CE EMC TEST REPORT

Report No.: DDT-B22111101-1E01V1

Applicant	:	Tiandy technologies co., ltd
Address	:	NO.8, HAITAI HUAKE RD2 (OUTSIDE RING ROAD), HUAYUAN NEW TECHNOLOGY INDUSTRIAL PARK, TIANJIN 300384 CHINA
Equipment under Test	:	Net Video Recorder
Model No.	:	TC-R3105
Series Model No.	:	TC-R3104, TC-R3108, TC-R3110, TC-R3112, TC-R3120, TC-R3116
Trade Mark	:	Tiandy
Manufacturer	:	Tiandy technologies co., ltd
Address	:	NO.8, HAITAI HUAKE RD2 (OUTSIDE RING ROAD), HUAYUAN NEW TECHNOLOGY INDUSTRIAL PARK, TIANJIN 300384 CHINA

Issued By: Tianjin Dongdian Testing Service Co., Ltd.

Address: Building D-1, No. 19, Weisi Road, Microelectronics Industrial Park Development Area, Tianjin, China

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REPORT

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Test Report Declare

Applicant	:	Tiandy technologies co., ltd
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Test Standard Used:
EN 55032:2015/A11:2020,
EN 55035:2017/A11:2020,
EN IEC 61000-3-2:2019/A1:2021,
EN 61000-3-3:2013/A1:2019
EN 50130-4:2011/A1:2014
Test Procedure Used:
IEC 61000-4-2:2008, IEC 61000-4-3:2020, IEC 61000-4-4:2012,
IEC 61000-4-5:2014+AMD1:2017, IEC 61000-4-6:2013, IEC 61000-4-8:2009,
IEC 61000-4-11:2020

We Declare:
The equipment described above is tested and assessed by Tianjin Dongdian Testing Service Co., Ltd. and in the configuration assessed the equipment complied with the standards specified above. The tested and assessed results are contained in this test report and Tianjin Dongdian Testing Service Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these assessments.
After test and evaluation, our opinion is that the equipment in accordance with above standards.

Report No.:	DDT-B22111101-1E01V1		
Date of Receipt:	Nov. 14, 2022	Date of Test:	Nov. 15, 2022 ~ Jan. 04, 2023

Prepared By: Approved By:

Zoey Gao/Engineer

Aaron Zhang/EMC Manager

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Tianjin Dongdian Testing Service Co., Ltd.
The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

Revision History

Rev.	Revisions	Issue Date	Revised By
---	Initial issue	Dec. 08, 2022	
V1	Added test content.of EN 50130-4:2011/A1:2014.	Jan. 09, 2022	Zoey Gao

1. Summary of Test Results

Emission		
Description of Test Item	**Standard**	**Result**
Conducted emission at AC mains terminals	EN 55032:2015/A11:2020	PASS
Conducted emission at telecommunication port	EN 55032:2015/A11:2020	PASS
Radiated emission	EN 55032:2015/A11:2020	PASS
Harmonic current	EN IEC 61000-3-2:2019	N/A
Voltage fluctuation & Flicker	EN 61000-3-3:2013/A1:2019	PASS

Immunity				
Description of Test Item	**Standard**	**Result**	**Performance Criteria**	
			Required	**Observation**
Mains supply voltage variations	EN 50130-4：2011/A1:2014	Pass	A*	A*
Electrostatic discharge (ESD)	IEC 61000-4-2:2008 EN 55035:2017/A11:2020 EN 50130-4:2011/A1:2014	Pass	B A*	A A*
Radiated, radio-frequency, electromagnetic field	IEC 61000-4-3:2020 EN 55035:2017/A11:2020 EN 50130-4:2011/A1:2014	Pass	A A*	A A*
Electrical fast transients (EFT)	IEC 61000-4-4:2012 EN 55035:2017/A11:2020 EN 50130-4:2011/A1:2014	Pass	B A*	A A*
Surges	IEC 61000-4-5:2014+AMD1:2017 EN 55035:2017/A11:2020 EN 50130-4:2011/A1:2014	Pass	B/C A*	A A*
Continuous conducted disturbances	IEC 61000-4-6:2013 EN 55035:2017/A11:2020 EN 50130-4:2011/A1:2014	Pass	A A*	A A*
Power frequency magnetic field	IEC 61000-4-8:2009	Pass	A	A
Voltage dips, < 5%	IEC 61000-4-11:2020 EN 55035:2017/A11:2020	Pass	B	A
Voltage dips, 70%		Pass	C	A
Voltage interruptions		Pass	C	C
Voltage dips, 80%	EN 50130-4:2011/A1:2014	Pass	A*	A*
Voltage dips, 70%		Pass	A*	A*
Voltage dips, 40%		Pass	A*	A*
Voltage interruptions		Pass	B*	B*
Note: N/A is an abbreviation for Not Applicable.				

2. General Test Information

2.1 Description of EUT

EUT* Name	:	Net Video Recorder
Model Number	:	TC-R3105
Series Model No.	:	TC-R3104, TC-R3108, TC-R3110, TC-R3112, TC-R3120, TC-R3116
Model Differences	:	Models applied for this application are the equipment color, sales area and salesman, which do not affect the material, electromagnetic compatibility and safety electrical performance of the product.
Test Model	:	TC- R3105
Serial Number	:	485245C2446A00028
EUT function description	:	Please refer to user manual of this device
Power supply	:	DC 48V(power supply by 100-240V,50HZ/60Hz AC/DC adapter)
EUT Class	:	Class A
Maximum work frequency	:	25 MHz

Note: EUT is the abbreviation of equipment under test.

2.2 Primary Function of EUT

Function	Description
☒Broadcast reception function	N/A
☒Print	N/A
☒Scan	N/A
☑Display or display output	Display output
☒Musical tone generating	N/A
☑Networking	Data transmission
☒Audio output	N/A
☒Telephony	N/A
☒Bluetooth	N/A
☒Other:	N/A
Note: "☒" means the product does not have this function, "☑" means the product has this function, N/A means not applicable	

2.3 Port of EUT

Port	Description
☑AC mains power port	AC Main Port(power supply by 100-240V,50HZ/60Hz AC/DC adapter)
☒DC network power port	N/A
☑Wired network port	Five LAN ports
☒Signal data/control port	N/A
☒Antenna port	N/A
☒Broadcast receiver tuner port	N/A
☑Audio output/input t port	N/A
☑Video output port	One VGA Port,One HDMI Port
☑Other:	Two USB-A ports
Note: "☒" means the product does not have this port, "☑" means the product has this port, N/A means not applicable	

2.4 Accessories of EUT

Description of Accessories	Manufacturer	Model number	Description	Remark
3D Optical Mouse	N/A	N/A	N/A	N/A
Switch Mode Power Supply	MASS POWER	S065-1A480135B3	N/A	MASS POWER

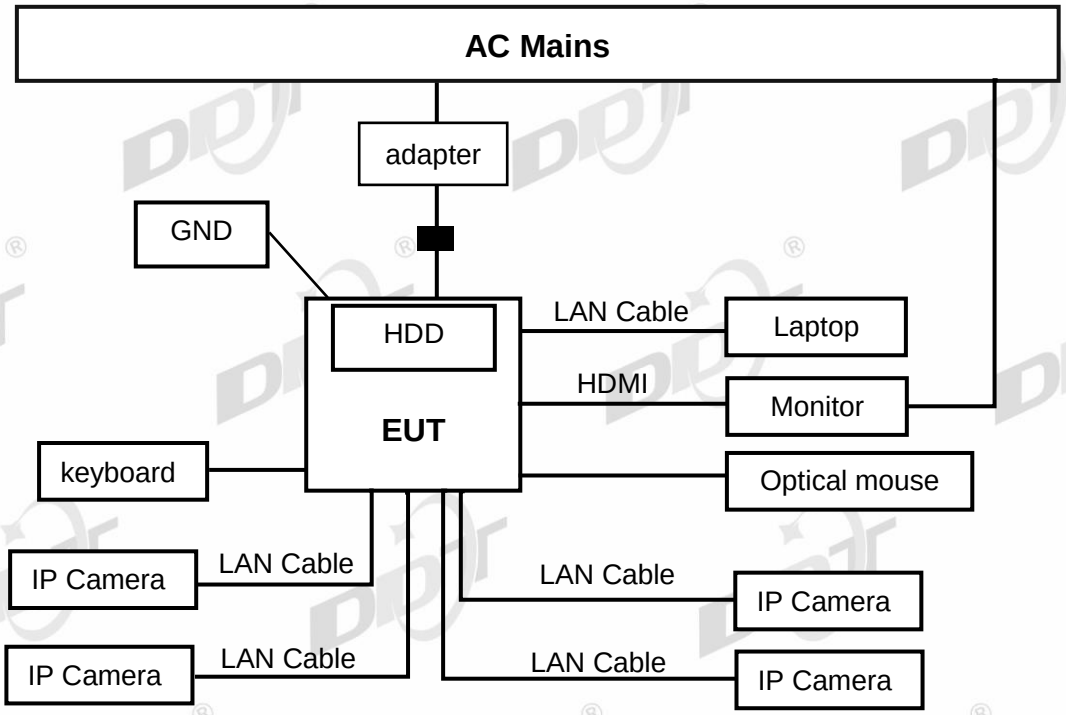
2.5 Test peripherals

Device	Manufacturer	Model No.	Serial No.	Remark
Laptop	HP	HP ProBook 455R G6	5CD0122F5D	HP
Laptop	Lenovo	Lenovo 威 6 15 ITL	MP22HP0E	Lenovo
Monitor	SAMSUNG	LS24C350HLAG KR	ZYJ8HTEF600031F	SAMSUN G
Monitor	SAMSUNG	U32H750UMC	0QMVHTPJ200038Y	SAMSUN G
HDD	SEAGATE	ST1000DM003	Z1DCJ6NC	N/A
IP Camera	Tiandy	TC-C52EN	N/A	Tiandy
IP Camera	Tiandy	TC-C52EN	N/A	Tiandy
IP Camera	Tiandy	TC-C142WE	N/A	Tiandy
IP Camera	Tiandy	TC-C52EN	N/A	Tiandy
keyboard	Dell	SK-8185	N/A	N/A
LAN cable	N/A	N/A	Shielded, Length: 1.5m	N/A
LAN cable	N/A	N/A	Shielded, Length: 1.5m	N/A
LAN cable	N/A	N/A	Shielded, Length: 1.5m	N/A
LAN cable	N/A	N/A	Shielded, Length: 1.5m	N/A
LAN cable	N/A	N/A	Shielded, Length: 1.5m	N/A
LAN cable	N/A	N/A	Unshielded, Length: 1.5m	N/A

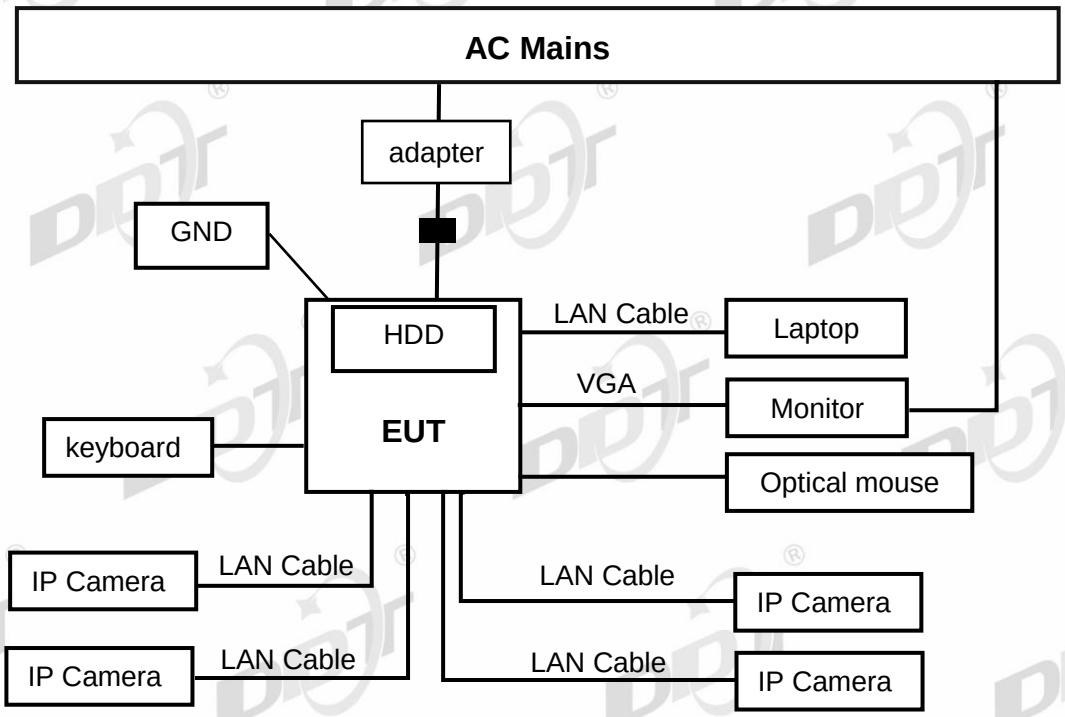
LAN cable	N/A	N/A	Unshielded, Length: 1.5m	N/A
LAN cable	N/A	N/A	Unshielded, Length: 1.5m	N/A
LAN cable	N/A	N/A	Unshielded, Length: 1.5m	N/A
LAN cable	N/A	N/A	Unshielded, Length: 1.5m	N/A

2.6 Block diagram EUT configuration for test

Mode 1



Mode 2



Ferrite Core
Terminal

2.7 EUT operating mode(s)

Mode1: HDMI	Connect HDMI cable from PC's HDMI port to EUT's HDMI Port. The monitor displays the real-time image of the camera.
Mode2: VGA	Connect VGA cable from PC's VGA port to EUT's VGA Port. The monitor displays the real-time image of the camera.

Test mode description: EUT Contains one hard disk.EUT connect to laptop and vedio camera with network cable. The camera's video displayed on laptop with web. The laptop was at the outside of chamber when radiated emission test and continuous radio trequency disturbances test. Doing the ping test from laptop to EUT.

2.8 Decision of final test mode

According pre-test, the worst test modes decided as below and reported.

Emission	Conducted emission (mains power port)	Mode 1
	Conducted emission(Telecommunication port)	Mode 1
	Radiated emission	Mode 1
	Harmonic current emissions	Mode 1
	Voltage fluctuations & flicker	Mode 1
Immunity	Electrostatic discharge	Mode 1
	Continuous radio frequency disturbances	Mode 1
	Electrical fast transients	Mode 1
	Surges	Mode 1
	Continuous conducted disturbances	Mode 1
	Power-frequency magnetic fields	Mode 1
	Voltage dips and interruptions	Mode 1

2.9 Performance Criteria

During and/or after immunity testing for EN55035:2017, the EUT was monitored to the following performance criterion.

Criterion	Description
A	No noticeable degradation or loss of function is allowed during the test. The EUT shall continue to operate as intended without operator intervention. The product conforms with the requirements of clause 8 of EN55035:2017. The product conforms with the requirements of Annex of EN55035:2017. ☐ Annex A ☐ Annex B ☐ Annex C ☒ Annex D ☐ Annex E ☒ Annex F ☐ Annex G
B	No noticeable degradation or loss of function is allowed after the test. The EUT shall continue to operate as intended without operator intervention. During the test, degradation of performance is allowed. No change of operating state or stored data is allowed to persist after the test. The product conforms with the requirements of clause 8 of EN55035:2017. The product conforms with the requirements of Annex of EN55035:2017. ☐ Annex A ☐ Annex B ☐ Annex C ☒ Annex D ☐ Annex E ☒ Annex F ☐ Annex G
C	Loss of function is allowed, provided that the function is self recoverable. or can be restored by the operation of the controls by the user. The product conforms with the requirements of clause 8 of EN55035:2017. The product conforms with the requirements of Annex of EN55035:2017. ☐ Annex A ☐ Annex B ☐ Annex C ☒ Annex D ☐ Annex E ☒ Annex F ☐ Annex G

2.10 Deviations of test standard

[Standard deviation 1] Surge immunity test was done according to IEC 61000-4-5:2014+AMD1:2017 instead of IEC 61000-4-5:2005.
[Standard deviation 2] Radio-frequency conducted immunity test was done according to IEC 61000-4-6:2013 instead of IEC 61000-4-6:2008.
[Standard deviation 3] Radiated, radio-frequency, electromagnetic field immunity test was done according to IEC 61000-4-3:2020 instead of IEC 61000-4-3:2006/A1:2007/A2:2010.
[Standard deviation 4] Voltage dips, short interruptions and voltage variations immunity tests was done according to IEC 61000-4-11:2020 instead of IEC 61000-4-11:2004.

2.11 Test laboratory

Tianjin Dongdian Testing Service Co., Ltd.
Address: Building D-1, No. 19, Weisi Road, Microelectronics Industrial Park Development Area, Tianjin, China.
Tel: +86-22-58038033, http://www.ddttest.com, Email: ddt@dgddt.com
NVLAP (National Voluntary Laboratory Accreditation Program) CODE: 500036-0
CNAS (China National Accreditation Service for Conformity Assessment) CODE: L13402
FCC Designation Number: CN5004; FCC Test Firm Registration Number: 368676
ISED (Innovation, Science and Economic Development Canada) Company Number: 27768
Conformity Assessment Body Identifier: CN0125
VCCI Facility Registration Number: C-20089, T-20093, R-20125, G-20122

2.12 Measurement uncertainty

Test Item		Uncertainty
Conducted emission	Main terminal	3.4dB (150KHz-30MHz)
	Telecommunication (ISN T800)	4.59dB
	Telecommunication (ISN ST08)	3.5dB
Uncertainty for 10m Radiation Emission test (30MHz-1GHz)		5.2 dB (Antenna Polarize: H)
		5.2 dB (Antenna Polarize: V)
Uncertainty for Radiation disturbance test (1GHz to 6GHz)		5.0dB
Harmonics current		3.1 %
Voltage fluctuation & Flicker		1.7 %
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2. We have conducted the Electrostatic discharge, Electrical fast transient/burst, Surge, Voltage dips, short interruptions and voltage variations tests to check the uncertainty. Radiated, radio-frequency, electromagnetic field 5.4dB. Conducted disturbances, induced by radio-frequency fields 1.1dB.		

