



# TEST REPORT



Report No. : KES-EM243582

Page 1 / 43

**KES Co., Ltd.**

#3002, #3503, #3701, 40, Simin-daero365beon-gil, Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Republic of Korea  
Tel : +82-31-425-6200, Fax : +82-31-381-3838

## 1. Client

Applicant : Hanwha Vision Co., Ltd

Applicant Address : 6, Pangyo-ro 319Beon-gil, Bundang-gu, Seongnam-si, Gyeonggi-do, Republic of Korea

## 2. Sample Description

Product name : NETWORK CAMERA

Model/Type No. : TNO-A26081

Variant Model : -

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 Ward, Bac Ninh City, Bac Ninh Province, Vietnam  
2. 173-25, Saneop-ro, Gwonseon-gu, Suwon-si, Gyeonggi- do, Korea (Suwon Industrial Complex)

3. Date of Receipt : Oct. 16, 2024

4. Test date : Oct. 24, 2024 ~ Oct. 26, 2024

5. Date of Issue : Nov. 06, 2024

6. Test Results : In Compliance

*Tested by*

*Reviewed by*

---

Eun Gu, Jeon  
EMC Test Engineer

---

Dong Hun, Jang  
EMC Technical Manager

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



REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Nov. 06, 2024	KES-EM243582	Issued

*This report shall not be reproduced except in full, without the written approval of KES Co., Ltd. This document may be altered or revised by KES Co., Ltd. personnel only, and shall be noted in the revision section of the document. Any alteration of this document not carried out by KES Co., Ltd. will constitute fraud and shall nullify the document.*



## TABLE OF CONTENTS

1.0	General Product Description.....	4
1.1	Test Voltage & Frequency .....	8
1.2	Variant Model Differences .....	8
1.3	Device Modifications .....	8
1.4	Equipment Under Test .....	8
1.5	Support Equipments .....	8
1.6	External I/O Cabling.....	9
1.7	EUT Operating Mode(s).....	10
1.8	Configuration.....	11
1.9	Remarks when standards applied .....	12
1.10	Calibration Details of Equipment Used for Measurement.....	12
1.11	Test Facility .....	12
1.12	Laboratory Accreditations and Listings .....	13
2.0	Test Regulations .....	14
2.1	Conducted Emissions at Mains Power Ports.....	15
2.2	Conducted Emissions at Telecommunication Ports.....	16
2.3	Radiated Electric Field Emissions(Below 1 GHz).....	17
2.4	Radiated Electric Field Emissions(Above 1 GHz) .....	18
APPENDIX A – TEST DATA .....		19
Conducted Emissions at Mains Power Ports .....		19
Conducted Emissions at Telecommunication Ports .....		21
Radiated Electric Field Emissions(Below 1 GHz) .....		23
Radiated Electric Field Emissions(Above 1 GHz).....		25
Test Setup Photos and Configuration.....		27
Conducted Emissions at Mains Power Ports .....		27
Conducted Emissions at Telecommunication Ports .....		28
Radiated Electric Field Emissions(Below 1 GHz) .....		30
Radiated Electric Field Emissions(Above 1 GHz).....		32
EUT External Photographs.....		34
EUT Internal Photographs.....		35



## 1.0 General Product Description

Main Specifications of EUT are:

Highest Maximum Frequency	1.2 GHz
<b>Video</b>	
Imaging Device	Diagonal 28.3mm 1.8" CMOS
Resolution	6240x4160(WideAI off 30fps, WideAI on 20fps), 3840x2160, 2880x1920, 1920x1280, 1600x1200, 1440x960, 1280x800, 1024x768, 1280x720, 720x480, 640x480
Max. Framerate	H.265/H.264: Max. 30fps MJPEG: Max. 30fps(@26MP Max. 1fps)
NETD	None
Pixel Size	None
Min. Illumination	Color : 0.2Lux(F4.0, 1/30sec) B/W : 0.02Lux(F4.0, 1/30sec)
Video Out	USB: Micro USB Type C, 1280x720 for installation
Video Transmission Distance	None
<b>Lens</b>	
Focal Length (Zoom Ratio)	55~250mm(4.54x) manual varifocal
Max. Aperture Ratio	F4(Wide)~F5.6(Tele)
Angular Field of View	H: 24°(Wide)~5.4°(Tele) V: 16°(Wide)~3.6°(Tele) D: 29°(Wide)~6.5°(Tele)
Min. Object Distance	0.85m (2.8ft)
Focus Control	Simple focus
Lens Type	Canon EF-S 55~250mm F4-5.6 IS STM
Mount Type	Canon EF-S
Optional Lens	None
<b>Pan / Tilt / Rotate</b>	
Pan / Tilt / Rotate Range	None
Pan Range	None
Pan Speed	None
Tilt Range	None
Tilt Speed	None
Rotate Range	None
Sequence	None
Preset Accuracy	None
<b>Operational</b>	
Camera Title	Displayed up to 85 characters
Direction Indicator	None
Day & Night	Auto(ICR)
Backlight Compensation	BLC, SDDR
Wide Dynamic Range	None
Digital Noise Reduction	SSNR V, WiseNR II (Based on AI engine)(revision)
Digital Image Stabilization	None
Defog	None
Motion Detection	8ea, 8point Polygonal zones
Privacy Masking	6ea, Rectangular - Color: Gray/Black/White
Gain Control	Low / Middle / High
White Balance	ATW / AWC / Manual / Indoor / Outdoor
LDC	None
Electronic Shutter Speed	Minimum / Maximum / Anti flicker (1/5~1/12,000sec) Prefer shutter control(Based on AI engine)



Digital PTZ	Flip, Mirror, Hallway view(90°/270°)
Video Rotation	Support
Analytics	Classified object type : Person/Face/Vehicle/License plate Attributes : Person(Gender, Color and Bag), Face(Age, Gender, Mask and Glasses), Vehicle(Type:car/bus/truck/motorcycle/bicycle and Color) Support Bestshot per object Analytics events based on AI engine - Object detection, Virtual line*(Crossing/Direction), Virtual area*(Loitering/Intrusion/Enter/Exit), Motion detection Analytics events - Defocus detection, Tampering, Audio detection, Virtual area(Appear/Disappear) <i>*Some of the video analytics only works with people and vehicle detection</i>
Business Intelligence	Based on AI engine: People counting, Queue management, Heatmap, Vehicle counting
Serial Interface	None
Alarm I/O	2 configurable I/O ports
Alarm Triggers	Analytics, Network disconnect, Alarm input, App event, Time schedule, MQTT subscription
Alarm Events	When alarm trigger occurred - File upload(image/video clip): e-mail/FTP/SFTP - 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
Audio Streaming	None
Audio In	Selectable(mic in/line in) Supply voltage: 2.5VDC(4mA), Input impedance: 2K Ohm
Audio Out	Line out, Max.output level: 1Vrms
Light Type	None
Light Viewable Length	None
IR Viewable Length	None
IR Illuminator (Optional)	None
IR Radiation angle	None
IR LED	None
IR Wavelength	None
IR Operation	None
Water Removal	None
Auto Tracking	None
Coaxial Protocol	None
Color Palettes	None
<b>Radiometry</b>	
Temperature Detect Range	None
Temperature Accuracy	None
Temperature Detection	None
Additional	None
<b>Network</b>	
Ethernet	Metal shielded RJ-45(10/100/1000 BASE-T), SFP slot(100/1000Mbps)
Video Compression	H.265/H.264: Main/High, MJPEG
Audio Compression	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 Quality Adjustment	None
Bitrate Control	H.264/H.265: CBR or VBR MPEG: VBR
Streaming	Unicast(20 users) / Multicast Multiple streaming(Up to 10 profiles)
Protocol	IPv4, IPv6, TCP/IP, UDP/IP, RTP(UDP), RTP(TCP), RTCP, RTSP, NTP, HTTP, HTTPS, SSL/TLS, DHCP, FTP, SFTP, SMTP, SMTPS, ICMP, IGMP, SNMPv1/v2c/v3(MIB-2), ARP, DNS, DDNS, QoS, UPnP, Bonjour, LLDP, CDP, SRTP (TCP, UDP Unicast), MQTT
SIP support (VoIP, Peer-to-peer, S)	None
Security	None
Application Programming Interface	ONVIF Profile S/G/T/M SUNAPI(HTTP API)
<b>Security</b>	
OS / Firmware Protect	Encrypted Firmware, Secure boot, Signed Firmware
User authentication	Digest Authentication, Prevent brute-force attack
Network authentication	IEEE 802.1X (EAP-TLS, EAP-LEAP, EAP-PEAP, MSCHAPv2)
Secure Communication	HTTPS, WSS (WebSocket Secure), SRTP
Access Control	IP-based access control, MAC-based access control
Data Protect	Encryption Credentials, Encrypt compress for live recording file export
Audit	Access / System / Event Log management
Device ID	Device certificate (Hanwha Techwin Root CA)
Secure Storage	TPM(Trusted platform module), SDcard partition encrypt
Security Certificate	TPM with FIPS 140-3 level 3
<b>General</b>	
Webpage Language	None
Web Viewer	None
Edge Storage	Micro SD/SDHC/SDXC 2slot 1TB
Memory	8GB RAM, 16GB EMMC
<b>Environmental &amp; Electrical</b>	
Operating Temperature / Humidity	-40°C~+50°C (-40°F~+122°F) / 0~95% RH
Storage Temperature / Humidity	-50°C~+60°C (-58°F~+140°F) / 0~95% RH
Certification	IP66/IP67, IK10(Excluding window glass), NEMA4X
Input Voltage	HPoE(IEEE802.3bt type4, Class8, Injector not included), DC12V
Power Consumption	PoE++ : Max 44.3W, Typical : 24.9W 12VDC : Max 35.4W, Typical : 19.6W
<b>Mechanical</b>	
Color / Material	White / Aluminum, PC(Polycarbonate)
RAL Code	RAL9003
Product Dimensions / Weight	193.5x193.5x532mm(7.62"x7.62"x20.94"), 8100g(17.86 lb)
Compatible Conduit hole / Gang	None
Hanging Mount (Dome)	None
Skin Cover	None
Skin Cover (Dome)	None
Weather Cap (Dome)	None
Power Module	None
Backbox	None
Ceiling Mount (Assy)	None
Wall Mount	None
Pole Mount	None



In-ceiling Mount	None
Parapet Mount	None
Corner Mount	None
Tilt Mount	None
Housing (Box)	None
Cabinet	None
Gang Plate	None
Conduit Adaptor	None
Other Compatible Models	None
<b>Certifications &amp; Standards</b>	
Network	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 RCM AS/NZS CISPR 32 Class A KS C 9832 Class A , KS C 9835
Safety	UL 62368-1, CAN/CSA C22.2 NO. 62368-1 IEC/EN 62471
Environment	IEC/EN 63000 IEC/EN 60529 IP66/IP67, IEC/EN 62262 IK10 NEMA 250 type 4X
Video	None
<b>DORI (EN62676-4 standard)</b>	
Detect (25PPM/ 8PPF)	Wide: 587.1m(1,926.3ft) / Tele: 2,646.4m(8,682.3ft)
Observe (63PPM/ 19PPF)	Wide: 234.9m(770.5ft) / Tele: 1,058.6m(3,472.9ft)
Recognize (125PPM/ 38PPF)	Wide: 117.4m(385.3ft) / Tele: 529.3m(1,736.5ft)
Identify (250PPM/ 76PPF)	Wide: 58.7m(192.6ft) / Tele: 264.6m(868.2ft)
<b>LPR/ANPR/MMCR</b>	
Speed Description	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
Lane Coverage	None
Vehicle Recognition	None
Available Countries	None



