EMC TEST REPORT

For

26 RAFAEL SDN BHD

Product Name	:	RAFAEL PURE-PORTABLE
Trademark	:	RAFAEL PURE
Model Number	:	RP126
Prepared For	:	26 RAFAEL SDN BHD
Address	:	B-3A-12, IOI BOULEVARD, JALAN KENARI 5, BANDAR PUCHONG JAYA, 47170 PUCHONG, SELANGOR
Report No.	:	LST221068052ER
Testing laboratory	:	Shenzhen LST Technology Co., Ltd.
Address	:	Huichao Building, Yintian Industry zone, Bao'an District, Shenzhen, Guangdong P.R. China

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Applicant	:	26 RAFAEL SDN BHD
Address	:	B-3A-12, IOI BOULEVARD, JALAN KENARI 5, BANDAR PUCHONG JAYA ,47170 PUCHONG, SELANGOR
Manufacturer	:	26 RAFAEL SDN BHD
Address	:	B-3A-12, IOI BOULEVARD, JALAN KENARI 5, BANDAR PUCHONG JAYA ,47170 PUCHONG, SELANGOR
Factory	:	26 RAFAEL SDN BHD
Address	:	B-3A-12, IOI BOULEVARD, JALAN KENARI 5, BANDAR PUCHONG JAYA ,47170 PUCHONG, SELANGOR
EUT	:	RAFAEL PURE-PORTABLE
Model Number	:	RP126
Trademark:	:	RAFAEL PURE
Test Date	:	Oct. 18, 2022 –Oct. 24, 2022
Date of Report	:	Oct. 24, 2022
Test Result:	:	The equipment under test was found to be compliance with the requirements of the standards applied.

Test Procedure Used:

EMI : EN IEC 55014-1:2021
EN IEC 61000-3-2:2019+A1:2021, EN 61000-3-3:2013+A2:2021

EMS : EN IEC 55014-2:2021
EN 61000-4-2:2009, EN 61000-4-3:2020,
EN 61000-4-4:2012, EN 61000-4-5:2014+A1:2017,
EN 61000-4-6:2014, EN 61000-4-11:2020

Prepared by(Engineer):

Reviewer(Supervisor):

Approved(Manager):

This test report is based on a single evaluation of one sample of above mentioned products. The test results in the report only apply to the tested sample. It is not permitted to be duplicated in extracts without written approval of Shenzhen LST Technology Co., Ltd.

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1.GENERAL INFORMATION

1.1.Description of Device (EUT)

EUT : RAFAEL PURE-PORTABLE

Trademark : RAFAEL PURE

Model Number : RP126

Power Supply : DC 5V

1.2.Tested System Details

None.

1.3.Test Uncertainty

Conducted Emission Uncertainty : ±2.66dB

Radiated Emission Uncertainty : ±4.26dB

1.4.Test Facility

Site Description :

Name of Firm : Shenzhen LST Technology Co., Ltd.

Address : Huichao Building, Yintian Industry zone, Bao'an District, Shenzhen, Guangdong P.R. China

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2.TEST INSTRUMENT USED

Conducted Emission Test					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Last Cal.**	**Cal.Due Date**
EMI Test Receiver	Rohde & Schwarz	ESCI	100321	Dec. 22, 2021	Dec. 21, 2022
RF Switching Unit	Compliance Direction SystemsInc	RSU-A4	34403	Dec. 22, 2021	Dec. 21, 2022
AMN	SCHWARZBECK	NNBL 8226-2	8226-2/164	Dec. 22, 2021	Dec. 21, 2022
LISN	Rohde & Schwarz	ENV216	101131	Dec. 22, 2021	Dec. 21, 2022
Radiation Emission Test					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Last Cal.**	**Cal.Due Date**
Spectrum Analyzer	Agilent	E4407B	MY45106456	Dec. 22, 2021	Dec. 21, 2022
EMI Test Receiver	Rohde & Schwarz	ESPI	100010/007	Dec. 22, 2021	Dec. 21, 2022
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Dec. 22, 2021	Dec. 21, 2022
Horn Antenna	ETS-LINDGREN	3117	00143207	Dec. 22, 2021	Dec. 21, 2022
Pre-amplifier	Sonoma	310N	185903	Dec. 22, 2021	Dec. 21, 2022
Pre-amplifier	HP	8449B	3008A00849	Dec. 22, 2021	Dec. 21, 2022
Cable	HUBER+SUHNER	100	SUCOFLEX	Dec. 22, 2021	Dec. 21, 2022
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A
Harmonic Current and Voltage Fluctuation and Flicker Test					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Last Cal.**	**Cal.Due Date**
Harmonic Flicker Test System	CI	5001ix-CTS-400	100321	Dec. 22, 2021	Dec. 21, 2022
5K VA AC Power Source	CI	500liX	59468	Dec. 22, 2021	Dec. 21, 2022
Discharge Immunity Test					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Last Cal.**	**Cal.Due Date**
ESD Generator	HAFELY	PESD 1610	H808671	Dec. 22, 2021	Dec. 21, 2022