3. Conducted Emission (mains power port)

3.1 General information

Test date	Dec 2, 2022	Test engineer	Sam	
Climate condition	Ambient temperature	23.2±1℃	Relative humidity	32±1%
	Atmospheric pressure	102.7±0.2 kPa		
Test place	Shield Room 2#			

3.2 Test Equipment

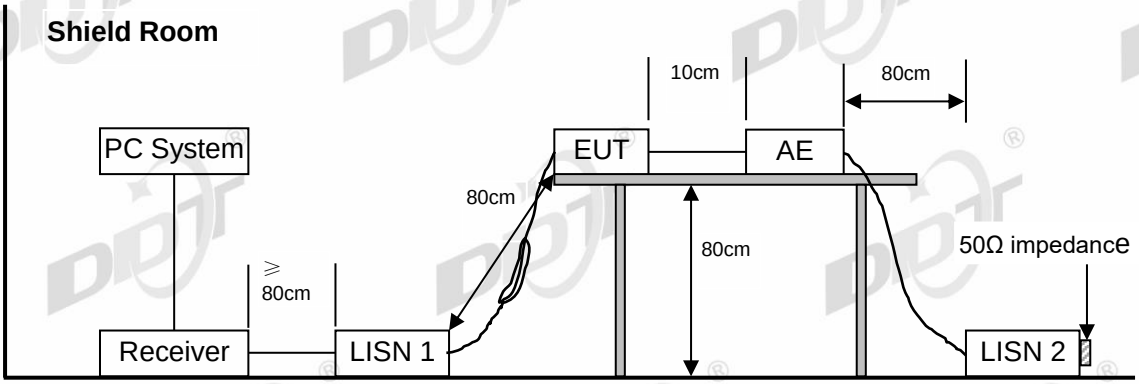
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Test Receiver	R&S	ESCI	101397	Mar. 03, 2022	1 Year
Two-Line V-Network	R&S	ENV216	101122	Mar. 23, 2022	1 Year
Two-Line V-Network	R&S	ENV216	101254	Mar 03, 2022	1 Year
Test software	TOYO	EP5/CE	V 5.4.40	N/A	N/A

3.3 Reference standard

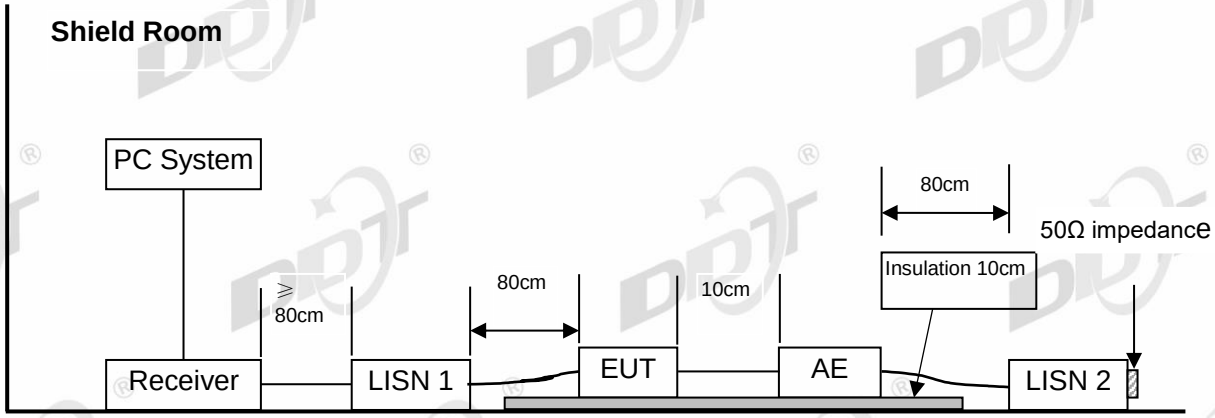
EN 55032:2015/A11:2020 (Class A)

3.4 Block diagram of test setup

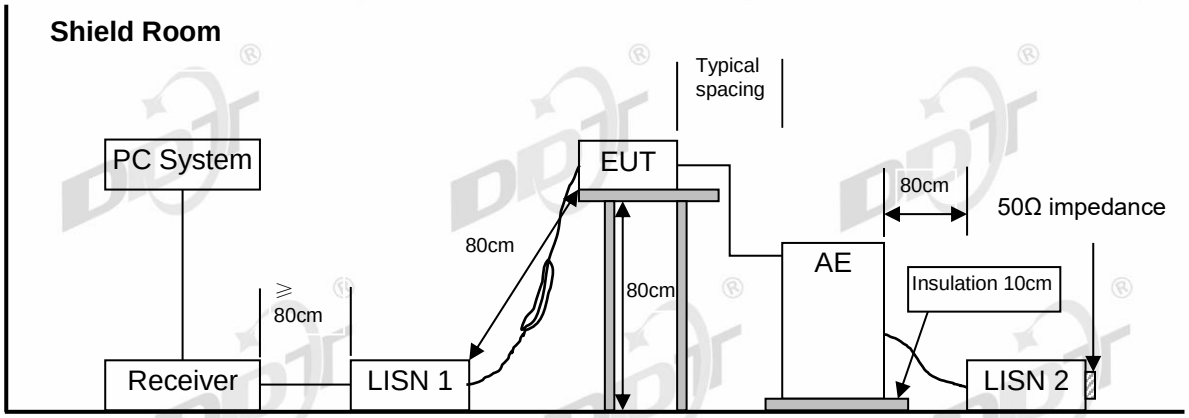
For table-top equipment



For floor standing equipment



For combinations equipment



3.5 Limits

Class A

Frequency			Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz	~	500kHz	79	66
500kHz	~	30MHz	73	60

Class B

Frequency			Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz	~	500kHz	66 ~ 56*	56 ~ 46*
500kHz	~	5MHz	56	46
5MHz	~	30MHz	60	50

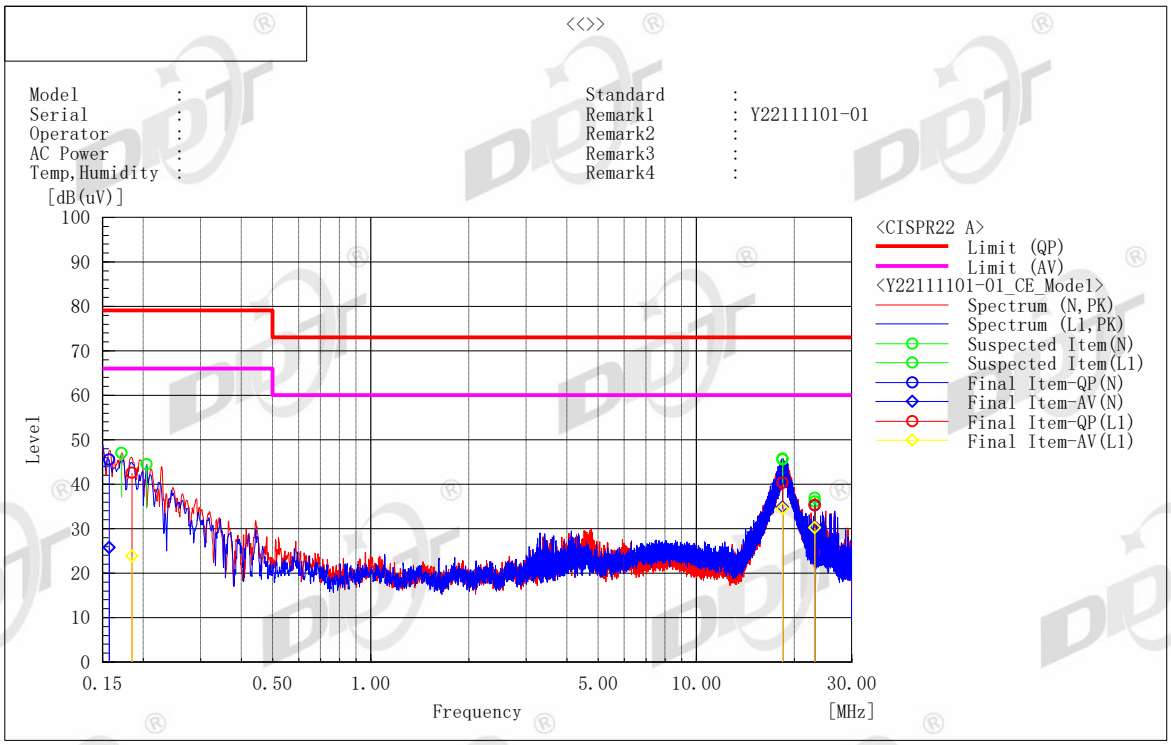
Notes: 1. * Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

3.6 Test procedure

(1) The EUT was placed on a non-metallic table, 80cm above the ground plane.
(2) The EUT's power adapter was connected to the power mains through a line impedance stabilization network (L.I.S.N). which this provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). Both sides of power line were checked for maximum conducted disturbance. In order to find the maximum emission, the relative positions of equipment and all of the interface cables were changed according to EN 55032 on conducted disturbance emission test.
(3) The bandwidth of test receiver is set at 9 kHz.
(4) The frequency range from 150 kHz to 30MHz is checked.
(5) Pre-scan measurements were performed in all operating mode or resolution.
But final measurements were performed in worst cases based on pre-scan measurements.

3.7 Test result

PASS. (See below detailed test result)
Operating Mode 1:



Final Result

--- N Phase ---

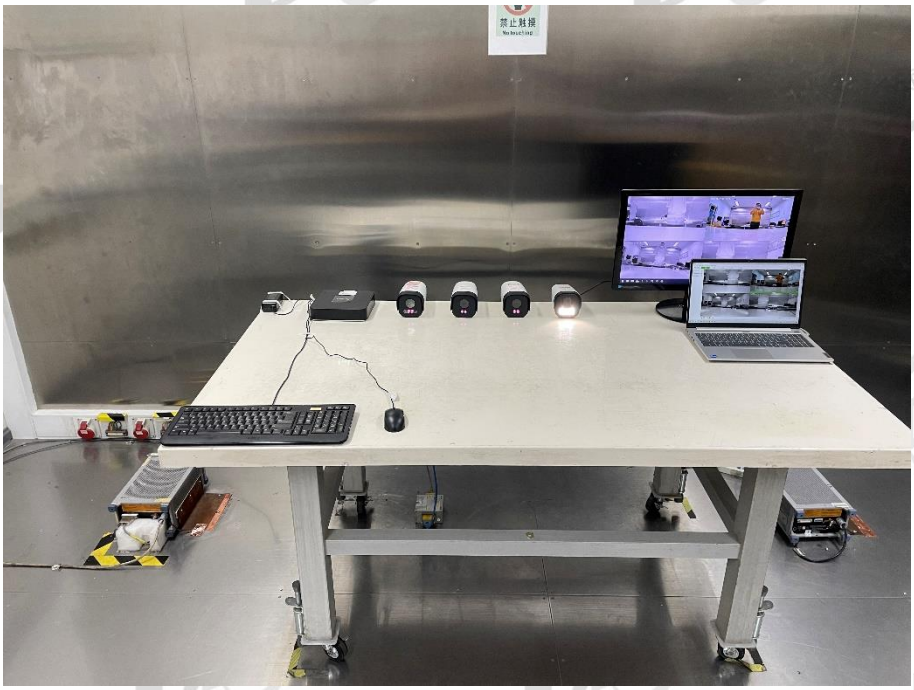
No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]
1	0.157	35.7	15.9	9.8	45.5	25.7	79.0	66.0	33.5	40.3
2	18.39681	30.1	24.6	10.2	40.3	34.8	73.0	60.0	32.7	25.2
3	23.12834	25.0	20.1	10.2	35.2	30.3	73.0	60.0	37.8	29.7

--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]
1	0.18478	32.7	14.0	9.8	42.5	23.8	79.0	66.0	36.5	42.2
2	18.40503	30.1	24.2	10.2	40.3	34.4	73.0	60.0	32.7	25.6
3	23.12827	25.2	20.1	10.1	35.3	30.2	73.0	60.0	37.7	29.8

Note1) Level (Quasi-Peak and/or C/Average) = Meter Reading + Factor
Note2) Line = Polarity of input power (Live or Neutral)
N : Abbreviation of Neutral Polarity, L1 : Abbreviation of Live Polarity,
Note3) Factor = LISN Insertion Loss + Cable Loss
Note4) Margin = Limit – Level (Quasi-Peak and/or C/Average)
Note5) C/Average : Abbreviation of CISPR Average

3.8 Test Photo



Front

Rear

4. Conducted Emission (Telecommunication Port)

4.1 General information

Test date	Dec 2, 2022	**Test engineer**	Sam	
Climate condition	**Ambient temperature**	23.2±1℃	**Relative humidity**	32±1%
	Atmospheric pressure	102.7±0.2 kPa		
Test place	Shield Room 2#			

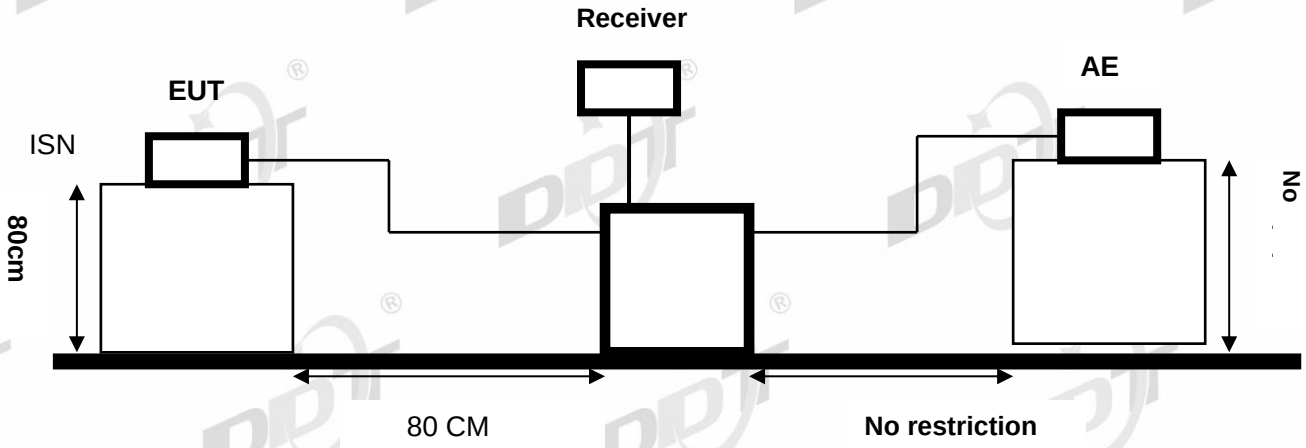
4.2 Test equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Test Receiver	R&S	ESCI	101397	Mar. 03, 2022	1 Year
Two-Line V-Network	R&S	ENV216	101122	Mar. 23, 2022	1 Year
Two-Line V-Network	R&S	ENV216	101254	Mar 03, 2022	1 Year
ISN	TESEQ	T800	30844	Nov. 17, 2022	1 Year
ISN	TESEQ	ISN ST08	33992	Feb. 16, 2022	1 Year
Test software	TOYO	EP5/CE	V 5.4.40	N/A	N/A

4.3 Reference standard

EN 55032:2015/A11:2020 (Class A)

4.4 Block diagram of test setup



EUT means Equipment Under Test
AE means Associated Equipment.

4.5 Limits

Class A

Frequency			Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz	~	500kHz	97 ~ 87*	84 ~ 74*
5MHz	~	30MHz	87	74

Class B

Frequency			Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz	~	500kHz	84 ~ 74*	74 ~ 64*
5MHz	~	30MHz	74	64

Notes: 1. * Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

4.6 Test procedure

The EUT was placed on a 0.8m high non-metallic table in shielded room.
Connect ISN directly to reference ground plane.
The measured voltage at the measurement port of the ISN should correct the reading by adding the voltage division factor of the ISN, and compare to the voltage limit.

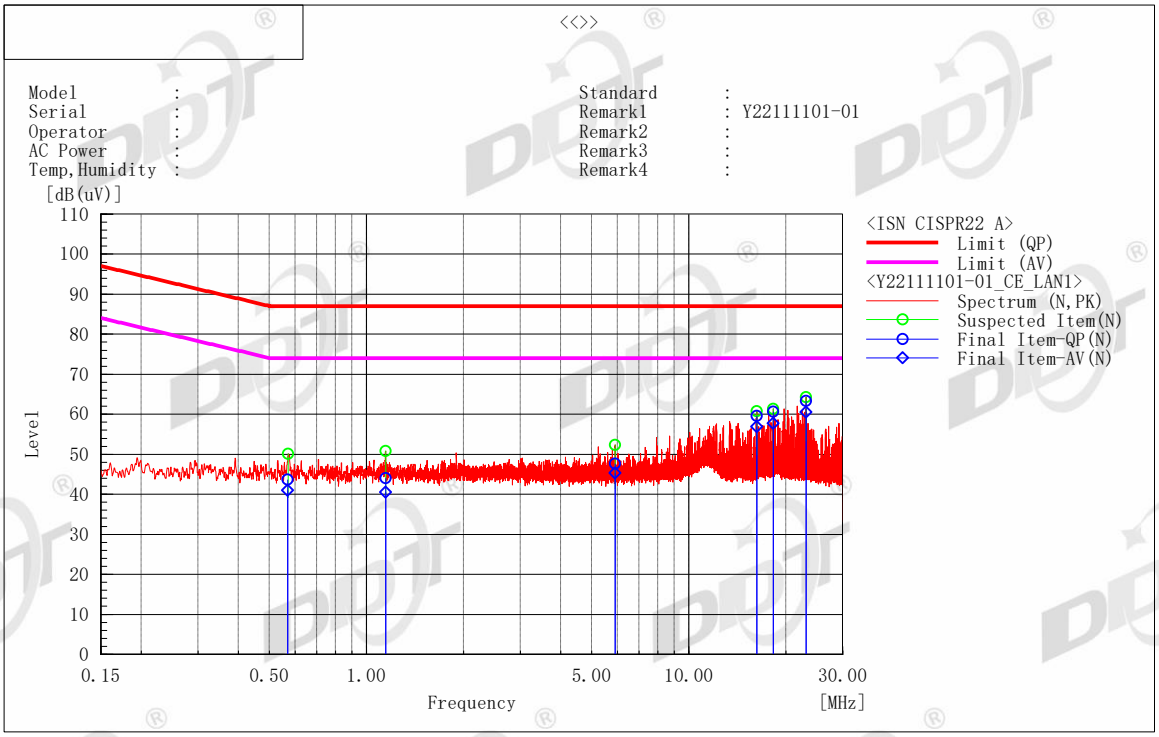
For Local Area Network (LAN) device, in order to make reliable emission measurements representative of high LAN utilization it is only necessary to create a condition of LAN utilization in excess of 10 % and sustain that level for a minimum of 250 ms. The content of the test traffic should consist of both periodic and pseudo-random messages in order to emulate realistic types of data transmission (e.g. random: files compressed or encrypted; periodic: uncompressed graphic files, memory dumps, screen updates, disk images). If the LAN maintains transmission during idle periods measurements shall also be made during idle periods.

When disturbance voltage measurements are performed on a single unscreened balanced pair, an adequate ISN for two wires shall be used; when performed on unscreened cables containing two balanced pairs, an adequate ISN for four wires shall be used.

4.7 Test result

Operating Mode 1:

LAN1:

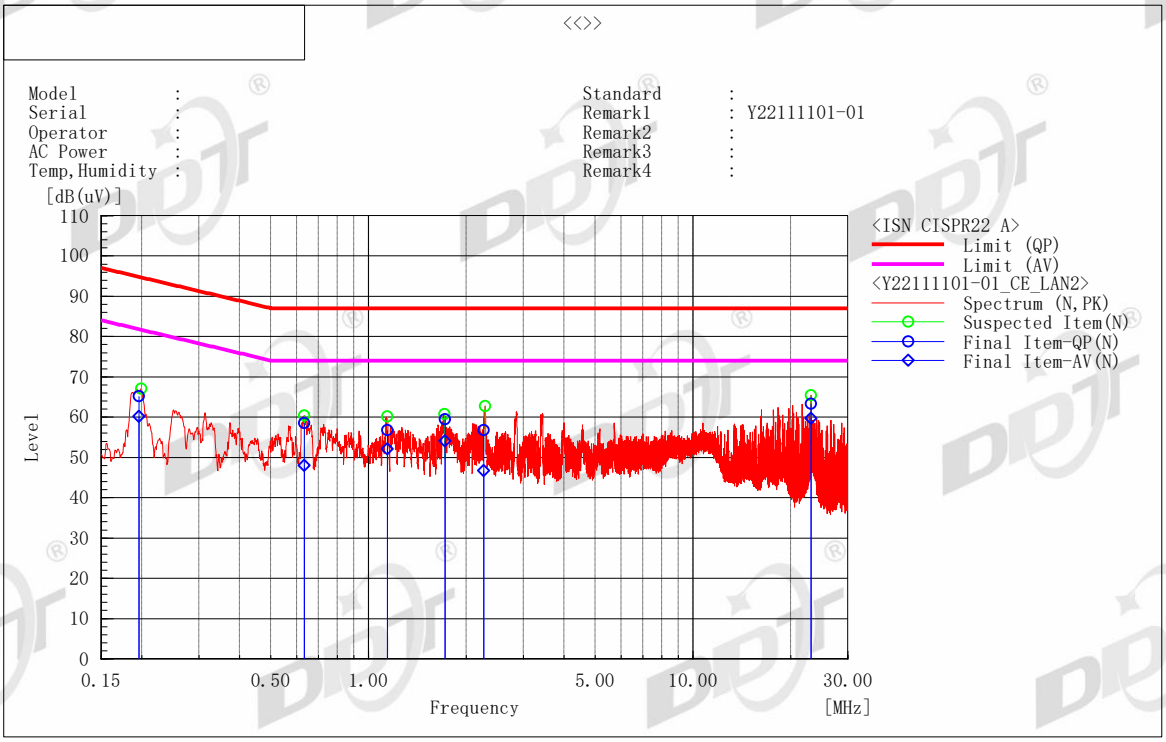


Final Result

--- N Phase ---

No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]
1	0.56898	33.9	31.2	9.7	43.6	40.9	87.0	74.0	43.4	33.1
2	1.14653	34.4	30.9	9.6	44.0	40.5	87.0	74.0	43.0	33.5
3	5.90726	38.0	35.6	9.6	47.6	45.2	87.0	74.0	39.4	28.8
4	16.2277	49.7	47.0	9.8	59.5	56.8	87.0	74.0	27.5	17.2
5	18.243	50.7	47.8	9.9	60.6	57.7	87.0	74.0	26.4	16.3
6	23.12854	53.4	50.5	9.9	63.3	60.4	87.0	74.0	23.7	13.6

LAN2:

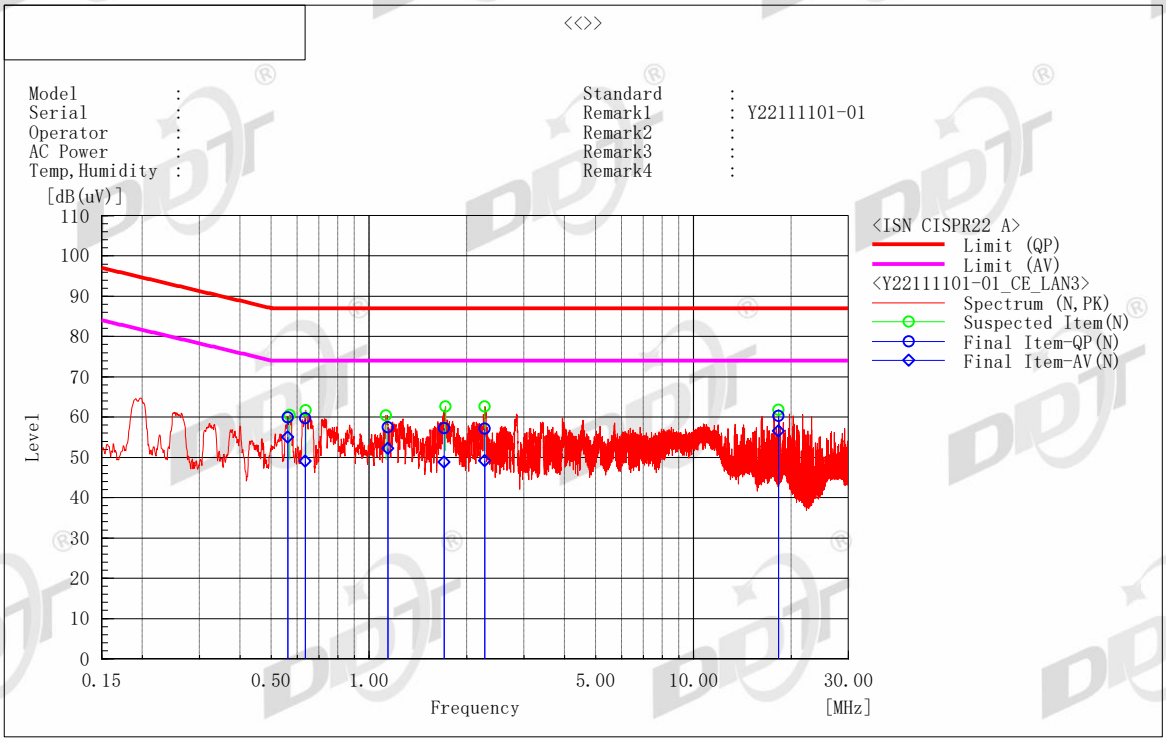


Final Result

--- N Phase ---

No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]	Remark
1	0.1959	55.8	50.7	9.4	65.2	60.1	94.8	81.8	29.6	21.7	
2	0.63437	49.1	38.6	9.4	58.5	48.0	87.0	74.0	28.5	26.0	
3	2.26373	47.0	36.9	9.8	56.8	46.7	87.0	74.0	30.2	27.3	
4	1.71773	49.7	44.3	9.8	59.5	54.1	87.0	74.0	27.5	19.9	
5	1.14157	47.0	42.3	9.8	56.8	52.1	87.0	74.0	30.2	21.9	
6	23.12786	53.2	49.6	10.1	63.3	59.7	87.0	74.0	23.7	14.3	

LAN3:

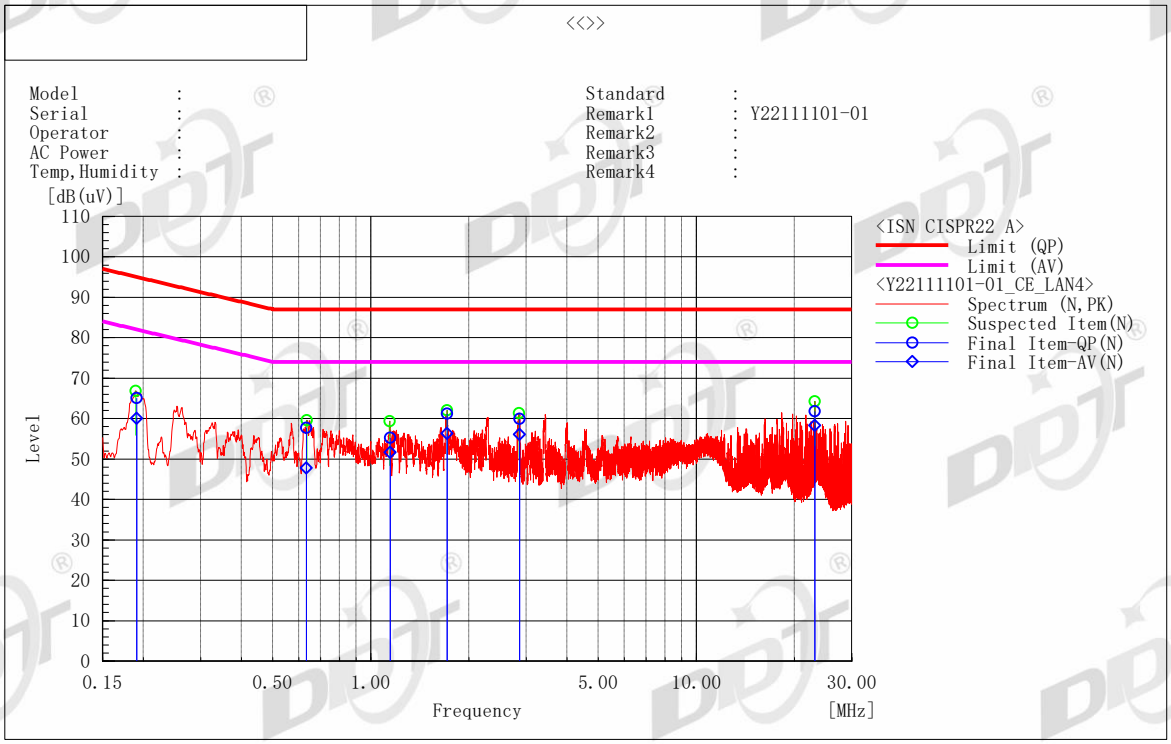


Final Result

--- N Phase ---

No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]	Remark
1	0.63679	50.2	39.6	9.4	59.6	49.0	87.0	74.0	27.4	25.0	
2	0.56244	50.6	45.6	9.4	60.0	55.0	87.0	74.0	27.0	19.0	
3	1.70115	47.4	39.0	9.8	57.2	48.8	87.0	74.0	29.8	25.2	
4	2.27561	47.3	39.4	9.8	57.1	49.2	87.0	74.0	29.9	24.8	
5	1.14356	47.6	42.4	9.8	57.4	52.2	87.0	74.0	29.6	21.8	
6	18.24244	50.1	46.3	10.2	60.3	56.5	87.0	74.0	26.7	17.5	

LAN4:

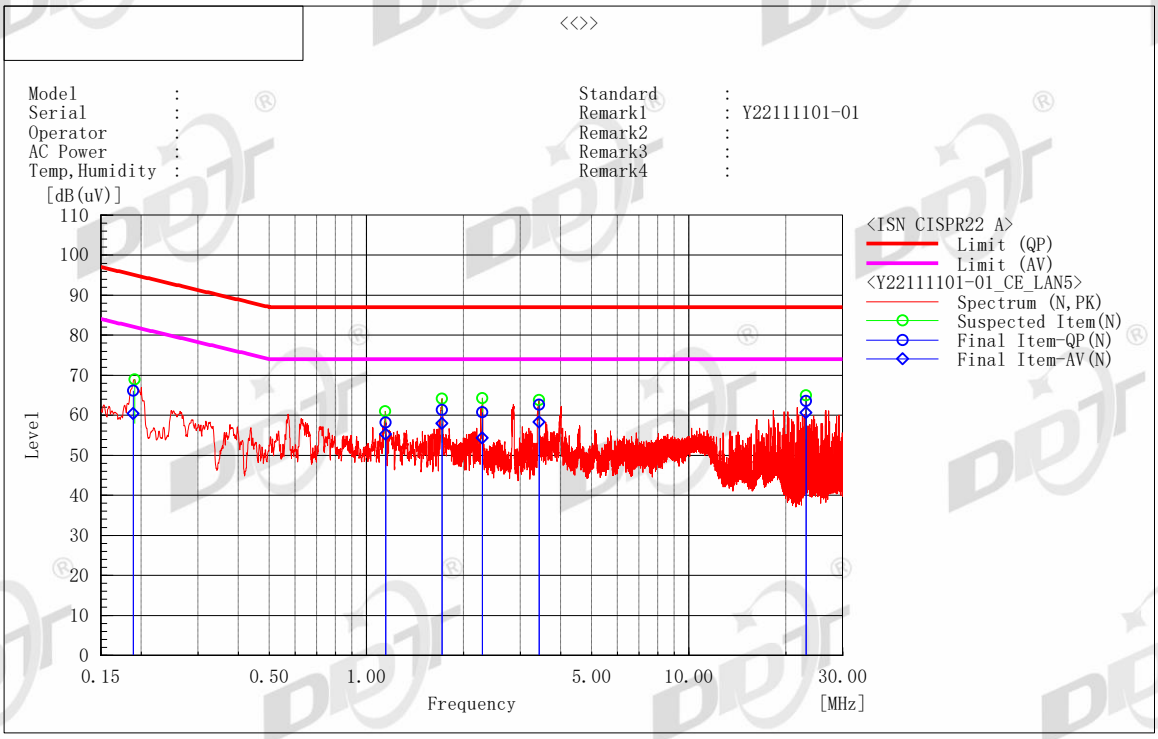


Final Result

--- N Phase ---

No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]	Remark
1	0.19069	55.6	50.6	9.4	65.0	60.0	95.0	82.0	30.0	22.0	
2	1.14623	45.4	41.8	9.8	55.2	51.6	87.0	74.0	31.8	22.4	
3	0.63419	48.3	38.4	9.4	57.7	47.8	87.0	74.0	29.3	26.2	
4	2.86146	50.0	46.2	9.9	59.9	56.1	87.0	74.0	27.1	17.9	
5	1.71402	51.4	46.5	9.8	61.2	56.3	87.0	74.0	25.8	17.7	
6	23.12747	51.7	48.2	10.1	61.8	58.3	87.0	74.0	25.2	15.7	

LAN5:



Final Result

--- N Phase ---

No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]	Remark
1	0.18908	56.7	50.9	9.4	66.1	60.3	95.1	82.1	29.0	21.8	
2	1.71454	51.5	48.2	9.8	61.3	58.0	87.0	74.0	25.7	16.0	
3	2.28384	50.9	44.4	9.8	60.7	54.2	87.0	74.0	26.3	19.8	
4	3.4362	52.7	48.4	9.9	62.6	58.3	87.0	74.0	24.4	15.7	
5	23.12917	53.5	50.6	10.1	63.6	60.7	87.0	74.0	23.4	13.3	
6	1.14572	48.4	45.5	9.8	58.2	55.3	87.0	74.0	28.8	18.7	

Note1) Level (Quasi-Peak and/or C/Average) = Meter Reading + Factor
Note2) Line = Polarity of input power (Live or Neutral)
N : Abbreviation of Neutral Polarity, L1 : Abbreviation of Live Polarity,
Note3) Factor = LISN Insertion Loss + Cable Loss
Note4) Margin = Limit – Level (Quasi-Peak and/or C/Average)
Note5) C/Average : Abbreviation of CISPR Average

4.8 Test Photo

Front

Rear

5. Radiated Emissions (30MHz to 1GHz)

5.1 General information

Test date	Dec. 5, 2022	Test engineer	Dominic	
Climate condition	Ambient temperature	20.4±1℃	Relative humidity	22±1%
	Atmospheric pressure	103.4±0.2kPa		
Test place	10m Chamber			

5.2 Test equipment

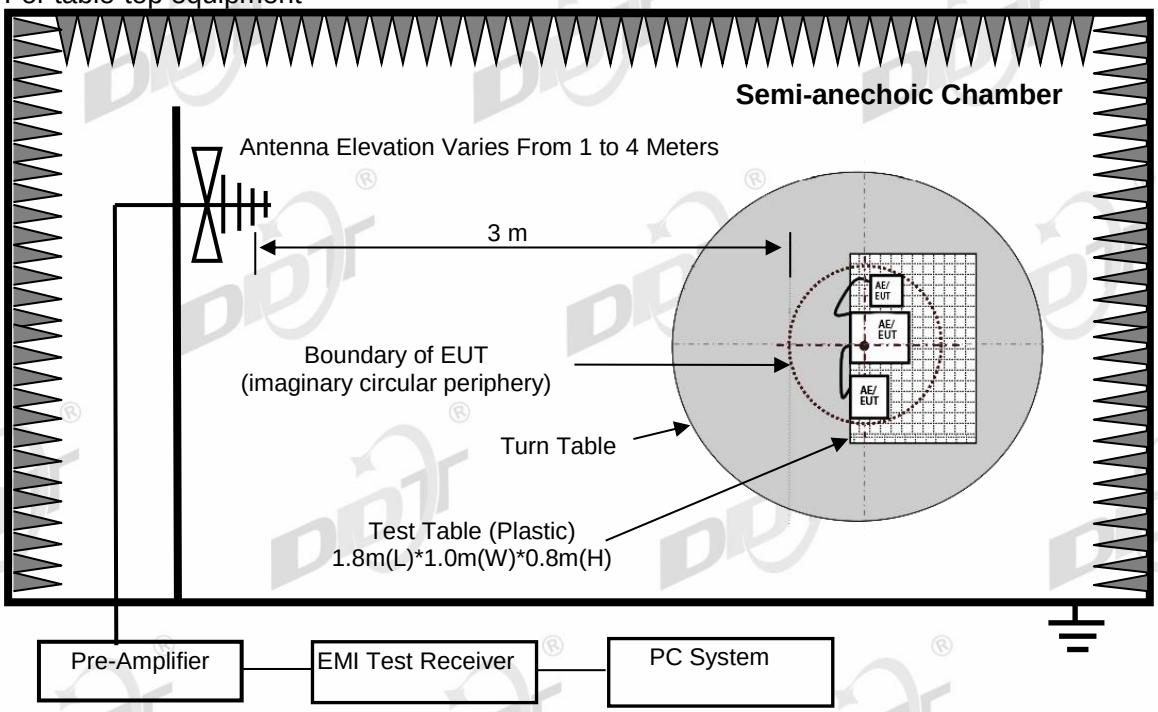
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
EMI Test Receiver	R&S	ESCI	101024	Mar. 03, 2022	1 Year
EMI Test Receiver	R&S	ESCI	101030	Mar. 29, 2022	1 Year
Bilog Antenna	TESEQ	CBL6112D	29068	Oct, 10, 2022	2 Year
Bilog Antenna	TESEQ	CBL6112D	29069	Oct, 10, 2022	2 Year
Amplifier	Sonoma	310N	300913	Feb. 15, 2022	1 Year
Amplifier	Sonoma	310N	300914	Feb. 15, 2022	1 Year
Mast Controller	Innco	CO2000	ZOAA97AZ100013D	N/A	N/A
RF Selector 4CH	TOYO	NS4904N	Selector1	N/A	N/A
RF Selector 4CH	TOYO	NS4904N	Selector2	N/A	N/A
Test software	TOYO	EP5/RE	V 5.7.10	N/A	N/A
Notes. N/A means Not applicable.					

5.3 Reference standard

EN 55032:2015/A11:2020 (Class A)

5.4 Block diagram of test setup

Below 1GHz
For table-top equipment



5.5 Limits

Class A

Equipment	Frequency	Field Strengths Limits at 10m measuring distance dB(μV)/m	Field Strengths Limits at 3m measuring distance dB(μV)/m
Class A Equipment	30MHz to 230MHz	40	50
	230MHz to 1000MHz	47	57

Class B

Equipment	Frequency	Field Strengths Limits at 10m measuring distance dB(μV)/m	Field Strengths Limits at 3m measuring distance dB(μV)/m
Class B Equipment	30MHz to 230MHz	30	40
	230MHz to 1000MHz	37	47

Note: (1) The smaller limit shall apply at the cross point between two frequency bands.
(2) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

5.6 Test procedure

For Radiated emissions:

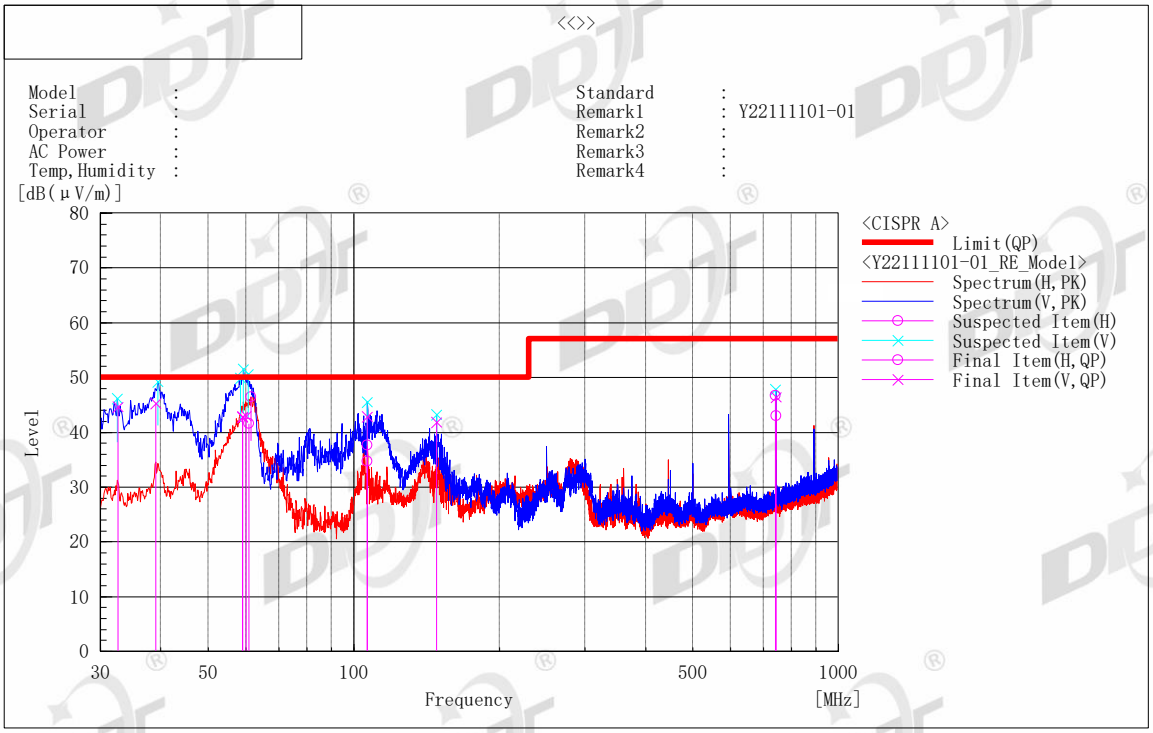
(1) The EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber.
(2) Test antenna was located ☒3m / ☐10m (see note) from the EUT on an adjustable mast. A pre-scan was first performed in order to find prominent radiated emissions. For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipment and all of the interface cables were changed according to EN 55032 on radiated emission test.
(3) Spectrum frequency from 30MHz to☒1GHz /☐2GHz was investigated.
(4) For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipment and all of the interface cables were changed according to EN 55032 on Radiated Emission test.
(5) For emissions from 30MHz to 1GHz, Quasi-Peak values were measured with EMI Receiver and the bandwidth of Receiver is 120 kHz.
(6) Final measurements consisted of 3 steps.
First step, frequency fine tuning to find exact emission frequency.
Second step, rechecking to search for maximum height and azimuth for interference fromEUT
In final step, there are conducted measuring with quasi-peak detector for points which are detected from 1st step & 2nd step.
Results checked manually and points close to the limit line were re-measured.
(7) Pre-scan measurements were performed in all operating mode or resolution. But final measurements were performed in worst cases based on pre-scan measurements.

5.7 Test result

PASS. (See below detailed test result)

Note: All emissions not reported below are too low against the prescribed limits.

