

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:	XNO-8080RN
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-Eletronic 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-E1-16T0619

NETWORK CAMERA, Model XNO-8080N 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-E1-16T0619

Date of Issue: 12. 11, 2016

Dong Hun, Jang
Technical Manager
Signature:



KES.Co., Ltd.

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EMC TEST REPORT For FCC

Test Report No. : KES-E1-16T0619

Date of Issue : Dec. 11, 2016

Product name : NETWORK CAMERA

Model/Type No. : XNO-8080RN

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 : Nov, 23, 2016

Test date : Dec. 02, 2016 ~ Dec. 03, 2016

Test Results : ☒ In Compliance ☐ Not in Compliance

Tested by

Kyeng Sun, Min
EMC Test Engineer

Reviewed by

Dong-Hun, Jang
EMC Technical Manager

**KES Co., Ltd.**

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Test report No.:
KES-E1-16T0619
Page (2) of (44)

REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Dec. 11, 2016	KES-E1-16T0619	Issued

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TABLE OF CONTENTS

1.0	General Product Description.....	4
1.1	Test Voltage & Frequency	7
1.2	Variant Model Differences.....	7
1.3	Device Modifications	7
1.4	Equipment Under Test.....	7
1.5	Support Equipments	7
1.6	External I/O Cabling	8
1.7	EUT Operating Mode(s)	9
1.8	Configuration	10
1.9	Calibration Details of Equipment Used for Measurement.....	12
1.10	Test Facility	12
1.11	Laboratory Accreditations and Listings	12
2.0	Test Regulations	13
2.1	Conducted Emissions at Mains Power Ports	15
2.2	Radiated Electric Field Emissions(Below 1 GHz)	16
2.3	Radiated Electric Field Emissions(Above 1 GHz)	17
APPENDIX A – TEST DATA		18
Conducted Emissions at Mains Power Ports.....		18
Radiated Electric Field Emissions(Below 1 GHz)		20
Radiated Electric Field Emissions(Above 1 GHz)		22
Test Setup Photos and Configuration.....		28
Conducted Voltage Emissions		28
Radiated Electric Field Emissions(Below 1 GHz)		29
Radiated Electric Field Emissions(Above 1 GHz)		32
EUT External Photographs		35
EUT Internal Photographs		36



1.0 General Product Description

Main Specifications of EUT are:

Video	
Imaging Device	1/1.8" 6M CMOS
Total Pixels	3096(H) x 2094(V)
Effective Pixels	2616(H) x 1976(V)
Scanning System	Progressive Scan
Min. Illumination	Color : 0.1 lux (TBD) 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 USB : Micro USB type B, 1920 x 1080(TBD), for installation
Lens	
Focal Length (Zoom Ratio)	3.9~9.4mm(2.4x) motorized varifocal (Wide 확대검토中)
Max. Aperture Ratio	F1.3
Angular Field of View	TBD
Min. Object Distance	0.5m (1.64ft)
Focus Control	Simple focus(Motorized V/F) / Manual, Remote control via network(Manual, Simple focus)
Lens Type	DC Auto Iris, P-iris
Mount Type	Board-in type
Pan / Tilt / Rotate	
Pan / Tilt / Rotate range	
Operational	
IR LED	TBD
Viewable Length	(TBD)50m(164.04ft)
Camera Title	Off / On (Displayed up to 55 characters) - W/W : English/Numeric/Special Characters - China : English/Numeric/Special/Chinese 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 / External / Schedule
Backlight Compensation	Off / BLC / HLC(Masking/Dimming), WDR(Seamless transition TBD)
Wide Dynamic Range	120dB(TBD)
Contrast Enhancement	SSDR (Off / On)
Digital Noise Reduction	SSNR5 (2D+3D Noise Filter) (Off / On)
Digital Image Stabilization	Off / On
Defog	Auto(input from fog&Dust detection) / Manual / Off
Motion Detection	Yes(8ea, 4point Polygonal zones)
Privacy Masking	Off / On (32ea, polygonal zones) - Color : Grey/Green/Red/Blue/Black/White - Mosaic ※ Zoom ratio option for mask mode (TBD)
Gain Control	Off / Low / Middle / High
White Balance	ATW / AWC / Manual / Indoor / Outdoor((included Mercury & Sodium)
Contrast	level adjustment
LDC	On/Off (5 levels with Min/Max)

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Test report No.:

KES-E1-16T0619

Page (5) of (44)

Electronic Shutter Speed	Minimum / Maximum / Anti flicker (2 ~ 1/12,000sec →TBD)
Digital PTZ	24X, 'Digital PTZ(Preset, Group)
Flip / Mirror	Flip : On/Off Mirror : On/Off Hallway view : 90°/270°
Intelligent Video & Audio Analy	Tampering, Loitering, Directional Detection, Defocus Detection, Fog&Dust Detection, Virtual Line, Enter/Exit, Appear / Disappear, Audio Detection, Motion Detection, Digital Auto Tracking, Sound Classification
Alarm I/O	Input 1ea / Output 1ea
Remote Control Interface	-
RS-485 Protocol	-
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 Event Triggers External output DPTZ preset
Audio In	Selectable (Mic IN/Line IN), Supply voltage: 2.5VDC(4mA), Input impedance: approx. 2K Ohm
Audio out	Line out, Max output level: 1 Vrms
Fan / Heater	-
Pixel Counter	Support
Network	
Ethernet	RJ-45 (10/100BASE-T)
Video Compression Format	H.265/H.264 (MPEG-4 Part 10/AVC) : Main/Baseline/High , Motion JPEG
Resolution	5M mode : 2592 x 1944, 2592 x 1464, 1920 x 1080, 1600 x 1200, 1280 x 1024, 1280 x 960 1280 x 720, 1024 x 768, 800 x 600, 720 x 576, 720 x 480, 640 x 480, 320 x 240 2M mode : 1920x1080, 1280x1024, 1280x960, 1280x720, 1024x768, 800x600, 800x450, 720x576 640x480, 640x360, 320x240, 320x180
Max. Framerate	5M mode : H.265/H.264 : Max. 30fps at all resolutions Motion JPEG : Max. 30fps 2M mode : H.265/H.264 : Max. 60fps at all resolutions Motion JPEG : Max. 30fps
Smart Codec	Manual Mode (area-based : 5EA)
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 u-law /G.726 Selectable G.726 (ADPCM) 8KHz, G.711 8KHz G.726 : 16Kbps, 24Kbps, 32Kbps, 40Kbps AAC-LC : 48Kbps at 8/16/32/48KHz
Audio Communication	Bi-directional (2-Way)
IP	IPv4, IPv6

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KES-E1-16T0619
Page (6) of (44)

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 Encryption 기능구현
Streaming Method	Streaming Method
Max. User Access	20 users at Unicast Mode(TBD)
Edge Storage	SD/SDHC/SDXC 2slot (up to 512 GB) - Continuous recording(1'st slot to 2'nd slot) - (TBD) Redundant recording - Motion Images recorded in the SD/SDHC/SDXC memory card can be downloaded. NAS(Network Attached Storage) Local PC for Instant Recording
Application Programming Interface	ONVIF Profile S/G SUNAPI(HTTP API) Open Platform
Webpage Language	English, Korean, Chinese, French, Italian, Spanish, German, Japanese, Russian, Swedish, Danish, Portuguese, Czech, Polish, Turkish, Rumanian, Serbian, Dutch, Croatia, Hungary, Greek, Norsk, Finnish
Web Viewer	Supported OS: Windows 7, 8, 10, Mac OS X 10.8, 10.9, 10.10, 10.11 Non-plugin Webviewer Supported Browser: Google Chrome 47, MS Edge 20 Support Codec : Video : H.264, MJPEG (MAX 1M 15FPS) Audio : G.711 Plug-in Webviewer Supported Browser : MS Explore 11 , Mozilla Firefox 43 , Apple Safari 9 * Mac OS X only
Central Management Software SmartViewer, SSM	
Environmental	
Operating Temperature / Humidity	-30°C ~ +55°C (-22°F ~ +131°F) / Less than 90% RH *Start up should be done at above -20°C
Storage Temperature / Humidity	-30°C ~ +60°C (-22°F ~ +140°F) / Less than 90% RH
Ingress Protection	IP67, IP66, NEMA 4X
Vandal Resistance	IK10
Electrical	
Input Voltage / Current	24VAC ± 10%, 12VDC ± 10%, PoE(IEEE802.3af)
Power Consumption	TBD
Mechanical	
Color / Material	Dark gray / Aluminum
Dimension (WxHxD)	TBD
Weight	TBD

