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Report No.:

KES-EM-23T0255

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EMC TEST REPORT For RCM

Test Report No. : KES-EM-23T0255

Date of Issue : Mar. 17, 2023

Product name : Network Camera

Model/Type No. : TNV-C7013RC

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 : Feb. 21, 2023

Test date : Mar. 03, 2023 ~ Mar. 07, 2023

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

Tested by

Dae Soo, Kim
EMC Test Engineer

Reviewed by

Seong Min, Choi
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
Mar. 17, 2023	KES-EM-23T0255	Issued

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1.0 General Product Description

Main Specifications of EUT are:

Video		Radiometry	
Imaging Device	1/1.8" progressive CMOS	Temperature Detect Range	None
Resolution	2048x1536, 1920x1080, 1600x1200, 1280x1024, 1280x960, 1280x720, 1024x768, 800x600, 800x480, 720x576, 720x480, 640x480, 640x360, 320x240.	Temperature Accuracy	None
Max. Framerate	H.265/H.264: Max. 30fps/25fps(60Hz/50Hz) MJPEG: Max. 30fps@3MP Max. 5fps)	Temperature Detection	None
NETD	None	Additional	None
Pixel Size	None	Network	
Min. Illumination	Color: 0.04Lux(F2.0, 1/30sec, 30IRE) BW: 0.04Lux(F2.0, 1/30sec, 30IRE), 0Lux(IR LED on)	Ethernet	Metal shielded RJ-45(10/100BASE-T)
Video Out	None	Video Compression	H.265/H.264: Main/Baseline/High, MJPEG 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
Video Transmission Distance	None	Audio Compression	Smart Codec Manual(Sea area), WiseStreamII, WiseStreamIII(Based on AI engine)
Lens		Video Quality Adjustment	H.264/H.265: Target bitrate level control MJPEG: Target bitrate level control
Focal Length (Zoom Ratio)	2.39mm fixed focal	Bitrate Control	H.264/H.265: CBR or VBR MJPEG: VBR
Max. Aperture Ratio	F2.0	Streaming	Unicast(20 users) / Multicast Multiple streaming(Up to 10 profiles, 3 virtual channel support)
Angular Field of View	H: 128°, V: 100°	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, UPnP, Bonjour, LLDP, CDP, SRTP(TCP, UDP Unicast), MQTT
Min. Object Distance	0.5m(1.64ft)	SIP support (VoIP, Peer-to-peer, SIP/P	None
Focus Control	Fixed		TPM 2.0(FIPS 140-2 level 2) 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
Lens Type	None		ONVIF Profile S/G/T/M SUNAPI(HTTP API) Wisenet open platform
Mount Type	None	General	
Optional Lens	None	Webpage Language	None
Pan / Tilt / Rotate		Web Viewer	None
Pan / Tilt / Rotate Range	None	Edge Storage	Micro SD/SDHC/SDXC 1slot 1TB
Pan Range	None	Memory	4096MB RAM, 512MB Flash
Pan Speed	None	Environmental & Electrical	
Tilt Range	None	Operating Temperature / Humidity	-10°C ~ +55°C (14°F ~ +131°F) 0~95% RH(non-condensing) Humidity control /w AIR vent
Tilt Speed	None	Storage Temperature / Humidity	-50°C ~ +60°C(-58°F ~ +140°F) / 0~90% RH
Rotate Range	None	Certification	IP66, IP6K9K, IK10+
Sequence	None	Input Voltage	PoE(IEEE802.3af, Class3)
Preset Accuracy	None	Power Consumption	PoE: Max 12.95W, typical 9.7W DC : Max 12.7W, typical 9.0W
Operational		Mechanical	
Camera Title	Displayed up to 85 characters	Color / Material	White / Aluminum
Direction Indicator	None	RAL Code	RAL9003
Day & Night	Auto(ICR)	Product Dimensions / Weight	198.3(W)x104.8(H)x198.6(D)(mm)(7.87"x4.13"x7.82"), 1.935g (4.27lb)
Backlight Compensation	BLC, HLC, WDR, SSDR	Compatible Conduit hole / Gangbox	None
Wide Dynamic Range	extremeWDR (120dB)	Hanging Mount (Dome)	None
Digital Noise Reduction	WiseNRII(Based on AI engine), SSNR V	Skin Cover	None
Digital Image Stabilization	Support	Skin Cover (Dome)	SPG-VAN13W
Defog	Support	Weather Cap (Dome)	None
Motion Detection	8ea, 8point polygonal zones	Power Module	None
Privacy Masking	32ea, 4point Quadrangle zones - Color: Gray/Green/Red/Blue/Black/White - Mosaic	Backbox	None
Gain Control	Off / Max Gain / Manual	Certifications & Standards	
White Balance	ATW / Narrow ATW / AWC / Manual / Indoor / Outdoor	Network	None
LDC	None	EMC	FCC 47 CFR 15 Subpart B Class A ICES-3(A)/NMB-3(A) CE/UKCA - EN 55032 Class A, EN 50130-4, EN 61000-3-2, EN 61000-3-3 VCCI C1SPR 32 Class A RCM AS/NZS CISPR 32 Class A KS C 9832 Class A, KS C 9835
Electronic Shutter Speed	Minimum / Maximum / Anti flicker (2~1/12,000sec) Prefer shutter control(Based on AI engine)	Safety	UL 62368-1, CAN/CSA C22.2 NO. 62368-1 IEC/EN 62471
Digital PTZ	Support(Preset, Group)	Environment	IEC/EN 63000 IEC/EN 60529 IP66, ISO 20653 IP6K9K, IEC/EN 62262 IK10+
Video Rotation	Flip, Mirror, Halfway view(90°/270°)	Video	None
Analytics	Classified object type : Person/Face/Vehicle/License plate Support DetectionShot Analytics events based on AI engine - Object detection, Virtual line(Crossing/Direction), Virtual area(Loitering/Intrusion/Enter/Exit) Analytics events - Defocus detection, Motion detection, Tampering, Audio detection, Sound classification, Virtual area(Appear/Disappear), Clothes color detection(Orange/Black/Red, @400lux)	DORI (EN62676-4 standard)	
Business Intelligence	None	Detect (25PPM/ 8PPF)	35.1m(115.16ft)
Serial Interface	None	Observe (63PPM/ 19PPF)	14m(45.93ft)
Alarm I/O	2 configurable I/O ports * Support Alarm via optional SPM-4210 I/O box	Recognize (125PPM/ 38PPF)	7.0m(22.97ft)
Alarm Triggers	Analytics, Network disconnect, Alarm input, App event, Time schedule, MQTT	Identify (250PPM/ 76PPF)	3.5m(11.48ft)
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 - MQTT: publication	LPR/ANPR/MMCR	
Audio Streaming	None	Speed Description	None
Audio In	Selectable(mic in/line in), Built-in MIC Supply voltage: 2.5VDC(4mA), Input impedance: 2K Ohm * Support Audio via optional SPM-4210 I/O box	Speed limit	None
Audio Out	Line out, Max. output level: 1Vrms	Min. Forward Distance	None
IR Viewable Length	Wise IR 15m(49.21ft)	Max. Forward Distance	None
IR Illuminator (Optional)	None	Max. Horizontal Angle	None
IR Radiation angle	None	Max. Vertical Angle	None
IR LED	None	Horizontal Offset	None
IR Wavelength	None	Camera Height	None
IR Operation	None	Lane Coverage	None
Water Removal	None	Vehicle Recognition	None
Auto Tracking	None	Available Countries	None
Coaxial Protocol	None	Wisenet Road AI LPR/ANPR/MMCR	
Color Palettes	None	Solution	None
		Speed Description	None
		Lane Coverage	None
		Speed limit	None
		Min. Forward Distance	None
		Max. Forward Distance	None
		Max. Horizontal Angle	None
		Max. Vertical Angle	None
		Horizontal Offset	None
		Camera Height	None
		Vehicle Recognition	None
		Available Countries	None

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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.