Operating Mode 1:

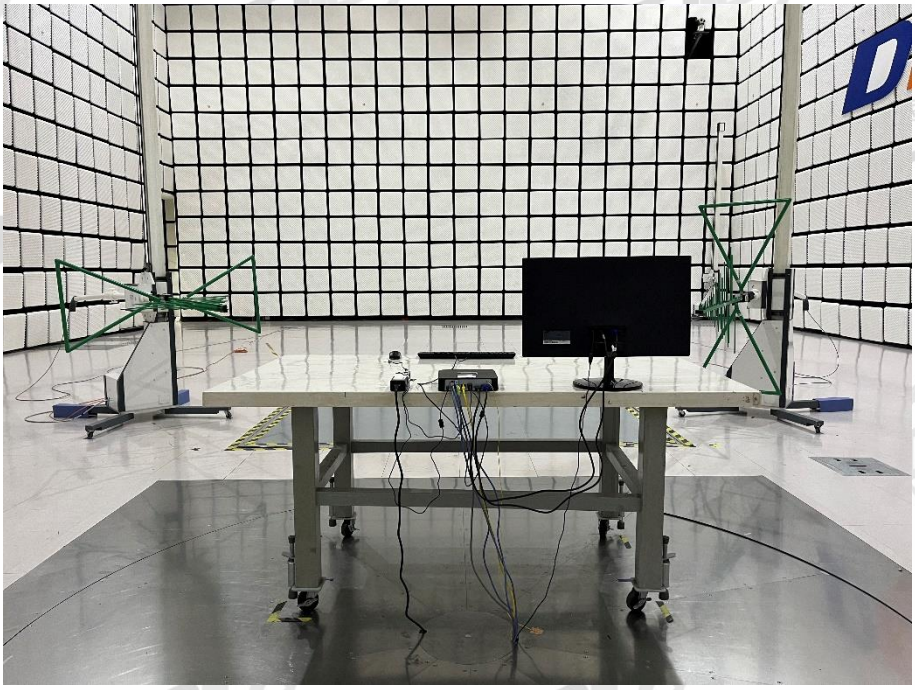


Final Result

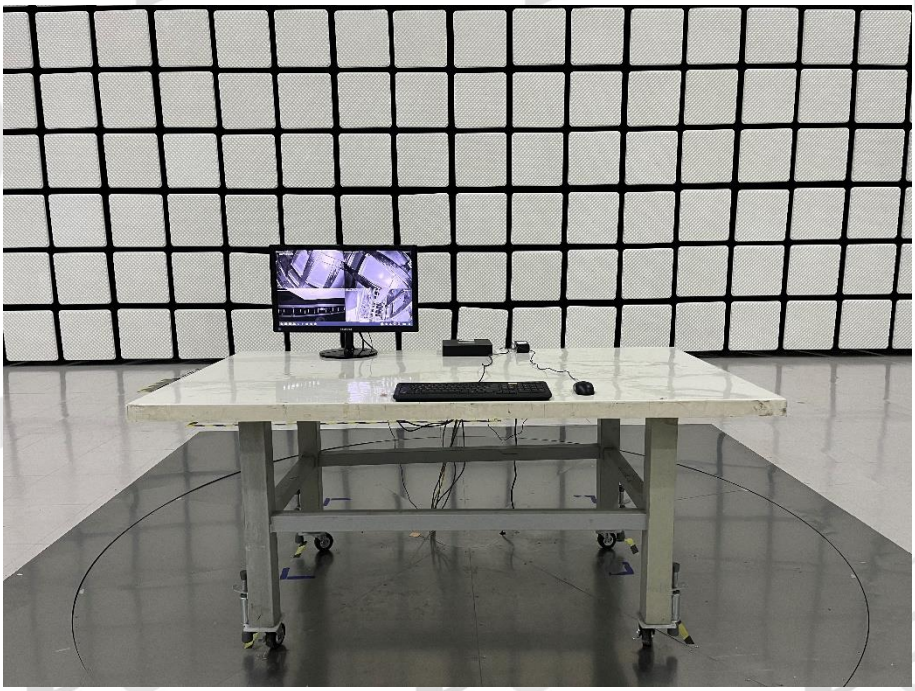
No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c.f [dB(1/m)]	Result QP [dB(μV/m)]	Limit QP [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [°]	System	Remark
1	32.600	V	50.5	-5.8	44.7	50.0	5.3	136.0	98.5	2	
2	39.021	V	54.5	-9.2	45.3	50.0	4.7	127.0	174.3	2	
3	59.008	V	59.5	-16.6	42.9	50.0	7.1	108.0	103.7	2	
4	59.016	V	59.4	-16.6	42.8	50.0	7.2	119.0	84.7	2	
5	59.869	V	59.5	-16.5	43.0	50.0	7.0	124.0	69.9	2	
6	106.695	V	53.5	-10.6	42.9	50.0	7.1	107.0	270.6	2	
7	148.137	V	52.7	-10.8	41.9	50.0	8.1	105.0	161.7	2	
8	742.490	V	43.1	3.3	46.4	57.0	10.6	128.0	223.8	2	
9	60.793	H	58.7	-17.1	41.6	50.0	8.4	315.0	64.1	1	
10	106.710	H	45.9	-11.2	34.7	50.0	15.3	329.0	21.8	1	
11	742.479	H	44.9	1.8	46.7	57.0	10.3	218.0	118.0	1	

Note) Receiving antenna polarization : Horizontal and/or Vertical
Test Distance : 3 m, Antenna Height : 1 m to 4 m
Level QP (Quasi-Peak) = Reading QP + Factor (Antenna Factor + Cable Loss - Amp. Gain)
Margin QP (Quasi-Peak) = Limit – Level QP

5.8 Test Photo



Front



Rear

6. Radiated Emissions (Above 1GHz)

6.1 General information

Test date	N/A	**Test engineer**	N/A	
Climate condition	**Ambient temperature**	N/A	**Relative humidity**	N/A
	Atmospheric pressure	N/A		
Test place	10m Chamber			

6.2 Test equipment

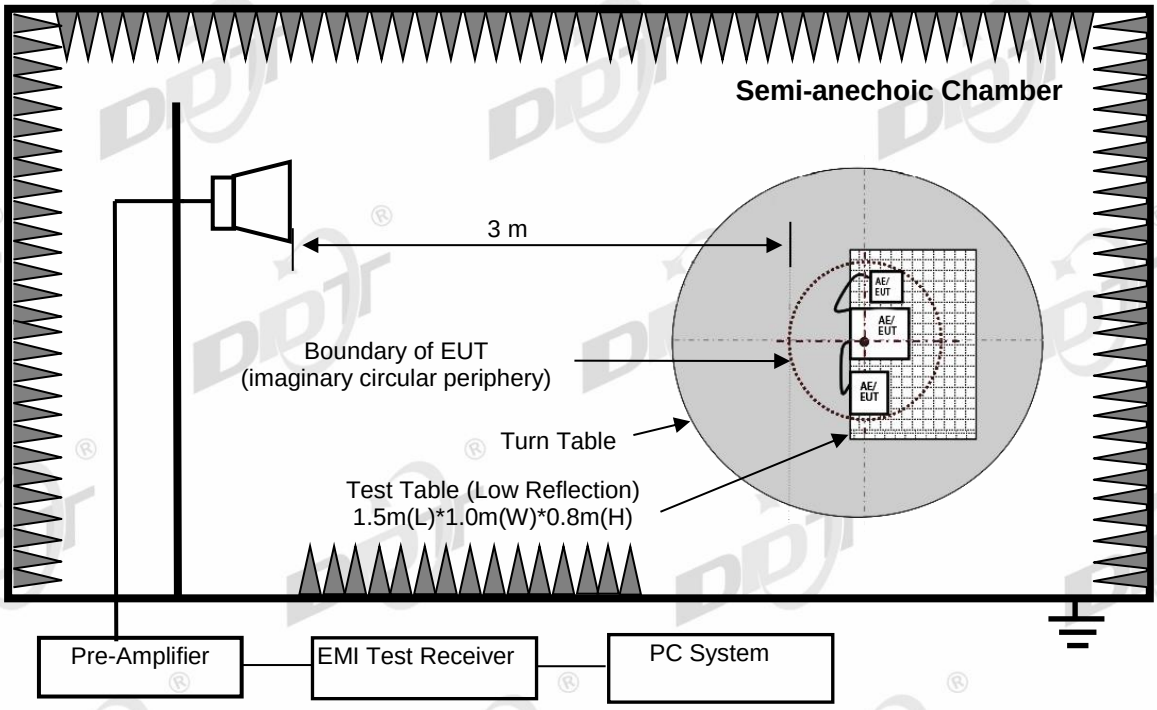
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Last Cal.**	**Cal. Interval**
EMI Test Receiver	R&S	ESU26	100244	Mar. 03, 2022	1 Year
Double Ridged Horn Antenna	TESEQ	BHA9118	31754	Oct. 12, 2021	2 Year
Pre-amplifier	TOYO	TPA0108-40	1409	Feb. 15, 2022	1 Year
Test software	TOYO	EP5/RE	V 5.7.10	N/A	N/A
Notes. N/A means Not applicable.					

6.3 Reference standard

EN 55032:2015/A11:2020 (Class A)

6.4 Block diagram of test setup

Above 1GHz
For table-top equipment



6.5 Limits

Frequency range Limits (GHz)	Limits of Class A, dB(μV/m)		Limits of Class B, dB(μV/m)	
	Peak	C/Average	Peak	C/Average
1 ~ 3	76	56	70	50
3 ~ 6	80	60	74	54
Note: The lower limit shall apply at the transition frequency				

6.6 Test procedure

The highest internal source of an EUT is defined as the highest frequency generated or used within the EUT or on which the EUT operates or tunes.
If the highest frequency of the internal sources of the EUT is less than 108 MHz, the measurement shall only be made up to 1 GHz.
If the highest frequency of the internal sources of the EUT is between 108 MHz and 500 MHz, the measurement shall only be made up to 2 GHz.
If the highest frequency of the internal sources of the EUT is between 500 MHz and 1 GHz, the measurement shall only be made up to 5 GHz.
If the highest frequency of the internal sources of the EUT is above 1 GHz, the measurement shall be made up to 5 times the highest frequency or 6 GHz, whichever is less.
For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1MHz.
Measurements within 20 dB of the limit were then maximized by adjusting turntable position.
Final measurements were made using an C/Average detector.
Results checked manually and points close to the limit line were re-measured.

Pre-scan measurements were performed in all operating mode or resolution. But final measurements were performed in worst cases based on pre-scan measurements.

6.7 Test result

Not applicable: This product's highest frequency of the internal sources is less than 108 MHz, the measurement only be made up to 1 GHz.

6.8 Test Photo

N/A

7. Harmonics current

7.1 General information

Test date	Nov. 16, 2022	**Test engineer**	Sam	
Climate condition	**Ambient temperature**	21.3±1℃	**Relative humidity**	32±1%
	Atmospheric pressure	101.8±0.2kPa		
Test place	Shield Room 1#			

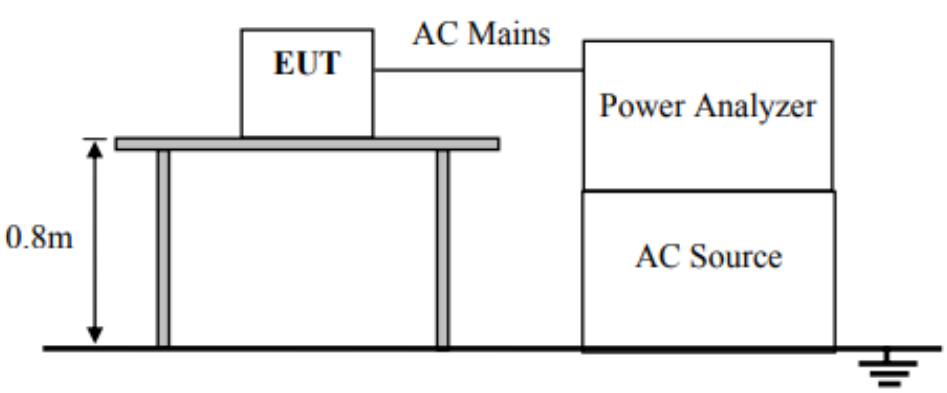
7.2 Test equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Power Analyzer	N4L	PPA5511	162-04584	Dec. 27, 2021	1 year
Reference Impedance Network	Voltech	IEC61000-3	1G164/2021	Dec. 27, 2021	1 year
AC Power Source	Pacific	360-AMX	1235	Feb. 16, 2022	1 year

7.3 Reference standard

EN IEC 61000-3-2:2019 (Class A)

7.4 Block diagram of test setup



7.5 Limits

Limits for Class A equipment

Harmonic order n	Maximum permissible harmonic current A
Odd harmonics	
3	2.30
5	1.14
7	0.77
9	0.40
11	0.33
13	0.21
15 ≤ n ≤ 39 (odd harmonics only)	0.15 15/n
Even harmonics	
2	1.08
4	0.43
6	0.30
8 ≤ n ≤ 40	0.23 8/n

Limits for Class D equipment

Harmonic order n	Maximum permissible harmonic current per watt mA/W	Maximum permissible harmonic current A
3	3.4	2.30
5	1.9	1.14
7	1.0	0.77
9	0.5	0.40
11	0.35	0.33
13 ≤ n ≤ 39 (odd harmonics only)	3.85/n	See Table 1

7.6 Test result

N/A. Rated Power < 75W. (See below detailed test result)
Operating Mode 1:

16th November 2022 - 09:39:00	Page	IEC Soft V2.4e

IEC61000-3-2:2014
Fluctuating Harmonics

Instrument Details		
Instrument Model	PPA5511	
Instrument Serial	162-04584	
Instrument Firmware	2.17	
Instrument Last Calibrat	11 NOV 2015 1105 CH	
Instrument Version	Low Current	
Test Settings		
Class	Class A	
Mode	Measure	
Equipment Under Test		
Brand	N/A	
Model	Y22111101-01	
Serial	N/A	
Impedance Network ID	N/A	
Test Conditions		
	User Entered	Measured
Rated Voltage	230.000 V	231.054 V
Rated Current	N/A	218.180 mA
Rated Frequency	50.000 Hz	50.000 Hz
Rated Power	N/A	17.490 W
Additional Test Information		
Measured Power Factor	0.347	
Max Current THD	251.62%	
Max THC	0.2021A	
Max Power	17.520 W	
Max F.Current	80.642 mA	
Average F.Current	80.448 mA	
Minimum Current	100mA	
Test Duration	2.5 minutes	
Additional Test Details		
Operator	N/A	
Lab Name	N/A	
Location	N/A	
Notes		
Signature		
Results	Test - N/A. Rated Power < 75W	

7.7 Test Photo

8. Voltage fluctuation & Flicker

8.1 General information

Test date	Nov. 16, 2022	**Test engineer**	Sam	
Climate condition	**Ambient temperature**	21.3±1℃	**Relative humidity**	32±1%
	Atmospheric pressure	101.8±0.2kPa		
Test place	Shield Room 1#			

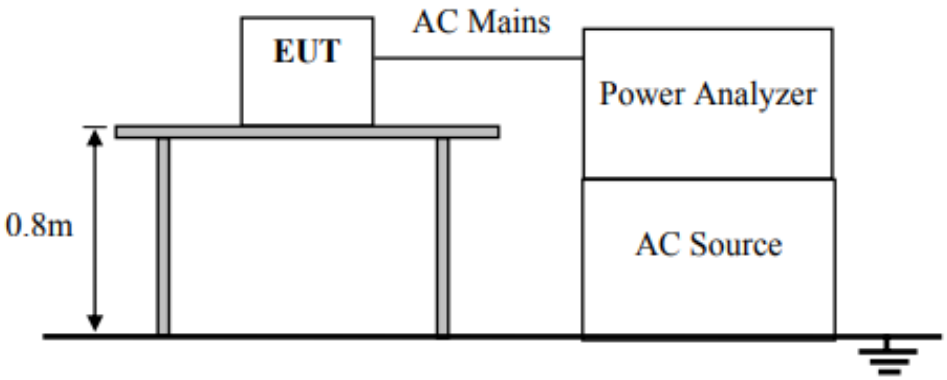
8.2 Test equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Power Analyzer	N4L	PPA5511	162-04584	Dec. 27, 2021	1 year
Reference Impedance Network	Voltech	IEC61000-3	1G164/2021	Dec. 27, 2021	1 year
AC Power Source	Pacific	360-AMX	1235	Feb. 16, 2022	1 year

8.3 Reference standard

EN 61000-3-3:2013/A1:2019

8.4 Block diagram of test setup



8.5 Limits

short-term flicker indicator, Pst	the relative steady-state voltage change, dc	the value of d(t) during a voltage change, d(t) >3.3 %	the maximum relative voltage change, dmax
1.0	3.3 %	500 ms	4 %

8.6 Test result

PASS. (See below detailed test result)

Operating Mode 1:

16th November 2022 - 09:50:35	Page 1/3	IEC Soft V2.4e

IEC61000-3-3:2013 Ed.3.0
Flickermeter

Instrument Details	
Instrument Model	PPA5511
Instrument Serial	162-04584
Instrument Firmware	2.17
Instrument Last Calibrat	11 NOV 2015 1105 CH
Instrument Version	Low Current
Test Settings	
Class	Voltage
Mode	Normal - 4%
Minimum Current	10A
PST	10.00 minutes
PLT	1 PSTs
Equipment Under Test	
Brand	N/A
Model	Y22111101-01
Serial	N/A
Impedance Network ID	N/A

Test Conditions	User Entered	Measured
Rated Voltage	230.000 V	231.041 V
Rated Current	N/A	N/A
Rated Frequency	50.000 Hz	50.000 Hz
Rated Power	N/A	N/A
D max	0.0704% (Limit: 4%)	
T max	0.0000 s (Limit: 0.5 s)	
DC max	0.0064% (Limit: 3.3%)	
Additional Test Details		
Operator	N/A	
Lab Name	N/A	
Location	N/A	
Notes		
Signature		
Results	Phase1: PASS	

8.7 Test Photo

9. Mains supply voltage variations

9.1 General information

Test date	Jan. 4, 2023	**Test engineer**	Zoey	
Climate condition	**Ambient temperature**	20.5±1℃	**Relative humidity**	35±1%
	Atmospheric pressure	103.0±0.2kPa		
Test place	Shield Room 3#			

9.2 Test equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Programmable power supply	CHROMA	6560	656038000994	Feb. 14,2022	1 year
Paperless recorder	Yokogawa	GP20	S5R505525	Feb, 16,2022	1 year

9.3 Reference standard

EN 50130-4:2011/A1:2014

9.4 Block diagram of test setup

N/A

9.5 Test levels and performance criterion

Subject the specimen to each of the power supply conditions, indicated in Table as follow, until temperature stability is reached.

Supply voltage max(Umax)	Unom+10%	**Performance Criteria**
Supply voltage max(Umin)	Unom-15%	A*
Unom = Nominal mains voltage. Where provision is made to adapt the equipment to suit a number of nominal supply voltages (e.g. by transformer tap changing), the above conditioning severity shall be applied for each nominal voltage, with the equipment suitably adapted. For equipment which is claimed to be suitable for a range of nominal mains voltages (e.g. 220/240 V) without adaptation, Umax = (Maximum Unom) + 10 %, and Umin = (Minimum Unom) – 15 %. In any case the range of Unom shall include the European nominal mains voltage of 230 V.		

Performance criteria A* description:There shall be no damage, malfunction or change of status due to the different supply voltage conditions.

9.6 Test procedure

Connect the specimen to suitable power supply, monitoring and loading equipment (see 5.1). The specimen shall be in its operating condition (see 5.3).

Monitor the specimen during the conditioning to detect any change in status. When temperature stability has been obtained, at each of the supply conditions, subject the specimen to the functional test (see Clause 6).

9.7 Test result

Supply voltage:100V-240V 50Hz/60Hz AC				
Test condition		Required	Observation	Result (Pass/Fail)
Supply voltage max(Umax)	264V	A*	A*	Pass
Supply voltage max(Umin)	85V	A*	A*	Pass
Observation Description: Before the conditioning, the sample function test is normal. Data transmission loss rate: 0% A*: No damage, malfunction or change of status due to the different supply voltage conditions. Data transmission loss rate≤5%.				

10. Electrostatic Discharge

10.1 General information

Test date	Dec. 6, 2022 Jan 3, 2023	**Test engineer**	Oliver	
Climate condition	**Ambient temperature**	20.0±1℃	**Relative humidity**	35±1%
	Atmospheric pressure	102.4±0.2kPa		
Test place	Shield Room 3#			

10.2 Test equipment

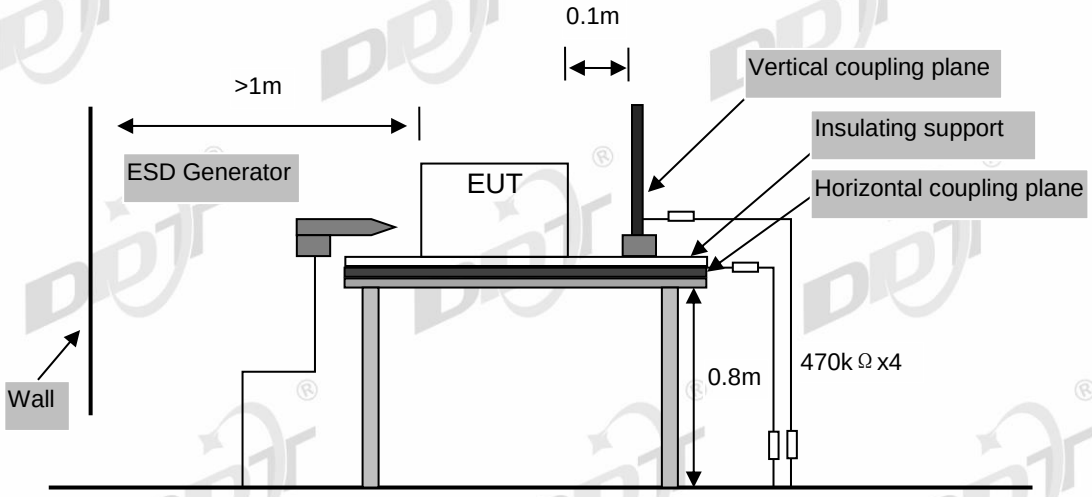
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
ESD Generator	TESEQ	NSG 438	1040	Oct. 14, 2022	1 Year

10.3 Test and reference standards

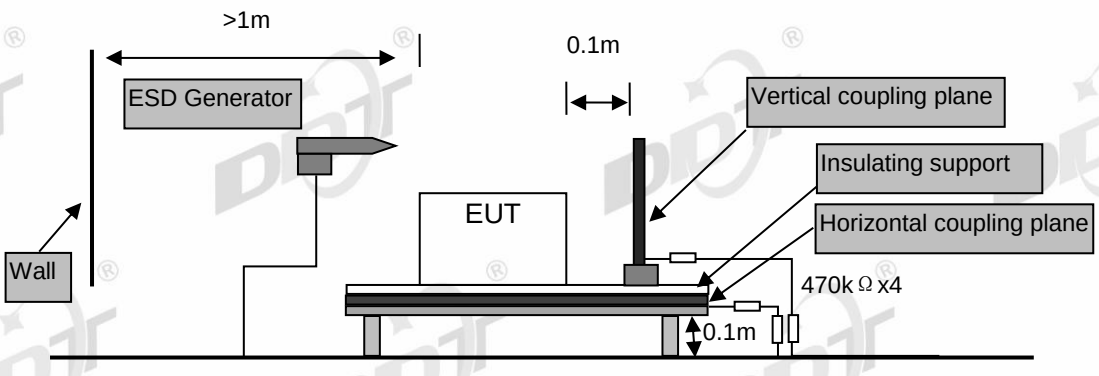
EN 55035:2017/A11:2020
IEC 61000-4-2:2008
EN 50130-4:2011/A1:2014

10.4 Block diagram of test setup

Table-top equipment



Floor-standing equipment



10.5 Test levels and performance criterion

EN 55035:2017/A11:2020

Test Level		Performance Criteria
Air Discharge	±2kV, ±4kV and ±8kV	B
Contact Discharge	±4kV	

Performance criteria B description: During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test. After the test, the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the EUT is used as intended.