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1.1 Test Voltage & Frequency

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

Voltage ☐ 100 Vac ☐ 120 Vac ☒ 24 Vac ☒ 12 Vdc ☒ PoE

Frequency ☐ 50 Hz ☐ 60 Hz ☐ Hz

1.2 Variant Model Differences

Not applicable

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
NETWORK CAMERA	XNO-8080RN	-	Hanwha Techwin Co., Ltd.	E.U.T

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
POE Adapter	PD-3001GC/AC	RD9356082016964200	Power Dsine	-
Notebook	X56K	HN11N5151FJ0045W	HANSUNG	-
Notebook Adapter	A12-120P1A	F180271552011758	CHICONY POWER TECHNOLOGY CO.,LTD.	-
Phone	A1530	-	APPLE	-
MIC	CMK-303	-	CAMAC	1.7 m
Speaker	BR10000A CUVE	-	BEIJING EDIFIER HI-TECH GROUP.	1.6 m
Alarm	-	-	-	-
SD card	-	-	SanDisk	16 GB



1.6 External I/O Cabling

- AC 24 V Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
NETWORK CAMERA (E.U.T)	RJ-45	Notebook	RJ-45	3.0	U
	7 Pin	MIC	3.5 mm	1.7	U
		Speaker	3.5 mm	1.6	U
		Alarm	2 pin	3.0	U
	Slot	SD card	Slot	-	-
Notebook	Audio in	Phone	Audio out	1.7	-

- DC 12 V Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
NETWORK CAMERA (E.U.T)	RJ-45	Notebook	RJ-45	3.0	U
	7 Pin	MIC	3.5 mm	1.7	U
		Speaker	3.5 mm	1.6	U
		Alarm	2 pin	3.0	U
	Slot	SD card	Slot	-	-
Notebook	Audio in	Phone	Audio out	1.7	-



- POE Mode

Start		END		Cable Spec.	
Description	I / O Port	Description	I / O Port	Length	Shield
NETWORK CAMERA (E.U.T)	RJ-45 (POE)	POE Adapter	RJ-45 (POE)	3.0	U
	7 Pin	MIC	3.5 mm	1.7	U
		Speaker	3.5 mm	1.6	U
		Alarm	2 pin	3.0	U
	Slot	SD card	Slot	-	-
Notebook	Audio in	Phone	Audio out	1.7	-
	RJ-45 (DATA)	POE Adapter	RJ-45 (DATA)	3.0	U

* Unshielded = U, Shielded = S

1.7 EUT Operating Mode(s)

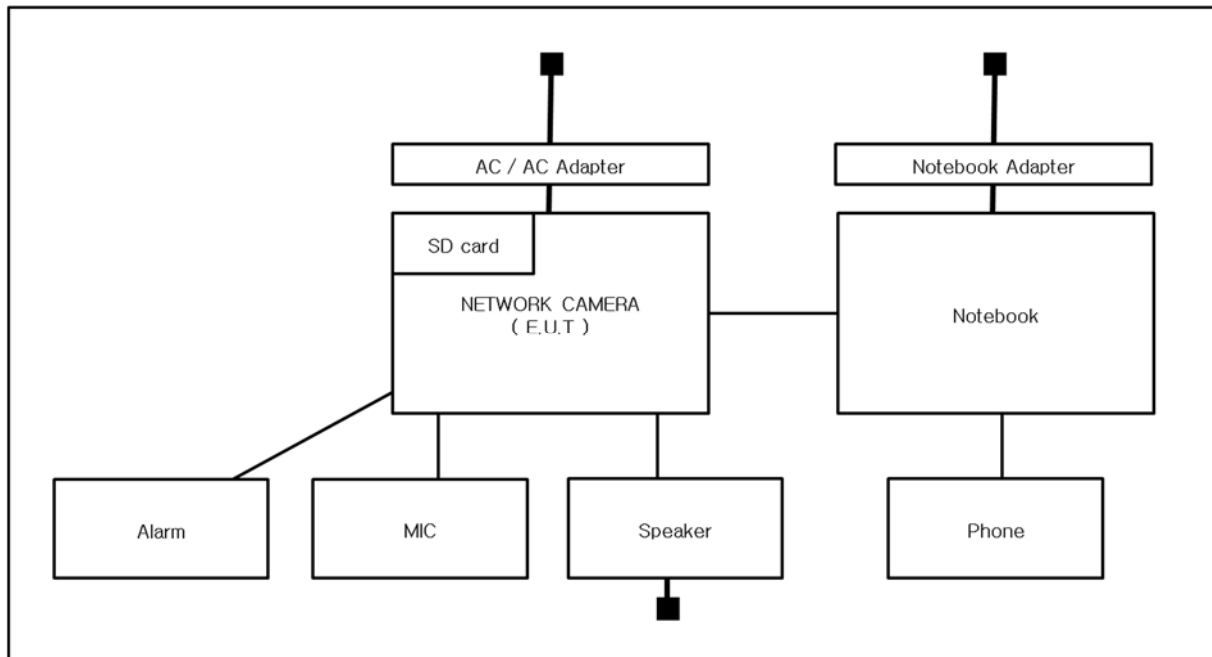
Test mode	Normal operating
E.U.T Monitoring , Ping test, 1 kHz	

