

**KES Co., Ltd.**

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Report No.:
KES-EM-21T0190
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EMC TEST REPORT For CE

Test Report No. : KES-EM-21T0190
Date of Issue : Mar. 17, 2021
Product name : 2M 32x Network Camera
Model/Type No. : TNO-6322ER
Variant Model : -
Applicant : Hanwha Techwin Co., Ltd.
Applicant Address : 6, Pangyo-ro 319Beon-gil, Bundang-gu, Seongnam-si,
Gyeonggi-do, Republic of Korea
Manufacturer : KEVIS
Manufacturer Address : B-1307 GUNPO IT VALLY, GOSANRP 148-17 GUNPO CITY,
GYUNGGI-DO, KOREA
Date of Receipt : Feb. 26, 2021
Test date : Mar. 04, 2021 ~ Mar. 10, 2021
Test Results : ☒ In Compliance ☐ Not in Compliance

Tested by

Dae Soo, Kim
EMC Test Engineer

Reviewed by

Dong-Hun, Jang
EMC Technical Manager

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

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REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Mar. 17, 2021	KES-EM-21T0190	Issued

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1.0 General Product Description

Main Specifications of EUT are:

Video	
Photographing device	1/2.8" CMOS
Resolution	1920x1080, 1280x1024, 1280x960, 1280x720, 1024x768, 800x600, 800x448, 720x576, 720x480, 640x480, 640x360, 320x240
Maximum Frame Rate	H.265/H.264: 최대 60fps/50fps(60Hz/50Hz) MJPEG: 최대 30fps/25fps(60Hz/50Hz)
Lowest illumination	Color: 0.05Lux (1/30sec, F1.6) Black and White: 0Lux(IR LED on)
Lens	
a focal distance	4.44 to 142.6 mm (32X) Zoom Lens
Maximum viewing fee	F1.6 (wide angle) to F4.4 (telephoto)
the angle of view	H: 61.8° (wide-angle) to 2.19° (telephoto) / V: 36.2° (wide-angle) to 1.24° (telephoto)
Minimum Distance	1.5 telephoto, 2 meters wide.
Focus Control	One shot AF
Lens type	DC auto iris
Camera function	
Camera Title	Up to 85 Characters
Day & Night	Automatic(ICR)
Backlight Calibration	BLC, HLC, WDR, SDDR
Wide Dynamic Range	120dB
Noise Rejection	SSNR V
image shaking correction	Support
Fog Removal	Support
Motion detection	Supports 8 and 8 polygons
Privacy Features	Supports 32 and 8 polygons - Color: Black/Blue/Red/Grey/White/Green - Mosaic
Gain Control	Low / Medium / High
White Balance	ATW / AWC / Manual / Indoor / Outdoor
Electronic Shutter	Minimum / Maximum / Flicker Prevention (1-1/12,000 seconds)
Image Rotation	Top and bottom, left and right.
Intelligent Analysis	defocus detection, orientation detection, fog detection, face detection, motion detection, auto tracking, occurrence/destruction detection, entry detection, wander, tempering, virtual line, audio detection
Alarm Input/Output	1 input / 1 output
Alarm Trigger	Intelligent analysis, network disconnection, alarm input
Alarm Events	Transferring and uploading files via FTP and E-Mail Notification via E-Mail Record to SD/SDHC/SDXC or NAS when alarm trigger occurs External Alarm Output PTZ Preset
Audio Input	Selectable (Mike/Line Input) Supported Voltage: 2.5 VDC (4 mA), Input Impedance: 2K Ohm
Audio output	line output, maximum output: 1 Vrms
Night Visible Distance	70m
Drain	Support (wipe)
Network	
Ethernet	Metal shielded RJ-45(10/100BASE-T), RJ-45(10/100BASE-T)
Video compression	H.265/H.264: Main/Baseline/High, MJPEG

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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
Smart Compression	Manual (5 areas), WiseStream II
Quality Control	H.264/H.265: Bitrate Level Control MJPEG: Bitrate Level Control
Bitrate Control	H.264/H.265: CBR or VBR MJPEG: VBR
Streaming	Unicast" (up to 20 people) / Multicast Multi-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, SMTP, ICMP, IGMP, SNMPv1/v2c/v3(MIB-2), ARP, DNS, DDNS, QoS, PIM-SM, UPnP, Bonjour
Security	HTTPS (SSL) authentication methods Digest authentication method IP Address Filtering User Connection Log History 802.1X authentication method (EAP-TLS, EAP-LEAP)
Application Interface	ONVIF Profile S/G/T SUNAPI(HTTP API) Wisenet open platform
General	
Web Page Language	Korean
Memory	1024MB RAM, 256MB Flash
Operating Environment and Power	
Operating temperature / humidity	IR Off : -40°C~+60°C / 95% RH or less IR On : -40°C~+55°C / 95% RH or less
Storage Temperature / Humidity	-30°C~+60°C / 95% RH or less
Specification authentication	IECEEx, ATEX, KCs, KC, CE IP67, IK10
Power	24VAC
Power Consumed	24VAC: Max 45W
The external appearance	
Color / Material	Silver / Stainless (SUS316L)
Product Size / Weight	175(W)x243.5(H)x320(D)mm, 11.5kg

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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.

Voltage ☒ 230 Vac ☐ 100 Vac ☐ 24 Vac ☐ 12 Vdc ☐ PoE
Frequency ☒ 50 Hz ☐ 60 Hz ☐ 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
2M 32x Network Camera	TNO-6322ER	-	KEVIS	EUT

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
Adapter	MKAC-96-246000K	HU06047-17004A	Shenzhen Macable Technology Co.,Ltd Dongguan Brance	-
Notebook	CQ61-127TU	CNF91801TM	HP	-
Notebook Adapter	PPP09D	601W94D1CKU	HP	-
Alarm	SIP-1201DD D0	-	SAMSUNG TECHWIN CO., LTD.	-
Button alarm	-	-	-	-
Smartphone	LG-SU760	108KPQJ0186212	LG	-
Speaker	BR1000A Cuve Black 2	-	DONGGUAN EDIFIER TECHNOLOGY Co., Ltd	-
MIC	MP1000	-	-	-
Multi Meter	107	-	FLUKE	-
Micro SD Card	-	-	SanDisk	16 GB

1.6 External I/O Cabling

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
NETWORK CAMERA (EUT)	RJ-45	Notebook	RJ-45	3.0	U
	Alarm OUT	Alarm	Alarm IN	3.0	U
	Alarm IN	Button alarm	Alarm OUT	3.0	U
	Audio OUT	Speaker	Audio OUT	3.0	U
	Audio IN	MIC	Audio IN	3.0	U
	WAS ON	Multi Meter	+	3.0	U
	WAS COM		-	3.0	U
	SLOT	Micro SD Card	SLOT	-	-
Notebook	3.5 mm	Smartphone	3.5 mm	0.5	U

* Unshielded=U, Shielded=S

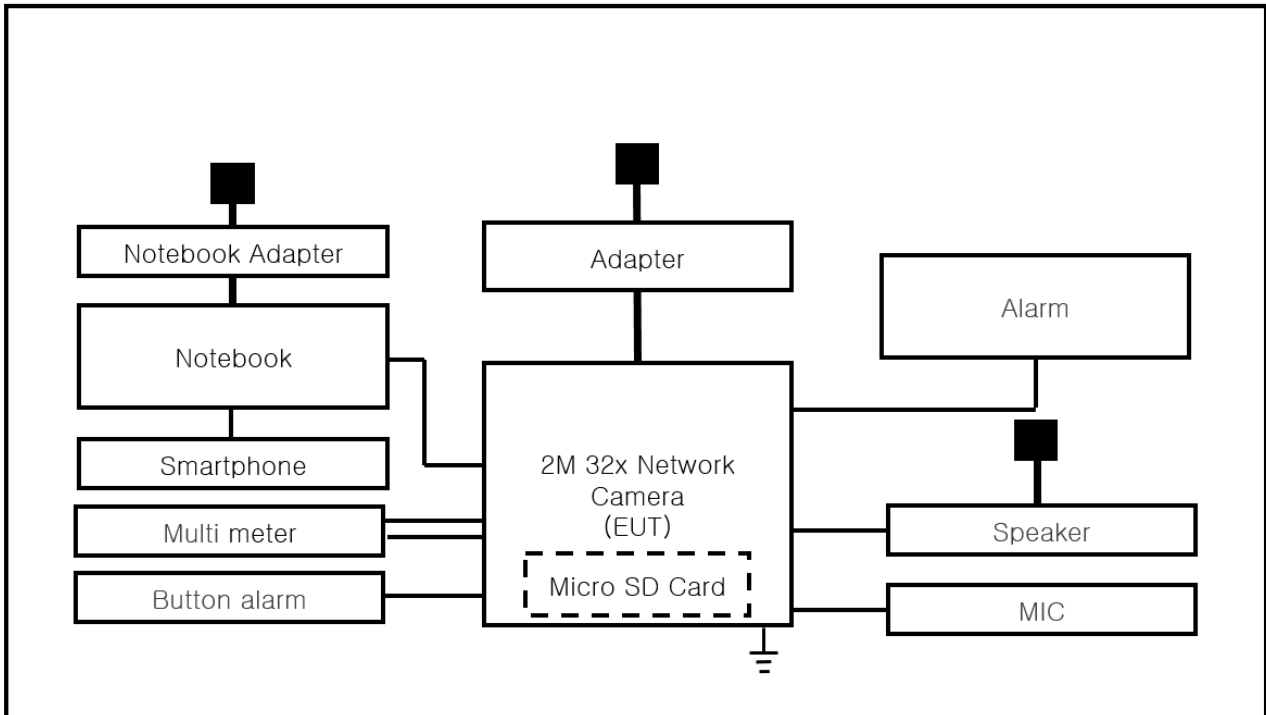
1.7 EUT Operating Mode(s)

Test Mode	operating
OP	the test was conducted while checking the camera video output from the laptop and making sure that they operate normally while performing a ping test.

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

1.8 Configuration

■ AC Main
 □ DC Main



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. The sites are constructed in conformance with the requirements of ANSI C63.4: 2014 and CISPR 16-1-4: 2012

1.12 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
KOREA	RRA	EMI (3 m & 10 m Semi-Anechoic Chamber , 10 m Open Area 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, 10 m Open Area and Conducted test site to perform FCC Part 15/18 measurements.	 KR0100
Canada	ISED	3 m & 10 m Semi-Anechoic Chamber and Conducted test site	 23298-1
JAPAN	VCCI	Mains Ports Conducted Interference Measurement, Telecommunication Ports Conducted Disturbance Measurement and Radiation 10 meter site, Facility for measuring radiated disturbance above 1 GHz	 R-20056, C-20036, T-20040, G-20057
Europe	TÜV SÜD	EMI (3 m & 10 m Semi-Anechoic Chamber , 10 m Open Area 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 61000-6-3: 2011

☐ EN 61000-6-1: 2007

☐ EN 61000-6-4: 2007 +A1: 2011

☐ EN 61000-6-2: 2005

☐ EN 55011: 2007 +A1: 2010

☐ Group 1
☐ Class A

☐ Group 2
☐ Class B

☐ EN 55014-1: 2006 +A2: 2011

☐ EN 55014-2: 1997 +A2: 2008

☐ EN 55015: 2013

☐ EN 61547: 2009

☒ EN 55032: 2012/AC: 2013

☒ Class A

☐ Class B

☐ EN 55024: 2010 +A1: 2015

☒ EN 50130-4: 2011+A1 : 2014

☒ EN 61000-3-2: 2014

☒ EN 61000-3-3: 2013

☐ EN 61326-1: 2013

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-
- | | | |
|--|----------------------------------|----------------------------------|
| <input type="checkbox"/> VCCI -CISPR 32:2016 | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> AS/NZS CISPR32:2015 | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> 47 CFR Part 15, Subpart B | | |
| <input type="checkbox"/> CISPR 22:2009 +A1:2010 | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> ANSI C63.4-2014 | | |
| <input type="checkbox"/> IC Regulation ICES-003 : 2016 | | |
| <input type="checkbox"/> CAN/CSA CISPR 22-10 | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> ANSI C63.4-2014 | | |
|
<input type="checkbox"/> RE- Directive 2014/53/EU | | |
|
<input type="checkbox"/> EN 301 489-1 V2.2.3 | | |
| <input type="checkbox"/> Equipment for fixed use | | |
| <input type="checkbox"/> Equipment for vehicular use | | |
| <input type="checkbox"/> Equipment for portable use | | |
|
<input type="checkbox"/> EN 301 489-3 V1.6.1 | | |
|
<input type="checkbox"/> EN 301 489-17 V2.2.1 | | |
|
<input type="checkbox"/> EN 60945: 2002 | | |

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2.1 Conducted Emissions at Mains Power Ports

Test Date

Mar. 04, 2021

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	01, 15, 2022
<input checked="" type="checkbox"/>	LISN	ENV216	R & S	101787	12, 29, 2021
<input checked="" type="checkbox"/>	LISN	ESH2-Z5	R & S	100450	12, 29, 2021
<input checked="" type="checkbox"/>	PULSE LIMITER	ESH3-Z2	R & S	101915	12, 29, 2021

Test Conditions

Temperature: (23,5 ± 0,4) °C

Relative Humidity: (44,7 ± 0,2) % 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.

