

**KES Co., Ltd.**

3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
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Report No.:

KES-EM-21T1212-R2

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EMC TEST REPORT For RCM

Test Report No. : KES-EM-21T1212-R2

Date of Issue : Feb. 24, 2023

Product name : NETWORK CAMERA

Model/Type No. : PNM-A9083RVD

Variant Model : PNM-C12083RVD

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 : Dec. 15, 2021

Test date : Dec. 18, 2021

Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Eun Gu, Jeon
EMC Test Engineer

Reviewed by

Dong-Hun, Jang
EMC Technical Manager

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

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REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Dec. 23, 2021	KES-EM-21T1212	Issued
Mar. 10, 2022	KES-EM-21T1212-R1	Reissuance due to the addition of a derivative
Feb. 24, 2023	KES-EM-21T1212-R2	Change the Applicant and manufacturer at the request of the customer

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1.0 General Product Description

Main Specifications of EUT are:

Video	
Imaging Device	CMOS x 2CH (Must have independent configuration)
Resolution	3328x1872, 3072x1728, 2592x1944, 2688x1520, 1920x1080, 1600x1200, 1280x1024, 1280x960, 1280x720, 1024x768, 800x600, 800x448, 720x576, 720x480, 640x480, 640x360, 320x240
Min. Illumination	Color: 0.16lux (F1.67, 1/30sec) (TBD) BW: 0 lux(IR LED on)
Max. Framerate	H.265/H.264: 6MP Max. 20fps(60Hz/50Hz) MJPEG: Max. 20fps(60Hz/50Hz)
Video Out	USB: micro USB Type B, 1280x720 for installation
Lens	
Focal Length (Zoom Ratio)	3.54~6.69mm motorized varifocal
Max. Aperture Ratio	F1.67(Wide)~F2.64(Tele)
Angular Field of View	H: 95.08°(Wide)~47.64°(Tele) / V: 50.78°(Wide)~26.7°(Tele) / D: 112.6°(Wide)~54.74°(Tele) -- TBD
Min. Object Distance	1.5m(4.92ft)
Focus Control	Simple focus
Pan / Tilt / Rotate Range	0~355°/0~78°/0~180°
Lens Type	Fixed IRIS
Operational	
Camera Title	Displayed up to 85 characters
Day & Night	Auto(ICR)
Backlight Compensation	BLC, WDR, SDR
Wide Dynamic Range	120dB
Digital Noise Reduction	SSNR, WiseNR II(using AI engine)
Digital Image Stabilization	Not Support
Defog	Not Support
Motion Detection	8ea, 8point polygonal zones
Privacy Masking	6ea rectangular zones (Nice to have 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, Hallway view(90°/270°) - Each channel separately
Analytics	- Analytics events based on AI engine: Object detection (Person/Face/Vehicle (car/truck/bus/bicycle/bike) /licence plate), Bestshot support, Attributes Not Support, IVA (Virtual line/Area, Enter/Exit, Loitering, direction, intrusion), Appear/Disappear - Analytics events : Defocus detection, Motion detection, Tampering, * Audio detection, Sound classification (with NW I/O Box)
Alarm Triggers	Analytics, Network disconnect * Alarm input(with NW I/O Box)
Alarm Events	Notification via e-mail SD/SDHC/SDXC recording at event triggers * Alarm output(with NW I/O Box)
Audio In	* Audio In (with NW I/O Box)

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Audio Out	* Audio Out (with NW I/O Box)
IR Viewable Length	15m, Wise IR (Nice to have 30m)
Network	
Ethernet	RJ-45(10/100/1000BASE-T)
Video Compression	H.265/H.264: Main/Baseline/High, MJPEG
Smart Codec	Manual(5ea 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) Multiple streaming(Up to 5 profiles)
Protocol	IPv4, IPv6, 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, LLDP
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 SUNAPI(HTTP API)
General	
Webpage Language	English, Korean, Chinese, French, Italian, Spanish, German, Japanese, Russian, Swedish, Portuguese, Czech, Polish, Turkish, Dutch, Hungarian, Greek
Edge Storage	Micro SD/SDHC/SDXC 1slot 256GB (1slots 512GB TBD)
Open platform	Open platform Application that has access to both channels
Environmental & Electrical	
Operating Temperature / Humidity	-40°C~+55°C(-40°F~+131°F) / Less than 90% RH
Storage Temperature / Humidity	-50°C~+60°C(-58°F~+140°F) / Less than 90% RH
Certification	IP66, IK10, NEMA4X (IP67 would be nice to have)
Input Voltage	PoE+
Power Consumption	<25.5watt (Typical : TBD, Max : TBD)
Mechanical	
Color / Material	White / Aluminum Hard-coated dome bubble
RAL Code	RAL9003
Product dimensions / weight	215(H) X 135(V) X 93.2(H) (mm) / 1.33 kg
Gangbox compatibility	Single, Double, 4" Square, 4" Octagon by using a back plate The camera mounting holes should fit at least one of the above electrical boxes

