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检测
TESTING
CNAS L6478

TEST REPORT

Reference No.	:	WTF23F10227626E
Applicant	:	Mid Ocean Brands B.V.
Address	:	7/F., Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong
Manufacturer	:	118144
Address	:	---
Product Name	:	USB foldable desk fan
Model No.	:	MO2123
Test specification	:	EN 55032:2015+A11:2020+A1:2020 EN 55035:2017+A11:2020
Date of Receipt sample	:	2023-10-25
Date of Test	:	2023-10-25 to 2023-11-20
Date of Issue	:	2023-11-21
Test Report Form No.	:	WEI-55032A-04A
Test Result	:	**Pass**

Remarks:
The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of approver.

Prepared By:
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Tested by: Leo Feng

Leo Feng

Approved by: Tammy Zhou

Tammy Zhou

1 Test Summary

EMISSION			
Test Item	**Test Standard**	**Class / Severity**	**Result**
Mains Terminal Disturbance Voltage, 150kHz to 30MHz	EN 55032:2015+A11:2020+A1:2020	Table A.10	Pass
Radiated Emission, 30MHz to 1000MHz	EN 55032:2015+A11:2020+A1:2020	Table A.4	Pass

IMMUNITY (EN 55035:2017+A11:2020)				
Test Item	**Test Method**	**Class / Severity**	**Performance Criteria**	**Result**
Electrostatic Discharge(ESD)	IEC 61000-4-2:2008	±4 Kv Contact ±8 Kv Air	B	Pass
Continuous RF Electromagnetic Field Disturbances	IEC 61000-4-3: 2006+A1+A2	3V/m, 80%, 1kHz, Amp. Mod.	A	Pass
Electrical Fast Transients (EFT)	IEC 61000-4-4:2012	AC ±1.0Kv DC ±0.5Kv	B	Pass
Surge	IEC 61000-4-5:2005	±1Kv D.M.† ±2Kv C.M.‡	B	Pass
Continuous Induced RF Disturbances, 0.15MHz to 10MHz	IEC 61000-4-6:2008	3Vr.m.s.(emf), 80%, 1kHz Amp. Mod.	A	Pass
Continuous Induced RF Disturbances, 10MHz to 30MHz		3 to 1Vr.m.s.(emf), 80%, 1kHz Amp. Mod	A	Pass
Continuous Induced RF Disturbances, 30MHz to 80MHz		1Vr.m.s.(emf), 80%, 1kHz Amp. Mod	A	Pass
Power-Frequency Magnetic Field	IEC 61000-4-8:2009	1A/m	A	N/A
Voltage Dips	IEC 61000-4-11:2004	< 5 % U_T * for 0.5per	B	Pass
		70 % U_T * for 25/30per	C	Pass
Voltage Interruptions	IEC 61000-4-11:2004	< 5 % U_T * for 250/300per	C	Pass

Remark:

Pass	Test item meets the requirement
Fail	Test item does not meet the requirement
N/A	Test case does not apply to the test object
A.M	Amplitude Modulation
†	Differential Mode
‡	Common Mode
*	U_T is the nominal supply voltage

2 Contents

3 General Information

3.1 General Description of E.U.T.

Product Name	:	USB foldable desk fan
Model No.	:	MO2123
Remark	:	---

3.2 Details of E.U.T.

Technical Data	:	Battery Capacity:3000mAh 11.1Wh Input (Type-C): DC 5V 1A Output (USB-A) / Output (Type-C): DC 5V 1A

3.3 Description of Support Units

The EUT has been tested as an independent unit. MO2123 is the test smaple. The DV&RE tests were performed in the condition of AC 240V/50Hz input. The other tests were performed in the condition of AC 230V/50Hz input. All AC input tests were carried out with an adapter specified by laboratory.
And the RE, ESD&RS tests were performed in the additional condition of battery 3.7V.

3.4 Standards Applicable for Testing

The tests were performed according to following standards:

EN 55032:2015+A11:2020 +A1:2020	Electromagnetic compatibility of multimedia equipment — Emission Requirements
EN 55035:2017+A11:2020	Electromagnetic compatibility of multimedia equipment - Immunity requirements

3.5 Test Facility

The test facility has a test site registered with the following organizations:

- **ISED – Registration No.: 21895**

Waltek Testing Group (Foshan) Co., Ltd. has been registered and fully described in a report filed with the Innovation, Science an Economic Development Canada(ISED). The acceptance letter from the ISED is maintained in our files. Registration ISED number:21895, March 12, 2019

- **FCC – Registration No.: 820106**

Waltek Testing Group (Foshan) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 820106, August 16, 2018

- **NVLAP – Lab Code: 600191-0**

Waltek Testing Group (Foshan) Co., Ltd. EMC Laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 600191-0.
This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

3.6 Subcontracted

Whether parts of tests for the product have been subcontracted to other labs:

☐ Yes ☒ No

If Yes, list the related test items and lab information:

Test items: ---

Lab information: ---

3.7 Abnormalities from Standard Conditions

None.

4 Equipment Used during Test

☐Mains Terminal Disturbance Voltage (Conducted Emission) 1#					
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Status**
1.	EMI Test Receiver	R&S	ESR3	102423	Valid
2.	LISN	R&S	ENV216	101343	Valid
3.	Cable	HUBER+SUHNER	CBL2-NN-6M	223NN624	Valid
4.	Switch	CD	RSU-A4 18G	RSUA4008	Valid
☒Mains Terminal Disturbance Voltage (Conducted Emission) 2#					
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Status**
1.	EMI Test Receiver	R&S	ESCI	101178	Valid
2.	LISN	R&S	ENV216	101215	Valid
3.	Cable	HUBER+SUHNER	CBL2-NN-6M	6102701	Valid
4.	Switch	ESE	RSU/M2	---	Valid
☐Mains Terminal Disturbance Voltage (Conducted Emission) 3#					
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Status**
1.	EMI Test Receiver	R&S	ESR3	102842	Valid
2.	LISN	R&S	ENV216	101542	Valid
3.	Cable	YIHENG	LMR195UF-NMNM-2.5	---	Valid
4.	Manual RF Switch	YIHENG	SW-2	RSU0402	Valid
☒Radiated Emission (30MHz to 1GHz) 1#					
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Status**
1.	3m Semi-anechoic Chamber	CHANGCHUANG	9m×6m×6m	-	Valid
2.	EMI Test Receiver	R&S	ESR7	101566	Valid
3.	Trilog Broadband Antenna	SCHWARZBECK	VULB 9162	9162-117	Valid
4.	Coaxial Cable (below 1GHz)	H+S	CBL3-NN-12+3 m	214NN320	Valid
☐Radiated Emission (30MHz to 1GHz) 2#					
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Status**
1.	3m Semi-anechoic Chamber	YIHENG	10m×5.3m×3.5m	YH2021071804	Valid
2.	EMI Test Receiver	R&S	ESR7	102454	Valid
3.	Trilog Broadband Antenna	SCHWARZBECK	VULB 9163	01418	Valid
4.	Coaxial Cable (below 1GHz)	Times-Microwave Systems	LMR240UF-NMSM-7.5	-	Valid

☐Radiated Emission (1GHz to 6GHz) 1#					
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Status**
1.	3m Semi-anechoic Chamber	CHANGCHUANG	9m×6m×6m	-	Valid
2.	EMI Test Receiver	R&S	ESR7	101566	Valid
3.	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	01561	Valid
4.	Coaxial Cable (above 1GHz)	Times-Micorwave	CBL5-NN	-	Valid
5.	Preamplifier	Lunar E M	LNA1G18-40	20160501002	Valid

☐Radiated Emission (1GHz to 6GHz) 2#					
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Status**
1.	3m Semi-anechoic Chamber	YIHENG	10m×5.3m×3.5m	YH2021071804	Valid
2.	EMI Test Receiver	R&S	ESR7	102454	Valid
3.	Broad-band Horn Antenna	SCHWARZBECK	BBHA9120D	02465	Valid
4.	Coaxial Cable (above 1GHz)	Times-Microwave Systems	SFT205-NMSM-7	-	Valid
5.	Preamplifier	Tonscend	TAP0118045	AP21J806168	Valid

☒ESD					
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Status**
1.	ESD Simulator	TESEQ	NSG437	521	Valid

☒EFT & Voltage Dips and Interruptions					
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Status**
1.	EMS test system	TESEQ	NSG3040	1858	Valid

☒Surge					
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Status**
1.	Surge Simulator	TESEQ	NSG3060	1395	Valid

☒Injected Currents					
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Status**
1.	Conducted Immunity test system	TESEQ	NSG4070	31469	Valid
2.	CDN	TESEQ	CDN M016	31586	Valid
3.	6dB Attenuator	TESEQ	ATN6075	32122	Valid

☒Radio-frequency Electromagnetic Fields					
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Status**
1.	RF Power Amplifier	OPHIR	5225R	1051/1712	Valid
2.	RF Power Amplifier	OPHIR	5293RE	1051/171	Valid
3.	Stacked double logarithmic periodic antenna	SCHWARZBECK	STLP9128E-SPECIAL	142	Valid
4.	Stacked double logarithmic periodic	SCHWARZBECK	STLP 9149	476	Valid

	antenna				
5.	RF signal generator	Agilent	N5181A	MY48180720	Valid
6.	Power meter	RS	NRP6A	101133	Valid
7.	Power meter	RS	NRP6A	101134	Valid