☒ AC 240 V, 50 Hz ☒ 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	TNV-C7013RC	-	HANWHA VISION VIETNAM COMPANY LIMITED	EUT

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
AC / DC ADAPTOR	KPL-048F-VI	-	I.T.E POWER SUPPLY	-
PoE SWITCH	POE29U-1AT(PL)	3115156G00001 3	Phihong Technology Co., Ltd.	-
LAPTOP	Latitude 5300	8C47BE45C060	DELL INC.	-
LAPTOP ADAPTOR	HA65NM130	-	Chicony Power Technology(Suzhou)Co., Ltd.	-
HEADSET	K550	-	Britz®	-
BUTTON ALARM	-	-	-	-
ALARM	-	-	-	-
SMART PHONE	SM-N920	-	SAMSUNG	-
Micro SD card	-	-	SanDisk	-

1.6 External I/O Cabling

■ DC Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
Network Camera (EUT)	DC JACK	AC / DC ADAPTOR	DC JACK	1.2	U
	RJ-45	LAPTOP	RJ-45	3.1	U
	MIC	HEADSET	MIC	1.8	U
	SPEAKER		SPEAKER	1.7	U
	ALARM IN	BUTTON ALARM	ALARM OUT	3.1	U
	ALARM OUT	ALARM	ALARM IN	3.1	U
	Micro SD Slot	Micro SD card	Micro SD Slot	-	-

* Unshielded=U, Shielded=S

■ PoE Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
Network Camera (EUT)	RJ-45 (PoE)	PoE SWITCH	RJ-45 (PoE)	3.1	U
	MIC	HEADSET	MIC	1.8	U
	SPEAKER		SPEAKER	1.7	U
	ALARM IN	BUTTON ALARM	ALARM OUT	3.1	U
	ALARM OUT	ALARM	ALARM IN	3.1	U
	Micro SD Slot	Micro SD card	Micro SD Slot	-	-

* Unshielded=U, Shielded=S

1.7 EUT Operating Mode(s)

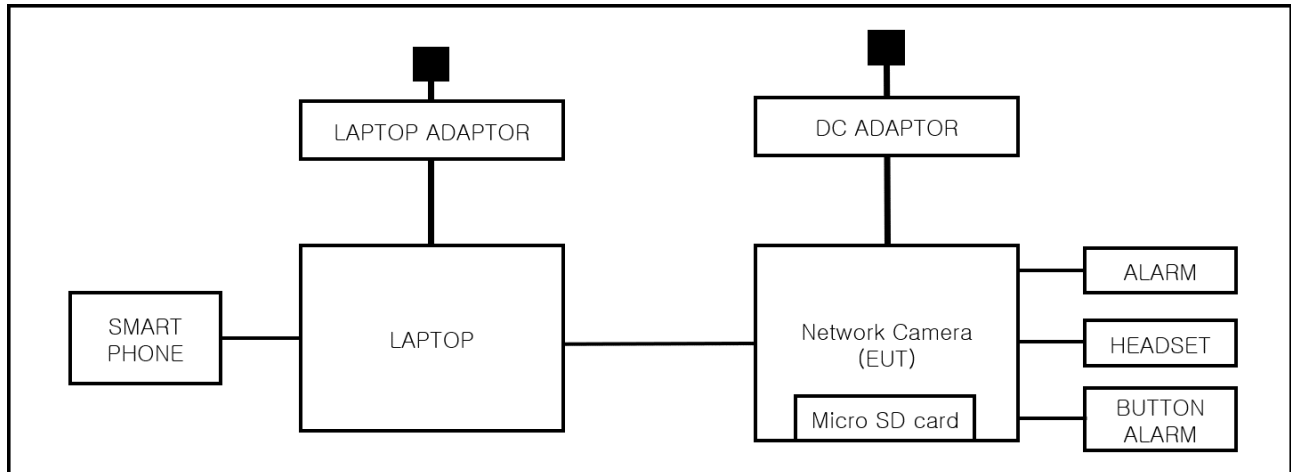
Test Mode	operating
Operation	1. Network ping test on the EUT and laptop. 2. Check if the image is output normally through the laptop's WEB VIEWER. 3. Run 1KHz Tone on the smartphone connected to the peripheral laptop to verify that it is output to the headset normally. 4. After the test, check if the micro SD card recorded properly.

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

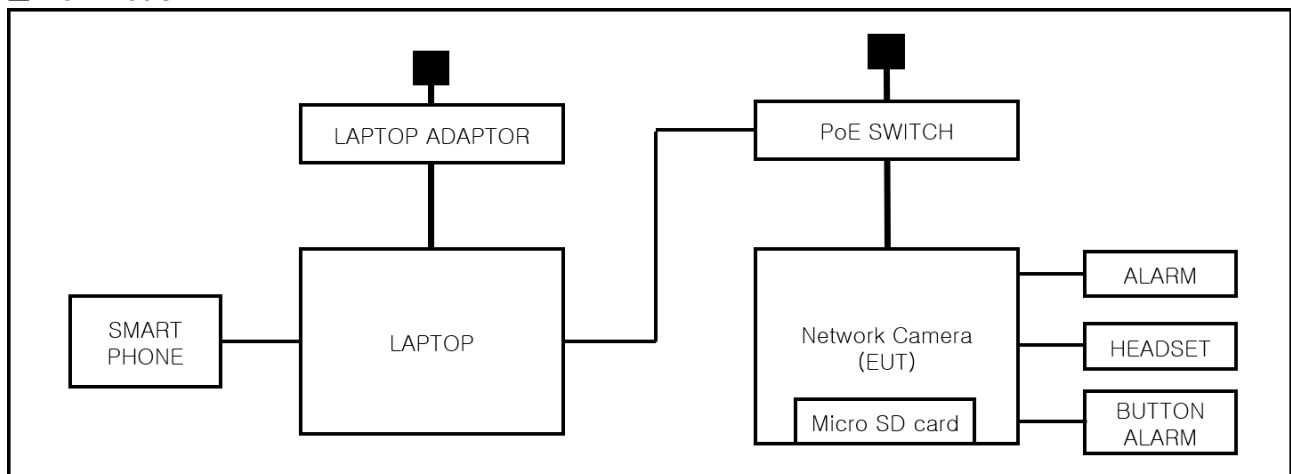
1.8 Configuration

■ AC Main
 □ DC Main

■ DC Mode



■ PoE Mode



1.9 Remarks when standards applied

N/A

1.10 Calibration Details of Equipment Used for Measurement

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

1.11 Test Facility

The measurement facility is located at 473-21, Gayeo-ro, Yeosu-si, Gyeonggi-do, 12658, Korea, 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

Mar. 06, 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

Test Conditions

Temperature: (24,2 ± 0,0) °C

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

Frequency Range of Measurement

150 kHz to 30 MHz

Instrument Settings

IF Band Width: 9 kHz

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.

2.2 Conducted Emissions at Telecommunication Ports

Test Date

Mar. 07, 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
☐	CDN	CDNS502A	TESEQ	40431	11, 10, 2023

Test Conditions

Temperature: (24,2 ± 0,0) °C

Relative Humidity: (43,2 ± 0,0) % 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

Mar. 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, 31, 2023
☒	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: (23,9 ± 0,1) °C
Relative Humidity: (43,1 ± 0,0) % 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

Mar. 05, 2023

Test Location

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, 31, 2023
☒	PREAMPLIFIER	8449B	AGILENT	3008A01742	11, 07, 2023
☒	ATTENUATOR	8491A	HP	35496	03, 03, 2024
☒	HORN ANTENNA	BBHA 9120D	SCHWARZBECK	9120D-1802	11, 08, 2023

Test Conditions

Temperature: (23,5 ± 0,1) °C

Relative Humidity: (43,2 ± 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.
- The Average of the test data is the cispr average result.

APPENDIX A – TEST DATA

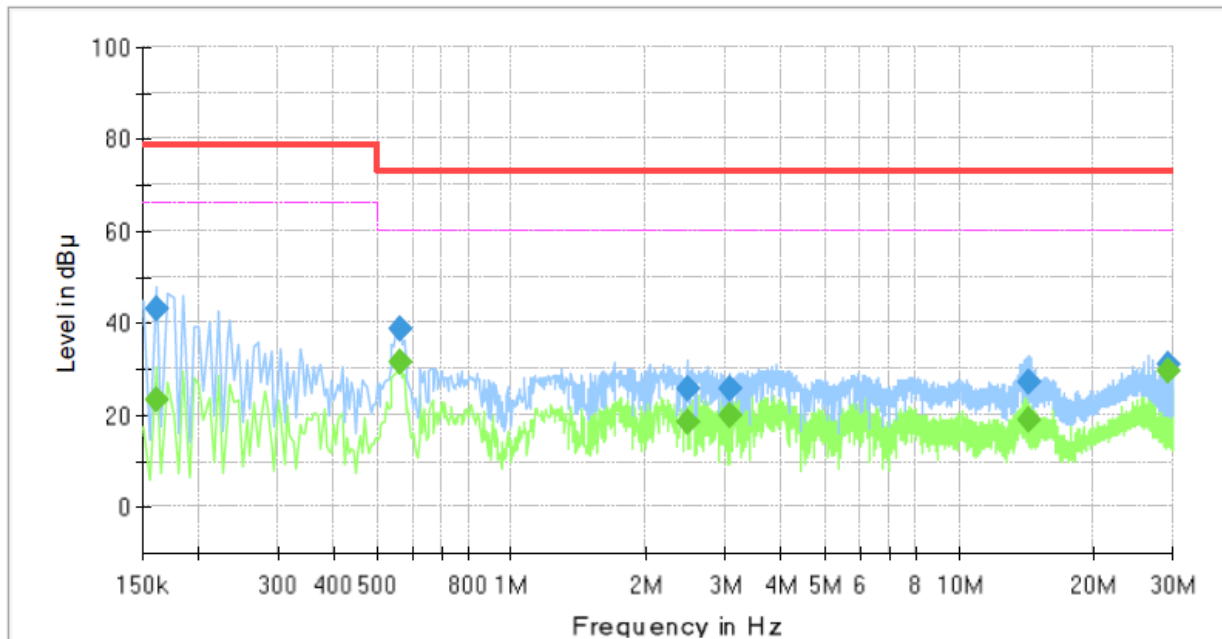
Conducted Emissions at Mains Power Ports