EN 50130-4:2011/A1:2014

Test Level		Performance Criteria
Air Discharge	±2kV, ±4kV and ±8kV	A*
Contact Discharge	±6kV	

Performance criteria A* description: 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.

10.6 Test procedure

Air Discharge:
The test was applied on non-conductive surfaces of EUT. The round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT. After each discharge, the discharge electrode was removed from the EUT. The generator was re-triggered for a new single discharge and repeated 20 times or 10 times for each pre-selected test point. This procedure was repeated until all the air discharge completed.

Contact Discharge:
All the procedure was same as air discharge. Except that the generator was re-triggered for a new single discharge. The tip of the discharge electrode was touching the EUT before the discharge switch was operated.

Indirect discharge for horizontal coupling plane:
At least 20 or 10single discharges were applied to the horizontal coupling plane, at points on each side of the EUT. The discharge electrode positions vertically at a distance of 0.1m from the EUT and with the discharge electrode touching the coupling plane.

Indirect discharge for vertical coupling plane:
At least 20 or 10 single discharges were applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, was placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges were applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

10.7 Test result

Test Times: 20 times at each point for contact discharge; 20 times at each point for air discharge.

Operation Mode	Type of discharge	Test Level	Test Point	Performance		Result
				Required	Observation	(Pass/Fail)
Mode 1	Contact to EUT	±4kV	4,5,7,8	B	A	Pass
	Contact to Coupling Planes	±4kV	Coupling Planes	B	A	Pass
	Air	±2kV, ±4kV,±8kV	1,2,3,6,7	B	A	Pass

Test Point:

No.	Description	No.	Description	No.	Description
1	Gap	2	Status lamp	3	DC Port
4	LAN Port	5	USB Port	6	HDMI Port
7	VGA Port	8	Shield cover		

Observation Description:
Data transmission loss rate: 0%
A: Operation as intend, no loss of function during test and after test. Data transmission loss rate≤5%.

Test Times: 10 times at each point for contact discharge; 10 times at each point for air discharge.

Operation Mode	Type of discharge	Test Level	Test Point	Performance		Result
				Required	Observation	(Pass/Fail)
Mode 1	Contact to EUT	±4kV	4,5,7,8	A*	A*	Pass
	Contact to Coupling Planes	±4kV	Coupling Planes	A*	A*	Pass
	Air	±2kV, ±4kV,±8kV	1,2,3,6,7	A*	A*	Pass

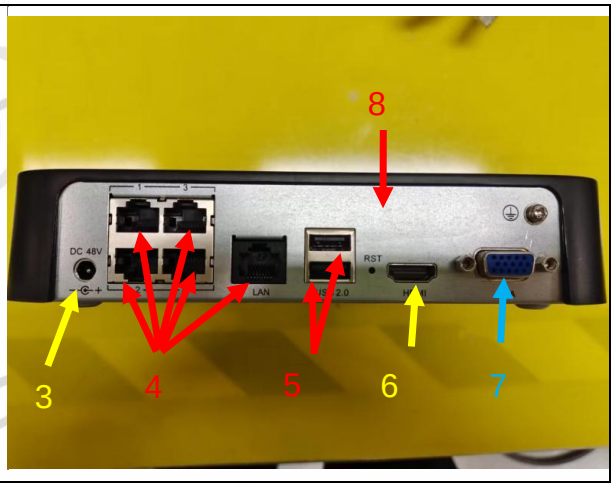
Test Point:

No.	Description	No.	Description	No.	Description
1	Gap	2	Status lamp	3	DC Port
4	LAN Port	5	USB Port	6	HDMI Port
7	VGA Port	8	Shield cover		

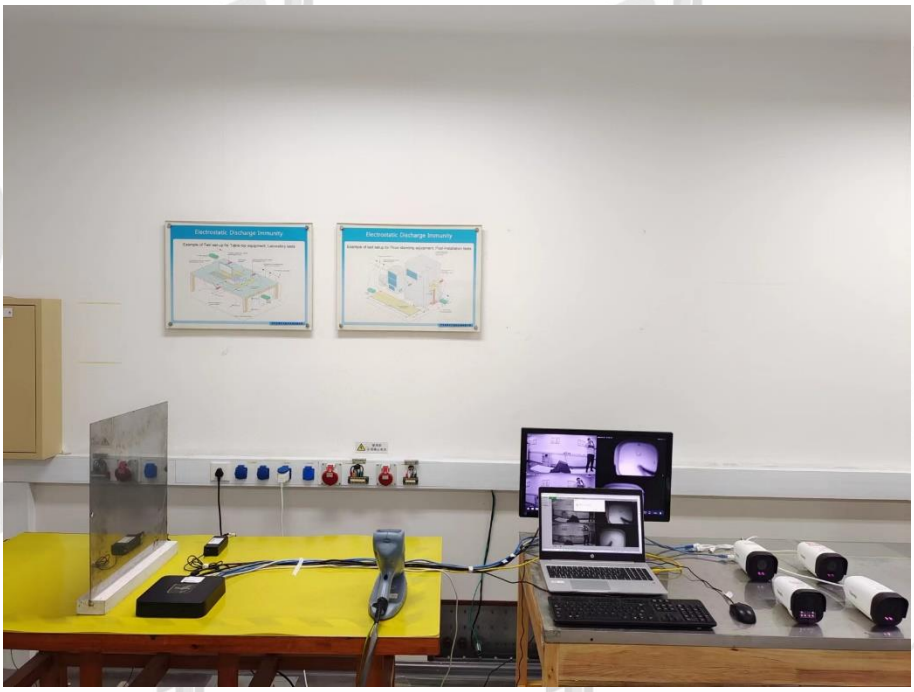
Observation Description:
Before the conditioning, the sample function test is normal.
Data transmission loss rate: 0%
A*: No damage, failure, or change of condition due to adjustment. Data transmission loss rate≤5%.

Photo of ESD point on EUT

Contact Air Contact + Air



10.8 Test Photo



11. Continuous Radio Frequency Disturbances

11.1 General information

Test date	Nov. 15, 2022 Dec 30, 2022	**Test engineer**	Make	
Climate condition	**Ambient temperature**	20.1±1℃	**Relative humidity**	35±1%
	Atmospheric pressure	102.5±0.2kPa		
Test place	3m Chamber 1#			

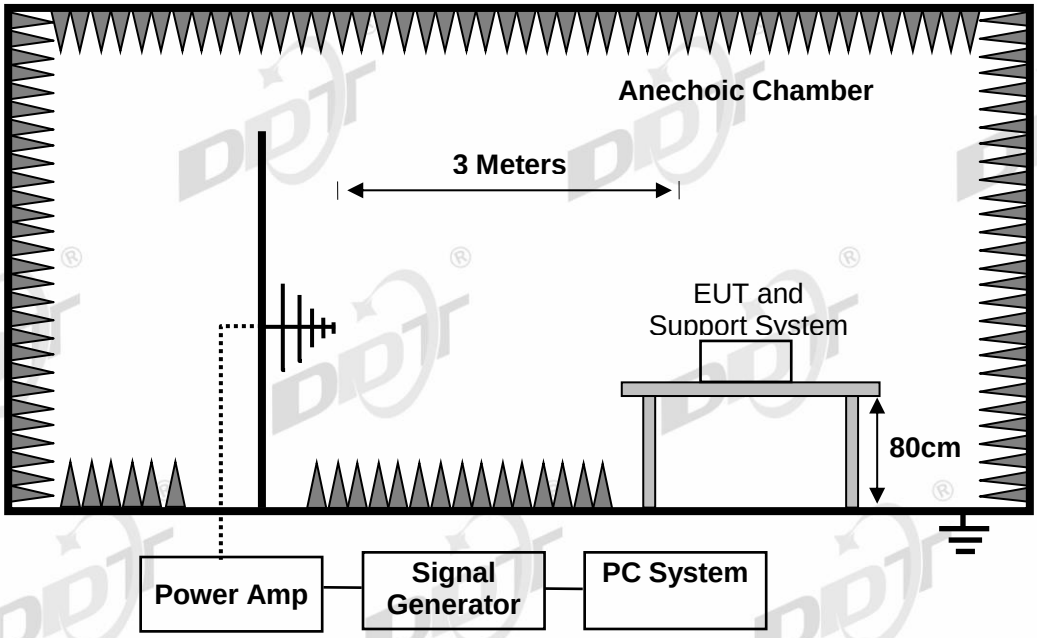
11.2 Test equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Signal Generator	R&S	SMB100A	104909	Feb. 15, 2022	1 Year
RF Switch for Radiated	SKET	RS_DC06G-AMC-3C	SK20200819 01	N/A	N/A
Power Amplifier	SKET	HAP_01G032G-250W	202104178	Aug. 3, 2022	1 Year
Power Amplifier	SKET	HAP_03G06G-75W	SK20210622 1	Aug. 23, 2022	1 Year
Power Amplifier (Combiner)	SKET	HAP_80M200M/200M 1G-2000/1000W	202102154	Aug. 3, 2022	1 Year
Power meter	R&S	NRP	102424	Feb. 15, 2022	1 Year
Power sensor	R&S	NRP-Z91	100937	Feb. 15, 2022	1 Year
Power sensor	R&S	NRP-Z91	100938	Feb. 15, 2022	1 Year
Log-periodic antenna	Schwarzbeck	STLP 9149	9149-059	N/A	N/A
Log-periodic antenna	Schwarzbeck	STLP 9128 E special	9128ES-171	N/A	N/A

11.3 Test and reference standards

EN 55035:2017/A11:2020
IEC 61000-4-3:2020
EN 50130-4:2011/A1:2014

11.4 Block diagram of test setup



11.5 Test levels and performance criterion

EN 55035:2017/A11:2020:

Swept frequency test		Performance Criteria
Frequency (MHz)	80 to 1000	A
Field Strength	3V/m rms voltage level of the unmodulated signal	
Modulation	AM modulated to a depth of 80% by a sine wave of ☒1kHz,☐400Hz (note 1)	
Step Size	1% increments	
Dwell time	＜5 Sec.	

Spot frequency test		Performance Criteria
Frequency (MHz)	1800, 2600, 3500, 5000	A
Field Strength	3V/m rms voltage level of the unmodulated signal	
Modulation	AM modulated to a depth of 80% by a sine wave of ☒1kHz, ☐400Hz (note 1)	
Dwell time	＜5 Sec.	

Note 1: The 1kHz modulation may be replaced by a different audio modulation frequency more appropriate for a given EUT if, for example, 1kHz is not within the operating audio range of the EUT.

Performance criteria A description for devices with the audio output function: The measured acoustic interference ratio and/or the measured electrical interference ratio during the test shall be -20 dB or better.
For equipment with audio output function:
☐The acoustic measurement method was selected according to clause G6.4.1 of EN 55035.
☐The electrical measurement method was selected according to clause G6.4.2 of EN 55035.

Performance criteria A for devices with the telephony function.

Frequency range MHz	Acoustic or electrical interference ratio	Equivalent direct measurement		
		dB(SPL)	Digital dBm0	Analogue dBm0
80 to 1000	-0 dB	75	-30	-30

Note: At the step in the frequency range, the lower limit shall be applied.
The interference ratio (electrical or acoustic) shall meet the limits in column 2; or,
The acoustic level of the demodulated audio shall be less than the limits in column 3; or
The digitally coded level of demodulated audio shall be less than limits in column 4; or,
The analogue level of the demodulated audio shall be less than the limits in column 5.

Performance criteria A description for other devices: During and after the test the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a minimum performance level specified by the manufacturer when the EUT is used as intended.

EN 50130-4:2011/A1:2014:

Swept frequency test		Performance Criteria
Frequency (MHz)	80 to 2700	A*
Field Strength	10V/m rms voltage level of the unmodulated signal	
Modulation	AM modulated to a depth of 80% by a sine wave of ☒1kHz,☐400Hz (note 1)	
Step Size	1% increments	
Dwell time	⩾3 Sec.	

Performance criteria A* description: 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, and no such flickering of indicators occurs at a field strength of 3 V/m.
For components of CCTV systems, where the status is monitored by observing the TV picture, then deterioration of the picture is allowed at 10 V/m, providing.
a) there is no permanent damage or change to the EUT (e.g. no corruption of memory or changes toprogrammable settings 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.

11.6 Test procedure

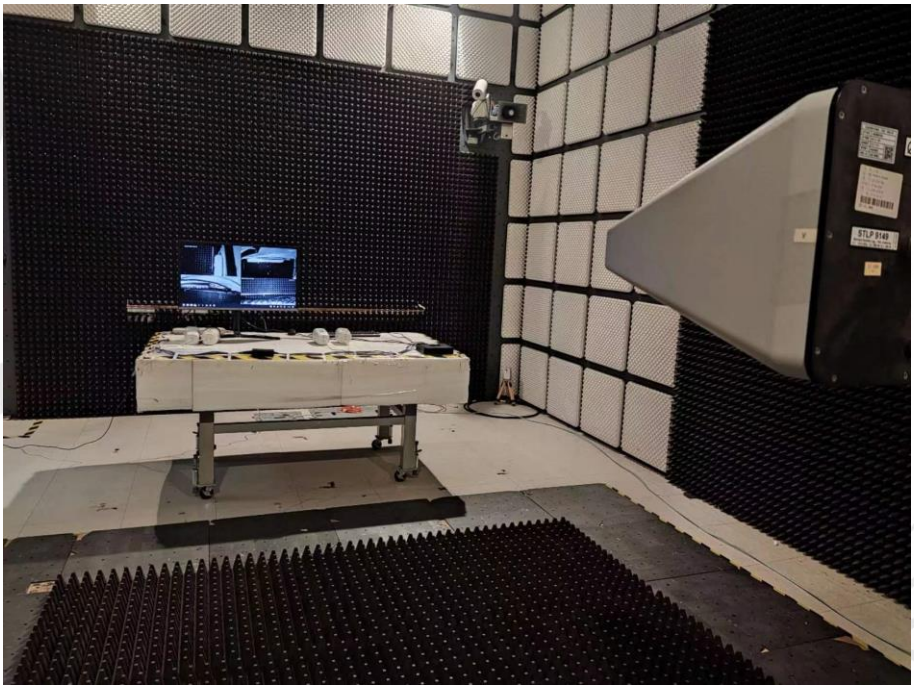
The field sensor is placed on the EUT table (0.8 meter above the ground) which is 3 meters away from the transmitting antenna. Through the signal generator, power amplifier and transmitting antenna to produce a uniformity field strength (3V/m measured by field sensor) around the EUT table from frequency range specified and records the signal generator‘s output level at the same time for whole measured frequency range. Then, put EUT and its simulators on the EUT turn table and keep them 3 meters away from the transmitting antenna which is mounted on an antenna tower and fixes at 1.4 meter height above the ground. Using the recorded signal generator’s output level to measure the EUT from frequency range specified and both horizontal & vertical polarization of antenna must be set and measured. Each of the four sides of EUT must be faced this transmitting antenna and measures individually.

11.7 Test result

Field Strength : ☒3V/m ☐10V/m Steps: ☒1% ☐other: Dwell time: ☒1s ☐other:						
Swept Frequency Range: ☒80MHz---1GHz; ☒1800MHz, 2600MHz, 3500MHz, 5000MHz; ☐ other:						
Modulation : ☐None ☒AM ☒1kHz ☐400Hz Modulation depth: ☒80% ☐other:						
Operation Mode	EUT Position towards antenna	Antenna: Horizontal		Antenna: Vertical		Result
		Required	Observation	Required	Observation	(Pass/Fail)
Mode 1	Front	A	A	A	A	Pass
	Right	A	A	A	A	Pass
	Rear	A	A	A	A	Pass
	Left	A	A	A	A	Pass
Note 1: this row only for the device with audio output function. Note 2: this device without the telephony function.						
Observation Description: Data transmission loss rate: 0% A: Operation as intend, no loss of function during test and after test. Data transmission loss rate≤5%.						

Field Strength : ☐3V/m ☒10V/m Steps: ☒1% ☐other: Dwell time: ☒3s ☐other:						
Swept Frequency Range: ☒80MHz---1GHz; ☒1GHz-2.7GHz; ☐other:						
Modulation : ☐None ☒AM ☒1kHz ☐400Hz Modulation depth: ☒80% ☐other:						
Operation Mode	EUT Position towards antenna	Antenna: Horizontal		Antenna: Vertical		Result
		Required	Observation	Required	Observation	(Pass/Fail)
Mode 1	Front	A*	A*	A*	A*	Pass
	Right	A*	A*	A*	A*	Pass
	Rear	A*	A*	A*	A*	Pass
	Left	A*	A*	A*	A*	Pass
Observation Description: Before the conditioning, the sample function test is normal. Data transmission loss rate: 0% A:* No damage, failure, or change of condition due to adjustment. Data transmission loss rate≤5%.						