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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

Add derivative model for vendor management

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
NETWORK CAMERA	PNM-A9083RVD	-	HANWHA VISION VIETNAM COMPANY LIMITED	EUT

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
PoE INJECTOR	GS728TPP	-	NETGEAR	-
Notebook	P95G001	9JM8HT2	Wistron Infocom (Chengdu) Company Limited	-
Notebook Adapter	LA65NS2-01	-	LITE-ON TECHNOLOGY (CHANGZHOU)CO.,LTD.	-
Micro SD Card	-	-	Sandisk	8 GB



1.6 External I/O Cabling

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
NETWORK CAMERA (EUT)	RJ-45	PoE INJECTOR	RJ-45	3.0	U
	Micro SD Slot	Micro SD Card	Micro SD Slot	-	-
Notebook	RJ-45	PoE INJECTOR	RJ-45	2.0	U
	DC Jack	Notebook Adapter	DC Jack	1.6	U

* Unshielded=U, Shielded=S

1.7 EUT Operating Mode(s)

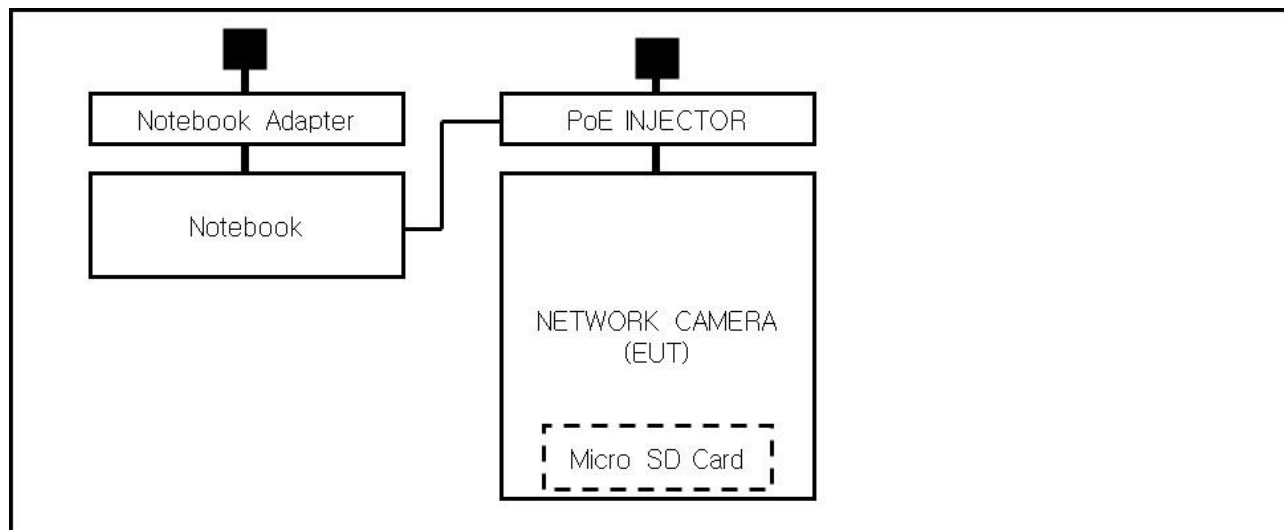
operating
EUT Monitoring, Ping Test

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 main power ports were excluded tested because, the EUT operated by PoE Powered.
- USB ports are not used and have not been tested. (For firmware update)

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 CISPR32:2015**

☒ 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	01, 15, 2022
☐	LISN	ENV216	R & S	101787	12, 29, 2021
☐	LISN	ESH2-Z5	R & S	100450	12, 29, 2021
☐	PULSE LIMITER	ESH3-Z2	R & S	101915	12, 29, 2021

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

Please refer to the Remarks when standards applied.

