

#### **EMC TEST REPORT**

For

Huizhou Huajiekang Electronic Technology Co., Ltd

Charger

Test Model: C7-EU

Prepared for

: Huizhou Huajiekang Electronic Technology Co., Ltd

Address

: 2nd Floor 1st of Ritongda Building ,Wuyi Avenue, Chenjiang Town, Zhongkai Districk, Huizhou, China

Prepared by

: Shenzhen LCS Compliance Testing Laboratory Ltd.

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Date of receipt of test sample

June 25, 2021

Number of tested samples

: 1

Serial number

: Prototype

Date of Test

: June 25, 2021~ June 30, 2021

Date of Report

: August 06, 2021

#### **EMC TEST REPORT**

EN 55032: 2015+A11: 2020

Electromagnetic compatibility of multimedia equipment - Emission Requirements

EN 55035: 2017+A11: 2020

Electromagnetic compatibility of multimedia equipment – Immunity requirements

Report Reference No. ...... : LCS210624004AE Date of Issue..... : August 06, 2021

: Shenzhen LCS Compliance Testing Laboratory Ltd. Testing Laboratory Name.....

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

Other standard testing method

Applicant's Name.....: : Huizhou Huajiekang Electronic Technology Co., Ltd

Address ...... : 2nd Floor 1st of Ritongda Building ,Wuyi Avenue, Chenjiang

Town, Zhongkai Districk, Huizhou, China

Test Specification

: EN 55032: 2015+A11: 2020 Standard .....

> EN 55035: 2017+A11: 2020 EN IEC 61000-3-2: 2019

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

Test Report Form No. ..... : LCSEMC-1.0

TRF Originator.....: Shenzhen LCS Compliance Testing Laboratory Ltd.

Master TRF.....: Dated 2011-03

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Test Item Description. .....: : Charger

Trade Mark ..... JKVN

Test Model.....

Ratings ..... : Please Refer to Page 9

Result .....: : Positive

Compiled by:

Supervised by:

Cindy Nie

Baron Wen

Cindy Nie/ File administrators

Baron Wen/ Technique principal

Gavin Liang/ Manager

# CHENZHEN LCS COMPLIANCE TESTING <u>LABORATORY LTD.</u> Report No.: LCS210624004AE

# **EMC -- TEST REPORT**

August 06, 2021 Test Report No.: LCS210624004AE Date of issue

Test Model..... : C7-EU EUT.....:: Charger Applicant.....: : Huizhou Huajiekang Electronic Technology Co., Ltd Address...... : 2nd Floor 1st of Ritongda Building ,Wuyi Avenue, Chenjiang Town, Zhongkai Districk, Huizhou, China Telephone.....::/ Fax.....: : / Manufacturer.....: : Huizhou Huajiekang Electronic Technology Co., Ltd Address.....: 2nd Floor 1st of Ritongda Building , Wuyi Avenue, Chenjiang Town, Zhongkai Districk, Huizhou, China Telephone....:: : / Fax.....:: : / Factory.....:: SHANGHAI CALER ELECTRONICS CO., LTD. Address......: NO. 30 Lane 429 Shenglong Rd. Songjiang Shanghai China 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.



# **Revision History**

Revision	Issue Date	Revisions	Revised By
000	August 06, 2021	Initial Issue	Gavin Liang



# SHENZHEN LCS COMPLIANCE TESTING LABORATORY LTD. Report No.: LCS210624004AE

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# 1. TEST STANDARDS

# The tests were performed according to following standards:

EN 55032: 2015+A11: 2020 Electromagnetic compatibility of multimedia equipment - Emission Requirements

<u>EN 55035: 2017+A11: 2020</u> Electromagnetic compatibility of multimedia equipment – Immunity characteristics

EN IEC 61000-3-2: 2019 Electromagnetic compatibility (EMC) -- Part 3-2: Limits - Limits for harmonic current emissions (equipment input current up to and including 16 A per phase) EN 61000-3-3: 2013+A1: 2019 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 ≤ 16 A per phase and not subject to conditional connection



# 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.

Emission (EN 55032: 2015+A11: 2020)					
Description of Test Item	Limits	Results			
Conducted disturbance at mains terminals	EN 55032: 2015+A11: 2020	Class B	PASS		
Conducted disturbance at telecommunication port	EN 55032: 2015+A11: 2020	Class B	N/A		
Radiated disturbance	EN 55032: 2015+A11: 2020	Class B	PASS		
Harmonic current emissions	EN IEC 61000-3-2: 2019	Class A	PASS		
Voltage fluctuations & flicker	EN 61000-3-3: 2013+A1: 2019		PASS		
	munity (EN 55035: 2017+A11:				
Description of Test Item	Basic Standard	Performance Criteria	Results		
Electrostatic discharge (ESD)	EN 61000-4-2: 2009	В	PASS		
Radio-frequency, Continuous radiated disturbance	EN 61000-4-3: 2006+A2: 2010	А	PASS		
Electrical fast transient (EFT)	EN 61000-4-4: 2012	В	PASS		
Surge (Input a.c. power ports)	EN 61000-4-5: 2014+A1: 2017	В	PASS		
Surge (Telecommunication ports)	EN 61000-4-5. 2014+A1. 2017	В	N/A		
Radio-frequency, Continuous conducted disturbance	EN 61000-4-6: 2014+A1: 2015	А	PASS		
Power frequency magnetic field	EN 61000-4-8: 2010	Α	PASS		
Voltage dips, >95% reduction		В	PASS		
Voltage dips, 30% reduction	EN 61000-4-11: 2020+AC: 2020	С	PASS		
Voltage interruptions		С	PASS		
***Note: N/A is an abbreviation for Not Applicable.					

Test mode:			
Mode 1	Full Load	Record	
Mode 2	Half Load	Pre-scan	
Mode 3	No load	Pre-scan	
***Note: All test modes were tested, but we only recorded the worst case in this report.			



## 2.2. Description of Performance Criteria

General Performance Criteria

Examples of functions defined by the manufacturer to be evaluated during testing include, but are not limited to, the following:

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essential operational modes and states;

#### 2.2.1. 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 manufacture 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 deriver from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

#### 2.2.2. 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 manufacture, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance.

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

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

#### 2.2.3. 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 manufacture's instructions.

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



# 3. GENERAL INFORMATION

# 3.1. Description of Device (EUT)

EUT : Charger

Trade Mark :

Test Model : C7-EU

Additional Model No. : /

PCB board, structure and internal of these model(s)

Model Declaration

are the same, So no additional models were tested

Power Supply : Input: 100-240V~, 50-60Hz, 700mA

USB output: 5.0V-1.0A

DC Output: 3V/4.5V/5V/6V/7.5V/9V/12V-2.0A

EUT Clock : ≤ 108MHz

Highest internal frequency (Fx)	Highest measured frequency
Fx ≤ 108 MHz	1 GHz
108 MHz < Fx ≤ 500 MHz	2 GHz
500 MHz < Fx ≤ 1 GHz	5 GHz
Fx > 1 GHz	5 × Fx up to a maximum of 6 GHz

NOTE 1 For FM and TV broadcast receivers, Fx is determined from the highest frequency generated or used excluding the local oscillator and tuned frequencies.

