



EMC TEST REPORT For RCM

Test Report No. : KES-EM-23T0405
Date of Issue : May. 16, 2023
Product name : Network Camera
Model/Type No. : PNM-C32083RVQ
Variant Model : -
Applicant : Hanwha Vision Co., Ltd
Applicant Address : 6, Pangyo-ro 319Beon-gil, Bundang-gu, Seongnam-si,
Gyeonggi-do, Republic of Korea
Manufacturer : 1. HANWHA VISION VIETNAM COMPANY LIMITED
2. D-TECH CO.,LTD.
Manufacturer Address : 1. Lot O-2, Que Vo Industrial Zone extended area,
Nam Son commune, Bac Ninh city, Bac Ninh province, Vietnam
2. 173-25, Saneop-ro, Gwonseon-gu, Suwon-si, Gyeonggi- do,
Korea (Suwon Industrial Complex)
Date of Receipt : Mar. 22, 2023
Test date : May. 03, 2023
Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Seong Min, Jang
EMC Test Engineer

Reviewed by

Hyo Jin, Kim
EMC Technical Manager

This test report is not related to KS Q ISO/IEC 17025 and KOLAS.

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KES-EM-23T0405

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REPORT REVISION HISTORY

Date	Test Report No.	Revision History
May. 16, 2023	KES-EM-23T0405	Issued

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1.0 General Product Description

Main Specifications of EUT are:

Video	
Imaging Device	1/2.8" 4k CMOS x 4CH (Must have independent configuration)
Resolution	3840x2160, 3328x1872, 3072x1728, 2592x1944, 2688x1520, 1920x1080, 1600x1200, 1280x1024, 1280x960, 1280x720, 1024x768, 800x600, 800x448, 720x576, 720x480, 640x480, 640x360, 320x240
Max. Frame rate	H.265/H.264: 8MP Max. 20fps/20fps(60Hz/50Hz) MJPEG: Max. 20fps/20fps(60Hz/50Hz)
Min. Illumination	color: 0.10lux (F1.5, 1/30sec) BW: 0 lux(0.05lux)
Video Out	USB: micro USB Type B, 1280x720 for installation
Lens	
Focal Length (Zoom Ratio)	3.3~5.7mm motorized varifocal
Max. Aperture Ratio	F1.5(Wide) ~ F1.9(Tele)
Angular Field of View	H: 108.3°(Wide)~56.4°(Tele) V: 54.7°(Wide)~31.2°(Tele) D: 135.5°(Wide)~65.2°(Tele)
Min. Object Distance	Wide : 1.3m ; Tele : 3.3m
Focus Control	Simple focus
Pan / Tilt / Rotate Range	0~360° / 0~73°/0~90°
Lens Type	Fixed lens
Operational	
Camera Title	Displayed up to 85 characters
Day & Night	Auto(ICR)
Backlight Compensation	BLC, WDR, SSDR
Wide Dynamic Range	120dB
Digital Noise Reduction	SSNR V, WiseNR II (using AI engine)
Digital Image Stabilization	None
Defog	Support
Motion Detection	8ea, 8point polygonal zones
Privacy Masking	6ea polygonal zones - Color: Grey/Black/White
Gain Control	Low / Middle / High
White Balance	ATW / AWC / Manual / Indoor / Outdoor
LDC	Support
Electronic Shutter Speed	Minimum / Maximum / Anti flicker (1/5 ~ 1/12,000sec), Auto prefer shutter control(Based on AI engine)
Video Rotation	Flip, Mirror, Halfway view(90/270) - Each channel separately
Analytics	- Analytics events based on AI engine: Object detection (Person/Vehicle (car/truck/bus/bicycle/bike)), IVA (Virtual line/Area, Enter/Exit, Loitering, direction, intrusion), Appear/Disappear, (Bestshot/Goodshot without attributes) - Analytics events : Defocus detection, Motion detection, Tampering, Audio detection, Sound classification
Alarm I/O	2 configurable I/O ports, + I/O Box compatibility
Alarm Triggers	Analytics, Network disconnect, Alarm input
Alarm Events	When alarm trigger occurred - File upload(image) : e-mail/FTP - Notification : e-mail - Recording : SD/SDHC/SDXC or NAS recording at event triggers - Alarm output - Handover(PTZ preset, Send message by HTTP/HTTPS/TCP) - Audio clip playback
Audio In	Selectable (microphone in/line in) Supply voltage: 2.5VDC(4mA), Input impedance: 2K Ohm
Audio Out	Line out, Maximum output level: 1Vrms
IR Viewable Length	Wise IR 20m
Network	
Ethernet	Metal shielded RJ-45/10/100/1000BASE-T
Video Compression	H.265/H.264: Main/Baseline/High, MJPEG
Smart Codec	Manual(Sea area), WiseStreamII, WiseStreamIII(Based on AI engine)
Bitrate Control	H.264/H.265: CBR or VBR MJPEG: VBR
Streaming	(5 Profiles/channel) Unicast(10 users) / Multicast (TBD)
Protocol	IPv4, IPv6, TCP/IP, UDP/IP, RTP(UDP), RTP(TCP), RTCP, RTSP, NTP, HTTP, HTTPS, SSL/TLS, DHCP, FTP, SFTP, iCMP, iGMP, SNMPv1/v2c/v3(MIB-2), ARP, DNS, DDNS, QoS, PIM-SM, UPnP, Bonjour, LLDP, SRTP
Security	HTTPS/SSL Login Authentication Digest Login Authentication IP Address Filtering User access log 802.1X Authentication(EAP-TLS, EAP-LEAP, EAP-PEAP MSCHAPv2) Device Certificate/Hanwha Techwin Root CA, pre-installed Secure by default certificate Secure OS/Boot/Storage, Verify firmware forgery, TPM with FIPS 140-2 level2
Application Programming Interface	ONVIF Profile S/T ONVIF Profile M SUNAPI(HTTP API)
General	
Webpage Language	English, Korean, Chinese, French, Italian, Spanish, German, Japanese, Russian, Portuguese, Czech, Polish, Turkish, Dutch, Hungarian, Greek
Edge Storage	Micro SD/SDHC/SDXC 2 slots x 512GB
Open platform	Open platform Application that has access to 4 channels
Environmental & Electrical	
Operating Temperature / Humidity	-40°C ~ +55°C(-40°F ~ +131°F) / Less than 90% RH *Start up should be above at -35°C
Storage Temperature / Humidity	-50°C ~ +60°C(-58°F ~ +140°F) / Less than 90% RH
Certification	IP66, IK10, NEMA4X
Input Voltage	PoE+
Power Consumption	Max : 25.5W
Mechanical	
Color / Material	White / Aluminum Hard-coated dome bubble
RAL Code	RAL9003
Product dimensions / weight	250mm x 114.2mm, weight: 2.8kg
Gangbox compatibility	Single, Double, 4" Square, 4" Octagon

