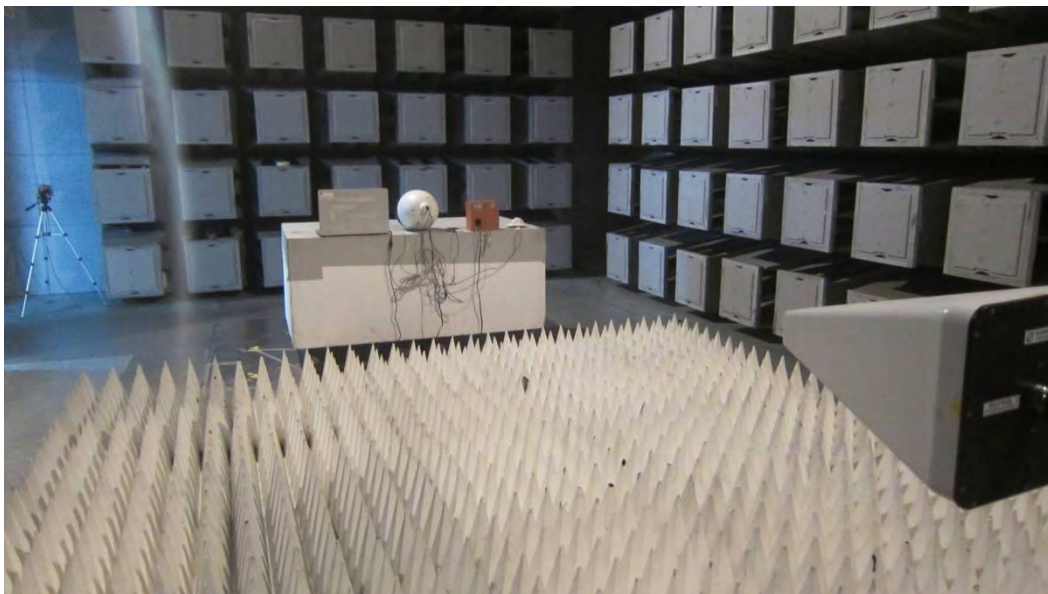
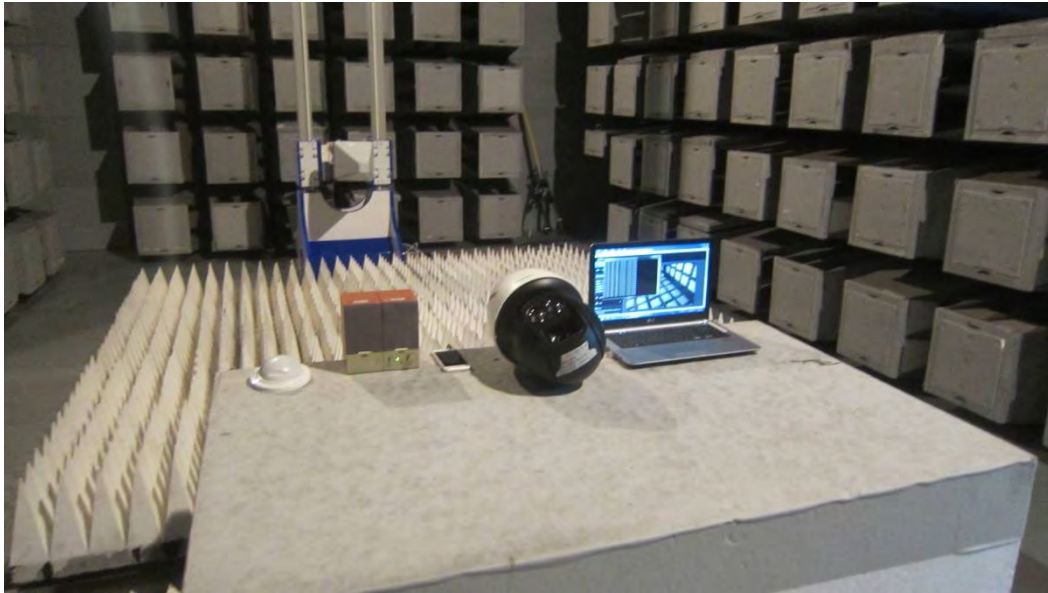
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

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.

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.

EUT External Photographs

(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.