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

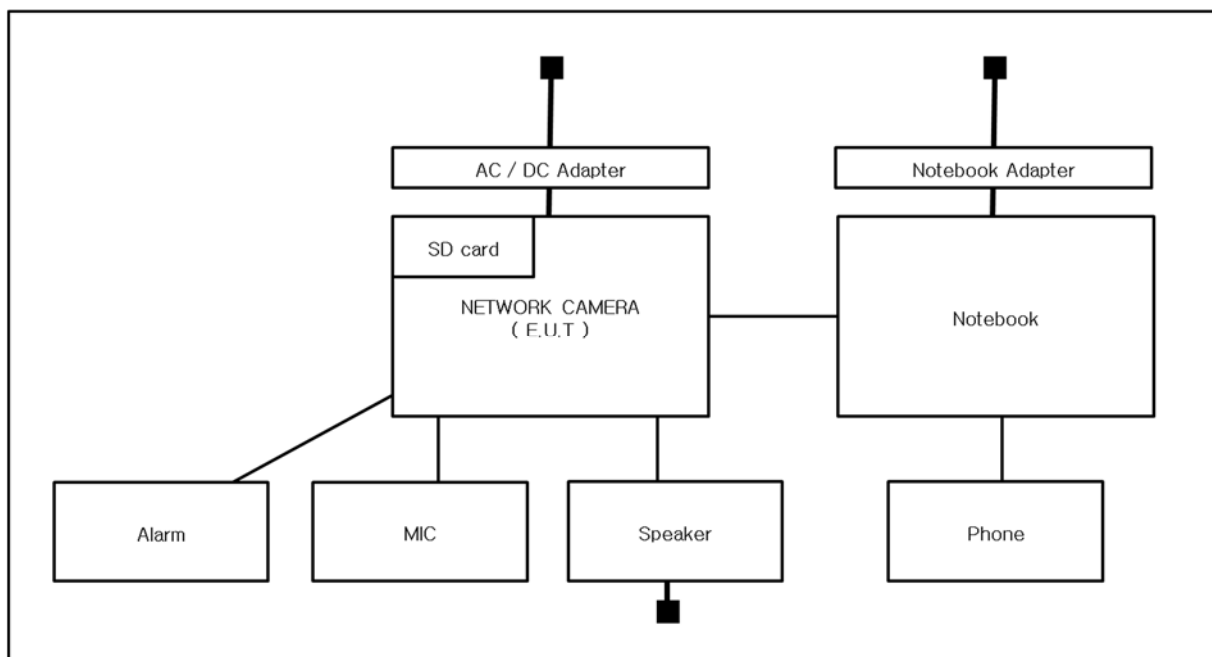
1.8 Configuration

■ AC Main
□ DC Main

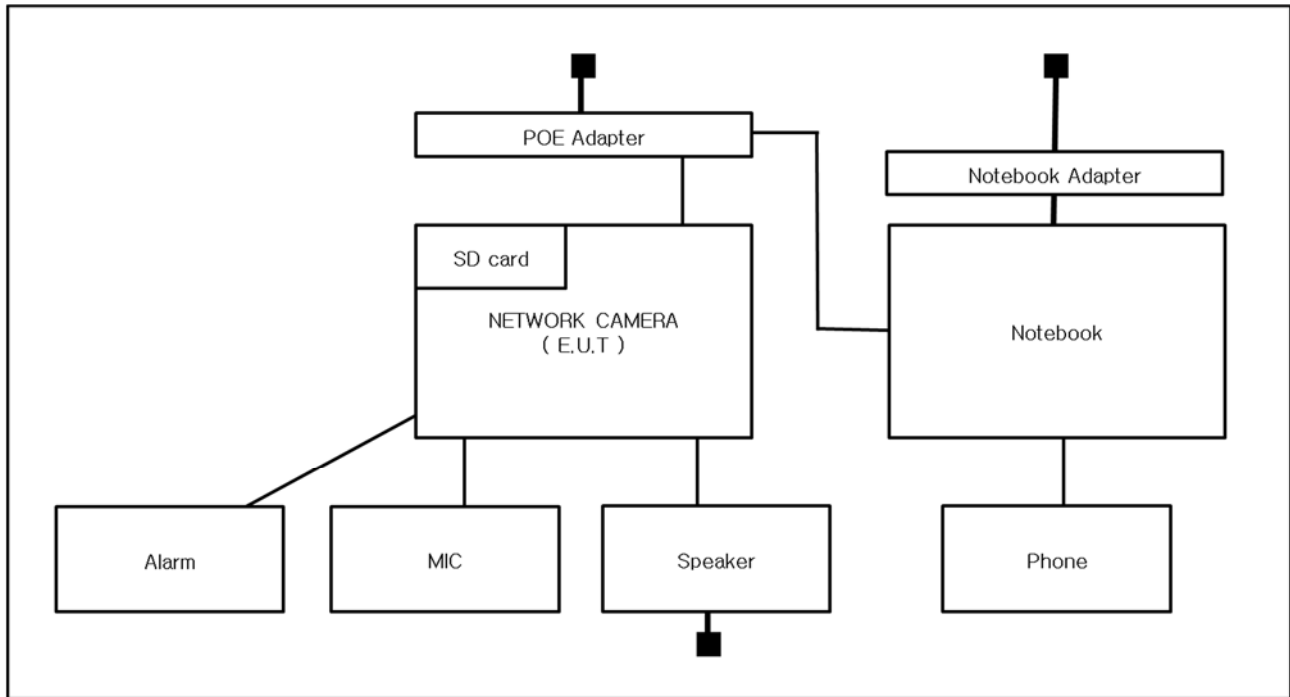
- AC 24 V Mode



- DC 12 V Mode



- POE Mode



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, Yeosu-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

Dec, 02, 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: 16,5 °C

Relative Humidity: 39,8 %

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

Dec, 03, 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	ESR3	R&S	101781	05, 03, 2017
☒	Trilog-Broadband ANT	VULB 9163	Schwarzbeck	9163-713	05, 15, 2017
☒	OATS	-	KES	-	-
☒	Antenna Mast	-	DAEIL EMC	-	-
☒	Turn Table	-	DAEIL EMC	-	-
☒	EMI Test S/W	-	-	-	-

Test Conditions

Temperature: 9,8 °C
Relative Humidity: 35,0 %

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

Dec, 03, 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: 19,6 °C

Relative Humidity: 47,2 %

Frequency Range of Measurement

1 GHz to 6 GHz

Instrument Settings

IF Band Width: 1 MHz

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.

APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

- AC 24 V Mode

[HOT]

Common Information

Test Description:

Model No.:

Mode

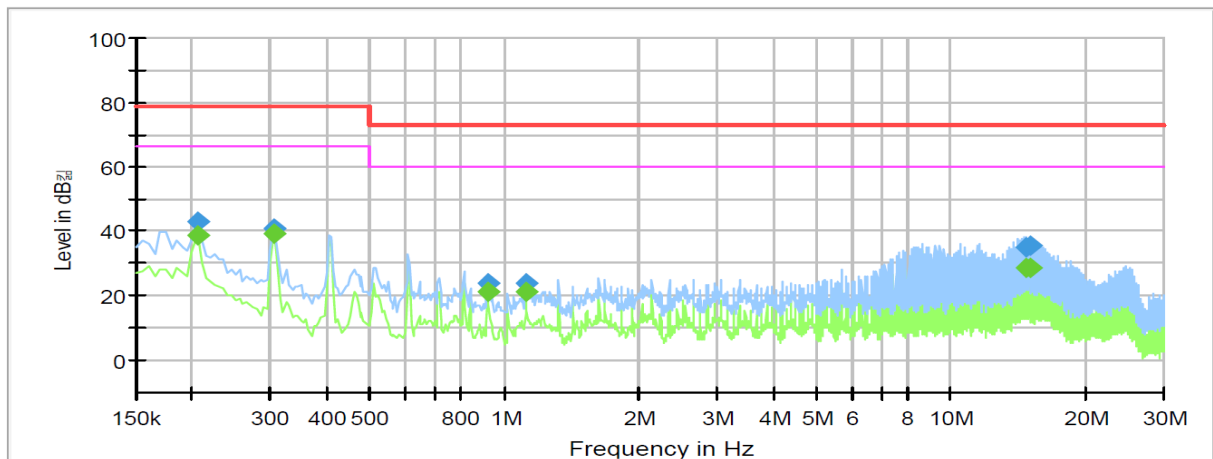
Operator Name:

Conducted Emission

XNO-8080RN

AC 24 V

KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.205000	---	38.81	66.00	27.19	1000.0	9.000	L1	9.7
0.205000	42.85	---	79.00	36.15	1000.0	9.000	L1	9.7
0.305000	---	39.41	66.00	26.59	1000.0	9.000	L1	9.7
0.305000	40.68	---	79.00	38.32	1000.0	9.000	L1	9.7
0.915000	---	21.04	60.00	38.96	1000.0	9.000	L1	10.0
0.915000	23.73	---	73.00	49.27	1000.0	9.000	L1	10.0
1.120000	---	21.02	60.00	38.98	1000.0	9.000	L1	10.1
1.120000	24.11	---	73.00	48.89	1000.0	9.000	L1	10.1
14.775000	---	28.39	60.00	31.61	1000.0	9.000	L1	10.1
14.775000	34.76	---	73.00	38.24	1000.0	9.000	L1	10.1
15.080000	---	28.65	60.00	31.35	1000.0	9.000	L1	10.1
15.080000	35.70	---	73.00	37.30	1000.0	9.000	L1	10.1

◆ Calculation

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

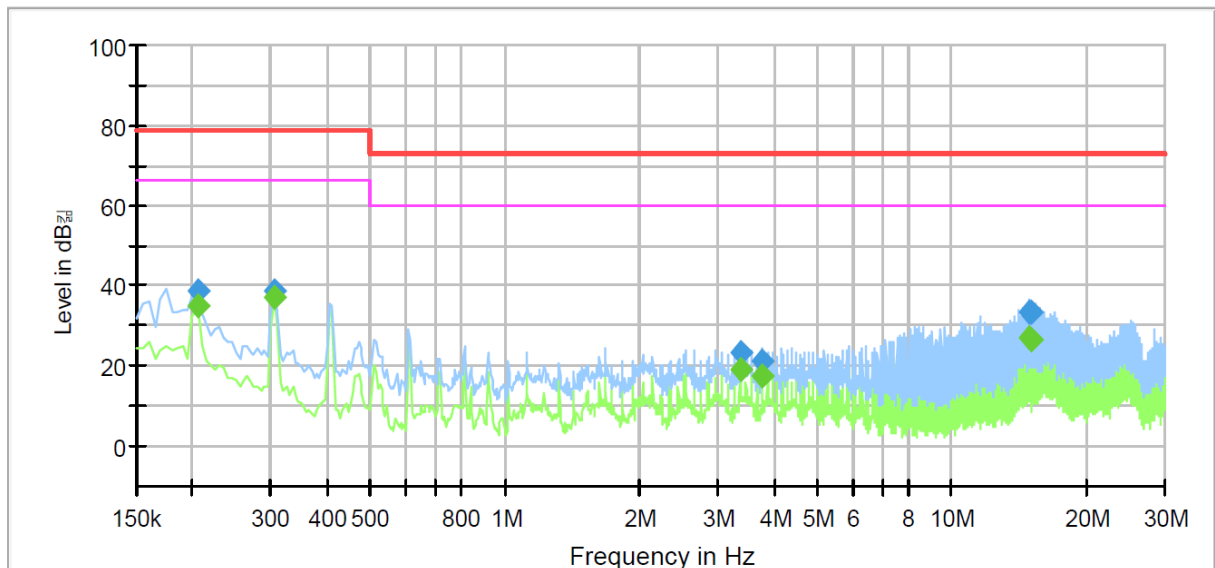
QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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

