CE TEST REPORT

for

Lithium-ion battery

Model: 21700

(Other models please see the page 3)

Prepared for: Dongguan Ulipower Electronic Technology Limited
Room 202, Building 2, No.13 Baima Xianfeng Road, Nancheng Street.Dongguan City,Guangdong Province

Prepared by: Shenzhen NCT Testing Technology Co., Ltd
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Report Number： NCT240131608XE1-1
Date of Test： Mar. 29, 2024 ~ Apr. 08, 2024
Date of Issue： Apr. 08, 2024

Tested By:_____ Reported By:_____ Reviewed By:_____
Shine Wu Keven Wu Henry Wang

The results detailed in this test report relate only to the specific sample(s) tested. It is the Application's responsibility to ensure that all production units are manufactured with equivalent EMC characteristics. This report is not to be reproduced except in full, without written approval from NCT Testing Technology.

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1.0 General Information

1.1 Client Information

Application:	Dongguan Ulipower Electronic Technology Limited
Address of Application:	Room 202, Building 2, No.13 Baima Xianfeng Road, Nancheng Street.Dongguan City,Guangdong Province
Manufacturer:	Dongguan Ulipower Electronic Technology Limited
Address of Manufacturer:	Room 202, Building 2, No.13 Baima Xianfeng Road, Nancheng Street.Dongguan City,Guangdong Province

1.2 General Description of E.U.T.

Product Name:	Lithium-ion battery
Model:	21700
Additional Model:	26V, 33V, 35V, P28A, P42A, P45B, 35E, 29E, 50S, MH1, 20R, 22P, 35E, 25P, 18650BD, 35E
Trade Mark:	N/A
Power Supply:	DC 3.5V 4.0Ah
Memo:	According client required.
Model Difference:	All models are same except the model name.
Remark:	This test report is only for the test of the main model of the prototype

1.3 Test Facility:

Name of Test Lab:	Shenzhen NCT Testing Technology Co., Ltd
Address of Test Lab:	B2A101, B2A201, B2A202, Fuqiao 6th Area, Xintian Community, Fuhai Street, Baoan District, Shenzhen, China
Telephone:	+86-400-8868-419

2.0 List of Measurement Equipment					
Conducted emission					
Name	**Model No.**	**Serial No.**	**Manufacturer**	**Date of Cal.**	**Due Date**
EMI Test Receiver	ESPI	101604	RS	2023/6/21	2024/6/20
LISN	ENV 216	102796	RS	2023/6/17	2024/6/16
LISN	VN1-13S	004023	CRANAGE	2023/6/21	2024/6/20

Radiated emission					
Name	**Model No.**	**Serial No.**	**Manufacturer**	**Date of Cal.**	**Due Date**
EMI Test Receiver	ESCI	101178	RS	2023/6/21	2024/6/20
Spectrum Analyzer	N9020A	MY50510202	Agilent	2023/6/21	2024/6/20
Amplifier	BBV 9743 B	00374	SCHWARZBECK	2023/6/21	2024/6/20
Bilog Antenna	VULB9162	00473	SCHNARZBECK	2023/3/19	2025/3/18
Horn antenna	BBHA 9120 D	02622	SCHNARZBECK	2023/3/19	2025/3/18
Preamplifier	BBV 9718D	00042	SCHNARZBECK	2023/6/21	2024/6/20

Harmonic & Flicker					
Name	**Model No.**	**Serial No.**	**Manufacturer**	**Date of Cal.**	**Due Date**
Harmonics Flicker Test System	AC200A	512369	LAPLACE	2023/6/21	2024/6/20

Electrostatic Discharge					
Name	**Model No.**	**Serial No.**	**Manufacturer**	**Date of Cal.**	**Due Date**
Electostastic Discharge Generator	HESD 16	006315	HTEC	2023/6/26	2024/6/25

Continuous radiated disturbances(Keyway)					
Name	**Model No.**	**Serial No.**	**Manufacturer**	**Date of Cal.**	**Due Date**
Bilog Antenna	3142D	00135452	ETS	2023/04/11	2024/04/10
Amplifier (80-1000MHz)	AP801000_250	MPA1708341	SKET	2023/04/10	2024/04/09
Amplifier (1-3GHz)	AP0103_75	MPA1708342	SKET	2023/04/10	2024/04/09
Amplifier (3-6GHz)	AP0206_50	MPA1708343	SKET	2023/04/10	2024/04/09
RF Switch	/	/	EMC TOYO	2023/04/10	2024/04/09
Power Sensor	/	MY41496069	Agilent	2023/04/10	2024/04/09
Signal Generator	N5181B	MY53050432	Agilent	2023/04/10	2024/04/09

EFT/Dip					
Name	**Model No.**	**Serial No.**	**Manufacturer**	**Date of Cal.**	**Due Date**
Fast Transient Burst Simulator	HCOM PACT52	221003	HTEC	2023/6/21	2024/6/20
CYCLE SAG SIMULATOR	HV1P16T	221302	HTEC	2023/6/21	2024/6/20

Continuous conducted disturbances					
Name	**Model No.**	**Serial No.**	**Manufacturer**	**Date of Cal.**	**Due Date**
Signal Generator	CDG-7000-25	10904-1	SCHLODER	2023/6/21	2024/6/20
Power Amplifier	CDG 6050-100	191103	SCHLODER	2023/6/21	2024/6/20
CDN	M2+3	210319	SCHLODER	2023/6/21	2024/6/20

Power-frequency Magnetic field					
Name	**Model No.**	**Serial No.**	**Manufacturer**	**Date of Cal.**	**Due Date**
Continuous Wave Simulator	HMFG100	212305	HTEC	2023/6/21	2024/6/20

Surge					
Name	**Model No.**	**Serial No.**	**Manufacturer**	**Date of Cal.**	**Due Date**
Lightning Surge Generator	HOV 7000	222202	HTEC	2023/6/30	2024/6/29
Lightning Surge Generator	HIM 450	222201	HTEC	2023/6/30	2024/6/29
Lightning Surge Generator	SCDN161	222203	HTEC	2023/6/30	2024/6/29

3.0 Technical Details

3.1 Investigations Requested

Perform Electromagnetic Interference [EMI] & Electromagnetic Susceptibility [EMS] tests for CE Marking

3.2 Test Standards

EN IEC 61000-6-3:2021	Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments
EN IEC 61000-6-1:2019	Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity standard for residential, commercial and light-industrial environments
EN IEC 61000-3-2:2019/Al:2021	Electromagnetic compatibility(EMC)- Part 3-2:Limits-Limits for harmonic current emissions(equipment input current ≤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 ≤16A per phase and not subject to conditional connection

3.3 Performance Criteria

Criterion A During and after the test the EUT shall continue to operate as intended without operator intervention. No degradation of performance of loss of function is allowed.

Criterion B During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test.

Criterion C During and after testing, 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' instructions.

Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

3.4 Test standards and Results Summary Tables

Test Condition	Test Requirement	Test Result
EMISSION Results Summary		
Conducted Emission on AC Mains, 150KHz to 30MHz	EN IEC 61000-6-3	N/A
Conducted Emission on at telecommunication ports, 150KHz to 30MHz	EN IEC 61000-6-3	N/A
Radiated Emissions, 30MHz to 1GHz	EN IEC 61000-6-3	Pass
Harmonic Emissions on AC supply	EN IEC 61000-3-2	N/A
Voltage fluctuations on AC supply	EN 61000-3-3	N/A
IMMUNITY Results Summary		
Electrostatic Discharge	EN IEC 61000-6-1	Pass
RF field strength susceptibility	EN IEC 61000-6-1	Pass
Electrical Fast transients /Burst Immunity	EN IEC 61000-6-1	N/A
Surge	EN IEC 61000-6-1	N/A
Conducted susceptibility	EN IEC 61000-6-1	N/A
Power-frequency Magnetic Field	EN IEC 61000-6-1	N/A
Dips/Voltage Interruption Variation	EN IEC 61000-6-1	N/A

Note: N/A=Not applicable

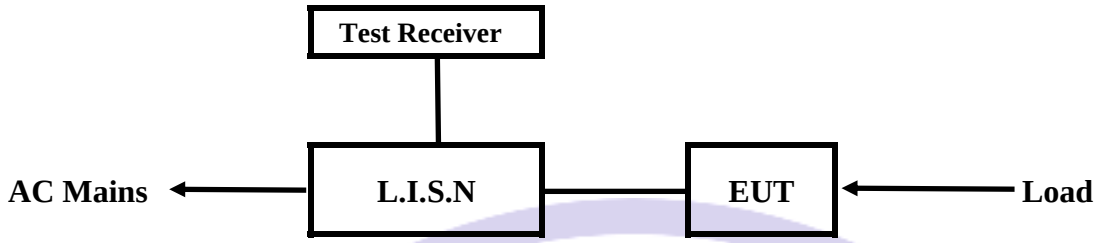
3.5 Measurement Uncertainty（95% confidence levels, k=2)

No.	Item	MU
1.	Temperature	±0.1℃
2.	Humidity	±1.0%
3.	Spurious emissions, conducted	±3.24dB
4.	All emissions, radiated	±5.03dB

4.0 Electromagnetic Interference Test results

4.1 Power Line Conducted Emission Test

4.1.1 Schematics of the test



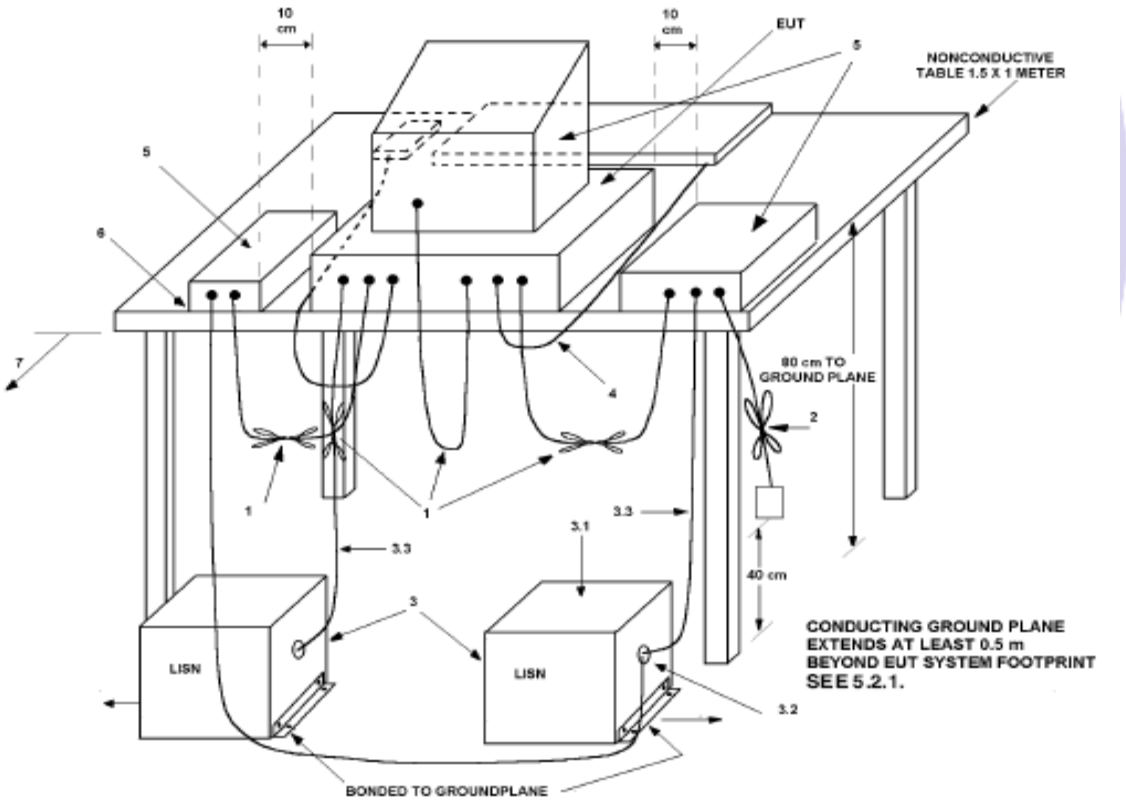
EUT: Equipment Under Test

4.1.2 Test Method and test Procedure

The test was performed in accordance with EN IEC 61000-6-3

Test Voltage: 230V~, 50Hz

Block diagram of Test setup



4.1.3 EUT Operating Condition

Operating condition is according to EN IEC 61000-6-3

Setup the EUT and simulators as shown on the following

4.1.4 Test Equipment

Please refer to the Section 2

4.1.5 Power line conducted Emission Limit

Frequency(MHz)	Class A Limits (dBμV)		Class B Limits (dBμV)	
	Quasi-peak Level	Average Level	Quasi-peak Level	Average Level
0.15 ～ 0.50	79.0	66.0	66.0～56.0*	56.0～46.0*
0.50 ～ 5.00	73.0	60.0	56.0	46.0
5.00 ～ 30.00	73.0	60.0	60.0	50.0

Notes: 1. *Decreasing linearly with logarithm of frequency.

2. The tighter limit shall apply at the transition frequencies

4.1.6 Photo documentation of the test set-up

Please refer to the Section 7

4.1.7 Test specification:

Environmental conditions: Temperature: 23° C Humidity: 50% Atmospheric pressure: 103kPa

Frequency range: 0.15 MHz – 30 MHz

4.1.8 Test result N/A

The requirements are FULFILLED

Remarks: According to the EN IEC 61000-6-3

A Conducted Emission on Live Terminal of the power line (150kHz to 30MHz)

EUT Description: --
Operation Mode: --
Tested By: --
Test date: --
Test Result: --

Start Frequency	Stop Frequency	Step	IF BW	Detector	Final M-Time
0.15MHz	30MHz	4.5KHz	10KHz	QP+AV	1s

Frequency (MHz)	Reading(dBμV)				Limit (dBμV)	
	Live		Neutral			
	Quasi-peak	Average	Quasi-peak	Average	Quasi-peak	Average
			--	--		
			--	--		

Remark: The test item is not applicable.