EUT Internal Photographs

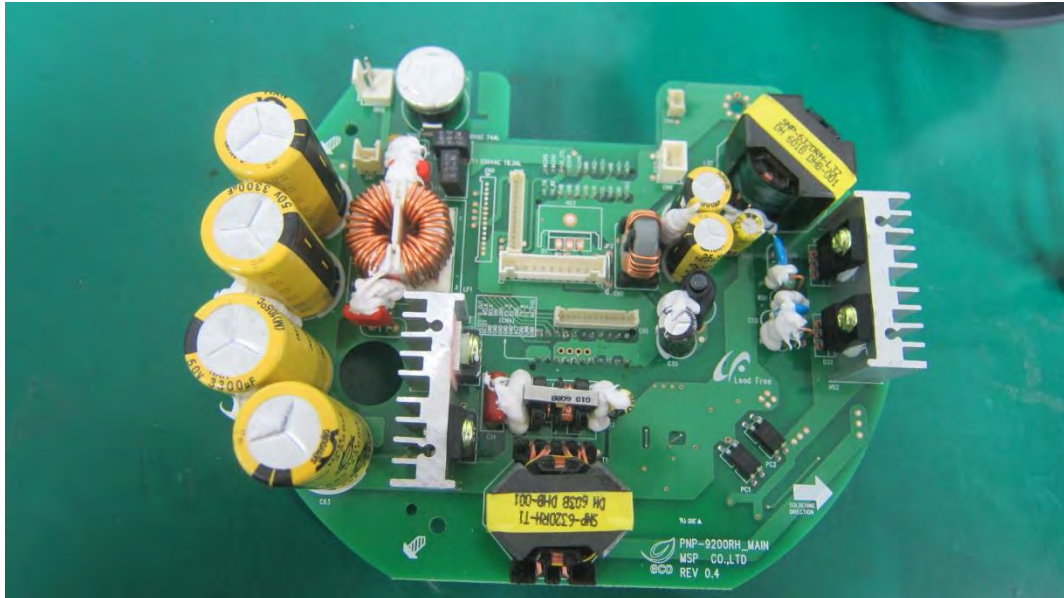
(Internal View)



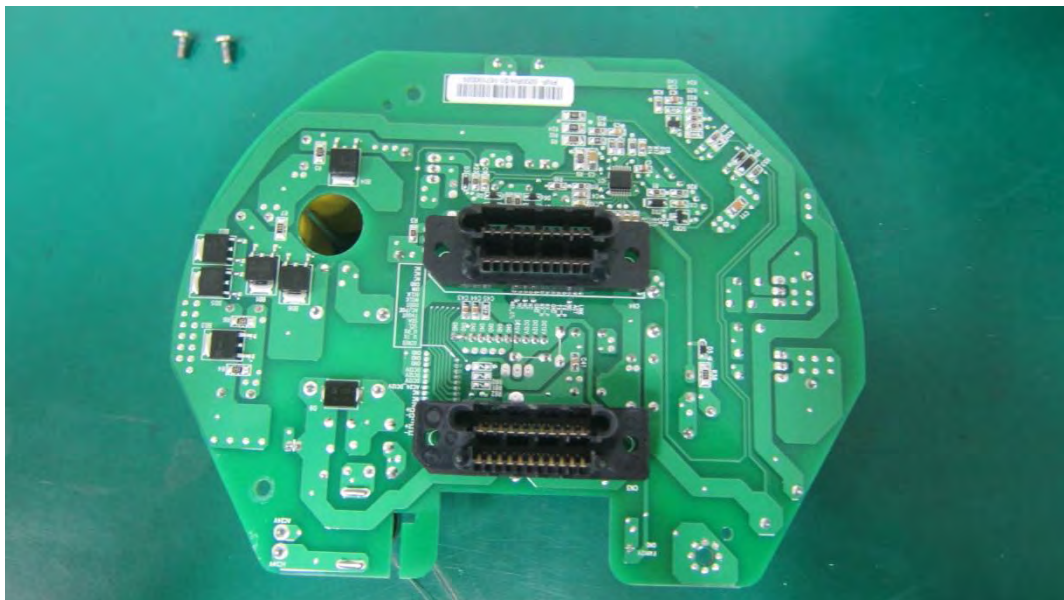
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

EUT Internal View – Main Board

(Top)