■ DC Mode

HOT LINE

Common Information

Test Description:	Conducted Emission
Model No.:	TNV-C7013RC
Phase:	H
Mode:	DC
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.160000	---	23.46	66.00	42.54	1000.0	9.000	L1	19.5
0.160000	42.84	---	79.00	36.16	1000.0	9.000	L1	19.5
0.560000	---	31.62	60.00	28.38	1000.0	9.000	L1	19.8
0.560000	38.56	---	73.00	34.44	1000.0	9.000	L1	19.8
2.465000	---	18.44	60.00	41.56	1000.0	9.000	L1	20.2
2.465000	25.81	---	73.00	47.19	1000.0	9.000	L1	20.2
3.060000	---	19.90	60.00	40.10	1000.0	9.000	L1	20.2
3.060000	25.75	---	73.00	47.25	1000.0	9.000	L1	20.2
14.370000	---	18.74	60.00	41.26	1000.0	9.000	L1	19.9
14.370000	27.15	---	73.00	45.85	1000.0	9.000	L1	19.9
29.235000	---	29.35	60.00	30.65	1000.0	9.000	L1	20.4
29.235000	30.81	---	73.00	42.19	1000.0	9.000	L1	20.4

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NEUTRAL LINE

Common Information

Test Description:

Model No.:

Phase:

Mode:

Operator Name:

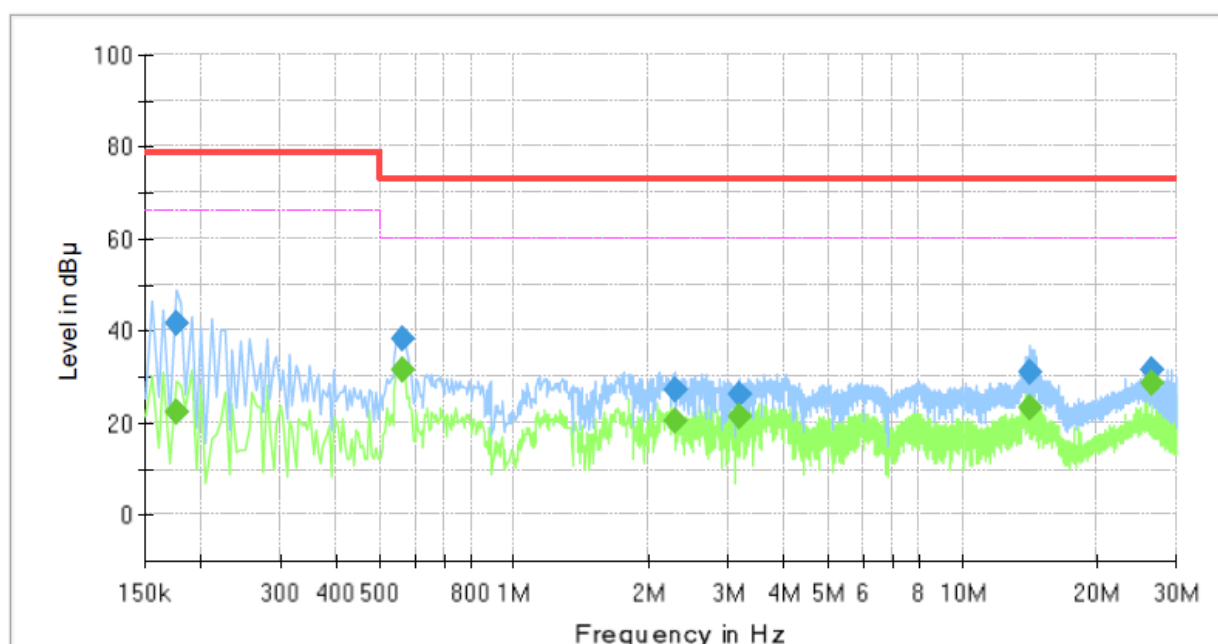
Conducted Emission

TNV-C7013RC

N

DC

KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.175000	---	22.49	66.00	43.51	1000.0	9.000	N	19.5
0.175000	41.55	---	79.00	37.45	1000.0	9.000	N	19.5
0.565000	---	31.62	60.00	28.38	1000.0	9.000	N	19.8
0.565000	38.38	---	73.00	34.62	1000.0	9.000	N	19.8
2.285000	---	20.22	60.00	39.78	1000.0	9.000	N	20.3
2.285000	27.10	---	73.00	45.90	1000.0	9.000	N	20.3
3.170000	---	21.22	60.00	38.78	1000.0	9.000	N	20.1
3.170000	26.21	---	73.00	46.79	1000.0	9.000	N	20.1
14.110000	---	23.27	60.00	36.73	1000.0	9.000	N	19.9
14.110000	30.92	---	73.00	42.08	1000.0	9.000	N	19.9
26.610000	---	28.83	60.00	31.17	1000.0	9.000	N	20.4
26.610000	31.53	---	73.00	41.47	1000.0	9.000	N	20.4

◆ Calculation

$$\text{QuasiPeak [dBuV]} / \text{CAverage [dBuV]} = \text{Reading Value [dBuV]} + \text{Corr. [dB]}$$

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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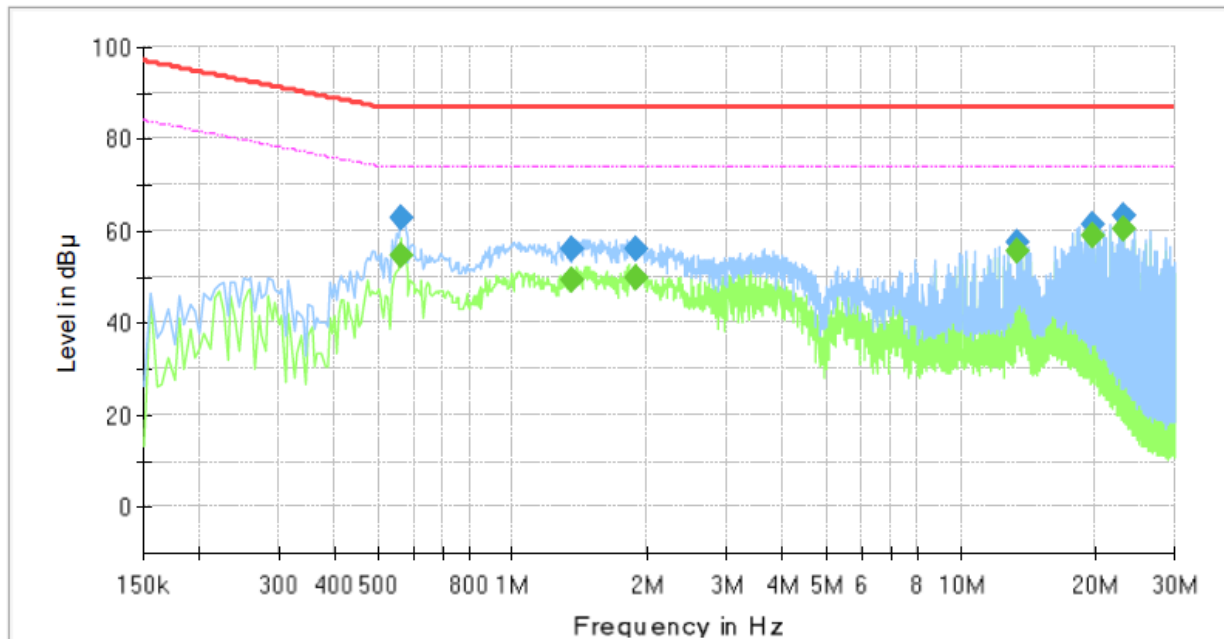
Conducted Emissions at Telecommunication Ports

■ DC Mode

[100 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	TNV-C7013RC
Mode :	DC
Speed :	100 Mbps
Operator Name:	KES