## 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

## 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	TNO-A26081	-	HANWHA VISION VIETNAM COMPANY LIMITED	EUT

## 1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
AC/DC Adapter	KPL-048F-VI	-	Channel Well Technology (Guangzhou) Co., Ltd.	-
PoE Injector	PT-PSE109GBRO-AH-S	-	Dongguan PROCET Network Technology Co.,Ltd	-
Optical Module#1	-	-	SOLTECH	-
Optical Module#2	-	-	SOLTECH	-
Laptop	P95G001	9JM8HT2	DELL INC.	-
Laptop Adapter	HA65NM130	-	Chicony Power Technology(Suzhou)Co.,Ltd.	-
Smartphone	SM-N920S	-	Samsung Electronics Co., Ltd.	-
Headset	K550	-	Britz®	-
Alarm	-	-	-	-
Button Alarm	-	-	-	-
Micro SD Card#1	-	-	SanDisk	16 GB
Micro SD Card#2	-	-	SanDisk	16 GB





## 1.6 External I/O Cabling

■ #1

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
NETWORK CAMERA (EUT)	DC IN (Terminal)	AC/DC Adapter	Line	1.2	U
	RJ-45	Laptop	RJ-45	3.1	S
	ALARM AUDIO (SPEAKER)	Headset	Line	1.8	U
	ALARM AUDIO (MIC)				
	ALARM AUDIO (ALARM OUT)	Alarm	Line	3.1	U
	ALARM AUDIO (ALARM IN)	Button Alarm	Line	3.1	U
	SFP	Optical Module#1	SFP	-	-
	Micro SD Slot	Micro SD Card#1	Micro SD Slot	-	-
	Micro SD Slot	Micro SD Card#2	Micro SD Slot	-	-
Optical Module#1	Optical	Optical Module#2	Optical	5.0	U
PoE Injector	SFP		SFP	-	-
Laptop	DC Jack	Laptop Adapter	Line	1.4	U
	3.5 mm	Smartphone	3.5 mm	1.0	U

\* Unshielded=U, Shielded=S



## ■ #2

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
NETWORK CAMERA (EUT)	RJ-45	PoE Injector	RJ-45	3.1	S
	ALARM AUDIO (SPEAKER)	Headset	Line	1.8	U
	ALARM AUDIO (MIC)				
	ALARM AUDIO (ALARM OUT)	Alarm	Line	3.1	U
	ALARM AUDIO (ALARM IN)	Button Alarm	Line	3.1	U
	SFP	Optical Module#1	SFP	-	-
	Micro SD Slot	Micro SD Card#1	Micro SD Slot	-	-
	Micro SD Slot	Micro SD Card#2	Micro SD Slot	-	-
Optical Module#1	Optical	Optical Module#2	Optical	5.0	U
PoE Injector	SFP		SFP	-	-
Laptop	DC Jack	Laptop Adapter	Line	1.4	U
	3.5 mm	Smartphone	3.5 mm	1.0	U
	RJ-45	PoE Injector	RJ-45	0.8	S

\* Unshielded=U, Shielded=S

## 1.7 EUT Operating Mode(s)

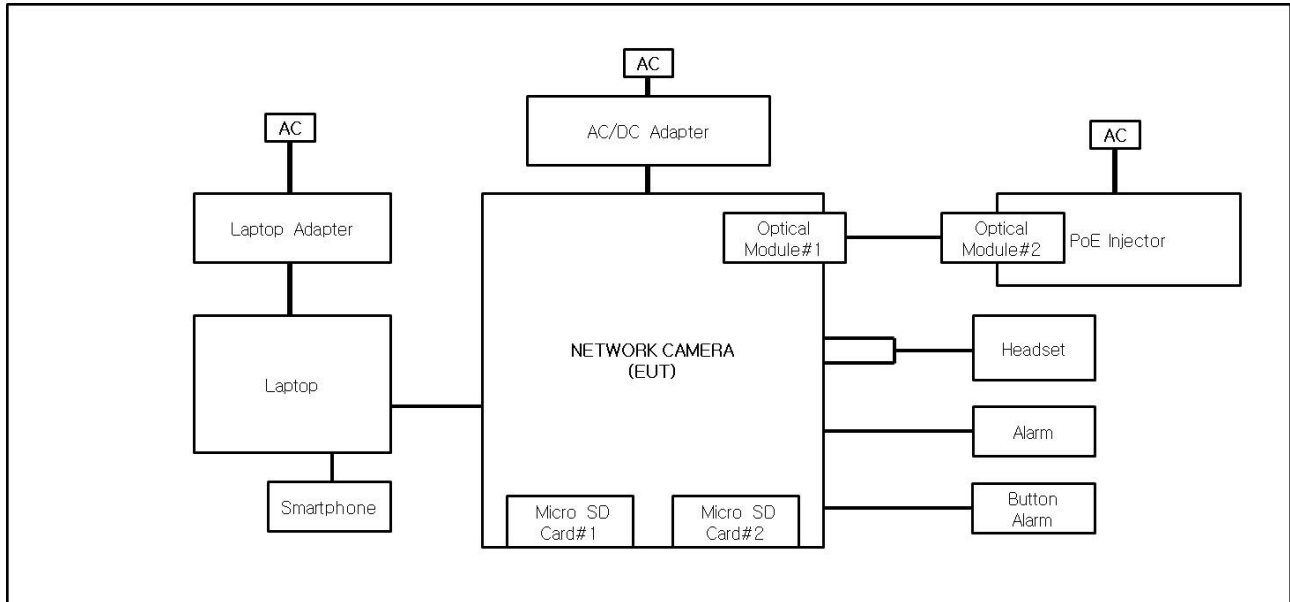
Division	Test mode	Normal operating	Test Voltages
#1	DC	<ul style="list-style-type: none"> <li>- Monitoring EUT Using Web Viewer, Ping Test</li> <li>- Check Audio Port Behavior Through Headset</li> <li>- When the Button Alarm is pressed, make sure the Alarm is working</li> <li>- Check the operation of the SFP port through a link in PoE Injector</li> <li>- Check the files stored on the Micro SD Card after testing</li> </ul>	AC 240 V, 50 Hz
#2	PoE		

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

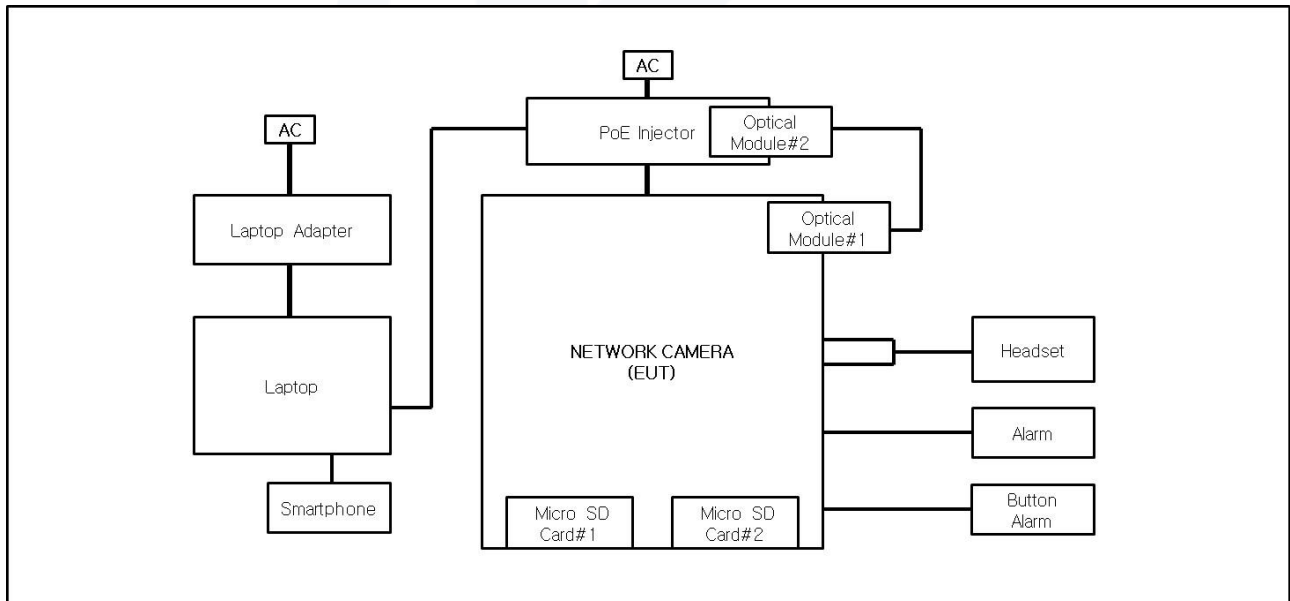


## 1.8 Configuration

■ #1



■ #2





### 1.9 Remarks when standards applied

- The USB C Type port was excluded from the test as a port for administrators.
- It receives PoE power, and the PoE port is considered a wired network port.
- 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 0008



## 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





## 2.1 Conducted Emissions at Mains Power Ports

**Test Date**

Oct. 24, 2024

**Test Location**

Electro wave Shieldroom #6

**Test Equipment**

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMI Test S/W	EMC32	R & S	9.12.00	-
<input checked="" type="checkbox"/>	EMI TEST RECEIVER	ESR3	R & S	101783	11, 08, 2024
<input checked="" type="checkbox"/>	LISN	ENV216	R & S	101787	11, 08, 2024
<input checked="" type="checkbox"/>	LISN	ESH2-Z5	R & S	100450	11, 08, 2024
<input checked="" type="checkbox"/>	PULSE LIMITER	ESH3-Z2	R & S	101915	11, 08, 2024

**Test Conditions**

Temperature: (24,1 ± 0,1) °C

Relative Humidity: (47,0 ± 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.



## 2.2 Conducted Emissions at Telecommunication Ports

**Test Date**

Oct. 24, 2024

**Test Location**

Electro wave Shieldroom #6

**Test Equipment**

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMI Test S/W	EMC32	R & S	9.12.00	-
<input checked="" type="checkbox"/>	EMI TEST RECEIVER	ESR3	R & S	101783	11, 08, 2024
<input checked="" type="checkbox"/>	LISN	ENV216	R & S	101787	11, 08, 2024
<input checked="" type="checkbox"/>	LISN	ESH2-Z5	R & S	100450	11, 08, 2024
<input checked="" type="checkbox"/>	PULSE LIMITER	ESH3-Z2	R & S	101915	11, 08, 2024
<input type="checkbox"/>	8-WIRE ISN CAT3,5	ENY81	R & S	100174	11, 09, 2024
<input checked="" type="checkbox"/>	ISN	ISN S8	SCHWARZBECK	ISN-S8-0019	03, 05, 2025

**Test Conditions**

Temperature: (24,1 ± 0,1) °C

Relative Humidity: (47,0 ± 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.