11.8 Test Photo



12. Electrical Fast Transients (EFT)

12.1 General information

Test date	Dec. 5, 2022 Jan 3, 2023	**Test engineer**	Oliver	
Climate condition	**Ambient temperature**	20.0±1℃	**Relative humidity**	36±1%
	Atmospheric pressure	102.9±0.2kPa		
Test place	Shield Room 3#			

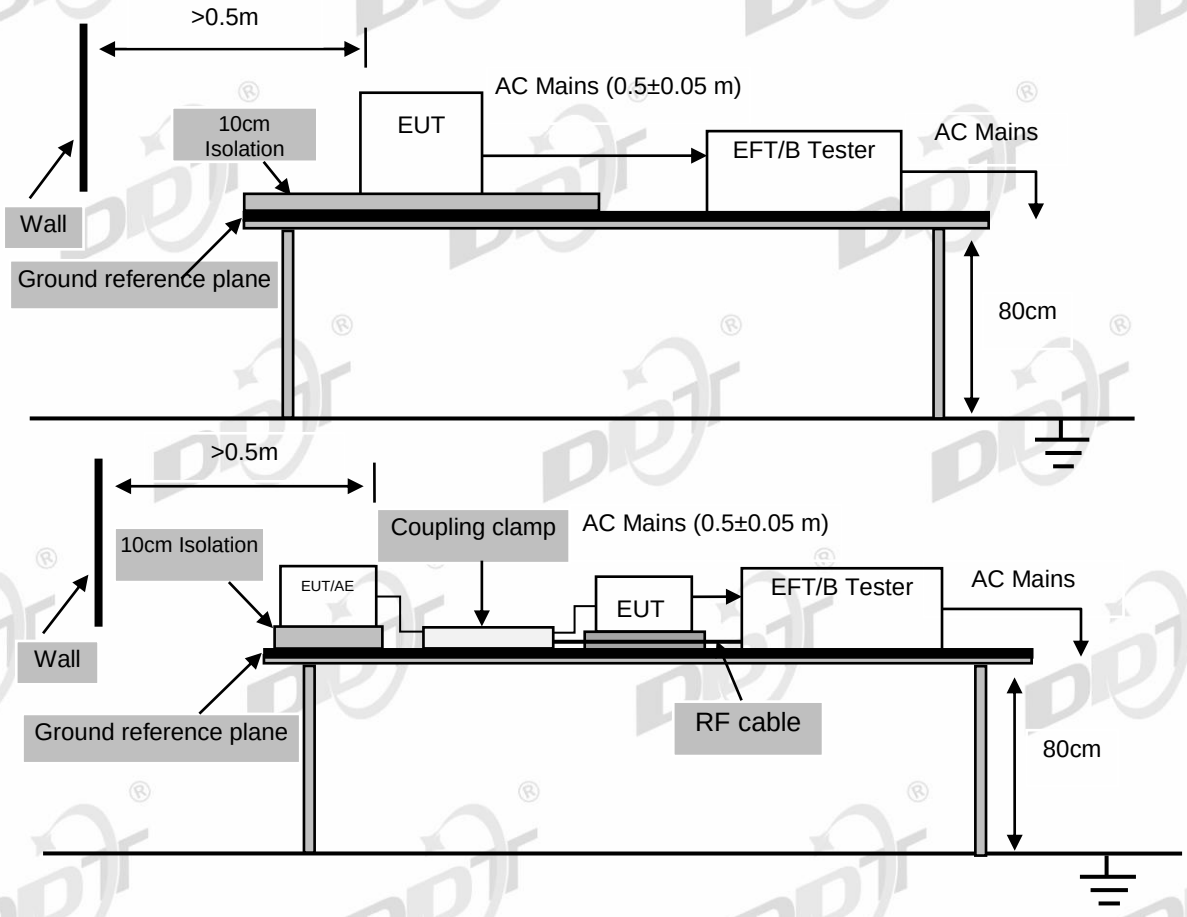
12.2 Test equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
EFT Generator	TESEQ	NSG 3060	1338	Feb. 15, 2022	1 Year
Coupling/Decoupling Network	TESEQ	CDN3061	210	Feb. 15, 2022	1 Year
Capacitive Coupling Clamp	TESEQ	CDN 8014	29223	Feb. 16, 2022	1 Year

12.3 Test and reference standards

EN 55035:2017/A11:2020
IEC 61000-4-4:2012
EN 50130-4:2011/A1:2014

12.4 Block diagram of test setup



12.5 Test levels and performance criterion

EN 55035:2017/A11:2020

Test Level			Performance Criteria
Test voltage	±1kV For AC mains Port	±0.5kV for DC input or signal Port	B
Repetition Frequency	5kHz	5kHz	
Burst Duration	15ms	15ms	
Burst Period	300ms	300ms	
Inject Time(s)	120s	120s	
Inject Method	Direct for AC mains port	Direct for signal port Direct for dc input port	
Inject Line	AC Mains of adapter	DC input of adapter or Capacitive coupling clamp	

Note: This test shall be additionally performed on analogue/digital data ports, and DC network power ports, of radio equipment and associated ancillary equipment, if the cables may be longer than 3 m.
Performance criteria B description: During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test. After the test, the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the EUT is used as intended.

EN 50130-4:2011/A1:2014

Test Level			Performance Criteria
Test voltage	±2kV for AC mains Port	±1kV for other supplyt or signal Port[b]	A*
Repetition Frequency	100kHz	100kHz	
Burst Duration	0.75ms	0.75ms	
Burst Period	300ms	300ms	
Inject Time(min)	1min	1min	
Inject Method	Direct for AC mains port	Direct for signal port Direct for dc input port	
Inject Line	AC Mains of adapter	DC input of adapter or Capacitive coupling clamp	

Note:
a. Applied by a CDN. DC ports, which are not intended to be connected to a DC distribution network, e.g. outputs for Sounders, are treated as signal ports.
b. Applied by the capacitive clamp injection method, no test is required where the manufacturer's specification indicates that it is not permitted to connect cables > 3 m long.
Performance criteria A* description: There shall be no damage, malfunction or change of status due to the conditioning. Flickering of an indicator during the application of the bursts 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.

12.6 Test Procedure

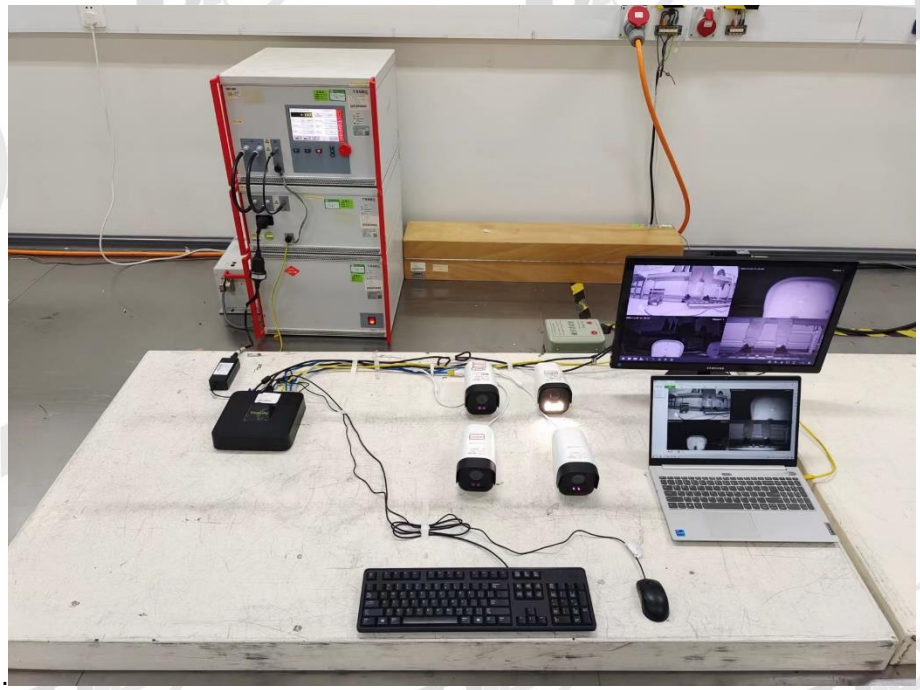
The EUT and its simulators were placed on the ground reference plane and were insulated from it by a wood support 0.1m ± 0.01m thick. The ground reference plane was 1m*1m metallic sheet with 0.65mm minimum thickness. This reference ground plane was project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane was more than 0.5m. All cables to the EUT was placed on the wood support, cables not subject to EFT/B was routed as far as possible from the cable under test to minimize the coupling between the cables.
For DC input and AC power ports:
The EUT was connected to the power mains by using a coupling device that couples the EFT interference signal to AC power lines. Both positive transients and negative transients of test.
For signal ports:
The capacitive coupling clamp was connected to the power by using a coupling device that couples the EFT interference signal to capacitive coupling clamp. Both positive transients and negative transients of test voltage were applied during compliance test.

12.7 Test result

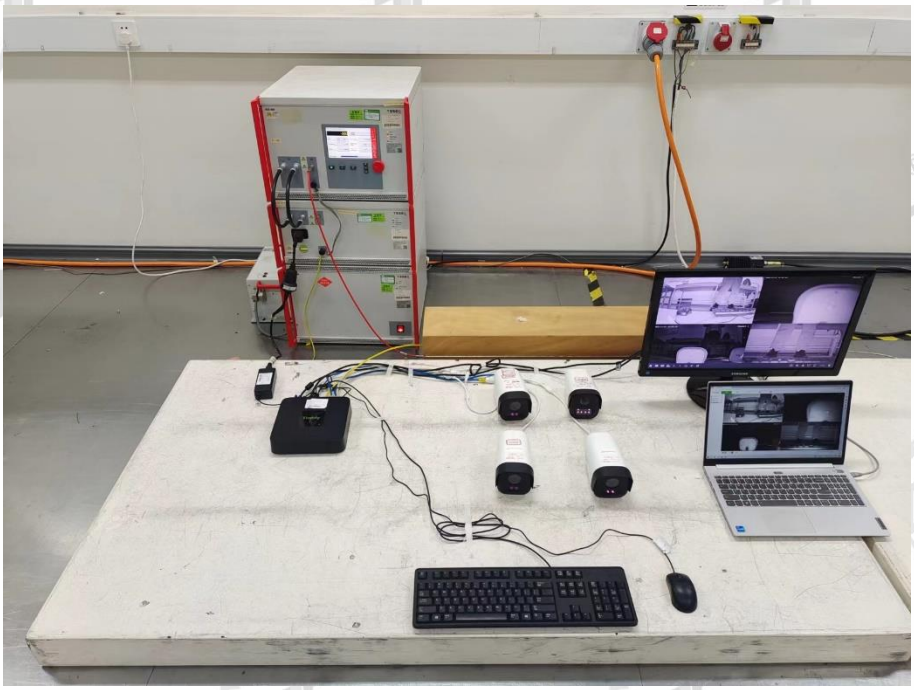
Port ☒ AC Mains ☐DC Supply ☒Signal			Burst Period: ☒ 300ms ☐Other:			
Coupling: ☒Direct ☒Capacitive Clamp			Test Time: ☒ 120S ☐Other:			
Repetition Frequency: ☒ 5KHz ☐Other:			Burst Durations: ☒15ms ☐Other:			
Operation Mode	Line/port	Test Voltage	Performance			Result
			Required	Observation (+)	Observation (-)	(Pass/Fail)
Mode 1	L	±1kV	B	A	A	Pass
	N	±1kV	B	A	A	Pass
	L-N	±1kV	B	A	A	Pass
	PE	±1kV	B	A	A	Pass
	L-PE	±1kV	B	A	A	Pass
	N-PE	±1kV	B	A	A	Pass
	L-N-PE	±1kV	B	A	A	Pass
	LAN	± 500V	B	A	A	Pass
	POE LAN1	± 500V	B	A	A	Pass
Observation Description: Data transmission loss rate: 0% A: Operation as intend, no loss of function during test and after test. Data transmission loss rate≤5%.						

Port ☒ AC Mains ☐DC Supply ☒Signal			Burst Period: ☒ 300ms ☐Other:			
Coupling: ☒Direct ☒Capacitive Clamp			Test Time: ☒ 1min ☐Other:			
Repetition Frequency: ☐ 5KHz ☒100kHz			Burst Durations: ☐15ms ☒0.75ms			
Operation Mode	Line/port	Test Voltage	Performance			Result
			Required	Observation (+)	Observation (-)	(Pass/Fail)
Mode 1	L	±2kV	A*	A*	A*	Pass
	N	±2kV	A*	A*	A*	Pass
	L-N	±2kV	A*	A*	A*	Pass
	PE	±2kV	A*	A*	A*	Pass
	L-PE	±2kV	A*	A*	A*	Pass
	N-PE	±2kV	A*	A*	A*	Pass
	L-N-PE	±2kV	A*	A*	A*	Pass
	LAN	±1kV	A*	A*	A*	Pass
	POE LAN1	±1kV	A*	A*	A*	Pass
Observation Description: Before the conditioning, the sample function test is normal. Data transmission loss rate: 0% A*: No damage, failure, or change of condition due to adjustment. Data transmission loss rate≤5%.						

12.8 Test Photo



AC Port



LAN Port

13. Surges

13.1 General information

Test date	Dec. 5, 2022 Jan 3, 2023	**Test engineer**	Oliver	
Climate condition	**Ambient temperature**	20.0±1℃	**Relative humidity**	36±1%
	Atmospheric pressure	102.9±0.2kPa		
Test place	Shield Room 3#			

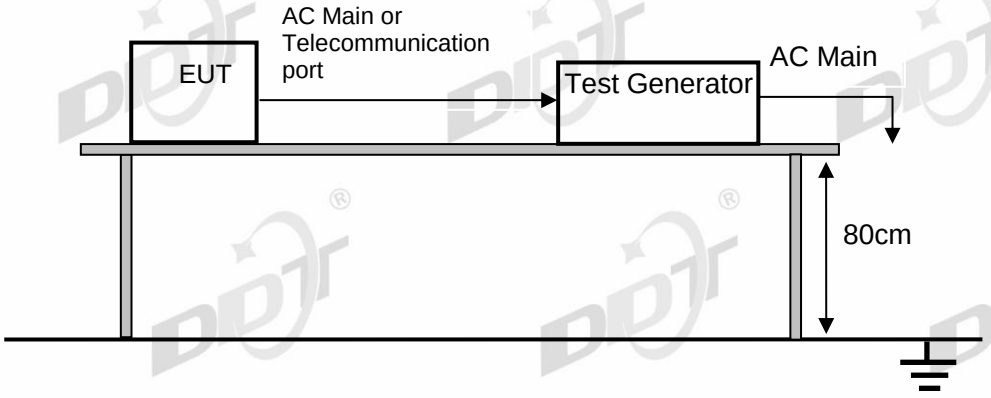
13.2 Test equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Multifunctional Generator	EM Test	UCS 500N7.1	P1303110687	May. 09, 2022	1 Year
Coupling / Decoupling Network	EM Test	CNI 508N1	V1250114301	Mar. 29, 2022	1 Year
3-Phase Coupling Decoupling Network	EM Test	CNI 503B7	V1250114298	Mar. 29, 2022	1 Year
Surge Protection Network	EM Test	SPN 508N1	V1250114303	Mar. 29, 2022	1 Year
Coupling Network	EM Test	CN 508N1	V1250114302	Mar. 29,2022	1 Year

13.3 Test and reference standards

EN 55035:2017/A11:2020
IEC 61000-4-5:2014+AMD1:2017
EN 50130-4:2011/A1:2014

13.4 Block diagram of test setup



13.5 Test levels and performance criterion

EN 55035:2017/A11:2020

Test level for AC mains ports		Performance Criterion
Line to Line	1kV 1.2/50(8/20) μs	B
Line to Ground	2kV 1.2/50(8/20) μs	B
Analogue/digital data port, Port type: unshielded symmetrical		Performance Criterion
Line to Ground	1 kV and 4kV 10/700(5/320) μs (used with the primary protection)	C
Line to Ground	1 kV 10/700(5/320) μs (used without the primary protection)	C
Note: Applicable only to ports which, according to the manufacturer's specification, the cable lengths greater than 3m.		
Analogue/digital data port, Port type: coaxial or shielded		Performance Criterion
Shield to ground	0.5 kV 1.2/50(8/20) μs	B
Note: Applicable only to ports which, according to the manufacturer's specification, the cable lengths greater than 3m.		
DC network power port		Performance Criterion
Line to reference ground	0.5 kV 1.2/50(8/20) μs	B
Note: Applicable only to ports which, according to the manufacturer's specification, 1. The cable lengths greater than 3m; 2. May connect directly to outdoor cables.		

Performance criteria B description: During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test. After the test, the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the EUT is used as intended.

EN 50130-4:2011/A1:2014

Test voltages[a]: AC mains supply lines: - line-to-line - line-to-ground[b] Other supply/signal lines[c] - line-to-ground[d]	 0,5 kV & 1 kV 0,5 kV; 1 kV & 2 kV 0,5 kV & 1 kV	Performance Criterion A*
Polarity	+ & −	
Minimum number of surges at each polarity, voltage, coupling mode and line: AC mains supply lines Other supply/signal lines	 20[e] 5	
a:The test voltages specified are the open-circuit voltages. The test voltages for the lower severity levels are included because all the lower severity levels also have to be satisfied. b:Via a 10 Ω series resistor. c:No test is required where the manufacturer's specification indicates that it is not permitted to connect cables > 30 m long. d:Via a 40 Ω series resistor. e:5 at each zero-crossing point and at the maximum and minimum points on the mains voltage wave.		

Performance criteria A* description: There shall be no damage, malfunction or change of status due to the conditioning. Flickering of an indicator during the application of the surges 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.

13.6 Test Procedure

For line-to-neutral coupling mode, provide a 0.5 kV/1 kV 1.2/50 us voltage surge (at open-circuit condition) and 8/20 us current surge to EUT selected points.
For line-to-ground coupling mode, provide a 0.5 kV/1 kV/2 kV 1.2/50 us voltage surge (at open-circuit condition) and 8/20 us current surge to EUT selected points.

The number of pulses applied in EN 55035:2017/A11:2020 shall be five positive and negative pulses at 90° and 270° phase.

The number of pulses applied in EN 50130-4:2011/A1:2014 shall be 5 at each zero-crossing point and at the maximum and minimum points on the mains voltage wave.

Maximum 1/min repetition rate are applied during test.
Different phase angles are done individually.

For telecommunication surge test, each line of internet port to ground coupling mode, provide a 1.0kV 10/700us voltage surge (at open-circuit condition) and 5/320us current surge to EUT selected points.

At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are applied during test.

Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

13.7 Test result

Line: ☒ AC Mains ☐DC Supply ☒Telecommunication port ☐Signal port											
Wave Type: ☒ 1.2/50us-8/20us ☐ 10/700 us-5/320us Internal impedance: ☒2Ω☒12Ω☐25Ω☒42Ω☐160Ω											
Pulse times: 5 times at each polarity Pulse Interval: 60S Voltage Phase: ☐ 0°, 90°, 180°, 270°☒ 90°, 270°											
Operation Mode	Line/ Port	0.5kV			1kV			2kV			Result
		Required	Observation		Required	Observation		Required	Observation		Pass/Fail
			+	-		+	-		+	-	
Mode 1	L-N	B	A	A	B	A	A	N/A	N/A	N/A	Pass
	L-Pe	B	A	A	B	A	A	B	A	A	Pass
	N-Pe	B	A	A	B	A	A	B	A	A	Pass
	LAN	C	A	A	C	A	A	N/A	N/A	N/A	Pass
	POE LAN1	C	A	A	C	A	A	N/A	N/A	N/A	Pass
Observation Description: Data transmission loss rate: 0% A: Operation as intend, no loss of function during test and after test. Data transmission loss rate≤5%.											

Line: ☒ AC Mains ☐DC Supply ☒Telecommunication port ☐Signal port											
Wave Type: ☒ 1.2/50us-8/20us ☒ 10/700 us-5/320us Internal impedance: ☒2Ω☒12Ω☐25Ω☒42Ω☐160Ω											
Pulse times: 5 times at each polarity Pulse Interval: 60S Voltage Phase: ☒ 0°, 90°, 180°, 270°☐90°, 270°											
Operation Mode	Line/ Port	0.5kV			1kV			2kV			Result
		Required	Observation		Required	Observation		Required	Observation		Pass/Fail
			+	-		+	-		+	-	
Mode 1	L-N	A*	A*	A*	A*	A*	A*	N/A	N/A	N/A	Pass
	L-PE	A*	A*	A*	A*	A*	A*	A*	A*	A*	Pass
	N-PE	A*	A*	A*	A*	A*	A*	A*	A*	A*	Pass
	LAN	A*	A*	A*	A*	A*	A*	N/A	N/A	N/A	Pass
	POE LAN1	A*	A*	A*	A*	A*	A*	N/A	N/A	N/A	Pass
Observation Description: Before the conditioning, the sample function test is normal. Data transmission loss rate: 0% A*:No damage, failure, or change of condition due to adjustment. Data transmission loss rate≤5%.											

13.8 Test Photo

AC Port

LAN Port

14. Continuous Conducted Disturbances

14.1 General information

Test date	Dec. 5, 2022 Jan 3, 2023	**Test engineer**	Oliver	
Climate condition	**Ambient temperature**	20.0±1℃	**Relative humidity**	36±1%
	Atmospheric pressure	102.9±0.2kPa		
Test place	Shield Room 3#			

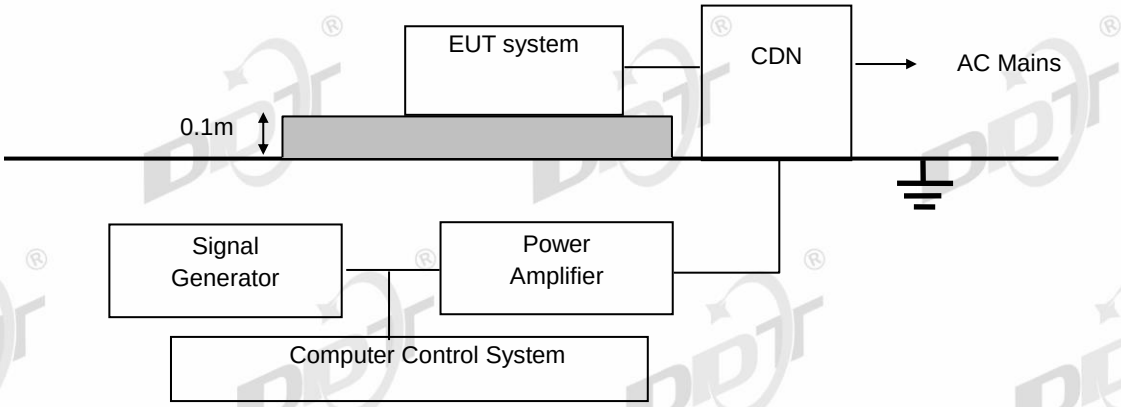
14.2 Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Signal Generator	R&S	SMB100A	103231	Feb. 15, 2022	1 Year
CDN	TESEQ	CDN M016	28987	Feb. 16, 2022	1 Year
RF Power Amplifiers	AR	75A250A	0332892	Feb. 16, 2022	1 Year
Directional Coupler	AR	DC2600M2	0333399	Feb. 16, 2022	1 Year
Power Meter	R&S	NRVS	101785	Mar. 29, 2022	1 Year
Coaxial voltage measurement probe	R&S	URV5-Z4	100215	Mar. 29, 2022	1 Year
EM Injection Clamp	FCC	F-203I-23MM	100331	Feb. 16, 2022	1 Year
COUPLING / DECOUPLING NETWORK	TESEQ	CDN T800	39134	Feb. 16, 2022	1 Year
Test Software	R&S	EMC 32	Ver 10.28.0	N/A	N/A

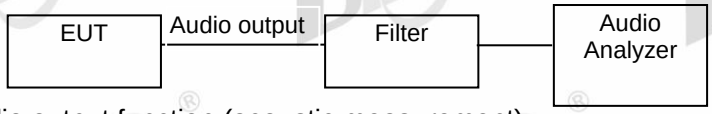
14.3 Test and reference standards

EN 55035:2017/A11:2020
IEC 61000-4-6:2013
EN 50130-4:2011/A1:2014

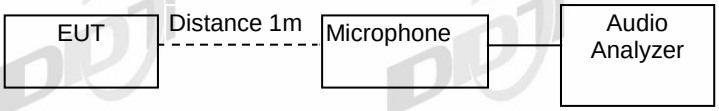
14.4 Block diagram of test setup



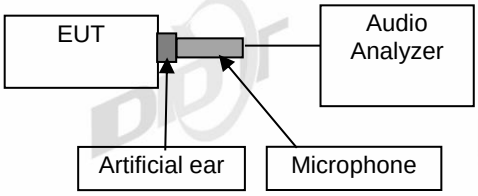
For audio output function (electrical measurement, direct connection to EUT)



For audio output function (acoustic measurement)



For audio output function (on-ear acoustic measurement)



14.5 Test levels and performance criterion

EN 55035:2017/A11:2020

Test Level		Performance Criteria
Frequency and Field Strength	0.15MHz to 10MHz, 3V rms voltage level of the unmodulated signal	A
	10MHz to 30MHz, 3V to 1V rms voltage level of the unmodulated signal	
	30MHz to 80MHz, 1V rms voltage level of the unmodulated signal	
Modulation	AM modulated to a depth of 80% by a sine wave of ☒1kHz, ☐400Hz (note 1)	
Step Size	1% increments	
Dwell time	1 Sec.	

