



TEST REPORT



Report No. : KES-EM240414

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KES Co., Ltd.

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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. : TNV-C8011RW

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 : Jan. 31, 2024

4. Test date : Feb. 01, 2024 ~ Feb. 03, 2024

5. Date of Issue : Feb. 15, 2024

6. Test Results : In Compliance

Tested by

Reviewed by

Jae Won, Lee
EMC Test Engineer

Dae Jung, Choi
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
Feb. 15, 2024	KES-EM240414	Issued

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1.0 General Product Description

Main Specifications of EUT are:

TNV-C8011RW			
Video		Digital Noise Reduction	SSNR V, WiseNR II (Based on AI engine)
Imaging Device	1/2.8" progressive 5 MP CMOS	Digital Image Stabilization	None
Resolution	2592x1944, 2560x1440, 1920x1080, 1280x960, 1280x720, 800x600, 800x448, 720x576, 720x480, 640x480, 640x360, 320x240	Defog	None
Max. Frame rate	H.265/H.264: Max. 30fps/25fps(60Hz/50Hz) MJPEG: Max. 30fps@5MP Max. 5fps	Motion Detection	Bea, 8point Polygonal zones
NETD	None	Privacy Masking	32ea, 4point quadrangle zones
Pixel Size	None	Gain Control	Low / Middle / High
Min. Illumination	Color: 0.038Lux(F1.6, 1/30sec, 30IRE) BW: 0.0038Lux(F1.6, 1/30sec, 30IRE), 0Lux(IR LED on)	White Balance	ATW / AWC / Manual / Indoor / Outdoor
Video Out	USB: Micro USB Type B, 1280x720 for installation	LDC	Support
Video Transmission Distance	None	Electronic Shutter Speed	Minimum / Maximum / Anti flicker (1/5~1/12,000sec)
Lens		Digital PTZ	Support
Focal Length (Zoom Ratio)	1.6mm fixed focal	Video Rotation	Flip, Mirror, Hallway view(90°/270°)
Max. Aperture Ratio	F1.6	Analytics	Classified object type: Person/Face/ Vehicle Attributes: VehicleType(car/bus/truck/motorcycle/bicycle) Support DetectionShot Analytics events based on AI engine - Motion detection*, Object detection, Virtual line(Crossing/Direction), Virtual area* (Loitering/Intrusion/Enter/Exit) Analytics events - Defocus detection, Tampering, Shock detection, Virtual area(Appear/Disappear) * Some of the video analytics only works with people and vehicle detection
Angular Field of View	H: 175° / V: 125° / D: 175°		
Min. Object Distance	0.3M		
Focus Control	Fixed		
Lens Type	None		
Mount Type	None		
Optional Lens	None		
Pan / Tilt / Rotate		Business Intelligence	Based on AI engine: People counting, Vehicle counting, Queue management, Heatmap
Pan / Tilt / Rotate Range	- / -25°~+25° / -	Serial Interface	None
Pan Range	None	Alarm I/O	None
Pan Speed	None	Alarm Triggers	Analytics, Network disconnect
Tilt Range	None	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 - Handover(PTZ preset, Send message by HTTP/HTTPS/TCP)
Tilt Speed	None		
Rotate Range	None		
Sequence	None	Audio Streaming	None
Preset Accuracy	None	Audio In	Built-in mic only
Operational		Audio Out	None
Camera Title	Displayed up to 85 characters	Light Type	None
Direction Indicator	None	Light Viewable Length	None
Day & Night	Auto(ICR)	Application Programming Interface	ONVIF Profile S/G/T/M SUNAPI(HTTP API)
Backlight Compensation	BLC, WDR, SDDR		
Wide Dynamic Range	120dB	Security	
IR Viewable Length	15m(49.21ft)	OS / Firmware Protect	Secure boot, Signed firmware, Firmware encryption
IR Illuminator (Optional)	None	User authentication	Digest Authentication, Prevent brute-force attack
IR Radiation angle	None	Network authentication	802.1X Authentication(EAP-TLS, EAP-LEAP, EAP-PEAP MSCHAPv2)
IR LED	None	Secure Communication	HTTPS, SRTP, WSS(Websocket secure)
IR Wavelength	long-life 850 nm IR LED	Access Control	Access control based on IP address
IR Operation	None	Data Protect	Authentication information encryption, ZIP compression encryption
Water Removal	None	Audit	User Access/System/Event log management
Auto Tracking	None	Device ID	Device Certificate(Hanwha Private Root CA)
Coaxial Protocol	None	Secure Storage	SDcard partition encrypt
Color Palettes	None	Security Certificate	None
Radiometry		General	
Temperature Detect Range	None	Webpage Language	English, Korean, Chinese, French, Italian, Spanish, German, Japanese, Russian, Portuguese, Czech, Polish, Turkish, Dutch, Hungarian, Greek
Temperature Accuracy	None	Web Viewer	None
Temperature Detection	None	Edge Storage	Micro SD/SDHC/SDXC 1slot 256GB
Additional	None	Memory	2GB RAM, 1GB Flash
Network		Environmental & Electrical	
Ethernet	RJ-45(10/100BASE-T)	Operating Temperature / Humidity	-30°C ~ +55°C(-22°F ~ +131°F) / Less than 95% RH
Video Compression	H.265/H.264: Main/High, MJPEG	Storage Temperature / Humidity	-30°C ~ +60°C(-22°F ~ +140°F) / Less than 95% RH
Audio Compression	G.711 u-law / G.726 Selectable	Certification	IP66, IK10
	G.726(ADPCM) 8KHz, G.711 8KHz G.726: 16Kbps, 24Kbps, 32Kbps, 40Kbps AAC-LC: 48Kbps at 16KHz	Input Voltage	PoE(IEEE802.3af, Class3)
Smart Codec	Manual(Sea area), WiseStream III (Based on AI engine)	Power Consumption	Max 11.5W / Typ 4.8W
Video Quality Adjustment	H.264/H.265: Target bitrate level control MJPEG: Quality Level control	Mechanical	
Bitrate Control	H.264/H.265: CBR or VBR MJPEG: VBR	Color / Material	White / Aluminum Hard-coated dome bubble
Streaming	Unicast(20 users) / Multicast Multiple streaming(Up to 5 profiles)	RAL Code	RAL9003
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	Product Dimensions / Weight	80(W)x167(H)x57(D)mm(31.5x65.6x22.4"), 600g(1.32 lb)
		Compatible Conduit hole / Gang	Conduit hole : None Gangbox : Single
		Hanging Mount (Dome)	TBD
SIP support (VoIP, Peer-to-peer)	None	Skin Cover	None
Security	None	Skin Cover (Dome)	None
		Weather Cap (Dome)	None



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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	SBV-140TBW
Housing (Box)	None
Cabinet	None
Gang Plate	None
Conduit Adaptor	None
Other Compatible Models	None
Certifications & Standards	
Network	None
EMC	EN 55032:2015/A11:2020 EN 50130-4:2011/A1:2014 FCC 47 CFR Part 15, Subpart B Class A IC Regulation ICES-003 Issue 7 Class A KS C 9832:2023 KS C 9835:2019 AS/NZS CISPR 32 Class A VCCI CISPR 32 Class A
Safety	UL 62368-1, CSA C22.2 NO. 62368-1 KC 62368-1
Environment	IEC EN 60529: 1989+A1:1999+A2:2013 IEC EN 62262:2005 IEC EN 63000:2018
Video	None
DORI (EN62676-4 standard)	
Detect (25PPM/ 8PPF)	TBD
Observe (63PPM/ 19PPF)	TBD
Recognize (125PPM/ 38PPF)	TBD
Identify (250PPM/ 76PPF)	TBD
LPR/ANPR/MMCR	
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
Wisenet Road AI LPR/ANPR/MMCR	
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
Ver	202312



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	TNV-C8011RW	-	HANWHA VISION VIETNAM COMPANY LIMITED	EUT

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
Laptop	LG15U590	-	LG Electronics Co., Ltd.	-
Laptop Adapter	A13-040N3A	-	CHICONY POWER TECHNOLOGY (Chongqing) CO., LTD.	-
PoE Injector	PT-PSE109GBRO-AH	-	Dongguan PROCET Network Technology Co.,Ltd	-
Micro SD Card	-	-	Sandisk	32 GB