B Conducted Emission on Neutral Terminal of the power line (150kHz to 30MHz)

EUT Description: --
Operation Mode: --
Tested By: --
Test date: --
Test Result: --

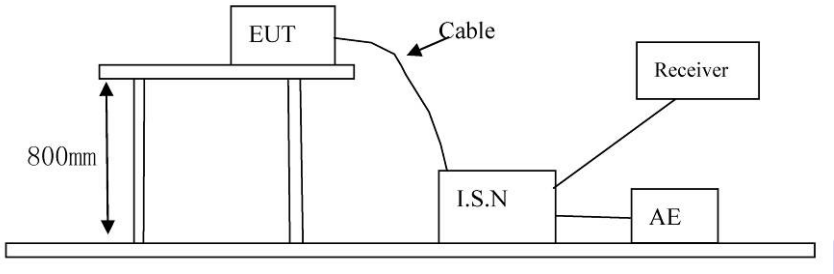
Start Frequency	Stop Frequency	Step	IF BW	Detector	Final M-Time
0.15MHz	30MHz	4.5KHz	10KHz	QP+AV	1s

Frequency (MHz)	Reading(dBμV)				Limit (dBμV)	
	Live		Neutral			
	Quasi-peak	Average	Quasi-peak	Average	Quasi-peak	Average
	--	--				
	--	--				

Remark: The test item is not applicable.

4.2 Telecommunication ports Conducted Emission Test

4.2.1 Test Method: The test was performed in accordance with EN IEC 61000-6-3



4.2.2 EUT Operating Condition

Operating condition is according to EN IEC 61000-6-3

4.2.3 Test Equipment

Please refer to the Section 2

4.2.4 Power line conducted Emission Limit

Frequency(MHz)	Class A Limits (dBμV)		Class B Limits (dBμV)	
	Quasi-peak Level	Average Level	Quasi-peak Level	Average Level
0.15 ～ 0.50	97 to 87	84 to 74	84 to 74	74 to 64
0.50 ～ 30.00	87	74	74	64

Notes: 1. *Decreasing linearly with logarithm of frequency.

2. The tighter limit shall apply at the transition frequencies

4.2.5 Test specification:

Environmental conditions: Temperature: 23° C Humidity: 50% Atmospheric pressure: 103kPa

Frequency range: 0.15 MHz – 30 MHz

4.2.6 Test result N/A

The requirements are FULFILLED

Remarks: According to the EN IEC 61000-6-3

A Conducted Emission on Telecommunication port (150kHz to 30MHz)

EUT Description: --
Operation Mode: --
Tested By: --
Test date: --
Test Result: --

Start Frequency	Stop Frequency	Step	IF BW	Detector	Final M-Time
0.15MHz	30MHz	4.5KHz	10KHz	QP+AV	1s

Frequency (MHz)	Port	Reading(dBμA)		Limit(dBμA)	
		Quasi-peak	Average	Quasi-peak	Average

Remark: The test item is not applicable.

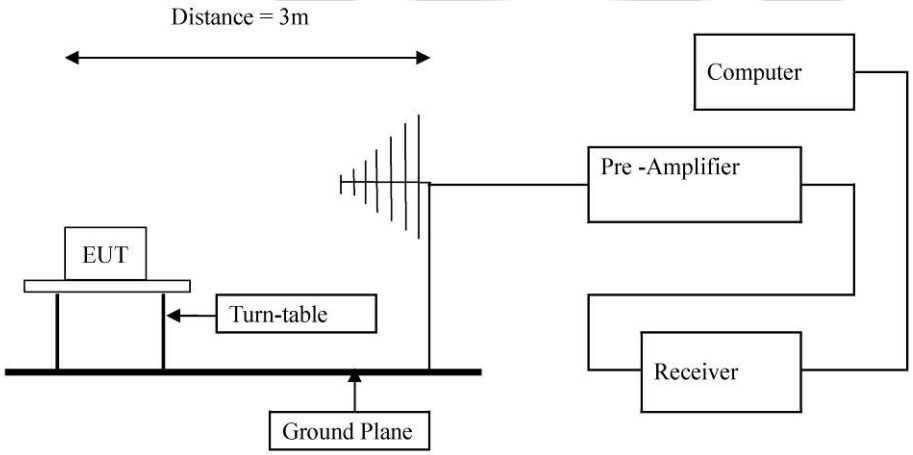
4.3 Radiated Emission Test

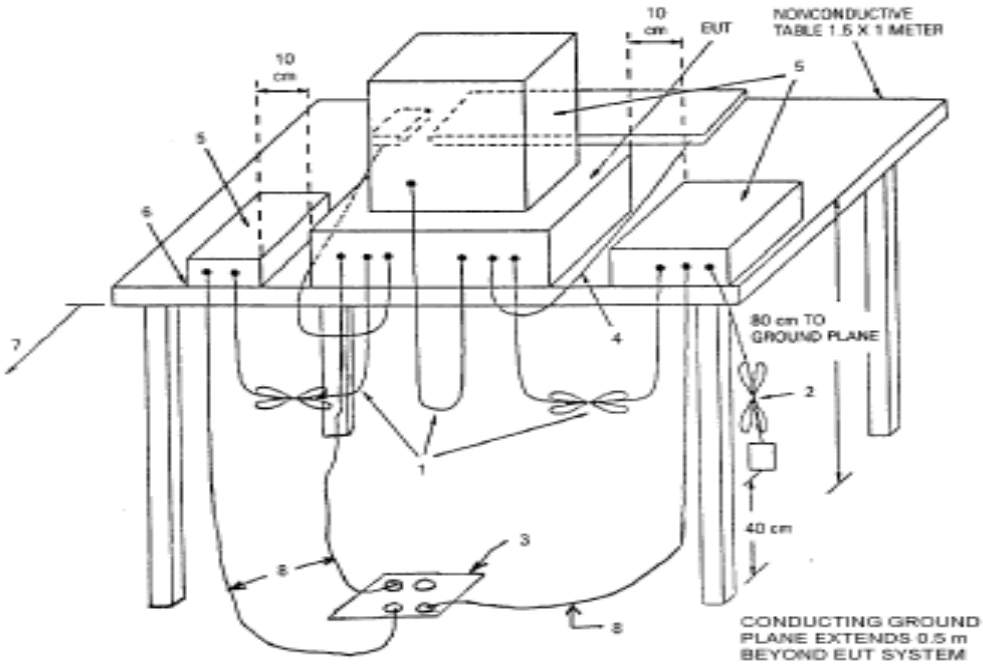
4.3.1 Schematics of the test

EUT: Equipment Under Test

4.3.2 Test Method: The test was performed in accordance with EN IEC 61000-6-3

Block diagram of Test setup





4.3.3 EUT Operating Condition

Operating condition is according to EN IEC 61000-6-3

4.3.4 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below:

Frequency Range (MHz)	Distance (m)	Quasi-Peak limits (dB μ V/m)	
		Class A Limits	Class B Limits
30-230	3	50.00	40.00
230-1000	3	57.00	47.00

