



EMC TEST REPORT

Test Report No. : KES-E1-18T0004
Date of Issue : Jan. 03, 2018
Product name : Network Camera
Model/Type No. : PNM-7000VDN
Variant Mode : -
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
Equipment authorization : ☐ Declaration of Conformity
☒ Verification
☐ Certification
Date of Receipt : Dec. 21, 2017
Test date : Dec. 28, 2017 ~ Dec. 29, 2017
Test Results : ☒ In Compliance ☐ Not in Compliance

Tested by

Dae Jung, Choi
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
Jan. 03, 2018	KES-E1-18T0004	Issued

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1.0 General Product Description

Main Specifications of EUT are:

Video	
Imaging Device	-
Total Pixels	-
Effective Pixels	-
Scanning System	-
Min. Illumination	-
S / N Ratio	-
Video Out	CVBS : 1.0 Vp-p / 75Ω composite, 720x480(N), 720x576(P), for installation
Lens	
Focal Length (Zoom Ratio)	-
Max. Aperture Ratio	-
Angular Field of View	-
Focus Control	-
Lens Type	-
Mount Type	-
Operational	
Camera Title	Off / On (Displayed up to 85 characters) - W/W : English/Numeric/Special Characters - China : English/Numeric/Special/Chinese Characters - Common : Multi-line (Max 5), Color (Grey/Green/Red/Blue/Black/White), Transparency, Auto Scale by Resolution
Day & Night	Auto (Electrical) / Color / B/W / Schedule
Backlight Compensation	Off / BLC / HLC(Masking/Dimming), WDR
Wide Dynamic Range	150dB
Contrast Enhancement	SSDR (Off / On)
Digital Noise Reduction	SSNR5 (2D+3D Noise Filter) (Off / On)
Digital Image Stabilization	Off / On
Defog	Off / Auto / Manual
Motion Detection	Off/ On(8ea, 8point Polygonal zones)
Privacy Masking	Off / On (32ea, polygonal zones) - Color : Grey/Green/Red/Blue/Black/White - Mosaic
Gain Control	Off / Low / Middle / High
White Balance	ATW / AWC / Manual / Indoor / Outdoor(included Mercury & Sodium)
Contrast	level adjustment
LDC	On/Off (5 levels with Min/Max)
Electronic Shutter Speed	Minimum / Maximum / Anti flicker (2 ~ 1/12,000sec)
Digital Zoom	24X
Flip / Mirror	Flip : On/Off Mirror : On/Off Hallway view : 90°/270°
Video Analytics	Tampering, Loitering, Directional Detection, Fog&Dust Detection, Virtual Line, Enter/Exit, Appear/Disappear, Face Detection, Motion Detection
Alarm Triggers	Motion Detection, Video Analytics, Network Disconnect
Alarm events	File upload via FTP, E-Mail Notification via E-Mail local storage(SD/SDHC/SDXC) or NAS recording at Event Triggers
Pixel Counter	Support

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Network	
Ethernet	RJ-45 (10/100BASE-T)
Video Compression Format	H.265/H.264 (MPEG-4 Part 10/AVC) : Main/Baseline/High , Motion JPEG
Resolution	1920x1080, 1280x1024, 1280x960, 1280x720, 1024x768, 800x600, 800x448, 720x576, 720x480, 640x480, 640x360, 320x240
Max. Framerate	H.265/H.264 : 2M Max. 60fps at all resolutions Motion JPEG : Max. 30fps
Smart Codec	Manual Mode (area-based : 5EA)
WiseStreamII	Support
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 MJPEG : VBR
Streaming Capability	Multiple Streaming (Up to 10 Profiles)
IP	IPv4, IPv6
Protocol	TCP/IP, UDP/IP, RTP(UDP), RTP(TCP), RTCP,RTSP, NTP, HTTP, HTTPS, SSL/TLS, DHCP, 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 2slot (Each CH) - Motion Images recorded in the SD/SDHC/SDXC memory card can be downloaded. Local PC for Instant Recording
Application Programming Interf	ONVIF Profile S SUNAPI(HTTP API)
Webpage Language	English, Korean, Chinese, French, Italian, Spanish, German, Japanese, Russian, Swedish,, Portuguese, Czech, Polish, Turkish, Dutch, Hungarian, Greek
Web Viewer	Supported OS: Windows 7, 8, 10, Mac OS X 10.10, 10.11, 10.12 Non-plugin Webviewer Supported Browser: Google Chrome 54, MS Edge 38, Mozilla Firefox 49(Windows 64bit only) , Apple Safari 9 (Mac OS X only)
Central Management Software	SmartViewer, SSM
Environmental	
Operating Temperature / Humidity	-40°C ~ +55°C (-40°F ~ +131°F) / Less than 90% RH
Storage Temperature / Humidity	-50°C ~ +60°C (-22°F ~ +131°F) / Less than 90% RH
Ingress Protection	IP66
Vandal Resistance	IK10
Electrical	
Input Voltage / Current	PoE(IEEE802.3af, Class3)
Power Consumption	Max.12.95W(PoE)
Mechanical	
Color / Material	Ivory / Metal
Dimension (WxHxD)	Φ160 x 73mm
Weight	840g