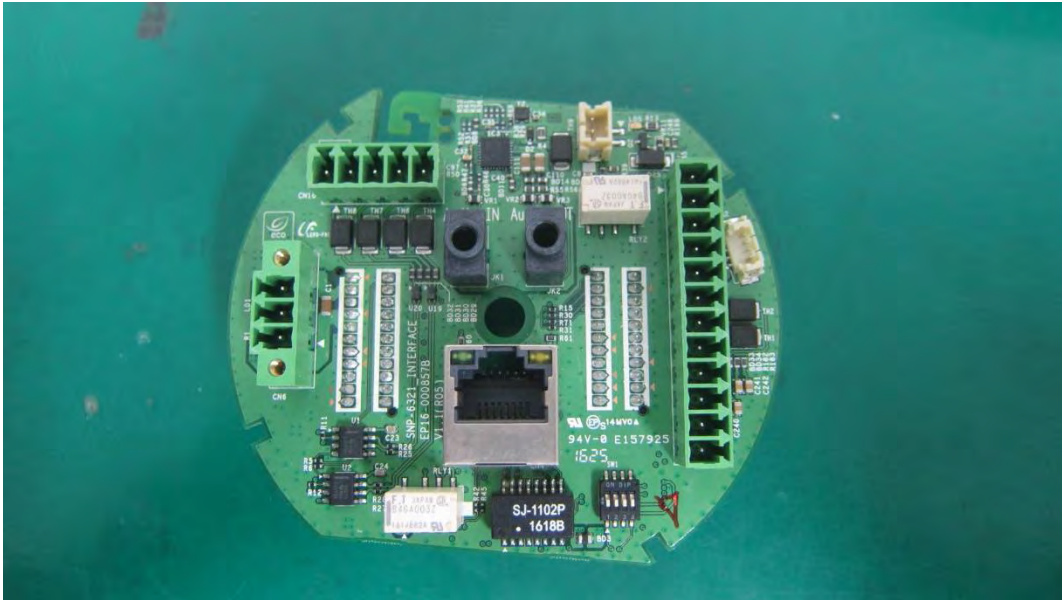
(Bottom)



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.

EUT Internal View – Sub Board 1

(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.

EUT Internal View – Sub Board 2

(Top)



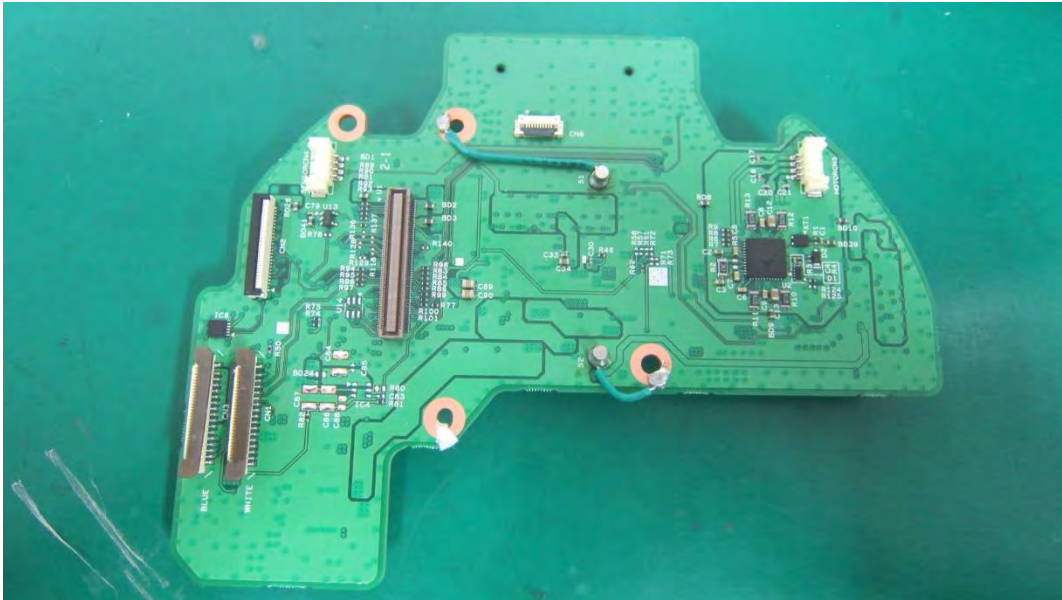
(Bottom)