☐: ***Not Used***

☒: ***Used***

4.1 Software List

Description	Manufacturer	Model	Version
EMI Test Software (Conducted Emission 1#)	FARATRONIC	EZ-EMC	EMEC-3A1
EMI Test Software (Conducted Emission 2#)	FARATRONIC	EZ-EMC	CON-03A1
EMI Test Software (Conducted Emission 3#)	FARATRONIC	EZ-EMC	COM 3A1.1
EMI Test Software (Radiated Emission 1#)	FARATRONIC	EZ-EMC	RA-03A1-1
EMI Test Software (Radiated Emission 2#)	FARATRONIC	EZ-EMC	RA-03A1-1
Radiated Immunity Test Software	TONSCEND	JS35-RS	V2.0.1.7

4.2 Measurement Uncertainty

Test Item	Frequency Range	Uncertainty	Note
Conducted Emission	150kHz~30MHz	±2.6dB	(1)
Radiated Emission	30MHz~1GHz	±4.5dB	(1)
Radiated Emission	1GHz~6GHz	±4.5dB	(1)

(1)This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

4.3 Special Accessories and Auxiliary Equipment

Item	Equipment	Technical Data	Manufacturer	Model No.	Serial No.
1.	/	/	/	/	/

4.4 Decision Rule

Compliance or non-compliance with a disturbance limit shall be determined in the following manner.

If U_{LAB} is less than or equal to U_{cispr}, then

-Compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;

-Non-compliance is deemed to occur is any measured disturbance level exceeds the disturbance limt.

If U_{LAB} is greater than U_{cispr}, then

-Compliance is deemed to occur if no measured disturbance level, increased by(U_{LAB}-U_{cispr}) , exceeds the disturbance limit;

-Non-compliance is deemed to occur if any measured disturbance level, increased by(ULAB-Ucispr) , exceeds the disturbance limit.

5 Emission Test Results

5.1 Mains Terminals Disturbance Voltage, 150 kHz to 30MHz

Test Requirement..... : EN 55032 Annex A.3

Test Method..... : EN 55032 Annex A.3

Test Result..... : Pass

Frequency Range..... : 150kHz to 30MHz

Class/Severity..... : Table A.10 of EN 55032

Classification..... : Class B

5.1.1 E.U.T. Operation

Operating Environment:

Temperature ..... : 24.8°C

Humidity..... : 49.3%RH

Atmospheric Pressure..... : 101.2kPa

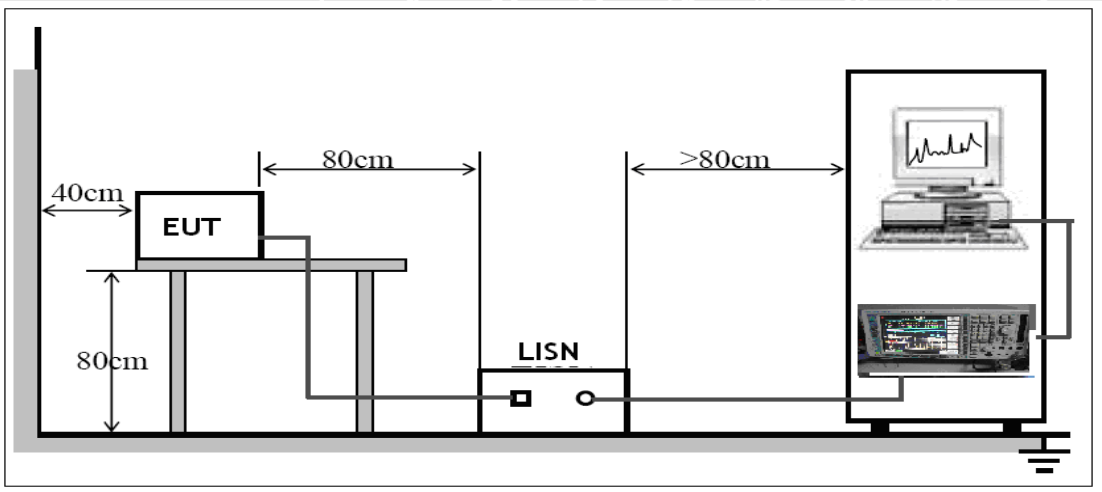
EUT Operation:

Input Voltage ..... : AC 240V/50Hz

Operating Mode..... : Charging + discharging mode

5.1.2 Block Diagram of Test Setup

The Mains Terminals Disturbance Voltage tests were performed in accordance with the CISPR 16-1-2.



5.1.3 Measurement Data

The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

5.1.4 Corrected Amplitude & Margin Calculation

The Corrected factor is calculated by adding LISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

Measurement = Reading Level + Correct Factor

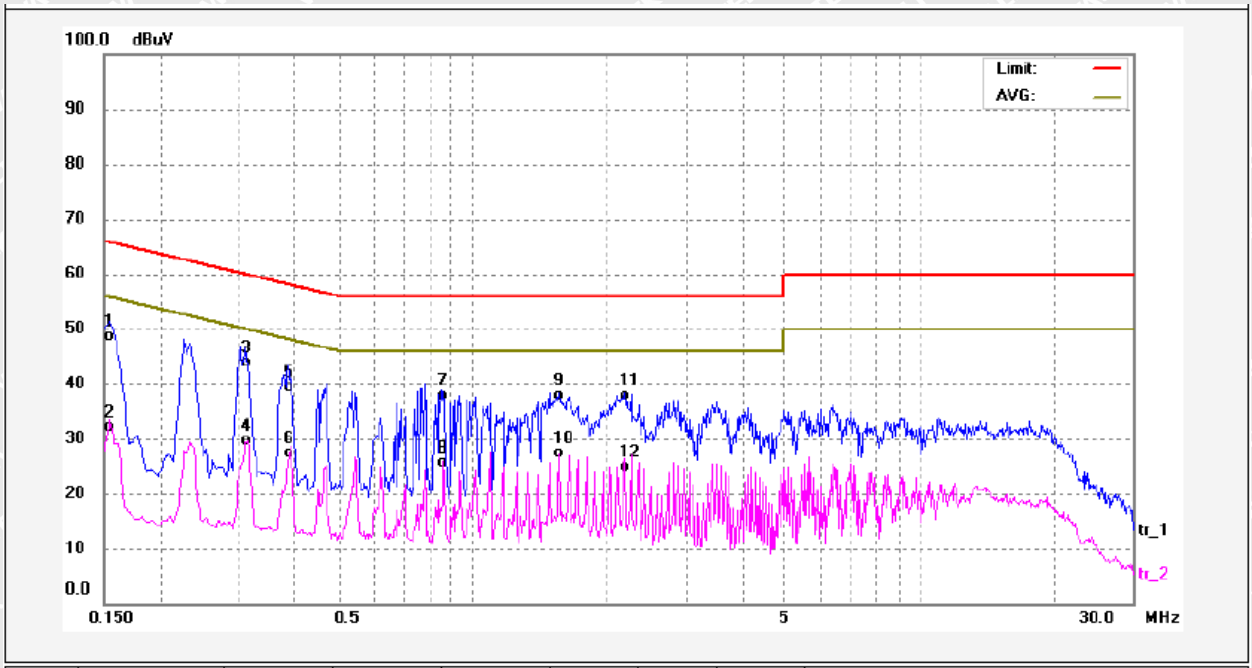
Correct Factor = LISN VDF + Cable Loss

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

Margin = Measurement - Limit

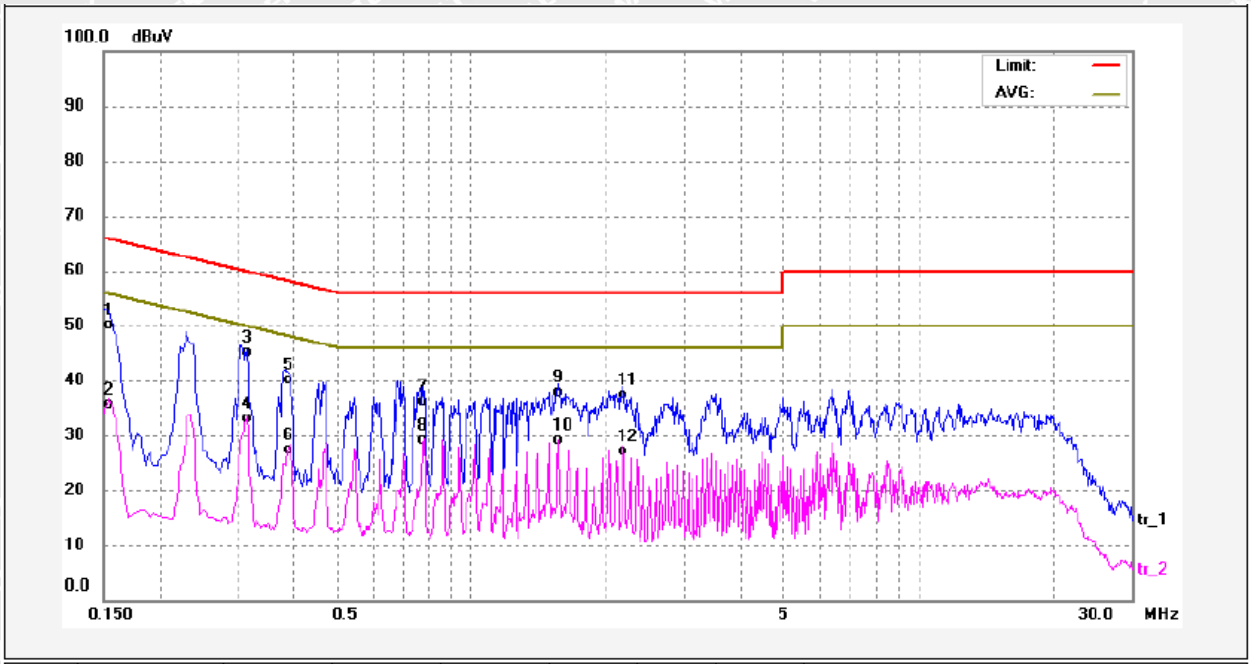
5.1.5 Mains Terminals Disturbance Voltage Test Data

