EMC TEST REPORT

Report No	:	AST2210202001
Product Name	:	Universal charger
Product Model	:	M-UNPLUGU, UC-01,UC-24
Applied Standard	:	EN 55032:2015+AC:2016-07+A1:2020 +A11:2020 EN 55035:2017+A11:2020 EN IEC 61000-3-2:2019+A1:2021 EN 61000-3-3:2013+A1:2019+A2:2021
Test Result	:	PASS
Issue Date	:	Oct. 18, 2022

Aerospace Testing Technology (Shenzhen) Co., Ltd.

101, Block A4, No. 5, 8th Road, Shapu Yangyong Industrial Park,
Songgang Street, Bao'an District, Shenzhen, Guangdong, China

Tel:. .086-0755-27781492
Fax.: 086-0755-27781492
Web.:www.ast-test.com
E-mail: ast@hangtianjc.com

Product Name	:	Universal charger
Tested Model	:	M-UNPLUGU
Series Model Difference Description	:	/
Trademark	:	N/A
Applicant	:	Seacco Technology Limited
Address	:	Room 2010, 20/F, Tower A, CHINTO Technology Building, 1079 Minzhi Road, Longhua District, ShenZhen City, Guangdong Province, China.
Manufacturer	:	Seacco Technology Limited
Address	:	Room 2010, 20/F, Tower A, CHINTO Technology Building, 1079 Minzhi Road, Longhua District, ShenZhen City, Guangdong Province, China.
Factory	:	Seacco Technology Limited
Address	:	Room 2010, 20/F, Tower A, CHINTO Technology Building, 1079 Minzhi Road, Longhua District, ShenZhen City, Guangdong Province, China.
Test date	:	Oct. 8, 2022 to Oct. 18, 2022

Remark:
This test report is based on a single evaluation of one sample of above mentioned products. It is not permitted to be duplicated in extracts without written approval of Aerospace Testing Technology (Shenzhen) Co., Ltd.

Prepared by	Reviewed by	Approved by
Mason	Lucas	Nero
Mason	Lucas	Nero
Oct. 18, 2022	**Oct. 18, 2022**	**Oct. 18, 2022**

Aerospace Testing Technology (Shenzhen) Co., Ltd. AST.LAB Approved

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1. SUMMARY OF TEST RESULTS

EMISSION		
Test Item	Standard	Results
Power Line Conducted Emission Test	EN 55032:2015+AC:2016-07+A1:2020+A11:2020	PASS
Radiated Emission	EN 55032:2015+AC:2016-07+A1:2020+A11:2020	PASS
Harmonic Current	EN IEC 61000-3-2:2019+A2:2021	PASS
Voltage Fluctuation And Flicker	EN 61000-3-3:2019+A2:2021	PASS
IMMUNITY (EN 55035:2017+A11:2020)		
Test Item	Basic Standard	Results
Electrostatic Discharge Immunity	EN 61000-4-2:2009	PASS
Radiated Electromagnetic Fields Immunity	EN IEC 61000-4-3:2020	PASS
Electric Fast Transient Burst Immunity	EN 61000-4-4:2012	PASS
Surge Immunity	EN 61000-4-5:2014+A1:2017	PASS
Injected Currents Susceptibility Test	EN 61000-4-6:2019	PASS
Power Frequency Magnetic Field Immunity(50/60Hz)	EN 61000-4-8:2010	PASS
Voltage Dips And Interruptions Immunity	EN IEC 61000-4-11:2020	PASS
N/A is an abbreviation for Not Applicable.		

2. GENERAL INFORMATION

2.1. Test Laboratory

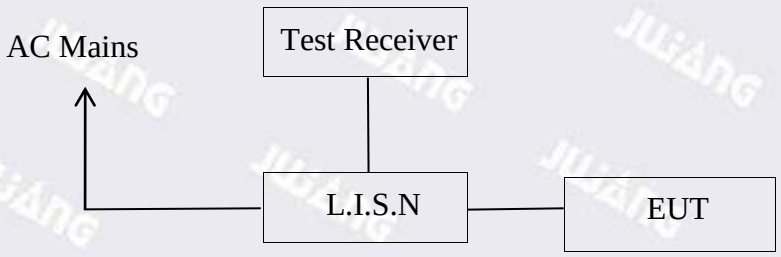
Test Site1		
Name	:	Aerospace Testing Technology (Shenzhen) Co., Ltd.
Address	:	101, Block A4, No. 5, 8th Road, Shapu Yangyong Industrial Park, Songgang Street, Bao'an District, Shenzhen, Guangdong, China
Phone	:	+ 086 0755-27781492
E-mail	:	ast@hangtianjc.com
Test Site2		
Name	:	/
Address	:	/
Phone	:	/
E-mail	:	/
Test Site3		
Name	:	/
Address	:	/
Phone	:	/
E-mail	:	/
Test Report Form No.	:	EN55035_32J
TRF Originator	:	AST
Master TRF	:	Oct. 18, 2021

2.2. List Of Test Equipments

Item	Kind of Equipment	Manufacturer	Type No.	Calibrated until
1	EMI Test Receiver	R&S	ESU8	Aug. 24, 2022
2	Bilog Antenna	SCHWARZBECK	VULB 9163	Aug. 24, 2022
3	Horn Antenna	SCHWARZBECK	BBHA9120D	Aug. 24, 2022
4	Amplifier	Tonscend	TAP-9E6343	Aug. 24, 2022
5	Amplifier	Tonscend	TAP-051841	Aug. 24, 2022
6	Triple-Loop Antenna	Daze	ZN30401	Aug. 24, 2022
7	EMI Test Receiver	R&S	ESRP3	Aug. 24, 2022
8	LISN	Schwarzbeck	NNLK 8121	Aug. 24, 2022
9	Amplitude limiter	Schwarzbeck	VTSD 9561 F	Aug. 24, 2022
10	ESD TEST GENERATOR	3Ctest	EDS 30V	Aug. 24, 2022
11	Signal Generator	Keysight	N5181A	Aug. 24, 2022
12	Power Amplifier	Mic-top	MPA-80-1000-1000	Aug. 24, 2022
13	Power meter	Keysight	E4419A	Aug. 24, 2022
14	Power probe	Keysight	E9304A	Aug. 24, 2022
15	Power Amplifier	AR	25S1G4A	Aug. 24, 2022
16	Antenna	Schwarzbeck	STLP9149	Aug. 24, 2022
17	Control	Positioning Controller	Model MF-7802	04/26/2022
18	Immunity test	3CTest	CCS 600	Aug. 24, 2022
19	Coupling clamp	3CTest	CCC100	Aug. 24, 2022
20	CDN	3CTest	SEPN3832T	Aug. 24, 2022
21	Voltage regulator	3CTest	VVT2216	Aug. 24, 2022

3. ENTPOWER LINE CONDUCTED EMISSION MEASUREMENT

3.1. Block Diagram of Test Setup



3.2. Measuring Standard

Power Line Conducted Emission Limits (Class B)

Frequency (MHz)	Limit (dB V)	
	Quasi-Peak Level	Average Level
0.15 ~ 0.50	66.0 ~ 56.0 *	56.0 ~ 46.0 *
0.50 ~ 5.00	56.0	46.0
5.00 ~ 30.00	60.0	50.0
NOTE1-The lower limit shall apply at the transition frequencies. NOTE2-The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.		