1.6 External I/O Cabling

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
NETWORK CAMERA (EUT)	Micro SD Slot	Micro SD Card	Micro SD Slot	-	-
	RJ-45(PoE)	PoE Injector	RJ-45(PoE)	3.5	U
PoE Injector	RJ-45(LAN)	Laptop	RJ-45(LAN)	2.0	U
Laptop	DC Jack	Laptop Adapter	DC Jack	1.6	U

* Unshielded = U, Shielded = S

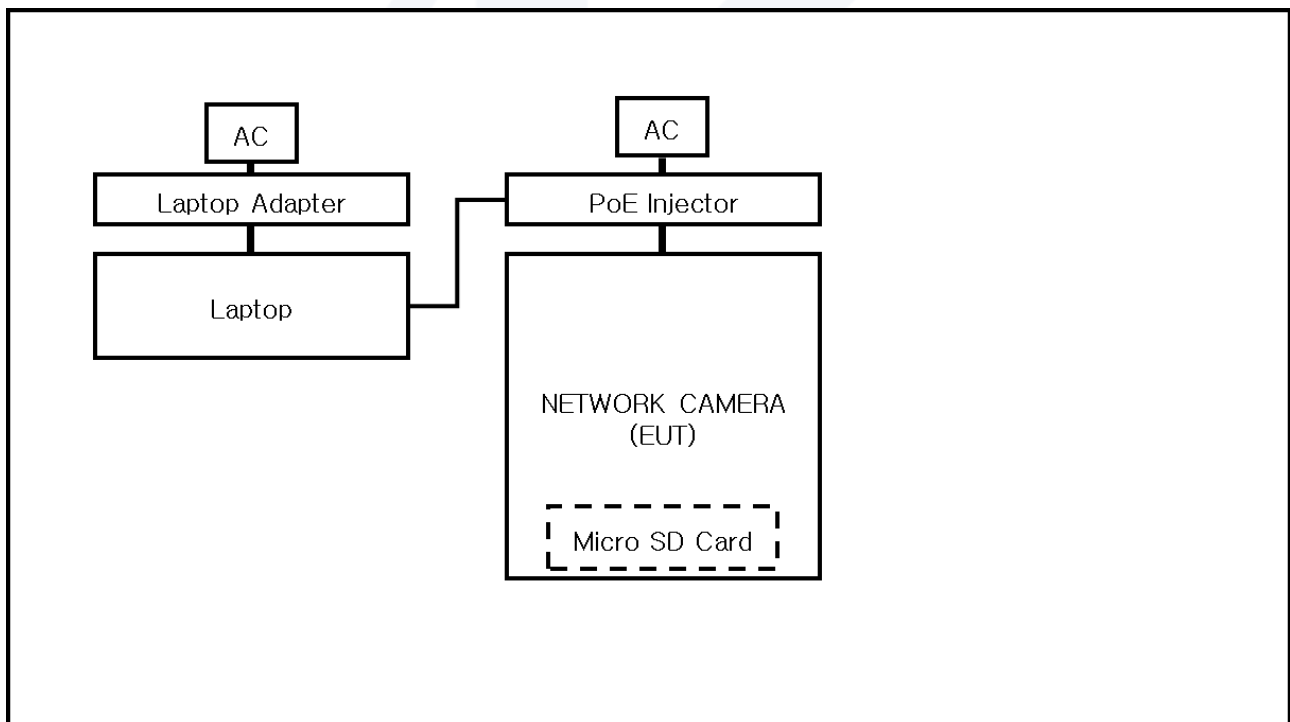


1.7 EUT Operating Mode(s)

Test mode	operating
Operating	1. Monitoring EUT Using Web Viewer, Ping Test 2. After testing, checked the files stored on Micro SD card.

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

1.8 Configuration





1.9 Remarks when standards applied

- It receives PoE power, and the PoE port is considered a wired network port. Test items related to the power port are not applicable.
- The Micro 5 Pin port is for administrator use, so it is not tested.

-Port picture for administrator



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



2.0 Test Regulations

The emissions tests were performed according to following regulations:

☒ **EMC – Directive 2014/30/EU**

☒ EN 55032:2015/A11:2020

☒ Class A

☐ Class B

☒ EN 50130-4:2011/A1:2014

☒ **EMC –Regulations 2016**

☒ EN 55032:2015/A11:2020

☒ Class A

☐ Class B

☒ EN 50130-4:2011/A1:2014





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
<input type="checkbox"/>	EMI Test S/W	EMC32	R & S	9.12.00	-
<input type="checkbox"/>	EMI TEST RECEIVER	ESR3	R & S	101783	11, 08, 2024
<input type="checkbox"/>	LISN	ENV216	R & S	101787	11, 08, 2024
<input type="checkbox"/>	LISN	ESH2-Z5	R & S	100450	11, 08, 2024
<input type="checkbox"/>	PULSE LIMITER	ESH3-Z2	R & S	101915	11, 08, 2024

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

Feb. 02, 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 checked="" type="checkbox"/>	8-WIRE ISN CAT3,5	ENY81	R & S	100174	11, 09, 2024
<input type="checkbox"/>	8-WIRE ISN CAT6	ENY81-CAT6	R & S	101665	11, 09, 2024
<input type="checkbox"/>	ISN	ISN S8	SCHWARZBECK	ISN-S8-0019	03, 06, 2024

Test Conditions

Temperature: (22,4 ± 0,1) °C

Relative Humidity: (45,3 ± 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

RemarksSee Appendix A for test data.



2.3 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Feb. 02, 2024

Test Location☐ OPEN AREA TEST SITE #2☒ SEMI ANECHOIC CHAMBER #4(10 m)**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	03, 21, 2024
<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	03, 03, 2024

Test Conditions

Temperature: (22,8 ± 0,1) °C

Relative Humidity: (45,8 ± 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

RemarksSee Appendix A for test data.



2.4 Radiated Electric Field Emissions(Above 1 GHz)

Test Date

Feb. 01, 2024

Test Location

SEMI ANECHOIC CHAMBER #3

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	ESR7	R & S	101190	07, 31, 2024
<input checked="" type="checkbox"/>	PREAMPLIFIER	8449B	AGILENT	3008A01967	03, 06, 2024
<input checked="" type="checkbox"/>	ATTENUATOR	8491A	HP	35496	03, 03, 2024
<input checked="" type="checkbox"/>	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	03, 06, 2024

Test Conditions

Temperature: (22,8 ± 0,1) °C

Relative Humidity: (46,2 ± 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

RemarksSee Appendix A for test data.



2.5 Harmonic Current Emissions

Test Date

N/A

Test Location

Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input type="checkbox"/>	EMI Test S/W	net.control	EM TEST	2.1.4	-
<input type="checkbox"/>	DIGITAL POWER ANALYZER	DPA 500N	EM TEST	V1024106759	03, 27, 2024
<input type="checkbox"/>	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

Test Conditions

Temperature:

°C

Relative Humidity:

% R.H.

Classification of Equipment for Harmonic Current Emissions

- ☐ Class A
☐ Class B
☐ Class C(Below 25 W)
☐ Class C(Above 25 W)
☐ Class D

Test Results

The requirements are:

- ☐ PASS
☐ NOT PASS
☒ NOT APPLICABLE

RemarksRefer to 'Remarks when standards applied'.



2.6 Voltage Fluctuations and Flicker

Test Date

N/A

Test Location

Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input type="checkbox"/>	EMI Test S/W	net.control	EM TEST	2.1.4	-
<input type="checkbox"/>	DIGITAL POWER ANALYZER	DPA 500N	EM TEST	V1024106759	03, 27, 2024
<input type="checkbox"/>	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

Test Conditions

Temperature:

°C

Relative Humidity:

% R.H.

Test Results

The requirements are:

- ☐ PASS
☐ NOT PASS
☒ NOT APPLICABLE

RemarksRefer to 'Remarks when standards applied'.



3.0 Criteria for compliance

Criteria for compliance was based on the following guidelines:

EN 50130-4:2011/A1:2014 Alarm systems-Part 4: Electromagnetic compatibility Product family standard:

Immunity requirements for components of fire, intruder and social alarm systems

The variety and the diversity of the apparatus within the scope of this document makes it difficult to define precise criteria for the evaluation of the immunity test results.

If as a result of the application of the tests defined in this standard, the apparatus

becomes dangerous or unsafe then the apparatus shall be deemed to have failed the test.

A functional description and a definition of performance by the manufacture and noted in the test report, based on the following criteria:

Electrostatic discharge

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the application of discharge is permissible, providing that is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change.

