

SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

SZEMC-TRF-01 Rev. A/1

Report No.: SZCR231200433101

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TEST REPORT

Application No.: SZCR2312004331AT(KSCR2312002315AT)
Applicant: Hangzhou Ezviz Software Co., Ltd.
Address of Applicant: Room 302,Unit B,Building 2,399 Danfeng Road,Binjiang District,Hangzhou,Zhejiang
Manufacturer: Hangzhou Ezviz Software Co., Ltd.
Address of Manufacturer: Room 302,Unit B,Building 2,399 Danfeng Road,Binjiang District,Hangzhou,Zhejiang
Equipment Under Test (EUT):
EUT Name: Smart Home Camera
Model No.: CS-H7c, CS-H7c (44WF,W2) ♣
 ♣ Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.
Trade Mark: EZVIZ
Standard(s) : EN 55032: 2015+A11:2020+A1:2020
 EN 61000-3-3: 2013+ A1:2019+A2:2021
 EN IEC 61000-3-2: 2019+A1:2021
 EN 50130-4: 2011 +A1:2014
Date of Receipt: 2023-12-20
Date of Test: 2023-12-22 to 2023-12-28
Date of Issue: 2024-01-03

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards specified above.

Keny Xu
EMC Laboratory Manager



Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2024-01-03		Original

Authorized for issue by:			
		<i>Bill Chen</i>	
		Bill Chen /Project Engineer	
		<i>Eric Fu</i>	
		Eric Fu/Reviewer	



2 Test Summary

Emission Part				
Item	Standard	Method	Requirement	Result
Conducted Emissions at Mains Power Port (150kHz-30MHz)	EN 55032: 2015+A11:2020+A1:2020	EN 55032: 2015+A11:2020+A1:2020	Class B	Pass
Asymmetric Mode Conducted Emissions(150kHz-30MHz)		EN 55032: 2015+A11:2020+A1:2020	Class B	Pass
Radiated Emissions (30MHz-1GHz)		EN 55032: 2015+A11:2020+A1:2020	Class B	Pass
Radiated Emissions (Above 1GHz)		EN 55032: 2015+A11:2020+A1:2020	Class B	Pass
Voltage Fluctuations and Flicker	EN 61000-3-3: 2013+ A1:2019+A2:2021	EN 61000-3-3: 2013+ A1:2019+A2:2021	Clause 5	Pass
Harmonic Current Emission	EN IEC 61000-3-2: 2019+A1:2021	EN IEC 61000-3-2: 2019+A1:2021	Class A	Pass

Immunity Part				
Item	Standard	Method	Requirement	Result
Electrostatic Discharge	EN 50130-4: 2011 +A1:2014	EN 61000-4-2:2009	6kV Contact Discharge, 2,4,8kV Air Discharge	Pass
Radiated Immunity(80MHz-2.7GHz)		EN IEC 61000-4-3: 2020	10V/m, 80%, 1kHz sinusoidal Amp. Mod.	Pass
Electrical Fast Transients & Burst at AC Power Port		EN 61000-4-4:2012	2kV, 5/50ns Tr/Td, 100kHz Repetition Frequency	Pass
Electrical Fast Transients & Burst at Signal Port		EN 61000-4-4:2012	1kV, 5/50ns Tr/Td, 100kHz Repetition Frequency	Pass
Surge at AC Power Port		EN 61000-4-5:2014 +A1:2017	1.2/50µs Tr/Td, 0.5,1kV Line to Line, 0.5,1,2kV Line to Ground	Pass
Surge at Signal Port		EN 61000-4-5:2014 +A1:2017	1.2/50µs Tr/Td, 0.5,1kV line-to-ground	Pass
Conducted Immunity at Power Port (150kHz-100MHz)		EN 61000-4-6:2014	10Vrms (emf),80%,1kHz sinusoidal Amp. Mod.	Pass



Immunity Part				
Item	Standard	Method	Requirement	Result
Conducted Immunity at Signal Port (150kHz-100MHz)		EN 61000-4-6:2014	10Vrms (emf),80%,1kHz sinusoidal Amp. Mod	Pass
Mains Supply Voltage Variations		EN 50130-4:2011+A1:2014	Unom+10%, Unom-15%	Pass
Voltage Dips and Interruptions		EN IEC 61000-4-11:2020	80 % UT for 250per, 70 % UT for 25per, 40 % UT for 10per, 0 % UT for 250per	Pass

Declaration of EUT Family Grouping:

There are series models mentioned in this report and they are the Identical in electrical and electronic characters. Only the model CS-H7c was tested since their differences were the model number and appearance.



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4 General Information

4.1 Details of E.U.T.

Power supply:	DC 5V,2A 10W Max
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Remark: The information in this section is provided by the applicant or manufacturer, SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Notebook	Lenovo	/	/
AC Adapter	/	/	/
Router	/	/	/

4.3 Measurement Uncertainty

Test Item	Measurement Uncertainty
Conducted Emissions at Mains Power Port (150kHz-30MHz)	± 2.9dB
Radiated Emissions (30MHz-1GHz)	± 5.5dB
Voltage Fluctuations and Flicker	± 3.7%
Harmonic Current Emission	± 3.7%
Electrostatic Discharge	± 6%
Radiated Immunity (80MHz-1GHz,1800MHz,2600MHz,3500MHz,5000MHz)	± 2.1dB
Electrical Fast Transients & Burst at AC Power Port	± 5.5%
Surge at AC Power Port	± 5.5%
Conducted Immunity at AC Power Port (150kHz-80MHz)	± 1.5dB
Voltage Dips and Interruptions	± 3.7%

Remark:

The U_{lab} (lab Uncertainty) is less than $U_{CISPR/ETSI}$ (CISPR/ETSI Uncertainty), so the test results

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.



4.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch

Address 1: No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Nanshan District, Shenzhen, Guangdong, China. 518057.

No tests were sub-contracted.

Note:

1. SGS is not responsible for wrong test results due to incorrect information (e.g. max. clock frequency, highest internal frequency, antenna gain, cable loss, etc) is provided by the applicant. (if applicable).

2. SGS is not responsible for the authenticity, integrity and the validity of the conclusion based on results of the data provided by applicant. (if applicable).

3. Sample source: sent by customer.

4.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

• **VCCI (Member No. 1937)**

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd.

Shenzhen EMC laboratory have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

• **FCC –Designation Number: CN1336**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1336. Test Firm Registration Number: 787754.

• **Innovation, Science and Economic Development Canada**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

None

4.6 Abnormalities from Standard Conditions

None

4.7 EMS Monitor

Visual: Work statuses of EUT.



5 Equipment List

Conducted Emissions at Mains Power Port (150kHz-30MHz)					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Shielding Room	ZhongYu Electron	GB-88	SEM001-06	2022-05-14	2025-05-13
EMI Test Receiver	Rohde&Schwarz	ESCI	SEM004-02	2023-03-20	2024-03-19
Measurement Software	AUDIX	e3 V8.2014-6-27a	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM024-01	2023-07-07	2024-07-06
LISN	Rohde&Schwarz	ENV216	SEM007-01	2023-09-19	2024-09-18
LISN	ETS-LINDGREN	3816/2	SEM007-02	2023-03-20	2024-03-19

Asymmetric Mode Conducted Emissions(150kHz-30MHz)					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Shielding Room	ZhongYu Electron	GB-88	SEM001-06	2022-05-14	2025-05-13
EMI Test Receiver	Rohde&Schwarz	ESCI	SEM004-02	2023-03-20	2024-03-19
Measurement Software	AUDIX	e3 V8.2014-6-27a	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM024-01	2023-07-07	2024-07-06
Capacitive Voltage Probe	Schwarzbeck	CVP9222B	SEM009-11	2023-04-01	2024-03-31
Current Sensor Probe	TESEQ	CSP9160A	SEM009-12	2023-09-19	2024-09-18
Impedance Stabilisation Network	SCHWARZBECK MESS-ELEKTRONIK	ISN S8	SEM007-23	2023-03-31	2024-03-30
ISN T8-Cat6	Teseq	ISN T8-Cat6	SEM007-12	2023-03-20	2024-03-19
ISN T800	Teseq	ISN T800	SEM007-11	2023-03-20	2024-03-19

Radiated Emissions (30MHz-1GHz)					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
10m Semi-Anechoic Chamber	SAEMC	FSAC1018	SEM001-03	2021-03-27	2024-03-26
MXE EMI receiver	KEYSIGHT	N9038A	SEM004-16	2023-10-19	2024-10-18
Trilog-Broadband Antenna	Schwarzbeck	VULB9168	SEM003-18	2023-09-23	2025-09-22
Pre-amplifier	Sonoma Instrument Co	310N	SEM005-04	2023-03-31	2024-03-30
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM029-01	2023-07-07	2024-07-06



Radiated Emissions (Above 1GHz)					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
3m Fully-Anechoic Chamber	AUDIX	N/A	SEM001-02	2023-04-01	2026-03-31
Signal Analyzer	Rohde & Schwarz	FSV40	SEM008-04	2023-03-20	2024-03-19
Horn Antenna	Rohde&Schwarz	HF907	SEM003-07	2023-07-23	2025-07-22
Microwave system amplifier	Agilent	83017A	SEM005-25	2023-09-19	2024-09-18
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2023-07-07	2024-07-06

Voltage Fluctuations and Flicker					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
AC Power Source	California Instruments	5001ix	SEM016-02	2023-10-19	2024-10-18
Power Analyzer	California Instruments	PACS-1	SEM016-01	2023-10-19	2024-10-18
Measurement Software	California Instruments	CTS 4.0 V4.29.0	N/A	N/A	N/A

Electrostatic Discharge					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
ESD Generator	TESEQ AG	NSG 437	SEM019-02	2023-03-22	2024-03-21

Radiated Immunity (80MHz-2.7GHz)					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Fully-Anechoic Chamber 2	Chang Zhou Zhong Shuo	854	SEM001-05	2023-06-19	2026-06-18
Power Sensor	Rohde & Schwarz	NRP-Z91	SEM009-09	2023-03-21	2024-03-20
Stacked Log.-Per.-Broadband Antenna	Schwarzbeck	STLP 9129	SEM003-25	N/A	N/A
Signal Generator	Rohde & Schwarz	SMB100A	SEM006-11	2023-03-21	2024-03-20
Broadband Amplifier	Rohde & Schwarz	BBA150-BC250	SEM005-12	2023-09-19	2024-09-18
Broadband Amplifier	Rohde & Schwarz	BBA150-D110	SEM005-13	2023-03-21	2024-03-20
Broadband Amplifier	Rohde & Schwarz	BBA150-E60	SEM005-16	2023-03-21	2024-03-20
Measurement Software	Rohde & Schwarz	EMC32 V9.25.00	N/A	N/A	N/A



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Electrical Fast Transients & Burst at AC Power Port					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Ultra Compact Simulator	EM Test	UCS 500N7	SEM018-02	2023-03-20	2024-03-19

Electrical Fast Transients & Burst at Signal Port					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Ultra Compact Simulator	EM Test	UCS 500N7	SEM018-02	2023-03-20	2024-03-19
Capacitive Coupling Clamp	EM Test	HFK	SEM018-03	2023-03-20	2024-03-19

Surge at AC Power Port					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Ultra Compact Simulator	EM Test	UCS 500N7	SEM018-02	2023-03-20	2024-03-19

Conducted Immunity at AC Power Port (150kHz-100MHz)					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Shielding Room	TST PASS	N/A	SEM001-17	2021-11-22	2024-11-21
RF-Generator	SCHAFFNER	NSG 2070	SEM006-01	2023-10-19	2024-10-18
Coupling/Decoupling Network	SCHAFFNER	CDN M016	SEM007-03	2023-03-31	2024-03-30

Conducted Immunity at Signal Port (150kHz-100MHz)					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Shielding Room	TST PASS	N/A	SEM001-17	2021-11-22	2024-11-21
RF-Generator	SCHAFFNER	NSG 2070	SEM006-01	2023-10-19	2024-10-18
Coupling/Decoupling Network	SCHAFFNER	CDN M016	SEM007-03	2023-03-31	2024-03-30
EM Clamp	SCHAFFNER	KEMZ 801	SEM013-01	2023-04-08	2024-04-07

Voltage Dips and Interruptions					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Ultra Compact Simulator	EM Test	UCS 500N7	SEM018-02	2023-03-20	2024-03-19



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General used equipment					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Humidity/ Temperature Indicator	deli	8838	SEM002-32	2023-07-28	2024-07-27
Humidity/ Temperature Indicator	deli	8838	SEM002-33	2023-07-28	2024-07-27
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2023-03-23	2024-03-22



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6 Emission Test Results

6.1 Conducted Emissions at Mains Power Port (150kHz-30MHz)

Test Requirement: EN 55032: 2015+A11:2020+A1:2020

Test Method: EN 55032: 2015+A11:2020+A1:2020

Limit:

0.15MHz-0.5MHz 66dB(μV)-56dB(μV) quasi-peak, 56dB(μV)-46dB(μV) average

0.5MHz-5MHz 56dB(μV) quasi-peak, 46dB(μV) average

5MHz-30MHz 60dB(μV) quasi-peak, 50dB(μV) average

Detector: Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz

6.1.1 E.U.T. Operation

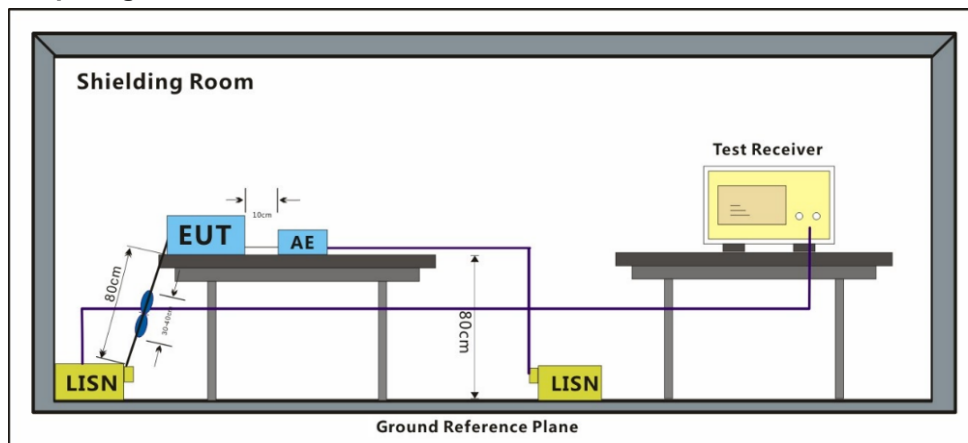
Operating Environment:

Temperature: 24 °C Humidity: 48 % RH Atmospheric Pressure: 1010 mbar

6.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	Ethernet Monitoring mode_Establish communication between EUT and router via LAN port, and then connect PC to Router. Using PC monitoring images.

6.1.3 Test Setup Diagram



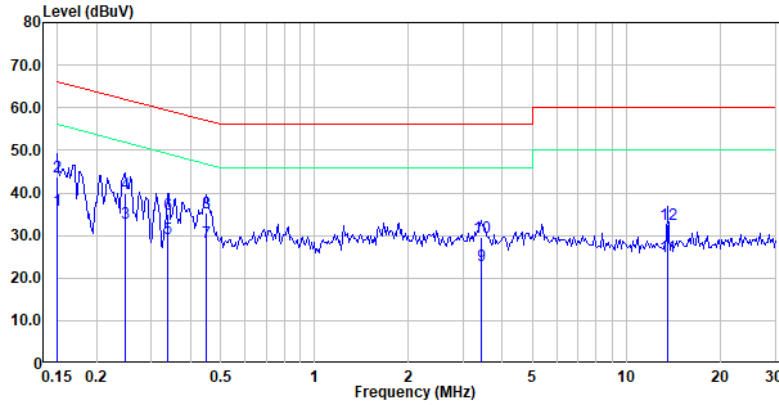
6.1.4 Measurement Procedure and Data

An initial pre-scan was performed with peak detector. Quasi-Peak or Average measurement were performed at the frequencies with maximized peak emission were detected.

Remark: Level= Read Level+ Cable Loss+ LISN Factor



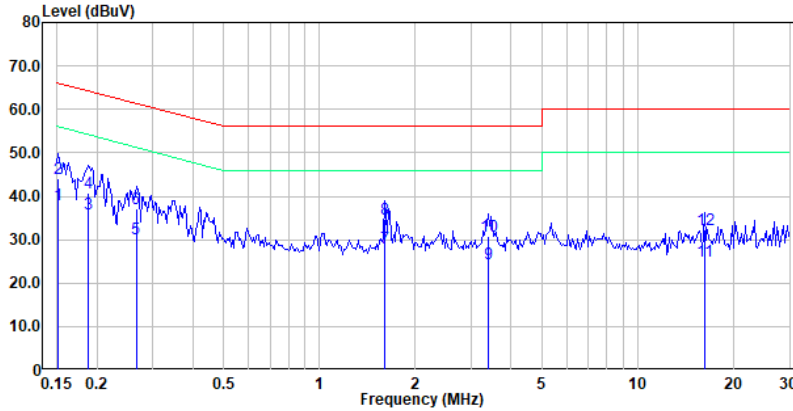
Test Mode: 00; Line: Live line



No.	Freq (MHz)	Read level (dBuV)	LISN Factor (dB)	Emission Level (dBuV)	Limit (dBuV)	Over Limit (dB)	Remark
1	0.15	16.47	19.56	36.03	66.00	-29.97	Average
2	0.15	24.36	19.56	43.92	66.00	-22.08	QP
3	0.25	13.37	19.57	32.94	61.86	-28.92	Average
4	0.25	20.42	19.57	39.99	61.86	-21.87	QP
5	0.34	9.85	19.57	29.42	59.22	-29.80	Average
6	0.34	15.31	19.57	34.88	59.22	-24.34	QP
7	0.45	8.72	19.57	28.29	56.85	-28.56	Average
8	0.45	15.63	19.57	35.20	56.85	-21.65	QP
9	3.42	3.26	19.62	22.88	56.00	-33.12	Average
10	3.42	10.01	19.62	29.63	56.00	-26.37	QP
11	13.55	5.21	19.77	24.98	60.00	-35.02	Average
12	13.55	12.71	19.77	32.48	60.00	-27.52	QP



Test Mode: 00; Line: Neutral Line



No.	Freq (MHz)	Read level (dBuV)	LISN Factor (dB)	Emission Level (dBuV)	Limit (dBuV)	Over Limit (dB)	Remark
1	0.15	18.41	19.54	37.95	65.91	-27.96	Average
2	0.15	24.68	19.54	44.22	65.91	-21.69	QP
3	0.19	16.50	19.55	36.05	64.15	-28.10	Average
4	0.19	21.26	19.55	40.81	64.15	-23.34	QP
5	0.27	10.62	19.56	30.18	61.25	-31.07	Average
6	0.27	17.48	19.56	37.04	61.25	-24.21	QP
7	1.61	8.35	19.58	27.93	56.00	-28.07	Average
8	1.61	15.14	19.58	34.72	56.00	-21.28	QP
9	3.38	4.86	19.61	24.47	56.00	-31.53	Average
10	3.38	11.09	19.61	30.70	56.00	-25.30	QP
11	16.23	5.20	19.80	25.00	60.00	-35.00	Average
12	16.23	12.60	19.80	32.40	60.00	-27.60	QP



6.2 Asymmetric Mode Conducted Emissions(150kHz-30MHz)

Test Requirement: EN 55032: 2015+A11:2020+A1:2020

Test Method: EN 55032: 2015+A11:2020+A1:2020

Limit:

0.15 MHz -0.5MHz 84dB(μV)-74dB(μV) quasi-peak, 74dB(μV)-64dB(μV) average

0.5 MHz -30MHz 74dB(μV) quasi-peak, 64dB(μV) average

Detector: Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz

6.2.1 E.U.T. Operation

Operating Environment:

Temperature: 24 °C

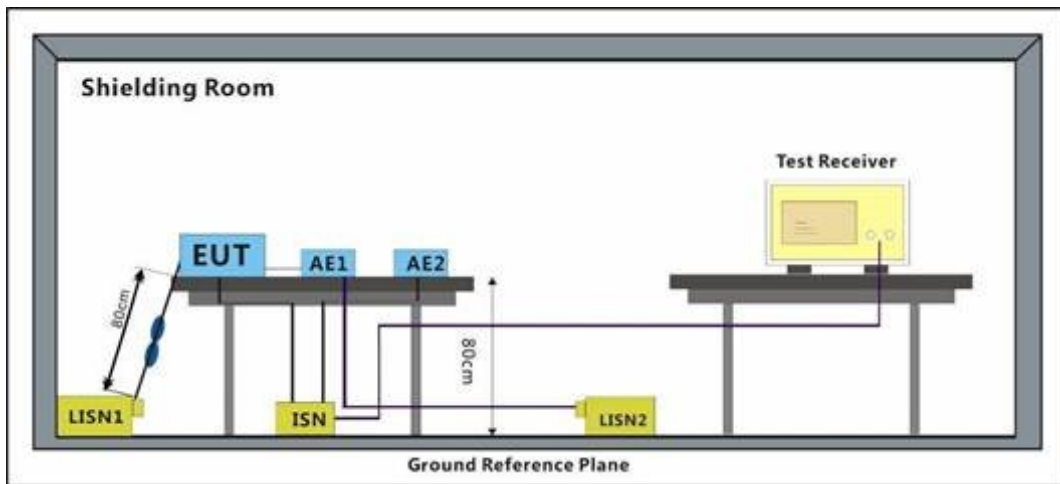
Humidity: 48 % RH

Atmospheric Pressure: 1010 mbar

6.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	Ethernet Monitoring mode_Establish communication between EUT and router via LAN port, and then connect PC to Router. Using PC monitoring images.

6.2.3 Test Setup Diagram



6.2.4 Measurement Procedure and Data

An initial pre-scan was performed with peak detector. Quasi-Peak or Average measurement were performed at the frequencies with maximized peak emission were detected.

Remark: Level= Read Level+ Cable Loss+ LISN Factor



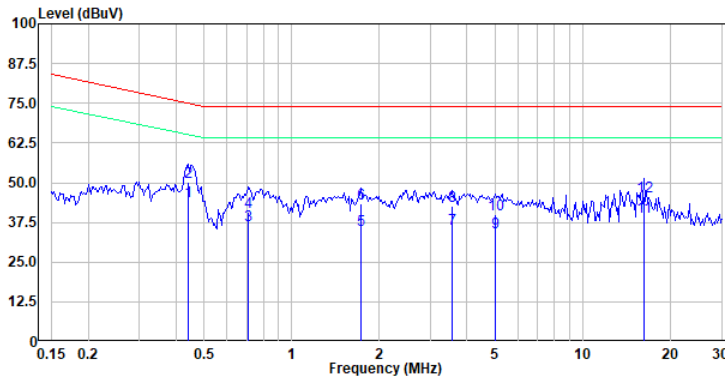
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Test Mode: 00



No.	Freq (MHz)	Read level (dBuV)	LISN Factor (dB)	Emission Level (dBuV)	Limit (dBuV)	Over Limit (dB)	Remark
1	0.44	24.73	19.59	44.32	75.02	-30.70	Average
2	0.44	30.46	19.59	50.05	75.02	-24.97	QP
3	0.71	16.93	19.52	36.45	74.00	-37.55	Average
4	0.71	21.28	19.52	40.80	74.00	-33.20	QP
5	1.73	15.74	19.41	35.15	74.00	-38.85	Average
6	1.73	23.87	19.41	43.28	74.00	-30.72	QP
7	3.57	15.90	19.42	35.32	74.00	-38.68	Average
8	3.57	23.16	19.42	42.58	74.00	-31.42	QP
9	5.01	14.73	19.44	34.17	74.00	-39.83	Average
10	5.01	20.72	19.44	40.16	74.00	-33.84	QP
11	16.23	19.85	19.45	39.30	74.00	-34.70	Average
12	16.23	26.36	19.45	45.81	74.00	-28.19	QP



6.3 Radiated Emissions (30MHz-1GHz)

Test Requirement: EN 55032: 2015+A11:2020+A1:2020

Test Method: EN 55032: 2015+A11:2020+A1:2020

Limit:

Test Distance: 3m

30MHz-230MHz: 40 dB(μV/m) quasi-peak

230MHz-1GHz: 47 dB(μV/m) quasi-peak

Detector: Peak for pre-scan (120kHz resolution bandwidth) 30MHz to 1000MHz

6.3.1 E.U.T. Operation

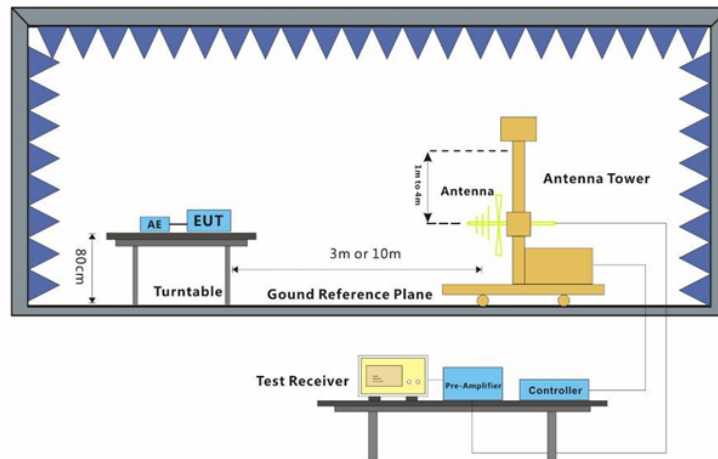
Operating Environment:

Temperature: 19.7 °C Humidity: 39.5 % RH Atmospheric Pressure: 1010 mbar

6.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	Ethernet Monitoring mode_Establish communication between EUT and router via LAN port, and then connect PC to Router. Using PC monitoring images.