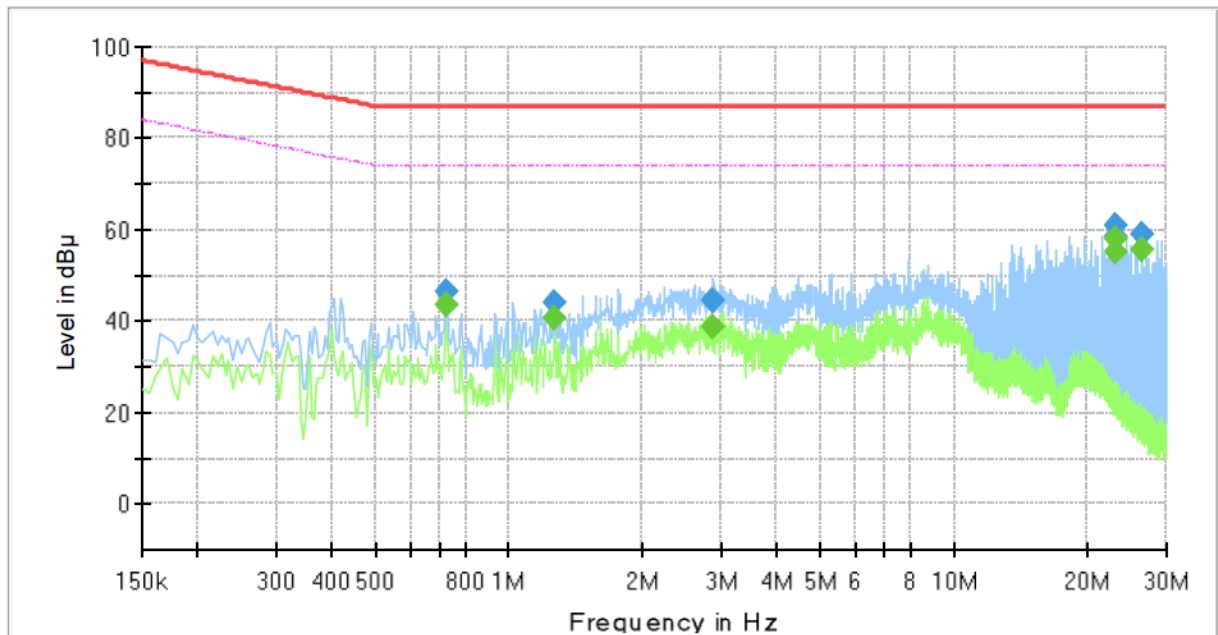
Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.560000	62.90	---	87.00	24.10	1000.0	9.000	Single Line	19.8
0.560000	---	54.83	74.00	19.17	1000.0	9.000	Single Line	19.8
1.350000	56.28	---	87.00	30.72	1000.0	9.000	Single Line	20.1
1.350000	---	49.44	74.00	24.56	1000.0	9.000	Single Line	20.1
1.885000	55.96	---	87.00	31.04	1000.0	9.000	Single Line	20.1
1.885000	---	49.88	74.00	24.12	1000.0	9.000	Single Line	20.1
13.420000	57.64	---	87.00	29.36	1000.0	9.000	Single Line	19.7
13.420000	---	55.57	74.00	18.43	1000.0	9.000	Single Line	19.7
19.710000	61.58	---	87.00	25.42	1000.0	9.000	Single Line	20.0
19.710000	---	59.12	74.00	14.88	1000.0	9.000	Single Line	20.0
23.130000	63.24	---	87.00	23.76	1000.0	9.000	Single Line	20.1
23.130000	---	60.45	74.00	13.55	1000.0	9.000	Single Line	20.1

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PoE Mode
[100 Mbps]
Common Information

Test Description:	Telecommunication Emission
Model No.:	TNV-C7013RC
Mode :	PoE
Speed :	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)
0.720000	46.48	---	87.00	40.52	1000.0	9.000	Single Line	19.9
0.720000	---	43.74	74.00	30.26	1000.0	9.000	Single Line	19.9
1.265000	44.23	---	87.00	42.77	1000.0	9.000	Single Line	20.1
1.265000	---	40.70	74.00	33.30	1000.0	9.000	Single Line	20.1
2.885000	44.57	---	87.00	42.43	1000.0	9.000	Single Line	20.0
2.885000	---	38.87	74.00	35.13	1000.0	9.000	Single Line	20.0
23.125000	58.39	---	87.00	28.61	1000.0	9.000	Single Line	20.1
23.125000	---	55.09	74.00	18.91	1000.0	9.000	Single Line	20.1
23.130000	61.02	---	87.00	25.98	1000.0	9.000	Single Line	20.1
23.130000	---	57.80	74.00	16.20	1000.0	9.000	Single Line	20.1
26.610000	---	55.75	74.00	18.25	1000.0	9.000	Single Line	20.4
26.610000	58.95	---	87.00	28.05	1000.0	9.000	Single Line	20.4

◆ Calculation

$$\text{QuasiPeak [dBuV]} / \text{CAverage [dBuV]} = \text{Reading Value [dBuV]} + \text{Corr. [dB]}$$

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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

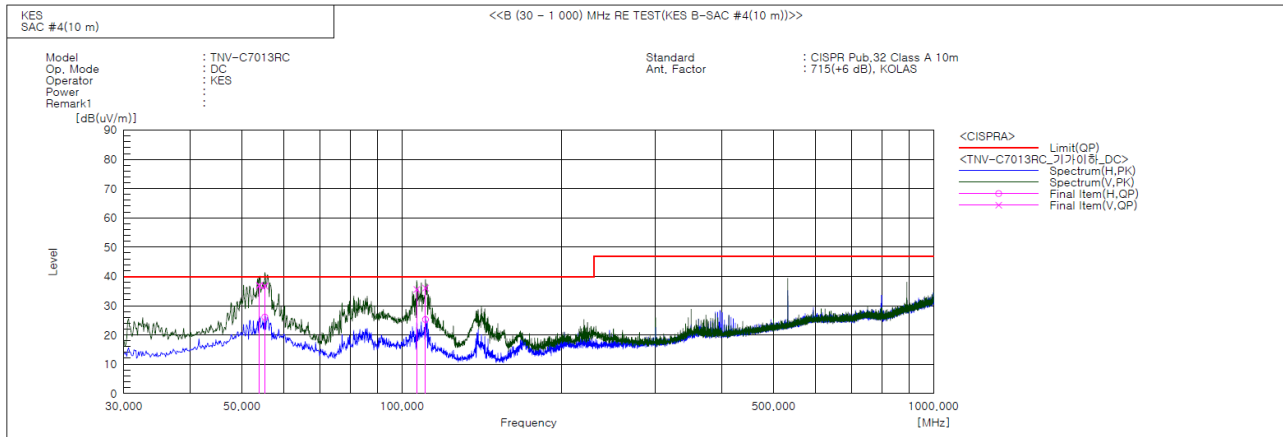
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Radiated Electric Field Emissions(Below 1 GHz)

■ DC Mode

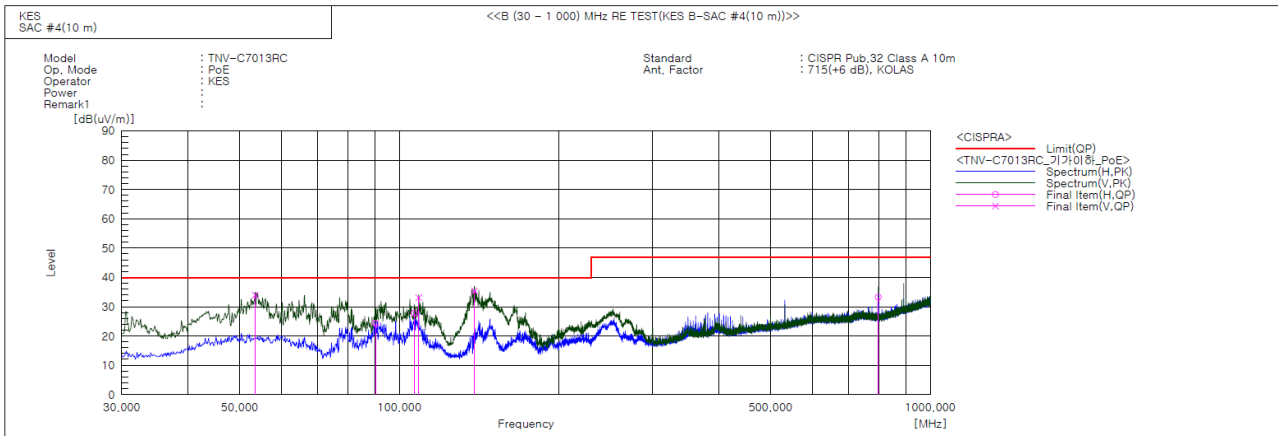


Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	53.886	V	57.7	-20.8	36.9	40.0	3.1	145.0	126.0	
2	55.220	V	57.7	-21.0	36.7	40.0	3.3	112.0	97.0	
3	55.220	H	47.1	-21.0	26.1	40.0	13.9	394.0	104.0	
4	106.630	V	58.2	-22.6	35.6	40.0	4.4	171.0	253.0	
5	110.753	V	59.0	-23.0	36.0	40.0	4.0	106.0	245.0	
6	110.753	H	48.3	-23.0	25.3	40.0	14.7	348.0	127.0	