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2.2 Conducted Emissions at Telecommunication Ports

Test Date

Mar. 04, 2021

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	01, 15, 2022
<input checked="" type="checkbox"/>	LISN	ENV216	R & S	101787	12, 29, 2021
<input checked="" type="checkbox"/>	LISN	ESH2-Z5	R & S	100450	12, 29, 2021
<input checked="" type="checkbox"/>	PULSE LIMITER	ESH3-Z2	R & S	101915	12, 29, 2021
<input checked="" type="checkbox"/>	8-WIRE ISN CAT3,5	ENY81	R & S	100174	12, 30, 2021
<input type="checkbox"/>	8-WIRE ISN CAT6	ENY81-CAT6	R & S	101665	12, 30, 2021

Test Conditions

Temperature: (23,5 ± 0,4) °C

Relative Humidity: (44,7 ± 0,2) % 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.

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2.3 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Mar. 04, 2021

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	04, 01, 2021
<input checked="" type="checkbox"/>	AMPLIFIER	SCU 01	R & S	100603	11, 25, 2021
<input checked="" type="checkbox"/>	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	12, 08, 2022
<input checked="" type="checkbox"/>	ATTENUATOR	8491A	HP	32173	03, 10, 2022

Test Conditions

Temperature: (23,4 ± 0,2) °C

Relative Humidity: (44,9 ± 0,2) % R.H.

Frequency Range of Measurement

30 MHz to 1 GHz

Instrument Settings

IF Band Width: 120 kHz

Test Results

The requirements are:

☒ PASS☐ NOT PASS☐ NOT APPLICABLE

Remarks

See Appendix A for test data.

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2.4 Radiated Electric Field Emissions(Above 1 GHz)

Test Date

Mar. 10, 2021

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	08, 05, 2021
<input checked="" type="checkbox"/>	PREAMPLIFIER	8449B	AGILENT	3008A01967	04, 20, 2021
<input type="checkbox"/>	ATTENUATOR	8491A	HP	35496	03, 10, 2022
<input checked="" type="checkbox"/>	HORN ANTENNA	BBHA 9120D	SCHWARZBECK	9120D-1802	12, 14, 2021

Test Conditions

Temperature: (23,1 ± 0,4) °C

Relative Humidity: (46,4 ± 0,4) % R.H.

Frequency Range of Measurement

1 GHz to 6 GHz

Instrument Settings

IF Band Width: 1 MHz

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.

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2.5 Harmonic Current Emissions

Test Date
Mar. 04, 2021

Test Location
Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMI Test S/W	net.control	EM TEST	2.1.4	-
<input checked="" type="checkbox"/>	DIGITAL POWER ANALYZER	DPA 500N	EM TEST	V1024106759	04, 06, 2021
<input checked="" type="checkbox"/>	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

Test Conditions

Temperature: (24,1 ± 0,4) °C
Relative Humidity: (46,6 ± 0,4) % 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

Remarks

See Appendix A for test data.



2.6 Voltage Fluctuations and Flicker

Test Date
Mar. 04, 2021

Test Location
Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMI Test S/W	net.control	EM TEST	2.1.4	-
<input checked="" type="checkbox"/>	DIGITAL POWER ANALYZER	DPA 500N	EM TEST	V1024106759	04, 06, 2021
<input checked="" type="checkbox"/>	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

Test Conditions

Temperature: (24,1 ± 0,4) °C
Relative Humidity: (46,6 ± 0,4) % R.H.

Test Results

The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.

3.0 Criteria for compliance

Criteria for compliance was based on the following guidelines:

EN 50130-4: 2011 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
Mar. 09, 2021

Test Location
EMS-ESD: Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	ESD SIMULATOR	ESS-2000	Noise Ken	ESS01Z0454	02, 01, 2022
<input checked="" type="checkbox"/>	HCP	-	KES	-	-
<input checked="" type="checkbox"/>	VCP	-	KES	-	-

Test Conditions

Temperature: (22,9 ± 0,2) °C
Relative Humidity: (44,8 ± 0,2) % R.H.
Atmospheric Pressure: (100,9 ± 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

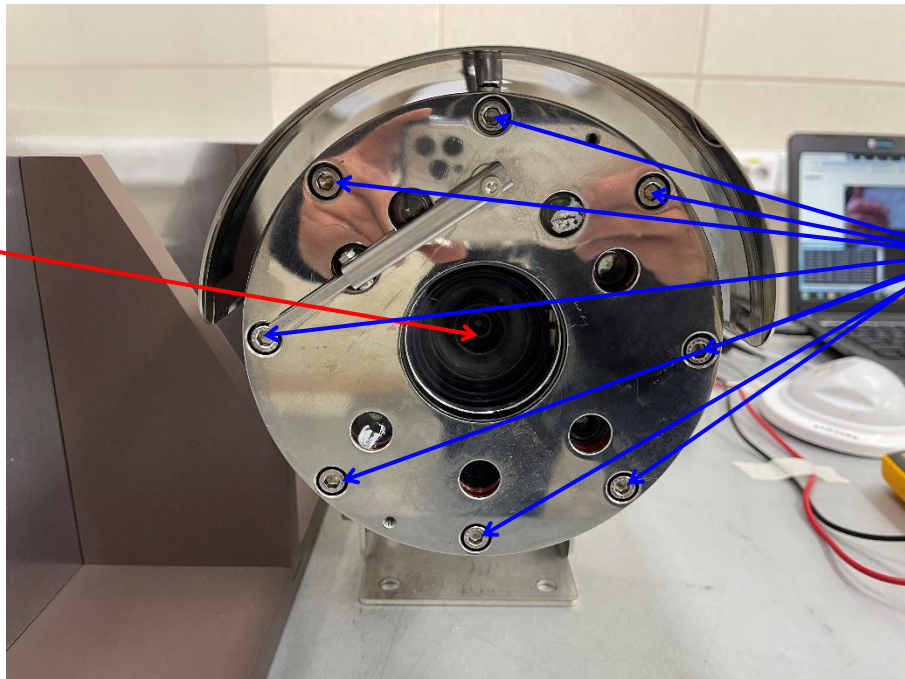
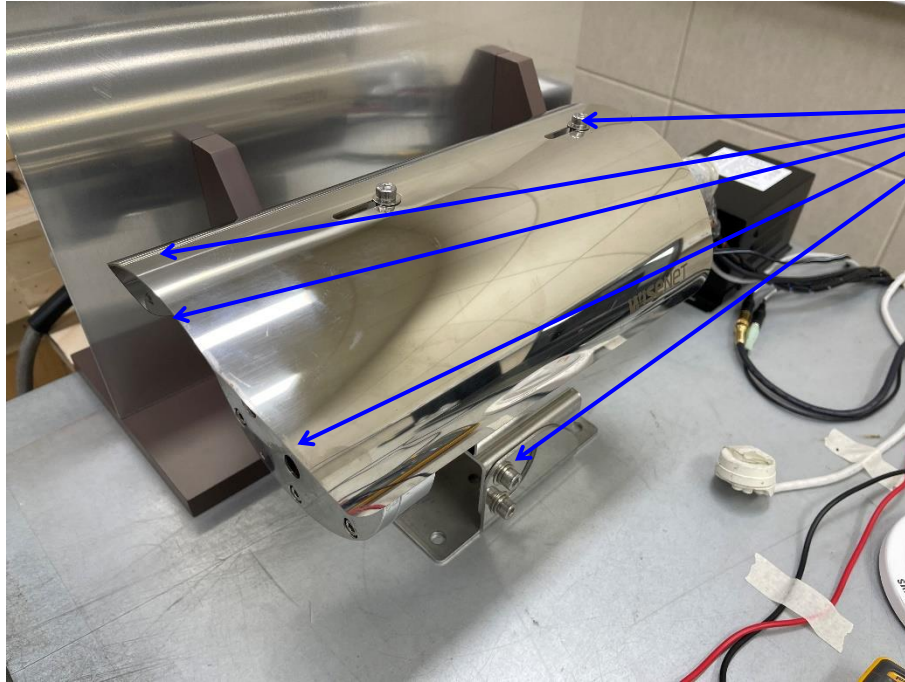
Notes: HCP: Horizontal coupling plane
VCP: Vertical coupling plane

Required Performance Criteria: ☒ Complied

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Location of Discharge:

Air
Contact



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3



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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, screw	Contact Discharge	Complied	-
2	Lens	Air Discharge	Complied	-
3	Port	Contact 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

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3.2 Radiated Electric Field Immunity

Reference Standard

EN 61000-4-3: 2006 +A2: 2010

Test Date

Mar. 10, 2021

Test Location

EMS-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	9.12.00	-
<input checked="" type="checkbox"/>	SIGNAL GENERATOR	SMB 100A	Rohde & Schwarz	108252	08, 05, 2021
<input checked="" type="checkbox"/>	HIGH POWER DUAL AMP	SSA532	SUNGSAN	SSA532-001	-
<input checked="" type="checkbox"/>	POWER METER	E4419B	Agilent	GB40203000	04, 20, 2021
<input checked="" type="checkbox"/>	CW POWER SENSOR	E4412A	Agilent	US38488240	04, 20, 2021
<input checked="" type="checkbox"/>	CW POWER SENSOR	E4412A	Agilent	MY41501662	04, 20, 2021
<input checked="" type="checkbox"/>	STACKED DOUBLE LOG-PER- ANTENNA	STPL9128 E	Schwarzbeck	9128ES-121	-
<input checked="" type="checkbox"/>	HORN ANTENNA	BBHA 9120D	SCHWARZBECK	9120D-1802	12, 14, 2021

Test Conditions

Temperature: (23,1 ± 0,4) °C

Relative Humidity: (46,4 ± 0,4) % R.H.

Atmospheric Pressure: (101,0 ± 0,0) kPa

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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

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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

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3.3 Electrical Fast Transients/Bursts

Reference Standard
EN 61000-4-4: 2012

Test Date
Mar. 09, 2021

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	5.4.7	-
<input checked="" type="checkbox"/>	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	11, 26, 2021
<input checked="" type="checkbox"/>	MOTOR VARIAC	MV2616	EM TEST	P1552169719	11, 26, 2021
<input checked="" type="checkbox"/>	CAPACITIVE COUPLING CLAMP	HFK	EM TEST	P1633183115	11, 26, 2021

Test Conditions

Temperature: (22,9 ± 0,4) °C
Relative Humidity: (44,8 ± 0,2) % R.H.
Atmospheric Pressure: (100,9 ± 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 kHz ☒ 100 kHz

Duration of Test Voltage: ☒ ≥ 1 min

Required Performance Criteria: ☒ Complied

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Test Data

☒ Input a.c. power ports – Coupling/Decoupling Network used

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
L	Complied	Complied
N	Complied	Complied
PE	Complied	Complied
L – N	Complied	Complied
L – PE	Complied	Complied
N – PE	Complied	Complied
L – N – PE	Complied	Complied

☐ 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	Complied	Complied
Alarm In	Complied	Complied
Alarm Out	Complied	Complied
Audio IN	Complied	Complied
Audio OUT	Complied	Complied
WAS ON	Complied	Complied
WAS COM	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

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3.4 Surge Transients

Reference Standard
EN 61000-4-5: 2014

Test Date
Mar. 09, 2021

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	5.4.7	-
<input checked="" type="checkbox"/>	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	11, 26, 2021
<input checked="" type="checkbox"/>	MOTOR VARIAC	MV2616	EM TEST	P1552169719	11, 26, 2021
<input checked="" type="checkbox"/>	CDN	CNV 508N1	EM TEST	P1610176296	11, 27, 2021

Test Conditions

Temperature: (22,9 ± 0,4) °C
Relative Humidity: (44,8 ± 0,6) % R.H.
Atmospheric Pressure: (100,9 ± 0,0) kPa

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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

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Test Data

☒ Line to Line – Differential Mode

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
L – N	Complied	Complied

☒ Line to Earth – Common Mode

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
L – PE	Complied	Complied
N – PE	Complied	Complied

