



EMC TEST REPORT For CE

Test Report No. : KES-E1-17T0850
Date of Issue : Dec. 22, 2017
Product name : NETWORK CAMERA
Model/Type No. : SNB-7004P
Variant Model : -
Applicant : Hanwha Techwin Co., Ltd.
Applicant Address : 1204, Changwon-daero, Seongsan-gu Changwon-si,
Gyeongsangnam-do, Korea
Manufacturer : Hanwha Techwin (Tianjin) Co., Ltd.
Manufacturer Address : No.11 Weiliu Rd, Micro-Electronic Industrial Park, TEDA,
Tianjin, 300385, People's Republic of China
Date of Receipt : Dec. 12, 2017
Test date : Dec. 16, 2017 ~ Dec. 19, 2017
Test Results : ☒ In Compliance ☐ Not in Compliance

Tested by

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EMC Test Engineer

Reviewed by

Dong-Hun, Jang
EMC Technical Manager

This test report is not related to KOLAS.

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REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Dec. 22, 2017	KES-E1-17T0850	Issued

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1.0 General Product Description

Main Specifications of E.U.T are:

Video	
Imaging Device	1/2.8" PS Exmor 3.20M CMOS (IMX124)
Total Pixels	2,065(H) X 1,565(V)
Effective Pixels	2,065(H) X 1,553(V)
Scanning System	Progressive
Min. Illumination	Color : 0.1 Lux (F1.2, 50IRE), 0.01Lux (Sens-up 60x, 50IRE) 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 - connector type
Lens	
Focal Length (Zoom Ratio)	3 ~ 8.5mm (2.8x) Motorized Varifocal
Max. Aperture Ratio	F1.2
Angular Field of View	H : 100.12°(Wide) ~ 35.38°(Tele) / V : 73.76°(Wide) ~ 26.58°(Tele)
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
Mount Type	Board-in type
Pan / Tilt / Rotate	
Pan Range	0 ° ~ +355 °
Tilt Range	0 ° ~ +67 °
Rotate Range	0 ° ~ +355 °
Operational	
IR LED	12ea
Viewable Length	25m(82.02ft)
Camera Title	Off / On (Displayed up to 45 characters)
Day & Night	Auto (ICR) / Color / B/W / External / Schedule
Backlight Compensation	Off / BLC
Wide Dynamic Range	Max. 120dB
Contrast Enhancement	SSDR (Samsung Super Dynamic Range) (Off / On)
Digital Noise Reduction	SSNRIII (2D+3D Noise Filter) (Off / On)
Digital Image Stabilization	Off / On
Defog	Auto/Manual/Off
Motion Detection	Off / On (4 zones with 4 points Polygon)
Privacy Masking	Off / On (32 zones with 4 points of polygon)
Sens-up (Frame Integration)	-
Gain Control	Off / Low / Middle / High
White Balance	ATW / AWC / Manual / Indoor / Outdoor
Electronic Shutter Speed	Minimum / Maximum / Anti flicker (1 ~ 1/12,000sec)

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Digital PTZ	-
Flip / Mirror	Off / On
Intelligent Video Analytics	Tampering, Virtual Line, Enter/Exit, Appear / Disappear, Audio Detection, Face Detection with Metadata
Alarm I/O	Input 1ea / Output 1ea
Alarm Triggers	Motion detection, Tampering Detection , Audio Detection, Face Detection, Video Loss, Video Analytics, Alarm Input
Alarm events	File upload via FTP and E-Mail Notification via E-Mail, TCP and HTTP local storage(SD/SDHC/SDXC) recording at Network disconnected & Event (Alarm Triggers) External output
Network	
Ethernet	RJ-45 (10/100BASE-T)
Video Compression Format	H.264 (MPEG-4 Part 10/AVC), Motion JPEG
Resolution	2048x1536 / 1920x1080 / 1600x1200 / 1280x1024 / 1280x960 / 1280x720 / 1024x768 / 800x600 / 800x450 / 640x480 / 640x360 / 320x240 / 320x180
Max. Framerate	H.264 : 3M Mode Max 30fps@2048x1536 / 1920x1080 / 1600x1200 / 1280x1024 / 1280x960 / 1280x720 / 1024x768 / 800x600 / 800x450 / 640x480 / 640x360 / 320x240 / 320x180 2M Mode Max 60fps @1920x1080 / 1600x1200 / 1280x1024 / 1280x960 / 1280x720 / 1024x768 / 800x600 / 800x450 / 640x480 / 640x360 / 320x240 / 320x180 MJPEG : Max 10fps@2048x 1536 / 1920x1080 / 1600x1200 / 1280x1024 / 1280x960 / 1280x720 / 1024x768 Max 30fps@ 800x600 / 800x450 / 640x480 / 640x360 / 320x240 / 320x180
Smart Codec	Built-in Area-Based : 5EA Face detection Mode
Video Quality Adjustment	H.264 : Compression Level, Target Bitrate Level Control MJPEG : Quality Level Control
Bitrate Control Method	H.264 : CBR or VBR, MJPEG : VBR
Streaming Capability	Multiple Streaming (Up to 10 Profiles)
Audio I/O	Mic(Line)-in Selectable via UI, Line-out (Mono, 1Vrms) 2.5VDC(4mA) powered 2K Ohm
Audio Compression Format	G.711 u-law /G.726 Selectable G.726 (ADPCM) 8KHz, G.711 8KHz G.726 : 16Kbps, 24Kbps, 32Kbps, 40Kbps
Audio Communication	Bi-directional
IP	IPv4, IPv6
Protocol	TCP/IP, UDP/IP, RTP(UDP), RTP(TCP), RTCP,RTSP, NTP, HTTP, HTTPS, SSL, 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

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Streaming Method	Unicast / Multicast
Max. User Access	15 users at Unicast Mode
Memory Slot	micro SD/SDHC/SDXC - motion Images recorded in the SDX/SDHC/SD memory card can be downloaded.
Application Programming Interface	ONVIF Profile S SUNAPI(HTTP API) v2.0 SVNP 1.2
Webpage Language	English, French, German, Spanish, Italian, Chinese, Korean, Russian, Japanese, Swedish, Danish, Portuguese, Turkish, Polish, Czech, Rumanian, Serbian, Dutch, Croatian, Hungarian, Greek, Norwegian, Finnish
Web Viewer	Supported OS : Windows XP / VISTA / 7 / 8, MAC OS X 10.7 Supported Browser : Microsoft Internet Explorer (Ver. 10, 9, 8, 7), Mozilla Firefox (Ver. 19, 18, 17, 16, 15, 14, 13, 12, 11, 10, 9), Google Chrome (Ver. 25, 24, 23, 22, 21, 20, 19, 18, 17, 16, 15), Apple Safari (Ver. 6.0.2(Mac OS X 10.8, 10.7 only), 5.1.7) * Mac OS X only
Central Management Software	SmartViewer 4.x
Environmental	
Operating Temperature / Humidity	AC24V : -40°C to +55°C / Less than 90% RH DC12V, PoE (IEEE802.3af) : -10°C to +55°C / Less than 90% RH
Storage Temperature / Humidity	-30°C ~ +60°C (-22°F ~ +140°F) / Less than 90% RH
Ingress Protection	IP66 Grade
Vandal Resistance	IK10
Electrical	
Input Voltage / Current	AC24V, DC12V, PoE(IEEE802.3af class 3)
Power Consumption	Max. 10.5W (DC 12V) Max. 11.5W (PoE) Max. 12.0W(AC24V, Heater Off), Max 15.0W(AC24V, Heater On)
Mechanical	
Color / Material	Ivory / Aluminum
Dimension (WxHxD)	Ø160 x H118.5
Weight	960g

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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 ☐ 230Vac ☐ 100 Vac ☒ 24 Vac ☒ 12 Vdc ☒ PoE
Frequency ☐ 50 Hz ☐ 60 Hz ☐ Hz

1.2 Variant Model Differences

Not applicable

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
NETWORK CAMERA	SNB-7004P	-	Hanwha Techwin (Tianjin) Co.,Ltd	E.U.T

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1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
PoE Adapter	ANY4805C-LT1	10H300002	ANY ELECTRONICS CO., LTD	-
Notebook	NT63025J	JK9091EF400432X	SAMSUNG	-
Notebook Adapter	A13-040N2A	-	Chicony Power Technology Co., Ltd.	-
Speaker	BR10000A CUVE	-	BEIJING EDIFIER HI-TECH GROUP.	-
Mike	CMK-303	-	CAMAC	-
Alarm sensor	SIP-1201DD D0	-	SAMSUNG TECHWIN CO., LTD.	-
Alarm button	-	-	-	-
Controller	SPC-1010	C50E67WD601003	SamSung Techwin Co.,Ltd.	-
Controller Adapter	RS-AB1000	-	Dongguan Jinhusheng Power Technology Co.,Ltd.	-

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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	4.0	U
	2 pin	Alarm button	2 pin	3.0	U
	2 pin	Alarm sensor	2 pin	3.0	U
	3.5 mm	Speaker	3.5 mm	1.7	U
	3.5 mm	Mike	3.5 mm	1.6	U
	2 pin	Controller	2 pin	3.0	U

* Unshielded=U, Shielded=S

■ 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	4.0	U
	2 pin	Alarm button	2 pin	3.0	U
	2 pin	Alarm sensor	2 pin	3.0	U
	3.5 mm	Speaker	3.5 mm	1.7	U
	3.5 mm	Mike	3.5 mm	1.6	U
	2 pin	Controller	2 pin	3.0	U

* Unshielded=U, Shielded=S

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■ PoE Mode

Start		END		Cable Spec.	
Description	I / O Port	Description	I / O Port	Length	Shield
NETWORK CAMERA (E.U.T)	RJ-45	PoE Adapter	RJ-45	4.0	U
	2 pin	Alarm button	2 pin	3.0	U
	2 pin	Alarm sensor	2 pin	3.0	U
	3.5 mm	Speaker	3.5 mm	1.7	U
	3.5 mm	Mike	3.5 mm	1.6	U
	2 pin	Controller	2 pin	3.0	U
PoE Adapter	RJ-45	Notebook	RJ-45	3.0	U

* Unshielded=U, Shielded=S

1.7 E.U.T Operating Mode(s)

Test mode	operating
AC 24 V	E.U.T Monitoring, Ping Test
DC 12 V	E.U.T Monitoring, Ping Test
PoE	E.U.T Monitoring, Ping Test

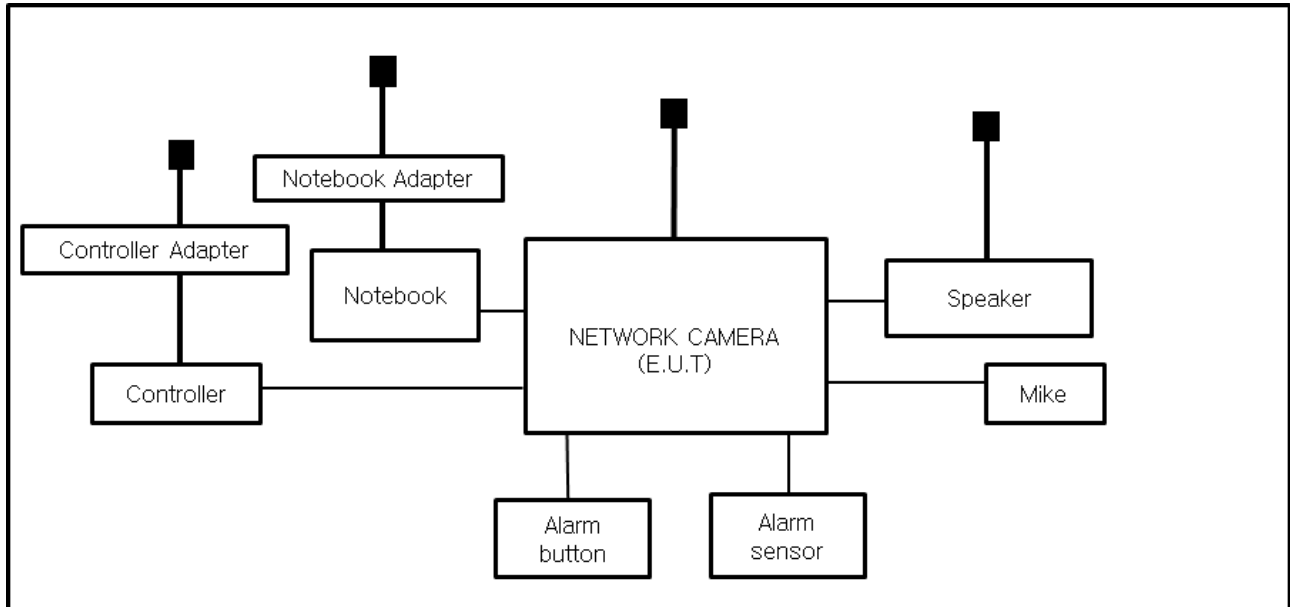
E.U.T Test operating S/W		
Name	Version	Manufacture Company
-	-	-

