EMC TEST REPORT For CE

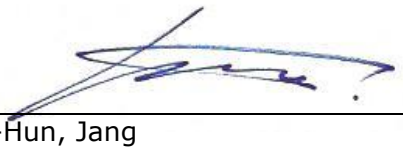
Test Report No.	:	KES-E1-16T0489-R1
Date of Issue	:	Oct. 31, 2017
Product name	:	NETWORK CAMERA
Model/Type No.	:	PNM-9020VP
Variant Model	:	-
Applicant	:	Hanwha Techwin Co., Ltd.
Applicant Address	:	1204, Changwon-daero, Seongsan-gu, Changwon-si, Gyeongsangnam-do, Korea
Manufacturer	:	Hanwha Techwin(Tianjin) Co., Ltd.
Manufacturer Address	:	No.11 Weiliu Rd,Micro-Electronic Industrial Park, TEDA, Tianjin, 300385, People's Republic of China
Date of Receipt	:	Sep, 13, 2016
Test date	:	Sep, 21, 2016 – Sep. 23, 2016
Test Results	:	☒ **In Compliance** ☐ **Not in Compliance**

Tested by



Dae Hyun, Kim
EMC Test Engineer

Reviewed by



Dong-Hun, Jang
EMC Technical Manager

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REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Sep. 26, 2016	KES-E1-16T0489	Issued
Oct. 31, 2017	KES-E1-16T0489-R1	Standard Revision

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1.0 General Product Description

Main Specifications of E.U.T are:

Video	
Imaging Device	8M(2M x 4)
Total Pixels	TBD
Effective Pixels	TBD
Scanning System	Progresive
Min. Illumination	Color : 0.1Lux ↓
S / N Ratio	N/A
Video Out	N/A
Lens	
Focal Length (Zoom Ratio)	3.6mm Fiexd
Max. Aperture Ratio	TBD
Angular Field of View	[Total 4sensor] H : 180˚, V : TBD [Per sensor] H : 50˚↑ V : TBD
Min. Object Distance	0.5m(1.64ft)
Focus Control	Manual
Lens Type	-
Mount Type	Board-in type
Pan / Tilt / Rotate	
Pan Range	0 ° ~ +355 °
Tilt Range	0 ° ~ +73 °
Rotate Range	N/A
Operational	
IR LED	N/A
Viewable Length	N/A
Camera Title	Off / On (Displayed up to 45 characters) - W/W : English/Numeric/Special Characters - Korea : English/Numeric/Sepcial/Korean 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 / WDR
Wide Dynamic Range	120dB
Contrast Enhancement	SSDR (Samsung Super Dynamic Range) (Off / On)
Digital Noise Reduction	SSNRⅢ (2D+3D Noise Filter) (Off / On)
Defog	Auto/Manual/Off
LDC	Off/On
Motion Detection	Off / On(8ea, Polygonal)
Privacy Masking	Off / On (16ea, Polygonal with 4Lines Only) - Color : Gray, Green, Red, Blue, Black, White
Gain Control	Off / Low / Middle / High
White Balance	ATW / AWC / Manual / Indoor / Outdoor (included Mercury & Sodium)
Electronic Shutter Speed	Minimum / Maximum / Anti flicker
Rotate Image	Flip : On/Off Mirror : On/Off Hallway : N/A
Digital PTZ	Support
Flip / Mirror	Off / On
Intelligent Video Analytics	Tampering, Virtual Line, Enter/Exit, Appear / Disappear, Audio Detection, Face Detection Defocus Detection ,Digital Auto Tracking, Heat map
Alarm I/O	Input 1ea / Output 1ea

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Audio In	Line IN Supply voltage: 2.5VDC(4mA), Input impedance: approx. 2K Ohm
Audio out	Line out (3.5mm stereo mini jack)
Alarm Triggers	Tampering(Scene Change), Heat Map Virtual Line, Enter/Exit, Appear / Disappear, Audio Detection,Defocus Detection,Digital Auto Tracking - with Metadata
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
Network	
Ethernet	RJ-45(1000BASE-T), Plug-in type
Video Compression Format	H.265/H.264 (MPEG-4 Part 10/AVC) : Main/Baseline/High Motion JPEG
Resolution	[Panorama] Onboard stitch 4096 x 1843 [4:3] 1600x1200, 1280x960, 1024x768, 800x600, 720 x 576, 720 x 480 640x480, 480x360, 320x240 [16:9] 1920x1080, 1280x720, 800x450, 640x360
Max. Framerate	H.265/H.264 : Max. 30fps at all resolutions Motion JPEG : Max. 15fps at all resolutions
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, Motion JPEG : 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 16KHz
Audio Communication	Bi-dierctional (2-Way)
IP	IPv4, IPv6
Protocol	TCP/IP, UDP/IP, RTP(UDP), RTP(TCP), RTCP,RTSP, NTP, HTTP, HTTPS, SSL/TLS, DHCP, PPPoE, FTP, SMTP, ICMP, IGMP, SNMPv1/v2c/v3(MIB-2), ARP, DNS, DDNS, QoS, PIM-SM, UPnP, Bonjour
Security	HTTPS(SSL) Login Authentication Digest Login Authentication IP Address Filtering User access Log 802.1X Authentication (EAP-TLS, EAP-LEAP)
Streaming Method	Unicast / Multicast
Max. User Access	20 users at Unicast Mode
Edge Storage	SD/SDHC/SDXC (up to 128Gb) - motion Images recorded in the SD/SDHC/SDXC memory card can be downloaded. - camera can detect automatically when the memory is connected - memory status display (normal/error/active/formatting/lock) NAS(Network Attached Storage) Local PC for Instant Recording(plug-in viewer only)
Application Programming Interface	ONVIF Profile S/G SUNAPI(HTTP API) SVNP SAMSUNG TECHWIN Open Platform

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Webpage Language	English, French, German, Spanish, Italian, Chinese, Russian, Japanese, Swedish, Denish, Portuguese, Turkish, Polish, Czech, Rumanian, Serbian, Dutch, Croatia, Hungary, Greek
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
Pixel Counter	support (plug-in viewer only)
Environmental	Non-plugin Webviewer
Operating Temperature / Humidity	-40°C ~ +55°C(-40°F ~ +131°F) / Less than 90% RH * Start up should be done at above -35°C
Storage Temperature / Humidity	-40°C ~ +60°C (-40°F ~ +140°F) / Less than 90% RH
Fan / Heater	On/Off via webvier
Ingress Protection	IP66
Vandal Resistance	IK10
Electrical	
Input Voltage / Current	PoE+(IEEE802.3at)
Power Consumption	Max 25.5W(PoE+/DC, Heater On)
Mechanical	
Color / Material	Ivory / Aluminum
Dimension (WxHxD)	Ø188 x H146mm
Weight	1426g

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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 ☐ 220 Vac ☐ 230 Vac ☐ 240 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	PNM-9020VP	-	Hanwha Techwin(Tianjin) Co., Ltd.	E.U.T

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
Notebook	NT63025J	JK9091EF400142M	Samsung Electronics Co., Ltd.	-
Notebook Adapter	A13-040N2A	CN60BA4400313AD 0N843KO2OO	Chicony Power Technology (suzhou)Co., Ltd.	-
PoE Adapter	3001GC	-	PowerDsine	-

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1.6 External I/O Cabling

■ 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(LAN)	Notebook	RJ-45(LAN)	4.0	U

* Unshielded=U, Shielded=S

■ 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)	4.0	U
PoE Adapter	RJ-45(LAN)	Notebook	RJ-45(LAN)	0.8	U

* Unshielded=U, Shielded=S

1.7 E.U.T Operating Mode(s)

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

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

Test mode	Normal operating
DC 12 V	E.U.T Monitoring
PoE	E.U.T Monitoring

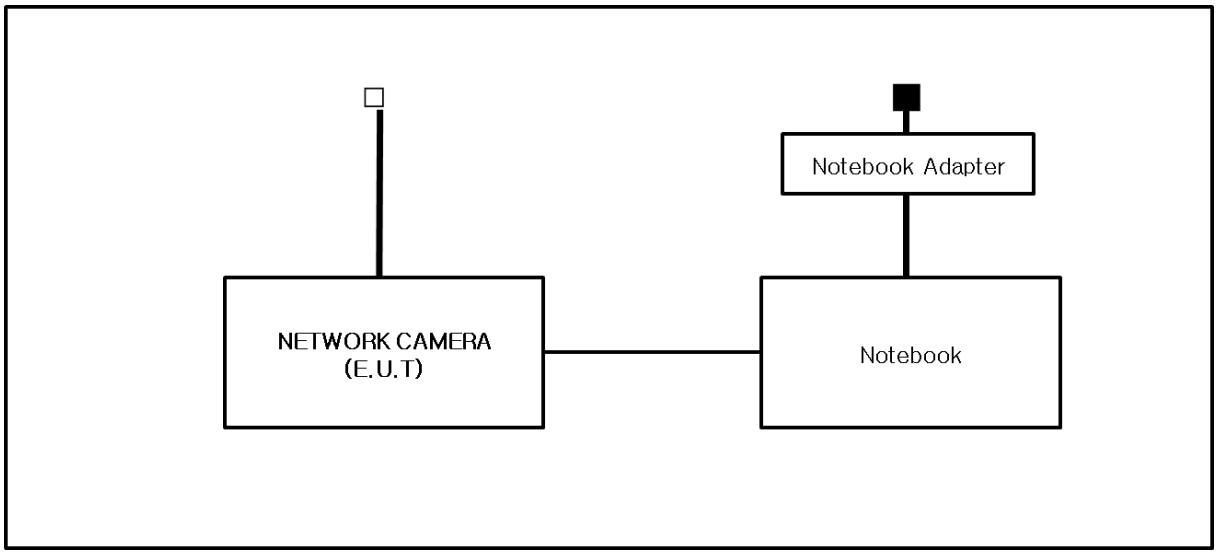
- Input power condition during the measurements was 12 v (dc) , PoE

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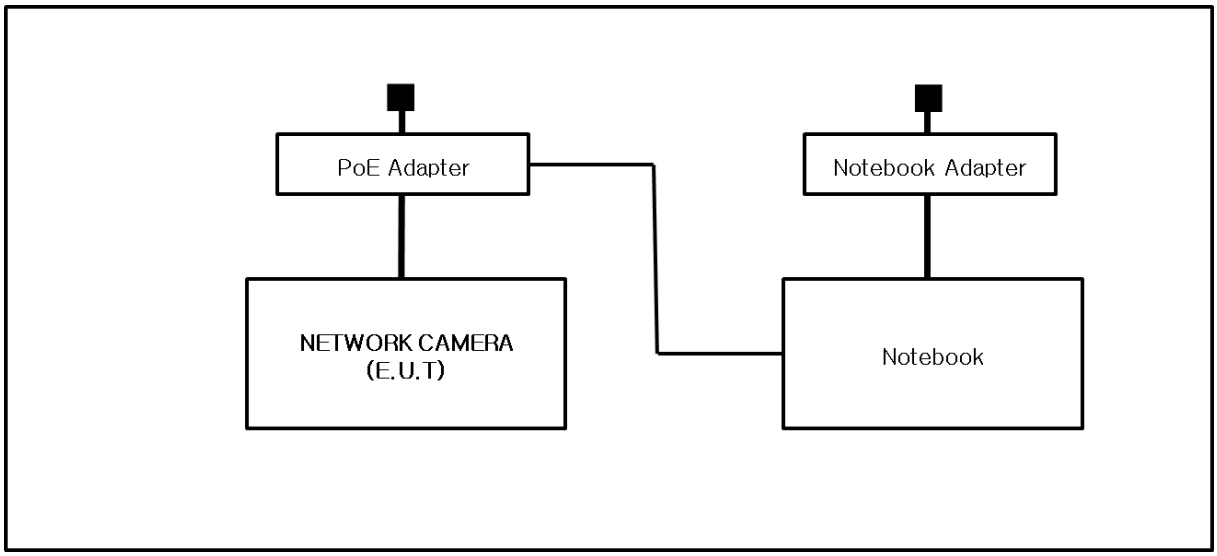
1.8 Configuration

■ AC Main
□ DC Main

■ DC 12 V Mode



■ PoE Mode



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1.9 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less.

1.10 Test Facility

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

1.11 Laboratory Accreditations and Listings

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

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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	☒ 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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☐ **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

☐ **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

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2.1 Conducted Emissions at Mains Power Ports

Test Date
N/A

Test Location
Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☐	EMI Test Receiver	ESR7	R & S	101190	08, 08, 2017
☐	LISN	ENV216	R & S	101787	01, 14, 2017
☐	LISN	ESH2-Z5	R & S	100450	05, 02, 2017
☐	Electro wave Shieldroom	-	AONE SHIELD	-	-
☐	EMI Test S/W	EMC32	R&S	9.12.00	-

Test Conditions
Temperature: ℃
Relative Humidity: %

.

Frequency Range of Measurement
150 ㎑ to 30 ㎒

Instrument Settings
IF Band Width: 9 ㎑

Test Results
The requirements are:

☐ PASS
☐ NOT PASS
☒ NOT APPLICABLE

Remarks
N/A :
Because the E.U.T power is 12 v (dc) power and PoE, limits are not specified

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2.2 Conducted Emissions at Telecommunication Ports

Test Date
Sep, 22, 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
☒	8-Wire ISN CAT3	CAT3 8158	Schwarzbeck Mess	8158-0019	04, 01, 2017
☒	8-Wire ISN CAT5	CAT5 8158	Schwarzbeck Mess	8158-0030	04, 01, 2017
☒	8-Wire ISN CAT6	NTFM 8158	Schwarzbeck Mess	8158-0029	08, 11, 2017
☒	Electro wave Shieldroom	-	SEMITEC	-	-
☒	EMI Test S/W	EMC32	R&S	9.12.00	-

Test Conditions
Temperature: 21,6 ℃
Relative Humidity: 43,5 %

Frequency Range of Measurement
150 ㎑ to 30 ㎒

Instrument Settings
IF Band Width: 9 ㎑

Test Results
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks
See Appendix A for test data.

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2.3 Radiated Electric Field Emissions(Below 1 ㎓)

Test Date
Sep, 22, 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
☒	Open Area Test Site	-	KES	-	-
☒	Antenna Mast	-	DAEIL EMC	-	-
☒	Turn Table	-	DAEIL EMC	-	-
☒	EMI Test S/W	-	-	-	-

Test Conditions
Temperature: 18,5 ℃
Relative Humidity: 47,0 %

Frequency Range of Measurement
30 ㎒ to 1 ㎓

Instrument Settings
IF Band Width: 120 ㎑

Test Results
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks
See Appendix A for test data.

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2.4 Radiated Electric Field Emissions(Above 1 ㎓)

Test Date
Sep, 23, 2016

Test Location
Semi Anachoic Chamber #2

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test Receiver	ESU26	R&S	100552	04, 24, 2017
☒	Broadband Coaxial Preamplifier	BBV 9718	Schwarzbeck Mess - Elektronik	9718-246	10, 23, 2016
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	05, 07, 2017
☒	Semi Anachoic Chamber #2	-	SEMITEC	-	-
☒	Antenna Mast	-	AUDIX	-	-
☒	Turn Table	-	AUDIX	-	-
☒	EMI Test S/W	e3	AUDIX	8.083b	-

Test Conditions
Temperature: 21,7 ℃
Relative Humidity: 46,8 %

Frequency Range of Measurement
1 ㎓ to 6 ㎓

Instrument Settings
IF Band Width: 1 ㎒

Test Results
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks
See Appendix A for test data.

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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
☐	AC Source	ACS 500 N	EM TEST	V1024106760	08, 08, 2017
☐	Digital Power Analyzer	DPA 500 N	EM TEST	V1024106759	08, 08, 2017
☐	EMI Test S/W	dpa.control	EM TEST AG	5.4.8.0	-

Test Conditions
Temperature: ℃
Relative Humidity: %

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.