Radiated electromagnetic fields

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the application of discharge is permissible, providing which could be interpreted by associated equipment as a change, and no such

Flickering of indicators occurs at a field strength of 3 V/m .

For components of CCTV systems, where the picture is allowed at 10 V/m , providing.

(a) there is no permanent damage or change to EUT

(e.g. no corruption of memory or changes to programmable setting etc.)

(b) at 3 V/m , any deterioration of the picture is so minor that the system could still be used; and

(c) there is no observable deterioration of the picture at 1 V/m .



Fast transient burst / slow high energy voltage surge

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the application of discharge is permissible, providing

That there is no residual is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change.

Conducted RF immunity

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the application of discharge is permissible, providing

That there is no residual is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change, and no such flickering of indicators oeuvres at $U = 130 \text{ dB}\mu\text{V}$.

For component of CCTV systems, where the status is monitored by observing the TV picture, then deterioration of the picture is allowed at $U = 140 \text{ dB}\mu\text{V}$, providing:

- (a) there is no permanent damage or change to the EUT
(e.g. no corruption of memory or changes to programmable settings etc.)
- (b) at $U = 130 \text{ dB}\mu\text{V}$, any deterioration of the picture is so minor that the system could still be used; and
- (c) there in no observable deterioration of the picture at $U = 120 \text{ dB}\mu\text{V}$.

Voltage dip/interruption / Voltage variation

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the conditioning is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change. The EUT shall meet the acceptance criteria for the functional test, after the conditioning.



3.1 Electrostatic Discharge

Reference Standard

EN 61000-4-2:2009

Test Date

Feb. 03, 2024

Test Location

EMS-ESD: Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	ESD SIMULATOR	ESS-2000	Noise Ken	ESS05X4620	03, 06, 2024
<input checked="" type="checkbox"/>	HCP	-	Noise Ken	-	-
<input checked="" type="checkbox"/>	VCP	-	Noise Ken	-	-

Test Conditions

Temperature: (22,5 ± 0,1) °C
Relative Humidity: (45,3 ± 0,1) % R.H.
Atmospheric Pressure: (100,3 ± 0,0) kPa

Test Specifications

Discharge Factor: ≥ 1 s

Discharge Impedance: 330 ohm / 150 pF

Kind of Discharge: Air, Contact (direct and indirect)

Polarity: Positive and Negative

Number of Discharge: 10 at all locations for Air discharge
10 at all locations for Contact discharge

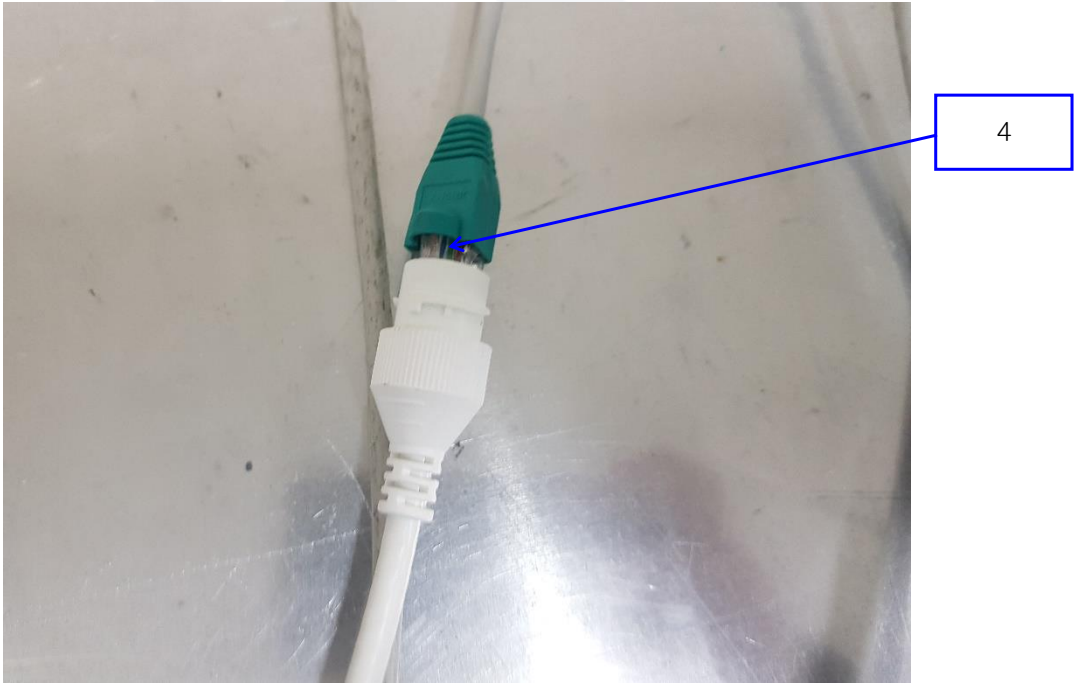
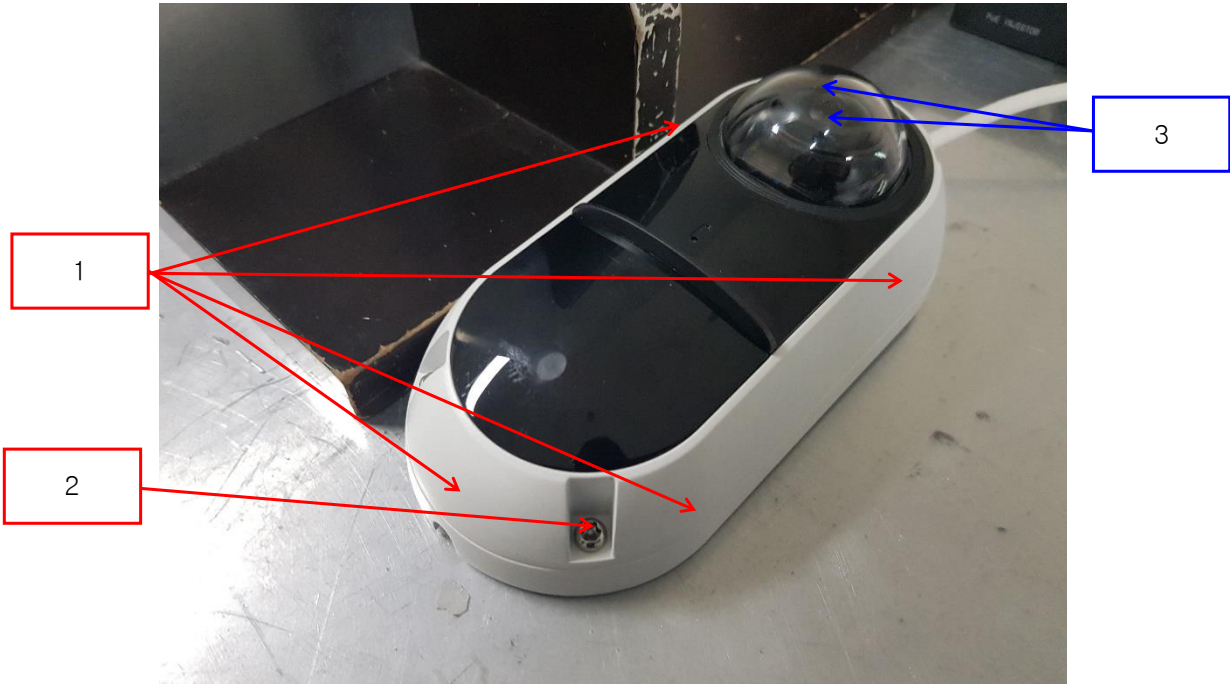
Discharge Voltage:	Contact	Air	HCP	VCP
	<input type="checkbox"/> 2 kV	<input checked="" type="checkbox"/> 2 kV	<input type="checkbox"/> 2 kV	<input type="checkbox"/> 2 kV
	<input type="checkbox"/> 4 kV	<input checked="" type="checkbox"/> 4 kV	<input type="checkbox"/> 4 kV	<input type="checkbox"/> 4 kV
	<input checked="" type="checkbox"/> 6 kV	<input type="checkbox"/> 6 kV	<input checked="" type="checkbox"/> 6 kV	<input checked="" type="checkbox"/> 6 kV
	<input type="checkbox"/> 8 kV	<input checked="" type="checkbox"/> 8 kV	<input type="checkbox"/> 8 kV	<input type="checkbox"/> 8 kV
	<input type="checkbox"/> 15 kV	<input type="checkbox"/> 15 kV	<input type="checkbox"/> 15 kV	<input type="checkbox"/> 15 kV