Signal Lines

☒ Line to Earth – Common Mode

Mode of Application	Coupling Method	Observations	
		(+) Surge (kV)	(-) Surge (kV)
RJ-45	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
☐ NOT APPLICABLE

Remarks

PASS Required Performance Criteria



3.5 Conducted Disturbance

Reference Standard
EN 61000-4-6: 2014

Test Date
Mar. 05, 2021 / Mar. 08, 2021

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	5.3.11	-
<input checked="" type="checkbox"/>	CONTINUOUS WAVE SIMULATOR	CWS 500N1.4	EM TEST	P1602169880	11, 25, 2021
<input checked="" type="checkbox"/>	ATTENUATOR	ATT 6/80	EM TEST	P1614178148	11, 25, 2021
<input checked="" type="checkbox"/>	CDN	CDN M016	TESEQ	43694	11, 25, 2021
<input checked="" type="checkbox"/>	CDN	CDN M016	TESEQ	43697	11, 25, 2021
<input checked="" type="checkbox"/>	CDN	CDN T8RJ45	EM TEST	0909-09	08, 05, 2021
<input checked="" type="checkbox"/>	EM CLAMP	KEMZ 801A	TESEQ	44099	11, 26, 2021

Test Conditions

	Mar. 05, 2021	Mar. 08, 2021
Temperature:	(23,7 ± 0,4) °C	(22,7 ± 0,6) °C
Relative Humidity:	(45,9 ± 0,4) % R.H.	(46,2 ± 0,4) % R.H.
Atmospheric Pressure:	(100,6 ± 0,0) kPa	(100,9 ± 0,0) kPa

Test Specifications

Frequency range:	<input checked="" type="checkbox"/> 150 kHz to 100 MHz	<input type="checkbox"/> 150 kHz to 80 MHz
Voltage Level:	<input type="checkbox"/> 1 Vrms <input checked="" type="checkbox"/> 10 Vrms	<input type="checkbox"/> 3 Vrms
Modulation:	<input checked="" type="checkbox"/> AM, 80 %, 1 kHz sine wave <input checked="" type="checkbox"/> PM, 1 Hz (0,5 s ON : 0,5 s OFF)	
Frequency step:	<input checked="" type="checkbox"/> 1 % step	
Dwell Time:	<input type="checkbox"/> 1 s	<input checked="" type="checkbox"/> 3 s

Required Performance Criteria: ☒ Complied

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Test Data

☒ Input a.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Observations
L – N – PE	CDN	Complied

☐ 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	CDN	Complied
Alarm In	Clamp	Complied
Alarm Out	Clamp	Complied
Audio IN	Clamp	Complied
Audio OUT	Clamp	Complied
WAS ON	Clamp	Complied
WAS COM	Clamp	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 61000-4-11:2004

Test Date
Mar. 09, 2021

Test Location
EMS-Voltage dip: 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	5.4.7	-
<input checked="" type="checkbox"/>	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	11, 26, 2021
<input checked="" type="checkbox"/>	MOTOR VARIAC	MV2616	EM TEST	P1552169719	11, 26, 2021

Test Conditions

Temperature: (22,9 ± 0,2) °C
Relative Humidity: (44,8 ± 0,2) % R.H.
Atmospheric Pressure: (100,9 ± 0,0) 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 checked="" type="checkbox"/> 20 % dip	<input checked="" type="checkbox"/> 250 / 5 000	<u>Complied</u>
<input checked="" type="checkbox"/> 30 % dip	<input checked="" type="checkbox"/> 25 / 500	<u>Complied</u>
<input checked="" type="checkbox"/> 60 % dip	<input checked="" type="checkbox"/> 10 / 200	<u>Complied</u>
<input checked="" type="checkbox"/> 100 % dip	<input checked="" type="checkbox"/> 250 / 5 000	<u>Degradation</u>

- Voltage variations

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

Observations:

Complied – No degradation of function

Degradation - See "Remarks "

Test Results

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

Remarks

- PASS Required Performance Criteria.
- During the test(100%, 250cycle), EUT was turned off but after the test, it was recovered by no operator's intervention.



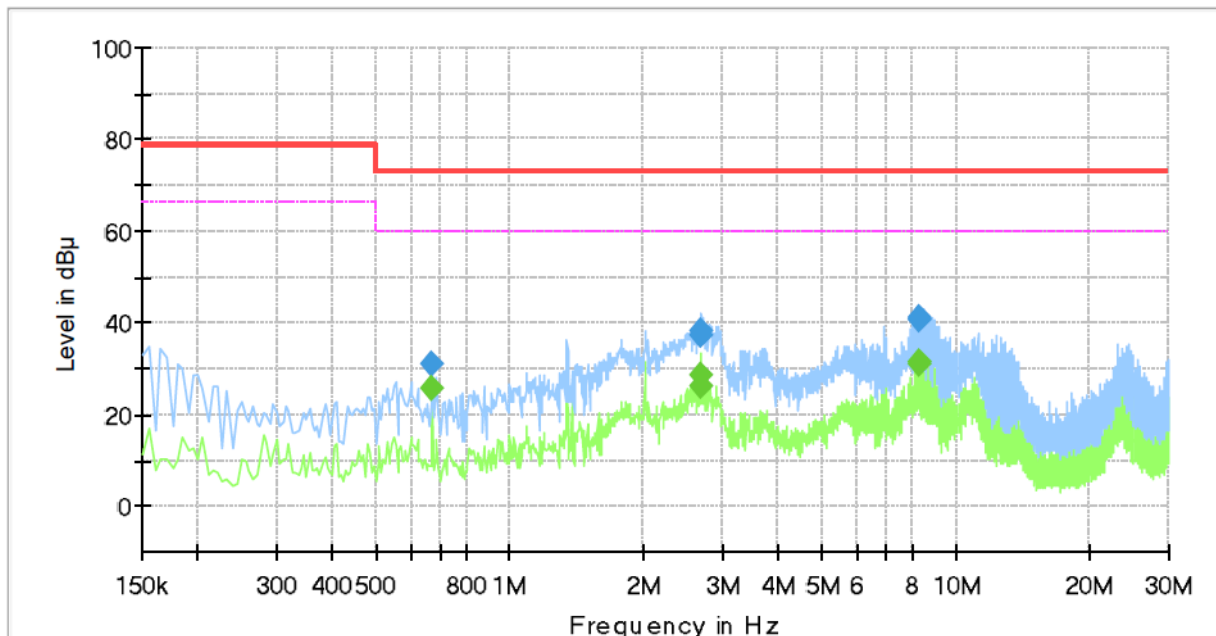
APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

[HOT]

Common Information

Test Description: Conducted Emission
Model No.: TNO-6322ER
Phase: H
Mode:
Operator Name: KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.670000	---	25.49	60.00	34.51	1000.0	9.000	L1	19.8
0.670000	31.07	---	73.00	41.93	1000.0	9.000	L1	19.8
2.680000	---	28.69	60.00	31.31	1000.0	9.000	L1	20.1
2.680000	38.11	---	73.00	34.89	1000.0	9.000	L1	20.1
2.690000	---	26.13	60.00	33.87	1000.0	9.000	L1	20.1
2.690000	37.52	---	73.00	35.48	1000.0	9.000	L1	20.1
8.285000	---	31.43	60.00	28.57	1000.0	9.000	L1	19.7
8.285000	40.53	---	73.00	32.47	1000.0	9.000	L1	19.7
8.290000	---	31.09	60.00	28.91	1000.0	9.000	L1	19.7
8.290000	41.15	---	73.00	31.85	1000.0	9.000	L1	19.7

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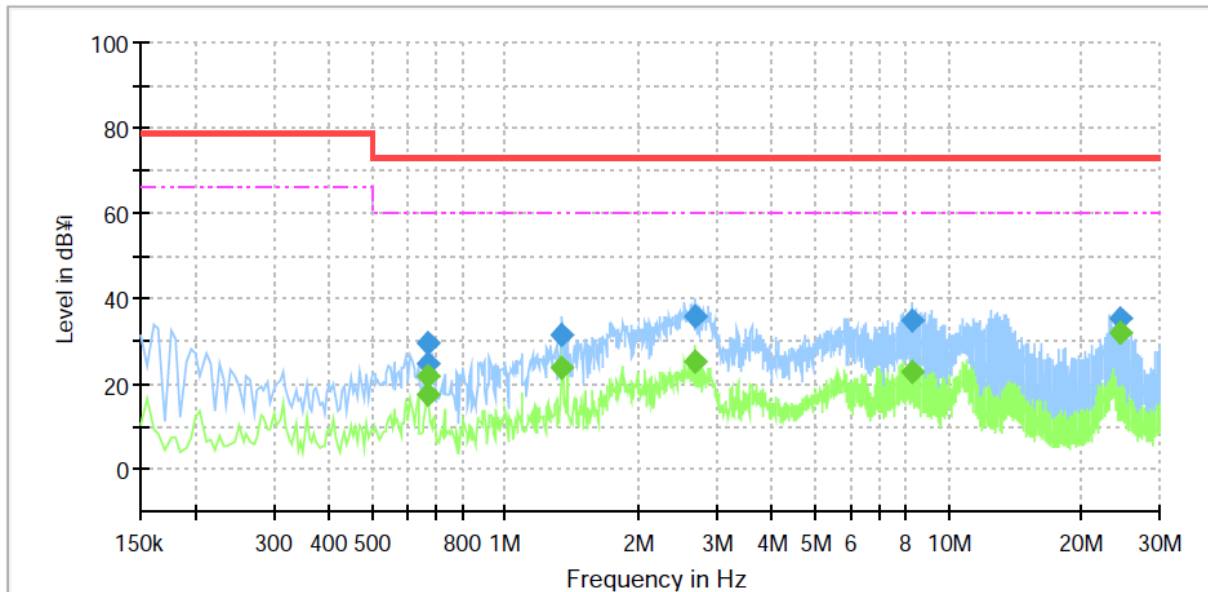
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[NEUTRAL]

Common Information

Test Description: Conducted Emission
Model No.: TNO-6322ER
Phase: N
Mode:
Operator Name: KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.665000	---	17.64	60.00	42.36	1000.0	9.000	N	19.8
0.665000	24.63	---	73.00	48.37	1000.0	9.000	N	19.8
0.670000	---	21.94	60.00	38.06	1000.0	9.000	N	19.8
0.670000	29.69	---	73.00	43.31	1000.0	9.000	N	19.8
1.340000	---	23.85	60.00	36.15	1000.0	9.000	N	20.1
1.340000	31.56	---	73.00	41.44	1000.0	9.000	N	20.1
2.675000	---	25.36	60.00	34.64	1000.0	9.000	N	20.1
2.675000	35.79	---	73.00	37.21	1000.0	9.000	N	20.1
8.295000	---	22.92	60.00	37.08	1000.0	9.000	N	19.7
8.295000	35.03	---	73.00	37.97	1000.0	9.000	N	19.7
24.350000	---	31.80	60.00	28.20	1000.0	9.000	N	20.1
24.350000	35.19	---	73.00	37.81	1000.0	9.000	N	20.1

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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

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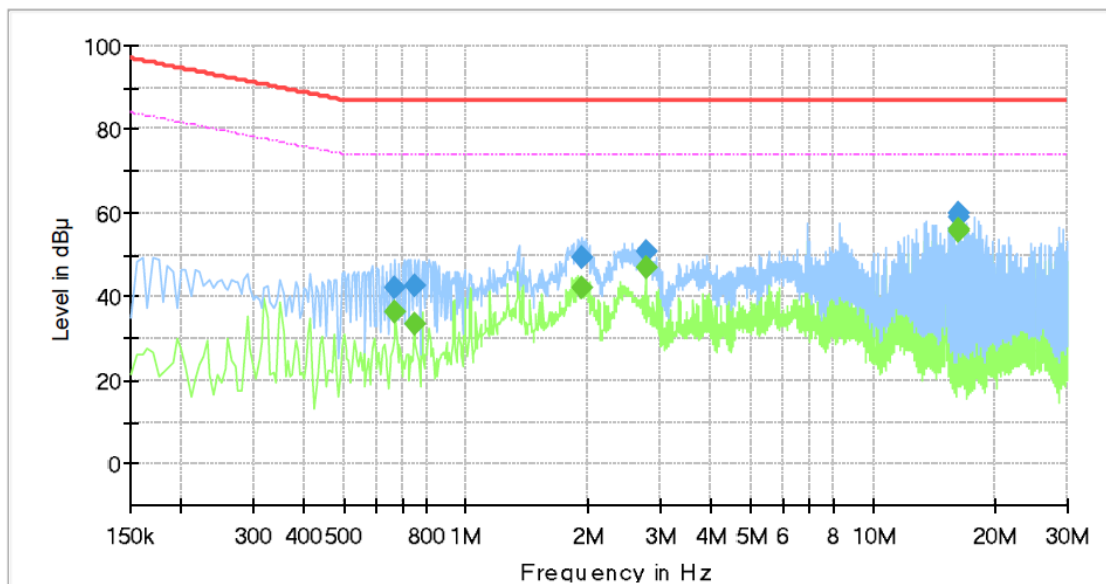
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Conducted Emissions at Telecommunication Ports