Where Fx is unknown, the radiated emission measurements shall be performed up to 6 GHz

# 3.2. Description of Support Device

Name	Manufacturers	M/N	S/N

# 3.3. Description of Test Facility

Site Description

EMC Lab. : NVLAP Accreditation Code is 600167-0.

FCC Designation Number is CN5024.

CAB identifier is CN0071.

CNAS Registration Number is L4595.



# 3.4. Statement of The Measurement Uncertainty

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.

# 3.5. Measurement Uncertainty

Test	Parameters	Expanded uncertainty (U <sub>lab</sub> )	Expanded uncertainty (U <sub>cispr</sub> )
Conducted Emission	Level accuracy (9kHz to 150kHz) (150kHz to 30MHz)	± 2.63 dB ± 2.35 dB	± 3.8 dB ± 3.4 dB
Power Disturbance	Level accuracy (30MHz to 300MHz)	± 2.90dB	± 4.5 dB
Electromagnetic Radiated Emission (3-loop)	Level accuracy (9kHz to 30MHz)	± 3.60 dB	± 3.3 dB
Radiated Emission	Level accuracy (9kHz to 30MHz)	± 3.68 dB	N/A
Radiated Emission	Level accuracy (30MHz to 1000MHz)	± 3.48 dB	± 5.3 dB
Radiated Emission	Level accuracy (above 1000MHz)	± 3.90 dB	$\pm$ 5.2 dB
Mains Harmonic	Mains Harmonic Voltage		N/A
Voltage Fluctuations & Flicker	Voltage	± 0.510%	N/A
EMF	/	± 21.59%	N/A

<sup>1)</sup> Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus.

<sup>2)</sup> The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor of k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.



# 4. MEASURING DEVICES AND TEST EQUIPMENT

LINE	CONDUCTED EMISS	SION				
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Date
1	EMI Test Software	EZ	EZ-EMC	/	N/A	N/A
2	EMI Test Receiver	R&S	ESPI	101840	2021-06-21	2022-06-20
3	Artificial Mains	R&S	ENV216	101288	2021-06-21	2022-06-20
4	10dB Attenuator	SCHWARZBECK	MTS-IMP-13 6	261115-001-00 32	2021-06-21	2022-06-20
5	Impedance Stabilization Network	TESEQ	ISN T800	45130	2020-12-02	2021-12-01
RAD	IATED DISTURBANC	E				
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Date
1	EMI Test Software	EZ	EZ-EMC	/	N/A	N/A
2	By-log Antenna	SCHWARZBECK	VULB9163	9163-470	2018-07-26	2021-07-25
3	Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1925	2018-07-02	2021-07-01
4	EMI Test Receiver	R&S	ESR 7	101181	2021-06-21	2022-06-20
5	Broadband Preamplifier	/	BP-01M18G	P190501	2021-06-21	2022-06-20
VOL.	TAGE FLUCTUATION	AND FLICKER/H	ARMONIC CU	RRENT EMISSI	ONS	
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Date
1	Power Analyzer Test System	Voltech	PM6000	20000670053	2021-06-21	2022-06-20
RF E	LECTROMAGNETIC	FIELD				
Item		Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	ESG Vector Signal Generator	Agilent	E4438C	MY42081396	2020-11-17	2021-11-16
2	RF POWER AMPLIFIER	OPHIR	5225R	1052	NCR	NCR
3	RF POWER AMPLIFIER	OPHIR	5273F	1019	NCR	NCR
4	Stacked Broadband Log Periodic Antenna	SCHWARZBECK	STLP 9128	9128ES-145	NCR	NCR
5	Stacked Mikrowellen LogPer Antenna	SCHWARZBECK	STLP 9149	9149-484	NCR	NCR
6	' ·	Narda S.TS./PMM	EP601	611WX80208	2021-03-25	2022-03-24
Note:	: NCR means no calibr	ation requirement				
ELEC	CTROSTATIC DISCHA	ARGE				
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Date
	<u> </u>			00.100=	2020 07 24	2021-07-20
1	ESD Simulator	SCHLODER	SESD 230	604035	2020-07-21	2021-07-20
	ESD Simulator CTRICAL FAST TRAN	I.	SESD 230	604035	2020-07-21	2021-07-20
	CTRICAL FAST TRAN	SIENT IMMUNITY  Manufacturer	SESD 230 Model No.	Serial No.	Last Cal.	Due Date



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SUR	SURGES, LINE TO LINE AND LINE TO GROUND					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Date
1	Immunity Simulative Generator	EM test	UCS500 M4	0101-34	2021-06-21	2022-06-20
RF C	OMMON MODE					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Date
1	Simulator	FRANKONIA	CIT-10/75	A126A1195	2021-06-21	2022-06-20
2	CDN	FRANKONIA	CDN-M2+M3	A2210177	2021-06-21	2022-06-20
3	6dB Attenuator	FRANKONIA	DAM25W	1172040	2021-06-21	2022-06-20
VOL	TAGE DIPS/INTERRUPTI	ONS IMMUNIT	Y TEST			
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Date
1	Voltage dips and up generator	3CTEST	VDG-1105G	EC0171014	2021-06-21	2022-06-20
MAGNETIC FIELD SUSCEPTIBILITY TEST						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Date
1	Power frequency mag-field generator System	EVERFINE	EMS61000-8K	906003	2021-06-21	2022-06-20

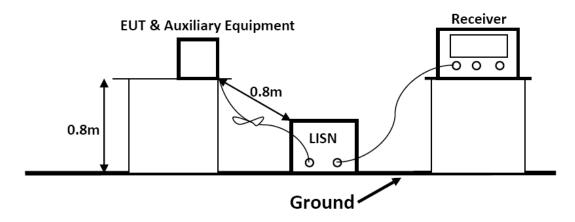
NCR --- No calibration requirement.



#### 5. TEST RESULTS

#### 5.1. POWER LINE CONDUCTED EMISSION MEASUREMENT

# 5.1.1. Block Diagram of Test Setup



#### 5.1.2. Test Standard

EN 55032: 2015+A11: 2020 Class B

Power Line Conducted Emission Limits (Class B)			
Frequency	Limit (dBμV)		
(MHz)	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.

# 5.1.3. EUT Configuration on Test

The following equipments are installed on Power Line Conducted Emission Measurement to meet the EN 55032 requirement and operating regulations in a manner, which tends to maximize its emission characteristics in a normal application.