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■ PoE Mode



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	53.523	V	54.7	-20.8	33.9	40.0	6.1	166.0	275.0	
2	90.261	H	48.4	-24.1	24.3	40.0	15.7	391.0	19.0	
3	106.630	H	50.4	-22.6	27.8	40.0	12.2	369.0	94.0	
4	108.691	V	55.9	-22.8	33.1	40.0	6.9	115.0	247.0	
5	138.398	V	60.8	-25.4	35.4	40.0	4.6	104.0	142.0	
6	797.998	H	40.7	-7.4	33.3	47.0	13.7	317.0	157.0	

◆ 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)]

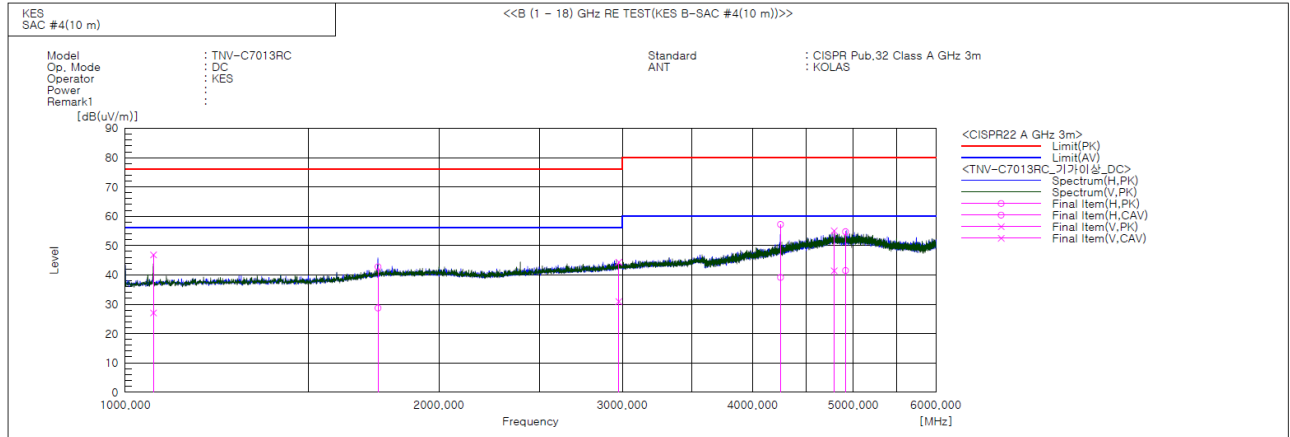
Reading(QP) : Reading value, Result(QP) : Reading value + Factor value

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



Radiated Electric Field Emissions(Above 1 GHz)

■ DC Mode

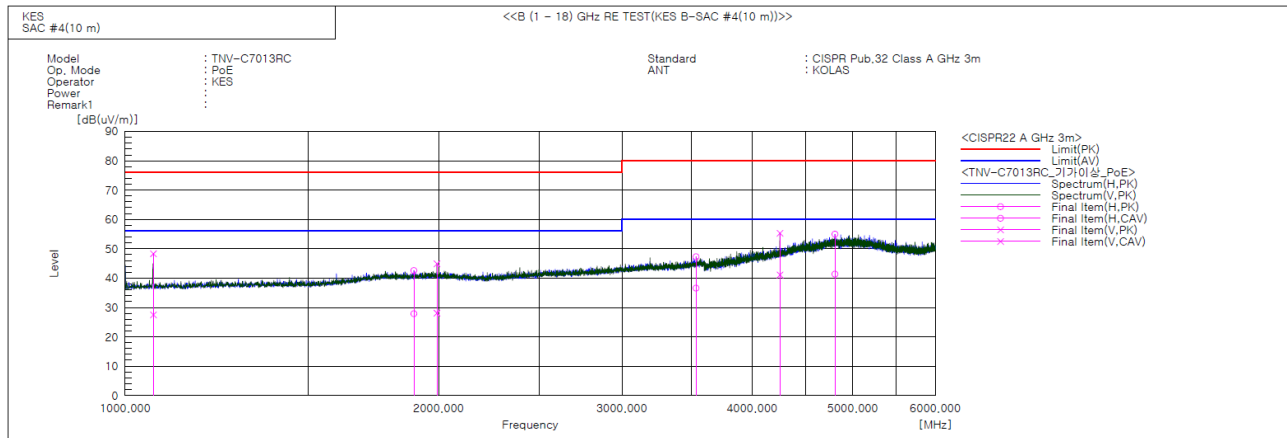


Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB(1/m)]	Result PK [dB(uV/m)]	Result CAV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin CAV [dB]	Height [cm]	Angle [deg]	Remark
1	1063.969	V	50.9	31.1	-4.0	46.9	27.1	76.0	56.0	29.1	28.9	100.0	25.0	
2	1748.125	H	41.6	27.5	1.2	42.8	28.7	76.0	56.0	33.2	27.3	100.0	147.0	
3	2976.250	V	39.1	25.7	5.3	44.4	31.0	76.0	56.0	31.6	25.0	100.0	163.0	
4	4255.457	H	43.3	25.2	13.9	57.2	39.1	80.0	60.0	22.8	20.9	100.0	349.0	
5	4792.113	V	37.2	23.6	17.8	55.0	41.4	80.0	60.0	25.0	18.6	100.0	0.0	
6	4914.306	H	36.6	23.4	18.1	54.7	41.5	80.0	60.0	25.3	18.5	100.0	157.0	



PoE Mode



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB(1/m)]	Result PK [dB(uV/m)]	Result CAV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin CAV [dB]	Height [cm]	Angle [deg]	Remark
1	1063.963	V	52.3	31.5	-4.0	48.3	27.5	76.0	56.0	27.7	28.5	100.0	28.0	
2	1893.772	H	40.8	26.1	1.8	42.6	27.9	76.0	56.0	33.4	28.1	100.0	114.0	
3	1992.561	V	42.8	26.0	2.1	44.9	28.1	76.0	56.0	31.1	27.9	100.0	264.0	
4	3534.375	H	39.0	28.3	8.3	47.3	36.6	80.0	60.0	32.7	23.4	100.0	265.0	
5	4255.625	V	41.4	27.2	13.9	55.3	41.1	80.0	60.0	24.7	18.9	100.0	79.0	
6	4806.250	H	37.2	23.6	17.8	55.0	41.4	80.0	60.0	25.0	18.6	100.0	253.0	

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

Test Setup Photos and Configuration

Conducted Emissions at Mains Power Ports

■ DC Mode



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Conducted Emissions at Telecommunication Ports