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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.

☒ PoE

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-C32083RVQ	-	HANWHA VISION VIETNAM COMPANY LIMITED	EUT

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
Micro SD Card	-	-	SanDisk	-
Laptop	Inspiron 15-7577	-	DELL	-
Laptop Adapter	LA130PM121	-	DELL	-
PoE Injector	PT-PSE109GBRO-AH-S	-	Dongguan PROCET Network Technology Co., Ltd	-
Headset	K550	-	Britz®	-
Cell Phone	SM-A305N	R59M503KX0M	SAMSUNG	-
LED Alarm	PRO-SL	-	SENSOR PRO	-
Button Alarm	-	-	-	-

1.6 External I/O Cabling

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
Network Camera (EUT)	Micro SD Slot	Micro SD Card	Micro SD Slot	-	-
	RJ-45	PoE Injector	RJ-45	4.0	S
	Mic	Headset	3.5 mm	2.5	U
	Speaker		3.5 mm	2.5	U
	Alarm Out	LED Alarm	Alarm Out	3.1	U
	Alarm In	Button Alarm	Alarm In	3.1	U
PoE Injector	RJ-45	Laptop	RJ-45	1.0	U
Laptop	DC jack	Laptop Adapter	DC jack	1.5	U
	3.5 mm	Cell Phone	3.5 mm	0.1	U