[100 Mbps]

Common Information

Test Description: Telecommunication Emission
 Model No.: TNO-6322ER
 Mode :
 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)
0.670000	---	36.36	74.00	37.64	1000.0	9.000	Single Line	19.9
0.670000	42.33	---	87.00	44.67	1000.0	9.000	Single Line	19.9
0.750000	---	33.61	74.00	40.39	1000.0	9.000	Single Line	19.9
0.750000	42.61	---	87.00	44.39	1000.0	9.000	Single Line	19.9
1.915000	---	41.95	74.00	32.05	1000.0	9.000	Single Line	20.1
1.915000	49.54	---	87.00	37.46	1000.0	9.000	Single Line	20.1
2.760000	---	47.11	74.00	26.89	1000.0	9.000	Single Line	19.9
2.760000	50.93	---	87.00	36.07	1000.0	9.000	Single Line	19.9
16.225000	---	55.46	74.00	18.54	1000.0	9.000	Single Line	19.7
16.225000	59.21	---	87.00	27.79	1000.0	9.000	Single Line	19.7
16.230000	---	56.07	74.00	17.93	1000.0	9.000	Single Line	19.7
16.230000	59.81	---	87.00	27.19	1000.0	9.000	Single Line	19.7

◆ 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))

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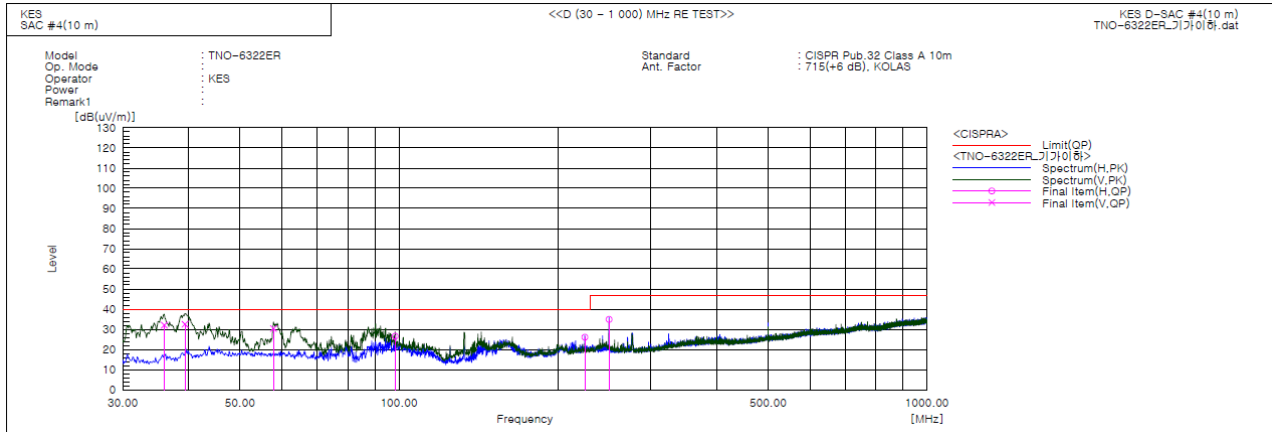


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3701, 40, Simin-daero 365beon-gil,
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Report No.:
KES-EM-21T0190
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Radiated Electric Field Emissions(Below 1 GHz)



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	35.941	V	56.8	-24.7	32.1	40.0	7.9	171.0	308.0	
2	39.336	V	55.5	-23.0	32.5	40.0	7.5	114.0	255.0	
3	57.888	V	52.1	-21.7	30.4	40.0	9.6	168.0	105.0	
4	98.385	H	49.3	-22.7	26.6	40.0	13.4	283.0	188.0	
5	224.970	H	46.1	-20.0	26.1	40.0	13.9	391.0	237.0	
6	249.948	H	54.0	-19.1	34.9	47.0	12.1	335.0	2.0	

◆ Calculation – SEMI ANECHOIC CHAMBER #4(10 m)

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

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

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

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

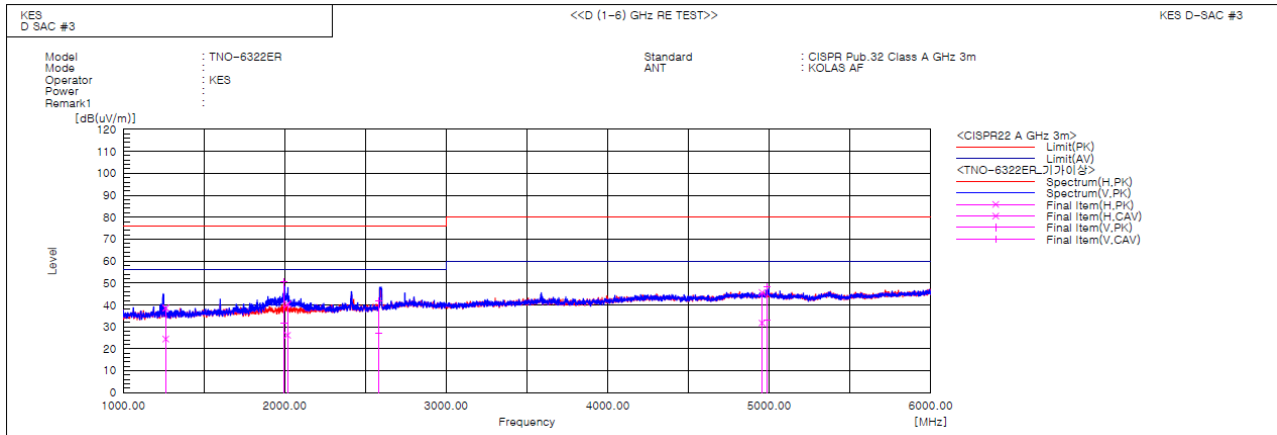


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Report No.:
KES-EM-21T0190
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Radiated Electric Field Emissions(Above 1 GHz)



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB(1/m)]	Result PK [dB(uV/m)]	Result CAV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin CAV [dB]	Height [cm]	Angle [deg]	Remark
1	1263.427	H	45.2	31.1	-6.7	38.5	24.4	76.0	56.0	37.5	31.6	100.0	306.4	
2	2016.956	H	43.5	29.3	-3.2	40.3	26.1	76.0	56.0	35.7	29.9	100.0	298.9	
3	1995.801	V	53.7	35.0	-3.2	50.5	31.8	76.0	56.0	25.5	24.2	100.0	352.2	
4	2583.173	V	43.2	28.6	-1.6	41.6	27.0	76.0	56.0	34.4	29.0	100.0	285.0	
5	4954.833	H	39.5	25.6	6.2	45.7	31.8	80.0	60.0	34.3	28.2	100.0	353.8	
6	4985.442	V	42.0	26.7	6.2	48.2	32.9	80.0	60.0	31.8	27.1	100.0	275.0	

◆ 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



Harmonic Current Emissions and Voltage Fluctuations and Flicker

Average harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	0.094			
2	0.003	0.302	1.080	n/a
3	0.031	1.365	2.300	PASS
4	0.002	0.378	0.430	n/a
5	0.022	1.942	1.140	PASS
6	0.001	0.229	0.300	n/a
7	0.012	1.530	0.770	PASS
8	0.001	0.291	0.230	n/a
9	0.010	2.528	0.400	PASS
10	0.001	0.510	0.184	n/a
11	0.005	1.462	0.330	n/a
12	0.001	0.381	0.153	n/a
13	0.004	1.679	0.210	n/a
14	0.001	0.664	0.131	n/a
15	0.002	1.167	0.150	n/a
16	0.001	0.955	0.115	n/a
17	0.001	1.035	0.132	n/a
18	0.001	0.622	0.102	n/a
19	0.002	1.418	0.118	n/a
20	0.001	0.729	0.092	n/a
21	0.001	0.862	0.161	n/a
22	0.001	0.802	0.084	n/a
23	0.001	0.612	0.147	n/a
24	0.001	1.028	0.077	n/a
25	0.001	0.632	0.135	n/a
26	0.001	1.065	0.071	n/a
27	0.001	0.532	0.125	n/a
28	0.001	1.086	0.066	n/a
29	0.001	0.756	0.116	n/a
30	0.001	1.061	0.061	n/a
31	0.001	0.842	0.109	n/a
32	0.001	1.296	0.058	n/a
33	0.001	0.768	0.102	n/a
34	0.001	1.195	0.054	n/a
35	0.001	0.718	0.096	n/a
36	0.001	1.288	0.051	n/a
37	0.001	0.757	0.091	n/a
38	0.001	1.215	0.048	n/a
39	0.001	0.766	0.087	n/a
40	0.001	1.818	0.046	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 - Harmonics (continued)

Maximum harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	0.094			
2	0.004	0.217	1.620	n/a
3	0.032	0.915	3.450	PASS
4	0.002	0.266	0.645	n/a
5	0.022	1.299	1.710	PASS
6	0.001	0.187	0.450	n/a
7	0.012	1.032	1.155	PASS
8	0.001	0.224	0.345	n/a
9	0.010	1.704	0.600	PASS
10	0.001	0.373	0.276	n/a
11	0.005	1.005	0.495	n/a
12	0.001	0.284	0.230	n/a
13	0.004	1.150	0.315	n/a
14	0.001	0.478	0.197	n/a
15	0.002	0.889	0.225	n/a
16	0.001	0.688	0.173	n/a
17	0.001	0.745	0.199	n/a
18	0.001	0.463	0.153	n/a
19	0.002	0.995	0.178	n/a
20	0.001	0.537	0.138	n/a
21	0.002	0.996	0.161	n/a
22	0.001	0.607	0.125	n/a
23	0.001	0.845	0.147	n/a
24	0.001	0.799	0.115	n/a
25	0.001	0.742	0.135	n/a
26	0.001	0.795	0.106	n/a
27	0.001	0.642	0.125	n/a
28	0.001	0.807	0.099	n/a
29	0.001	0.840	0.116	n/a
30	0.001	0.804	0.092	n/a
31	0.001	0.977	0.109	n/a
32	0.001	0.956	0.086	n/a
33	0.001	0.844	0.102	n/a
34	0.001	0.894	0.081	n/a
35	0.001	0.792	0.096	n/a
36	0.001	0.944	0.077	n/a
37	0.001	0.835	0.091	n/a
38	0.001	0.912	0.073	n/a
39	0.001	0.847	0.087	n/a
40	0.001	1.312	0.069	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:	0.028	0.028	0	< 0.2	0
Limits:	0.65	1	3.3	4	0.5
Results:	PASS	PASS	PASS	PASS	PASS