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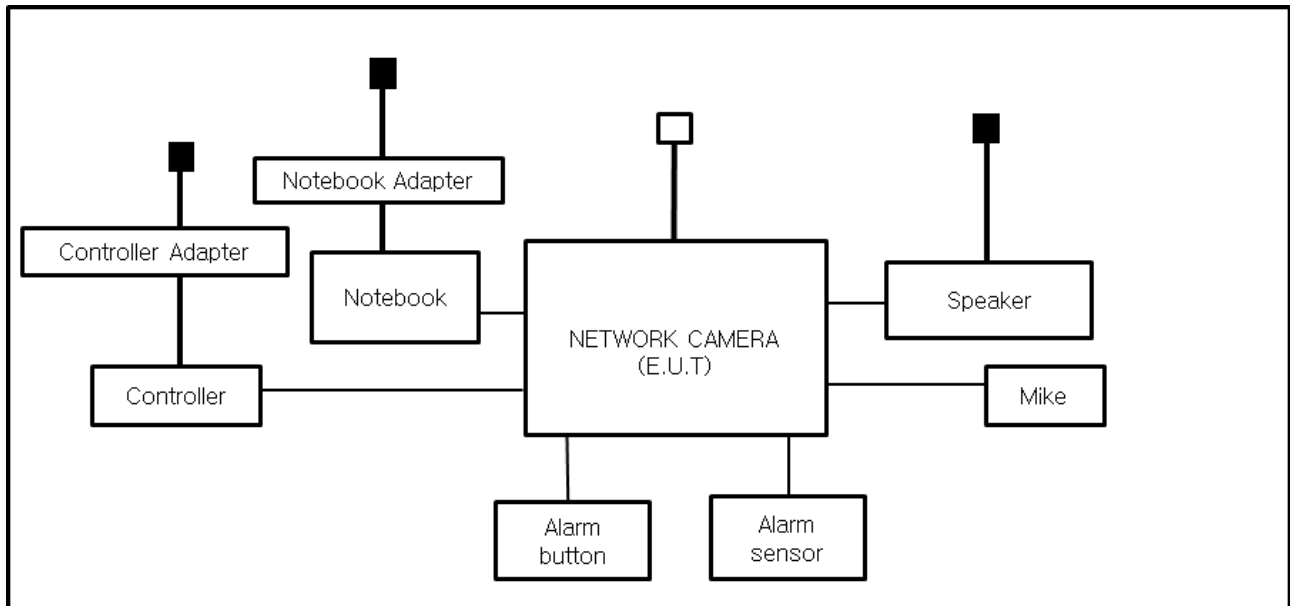
1.8 Configuration

■ AC Main
 □ DC Main

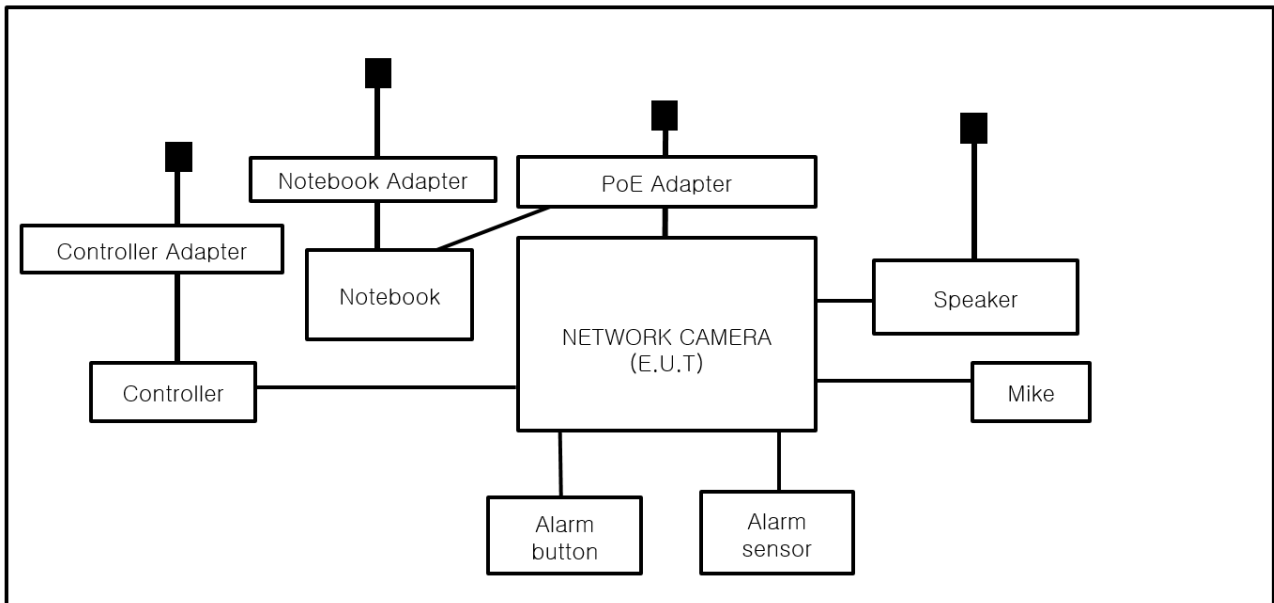
■ AC 24 V Mode



■ DC 12 V Mode



■ PoE Mode



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 and CISPR Publication 32.

1.12 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)	

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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: 2007 +A1: 2010

☐ Group 1
☐ Class A

☐ Group 2
☐ Class B

☐ EN 55014-1: 2006 +A2: 2011

☐ EN 55014-2: 1997 +A2: 2008

☐ EN 55015: 2013

☐ EN 61547: 2009

☒ EN 55032: 2012/AC: 2013

☒ Class A

☐ Class B

☐ EN 55024: 2010 +A1: 2015

☒ EN 50130-4: 2011

☐ EN 61000-3-2: 2014

☐ EN 61000-3-3: 2013

☐ EN 61326-1: 2013



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-
- | | | |
|--|----------------------------------|----------------------------------|
| <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
Dec. 16, 2017

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, 11, 2018
<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
<input type="checkbox"/>	LISN	NNBM8124	SCHWARZBECK	8124-1002	08, 07, 2018
<input type="checkbox"/>	LISN	NNBM8124	SCHWARZBECK	8124-1003	08, 07, 2018

Test Conditions

Temperature: 21,2 °C
Relative Humidity: 41,5 % R.H.

Frequency Range of Measurement

150 kHz to 30 MHz

Instrument Settings

IF Band Width: 9 kHz

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.

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2.2 Conducted Emissions at Telecommunication Ports

Test Date
Dec. 16, 2017

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, 11, 2018
<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
<input checked="" type="checkbox"/>	8-WIRE ISN CAT3,5	ENY81	R & S	100174	01, 11, 2018
<input type="checkbox"/>	8-WIRE ISN CAT6	ENY81-CAT6	R & S	101665	01, 11, 2018
<input type="checkbox"/>	ISN	ISN S8	SCHWARZBECK	ISN-S8-0019	05, 12, 2018
<input type="checkbox"/>	CDN	CDNS502A	TESEQ	40431	01, 11, 2018

Test Conditions

Temperature: 21,2 °C
Relative Humidity: 41,5 % R.H.

Frequency Range of Measurement

150 kHz to 30 MHz

Instrument Settings

IF Band Width: 9 kHz

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.



2.3 Radiated Electric Field Emissions(Below 1 GHz)

Test Date
Dec. 16, 2017

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: 22,6 °C
Relative Humidity: 43,1 % R.H.

Frequency Range of Measurement
30 MHz to 1 GHz

Instrument Settings
IF Band Width: 120 kHz

Test Results
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks
See Appendix A for test data.



2.4 Radiated Electric Field Emissions(Above 1 GHz)

Test Date
Dec. 16, 2017

Test Location
SEMI ANECHOIC CHAMBER #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, 07, 2018
<input checked="" type="checkbox"/>	PREAMPLIFIER	8449B	AGILENT	3008A01967	05, 31, 2018
<input type="checkbox"/>	ATTENUATOR	8491A	HP	32173	03, 24, 2018
<input checked="" type="checkbox"/>	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	05, 02, 2019

Test Conditions
Temperature: 22,8 °C
Relative Humidity: 42,7 % 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.

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2.5 Harmonic Current Emissions

Test Date
N/A

Test Location
Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input type="checkbox"/>	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 E.U.T power is less than 75 W, limits are not specified.

3.0 Criteria for compliance

Criteria for compliance was based on the following guidelines:

EN 50130-4: 2011 Alarm systems-Part 4: Electromagnetic compatibility Product family
standard: Immunity requirements for components of fire, intruder and social alarm systems

The variety and the diversity of the apparatus within the scope of this document makes it difficult to define precise criteria for the evaluation of the immunity test results.

If as a result of the application of the tests defined in this standard, the apparatus becomes dangerous or unsafe then the apparatus shall be deemed to have failed the test.

A functional description and a definition of performance by the manufacture and noted in the test report, based on the following criteria:

Electrostatic discharge

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the application of discharge is permissible, providing that is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change.

Radiated electromagnetic fields

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the application of discharge is permissible, providing which could be interpreted by associated equipment as a change, and no such

Flickering of indicators occurs at a field strength of 3 V/m.

For components of CCTV systems, where the picture is allowed at 10 V/m, providing.

(a) there is no permanent damage or change to EUT

(e.g. no corruption of memory or changes to programmable setting etc.)

(b) at 3 V/m, any deterioration of the picture is so minor that the system could still be used; and

(c) there is no observable deterioration of the picture at 1 V/m.

Fast transient burst / slow high energy voltage surge

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the application of discharge is permissible, providing

That there is no residual is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change.

Conducted RF immunity

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the application of discharge is permissible, providing

That there is no residual is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change,

and no such flickering of indicators occurs at $U = 130 \text{ dB}\mu\text{V}$.

For component of CCTV systems, where the status is monitored by observing the TV picture, then deterioration of the picture is allowed at $U = 140 \text{ dB}\mu\text{V}$, providing:

(a) there is no permanent damage or change to the EUT

(e.g. no corruption of memory or changes to programmable settings etc.)

(b) at $U = 130 \text{ dB}\mu\text{V}$, any deterioration of the picture is so minor that the system could still be used; and

(c) there is no observable deterioration of the picture at $U = 120 \text{ dB}\mu\text{V}$.

Voltage dip/interruption / Voltage variation

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the conditioning is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment

as a change. The EUT shall meet the acceptance criteria for the functional test, after the conditioning.