Note: 1) The lower limit shall apply at the transition frequencies

2) If measurement is not made at 3m distance, then F.S Limitation at 3m distance is adjusted by using the formula Ld1 = Ld2 * (d2/d1)

4.3.5 Photo documentation of the test set-up

Please refer to the Section 7

4.3.6 Test Equipment:

Please refer to the Section 2

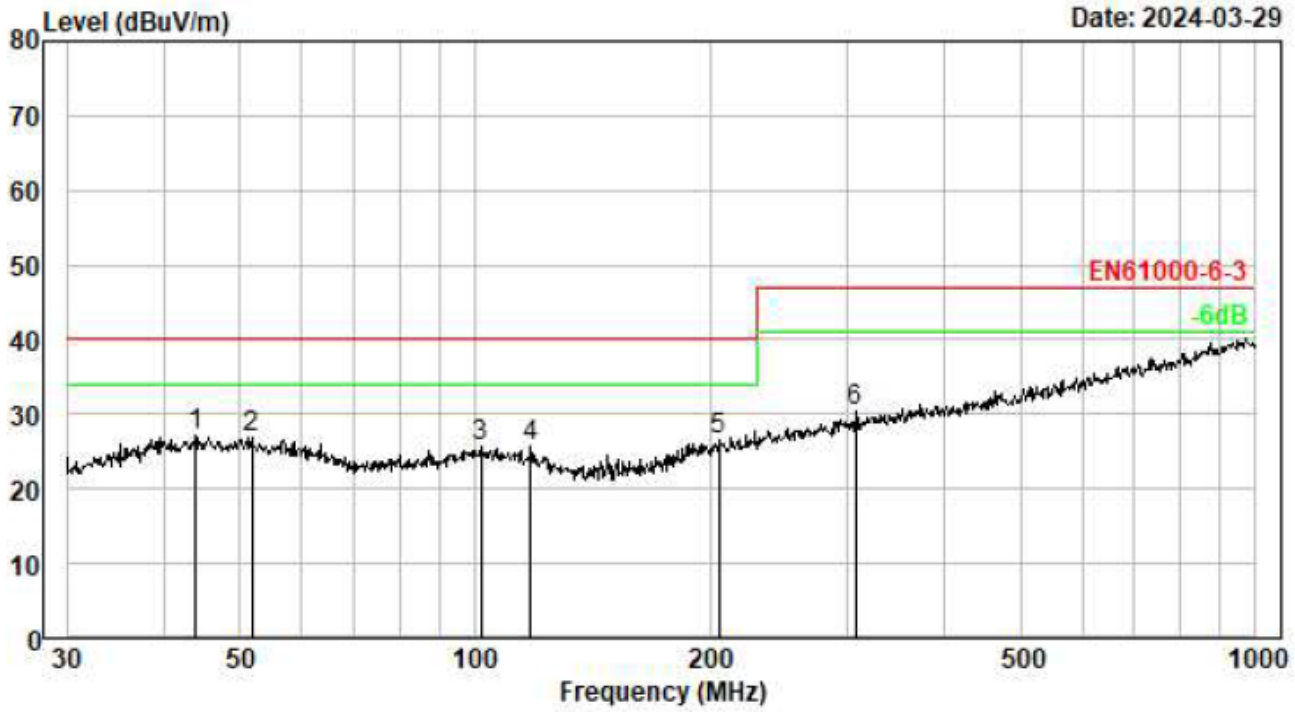
4.3.7 Test specification:

Environmental conditions: Temperature 26° C Humidity: 56% Atmospheric pressure: 103kPa

4.3.8 Test result Pass

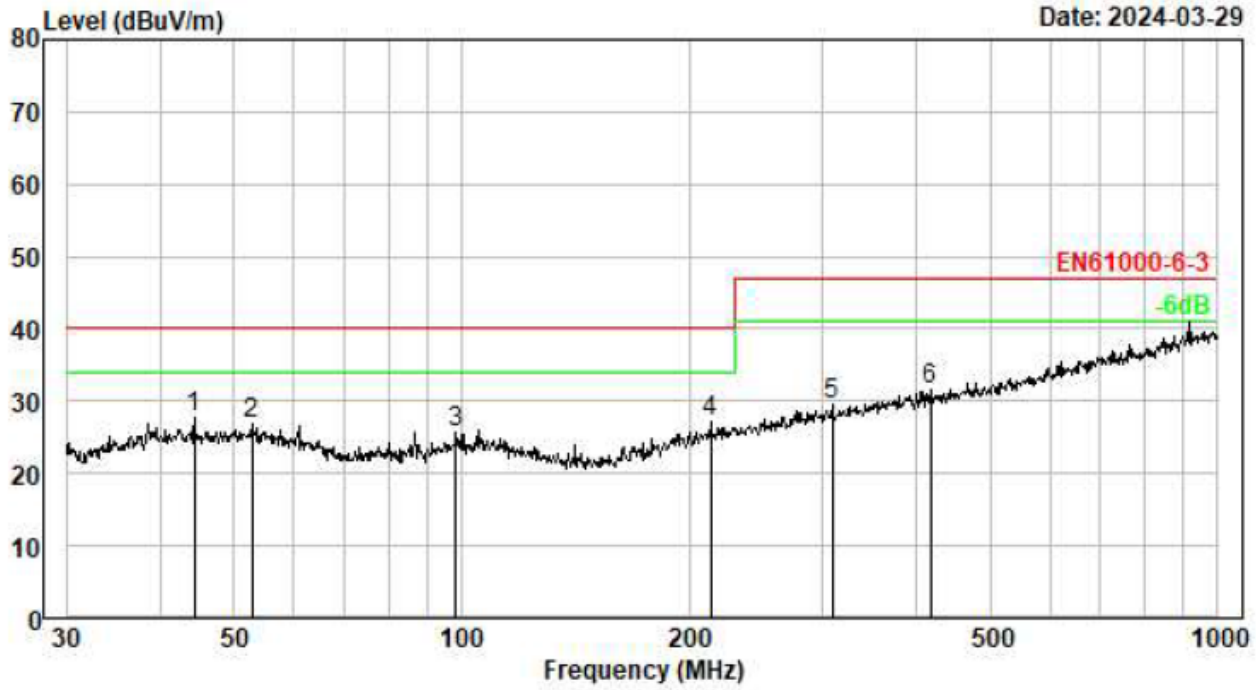
Remarks: According to the EN IEC 61000-6-3

A. **Radiated Emission In Horizontal (30MHz----1000MHz)**



No.	Freq MHz	Cable Loss dB	ANT Factor dB/m	Preamp Gain dB	Receiver Reading dBµV	Emission Level dBµV/m	Limit dBµV/m	Over Limit dB	Remark
1	43.812	0.38	12.58	0.00	14.25	27.21	40.00	-12.79	QP
2	51.843	0.44	12.50	0.00	14.00	26.94	40.00	-13.06	QP
3	101.644	0.70	11.12	0.00	13.83	25.65	40.00	-14.35	QP
4	117.773	0.78	10.49	0.00	14.40	25.67	40.00	-14.33	QP
5	205.675	1.08	11.60	0.00	13.94	26.62	40.00	-13.38	QP
6	307.831	1.29	14.43	0.00	14.64	30.36	47.00	-16.64	QP