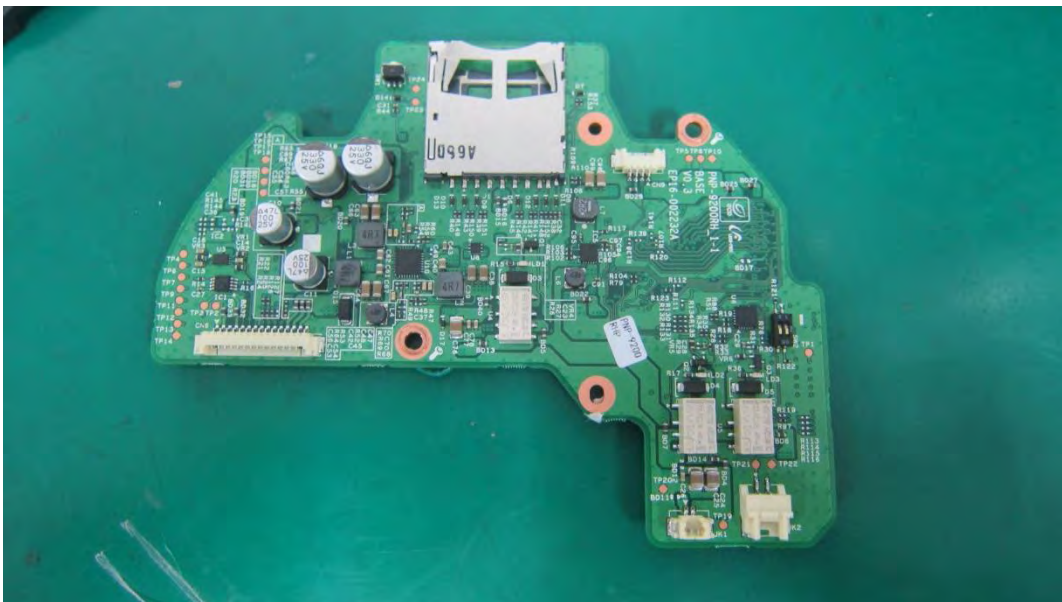
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

EUT Internal View – Sub Board 3

(Top)



(Bottom)



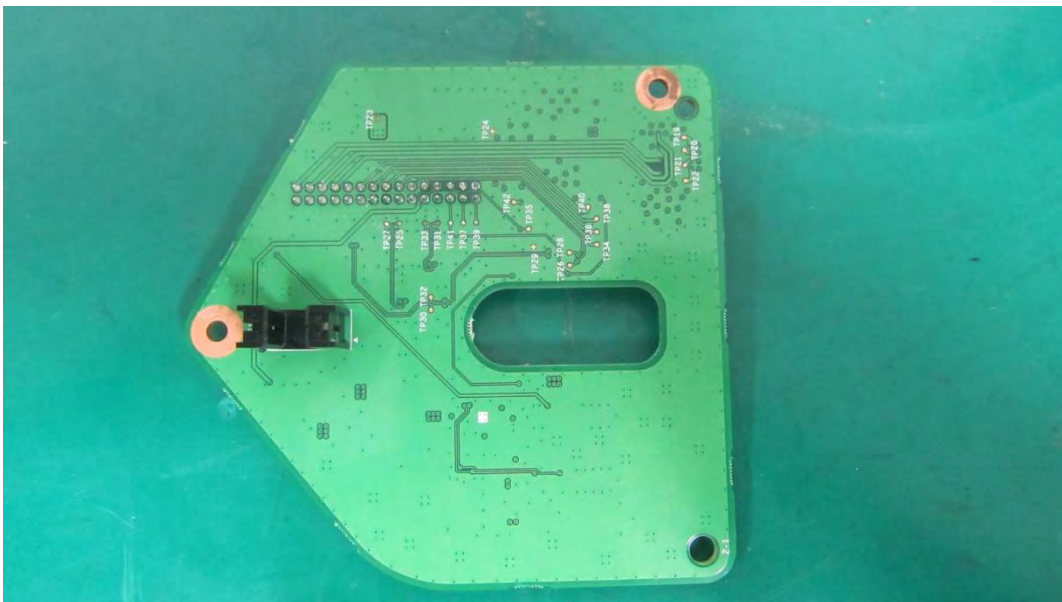
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

EUT Internal View – Sub Board 4

(Top)



(Bottom)