# 5.1.4. Operating Condition of EUT

- 5.1.4.1. Setup the EUT as shown on Section 5.1.1
- 5.1.4.2. Turn on the power of all equipments.
- 5.1.4.3.Let the EUT work in measuring mode(1) and measure it.



#### 5.1.5. 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 50-ohm coupling impedance for the tested equipments. Both sides of AC line are investigated to find out the maximum conducted emission according to the EN 55032 regulations during conducted emission measurement.

The bandwidth of the field strength meter is set at 9kHz in 150kHz~30MHz. The frequency range from 150kHz to 30MHz is investigated.

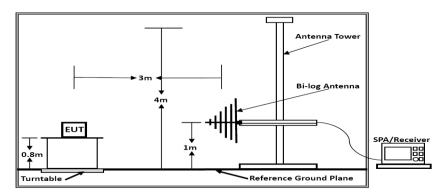
#### 5.1.6. Test Results

PASS.

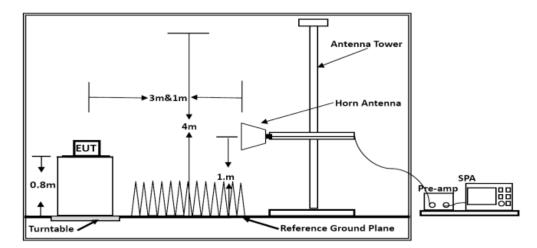


# **5.2. RADIATED EMISSION MEASUREMENT**

# 5.2.1. Block Diagram of Test Setup



Below 1GHz



Above 1GHz



#### 5.2.2. Test Standard

EN 55032: 2015+A11: 2020 Class B

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:

Limits for Radiated Emission Below 1GHz			
Frequency Distance Field Strengths Limit			
(MHz)	(Meters)	(dBµV/m)	
30 ~ 230	3	40	
230 ~ 1000	3	47	

<sup>\*\*\*</sup>Note:

<sup>(2)</sup> Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the EUT.

Limits for Radiated Emission Above 1GHz						
Frequency Distance Peak Limit Average Limit						
(MHz)	(Meters)	(dBµV/m)	(dBµV/m)			
1000 ~ 3000 3 70 50						
3000 ~ 6000 3 74 54						
***Note: The lower limit applies at the transition frequency						

<sup>5.2.3.</sup> EUT Configuration on Test

The EN 55032 regulations test method must be used to find the maximum emission during radiated emission measurement.

#### 5.2.4. Operating Condition of EUT

5.2.4.1. Turn on the power.

5.2.4.2.Let the EUT work in the test mode(1) and measure it.

#### 5.2.5. Test Procedure

The EUT is placed on a turntable, which is 0.8 meter high above the ground. The turntable 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. By-log antenna is used as a receiving antenna. Both horizontal and vertical polarization of the antenna is set on test.

The bandwidth of the EMI test receiver is set at RBW/VBW=120kHz/300kHz.

The frequency range from 30MHz to 1000MHz is checked.

The bandwidth of the Spectrum analyzer is set at RBW/VBW=1MHz/3MHz.

The frequency range from 1GHz to the frequency which about 5th carrier harmonic or 6GHz is checked.

#### 5.2.6. Test Results

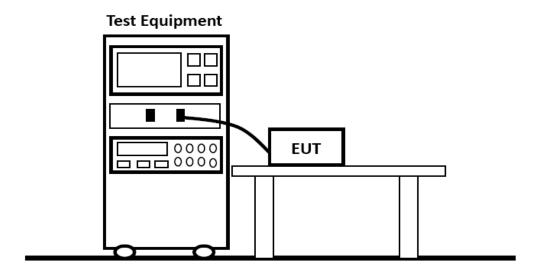
#### PASS.

<sup>(1)</sup> The smaller limit shall apply at the combination point between two frequency bands.



# 5.3. HARMONIC CURRENT EMISSION MEASUREMENT

# 5.3.1. Block Diagram of Test Setup



# 5.3.2. Test Standard

EN IEC 61000-3-2: 2019

# 5.3.3. Operating Condition of EUT

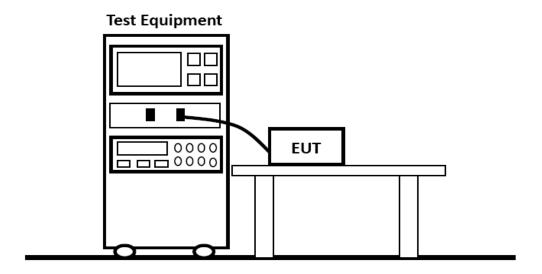
Same as Section 5.2.4, except the test setup replaced as Section 5.3.1.

# 5.3.4. Test Results



# 5.4. VOLTAGE FLUCTUATION AND FLICKER MEASUREMENT

# 5.4.1. Block Diagram of Test Setup



# 5.4.2. Test Standard

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

# 5.4.3. Operating Condition of EUT

Same as Section 5.2.4, except the test setup replaced as Section 5.4.1.

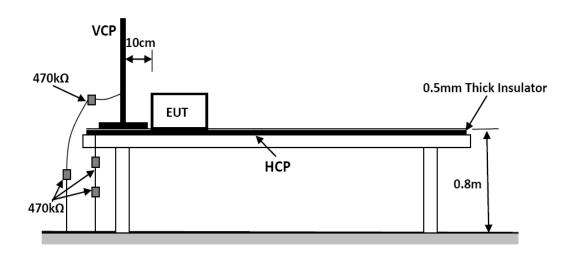
# 5.4.4. Test Results

PASS.



#### 5.5. ELECTROSTATIC DISCHARGE IMMUNITY TEST

# 5.5.1. Block Diagram of Test Setup



#### 5.5.2. Test Standard

EN 55035: 2017+A11: 2020 (EN 61000-4-2: 2009, Severity Level: 3 / Air Discharge:

±8KV, Level: 2 / Contact Discharge: ±4KV)

# 5.5.3. Severity Levels and Performance Criterion

5.5.3.1. Severity level

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

5.5.3.2. Performance Criterion

Performance Criterion: B

# 5.5.4. EUT Configuration on Test

The configuration of EUT is listed in Section 5.5.1.

# 5.5.5. Operating Condition of EUT

Same as conducted emission measurement, which is listed in Section 5.1.4. Except the test set up replaced by Section 5.5.1.



#### 5.5.6. Test Procedure

#### 5.2.6.1. Air Discharge

This test is done on a non-conductive surfaces. The round discharge tip of the Electrostatic Discharge simulator shall be approached as fast as possible then to touch the EUT. After each discharge, the simulator shall be removed from the EUT. The simulator 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

#### 5.2.6.2. Contact Discharge

All the procedure shall be same as air discharge, except using the acute discharge tip. The top end of the Electrostatic Discharge simulator is touch the EUT all the time when the simulator is re-triggered for a new single discharge and repeated 10 times for each pre-selected test point.