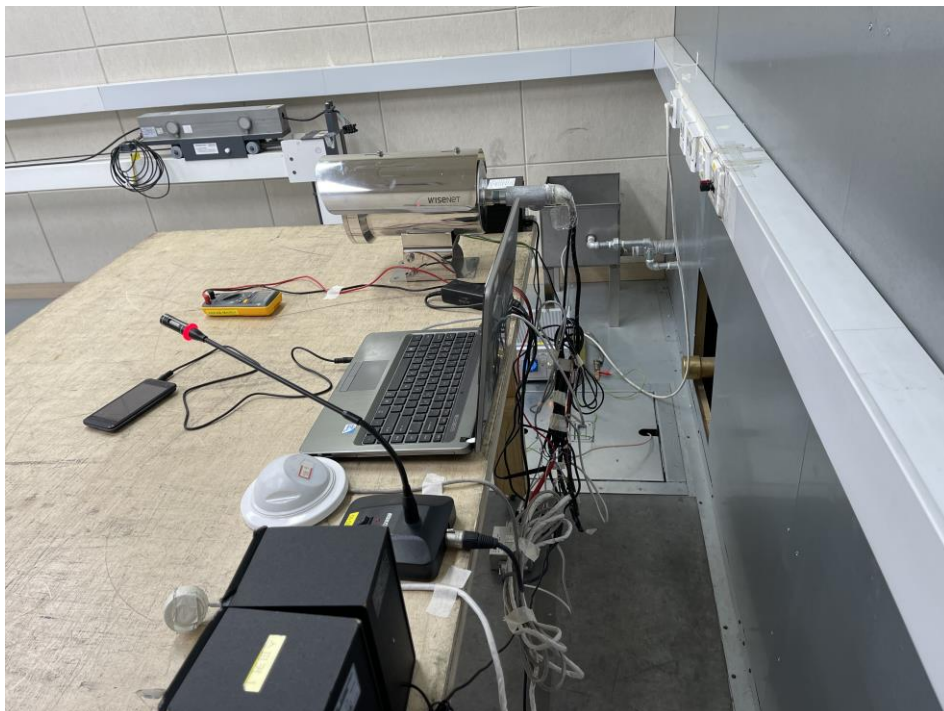
Test Setup Photos and Configuration

Conducted Emissions at Mains Power Ports



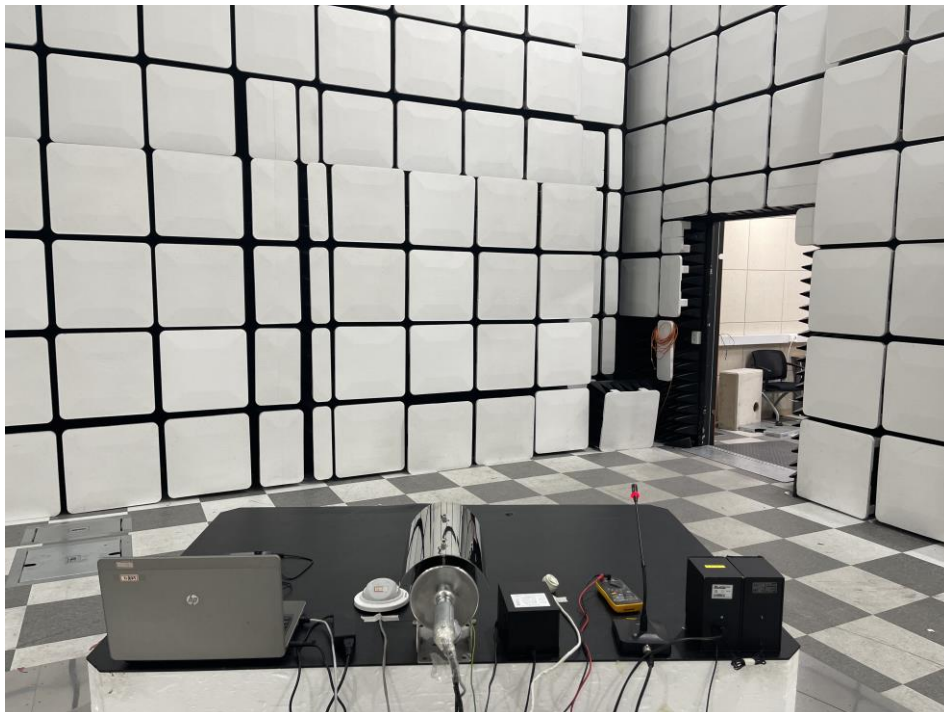
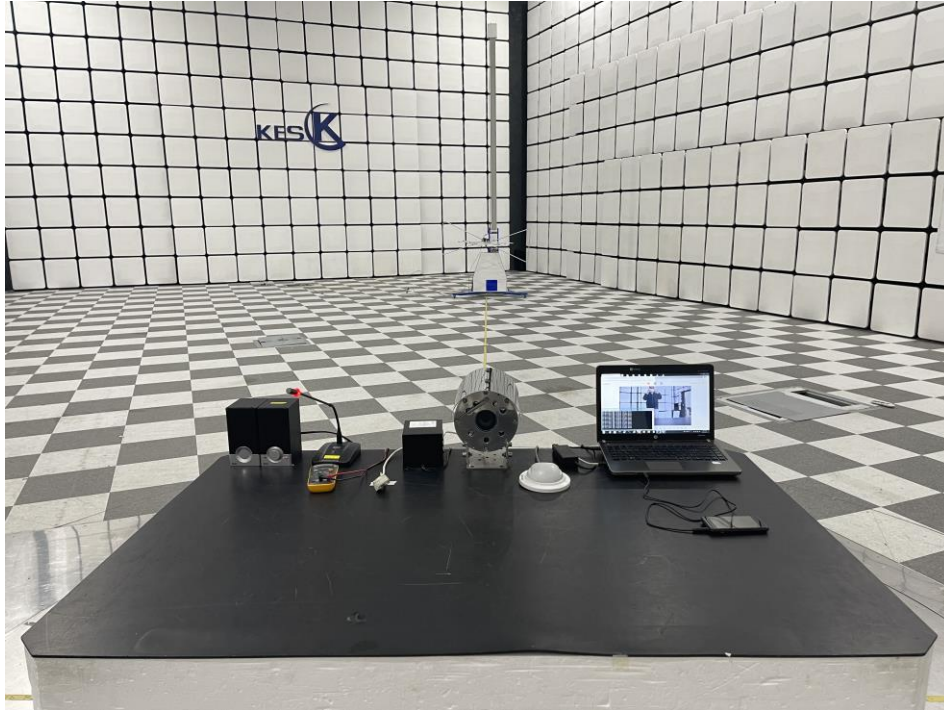
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Conducted Emissions at Telecommunication Ports



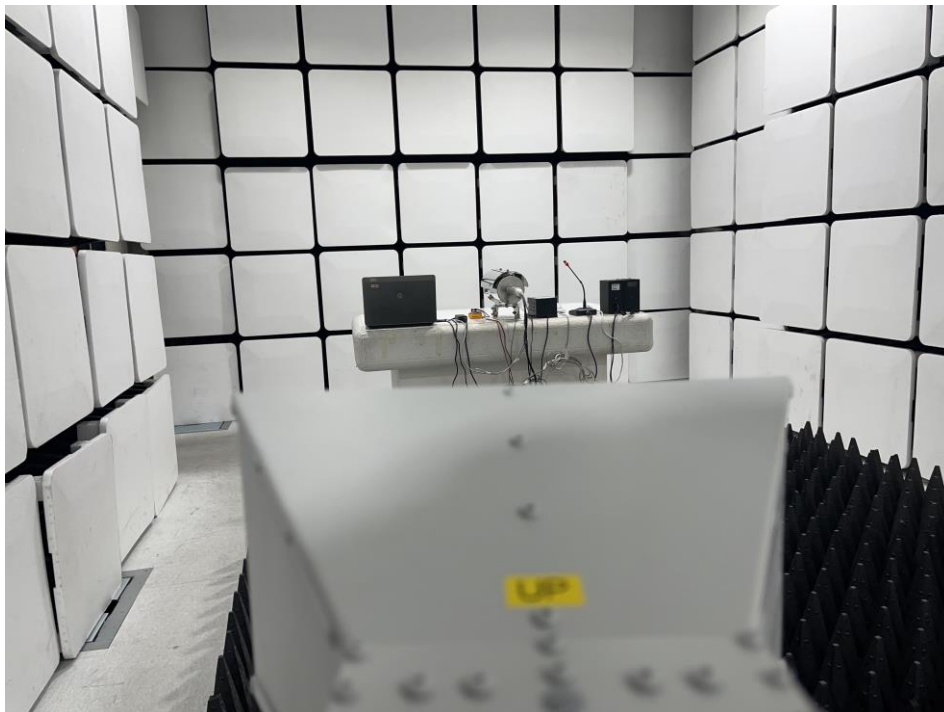
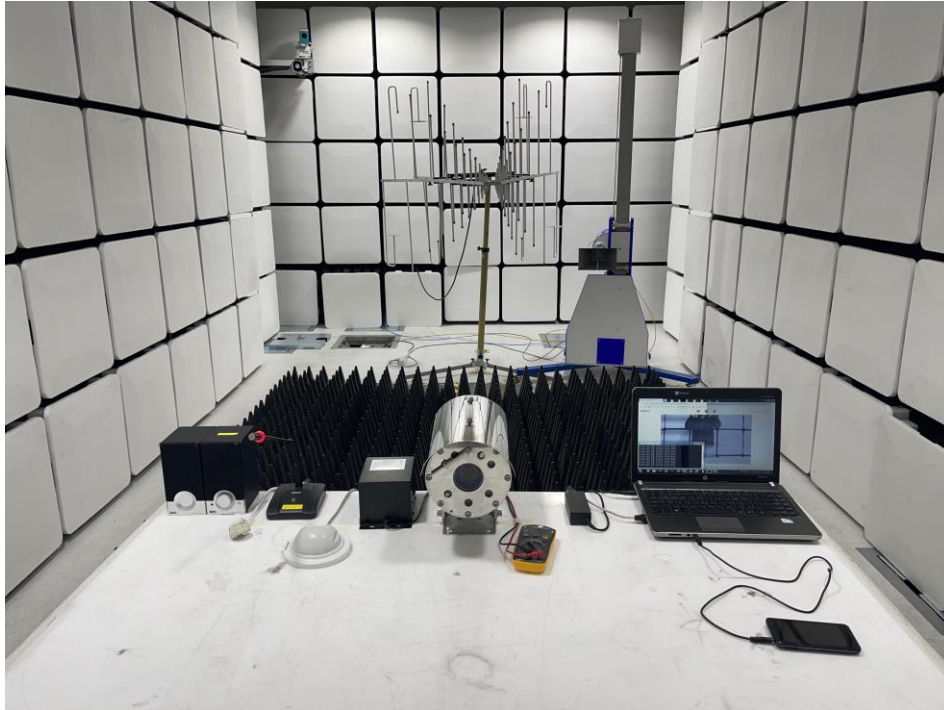
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Radiated Electric Field Emissions(Below 1 GHz)



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Radiated Electric Field Emissions(Above 1 GHz)



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Harmonic Current Emissions and Voltage Fluctuations and Flicker

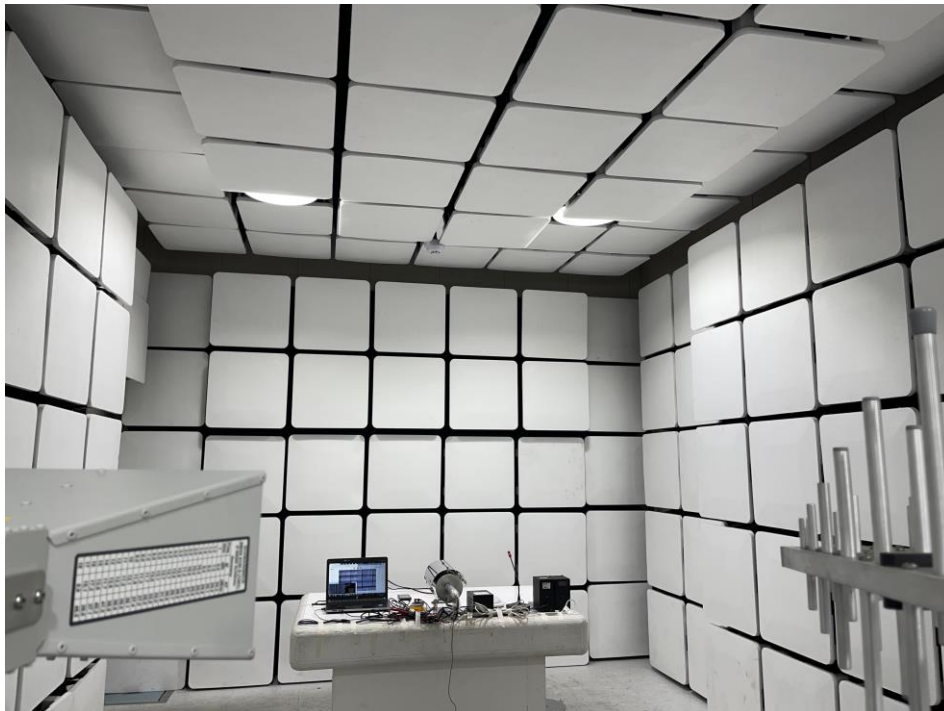


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Electrostatic Discharge



Radiated Electric Field Immunity



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Electrical Fast Transients/Bursts