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Radiated Immunity Test					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Last Cal.**	**Cal.Due Date**
Signal Generator	Rohde & Schwarz	SMT03	200754	Dec. 22, 2021	Dec. 21, 2022
Power Meter	Rohde & Schwarz	NRVD	110562	Nov. 16, 2021	Nov. 15, 2022
Voltage Probe	Rohde & Schwarz	URV5-Z2	12056	Nov. 16, 2021	Nov. 15, 2022
Voltage Probe	Rohde & Schwarz	URV5-Z2	12074	Nov. 16, 2021	Nov. 15, 2022
RF Amplifier	AR	50S1G4A	326720	Nov. 16, 2021	Nov. 15, 2022
Bilog Antenna	ETS	3142C	00047662	Nov. 16, 2021	Nov. 15, 2022
Horn Antenna	ARA	DRG-118A	16554	Nov. 16, 2021	Nov. 15, 2022
Audio Analyzer	Rohde & Schwarz	UPL 16	SB2208	Nov. 16, 2021	Nov. 15, 2022
Sound Level Calibrator	B&K	4231	264516	Nov. 16, 2021	Nov. 15, 2022
Electrical Fast Transient/ Surge/ Voltage Dip and Interruption Test					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Last Cal.**	**Cal.Due Date**
Simulator	EMTEST	UCS500N5	V0948105575	Dec. 22, 2021	Dec. 21, 2022
Auto-transformer	EMTEST	V4780S2	0109-41	Dec. 22, 2021	Dec. 21, 2022
Coupling Clamp	EMTEST	HFK	1109-04	Dec. 22, 2021	Dec. 21, 2022
Conducted Immunity Test					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Last Cal.**	**Cal.Due Date**
RF Generator	FRANKONIA	CIT-10/75	126B1126	Dec. 22, 2021	Dec. 21, 2022
6dB Attenuator	FRANKONIA	59-6-33	A413	Dec. 22, 2021	Dec. 21, 2022
M-CDN	LUTHI	L-801 M2/M3	2599	Dec. 22, 2021	Dec. 21, 2022
AN/A-CDN	LUTHI	L-801:AN/A	2538	Dec. 22, 2021	Dec. 21, 2022
EM Injection Clamp	LUTHI	EM101	35958	Dec. 22, 2021	Dec. 21, 2022

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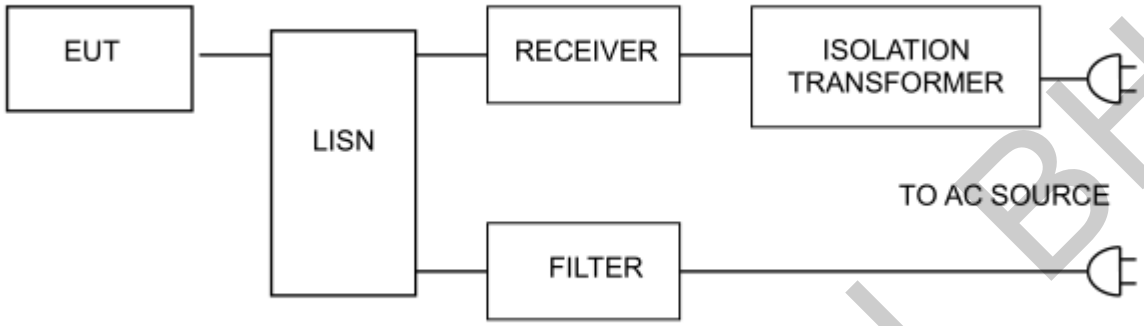
3.CONDUCTED EMISSION AT THE MAINS TERMINALS TEST

3.1.Block Diagram Of Test Setup



3.2.Test Standard

EN55014-1:2017+A11:2020

3.3.Power Line Conducted Emission Limit

Frequency MHz	Limits dB(μV)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	66 ~ 56*	59 ~ 46*
0.50 ~ 5.00	56	46
5.00 ~ 30.00	60	50

Notes: 1. *Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

3.4.EUT Configuration on Test

The following equipments are installed on conducted emission test to meet EN IEC 55014-1 requirement and operating in a manner which tends to maximize its emission characteristics in a normal application.

3.5.Operating Condition of EUT

3.5.1 Setup the EUT and simulators as shown in Section 3.1.
3.5.2 Turn on the power of all equipments.
3.5.3 Let the EUT work in test modes and test it.

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3.6. Test Procedure

The EUT is put on the ground and connected to the AC mains through a Artificial Mains Network (AMN). This provided a 50ohm coupling impedance for the tested equipments. Both sides of AC line are checked to find out the maximum conducted emission levels according to the **EN IEC 55014-1** regulations during conducted emission test.

The bandwidth of the test receiver (R&S Test Receiver ESCI) is set at 10KHz.

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

3.7. Test Result

The EUT is powered by the DC only,the test item is not applicable.

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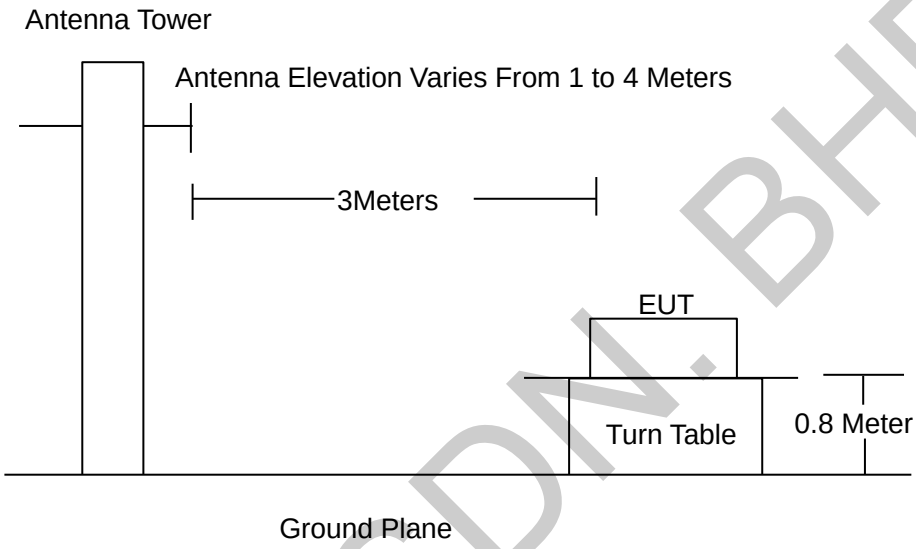
4.RADIATION EMISSION TEST