Notes: HCP: Horizontal coupling plane
VCP: Vertical coupling plane

Required Performance Criteria: ☒ Complied



Location of Discharge:



**Test Data****Indirect Discharge**

No.	Test Point	Discharge Method	Observations	Remarks
1	HCP Contact	Contact Discharge	Complied	-
2	VCP Contact	Contact Discharge	Complied	-

Direct Discharge

No.	Test Point	Discharge Method	Observations	Remarks
1	Enclosure	Contact Discharge	Complied	-
2	Screw	Contact Discharge	Complied	-
3	Camera Lens	Air Discharge	Complied	-
4	Around the Port	Air Discharge	Complied	-

Note: "Blank" = Not performed

Observations:

Complied – No degradation of function

Test Results

- ☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria

Remarks

PASS Required Performance Criteria



3.2 Radiated Electric Field Immunity

Reference Standard

EN IEC 61000-4-3:2020

Test Date

Feb. 01, 2024

Test LocationEMS-RS: ☐ SEMI ANECHOIC CHAMBER #2 ☒ SEMI ANECHOIC CHAMBER #3**Test Equipment**

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMS Test S/W	EMC32	R & S	10.10.02	-
<input checked="" type="checkbox"/>	SIGNAL GENERATOR	SMB 100A	Rohde & Schwarz	108252	07, 31, 2024
<input checked="" type="checkbox"/>	HIGH POWER DUAL AMP	SSA532	SUNGSAN	SSA532-001	-
<input checked="" type="checkbox"/>	POWER METER	E4419B	Agilent	GB40203000	03, 21, 2024
<input checked="" type="checkbox"/>	AVERAGE POWER SENSOR	E9301A	Agilent	MY52170007	03, 21, 2024
<input checked="" type="checkbox"/>	AVERAGE POWER SENSOR	E9301A	Agilent	MY41498669	03, 21, 2024
<input checked="" type="checkbox"/>	STACKED DOUBLE LOG-PER- ANTENNA	STPL9128 E	Schwarzbeck	9128ES-121	-
<input checked="" type="checkbox"/>	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	03, 06, 2024

Test Conditions

Temperature: (22,8 ± 0,6) °C
Relative Humidity: (46,2 ± 0,6) % R.H.
Atmospheric Pressure: (100,7 ± 0,0) kPa



Test Specifications

Antenna Polarization: Horizontal & vertical unless indicated otherwise

Antenna Distance: ☒ 3 m

Field Strength: ☐ 1 V/m ☐ 3 V/m
☒ 10 V/m

Frequency Range: ☐ 80 MHz to 1 GHz ☐ 1,4 GHz to 2,7 GHz
☒ 80 MHz to 2,7 GHz

Modulation: ☒ AM, 80 %, 1 kHz sine wave
☒ PM, 1 Hz (0,5 s ON : 0,5 s OFF)

Frequency step: ☒ 1 % step

Dwell Time: ☐ 1 s ☒ 3 s

of Sides Radiated: ☒ 4

Required Performance Criteria: ☒ Complied

**Test Data**

Side Exposed	Observations	
	Horizontal	Vertical
Front	Complied	Complied
Right	Complied	Complied
Back	Complied	Complied
Left	Complied	Complied

Note: "Blank" = Not performed

Observations:

Complied – No degradation of function

Test Results

- ☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria

Remarks

PASS Required Performance Criteria



3.3 Electrical Fast Transients/Bursts

Reference Standard

EN 61000-4-4:2012

Test Date

Feb. 03, 2024

Test Location

EMS-EFT: Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMS Test S/W	iec.control	EM TEST	5.4.8	-
<input checked="" type="checkbox"/>	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	11, 09, 2024
<input checked="" type="checkbox"/>	MOTOR VARIAC	MV2616	EM TEST	P1552169719	11, 09, 2024
<input checked="" type="checkbox"/>	CAPACITIVE COUPLING CLAMP	HFK	EM TEST	P1633183115	11, 10, 2024

Test Conditions

Temperature: (22,1 ± 0,1) °C
Relative Humidity: (46,0 ± 0,1) % R.H.
Atmospheric Pressure: (100,7 ± 0,0) kPa

Test Specifications

Pulse Amplitude & Polarity: ☐ ± 1.0 kV ☐ ± 2.0 kV
(AC Power Lines) ☐ ± 4.0 kV

Pulse Amplitude & Polarity: ☐ ± 0.5 kV ☒ ± 1.0 kV
(Other supply / Signal Lines) ☐ ± 2.0 kV

Burst Period: ☒ 300 ms ☐ 2 s

Repetition Rate: ☐ 5 klz ☒ 100 klz

Duration of Test Voltage: ☒ ≥ 1 min

Required Performance Criteria: ☒ Complied

**Test Data**☐ Input a.c. power ports – Coupling/Decoupling Network used

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
-	-	-

☐ Input d.c. power ports – Coupling/Decoupling Network used

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
-	-	-

☒ Signal ports and telecommunication ports – Coupling Clamp used

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
RJ-45(PoE)	Complied	Complied

Note: “Blank” = Not performed

Observations:

Complied – No degradation of function

Test Results☒ PASS Required Performance Criteria☐ NOT PASS Required Performance Criteria**Remarks**PASS Required Performance Criteria



3.4 Surge Transients

Reference Standard

EN 61000-4-5:2014+A1:2017

Test Date

Feb. 03, 2024

Test Location

EMS-Surge: Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMS Test S/W	iec.control	EM TEST	5.4.8	-
<input checked="" type="checkbox"/>	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	11, 09, 2024
<input checked="" type="checkbox"/>	MOTOR VARIAC	MV2616	EM TEST	P1552169719	11, 09, 2024
<input checked="" type="checkbox"/>	CDN	CNV 508N1	EM TEST	P1610176296	11, 10, 2024

Test Conditions

Temperature: (22,1 ± 0,6) °C
Relative Humidity: (46,0 ± 0,6) % R.H.
Atmospheric Pressure: (100,7 ± 0,0) kPa



Test Specifications

AC Power Lines

Source Impedance: 12 ohm for common Mode and 2 ohm for differential Mode

Surge Amplitude :

Common Mode

☐ (0,5 / 1,0 / 2,0) kV

Differential Mode

☐ (0,5 / 1,0) kV

Number of Surges:

☐ 5 surges per angle

Angle:

☐ 0°, 90°, 180°, 270° (input a.c. power port)

Polarity:

☐ Positive & Negative

Repetition Rate:

☐ 1 surge per min

☐ 1 surge per 30 sec.

Required Performance Criteria:

☐ Complied

Other supply / Signal Lines

Source Impedance:

42 ohm for common Mode

Surge Amplitude:

Common Mode

☒ (0,5 / 1,0) kV

Number of Surges:

☒ 5 Surges

Polarity:

☒ Positive & Negative

Repetition Rate:

☒ 1 surge per min

☐ 1 surge per 30 sec.

Required Performance Criteria:

☒ Complied

**Test Data**☐ Line to Line – Differential Mode

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
-	-	-

☐ Line to Earth – Common Mode

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
-	-	-

Signal Lines☒ Line to Earth – Common Mode

Mode of Application	Coupling Method	Observations	
		(+) Surge (kV)	(-) Surge (kV)
RJ-45(PoE)	CDN	Complied	Complied
	LINE	Complied	Complied

Note: "Blank" = Not performed

Observations:

Complied – No degradation of function

Test Results☒ PASS Required Performance Criteria☐ NOT PASS Required Performance Criteria**Remarks**PASS Required Performance Criteria



3.5 Conducted Disturbance

Reference Standard

EN 61000-4-6:2014

Test Date

Feb. 02, 2024

Test Location

EMS-CS: Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMS Test S/W	icd.control	EM TEST	5.3.12	-
<input checked="" type="checkbox"/>	CONTINUOUS WAVE SIMULATOR	CWS 500N1.4	EM TEST	P1602169880	11, 08, 2024
<input checked="" type="checkbox"/>	ATTENUATOR	ATT 6/80	EM TEST	P1614178148	11, 08, 2024
<input checked="" type="checkbox"/>	CDN	CDN M016	TESEQ	43694	11, 08, 2024
<input checked="" type="checkbox"/>	CDN	CDN M016	TESEQ	43697	11, 08, 2024
<input type="checkbox"/>	CDN	CDN T800	TESEQ	42800	11, 08, 2024
<input checked="" type="checkbox"/>	CDN	CDN T8RJ45	EM TEST	0909-09	07, 31, 2024