3.3. EUT Configuration on Measurement

The following equipments are installed on Conducted Emission Measurement to meet EN 61000-6-1 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

3.4. Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and connected to the AC mains through Line Impedance Stability Network (L.I.S.N).

This provided a 50ohm coupling impedance for the tested equipments.

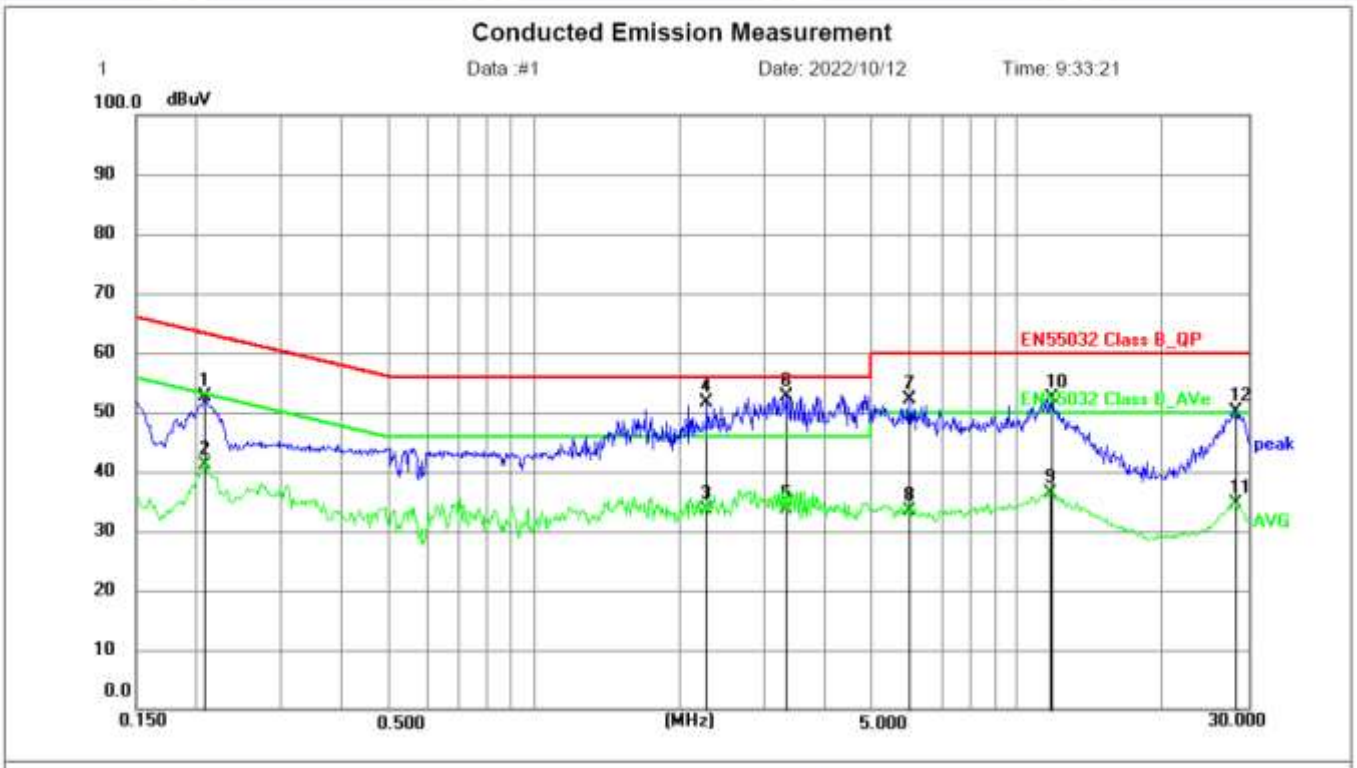
Both sides of AC line are investigated to find out the maximum conducted emission according to the EN 61000-6-1 regulations during conducted emission measurement.

The bandwidth of the field strength meter (R&S Test Receiver ESCS30) is set at 9KHz in 150KHz~30MHz and 200Hz in 9KHz~150KHz.

The frequency range from 150kHz to 30MHz is investigated.

Conduction Uncertainty: Uc = ±2.72 dB

3.5. Test Results

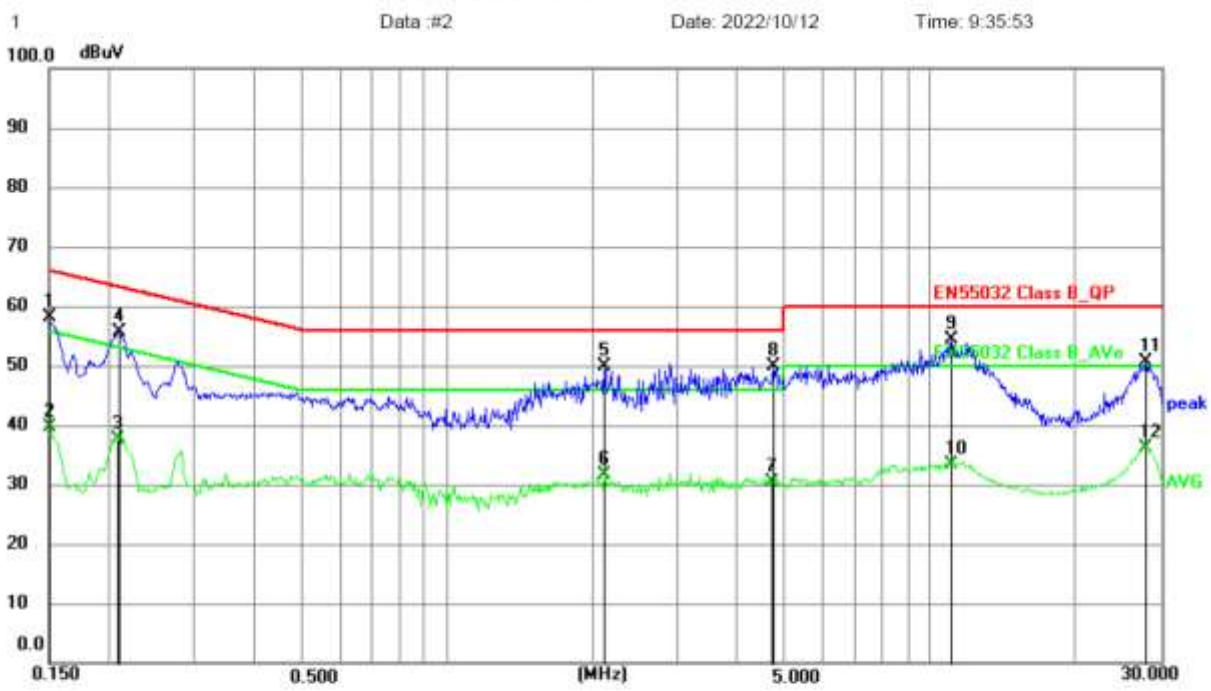


Site LAB
Limit: EN55032 Class B_QP
EUT: Universalcharger
M/N: M-UNPLUGU
Mode: 5V2.4A
Note: 负载灯泡
/