Live Line



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1539	37.91	9.73	47.64	65.78	-18.14	QP	
2	0.1539	21.52	9.73	31.25	55.78	-24.53	AVG	
3	0.3100	33.17	9.63	42.80	59.97	-17.17	QP	
4	0.3100	19.07	9.63	28.70	49.97	-21.27	AVG	
5	0.3860	28.73	9.62	38.35	58.15	-19.80	QP	
6	0.3860	16.70	9.62	26.32	48.15	-21.83	AVG	
7	0.8580	27.24	9.64	36.88	56.00	-19.12	QP	
8	0.8580	15.02	9.64	24.66	46.00	-21.34	AVG	
9	1.5620	26.93	9.84	36.77	56.00	-19.23	QP	
10	1.5620	16.42	9.84	26.26	46.00	-19.74	AVG	
11	2.1900	26.95	9.86	36.81	56.00	-19.19	QP	
12	2.1900	14.14	9.86	24.00	46.00	-22.00	AVG	

Neutral Line



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1539	39.53	9.57	49.10	65.78	-16.68	QP	
2	0.1539	24.99	9.57	34.56	55.78	-21.22	AVG	
3	0.3140	34.55	9.60	44.15	59.86	-15.71	QP	
4	0.3140	22.42	9.60	32.02	49.86	-17.84	AVG	
5	0.3832	29.57	9.62	39.19	58.21	-19.02	QP	
6	0.3832	16.83	9.62	26.45	48.21	-21.76	AVG	
7	0.7780	25.44	9.64	35.08	56.00	-20.92	QP	
8	0.7780	18.38	9.64	28.02	46.00	-17.98	AVG	
9	1.5620	27.33	9.66	36.99	56.00	-19.01	QP	
10	1.5620	18.46	9.66	28.12	46.00	-17.88	AVG	
11	2.1860	26.72	9.69	36.41	56.00	-19.59	QP	
12	2.1860	16.56	9.69	26.25	46.00	-19.75	AVG	

5.2 Radiated Emission, 30MHz to 1GHz

Test Requirement..... : EN 55032 Annex A.2

Test Method..... : EN 55032 Annex A.2

Test Limit..... : Table A.4 of EN 55032

Test Result..... : Pass

Frequency Range..... : 30MHz to 1000MHz

Class..... : Class B

5.2.1 E.U.T. Operation

Operating Environment:

Temperature ..... : 23.2°C

Humidity..... : 54.2%RH

Atmospheric Pressure..... : 101.2kPa

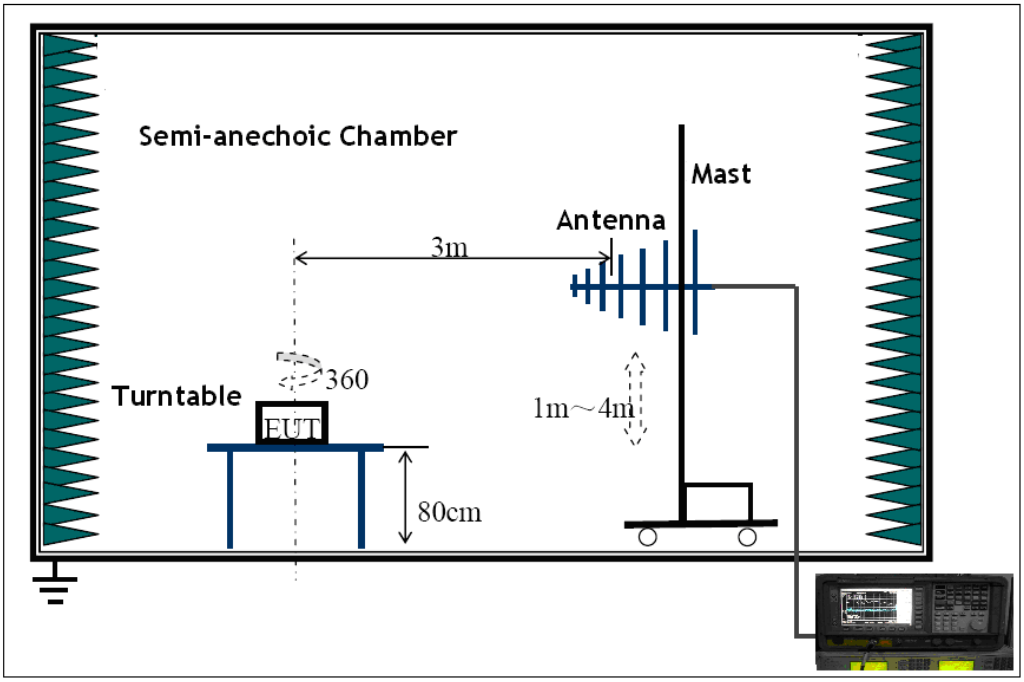
EUT Operation:

Input Voltage ..... : AC 240V/50Hz; Battery 3.7V

Operating Mode..... : Charging + discharging mode; Discharging mode

5.2.2 Block Diagram of Test Setup

The Radiated Emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the CISPR 16-2-3.



5.2.3 Measurement Data

The maximised peak emissions from the EUT was scanned and measured for EUT 0^0-360^0.Quasi-peak measurements were performed if peak emissions were within 6dB of the limit line.

5.2.4 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading + Corr. Factor

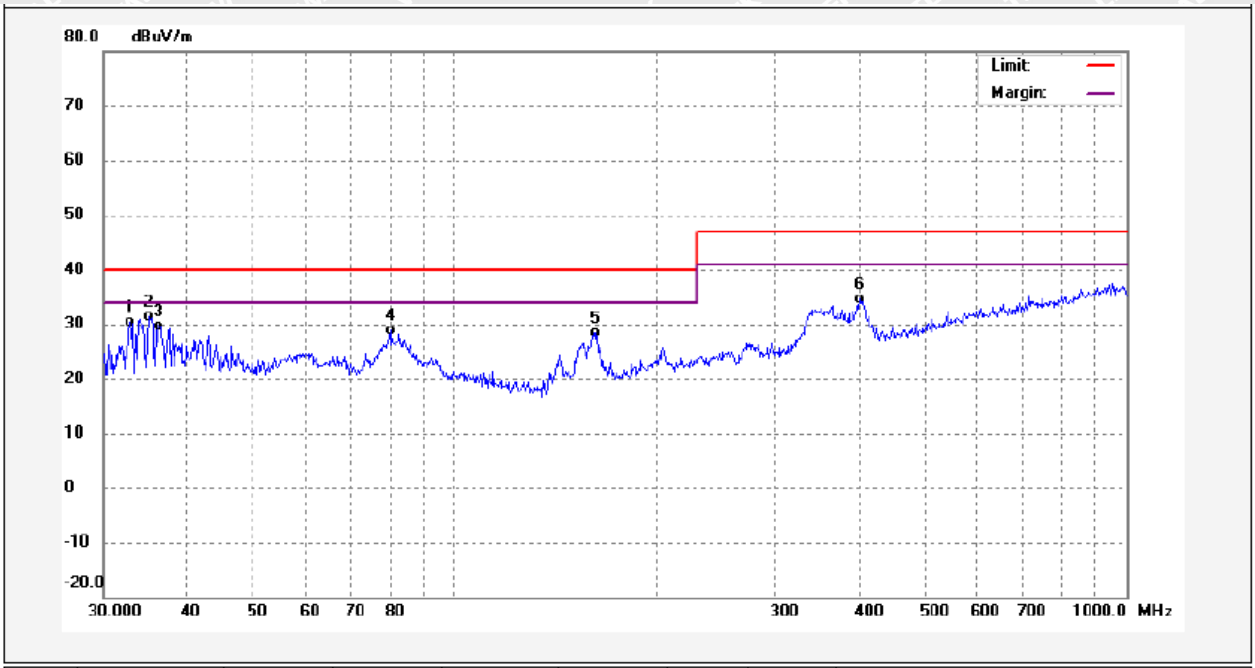
Corr.Factor=Antenna Factor + Cable Factor - Amplifier Gain

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit for Class B. The equation for margin calculation is as follows:

Margin = Corr. Ampl. – Limit

5.2.5 Radiated Emission Test Data

Vertical Polarization **Charging + discharging mode**



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	32.9098	18.54	11.78	30.32	40.00	-9.68	QP	
2	35.1278	19.30	12.18	31.48	40.00	-8.52	QP	
3	36.4197	17.30	12.42	29.72	40.00	-10.28	QP	
4	80.3336	20.17	8.63	28.80	40.00	-11.20	QP	
5	162.3257	17.62	10.81	28.43	40.00	-11.57	QP	
6	401.8385	17.76	16.93	34.69	47.00	-12.31	QP	

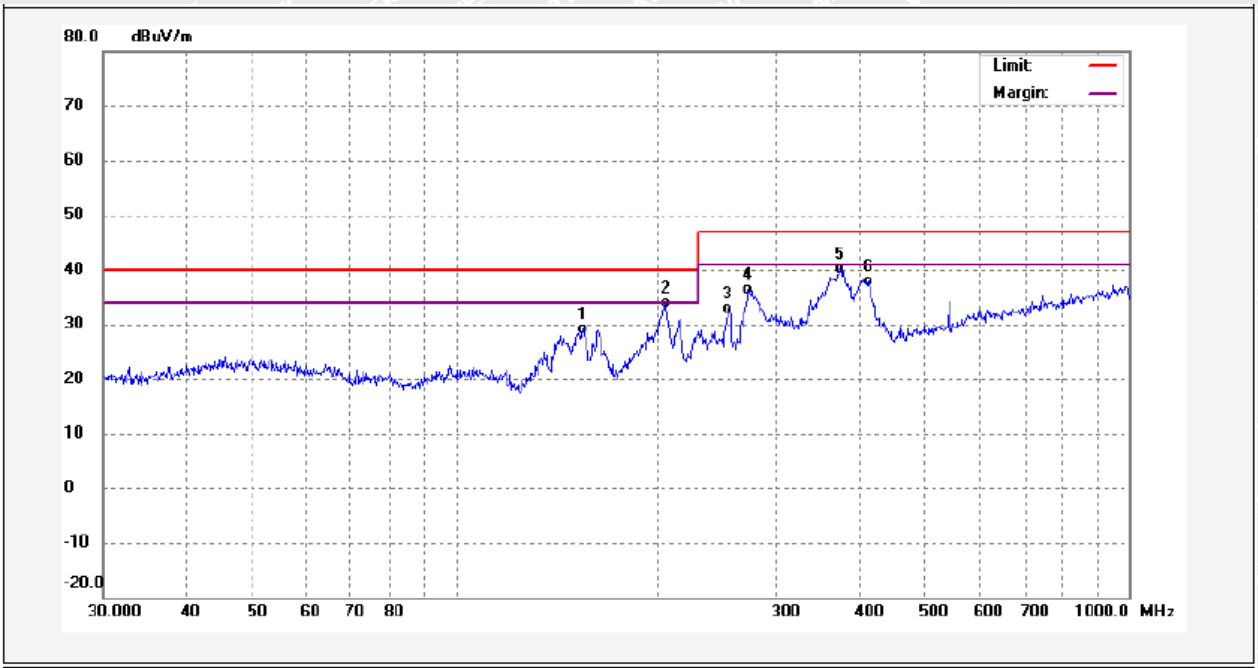
Horizontal Polarization **Charging + discharging mode**

No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	155.4188	19.96	8.83	28.79	40.00	-11.21	QP	
2	163.0673	19.25	9.30	28.55	40.00	-11.45	QP	
3	205.0989	21.56	11.94	33.50	40.00	-6.50	QP	
4	255.8024	15.57	18.51	34.08	47.00	-12.92	QP	
5	361.0802	23.02	15.89	38.91	47.00	-8.09	QP	
6	400.5723	21.97	16.87	38.84	47.00	-8.16	QP	

Vertical Polarization **Discharging mode**

No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	46.2104	14.40	13.61	28.01	40.00	-11.99	QP	
2	77.0235	22.13	8.03	30.16	40.00	-9.84	QP	
3	82.3299	19.18	8.96	28.14	40.00	-11.86	QP	
4	162.2688	17.27	10.80	28.07	40.00	-11.93	QP	
5	346.9307	16.86	16.10	32.96	47.00	-14.04	QP	
6	406.2304	17.82	17.12	34.94	47.00	-12.06	QP	

Horizontal Polarization Discharging mode



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	154.6035	20.43	8.79	29.22	40.00	-10.78	QP	
2	206.0360	22.08	11.90	33.98	40.00	-6.02	QP	
3	254.1929	14.49	18.48	32.97	47.00	-14.03	QP	
4	272.8511	22.55	13.81	36.36	47.00	-10.64	QP	
5	373.0494	23.92	16.10	40.02	47.00	-6.98	QP	
6	411.1026	20.69	17.10	37.79	47.00	-9.21	QP	

6 Immunity Test Results

6.1 Performance Criteria

Performance criterion A: 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.

Performance criterion B: After the test, the equipment 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 equipment is used as intended. During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test

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

6.2 Electrostatic Discharge (ESD)

Test Requirement..... : EN 55035

Test Method..... : IEC 61000-4-2

Test Result..... : Pass

Discharge Impedance..... : 330Ω / 150pF

Discharge Voltage..... : Air Discharge: ±8kV
Contact Discharge: ±4kV
HCP & VCP: ±4kV

Polarity..... : Positive & Negative

Number of Discharge..... : Minimum 10 times at each test point

Discharge Mode ..... : Single Discharge

Discharge Period ..... : 1 second minimum

6.2.1 E.U.T. Operation

Operating Environment:

Temperature ..... : 21.4°C

Humidity ..... : 52.6%RH

Barometric Pressure ..... : 100.1kPa

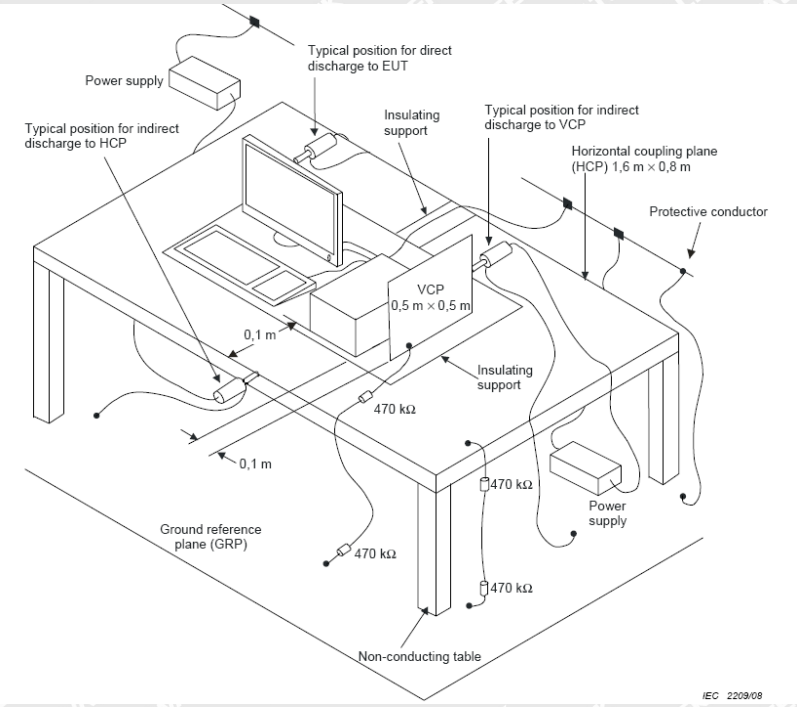
EUT Operation:

Input Voltage ..... : AC 230V/50Hz; Battery 3.7V

Operating Mode..... : Charging + discharging mode; Discharging mode

6.2.2 Block Diagram of Setup

The ESD test was performed in accordance with the IEC 61000-4-2.



6.2.3Direct Discharge Test Results

Observations: **Test points:** **1. All Exposed Surface & Seams;**
2. All metallic part

Direct Discharge			Test Results	
Applied Voltage (kV)	Performance Criterion	Test Point	Contact Discharge	Air Discharge
±8	B	1	N/A	Pass*
±4	B	2	Pass*	N/A

Remark:

* During the test no deviation was detected to the selected operation mode(s)

6.2.4 Indirect Discharge Test Results

Observations: **Test points:** **1. All sides.**

Indirect Discharge			Test Results	
Applied Voltage (kV)	Performance Criterion	Test Point	Horizontal Coupling	Vertical Coupling
±4	B	1	Pass*	Pass*

Remark:

* During the test no deviation was detected to the selected operation mode(s)

6.3 Continuous RF Electromagnetic Field Disturbances

Test Requirement ..... : EN 55035

Test Method ..... : IEC 61000-4-3

Test Result ..... : Pass

Frequency Range ..... : 80MHz to 1000MHz, 1800MHz, 2600MHz, 3500MHz, 5000MHz

Test level ..... : 3V/m

Modulation ..... : 80%, 1kHz Amplitude Modulation.