* Unshielded = U, Shielded = S

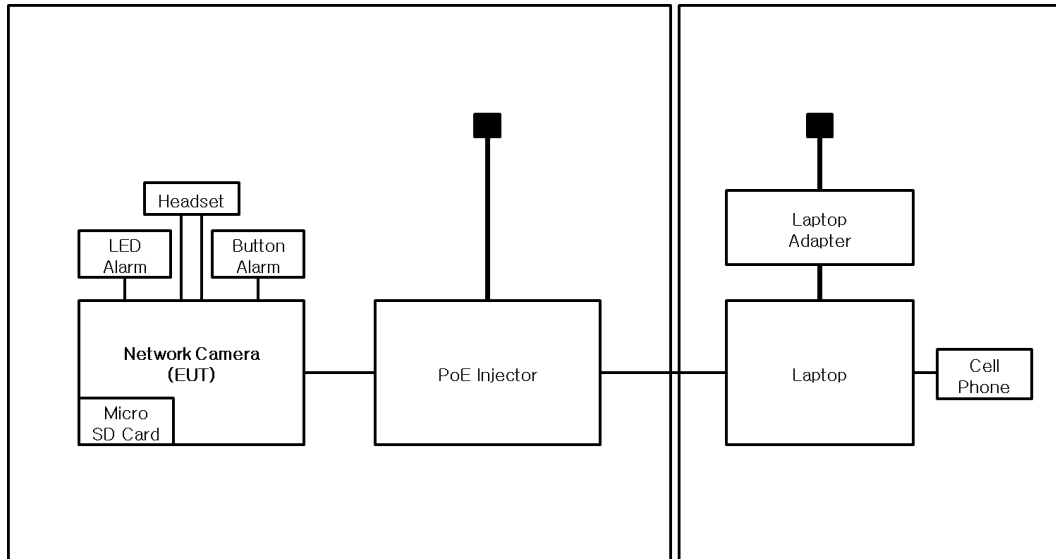
1.7 EUT Operating Mode(s)

Test mode	operating
Operation	1. Check if the EUT image is output to the laptop normally. 2. Check if the network is operating normally through a ping test. 3. After the test, check if the EUT video has been recorded normally.

EUT Test operating S/W		
Name	Version	Manufacture Company
Web Viewer	-	Hanwha Vision Co., Ltd

1.8 Configuration

■ AC Main
 □ DC Main



1.9 Remarks when standards applied

- The USBMicro 5 Pin port was excluded from the test because it was for administrators.
- The PoE mode of this test equipment receives PoE power, and the PoE port is considered a wired network port, so the test items related to the power port are not applicable.

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, Republic of. The sites are constructed in conformance with the requirements of ANSI C63.4a-2017 and CISPR 16-1-4:2019

1.12 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
KOREA	RRA	EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 KR0100
International	KOLAS	EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 KT489
USA	FCC	3 m & 10 m Semi-Anechoic Chamber Conducted test site to perform FCC Part 15/18 measurements.	 KR0100
Canada	ISED	3 m & 10 m Semi-Anechoic Chamber and Conducted test site	 23298
JAPAN	VCCI	EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site)	 C-20136, T-20137, R-20181, G-20176
Europe	TÜV SÜD	EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 CARAT 001633 0004



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2.0 Test Regulations

The emissions tests were performed according to following regulations:

☒ **AS/NZS CISPR 32:2015 AMD 1:2020**

☒ Class A

☐ Class B

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2.1 Conducted Emissions at Mains Power Ports

Test Date

N/A

Test Location

Electro wave Shieldroom #6

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	101783	11, 11, 2023
☐	LISN	ENV216	R & S	101787	11, 10, 2023
☐	LISN	ESH2-Z5	R & S	100450	11, 10, 2023
☐	PULSE LIMITER	ESH3-Z2	R & S	101915	11, 10, 2023

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

RemarksRefer to 'Remarks when standards applied'

2.2 Conducted Emissions at Telecommunication Ports

Test Date

May. 03, 2023

Test Location

Electro wave Shieldroom #6

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	101783	11, 11, 2023
☒	LISN	ENV216	R & S	101787	11, 10, 2023
☒	LISN	ESH2-Z5	R & S	100450	11, 10, 2023
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	11, 10, 2023
☐	8-WIRE ISN CAT3,5	ENY81	R & S	100174	11, 22, 2023
☒	ISN	ISN S8	SCHWARZBECK	ISN-S8-0019	03, 06, 2024

Test Conditions

Temperature: (23,1 ± 0,2) °C

Relative Humidity: (43,5 ± 0,1) % 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.
- For Ethernet interfaces, measurements are required at the highest data rate supported by the interface.

2.3 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

May. 03, 2023

Test Location

☐ OPEN AREA TEST SITE #2 ☒ SEMI ANECHOIC CHAMBER #4(10m)

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	03, 21, 2024
☒	AMPLIFIER	SCU 01	R & S	100603	11, 10, 2023
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	11, 17, 2024
☒	ATTENUATOR	8491A	HP	32173	03, 03, 2024

Test Conditions

Temperature: (23,2 ± 0,2) °C
Relative Humidity: (42,4 ± 0,1) % 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

May. 03, 2023

Test Location

SEMI ANECHOIC CHAMBER #3

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	ESR7	R & S	101190	08, 01, 2023
☒	PREAMPLIFIER	8449B	AGILENT	3008A01967	03, 06, 2024
☒	ATTENUATOR	8491A	HP	35496	03, 03, 2024
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	03, 06, 2024

Test Conditions

Temperature: (24,4 ± 0,1) °C

Relative Humidity: (45,2 ± 0,1) % 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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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.