Surge Transients

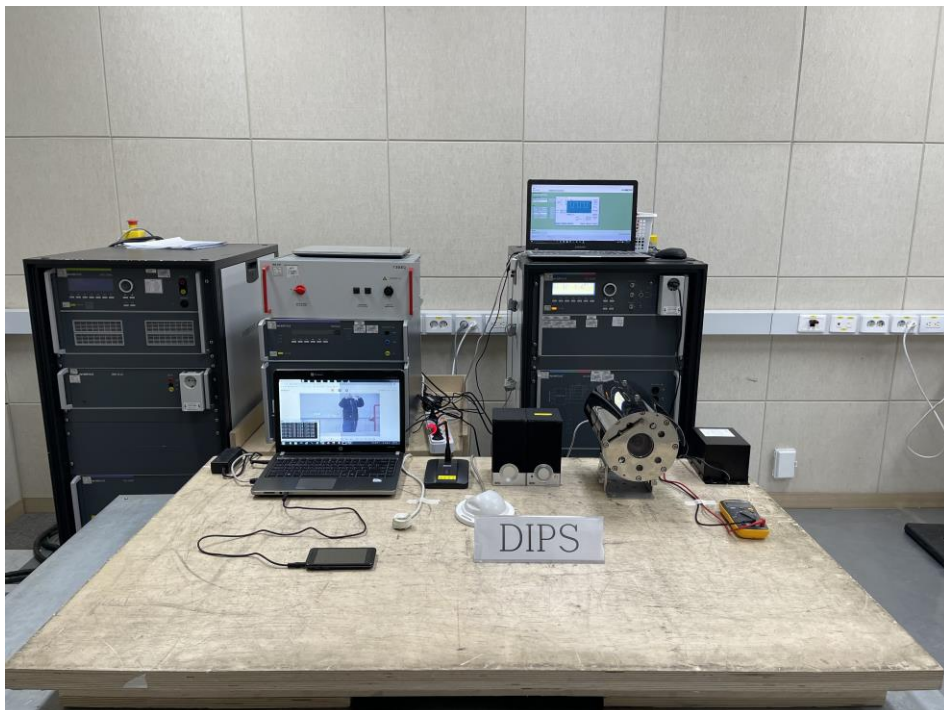


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Conducted Disturbance



Voltage Dips and Short Interruptions



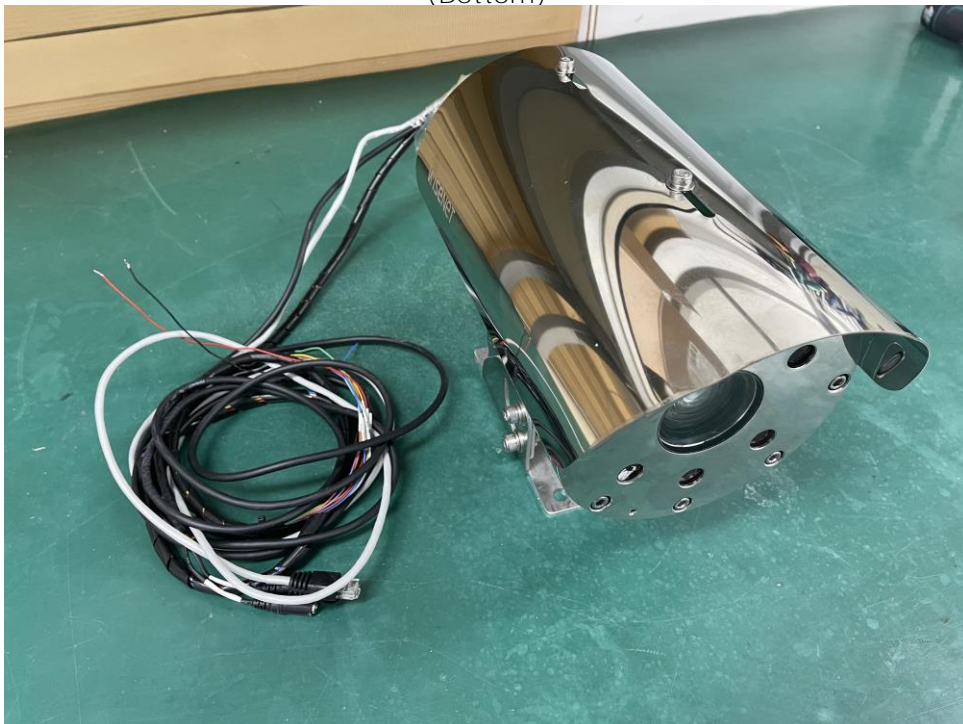
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EUT External Photographs

(Top)



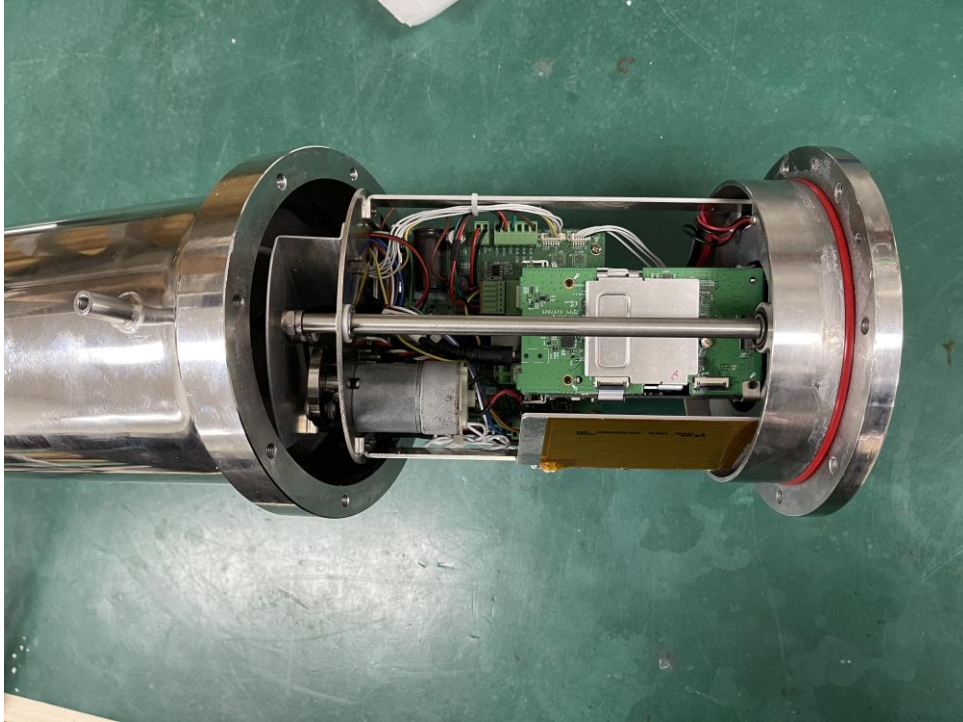
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EUT Internal Photographs

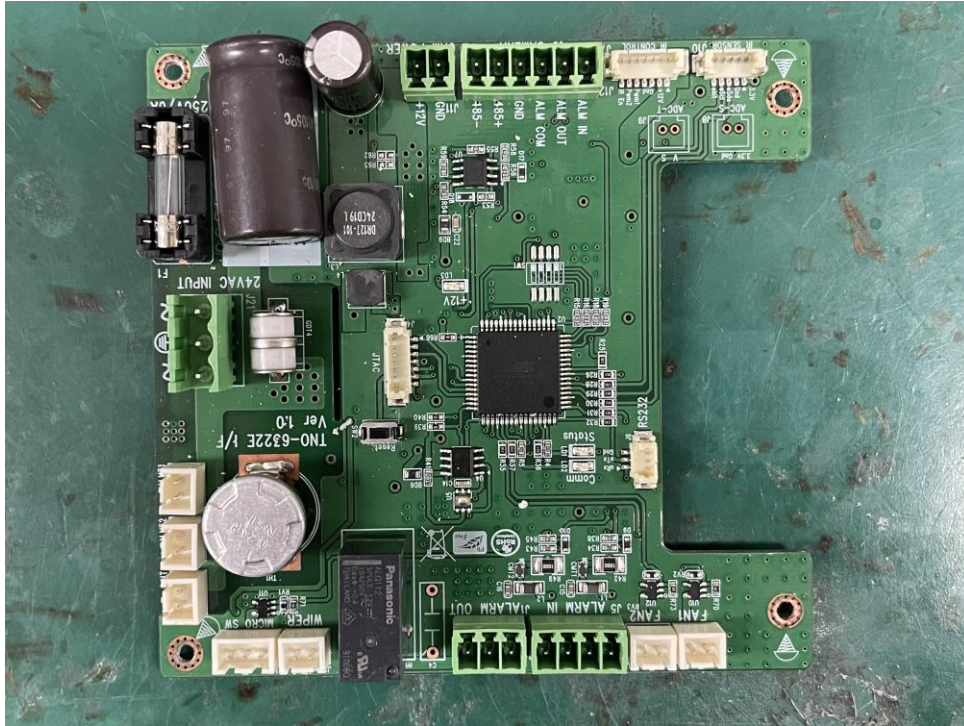
(Internal View)



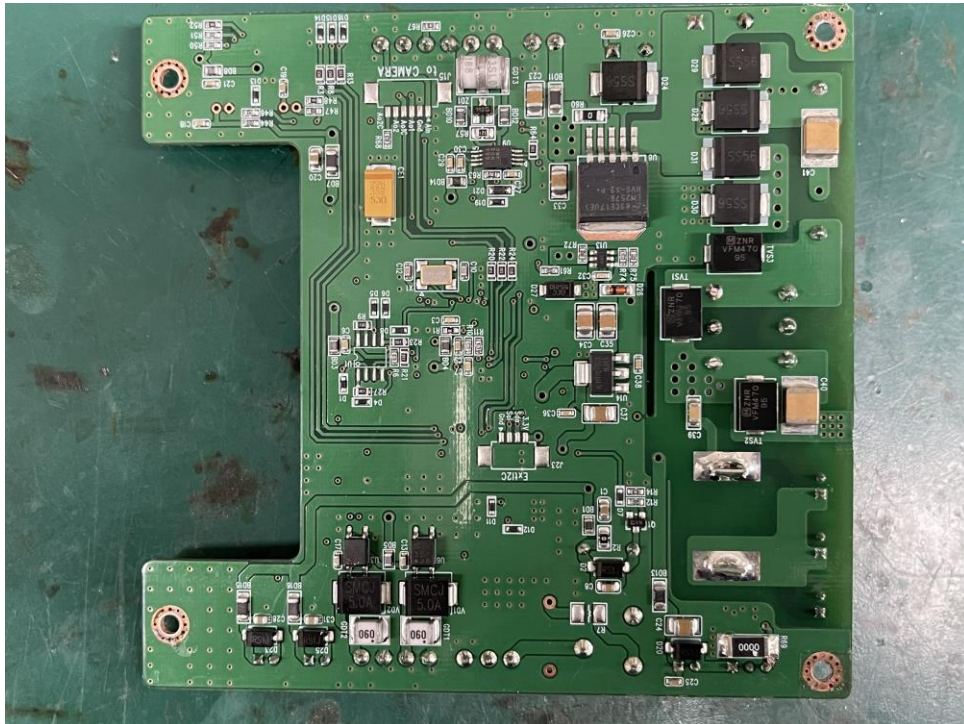
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EUT Internal View – Board 1

(Top)



(Bottom)



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EUT Internal View – Board 2

(Top)