6.3.3 Test Setup Diagram



6.3.4 Measurement Procedure and Data

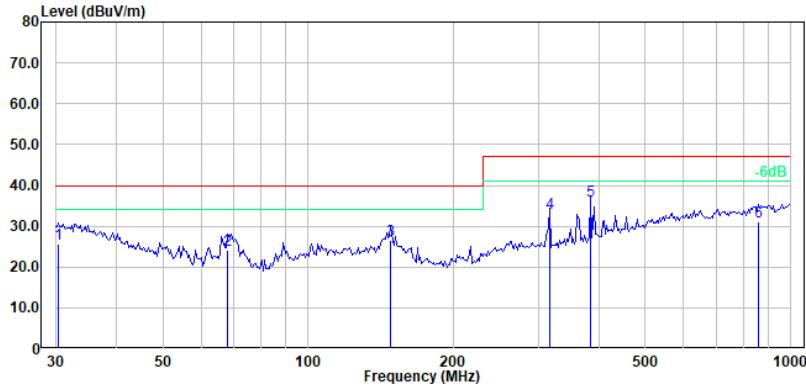
Frequency range: 30MHz-1GHz

An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by BiConiLog antenna with 2 orthogonal polarities.

The red line show in graphic is the limit in standard used in this section.

Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor

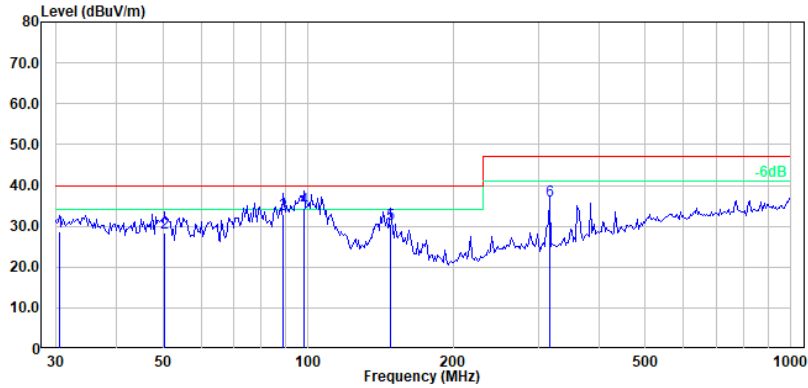
Test Mode: 00; Polarity: Horizontal



NO.	Freq (MHz)	Read level (dBUV)	Antenna Factor (dB/m)	Cable Loss (dB)	Level (dBUV/m)	Limit Line (dBUV/m)	Over Limit (dB)	Remark
1	30.42	0.37	24.98	0.29	25.64	40.00	-14.36	QP
2	68.15	8.53	14.88	0.70	24.11	40.00	-15.89	QP
3	148.44	8.58	16.77	1.14	26.49	40.00	-13.51	QP
4	316.59	12.31	19.69	1.29	33.29	47.00	-13.71	QP
5	385.28	13.60	21.26	1.41	36.27	47.00	-10.73	QP
6	857.03	2.17	26.70	2.18	31.05	47.00	-15.95	QP



Test Mode: 00; Polarity: Vertical



NO.	Freq (MHz)	Read level (dBUV)	Antenna Factor (dB/m)	Cable Loss (dB)	Level (dBUV/m)	Limit Line (dBUV/m)	Over Limit (dB)	Remark
1	30.64	3.33	24.94	0.30	28.57	40.00	-11.43	QP
2	50.41	10.75	17.25	0.32	28.32	40.00	-11.68	QP
3	88.96	18.39	13.99	0.67	33.05	40.00	-6.95	QP
4	98.14	17.51	15.98	0.79	34.28	40.00	-5.72	QP
5	148.44	12.62	16.77	1.14	30.53	40.00	-9.47	QP
6	316.59	15.14	19.69	1.29	36.12	47.00	-10.88	QP



6.4 Radiated Emissions (Above 1GHz)

Test Requirement: EN 55032: 2015+A11:2020+A1:2020
 Test Method: EN 55032: 2015+A11:2020+A1:2020
 Limit:
 1000MHz-6000MHz: 74 dB(μV/m) peak; 54 dB(μV/m) average
 Detector: Peak for pre-scan (1000kHz resolution bandwidth) 1000MHz to 6000MHz
 Highest internal frequency (Fx): Highest measured frequency:
 Fx ≤ 108MHz 1GHz
 108MHz < Fx ≤ 500MHz 2GHz
 500MHz < Fx ≤ 1GHz 5GHz
 Fx > 1GHz 5 × Fx up to a maximum of 6GHz

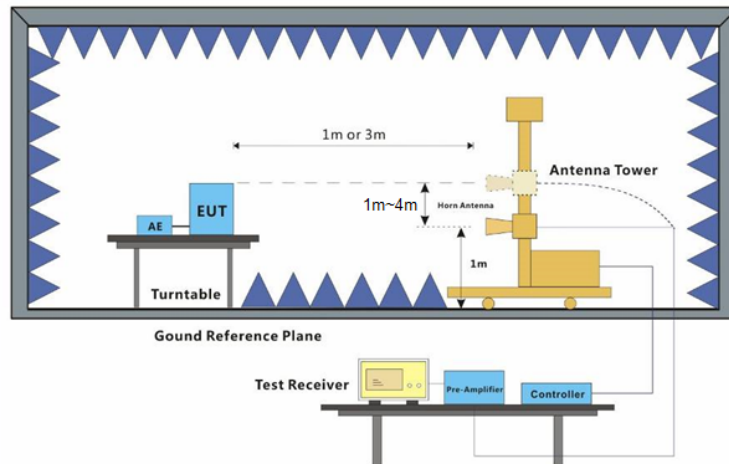
6.4.1 E.U.T. Operation

Operating Environment:
 Temperature: 26 °C Humidity: 49 % RH Atmospheric Pressure: 1010 mbar

6.4.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	Ethernet Monitoring mode_Establish communication between EUT and router via LAN port, and then connect PC to Router. Using PC monitoring images.

6.4.3 Test Setup Diagram



6.4.4 Measurement Procedure and Data

Frequency range: Above 1GHz

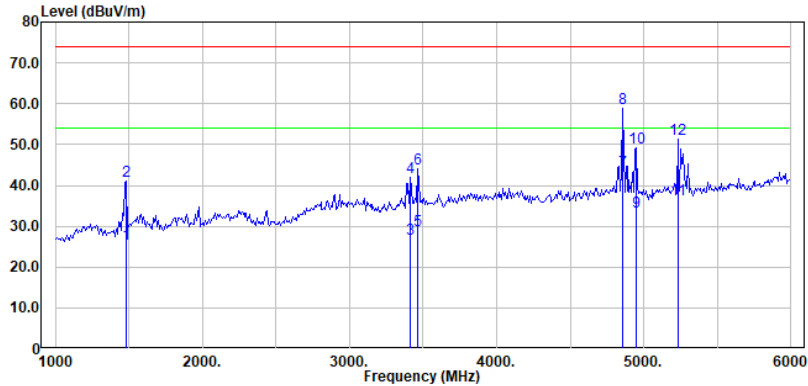
An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Average measurements were conducted based on the peak sweep graph. The EUT was measured by Horn antenna with 2 orthogonal polarities.

The red line show in graphic is the limit in standard used in this section.

Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor



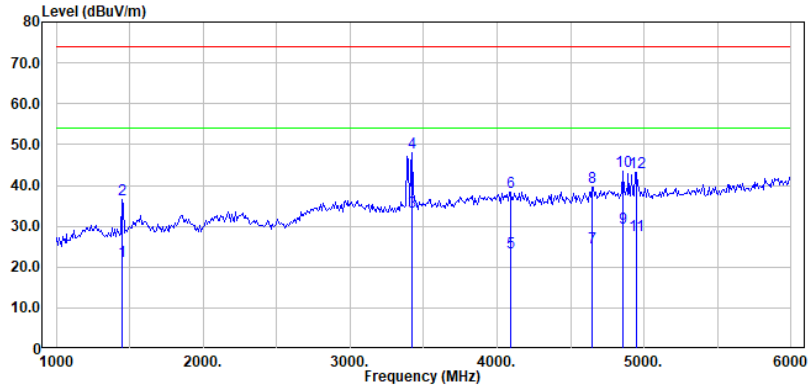
Test Mode: 00; Polarity: Horizontal



No.	Freq MHz	Read Level dBUV	Cable Loss dB	Preamp Factor dB	Ant Factor dB/m	Level dBUV/m	Limit Line dBUV/m	Over Limit dB	Remark
1	1480.77	46.47	4.97	50.89	25.03	25.58	54.00	-28.42	Average
2	1480.77	61.85	4.97	50.89	25.03	40.96	74.00	-33.04	Peak
3	3411.86	42.17	7.54	50.88	28.15	26.98	54.00	-27.02	Average
4	3411.86	57.26	7.54	50.88	28.15	42.07	74.00	-31.93	Peak
5	3459.94	44.16	7.59	50.86	28.16	29.05	54.00	-24.95	Average
6	3459.94	59.21	7.59	50.86	28.16	44.10	74.00	-29.90	Peak
7	4854.17	54.34	8.87	50.96	31.14	43.39	54.00	-10.61	Average
8	4854.17	69.71	8.87	50.96	31.14	58.76	74.00	-15.24	Peak
9	4950.32	44.30	8.96	50.99	31.36	33.63	54.00	-20.37	Average
10	4950.32	59.86	8.96	50.99	31.36	49.19	74.00	-24.81	Peak
11	5230.77	46.27	9.62	50.98	31.63	36.54	54.00	-17.46	Average
12	5230.77	61.06	9.62	50.98	31.63	51.33	74.00	-22.67	Peak



Test Mode: 00; Polarity: Vertical



No.	Freq MHz	Read Level dBuV	Cable Loss dB	Preamp Factor dB	Ant Factor dB/m	Level dBuV/m	Limit Line dBuV/m	Over Limit dB	Remark
1	1448.72	42.53	4.91	50.87	24.93	21.50	54.00	-32.50	Average
2	1448.72	57.58	4.91	50.87	24.93	36.55	74.00	-37.45	Peak
3	3419.87	48.59	7.55	50.87	28.15	33.42	54.00	-20.58	Average
4	3419.87	63.28	7.55	50.87	28.15	48.11	74.00	-25.89	Peak
5	4092.95	36.59	8.16	50.73	29.40	23.42	54.00	-30.58	Average
6	4092.95	51.57	8.16	50.73	29.40	38.40	74.00	-35.60	Peak
7	4645.83	36.43	8.67	50.89	30.68	24.89	54.00	-29.11	Average
8	4645.83	51.12	8.67	50.89	30.68	39.58	74.00	-34.42	Peak
9	4854.17	40.50	8.87	50.96	31.14	29.55	54.00	-24.45	Average
10	4854.17	54.39	8.87	50.96	31.14	43.44	74.00	-30.56	Peak
11	4950.32	38.47	8.96	50.99	31.36	27.80	54.00	-26.20	Average
12	4950.32	53.75	8.96	50.99	31.36	43.08	74.00	-30.92	Peak



6.5 Voltage Fluctuations and Flicker

Test Requirement: EN 61000-3-3: 2013+ A1:2019+A2:2021

Test Method: EN 61000-3-3: 2013+ A1:2019+A2:2021

6.5.1 E.U.T. Operation

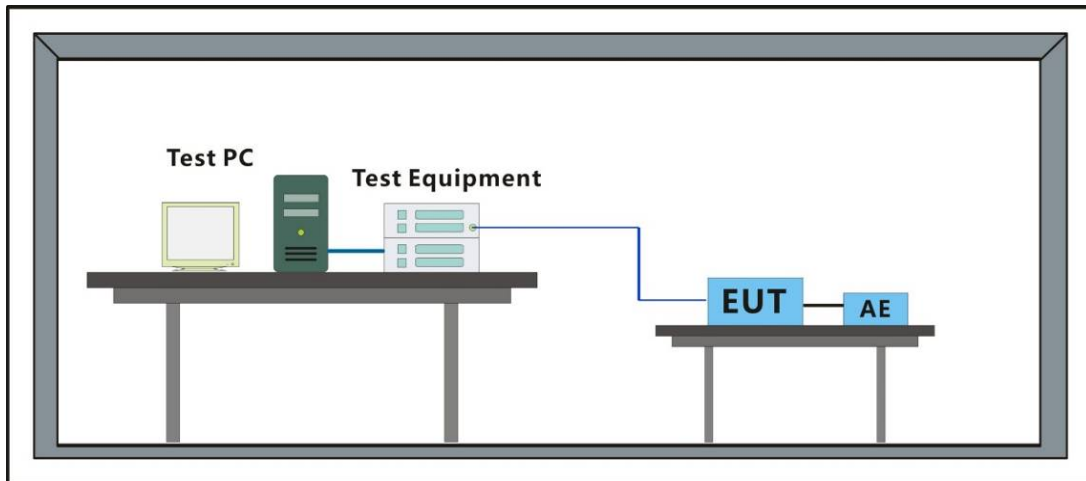
Operating Environment:

Temperature: 24 °C Humidity: 48 % RH Atmospheric Pressure: 1010 mbar

6.5.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	Ethernet Monitoring mode_Establish communication between EUT and router via LAN port, and then connect PC to Router. Using PC monitoring images.