2.2 Conducted Emissions at Telecommunication Ports

Test Date

Dec. 18, 2021

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	01, 15, 2022
☒	LISN	ENV216	R & S	101787	12, 29, 2021
☒	LISN	ESH2-Z5	R & S	100450	12, 29, 2021
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	12, 29, 2021
☒	8-WIRE ISN CAT3,5	ENY81	R & S	100174	12, 30, 2021
☐	8-WIRE ISN CAT6	ENY81-CAT6	R & S	101665	12, 30, 2021
☐	CDN	CDNS502A	TESEQ	40431	12, 29, 2021

Test Conditions

Temperature: (22,1 ± 0,1) °C

Relative Humidity: (43,4 ± 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

Dec. 18, 2021

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	04, 01, 2022
☒	AMPLIFIER	SCU 01	R & S	100603	11, 24, 2022
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	12, 08, 2022
☒	ATTENUATOR	8491A	HP	32173	03, 10, 2022

Test Conditions

Temperature: (22,1 ± 0,1) °C

Relative Humidity: (43,8 ± 0,2) % R.H.

Frequency Range of Measurement

30 MHz to 1 GHz

Instrument Settings

IF Band Width: 120 kHz

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.

2.4 Radiated Electric Field Emissions(Above 1 GHz)

Test Date

Dec. 18, 2021

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, 03, 2022
☒	PREAMPLIFIER	8449B	AGILENT	3008A01967	04, 07, 2022
☐	ATTENUATOR	8491A	HP	35496	03, 10, 2022
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	03, 11, 2022

Test Conditions

Temperature: (22,2 ± 0,2) °C

Relative Humidity: (43,5 ± 0,2) % 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))

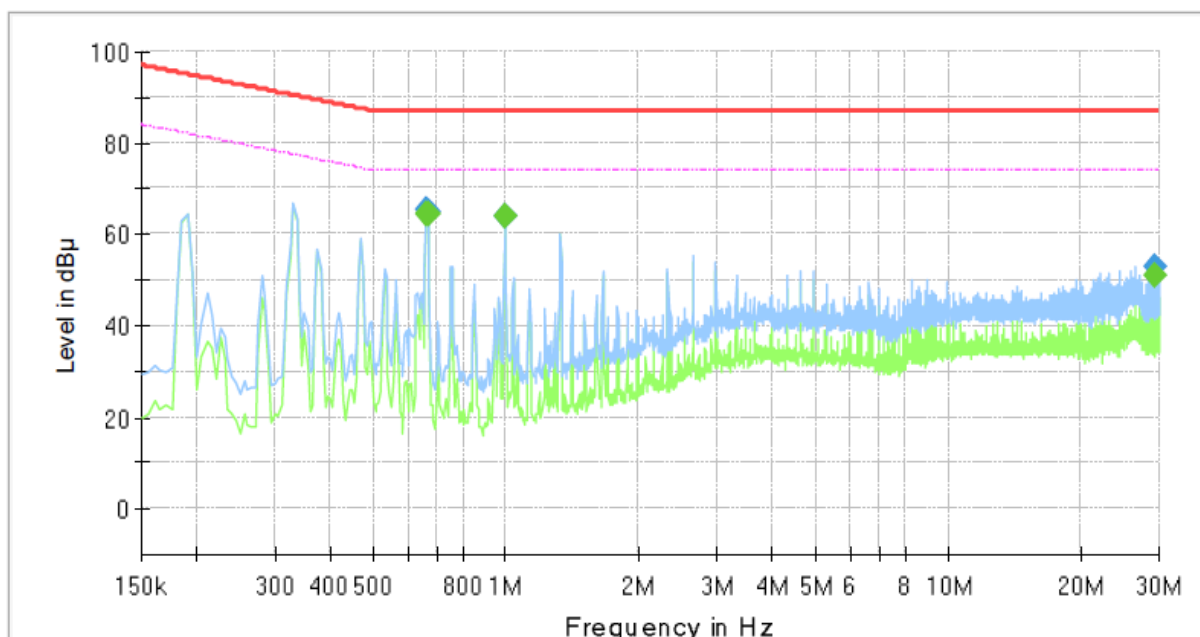
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Conducted Emissions at Telecommunication Ports

[1 000 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	PNM-A9083RVD
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)
0.660000	---	64.47	74.00	9.53	1000.0	9.000	Single Line	19.9
0.660000	65.25	---	87.00	21.75	1000.0	9.000	Single Line	19.9
0.665000	---	64.63	74.00	9.37	1000.0	9.000	Single Line	20.0
0.665000	64.73	---	87.00	22.27	1000.0	9.000	Single Line	20.0
0.995000	---	63.81	74.00	10.19	1000.0	9.000	Single Line	20.1
0.995000	63.79	---	87.00	23.21	1000.0	9.000	Single Line	20.1
29.235000	---	50.88	74.00	23.12	1000.0	9.000	Single Line	20.5
29.235000	53.15	---	87.00	33.85	1000.0	9.000	Single Line	20.5