3.1 Electrostatic Discharge

Reference Standard
EN 61000-4-2: 2009

Test Date
Dec. 19, 2017

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	10, 11, 2018
<input checked="" type="checkbox"/>	HCP	-	KES	-	-
<input checked="" type="checkbox"/>	VCP	-	KES	-	-

Test Conditions
Temperature: 22,6 °C
Relative Humidity: 43,2 % R.H.
Atmospheric Pressure: 101,0 kPa

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Test SpecificationsDischarge 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 type="checkbox"/> 2 kV	<input checked="" type="checkbox"/> 2 kV	<input type="checkbox"/> 2 kV	<input type="checkbox"/> 2 kV
	<input type="checkbox"/> 4 kV	<input checked="" type="checkbox"/> 4 kV	<input type="checkbox"/> 4 kV	<input type="checkbox"/> 4 kV
	<input checked="" type="checkbox"/> 6 kV	<input type="checkbox"/> 6 kV	<input checked="" type="checkbox"/> 6 kV	<input checked="" type="checkbox"/> 6 kV
	<input type="checkbox"/> 8 kV	<input checked="" type="checkbox"/> 8 kV	<input type="checkbox"/> 8 kV	<input type="checkbox"/> 8 kV
	<input type="checkbox"/> 15 kV	<input type="checkbox"/> 15 kV	<input type="checkbox"/> 15 kV	<input type="checkbox"/> 15 kV

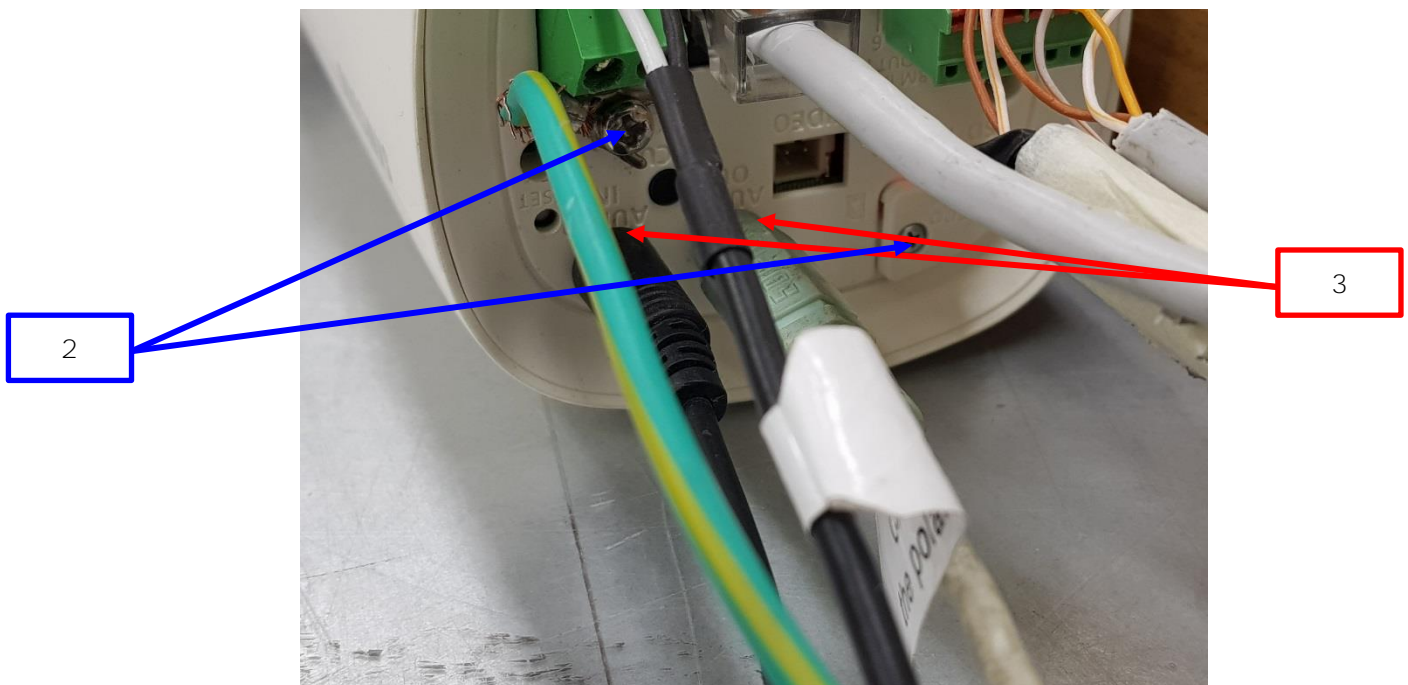
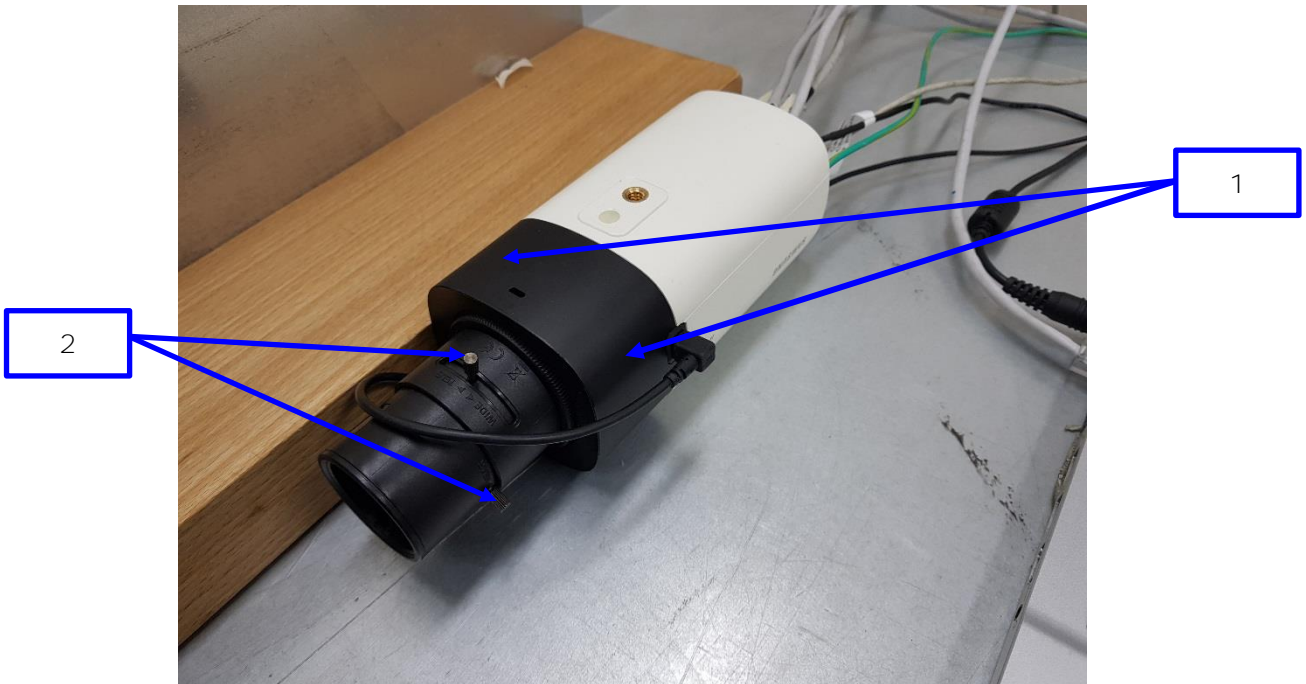
Notes: HCP: Horizontal coupling plane

VCP: Vertical coupling plane

Required Performance Criteria: ☒ Complied

Location of Discharge:

Air
Contact



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**Test Data****■ AC 24 V Mode**
Indirect Discharge

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

Direct Discharge

No.	Test Point	Discharge Method	Observations	Remarks
1	enclosure	Contact Discharge	Complied	-
2	screw	Contact Discharge	Complied	-
3	3.5mm	Air Discharge	Complied	-

■ DC 12 V Mode
Indirect Discharge

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

Direct Discharge

No.	Test Point	Discharge Method	Observations	Remarks
1	enclosure	Contact Discharge	Complied	-
2	screw	Contact Discharge	Complied	-
3	3.5mm	Air Discharge	Complied	-

■ PoE Mode
Indirect Discharge

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

Direct Discharge

No.	Test Point	Discharge Method	Observations	Remarks
1	enclosure	Contact Discharge	Complied	-
2	screw	Contact Discharge	Complied	-
3	3.5mm	Air Discharge	Complied	-



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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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3.2 Radiated Electric Field Immunity

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

Test Date
Dec. 18, 2017

Test Location
EMS-RS: ☐ SEMI ANECHOIC CHAMBER #2 ☒ SEMI ANECHOIC CHAMBER #3

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, 07, 2018
<input checked="" type="checkbox"/>	BROADBAND AMPLIFIER	BBA100	R & S	101239	08, 07, 2018
<input checked="" type="checkbox"/>	BROADBAND AMPLIFIER	100S1G6M1	AR	579931	08, 07, 2018
<input checked="" type="checkbox"/>	POWER METER	NRP2	R & S	103475	08, 07, 2018
<input checked="" type="checkbox"/>	AVG POWER SENSOR	NRP-Z91	R & S	102526	08, 07, 2018
<input checked="" type="checkbox"/>	AVG POWER SENSOR	NRP-Z91	R & S	102527	08, 07, 2018
<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, 07, 2018
<input checked="" type="checkbox"/>	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM, INC	781	05, 02, 2019

Test Conditions

Temperature: 21,6 °C
Relative Humidity: 43,7 % R.H.
Atmospheric Pressure: 101,0 kPa



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Test Specifications

Antenna Polarization: Horizontal & vertical unless indicated otherwise

Antenna Distance: ☒ 3 m

Field Strength: ☐ 1 V/m ☐ 3 V/m
☒ 10 V/m

Frequency Range: ☐ 80 MHz to 1 GHz ☐ 1,4 GHz to 2,7 GHz
☒ 80 MHz to 2,7 GHz

Modulation: ☒ AM, 80 %, 1 kHz sine wave
☒ PM, 1 Hz (0,5 s ON : 0,5 s OFF)

Frequency step: ☒ 1 % step

Dwell Time: ☒ 1 s ☐ 3 s

of Sides Radiated: ☒ 4

Required Performance Criteria: ☒ Complied

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Test Data**■ AC 24 V Mode**

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

■ DC 12 V Mode

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

■ PoE Mode

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

Note: "Blank" = Not performed

Observations:

Complied – No degradation of function

Test Results

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

Remarks

PASS Required Performance Criteria.



3.3 Electrical Fast Transients/Bursts

Reference Standard
EN 61000-4-4: 2012

Test Date
Dec. 19, 2017

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 checked="" 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: 22,6 °C
Relative Humidity: 43,2 % R.H.
Atmospheric Pressure: 101,0 kPa

Test Specifications

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

Test Data

■ AC 24 V Mode

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

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
L – N	Complied	Complied

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

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

☒ Signal ports and telecommunication ports – Coupling Clamp used

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
RJ-45	Complied	Complied
2Pin(Alarm In, OUT)	Complied	Complied
2Pin(Controller)	Complied	Complied

■ DC 12 V Mode

☐ 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	Complied	Complied

☒ Signal ports and telecommunication ports – Coupling Clamp used

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
RJ-45	Complied	Complied
2Pin(Alarm In, OUT)	Complied	Complied
2Pin(Controller)	Complied	Complied

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■ PoE Mode

☐ 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)
-	-	-

☒ Signal ports and telecommunication ports – Coupling Clamp used

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
RJ-45	Complied	Complied
2Pin(Alarm In, OUT)	Complied	Complied
2Pin(Controller)	Complied	Complied

Note: “Blank” = Not performed

Observations:

Complied – No degradation of function

Test Results

☒ PASS Required Performance Criteria☐ NOT PASS Required Performance Criteria

Remarks

PASS Required Performance Criteria.



3.4 Surge Transients

Reference Standard
EN 61000-4-5: 2014

Test Date
Dec. 19, 2017

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 checked="" type="checkbox"/>	MOTOR VARIAC	MV2616	EM TEST	P1552169719	11, 27, 2018
<input checked="" type="checkbox"/>	CDN	CNV 508N1	EM TEST	P1610176296	11, 28, 2018

Test Conditions
Temperature: 22,6 °C
Relative Humidity: 43,2 % R.H.
Atmospheric Pressure: 101,0 kPa



Test Specifications

AC Power Lines
Source Impedance:

12 ohm for common mode and 2 ohm for differential mode

Surge Amplitude :

Common Mode

☐ (0,5 / 1,0 / 2,0) kV

Differential Mode

☒ (0,5 / 1,0) kV

Number of Surges:

☒ 5 surges per angle

Angle:

☒ 0°, 90°, 180°, 270° (input a.c. power port)

Polarity:

☒ Positive & Negative

Repetition Rate:

☒ 1 surge per min ☐ 1 surge per 30 sec.

Required Performance Criteria: ☒ Complied

Other supply / Signal Lines

Source Impedance:

42 ohm for common mode

Surge Amplitude:

Common Mode

☒ (0,5 / 1,0) kV

Number of Surges:

☒ 5 Surges

Polarity:

☒ Positive & Negative

Repetition Rate:

☒ 1 surge per min ☐ 1 surge per 30 sec.

Required Performance Criteria: ☒ Complied

Test Data

■ AC 24 V Mode

☒ Line to Line – Differential Mode

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
L – N	Complied	Complied

☐ Line to Earth – Common Mode

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

Signal Lines

☒ Line to Earth – Common Mode

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
RJ-45	Complied	Complied
2Pin(Alarm In, OUT)	Complied	Complied
2Pin(Controller)	Complied	Complied

■ DC 12 V Mode

☐ Line to Line – Differential Mode

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
L – N	-	-

☐ Line to Earth – Common Mode

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

Signal Lines

☒ Line to Earth – Common Mode

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
RJ-45	Complied	Complied
2Pin(Alarm In, OUT)	Complied	Complied
2Pin(Controller)	Complied	Complied

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■ PoE Mode☐ Line to Line – Differential Mode

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
L – N	-	-

☐ Line to Earth – Common Mode

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

Signal Lines

☒ Line to Earth – Common Mode

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
RJ-45	Complied	Complied
2Pin(Alarm In, OUT)	Complied	Complied
2Pin(Controller)	Complied	Complied

Note: "Blank" = Not performed

Observations:

Complied – No degradation of function

Test Results

☒ PASS Required Performance Criteria☐ NOT PASS Required Performance Criteria

Remarks

PASS Required Performance Criteria.