B. Radiated Emission In Vertical (30MHz----1000MHz)



No.	Freq MHz	Cable Loss dB	ANT Factor dB/m	Preamp Gain dB	Receiver Reading dBµV	Emission Level dBµV/m	Limit dBµV/m	Over Limit dB	Remark
1	44.275	0.39	12.59	0.00	14.62	27.60	40.00	-12.40	QP
2	52.760	0.45	12.41	0.00	13.88	26.74	40.00	-13.26	QP
3	98.142	0.68	10.89	0.00	14.16	25.73	40.00	-14.27	QP
4	213.763	1.10	11.88	0.00	14.11	27.09	40.00	-12.91	QP
5	308.913	1.29	14.45	0.00	13.82	29.56	47.00	-17.44	QP
6	417.641	1.45	16.07	0.00	14.19	31.71	47.00	-15.29	QP

4.4 Harmonic Current Emissions

4.4.1 EUT Operating Mode

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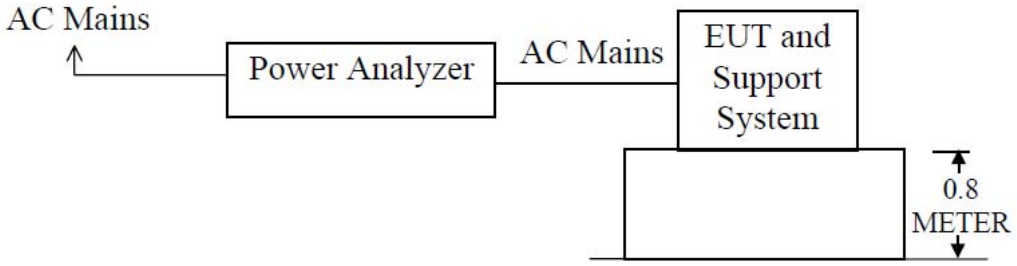
4.4.2 Block Diagram of Test Setup.



This test was performed as per EMC Basic Standard EN IEC 61000-3-2 Class A

4.4.3 Test Equipment

Please refer to Section 2 this report.

4.4.4 Test specification:

Environmental conditions: Temperature: 23° C Humidity: 54% Atmospheric pressure: 103kPa

4.4.5 Results

Port	EUT Operating mode	Result (Passed / Failed)
AC Input	N/A	N/A

Remark: The test item is not applicable.

4.5 Flicker and Voltage Fluctuation

4.5.1 EUT Operating Mode

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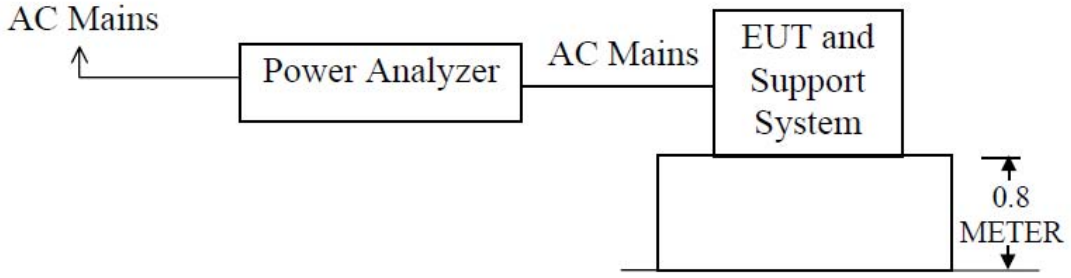
4.5.2 Block Diagram of Test Setup.



This test was performed as per EMC Basic Standard EN 61000-3-3

4.5.3 Limits of Voltage Fluctuation and Flicks Measurement

Test Item	Limit	Note
P_{st}	1.0	Pst means short-term flicker indicator
P_{lt}	0.65	Plt means long-term flicker indicator
T_{dt} (ms)	200	Tdt means maximum time that dt exceeds 3%.
d_{max} (%)	4	Dmax means maximum relative voltage change.
dc (%)	3	Dc means relative steady-state voltage change.

4.5.4 Test Equipment

Please refer to Section 2 this report.

4.5.5 Test specification:

Environmental conditions: Temperature: 23° C Humidity: 54% Atmospheric pressure: 103kPa

4.5.6 Results

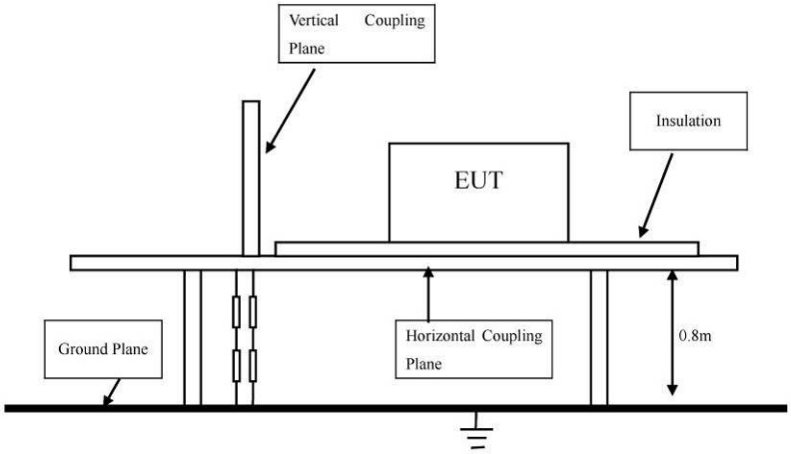
Port	EUT Operating mode	Result (Passed / Failed)
AC Input	N/A	N/A

Remark: The test item is not applicable.

5.0 Immunity Test

5.1 Electrostatic Discharge

5.1.1 Schematic of the test



5.1.2 Test method

The test was performed in accordance with EN IEC 61000-6-1

5.1.3 Test severity

±4kV for direct & in-direct Contact Discharge

±8kV for air Discharge

Performance Criterion Require: **B**

5.1.4 Test Equipment

Please refer to Section 2 this report.