◆ Calculation

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

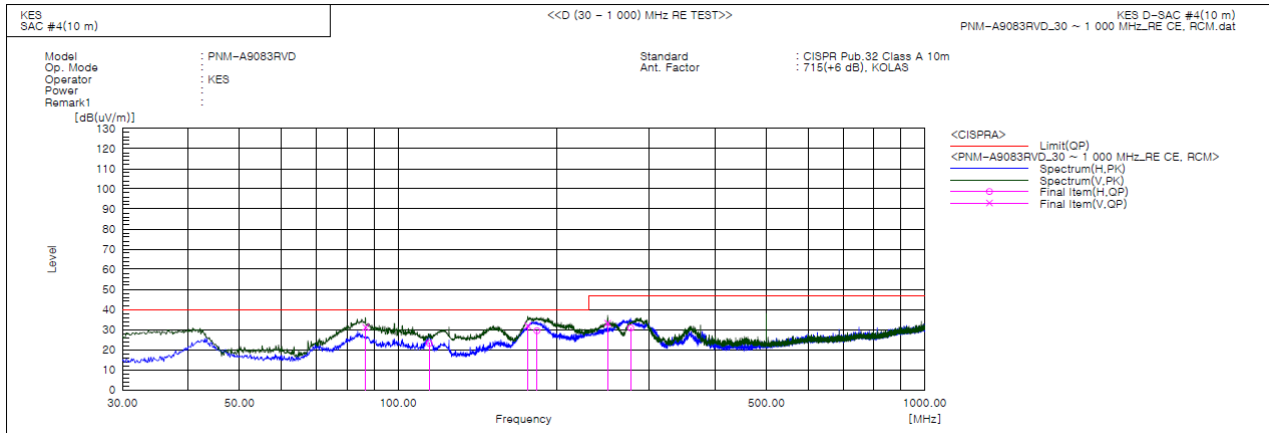
QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

Corr. : Correction values (ISN FACTOR + (Cable Loss + 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	86.792	V	56.3	-25.2	31.1	40.0	8.9	133.0	188.0	
2	114.659	H	46.0	-22.8	23.2	40.0	16.8	362.0	296.0	
3	176.372	V	55.5	-23.7	31.8	40.0	8.2	102.0	170.0	
4	183.536	H	52.4	-23.0	29.4	40.0	10.6	341.0	69.0	
5	249.962	V	52.3	-19.1	33.2	47.0	13.8	144.0	121.0	
6	276.394	H	49.4	-18.6	30.8	47.0	16.2	392.0	258.0	

◆ 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



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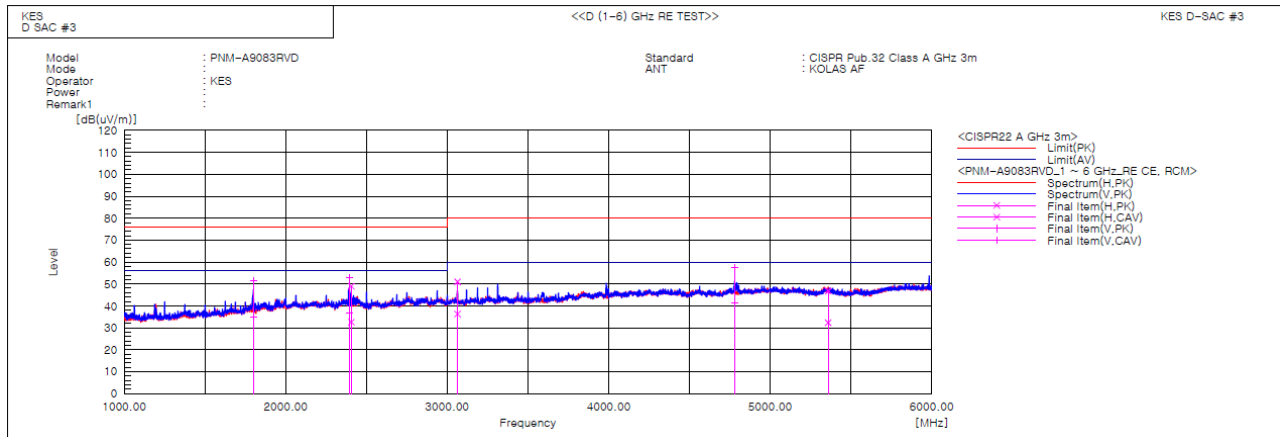
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Radiated Electric Field Emissions(Above 1 GHz)