## 2.3 Radiated Electric Field Emissions(Below 1 GHz)

**Test Date**

Oct. 25, 2024

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

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.0	-
<input checked="" type="checkbox"/>	EMI TEST RECEIVER	ESU26	R & S	100551	02, 13, 2025
<input checked="" type="checkbox"/>	AMPLIFIER	SCU 01	R & S	100603	11, 08, 2024
<input checked="" type="checkbox"/>	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	11, 17, 2024
<input checked="" type="checkbox"/>	ATTENUATOR	8491A	HP	32173	02, 13, 2025

**Test Conditions**

Temperature: (23,3 ± 0,1) °C

Relative Humidity: (46,8 ± 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**

Oct. 26, 2024

**Test Location**

SEMI ANECHOIC CHAMBER #5

**Test Equipment**

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMI Test S/W	ES10/RE	TOYO Corporation	2022.01.000	-
<input checked="" type="checkbox"/>	EMI TEST RECEIVER	ESU26	Rohde & Schwarz	100552	02, 13, 2025
<input checked="" type="checkbox"/>	HORN ANTENNA	BBHA 9120D	SCHWARZBECK	9120D-1802	11, 03, 2024
<input checked="" type="checkbox"/>	PREAMPLIFIER	8449B	HP	3008A00538	04, 30, 2025
<input checked="" type="checkbox"/>	ATTENUATOR	8491B	HP	23094	02, 13, 2025

**Test Conditions**

Temperature: (22,9 ± 0,1) °C

Relative Humidity: (46,0 ± 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

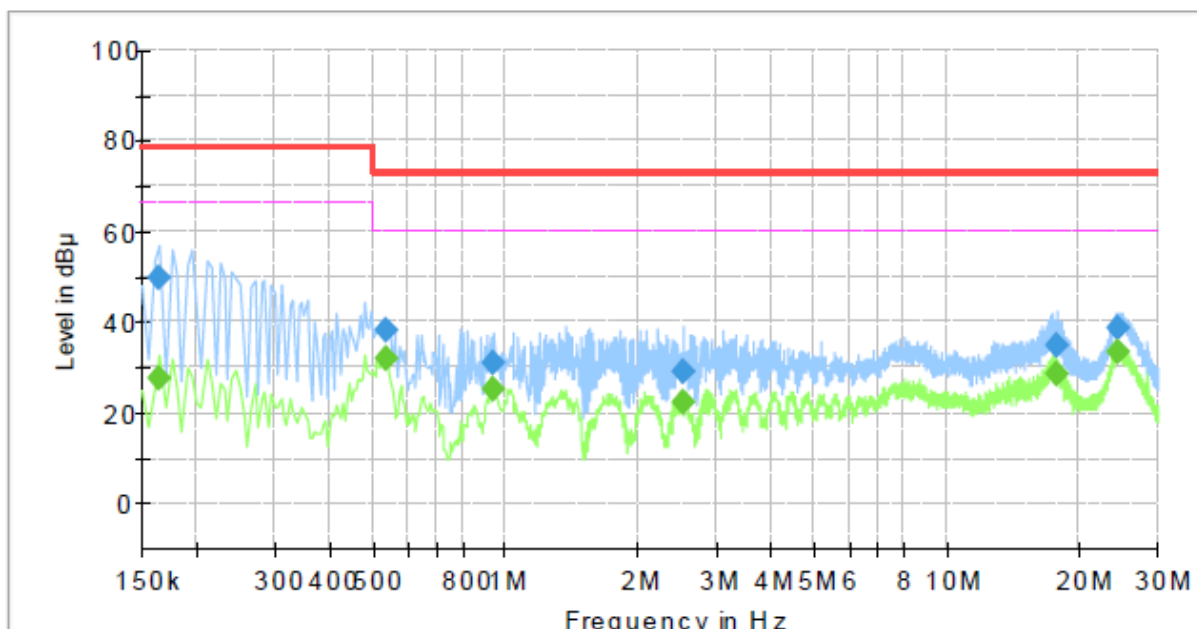
### Conducted Emissions at Mains Power Ports

■ #1

HOT LINE

#### Common Information

Test Description:	Conducted Emission
Job No.:	KES-EM243582
Phase:	L
Mode:	#1
Operator Name:	KES



#### Final Result

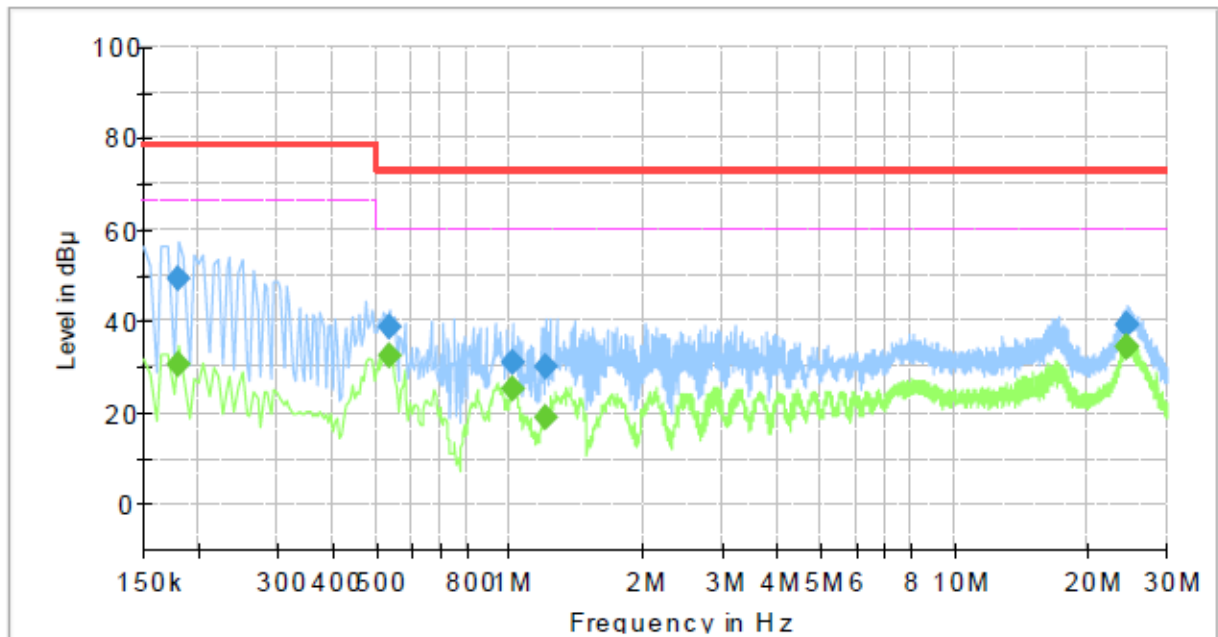
Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.165000	---	27.87	66.00	38.13	1000.0	9.000	L1	19.6
0.165000	50.04	---	79.00	28.96	1000.0	9.000	L1	19.6
0.540000	---	32.13	60.00	27.87	1000.0	9.000	L1	19.6
0.540000	38.31	---	73.00	34.69	1000.0	9.000	L1	19.6
0.935000	---	25.32	60.00	34.68	1000.0	9.000	L1	19.7
0.935000	30.79	---	73.00	42.21	1000.0	9.000	L1	19.7
2.535000	---	22.29	60.00	37.71	1000.0	9.000	L1	19.8
2.535000	29.14	---	73.00	43.86	1000.0	9.000	L1	19.8
17.850000	---	28.64	60.00	31.36	1000.0	9.000	L1	20.4
17.850000	34.76	---	73.00	38.24	1000.0	9.000	L1	20.4
24.510000	---	33.65	60.00	26.35	1000.0	9.000	L1	20.6
24.510000	38.67	---	73.00	34.33	1000.0	9.000	L1	20.6



## NEUTRAL LINE

**Common Information**

Test Description: Conducted Emission  
Job No.: KES-EM243582  
Phase: N  
Mode: #1  
Operator Name: KES

**Final Result**

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.180000	---	30.40	66.00	35.60	1000.0	9.000	N	19.5
0.180000	49.50	---	79.00	29.50	1000.0	9.000	N	19.5
0.540000	---	32.62	60.00	27.38	1000.0	9.000	N	19.6
0.540000	38.66	---	73.00	34.34	1000.0	9.000	N	19.6
1.020000	---	25.18	60.00	34.82	1000.0	9.000	N	19.7
1.020000	30.96	---	73.00	42.04	1000.0	9.000	N	19.7
1.205000	---	19.07	60.00	40.93	1000.0	9.000	N	19.7
1.205000	29.81	---	73.00	43.19	1000.0	9.000	N	19.7
24.395000	---	34.27	60.00	25.73	1000.0	9.000	N	20.6
24.395000	39.33	---	73.00	33.67	1000.0	9.000	N	20.6
24.560000	---	34.35	60.00	25.65	1000.0	9.000	N	20.6
24.560000	39.38	---	73.00	33.62	1000.0	9.000	N	20.6

## ◆ 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))

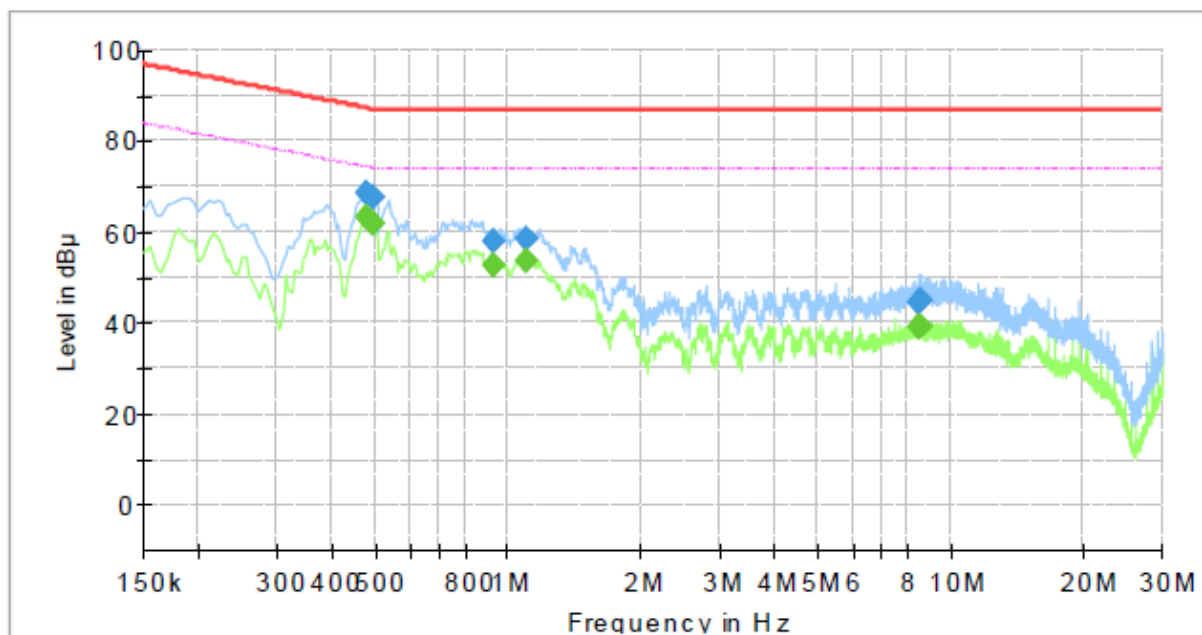
**Conducted Emissions at Telecommunication Ports**