Phase: N
Power: AC230V/50Hz

Temperature: 24(C)
Humidity: 54 %RH

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.2083	32.45	20.09	52.54	63.27	-10.73	peak	P	
2	0.2083	21.06	20.09	41.15	53.27	-12.12	AVG	P	
3	2.2694	13.15	20.38	33.53	46.00	-12.47	AVG	P	
4	2.2785	31.25	20.38	51.63	56.00	-4.37	peak	P	
5	3.3180	13.32	20.42	33.74	46.00	-12.26	AVG	P	
6 *	3.3450	32.24	20.42	52.66	56.00	-3.34	peak	P	
7	5.9730	31.65	20.44	52.09	60.00	-7.91	peak	P	
8	5.9730	12.89	20.44	33.33	50.00	-16.67	AVG	P	
9	11.6970	15.84	20.50	36.34	50.00	-13.66	AVG	P	
10	11.7780	31.76	20.50	52.26	60.00	-7.74	peak	P	
11	28.2700	13.61	20.93	34.54	50.00	-15.46	AVG	P	
12	28.3110	29.26	20.94	50.20	60.00	-9.80	peak	P	



Site LAB
Limit: EN55032 Class B_QP
EUT: Universalcharger
M/N: M-UNPLUGU
Mode: 5V2.4A
Note: 负载灯泡
/

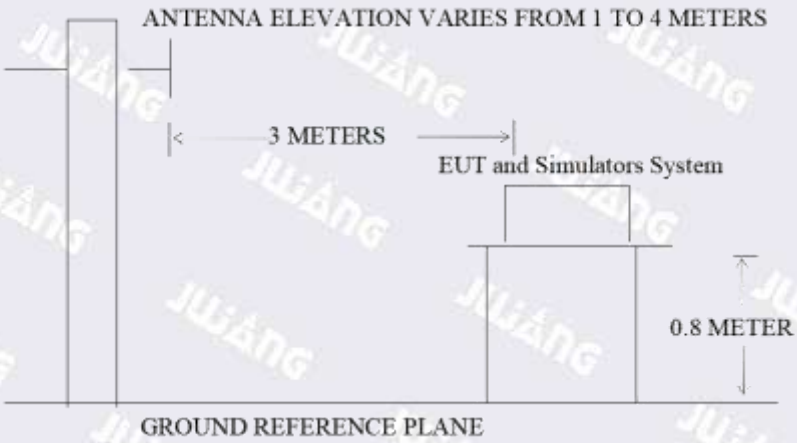
Phase: L1
Power: AC230V/50Hz

Temperature: 24(C)
Humidity: 54 %RH

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1500	37.94	20.08	58.02	66.00	-7.98	peak	P	
2	0.1500	19.57	20.08	39.65	56.00	-16.35	AVG	P	
3	0.2083	17.66	20.09	37.75	53.27	-15.52	AVG	P	
4	0.2084	35.59	20.09	55.68	63.27	-7.59	peak	P	
5	2.1210	29.57	20.37	49.94	56.00	-6.06	peak	P	
6	2.1210	11.16	20.37	31.53	46.00	-14.47	AVG	P	
7	4.7040	10.05	20.38	30.43	46.00	-15.57	AVG	P	
8	4.7310	29.41	20.38	49.79	56.00	-6.21	peak	P	
9 *	11.0310	33.91	20.51	54.42	60.00	-5.58	peak	P	
10	11.0310	12.95	20.51	33.46	50.00	-16.54	AVG	P	
11	27.8655	29.71	20.91	50.62	60.00	-9.38	peak	P	
12	27.8655	15.17	20.91	36.08	50.00	-13.92	AVG	P	

4. RADIATED EMISSION MEASUREMENT

4.1. Block diagram of test setup (In chamber)



4.2. Measuring

Radiated Emission Limits

All emanations from a class B device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified below:

FREQUENCY (MHz)	DISTANCE (Meters)	FIELD STRENGTHS LIMIT (dB V/m)
30 ~ 230	3	40
230 ~ 1000	3	47

Note**:** (1) The smaller limit shall apply at the combination point between two frequency bands.
(2)Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the EUT.

4.3. EUT Configuration on Test

The regulations test method must be used to find the maximum emission during radiated emission measurement.

4.4. Test Procedure

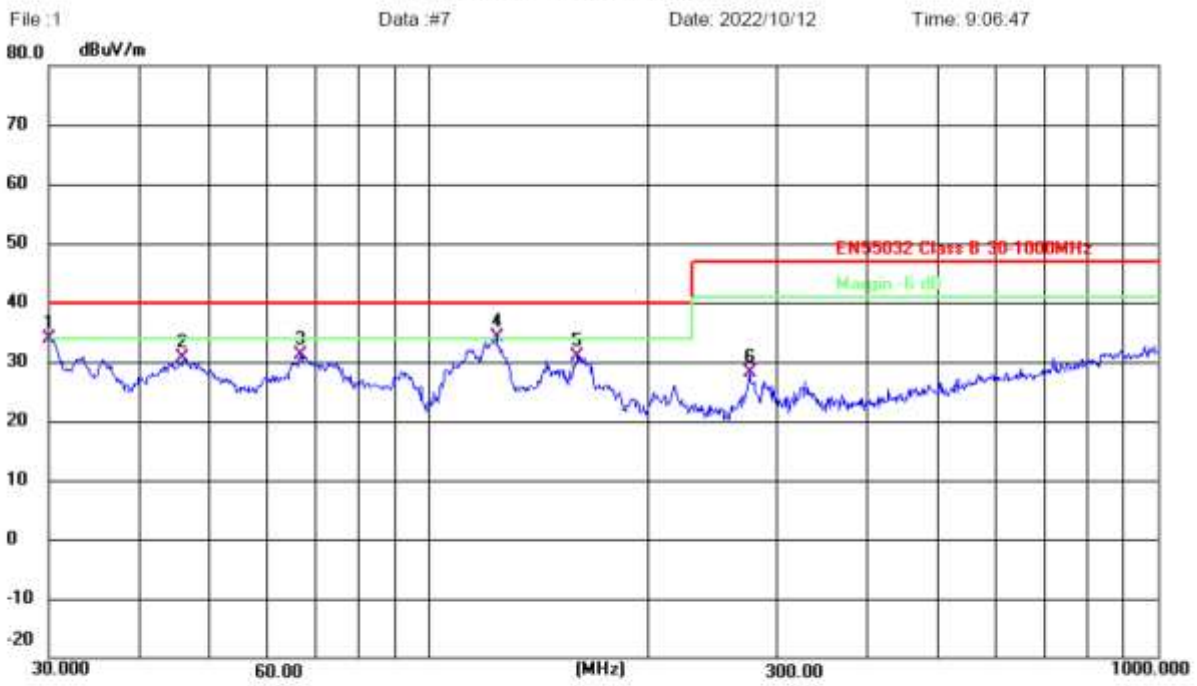
The EUT is placed on a turn table which is 0.8 meter high above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Bilog antenna (calibrated by Dipole Antenna) is used as a receiving antenna. Both horizontal and vertical polarization of the antenna are set on test.

The bandwidth of the Receiver (ESCS30) is set at 120kHz.
The frequency range from 30MHz to 1000MHz is investigated.