4.1.Block Diagram of Test Setup



4.2.Test Standard

EN55014-1:2017+A11:2020

4.3.Radiation Limit

Frequency MHz	Distance (Meters)	Field Strengths Limits dB(μV)/m
30 ～ 230	3	40.0
230 ～ 1000	3	47.0

Remark:

(1) Emission level (dB(μV)/m) = 20 log Emission level (μV/m)

(2) The smaller limit shall apply at the cross point between two frequency bands.

(3) Distance refers to the distance in meters between the measuring instrument, antenna and the closed point of any part of the device or system.

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4.4. EUT Configuration on Test

The EN IEC 55014-1 regulations test method must be used to find the maximum emission during radiated emission test.
The configuration of EUT is the same as used in conducted emission test. Please refer to Section 2.2.

4.5. Operating Condition of EUT

Same as conducted emission test, which is listed in Section 2.2 except the test set up replaced as Section 4.1.

4.6. Test Procedure

The EUT and its simulators are placed on a turned table that is 0.8 meter above the ground. The turned 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 that is mounted on the antenna tower. The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated biconical and log periodical antenna) is used as receiving antenna. Both horizontal and vertical polarization of the antenna is set on test. In order to find the maximum emission levels, the interface cable must be manipulated according to EN IEC 55014-1 on radiated emission test.
The bandwidth setting on the field strength meter (R&S Test Receiver ESCI) is set at 120KHz.
The frequency range from 30MHz to 1000MHz is checked.

4.7. Test Result

PASS

Please refer to the following page.

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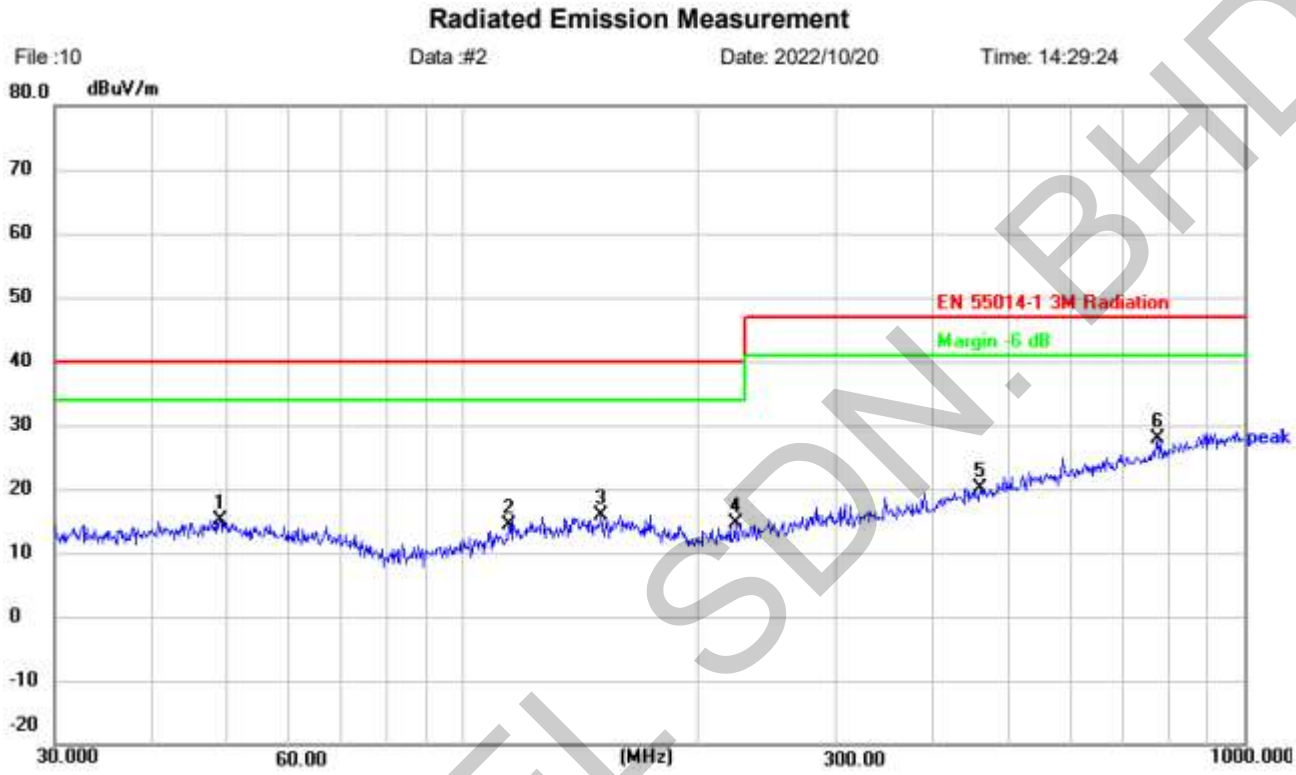
Radiation Emission Test Data			
Temperature:	24.5 ℃	Relative Humidity:	54%
Pressure:	1009hPa	Phase :	Horizontal
Test Voltage :	DC 5V	Test Mode:	Normal Mode