3.5 Conducted Disturbance

Reference Standard
EN 61000-4-6: 2014

Test Date
Dec. 19, 2017

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 checked="" type="checkbox"/>	EM CLAMP	KEMZ 801A	TESEQ	44099	11, 28, 2018

Test Conditions
Temperature: 22,6 °C
Relative Humidity: 41,9 % R.H.
Atmospheric Pressure: 101,0 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
☒ PM, 1 Hz (0,5 s ON : 0,5 s OFF)

Frequency step: ☒ 1 % step

Dwell Time: ☒ 1 s ☐ 3 s

Required Performance Criteria: ☒ Complied

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Test Data

■ AC 24 V Mode

☒ Input a.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Observations
L - N	CDN	Complied

☐ Input d.c. power ports

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

☒ Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Observations
RJ-45	CDN	Complied
2Pin(Alarm In, OUT)	Clamp	Complied
2Pin(Controller)	Clamp	Complied

■ DC 12 V Mode

☐ Input a.c. power ports

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

☒ Input d.c. power ports

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

☒ Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Observations
RJ-45	CDN	Complied
2Pin(Alarm In, OUT)	Clamp	Complied
2Pin(Controller)	Clamp	Complied

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■ PoE Mode☐ Input a.c. power ports

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

☐ Input d.c. power ports

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

☒ Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Observations
RJ-45	CDN	Complied
2Pin(Alarm In, OUT)	Clamp	Complied
2Pin(Controller)	Clamp	Complied

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.



3.6 Voltage Dips and Short Interruptions

Reference Standard
EN 61000-4-11:2004

Test Date
Dec. 19, 2017

Test Location
EMS-Voltage dip: 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 checked="" type="checkbox"/>	MOTOR VARIAC	MV2616	EM TEST	P1552169719	11, 27, 2018

Test Conditions
Temperature: 22,6 °C
Relative Humidity: 43,2 % R.H.
Atmospheric Pressure: 101,0 kPa



Test Specifications & Observations/Remarks

■ AC 24 V Mode

(Test Voltage : 230 V)

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

- Voltage variations

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

Observations:
Complied – No degradation of function

Test Results

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

Remarks

The test has been tested using the AC / AC Adaptor

* The test has been tested using the AC / AC Adaptor



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Test report No.:
KES-EI-17T0850
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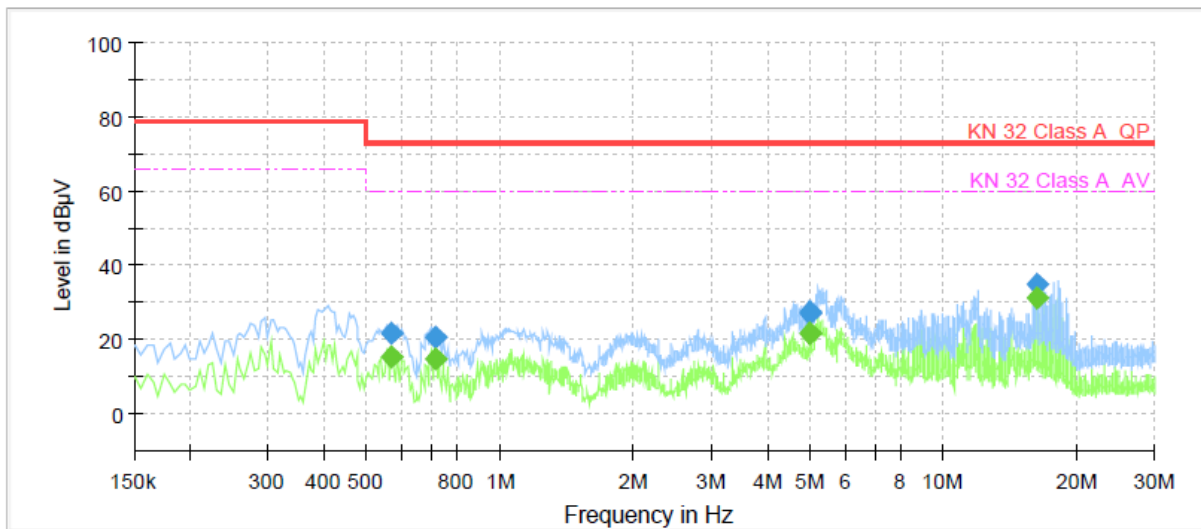
APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

■ AC 24 V Mode
[HOT]

Common Information

Test Description: Conducted Emission
Model No.: SNB-7004P
Mode: AC 24 V_H
Operator Name: KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.570000	---	15.17	60.00	44.83	1000.0	9.000	L1	19.8
0.570000	21.72	---	73.00	51.28	1000.0	9.000	L1	19.8
0.715000	---	14.61	60.00	45.39	1000.0	9.000	L1	19.9
0.715000	20.60	---	73.00	52.40	1000.0	9.000	L1	19.9
5.015000	---	21.53	60.00	38.47	1000.0	9.000	L1	19.8
5.015000	27.74	---	73.00	45.26	1000.0	9.000	L1	19.8
5.020000	---	21.72	60.00	38.28	1000.0	9.000	L1	19.8
5.020000	26.81	---	73.00	46.19	1000.0	9.000	L1	19.8
16.230000	---	31.12	60.00	28.88	1000.0	9.000	L1	20.1
16.230000	34.70	---	73.00	38.30	1000.0	9.000	L1	20.1

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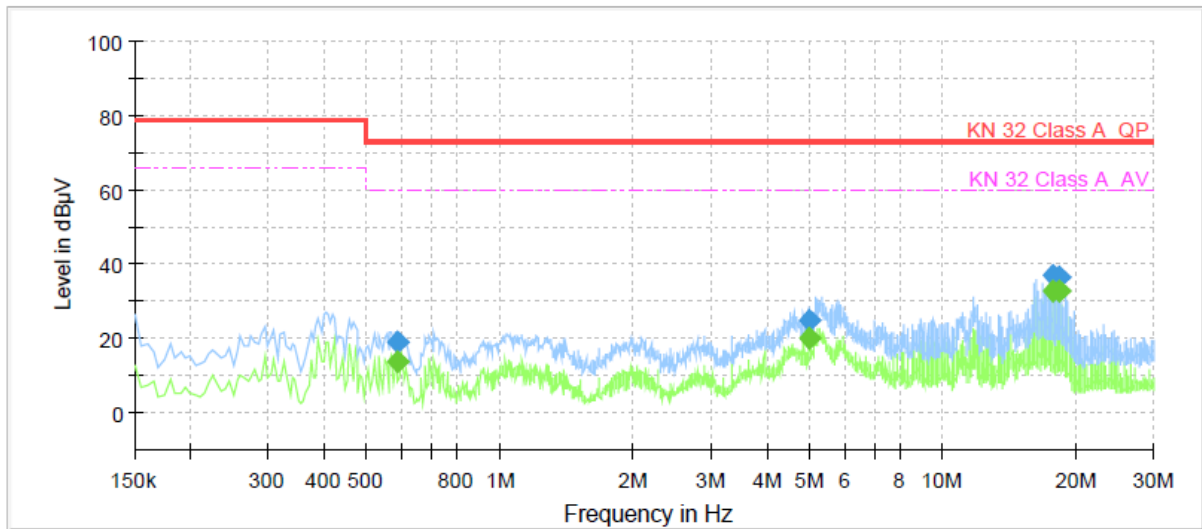
3701, 40, Simin-daero 365beon-gil,
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[NEUTRAL]

Common Information

Test Description: Conducted Emission
Model No.: SNB-7004P
Mode: AC 24 V_N
Operator Name: KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.585000	---	13.57	60.00	46.43	1000.0	9.000	N	19.8
0.585000	19.10	---	73.00	53.90	1000.0	9.000	N	19.8
5.020000	---	19.91	60.00	40.09	1000.0	9.000	N	19.8
5.020000	25.16	---	73.00	47.84	1000.0	9.000	N	19.8
17.695000	---	32.81	60.00	27.19	1000.0	9.000	N	20.3
17.695000	37.10	---	73.00	35.90	1000.0	9.000	N	20.3
18.305000	---	32.83	60.00	27.17	1000.0	9.000	N	20.3
18.305000	36.79	---	73.00	36.21	1000.0	9.000	N	20.3

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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

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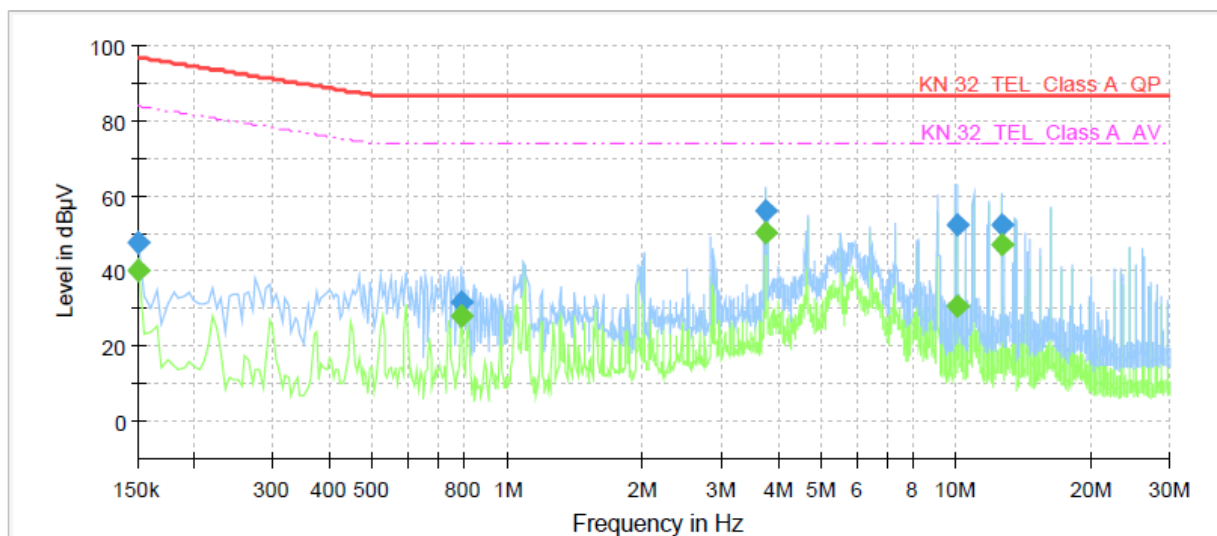
Test report No.:
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Conducted Emissions at Telecommunication Ports

■ AC 24 V Mode
[10 Mbps]

Common Information

Test Description: Telecommunication Emission
Model No.: SNB-7004P
Mode: AC 24 V_10 Mbps
Operator Name: KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.150000	---	40.37	84.00	43.63	1000.0	9.000	Single Line	19.8
0.150000	47.41	---	97.00	49.59	1000.0	9.000	Single Line	19.8
0.785000	---	27.93	74.00	46.07	1000.0	9.000	Single Line	19.8
0.785000	31.89	---	87.00	55.11	1000.0	9.000	Single Line	19.8
3.750000	---	50.46	74.00	23.54	1000.0	9.000	Single Line	19.7
3.750000	56.10	---	87.00	30.90	1000.0	9.000	Single Line	19.7
10.010000	---	30.92	74.00	43.08	1000.0	9.000	Single Line	19.8
10.010000	52.42	---	87.00	34.58	1000.0	9.000	Single Line	19.8
12.665000	---	46.86	74.00	27.14	1000.0	9.000	Single Line	19.9
12.665000	52.32	---	87.00	34.68	1000.0	9.000	Single Line	19.9