# 5.2.6.3. Indirect Discharge For Horizontal Coupling Plane

The vertical coupling plane(VCP) is placed 0.1m away from EUT. The top end of Electrostatic Discharge simulator should aim at the center of one border of the VCP for at least 25 times discharge.

# 5.2.6.4. Indirect Discharge For Vertical Coupling Plane

The top end of Electrostatic Discharge simulator should place at the point 0.1m away from EUT on the horizontal coupling plane(HCP). At least 25 times discharge should be done for every pre-selected point around EUT.

Record any performance degradation of the EUT during the test and judge the test result according to ce criterion.

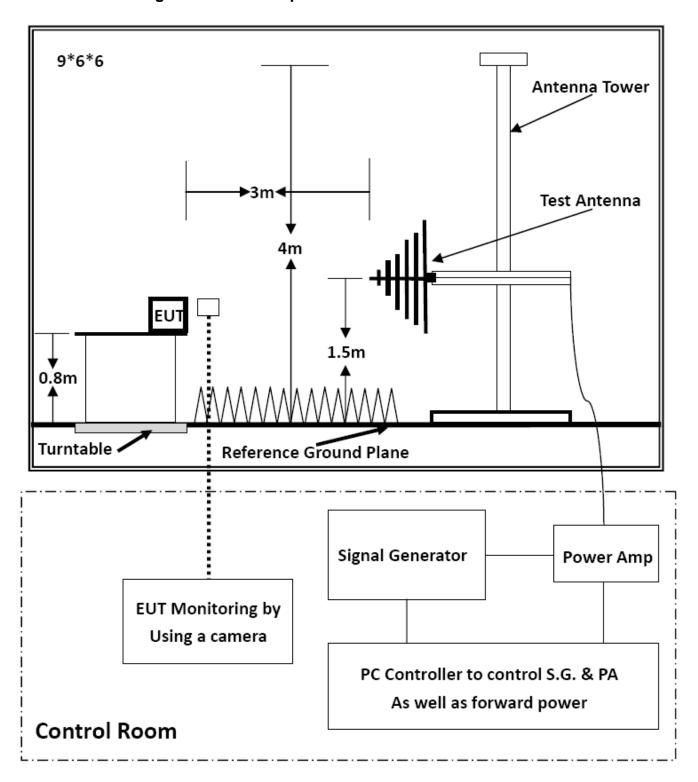
#### 5.5.7. Test Results

#### PASS.



#### 5.6. RF FIELD STRENGTH SUSCEPTIBILITY TEST

# 5.6.1. Block Diagram of Test Setup





#### 5.6.2. Test Standard

EN 55035: 2017+A11: 2020 (EN 61000-4-3: 2006+A2: 2010 Severity Level: 2, 3V/m)

# 5.6.3. Severity Levels and Performance Criterion

5.6.3.1. Severity level

Level	Field Strength (V/m)
1	1
2	3
3	10
X	1

# 5.6.3.2. Performance Criterion Performance Criterion: A

# 5.6.4. EUT Configuration on Test

The configuration of EUT is listed in Section 5.6.1.

# 5.6.5. Operating Condition of EUT

Same as radiated emission measurement, which is listed in Section 5.2..4, except the test setup replaced as Section 5.6.1.

#### 5.6.6. 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 is 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 Recording is used to monitor its screen. All the scanning conditions are as following:

Condition of Test	Remark
Fielded Strength	3 V/m (Severity Level 2)
Radiated Signal	Unmodulated
Test Frequency Range (swept test)	80-1000MHz
Test Frequency (spot test)	1800MHz, 2600MHz, 3500MHz, 5000MHz
Dwell time of radiated	0.0015 decade/s
Waiting Time	3 Sec.

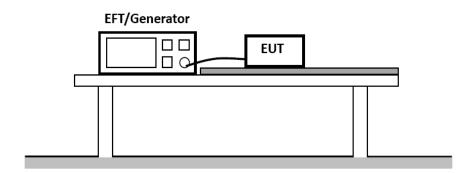
# 5.6.7. Test Results

#### PASS.



#### 5.7. ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST

# 5.7.1. Block Diagram of Test Setup



#### 5.7.2. Test Standard

EN 55035: 2017+A11: 2020 (EN 61000-4-4: 2012, Severity Level, Level 2: 1KV)

# 5.7.3. Severity Levels and Performance Criterion

5.7.3.1. Severity level

	Open Circuit Output Test Voltage ±10%				
Level	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			

# 5.7.3.2. Performance Criterion

Performance Criterion: B

# 5.7.4. EUT Configuration on Test

The configuration of EUT is listed in Section 5.7.1.

# 5.7.5. Operating Condition of EUT

- 5.7.5.1. Setup the EUT as shown in Section 5.7.1.
- 5.7.5.2. Turn on the power of all equipments.
- 5.7.5.3. Let the EUT work in test mode(1) and measure it.



#### 5.7.6. 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.

# 5.7.6.1. 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 1 mins.

5.7.6.2. For signal lines and control lines ports: It's unnecessary to test.

5.7.6.3. For DC output line ports: It's unnecessary to test.

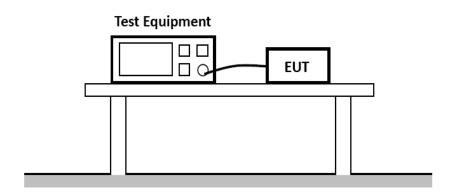
#### 5.7.7. Test Results

PASS.



#### **5.8. SURGE IMMUNITY TEST**

# 5.8.1. Block Diagram of Test Setup



#### 5.8.2. Test Standard

EN 55035: 2017+A11: 2020 (EN 61000-4-5: 2014+A1: 2017, Severity Level: Line to Line: Level 2, 1.0KV, Line to Earth: Level 3, 2.0KV)

# 5.8.3. Severity Levels and Performance Criterion

5.8.3.1. Severity level

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

5.8.3.2. Performance Criterion Performance Criterion: B

# 5.8.4. EUT Configuration on Test

The configuration of EUT is listed in Section 5.8.1.

# 5.8.5. Operating Condition of EUT

- 5.8.5.1. Setup the EUT as shown in Section 5.8.1.
- 5.8.5.1. Turn on the power of all equipments.
- 5.8.5.1.Let the EUT work in test mode (1) and measure it.



#### 5.8.6. Test Procedure

- 5.8.6.1. Set up the EUT and test generator as shown on Section 5.8.1.
- 5.8.6.2. 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.
- 5.8.6.3. At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are conducted during test.
- 5.8.6.4. Different phase angles are done individually.
- 5.8.6.5. Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

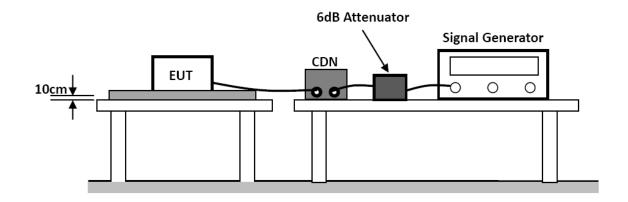
#### 5.8.7. Test Results

PASS.