**[NEUTRAL]****Common Information**

Test Description: Conducted Emission
Model No.: XNO-8080RN
Mode: AC 24 V
Operator Name: KES

**Final Result**

Frequency (MHz)	QuasiPeak (dB $\overline{\mu}$ V)	CAverage (dB $\overline{\mu}$ V)	Limit (dB $\overline{\mu}$ V)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.205000	---	34.81	66.00	31.19	1000.0	9.000	N	9.7
0.205000	38.89	---	79.00	40.11	1000.0	9.000	N	9.7
0.305000	---	37.25	66.00	28.75	1000.0	9.000	N	9.7
0.305000	38.58	---	79.00	40.42	1000.0	9.000	N	9.7
3.360000	---	18.83	60.00	41.17	1000.0	9.000	N	10.1
3.360000	23.57	---	73.00	49.43	1000.0	9.000	N	10.1
3.770000	---	17.41	60.00	42.59	1000.0	9.000	N	10.1
3.770000	21.06	---	73.00	51.94	1000.0	9.000	N	10.1
14.875000	---	26.92	60.00	33.08	1000.0	9.000	N	10.1
14.875000	33.41	---	73.00	39.59	1000.0	9.000	N	10.1
15.080000	---	26.31	60.00	33.69	1000.0	9.000	N	10.1
15.080000	33.60	---	73.00	39.40	1000.0	9.000	N	10.1

◆ 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)

- AC 24 V Mode

Frequency	Amplitude	ANT	ANT. Height	Correction Factor		Corrected Amplitude	Applicable Limit	Margin
[MHz]	[dB μ V]	Polar. (H/V)	[m]	ANT. [dB/m]	Cable [dB]	[dB μ V/m]	[dB μ V/m]	[dB]
196.60	20.02	H	4.00	10.98	4.08	35.08	43.50	8.42
221.18	20.33	H	4.00	11.77	4.37	36.47	46.40	9.93
221.19	19.48	V	1.00	11.77	4.37	35.62	46.40	10.78
319.49	22.41	H	4.00	13.83	5.34	41.58	46.40	4.82
344.15	20.85	H	4.00	14.40	5.58	40.83	46.40	5.57
491.09	16.37	H	3.30	16.98	6.97	40.32	46.40	6.08

* H : Horizontal, V : Vertical

◆ Calculation

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

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

Correction Factor : ANT FACTOR + Cable loss

- DC 12 V Mode

Frequency	Amplitude	ANT	ANT. Height	Correction Factor		Corrected Amplitude	Applicable Limit	Margin
[MHz]	[dB μ V]	Polar. (H/V)	[m]	ANT. [dB/m]	Cable [dB]	[dB μ V/m]	[dB μ V/m]	[dB]
196.63	19.86	H	4.00	10.98	4.08	34.92	43.50	8.58
221.18	19.94	H	4.00	11.77	4.37	36.08	46.40	10.32
221.23	19.46	V	1.00	11.77	4.37	35.60	46.40	10.80
319.77	21.16	H	4.00	13.84	5.34	40.34	46.40	6.06
344.29	20.67	H	4.00	14.41	5.58	40.66	46.40	5.74
491.50	16.81	H	3.50	16.98	6.97	40.76	46.40	5.64

* 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

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Test report No.:
KES-E1-16T0619
Page (21) of (44)

- POE Mode

Frequency	Amplitude	ANT	ANT. Height	Correction Factor		Corrected Amplitude	Applicable Limit	Margin
[MHz]	[dBμV]	Polar. (H/V)	[m]	ANT. [dB/m]	Cable [dB]	[dBμV/m]	[dBμV/m]	[dB]
196.62	19.76	H	4.00	10.98	4.08	34.82	43.50	8.68
221.18	20.23	H	4.00	11.77	4.37	36.37	46.40	10.03
319.47	22.34	V	1.10	13.83	5.34	41.51	46.40	4.89
319.50	21.84	H	3.90	13.83	5.34	41.01	46.40	5.39
344.13	20.71	H	4.00	14.40	5.58	40.69	46.40	5.71
369.63	18.35	H	4.00	15.00	5.85	39.20	46.40	7.20

* H : Horizontal, V : Vertical

◆ Calculation

Corrected Amplitude [dBμV] = Amplitude[dBuV] + Correction Factor [dB]

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

Correction Factor : ANT FACTOR + Cable loss

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Test report No.:
KES-E1-16T0619
Page (22) of (44)

Radiated Electric Field Emissions(Above 1 GHz)

- AC 24 V Mode

- PK

Frequency [MHz]	Amplitude [dB μ V]	ANT Polar. (H/V)	ANT. Height [m]	Correction Factor			Corrected Amplitude [dB μ V/m]	Applicable Limit [dB μ V/m]	Margin [dB]
				ANT. [dB /m]	Cable [dB]	AMP [dB]			
1 000.000	56.350	V	1.000	20.490	3.110	43.640	36.310	76.000	39.690
1 144.000	72.350	H	1.000	21.230	3.300	43.640	53.240	76.000	22.760
1 144.000	69.090	V	1.000	21.230	3.300	43.640	49.980	76.000	26.020
1 200.000	63.770	H	1.000	21.510	3.380	43.640	45.020	76.000	30.980
1 200.000	61.470	V	1.000	21.510	3.380	43.640	42.720	76.000	33.280
1 993.000	63.120	H	1.000	25.560	4.400	43.780	49.300	76.000	26.700
1 993.000	61.980	V	1.000	25.560	4.400	43.780	48.160	76.000	27.840
2 394.000	58.340	H	1.000	27.250	4.900	43.960	46.530	76.000	29.470
2 594.000	54.620	H	1.000	28.090	5.190	44.050	43.850	76.000	32.150
2 602.000	52.570	V	1.000	28.120	5.200	44.050	41.840	76.000	34.160
5 911.000	47.040	H	1.000	36.250	7.780	44.450	46.620	80.000	33.380
5 967.000	47.020	V	1.000	36.440	7.810	44.440	46.830	80.000	33.170

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Test report No.:
KES-E1-16T0619
Page (23) of (44)

- 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]			
1 096.000	49.000	V	1.000	20.980	3.240	43.640	29.580	56.000	26.420
1 136.000	47.530	V	1.000	21.180	3.290	43.640	28.360	56.000	27.640
1 144.000	52.870	H	1.000	21.230	3.300	43.640	33.760	56.000	22.240
1 200.000	51.060	H	1.000	21.510	3.380	43.640	32.310	56.000	23.690
2 458.000	44.000	H	1.000	27.520	4.990	43.990	32.520	56.000	23.480
2 490.000	40.570	V	1.000	27.650	5.040	44.010	29.250	56.000	26.750
2 506.000	44.140	H	1.000	27.720	5.060	44.010	32.910	56.000	23.090
2 995.000	43.580	V	1.000	29.770	5.360	44.200	34.510	56.000	21.490
4 052.000	39.790	V	1.000	31.490	6.680	44.220	33.740	60.000	26.260
4 902.000	39.030	H	1.000	33.050	6.990	44.320	34.750	60.000	25.250
5 983.000	35.540	H	1.000	36.490	7.820	44.430	35.420	60.000	24.580
6 000.000	36.080	V	1.000	36.550	7.680	44.430	35.880	60.000	24.120

◆ 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

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Test report No.:
KES-E1-16T0619
Page (24) of (44)

- DC 12 V Mode

- PK

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]			
1 136.000	65.350	H	1.000	21.180	3.290	43.640	46.180	76.000	29.820
1 144.000	70.050	V	1.000	21.230	3.300	43.640	50.940	76.000	25.060
1 192.000	65.840	H	1.000	21.470	3.370	43.640	47.040	76.000	28.960
1 985.000	64.540	V	1.000	25.520	4.390	43.780	50.670	76.000	25.330
1 993.000	55.960	H	1.000	25.560	4.400	43.780	42.140	76.000	33.860
2 394.000	56.130	V	1.000	27.250	4.900	43.960	44.320	76.000	31.680
2 498.000	56.880	H	1.000	27.690	5.050	44.010	45.610	76.000	30.390
2 586.000	55.780	V	1.000	28.060	5.180	44.040	44.980	76.000	31.020
2 602.000	52.510	H	1.000	28.120	5.200	44.050	41.780	76.000	34.220
4 910.000	51.440	V	1.000	33.060	6.990	44.320	47.170	80.000	32.830
5 799.000	47.370	V	1.000	35.880	8.070	44.470	46.850	80.000	33.150
5 951.000	46.960	H	1.000	36.390	7.800	44.440	46.710	80.000	33.290