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2.6 Voltage Fluctuations and Flicker

Test Date
N/A

Test Location
Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☐	AC Source	ACS 500 N	EM test	V1024106760	08, 08, 2017
☐	Digital Power Analyzer	DPA 500 N	EM test	V1024106759	08, 08, 2017
☐	EMI Test S/W	dpa.control	EM TEST AG	5.4.8.0	-

Test Conditions
Temperature: ℃
Relative Humidity: %

Test Results
The requirements are:

☐ PASS
☐ NOT PASS
☒ NOT APPLICABLE

Remarks
N/A : Because the E.U.T power is 12 v (dc) power and 24 v (ac), limit are not specified.

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3.0 Criteria for compliance

Criteria for compliance was based on the following guidelines:
EN 50130-4:2011 +A1:2014 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.

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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 oeuvres at U = 130 $dB\mu V$.

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 $dB\mu V$, 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 $dB\mu V$, any deterioration of the picture is so minor that the system could

still be used; and

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

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.

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3.1 Electrostatic Discharge

Reference Standard
EN 61000-4-2:2009

Test Date
Sep, 21, 2016

Test Location
EMS-ESD: Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	ESD SIMULATOR	ESS-2000	Noise Ken	ESS01Z0454	10, 23, 2016
☒	HCP	-	KES	-	-
☒	VCP	-	KES	-	-
☒	EMS Test S/W	-	-	-	-

Test Conditions
Temperature: 23,8 ℃
Relative Humidity: 52,4 %
Atmospheric Pressure: 98,9 kPa

Test Specifications
Discharge Factor: ≥ 1 s

Discharge Impedance: 330 ohm / 150 pF

Kind of Discharge: Air, Contact (direct and indirect)

Polarity: Positive and Negative

Number of Discharge: 10 at all locations for Air discharge
10 at all locations for Contact discharge

Discharge Voltage:

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

Notes: HCP: Horizontal coupling plane
VCP: Vertical coupling plane

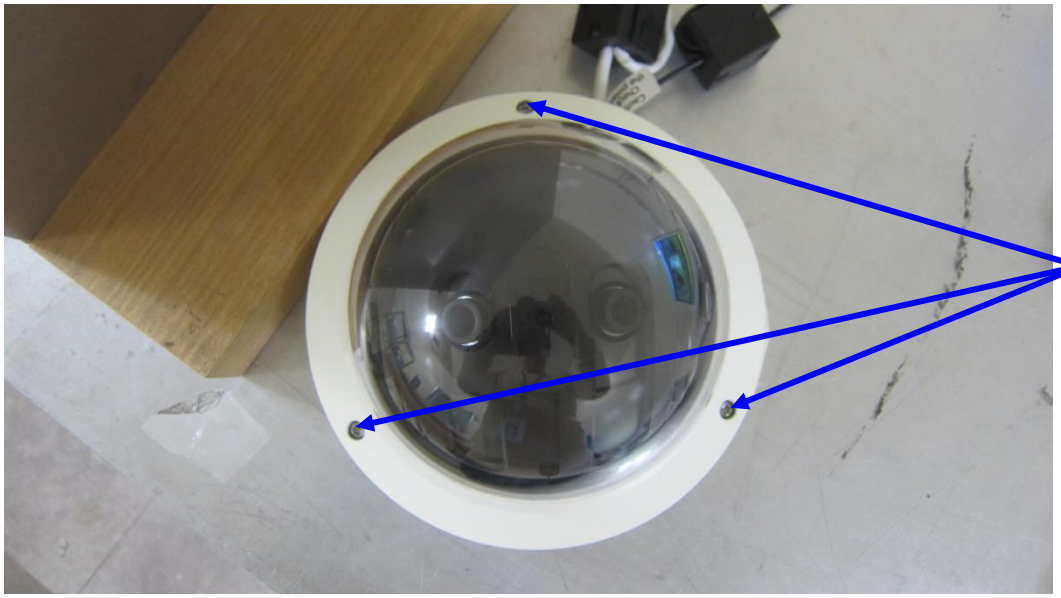
Required Performance Criteria: ☒ Complied

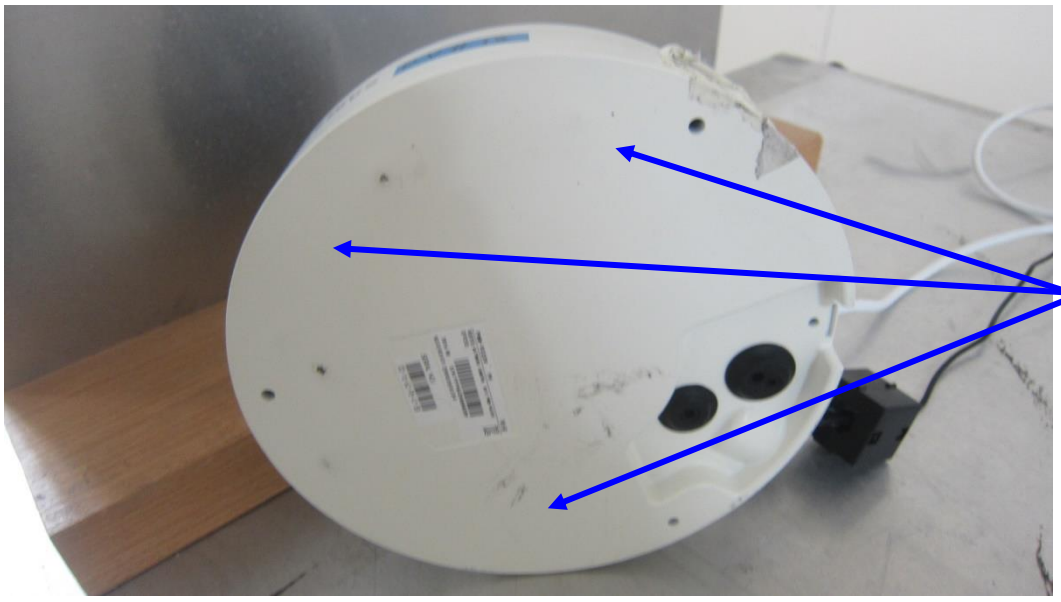
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Location of Discharge:

Air
Contact

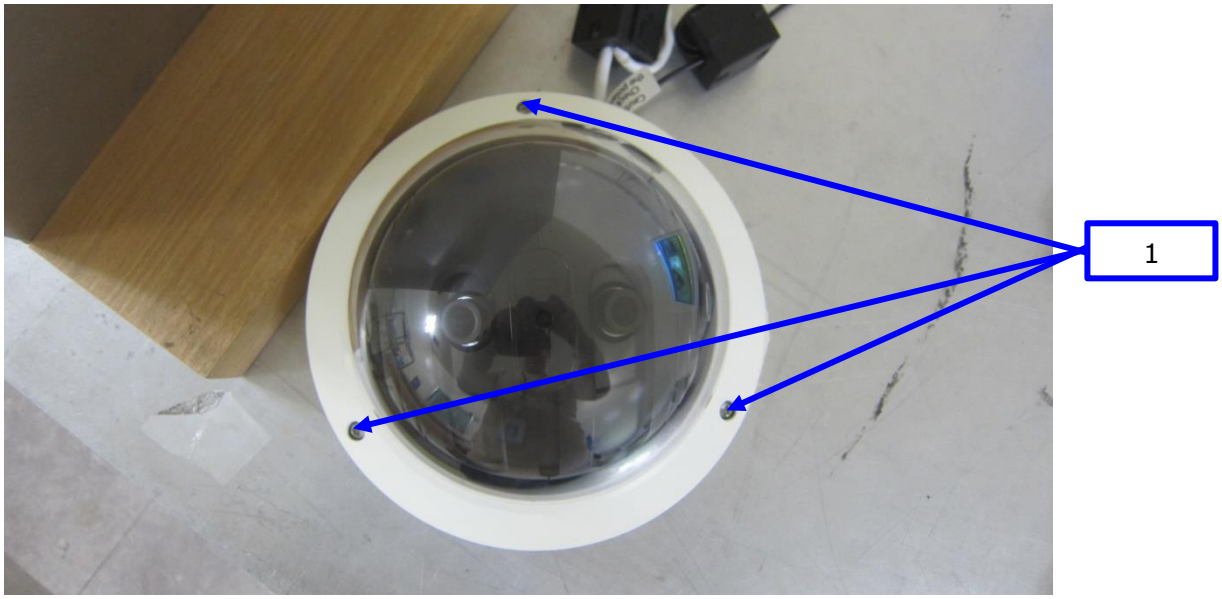
■ DC 12 V Mode

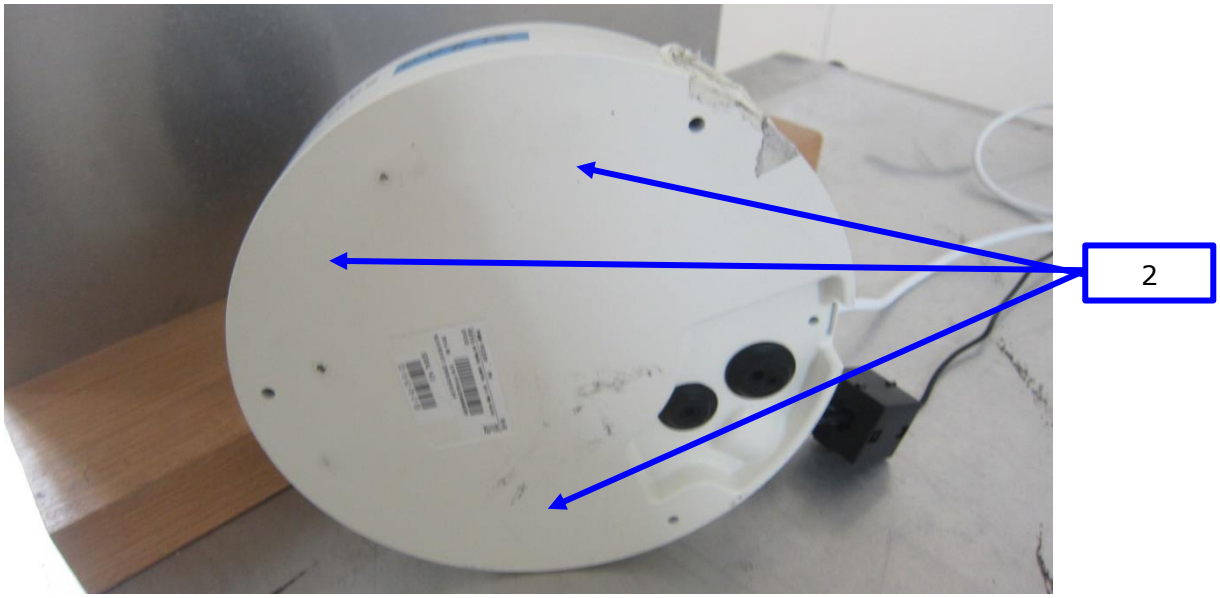




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■ PoE Mode





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Test Data

■ 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	E.U.T Screw	Contact Discharge	Complied	-
2	E.U.T Enclosure	Contact 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	E.U.T Screw	Contact Discharge	Complied	-
2	E.U.T Enclosure	Contact Discharge	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.

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3.2 Radiated Electric Field Immunity

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

Test Date
Sep, 23, 2016

Test Location
EMS-RS: ☐ Semi Anachoic Chamber #1 ☒ Semi Anachoic Chamber #2

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	SIGNAL GENERATOR	SMB 100A	Rohde & Schwarz	108252	08, 08, 2017
☒	BROADBAND AMPLIFIER	BBA100	Rohde & Schwarz	101239	08, 08, 2017
☒	BROADBAND AMPLIFIER	100S1G6M1	AR	579931	08, 08, 2017
☒	POWER METER	NRP2	Rohde & Schwarz	103475	08, 08, 2017
☒	AVG POWER SENSOR	NRP-Z91	Rohde & Schwarz	102526	08, 08, 2017
☒	AVG POWER SENSOR	NRP-Z91	Rohde & Schwarz	102527	08, 08, 2017
☒	Stacked Log.-Per.Antenna	STLP 9128 D	Schwarzbeck	9128D038	-
☒	DIRECTIONAL COUPLER	KYDC-D1070-DX40	Kytelecom Co., Ltd.	KY150001	08, 08, 2017
☒	Semi Anachoic Chamber #2	-	SEMITEC	-	-
☒	EMS Test S/W	EMC32	R&S	9.12.00	-

Test Conditions

Temperature: 21,7 ℃
Relative Humidity: 46,8 %
Atmospheric Pressure: 99,7 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

Test Data

■ DC 12 V Mode

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

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■ 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.

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3.3 Electrical Fast Transients/Bursts

Reference Standard
EN 61000-4-4:2012

Test Date
Sep, 21, 2016

Test Location
EMS-EFT: Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	Transient Test System	TRA3000F-S-D-V	EMC PARTNER AG	1524	03, 25, 2017
☒	MotorVariac	VAR-EXT1000	EMC PARTNER AG	1507	03, 25, 2017
☒	Capacitive Coupling Clamp	CN-EFT1000	EMC PARTNER AG	1528	03, 25, 2017
☒	EMS Test S/W	-	-	-	-

Test Conditions

Temperature:	23,8 ℃
Relative Humidity:	52,4 %
Atmospheric Pressure:	98,9 kPa

Test Specifications

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

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Test Data

■ DC 12 V Mode

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

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

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

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

☒ Signal ports and telecommunication ports – Coupling Clamp used

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

■ PoE Mode

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

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

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

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

☒ Signal ports and telecommunication ports – Coupling Clamp used

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

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3.4 Surge Transients

Reference Standard
EN 61000-4-5:2014

Test Date
Sep, 21, 2016

Test Location
EMS-Surge: Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	Ultra Compact Simulator	UCS 500 N5	EM TEST	V0936105120	06, 27, 2017
☒	Motor Variac	MV2616	EM TEST	V0936105123	06, 27, 2017
☒	CDN	CNV 508T5	EM TEST	P1549168422	04, 27, 2017
☒	EMS Test S/W	iec.control	EM TEST AG	5.0.9.0	-

Test Conditions
Temperature: 22,5 ℃
Relative Humidity: 49,2 %
Atmospheric Pressure: 99,9 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

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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

■ DC 12 V Mode

☐ Line to Line – Differential Mode

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

☒ Line to Earth – Common Mode

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
L1 - PE	Complied	Complied
L2 - PE	Complied	Complied

Signal Lines

☒ Line to Earth – Common Mode

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
RJ-45 (LAN)	Complied	Complied

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■ PoE Mode

☐ Line to Line – Differential Mode

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

☒ Line to Earth – Common Mode

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

Signal Lines

☒ Line to Earth – Common Mode

Mode of Application	Observations	
	(+) Surge (㎸)	(-) Surge (㎸)
RJ-45(PoE)	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.

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3.5 Conducted Disturbance

Reference Standard
EN 61000-4-6:2014

Test Date
Sep, 22, 2016

Test Location
EMS-CS: Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	Continuous Wave Generator	CWS 500N1	EM TEST	P1251106910	03, 25, 2017
☒	6 dB Attenuator	ATT6/75	EM TEST	1202-35	03, 25, 2017
☒	CDN	CDN-M2/M3N	EM TEST	0213-10	03, 25, 2017
☒	EM Injection Clamp	EM 101	Liithi	36152	03, 29, 2017
☒	EMS Test S/W	icd.control	EM TEST AG	5.2.5	-

Test Conditions
Temperature: 23,8 ℃
Relative Humidity: 52,3 %
Atmospheric Pressure: 98,3 kPa

Test Specifications
Frequency range: ☒ 150 kHz to 100 MHz ☐ 10 kHz to 30 MHz
☐ 150 kHz to 230 MHz ☐ 10 kHz to 100 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

■ DC 12 V Mode

☐ Input a.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Observations
-	CDN (☐M2, ☐M3)	-

☒ Input d.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Observations
L1 – L2	CDN (☒M2, ☐M3)	Complied

☒ Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Observations
RJ-45 (LAN)	EM Injection Clamp	Complied

■ PoE Mode

☐ Input a.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Observations
-	CDN (☐M2, ☐M3)	-

☐ Input d.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Observations
-	CDN (☐M2, ☐M3)	-

☒ Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Observations
RJ-45 (PoE)	EM Injection 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.