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	48.8429	37.78	-22.61	15.17	40.00	-24.83	peak	P	
2	114.5146	38.16	-23.82	14.34	40.00	-25.66	peak	P	
3	150.0108	37.62	-21.74	15.88	40.00	-24.12	peak	P	
4	222.9502	38.01	-23.30	14.71	40.00	-25.29	peak	P	
5	459.1144	36.80	-16.75	20.05	47.00	-26.95	peak	P	
6 *	774.1584	38.08	-10.32	27.76	47.00	-19.24	peak	P	

*:Maximum data x:Over limit !:over margin

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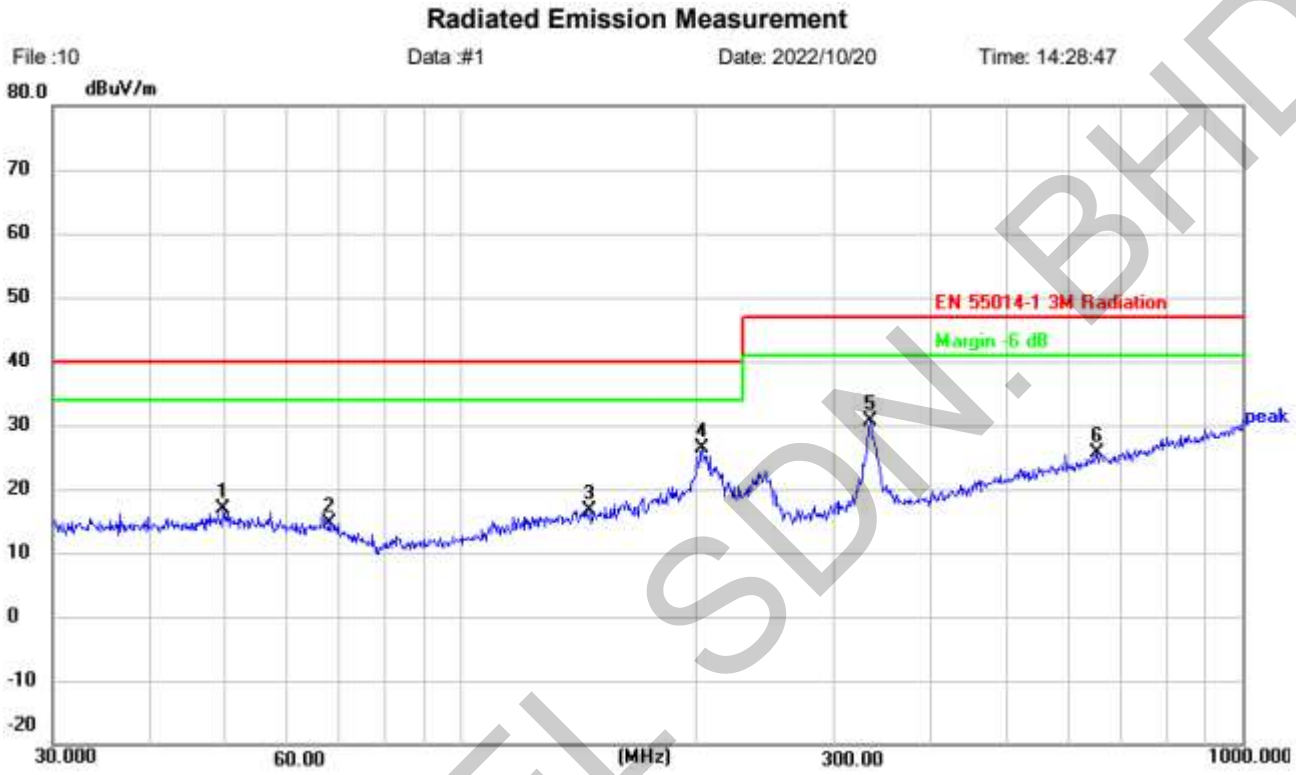
Radiation Emission Test Data			
Temperature:	24.5 ℃	Relative Humidity:	54%
Pressure:	1009hPa	Phase :	Vertical
Test Voltage :	DC 5V	Test Mode:	Normal Mode



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	49.5328	39.45	-22.57	16.88	40.00	-23.12	peak	P	
2	67.6751	38.76	-24.14	14.62	40.00	-25.38	peak	P	
3	145.8611	38.56	-21.86	16.70	40.00	-23.30	peak	P	
4 *	203.5228	50.26	-23.99	26.27	40.00	-13.73	peak	P	
5	333.6867	50.56	-20.02	30.54	47.00	-16.46	peak	P	
6	651.9417	38.15	-12.45	25.70	47.00	-21.30	peak	P	

*:Maximum data x:Over limit !:over margin

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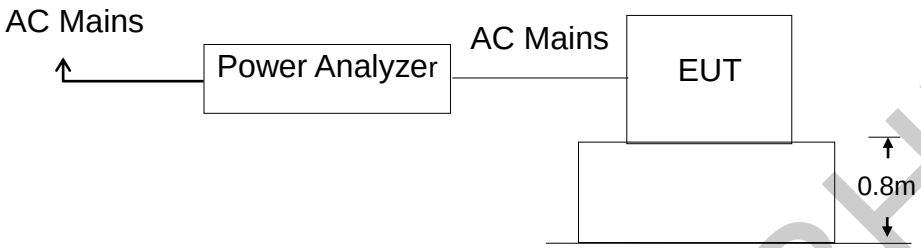
5.HARMONIC CURRENT EMISSION TEST

5.1. Block Diagram of Test Setup



5.2. Test Standard

EN IEC 61000-3-2:2019+A1:2021

5.3. Operating Condition of EUT

5.3.1 Setup the EUT as shown in Section 5.1.

5.3.2 Turn on the power of all equipments.

5.3.3 Let the EUT work in test mode and test it.

5.4. Test Procedure

The power cord of the EUT is connected to the output of the test system. Turn on the power of the EUT and use the test system to test the harmonic current level.