■ #1

[100 Mbps]

**Common Information**

Test Description: Telecommunication Emission  
Job No.: KES-EM243582  
Mode : #1  
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)
0.480000	---	63.41	74.34	10.93	1000.0	9.000	Single Line	19.5
0.480000	68.73	---	87.34	18.61	1000.0	9.000	Single Line	19.5
0.495000	---	61.98	74.08	12.10	1000.0	9.000	Single Line	19.5
0.495000	67.68	---	87.08	19.40	1000.0	9.000	Single Line	19.5
0.930000	---	52.90	74.00	21.10	1000.0	9.000	Single Line	19.4
0.930000	57.86	---	87.00	29.14	1000.0	9.000	Single Line	19.4
1.105000	---	53.80	74.00	20.20	1000.0	9.000	Single Line	19.4
1.105000	58.73	---	87.00	28.27	1000.0	9.000	Single Line	19.4
8.485000	---	39.05	74.00	34.95	1000.0	9.000	Single Line	19.6
8.485000	44.74	---	87.00	42.26	1000.0	9.000	Single Line	19.6
8.595000	---	39.25	74.00	34.75	1000.0	9.000	Single Line	19.6
8.595000	45.12	---	87.00	41.88	1000.0	9.000	Single Line	19.6

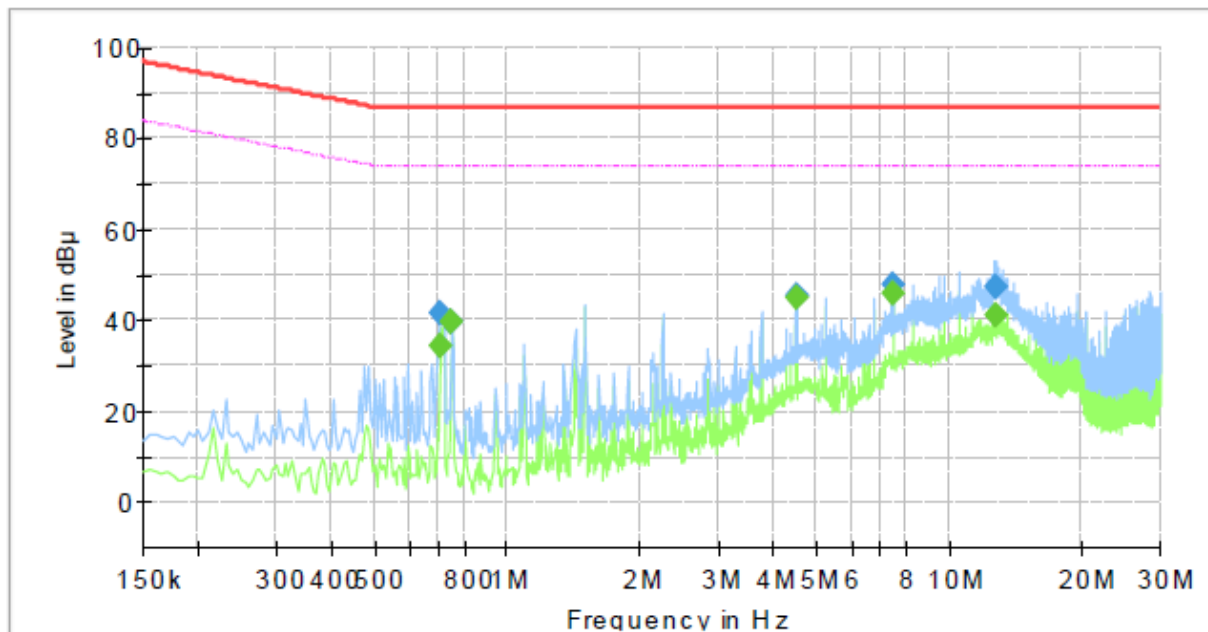


#2

[100 Mbps]

## Common Information

Test Description: Telecommunication Emission  
Job No.: KES-EM243582  
Mode : #2  
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)
0.705000	---	34.24	74.00	39.76	1000.0	9.000	Single Line	19.4
0.705000	41.69	---	87.00	45.31	1000.0	9.000	Single Line	19.4
0.750000	---	39.51	74.00	34.49	1000.0	9.000	Single Line	19.4
0.750000	39.47	---	87.00	47.53	1000.0	9.000	Single Line	19.4
4.500000	---	44.91	74.00	29.09	1000.0	9.000	Single Line	19.5
4.500000	45.54	---	87.00	41.46	1000.0	9.000	Single Line	19.5
7.500000	---	46.17	74.00	27.83	1000.0	9.000	Single Line	19.6
7.500000	47.66	---	87.00	39.34	1000.0	9.000	Single Line	19.6
12.750000	---	41.29	74.00	32.71	1000.0	9.000	Single Line	19.8
12.750000	47.36	---	87.00	39.64	1000.0	9.000	Single Line	19.8

### ◆ Calculation

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

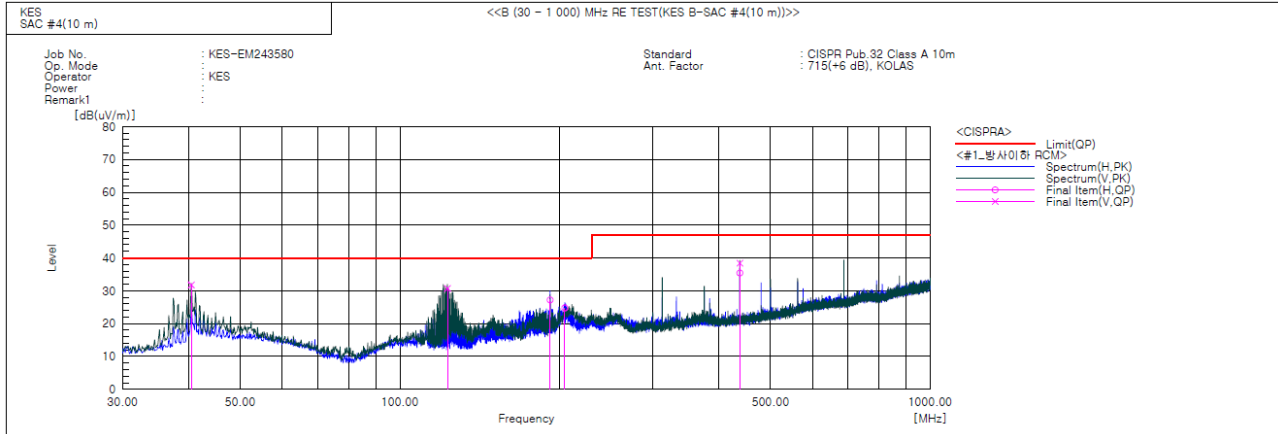
QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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

**Radiated Electric Field Emissions(Below 1 GHz)**

■ #1

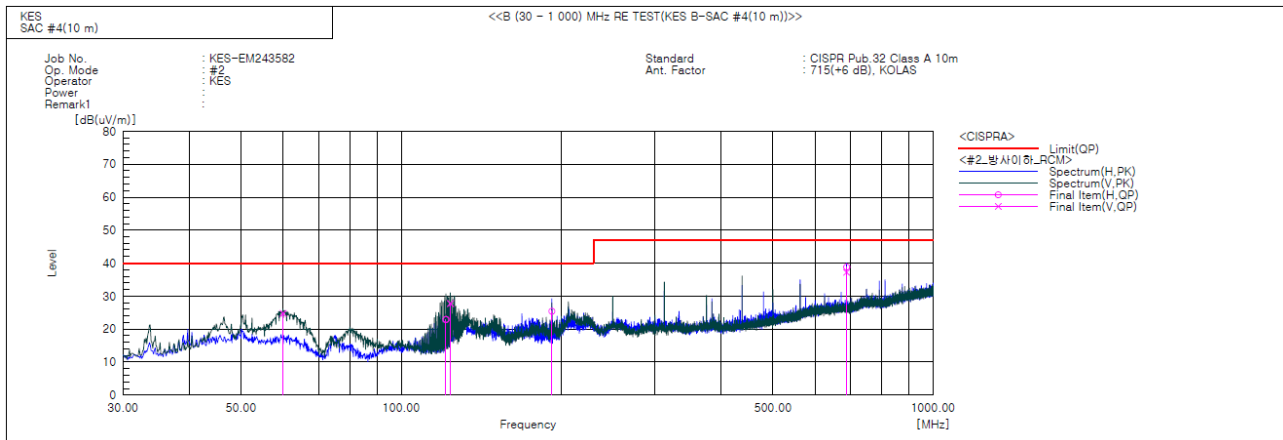
**Final Result**

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	40.428	V	54.5	-22.7	31.8	40.0	8.2	114.0	262.0	
2	122.999	V	55.0	-24.3	30.7	40.0	9.3	141.0	196.0	
3	191.990	H	48.9	-21.7	27.2	40.0	12.8	371.0	23.0	
4	204.721	H	45.2	-20.4	24.8	40.0	15.2	385.0	98.0	
5	437.521	V	51.5	-13.1	38.4	47.0	8.6	100.0	3.0	
6	437.821	H	48.5	-13.1	35.4	47.0	11.6	391.0	210.0	





## #2



## 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	59.949	V	46.9	-22.1	24.8	40.0	15.2	135.0	147.0	
2	121.423	H	47.1	-24.2	22.9	40.0	17.1	381.0	249.0	
3	123.794	V	52.2	-24.4	27.8	40.0	12.2	100.0	207.0	
4	191.971	H	47.1	-21.7	25.4	40.0	14.6	347.0	106.0	
5	687.539	V	43.9	-6.7	37.2	47.0	9.8	106.0	140.0	
6	687.854	H	45.5	-6.7	38.8	47.0	8.2	383.0	53.0	

## ◆ 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

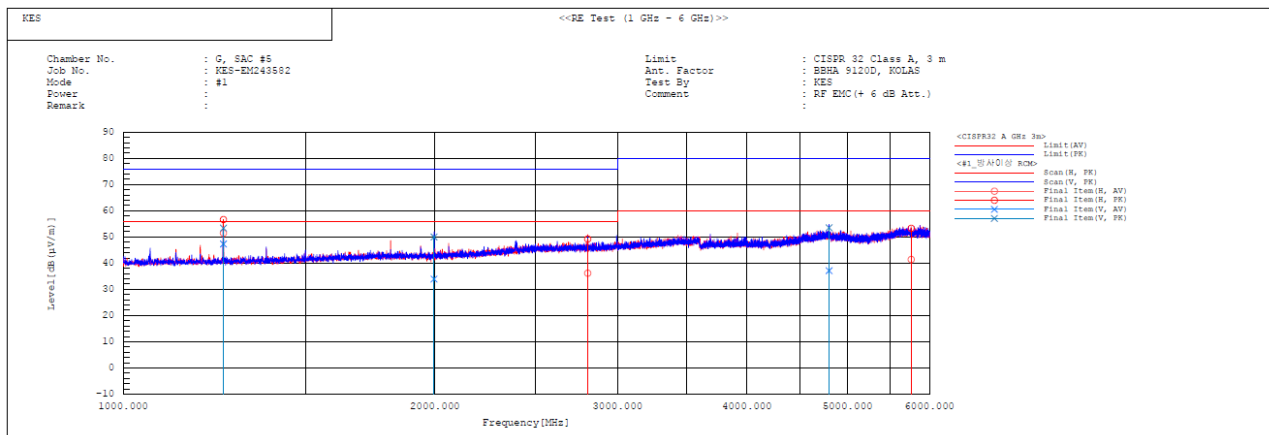
Limit(QP) : Limit value, c.f : (ANT Factor + Cable Loss - Preamp Factor), Margin: Margin value