Note 1: The 1kHz modulation may be replaced by a different audio modulation frequency more appropriate for a given EUT if, for example, 1kHz is not within the operating audio range of the EUT.

Performance criteria A description for devices with the audio output function: The measured acoustic interference ratio and/or the measured electrical interference ratio during the test shall be -20 dB or better.
☐The acoustic measurement method was selected according to clause G6.4.1 of EN 55035.
☐The electrical measurement method was selected according to clause G6.4.2 of EN 55035.

Performance criteria A for devices with the telephony function.

Frequency range MHz	Acoustic or electrical interference ratio	Equivalent direct measurement		
		dB(SPL)	Digital dBm0	Analogue dBm0
0.15 to 30	-20 dB	55	-50	-50
30 to 80	-10 dB	65	-40	-40

Note: At the step in the frequency range, the lower limit shall be applied.
The interference ratio (electrical or acoustic) shall meet the limits in column 2; or,
The acoustic level of the demodulated audio shall be less than the limits in column 3; or
The digitally coded level of demodulated audio shall be less than limits in column 4; or,
The analogue level of the demodulated audio shall be less than the limits in column 5.

Performance criteria A description for other devices: During and after the test the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a minimum performance level specified by the manufacturer when the EUT is used as intended.

EN 50130-4:2011/A1:2014

Test Level		Performance Criteria
Frequency and Field Strength	0.15MHz to 100MHz, 10V rms voltage level of the unmodulated signal	A*
Modulation	AM modulated to a depth of 80% by a sine wave of ☒1kHz, ☐400Hz (note 1)	
Step Size	1% increments	
Dwell time	⩾3 Sec.	

Performance criteria A* description: 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, and no such flickering of indicators occurs at U_0 = 3V.

For components of CCTV systems, where the status is monitored by observing the TV picture, then deterioration of the picture is allowed at U_0 = 10V, providing
a) there is no permanent damage or change to the EUT (e.g. no corruption of memory or changes toprogrammable settings, etc.),
b) at U_0 = 3V, 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 U_0 = V.

14.6 Test procedure

The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).

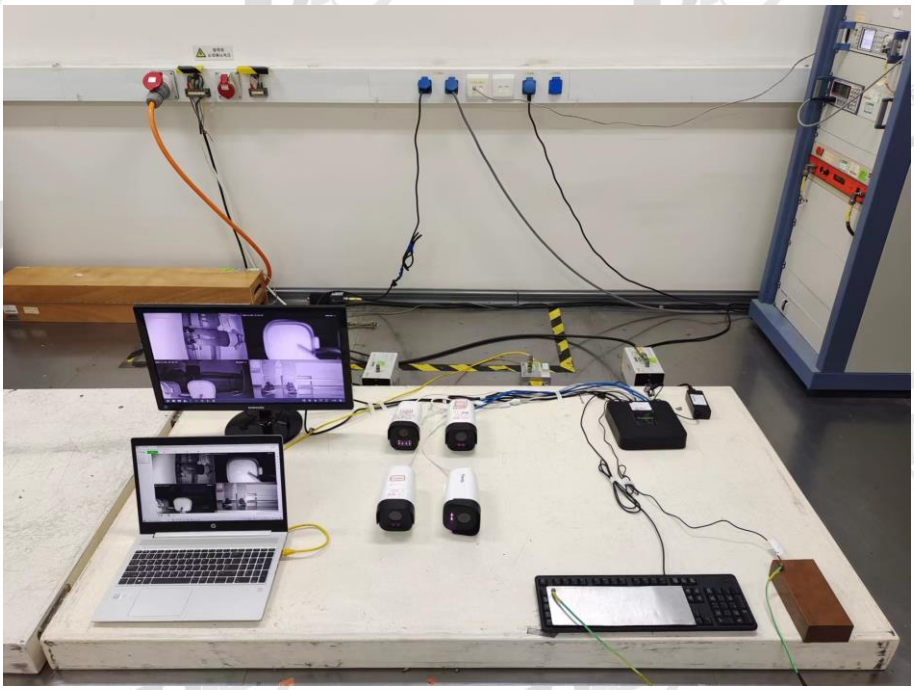
The disturbance signal described below is injected to EUT through CDN.
The EUT operates within its operational mode(s) under intended climatic conditions after power on.
The frequency range is swept from 0.150MHz to ☒80MHz/☐230MHz, the interference signal level according to clause 10.5, and with the disturbance signal 80% amplitude modulated with a ☒1kHz / ☐400Hz sine wave.
The rate of sweep shall not exceed 1.5*10-3decades/s. Where the frequency is swept incrementally; the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.
Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

14.7 Test result

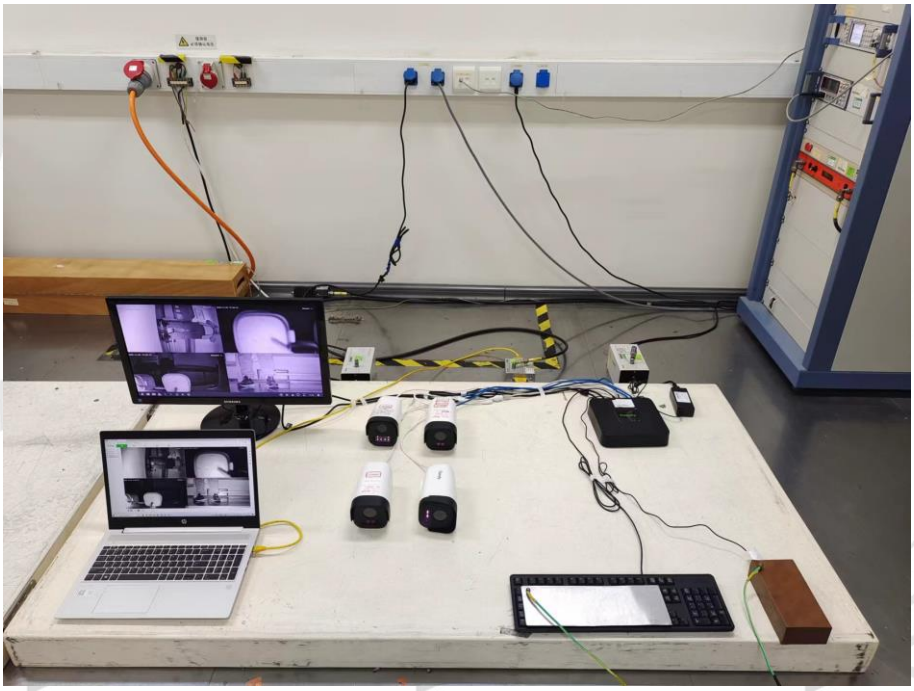
Modulation Signal: ☒1kHz ☐400Hz 80% AM ☐Other: Steps: ☒1% ☐other: Dwell time: ☒1s ☐other:						
Operation mode	Frequency Range	Injected Position	Strength(e.m.f) (unmodulated)	Required	Observation	Result (Pass/Fail)
Mode 1	0.15MHz-10MHz	AC Port	3V	A	A	Pass
	10MHz-30MHz	AC Port	3V-1V	A	A	Pass
	30MHz-80MHz	AC Port	1V	A	A	Pass
	0.15MHz-10MHz	LAN Port	3V	A	A	Pass
	10MHz-30MHz	LAN Port	3V-1V	A	A	Pass
	30MHz-80MHz	LAN Port	1V	A	A	Pass
	0.15MHz-10MHz	POE LAN1 Port	3V	A	A	Pass
	10MHz-30MHz	POE LAN1 Port	3V-1V	A	A	Pass
	30MHz-80MHz	POE LAN1 Port	1V	A	A	Pass
Note 1: this row only for the device with audio output function. Note 2: this device without the telephony function.						
Observation Description: Data transmission loss rate: 0% A: Operation as intend, no loss of function during test and after test. Data transmission loss rate≤5%.						

Modulation Signal: ☒1kHz ☐400Hz 80% AM ☐Other: Steps: ☒1% ☐other: Dwell time: ☒3s ☐other:						
Operation mode	Frequency Range	Injected Position	Strength(e.m.f) (unmodulated)	Required	Observation	Result (Pass/Fail)
Mode 1	0.15MHz-100MHz	AC Port	10V	A*	A*	Pass
	0.15MHz-100MHz	LAN Port	10V	A*	A*	Pass
	0.15MHz-100MHz	POE LAN1 Port	10V	A*	A*	Pass
Observation Description: Before the conditioning, the sample function test is normal. Data transmission loss rate: 0% A*:No damage, failure, or change of condition due to adjustment. Data transmission loss rate≤5%.						

14.8 Test Photo



AC Port



LAN Port

15. Power-Frequency Magnetic Fields

15.1 General information

Test date	Dec. 6, 2022	**Test engineer**	Oliver	
Climate condition	**Ambient temperature**	20.0±1℃	**Relative humidity**	35±1%
	Atmospheric pressure	102.4±0.2kPa		
Test place	Shield Room 3#			

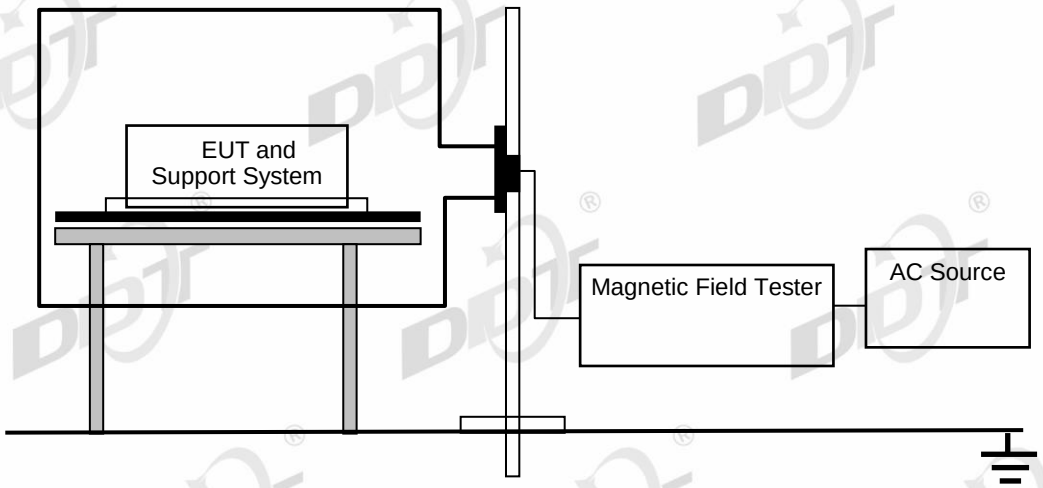
15.2 Test equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Magnetic Field Coil	TESEQ	INA 702	199	Feb. 16, 2022	1 Year
Magnetic Field Option	TESEQ	MFO 6502	123	Feb. 16, 2022	1 Year
Multifunction Generator Systems	TESEQ	NSG 3060	1338	Feb. 15, 2022	1 Year
Coupling/Decoupling Networks	TESEQ	CDN 3061	210	Feb. 15, 2022	1 Year

15.3 Test and reference standards

EN 55035:2017/A11:2020
IEC 61000-4-8:2009

15.4 Block diagram of test setup



15.5 Test levels and performance criterion

Level	Magnetic Field Strength (A/m)	Performance Criterion
1	1	A

Performance criteria A description: During and after the test the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a minimum performance level specified by the manufacturer when the EUT is used as intended.

15.6 Test procedure

The EUT shall be subjected to the test magnetic field by using the induction coil of standard dimensions (1m*1m) and shown in Section 14.4 Then induction coil shall then be rotated by 90°in order to expose the EUT to the test field with different orientations.

15.7 Test result

Operation Mode	Test Level	Testing Duration	Coil Orientation	Required	Observation	Result (Pass/Fail)
Mode 1	1A/m	5min/coil	X	A	A	Pass
		5min/coil	Y	A	A	Pass
		5min/coil	Z	A	A	Pass
Observation Description: Data transmission loss rate: 0% A: Operation as intend, no loss of function during test and after test. Data transmission loss rate≤5%.						

15.8 Test Photo

16. Voltage Dips and Interruptions

16.1 General information

Test date	Dec. 5, 2022 Jan 3, 2023	**Test engineer**	Oliver	
Climate condition	**Ambient temperature**	20.0±1℃	**Relative humidity**	36±1%
	Atmospheric pressure	102.9±0.2kPa		
Test place	Shield Room 3#			

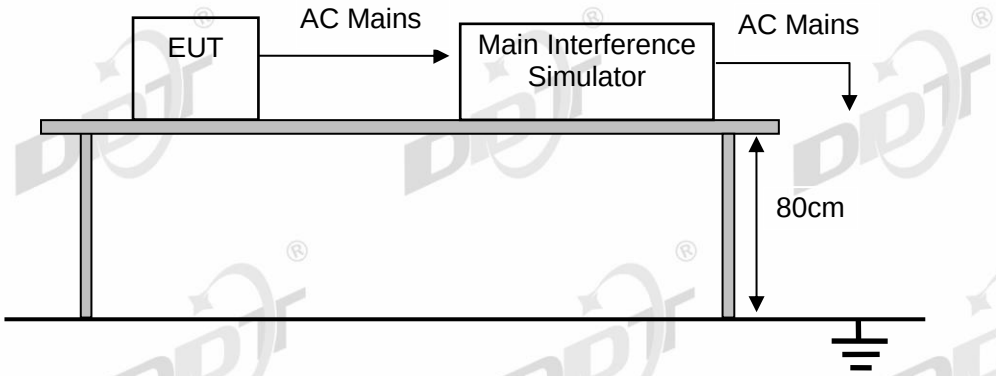
16.2 Test equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Motorized single phase variac	TESEQ	VAR 3005-D16	094	Feb. 15, 2022	1 Year
Multifunction Generator Systems	TESEQ	NSG 3060	1338	Feb. 15, 2022	1 Year
Coupling/Decoupling Networks	TESEQ	CDN 3061	210	Feb. 15, 2022	1 Year

16.3 Test and reference standards

EN 55035:2017/A11:2020
IEC 61000-4-11:2020

16.4 Block diagram of test setup



16.5 Test levels and performance criterion

EN 55035:2017/A11:2020

Test Level %UT	Duration (in period)	Performance Criterion
＜5	0.5	B
70	25 for 50Hz/30 for 60Hz	C
＜5	250 for 50Hz/300 for 60Hz	C

Performance criteria B description: During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test. After the test, the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the EUT is used as intended.
Performance criteria C description: During and after testing, a temporary loss of function is allowed, provided the function is self recoverable, or can be restored by the operation of the controls or cycling of the power to the EUT by the user in accordance with the manufacturer's instructions. Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

EN 50130-4:2011/A1:2014

Test Level %UT	Duration (in period)	Performance Criterion
80	250 for 50Hz	A*
70	25 for 50Hz	A*
40	10 for 50Hz	A*
0	250 for 50Hz	B*

Performance criteria A* description: 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.
Performance criteria B* description: Signalling a mains fault during the 100 % voltage reduction test is permitted.

16.6 Test procedure

The EUT and test generator were setup as shown. The interruptions are introduced at selected phase angles with specified duration. Record any degradation of performance.

16.7 Test result

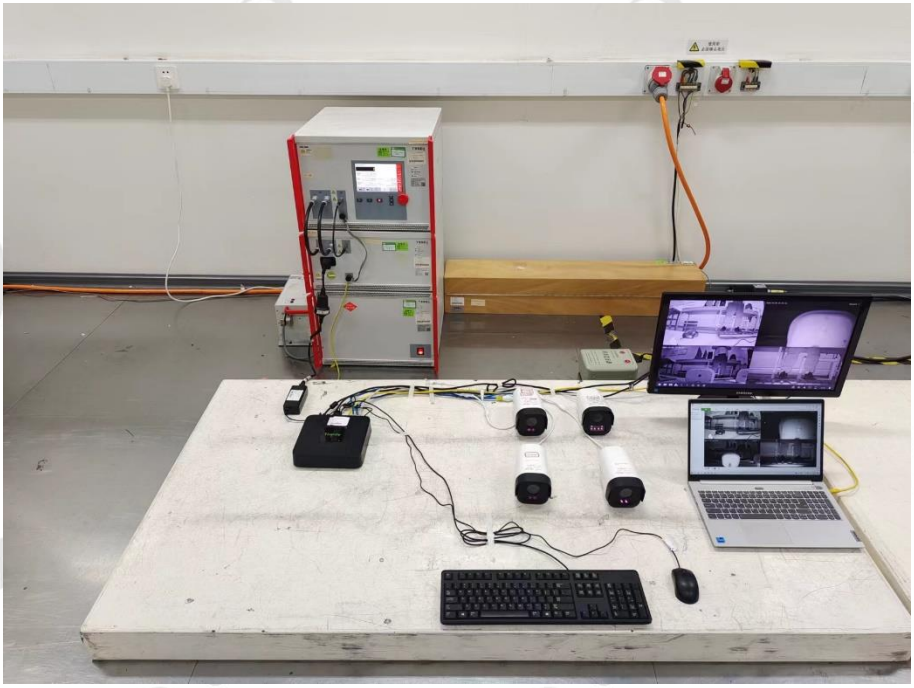
Power Supply: AC 100V/60Hz						
Memo:						
Operation Mode	Voltage Dips & Short Interruptions %Ur	Duration (in period)	Phase Angle	Required	Observation	Result (Pass/Fail)
Mode 1	0	0.5P	0°,180°	B	A	Pass
	70	30P	0°,180°	C	A	Pass
	0	300P	0°,180°	C	C	Pass
Observation Description: Voltage Dips' data transmission loss rate: 0% Short Interruptions' data transmission loss rate: 10% A: Operation as intend, no loss of function during test and after test. Data transmission loss rate≤5%. C: EUT lost communication, and recovers its normal performance, with operator intervention.						

Power Supply: AC 240V/50Hz						
Memo:						
Operation Mode	Voltage Dips & Short Interruptions %Ur	Duration (in period)	Phase Angle	Required	Observation	Result (Pass/Fail)
Mode 1	0	0.5P	0°,180°	B	A	Pass
	70	25P	0°,180°	C	A	Pass
	0	250P	0°,180°	C	C	Pass
Observation Description: Voltage Dips' data transmission loss rate: 0% Short Interruptions' data transmission loss rate: 10% A: Operation as intend, no loss of function during test and after test. Data transmission loss rate≤5%. C: EUT lost communication, and recovers its normal performance, with operator intervention.						

Power Supply: AC 100V/50Hz						
Operation Mode	Voltage Dips & Short Interruptions %Ur	Duration (in period)	Phase Angle	Required	Observation	Result (Pass/Fail)
Mode 1	80	250P	0°,180°	A*	A*	Pass
	70	25P	0°,180°	A*	A*	Pass
	40	10P	0°,180°	A*	A*	Pass
	0	250P	0°,180°	B*	B*	Pass
Observation Description: Before the conditioning, the sample function test is normal. Voltage Dips' data transmission loss rate: 0% Short Interruptions' data transmission loss rate: 10% A*:No damage, failure, or change of condition due to adjustment. Data transmission loss rate≤5%. B*: Transient power failure and data transmission loss occurred during 100% voltage drop test.						

