



EMC TEST REPORT

For

NAMTSO TECHNOLOGY CO., LTD.

Industrial Single Board Computer

Test Model: A10-3588

Additional Model No.: Please Refer to Page 9

Prepared for : NAMTSO TECHNOLOGY CO., LTD.
Address : 2702 QIANCHENG CENTER, HAICHENG ROAD,
XIXIANG STREET, BAO'AN DISTRICT, SHENZHEN

Prepared by : Shenzhen LCS Compliance Testing Laboratory Ltd.
Address : Room 101, 201, Building A and Room 301, Building C,
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Date of receipt of test sample : March 21, 2024
Number of tested samples : 1
Serial number : Prototype
Date of Test : March 21, 2024 to April 3, 2024
Date of Report : April 10, 2024



**TEST REPORT****Report No.** : LCSA03214040E**Date of Issue** : April 10, 2024**Testing Laboratory Name** : Shenzhen LCS Compliance Testing Laboratory Ltd.**Address** : Room 101, 201, Building A and Room 301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Bao'an District, Shenzhen, Guangdong, China**Testing Location/ Procedure** : Full application of Harmonised standards ■
Partial application of Harmonised standards □
Other standard testing method □**Applicant's Name** : NAMTSO TECHNOLOGY CO., LTD.**Address** : 2702 QIANCHENG CENTER, HAICHENG ROAD, XIXIANG STREET, BAO'AN DISTRICT, SHENZHEN**Test Specification****Standard** : EN 55032:2015/A1:2020
EN IEC 61000-3-2:2019/A1:2021
EN 61000-3-3:2013/A2:2021
EN 55035:2017/A11:2020**Test Report Form No** : LCSEMC-1.0**TRF Originator** : Shenzhen LCS Compliance Testing Laboratory Ltd.**Master TRF** : Dated 2011-03**Shenzhen LCS Compliance Testing Laboratory Ltd. All rights reserved.**

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Test Item Description : Industrial Single Board Computer**Trade Mark** : NAMTSO**Test Model** : A10-3588**Result** : Positive**Compiled by:**

Brody Xiong / File Administrator

Supervised by:

Baron Wen / Technique principal

Approved by:

Gavin Liang / Manager



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TEST REPORT

Test Report No.: LCSA03214040E	<u>April 10, 2024</u> Date of issue
---------------------------------------	--

Test Model	: A10-3588
EUT	: Industrial Single Board Computer
Applicant	: NAMTSO TECHNOLOGY CO., LTD.
Address	: 2702 QIANCHENG CENTER, HAICHENG ROAD, XIXIANG STREET, BAO'AN DISTRICT, SHENZHEN
Telephone	: /
Fax	: /
Manufacturer	: SHENZHEN WESION TECHNOLOGY CO., LTD.
Address	: 2701 QIANCHENG CENTER, HAICHENG ROAD,XIXIANG STREET,BAO'AN DISTRICT,SHENZHEN
Telephone	: /
Fax	: /
Factory	: SHENZHEN WESION TECHNOLOGY CO., LTD.
Address	: 2701 QIANCHENG CENTER, HAICHENG ROAD,XIXIANG STREET,BAO'AN DISTRICT,SHENZHEN
Telephone	: /
Fax	: /

Test Result	Positive
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The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.



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Revision History

Report Version	Issue Date	Revision Content	Revised By
000	April 10, 2024	Initial Issue	/





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1. TEST STANDARDS

The tests were performed according to following standards:

EN 55032:2015/A1:2020: Electromagnetic compatibility of multimedia equipment - Emission requirements

EN IEC 61000-3-2:2019/A1:2021: Electromagnetic compatibility (EMC) -- Part 3-2: Limits - Limits for harmonic current emissions (equipment input current up to and including 16A per phase)

EN 61000-3-3:2013/A2:2021: Electromagnetic compatibility (EMC) -- Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current $\leq 16A$ per phase and not subject to conditional connection

EN 55035:2017/A11:2020: Electromagnetic compatibility of multimedia equipment - Immunity requirements.



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2. SUMMARY OF STANDARDS AND RESULTS

2.1 Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below.

Description of Test Item	Standard	Limits	Result
Conducted emissions from AC mains power ports (150kHz-30MHz)	EN 55032:2015/A1:2020	Class B	Pass
Radiated emissions (30MHz-1GHz)	EN 55032:2015/A1:2020	Class B	Pass
Radiated emissions (above 1GHz)	EN 55032:2015/A1:2020	Class B	Pass
Harmonic current emission	EN IEC 61000-3-2:2019/A1:2021	Class A	Pass
Voltage fluctuations and flicker	EN 61000-3-3:2013/A2:2021	EN 61000-3-3, Clause 4	Pass
Electrostatic discharges	EN 55035:2017/A11:2020	Contact Discharge: +/- 4kV Air Discharge: +/- 8kV	Pass
RF electromagnetic field disturbances	EN 55035:2017/A11:2020	3V/m, 80%, 1kHz Amp. Mod.	Pass
Electrical fast transients / burst for AC mains power ports	EN 55035:2017/A11:2020	1kV; 5/50ns Tr/Th; 5kHz Repetition Frequency	Pass
Surges for AC mains power ports	EN 55035:2017/A11:2020	1.2/50µs Tr/Td; 1kV Line to Line	Pass
Continuous induced RF disturbances for AC mains power ports (150kHz-80MHz)	EN 55035:2017/A11:2020	0,15 to 10MHz 3Vrms (emf), 10 to 30MHz 3V to 1Vrms(emf), 30 to 80MHz 1Vrms(emf), 80%, 1kHz Amp. Mod.	Pass
Voltage dips and interruptions	EN 55035:2017/A11:2020	<5% residual voltage for 0.5 periods: B, 70% residual voltage for 25 periods: C, <5% residual voltage for 250 periods: C	Pass





2.2 Description of Test Modes

No	Title	Description
TM1	Working	Record

2.3 Description of Performance Criteria

General Performance Criteria

Performance Criteria A

The equipment shall continue to operate as intended without operator intervention. No degradation of performance, loss of function or change of operating state is allowed below a performance level specified by the manufacturer when the equipment is used as intended.

The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

Performance Criteria B

During the application of the disturbance, degradation of performance is allowed. However, no unintended change of actual operating state or stored data is allowed to persist after the test.

After the test, the equipment shall continue to operate as intended without operator intervention; no degradation of performance or loss of function is allowed, below a performance level specified by the manufacturer, when the equipment is used as intended.

The performance level may be replaced by a permissible loss of performance.

If the minimum performance level (or the permissible performance loss), or recovery time, is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

Performance Criteria C

Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. A reboot or re-start operation is allowed. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.





3. GENERAL INFORMATION

3.1 Description of Device (EUT)

EUT	: Industrial Single Board Computer
Test Model	: A10-3588
Additional Model No.	: A10-3588 Active Cooling Kit
Power Supply	: Input: 12V 3A or 20V 3A Output: 5V 1A
Highest Internal Frequency	: $f > 1\text{GHz}$
Classification of Equipment	: Class B

3.2 Support equipment List

Manufacturer	Description	Model	Serial Number	Certificate
Xiaomi Communication Technology Co., LTD	Power adapter	MDY-13-EF	VA62309A903141 J	/

3.3 Description of Test Facility

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. To CISPR 16 – 4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements” and is documented in the LCS quality system acc. To DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

NVLAP Accreditation Code is 600167-0.

FCC Designation Number is CN5024.

CAB identifier is CN0071.

CNAS Registration Number is L4595.

3.4 Measurement Uncertainty

Test Item	Measurement Uncertainty
Conducted Emission (150kHz to 30MHz)	$\pm 2.35\text{ dB}$
Radiated Emission (30MHz to 1000MHz)	$\pm 3.48\text{ dB}$
Radiated Emission (above 1000MHz)	$\pm 3.90\text{ dB}$
Voltage Fluctuations & Flicker	$\pm 0.510\%$
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.	





4. MEASURING DEVICES AND TEST EQUIPMENT

Conducted emissions from AC mains power ports (150kHz-30MHz)

Equipment	Manufacturer	Model No	Serial No.	Cal Date	Due Date
EMI Test Software	Farad	EZ	/	/	/
Artificial Mains	R&S	ENV216	101288	2023-06-09	2024-06-08
Pulse Limiter	R&S	ESH3-Z2	102750-NB	2023-08-15	2024-08-14
EMI Test Receiver	R&S	ESR3	102312	2024-03-02	2025-03-01

Radiated emissions (30MHz-1GHz)

Equipment	Manufacturer	Model No	Serial No.	Cal Date	Due Date
EMI Test Software	Farad	EZ	/	/	/
EMI Test Software	AUDIX	E3	/	/	/
By-log Antenna	SCHWARZBECK	VULB9163	9163-470	2021-09-12	2024-09-11
Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1925	2021-09-05	2024-09-04
EMI Test Receiver	R&S	ESR3	102311	2023-08-15	2024-08-14
Broadband Preamplifier	/	BP-01M18G	P190501	2023-06-09	2024-06-08
EMI Test Receiver	R&S	ESCI7	101173	2023-10-25	2024-10-24
By-log Antenna	SchwarzZBECK	VULB9163	01428	2023-09-05	2024-09-04

Radiated emissions (above 1GHz)

Equipment	Manufacturer	Model No	Serial No.	Cal Date	Due Date
EMI Test Software	AUDIX	E3	/	/	/
By-log Antenna	SCHWARZBECK	VULB9163	9163-470	2021-09-12	2024-09-11
Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1925	2021-09-05	2024-09-04
EMI Test Receiver	R&S	ESR3	102311	2023-08-15	2024-08-14
Broadband Preamplifier	/	BP-01M18G	P190501	2023-06-09	2024-06-08
EMI Test Software	Farad	EZ	/	/	/
MXA Signal Analyzer	Agilent	N9020A	MY53290398	2023-06-09	2024-06-08