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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 ☐ 230 Vac ☐ 120 Vac ☐ 24 Vac ☐ 12 Vdc ☒ PoE

Frequency ☐ 50 Hz ☐ 60 Hz ☐ Hz

1.2 Variant Model Differences

Not applicable

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
Network Camera	PNM-7000VDN	-	Hanwha Techwin (Tianjin) Co.,Ltd	E.U.T

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
PoE Adaptor	GS728TPP	-	NETGEAR, INC.	-
Notebook	NT730U3E	JJRE91CF200065A	Samsung Electronics Co., Ltd.	-
Notebook Adaptor	PA-1600-66	AD-6019P	Li Shin Co., Ltd.	-
2M LENS MODULE 1	SLA-2M2800D	-	Hanwha Techwin (Tianjin) Co.,Ltd	-
2M LENS MODULE 2	SLA-2M6000D	-	Hanwha Techwin (Tianjin) Co.,Ltd	-
Micro SD Card	-	-	SanDisk	32 GB



1.6 External I/O Cabling

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
Network Camera (E.U.T)	RJ-45 (PoE)	PoE Adaptor	RJ-45 (PoE)	3.0	U
	LENS In	2M LENS MODULE 1	LENS Out	-	-
	LENS In	2M LENS MODULE 2	LENS Out	-	-
	SLOT	Micro SD Card	SLOT	-	-
PoE Adaptor	RJ-45 (Data)	Notebook	RJ-45 (Data)	3.0	U

* Unshielded=U, Shielded=S

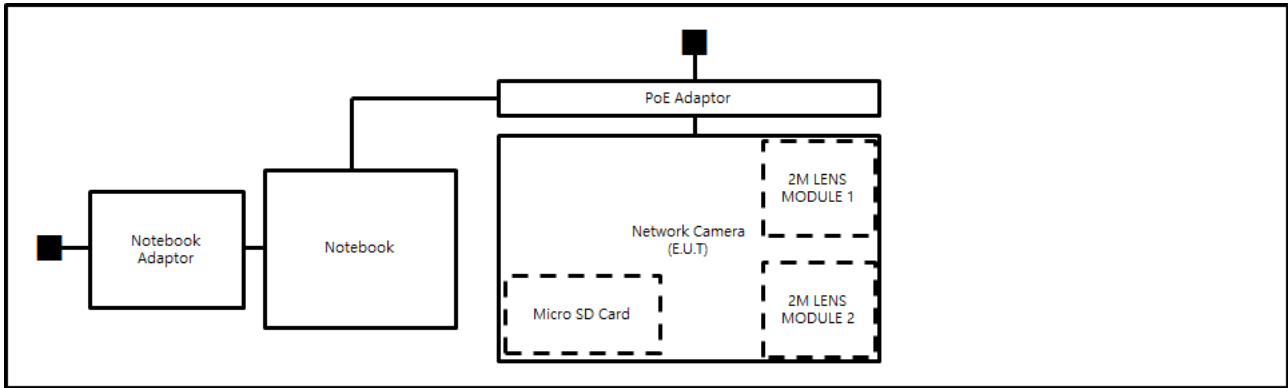
1.7 EUT Operating Mode(s)

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

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

1.8 Configuration

■ AC Main
 □ DC Main



1.9 Remarks when standards applied

Tested with the image output of 2M LENS MODULE 1 when E.U.T was tested.

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 55032:2015

☐ Class A

☐ Class B

☐ EN 55024:2010

☐ EN 50130-4:2011 +A1:2014

☐ EN 61000-3-2:2014

☐ EN 61000-3-3:2013

☐ EN 61326-1:2013



☐ **VCCI V-3 / 2015.04**

☐ Class A

☐ Class B

☐ **AS/NZS:2013**

☐ Class A

☐ Class B

☒ **47 CFR Part 15, Subpart B**

☒ CISPR 22:2009 +A1:2010

☒ Class A

☐ Class B

☐ ANSI C63.4-2014

☐ Class A

☐ Class B

☒ **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



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 S/W	EMC32	R & S	9.12.00	-
☐	EMI TEST RECEIVER	ESR3	R & S	101781	04, 27, 2018
☐	LISN	ENV216	R & S	101787	01, 11, 2018
☐	LISN	ESH2-Z5	R & S	100450	04, 27, 2018
☐	PULSE LIMITER	ESH3-Z2	R & S	101915	11, 27, 2018
☐	LISN	NNBM8124	SCHWARZBECK	8124-1002	08, 07, 2018
☐	LISN	NNBM8124	SCHWARZBECK	8124-1003	08, 07, 2018

Test Conditions

Temperature:

°C

Relative Humidity:

% 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

N/A

2.2 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Dec. 28, 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
☒	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.0	-
☒	EMI TEST RECEIVER	ESU26	R & S	100551	04, 18, 2018
☒	AMPLIFIER	SCU 01	R & S	100603	11, 27, 2018
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	716	11, 28, 2018

Test ConditionsTemperature: 20,9 °C
Relative Humidity: 42,3 % 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

RemarksSee Appendix A for test data.