5.5. Test Results

The EUT is powered by the DC only, the test item is not applicable.

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6.VOLTAGE FLUCTUATIONS & FLICKER TEST

6.1.Block Diagram of Test Setup

Same as Section 6.1..

6.2.Test Standard

EN 61000-3-3:2013+A2:2021

6.3.Operating Condition of EUT

Same as Section 5.3.. The power cord of the EUT is connected to the output of the test system. Turn on the power of the EUT and use the test system to test the harmonic current level.

Flicker Test Limit

Test items	Limits
Pst	1.0
dc	3.3%
Tmax	4.0%
dt	Not exceed 3.3% for 500ms

6.4. Test Procedure

The power cord of the EUT is connected to the output of the test system. Turn on the power of the EUT and use the test system to test the harmonic current level.

6.5.Test Results

The EUT is powered by the DC only, the test item is not applicable.

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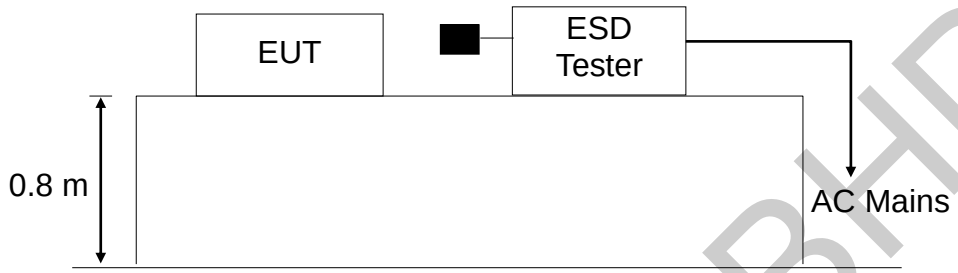
7.ELECTROSTATIC DISCHARGE IMMUNITY TEST

7.1.Block Diagram of Test Setup



7.2.Test Standard

EN IEC 55014-2:2021, EN 61000-4-2:2009

Severity Level: 3 / Air Discharge:±8KV
Level: 2 / Contact Discharge:±4KV

7.3.Severity Levels and Performance Criterion

7.3.1 Severity level

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

7.3.2 Performance criterion : B

A. The apparatus shall continue to operate as intended during the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as i

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B. The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. During the test, degradation of performance is allowed, however, no change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

C. Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls, or by any operation specified in the instructions for use.

7.4. EUT Configuration

The following equipments are installed on Electrostatic Discharge Immunity test to meet EN IEC 55014-2:2021, EN 61000-4-2:2009, requirement and operating in a manner which tends to maximize its emission characteristics in a normal application. The configuration of EUT is the same as used in conducted emission test.
Please refer to Section 2.4.

7.5. Operating Condition of EUT

Same as conducted emission measurement, which is listed in Section 3.5 except the test setup replaced by Section 7.1.2.

7.6. Test Procedure

7.6.1 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.

7.6.2 Contact Discharge**:**

All the procedure shall be same as Section 7.6.1. Except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

7.6.3 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

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the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge.

7.6.4 Indirect discharge for vertical coupling plane

At least 10 single discharges (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 complete illuminated.

7.7. Test Results

PASS

Please refer to the following page.

ESD Test Data				
Temperature:	24.5℃	Humidity:	53%	
Power Supply :	DC 5V	Test Mode:	Discharge	
Air Discharge: ± 8KV Contact Discharge: ± 4KV				
Test Points	Air Discharge	Contact Discharge	Performance Criterion	Result
Enclosure	±2,4,8KV	N/A	B	PASS
Slit	±2,4,8KV	N/A	B	PASS
Metal Part	N/A	±2,4 KV	B	PASS
VCP	N/A	±2,4 KV	B	PASS
HCP	N/A	±2,4 KV	B	PASS
Note: N/A				