Face of EUT..... : Front, Back, Left, Right

Antenna polarisation..... : Horizontal & Vertical

Test Distance ..... : 3m

6.3.1E.U.T. Operation

Operating Environment:

Temperature..... : 23.2°C

Humidity ..... : 54.2%RH

Barometric Pressure..... : 101.3kPa

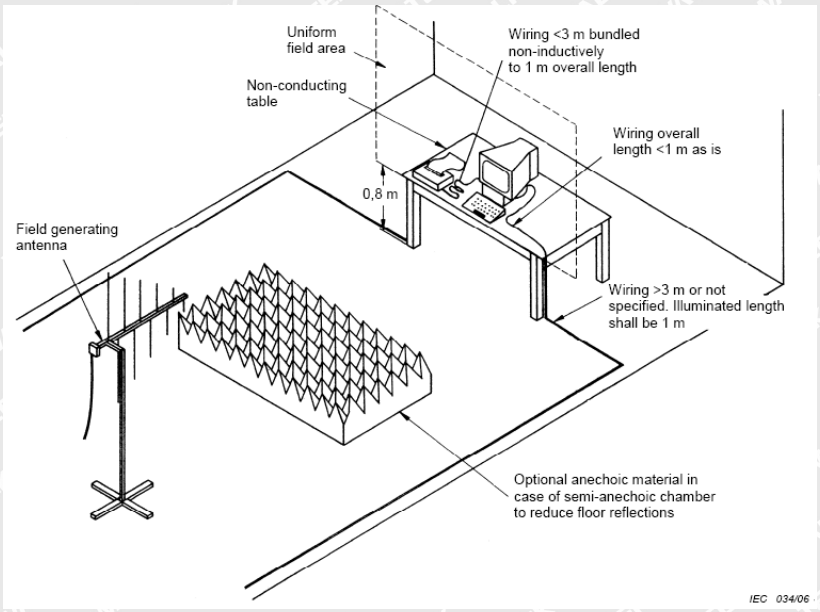
EUT Operation:

Input Voltage..... : AC 230V/50Hz; Battery 3.7V

Operating Mode..... : Charging + discharging mode; Discharging mode

6.3.2 Block Diagram of Setup

The Radio-frequency electromagnetic fields Immunity test was performed in accordance with the IEC 61000-4-3.



6.3.3 Test Results

Frequency	Face of EUT	Antenna polarisation	Test Level	Step Size	Dwell Time	Performance Criterion	Result
80 to 1000MHz	Front, Back, Left, Right	Horizontal	3V/m	1%	1s	A	Pass*
80 to 1000MHz	Front, Back, Left, Right	Vertical	3V/m	1%	1s	A	Pass*
1800MHz	Front, Back, Left, Right	Horizontal	3V/m	1%	1s	A	Pass*
1800MHz	Front, Back, Left, Right	Vertical	3V/m	1%	1s	A	Pass*
2600MHz	Front, Back, Left, Right	Horizontal	3V/m	1%	1s	A	Pass*
2600MHz	Front, Back, Left, Right	Vertical	3V/m	1%	1s	A	Pass*
3500MHz	Front, Back, Left, Right	Horizontal	3V/m	1%	1s	A	Pass*
3500MHz	Front, Back, Left, Right	Vertical	3V/m	1%	1s	A	Pass*
5000MHz	Front, Back, Left, Right	Horizontal	3V/m	1%	1s	A	Pass*
5000MHz	Front, Back, Left, Right	Vertical	3V/m	1%	1s	A	Pass*

Remark:

* During the test no deviation was detected to the selected operation mode(s)

6.4 Electrical Fast Transients (EFT)

Test Requirement..... : EN 55035

Test Method..... : IEC 61000-4-4

Test Result..... : Pass

Test Level..... : 1.0kV on AC Mains

Polarity..... : Positive & Negative

Repetition Frequency.... : 5kHz

Burst Duration..... : 5/50ns

Test Duration..... : 2 minutes per level & polarity

6.4.1E.U.T. Operation

Operating Environment:

Temperature ..... : 22.1°C

Humidity..... : 52.4%RH

Barometric Pressure..... : 100.8kPa

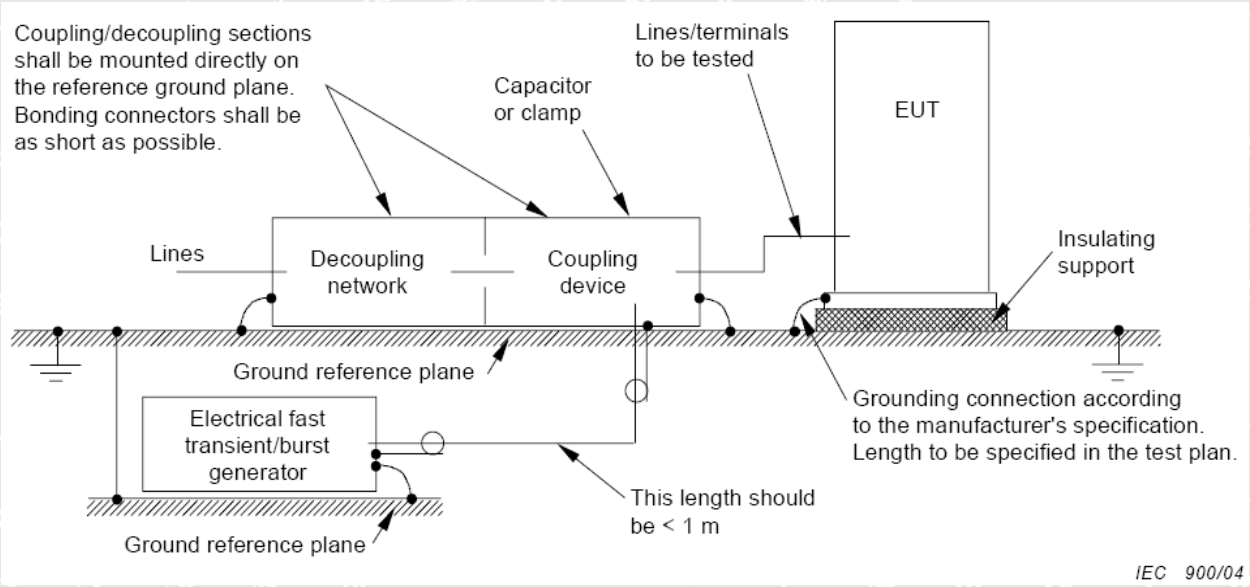
EUT Operation:

Input Voltage ..... : AC 230V/50Hz

Operating Mode..... : On mode

6.4.2 Block Diagram of Setup

The Electrical Fast Transients Immunity test was performed in accordance with the IEC 61000-4-4.



6.4.3Test Results

Test Port	Test Level(kV)	Performance Criterion	Result
Line-Neutral	±1.0	B	Pass*

Remark:

* During the test no deviation was detected to the selected operation mode(s)

6.5 Surge

Test Requirement..... : EN 55035

Test Method..... : IEC 61000-4-5

Test Result..... : Pass

Test level..... : ±1kV Live to Neutral, ±2kV Live to PE and Neutral to PE

Interval ..... : 60s between each surge

No. of surges ..... : five positive and five negative pulses each at 0º, 90º, 180º and at 270º

6.5.1E.U.T. Operation

Operating Environment:

Temperature ..... : 21.9°C

Humidity..... : 51.3%RH

Barometric Pressure..... : 100.5kPa

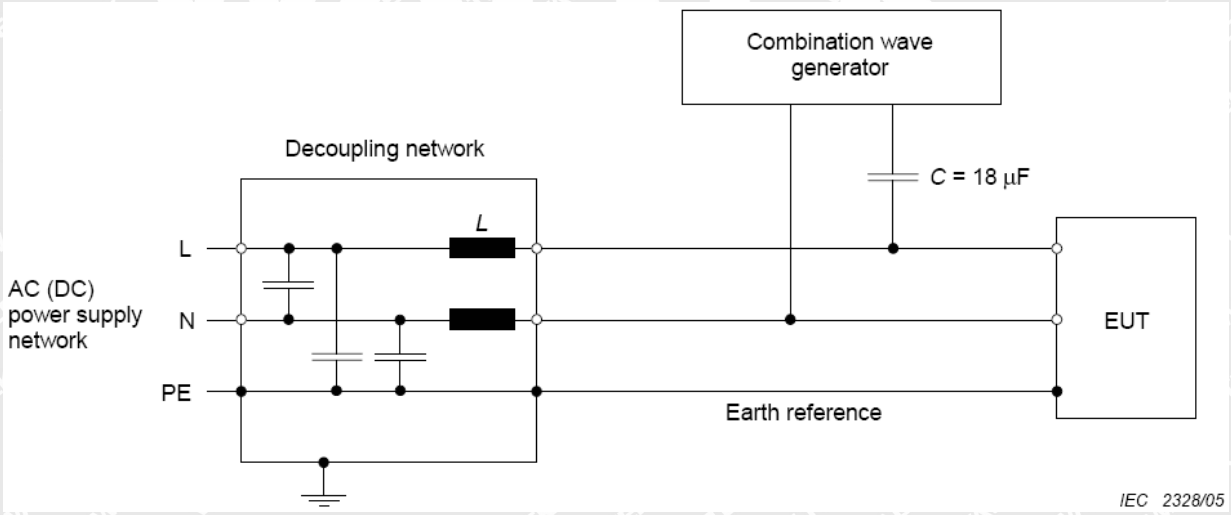
EUT Operation:

Input Voltage ..... : AC 230V/50Hz

Operating Mode..... : On mode

6.5.2Block Diagram of Setup

The Surge Immunity test was performed in accordance with the IEC 61000-4-5.