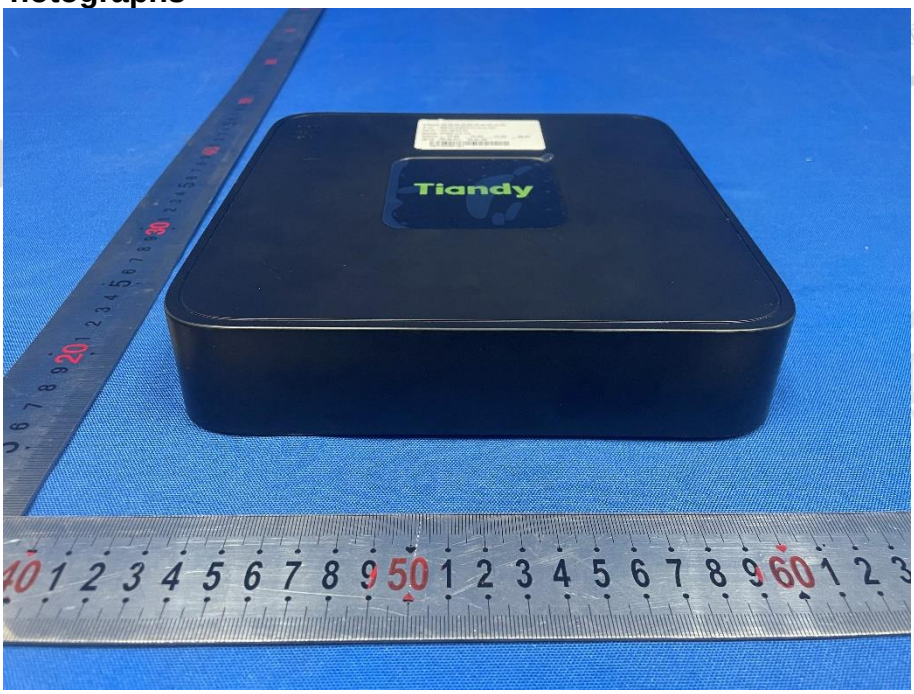
Power Supply: AC 240V/50Hz						
Operation Mode	Voltage Dips & Short Interruptions %Ur	Duration (in period)	Phase Angle	Required	Observation	Result (Pass/Fail)
Mode 1	80	250P	0°,180°	A*	A*	Pass
	70	25P	0°,180°	A*	A*	Pass
	40	10P	0°,180°	A*	A*	Pass
	0	250P	0°,180°	B*	B*	Pass
Observation Description: Before the conditioning, the sample function test is normal. Voltage Dips' data transmission loss rate: 0% Short Interruptions' data transmission loss rate: 10% A*:No damage, failure, or change of condition due to adjustment. Data transmission loss rate≤5%. B*: Transient power failure and data transmission loss occurred during 100% voltage drop test.						

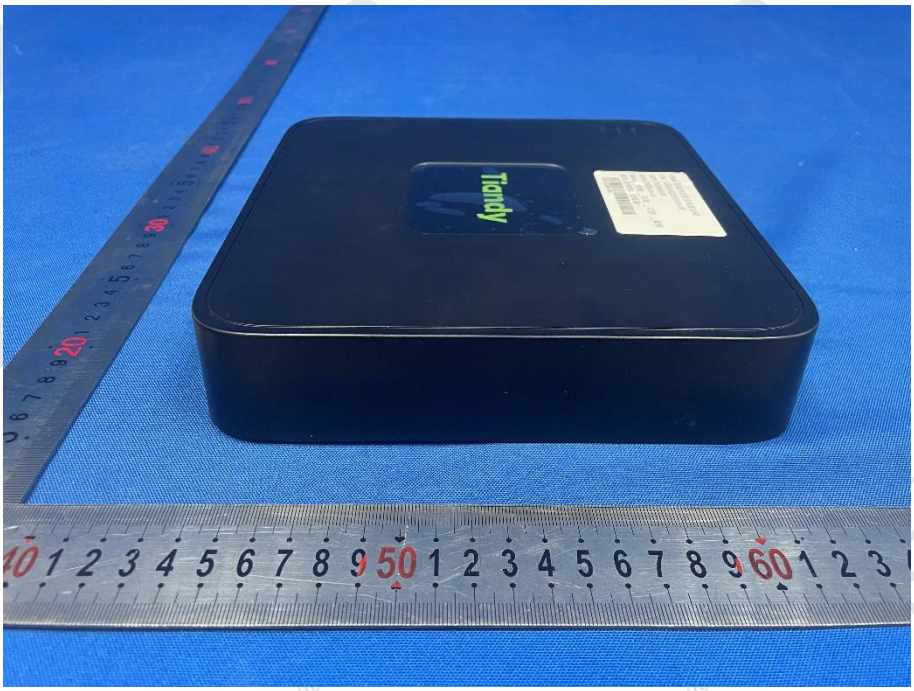
16.8 Test Photo



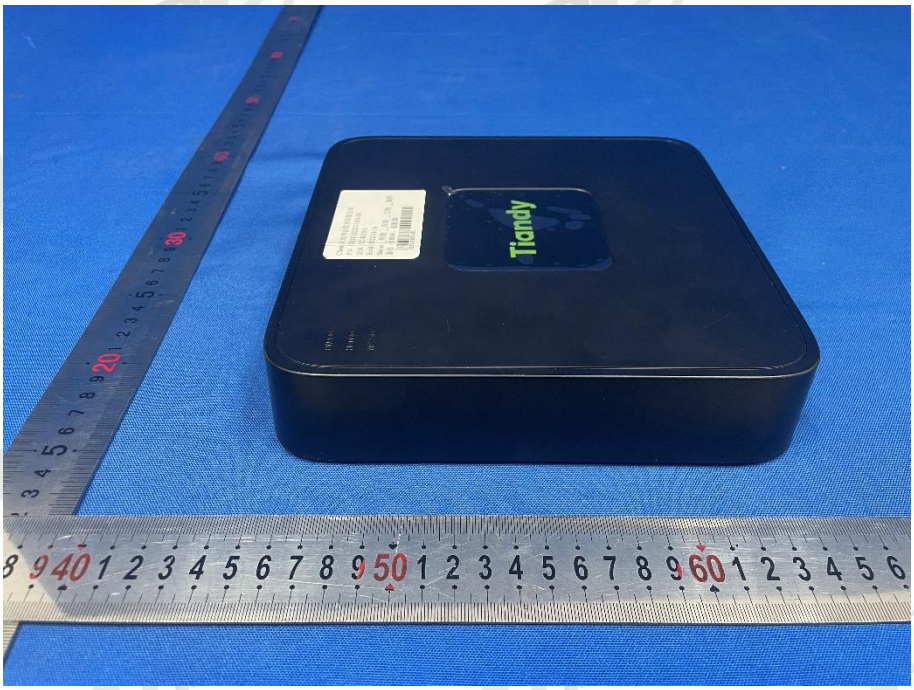
Annex A Photos of the EUT

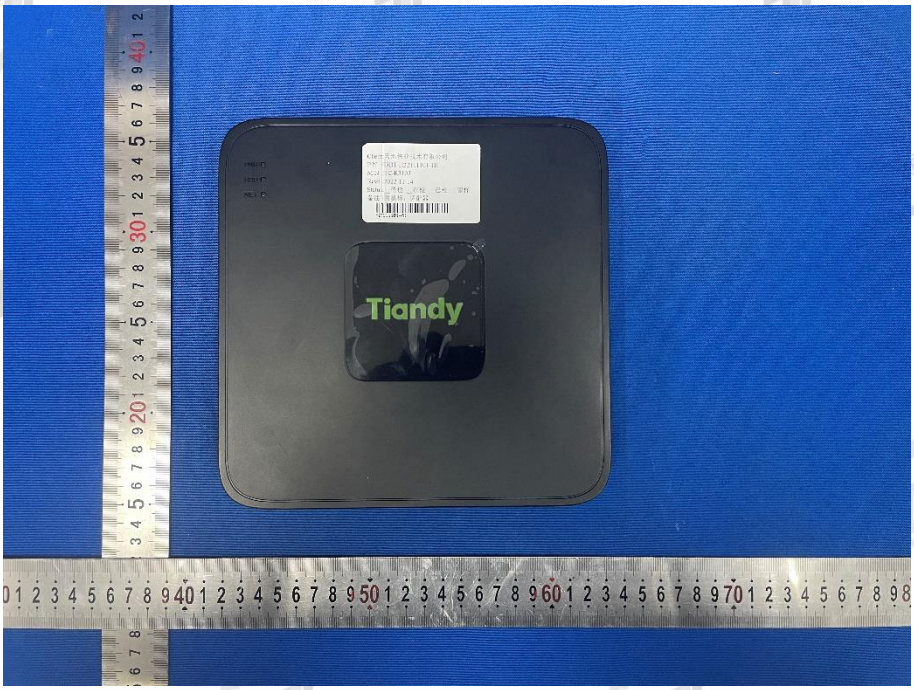
External Photographs






Tiandy
DC 48V
LAN
USB 2.0
RST
HDMI
VGA


Tiandy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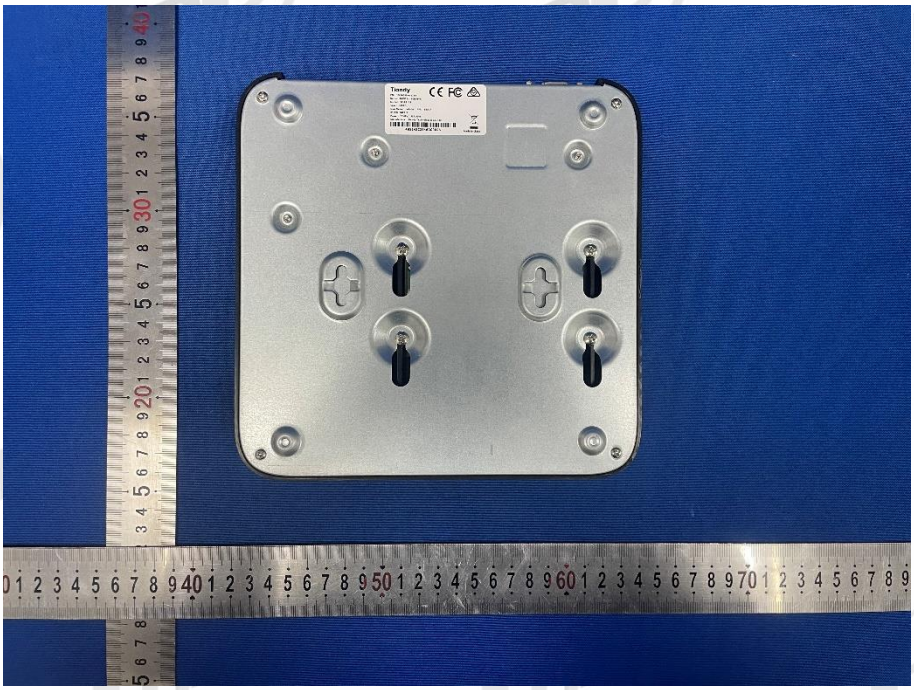
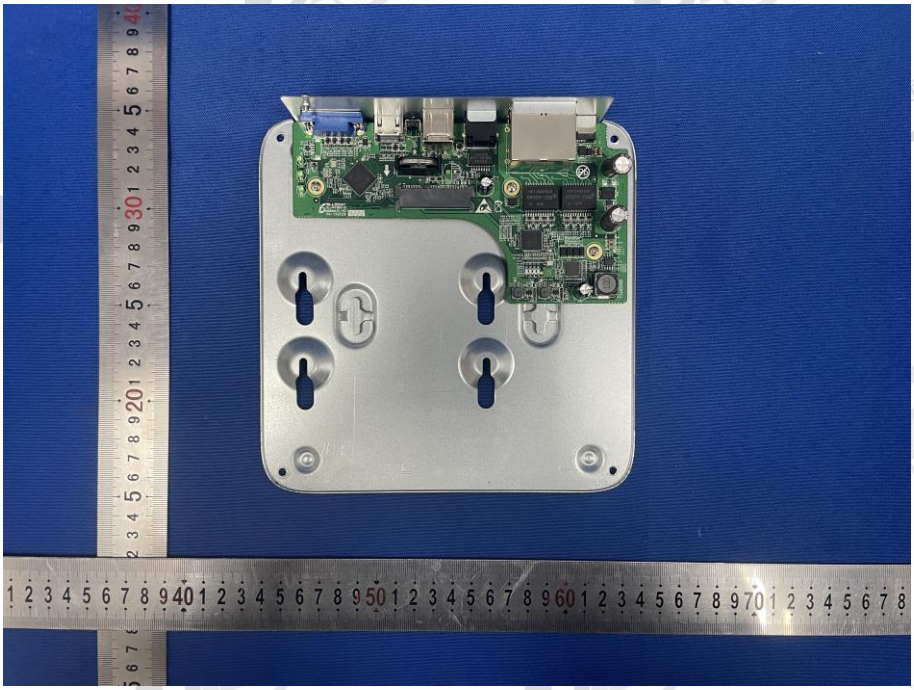


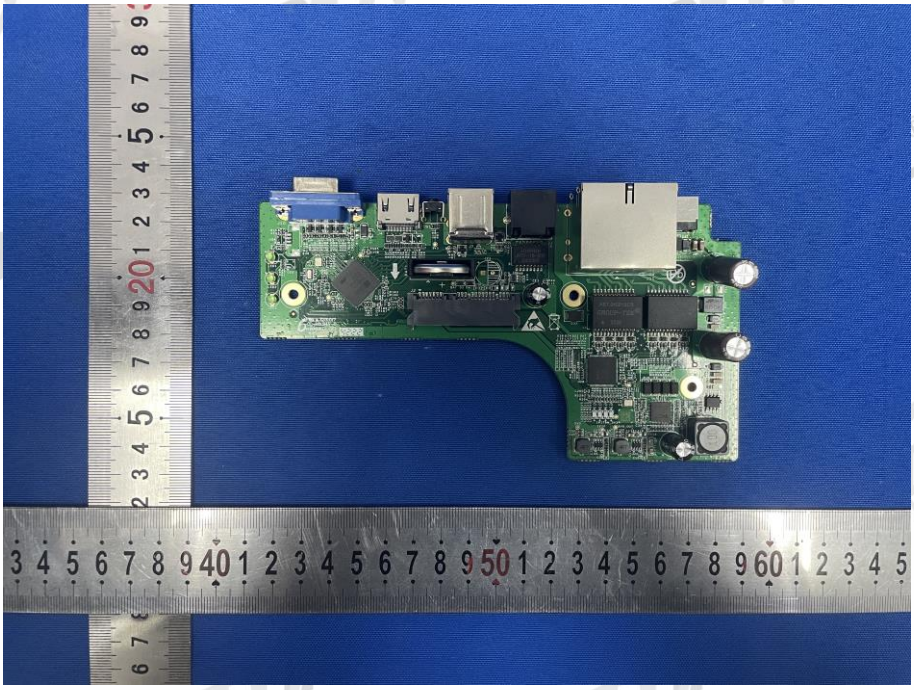

1
3
DC 48V
2
4
LAN
USB 2.0
RST
HDMI
VGA

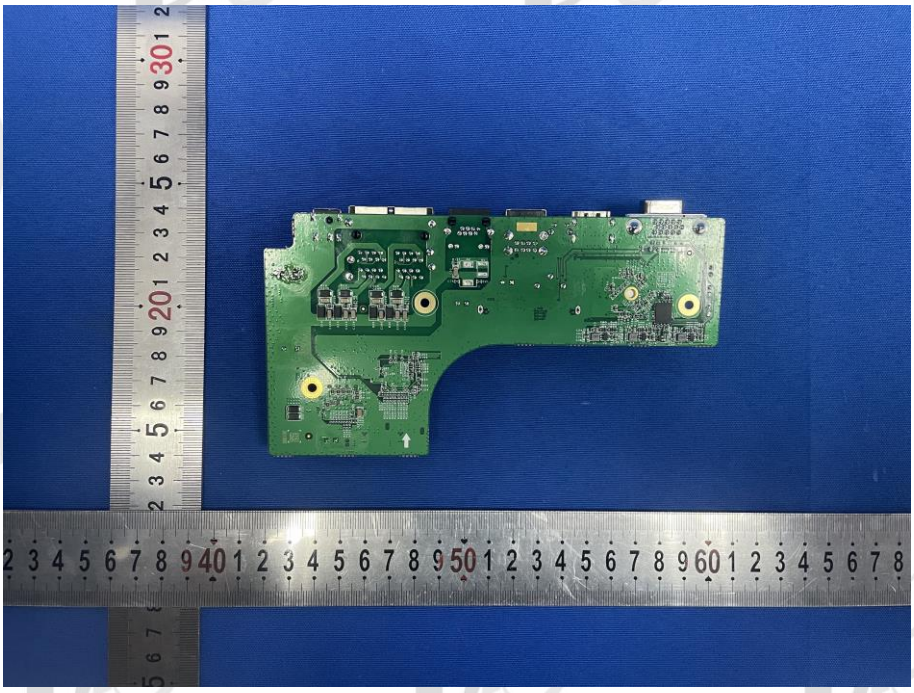

SWITCH MODE POWER SUPPLY
MASS POWER
电源适配器
MODEL(型号): S065-1A480135B3
INPUT(输入):100-240V~, 50/60Hz, 1.5A
OUTPUT(输出):48.0V ⎓ 1.35A 64.8W L.P.S
This device complies with part 15 of the FCC Rules.
Operation is subject to the following two conditions:
(1)This device may not cause harmful interference, and
(2)This device must accept any interference received,
including interference that may cause undesired operation.
CAUTION:INDOOR USE ONLY 警告:仅限室内使用
Mass Power Electronic Limited
MADE IN CHINA 中国制造
EFFICIENCY LEVEL VI
SAA-191812-EA
LISTED
E335801
Power Supply
1LC970095
전기용품안전관리법에 의한 표시
제 품 명 : 적류전원장치
모 델 명 : S065-1A480135B3
정격입력 : 100-240V~, 50/60Hz, 1.5A
정격출력 : 48.0Vdc, 1.35A
제 조 사 : Mass Power Electronics Inc.
제 조 국 : P.R.China
HU10935-19020
A/S연락처 : 022-58596000
R-R-3NB-S065LA53012283
최저소비효율기준만족 제품

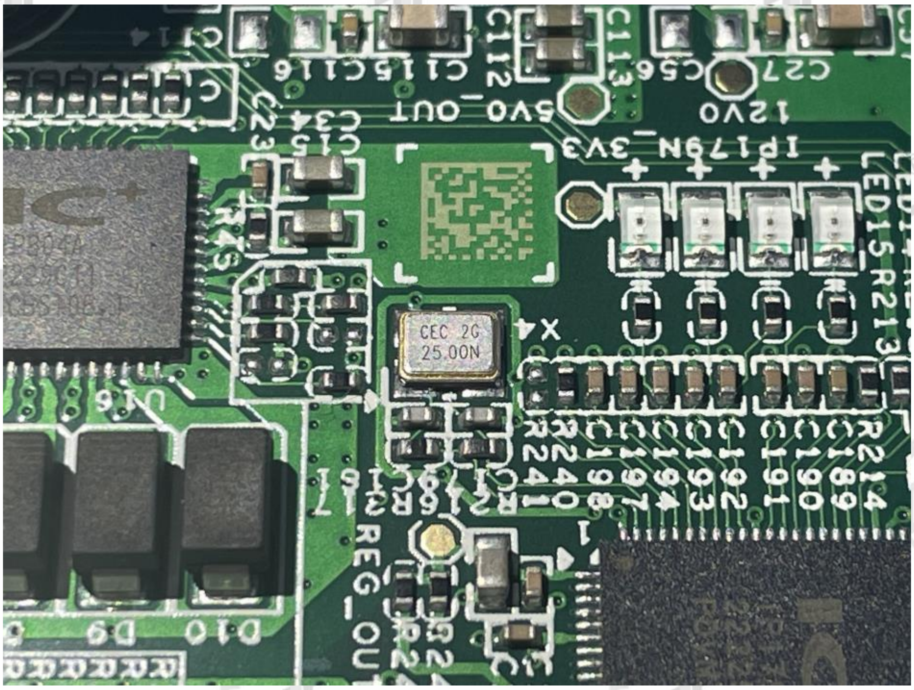
Internal Photographs



PCB






CEC 2G
25.00N

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Address: Building D-1, No. 19, Weisi Road, Microelectronics Industrial Park Development Area, Tianjin, China.
Postcode: 300385
Tel: 022-58038033
Fax: 022-58038033
Website: http://www.ddttest.com

END OF REPORT