#### 5.9. INJECTED CURRENTS SUSCEPTIBILITY TEST

# 5.9.1. Block Diagram of Test Setup



#### 5.9.2. Test Standard

EN 55035: 2017+A11: 2020(EN 61000-4-6: 2014+A1: 2015, Severity Level: Level 2, (0.15MHz ~ 80MHz))

# 5.9.3. Severity Levels and Performance Criterion

5.9.3.1. Severity level

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

5.9.3.2. Performance Criterion Performance Criterion: A

# 5.9.4. EUT Configuration on Test

The configuration of EUT is listed in Section 5.9.1.

# 5.9.5. Operating Condition of EUT

- 5.9.5.1. Setup the EUT as shown in Section 5.9.1.
- 5.9.5.2. Turn on the power of all equipments.
- 5.9.5.3.Let the EUT work in test mode(1) and measure it.



#### 5.9.6. Test Procedure

- 5.9.6.1. Set up the EUT, CDN and test generators as shown on Section 5.9.1.
- 5.9.6.2. Let the EUT work in test mode and measure it.
- 5.9.6.3. 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).
- 5.9.6.4. The disturbance signal described below is injected to EUT through CDN.
- 5.9.6.5. The EUT operates within its operational mode(s) under intended climatic conditions after power on.
- 5.9.6.6. The frequency range is swept from 150kHz to 10MHz using 3V signal level,10MHz to 30MHz using 3V to 1V signal level,30MHz to 80MHz using 1V signal level, and with the disturbance signal 80% amplitude modulated with a 1kHz sine wave. 5.9.6.7. The rate of sweep shall not exceed 1.5\*10-3decades/s. where the frequency is swept incrementally; the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.
- 5.9.6.8. Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

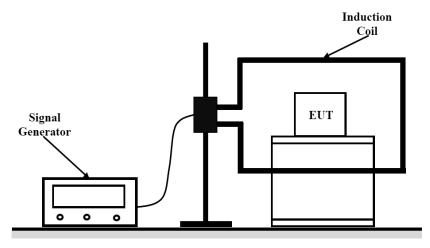
#### 5.9.7. Test Results

#### PASS.



#### 5.10. MAGNETIC FIELD SUSCEPTIBILITY TEST

# 5.10.1. Block Diagram of Test Setup



#### 5.10.2. Test Standard

EN 55035: 2017+A11: 2020 (EN 61000-4-8: 2010, Severity Level: Level 1, 1A/m)

# 5.10.3. Severity Levels and Performance Criterion

5.10.3.1. Severity level

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

#### 5.10.3.2. Performance Criterion

Performance Criterion: A

#### 5.10.4. EUT Configuration on Test

The configuration of EUT is listed in Section 5.10.1.

# 5.10.5. Test Procedure

EUT is placed on an insulating support of 0.1m high above a table of 0.8m high. There is a minimum 1m\*1m ground metallic plane put on this table. EUT is put in the center of the magnetic coil then two orientations of the magnetic coil, horizontal and vertical, shall be rotated in order to expose the EUT to the difference polarization magnetic field.

Record any performance degradation of the EUT during the test and judge the test result according to performance criterion.

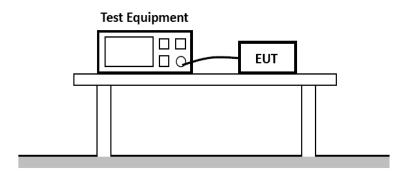
#### 5.10.6. Test Results

#### PASS.



#### 5.11. VOLTAGE DIPS AND INTERRUPTIONS TEST

# 5.11.1. Block Diagram of Test Setup



#### 5.11.2. Test Standard

EN 55035: 2017+A11: 2020 (EN 61000-4-11: 2020+AC: 2020)

# 5.11.3. Severity Levels and Performance Criterion

5.11.3.1. Severity level

Test Level				
Voltage Reduction	Voltage Dips	Duration		
%U⊤	%U <sub>T</sub>	(in Period)		
100	0	0.5		
100	0	1		
30	70	5		
Voltage Reduction	Voltage Dips	Duration		
¯ %U <sub>T</sub>	%Ū <sub>T</sub>	(in Period)		
100	0	250		

5.11.3.2. Performance Criterion Performance Criterion: B&C

# 5.11.4. EUT Configuration on Test

The configuration of EUT is listed in Section 5.11.1.

# 5.11.5. Operating Condition of EUT

- 5.11.5.1. Setup the EUT as shown in Section 5.11.1.
- 5.11.5.2. Turn on the power of all equipments.
- 5.11.5.3. Let the EUT work in test mode (1) and measure it.

#### 5.11.6. Test Procedure

- 5.11.6.1. Set up the EUT and test generator as shown on Section 5.11.1.
- 5.11.6.2. The interruptions are introduced at selected phase angles with specified duration.
- 5.11.6.3. Record any degradation of performance.

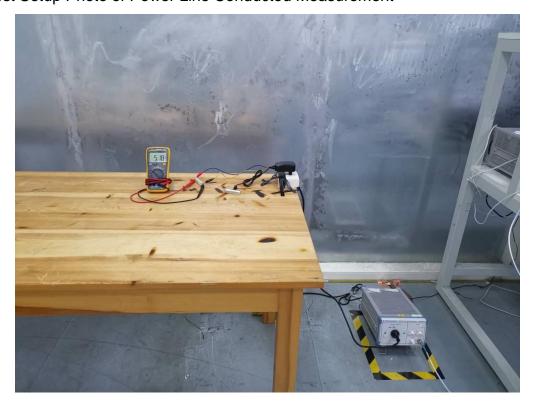
#### 5.11.7. Test Results

#### PASS.



# **ANNEX A**

(Test photograph) A.1 Test Setup Photo of Power Line Conducted Measurement



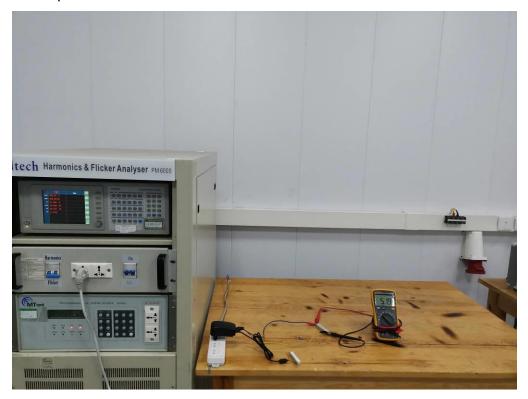
# A.2 Test Setup Photo of Radiated Measurement