Voltage fluctuations and flicker

Equipment	Manufacturer	Model No	Serial No.	Cal Date	Due Date
HARMONICS&FLICKER MEASUREMENT SYSTEM	EVERFINE	HFM-3000	P630850CD14 11116	2024-03-02	2025-03-01
HARMONICS&FLICKER TESTING POWER SOURCE	EVERFINE	HFS-4000	P624486CD14 111124	2024-03-02	2025-03-01



**Electrostatic discharges**

Equipment	Manufacturer	Model No	Serial No.	Cal Date	Due Date
ESD Simulator	SCHLODER	SESD 230	604035	2023-07-17	2024-07-16

RF electromagnetic field disturbances

Equipment	Manufacturer	Model No	Serial No.	Cal Date	Due Date
MXG Vector Signal Generator	Agilent	E4438C	MY42081396(6G)	2023-06-09	2024-06-08
RF POWER AMPLIFIER	SKET	HAP_0306G-50W	/	2023-06-09	2024-06-08
RF POWER AMPLIFIER	OPHIR	5225R	1052	2023-06-09	2024-06-08
RF POWER AMPLIFIER	OPHIR	5273F	1019	2023-06-09	2024-06-08
Stacked Broadband Log Periodic Antenna	SCHWARZBECK	STLP 9128	9128ES-145	/	/
Stacked Mikrowellen Log.-Per Antenna	SCHWARZBECK	STLP 9149	9149-484	/	/
RS Electric field probe	narda	EP601	611WX80208	2023-06-09	2024-06-08

Electrical fast transients / burst for AC mains power ports

Equipment	Manufacturer	Model No	Serial No.	Cal Date	Due Date
Electric fast pulse group generator	3ctest	EFT-4001G	EC0461044	2023-10-18	2024-10-17
Immunity Simulative Generator	EM TEST	UCS500-M4	0101-34	2023-08-15	2024-08-14

Surges for AC mains power ports

Equipment	Manufacturer	Model No	Serial No.	Cal Date	Due Date
Immunity Simulative Generator	EM TEST	UCS500-M4	0101-34	2023-08-15	2024-08-14

Continuous induced RF disturbances for AC mains power ports (150kHz-80MHz)

Equipment	Manufacturer	Model No	Serial No.	Cal Date	Due Date
Simulator	FRANKONIA	CIT-10/75	A126A1195	2023-08-15	2024-08-14
CDN	FRANKONIA	CDN-M2+M3	A2210177	2023-06-09	2024-06-08
6dB Attenuator	FRANKONIA	DAM25W	1172040	2023-06-09	2024-06-08





Voltage dips and interruptions					
Equipment	Manufacturer	Model No	Serial No.	Cal Date	Due Date
Voltage dips and up generator	3CTEST	VDG-1105G	EC0171014	2023-06-09	2024-06-08



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5. EVALUATION RESULTS (EVALUATION)

5.1 Harmonic current emission

Test Requirement:	Class A
Test Limit:	Not specified
Test Method:	EN IEC 61000-3-2:2019+A1:2021

5.1.1 Conclusion:

Refer to EN IEC 61000-3-2 clause 7.1:

"For the following categories of equipment, limits are not specified in this document:

- lighting equipment with a rated power less than but not equal to 5 W;
- equipment with a rated power of 75 W or less, other than lighting equipment;"

Since the rated power of the EUT is less than above described, it is deemed to comply with the requirement.





6. EMISSION TEST RESULTS (EMI)

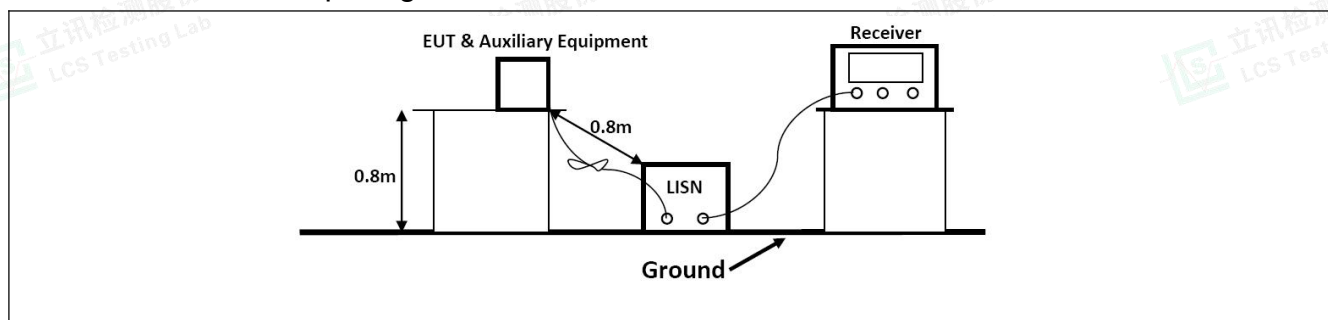
6.1 Conducted emissions from AC mains power ports (150kHz-30MHz)

Test Requirement:	Class B		
Test Limit:	Frequency Range	Limit (Quasi-Peak)	Limit (Average)
	0.15MHz to 0.5MHz	66dB(μV) to 56dB(μV)	56dB(μV) to 46dB(μV)
	0.5MHz to 5MHz	56dB(μV)	46dB(μV)
	5MHz to 30MHz	60dB(μV)	50dB(μV)
	Detector:	Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz	
Test Method:	Clause 7 of CISPR 16-2-1:2014/AMD1:2017		
Procedure:	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		

6.1.1 E.U.T. Operation:

Operating Environment:			
Temperature:	24.4 °C	Humidity:	53 %
Pre test mode:	TM1		
Final test mode:	TM1		

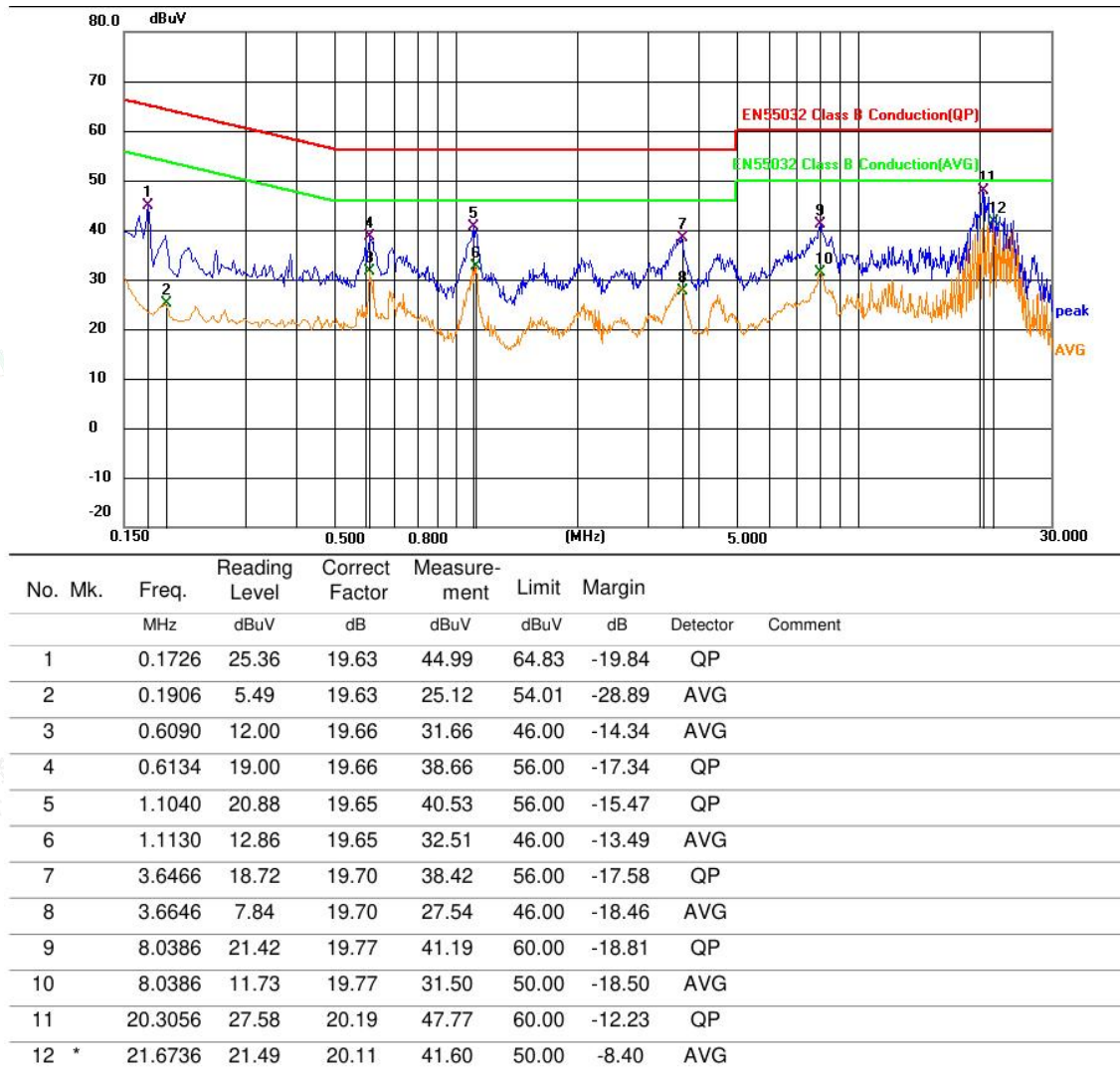
6.1.2 Test Setup Diagram:





6.1.3 Test Data:

TM1 / Line: Line



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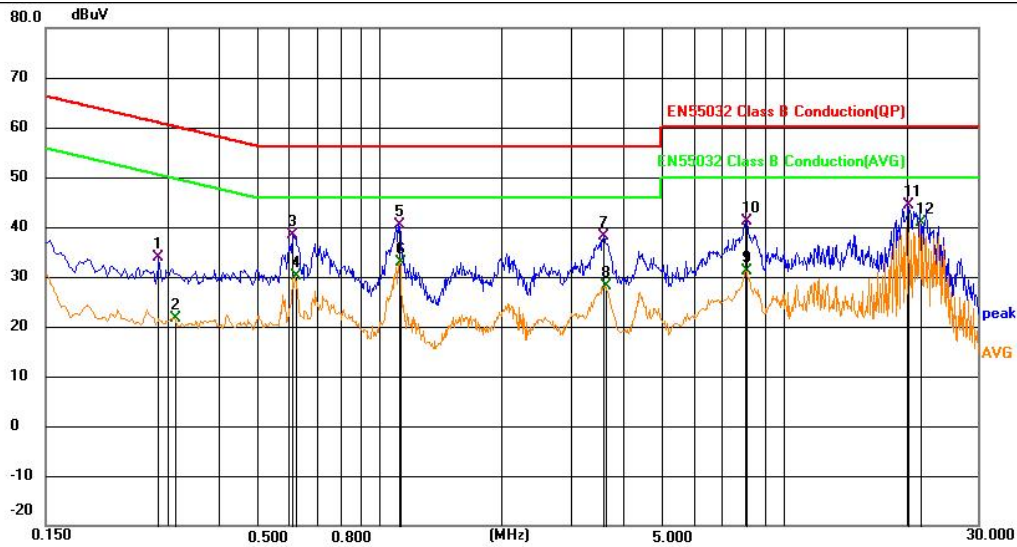
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TM1 / Line: Neutral



No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1	0.2850	14.30	19.63	33.93	60.67	-26.74	QP	
2	0.3121	2.12	19.63	21.75	49.91	-28.16	AVG	
3	0.6090	18.71	19.66	38.37	56.00	-17.63	QP	
4	0.6180	10.35	19.66	30.01	46.00	-15.99	AVG	
5	1.1131	20.75	19.65	40.40	56.00	-15.60	QP	
6	1.1176	13.25	19.65	32.90	46.00	-13.10	AVG	
7	3.5926	18.23	19.78	38.01	56.00	-17.99	QP	
8	3.6241	8.31	19.78	28.09	46.00	-17.91	AVG	
9	8.0566	11.25	19.84	31.09	50.00	-18.91	AVG	
10	8.1241	21.19	19.84	41.03	60.00	-18.97	QP	
11	20.2561	24.21	20.19	44.40	60.00	-15.60	QP	
12 *	21.6511	20.75	20.12	40.87	50.00	-9.13	AVG	





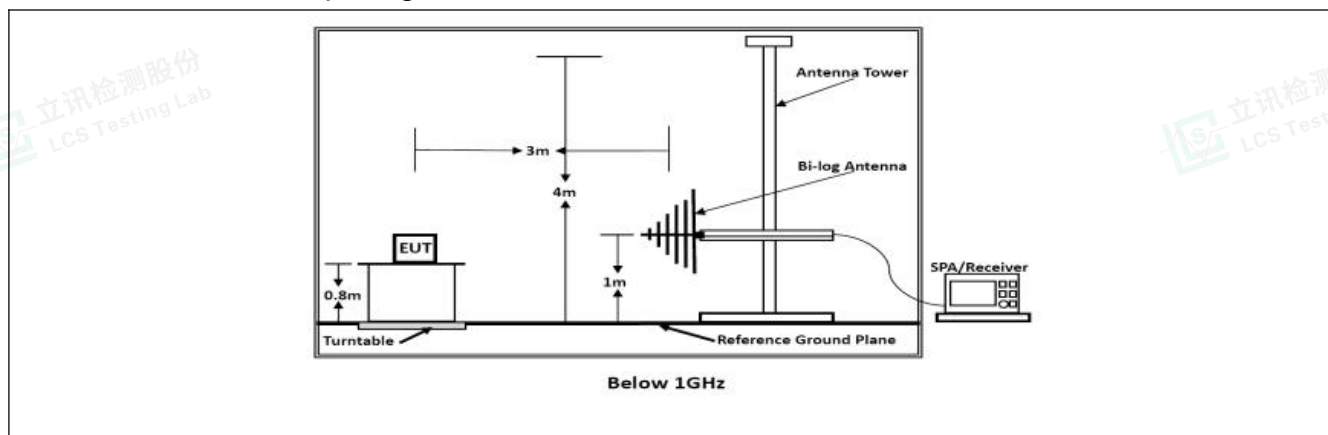
6.2 Radiated emissions (30MHz-1GHz)

Test Requirement:	Class B		
Test Limit:	Frequency (MHz)	Limit [dB(uV/m) at 10m]	Limit [dB(uV/m) at 3m]
	30 to 230	30	40
	230 to 1000	37	47
	Detector:	Peak for pre-scan (120kHz resolution bandwidth) 30M to 1000MHz	
Test Method:	Clause 7.3 of CISPR 16-2-3:2016		
Procedure:	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. Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor		

6.2.1 E.U.T. Operation:

Operating Environment:			
Temperature:	22.3 °C	Humidity:	53 %
Pre test mode:	TM1		
Final test mode:	TM1		

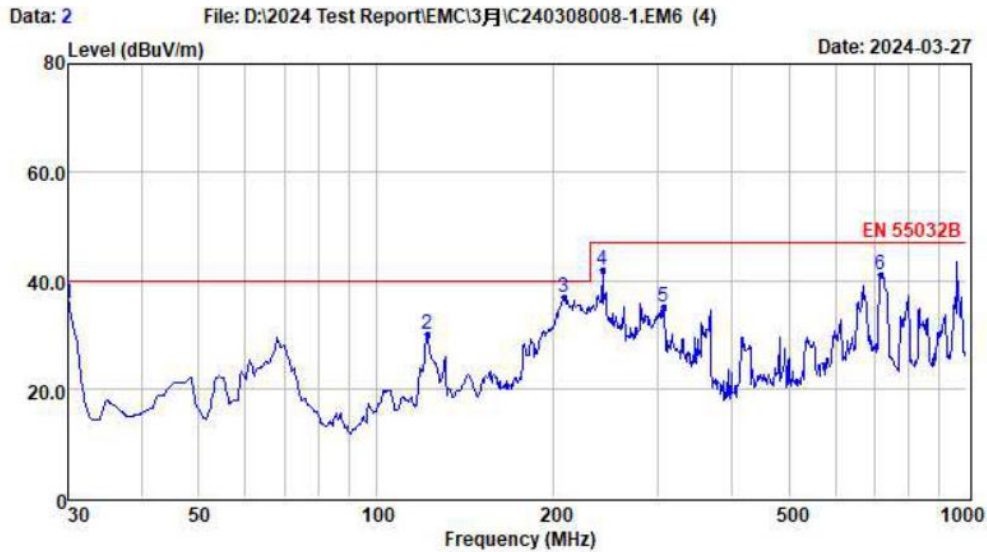
6.2.2 Test Setup Diagram:





6.2.3 Test Data:

TM1 / Polarization: Horizontal



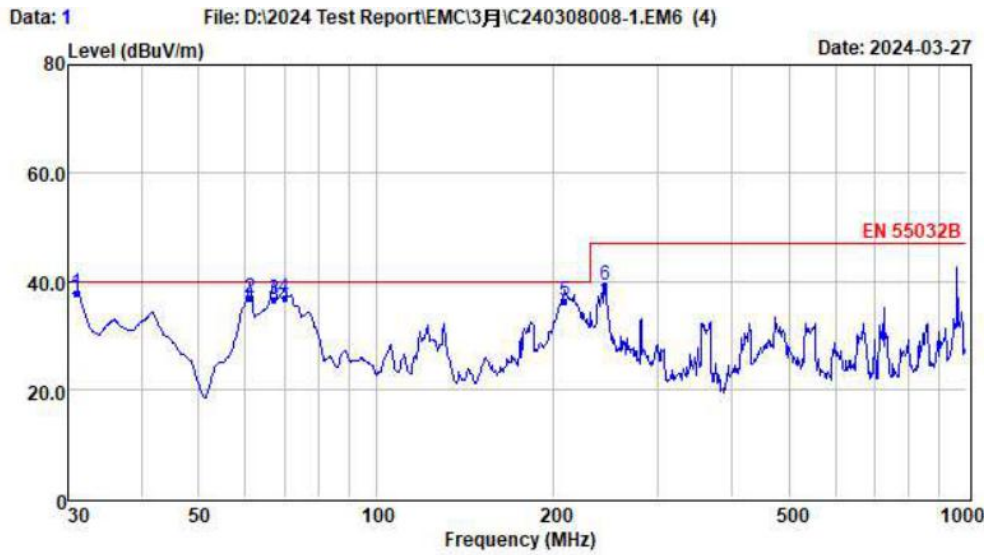
	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	30.00	24.73	0.40	10.60	35.73	40.00	-4.27	QP
2	121.98	18.78	0.91	10.36	30.05	40.00	-9.95	QP
3	207.85	24.50	1.21	11.16	36.87	40.00	-3.13	QP
4	241.68	28.35	1.25	12.24	41.84	47.00	-5.16	QP
5	306.75	20.13	1.32	13.64	35.09	47.00	-11.91	QP
6	716.68	20.26	1.84	19.04	41.14	47.00	-5.86	QP