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	1800.429	V	54.5	38.0	-3.1	51.4	34.9	76.0	56.0	24.6	21.1	100.0	148.4	
2	2393.382	V	52.8	36.5	0.2	53.0	36.7	76.0	56.0	23.0	19.3	100.0	324.8	
3	2405.293	H	48.8	32.4	0.2	49.0	32.6	76.0	56.0	27.0	23.4	100.0	354.0	
4	3063.198	H	49.2	34.5	1.8	51.0	36.3	80.0	60.0	29.0	23.7	100.0	214.0	
5	4779.491	V	49.8	33.6	7.8	57.6	41.4	80.0	60.0	22.4	18.6	100.0	164.4	
6	5359.106	H	38.5	24.0	8.3	46.8	32.3	80.0	60.0	33.2	27.7	100.0	146.6	

◆ 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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KES Co., Ltd.

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

Report No.:

KES-EM-21T1212-R2

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Test Setup Photos and Configuration

Conducted Emissions at Mains Power Ports

N/A

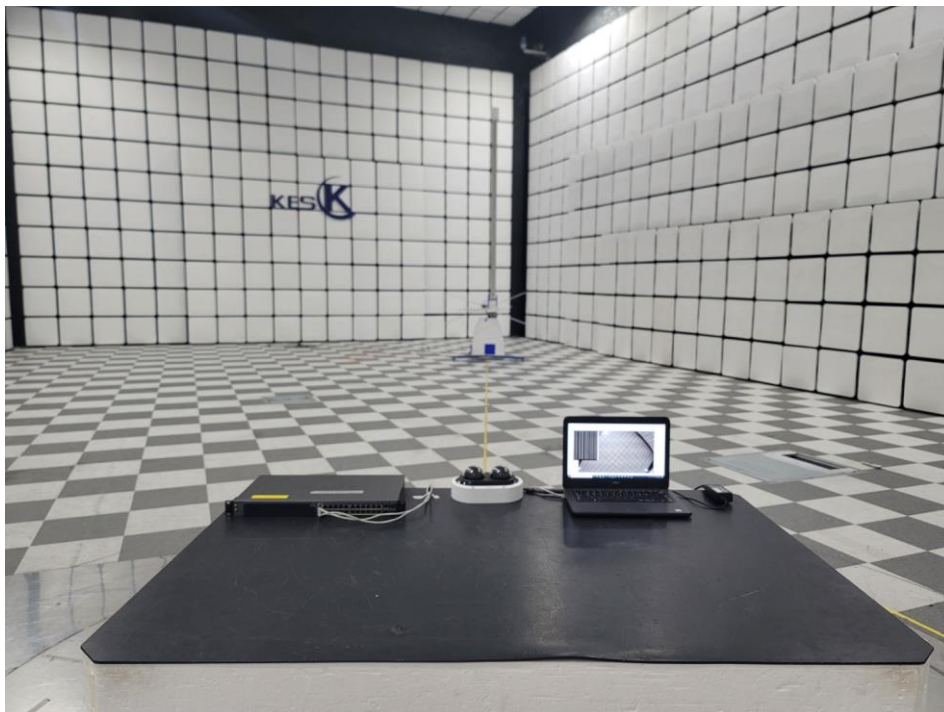
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Conducted Emissions at Telecommunication Ports



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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)