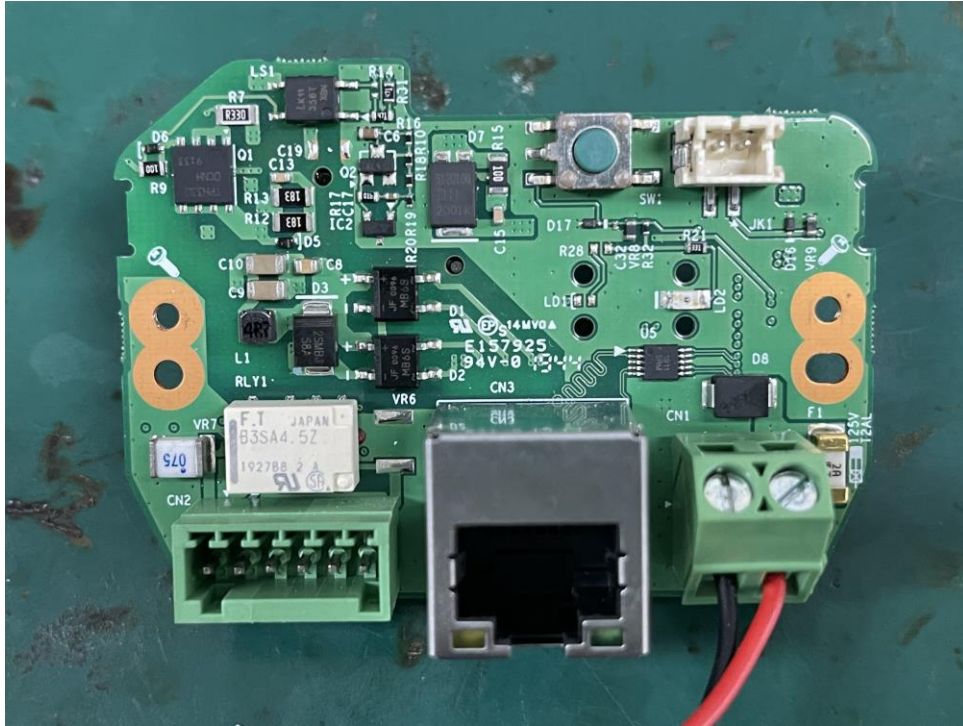
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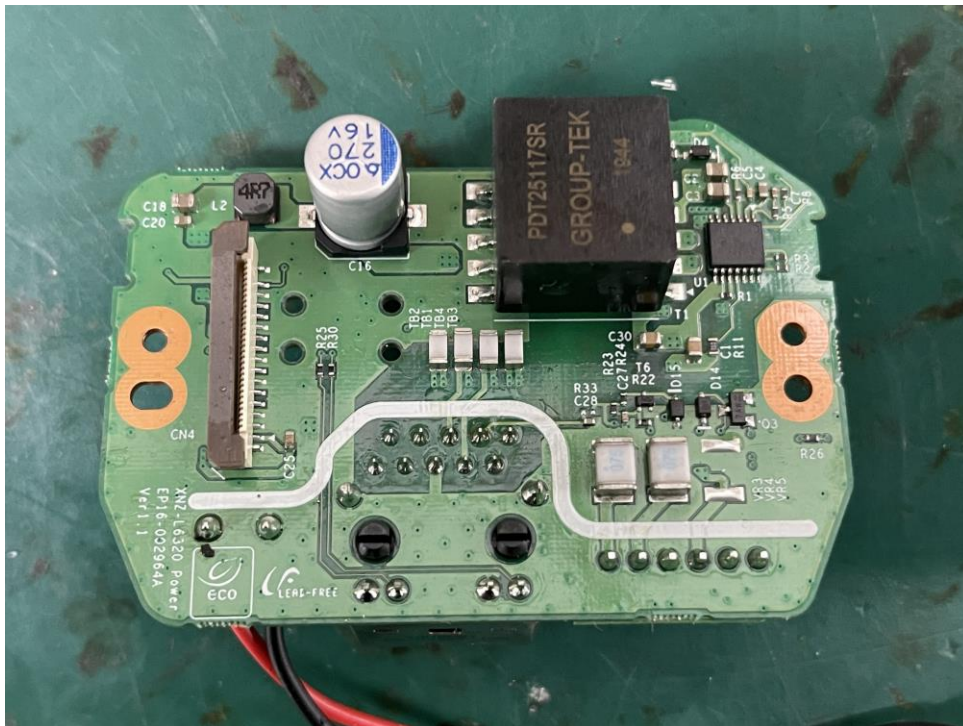
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EUT Internal View – Board 3

(Top)



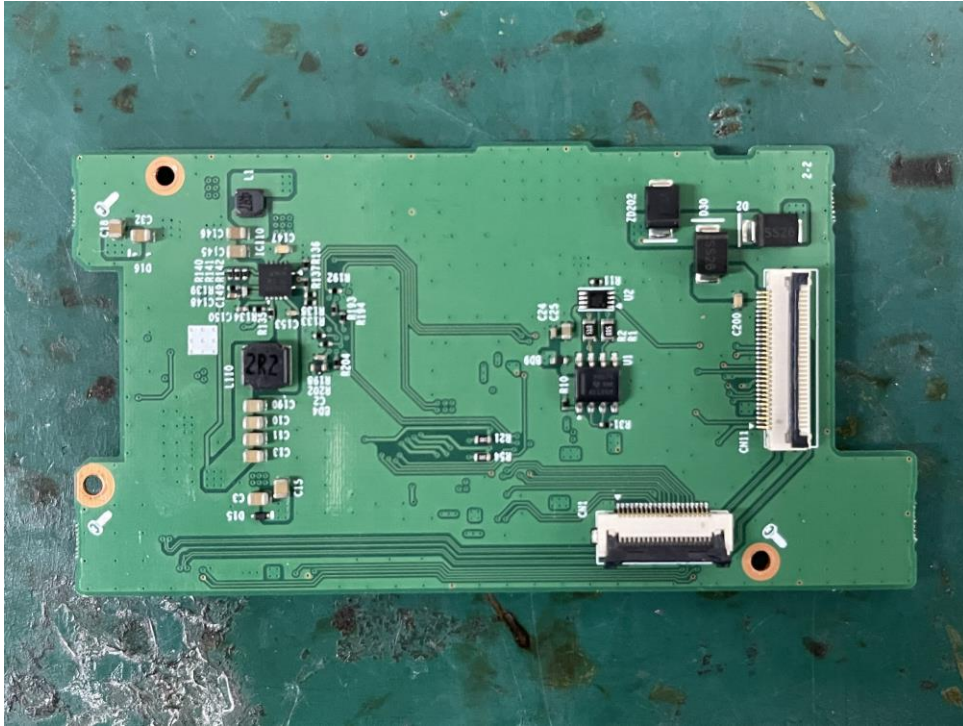
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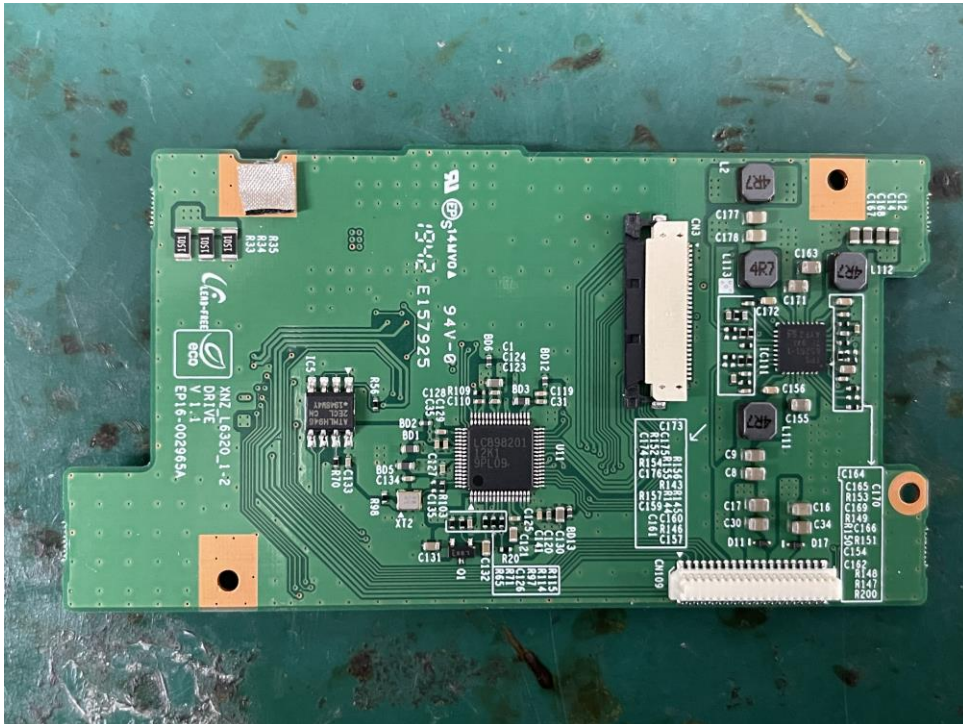
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EUT Internal View – Board 4

(Top)



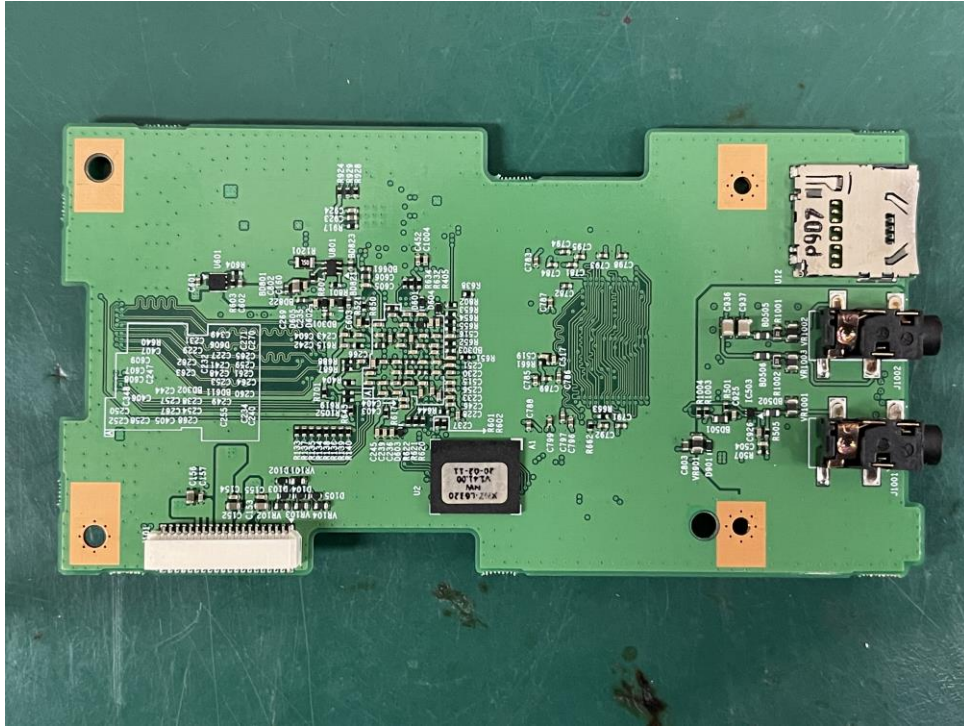
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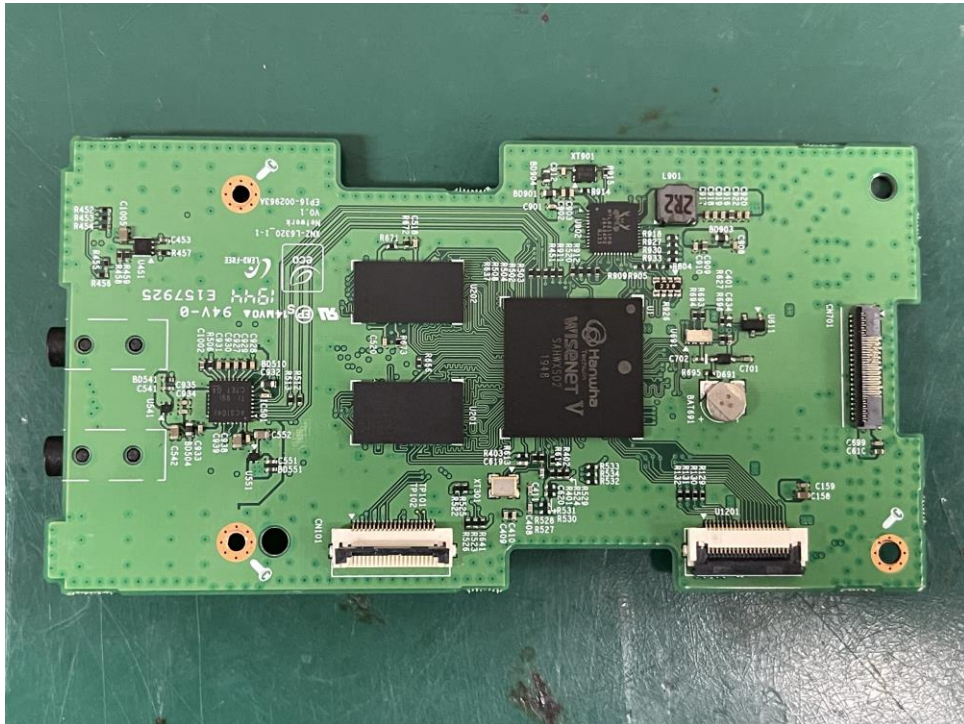
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EUT Internal View – Board 5

(Top)