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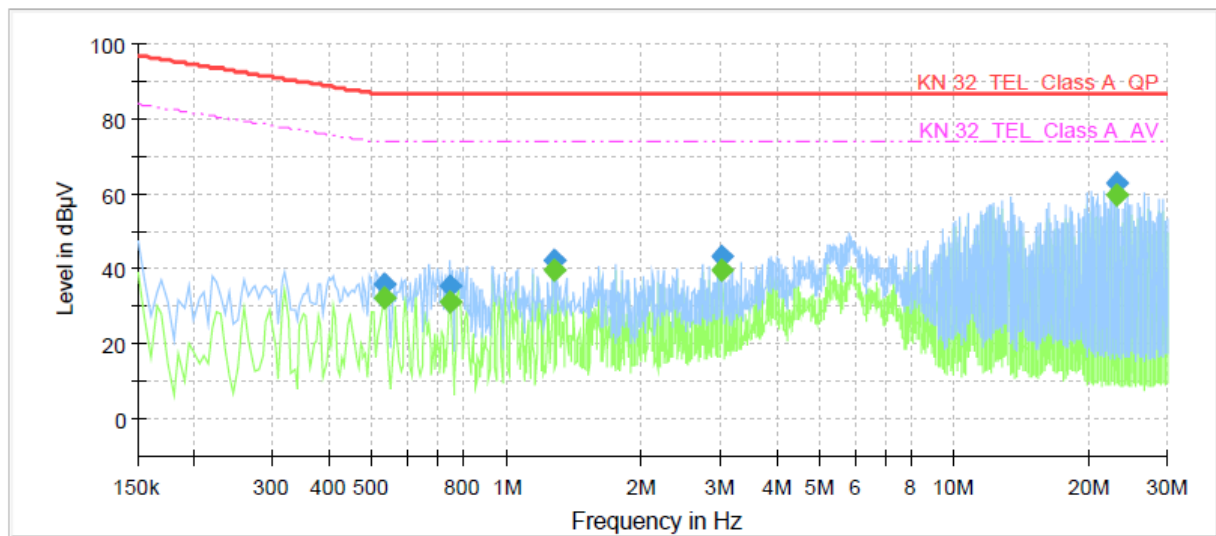
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[100 Mbps]

Common Information

Test Description: Telecommunication Emission
Model No.: SNB-7004P
Mode: AC 24 V_100 Mbps
Operator Name: KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.535000	---	32.10	74.00	41.90	1000.0	9.000	Single Line	20.0
0.535000	35.80	---	87.00	51.20	1000.0	9.000	Single Line	20.0
0.745000	---	31.07	74.00	42.93	1000.0	9.000	Single Line	20.1
0.745000	35.42	---	87.00	51.58	1000.0	9.000	Single Line	20.1
1.270000	---	39.50	74.00	34.50	1000.0	9.000	Single Line	20.2
1.270000	42.19	---	87.00	44.81	1000.0	9.000	Single Line	20.2
3.040000	---	39.61	74.00	34.39	1000.0	9.000	Single Line	20.2
3.040000	43.18	---	87.00	43.82	1000.0	9.000	Single Line	20.2
23.130000	---	59.61	74.00	14.39	1000.0	9.000	Single Line	20.6
23.130000	62.96	---	87.00	24.04	1000.0	9.000	Single Line	20.6

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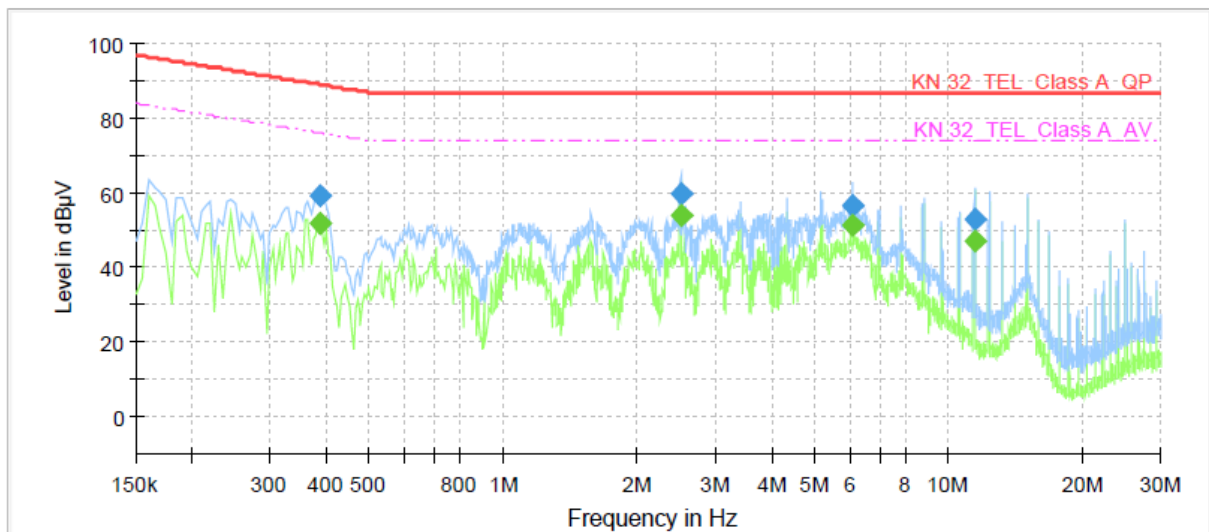
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■ DC 12 V Mode
[10 Mbps]

Common Information

Test Description: Telecommunication Emission
Model No.: SNB-7004P
Mode: DC 12 V_10 Mbps
Operator Name: KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.390000	---	51.82	76.06	24.24	1000.0	9.000	Single Line	19.6
0.390000	59.18	---	89.06	29.88	1000.0	9.000	Single Line	19.6
2.500000	---	53.93	74.00	20.07	1000.0	9.000	Single Line	19.9
2.500000	59.67	---	87.00	27.33	1000.0	9.000	Single Line	19.9
6.085000	---	51.16	74.00	22.84	1000.0	9.000	Single Line	19.4
6.085000	56.40	---	87.00	30.60	1000.0	9.000	Single Line	19.4
11.415000	---	46.87	74.00	27.13	1000.0	9.000	Single Line	19.9
11.415000	52.85	---	87.00	34.15	1000.0	9.000	Single Line	19.9

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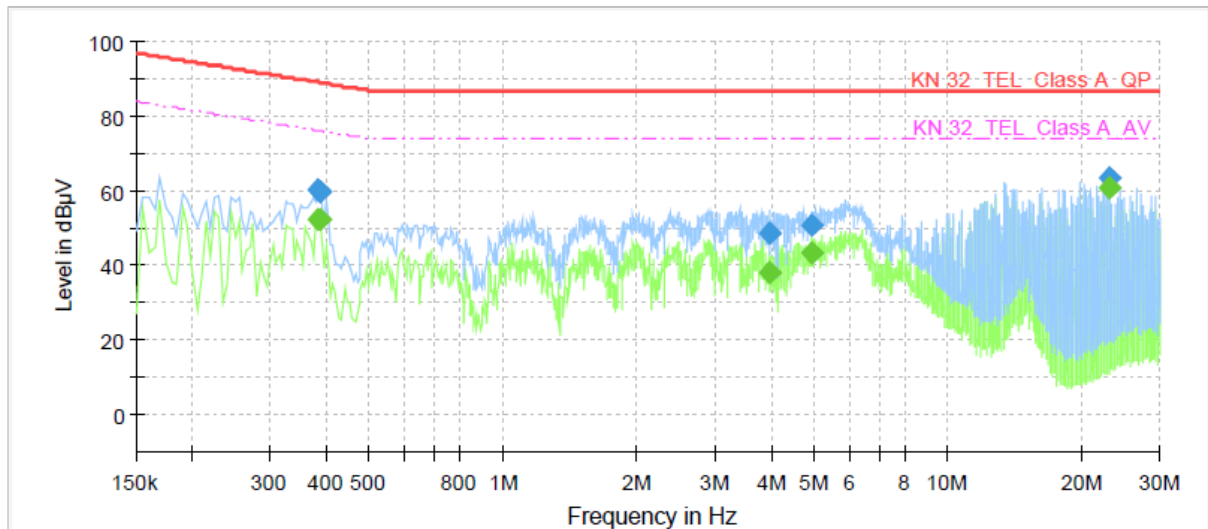
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[100 Mbps]

Common Information

Test Description: Telecommunication Emission
Model No.: SNB-7004P
Mode: DC 12 V_100 Mbps
Operator Name: KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.385000	---	52.42	76.17	23.75	1000.0	9.000	Single Line	19.9
0.385000	60.14	---	89.17	29.03	1000.0	9.000	Single Line	19.9
0.390000	---	52.24	76.06	23.82	1000.0	9.000	Single Line	19.9
0.390000	59.88	---	89.06	29.18	1000.0	9.000	Single Line	19.9
3.960000	---	38.06	74.00	35.94	1000.0	9.000	Single Line	20.0
3.960000	48.86	---	87.00	38.14	1000.0	9.000	Single Line	20.0
4.965000	---	43.58	74.00	30.42	1000.0	9.000	Single Line	19.8
4.965000	51.04	---	87.00	35.96	1000.0	9.000	Single Line	19.8
23.130000	---	60.78	74.00	13.22	1000.0	9.000	Single Line	20.6
23.130000	63.76	---	87.00	23.24	1000.0	9.000	Single Line	20.6

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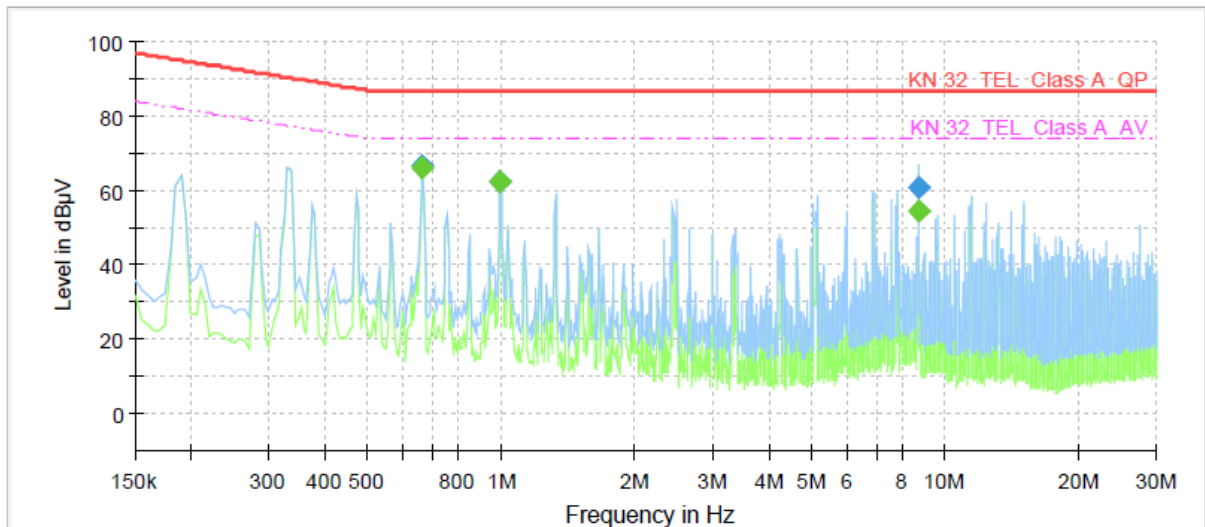
Page (50) of (74)

■ PoE Mode
[10 Mbps]

Common Information

Test Description:
Model No.:
Mode
Operator Name:

Telecommunication Emission
SNB-7004P
PoE_10 Mbps
KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.665000	---	66.37	74.00	7.63	1000.0	9.000	Single Line	19.8
0.665000	66.49	---	87.00	20.51	1000.0	9.000	Single Line	19.8
0.995000	---	62.65	74.00	11.35	1000.0	9.000	Single Line	19.9
0.995000	62.63	---	87.00	24.37	1000.0	9.000	Single Line	19.9
8.750000	---	54.75	74.00	19.25	1000.0	9.000	Single Line	19.6
8.750000	60.74	---	87.00	26.26	1000.0	9.000	Single Line	19.6