■ DC Mode



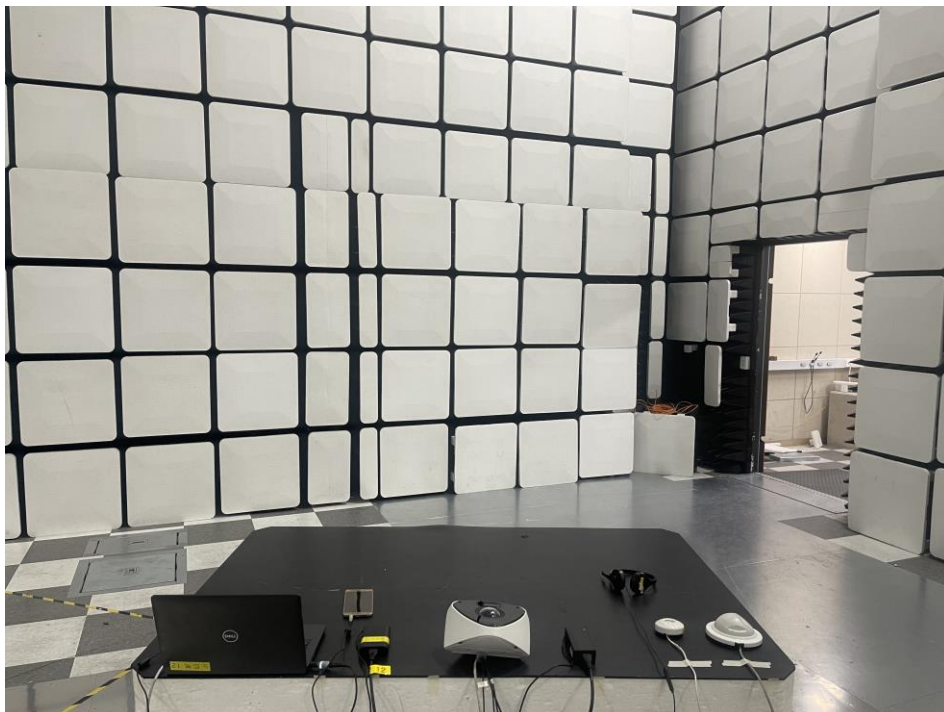
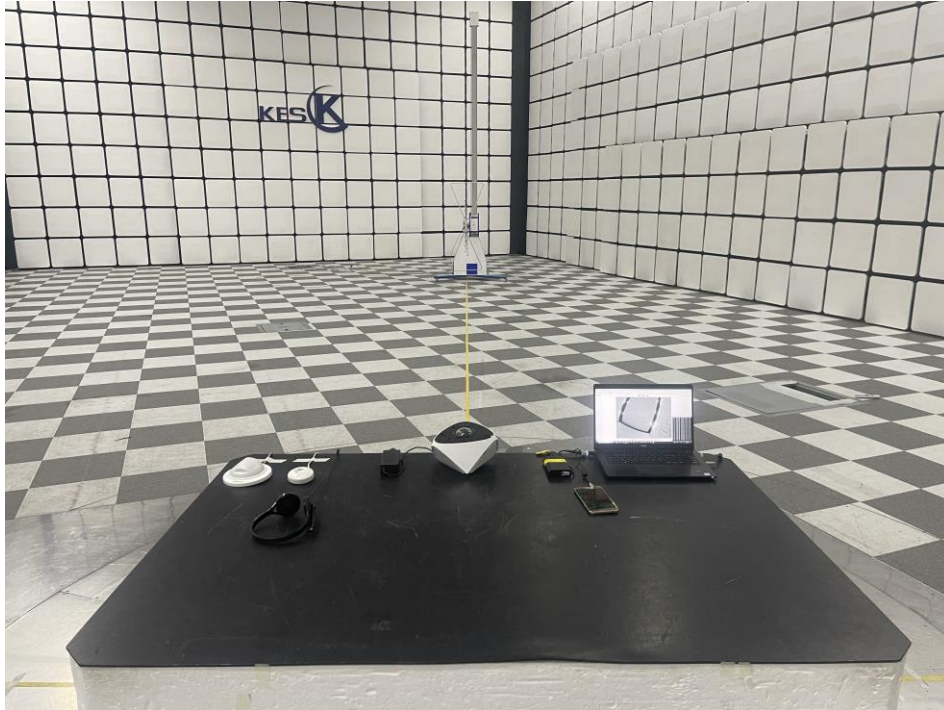
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■ PoE Mode

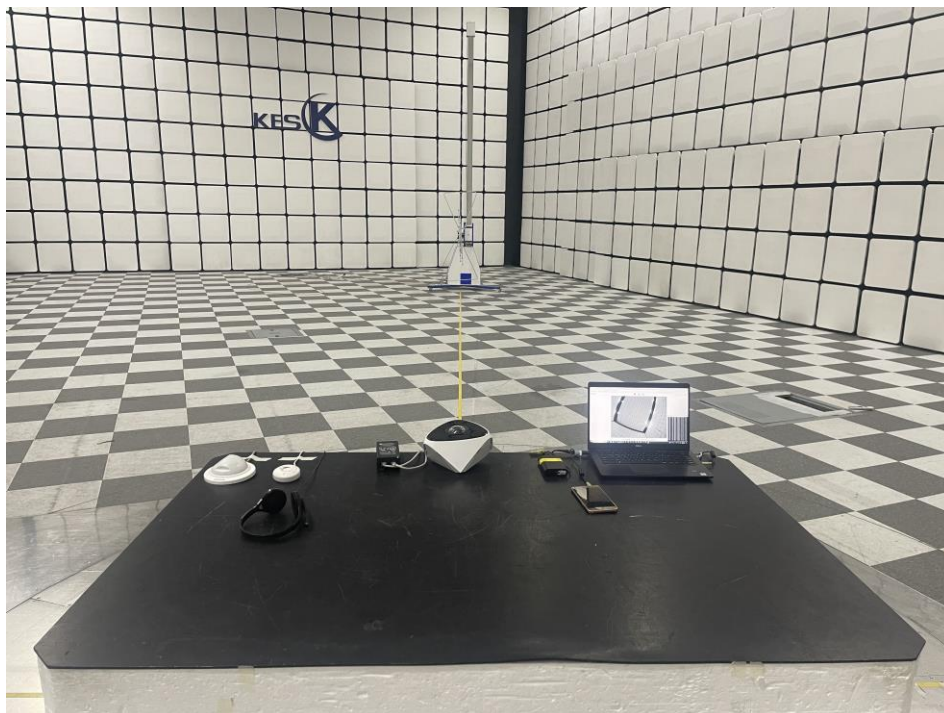


Radiated Electric Field Emissions(Below 1 GHz)

■ DC Mode



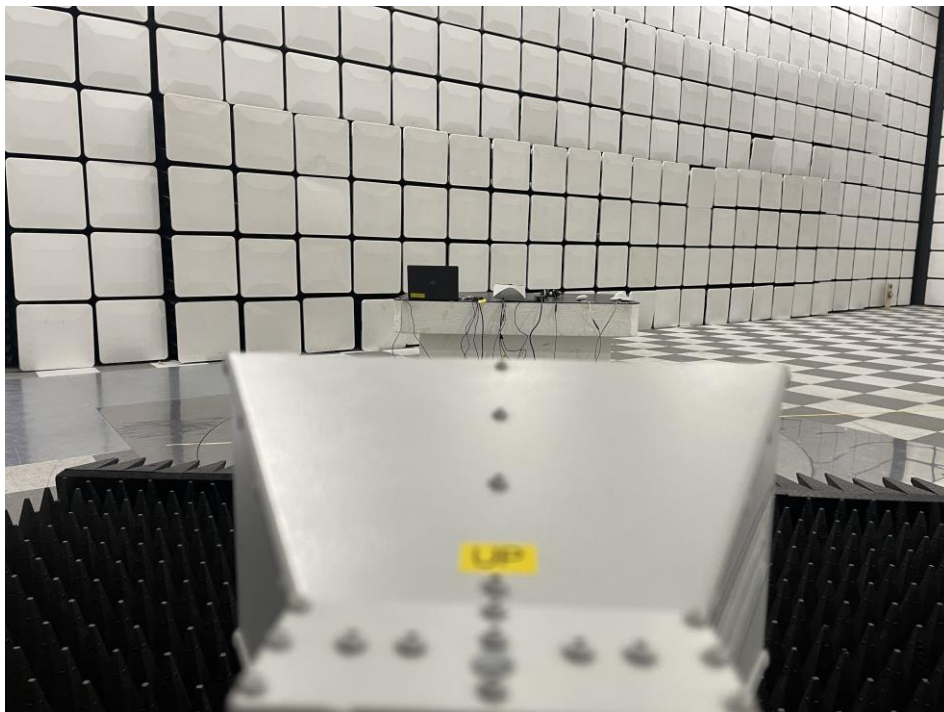
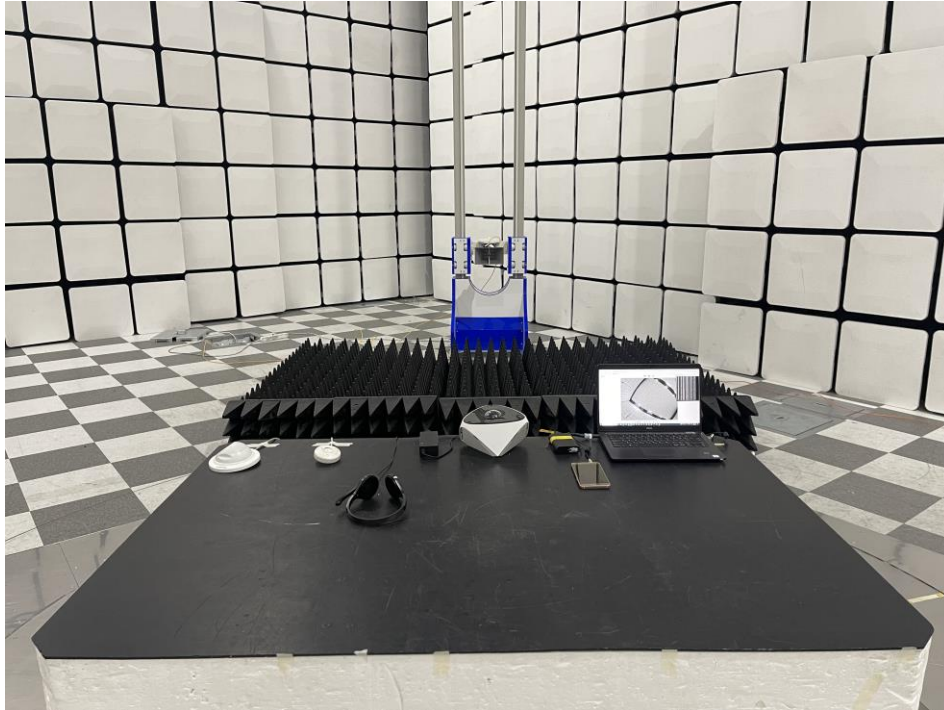
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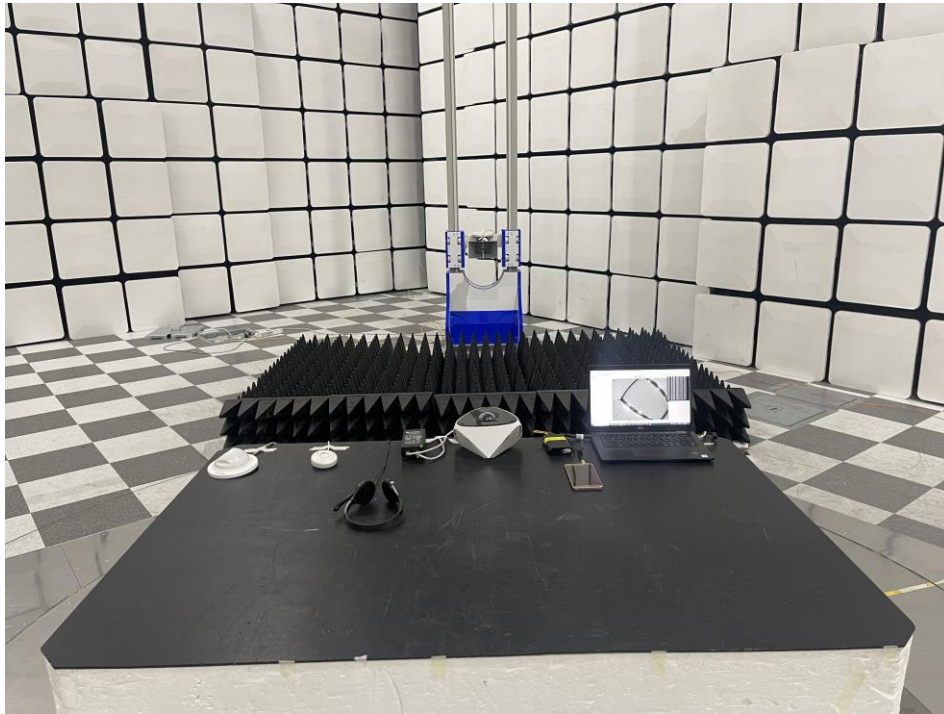
Radiated Electric Field Emissions(Above 1 GHz)