6.5.3Test Result

Test Port	Applied Voltage (kV)	Performance criterion	Result
Between Phase And Phase	±1	B	N/A
Between Live And Neutral	±1	B	Pass*
Between Live And Earth	±2	B	N/A
Between Neutral And Earth	±2	B	N/A

Remark:

* During the test no deviation was detected to the selected operation mode(s)

6.6 Continuous Induced RF Disturbance

Test Requirement ..... : EN 55035

Test Method ..... : IEC 61000-4-6

Test Result ..... : Pass

Frequency Range ..... : 0.15 to 10MHz, 10 to 30MHz, 30 to 80MHz

Test level ..... : 3V r.m.s. /3~1V r.m.s. / 1V r.m.s. (unmodulated emf into 150 Ω)

Modulation ..... : 80%, 1kHz Amplitude Modulation.

6.6.1E.U.T. Operation

Operating Environment:

Temperature ..... : 22.6°C

Humidity..... : 52.9%RH

Barometric Pressure..... : 101.1kPa

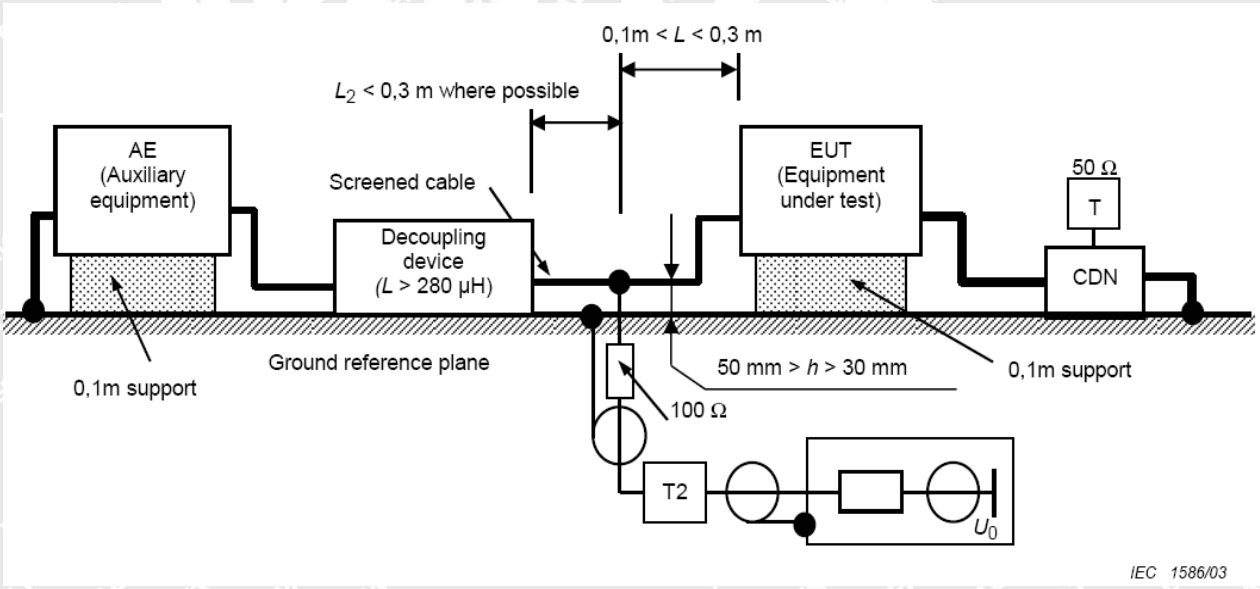
EUT Operation:

Input Voltage ..... : AC 230V/50Hz

Operating Mode..... : On mode

6.6.2 Block Diagram of Setup

The Injected Currents Immunity test was performed in accordance with the IEC 61000-4-6.



6.6.3Test Results

Frequency	Line	Test Level	Modulation	Step Size	Dwell Time	Performance Criterion	Result
0.15MHz to 10MHz	2 Wire AC Supply Cables	3Vr.m.s.	80%, 1kHz Amp. Mod.	1%	1s	A	Pass*
10MHz to 30MHz	2 Wire AC Supply Cables	3 to 1 Vr.m.s.	80%, 1kHz Amp. Mod.	1%	1s	A	Pass*
30MHz to 80MHz	2 Wire AC Supply Cables	1Vr.m.s.	80%, 1kHz Amp. Mod.	1%	1s	A	Pass*

Remark:

* During the test no deviation was detected to the selected operation mode(s)

6.7 Voltage Dips and Interruptions

Test Requirement..... : EN 55035

Test Method..... : IEC 61000-4-11

Test Result..... : Pass

Test Level(Voltage reduction) : >90% &30 % of Induction

No. of Dips / Interruptions..... : 1 per Level at 20ms intervals

6.7.1 E.U.T. Operation

Operating Environment:

Temperature..... : 22.9°C

Humidity..... : 52.2%RH

Barometric Pressure..... : 100.7kPa

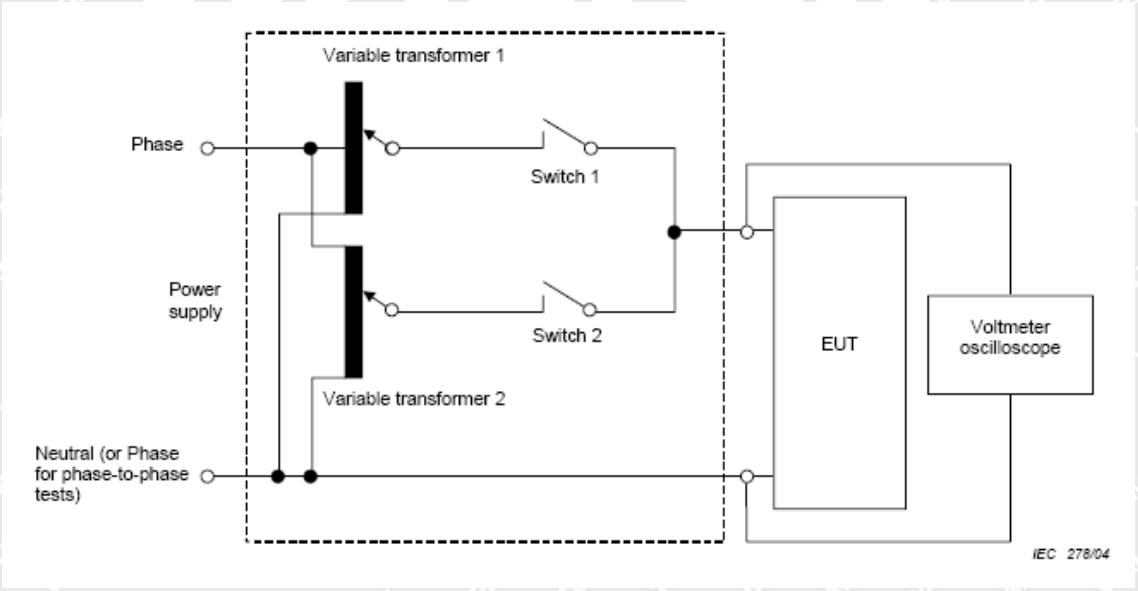
EUT Operation:

Input Voltage..... : AC 230V/50Hz

Operating Mode..... : On mode

6.7.2 Block Diagram of Setup

The Voltage Dips and Interruptions Immunity test was performed in accordance with the IEC 61000-4-11.



6.7.3Test Results

Test Item	Test Level in %U_T	Performance criterion	50Hz		60Hz	
			Duration	Result	Duration	Result
Voltage Dips	< 5	B	0.5	Pass*	0.5	N/A
	70	C	25	Pass*	30	N/A
Voltage Interruptions	< 5	C	250	Pass*	300	N/A

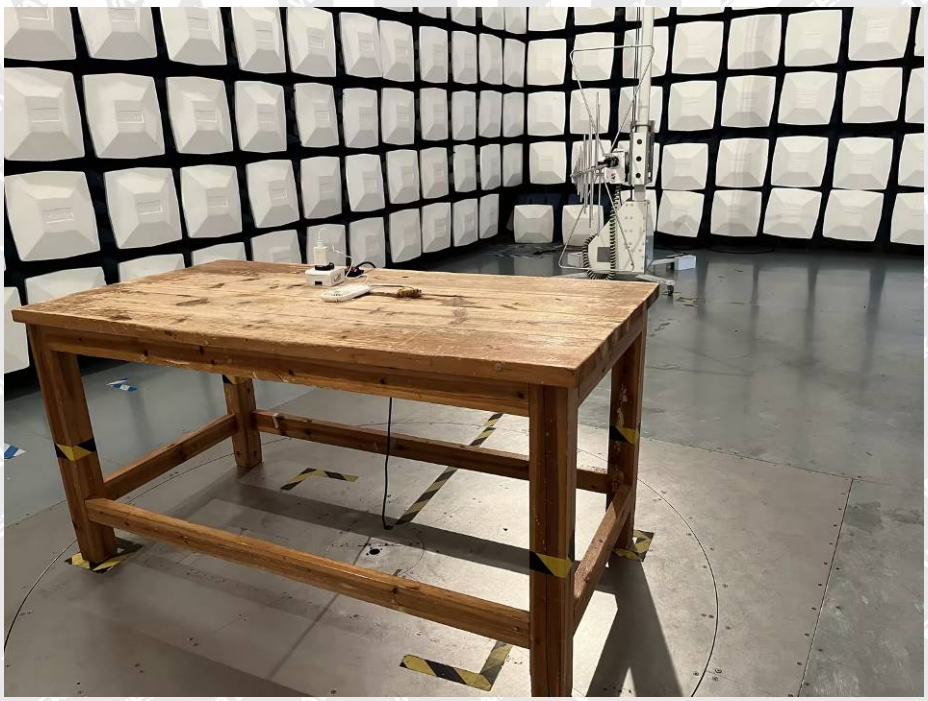
Remark:

* During the test no deviation was detected to the selected operation mode(s)

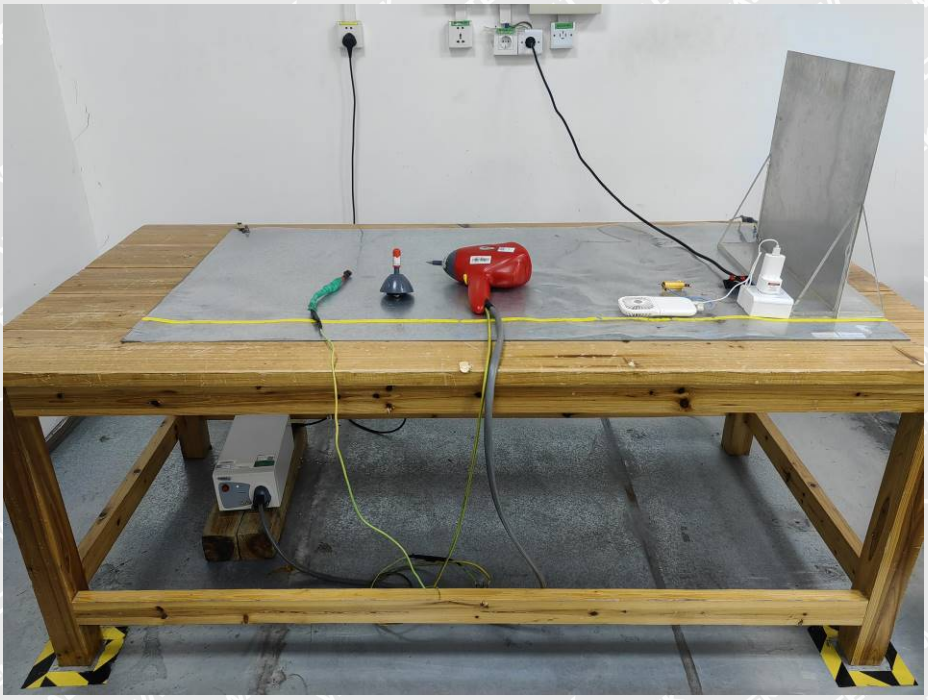
7 Photographs – Test Setup

7.1 Photograph – Mains Terminal Disturbance Voltage Test Setup

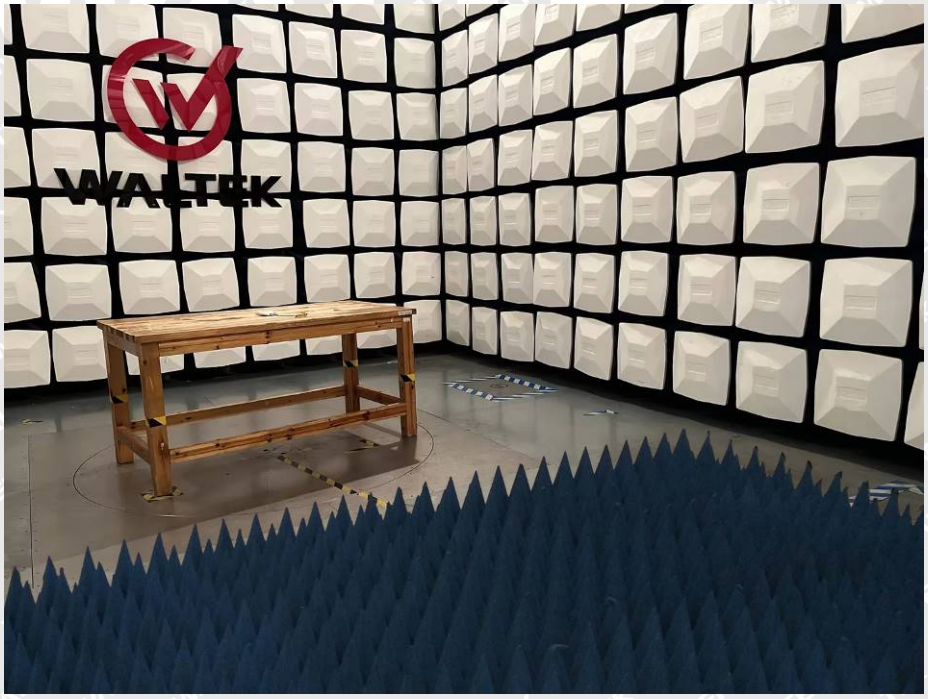
7.2 Photograph – Radiated Emission Test Setup, 30MHz to 1GHz



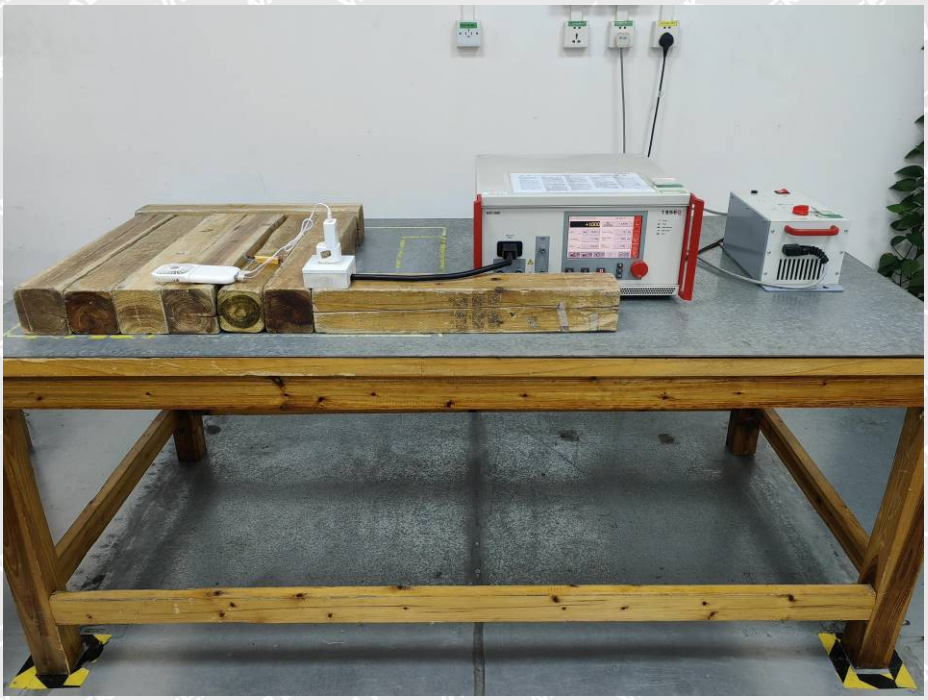
7.3 Photograph – ESD Immunity Test Setup