2.3 Radiated Electric Field Emissions(Above 1 GHz)

Test Date

Dec. 29, 2017

Test Location

SEMI ANECHOIC CHAMBER #4(10 m)

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.0	-
☒	EMI TEST RECEIVER	ESU26	R & S	100551	04, 17, 2018
☒	PREAMPLIFIER	8449B	AGILENT	3008A01967	05, 31, 2018
☐	ATTENUATOR	8491A	HP	32173	03, 24, 2018
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	05, 02, 2019

Test ConditionsTemperature: 21,3 °C
Relative Humidity: 41,8 % 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

RemarksSee Appendix A for test data.



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APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

HOT LINE

N/A

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NEUTRAL LINE

N/A

◆ 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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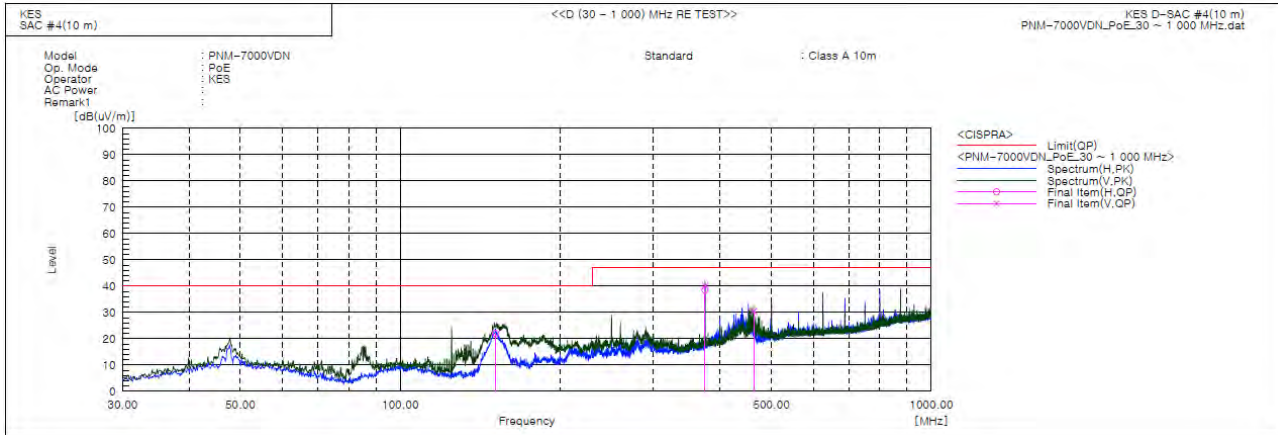


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Radiated Electric Field Emissions(Below 1 GHz)



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	151.302	H	53.4	-31.4	22.0	40.0	18.0	400.0	160.0	
2	374.893	H	59.9	-21.3	38.6	47.0	8.4	367.0	128.0	
3	375.031	V	61.4	-21.3	40.1	47.0	6.9	100.0	209.0	
4	462.984	V	49.3	-18.8	30.5	47.0	16.5	100.0	237.0	

◆ 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 - Preamp Factor), Margin: Margin value

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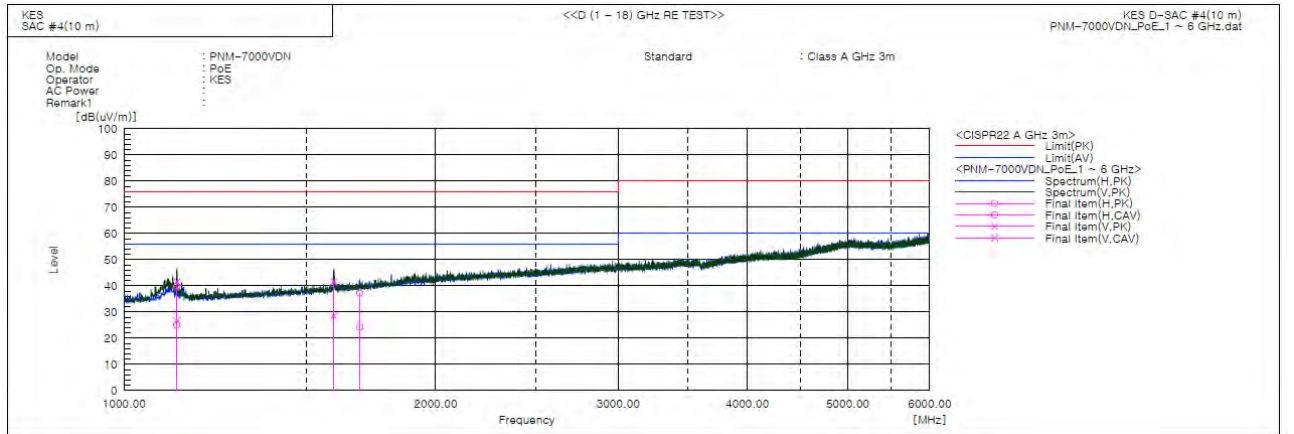