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3.6 Voltage Dips and Short Interruptions

Reference Standard
EN 61000-4-11:2004

Test Date
N/A

Test Location
EMS-Voltage dip: Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☐	Transient Test System	TRA3000F-S-D-V	EMC PARTNER AG	1524	03, 25, 2017
☐	MotorVariac	VAR-EXT1000	EMC PARTNER AG	1507	03, 25, 2017
☐	EMS Test S/W	N/A	N/A	N/A	-

Test Conditions
Temperature: ℃
Relative Humidity: %
Atmospheric Pressure: kPa

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Test Specifications & Observations/Remarks

(Test Voltage : AC 230 V, 50 ㎐)

Test Level	Duration [in period/ms (50 ㎐)]	Results
☐ 20 % dip	☐ 250 /5000	_____
☐ 30 % dip	☐ 25 /500	_____
☐ 60 % dip	☐ 10 /200	_____
☐ 100 % dip	☐ 250 /5000	_____

- Voltage cariations

☐ Unom + 10 %	☐ 253 V (ac)	_____
☐ Unom - 15 %	☐ 195.5 V (ac)	_____

Observations:
Complied – No degradation of function

Test Results

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

Remarks

N/A : Because the E.U.T power is 12 v (dc) and PoE, power limits are not specified

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APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

[HOT]

N/A

♦ Calculation
QuasiPeak[㏈uV] / CAverage [㏈uV] = Reading Value[㏈uV] + Corr. [㏈]
QuasiPeak / CAverage : The Final Value
Reading Value : Not shown in the table.
Corr. : Correction values (LISN FACTOR+ Cable Loss)

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[NEUTRAL]

N/A

♦ Calculation
QuasiPeak[㏈uV] / CAverage [㏈uV] = Reading Value[㏈uV] + Corr. [㏈]
QuasiPeak / CAverage : The Final Value
Reading Value : Not shown in the table.
Corr. : Correction values (LISN FACTOR+ Cable Loss)

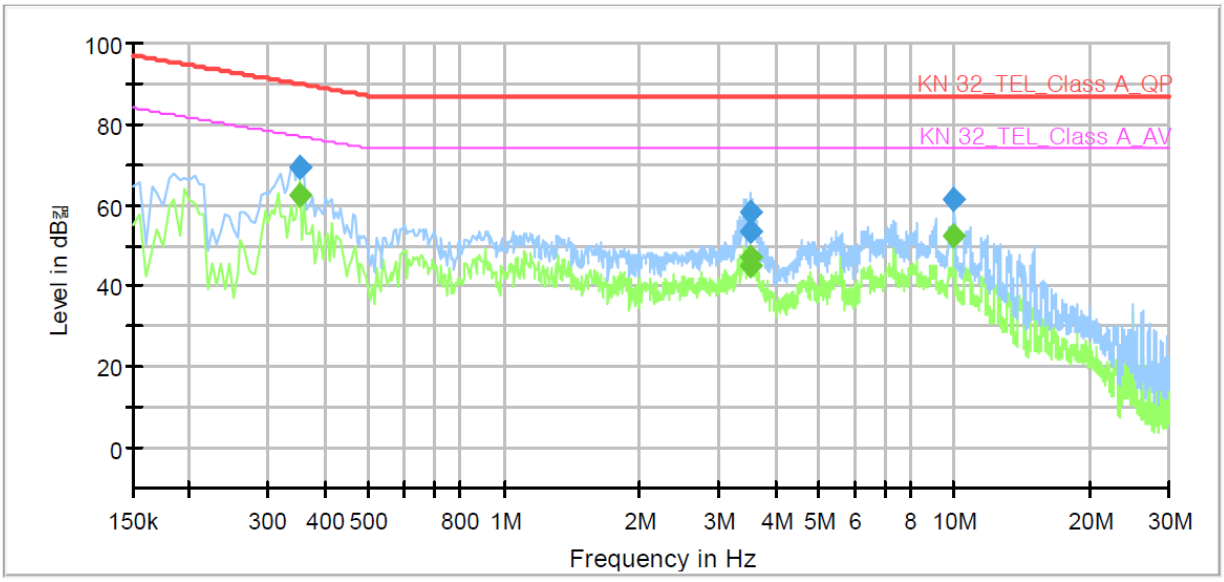
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Conducted Emissions at Telecommunication Ports

■ DC 12V Mode
[10 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	PNM-9020VP
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)
0.350000	---	62.29	76.96	14.67	1000.0	9.000	Single Line	10.1
0.350000	69.44	---	89.96	20.52	1000.0	9.000	Single Line	10.1
3.520000	---	45.25	74.00	28.75	1000.0	9.000	Single Line	10.1
3.520000	53.57	---	87.00	33.43	1000.0	9.000	Single Line	10.1
3.535000	---	47.09	74.00	26.91	1000.0	9.000	Single Line	10.1
3.535000	58.46	---	87.00	28.54	1000.0	9.000	Single Line	10.1
10.000000	---	52.30	74.00	21.70	1000.0	9.000	Single Line	10.0
10.000000	61.38	---	87.00	25.62	1000.0	9.000	Single Line	10.0

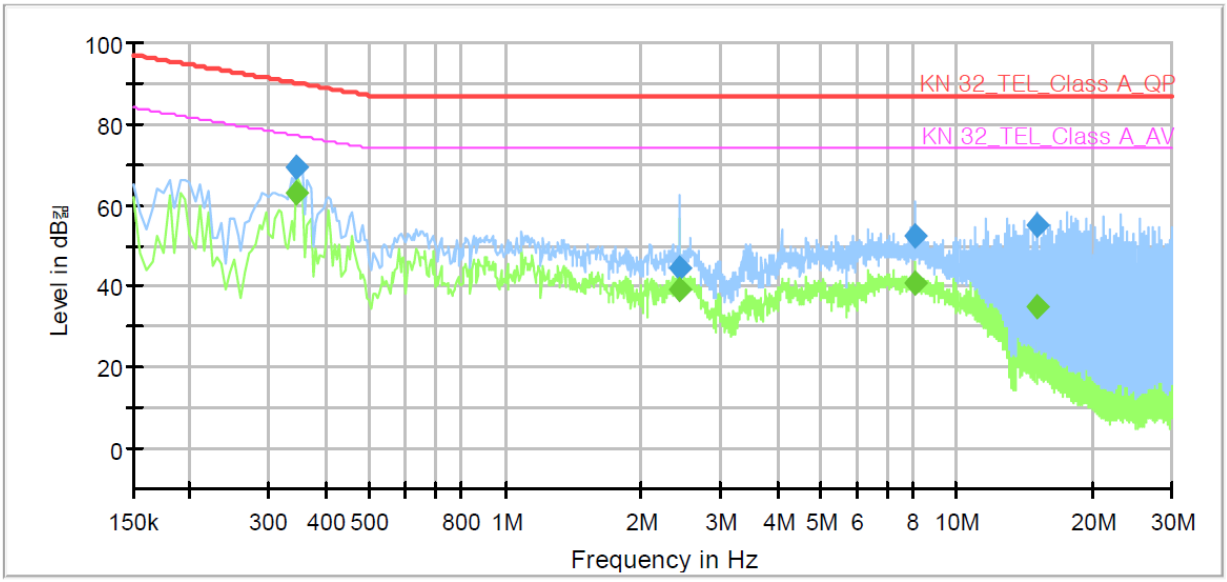
♦ Calculation
QuasiPeak[dBuV] / CAverage [dBuV] = Reading Value[dBuV] + Corr. [dB]
QuasiPeak / CAverage : The Final Value
Reading Value : Not shown in the table.
Corr. : Correction values (ISN FACTOR+ Cable Loss)

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

[100 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	PNM-9020VP
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)
0.345000	---	63.18	77.08	13.90	1000.0	9.000	Single Line	9.6
0.345000	69.45	---	90.08	20.63	1000.0	9.000	Single Line	9.6
2.435000	---	38.99	74.00	35.01	1000.0	9.000	Single Line	9.6
2.435000	44.66	---	87.00	42.34	1000.0	9.000	Single Line	9.6
8.120000	---	41.00	74.00	33.00	1000.0	9.000	Single Line	9.6
8.120000	52.65	---	87.00	34.35	1000.0	9.000	Single Line	9.6
15.020000	---	35.01	74.00	38.99	1000.0	9.000	Single Line	9.5
15.020000	55.23	---	87.00	31.77	1000.0	9.000	Single Line	9.5

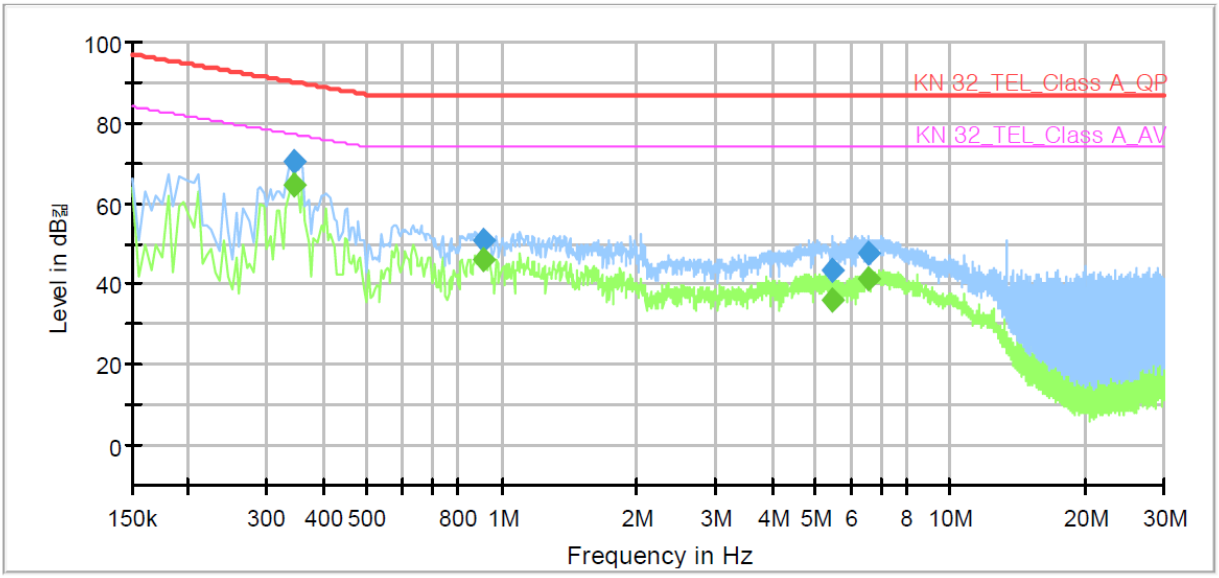
♦ Calculation
QuasiPeak[dBuV] / CAverage [dBuV] = Reading Value[dBuV] + Corr. [dB]
QuasiPeak / CAverage : The Final Value
Reading Value : Not shown in the table.
Corr. : Correction values (ISN FACTOR+ Cable Loss)

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[1 000 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	PNM-9020VP
Mode	DC 12 V_1 000 Mbps
Operator Name:	KES



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.345000	---	64.61	77.08	12.47	1000.0	9.000	Single Line	9.5
0.345000	70.24	---	90.08	19.84	1000.0	9.000	Single Line	9.5
0.905000	---	46.08	74.00	27.92	1000.0	9.000	Single Line	9.5
0.905000	51.03	---	87.00	35.97	1000.0	9.000	Single Line	9.5
5.445000	---	36.16	74.00	37.84	1000.0	9.000	Single Line	9.5
5.445000	43.18	---	87.00	43.82	1000.0	9.000	Single Line	9.5
6.570000	---	41.49	74.00	32.51	1000.0	9.000	Single Line	9.5
6.570000	47.56	---	87.00	39.44	1000.0	9.000	Single Line	9.5

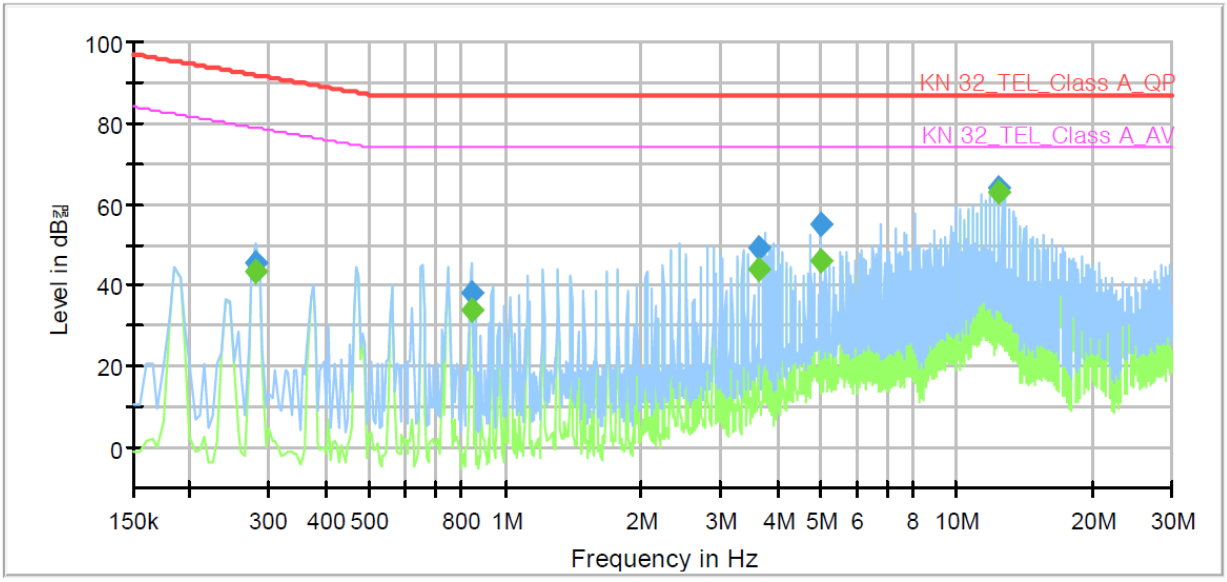
♦ Calculation
QuasiPeak[dBuV] / CAverage [dBuV] = Reading Value[dBuV] + Corr. [dB]
QuasiPeak / CAverage : The Final Value
Reading Value : Not shown in the table.
Corr. : Correction values (ISN FACTOR+ Cable Loss)

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■ PoE Mode
[10 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	PNM-9020VP
Mode	PoE_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)
0.280000	---	43.33	78.82	35.49	1000.0	9.000	Single Line	10.1
0.280000	45.44	---	91.82	46.38	1000.0	9.000	Single Line	10.1
0.840000	---	33.93	74.00	40.07	1000.0	9.000	Single Line	10.1
0.840000	38.10	---	87.00	48.90	1000.0	9.000	Single Line	10.1
3.640000	---	43.72	74.00	30.28	1000.0	9.000	Single Line	10.1
3.640000	49.04	---	87.00	37.96	1000.0	9.000	Single Line	10.1
4.980000	---	46.05	74.00	27.95	1000.0	9.000	Single Line	10.1
4.980000	55.09	---	87.00	31.91	1000.0	9.000	Single Line	10.1
12.350000	---	63.16	74.00	10.84	1000.0	9.000	Single Line	10.0
12.350000	63.84	---	87.00	23.16	1000.0	9.000	Single Line	10.0