5.1.5 Test specification:

Environmental conditions: Temperature: 23° C Humidity: 54% Atmospheric pressure: 103kPa

5.1.6 Operation mode: Discharging

5.1.7 Discharge location
- HCP
- VCP
- Shell
- OUT Port

5.1.8 Test Result Pass

5.2 RF field strength susceptibility (80MHz------ 6000MHz)

5.2.1 Test Method:

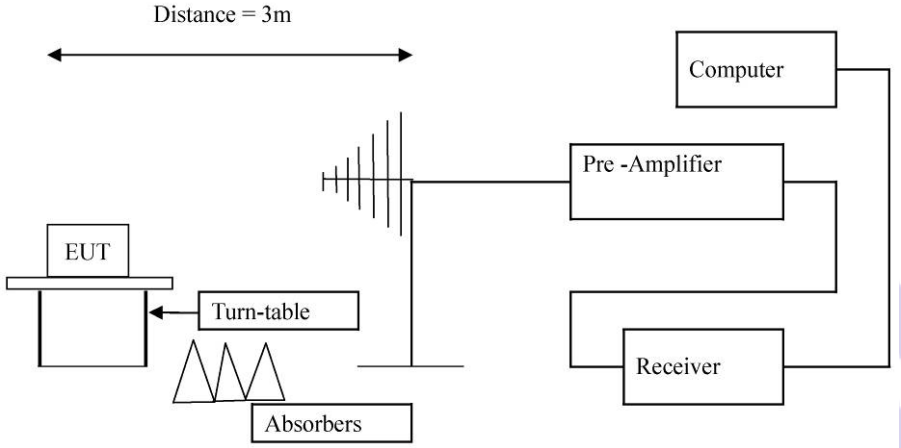
The test was performed in accordance with EN IEC 61000-6-1

Severity: Level 2 (3V/m)

Modulation: 1 KHz 80% AM

Performance Criterion Require: A

Block diagram of Test setup



5.2.2 Test Equipment

Please refer to Section 2 this report.

5.2.3 Test specification:

Environmental conditions: Temperature: 24° C Humidity: 54% Atmospheric pressure: 103kPa

5.2.4 Operation mode: Discharging

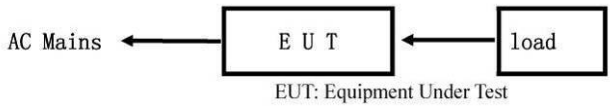
5.2.5 Test Result:

Please refer to the following table for individual results.

Frequency (MHz)	Radiation to	Polarity	Level (V/m)	Dwell Time(s)	Sweep Rate (%)	Results
80-1000	Front	H/V	3	1	1	Pass
80-1000	Rear	H/V	3	1	1	Pass
80-1000	Left	H/V	3	1	1	Pass
80-1000	Right	H/V	3	1	1	Pass
1400-6000	Front	H/V	3	1	1	Pass
1400-6000	Rear	H/V	3	1	1	Pass
1400-6000	Left	H/V	3	1	1	Pass
1400-6000	Right	H/V	3	1	1	Pass

5.3 Electrical Fast Transient/Burst (EFT/B) immunity test

5.3.1 Schematics of the test



EUT: Equipment Under Test

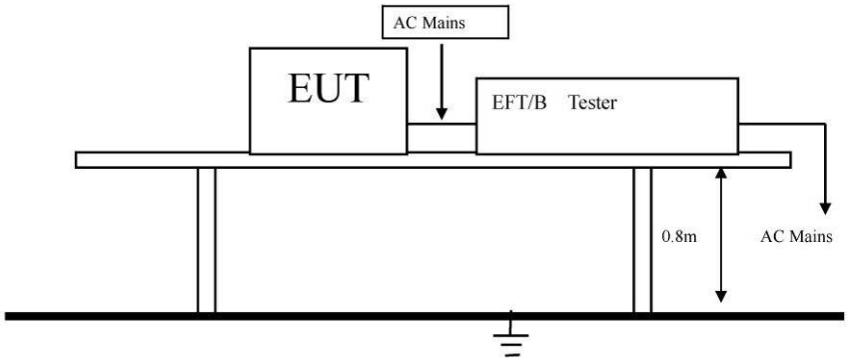
5.3.2 Test Method

The test was performed in accordance with EN IEC 61000-6-1

Severity: Level 2 (1kV)

Performance Criterion Require: **B**

Block diagram of Test setup



5.3.3 Test Equipment

Please refer to Section 2 this report.

5.3.4 Test specification:

Environmental conditions: Temperature: 23° C Humidity: 54% Atmospheric pressure: 103kPa

5.3.5 Operation mode: --

5.3.6 Test Results

Inject location: AC mains

Inject Line	Voltage kV	Inject Times (s)	Method	Results
L	±1	120	Direct	N/A
N	±1	120	Direct	N/A
L、N	±1	120	Direct	N/A
E	±1	120	Direct	N/A
L、E	±1	120	Direct	N/A
N、E	±1	120	Direct	N/A
L、N、E	±1	120	Direct	N/A

Remark: The test item is not applicable.

5.4 Surge test

5.4.1 Schematics of the test

EUT: Equipment Under Test

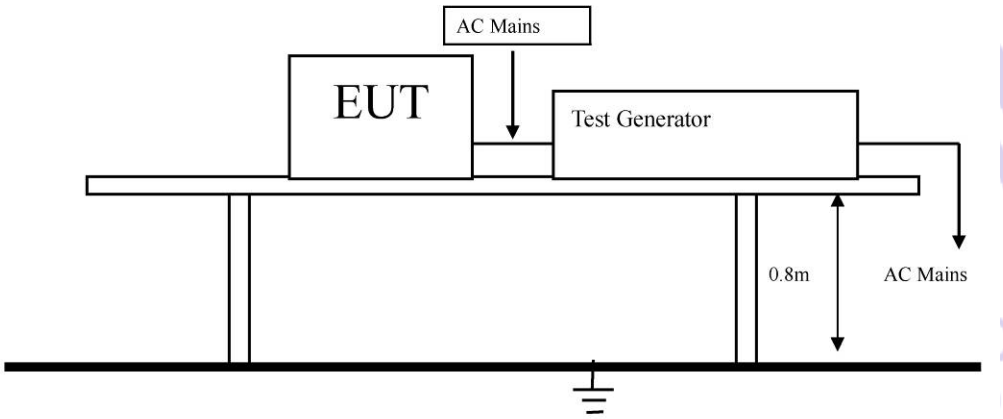
5.4.2 Test Method:

The test was performed in accordance with EN IEC 61000-6-1

Severity: Level 2

Performance Criterion Require: B

Block diagram of Test setup



5.4.3 Test Equipment

Please refer to Section 2 this report.

5.4.4 Test specification:

Environmental conditions: Temperature: 22° C Humidity: 54% Atmospheric pressure: 103kPa

5.4.5 Operation mode: --

5.4.6 Test Results

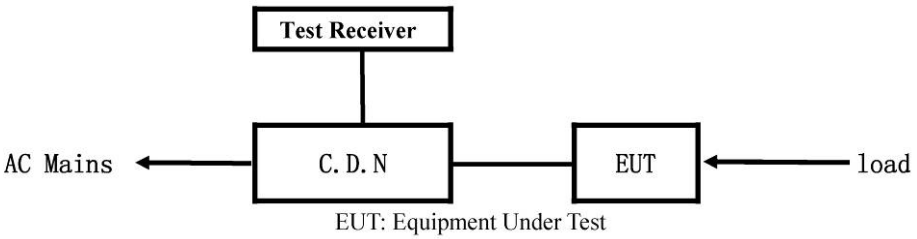
5 pulses for each polarity and test voltage, and repetition rate is 1 per min.