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Radiated Electric Field Emissions(Above 1 GHz)



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB(1/m)]	Result PK [dB(uV/m)]	Result CAV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin CAV [dB]	Height [cm]	Angle [deg]	Remark
1	1124.310	H	45.5	30.7	-5.7	39.8	25.0	76.0	56.0	36.2	31.0	100.0	228.0	
2	1124.843	V	47.2	32.4	-5.7	41.5	26.7	76.0	56.0	34.5	29.3	100.0	154.0	
3	1593.750	V	42.9	29.8	-1.3	41.6	28.5	76.0	56.0	34.4	27.5	100.0	146.0	
4	1689.375	H	37.4	24.5	-0.2	37.2	24.3	76.0	56.0	38.8	31.7	100.0	248.0	

◆ Calculation

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

Margin(PK/CAV)[dB] = Limit[dB(μV/m)] - Result(PK/CAV) [dB(μV/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 Setup Photos and Configuration

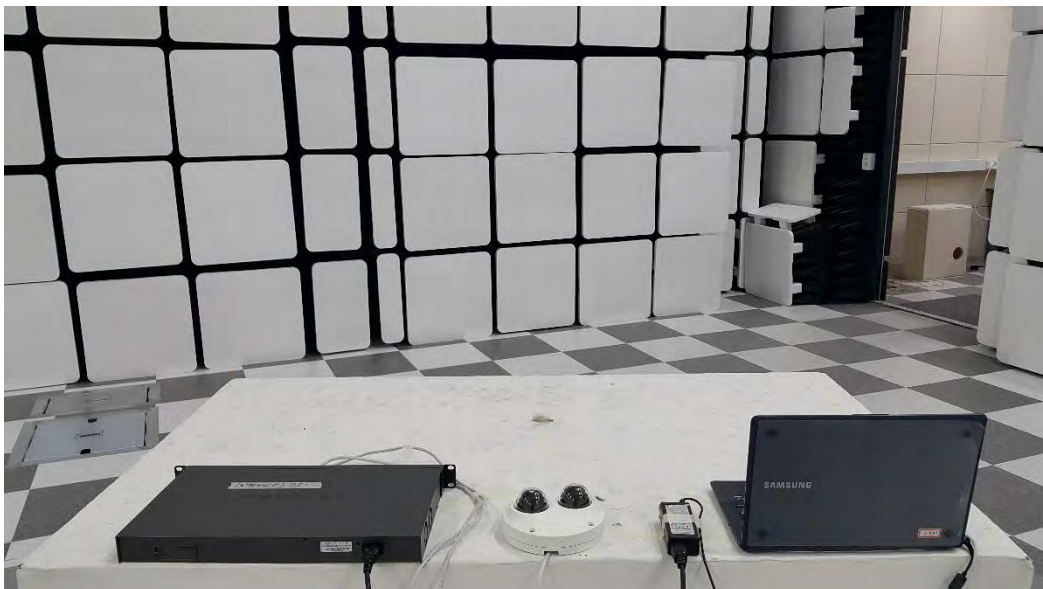
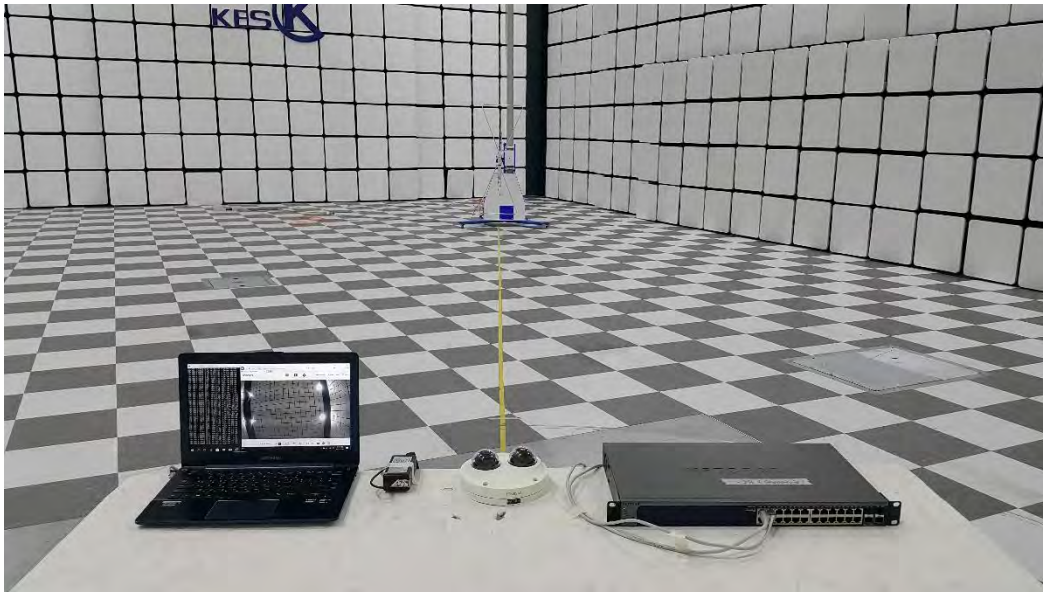
Conducted Voltage Emissions