## Radiated Electric Field Emissions(Above 1 GHz)

#1

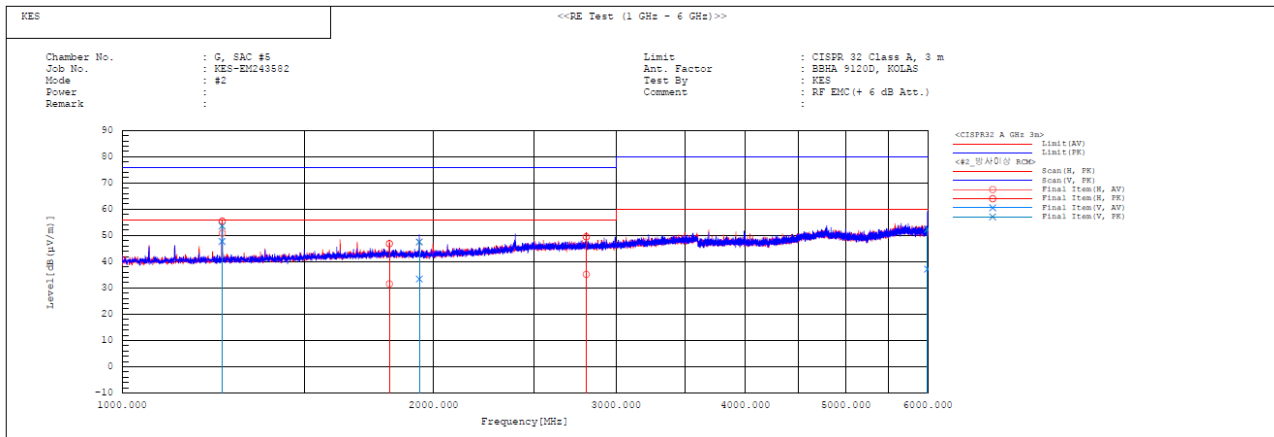


## Final Result

No.	Frequency	Pol	Reading AV [dB(μV)]	Reading PK [dB(μV)]	c.f [dB(1/m)]	Result AV [dB(μV/m)]	Result PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Limit PK [dB(μV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Remark
1	1249.821	V	47.8	53.9	-0.5	47.3	53.4	56.0	76.0	8.7	22.6	100.0	200.9	
2	1250.042	H	52.0	57.1	-0.5	51.5	56.6	56.0	76.0	4.5	19.4	100.0	27.0	
3	1995.382	V	31.1	47.2	2.8	33.9	50.0	56.0	76.0	22.1	26.0	100.0	65.6	
4	2808.205	H	30.6	43.6	5.6	36.2	49.2	56.0	76.0	19.8	26.8	100.0	200.1	
5	4799.772	V	25.5	41.9	11.6	37.1	53.5	60.0	80.0	22.9	26.5	100.0	169.5	
6	5762.162	H	27.7	39.6	13.7	41.4	53.3	60.0	80.0	18.6	26.7	100.0	175.1	



## ■ #2



## ◆ 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

■ #1





## Conducted Emissions at Telecommunication Ports

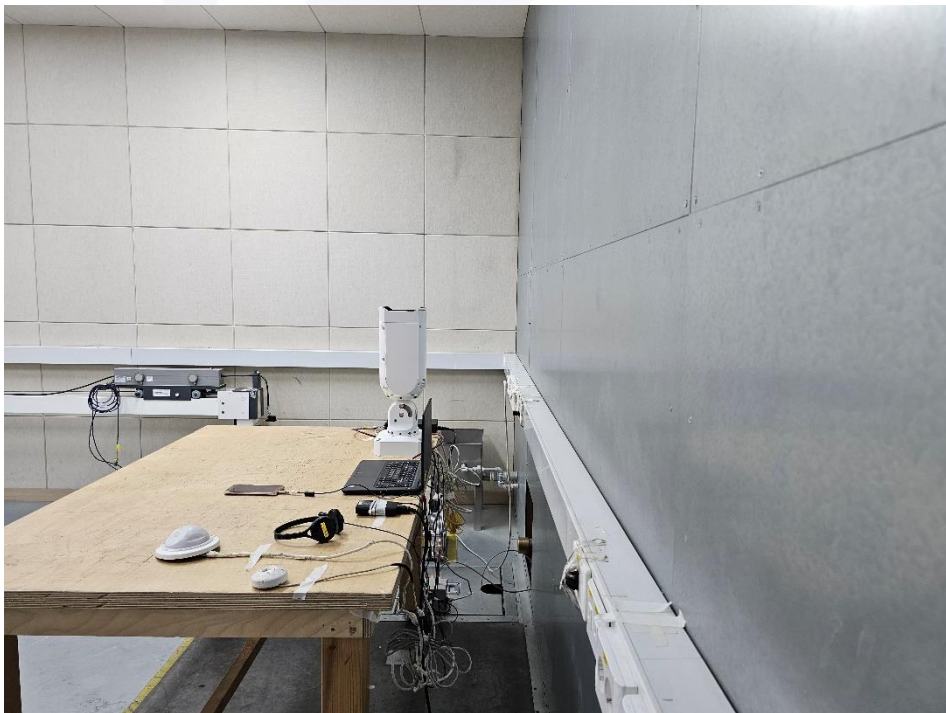
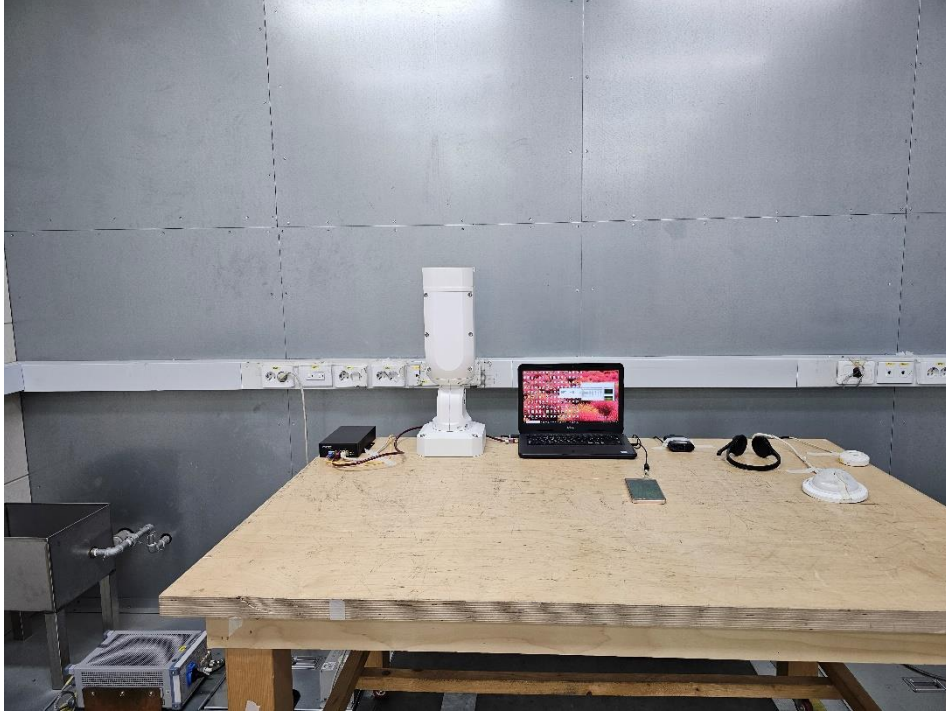
■ #1