Test Conditions

Temperature: (22,4 ± 0,6) °C
Relative Humidity: (45,3 ± 0,6) % R.H.
Atmospheric Pressure: (100,6 ± 0,0) kPa



Test Specifications

Frequency range:

☒ 150 kHz to 100 MHz

☐ 150 kHz to 80 MHz

Voltage Level:

☐ 1 Vrms

☐ 3 Vrms

☒ 10 Vrms

Modulation:

☒ AM, 80 %, 1 kHz sine wave

☒ PM, 1 Hz (0,5 s ON : 0,5 s OFF)

Frequency step:

☒ 1 % step

Dwell Time:

☐ 1 s

☒ 3 s

Required Performance Criteria:

☒ Complied



**Test Data**☐ Input a.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Observations
-	-	-

☐ Input d.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Observations
-	-	-

☒ Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Observations
RJ-45(PoE)	CDN	Complied

Notes: CDN = Coupling Decoupling Network
"blank" = Not performed

Observations:

Complied – No degradation of function

Test Results☒ PASS Required Performance Criteria☐ NOT PASS Required Performance Criteria**Remarks**

PASS Required Performance Criteria



3.6 Voltage Dips and Short Interruptions

Reference Standard

EN IEC 61000-4-11:2020

Test Date

N/A

Test Location

EMS-Voltage dip: Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input type="checkbox"/>	EMS Test S/W	iec.control	EM TEST	5.4.8	-
<input type="checkbox"/>	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	11, 09, 2024
<input type="checkbox"/>	MOTOR VARIAC	MV2616	EM TEST	P1552169719	11, 09, 2024

Test Conditions

Temperature:

°C

Relative Humidity:

% R.H.

Atmospheric Pressure:

kPa

**Test Specifications & Observations/Remarks****- Voltage Dips and Short Interruptions**

<u>Test Level</u>	<u>Duration [in period/ms (50 Hz)]</u>	<u>Results</u>
<input type="checkbox"/> 20 % dip	<input type="checkbox"/> 250 / 5 000	<u>N/A</u>
<input type="checkbox"/> 30 % dip	<input type="checkbox"/> 25 / 500	<u>N/A</u>
<input type="checkbox"/> 60 % dip	<input type="checkbox"/> 10 / 200	<u>N/A</u>
<input type="checkbox"/> 100 % dip	<input type="checkbox"/> 250 / 5 000	<u>N/A</u>

- Voltage variations

<input type="checkbox"/> Unom + 10 %	<input type="checkbox"/> 253.0 V (ac)	<u>N/A</u>
<input type="checkbox"/> Unom - 15 %	<input type="checkbox"/> 195.5 V (ac)	<u>N/A</u>

Observations:

Complied – No degradation of function

Degradation - See "Remarks "

Test Results

- ☐ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria
☒ NOT APPLICABLE

RemarksRefer to 'Remarks when standards applied'.



APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

[HOT]

N/A



[NEUTRAL]

N/A

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

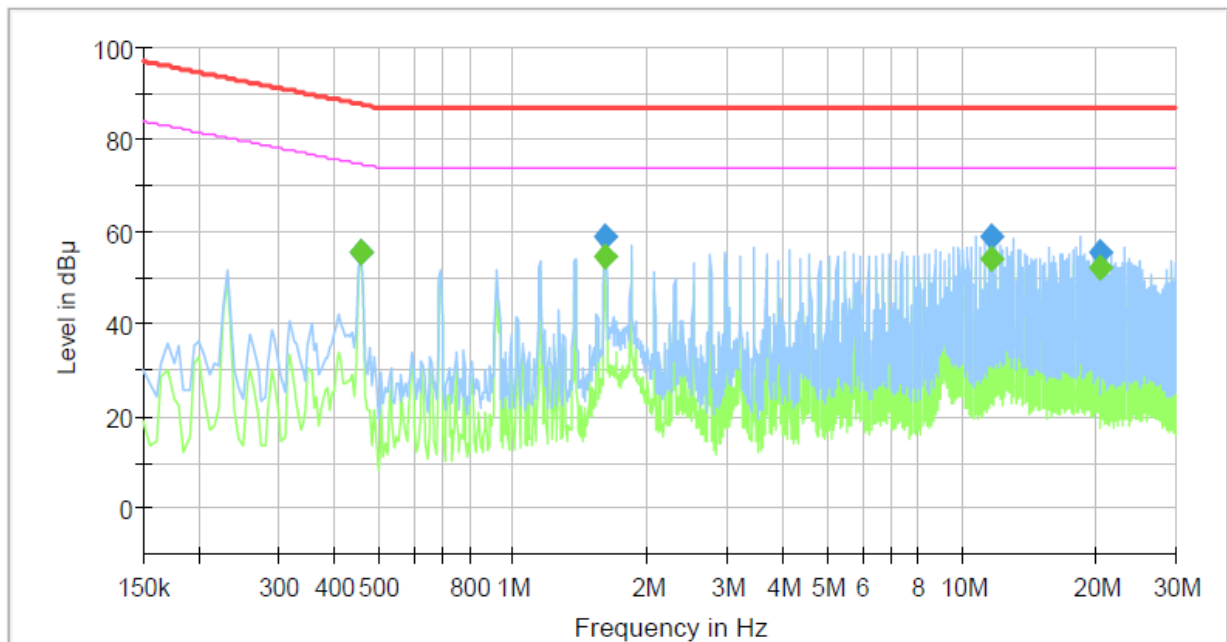
Corr. : Correction values (LISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

**Conducted Emissions at Telecommunication Ports**

[100 Mbps]

Common Information

Test Description: Telecommunication Emission
Model No.: TNV-C8011RW
Mode : PoE_TEL 100 Mbps
Speed :
Operator Name: KES

**Final Result**

Frequency (MHz)	QuasiPeak (dB μ V)	CAverage (dB μ V)	Limit (dB μ V)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.460000	---	55.40	74.69	19.29	1000.0	9.000	Single Line	19.4
0.460000	55.42	---	87.69	32.27	1000.0	9.000	Single Line	19.4
1.605000	---	54.72	74.00	19.28	1000.0	9.000	Single Line	19.3
1.605000	58.89	---	87.00	28.11	1000.0	9.000	Single Line	19.3
11.710000	---	53.97	74.00	20.03	1000.0	9.000	Single Line	19.7
11.710000	58.96	---	87.00	28.04	1000.0	9.000	Single Line	19.7
20.260000	---	52.41	74.00	21.59	1000.0	9.000	Single Line	20.0
20.260000	55.82	---	87.00	31.18	1000.0	9.000	Single Line	20.0

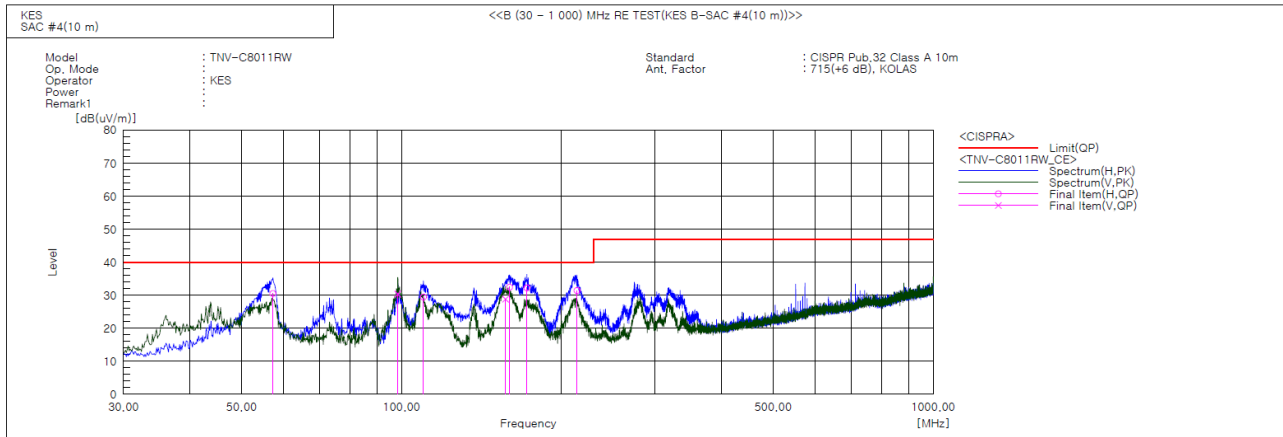
◆ Calculation

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(μV)]	c.f [dB(1/m)]	Result QP [dB(μV/m)]	Limit QP [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	57.281	H	52.1	-21.6	30.5	40.0	9.5	196.0	15.0	
2	98.385	V	52.7	-22.4	30.3	40.0	9.7	396.0	3.0	
3	109.904	H	52.2	-22.8	29.4	40.0	10.6	199.0	188.0	
4	156.828	V	53.7	-24.9	28.8	40.0	11.2	107.0	256.0	
5	159.616	H	57.2	-24.8	32.4	40.0	7.6	112.0	312.0	
6	172.105	H	56.1	-23.9	32.2	40.0	7.8	196.0	320.0	
7	213.694	H	51.2	-19.8	31.4	40.0	8.6	199.0	34.0	