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Test report No.:
KES-E1-16T0619
Page (25) of (44)

- 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]			
1 064.000	44.150	V	1.000	20.820	3.200	43.640	24.530	56.000	31.470
1 152.000	56.640	V	1.000	21.270	3.320	43.640	37.590	56.000	18.410
1 160.000	52.660	H	1.000	21.310	3.330	43.640	33.660	56.000	22.340
1 200.000	49.510	H	1.000	21.510	3.380	43.640	30.760	56.000	25.240
1 993.000	45.950	V	1.000	25.560	4.400	43.780	32.130	56.000	23.870
2 394.000	41.470	V	1.000	27.250	4.900	43.960	29.660	56.000	26.340
2 402.000	44.280	H	1.000	27.280	4.900	43.960	32.500	56.000	23.500
2 498.000	41.230	V	1.000	27.690	5.050	44.010	29.960	56.000	26.040
2 506.000	44.040	H	1.000	27.720	5.060	44.010	32.810	56.000	23.190
4 902.000	38.760	H	1.000	33.050	6.990	44.320	34.480	60.000	25.520
5 975.000	35.480	V	1.000	36.470	7.820	44.430	35.340	60.000	24.660
5 983.000	35.380	H	1.000	36.490	7.820	44.430	35.260	60.000	24.740

◆ 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

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Test report No.:
KES-E1-16T0619
Page (26) of (44)

- POE Mode

- PK

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]			
1 096.000	61.430	H	1.000	20.980	3.240	43.640	42.010	76.000	33.990
1 144.000	65.570	V	1.000	21.230	3.300	43.640	46.460	76.000	29.540
1 152.000	64.750	H	1.000	21.270	3.320	43.640	45.700	76.000	30.300
1 200.000	67.340	H	1.000	21.510	3.380	43.640	48.590	76.000	27.410
1 200.000	63.600	V	1.000	21.510	3.380	43.640	44.850	76.000	31.150
1 993.000	55.730	H	1.000	25.560	4.400	43.780	41.910	76.000	34.090
1 993.000	63.670	V	1.000	25.560	4.400	43.780	49.850	76.000	26.150
2 394.000	60.610	V	1.000	27.250	4.900	43.960	48.800	76.000	27.200
2 402.000	58.210	H	1.000	27.280	4.900	43.960	46.430	76.000	29.570
2 594.000	53.670	V	1.000	28.090	5.190	44.050	42.900	76.000	33.100
5 935.000	46.500	V	1.000	36.330	7.790	44.440	46.180	80.000	33.820
5 983.000	46.550	H	1.000	36.490	7.820	44.430	46.430	80.000	33.570

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Test report No.:
KES-E1-16T0619
Page (27) of (44)

- 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]			
1 096.000	61.430	H	1.000	20.980	3.240	43.640	42.010	76.000	33.990
1 144.000	65.570	V	1.000	21.230	3.300	43.640	46.460	76.000	29.540
1 152.000	64.750	H	1.000	21.270	3.320	43.640	45.700	76.000	30.300
1 200.000	67.340	H	1.000	21.510	3.380	43.640	48.590	76.000	27.410
1 200.000	63.600	V	1.000	21.510	3.380	43.640	44.850	76.000	31.150
1 993.000	55.730	H	1.000	25.560	4.400	43.780	41.910	76.000	34.090
1 993.000	63.670	V	1.000	25.560	4.400	43.780	49.850	76.000	26.150
2 394.000	60.610	V	1.000	27.250	4.900	43.960	48.800	76.000	27.200
2 402.000	58.210	H	1.000	27.280	4.900	43.960	46.430	76.000	29.570
2 594.000	53.670	V	1.000	28.090	5.190	44.050	42.900	76.000	33.100
5 935.000	46.500	V	1.000	36.330	7.790	44.440	46.180	80.000	33.820
5 983.000	46.550	H	1.000	36.490	7.820	44.430	46.430	80.000	33.570

◆ 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

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Test Setup Photos and Configuration

Conducted Voltage Emissions

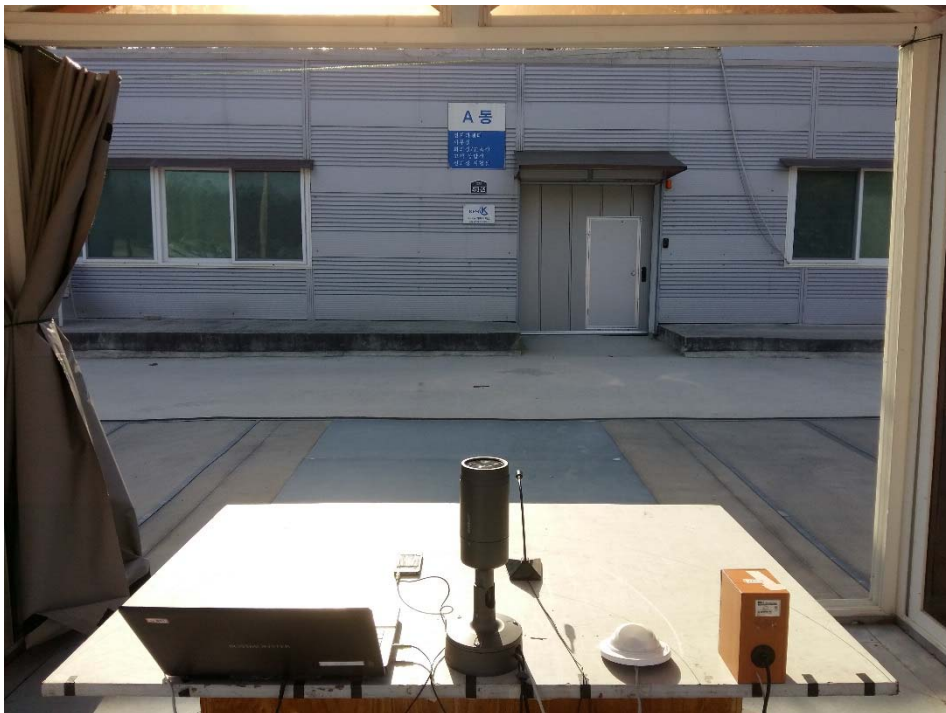
- AC 24 V Mode



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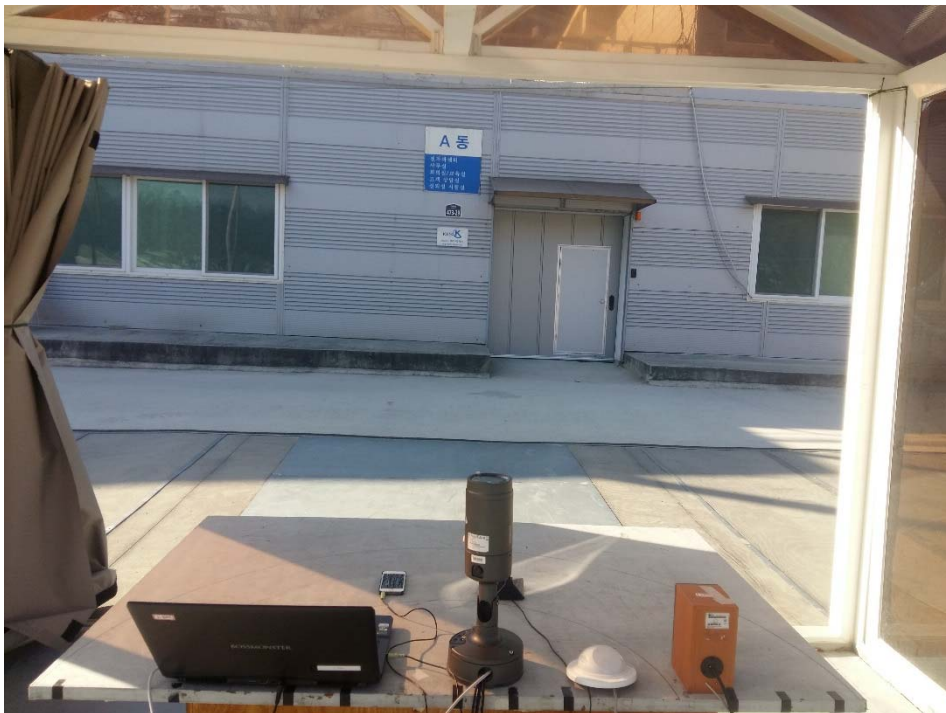
Radiated Electric Field Emissions(Below 1 GHz)