Radiation Uncertainty: Ur = ±3.84 dB

4.5. Test Results

its test data was showed as the follow:

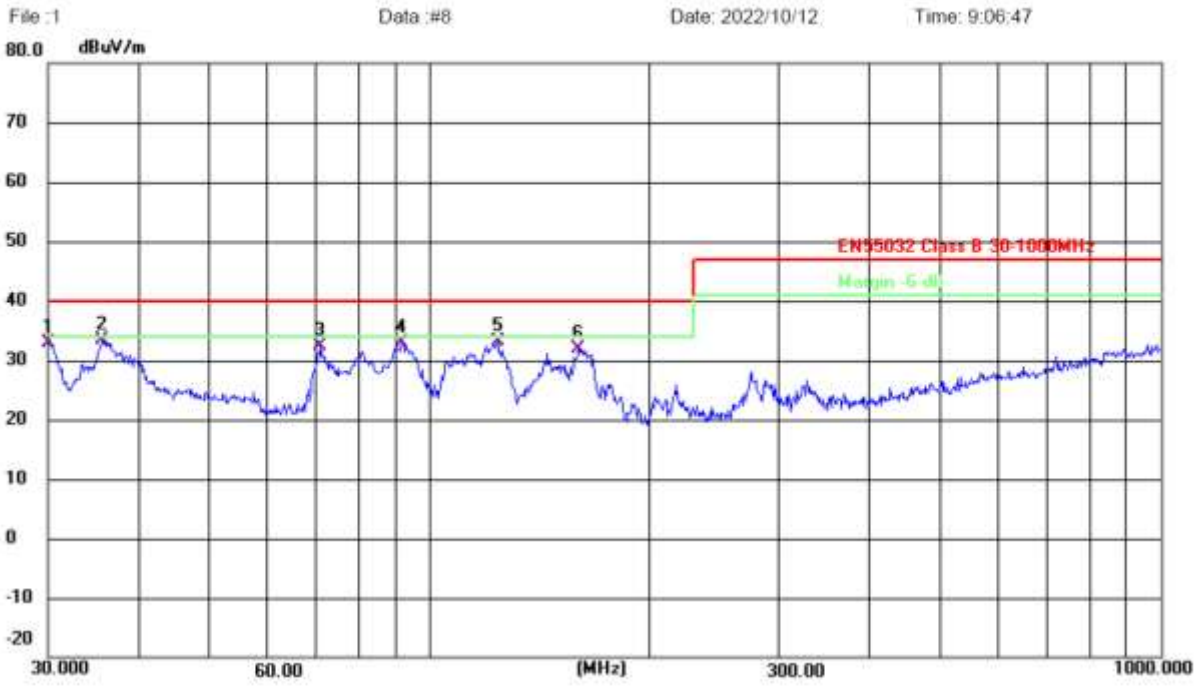


Site LAB
Limit: EN55032 Class B 30-1000MHz
EUT: Universalcharger
M/N: M-UNPLUGU
Mode: 5V2.4A
Note: 负载灯泡
/

Polarization: *Vertical*
Power: AC230V/50Hz
Distance: 3m

Temperature: 25(C)
Humidity: 60 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	30.1051	51.11	-17.33	33.78	40.00	-6.22	QP			P	
2	46.0162	61.18	-30.45	30.73	40.00	-9.27	QP			P	
3	66.4990	61.48	-30.46	31.02	40.00	-8.98	QP			P	
4 *	123.6984	64.67	-30.47	34.20	40.00	-5.80	QP			P	
5	159.7844	61.37	-30.45	30.92	40.00	-9.08	QP			P	
6	275.1570	58.69	-30.59	28.10	47.00	-18.90	QP			P	



Site LAB
Limit: EN55032 Class B 30-1000MHz
EUT: Universalcharger
M/N: M-UNPLUGU
Mode: 5V2.4A
Note: 负载灯泡
/

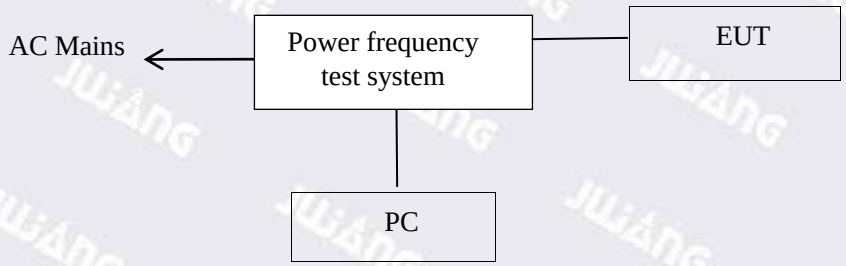
Polarization: *Vertical*
Power: AC230V/50Hz
Distance: 3m

Temperature: 25(C)
Humidity: 60 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	30.1051	50.11	-17.33	32.78	40.00	-7.22	QP			P	
2 *	35.6240	63.82	-30.52	33.30	40.00	-6.70	QP			P	
3	70.8315	62.93	-30.48	32.45	40.00	-7.55	QP			P	
4	91.4946	63.30	-30.48	32.82	40.00	-7.18	QP			P	
5	123.6984	63.67	-30.47	33.20	40.00	-6.80	QP			P	
6	159.7844	62.37	-30.45	31.92	40.00	-8.08	QP			P	

5. HARMONIC CURRENT EMISSION MEASUREMENT

5.1. Block Diagram of Test Setup



5.2. Measuring

EN IEC 61000-3-2:2019+A2:2021

5.3. Description of test Equipment

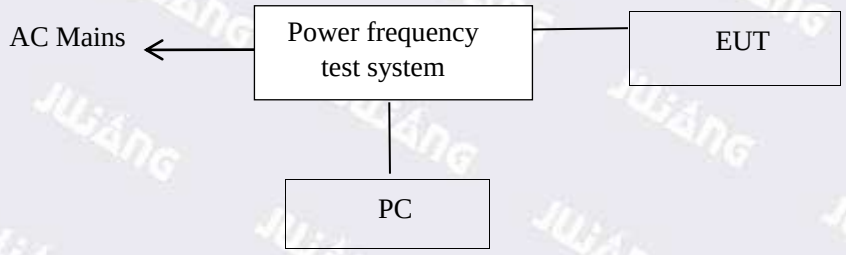
Note: Equipment is less than 75W, no corresponding harmonic current limit.

5.4. Test Results

PASS

6. VOLTAGE FLUCTUATION AND FLICKER MEASUREMENT

6.1. Block Diagram of Test Setup



6.2. Measuring Standard

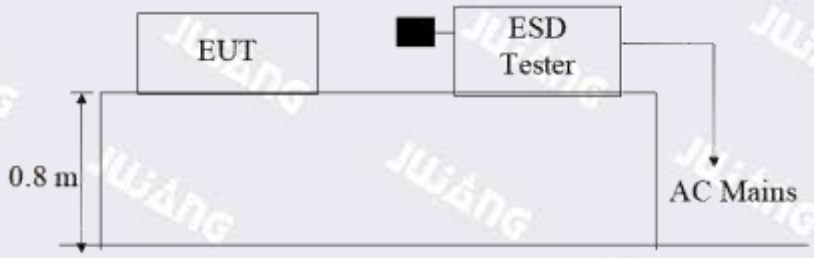
EN 61000-3-3:2019+A2:2021

6.3. Test Results

PASS.