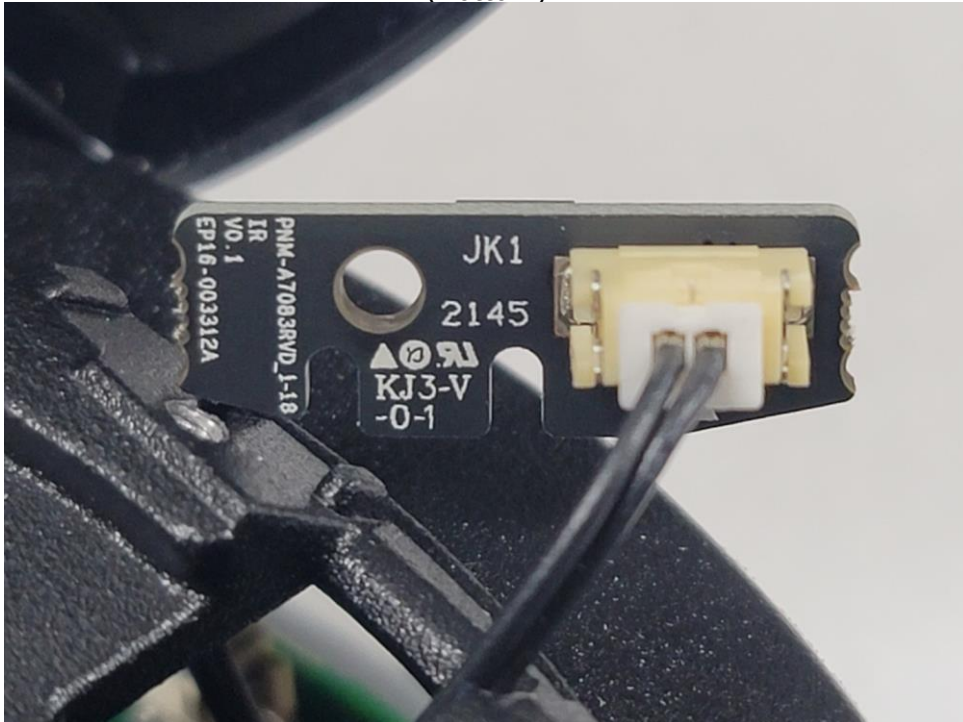
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EUT Internal View – Board 2

(Top)



(Bottom)



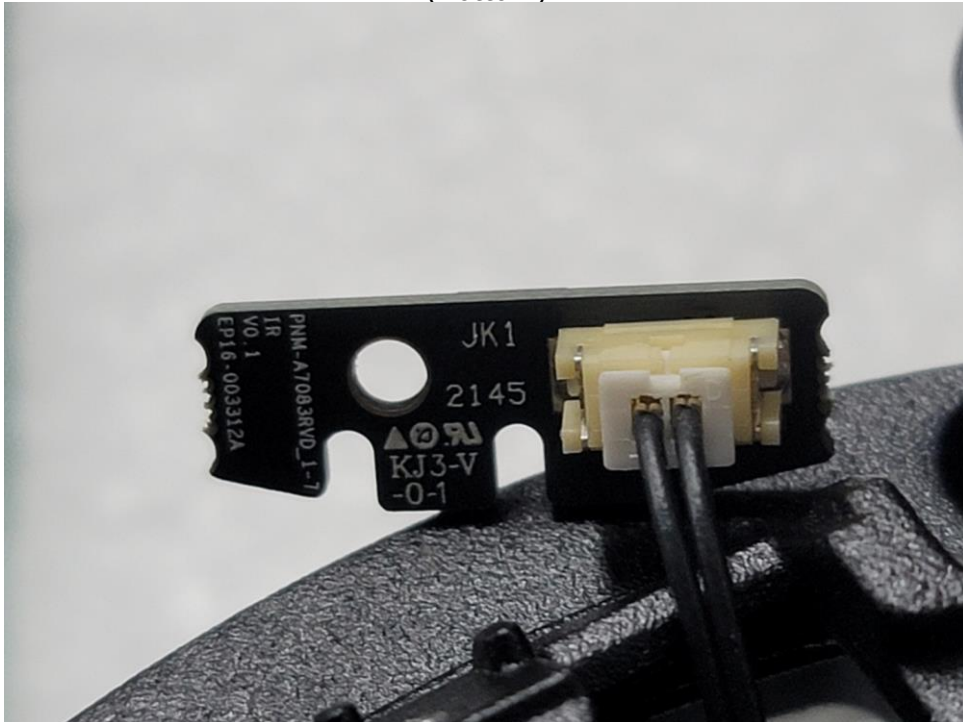
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EUT Internal View – Board 3

(Top)



(Bottom)