- AC 24 V Mode



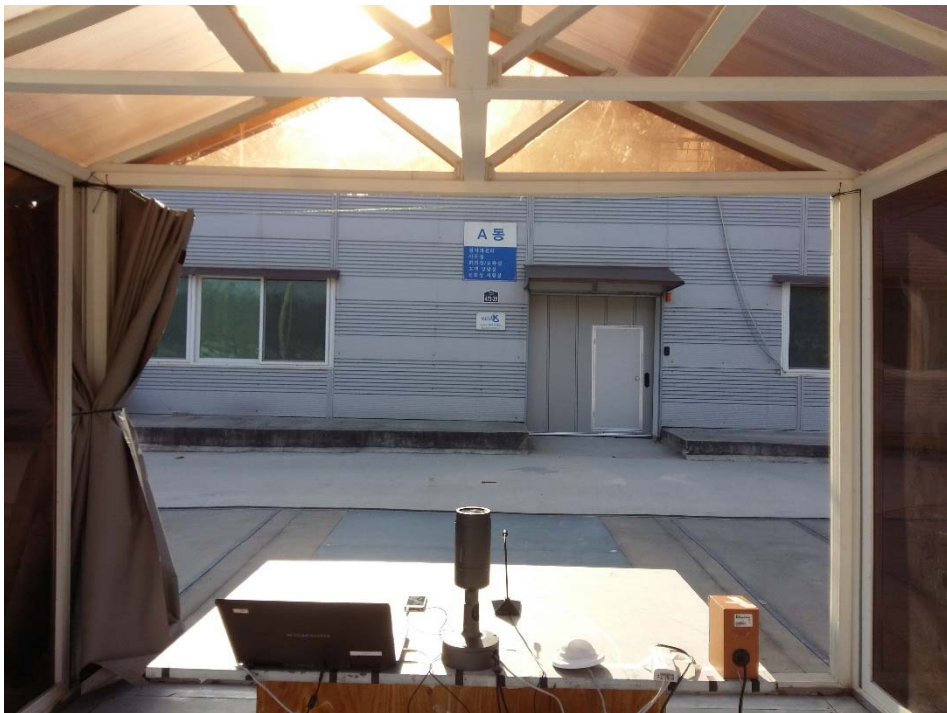
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- DC 12 V Mode



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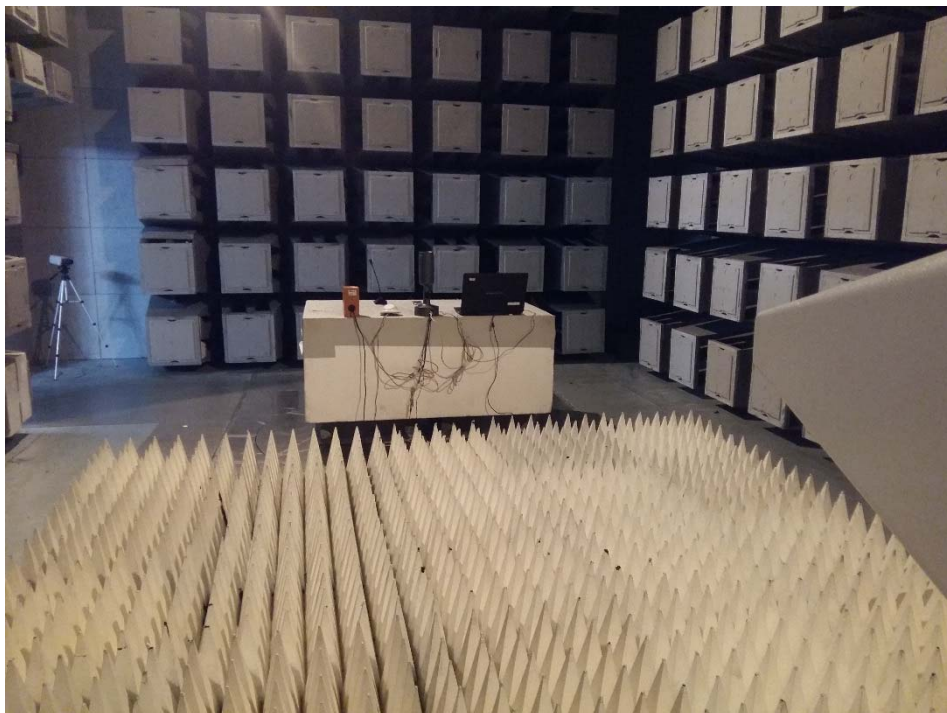
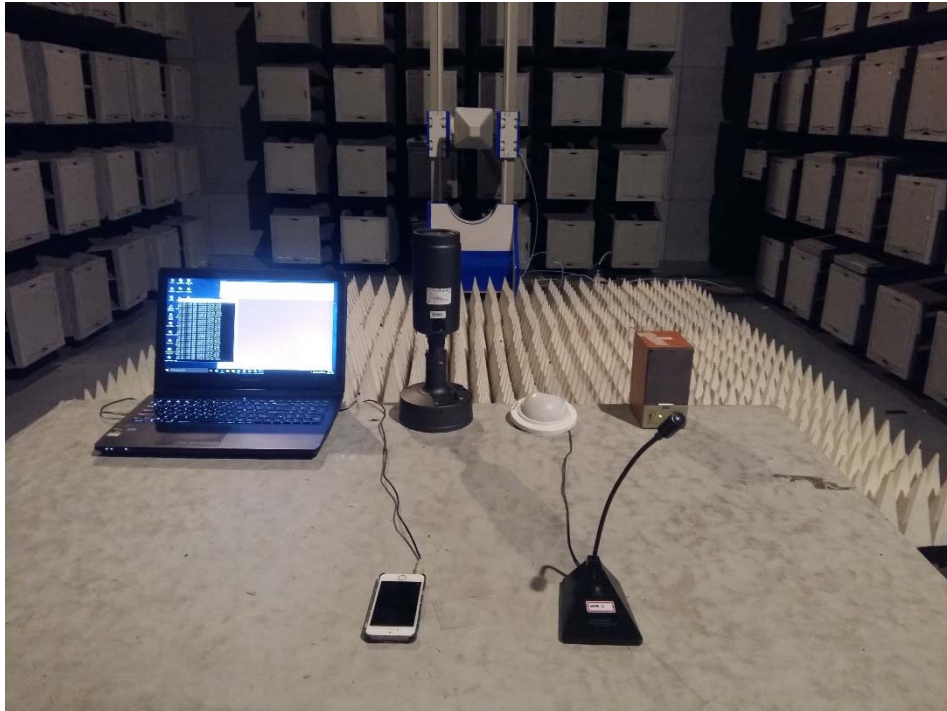
- POE Mode