■ DC Mode



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■ PoE Mode



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EUT External Photographs

(Top)



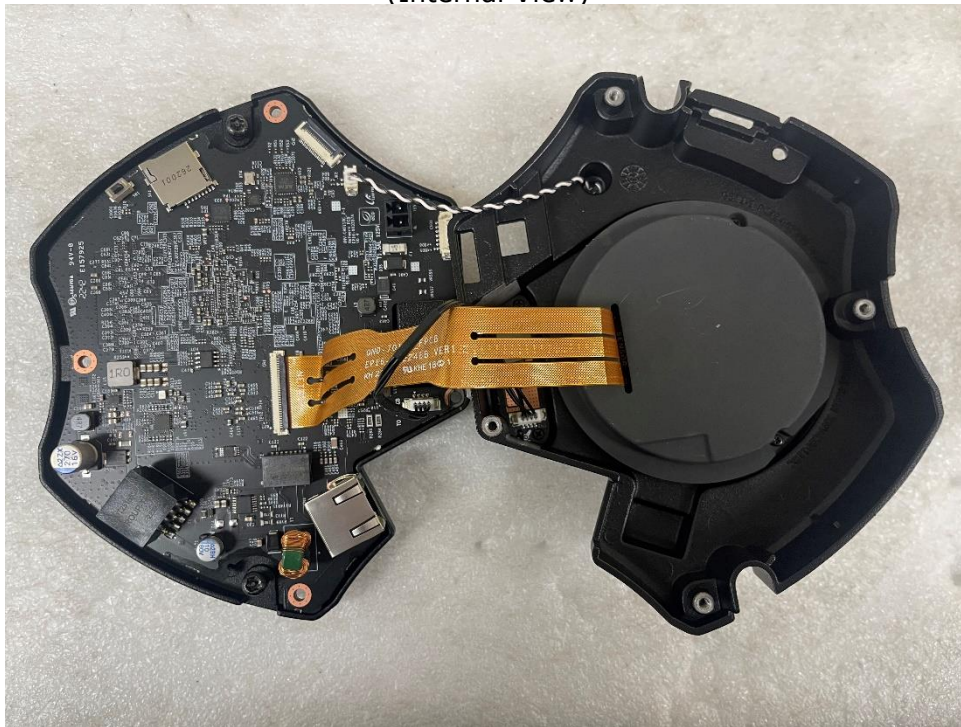
(Bottom)



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EUT Internal Photographs

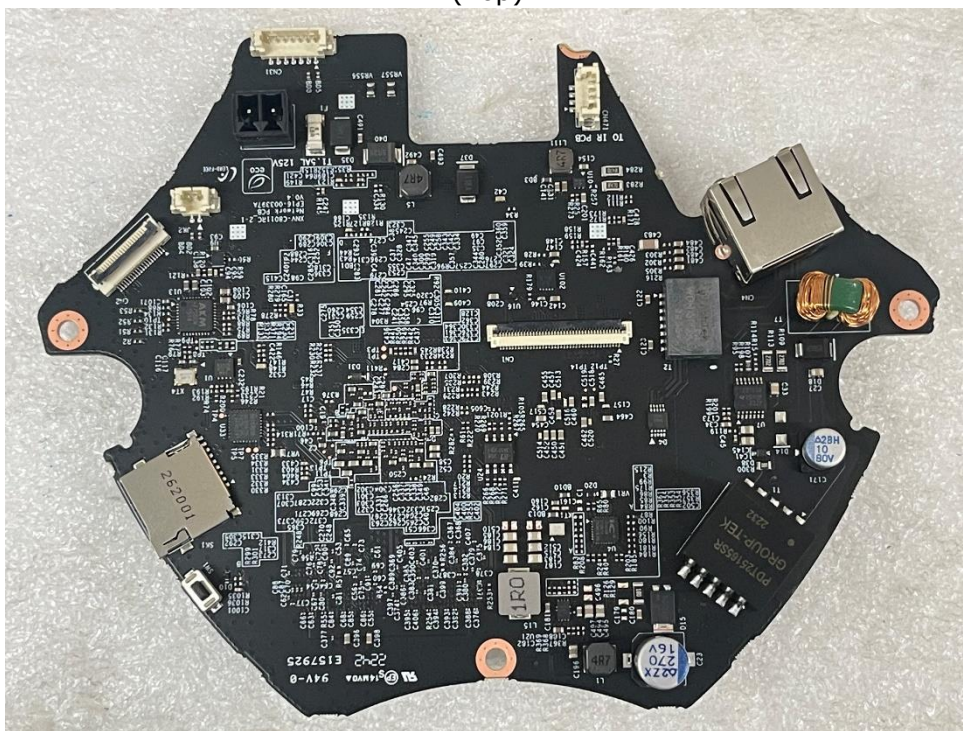
(Internal View)