N/A

N/A

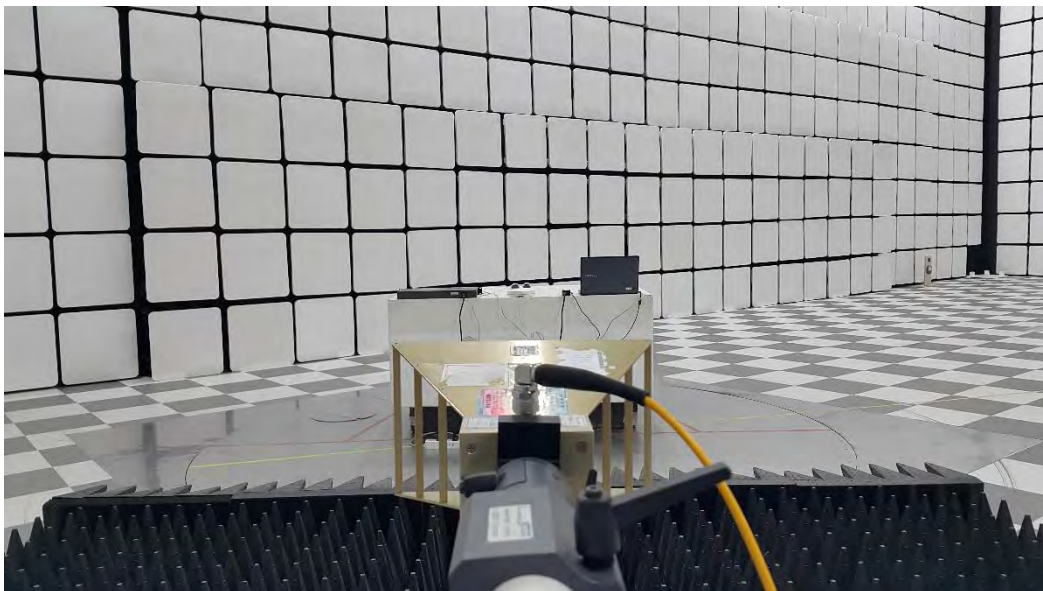
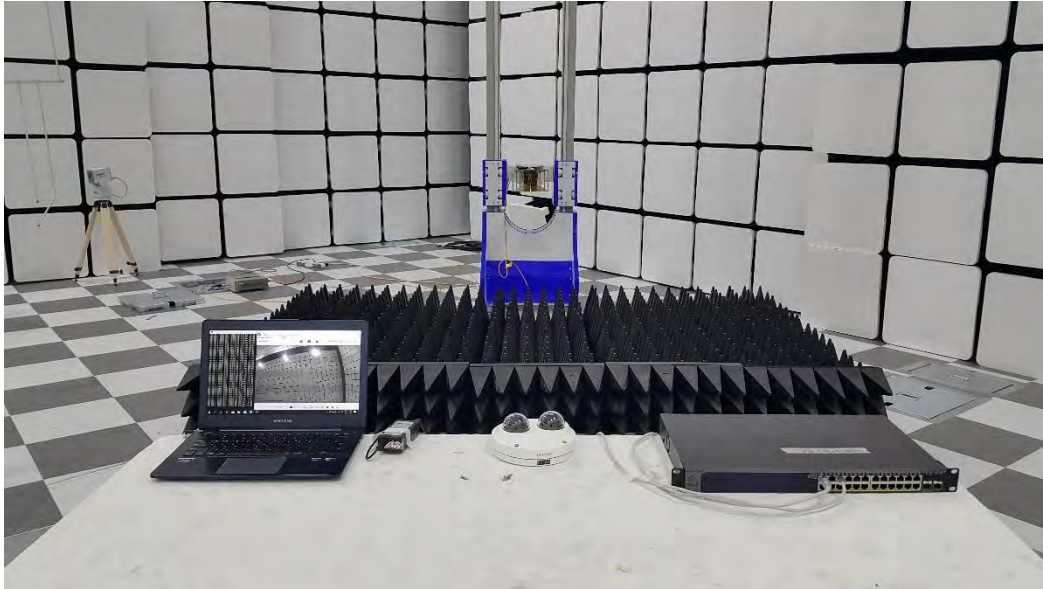
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Radiated Electric Field Emissions(Below 1 GHz)