6.5.3 Test Setup Diagram



6.5.4 Measurement Procedure and Data

Test Mode: 00

Parameter values recorded during the test:

Vrms at the end of test (Volt): 230.12

Highest dt (%):

T-max (mS): 0

Highest dc (%): 0.00

Highest dmax (%): 0.00

Highest Pst (10 min. period): 0.248

Highest Plt (2 hr. period): 0.108

Test limit (%):

Test limit (mS): 500.0 Pass

Test limit (%): 3.30 Pass

Test limit (%): 4.00 Pass

Test limit: 1.000 Pass

Test limit: 0.650 Pass



6.6 Harmonic Current Emission

Test Requirement: EN IEC 61000-3-2: 2019+A1:2021

Test Method: EN IEC 61000-3-2: 2019+A1:2021

6.6.1 E.U.T. Operation

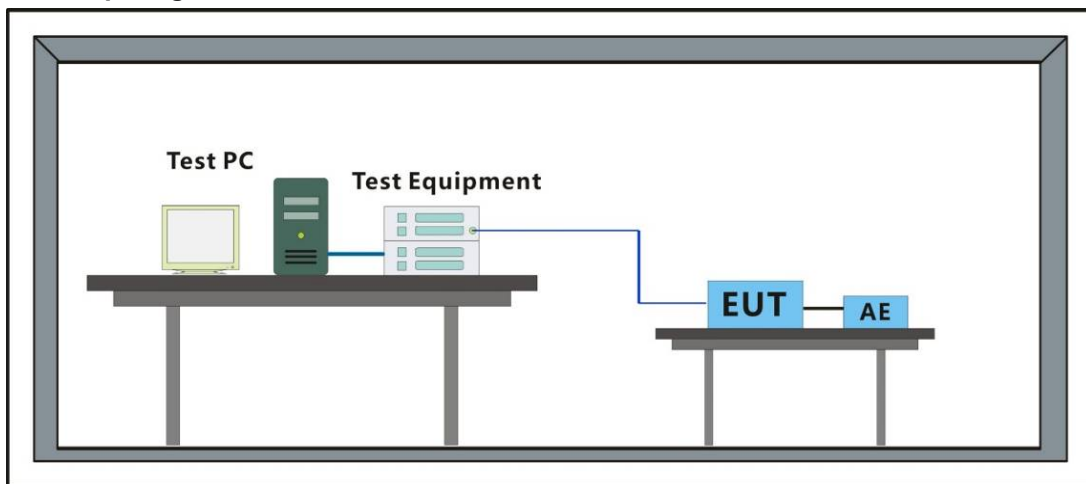
Operating Environment:

Temperature: 24 °C Humidity: 48 % RH Atmospheric Pressure: 1010 mbar

6.6.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	Ethernet Monitoring mode_Establish communication between EUT and router via LAN port, and then connect PC to Router. Using PC monitoring images.

6.6.3 Test Setup Diagram



6.6.4 Measurement Procedure and Data

Frequency Range: 100Hz to 2kHz



Test Mode: 00

Highest parameter values during test:

V _{RMS} (Volts):	230.20	Frequency(Hz):	50.00
I _{Peak} (Amps):	0.359	I _{RMS} (Amps):	0.054
I _{Fund} (Amps):	0.017	Crest Factor:	7.726
Power (Watts):	3.9	Power Factor:	0.396

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.001	1.080	N/A	0.002	1.620	N/A	Pass
3	0.013	2.300	0.6	0.018	3.450	0.5	Pass
4	0.001	0.430	N/A	0.001	0.645	N/A	Pass
5	0.013	1.140	1.1	0.018	1.710	1.0	Pass
6	0.001	0.300	N/A	0.002	0.450	N/A	Pass
7	0.012	0.770	1.6	0.017	1.155	1.4	Pass
8	0.001	0.230	N/A	0.001	0.345	N/A	Pass
9	0.012	0.400	2.9	0.015	0.600	2.6	Pass
10	0.001	0.184	N/A	0.001	0.276	N/A	Pass
11	0.011	0.330	3.3	0.014	0.495	2.9	Pass
12	0.001	0.153	N/A	0.001	0.230	N/A	Pass
13	0.010	0.210	4.8	0.013	0.315	4.1	Pass
14	0.001	0.131	N/A	0.001	0.197	N/A	Pass
15	0.009	0.150	6.1	0.011	0.225	5.1	Pass
16	0.000	0.115	N/A	0.001	0.173	N/A	Pass
17	0.008	0.132	6.2	0.010	0.198	5.0	Pass
18	0.000	0.102	N/A	0.001	0.153	N/A	Pass
19	0.007	0.118	6.1	0.009	0.178	4.8	Pass
20	0.000	0.092	N/A	0.001	0.138	N/A	Pass
21	0.006	0.107	5.8	0.007	0.161	4.4	Pass
22	0.000	0.084	N/A	0.001	0.125	N/A	Pass
23	0.005	0.098	5.4	0.006	0.147	4.0	Pass
24	0.000	0.077	N/A	0.001	0.115	N/A	Pass
25	0.004	0.090	N/A	0.005	0.135	N/A	Pass
26	0.000	0.071	N/A	0.001	0.107	N/A	Pass
27	0.004	0.083	N/A	0.004	0.125	N/A	Pass
28	0.000	0.066	N/A	0.001	0.099	N/A	Pass
29	0.003	0.078	N/A	0.003	0.116	N/A	Pass
30	0.000	0.061	N/A	0.001	0.092	N/A	Pass
31	0.003	0.073	N/A	0.003	0.109	N/A	Pass
32	0.000	0.058	N/A	0.001	0.086	N/A	Pass
33	0.002	0.068	N/A	0.002	0.102	N/A	Pass
34	0.000	0.054	N/A	0.001	0.081	N/A	Pass
35	0.002	0.064	N/A	0.002	0.096	N/A	Pass
36	0.000	0.051	N/A	0.001	0.077	N/A	Pass
37	0.002	0.061	N/A	0.002	0.091	N/A	Pass
38	0.000	0.048	N/A	0.001	0.073	N/A	Pass
39	0.001	0.058	N/A	0.002	0.087	N/A	Pass
40	0.000	0.046	N/A	0.001	0.069	N/A	Pass



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Test Mode: 00

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.155	0.460	33.59	OK
3	0.441	2.071	21.31	OK
4	0.030	0.460	6.49	OK
5	0.035	0.921	3.82	OK
6	0.088	0.460	19.01	OK
7	0.053	0.691	7.66	OK
8	0.045	0.460	9.83	OK
9	0.024	0.460	5.13	OK
10	0.028	0.460	6.10	OK
11	0.021	0.230	9.14	OK
12	0.014	0.230	6.29	OK
13	0.013	0.230	5.62	OK
14	0.017	0.230	7.24	OK
15	0.013	0.230	5.79	OK
16	0.015	0.230	6.39	OK
17	0.009	0.230	3.85	OK
18	0.015	0.230	6.40	OK
19	0.013	0.230	5.78	OK
20	0.009	0.230	3.89	OK
21	0.006	0.230	2.63	OK
22	0.007	0.230	3.00	OK
23	0.013	0.230	5.73	OK
24	0.006	0.230	2.49	OK
25	0.005	0.230	2.24	OK
26	0.011	0.230	4.72	OK
27	0.011	0.230	4.77	OK
28	0.008	0.230	3.55	OK
29	0.008	0.230	3.43	OK
30	0.007	0.230	2.86	OK
31	0.007	0.230	3.11	OK
32	0.005	0.230	2.36	OK
33	0.006	0.230	2.65	OK
34	0.003	0.230	1.27	OK
35	0.004	0.230	1.89	OK
36	0.003	0.230	1.38	OK
37	0.007	0.230	3.15	OK
38	0.003	0.230	1.30	OK
39	0.004	0.230	1.81	OK
40	0.005	0.230	1.97	OK



7 Immunity Test Results

Performance Criteria Description in EN 50130-4:2011 +A1:2014

There shall be no damage, malfunction or change of status due to the conditioning. Flickering of an indicator during the application of the discharges 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.

For further details, please refer to Clause 7.4, 8.4, 9.4, 10.4, 11.4, 12.4 and 13.4, of EN 50130-4.

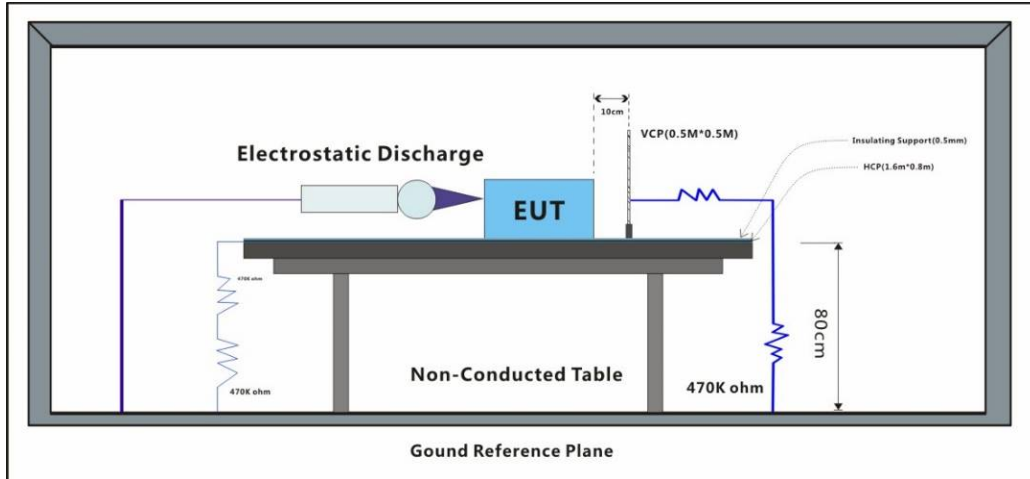


7.1 Electrostatic Discharge

Test Requirement: EN 50130-4: 2011 +A1:2014

Test Method: EN 61000-4-2:2009

7.1.1 Test Setup Diagram



7.1.2 E.U.T. Operation

Operating Environment:

Temperature: 21.2 °C

Humidity: 45.5 % RH

Atmospheric Pressure: 1010 mbar

7.1.3 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	Ethernet Monitoring mode_Establish communication between EUT and router via LAN port, and then connect PC to Router. Using PC monitoring images.



7.1.4 Test Condition and Results:

Number of Discharge: Minimum 10 times at each test point for Air Discharge; Minimum 50 times at each test point for Contact or VCP & HCP Discharge

Discharge Mode: Single Discharge

Discharge Period: 1 second minimum

Test Point 1: All insulated enclosure & seams.

Test Point 2: All accessible metal parts of the enclosure.

Test Point 3: All sides.

Discharge type	Level (kV)	Polarity	Test Point	Result / Observations
Air Discharge	2,4,8	+	1	A
Air Discharge	2,4,8	-	1	A
Contact Discharge	6	+	2	A
Contact Discharge	6	-	2	A
Horizontal Coupling	6	+	3	A
Horizontal Coupling	6	-	3	A
Vertical Coupling	6	+	3	A
Vertical Coupling	6	-	3	A

A: No degradation in the performance of the EUT was observed

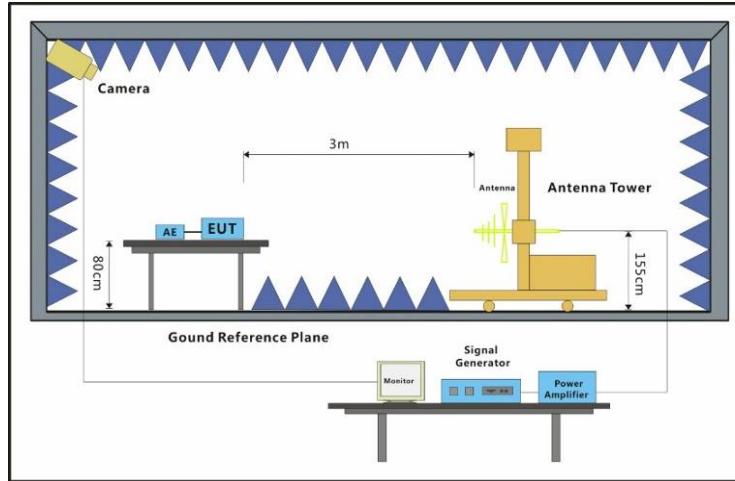


7.2 Radiated Immunity(80MHz-2.7GHz)

Test Requirement: EN 50130-4: 2011 +A1:2014

Test Method: EN IEC 61000-4-3: 2020

7.2.1 Test Setup Diagram



7.2.2 E.U.T. Operation

Operating Environment:

Temperature: 26 °C Humidity: 49 % RH Atmospheric Pressure: 1010 mbar

7.2.3 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	Ethernet Monitoring mode_Establish communication between EUT and router via LAN port, and then connect PC to Router. Using PC monitoring images.