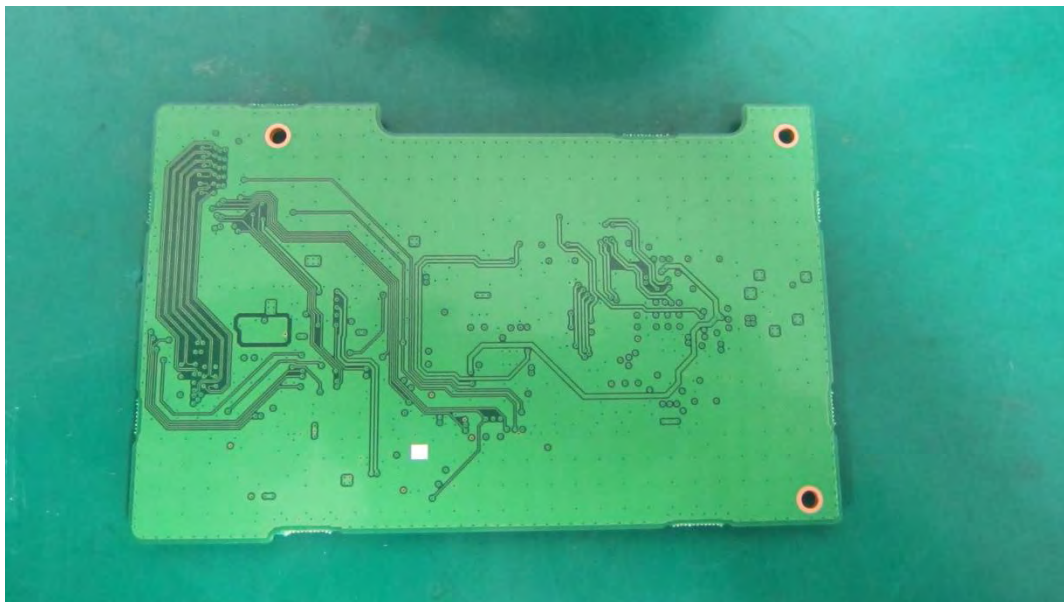
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

EUT Internal View – Sub Board 5

(Top)



(Bottom)

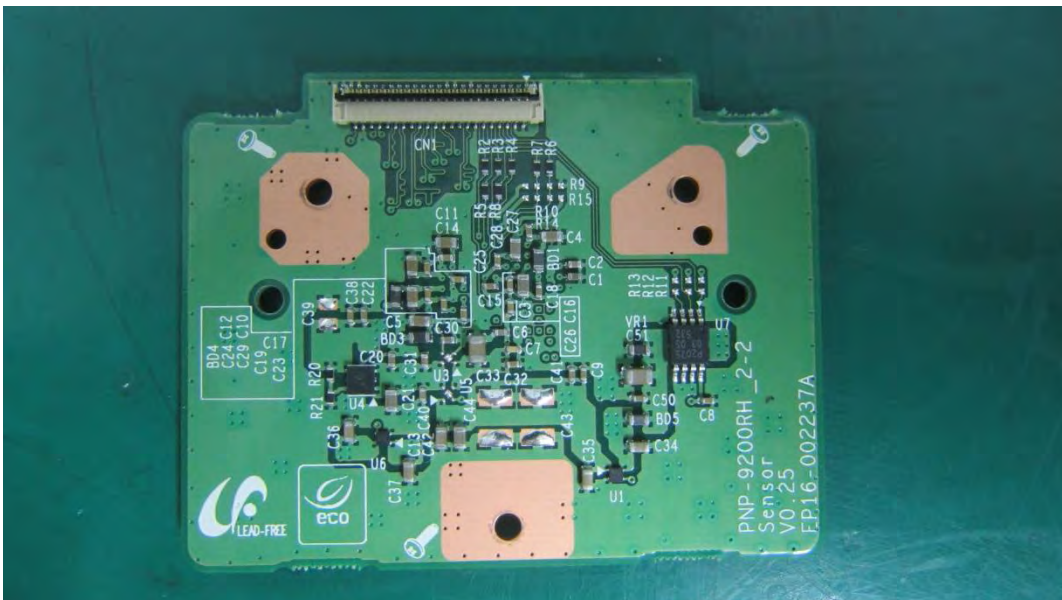


EUT Internal View – Sub Board 6

(Top)