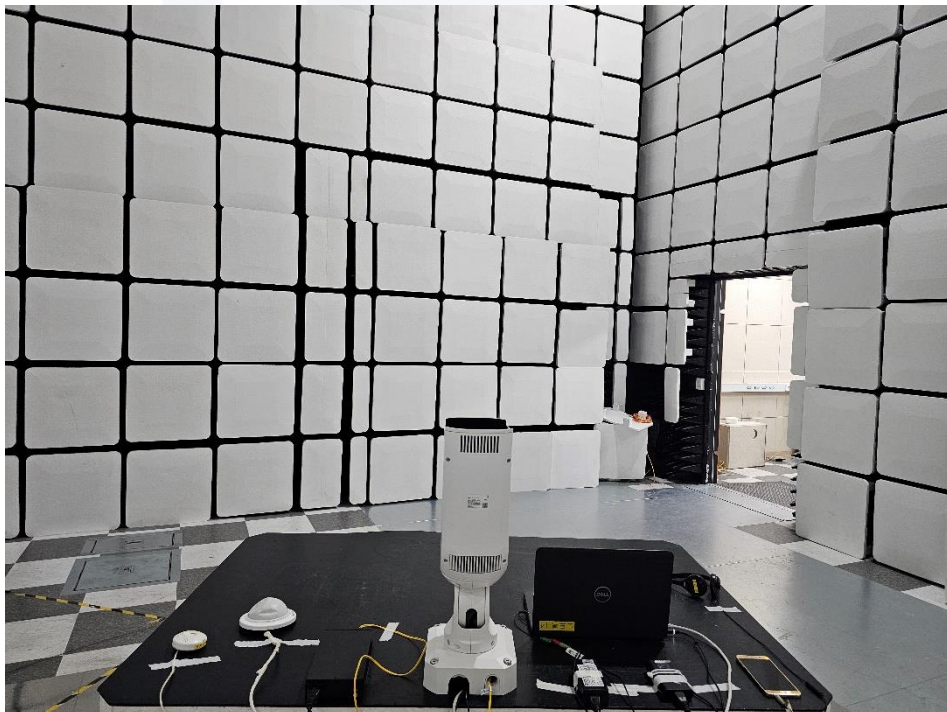
■ #2





## Radiated Electric Field Emissions(Below 1 GHz)

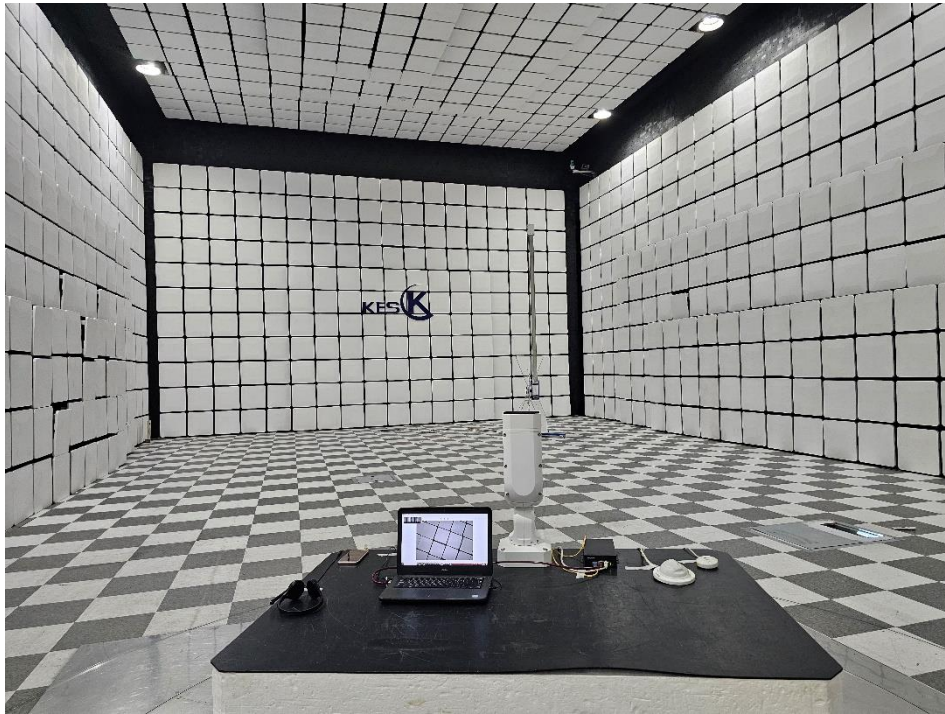
■ #1







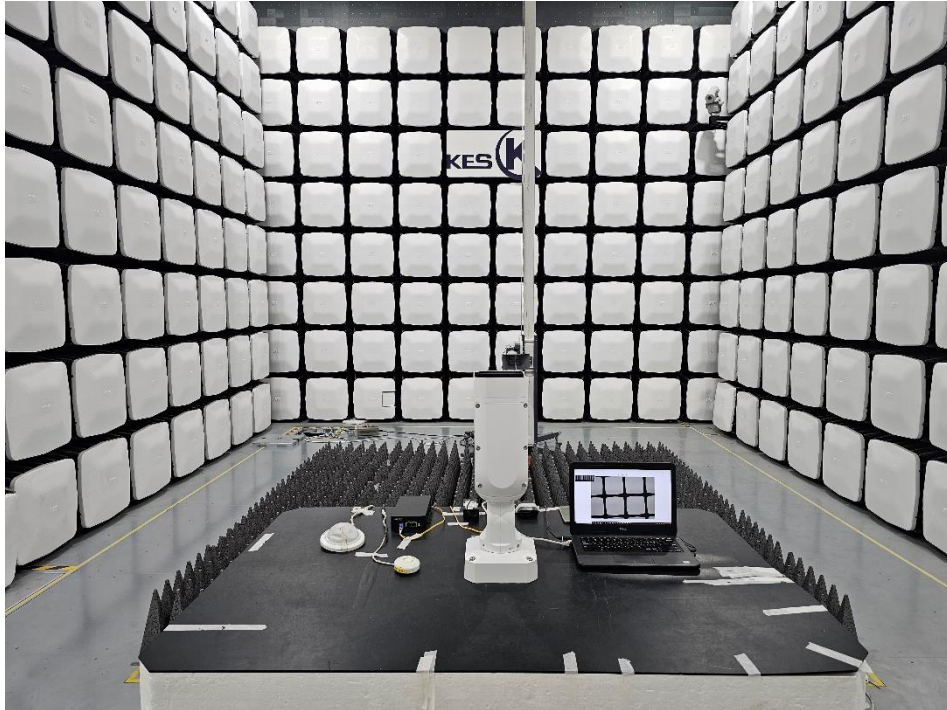
■ #2





## Radiated Electric Field Emissions(Above 1 GHz)

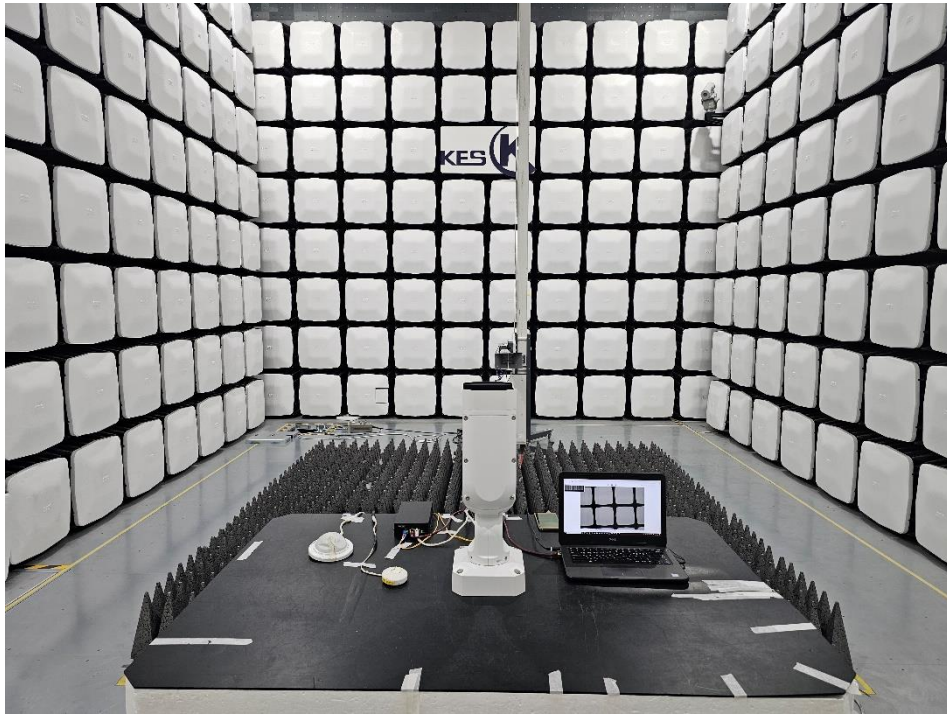
■ #1







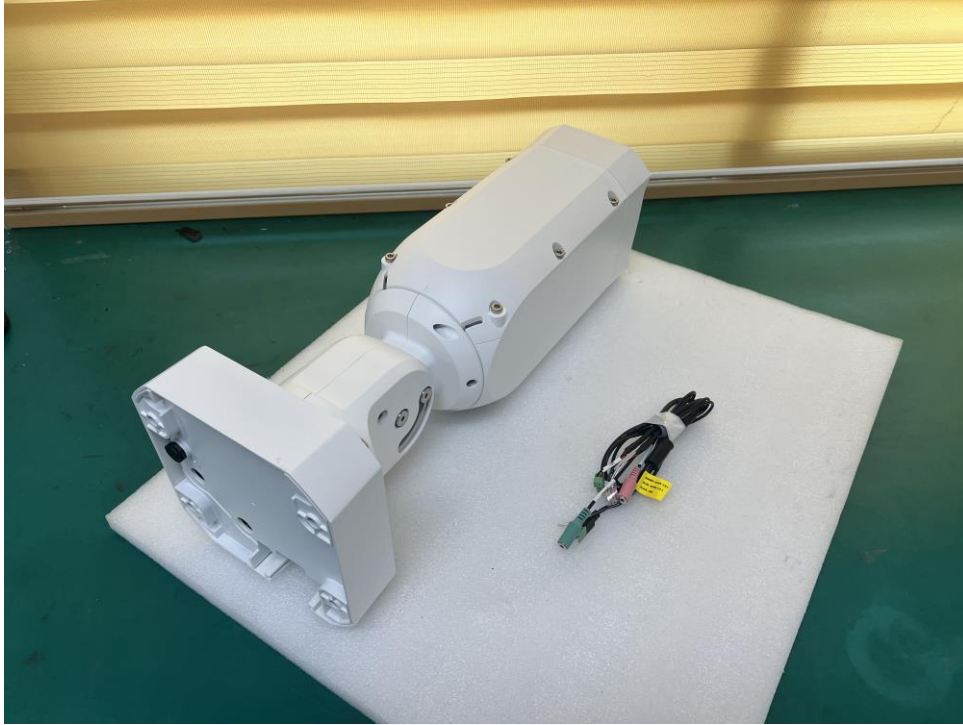
■ #2



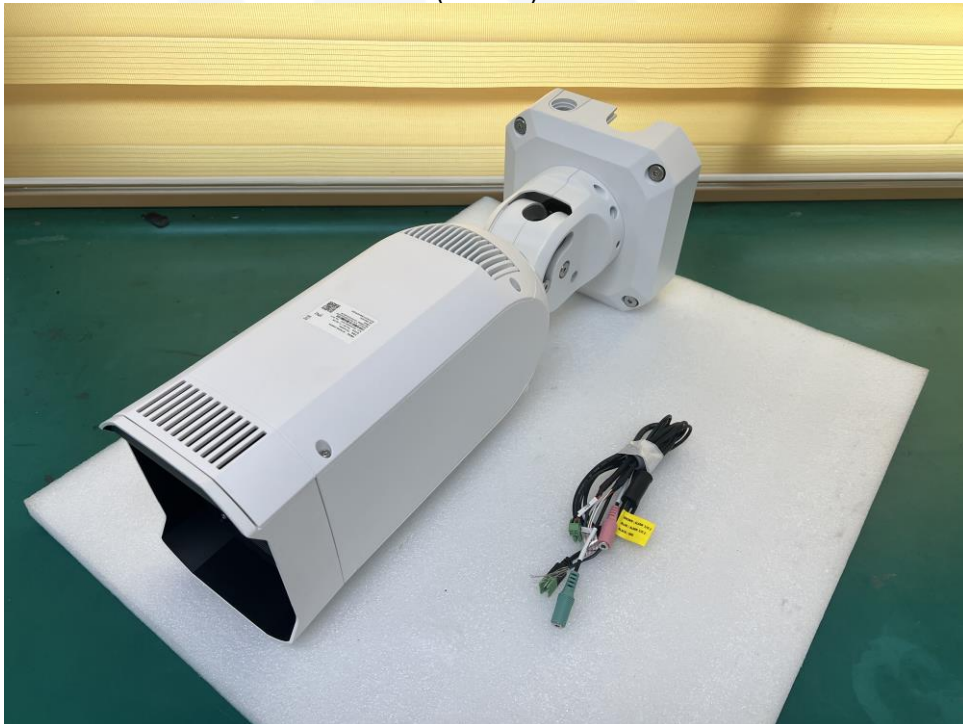


## EUT External Photographs

(Top)



(Bottom)





## EUT Internal Photographs

(Internal View)