Location	Polarity	0°	90°	180°	270°	Results
L-N	±1 KV	N/A	N/A	N/A	N/A	N/A
L-PE	±2 KV	N/A	N/A	N/A	N/A	N/A
N-PE	±2 KV	N/A	N/A	N/A	N/A	N/A

Remark: The test item is not applicable.

5.5 Conducted Immunity test

5.5.1 Schematics of the test



EUT: Equipment Under Test

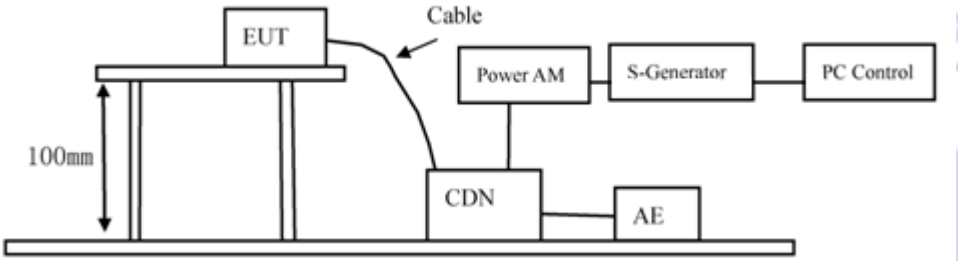
5.5.2 Test Method

The test was performed in accordance with EN IEC 61000-6-1

Severity: Level 2 (3 V rms),0.15MHz—80MHz

Performance Criterion Require: A

Block diagram of Test setup



5.5.3 Test Equipment

Please refer to Section 2 this report.

5.5.4 Test specification:

Environmental conditions: Temperature: 23° C Humidity: 54% Atmospheric pressure: 103kPa

5.5.5 Operation mode: --

5.5.6 Test Results:

Frequency Range (MHz)	Injected Position	Strength	Criterion	Result
0.15 - 80	AC Line	3V (rms) Unmodulated	A	N/A

Remark: The test item is not applicable.

5.6 Power-Frequency magnetic field test

5.6.1 Schematics of the test

EUT: Equipment Under Test

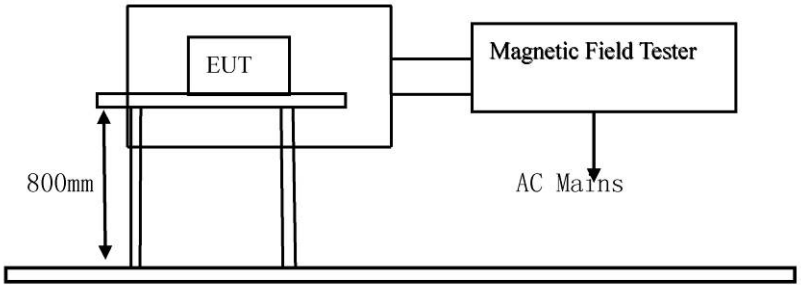
5.6.2 Test Method

The test was performed in accordance with EN IEC 61000-6-1

Severity: Level 1 (1A/m),

Performance Criterion Require: A

Block diagram of Test setup



5.6.3 Test Equipment

Please refer to Section 2 this report.

5.6.4 Test specification:

Environmental conditions: Temperature: 22° C Humidity: 54% Atmospheric pressure: 103kPa

5.6.5 Operation mode: --

5.6.6 Test Results:

Test Level	Testing Duration	Coil Orientation	Criterion	Result
1A/m	5 Mins	X	A	N/A
1A/m	5 Mins	Y	A	N/A
1A/m	5 Mins	Z	A	N/A

Remark: The test item is not applicable.

5.7 Voltage Dips/Interruptions immunity test

5.7.1 Schematics of the test

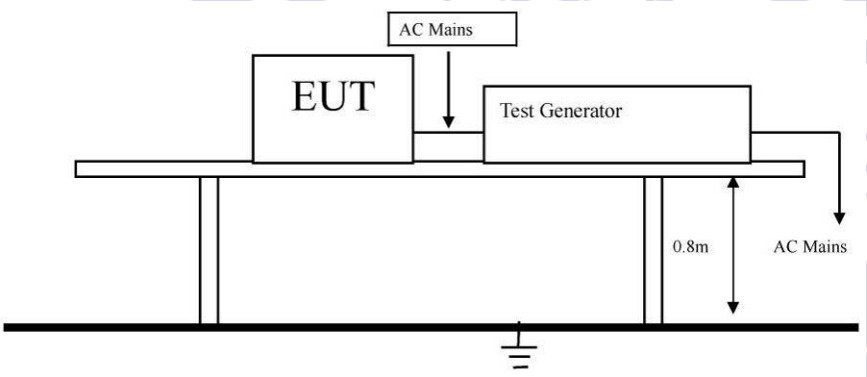
EUT: Equipment Under Test

5.7.2 Test Method:

The test was performed in accordance with EN IEC 61000-6-1

Performance Criterion Require: C&B

Block diagram of Test setup



5.7.3 Test Equipment

Please refer to Section 2 this report.

5.7.4 Test specification:

Environmental conditions: Temperature: 22° C Humidity: 54% Atmospheric pressure: 103kPa

5.7.5 Operation mode: --

5.7.6 Test Result:

Voltage Dip: Voltage Interceptions:

Test Level % Ut	Reduction	Duration (periods)	Phase Angle	Meet Criterion	Result
0	100	0.5	0° - 360°	B	N/A
0	100	1	0° - 360°	C	N/A
70	30	25	0° - 360°	C	N/A
0	100	250	0° - 360°	C	N/A

Remark: The test item is not applicable.

6.0 CE Label

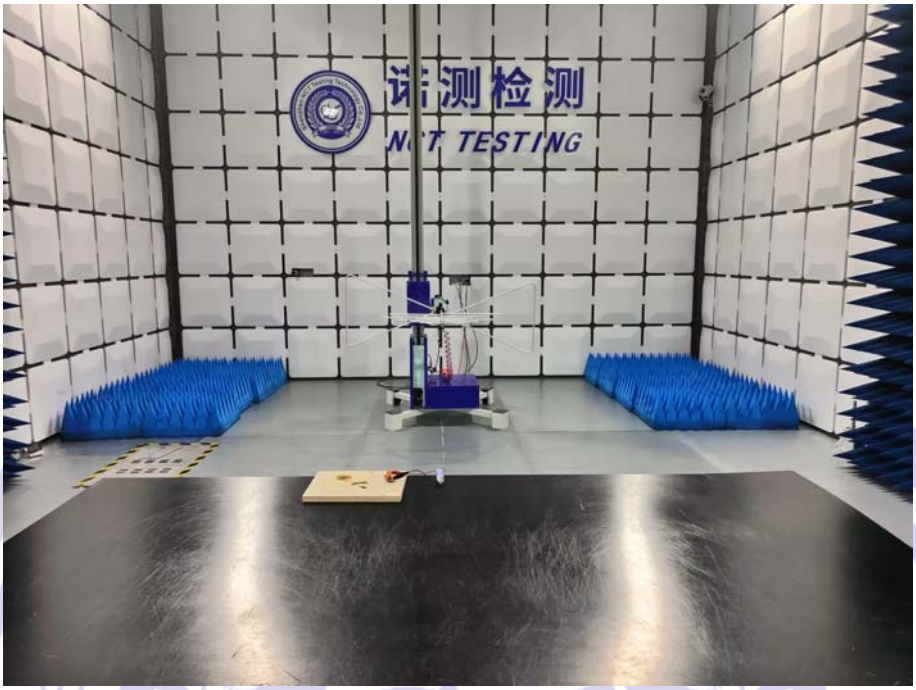
6.1 label specification

Text of the mark is black or white in color and is left justified. Labels are printed in indelible ink on permanent adhesive backing and shall be affixed at a conspicuous location on the EUT or silk-screened onto the EUT.