7. ELECTROSTATIC DISCHARGE IMMUNITY TEST

7.1. Block Diagram Of Test



7.2. Test Standard

EN 55035:2017+A11:2020
Severity Level: 3 / Air Discharge: ±8KV
Level: 2 / Contact Discharge: ±4KV)

7.3. Severity Levels and Performance Criterion

7.4. Severity Levels

Level	Test Voltage Contact Discharge (KV)	Test Voltage Air Discharge (KV)
1.	±2	±2
2.	±4	±4
3.	±6	±8
4.	±8	±15
X	Special	Special

7.3.1. Performance Criterion:B

7.5. Test Procedure

7.4.1. Air Discharge:

This test is done on a non-conductive surface. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

7.4.2. Contact Discharge:

All the procedure shall be same as Section 4.2.3.1. except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

7.4.3. Indirect discharge for horizontal coupling plane

At least 10 single discharges (in the most sensitive polarity) shall be applied at the front edge of each HCP opposite the center point of each unit (if applicable) of the EUT and 0.1m from the front of the EUT. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge.

7.4.4. Indirect discharge for vertical coupling plane

At least 10 single discharge (in the most sensitive polarity) shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

7.6. Test Results

PASS.

Please refer to the following pages.

Electrostatic Discharger Test Results			
Standard	EN 61000-4-2		
Temperature	25.4℃	**Humidity**	56.8%
Criterion	B	**Pressure**	996mbar
Test Mode	Normal	**Test Date**	2022-10-14

Air Discharge

Test Points	Test Levels			Results		
	2KV	4KV	8KV	Passed	Fail	Performance Criterion
Front	☒	☒	☒	☒	☐	☐ A ☒ B
Back	☒	☒	☒	☒	☐	☐ A ☒ B
Left	☒	☒	☒	☒	☐	☐ A ☒ B
Right	☒	☒	☒	☒	☐	☐ A ☒ B
Top	☒	☒	☒	☒	☐	☐ A ☒ B
Bottom	☒	☒	☒	☒	☐	☐ A ☒ B

Contact Discharge

Test Points	Test Levels		Results		
	2KV	4KV	Passed	Fail	Performance Criterion
Front	☒	☒	☒	☐	☐ A ☒ B
Back	☒	☒	☒	☐	☐ A ☒ B
Left	☒	☒	☒	☐	☐ A ☒ B
Right	☒	☒	☒	☐	☐ A ☒ B
Top	☒	☒	☒	☐	☐ A ☒ B
Bottom	☒	☒	☒	☐	☐ A ☒ B

Discharge To Horizontal Coupling Plane

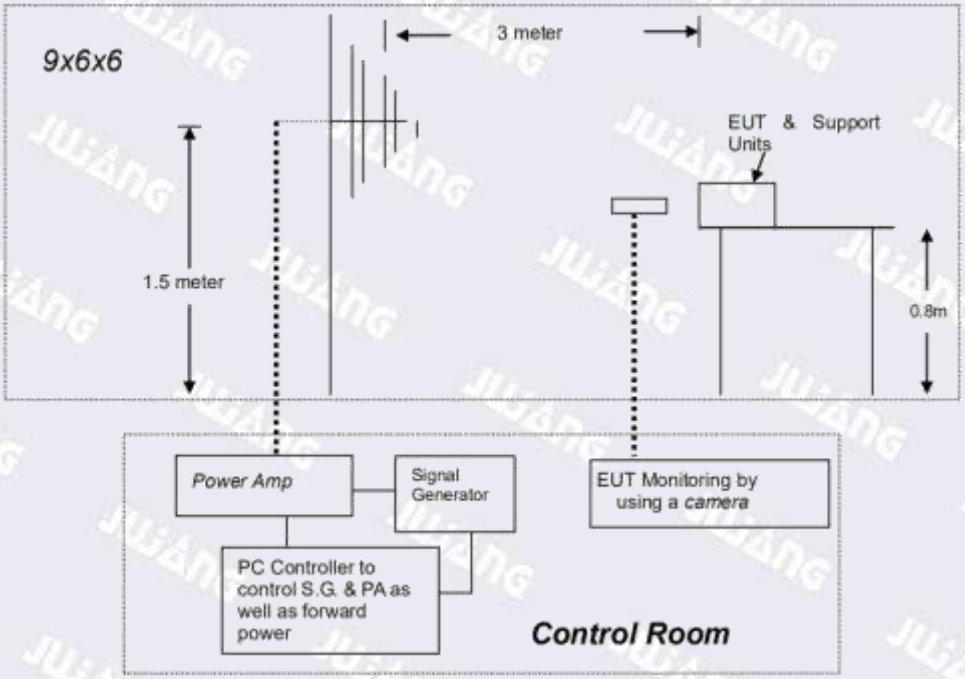
Side of EUT	Test Levels		Results		
	2KV	4KV	Passed	Fail	Performance Criterion
Front	☒	☒	☒	☐	☐ A ☒ B
Back	☒	☒	☒	☐	☐ A ☒ B
Left	☒	☒	☒	☐	☐ A ☒ B
Right	☒	☒	☒	☐	☐ A ☒ B

Discharge To Vertical Coupling Plane

Side of EUT	Test Levels		Results		
	2KV	4KV	Passed	Fail	Performance Criterion
Front	☒	☒	☒	☐	☐ A ☒ B
Back	☒	☒	☒	☐	☐ A ☒ B
Left	☒	☒	☒	☐	☐ A ☒ B
Right	☒	☒	☒	☐	☐ A ☒ B

8. RF FIELD STRENGTH SUSCEPTIBILITY TEST

8.1. Block Diagram Of Test



8.2. Test Standard

EN 61000-4-3: 2006+A1: 2008+A2: 2010

8.2.1. Severity Levels

Level	Field Strength V/m
1.	1
2.	3
3.	10
X	Special

8.2.2. Performance Criterion: A

8.3. Test Procedure

The EUT are placed on a table which is 0.8 meter high above the ground. The EUT is set 3 meters away from the transmitting antenna which is mounted on an antenna tower. Both horizontal and vertical polarization of the antenna are set on test. Each of the four sides of the EUT must be faced this transmitting antenna and measured individually. In order to judge the EUT performance, a CCD camera is used to monitor its screen. All the scanning conditions are as following:

Condition of Test	Remark
1. Fielded Strength	3 V/m (Severity Level 2)
2. Radiated Signal	Modulated
3. Scanning Frequency	80 - 1000 MHz 1800MHz 2600MHz 3500MHz 5000MHz
4. Sweeping time of radiated	0.0015 decade/s
5. Dwell Time	1 Sec.

8.4. Test Results

PASS.

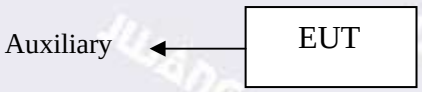
Please refer to the following pages.