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Radiated Electric Field Emissions(Above 1 GHz)



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EUT External Photographs

(Top)



(Bottom)



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EUT Internal Photographs

(Internal View)



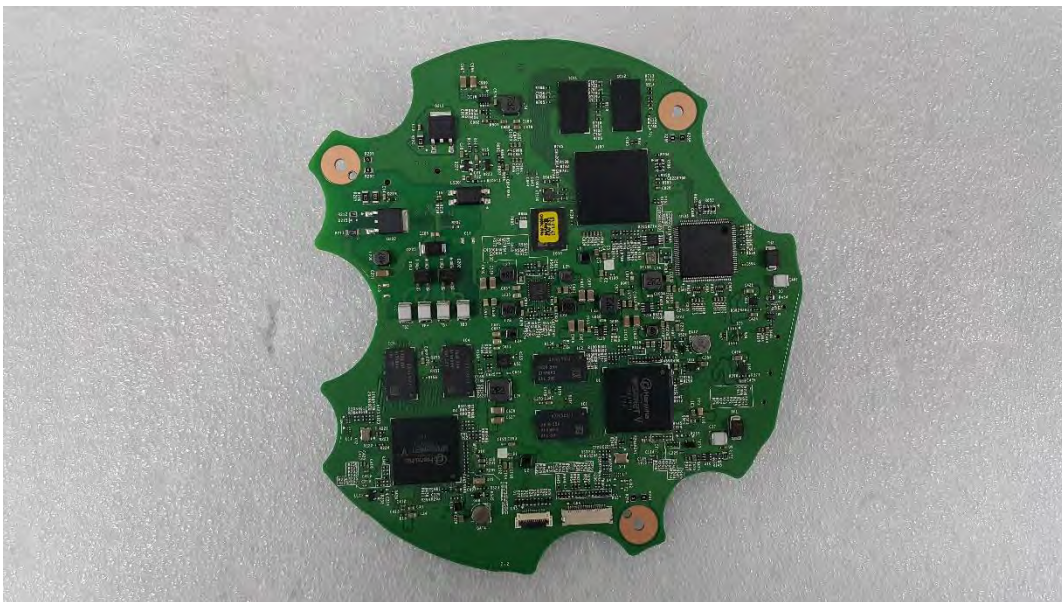
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EUT Internal View – Main board

(Top)



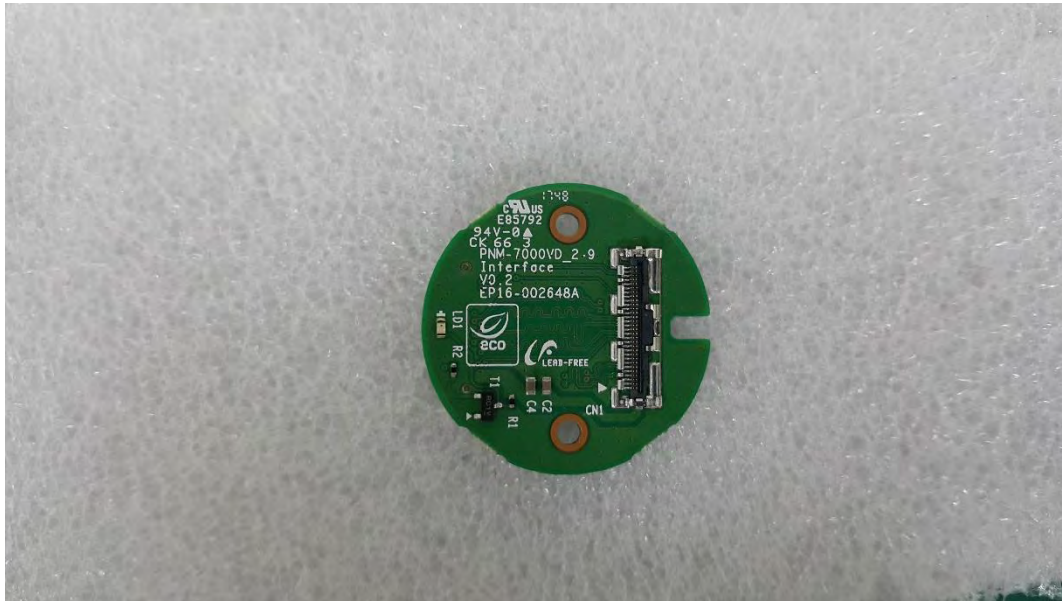
(Bottom)