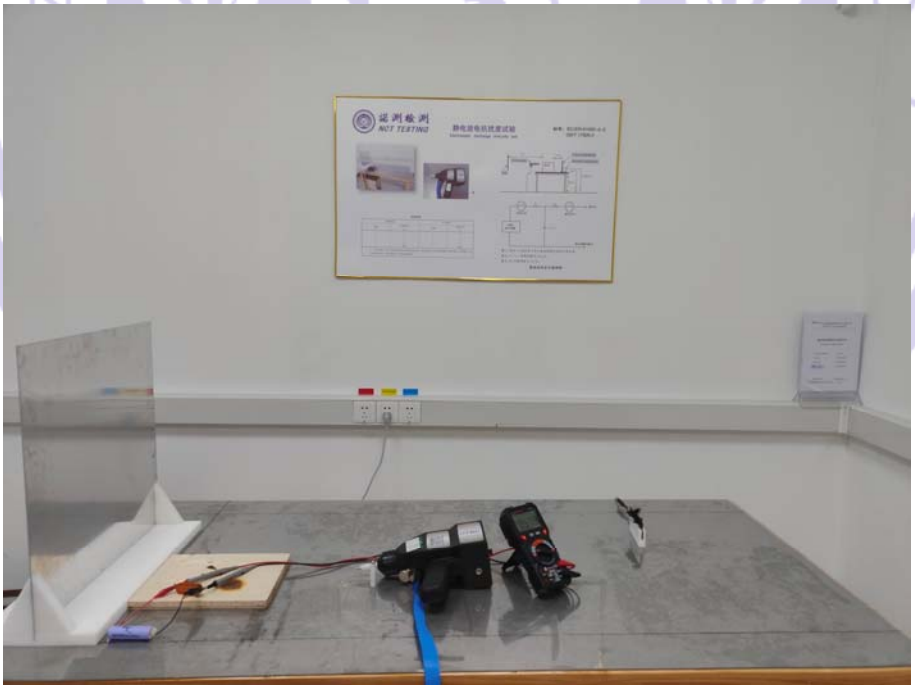
6.2 Mark Location: On the product body

7.0 Photos of testing

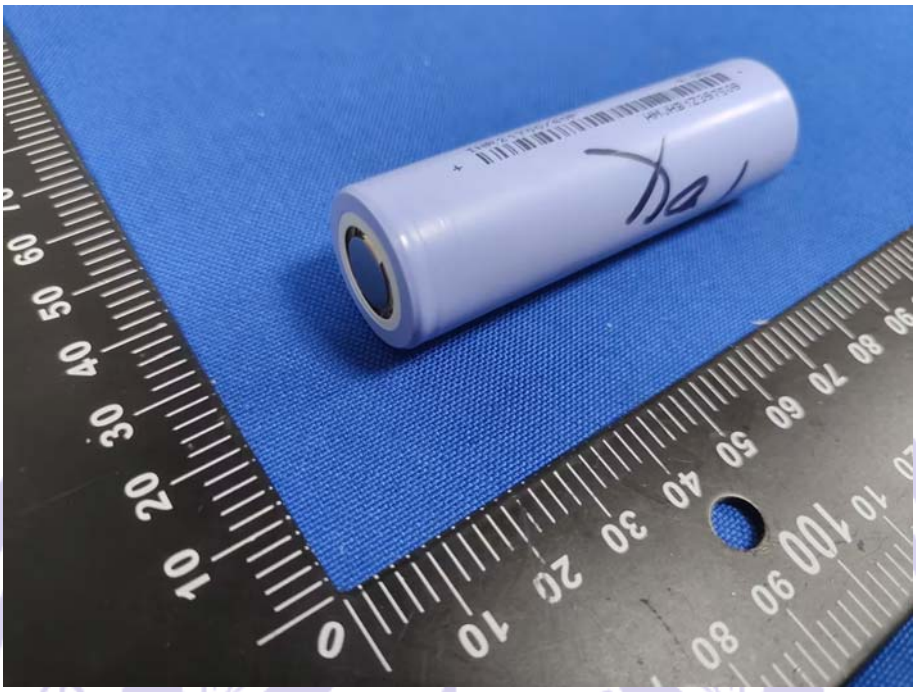
Radiated Emission Test View

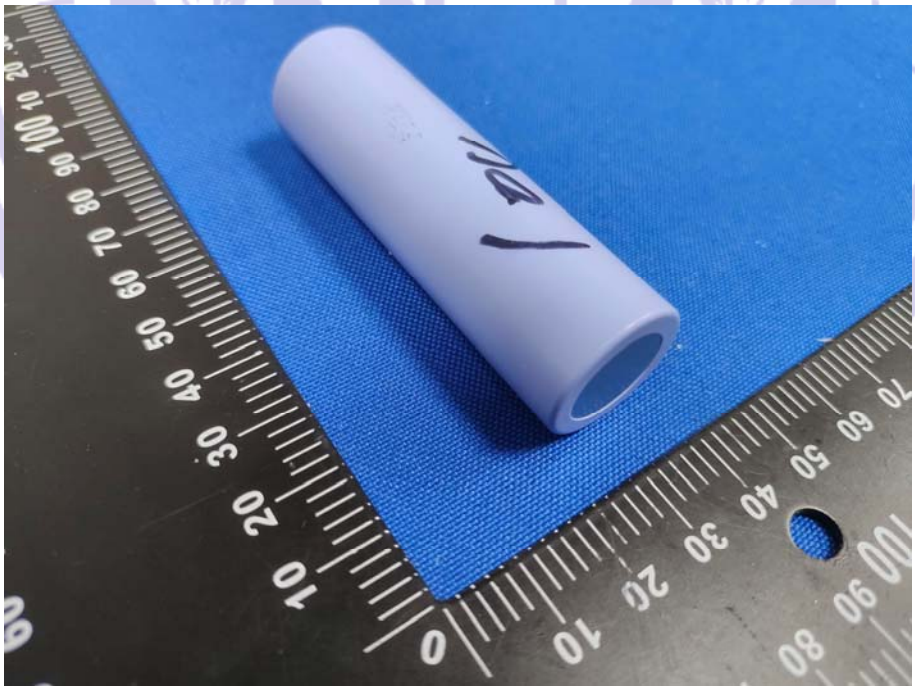


ESD Test View



8.0 Photos of the EUT





--End of the report--