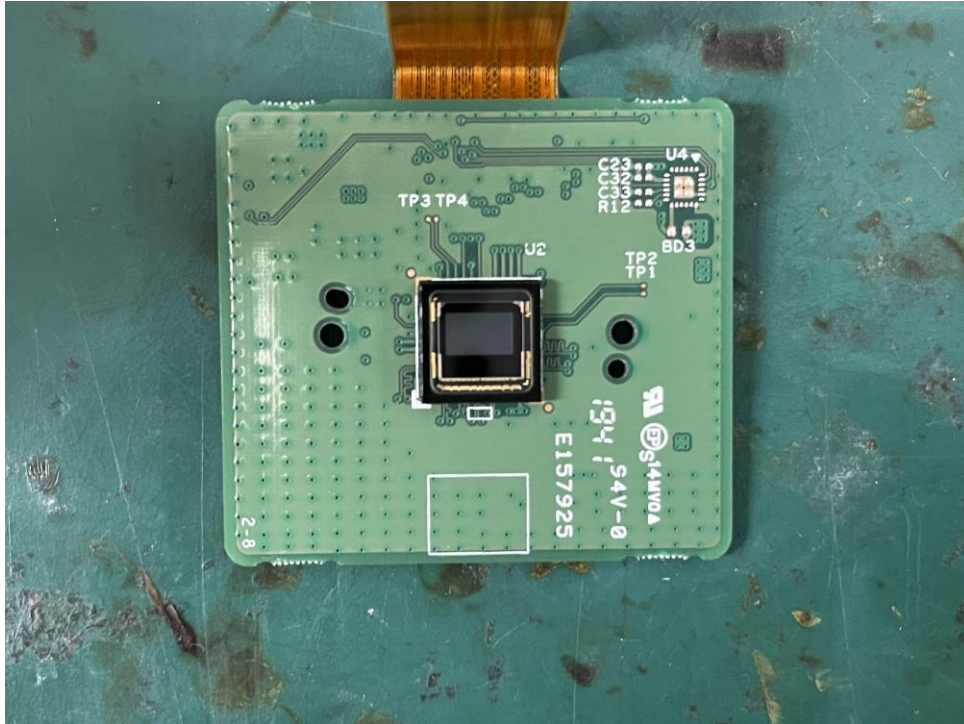
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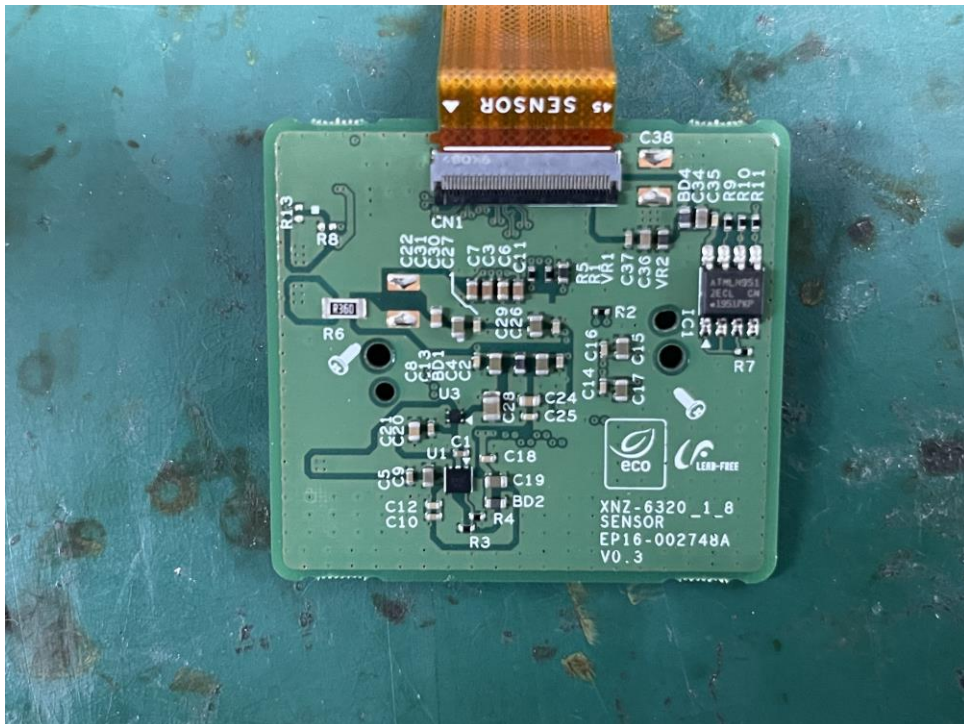
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EUT Internal View – Board 6

(Top)



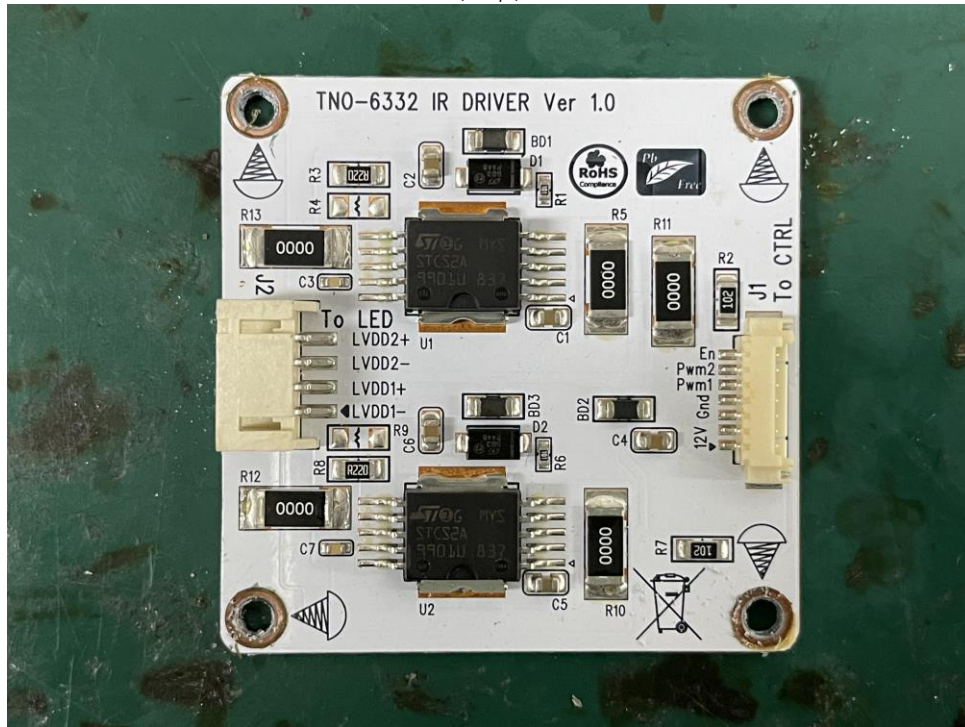
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EUT Internal View – Board 7

(Top)



(Bottom)



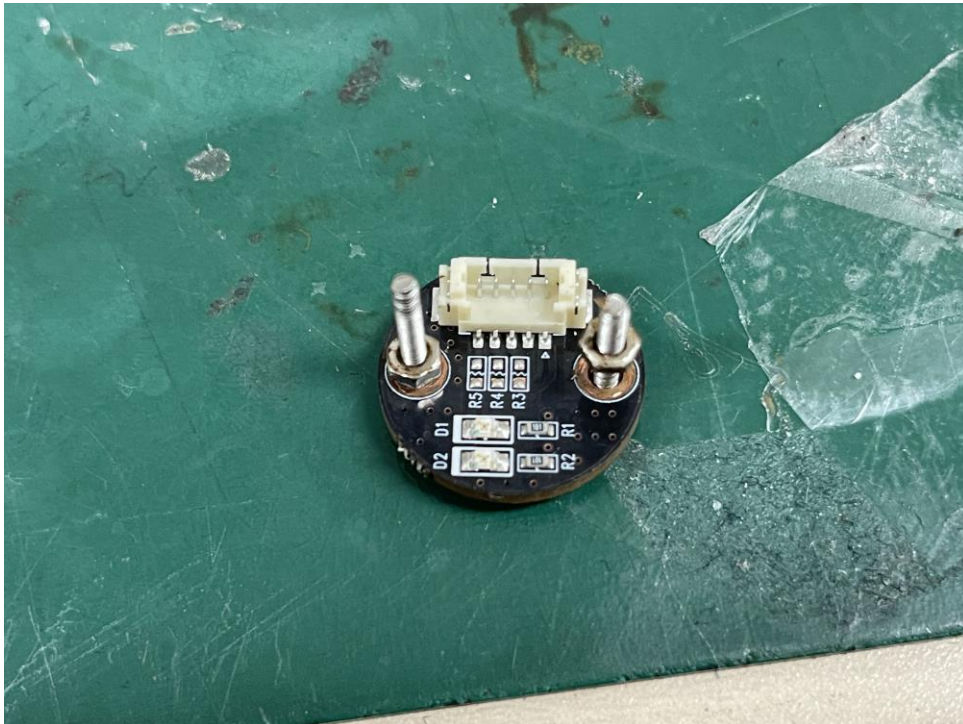
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EUT Internal View – Board 8

(Top)



(Bottom)



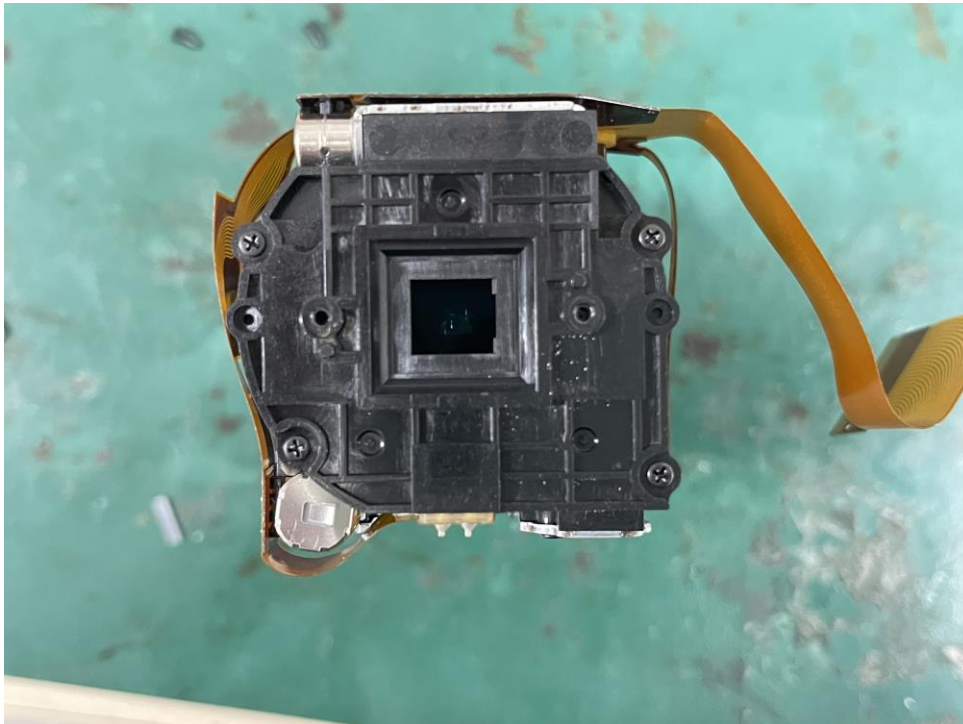
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EUT Internal View – Lens

(Top)



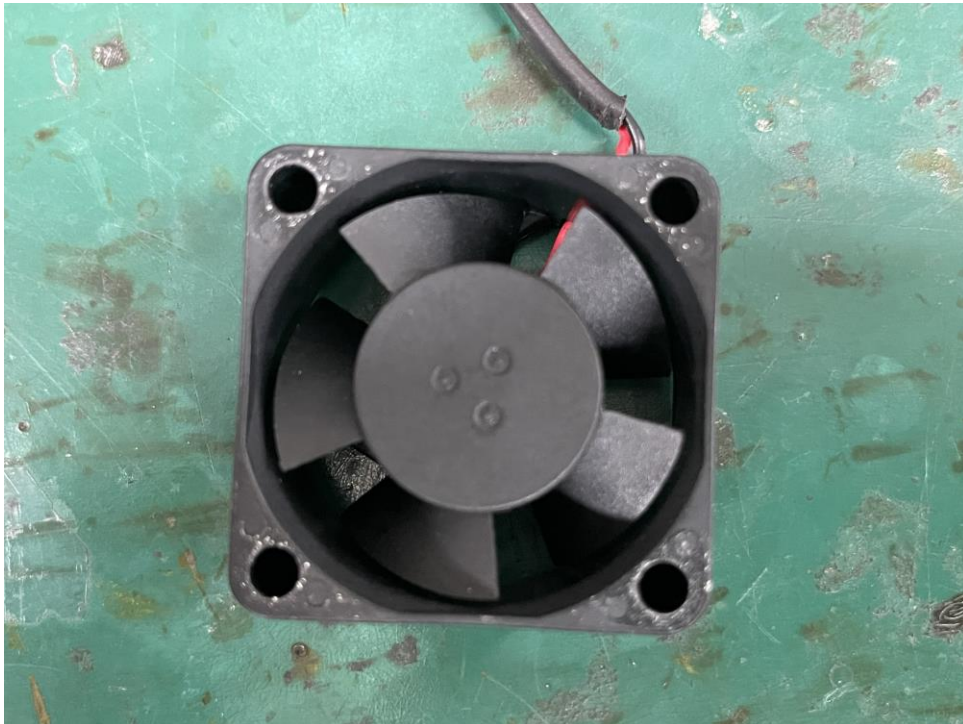
(Bottom)



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EUT Internal View – Cooler

(Top)



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Label and Location



2M 32x Network Camera

Model No : TNO-6322ER

Manufacturer : KEVIS

Made in Korea