RF Field Strength Susceptibility Test Results			
Standard	EN 61000-4-3		
Temperature	24.8℃	**Humidity**	57.5%
Criterion	A	**Field Strength**	3V/m
Test Mode	Normal	**Test Date**	2022-10-14
Frequency Range	80MHz to 1000 MHz		
Modulation	☐ None ☐Pulse ☒AM 1KHz 80%		
Steps	1%		
	Horizontal	**Vertical**	
Front	PASS	PASS	
Right	PASS	PASS	
Rear	PASS	PASS	
Left	PASS	PASS	

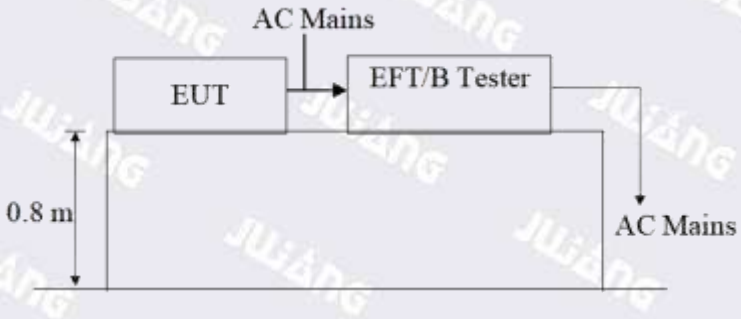
9. ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST

9.1. Block Diagram of Test Setup

9.1.1. Block Diagram of the EUT



9.1.2. EFT Test Setup



9.2. Test Standard

EN 61000-4-4:2012
Severity Level 2 at 1KV

9.3. Severity Levels and Performance Criterion

9.3.1. Severity level

Open Circuit Output Test Voltage ±10%		
Level	On Power Supply Lines	On I/O (Input/Output) Signal data and control lines
1.	0.5 KV	0.25 KV
2.	1 KV	0.5 KV
3.	2 KV	1 KV
4.	4 KV	2 KV
X	Special	Special

9.3.2. Performance criterion : B

9.4. Test Procedure

The EUT is put on the table which is 0.8 meter high above the ground. This reference ground plane shall 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 beneath the EUT, shall be more than 0.5m.

For input and output AC power ports

The EUT is connected to the power mains by using a coupling device which couples the EFT interference signal to AC power lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 2 mins.

9.5. Test Results

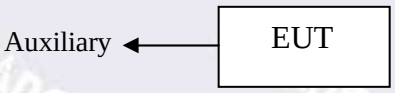
Test Point	Polarity	Test Level (kV)	Performance Criterion	Observation	Result
L 1	+/-	1	B	Note ☒1 ☐2	PASS
L 2	+/-	1	B	Note ☒1 ☐2	PASS
L 1–L 2	+/-	1	B	Note ☒1 ☐2	PASS
PE	+/-	1	B	Note ☒1 ☐2	PASS
L – PE	+/-	1	B	Note ☒1 ☐2	PASS
N – PE	+/-	1	B	Note ☒1 ☐2	PASS
L – N – PE	+/-	1	B	Note ☒1 ☐2	PASS

NOTE: 1. There was no change compared with initial operation during the test.
2. The loss of function of the EUT during the test and it was recovered by itself operation after the test.

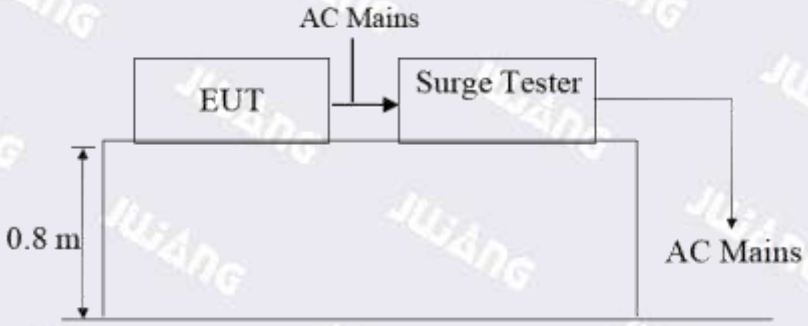
10. SURGE IMMUNITY TEST

10.1. Block Diagram of Test Setup

10.1.1. Block Diagram of the EUT



10.1.2. Surge Test Setup



Polarity : Positive / Negative
Pulse number : 5 pulses for each polarity
Coupling phase: 0 °, 90 °, 180 °, 270 °
Repetition rate : 1 pulse/min
Input voltage : AC 230 V, 50 Hz
Operation mode: Power on with incandescent bulb and operated Wi-Fi function

10.2. Test Standard

EN 55035:2017+A11:2020

Severity Level**:** Line to Line: Level 2, 1.0KV)

10.3. Severity Levels and Performance Criterion

10.3.1. Severity level

Severity Level	Open-Circuit Test Voltage KV
1	0.5
2	1.0
3	2.0
4	4.0
*	Special

10.3.2. Performance criterion : B

10.4. Test Procedure

1) Set up the EUT and test generator as shown on Section 10.1.2.
2) For line to line coupling mode, provide a 1.0 KV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to EUT selected points.
3) At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are conducted during test.
4) Different phase angles are done individually.
5) Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

10.5. Test Results

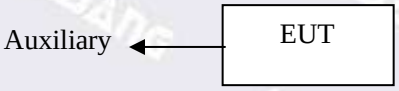
Test Point	Polarity	Test Level (kV)	Performance Criterion	Observation	Result
L 1 - L 2	+/-	1	B	Note ☒1 ☐2	PASS
L1 - PE	+/-	2	B	Note ☒1 ☐2	PASS
L2 - PE	+/-	2	B	Note ☒1 ☐2	PASS
R - Ground	--	--	--	Note ☐1 ☐2	N/A
T - Ground	--	--	--	Note ☐1 ☐2	N/A

NOTE: 1. There was no change compared with initial operation during the test.
2. The loss of function of the EUT during the test and it was recovered by itself operation after the test.

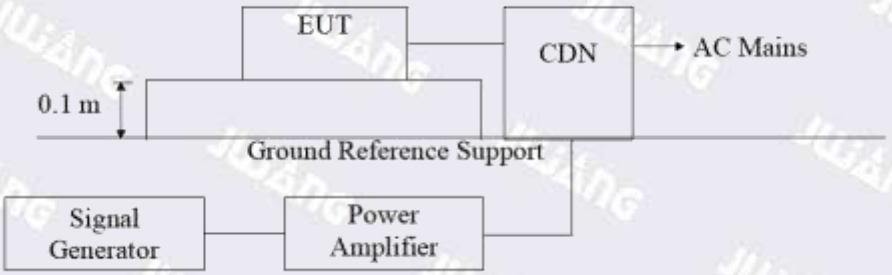
11. INJECTED CURRENTS SUSCEPTIBILITY TEST

11.1. Block Diagram of Test Setup

11.1.1. Block Diagram of the EUT



11.1.2. Block Diagram of Test Setup



11.2. Test Standard

EN 55035:2017+A11:2020

Severity Level 2 at 3V (rms), 0.15MHz ~ 10MHz
Severity Level 2 and Level 1 at 3 V to 1V (rms),
10MHz ~ 30MHz Severity Level 1 at 1V (rms), 30 MHz ~ 80MHz

11.3. Severity Levels and Performance Criterion

11.3.1. Severity level

Level	Field Strength V
1	1
2	3
3	10
X	Special

11.3.2. Performance criterion: A

11.4. Test Procedure

1) Set up the EUT, CDN and test generators as shown on Section 11.1.2.
2) Let the EUT work in test mode and measure it.