7.4 Photograph – Continuous RF Electromagnetic Field Disturbances Test Setup

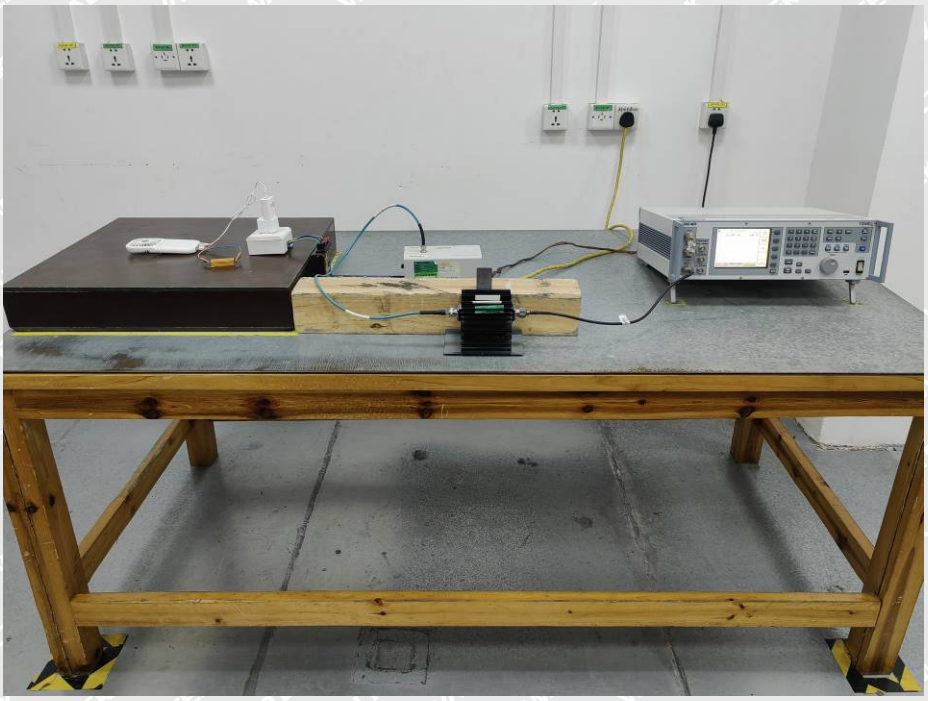


7.5 Photograph – EFT Immunity Test Setup

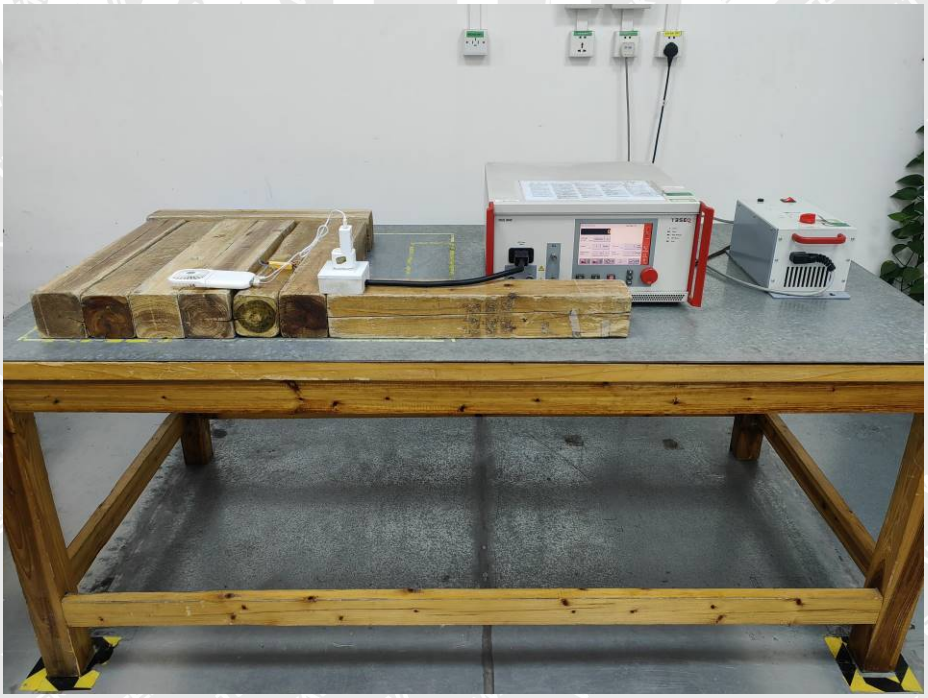


7.6 Photograph – Surge Immunity Test Setup

7.7 Photograph – Continuous Induced RF Disturbance Test Setup



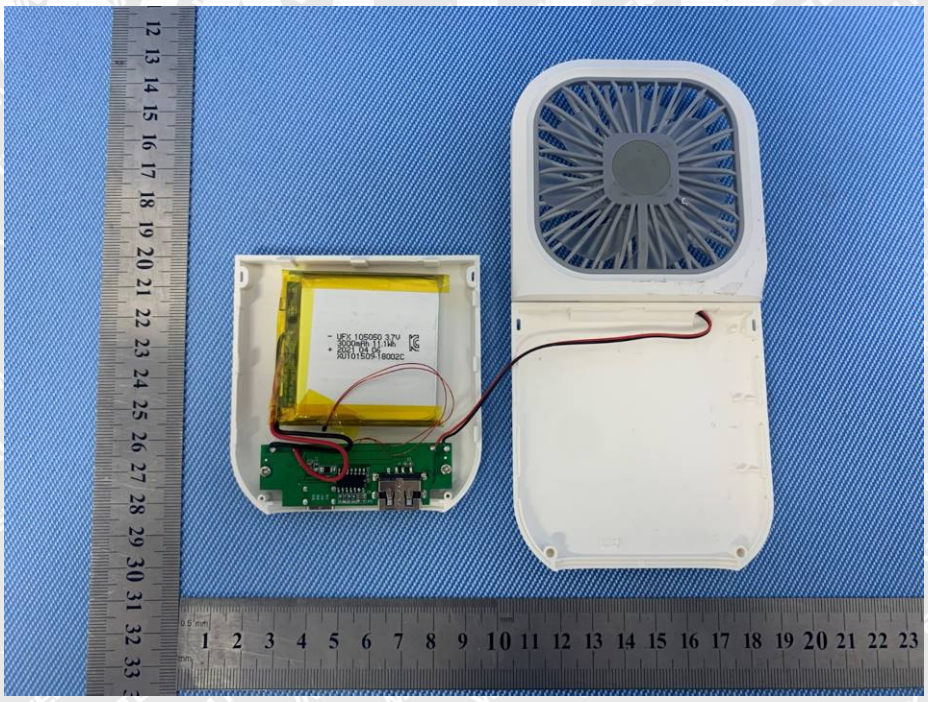
7.8 Photograph – Voltage Dips and Interruptions Immunity Test Setup

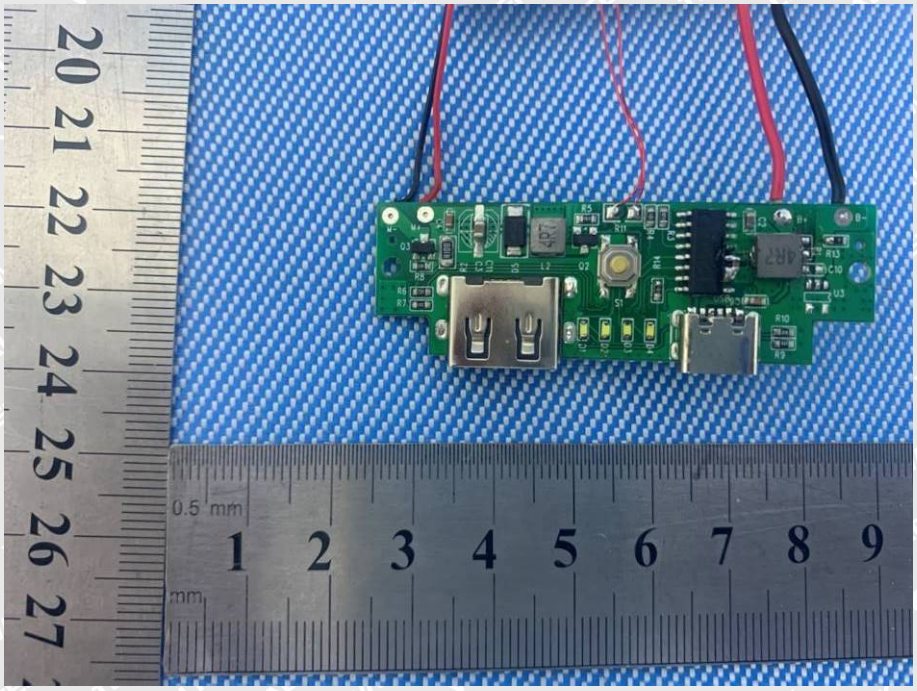


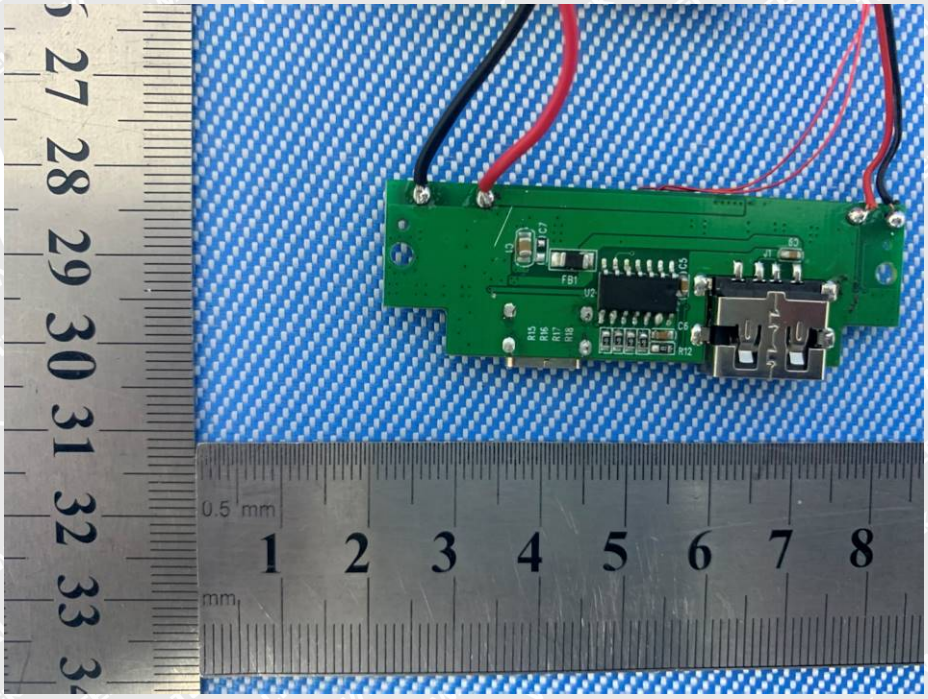
8 Photographs – Constructional Details

8.1 EUT – External View

8.2 EUT – Internal View







====== End of Report ======