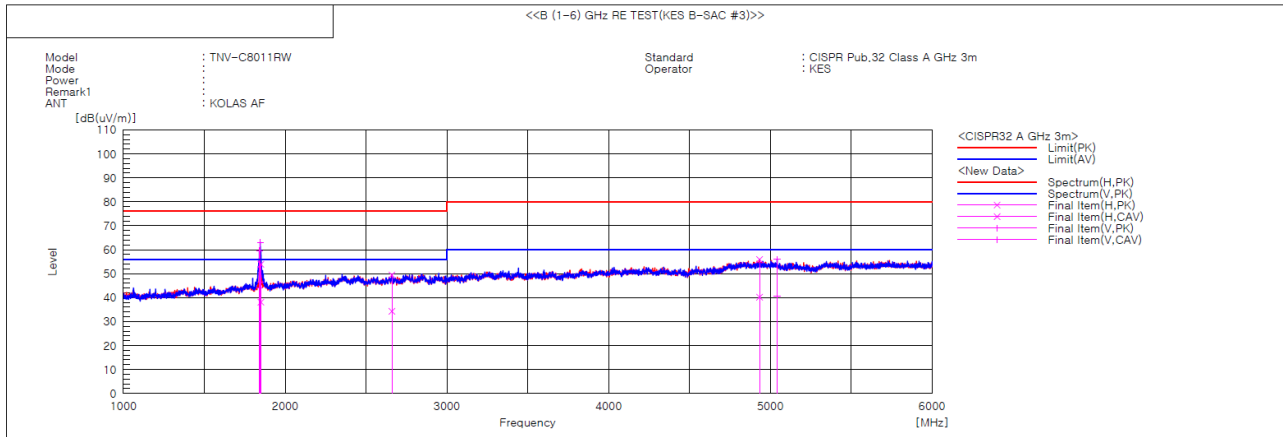
◆ Calculation

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)**

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	1841.617	V	56.6	41.0	3.1	59.7	44.1	76.0	56.0	16.3	11.9	100.0	188.5	
2	1846.849	V	60.0	43.5	3.1	63.1	46.6	76.0	56.0	12.9	9.4	100.0	205.2	
3	1849.083	H	50.7	34.9	3.2	53.9	38.1	76.0	56.0	22.1	17.9	100.0	185.0	
4	2660.338	H	42.6	27.4	6.9	49.5	34.3	76.0	56.0	26.5	21.7	100.0	227.9	
5	4933.728	H	40.8	25.1	15.1	55.9	40.2	80.0	60.0	24.1	19.8	100.0	150.9	
6	5042.716	V	40.7	25.5	15.3	56.0	40.8	80.0	60.0	24.0	19.2	100.0	147.1	

◆ 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

**Harmonic Current Emissions and Voltage Fluctuations and Flicker*****Average harmonic current results***

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
N/A				

Note: Harmonic currents less than 0.6 % of the input current measured under the test conditions, or less than 5 mA, whichever is greater, are disregarded.

* Application of limits for average is 100% except for odd harmonics from 21 to 39, where 150% applies.



Test Data - Voltage Fluctuations

Maximum Flicker results

Flicker Measurements					
	Plt	Max Pst	Max Dc	Max Dmax	Max Tmax
Line 1:	N/A				
Limits:					
Results:					