Note: 1. All readings are Quasi-peak values.
2. Measured= Reading + Antenna Factor + Cable Loss
3. The emission that are 20db below the official limit are not reported





TM1 / Polarization: Vertical



	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	30.96	26.80	0.41	10.66	37.87	40.00	-2.13	QP
2	61.13	23.94	0.66	12.22	36.82	40.00	-3.18	QP
3	66.97	25.18	0.68	10.86	36.72	40.00	-3.28	QP
4	69.84	25.98	0.70	10.23	36.91	40.00	-3.09	QP
5	208.58	23.91	1.21	11.19	36.31	40.00	-3.69	QP
6	244.23	25.71	1.26	12.29	39.26	47.00	-7.74	QP

Note: 1. All readings are Quasi-peak values.
2. Measured= Reading + Antenna Factor + Cable Loss
3. The emission that are 20db below the official limit are not reported





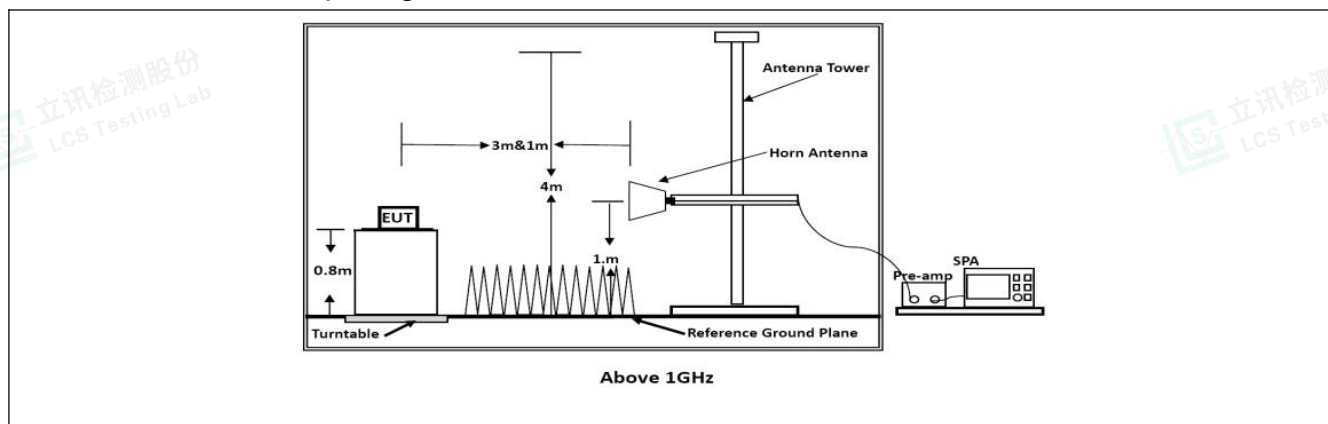
6.3 Radiated emissions (above 1GHz)

Test Requirement:	Class B		
Test Limit:	Frequency (MHz)	Limit (dBuV/m)	
		Peak	Average
	1000 to 6000	74	54
	Detector: Peak for pre-scan (1000kHz resolution bandwidth) 1000MHz to 6000MHz		
Test Method:	Clause 7.6 of CISPR 16-2-3:2016		
Procedure:	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. Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor		

6.3.1 E.U.T. Operation:

Operating Environment:			
Temperature:	23.8 °C	Humidity:	52.1 %
Pre test mode:	TM1		
Final test mode:	TM1		

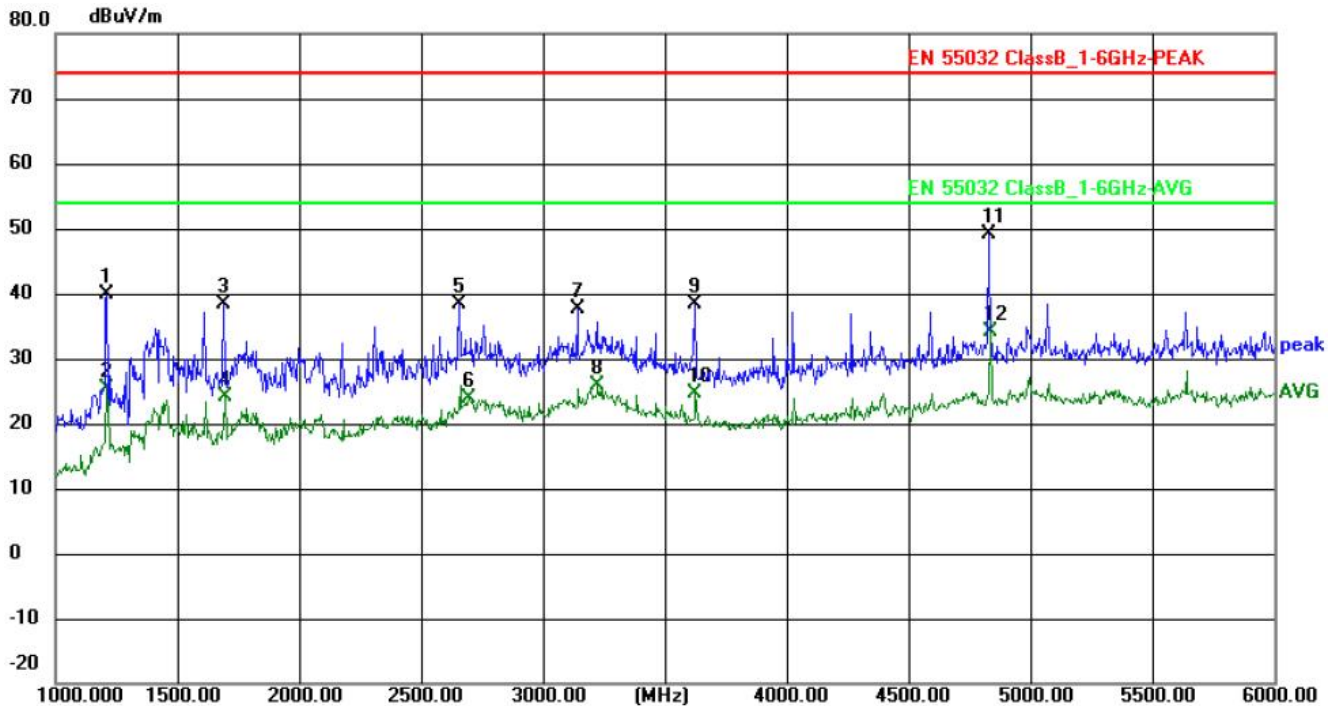
6.3.2 Test Setup Diagram:





6.3.3 Test Data:

TM1 / Polarization: Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	1210.000	55.10	-15.21	39.89	74.00	-34.11	peak	P	
2	1210.000	40.60	-15.21	25.39	54.00	-28.61	AVG	P	
3	1690.000	52.67	-14.40	38.27	74.00	-35.73	peak	P	
4	1695.000	38.51	-14.39	24.12	54.00	-29.88	AVG	P	
5	2655.000	49.22	-10.81	38.41	74.00	-35.59	peak	P	
6	2695.000	34.61	-10.66	23.95	54.00	-30.05	AVG	P	
7	3140.000	47.04	-9.53	37.51	74.00	-36.49	peak	P	
8	3225.000	35.43	-9.52	25.91	54.00	-28.09	AVG	P	
9	3625.000	47.69	-9.19	38.50	74.00	-35.50	peak	P	
10	3625.000	33.73	-9.19	24.54	54.00	-29.46	AVG	P	
11	4830.000	54.14	-4.96	49.18	74.00	-24.82	peak	P	
12	4835.000	39.01	-4.94	34.07	54.00	-19.93	AVG	P	



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Add: Room 101, 201, Building A and Room 301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Bao'an District, Shenzhen, Guangdong, China

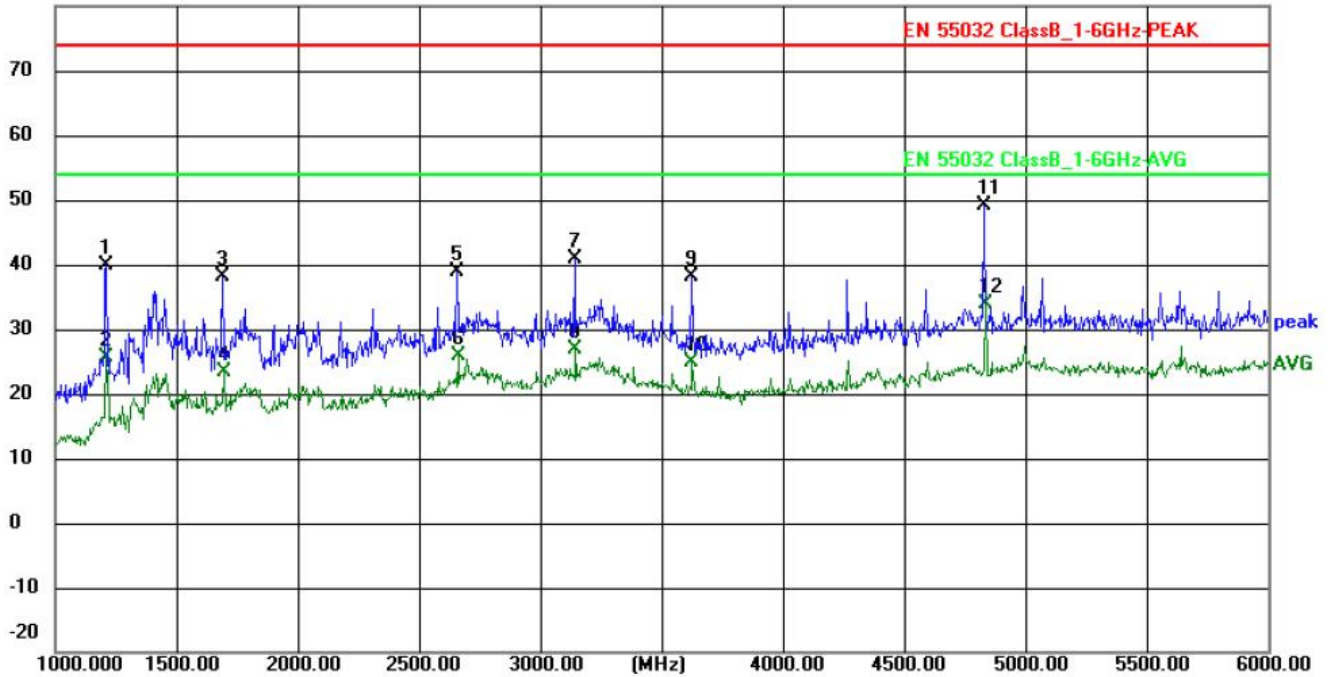
Tel: +(86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com