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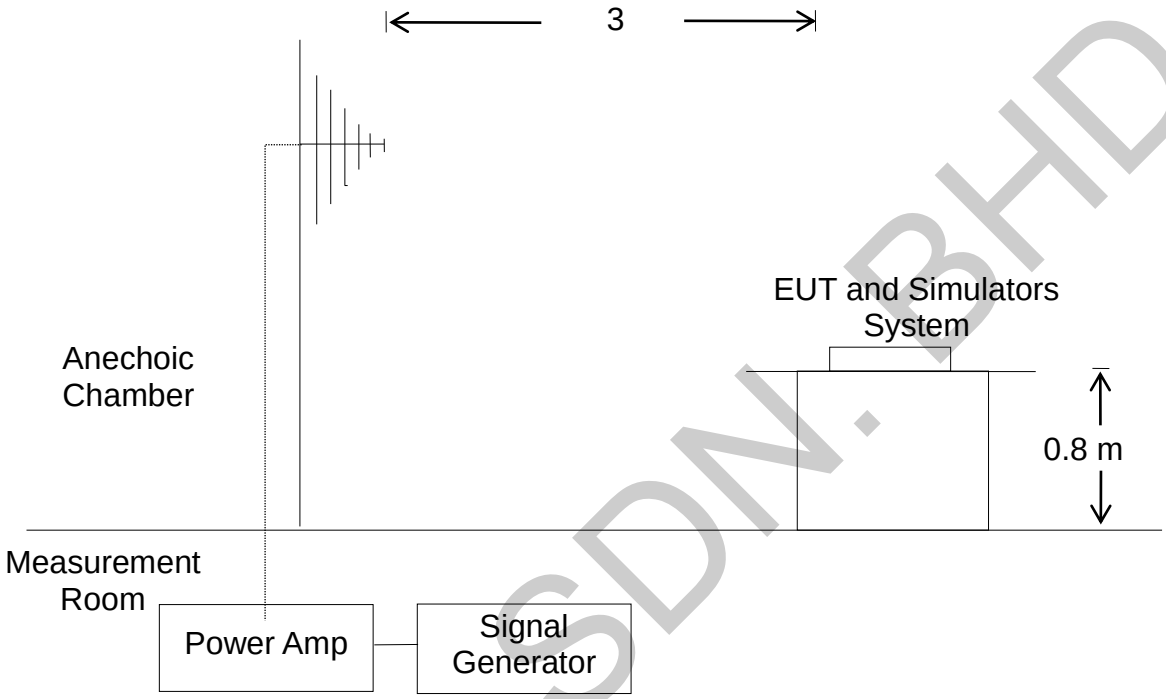
8.RF FIELD STRENGTH SUSCEPTIBILITY TEST

8.1.Block Diagram of Test Setup



8.2.Test Standard

EN IEC 55014-2:2021
EN 61000-4-3:2020

Severity Level 2, 3V / m

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8.3.Severity Levels and Performance Criterion

8.3.1. Severity level

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

8.3.2. **Performance criterion: A**

A、 The apparatus shall continue to operate as intended during the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as i

B、 The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. During the test, degradation of performance is allowed, however, no change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

C、 Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls, or by any operation specified in the instructions for use.

8.4.EUT Configuration on Test

The following equipments are installed on RF FIELD STRENGTH SUSCEPTIBILITY TEST to meet EN IEC 55014-2:2021,
EN 61000-4-3:2020, requirement and operating in a manner which tends to maximize its emission characteristics in a normal application. The configuration of EUT is the same as used in conducted emission test.
Please refer to Section 3.4.

8.5.Operating Condition of EUT

Same as conducted emission measurement, which is listed in Section 2.5 except the test setup replaced by Section 8.1.

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8.6. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. EUT is set 3 meter 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 EUT must be faced this transmitting antenna and measured individually.

All the scanning conditions are as follows **:**

Condition of Test	Remarks
1. Fielded Strength	3 V/m (Severity Level 2)
2. Radiated Signal	Modulated
3. Scanning Frequency	80 – 1000 MHz
4. Dwell time of radiated	0.0015 decade/s
5. Waiting Time	1 Sec.

8.7. Test Results

PASS

Please refer to the following page.

R/S Test Data			
Temperature : 25℃		Humidity : 53%	
Field Strength: 3 V/m		Criterion: A	
Power Supply: DC 5V		Frequency Range: 80 MHz to 1000 MHz	
Modulation: ☑ AM ☐ Pulse ☐none 1 KHz 80%			
Test Mode **:** Discharge			
	Frequency Range : 80-1000MHz		
Steps	1 %		
	Horizontal	Vertical	Result
Front	A	A	Pass
Right	A	A	Pass
Rear	A	A	Pass
Left	A	A	Pass
Note: N/A			

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9.ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST

9.1.Block Diagram of EUT Test Setup

9.2.Test Standard

EN IEC 55014-2:2021, EN 61000-4-4:2012

9.3.Severity Levels and Performance Criterion

Severity Level 2 at 1KV, Pulse Rise time & Duration: 5 nS / 50 nS
Severity Level:

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

Performance criterion: B

A. The apparatus shall continue to operate as intended during the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as i

B. The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. During the test, degradation of performance is allowed, however, no change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

C. Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls, or by any operation specified in the instructions for use.

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9.4. EUT Configuration on Test

The following equipments are installed on Electrical Fast Transient/Burst Immunity test to meet EN IEC 55014-2:2021, EN 61000-4-4:2012, requirement and operating in a manner which tends to maximize its emission characteristics in a normal application. The configuration of EUT is the same as used in conducted emission test.
Please refer to Section 3.4.

9.5. Operating Condition of EUT

Same as conducted emission measurement, which is listed in Section 2.6 except the test setup replaced by Section 9.1.

9.6. Test Procedure

EUT shall be placed 0.8m high above the ground reference plane which is a min.1m*1m metallic sheet with 0.65mm minimum thickness. 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

9.6.1. 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 2 minutes.

9.7. Test Results

The EUT is powered by the DC only, the test item is not applicable.

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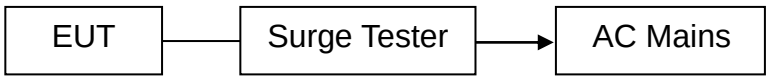
10.SURGE TEST

10.1. Block Diagram of EUT Test Setup



10.2. Test Standard

EN IEC 55014-2:2021, EN61000-4-5:2014+A1:2017

10.3. Severity Levels and Performance Criterion

Severity Level: Line to Line, Level 2 at 1KV;
Severity Level: Line to Earth, Level 3 at 2KV.