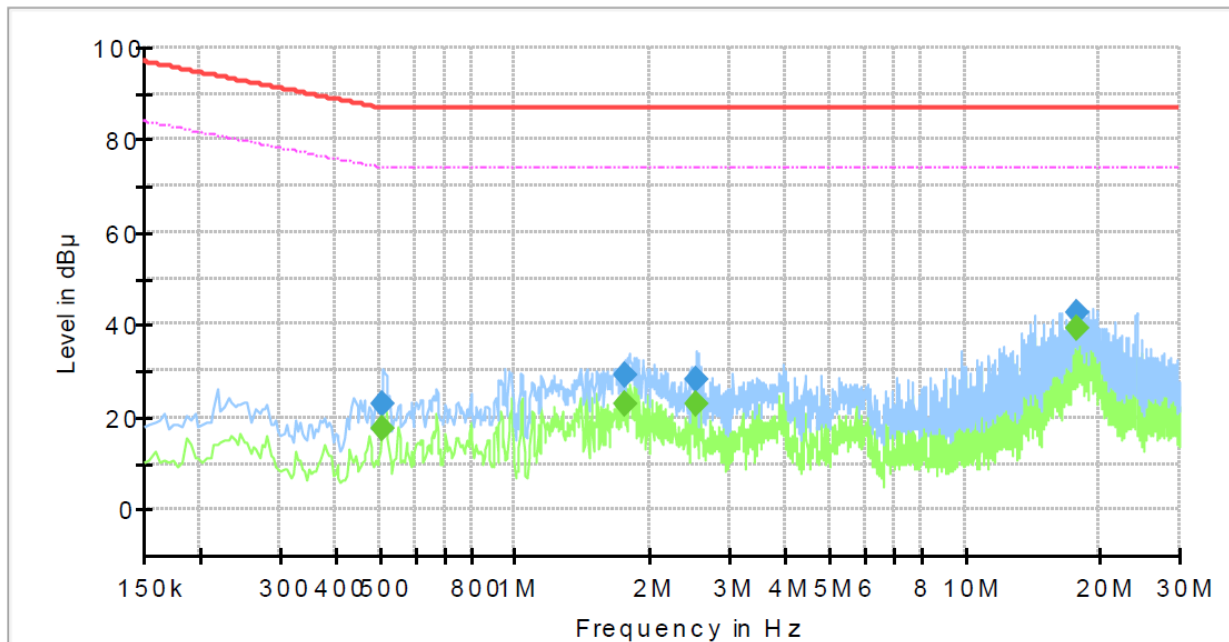
Corr. : Correction values (LISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

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Conducted Emissions at Telecommunication Ports [1 000 Mbps]

Common Information

Test Description: Telecommunication Emission
 Model No.: PNM-C320832RVQ
 Mode :
 Speed : 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)
0.510000	---	17.58	74.00	56.42	1000.0	9.000	Single Line	19.4
0.510000	22.79	---	87.00	64.21	1000.0	9.000	Single Line	19.4
1.758000	---	22.78	74.00	51.22	1000.0	9.000	Single Line	20.0
1.758000	29.32	---	87.00	57.68	1000.0	9.000	Single Line	20.0
2.534000	---	22.94	74.00	51.06	1000.0	9.000	Single Line	20.0
2.534000	27.91	---	87.00	59.09	1000.0	9.000	Single Line	20.0
17.694000	---	39.34	74.00	34.66	1000.0	9.000	Single Line	19.9
17.694000	42.59	---	87.00	44.41	1000.0	9.000	Single Line	19.9

◆ Calculation

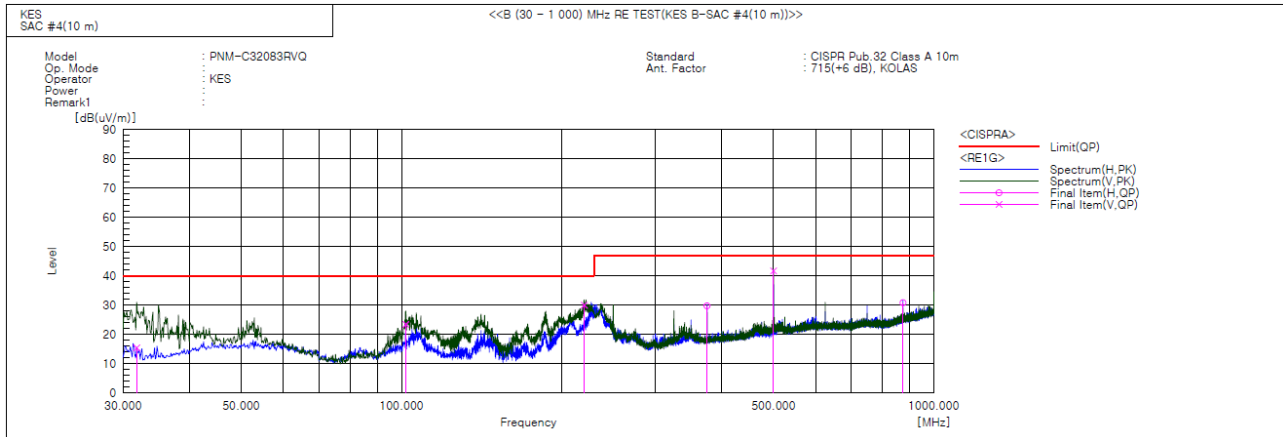
QuasiPeak[dBuV] / CAverage [dBuV] = Reading Value[dBuV] + Corr. [dB]