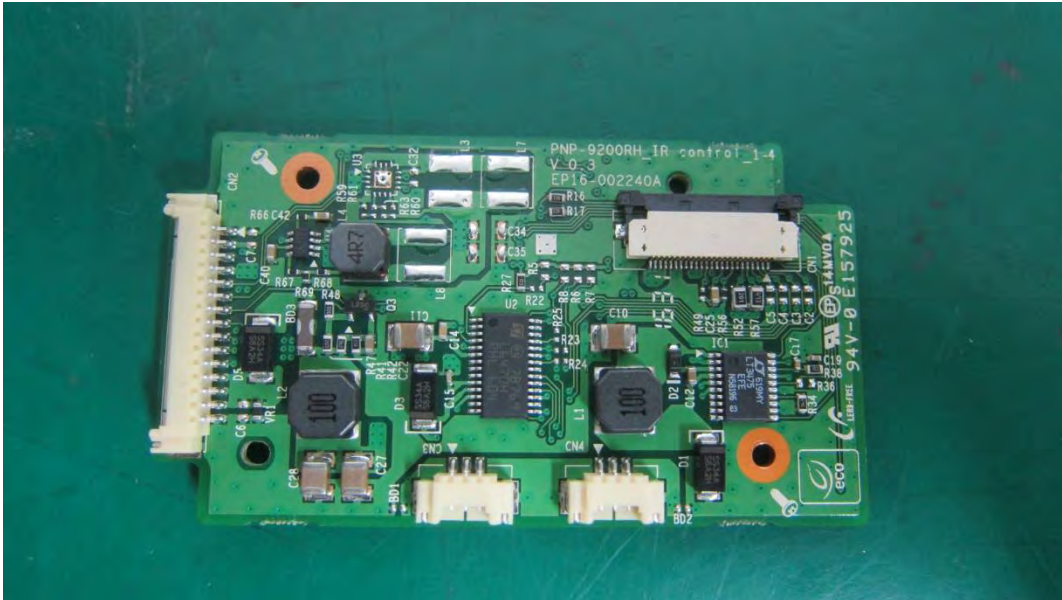
(Bottom)



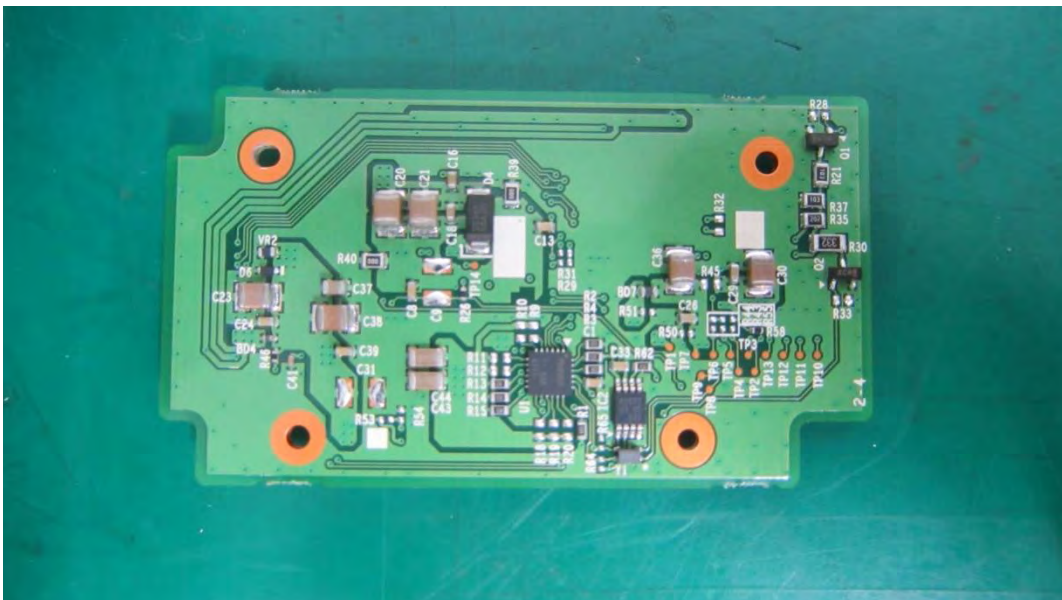
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

EUT Internal View – Sub Board 7

(Top)