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

Performance criterion: B

A. The apparatus shall continue to operate as intended during the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as i

B. The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. During the test, degradation of performance is allowed, however, no change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

C. Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls, or by any operation specified in the instructions for use.

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10.4. EUT Configuration on Test

The following equipments are installed on Electrical Fast Transient/Burst Immunity test to meet EN IEC 55014-2:2021, EN61000-4-5:2014+A1:2017, requirement and operating in a manner which tends to maximize its emission characteristics in a normal application

The configuration of EUT is the same as used in conducted emission test. Please refer to Section 3.4.

10.5. Operating Condition of EUT

Same as conducted emission measurement, which is listed in Section 2.7 except the test setup replaced by Section 10.1.

10.6. Test Procedure

1) Set up the EUT and test generator as shown on section 10.1
2) For line to line coupling mode, provide a 1KV 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) Repeat procedure 2) to 4) except the open-circuit test voltage change from 1KV to 2KV for line to earth coupling mode test.
6) Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

10.7. Test Result

The EUT is powered by the DC only, the test item is not applicable.

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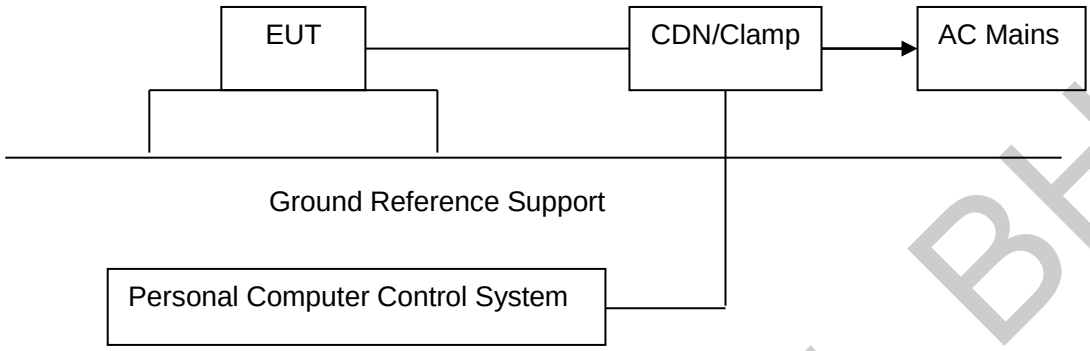
11.INJECTED CURRENTS SUSCEPTIBILITY TEST

11.1. Block Diagram of EUT Test Setup



11.2. Test Standard

EN IEC 55014-2:2021, EN61000-4-6:2014

11.3. Severity Levels and Performance Criterion

Severity Level 2: 3V(rms), 150KHz ～ 80MHz
Severity Level:

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

Performance criterion: A

A. The apparatus shall continue to operate as intended during the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as i

B. The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. During the test, degradation of performance is allowed, however, no change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

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C. Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls, or by any operation specified in the instructions for use.

11.4. EUT Configuration on Test

The configuration of EUT is the same as used in conducted emission test. Please refer to Section 2.8.

11.5. Operating Condition of EUT

Same as conducted emission test, which is listed in Section 2.8 except the test set up replaced as Section 11.1.

11.6. Test Procedure

1) Set up the EUT, CDN and test generator as shown on section 11.1

2) Let EUT work in test mode and measure.

3) The EUT and supporting equipments 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 at above 0.1-0.3m 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 to 80MHz 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 test and decide the EUT immunity criterion for above each test.

11.7. Test Result

The EUT is powered by the DC only, the test item is not applicable.

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12.VOLTAGE DIPS AND INTERRUPTIONS TEST

12.1. Block Diagram of EUT Test Setup

12.2. Test Standard

EN IEC 55014-2:2021, EN 61000-4-11:2020

12.3. Severity Levels and Performance Criterion

Severity Level:

Input and Output AC Power Ports.

☑ Voltage Dips.

☑ Voltage Interruptions.

Environmental Phenomena	Test Specification	Units	Performance Criterion
Voltage Dips	70 25	% Reduction period	C
	40 10	% Reduction period	C
Voltage Interruptions	0 0.5	% Reduction period	C

Performance criterion: B, C, C

A. The apparatus shall continue to operate as intended during the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as i

B. The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. During the test, degradation of performance is allowed, however, no change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

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C. Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls, or by any operation specified in the instructions for use.

12.4. EUT Configuration on Test

The configuration of EUT is the same as used in conducted emission test. Please refer to Section 2.10.

12.5. Operating Condition of EUT

Same as conducted emission test, which is listed in Section 2.10 except the test set up replaced as Section 13.1.

12.6. Test Procedure

1) Set up the EUT and test generator as shown on section 13.1
2) The interruption is introduced at selected phase angles with specified duration. There is a 3mins minimum interval between each test event.
3) After each test a full functional check is performed before the next test.
4) Repeat procedures 2 & 3 for voltage dips, only the level and duration is changed.
5) Record any degradation of performance.

12.7. Test Result

The EUT is powered by the DC only, the test item is not applicable.