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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

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	31.819	V	40.3	-24.9	15.4	40.0	24.6	110.0	16.0	
2	101.901	V	45.8	-22.4	23.4	40.0	16.6	121.0	269.0	
3	220.484	V	49.9	-19.9	30.0	40.0	10.0	109.0	5.0	
4	374.956	H	44.1	-14.4	29.7	47.0	17.3	377.0	139.0	
5	499.965	V	52.8	-11.1	41.7	47.0	5.3	109.0	192.0	
6	875.113	H	35.9	-5.1	30.8	47.0	16.2	395.0	47.0	

◆ Calculation

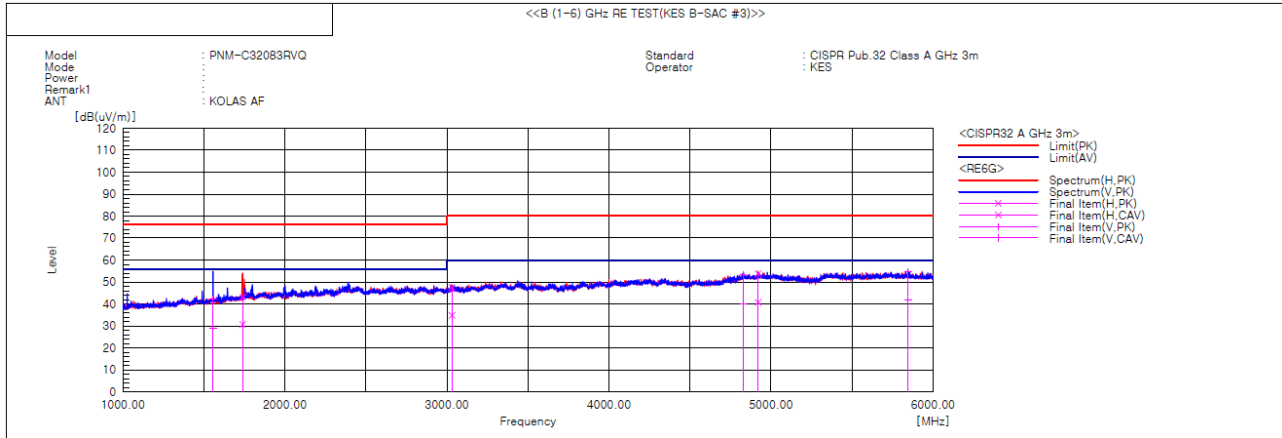
Result(QP) [dB(μV/m)] = (Reading(QP)[dB(μV)] + c.f[dB(1/m)])

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

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	1556.201	V	41.9	28.7	0.2	42.1	28.9	76.0	56.0	33.9	27.1	100.0	81.6	
2	1738.033	H	41.0	28.5	2.2	43.2	30.7	76.0	56.0	32.8	25.3	100.0	222.9	
3	3031.280	H	40.1	27.6	7.3	47.4	34.9	80.0	60.0	32.6	25.1	100.0	146.0	
4	4830.451	V	39.4	26.0	14.1	53.5	40.1	80.0	60.0	26.5	19.9	100.0	75.1	
5	4919.983	H	38.9	25.9	14.9	53.8	40.8	80.0	60.0	26.2	19.2	100.0	5.7	
6	5847.001	V	38.3	25.7	16.2	54.5	41.9	80.0	60.0	25.5	18.1	100.0	81.6	

◆ Calculation

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 Setup Photos and Configuration