Scan code to check authenticity



TM1 / Polarization: Vertical

80.0 dBuV/m



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	1210.000	55.13	-15.21	39.92	74.00	-34.08	peak	P	
2	1210.000	40.82	-15.21	25.61	54.00	-28.39	AVG	P	
3	1690.000	52.50	-14.40	38.10	74.00	-35.90	peak	P	
4	1695.000	37.72	-14.39	23.33	54.00	-30.67	AVG	P	
5	2655.000	49.79	-10.81	38.98	74.00	-35.02	peak	P	
6	2660.000	36.58	-10.79	25.79	54.00	-28.21	AVG	P	
7	3140.000	50.40	-9.53	40.87	74.00	-33.13	peak	P	
8	3145.000	36.31	-9.54	26.77	54.00	-27.23	AVG	P	
9	3625.000	47.44	-9.19	38.25	74.00	-35.75	peak	P	
10	3625.000	34.11	-9.19	24.92	54.00	-29.08	AVG	P	
11	4830.000	54.05	-4.96	49.09	74.00	-24.91	peak	P	
12	4835.000	38.71	-4.94	33.77	54.00	-20.23	AVG	P	



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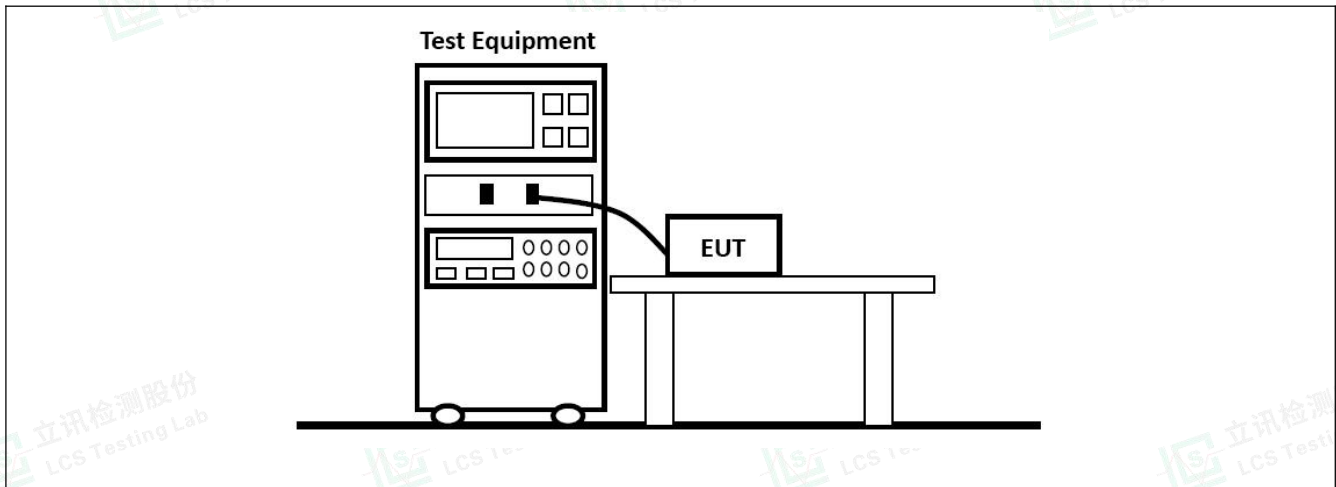
6.4 Voltage fluctuations and flicker

Test Requirement:	EN 61000-3-3, Clause 4
Test Limit:	EN 61000-3-3, Clause 5
Test Method:	EN 61000-3-3:2013+A2:2021

6.4.1 E.U.T. Operation:

Operating Environment:			
Temperature:	25 °C	Humidity:	55 %
Pre test mode:	TM1		
Final test mode:	TM1		

6.4.2 Test Setup Diagram:





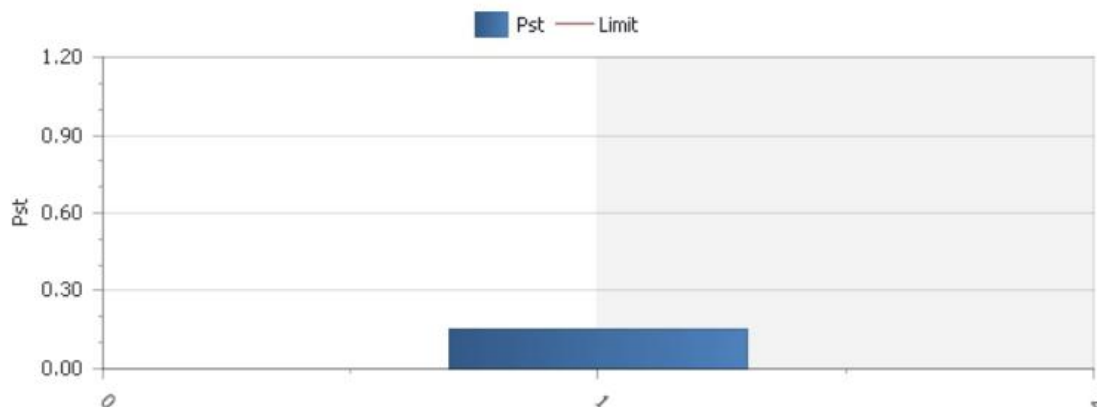
6.4.3 Test Data:

TM1

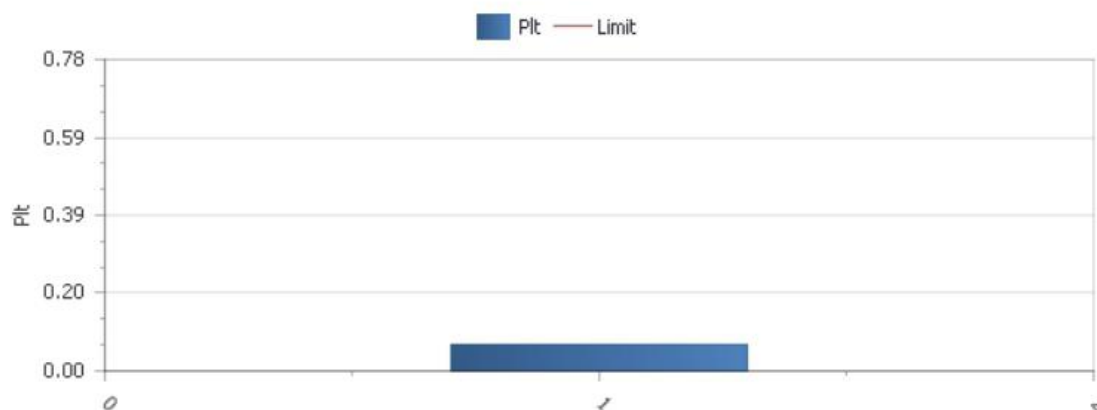
Customer : xxx

Result : PASS

Pst and Limit



Plt and Limit



Relevant Parameter and Judgement During Test Period

Vrms at the end of test (V) 229.58

Error Max (%)

Test Limit (%)

T-max (ms)

0.00

Test Limit (ms)

500

Pass

dc (%)

0.00

Test Limit (%)

3.30

Pass

dmax (%)

0.00

Test Limit (%)

4.00

Pass

Pst

0.154

Test Limit

1.000

Pass

Plt

0.067

Test Limit

0.650

Pass



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7. IMMUNITY TEST RESULTS (EMS)

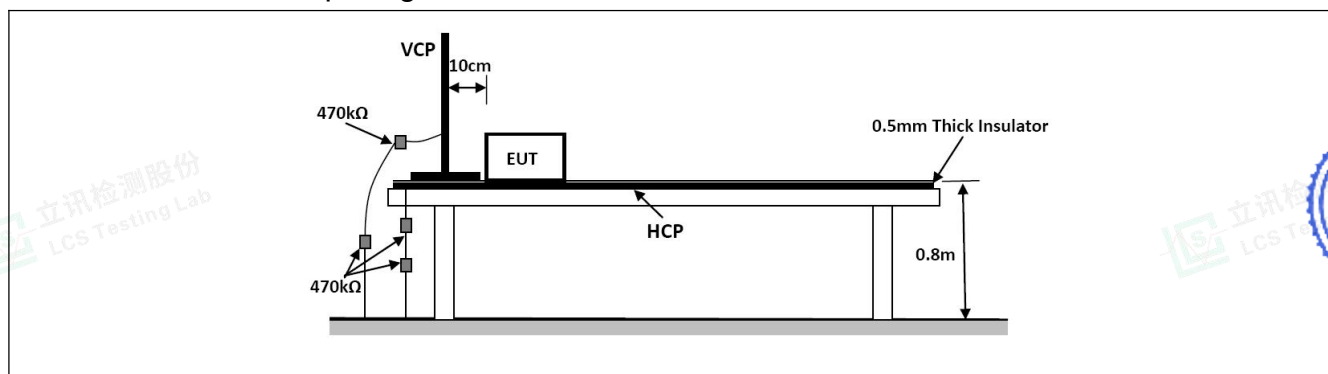
7.1 Electrostatic discharges

Test Requirement:	Contact Discharge: +/- 4kV Air Discharge: +/- 8kV
Test Method:	EN 61000-4-2: 2009
Procedure:	Discharge Impedance: 330Ω/150pF Number of Discharge: Minimum 10 times at each test point Discharge Mode: Single Discharge Discharge Period: 1 second minimum
Performance Criteria:	B