7.2.4 Test Condition and Results:

Modulation: 80%, 1 kHz Amplitude Modulation & 0.5s ON 0.5s OFF Pulse Modulation

Frequency	Level (V/m)	EUT Face	Dwell time	Result / Observations
80MHz-2.7GHz	10	Front	3s	A
80MHz-2.7GHz	10	Back	3s	A
80MHz-2.7GHz	10	Left	3s	A
80MHz-2.7GHz	10	Right	3s	A
80MHz-2.7GHz	10	Top	3s	A
80MHz-2.7GHz	10	Underside	3s	A

A: No degradation in the performance of the EUT was observed

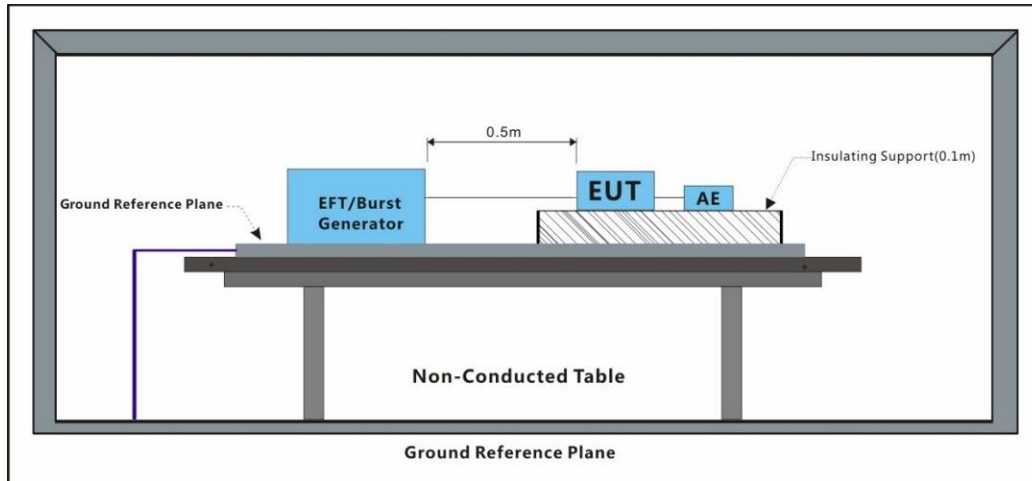


7.3 Electrical Fast Transients & Burst at AC Power Port

Test Requirement: EN 50130-4: 2011 +A1:2014

Test Method: EN 61000-4-4:2012

7.3.1 Test Setup Diagram



7.3.2 E.U.T. Operation

Operating Environment:

Temperature: 25 °C Humidity: 49 % RH Atmospheric Pressure: 1010 mbar

7.3.3 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	Ethernet Monitoring mode_Establish communication between EUT and router via LAN port, and then connect PC to Router. Using PC monitoring images.

7.3.4 Test Condition and Results:

Repetition Frequency: 100kHz

Burst Period: 300ms

Test Duration: 1 minute per level & polarity

Test Line	Level (kV)	Polarity	CDN/Clamp	Result / Observations
AC power port	2	+	CDN	A
AC power port	2	-	CDN	A

A: No degradation in the performance of the EUT was observed

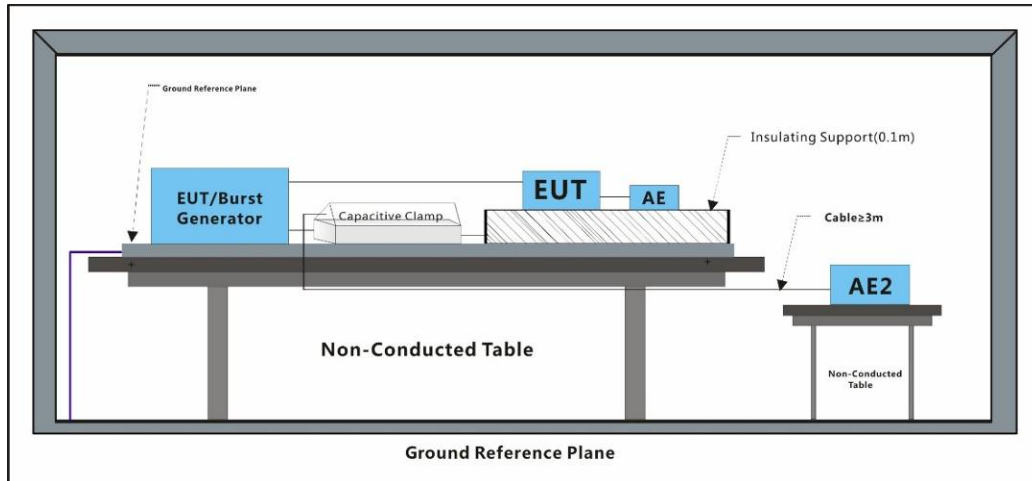


7.4 Electrical Fast Transients & Burst at Signal Port

Test Requirement: EN 50130-4: 2011 +A1:2014

Test Method: EN 61000-4-4:2012

7.4.1 Test Setup Diagram



7.4.2 E.U.T. Operation

Operating Environment:

Temperature: 25 °C Humidity: 49 % RH Atmospheric Pressure: 1010 mbar

7.4.3 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	Ethernet Monitoring mode_Establish communication between EUT and router via LAN port, and then connect PC to Router. Using PC monitoring images.

7.4.4 Test Condition and Results:

Repetition Frequency: 100kHz

Burst Period: 300ms

Test Duration: 1 minute per level & polarity

Test Line	Level (kV)	Polarity	CDN/Clamp	Result / Observations
Signal Port	1	+	Clamp	A
Signal Port	1	-	Clamp	A

A: No degradation in the performance of the EUT was observed

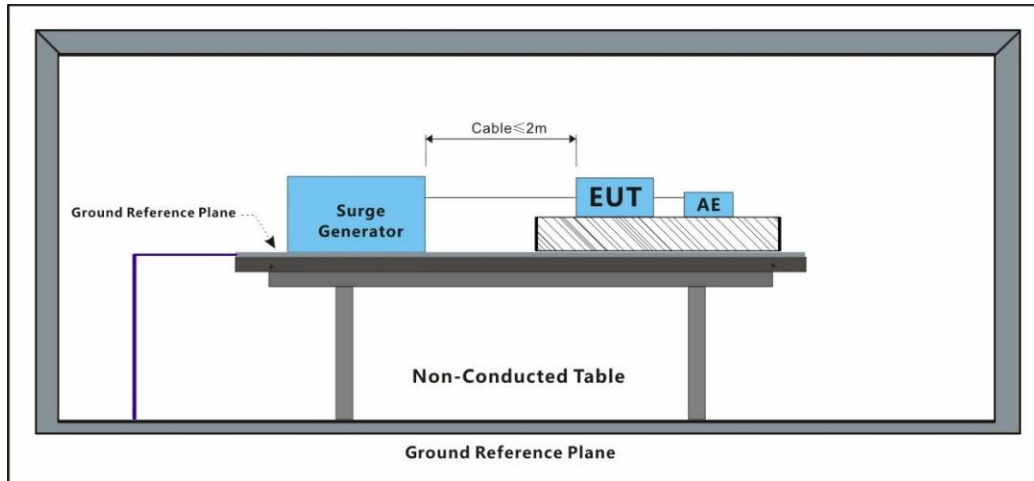


7.5 Surge at AC Power Port

Test Requirement: EN 50130-4: 2011 +A1:2014

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

7.5.1 Test Setup Diagram



7.5.2 E.U.T. Operation

Operating Environment:

Temperature: 25 °C

Humidity: 49 % RH

Atmospheric Pressure: 1010 mbar

7.5.3 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	Ethernet Monitoring mode_Establish communication between EUT and router via LAN port, and then connect PC to Router. Using PC monitoring images.

7.5.4 Test Condition and Results:

Interval: 60s between each surge

No. of surges: 5 positive, 5 negative

Test Line	Level (kV)	Polarity	Phase (deg)	Result / Observations
L-N	0.5,1	+	0°	A
L-N	0.5,1	-	0°	A
L-N	0.5,1	+	90°	A
L-N	0.5,1	-	90°	A
L-N	0.5,1	+	180°	A
L-N	0.5,1	-	180°	A
L-N	0.5,1	+	270°	A
L-N	0.5,1	-	270°	A

A: No degradation in the performance of the EUT was observed

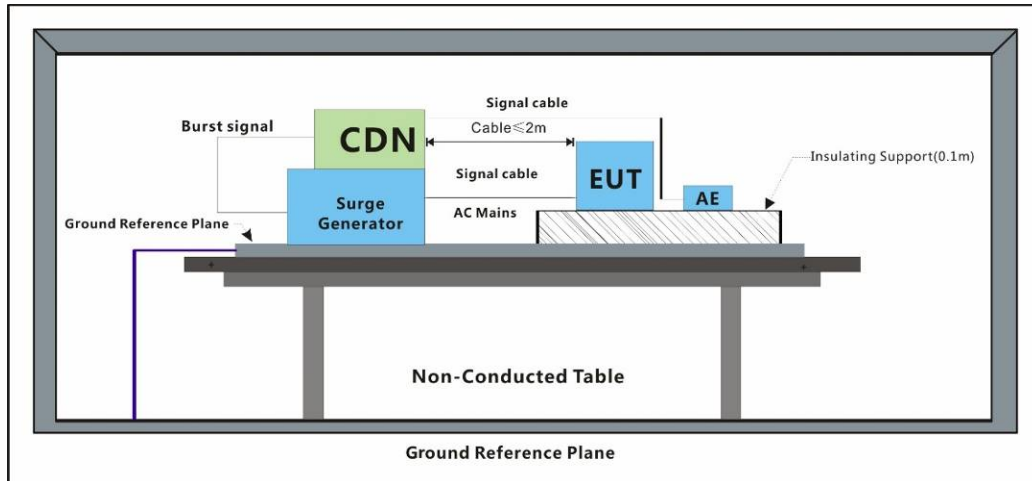


7.6 Surge at Signal Port

Test Requirement: EN 50130-4: 2011 +A1:2014

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

7.6.1 Test Setup Diagram



7.6.2 E.U.T. Operation

Operating Environment:

Temperature: 25 °C Humidity: 49 % RH Atmospheric Pressure: 1010 mbar

7.6.3 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	Ethernet Monitoring mode_Establish communication between EUT and router via LAN port, and then connect PC to Router. Using PC monitoring images.

7.6.4 Test Condition and Results:

Interval: 60s between each surge

No. of surges: 5 positive, 5 negative.

Port	Line	Level (kV)	Polarity	Result / Observations
Signal port	Line-Ground	0.5	+	A
Signal port	Line-Ground	0.5	-	A
Signal port	Line-Ground	1	+	A
Signal port	Line-Ground	1	-	A

A: No degradation in the performance of the EUT was observed



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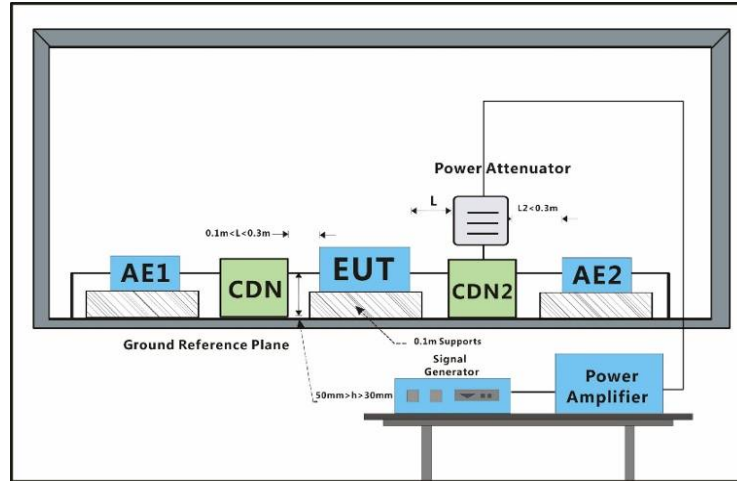
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7.7 Conducted Immunity at Power Port (150kHz-100MHz)

Test Requirement: EN 50130-4: 2011 +A1:2014

Test Method: EN 61000-4-6:2014

7.7.1 Test Setup Diagram



7.7.2 E.U.T. Operation

Operating Environment:

Temperature: 25 °C

Humidity: 49 % RH

Atmospheric Pressure: 1010 mbar

7.7.3 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	Ethernet Monitoring mode_Establish communication between EUT and router via LAN port, and then connect PC to Router. Using PC monitoring images.