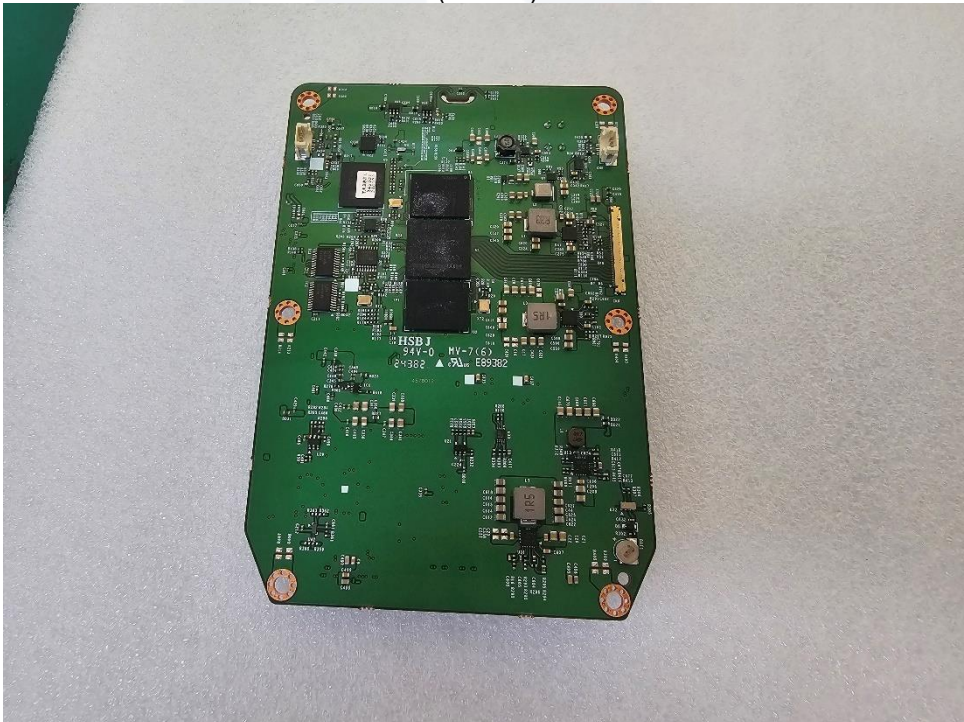


## EUT Internal View – Board 1

(Top)



(Bottom)



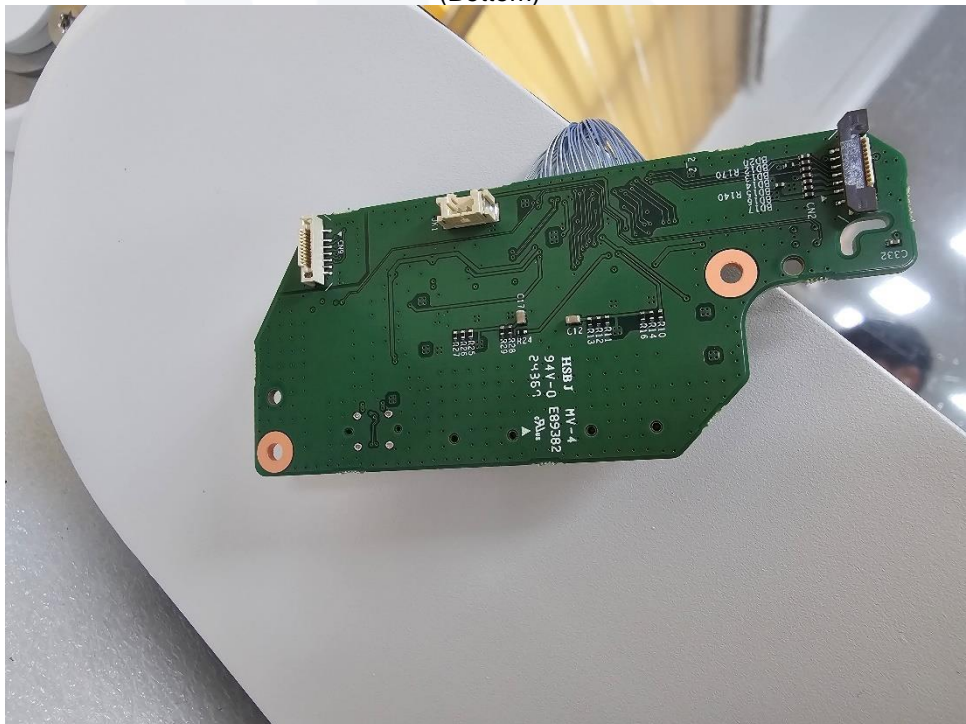


## EUT Internal View – Board 2

(Top)



(Bottom)

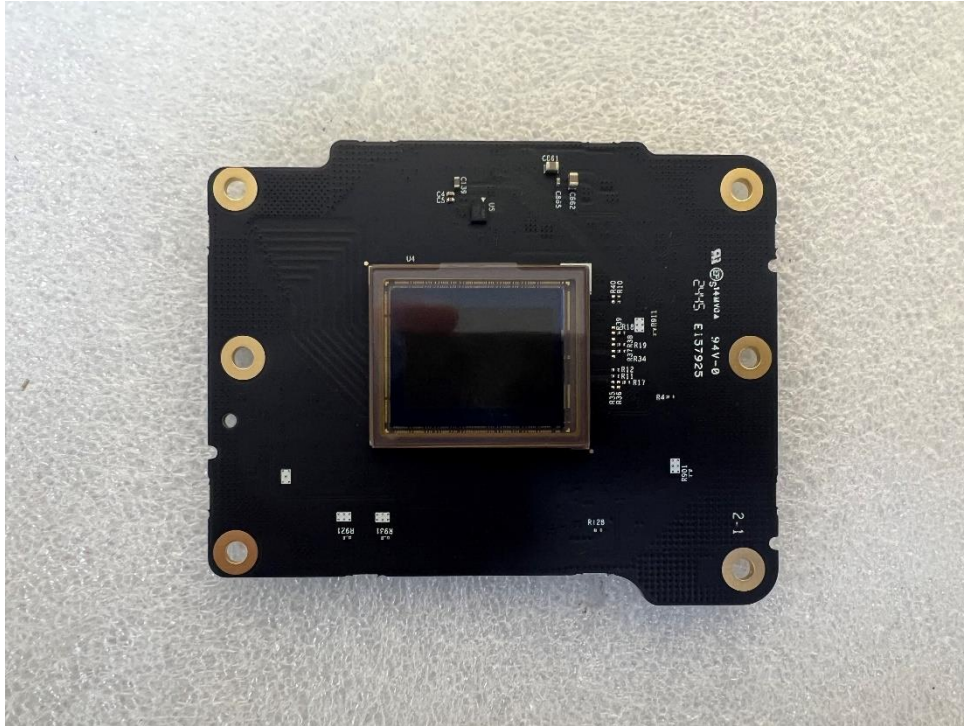




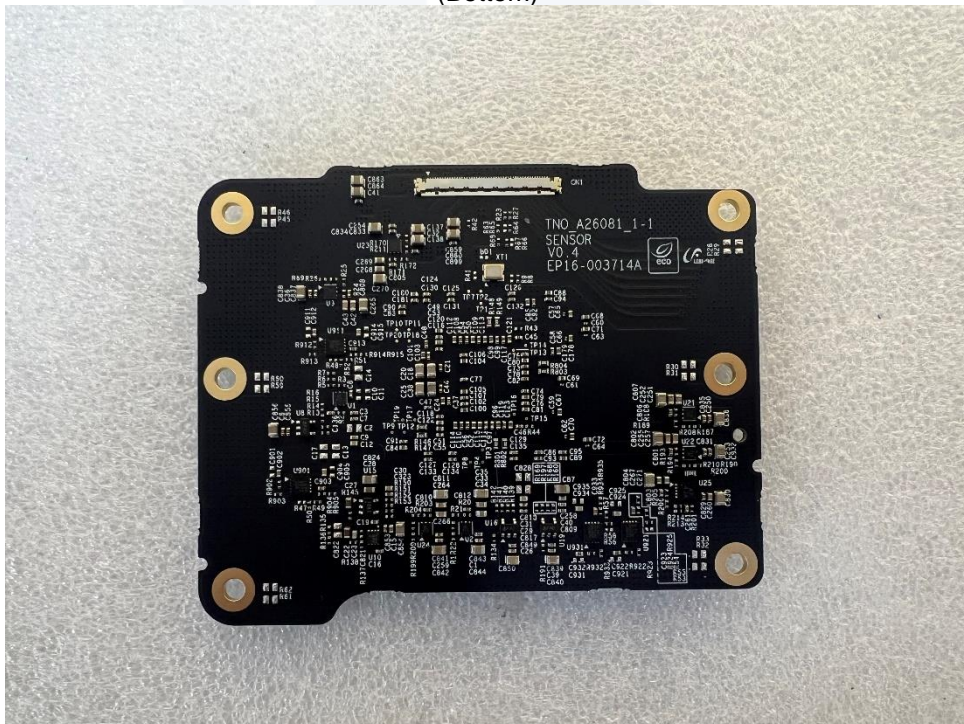


## EUT Internal View – Board 3

(Top)



(Bottom)