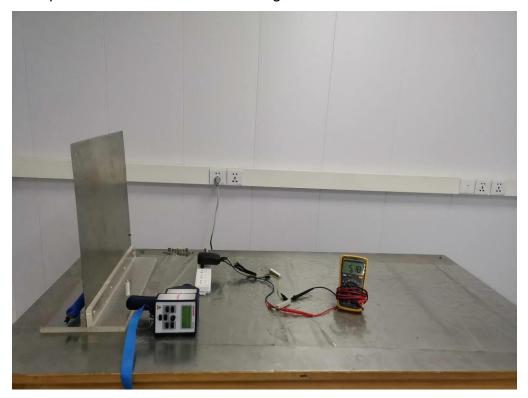
(30MHz~1GHz)



# A.3 Test Setup Photo of Harmonic & Flicker Measurement



# A.4 Test Setup Photo of Electrostatic Discharge Test

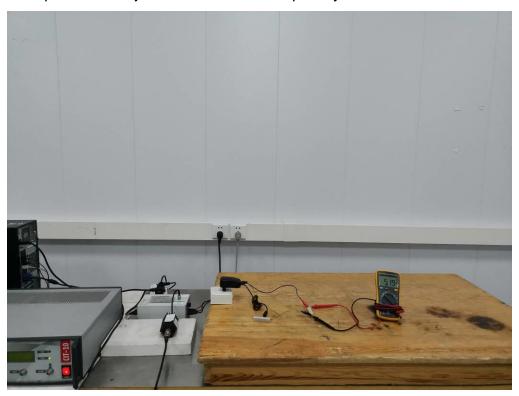


# S

# A.5 Photo of Electrical Fast Transient/Burst Test & Surge Immunity Test



# A.6 Test Setup Photo of Injected Currents Susceptibility Test

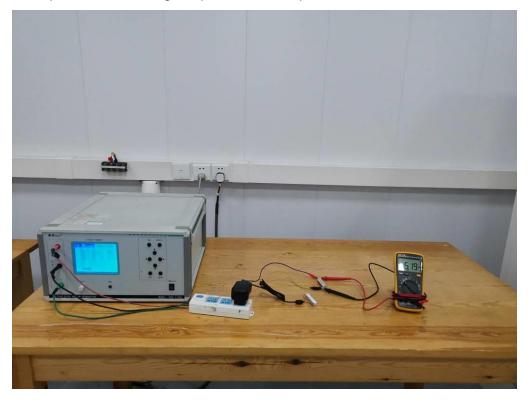




# A.7 Test Setup Photo of Magnetic Field Immunity Test



# A.8 Test Setup Photo of Voltage Dips and Interruptions Test





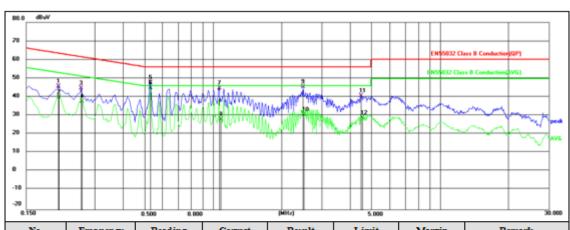
# **ANNEX B**

(Emission and Immunity test results)

# **B.1 POWER LINE CONDUCTED EMISSION MEASUREMENT**

Environmental Conditions:	23.3℃, 53.7% RH
Test Voltage:	AC 230V,50Hz
Test Model:	C7-EU
Test Mode:	Mode 1
Test Engineer:	THRIVING
Pol:	Line

#### Detailed results are shown below

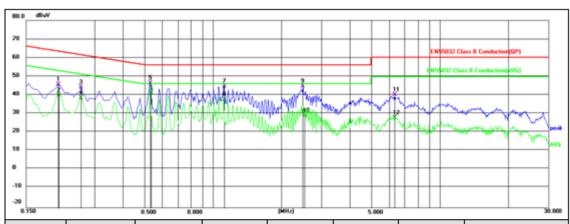


No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dB)	
1	0.2086	34.33	11.52	45.85	63.26	-17.41	QP
2	0.2094	28.53	11.52	40.05	53.23	-13.18	AVG
3	0.2626	33.23	11.52	44.75	61.35	-16.60	QP
4	0.2644	26.32	11.52	37.84	51.29	-13.45	AVG
5	0.5281	36.31	11.52	47.83	56.00	-8.17	QP
6	0.5281	33.68	11.52	45.20	46.00	-0.80	AVG
7	1.0636	32.84	12.02	44.86	56.00	-11.14	QP
8	1.0816	16.21	12.02	28.23	46.00	-17.77	AVG
9	2.4991	33.15	12.42	45.57	56.00	-10.43	QP
10	2.5261	18.29	12.42	30.71	46.00	-15.29	AVG
11	4.4791	28.56	12.37	40.93	56.00	-15.07	QP
12	4.5691	16.67	12.37	29.04	46.00	-16.96	AVG



23.3℃, 53.7% RH
AC 230V,50Hz
C7-EU
Mode 1
THRIVING
Neutral

# Detailed results are shown below



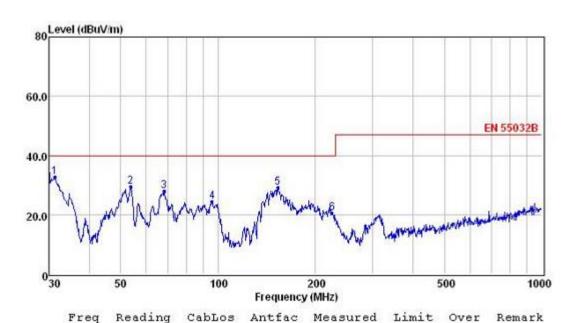
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dB)	
1	0.2086	34.37	11.52	45.89	63.26	-17.37	QP
2	0.2094	28.57	11.52	40.09	53.23	-13.14	AVG
3	0.2626	32.89	11.52	44.41	61.35	-16.94	QP
4	0.2626	27.05	11.52	38.57	51.35	-12.78	AVG
5	0.5281	35.14	11.51	46.65	56.00	-9.35	QP
6	0.5326	29.55	11.51	41.06	46.00	-4.94	AVG
7	1.1176	32.88	12.03	44.91	56.00	-11.09	QP
8	1.1176	25.81	12.03	37.84	46.00	-8.16	AVG
9	2.4991	32.42	12.40	44.82	56.00	-11.18	QP
10	2.5396	16.83	12.40	29.23	46.00	-16.77	AVG
11	6.3421	27.98	12.24	40.22	60.00	-19.78	QP
12	6.3421	15.78	12.24	28.02	50.00	-21.98	AVG

### SHENZHEN LCS COMPLIANCE TESTING <u>LABORATORY LTD. Report No.: LCS210624004AE</u>

#### B.2 Radiated Disturbance Test Results (30MHz to 1000MHz)

Environmental Conditions:	22.1°C, 53.2% RH
Test Voltage:	AC 230V,50Hz
Test Model:	C7-EU
Test Mode:	Mode 1
Test Engineer:	THRIVING
Pol:	Vertical