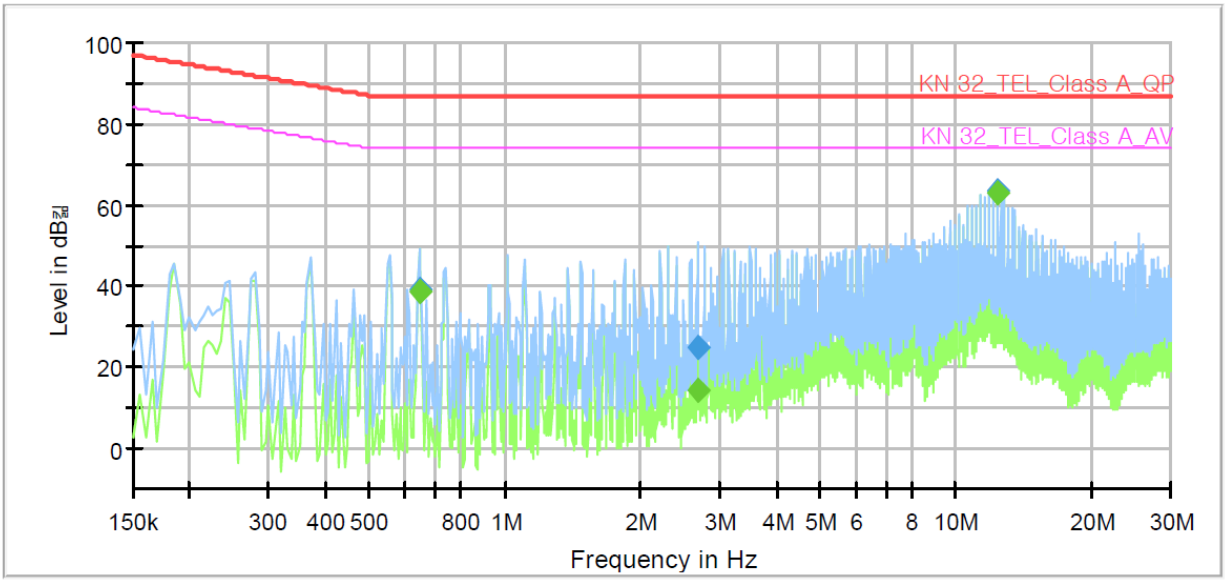
♦ Calculation
QuasiPeak[dBuV] / CAverage [dBuV] = Reading Value[dBuV] + Corr. [dB]
QuasiPeak / CAverage : The Final Value
Reading Value : Not shown in the table.
Corr. : Correction values (ISN FACTOR+ Cable Loss)

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[100 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	PNM-9020VP
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)
0.645000	---	38.70	74.00	35.30	1000.0	9.000	Single Line	9.6
0.645000	38.92	---	87.00	48.08	1000.0	9.000	Single Line	9.6
2.675000	---	14.22	74.00	59.78	1000.0	9.000	Single Line	9.6
2.675000	24.87	---	87.00	62.13	1000.0	9.000	Single Line	9.6
12.350000	---	63.15	74.00	10.85	1000.0	9.000	Single Line	9.5
12.350000	63.25	---	87.00	23.75	1000.0	9.000	Single Line	9.5

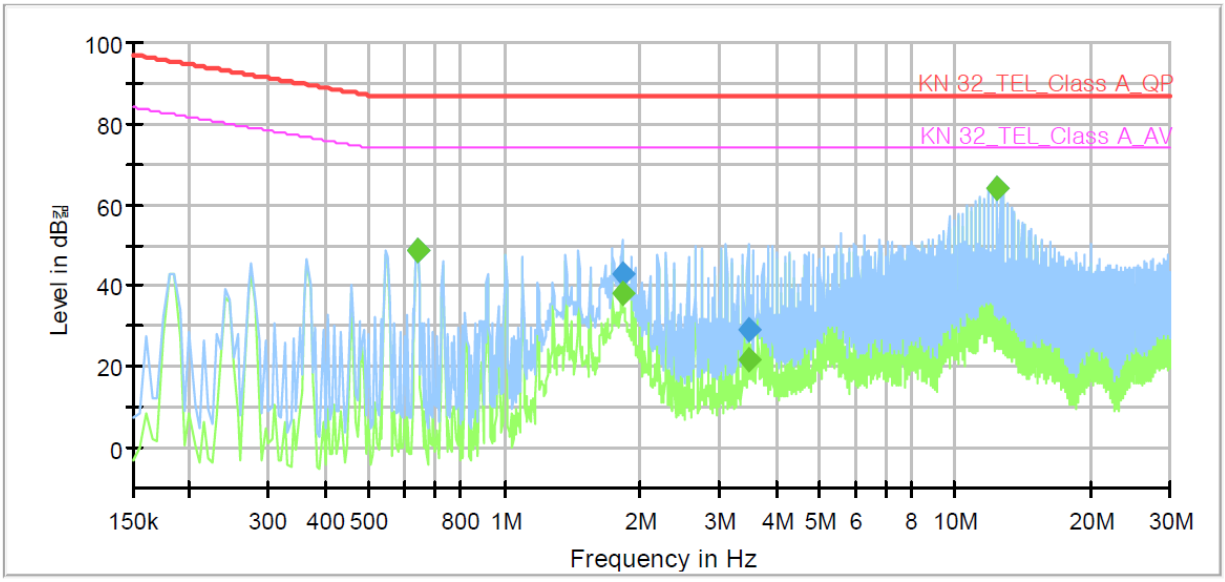
♦ Calculation
QuasiPeak[dBuV] / CAverage [dBuV] = Reading Value[dBuV] + Corr. [dB]
QuasiPeak / CAverage : The Final Value
Reading Value : Not shown in the table.
Corr. : Correction values (ISN FACTOR+ Cable Loss)

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[1 000 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	PNM-9020VP
Mode	PoE_1 000 Mbps
Operator Name:	KES



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.640000	---	48.92	74.00	25.08	1000.0	9.000	Single Line	9.5
0.640000	48.91	---	87.00	38.09	1000.0	9.000	Single Line	9.5
1.825000	---	37.98	74.00	36.02	1000.0	9.000	Single Line	9.5
1.825000	42.89	---	87.00	44.11	1000.0	9.000	Single Line	9.5
3.470000	---	21.49	74.00	52.51	1000.0	9.000	Single Line	9.5
3.470000	28.88	---	87.00	58.12	1000.0	9.000	Single Line	9.5
12.350000	---	64.15	74.00	9.85	1000.0	9.000	Single Line	9.4
12.350000	64.22	---	87.00	22.78	1000.0	9.000	Single Line	9.4

♦ 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)

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Radiated Electric Field Emissions(Below 1 ㎓)

■ DC 12V Mode

Frequency	Amplitude	ANT Polar.	ANT. Height	Correction Factor		Corrected Amplitude	Applicable Limit	Margin
[㎒]	[dB㎶]	(H/V)	[m]	ANT. [dB/m]	Cable [dB]	[dB㎶/m]	[dB㎶/m]	[dB]
186.04	11.73	V	1.00	9.98	3.97	25.68	40.00	14.32
259.80	20.81	H	4.00	12.60	4.80	38.21	47.00	8.79
300.51	20.79	H	4.00	13.39	5.16	39.34	47.00	7.66
500.10	17.11	H	2.80	17.10	7.01	41.22	47.00	5.78
599.98	14.46	H	3.10	19.30	7.83	41.59	47.00	5.41
750.65	11.40	V	1.00	20.26	9.04	40.70	47.00	6.30

* H : Horizontal, V : Vertical

♦ Calculation
Corrected Amplitude [㏈uV] = Amplitude[㏈uV] + Correction Factor [㏈]
Corrected Amplitude : The Final Value, Amplitude : Reading Value,
Correction Factor : ANT FACTOR + Cable loss

■ PoE Mode

Frequency	Amplitude	ANT Polar.	ANT. Height	Correction Factor		Corrected Amplitude	Applicable Limit	Margin
[㎒]	[dB㎶]	(H/V)	[m]	ANT. [dB/m]	Cable [dB]	[dB㎶/m]	[dB㎶/m]	[dB]
111.39	13.14	V	1.00	10.50	3.04	26.68	40.00	13.32
360.57	13.52	H	4.00	14.79	5.75	34.06	47.00	12.94
375.18	11.24	H	4.00	15.12	5.91	32.27	47.00	14.73
500.10	16.98	H	2.90	17.10	7.01	41.09	47.00	5.91
599.98	16.28	H	3.40	19.30	7.83	43.41	47.00	3.59
700.06	12.70	V	1.50	19.70	8.52	40.92	47.00	6.08

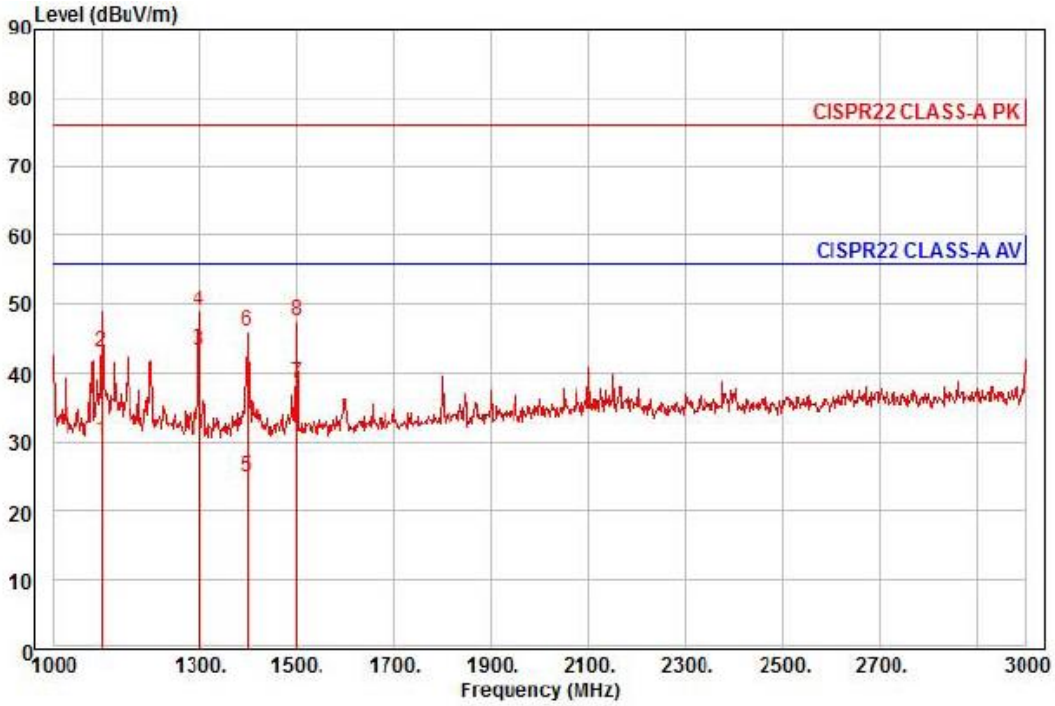
* H : Horizontal, V : Vertical

♦ Calculation
Corrected Amplitude [㏈uV] = Amplitude[㏈uV] + Correction Factor [㏈]
Corrected Amplitude : The Final Value, Amplitude : Reading Value,
Correction Factor : ANT FACTOR + Cable loss

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Radiated Electric Field Emissions(Above 1 ㎓)

■ DC 12V Mode




```
Site      : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) horizontal
         : RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project   : NETWORK CAMERA
Model     : PNM-9020VP
Mode      : DC 12 V
Memo      : 1 ~ 3 GHz
```

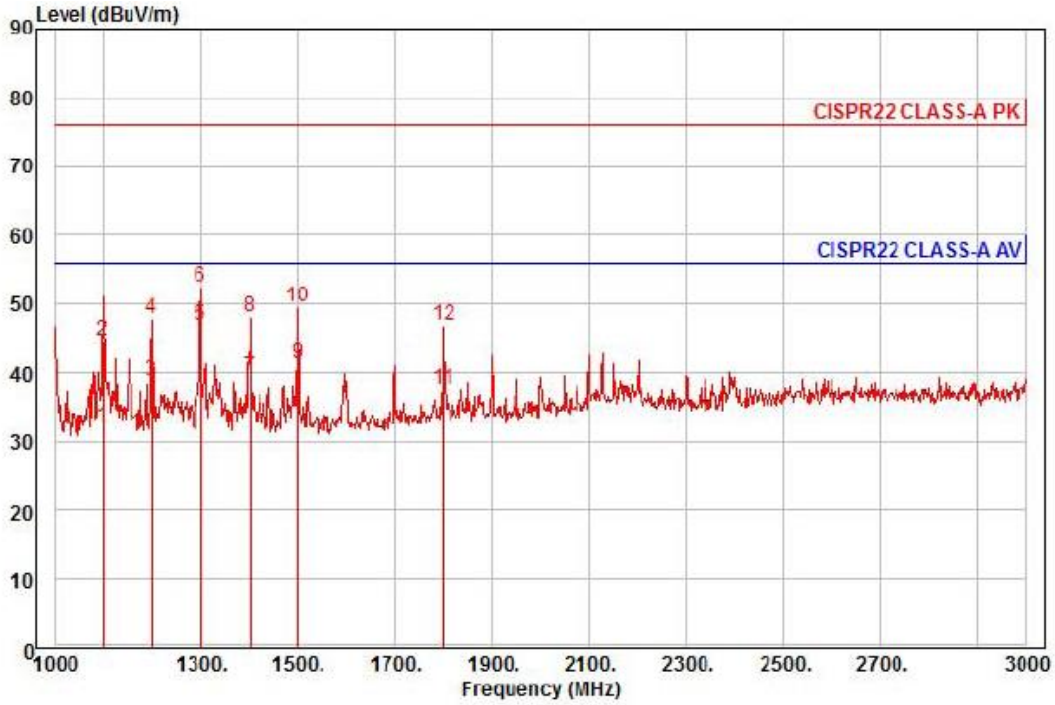
	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	1098.00	39.18	24.30	6.80	40.07	146	56.00	-25.79	horizontal	Average
2	1098.00	52.16	24.30	6.80	40.07	146	76.00	-32.81	horizontal	Peak
3 pp	1300.00	50.79	25.10	7.43	39.97	129	56.00	-12.65	horizontal	Average
4 pk	1300.00	56.39	25.10	7.43	39.97	129	76.00	-27.05	horizontal	Peak
5	1398.00	31.81	25.49	7.72	39.92	112	56.00	-30.90	horizontal	Average
6	1398.00	52.73	25.49	7.72	39.92	112	76.00	-29.98	horizontal	Peak
7	1500.00	44.43	25.90	8.02	39.88	21	56.00	-17.53	horizontal	Average
8	1500.00	53.42	25.90	8.02	39.88	21	76.00	-28.54	horizontal	Peak

♦ Calculation

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

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

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Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project : NETWORK CAMERA
Model : PNM-9020VP
Mode : DC 12 V
Memo : 1 ~ 3 GHz