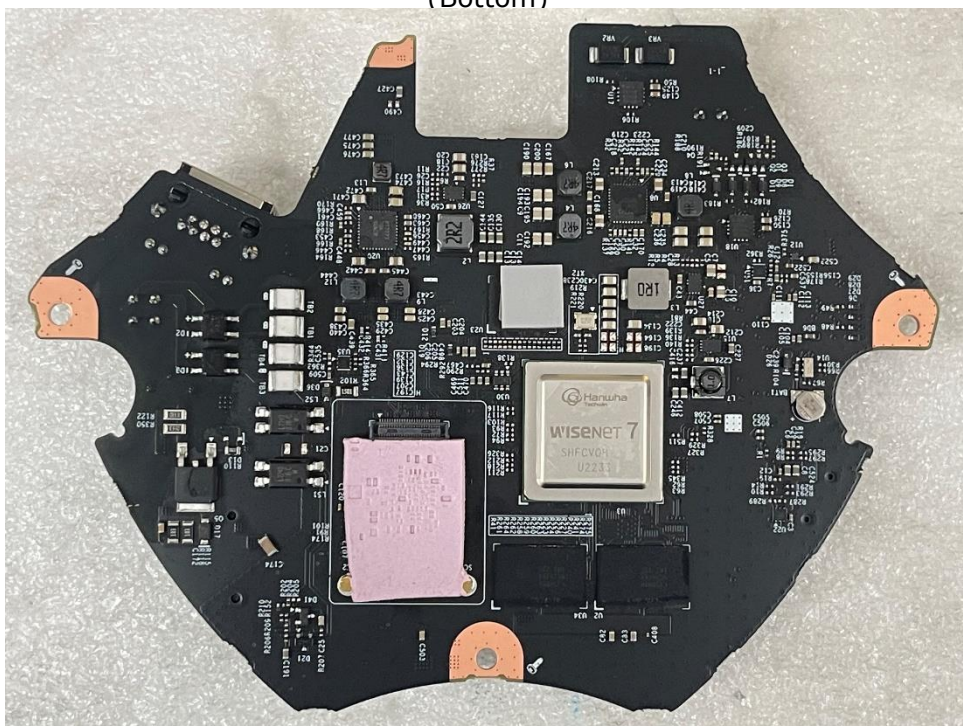
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EUT Internal View – Board 1

(Top)



(Bottom)



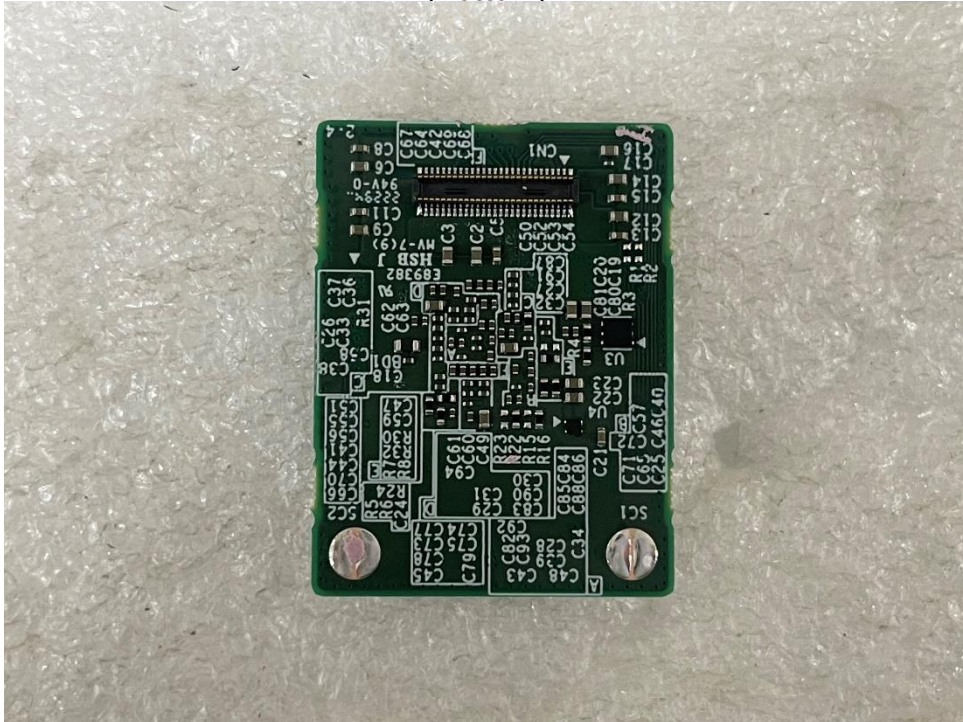
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EUT Internal View – Board 2

(Top)



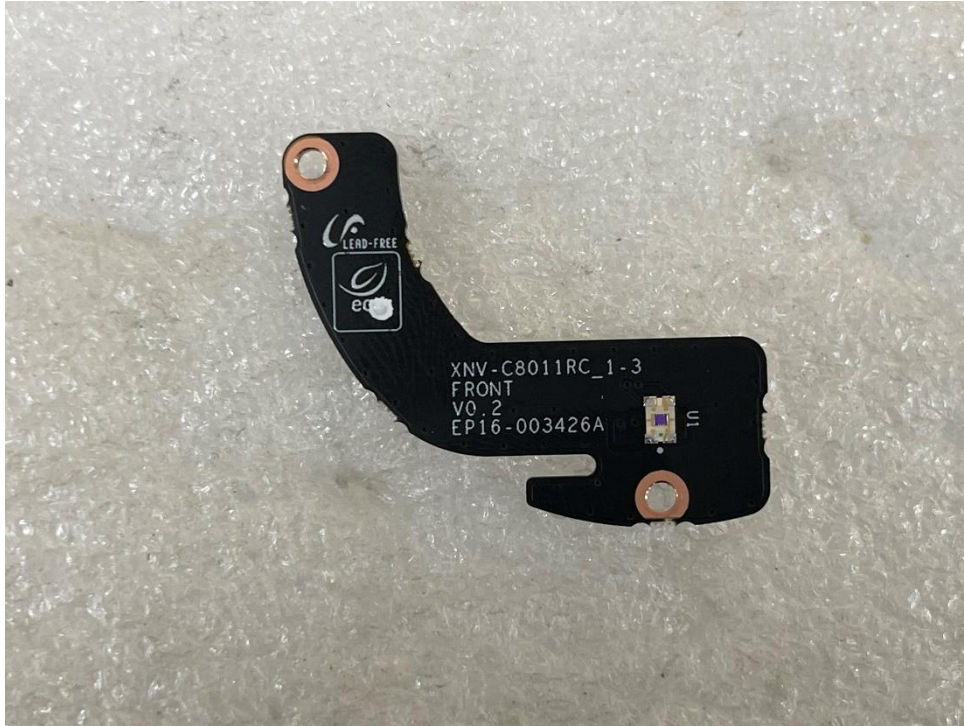
(Bottom)



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EUT Internal View – Board 3

(Top)



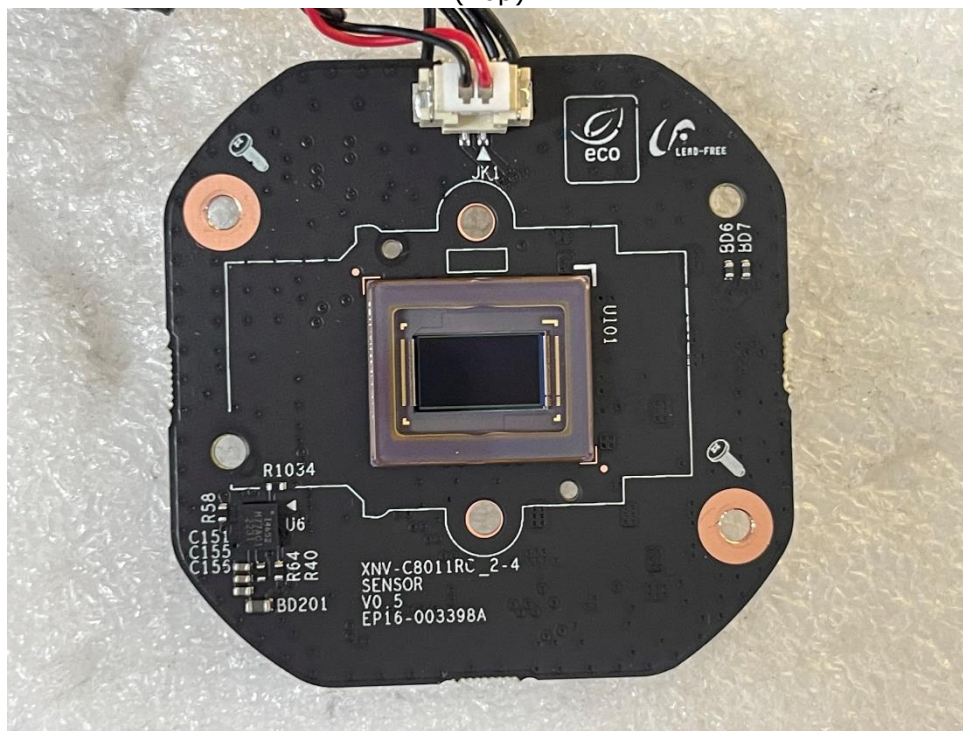
(Bottom)



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EUT Internal View – Board 4

(Top)



(Bottom)