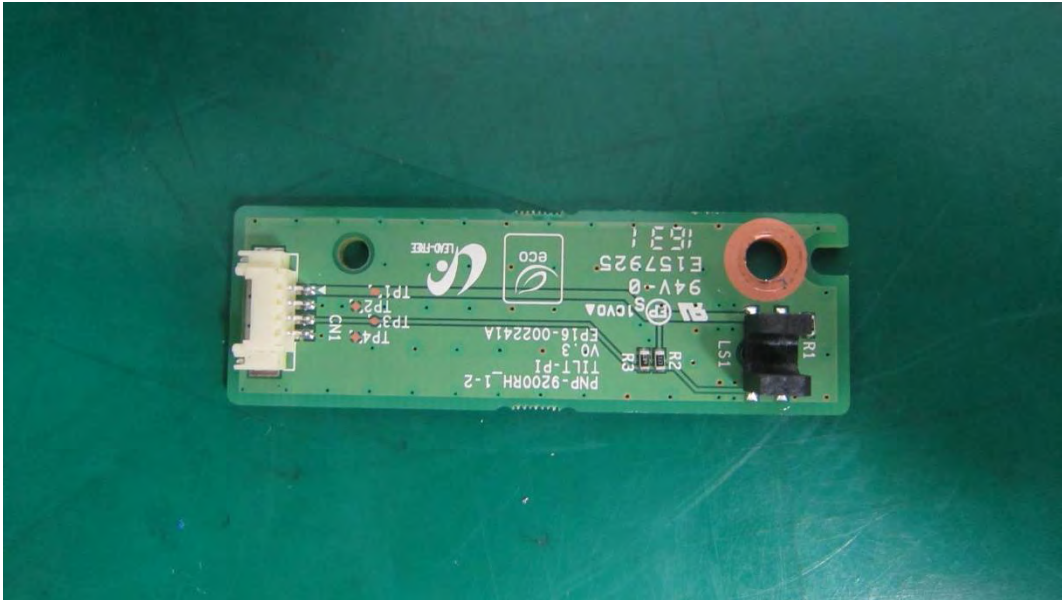
(Bottom)



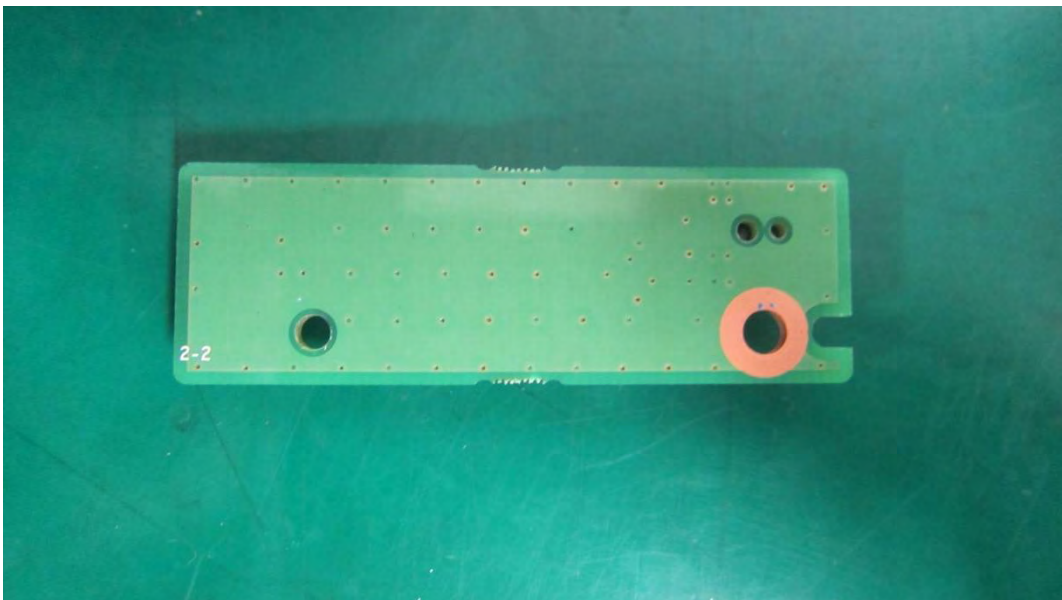
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

EUT Internal View – Sub Board 8

(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.

Label Photographs



This device complies with part 15 of the FCC Rules. Operation in subject to the following two conditions: (1) This device Sep not cause harmful interference, and (2) this device must accept any interference received, including interference that Sep cause undesired operation.