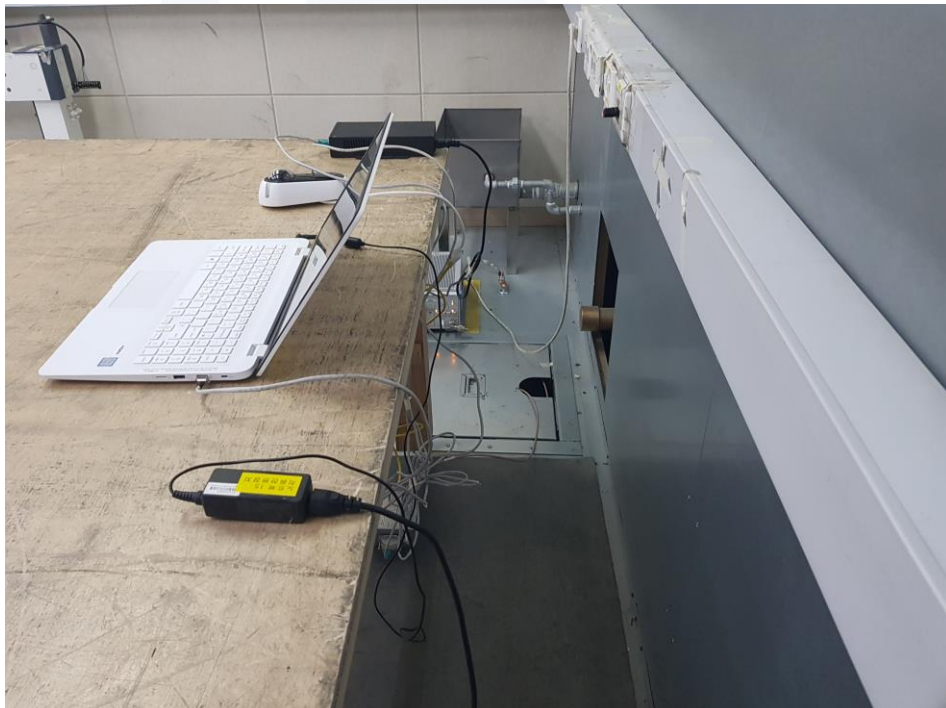
Test Setup Photos and Configuration

Conducted Emissions at Mains Power Ports

N/A

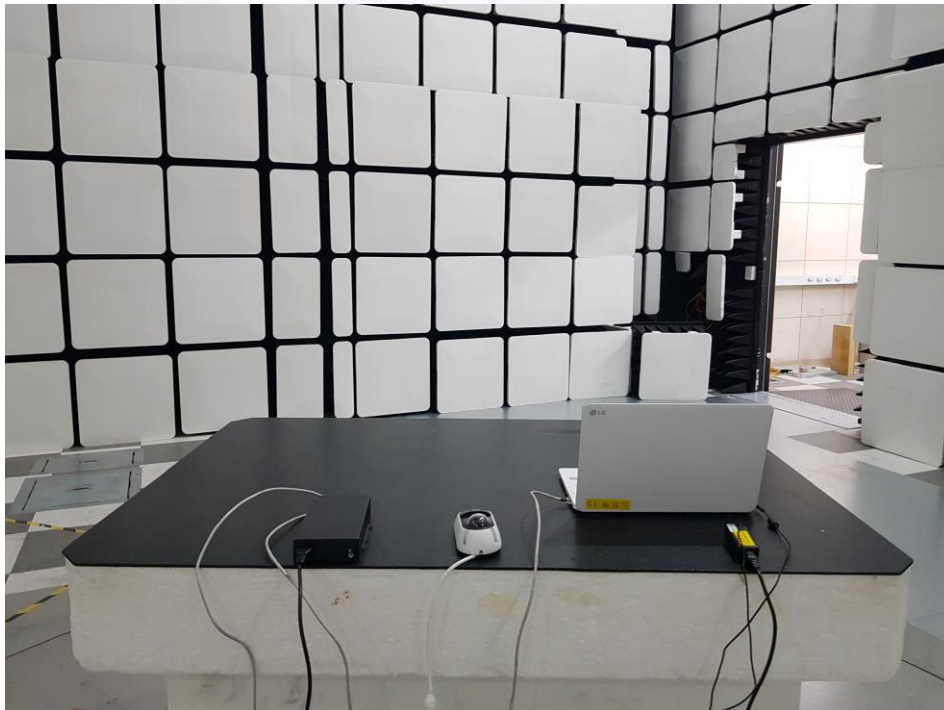
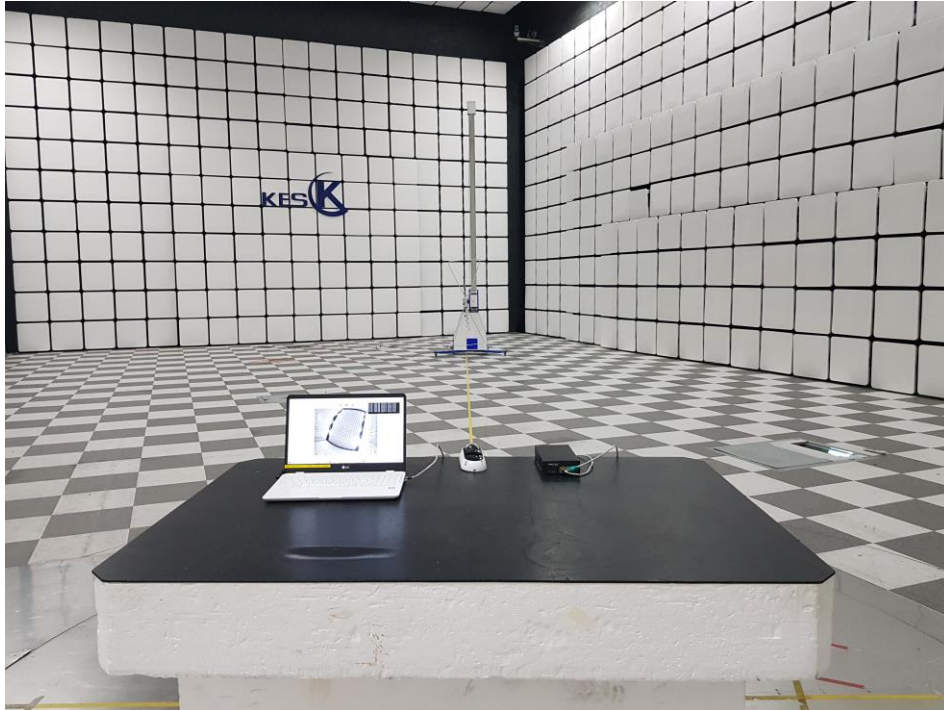


Conducted Emissions at Telecommunication Ports



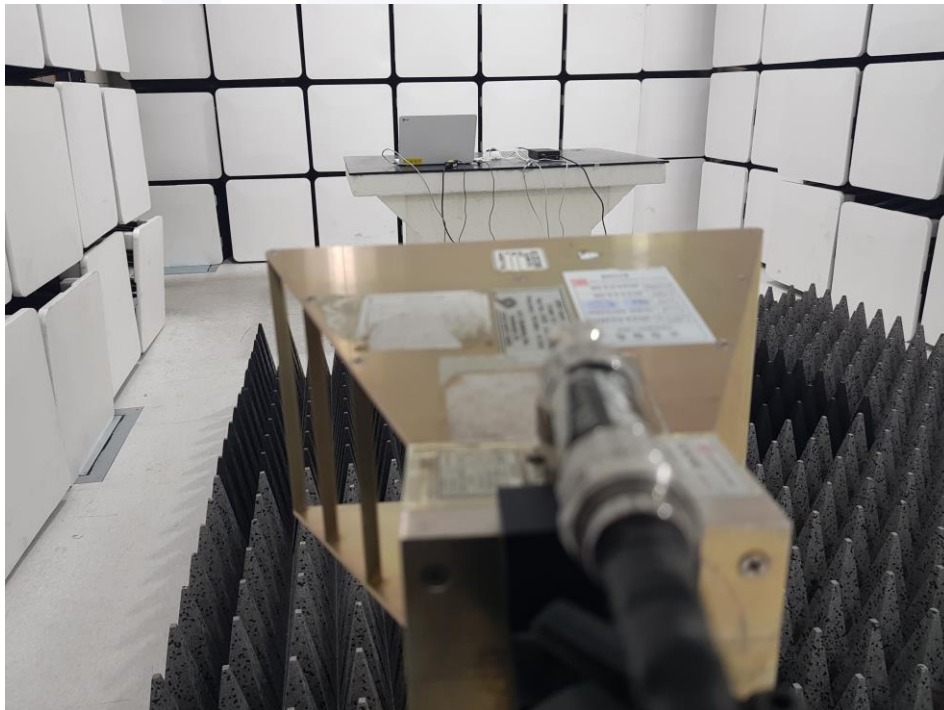


Radiated Electric Field Emissions(Below 1 GHz)





Radiated Electric Field Emissions(Above 1 GHz)





Harmonic Current Emissions and Voltage Fluctuations and Flicker

N/A





Electrostatic Discharge

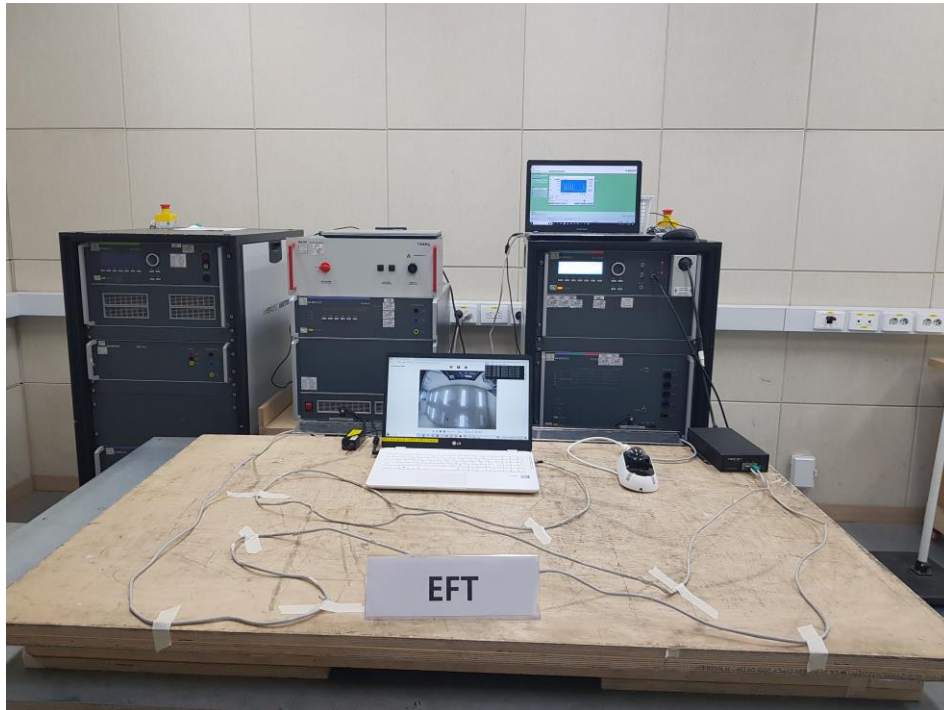


Radiated Electric Field Immunity

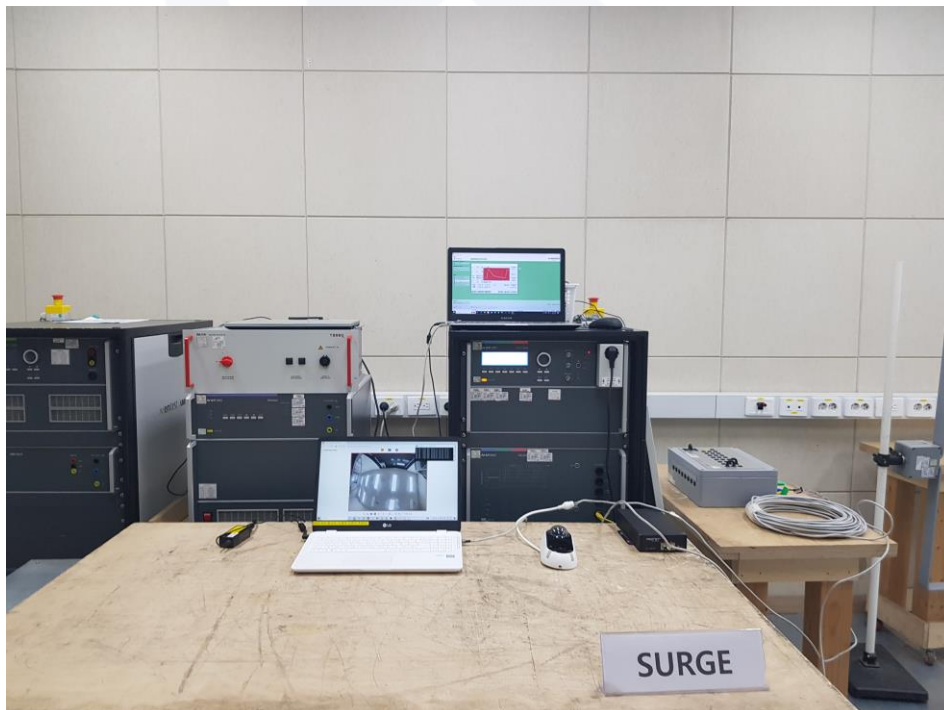




Electrical Fast Transients/Bursts



Surge Transients





Conducted Disturbance



Voltage Dips and Short Interruptions

N/A



EUT External Photographs

(Top)