Conducted Emissions at Mains Power Ports

N/A

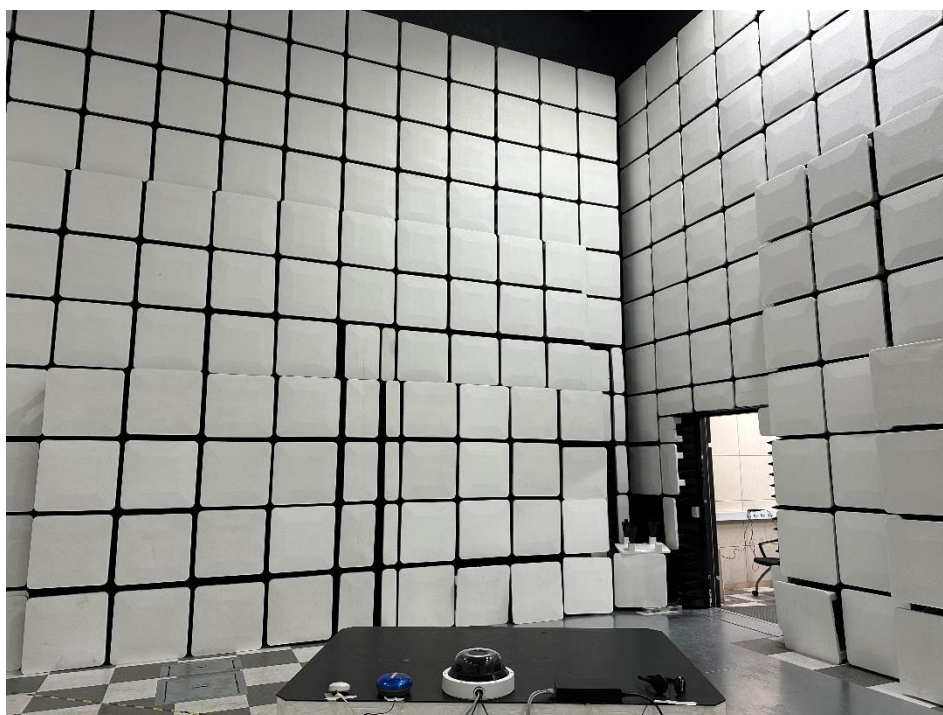
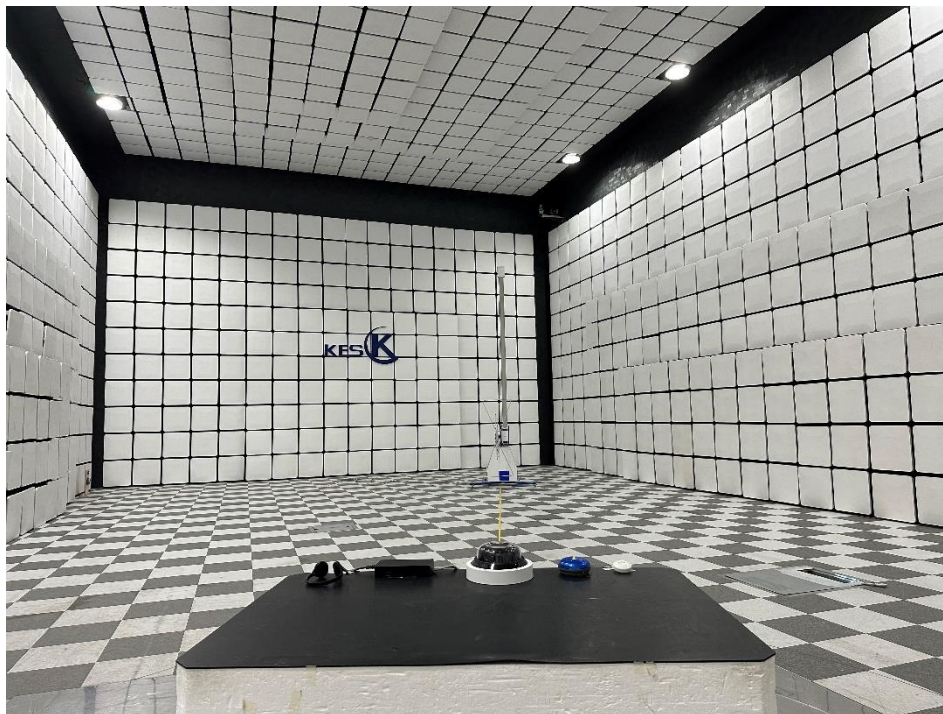
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Conducted Emissions at Telecommunication Ports