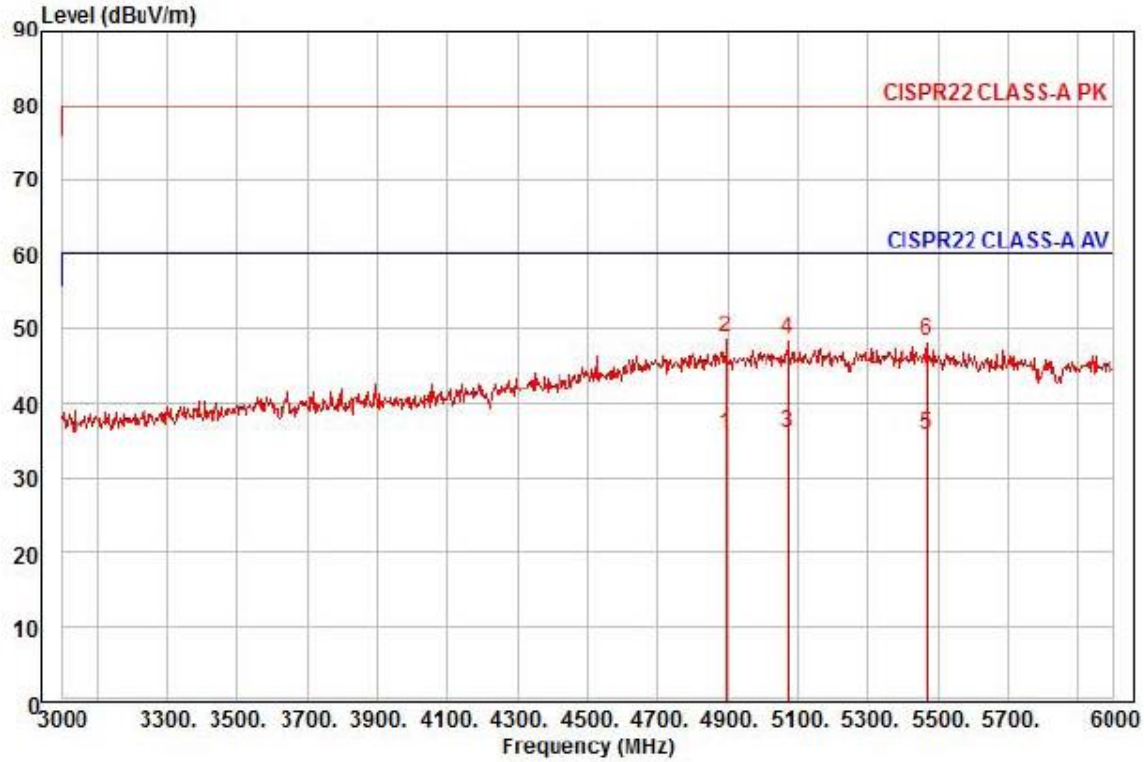
	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	1098.00	41.10	24.30	6.80	40.07	26	56.00	-23.87	vertical	Average
2	1098.00	53.64	24.30	6.80	40.07	26	76.00	-31.33	vertical	Peak
3	1200.00	46.89	24.70	7.14	40.02	143	56.00	-17.29	vertical	Average
4	1200.00	56.06	24.70	7.14	40.02	143	76.00	-28.12	vertical	Peak
5 pp	1300.00	54.36	25.10	7.43	39.97	8	56.00	-9.08	vertical	Average
6 pk	1300.00	59.93	25.10	7.43	39.97	8	76.00	-23.51	vertical	Peak
7	1400.00	46.13	25.50	7.72	39.92	85	56.00	-16.57	vertical	Average
8	1400.00	54.76	25.50	7.72	39.92	85	76.00	-27.94	vertical	Peak
9	1500.00	47.32	25.90	8.02	39.88	59	56.00	-14.64	vertical	Average
10	1500.00	55.57	25.90	8.02	39.88	59	76.00	-26.39	vertical	Peak
11	1800.00	41.27	27.09	8.83	39.73	46	56.00	-18.54	vertical	Average
12	1800.00	50.56	27.09	8.83	39.73	46	76.00	-29.25	vertical	Peak

♦ Calculation

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

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

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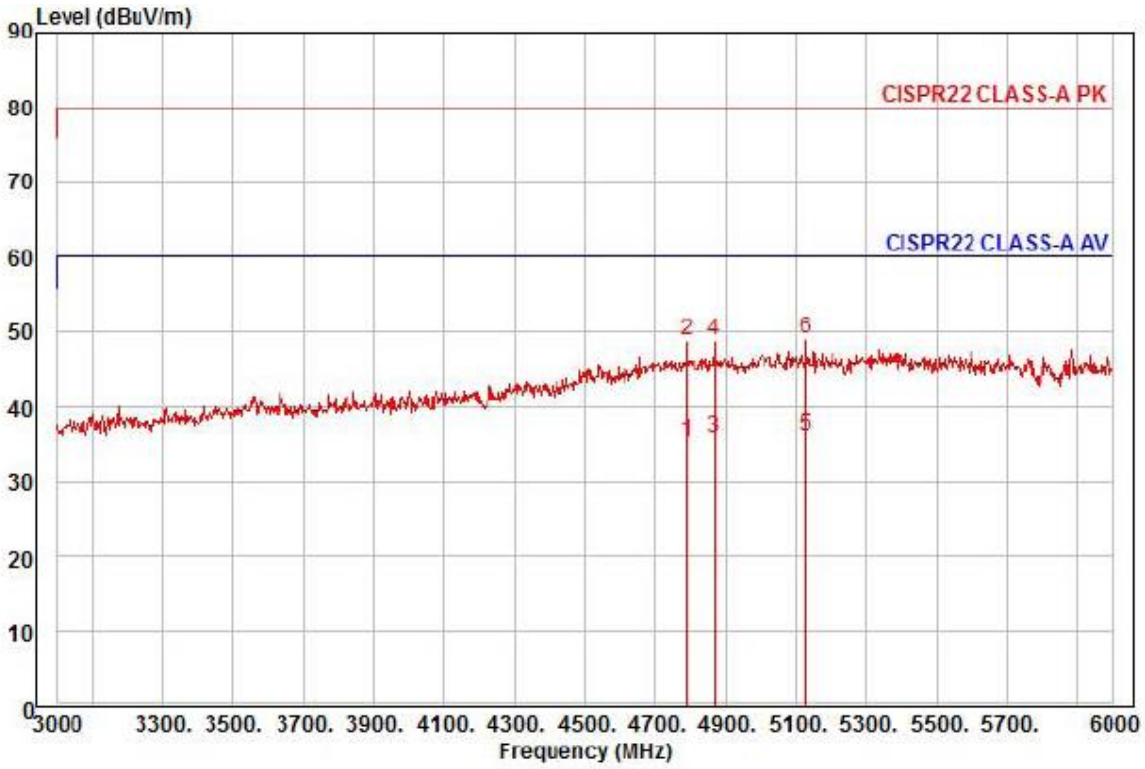

```
Site      : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) horizontal
          : RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project   : NETWORK CAMERA
Model     : PNM-9020VP
Mode      : DC 12 V
Memo      : 3 ~ 6 GHz
```

	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	4896.00	23.99	37.13	15.20	40.41	141	60.00	-24.09	horizontal	Average
2 pk	4896.00	37.00	37.13	15.20	40.41	141	80.00	-31.08	horizontal	Peak
3 pp	5073.00	23.34	37.57	15.46	40.40	204	60.00	-24.03	horizontal	Average
4	5073.00	36.03	37.57	15.46	40.40	204	80.00	-31.34	horizontal	Peak
5	5469.00	23.31	36.77	16.14	40.34	149	60.00	-24.12	horizontal	Average
6	5469.00	35.82	36.77	16.14	40.34	149	80.00	-31.61	horizontal	Peak

♦ Calculation

Over Limit [㏈] = (Read Level[㏈uV] + Ant Factor[㏈/m] + Cable Loss [㏈] − Preamp Factor [㏈]) − Limit Line[㏈uV]
Over Limit : Margin Value, Read Level : Reading Value, Ant Factor : Ant Factor, Cable Loss : Cable loss, Preamp Factor : Preamp Factor

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Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project : NETWORK CAMERA
Model : PNM-9020VP
Mode : DC 12 V
Memo : 3 ~ 6 GHz

	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	4788.00	24.18	36.51	15.07	40.41	138	60.00	-24.65	vertical	Average
2	4788.00	37.52	36.51	15.07	40.41	138	80.00	-31.31	vertical	Peak
3	4869.00	24.14	36.97	15.17	40.41	1	60.00	-24.13	vertical	Average
4	4869.00	37.06	36.97	15.17	40.41	1	80.00	-31.21	vertical	Peak
5 pp	5127.00	23.34	37.46	15.57	40.39	70	60.00	-24.02	vertical	Average
6 pk	5127.00	36.53	37.46	15.57	40.39	70	80.00	-30.83	vertical	Peak

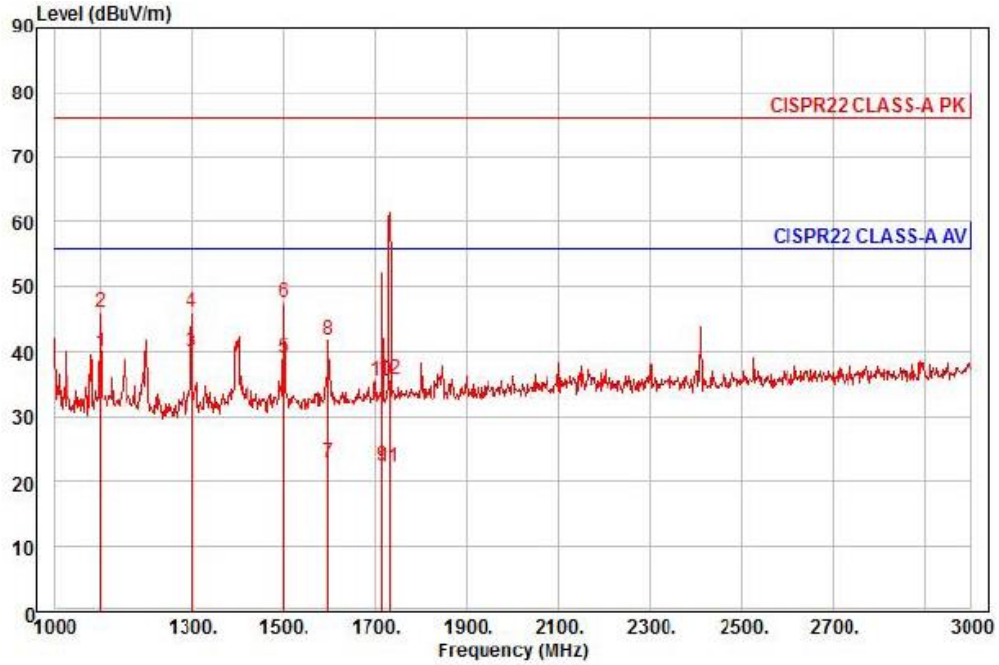
♦ Calculation

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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■ PoE Mode



Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project : NETWORK CAMERA
Model : PNM-9020VP
Mode : PoE
Memo : 1 ~ 3 GHz

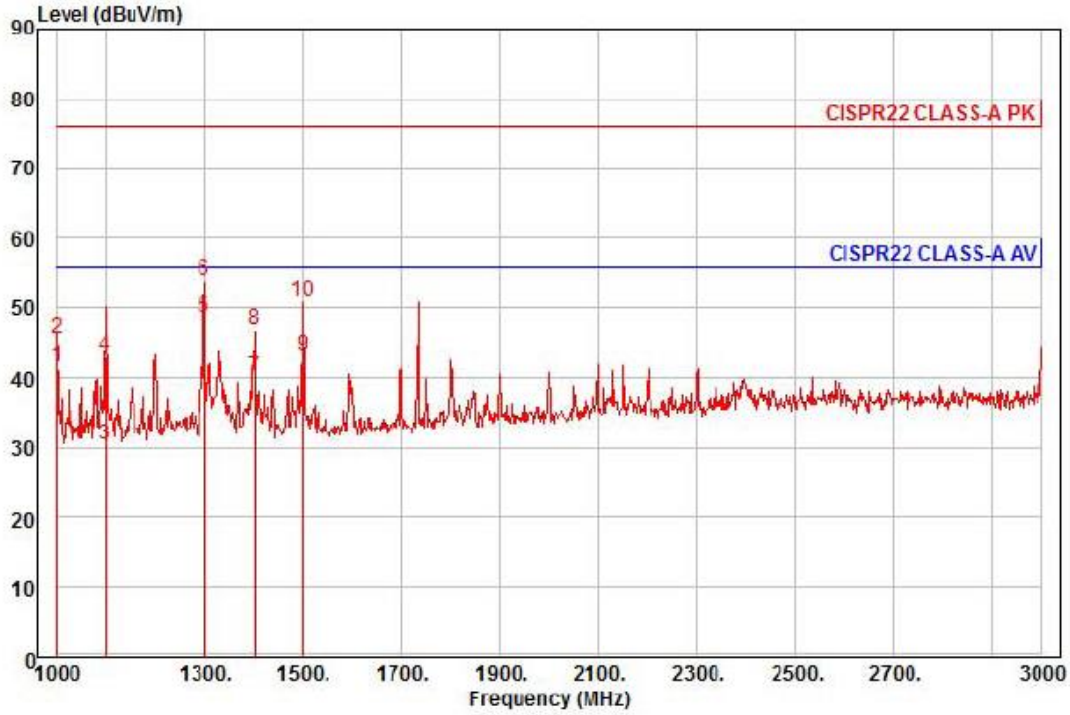
	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1 pp	1100.00	48.84	24.31	6.81	40.07	132	56.00	-16.11	horizontal	Average
2	1100.00	54.94	24.31	6.81	40.07	132	76.00	-30.01	horizontal	Peak
3	1300.00	47.33	25.10	7.43	39.97	331	56.00	-16.11	horizontal	Average
4	1300.00	53.57	25.10	7.43	39.97	331	76.00	-29.87	horizontal	Peak
5	1500.00	44.99	25.90	8.02	39.88	7	56.00	-16.97	horizontal	Average
6 pk	1500.00	53.52	25.90	8.02	39.88	7	76.00	-28.44	horizontal	Peak
7	1598.00	28.41	26.28	8.31	39.83	247	56.00	-32.83	horizontal	Average
8	1598.00	47.26	26.28	8.31	39.83	247	76.00	-33.98	horizontal	Peak
9	1716.00	26.86	26.75	8.61	39.77	16	56.00	-33.55	horizontal	Average
10	1716.00	39.90	26.75	8.61	39.77	16	76.00	-40.51	horizontal	Peak
11	1732.00	26.72	26.82	8.65	39.76	221	56.00	-33.57	horizontal	Average
12	1732.00	40.14	26.82	8.65	39.76	221	76.00	-40.15	horizontal	Peak

♦ Calculation

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

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

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Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project : NETWORK CAMERA
Model : PNM-9020VP
Mode : PoE
Memo : 1 ~ 3 GHz