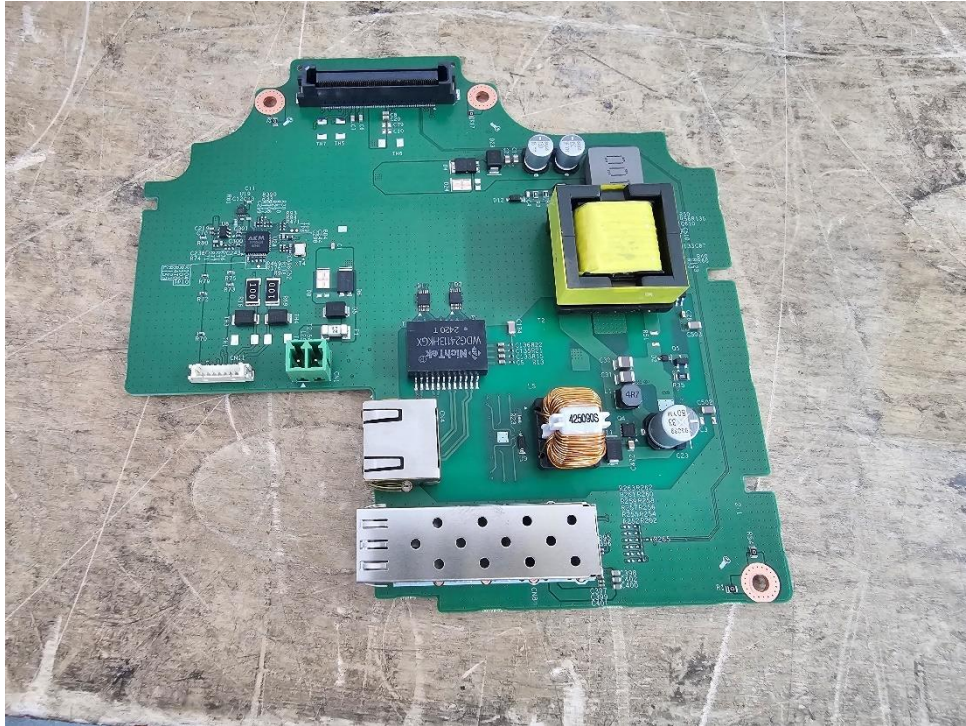




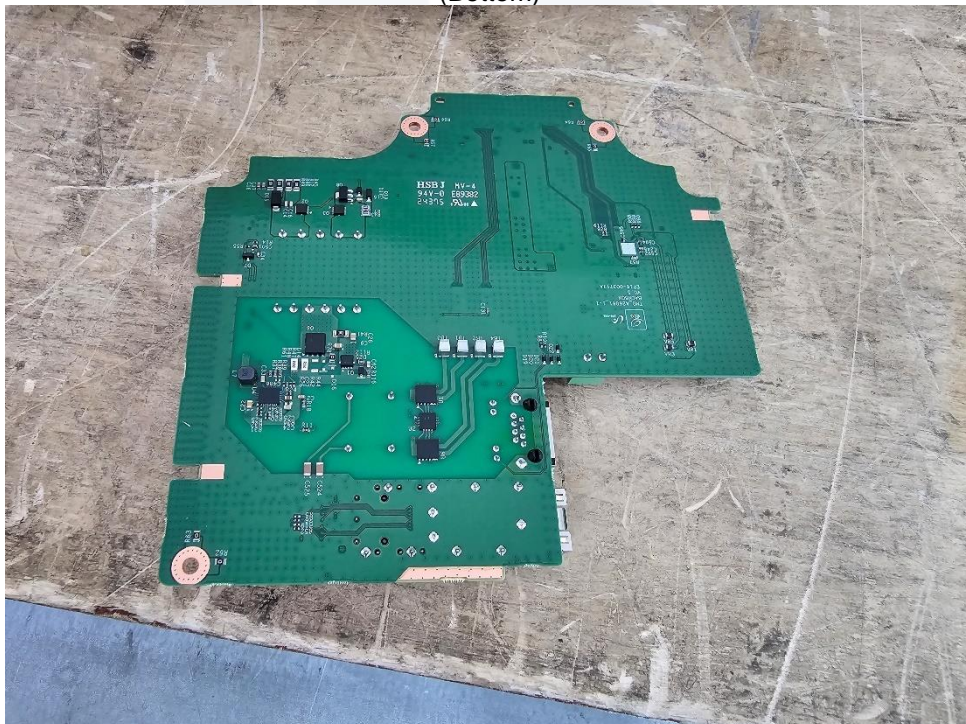


## EUT Internal View – Board 4

(Top)



(Bottom)





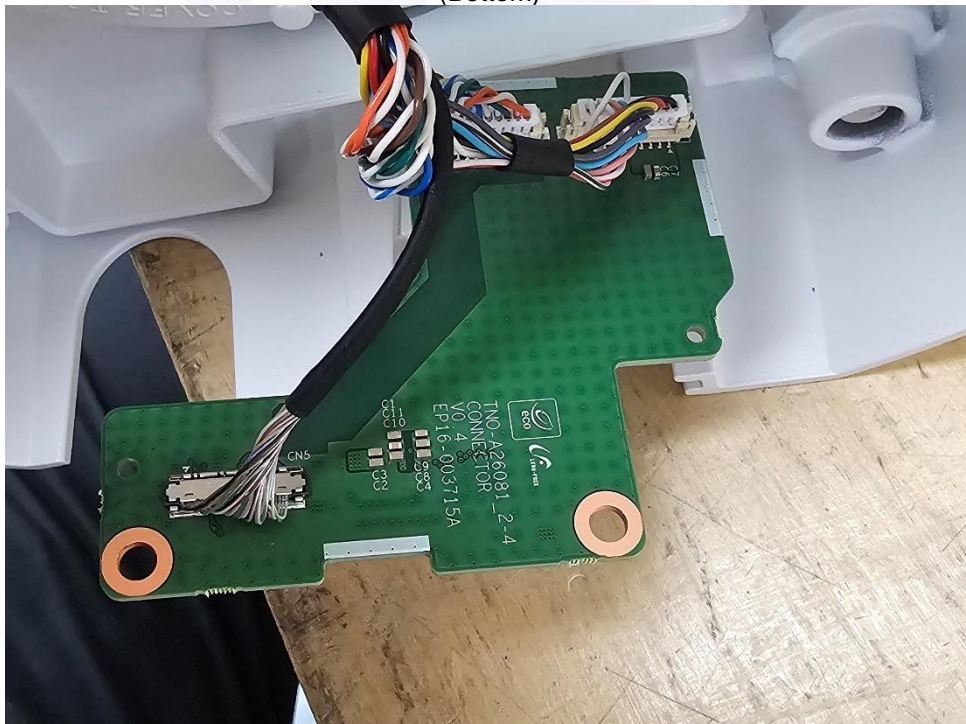


## EUT Internal View – Board 5

(Top)



(Bottom)







### EUT Internal View – Lens

(Top)



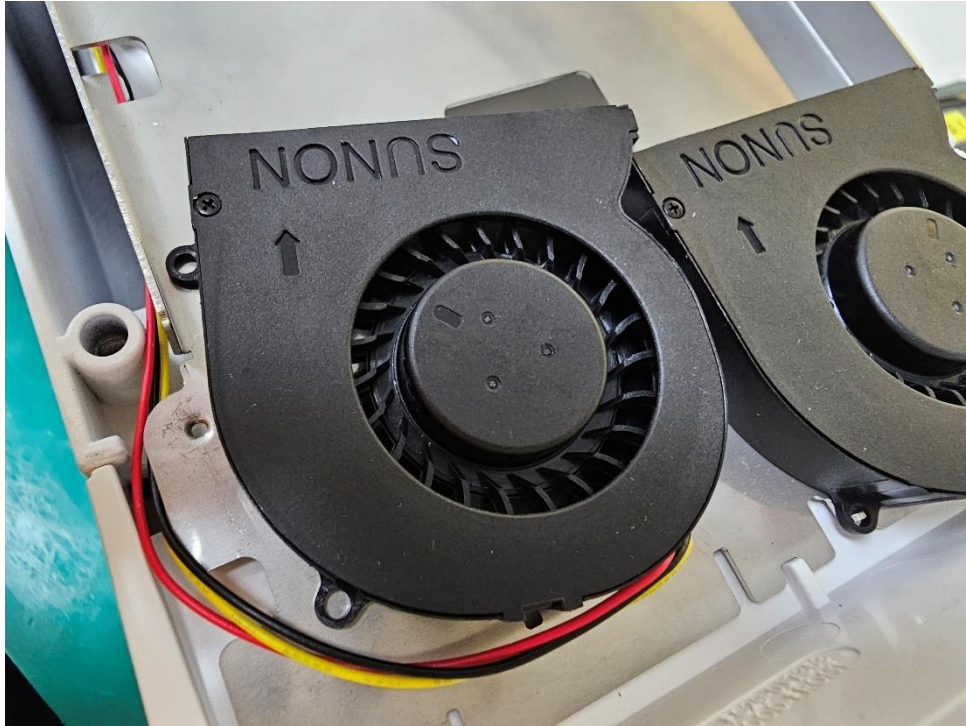
(Bottom)





## EUT Internal View – FAN

(Top)



(Bottom)

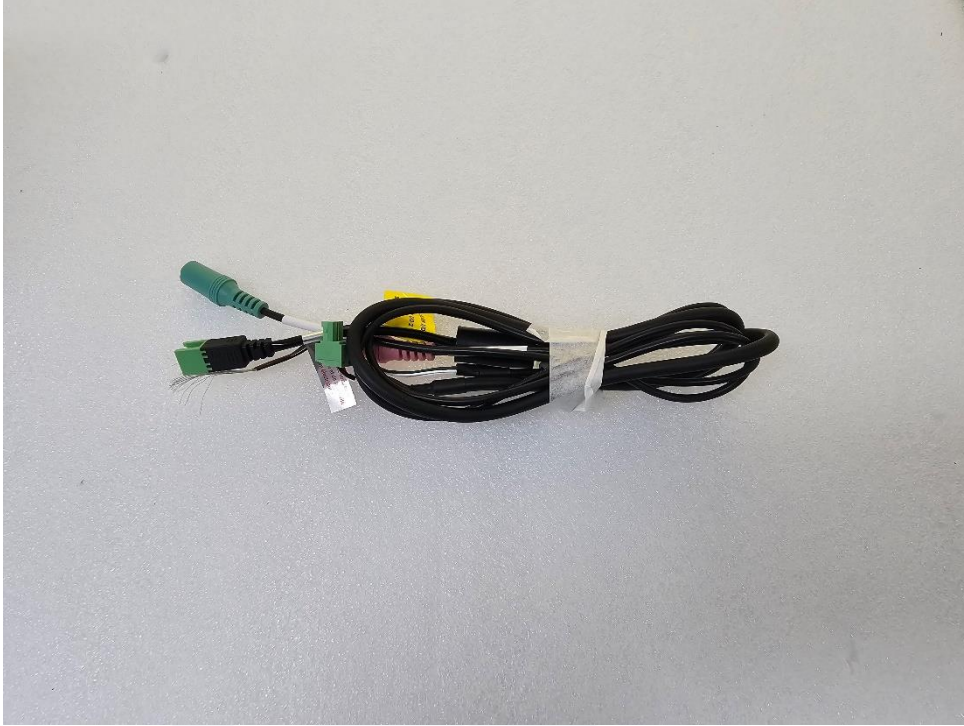




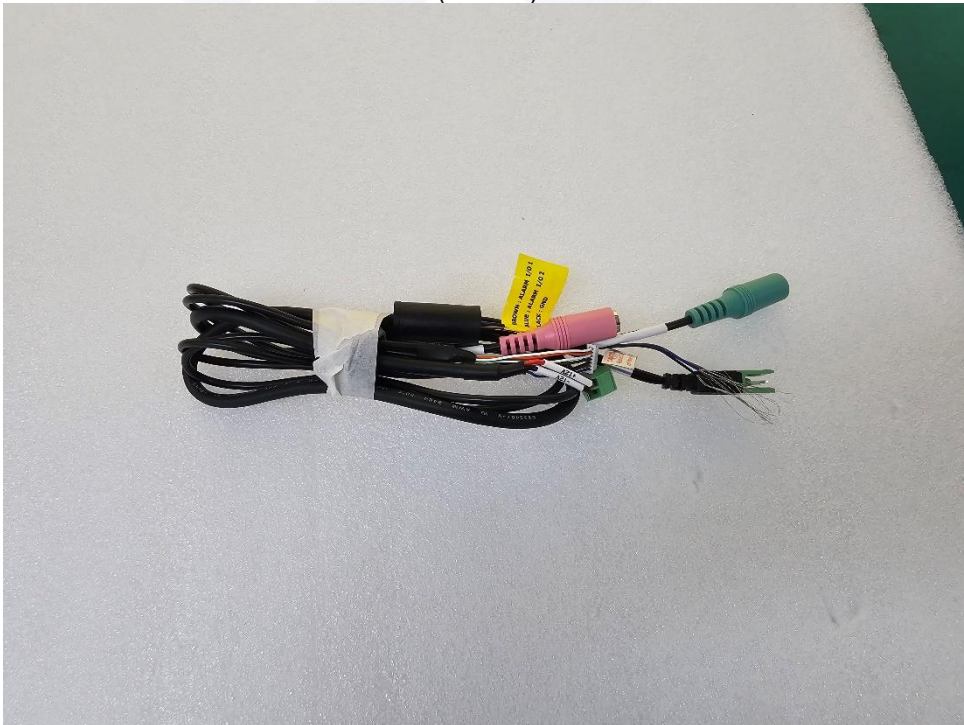


## EUT Internal View – Cable

(Top)



(Bottom)



The End.