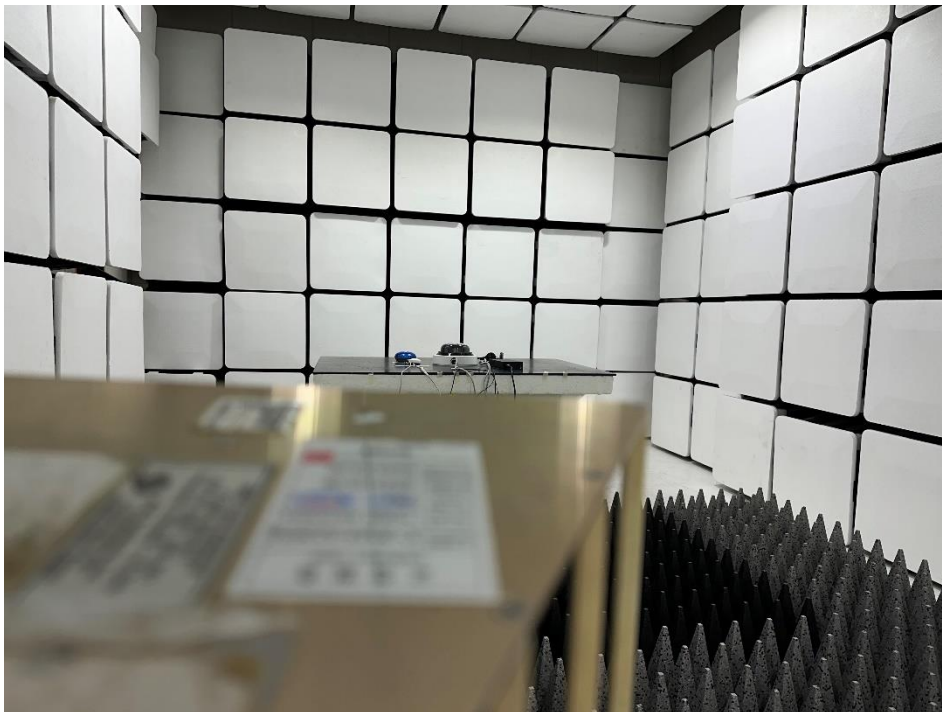
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Radiated Electric Field Emissions(Below 1 GHz)



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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)

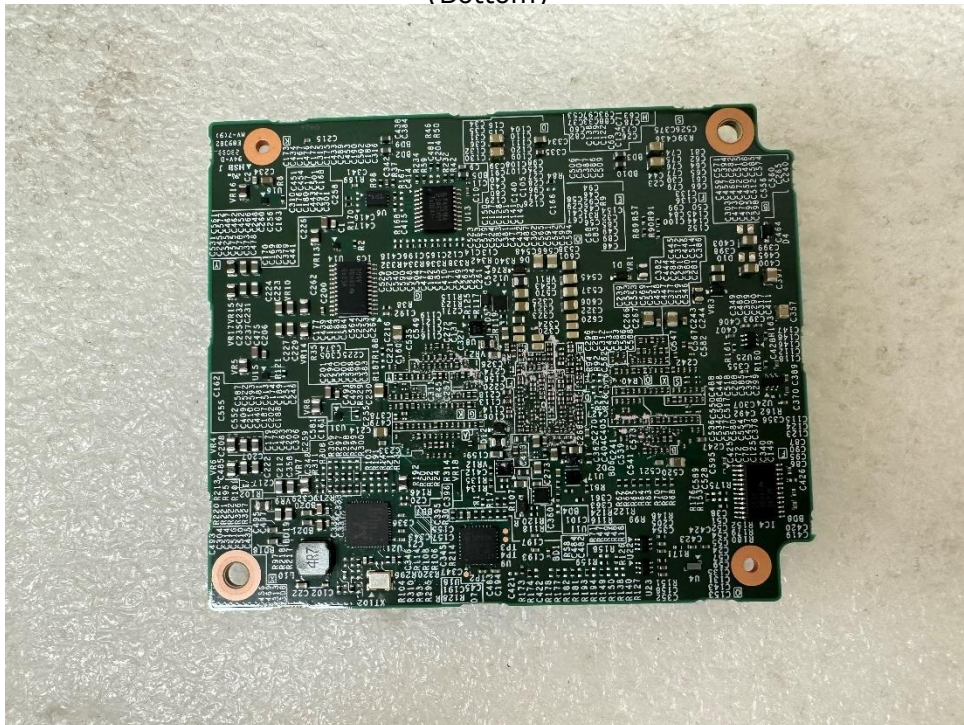


EUT Internal View – Board 1

(Top)



(Bottom)



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EUT Internal View – Board 2

(Top)



(Bottom)