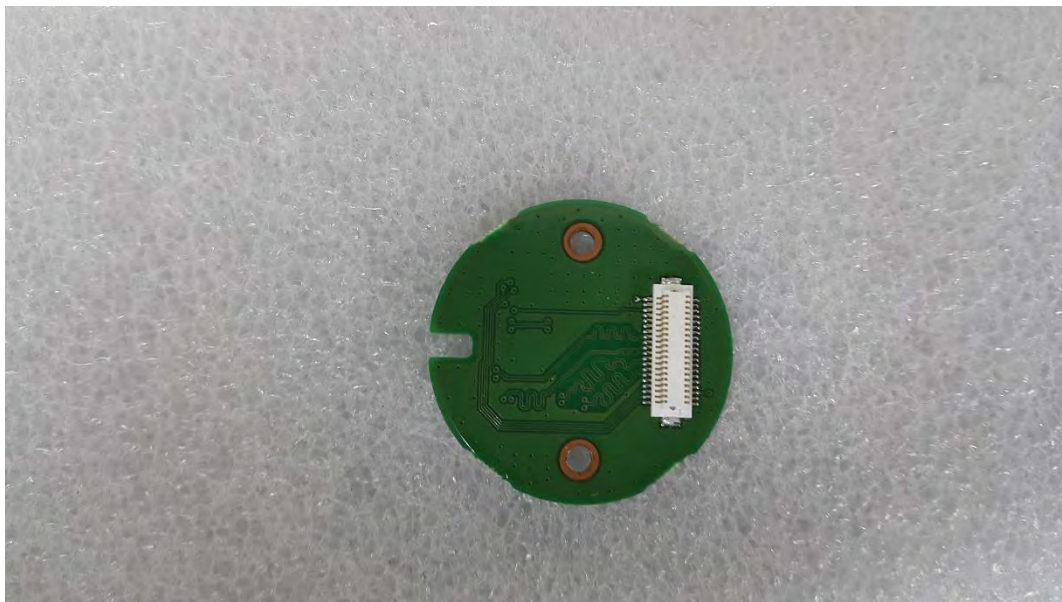
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EUT Internal View – Interface board 1

(Top)



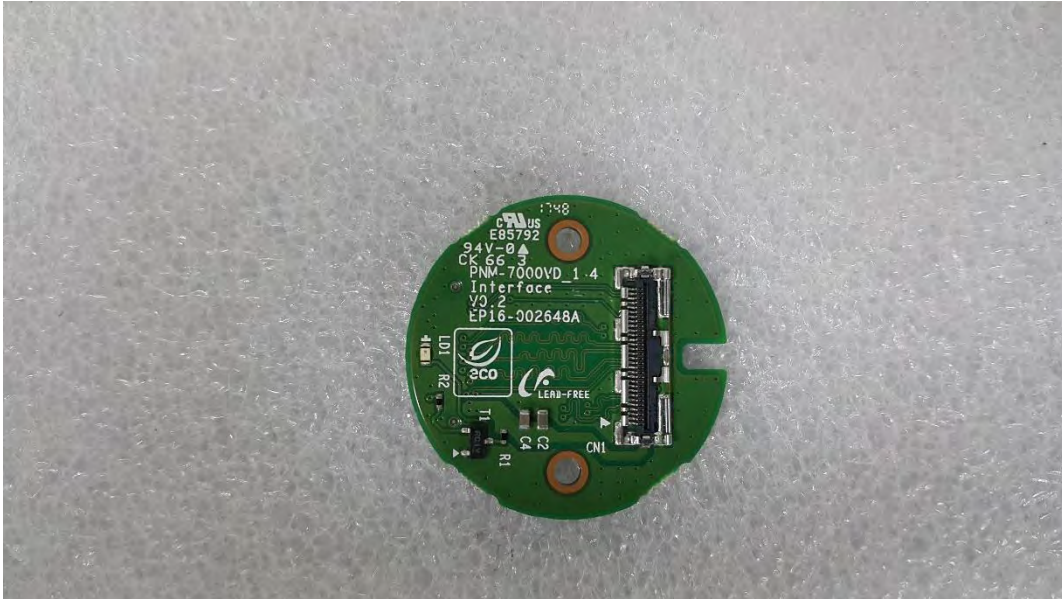
(Bottom)