7.1.1 E.U.T. Operation:

Operating Environment:			
Temperature:	22.3 °C	Humidity:	53.5 %
Pre test mode:	TM1		
Final test mode:	TM1		

7.1.2 Test Setup Diagram:





7.1.3 Test Data:

Discharge type	Volt (kV)	Polarity	Test Point	Result/ Observations
Air discharge	2,4,8	+	10	B
Air discharge	2,4,8	-	10	B
Contact discharge	4	+	10	B
Contact discharge	4	-	10	B
Horizontal Coupling	4	+	10	B
Horizontal Coupling	4	-	10	B
Vertical Coupling	4	+	10	B
Vertical Coupling	4	-	10	B

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





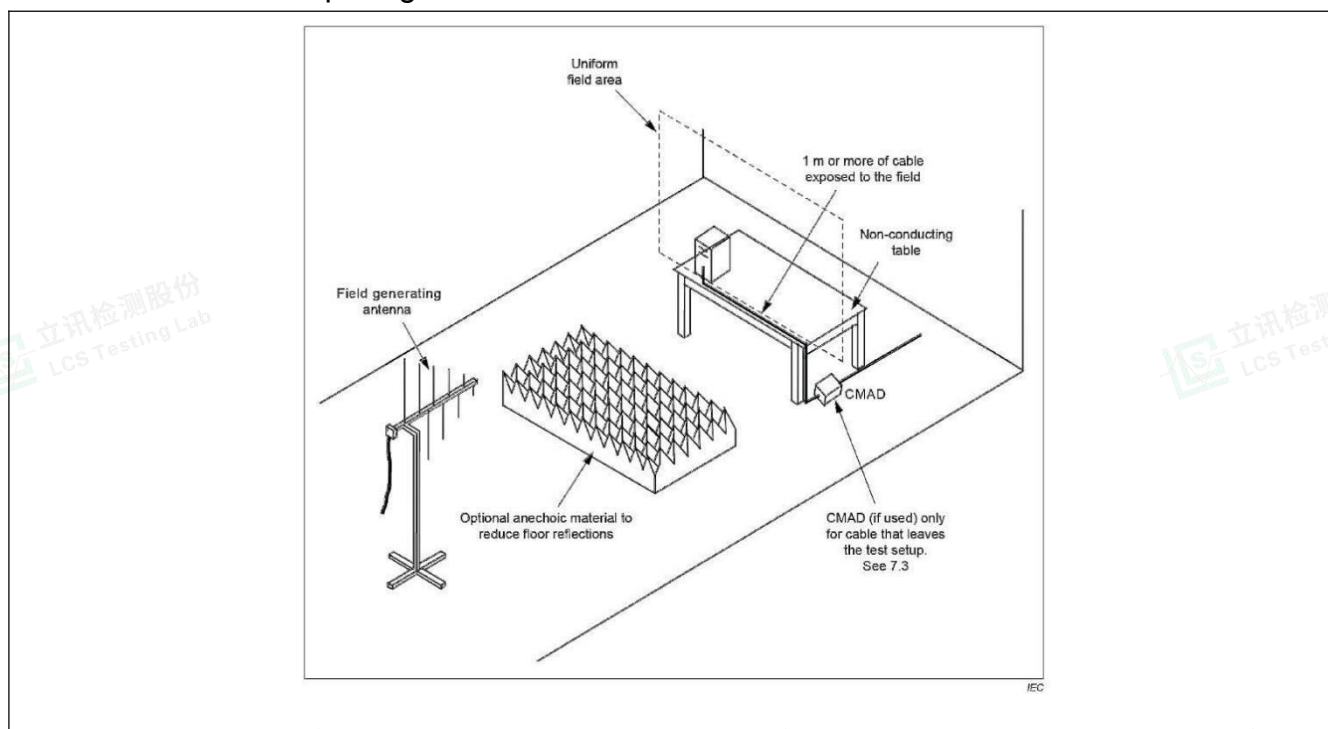
7.2 RF electromagnetic field disturbances

Test Requirement:	3V/m, 80%, 1kHz Amp. Mod.
Test Method:	EN IEC 61000-4-3: 2020
Procedure:	Frequency Range: 80MHz to 1GHz, 1800MHz, 2600MHz, 3500MHz, 5000MHz Antenna Polarisation: Vertical and Horizontal Modulation: 1kHz,80% Amp. Mod,1% increment
Performance Criteria:	A

7.2.1 E.U.T. Operation:

Operating Environment:			
Temperature:	22.3 °C	Humidity:	53.5 %
Pre test mode:	TM1		
Final test mode:	TM1		

7.2.2 Test Setup Diagram:





7.2.3 Test Data:

Frequency	Field Strength (V/m)	EUT face	Dwell time	Result/ Observations
80MHz-1GHz	3	Front, Back, Left, Right, Top, Bottom	3s	A
1800MHz	3	Front, Back, Left, Right, Top, Bottom	3s	A
2600MHz	3	Front, Back, Left, Right, Top, Bottom	3s	A
3500MHz	3	Front, Back, Left, Right, Top, Bottom	3s	A
5000MHz	3	Front, Back, Left, Right, Top, Bottom	3s	A

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





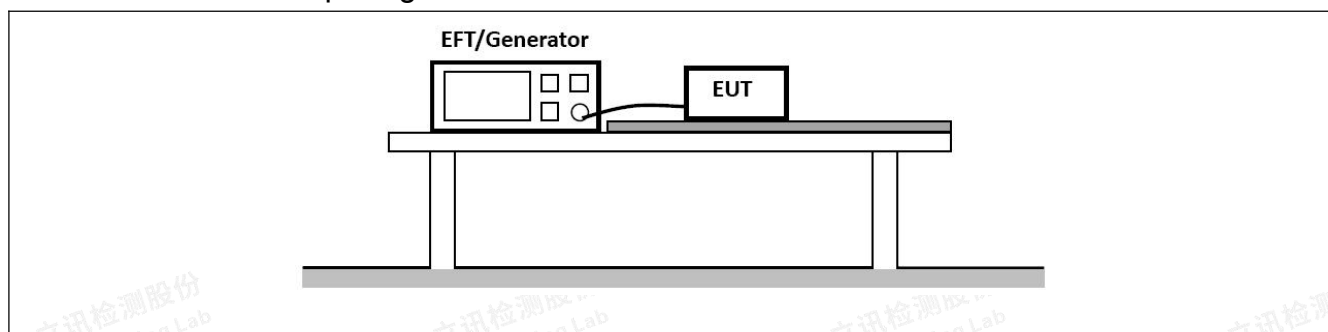
7.3 Electrical fast transients / burst for AC mains power ports

Test Requirement:	1kV; 5/50ns Tr/Th; 5kHz Repetition Frequency
Test Method:	EN 61000-4-4: 2012
Procedure:	Repetition Frequency: 5kHz Burst Period: 300ms Test Duration: 2 minute per level & polarity
Performance Criteria:	B

7.3.1 E.U.T. Operation:

Operating Environment:			
Temperature:	22.3 °C	Humidity:	53.5 %
Pre test mode:	TM1		
Final test mode:	TM1		

7.3.2 Test Setup Diagram:





7.3.3 Test Data:

Port	Volt (kV)	Polarity	CDN/ Clamp	Result/ Observations
AC power port	1	+	CDN	B
AC power port	1	-	CDN	B

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





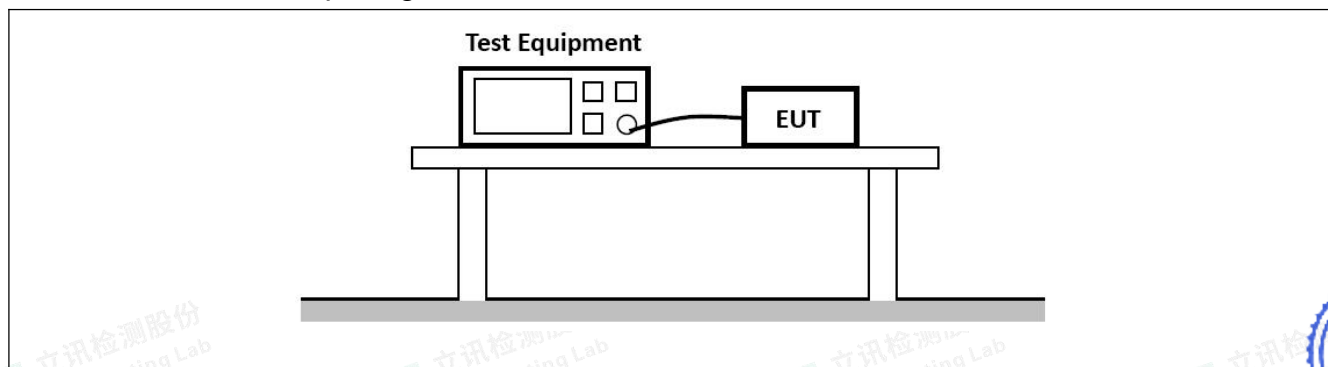
7.4 Surges for AC mains power ports

Test Requirement:	1.2/50 μ s Tr/Td; 1kV Line to Line
Test Method:	EN 61000-4-5: 2014 +A1: 2017
Procedure:	Interval: 60s between each surge No. of surges: 5 positive, 5 negative at 90°, 270°
Performance Criteria:	B