3) 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).
4) The disturbance signal described below is injected to EUT through CDN.
5) The EUT operates within its operational mode(s) under intended climatic conditions after power on.
6) The frequency range is swept from 150KHz to80MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1KHz sine wave.
7) The rate of sweep shall not exceed $1.5*10^{-3}$decades/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.
8) Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

11.5. Test Results

AC mains power input port

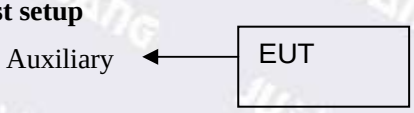
Frequency range: 150kHz to 80MHz
Modulated: Amplitude 80%, 1kHz sine wave
Severity Level: 3 V Unmodulated , r.m.s

Level	Voltage Level (e.m.f.) U_0	Pass	Fail
1	1	/	/
2	3	A	/
3	10	/	/
X	Special	/	/

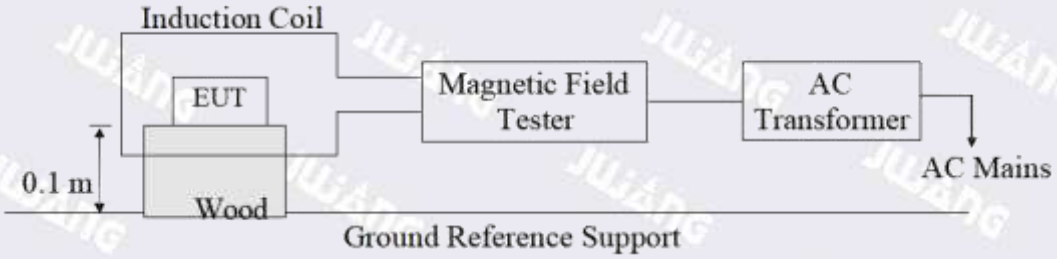
12. MAGNETIC FIELD SUSCEPTIBILITY TEST

12.1. Block Diagram of Test

12.1.1. Block diagram of test setup



12.1.2. Magnetic field test setup



12.2. Test Standard

(Severity Level: Level 1, 1A / m)

EN 55035:2017+A11:2020

12.3. Severity Levels and Performance Criterion

12.3.1. Severity Levels

Level	Field Strength A/m
1	1
2	3
3	10
4	30
5	100
X	Special

12.3.2. Performance Criterion : A

12.4. Test Procedure

The EUT is placed in the middle of a induction coil (1*1m), under which is a 1*1*0.1m (high) table, this small table is also placed on a larger table,0.8 m above the ground. Both horizontal and vertical polarization of the induction coil are set on test, so that each side of the EUT is affected by the magnetic field. Also can reach the same aim by change the position of the EUT.

12.5. Test Result

Magnetic Field Immunity Test Result			
Temperature	25.2℃	**Humidity**	56.8%
Test Mode	Normal	**Test Date**	2022-06-26

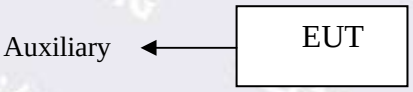
Test Level (A/M)	Testing Duration	Coil Orientation	Result
1	5 mins	X	Pass
1	5 mins	Y	Pass
1	5 mins	Z	Pass

A:Normal performance within the specification limits;
B:Temporary degradation or less of function or performance which is self-recoverable;
C:Temporary degradation or loss of function or performance which requires operator intervention or system reset;

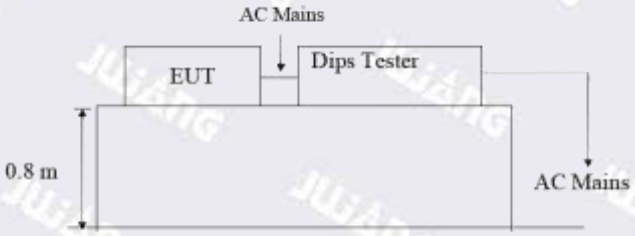
13. VOLTAGE DIPS AND INTERRUPTIONS TEST

13.1. Block Diagram of Test Setup

13.1.1. Block Diagram of the EUT



13.1.2. Dips Test Setup



13.2. Test Standard

EN 55035:2017+A11:2020

13.3. Severity Levels and Performance Criterion

13.3.1. Severity level

Test Level %UT	Voltage dip and short interruptions %UT	Duration (in period)
0	100	0.5 1 5 10 25 50 *
40	60	
70	30	

13.3.2. Performance criterion : B&C&C

13.4. Test Procedure

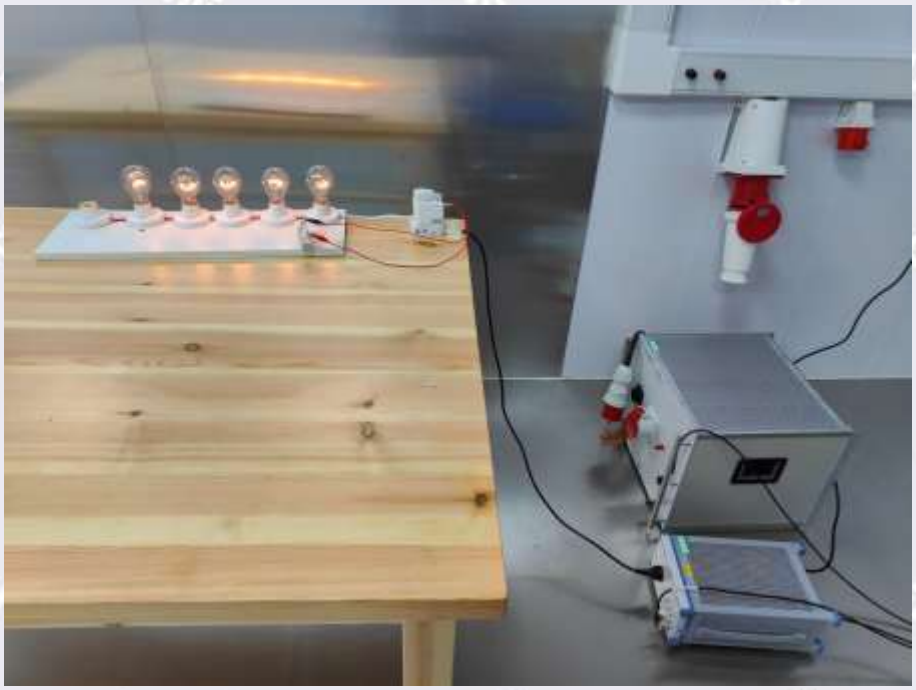
1) Set up the EUT and test generator as shown on Section 13.1.2.
2) The interruptions is introduced at selected phase angles with specified duration.
3) Record any degradation of performance.

13.5. Test Result

Environmental Phenomena	Test level (in % U_T)	Duration (in period of the rated frequency)	Remarks
Dips	0	0.5 T (10 ms)	During the test, the load lamp flickered. After the disturbance ceased, it could be restored automatically.
Dips	0	1 T (20 ms)	
Dips	70	25 T (500 ms)	
Interruptions	0	250 T (5 s)	

NOTE: 1.There was no change compared with initial operation during and after the test.
No unintentional response was found during the test.
2. The function stopped during the test, but can be recoverable by itself operation after the test.
3. The function stopped during the test, but can be recoverable manually after the test.