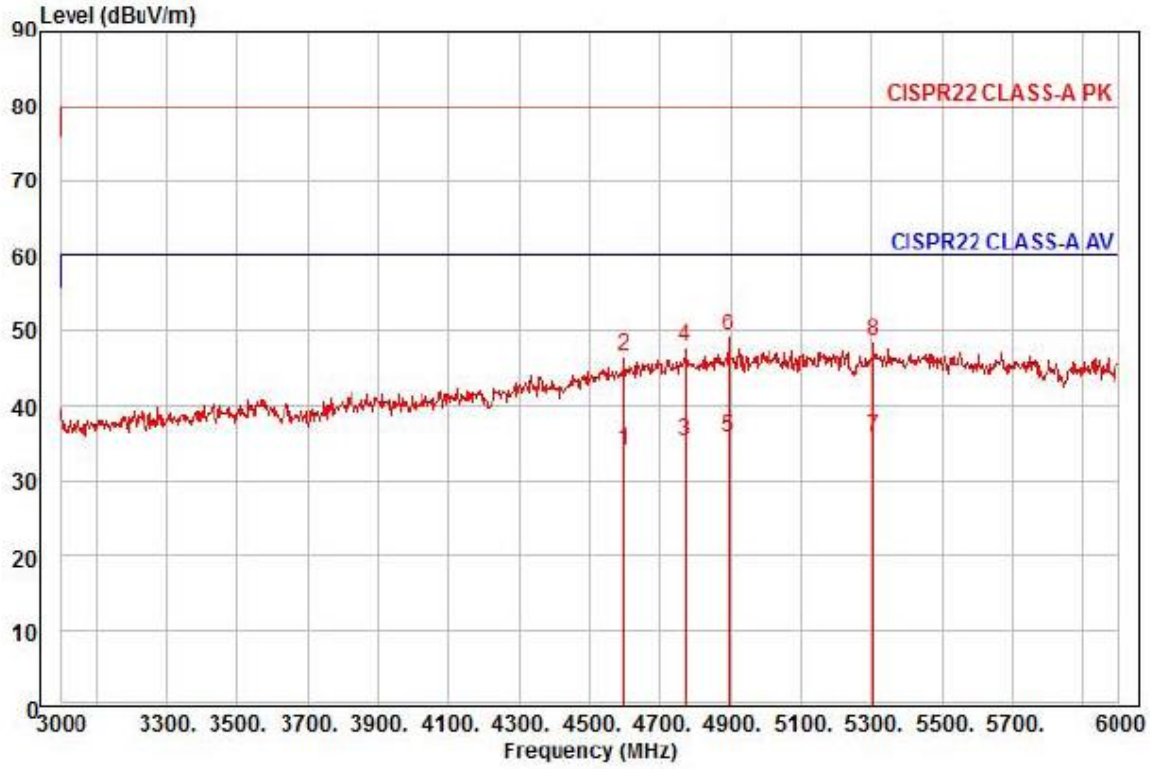
	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	1000.00	51.34	23.91	6.48	40.12	170	56.00	-14.39	vertical	Average
2	1000.00	55.26	23.91	6.48	40.12	170	76.00	-30.47	vertical	Peak
3	1098.00	39.46	24.30	6.80	40.07	19	56.00	-25.51	vertical	Average
4	1098.00	52.15	24.30	6.80	40.07	19	76.00	-32.82	vertical	Peak
5 pp	1300.00	55.88	25.10	7.43	39.97	359	56.00	-7.56	vertical	Average
6 pk	1300.00	61.48	25.10	7.43	39.97	359	76.00	-21.96	vertical	Peak
7	1400.00	46.96	25.50	7.72	39.92	59	56.00	-15.74	vertical	Average
8	1400.00	53.63	25.50	7.72	39.92	59	76.00	-29.07	vertical	Peak
9	1500.00	49.20	25.90	8.02	39.88	42	56.00	-12.76	vertical	Average
10	1500.00	56.89	25.90	8.02	39.88	42	76.00	-25.07	vertical	Peak
11	1734.00	0.00	26.82	8.66	39.76	359	76.00	-80.28	vertical	Peak

♦ Calculation

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

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

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Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project : NETWORK CAMERA
Model : PNM-9020VP
Mode : PoE
Memo : 3 ~ 6 GHz

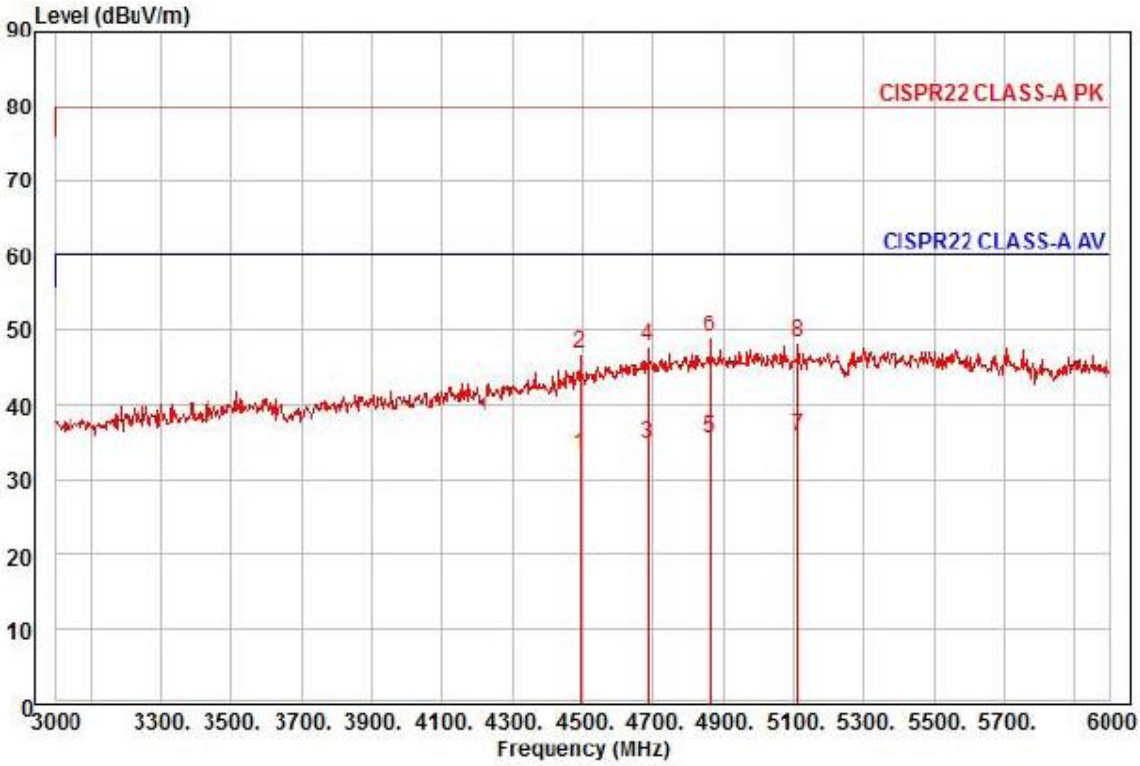
	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	4596.00	24.50	35.41	14.65	40.41	159	60.00	-25.85	horizontal	Average
2	4596.00	36.91	35.41	14.65	40.41	159	80.00	-33.44	horizontal	Peak
3	4770.00	24.22	36.41	15.03	40.41	215	60.00	-24.75	horizontal	Average
4	4770.00	36.88	36.41	15.03	40.41	215	80.00	-32.09	horizontal	Peak
5	4896.00	23.91	37.13	15.20	40.41	317	60.00	-24.17	horizontal	Average
6 pk	4896.00	37.31	37.13	15.20	40.41	317	80.00	-30.77	horizontal	Peak
7 pp	5304.00	23.22	37.11	15.88	40.37	262	60.00	-24.16	horizontal	Average
8	5304.00	36.06	37.11	15.88	40.37	262	80.00	-31.32	horizontal	Peak

♦ Calculation

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

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

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Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN781(2015.05.07) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project : NETWORK CAMERA
Model : PNM-9020VP
Mode : PoE
Memo : 3 ~ 6 GHz

	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	4494.00	24.54	34.83	14.45	40.41	255	60.00	-26.59	vertical	Average
2	4494.00	37.86	34.83	14.45	40.41	255	80.00	-33.27	vertical	Peak
3	4686.00	24.44	35.93	14.85	40.41	130	60.00	-25.19	vertical	Average
4	4686.00	37.37	35.93	14.85	40.41	130	80.00	-32.26	vertical	Peak
5	4863.00	23.87	36.94	15.17	40.41	115	60.00	-24.43	vertical	Average
6 pk	4863.00	37.27	36.94	15.17	40.41	115	80.00	-31.03	vertical	Peak
7 pp	5112.00	23.11	37.49	15.54	40.39	260	60.00	-24.25	vertical	Average
8	5112.00	35.75	37.49	15.54	40.39	260	80.00	-31.61	vertical	Peak

♦ 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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Harmonic Current Emissions and Voltage Fluctuations and Flicker

Average harmonic current results

Hn	Ieff [A]	% of Limit	Limit [A]	Result
1	N/A			
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				
32				
33				
34				
35				
36				
37				
38				
39				
40				

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

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Test Data - Harmonics (continued)

Maximum harmonic current results

Hn	Ieff [A]	% of Limit	Limit [A]	Result
1	N/A			
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				
32				
33				
34				
35				
36				
37				
38				
39				
40				

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

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Test Data - Voltage Fluctuations

Maximum Flicker results

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

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Test Setup Photos and Configuration

Conducted Voltage Emissions

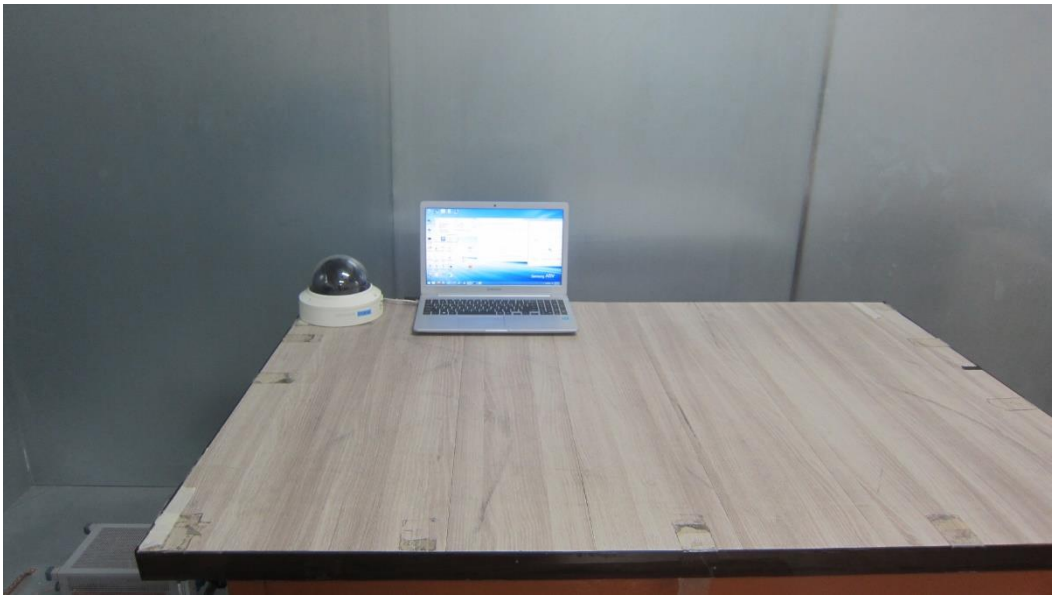
N/A

N/A

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Conducted Telecommunication Emissions

■ DC 12 V Mode

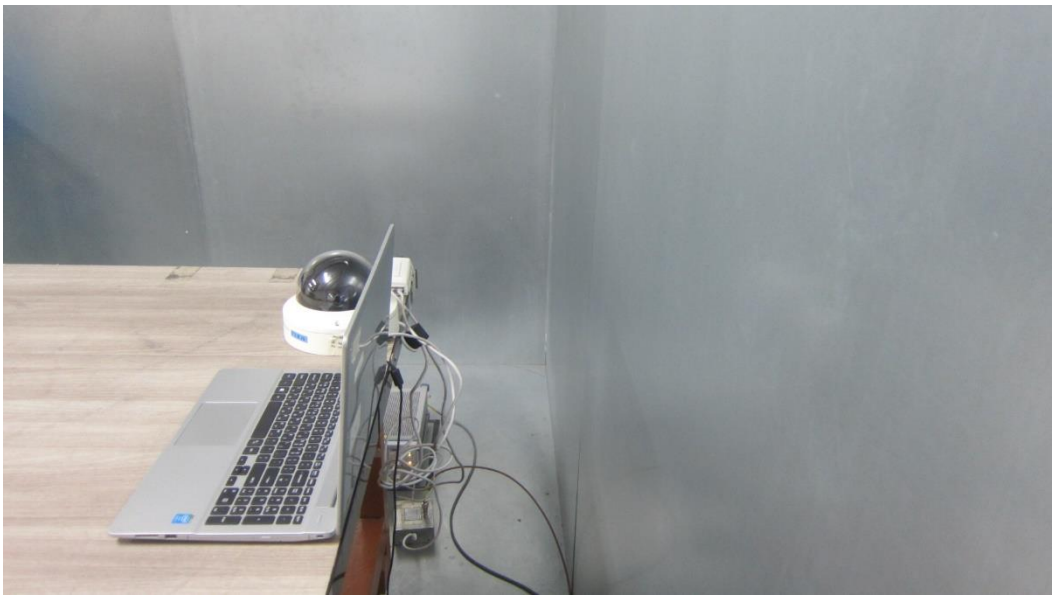




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■ PoE Mode





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Radiated Electric Field Emissions(Below 1 ㎓)

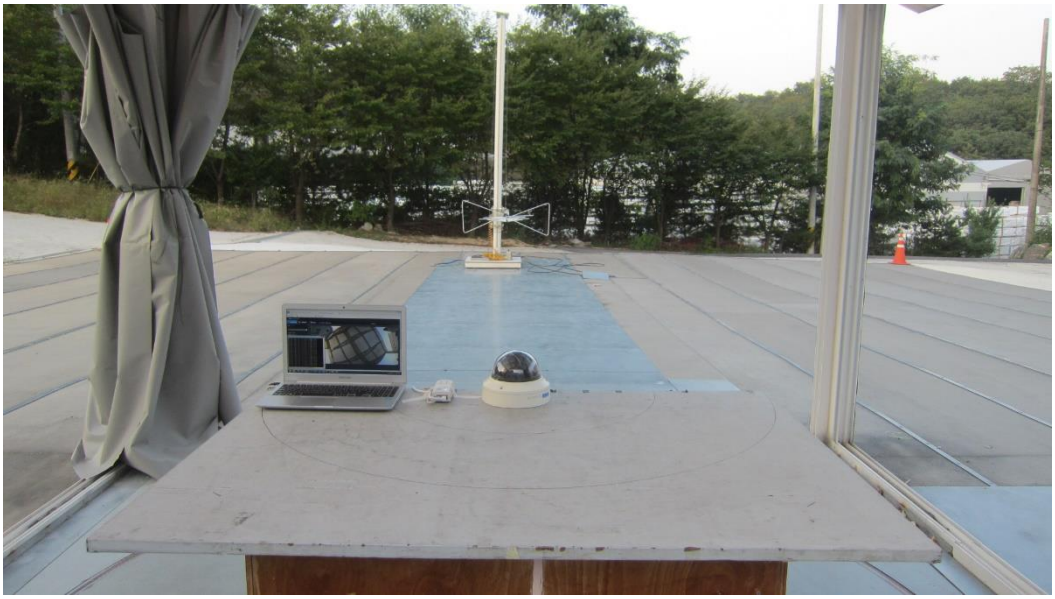
■ DC 12 V Mode





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■ PoE Mode

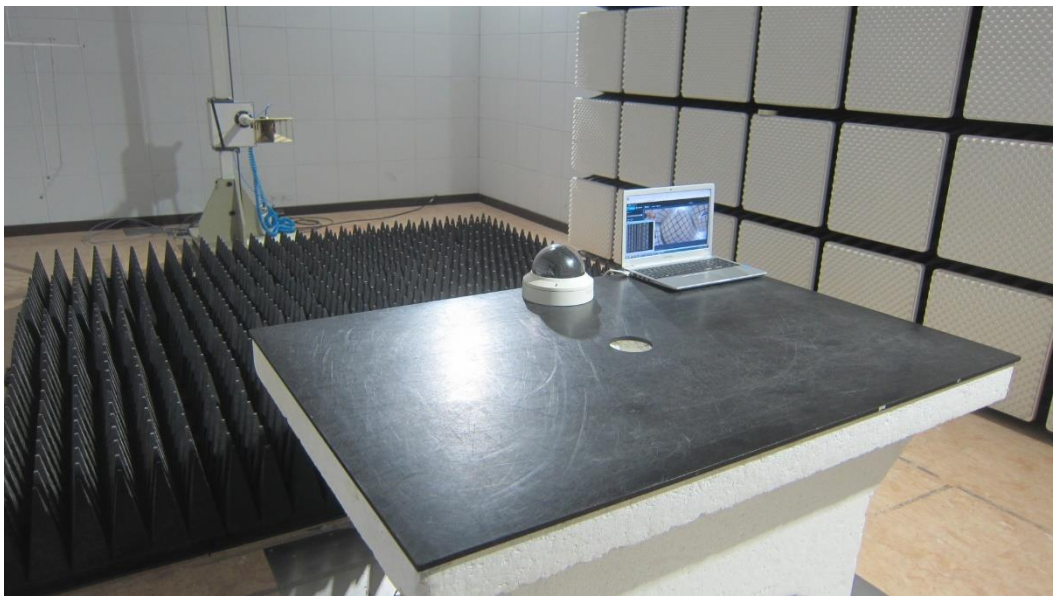




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Radiated Electric Field Emissions(Above 1 ㎓)