#### Detailed results are shown below



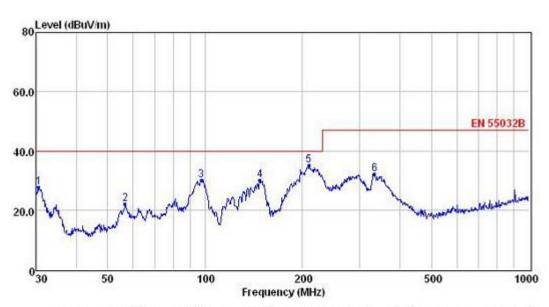
MHz dBuV dB dB/m dBuV/m dBuV/m dB 31.29 12.32 1 19.89 0.39 32.60 40.00 -7.40QP 2 53.69 15.85 0.46 13.08 29.39 40.00 -10.61 QP 3 68.15 18.02 0.51 9.41 27.94 40.00 -12.06 QP 4 95.76 10.87 0.58 12.89 24.34 40.00 -15.66 QP 5 153.20 19.89 0.73 8.39 29.01 40.00 -10.99 QP 6 225.31 8.30 0.89 11.44 20.63 40.00 -19.37QP

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

Environmental Conditions:	22.1℃, 53.2% RH
Test Voltage:	AC 230V,50Hz
Test Model:	C7-EU
Test Mode:	Mode 1
Test Engineer:	THRIVING
Pol:	Horizontal

#### Detailed results are shown below



Reading CabLos Antfac Measured Limit Over Remark MHz dBuV dB dB/m dBuV/m dBuV/m dB 30.64 14.84 0.39 12.33 27.56 40.00 -12.44 1 QP 2 56.59 8.77 0.47 12.91 22.15 40.00 -17.85 QP 3 97.46 16.51 0.61 13.00 30.12 40.00 -9.88 QP 147.92 20.95 0.86 8.25 30.06 40.00 -9.94 QP 209.31 23.30 0.86 10.86 35.02 40.00 -4.98 QP 333.69 17.21 13.87 32.19 47.00 1.11 -14.81 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

#### **B.3 HARMONIC CURRENT EMISSION MEASUREMENT**

#### **Pass**

Because the power of EUT is less than 75W, according to standard EN 61000-3-2, harmonic current unnecessary to test.



# SHENZHEN LCS COMPLIANCE TESTING LABORATORY LTD. Report No.: LCS210624004AE B.4 VOLTAGE FLUCTUATION AND FLICKER MEASUREMENT

Test Model		C7-EU		Test Engineer	THRIVING
Test Voltage		AC 230V/50H	lz		
Overall Result:	Note				
D400	Meas	surement method	- Voltage		
PASS					
		Pst	dc (%)	dmax (%)	Tmax(> 3.3%)(ms)
Limit		1.000	3.300	4.000	500
Reading 1		0.088	0.005	0.190	0

⊠B

 $\boxtimes B$ 

]A

]A

Left

Right

## SHENZHEN LCS COMPLIANCE TESTING LABORATORY LTD. Report No.: LCS210624004AE

#### **B.5 ELECTROSTATIC DISCHARGE IMMUNITY TEST**

Electrostatic Discharge Test Results							
Standard	□ IEC 61000-4-2 ☑ EN 61000-4-2						
Applicant	Huizhou Hu	Huizhou Huajiekang Electronic Technology Co., Ltd					
EUT	Charger			Tempera	Temperature 24.8℃		
M/N	C7-EU			Humidity		53.8%	
Criterion	В			Pressure		1021mbar	
Test Mode	Mode 1			Test Eng	ineer	THRIVING	
			<b>D</b>				
	 		r Discharge		D	14	
Test Points		Test Levels			Res	sults Performance	
rest Follits	± 2kV	± 4kV	± 8kV	Passed	Fail	Criterion	
Front		$\boxtimes$	$\boxtimes$	$\boxtimes$		□A ⊠B	
Back		$\boxtimes$		$\boxtimes$		□A ⊠B	
Left		$\boxtimes$	$\boxtimes$	$\boxtimes$		□A ⊠B	
Right						□A ⊠B	
Тор					<u> </u>	□A ⊠B	
Bottom	$\boxtimes$					□A ⊠B	
			act Dischar	ge		•.	
	Test Levels			Results			
Tool Dointo					1100		
Test Points	± 2 kV		±4 kV	Passed	Fail	Performance Criterion	
Test Points Front						Performance Criterion  A B	
Front Back						Performance Criterion  A B  A B	
Front Back Left						Performance Criterion  A B  A B  A B  A B	
Front Back Left Right						Performance Criterion  A B  A B  A B  A B  A B  A B  A B	
Front Back Left Right Top						Performance Criterion  A B  A B  A B  A B  A B  A B  A B  A	
Front Back Left Right					Fail	Performance Criterion  A B  A B  A B  A B  A B  A B  A B	
Front Back Left Right Top	Disch	harge To H			Fail	Performance Criterion  A B  A B  A B  A B  A B  A B  A B  A	
Front Back Left Right Top Bottom	Disch				Fail	Performance Criterion  A B  A B  A B  A B  A B  A B  A B  A	
Front Back Left Right Top	Disch	harge To H			Fail	Performance Criterion  A B  A B  A B  A B  A B  A B  A B  A	
Front Back Left Right Top Bottom	Disch	harge To H	□ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □	Dupling Pla	Fail	Performance Criterion  A B  A B  A B  A B  A B  A B  A B  A	
Front Back Left Right Top Bottom	Disch	harge To H	DOIZONTAL CO	Dupling Pla	Fail	Performance Criterion  A B A B A B A B A B A B A B A B A B A	
Front Back Left Right Top Bottom  Side of EUT	Disch	harge To H	orizontal Co	Passed	Fail	Performance Criterion  A B A B A B A B A B A B A B A B A B A	
Front Back Left Right Top Bottom  Side of EUT  Front Back	Disch	harge To H	by the state of th	Passed	Fail  Ine  Res  Fail  I	Performance Criterion  A B A B A B A B A B A B A B A B A B A	
Front Back Left Right Top Bottom  Side of EUT  Front Back Left	Disch	harge To H	orizontal Co	Passed	Fail  Ine  Res  Fail  I	Performance Criterion  A B A B A B A B A B A B A B A B A B A	
Front Back Left Right Top Bottom  Side of EUT  Front Back Left Right	Disch	harge To H	± 4 kV  Solution Solu	Passed	Fail  Inne Res Fail Inne Inne Inne Inne Inne Inne Inne Inn	Performance Criterion  A B A B A B A B A B A B A B A B A B A	
Front Back Left Right Top Bottom  Side of EUT  Front Back Left	Disch	harge To H Test Levels	± 4 kV  Solution Solu	Passed	Fail  Inne Res Fail Inne Inne Inne Inne Inne Inne Inne Inn	Performance Criterion  A B A B A B A B A B A B A B A B A B A	
Front Back Left Right Top Bottom  Side of EUT  Front Back Left Right	Disch	harge To H Test Levels	dertical Cou	Passed    Sample   Sa	Fail	Performance Criterion  A B A B A B A B A B A B A B A B A B A	