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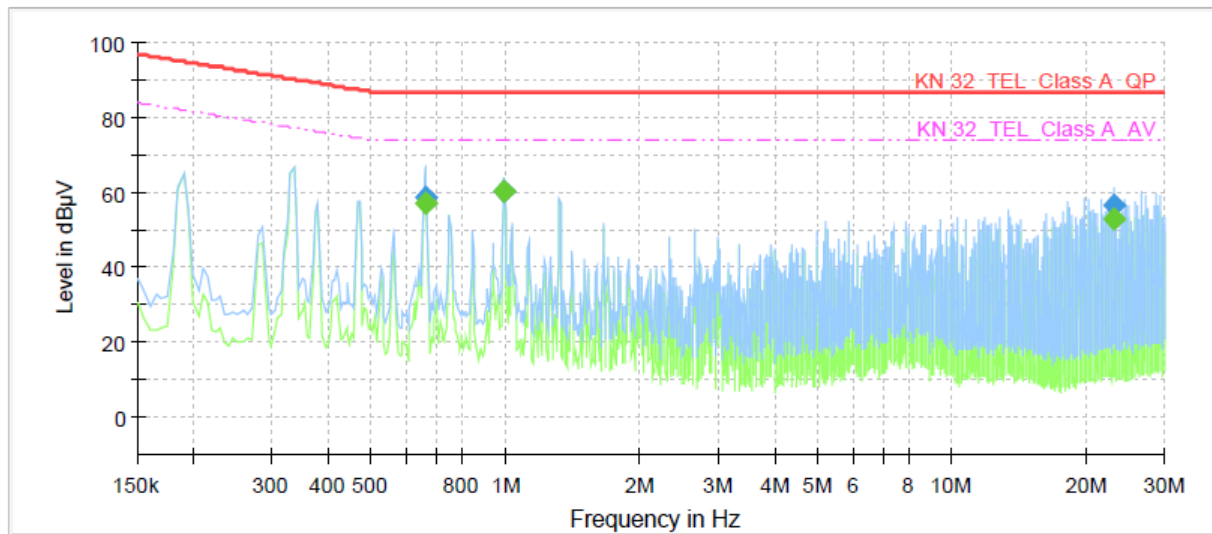
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[100 Mbps]

Common Information

Test Description: Telecommunication Emission
Model No.: SNB-7004P
Mode: PoE_100 Mbps
Operator Name: KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.660000	---	57.22	74.00	16.78	1000.0	9.000	Single Line	20.0
0.660000	59.01	---	87.00	27.99	1000.0	9.000	Single Line	20.0
0.995000	---	60.32	74.00	13.68	1000.0	9.000	Single Line	20.2
0.995000	60.40	---	87.00	26.60	1000.0	9.000	Single Line	20.2
23.125000	---	53.16	74.00	20.84	1000.0	9.000	Single Line	20.6
23.125000	56.56	---	87.00	30.44	1000.0	9.000	Single Line	20.6

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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

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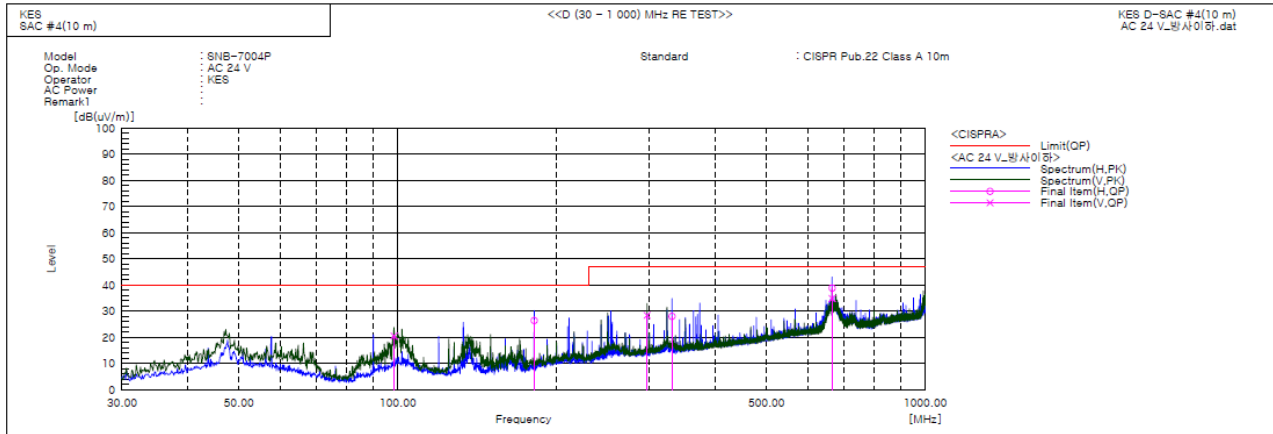
Test report No.:

KES-E1-17T0850

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Radiated Electric Field Emissions(Below 1 GHz)

■ AC 24 V Mode



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	98.385	V	49.0	-28.4	20.6	40.0	19.4	100.0	84.0	
2	181.441	H	55.9	-29.4	26.5	40.0	13.5	200.0	52.0	
3	296.993	V	52.5	-24.0	28.5	47.0	18.5	100.0	307.0	
4	331.064	H	51.0	-22.9	28.1	47.0	18.9	200.0	44.0	
5	666.078	H	52.8	-13.9	38.9	47.0	8.1	400.0	47.0	
6	666.125	V	48.8	-13.9	34.9	47.0	12.1	100.0	358.0	

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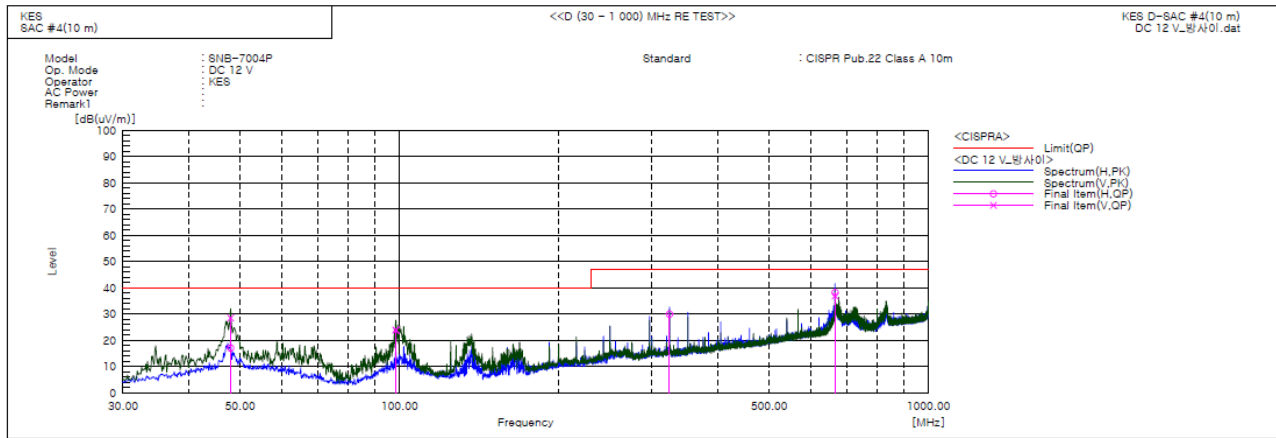
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Test report No.:

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DC 12 V Mode



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	47.945	H	45.0	-27.9	17.1	40.0	22.9	400.0	285.0	
2	47.949	V	56.5	-27.9	28.6	40.0	11.4	400.0	65.0	
3	98.385	V	52.4	-28.4	24.0	40.0	16.0	150.0	114.0	
4	324.031	H	53.1	-23.1	30.0	47.0	17.0	200.0	261.0	
5	666.078	H	52.2	-13.9	38.3	47.0	8.7	100.0	129.0	
6	666.078	V	50.9	-13.9	37.0	47.0	10.0	100.0	205.0	

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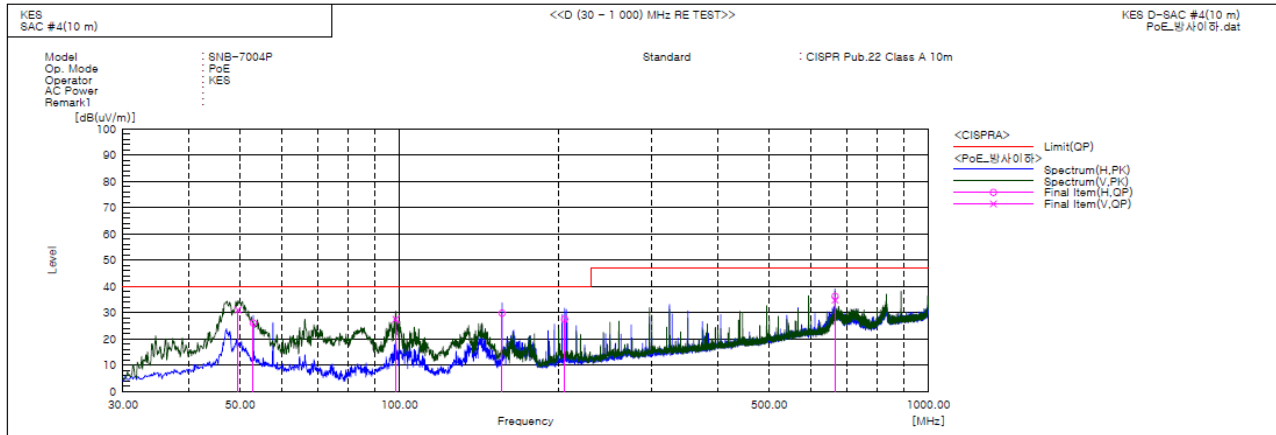
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■ PoE Mode



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	49.521	V	58.9	-27.8	31.1	40.0	8.9	150.0	119.0	
2	52.916	H	54.0	-27.9	26.1	40.0	13.9	400.0	77.0	
3	98.385	V	56.0	-28.4	27.6	40.0	12.4	100.0	119.0	
4	156.343	H	61.0	-31.1	29.9	40.0	10.1	400.0	77.0	
5	205.206	H	54.3	-26.7	27.6	40.0	12.4	400.0	77.0	
6	666.078	H	50.2	-13.9	36.3	47.0	10.7	200.0	295.0	
7	666.078	V	48.8	-13.9	34.9	47.0	12.1	150.0	349.0	

◆ Calculation – SAC #4(10 m)

Result(QP) [dB(μ V/m)] = (Reading(QP)[dB(μ V)] + c.f[dB(1/m)])

Margin(QP)[dB] = Limit[dB(μ V/m)] - Result(QP) [dB(μ V/m)]

Reading(QP) : Reading value, Result(QP) : Reading value + Factor value

Limit(QP) : Limit value, c.f : (ANT Factor + Cable Loss - Preamplifier Factor), Margin: Margin value

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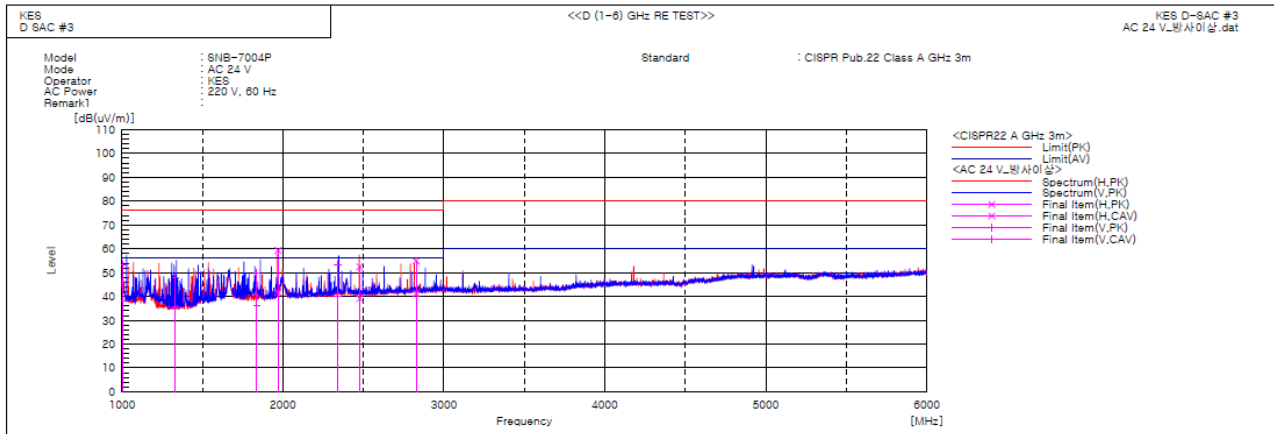
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Radiated Electric Field Emissions(Above 1 GHz)