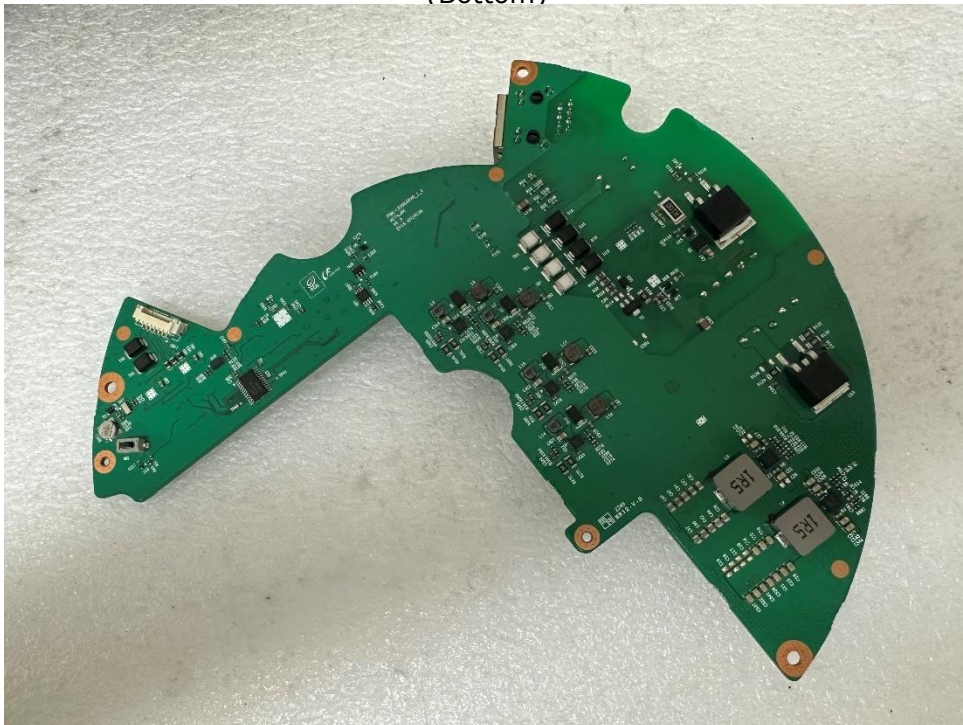
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EUT Internal View – Board 3

(Top)



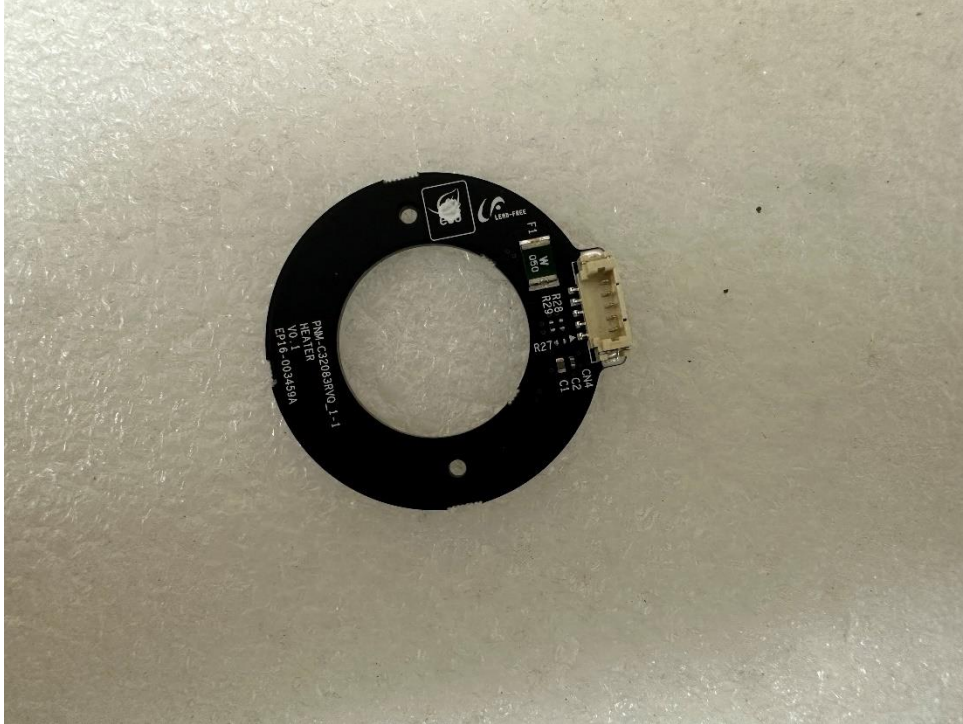
(Bottom)



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EUT Internal View – Board 4

(Top)



(Bottom)



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EUT Internal View – Board 5

(Top)



(Bottom)



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EUT Internal View – Board 6

(Top)



(Bottom)



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