Photographs of the Test Set-Up



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EUT PHOTOS

Photo1

Photo2

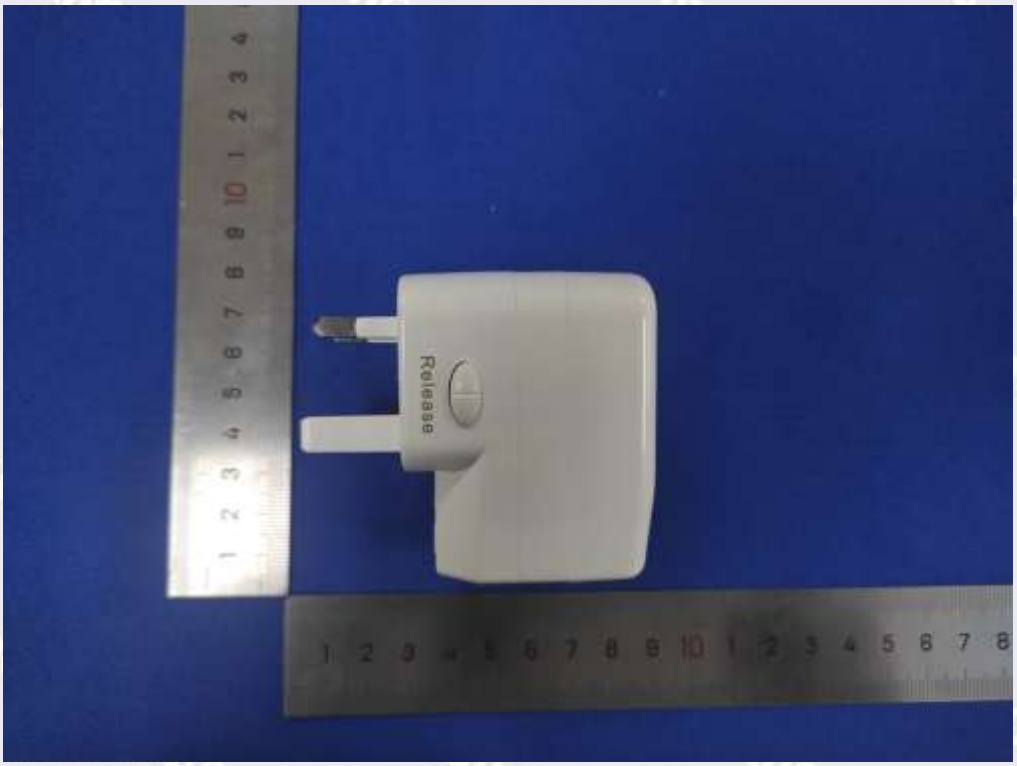

Photo3

Photo4

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Photo5

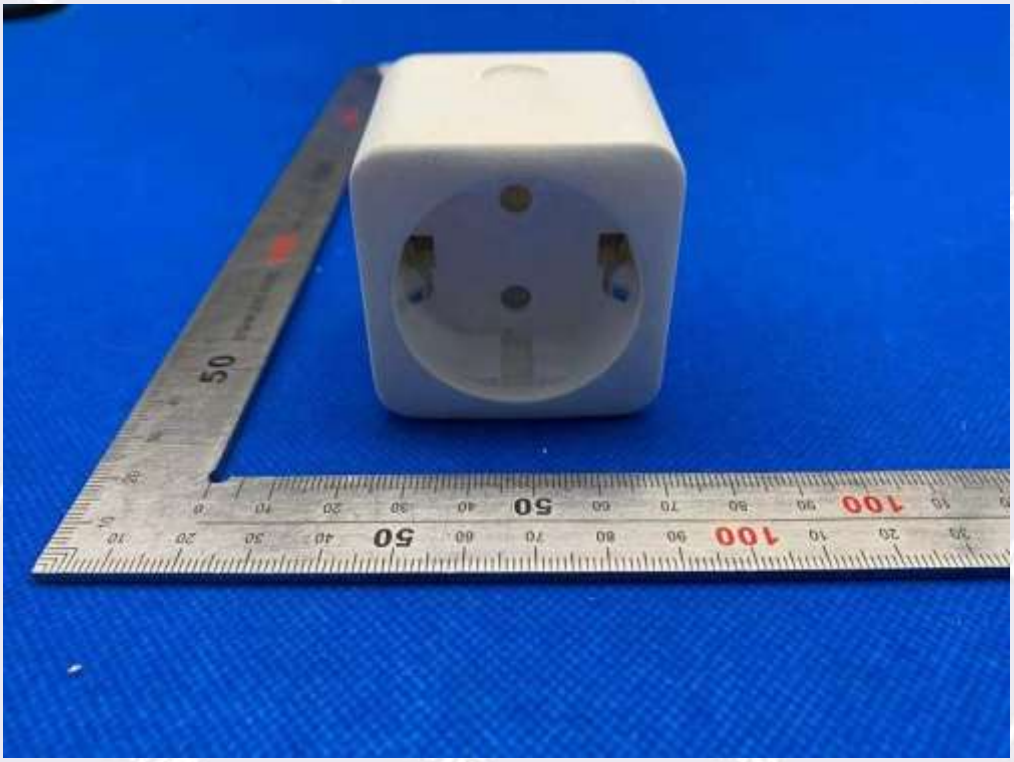
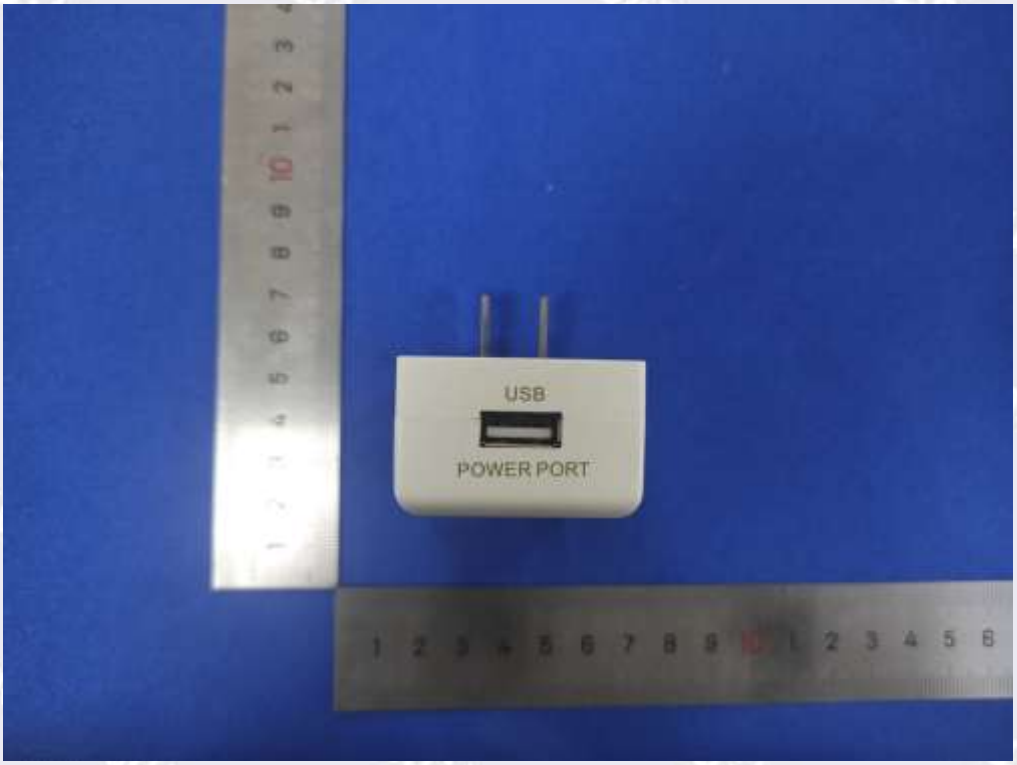


Photo6



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