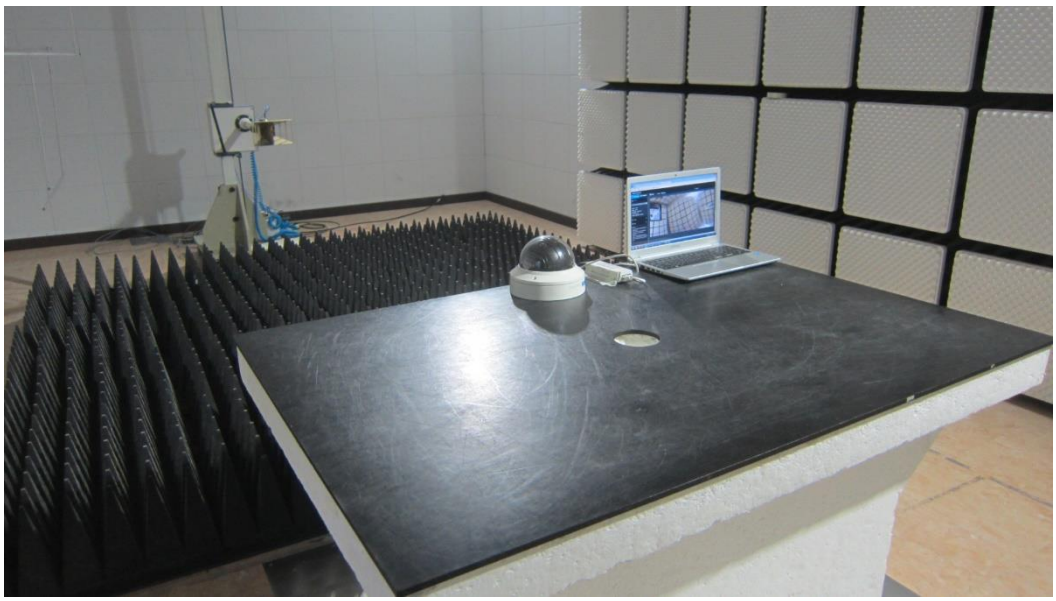
■ DC 12 V Mode





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■ PoE Mode





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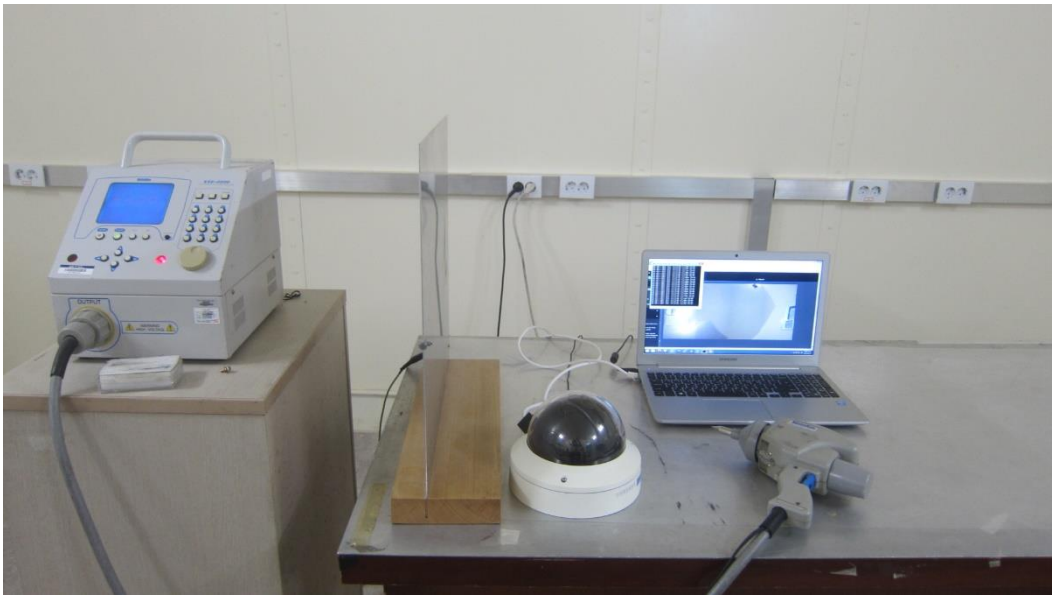
Harmonic Current Emissions and Voltage Fluctuations and Flicker

N/A

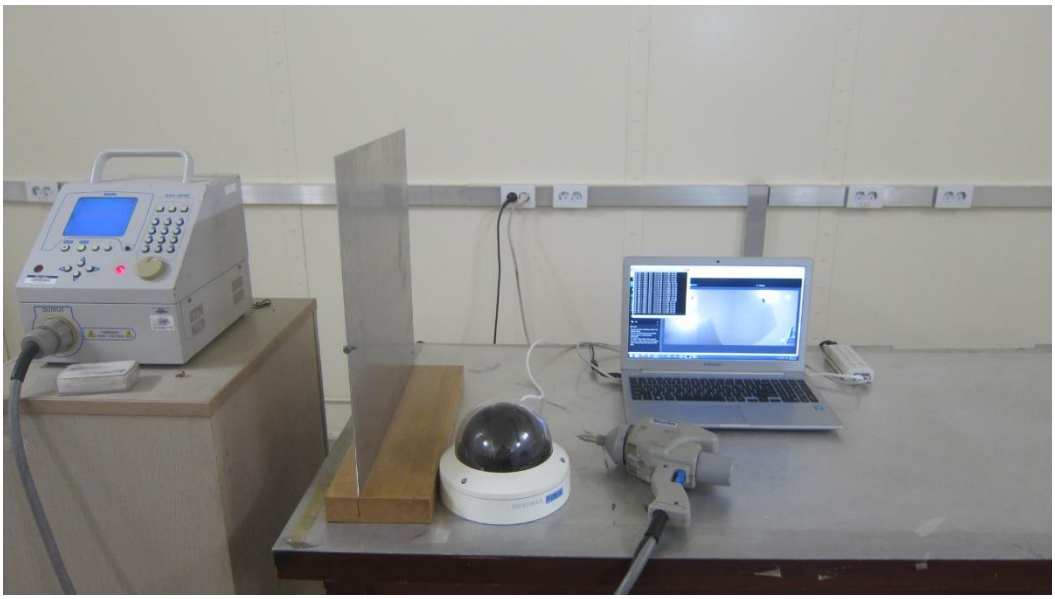
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Electrostatic Discharge

■ DC 12 V Mode



■ PoE Mode



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Radiated Electric Field Immunity

■ DC 12V Mode



■ PoE Mode



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Electrical Fast Transients/Bursts

■ DC 12 V Mode





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■ PoE Mode





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Surge Transients

■ DC 12 V Mode





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■ PoE Mode

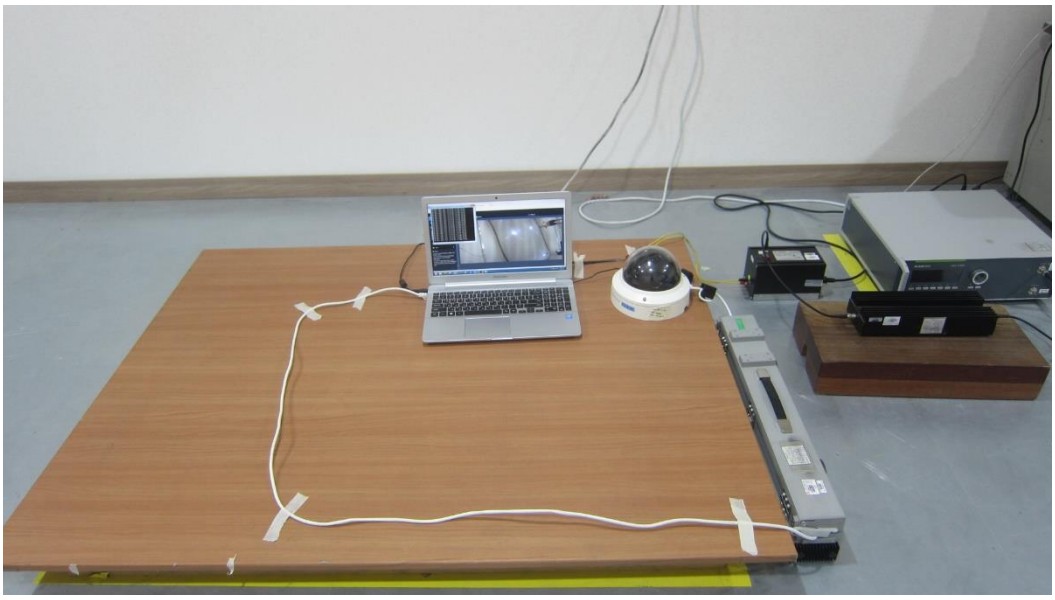


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Conducted Disturbance

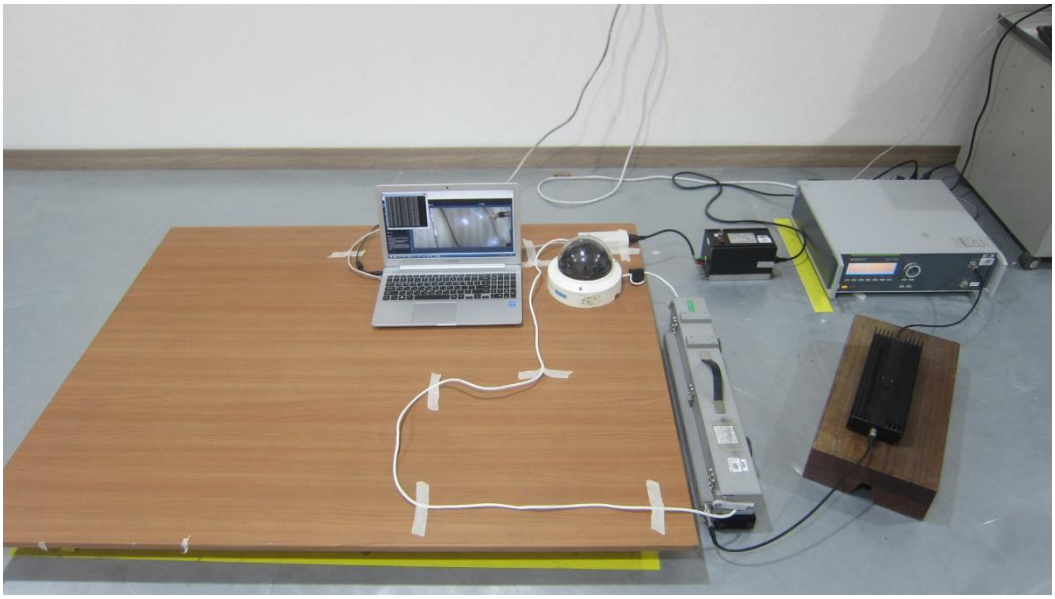
■ DC 12 V Mode





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■ PoE Mode



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Voltage Dips and Short Interruptions

N/A

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EUT External Photographs

(Top)



(Bottom)



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EUT Internal Photographs

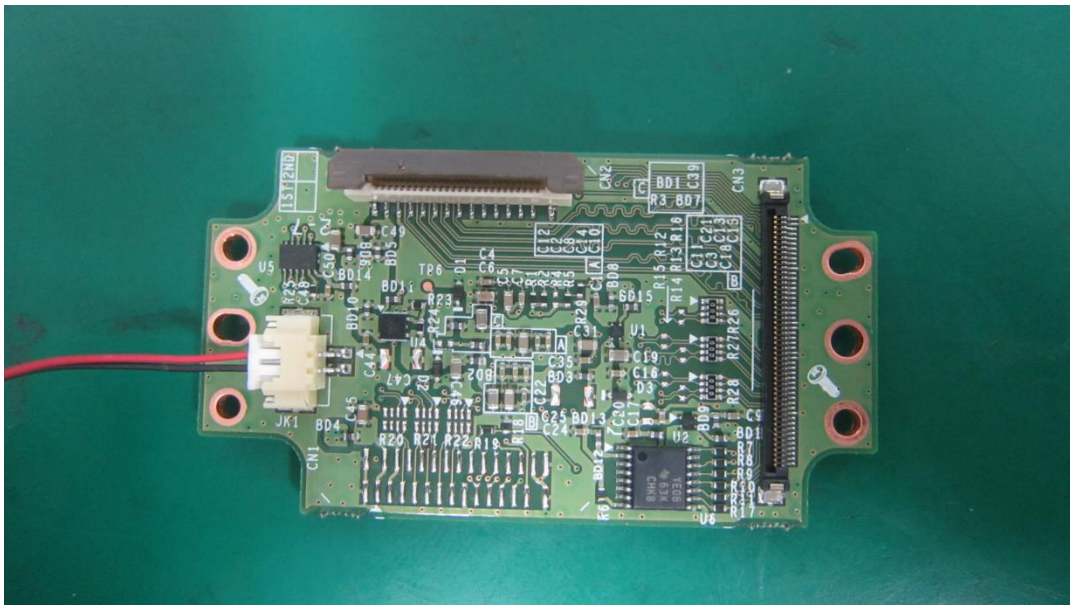
(Internal View)



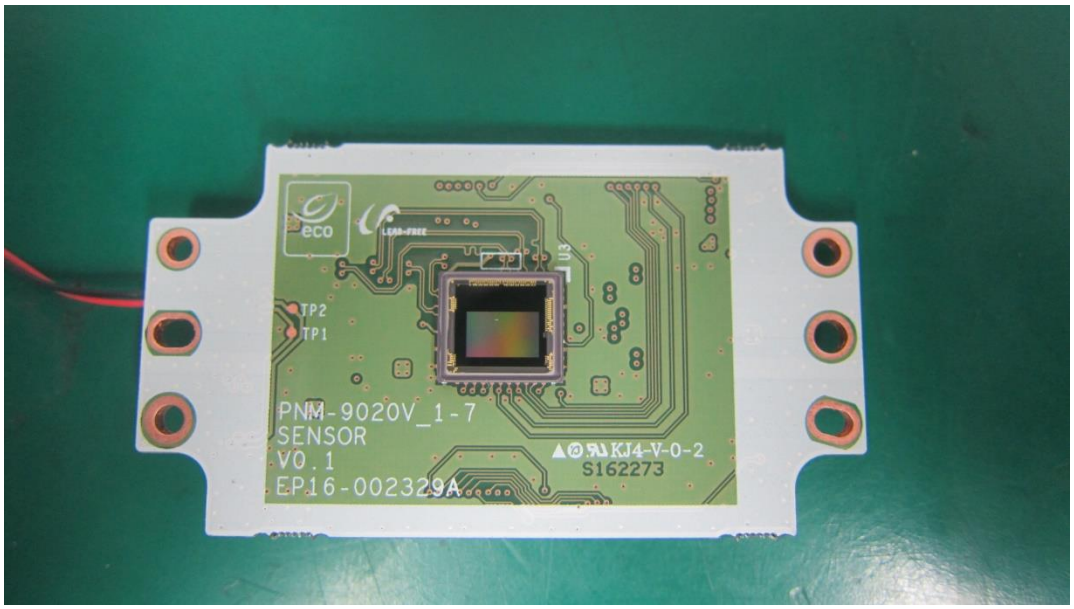
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EUT Internal View – Lens board