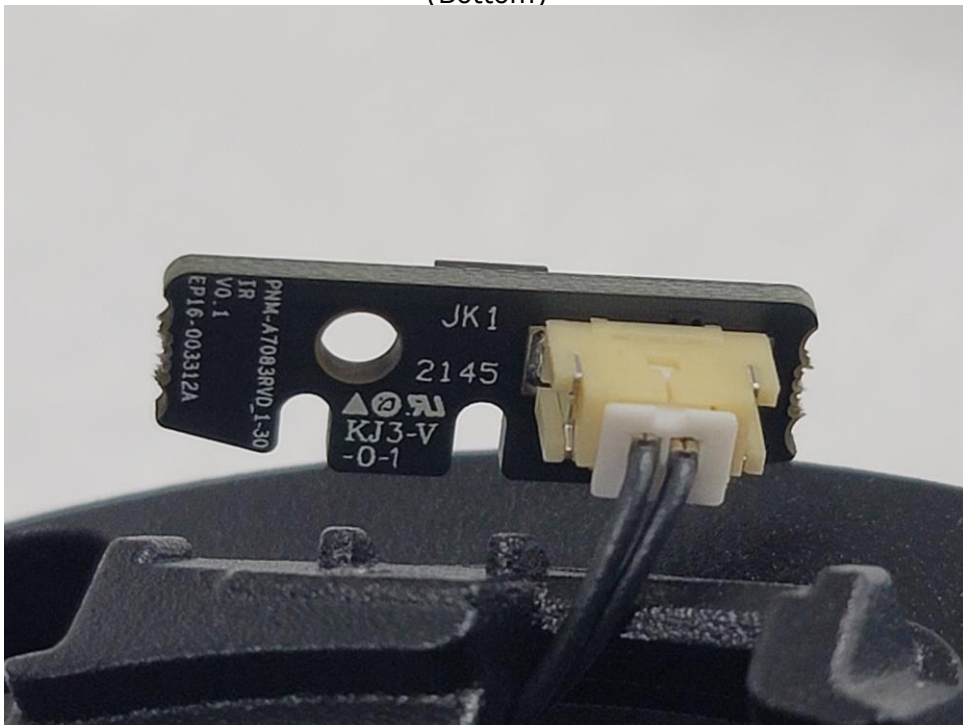
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EUT Internal View – Board 4

(Top)



(Bottom)



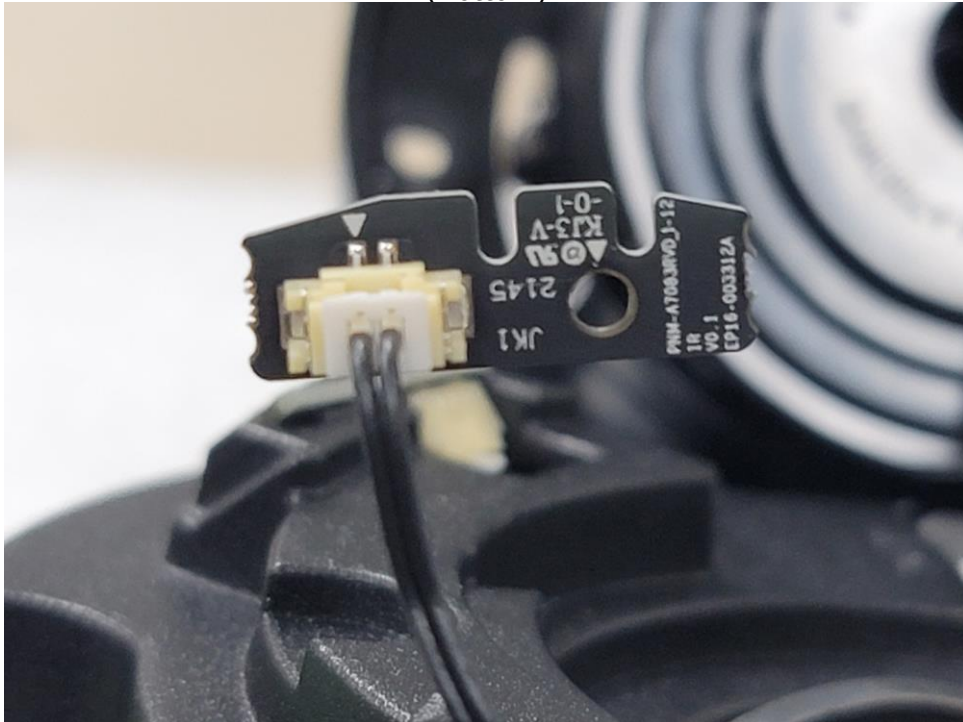
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EUT Internal View – Board 5

(Top)



(Bottom)



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EUT Internal View – Board 6

(Top)