7.4.1 E.U.T. Operation:

Operating Environment:			
Temperature:	22.3 °C	Humidity:	53.5 %
Pre test mode:	TM1		
Final test mode:	TM1		

7.4.2 Test Setup Diagram:





7.4.3 Test Data:

Port	Volt (kV)	Polarity	Phase(degree)	Result/ Observations
L-N	1	+	90°	B
L-N	1	-	270°	B

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





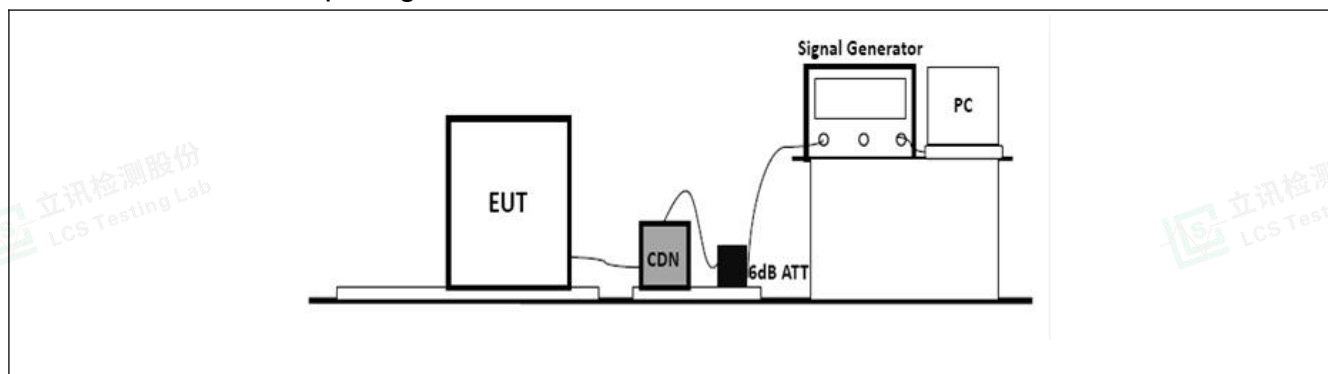
7.5 Continuous induced RF disturbances for AC mains power ports (150kHz-80MHz)

Test Requirement:	0,15 to 10MHz 3Vrms (emf), 10 to 30MHz 3V to 1Vrms(emf), 30 to 80MHz 1Vrms(emf), 80%,1kHz Amp. Mod.
Test Method:	EN 61000-4-6: 2014
Procedure:	Frequency Range: 0.15MHz to 80MHz Modulation: 80%, 1kHz Amplitude Modulation Step Size: 1%
Performance Criteria:	A

7.5.1 E.U.T. Operation:

Operating Environment:			
Temperature:	22.3 °C	Humidity:	53.5 %
Pre test mode:	TM1		
Final test mode:	TM1		

7.5.2 Test Setup Diagram:





7.5.3 Test Data:

Port	Strength (Vrms)	CDN/Clamp	Dwell time	Result/ Observations
AC power port	3(0.15MHz-10MHz)	CDN	3s	A
AC power port	3 to 1(10MHz-30MHz, Lines)	CDN	3s	A
AC power port	1(30MHz-80MHz)	CDN	3s	A

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





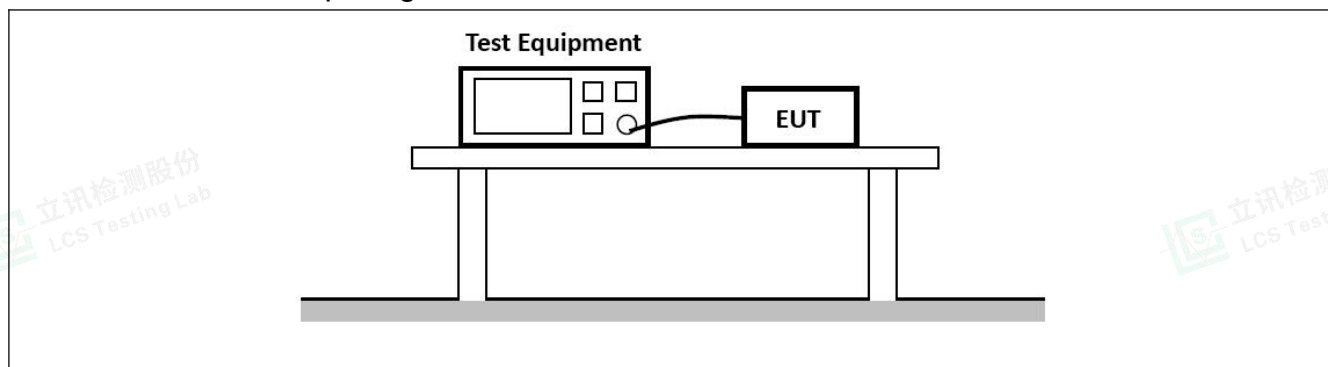
7.6 Voltage dips and interruptions

Test Requirement:	<5% residual voltage for 0.5 periods 70% residual voltage for 25 periods <5% residual voltage for 250 periods
Test Method:	EN IEC 61000-4-11:2020
Procedure:	<5% residual voltage for 0.5 period 70% residual voltage for 25 period <5% residual voltage for 250 period No. of Dips / Interruptions: 3 per Level Time between dropout: 10s
Performance Criteria:	B, C

7.6.1 E.U.T. Operation:

Operating Environment:			
Temperature:	22.3 °C	Humidity:	53.5 %
Pre test mode:	TM1		
Final test mode:	TM1		

7.6.2 Test Setup Diagram:





7.6.3 Test Data:

Level %UT	Phase (degree)	Duration	No. of Dips/ Interruptions	Result/ Observations
0	0°	0.5 Cycles	3	B
0	0°	250 Cycles	3	C
70	0°	25 Cycles	3	C
0	0°	0.5 Cycles	3	B
0	0°	300 Cycles	3	C
70	0°	30 Cycles	3	C

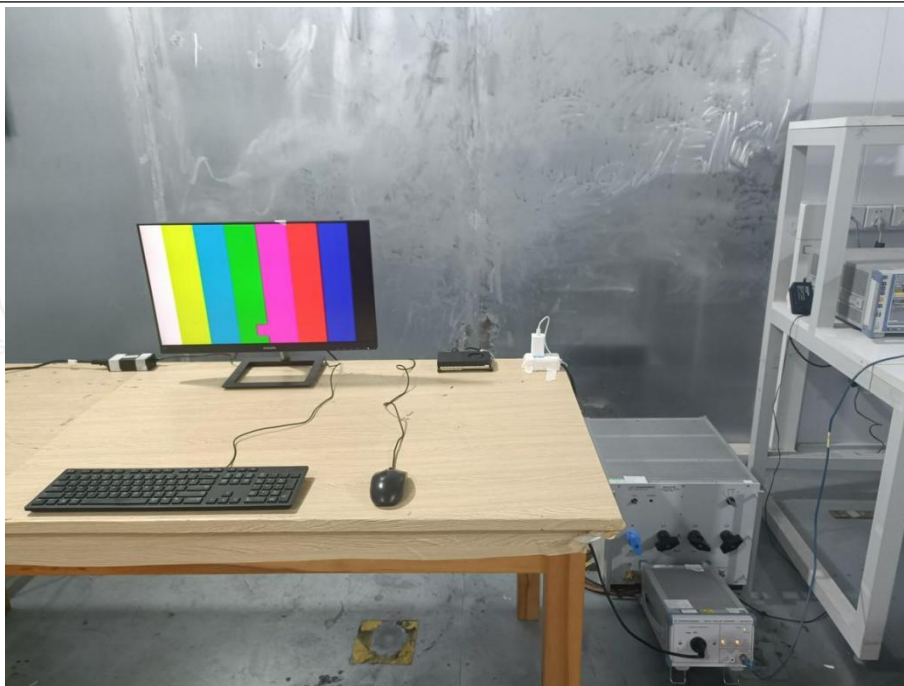
A: No degradation in the performance of the EUT was observed.