(Bottom)





EUT Internal Photographs

(Internal View)



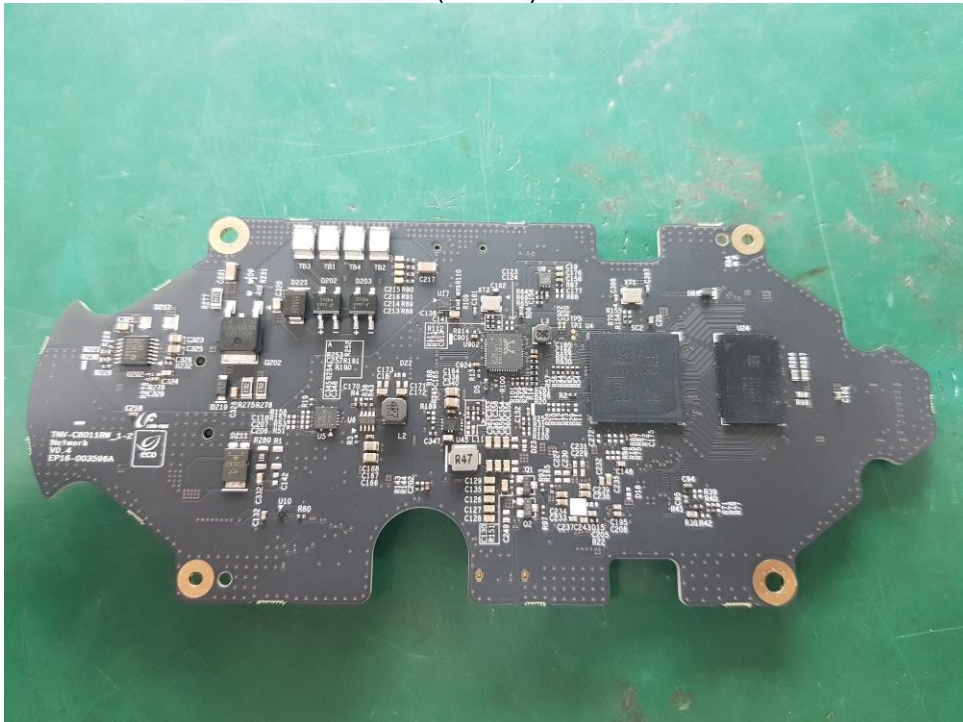


EUT Internal View – Main Board

(Top)



(Bottom)





EUT Internal View – Sub Board 1

(Top)



(Bottom)



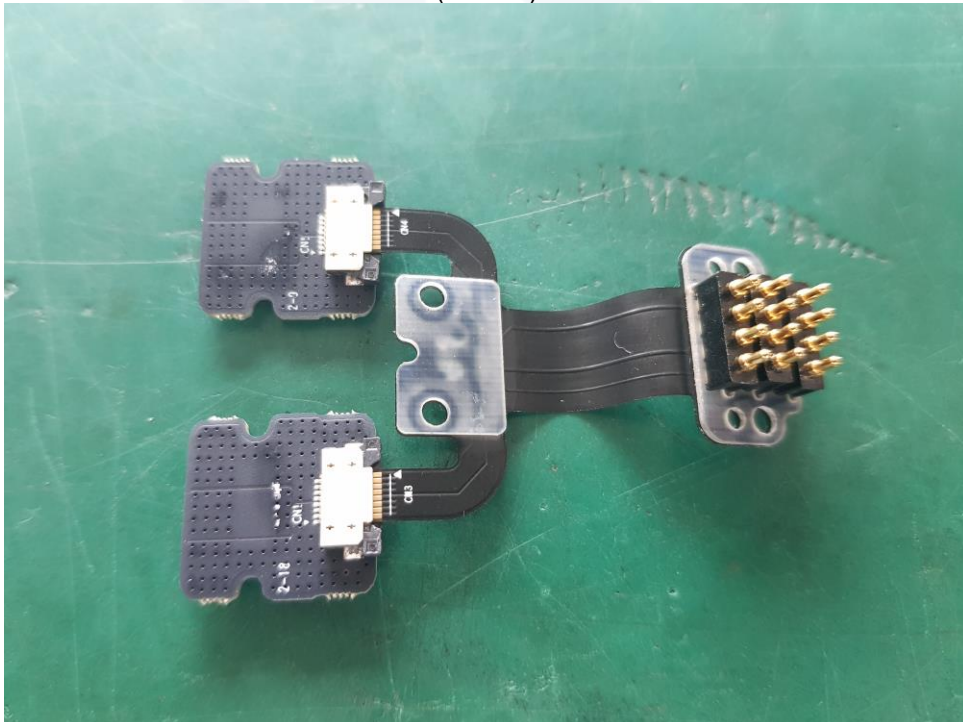


EUT Internal View – Sub Board 2

(Top)



(Bottom)





EUT Internal View – Camera Lens

(Top)



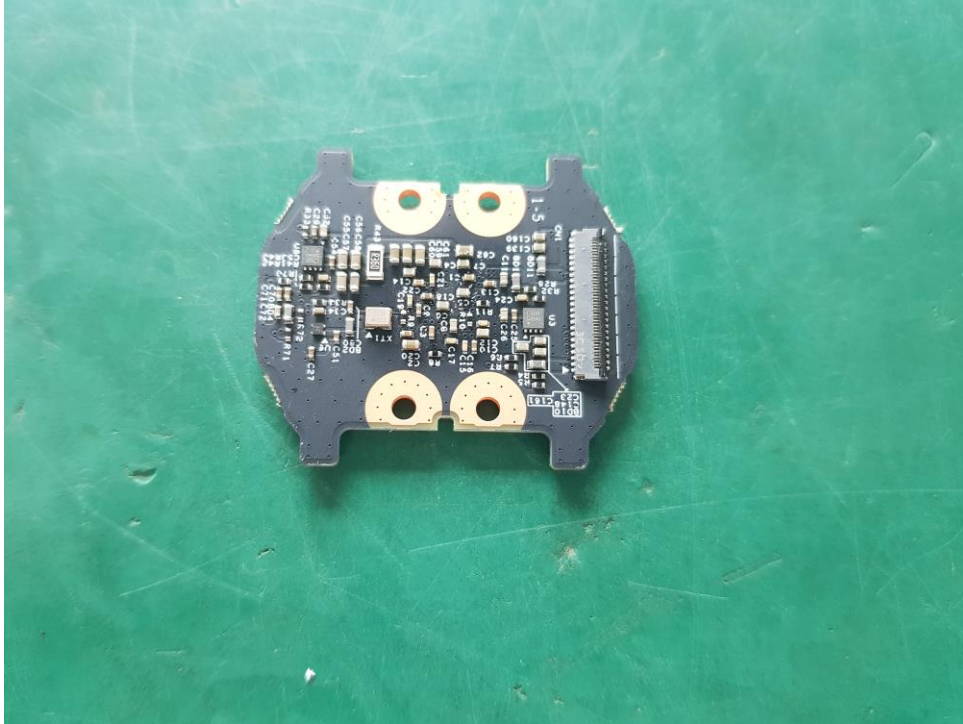
(Bottom)





EUT Internal View – Camera Lens Board

(Top)



(Bottom)





Label and Location



NETWORK CAMERA

Model No : TNV-C8011RW

Manufacturer : HANWHA VISION VIETNAM COMPANY LIMITED

Made in Vietnam