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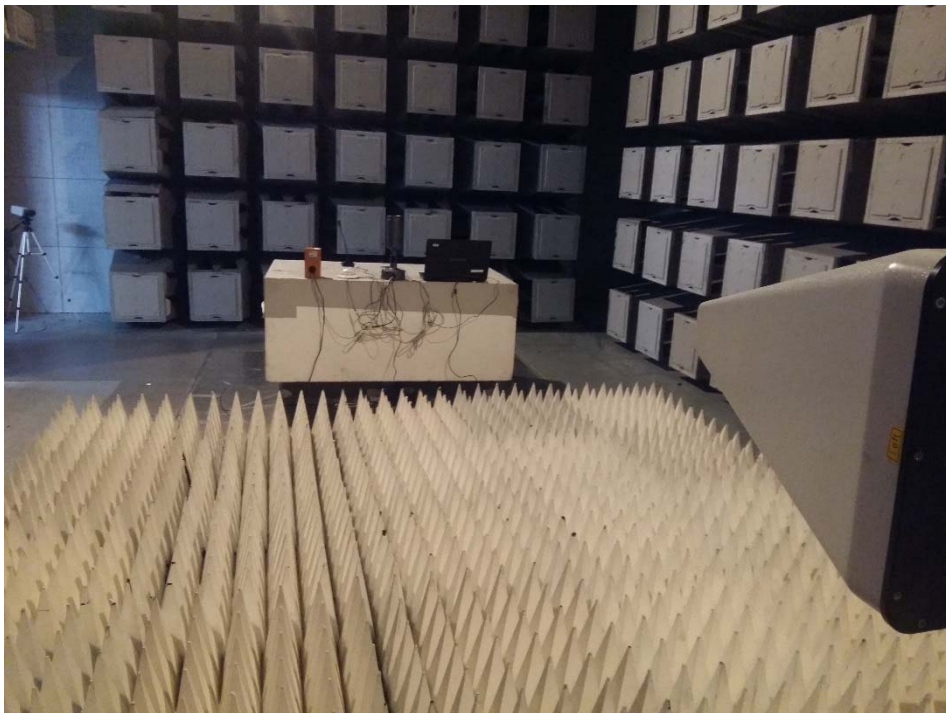
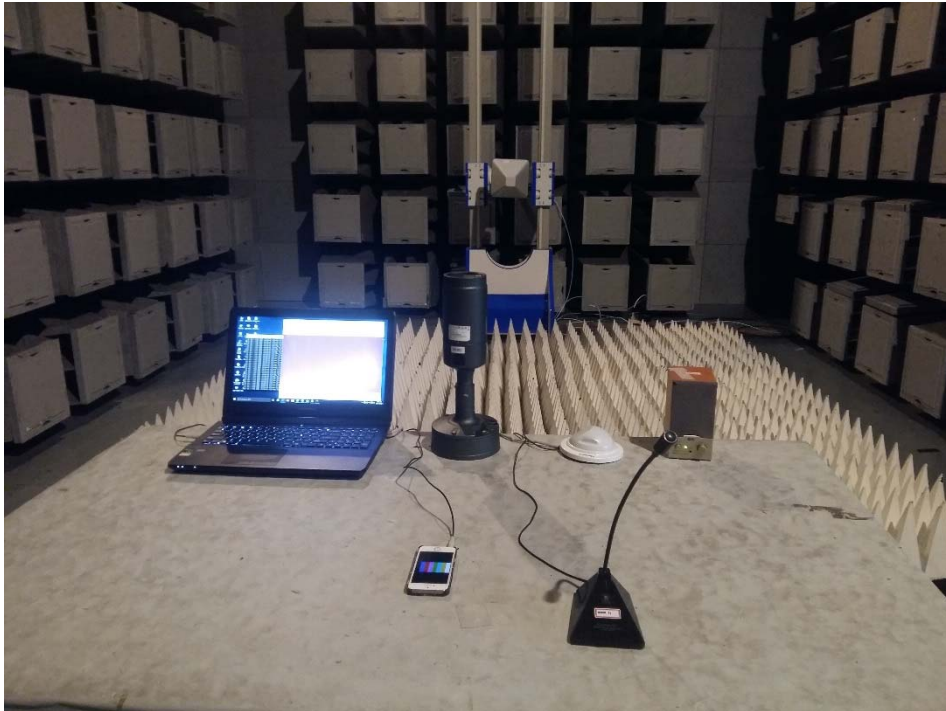
Radiated Electric Field Emissions(Above 1 GHz)

- AC 24 V Mode



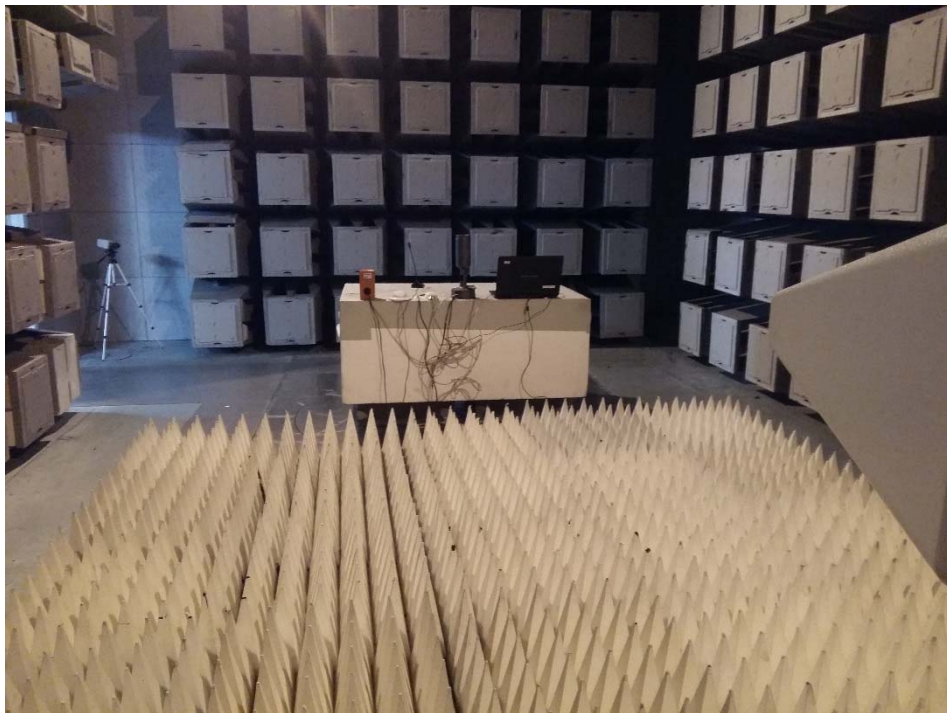
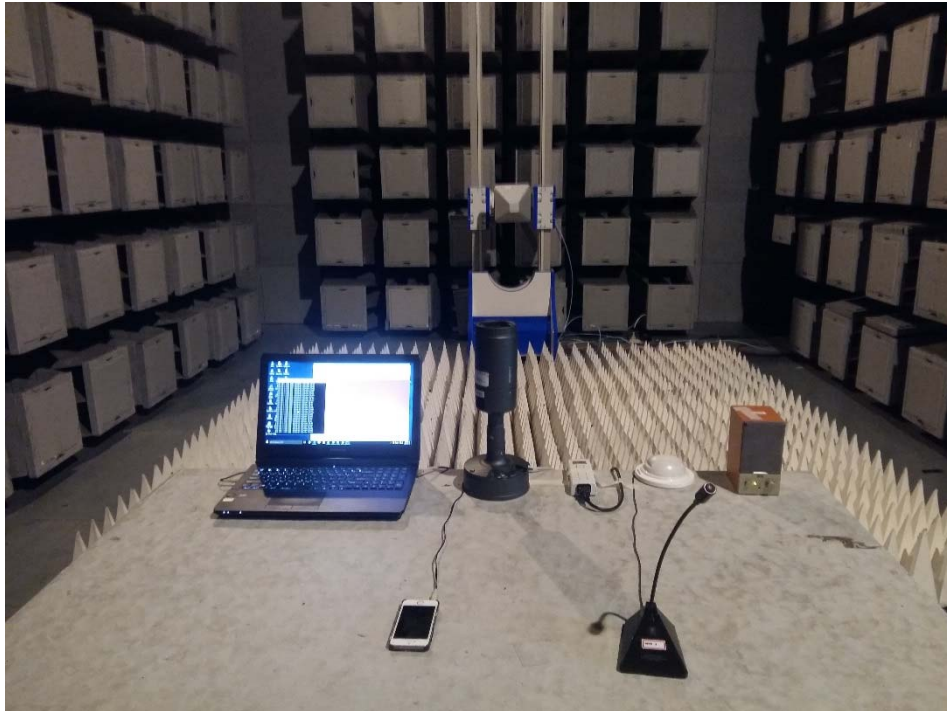
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- DC 12 V Mode



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- POE Mode



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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)