#### **B.6 RF FIELD STRENGTH SUSCEPTIBILITY TEST**

RF Field Strength Susceptibility Test Results					
Standard	☐ IEC 61000-4-3				
Applicant	Huizhou Huajiekang Electronic Ted	chnology Co., Ltd			
EUT	Charger	Temperature	22.8℃		
M/N	C7-EU	Humidity	53.6%		
Field Strength	3 V/m	Criterion	А		
Test Mode	Mode 1	Test Engineer	THRIVING		
Test Frequency	80MHz to 1000MHz (swept test) 1800MHz, 2600MHz, 3500MHz, 5000MHz (spot test)				
Modulation	□None □ Pulse	☑AM 1KHz 80%	)		
Steps	1%				

	Horizontal	Vertical
Front	PASS	PASS
Right	PASS	PASS
Rear	PASS	PASS
Left	_eft PASS PASS	

	A .	
Left	PASS	PASS
Note:		
I		

#### **B.7 ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST**

Electrical Fast Transient/Burst Test Results					
Standard	□ IEC 61000-4-4 ☑ EN 61000-4-4				
Applicant	Huizhou Huajiekang Electronic Technology Co., Ltd				
EUT	Charger		Temperatu	re	22.9℃
M/N	C7-EU		Humidity		53.4%
Test Mode	Mode 1	Criterion		В	
Test Engineer	THRIVING				
Line	Test Voltage	R	esult (+)		Result (-)

Line	Test Voltage	Result (+)	Result (-)
L	1KV	PASS	PASS
N	1KV	PASS	PASS
L-N	1KV	PASS	PASS
L-PE			
N-PE			
L-N-PE			
Signal Line			
I/O Cable			
Note:			



## SHENZHEN LCS COMPLIANCE TESTING LABORATORY LTD. Report No.: LCS210624004AE

#### **B.8 SURGE IMMUNITY TEST**

Surge Immunity Test Result					
Standard	□ IEC 61000-4-5 ☑ EN 61000-4-5				
Applicant	Huizhou Huajiekang Electronic Technology Co., Ltd				
EUT	Charger Temperature 22.9℃				
M/N	C7-EU <b>Humidity</b> 53.4%				
Test Mode	Mode 1 Criterion B				
Test Engineer	THRIVING				

Location	Polarity	Phase Angle	Number of Pulse	Pulse Voltage (KV)	Result
L-N	+	90°	5	1.0	PASS
L-IN	-	270°	5	1.0	PASS
L-PE					
N-PE					
Signal Line					
Note					

#### **B.9 INJECTED CURRENTS SUSCEPTIBILITY TEST**

Injected Currents Susceptibility Test Results					
Standard	□ IEC 61000-4-6 ☑ EN 61000-4-6				
Applicant	Huizhou Huajiekang Electronic Technology Co., Ltd				
EUT	Charger	Temperature	23.5℃		
M/N	C7-EU	Humidity	53.2%		
Test Mode	Mode 1	Criterion	А		
Test Engineer	THRIVING				

Frequency Range (MHz)	Injected Position	Strength (Unmodulated)	Criterion	Result
0.15 ~ 10		3V		
10 ~ 30	AC Mains	3V ~ 1V	Α	PASS
30 ~ 80		1V		
Note:				



#### **B.10 MAGNETIC FIELD SUSCEPTIBILITY TEST**

Magnetic Field Immunity Test Result				
Standard	□ IEC 61000-4-8 ☑ EN 61000-4-8			
Applicant	Huizhou Huajiekang Electronic Technology Co., Ltd			
EUT	Charger	Temperature	24.4℃	
M/N	C7-EU	Humidity	54.1%	
Test Mode	Mode 1	Criterion	Α	
Test Engineer	THRIVING			

Test Level (A/M)	Testing Duration	Coil Orientation	Criterion	Result
1	5 mins	X	А	PASS
1	5 mins	Υ	А	PASS
1	5 mins	Z	А	PASS

Note:



#### **B.11 VOLTAGE DIPS AND INTERRUPTIONS TEST**

Voltage Dips And Interruptions Test Results			
Standard	□ IEC 61000-4-11 ☑ EN 61000-4-11		
Applicant	Huizhou Huajiekang Electronic Technology Co., Ltd		
EUT	Charger	Temperature	22.3℃
M/N	C7-EU	Humidity	54.4%
Test Mode	Mode 1	Criterion	B&C
Test Engineer	THRIVING		

Test Level % U <sub>T</sub>	Voltage Dips & Short Interruptions % U <sub>T</sub>	Duration (in periods)	Criterion	Result
0	100	0.5P	В	PASS
70	30	25P	С	PASS
0	100	250P	С	PASS

70	30	25P	С	PASS
0	100	250P	С	PASS
Not				



### **ANNEX C**

(External and internal photos of the EUT)



Fig. 1



Fig. 2



Fig. 3



Fig. 4

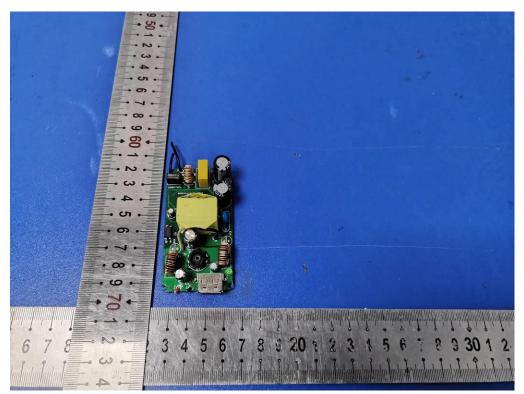


Fig. 5

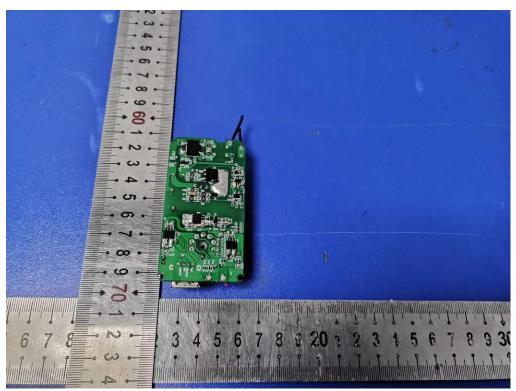


Fig. 6

-----THE END OF TEST REPORT ------