7.7.4 Test Condition and Results:

Modulation: 80%, 1 kHz Amplitude Modulation & 0.5s ON 0.5s OFF Pulse Modulation

Cable port	Level (Vrms)	CDN/Clamp	Dwell time	Result / Observations
AC power port	10	CDN	3s	A
A: No degradation in the performance of the EUT was observed				



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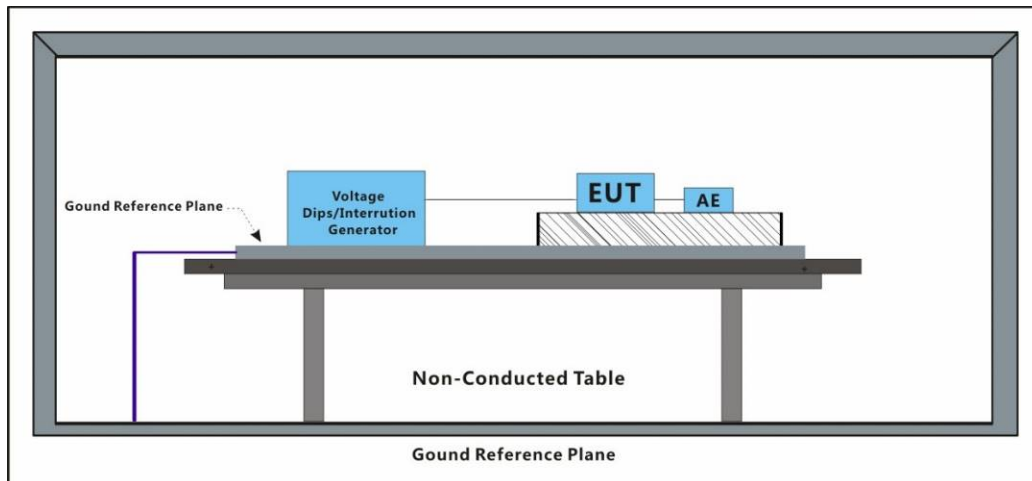
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7.9 Mains Supply Voltage Variations

Test Requirement: EN 50130-4: 2011 +A1:2014

Test Method: EN 50130-4:2011+A1:2014

7.9.1 Test Setup Diagram



7.9.2 E.U.T. Operation

Operating Environment:

Temperature: 25 °C Humidity: 49 % RH Atmospheric Pressure: 1010 mbar

7.9.3 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	Ethernet Monitoring mode_Establish communication between EUT and router via LAN port, and then connect PC to Router. Using PC monitoring images.

7.9.4 Test Condition and Results:

Voltage max.: AC 264V (Umax: Unom + 10%)

Voltage min.: AC 85V (Umin: Unom - 15%)

Unom Voltage: AC 100-240V

Test phenomenon description for the EUT:

1. The EUT working normal, before the conditioning.
2. Monitor the EUT during the conditioning period and detected no any changes in states, during the conditioning.
3. No degradation in the performance of the EUT was observed, after the conditioning.

A: No degradation in the performance of the EUT was observed



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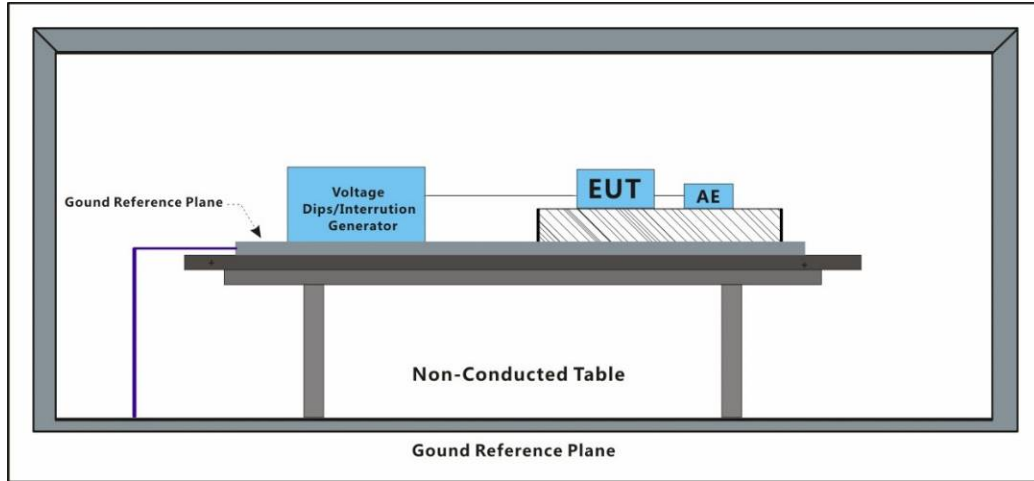
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7.10 Voltage Dips and Interruptions

Test Requirement: EN 50130-4: 2011 +A1:2014

Test Method: EN IEC 61000-4-11:2020

7.10.1 Test Setup Diagram



7.10.2 E.U.T. Operation

Operating Environment:

Temperature: 25 °C Humidity: 49 % RH Atmospheric Pressure: 1010 mbar

7.10.3 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	Ethernet Monitoring mode_Establish communication between EUT and router via LAN port, and then connect PC to Router. Using PC monitoring images.



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7.10.4 Test Condition and Results:

Performance Criterion:

0% of UT (Supply Voltage) for 250 Periods;

40% of UT for 10 Periods;

70% of UT for 25 Periods; 80% of UT for 250 Periods;

No. of Dips / Interruptions: 3 per Level

Time between dropout 10s

Level % UT	Phase (deg)	Duration	No. of Dips / Interruptions	Result / Observations
80	0°	250 Cycles	3	A
80	180°	250 Cycles	3	A
70	0°	25 Cycles	3	A
70	180°	25 Cycles	3	A
40	0°	10 Cycles	3	A
40	180°	10 Cycles	3	A
0	0°	250 Cycles	3	B
0	180°	250 Cycles	3	B

A: No degradation in the performance of the EUT was observed

B: During the test,the EUT working abnormally.

After the test,the EUT automatically recovering working normally.

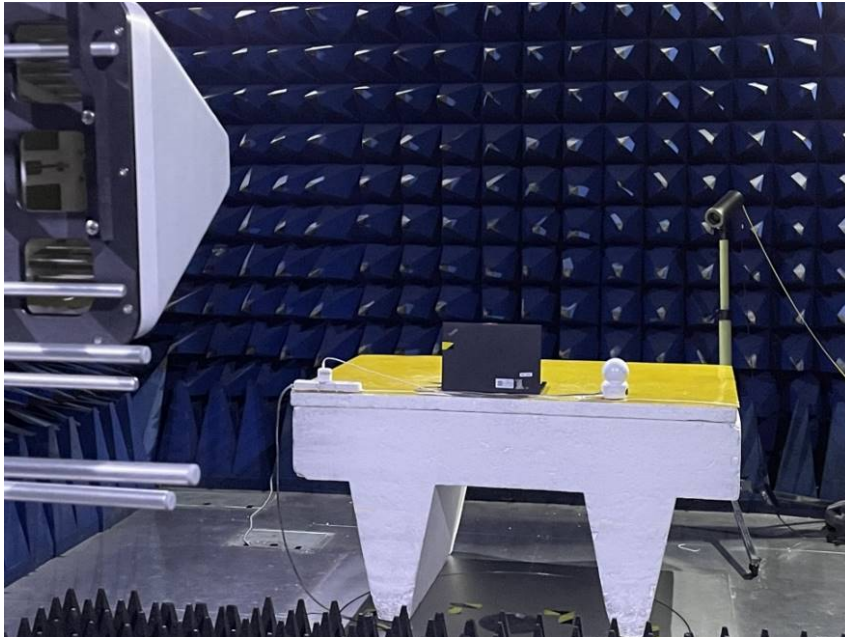


8 Test Setup Photo

Electrostatic Discharge



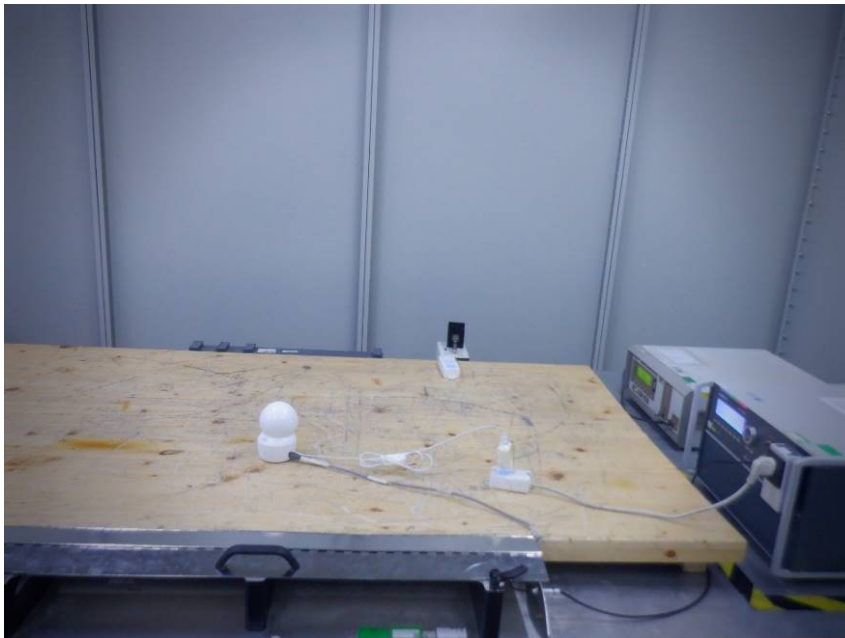
Radiated Immunity(80MHz-2.7GHz)



Electrical Fast Transients & Burst at AC Power Port



Electrical Fast Transients & Burst at Signal Port



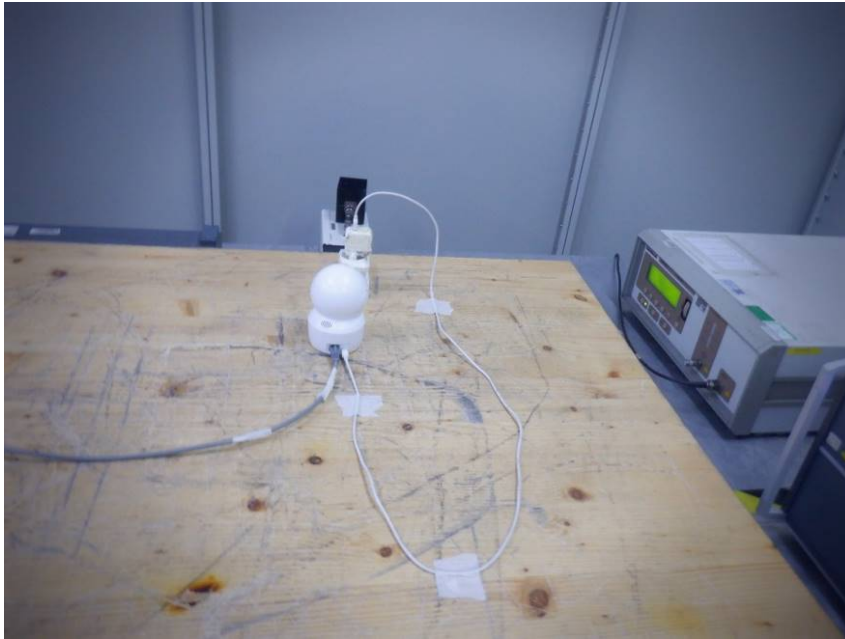
Surge at AC Power Port



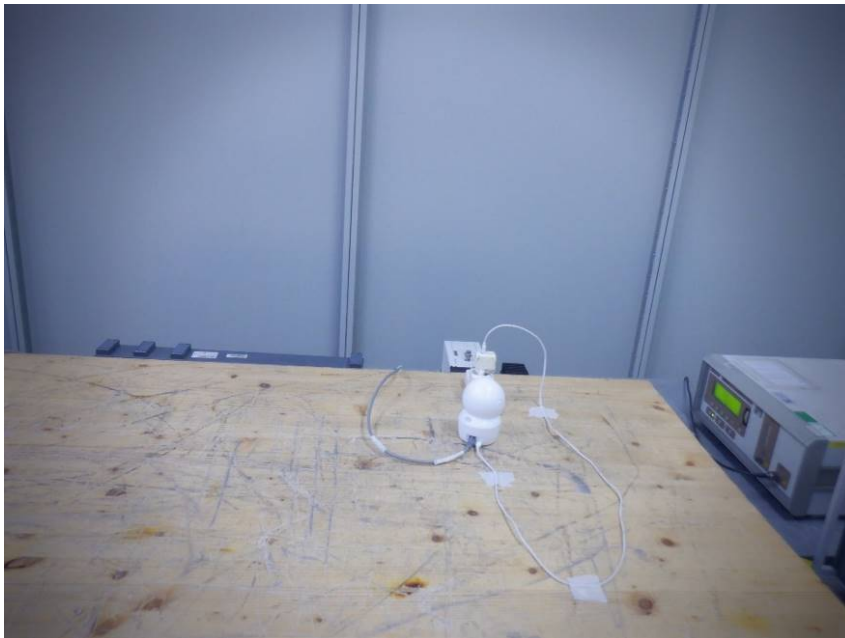
Surge at Signal Port



Conducted Immunity at Power Port (150kHz-100MHz)