8. TEST SETUP PHOTOS

Conducted emissions from AC mains power ports (150kHz-30MHz)

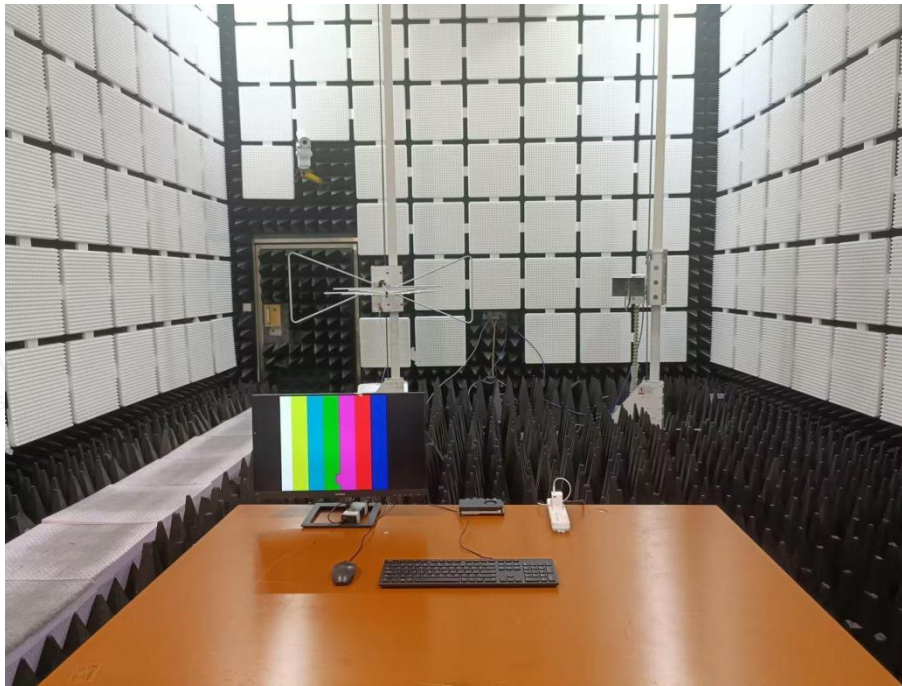


Radiated emissions (30MHz-1GHz)

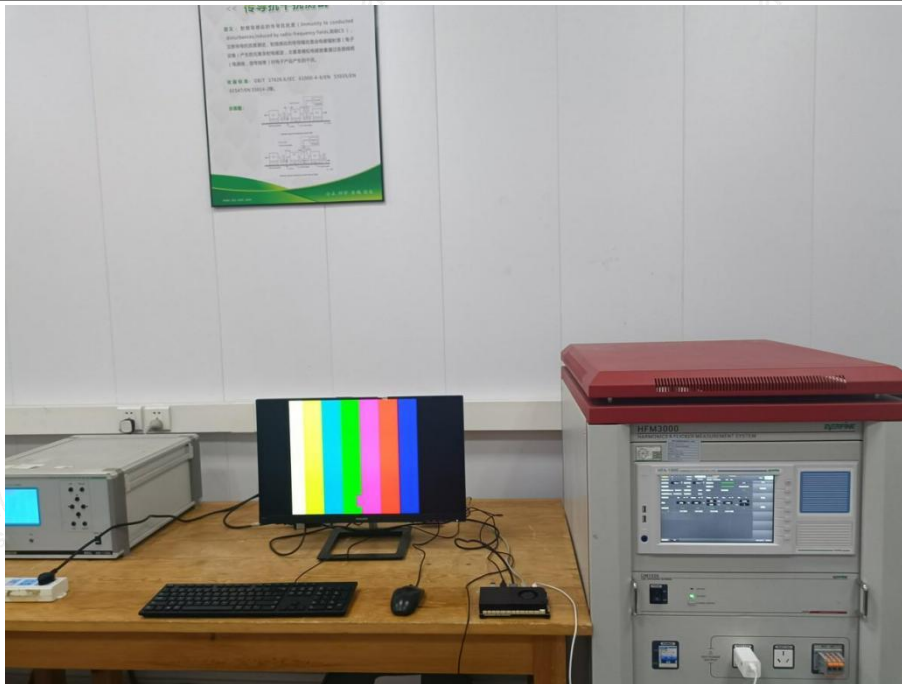




Radiated emissions (above 1GHz)



Voltage fluctuations and flicker

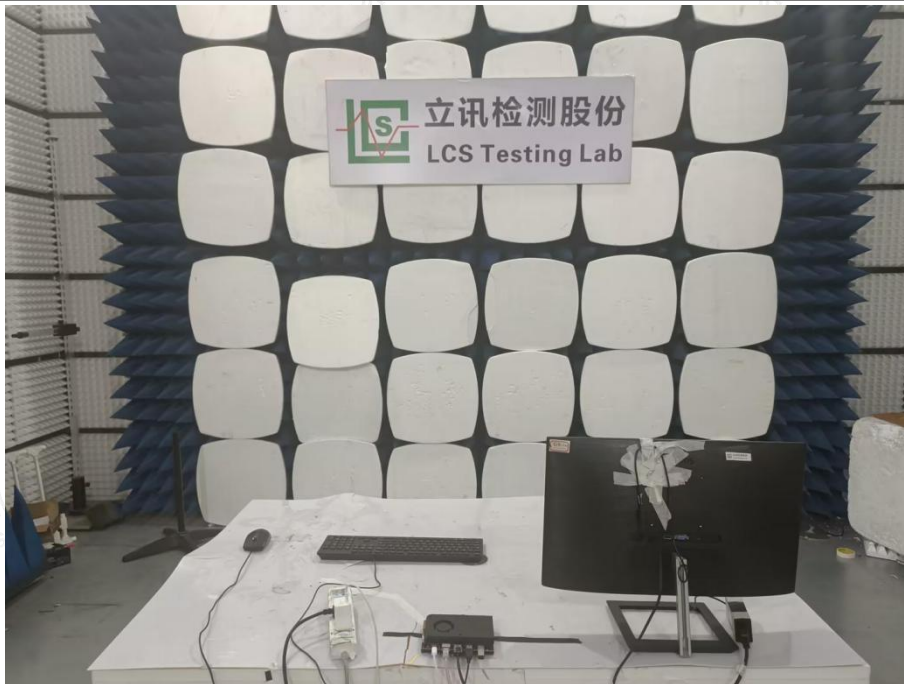




Electrostatic discharges



RF electromagnetic field disturbances

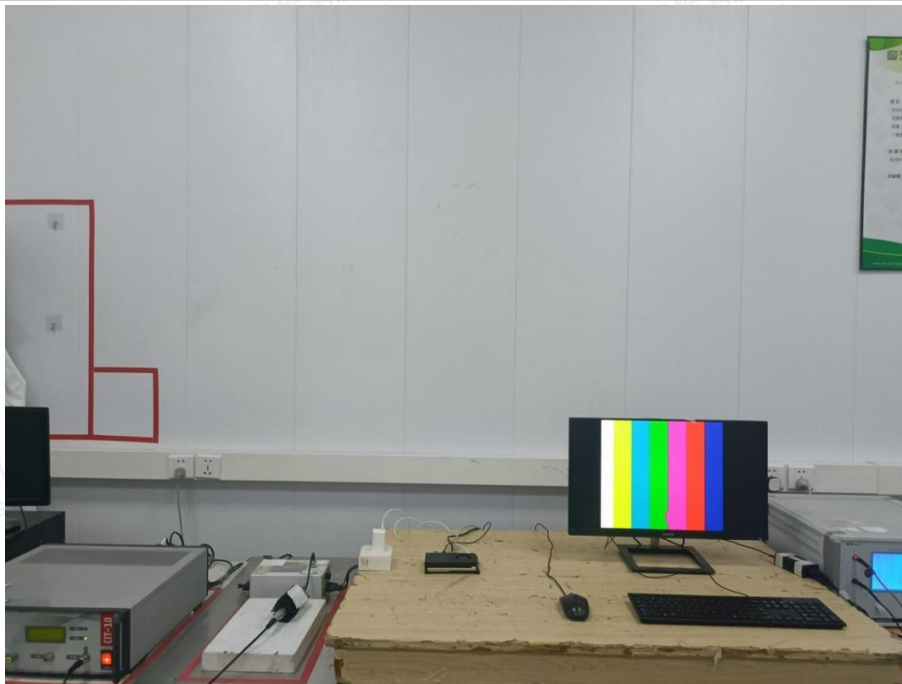




Electrical fast transients / burst for AC mains power ports Surges for AC mains power ports

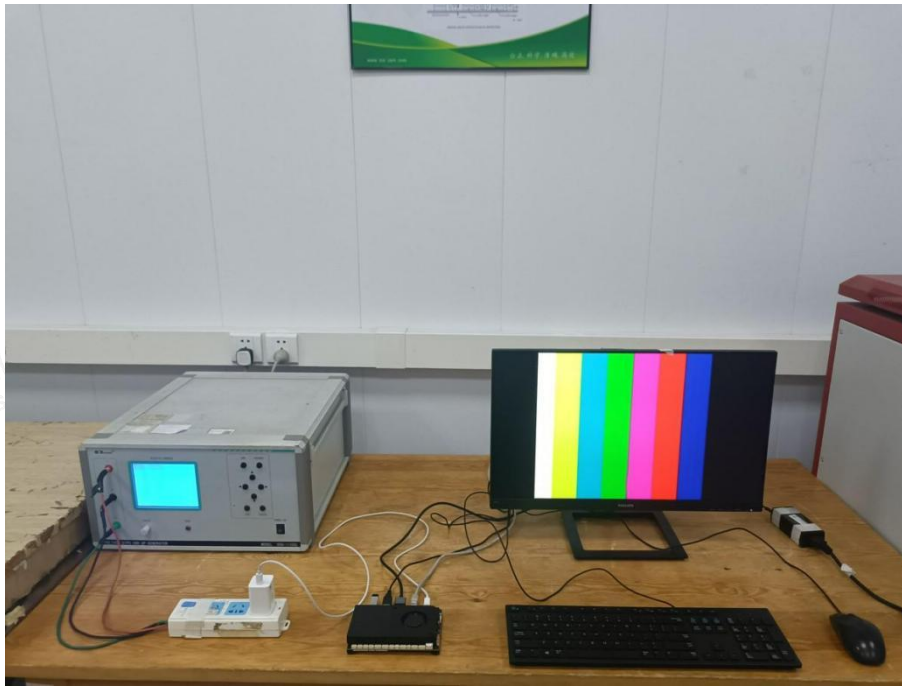


Continuous induced RF disturbances for AC mains power ports (150kHz-80MHz)





Voltage dips and interruptions





9. EUT CONSTRUCTIONAL DETAILS (EUT PHOTOS)

External







--- End of Report ---