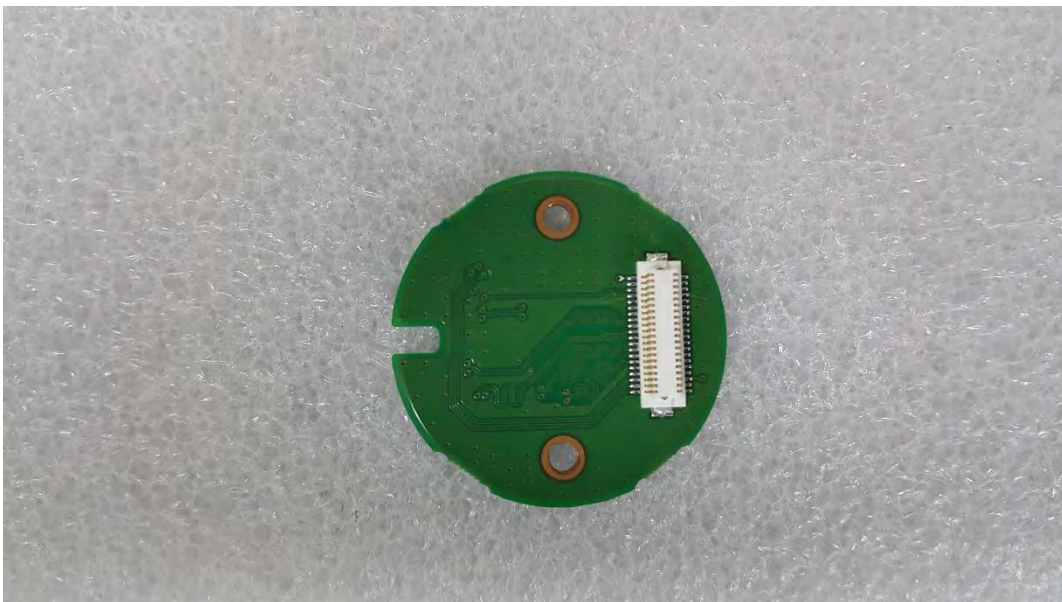
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EUT Internal View – Interface board 2

(Top)

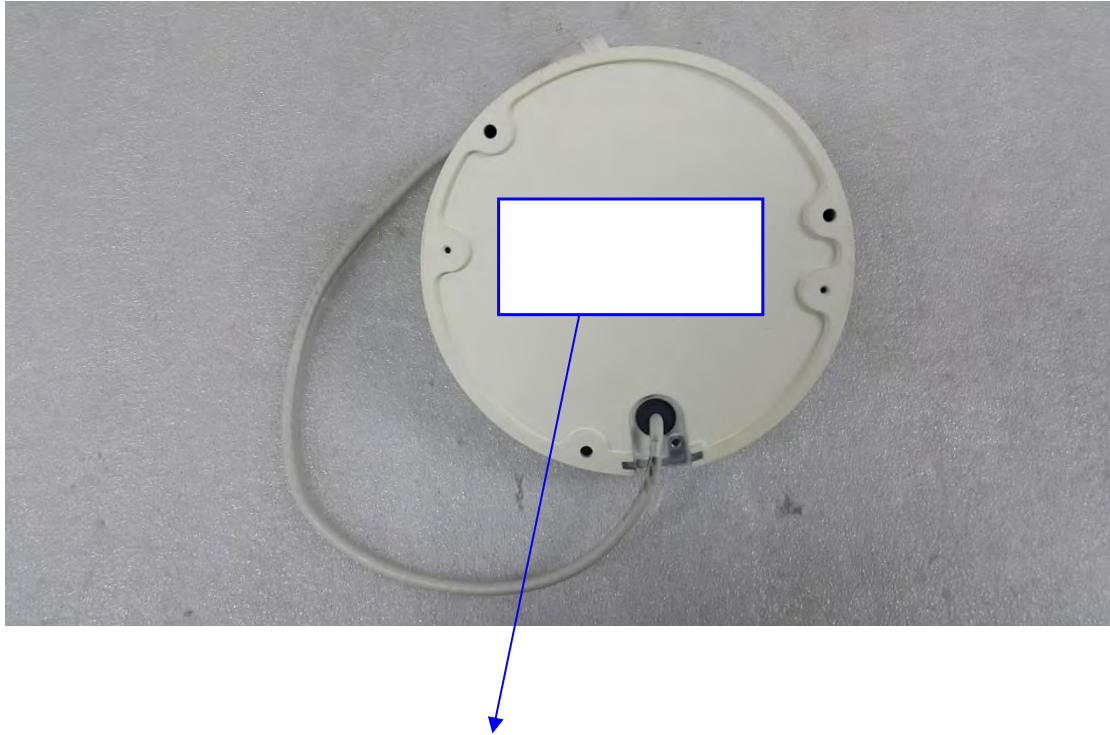


(Bottom)



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Label Photographs



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

CAN ICES-3(A) / NMB-3(A)