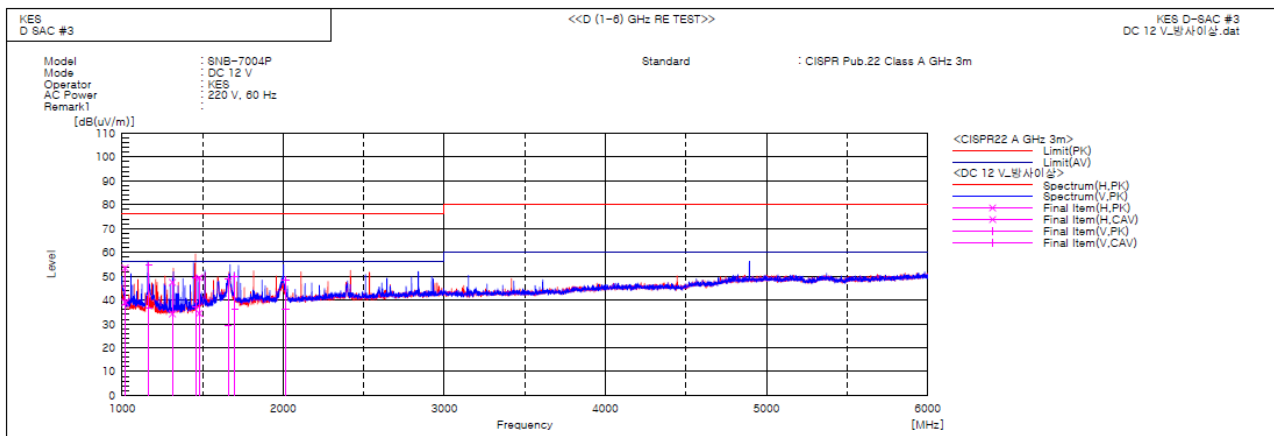
AC 24 V Mode



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	1007.004	V	63.1	48.1	-9.9	53.2	38.2	76.0	56.0	22.8	17.8	100.0	243.6	
2	1331.891	V	55.6	43.3	-7.5	48.1	35.8	76.0	56.0	27.9	20.2	100.0	279.4	
3	1837.624	V	52.9	39.0	-2.9	50.0	36.1	76.0	56.0	26.0	19.9	100.0	296.1	
4	1969.935	H	61.1	43.5	-1.8	59.3	41.7	76.0	56.0	16.7	14.3	100.0	292.1	
5	2340.911	V	53.5	40.0	0.0	53.5	40.0	76.0	56.0	22.5	16.0	100.0	254.6	
6	2477.739	H	51.9	38.6	0.5	52.4	39.1	76.0	56.0	23.6	16.9	100.0	48.7	
7	2628.098	H	52.9	39.3	2.0	54.9	41.3	76.0	56.0	21.1	14.7	100.0	241.6	

DC 12 V Mode



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	1018.892	H	63.3	48.8	-9.8	53.5	39.0	76.0	56.0	22.5	17.0	100.0	256.7	
2	1165.519	V	63.7	45.2	-8.8	54.9	36.4	76.0	56.0	21.1	19.6	100.0	9.5	
3	1312.101	H	55.1	41.9	-7.7	47.4	34.2	76.0	56.0	28.6	21.8	100.0	288.6	
4	1457.887	V	55.7	43.7	-6.5	49.2	37.2	76.0	56.0	26.8	18.8	100.0	7.9	
5	1479.245	H	55.7	40.7	-6.3	49.4	34.4	76.0	56.0	26.6	21.6	100.0	275.5	
6	1659.462	V	53.6	34.0	-4.6	49.0	29.4	76.0	56.0	27.0	26.6	100.0	56.0	
7	1700.044	V	54.0	40.2	-4.2	49.8	36.0	76.0	56.0	26.2	20.0	100.0	172.7	
8	2015.117	V	50.1	37.8	-1.6	48.5	36.2	76.0	56.0	27.5	19.8	100.0	50.0	

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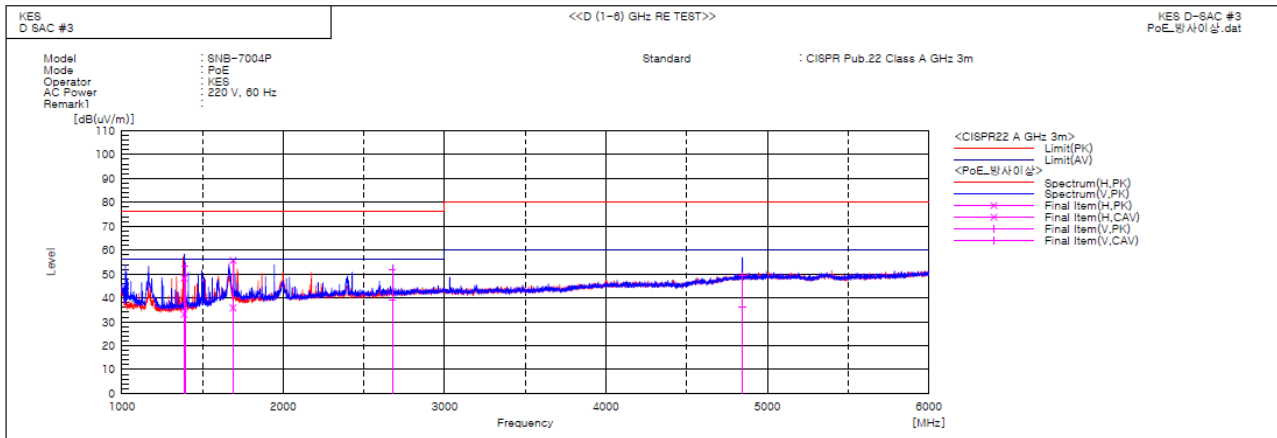
3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Test report No.:

KES-EI-17T0850

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PoE Mode



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	1385.405	H	55.4	40.2	-7.1	48.3	33.1	76.0	56.0	27.7	22.9	100.0	273.5	
2	1390.998	V	60.5	42.4	-7.1	53.4	35.3	76.0	56.0	22.6	20.7	100.0	210.9	
3	1689.524	H	60.0	40.1	-4.3	55.7	35.8	76.0	56.0	20.3	20.2	100.0	165.8	
4	2675.953	V	50.3	37.6	1.4	51.7	39.0	76.0	56.0	24.3	17.0	100.0	308.0	
5	4842.780	V	39.7	26.2	9.9	49.6	36.1	80.0	60.0	30.4	23.9	100.0	111.2	

◆ Calculation - SAC #3

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

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

Reading(PK/CAV) : Reading value, Result(PK/CAV) : Reading value + Factor value

Limit(QP) : Limit value, c.f : (ANT Factor + Cable Loss - Preamp Factor), Margin: Margin value

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Test report No.:
KES-EI-17T0850
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Harmonic Current Emissions and Voltage Fluctuations and Flicker

N/A

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Test Setup Photos and Configuration

Conducted Voltage Emissions



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Conducted Telecommunication Emissions



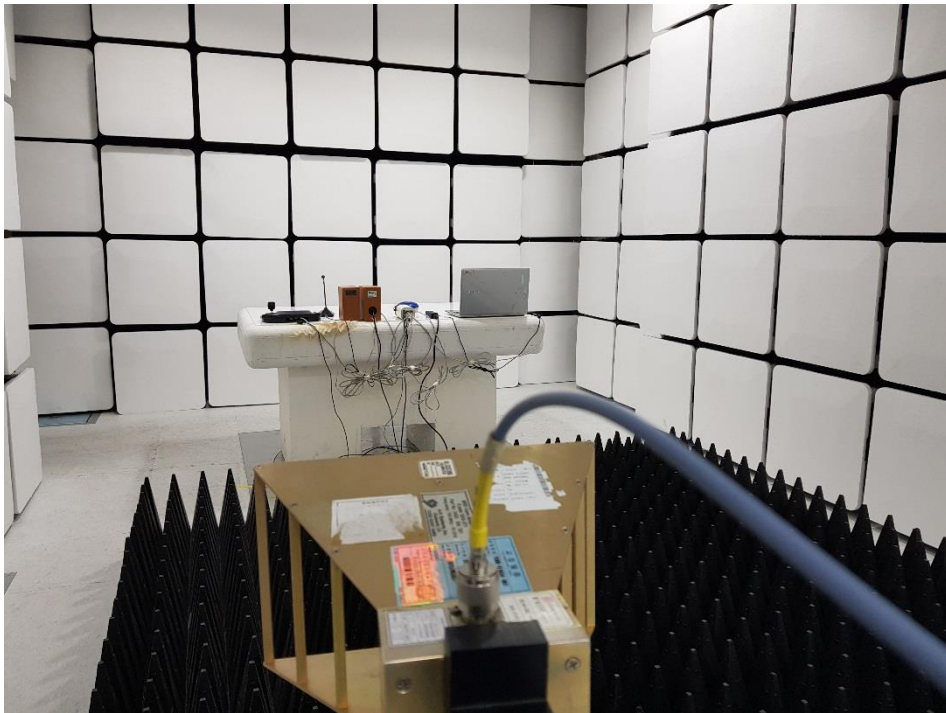
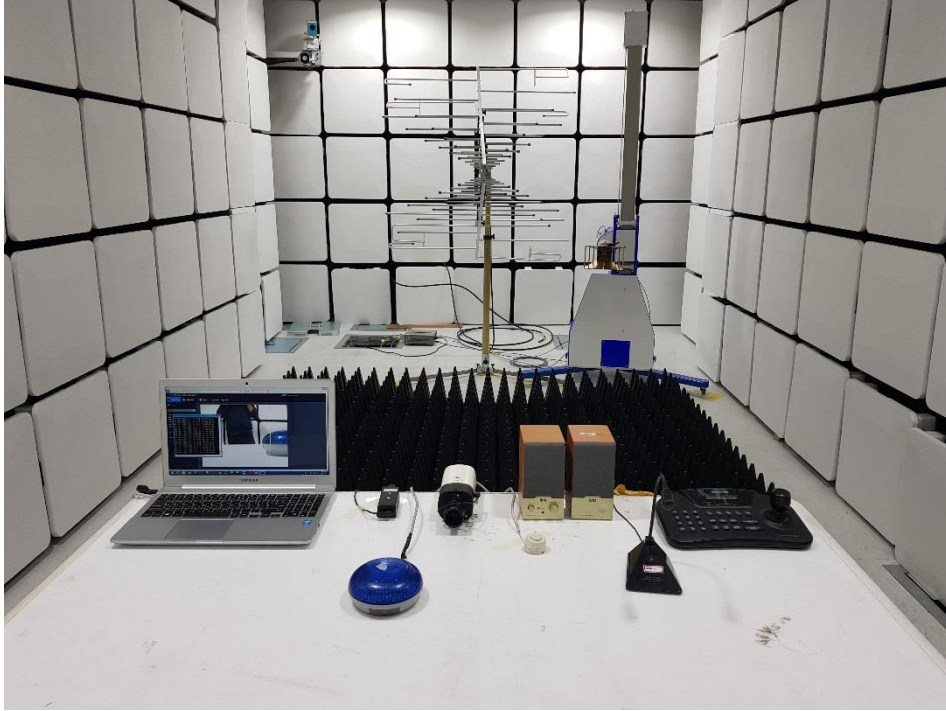
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Radiated Electric Field Emissions(Below 1 GHz)



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Radiated Electric Field Emissions(Above 1 GHz)



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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



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Surge Transients



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Conducted Disturbance



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Voltage Dips and Short Interruptions



EUT External Photographs

(Top)



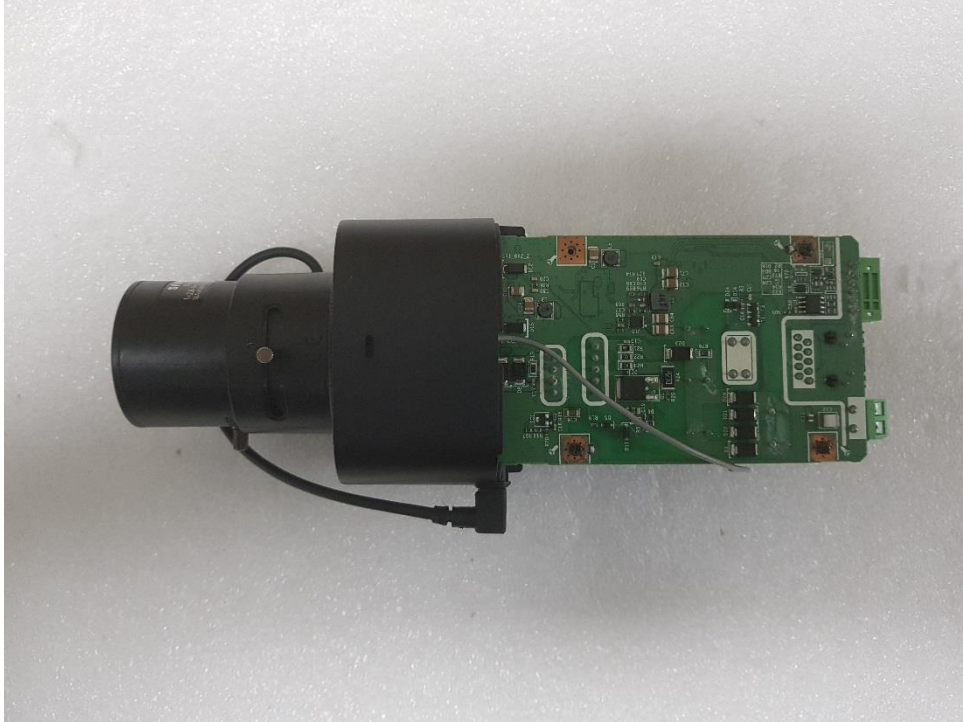
(Bottom)