Conducted Immunity at Signal Port (150kHz-100MHz)



Mains Supply Voltage Variations



Voltage Dips and Interruptions



Conducted Emissions at Mains Power Port (150kHz-30MHz)



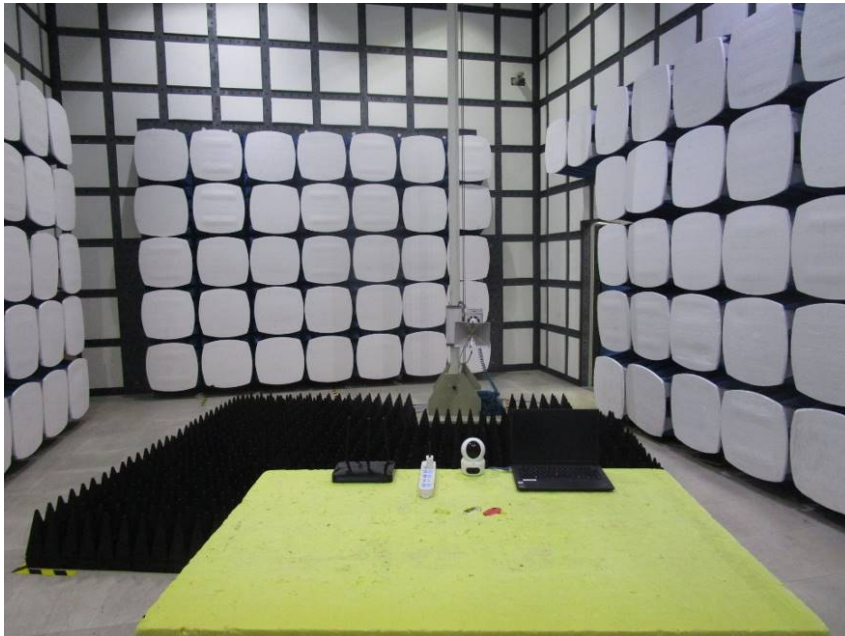
Asymmetric Mode Conducted Emissions(150kHz-30MHz)



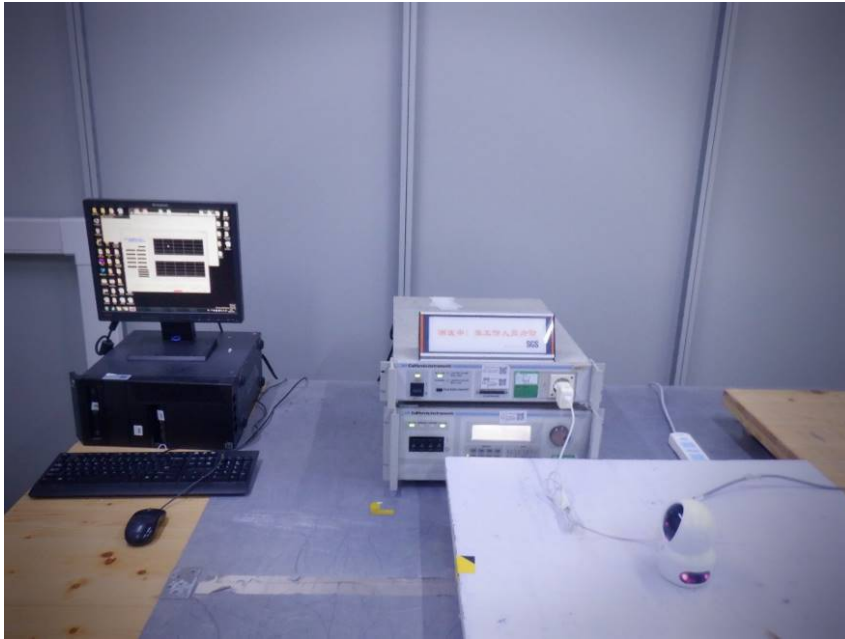
Radiated Emissions (30MHz-1GHz)



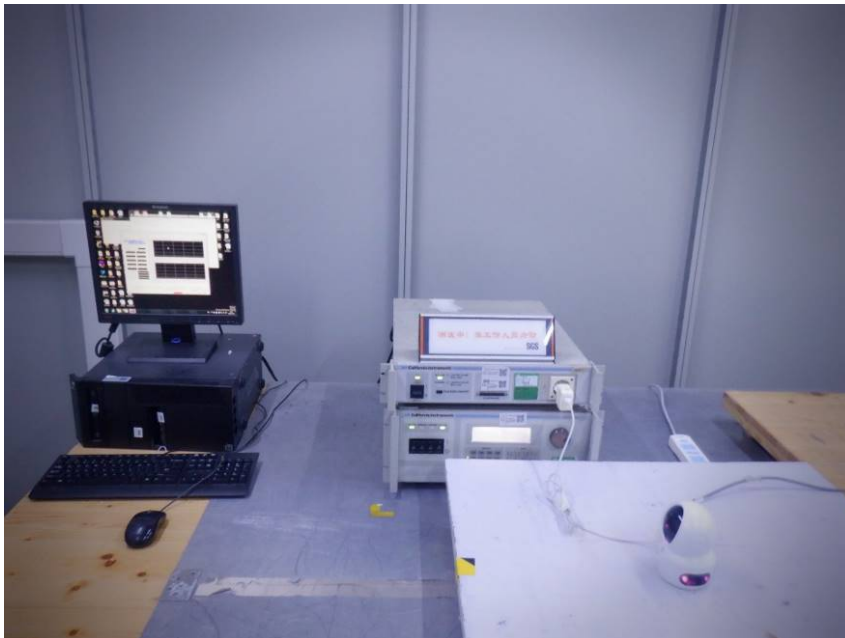
Radiated Emissions (Above 1GHz)



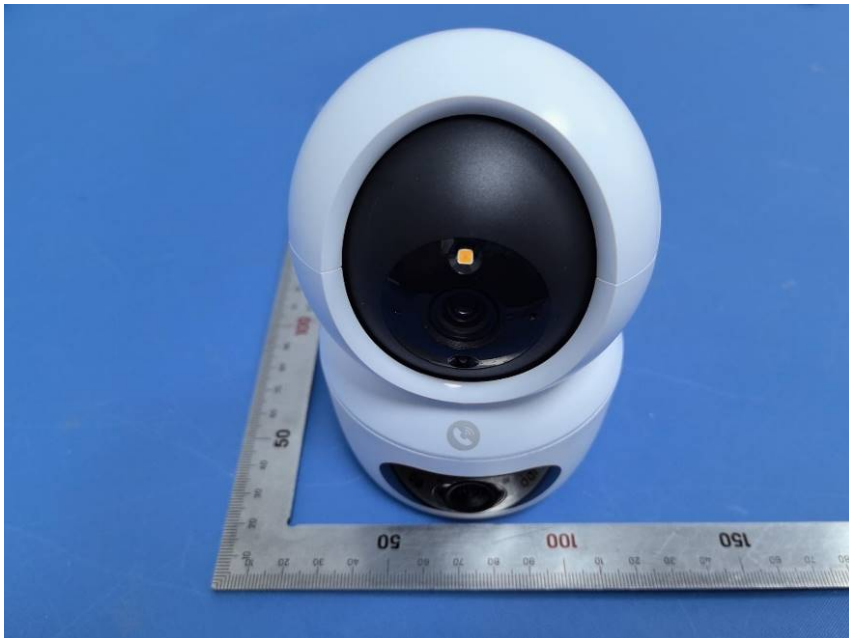
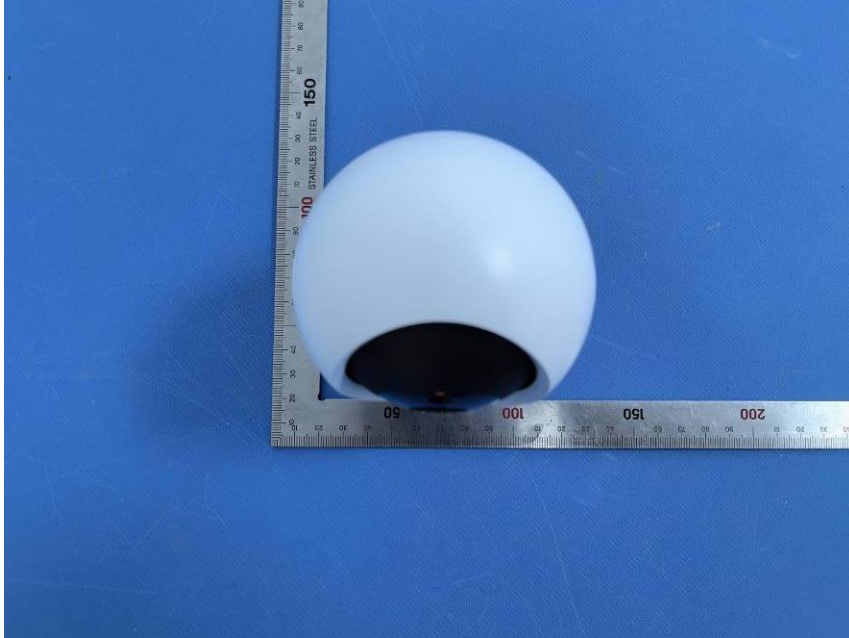
Voltage Fluctuations and Flicker



Harmonic Current Emission



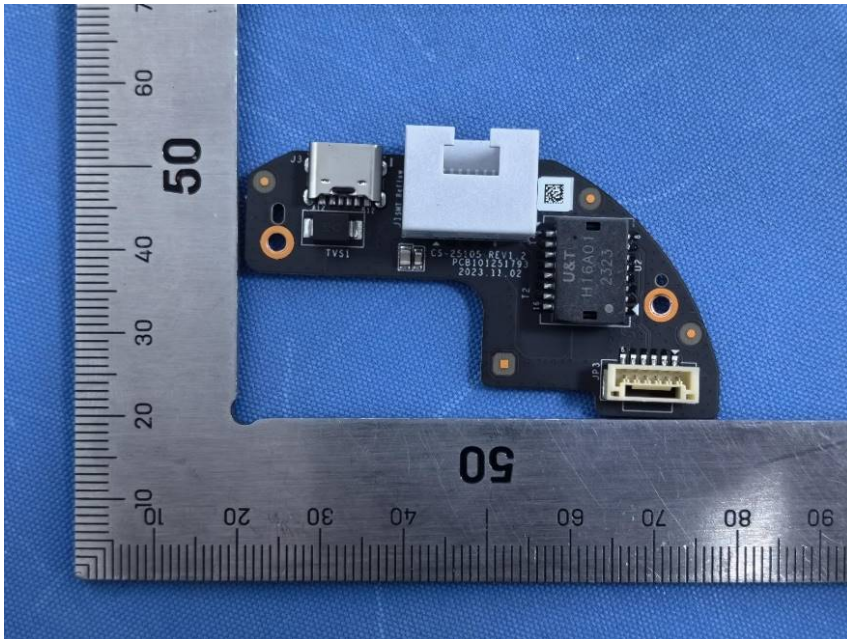
9 EUT Constructional Details (EUT Photos)