(Top)



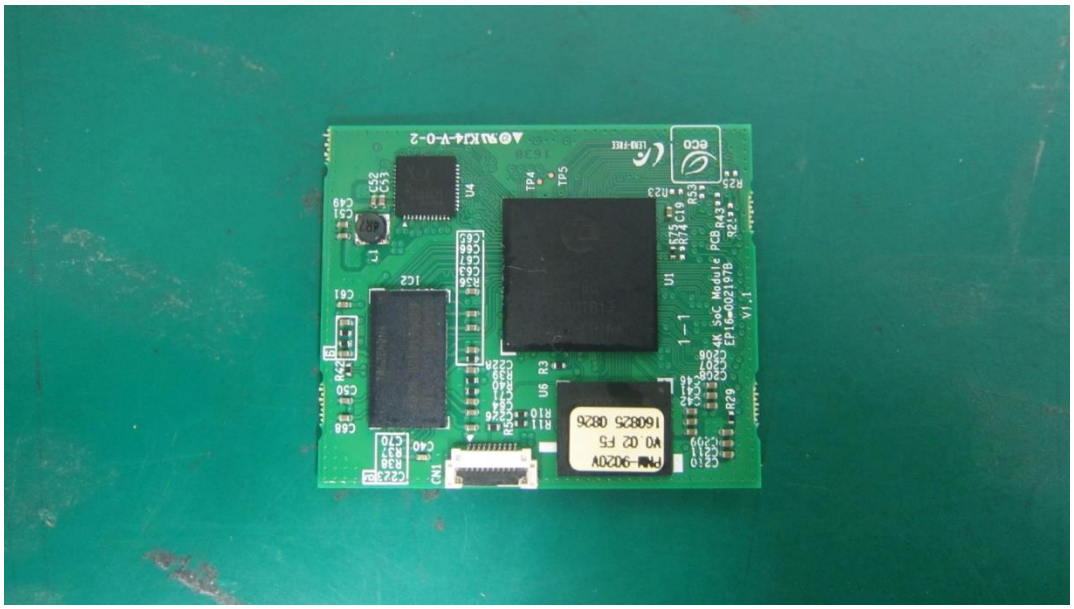
(Bottom)



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EUT Internal View – Sub Board 1

(Top)



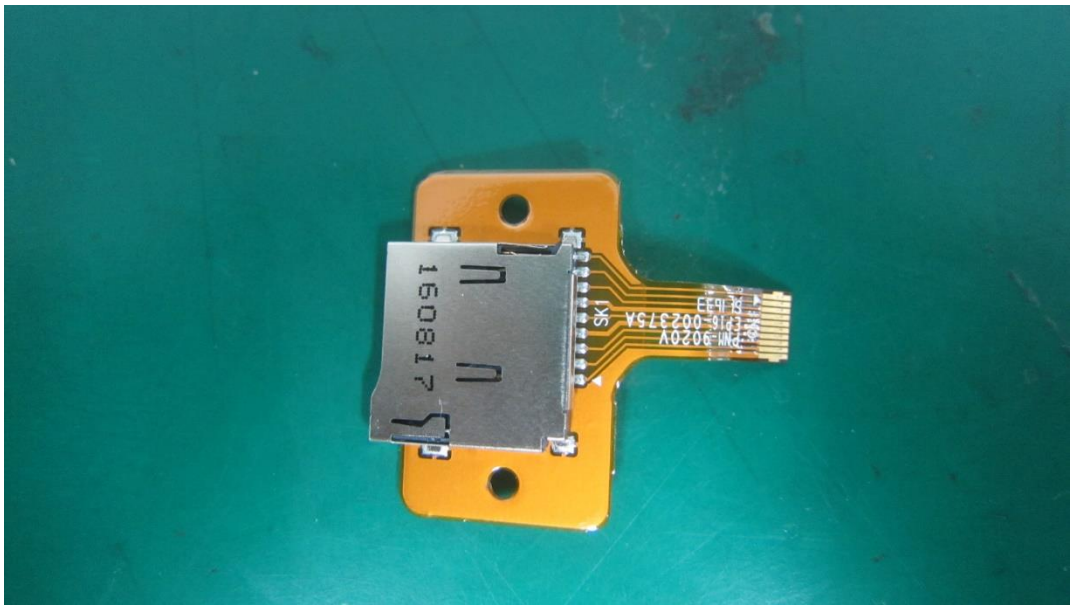
(Bottom)



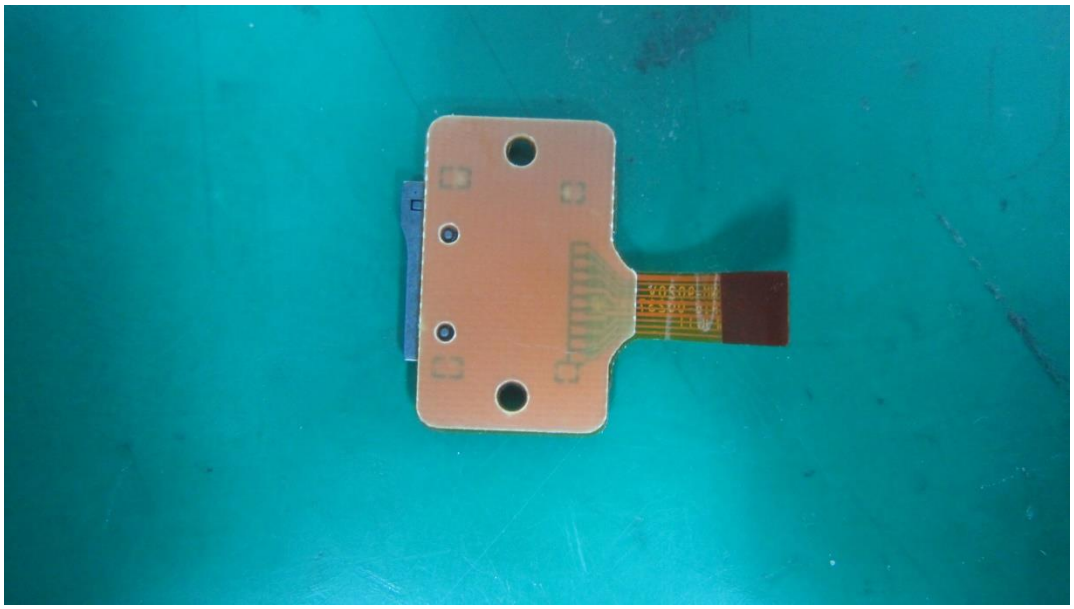
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EUT Internal View – Sub Board 2

(Top)



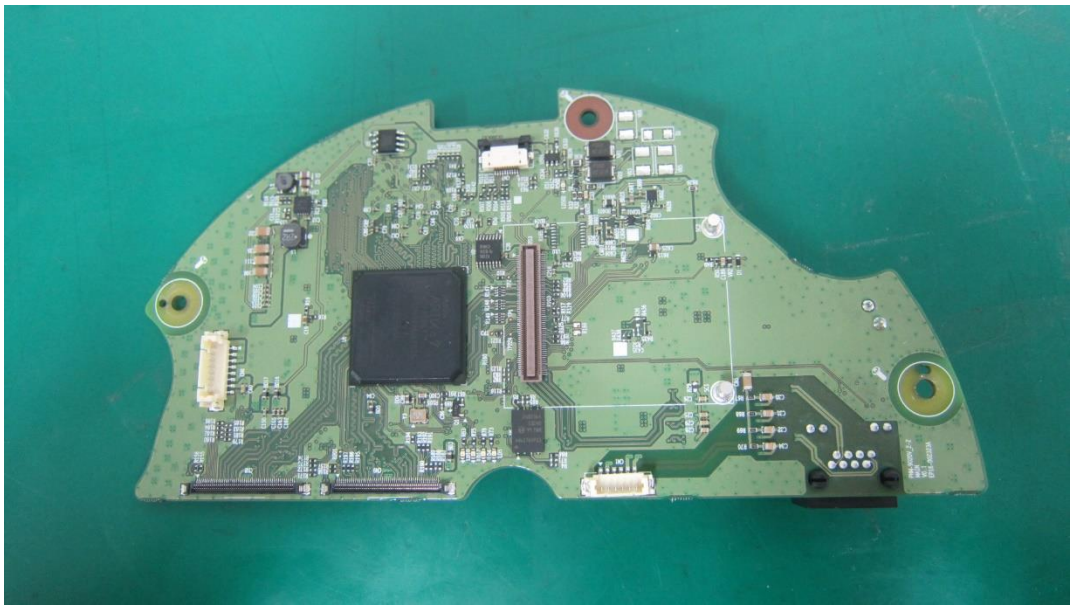
(Bottom)



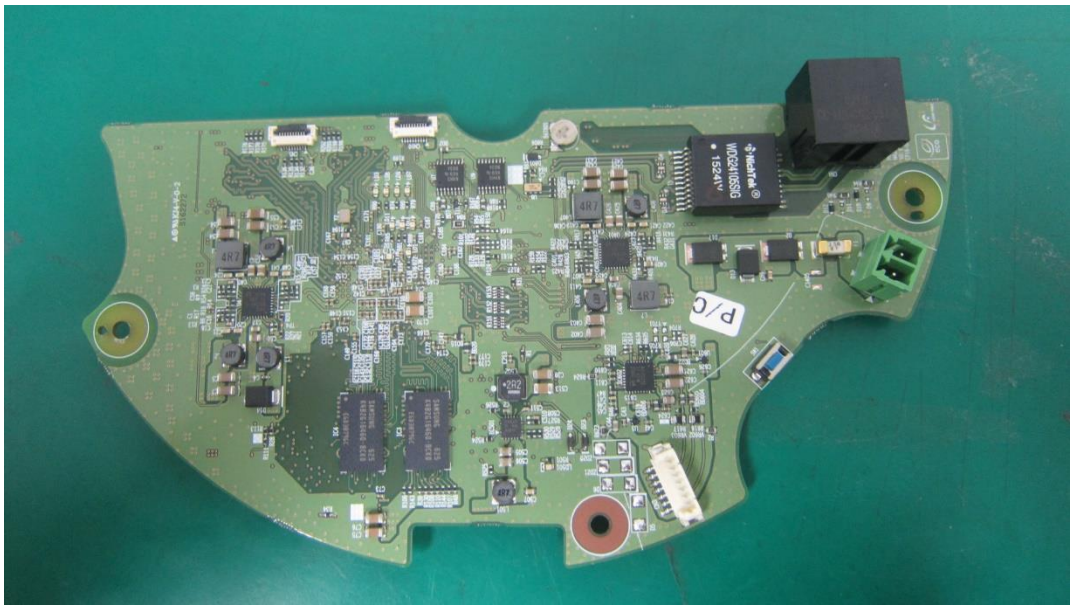
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EUT Internal View – Sub Board 3

(Top)



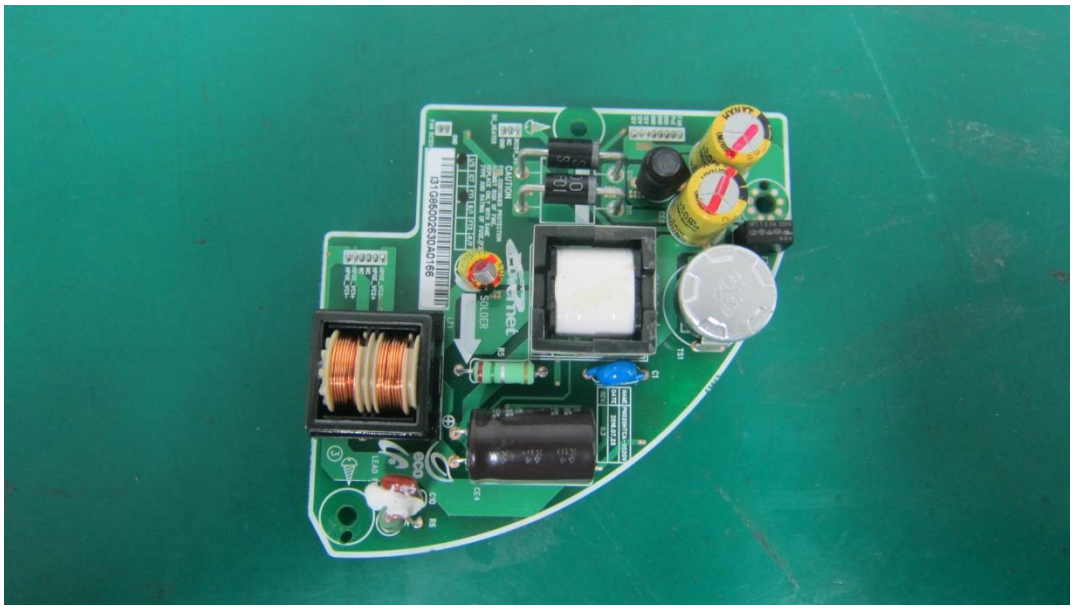
(Bottom)



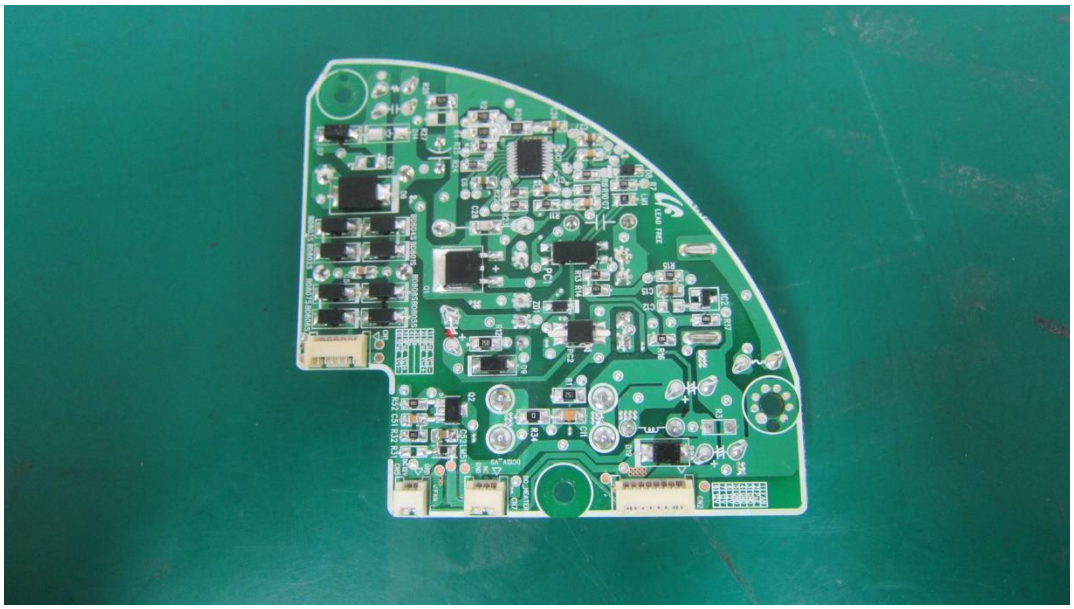
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EUT Internal View – Sub Board 4

(Top)



(Bottom)



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Label and Location



CCTV CAMERA

Model No : PNM-9020VP

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

Made in of China

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