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EUT Internal Photographs

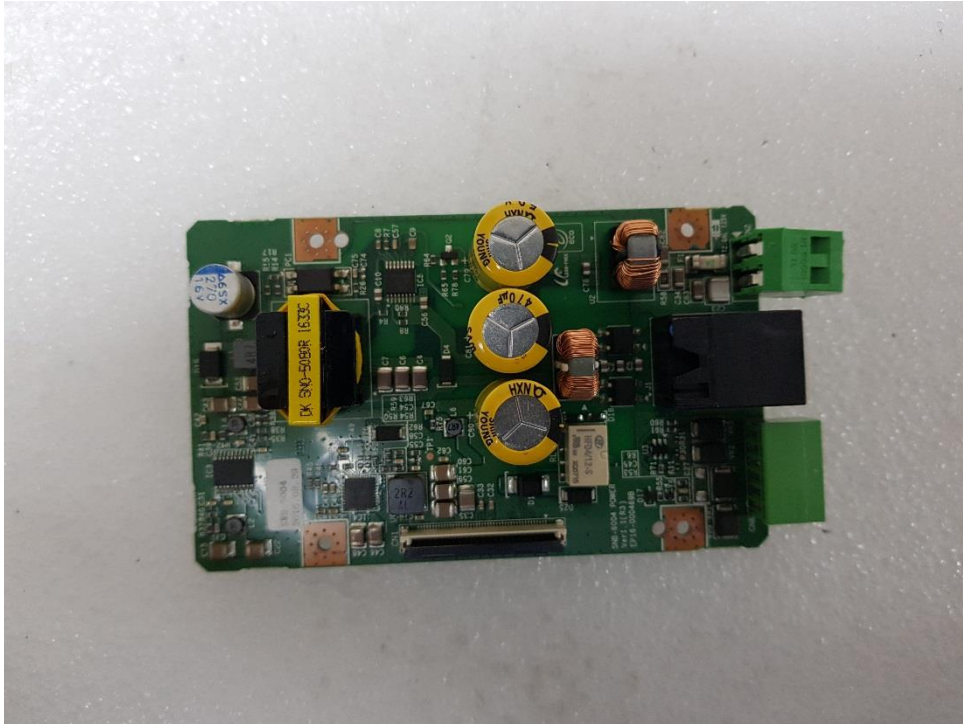
(Internal View)



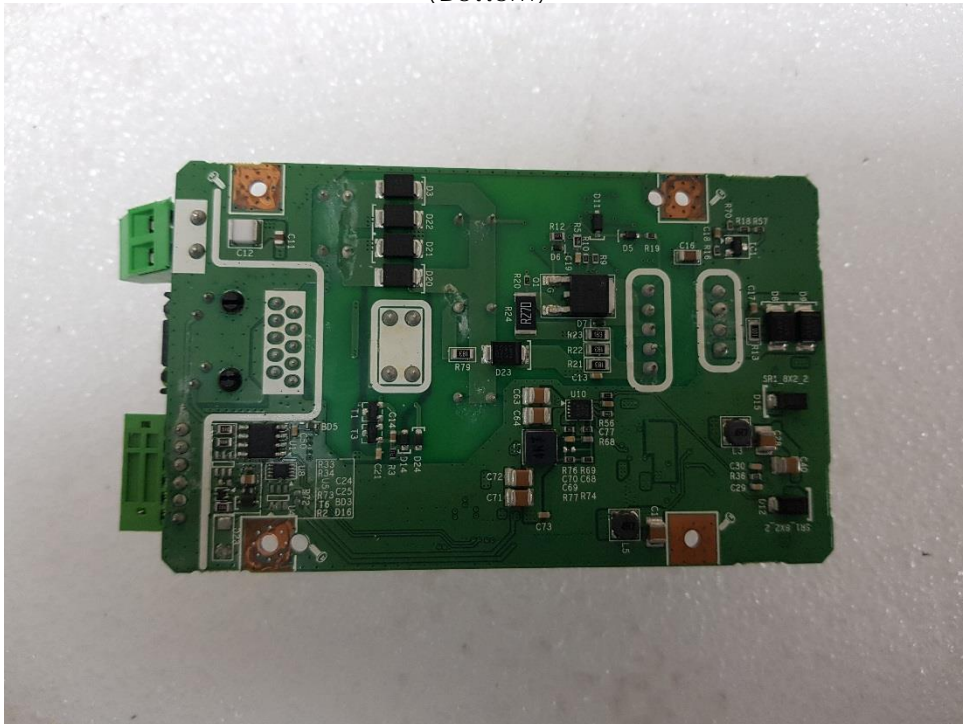
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EUT Internal View – Board 1

(Top)



(Bottom)



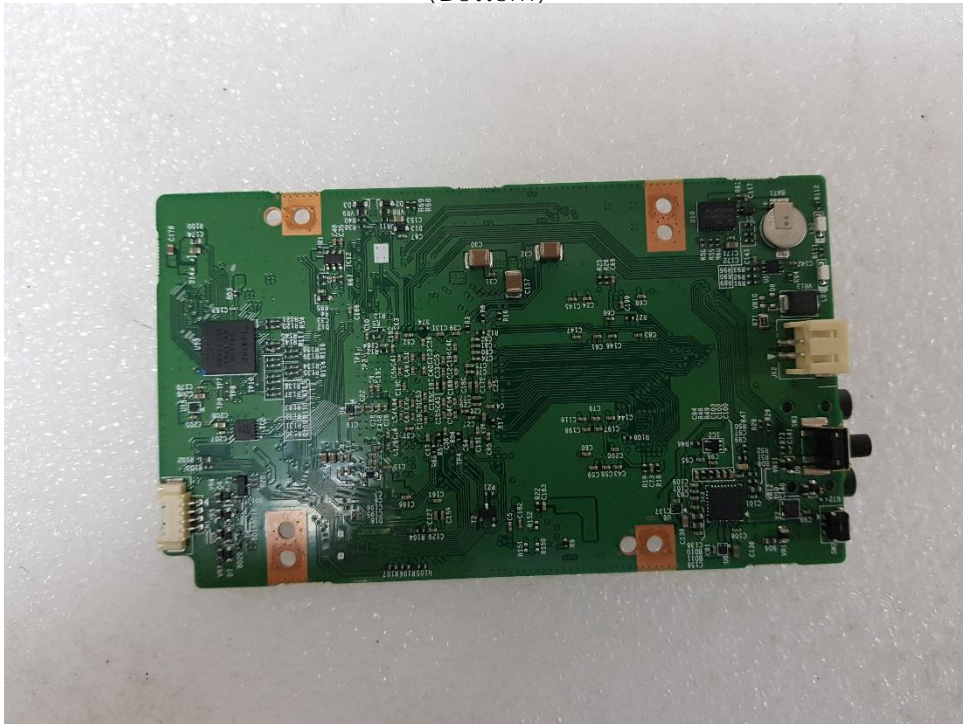
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EUT Internal View – Board 2

(Top)



(Bottom)



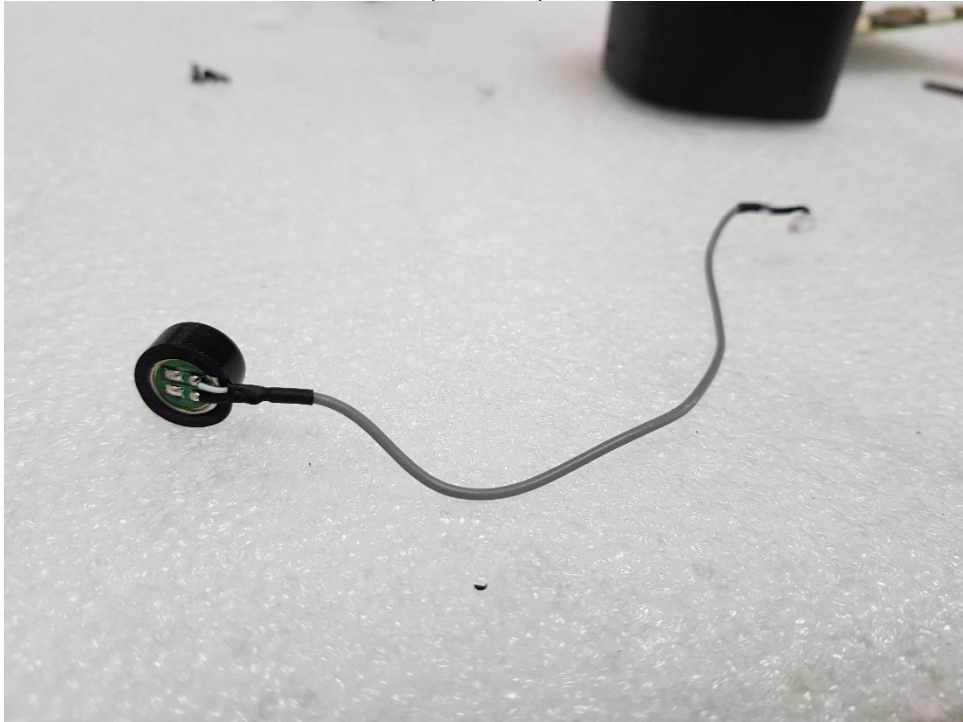
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EUT Internal View – MIC

(Top)



(Bottom)



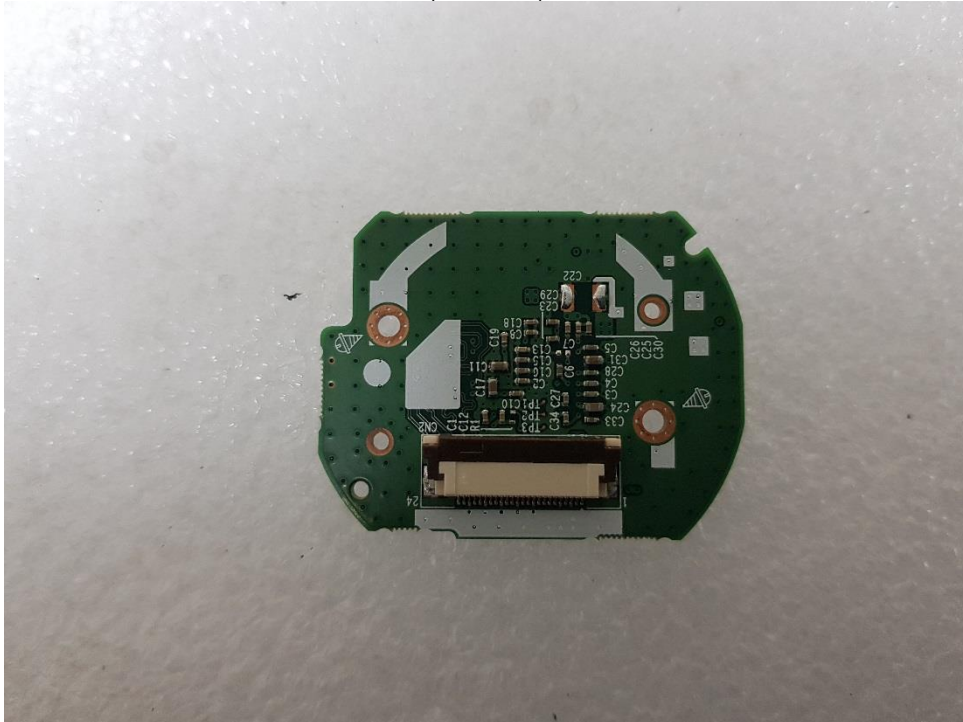
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EUT Internal View – Board 4

(Top)



(Bottom)



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EUT Internal View – Lens

(Top)



(Bottom)



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Label and Location



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

Made in China