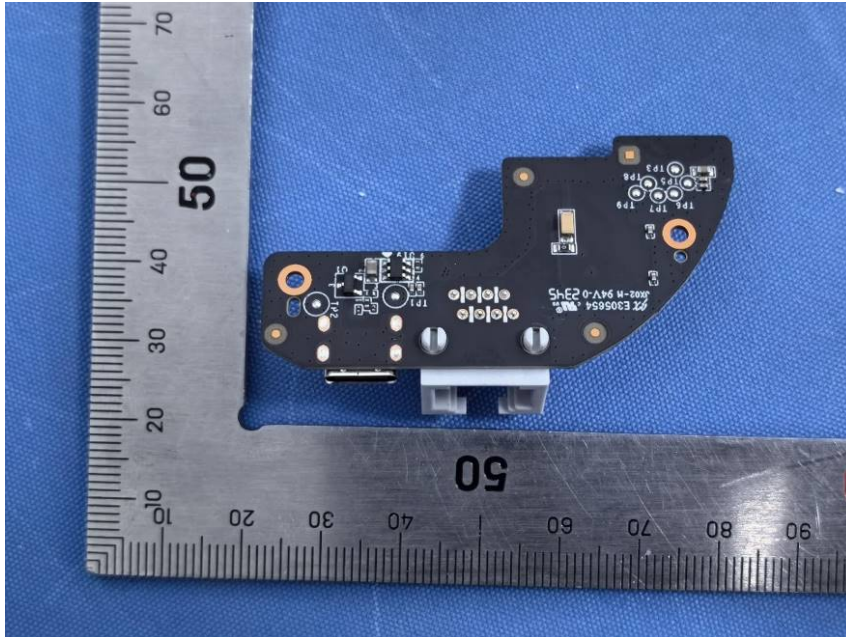


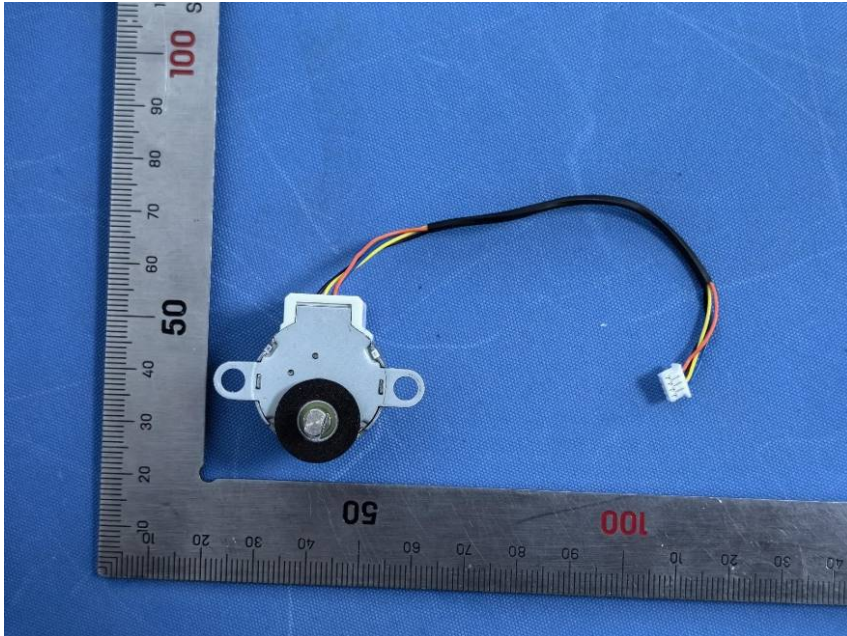
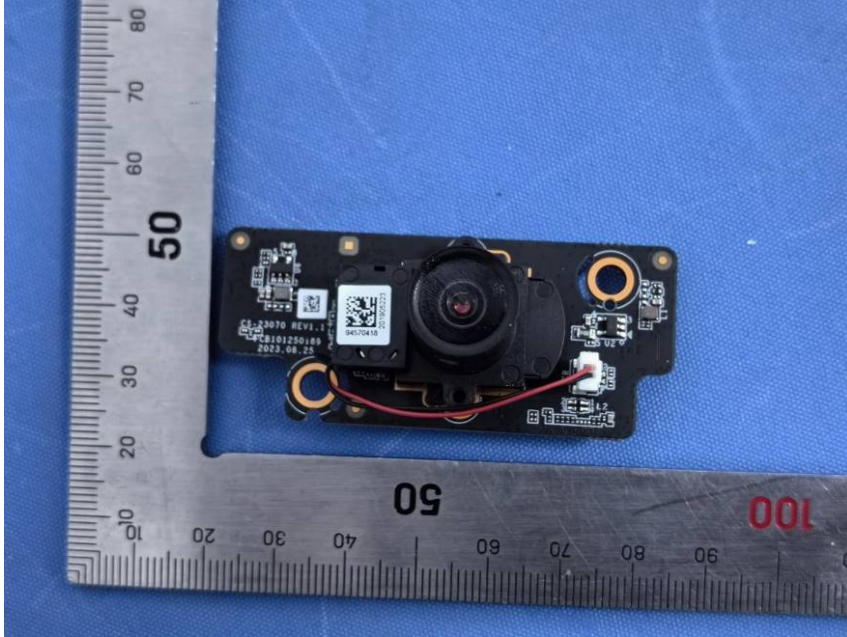






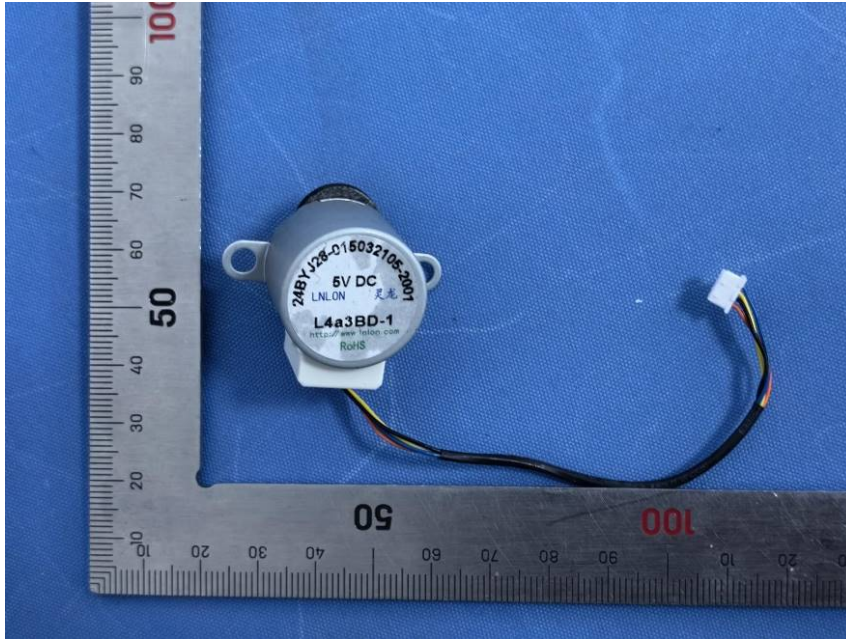






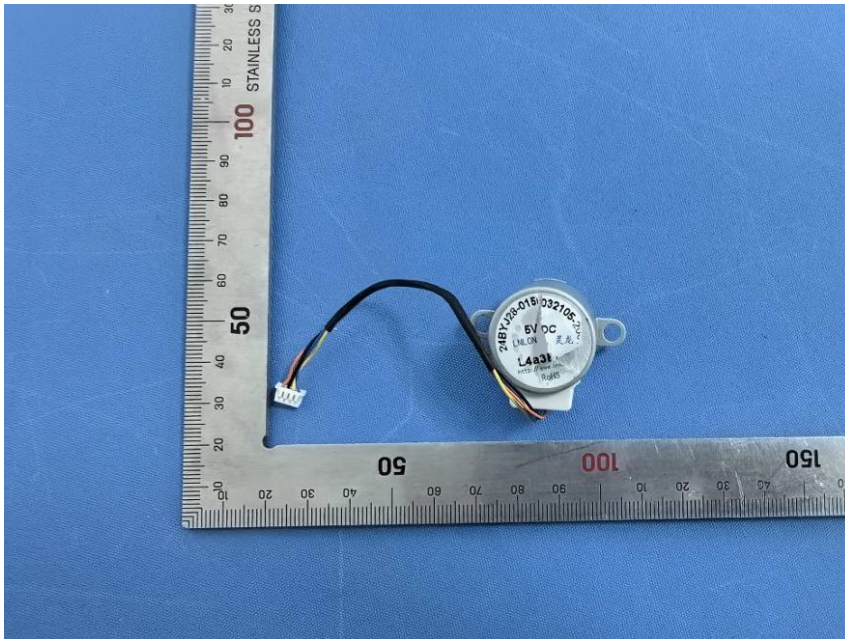
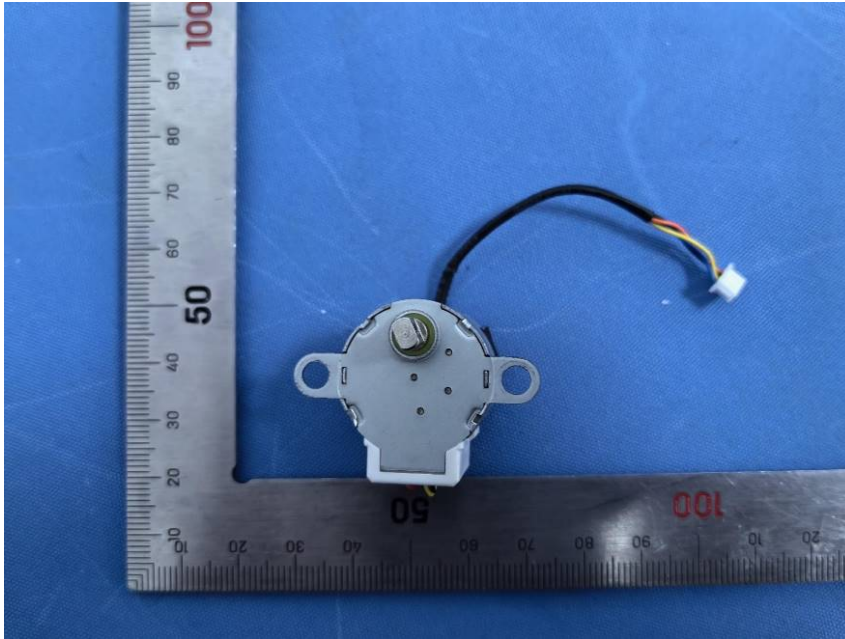
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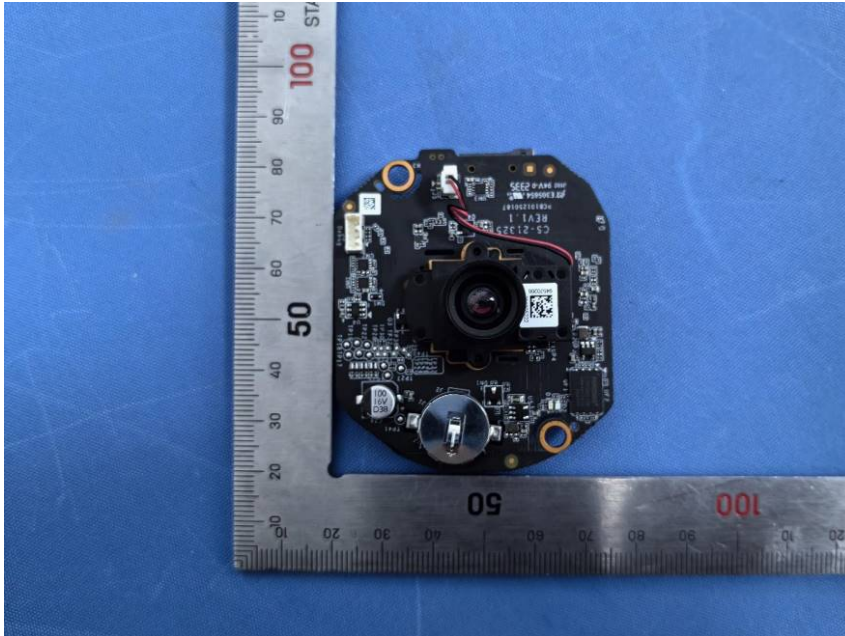
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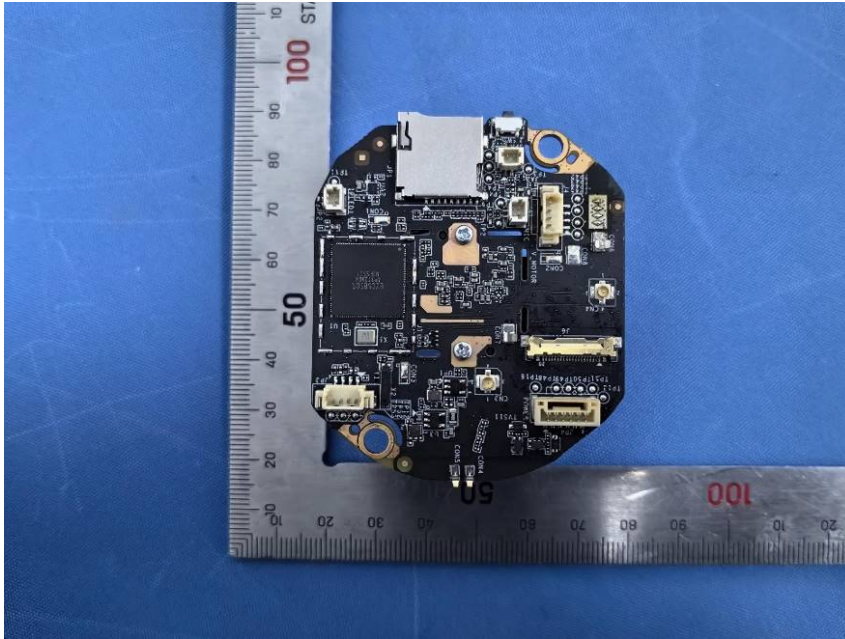


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