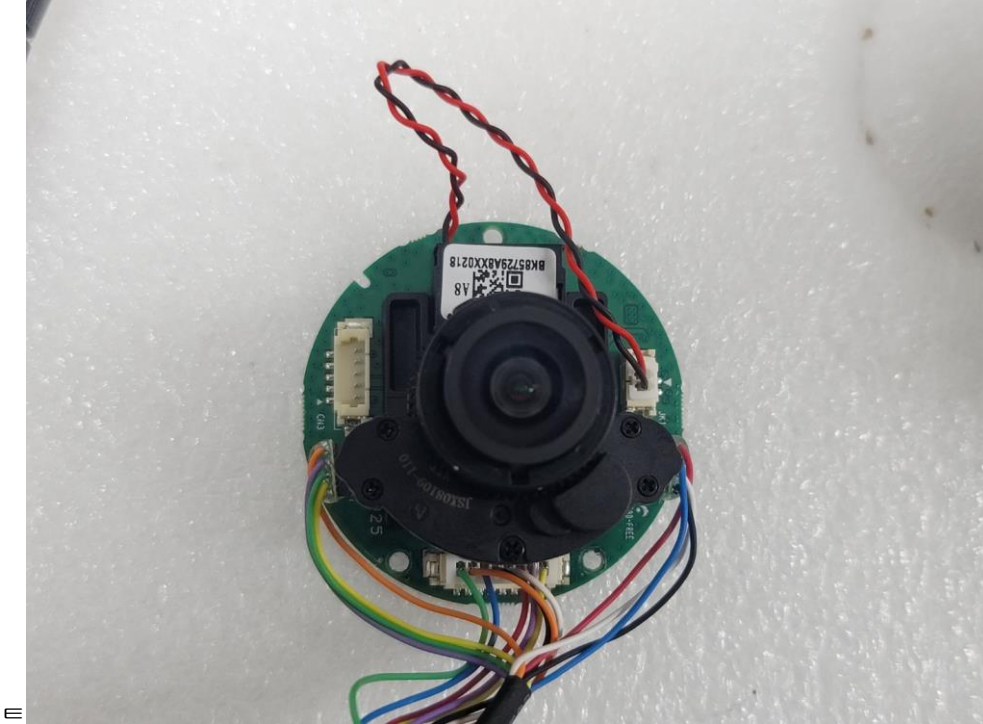
(Bottom)



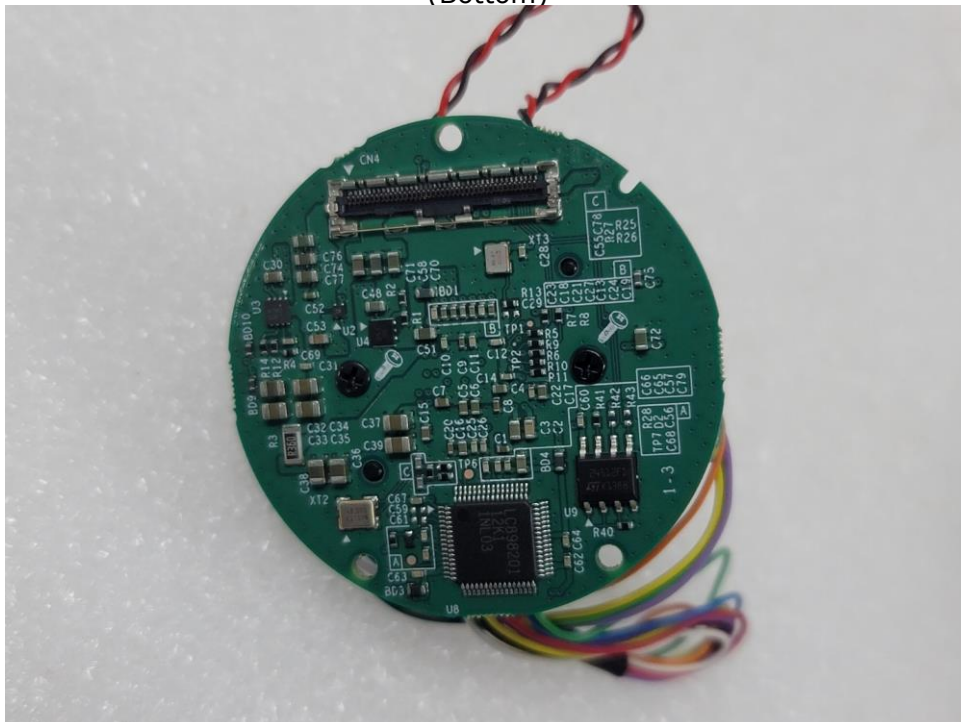
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EUT Internal View – Board 7

(Top)



(Bottom)



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