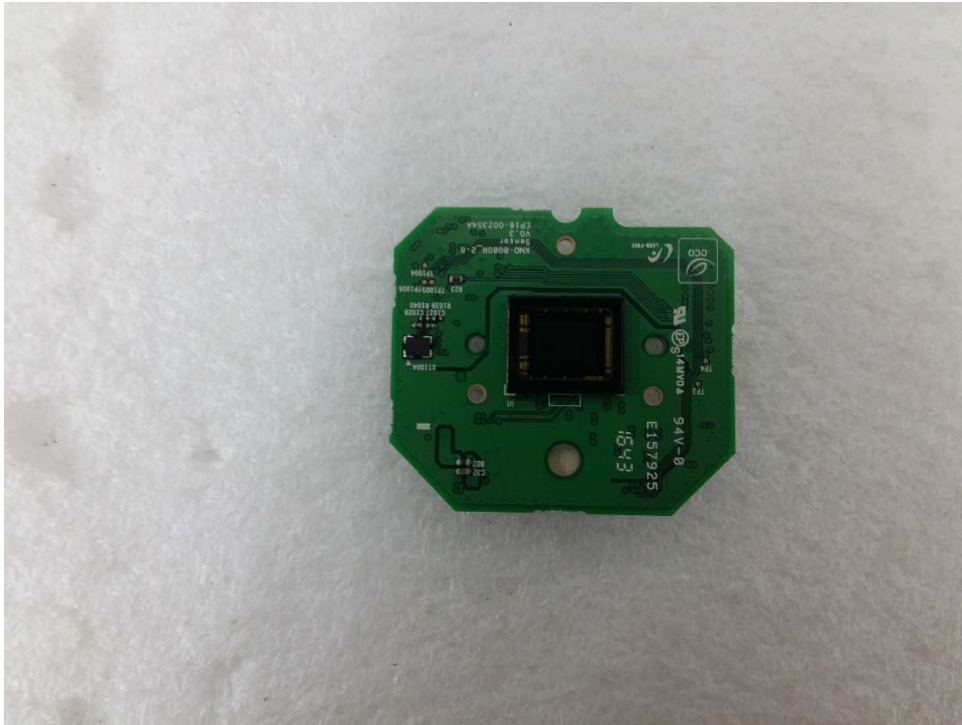
(Bottom)



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EUT Internal View – Lens Board

(Top)



(Bottom)



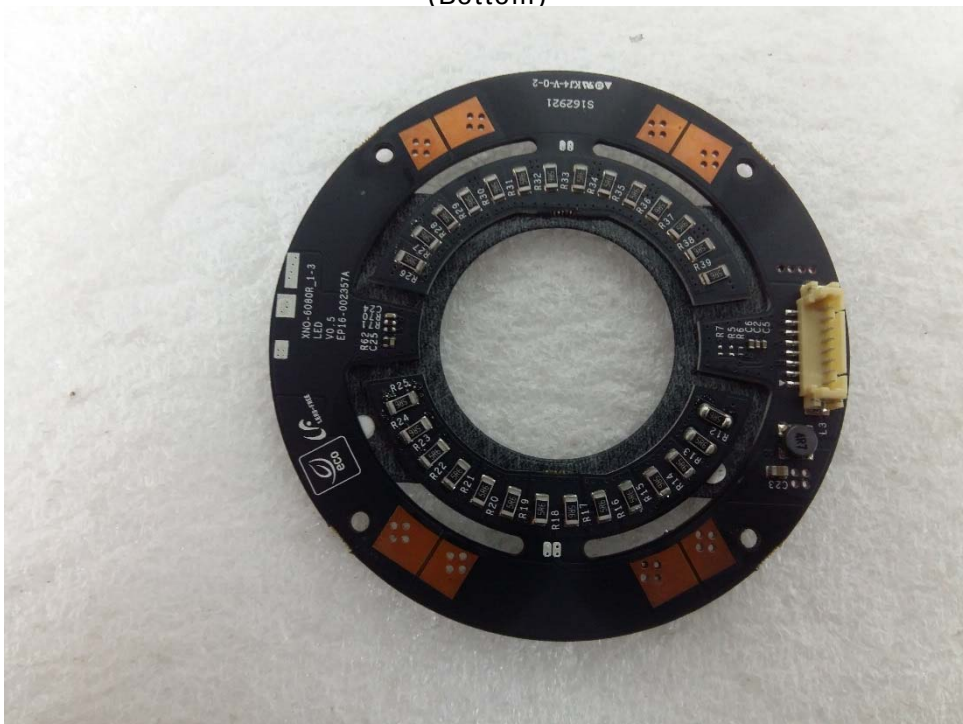
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EUT Internal View – Sub Board 1

(Top)



(Bottom)



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EUT Internal View – Sub Board 2

(Top)



(Bottom)



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EUT Internal View – Sub Board 3

(Top)



(Bottom)



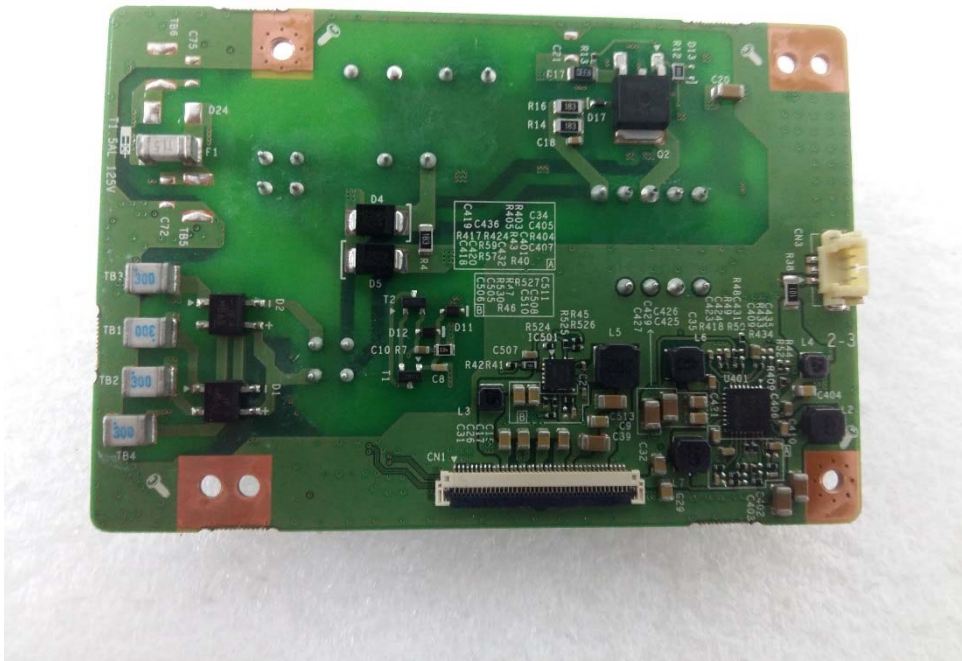
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EUT Internal View – Power Board

(Top)



(Bottom)



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The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

EUT Internal View – Camera Lens

(Top)

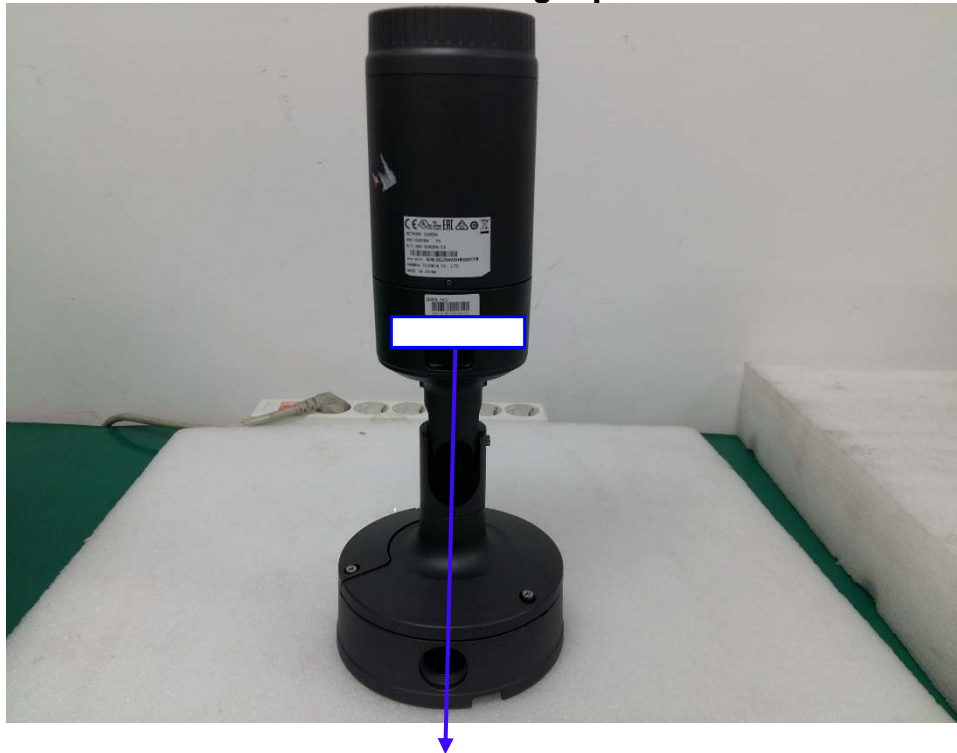


(Bottom)



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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.