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13.EUT PHOTOGRAPHS

EUT Photo 1

EUT Photo 2

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EUT Photo 3

EUT Photo 4

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EUT Photo 5

EUT Photo 6

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EUT Photo 7

EUT Photo 8

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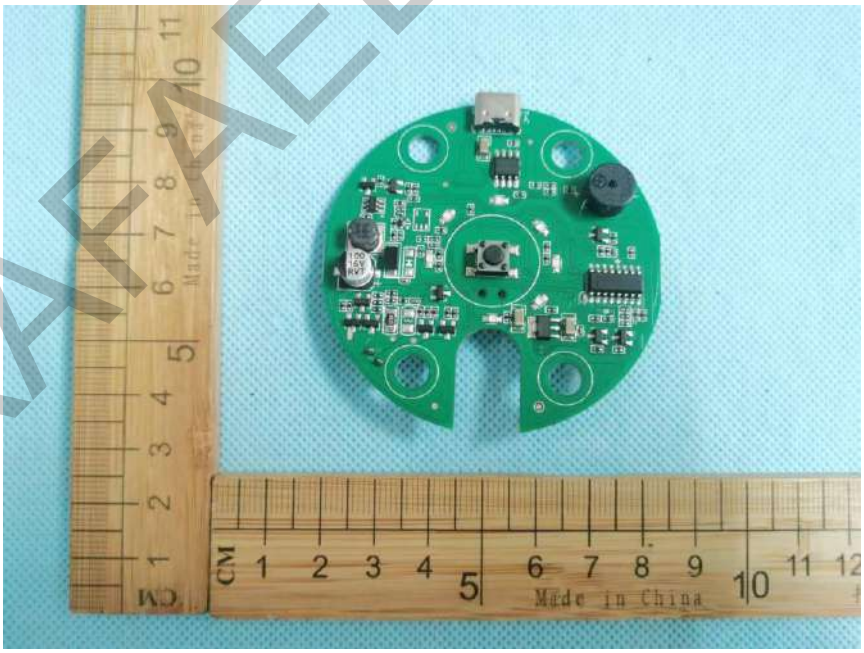
EUT Photo 9

EUT Photo 10



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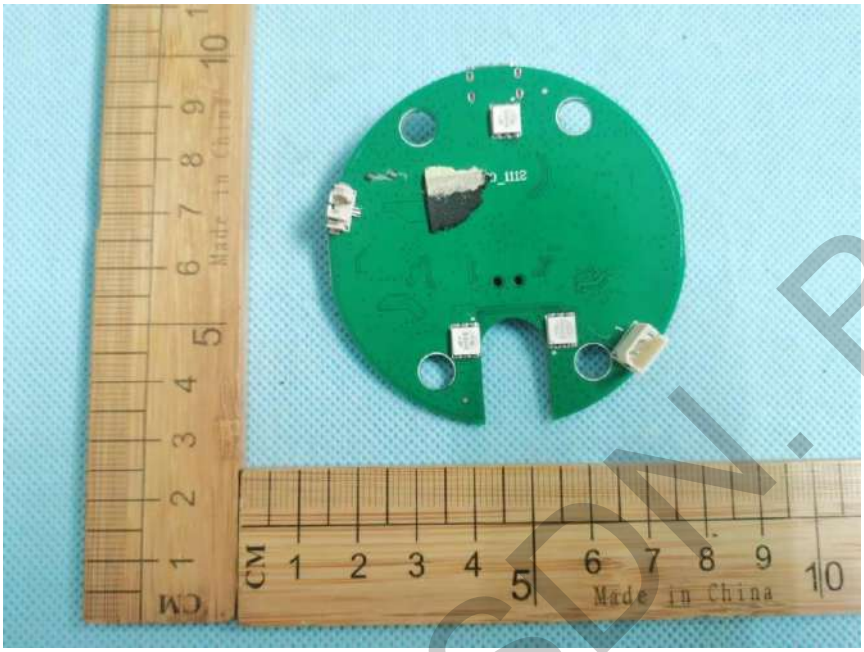
EUT Photo 11



EUT Photo 12

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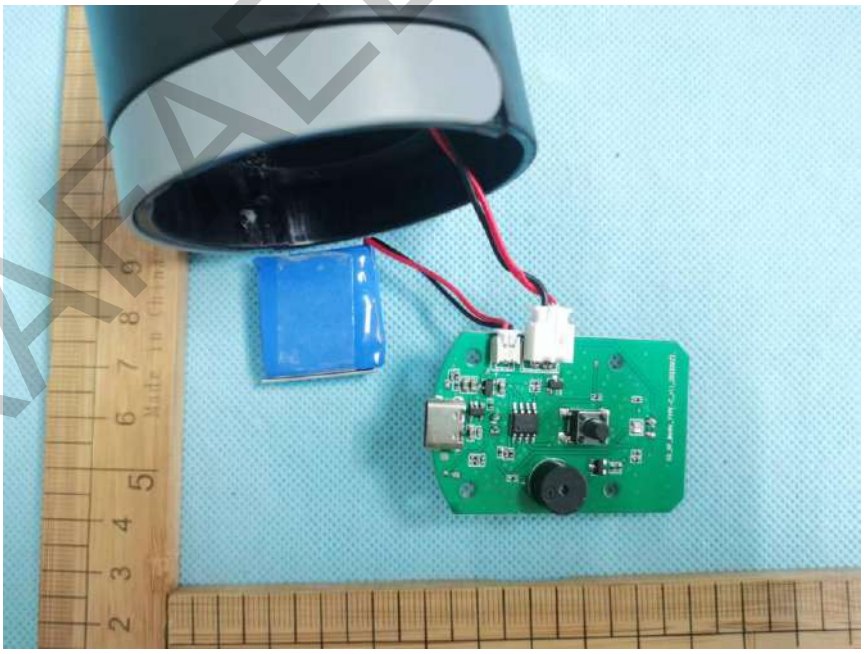
EUT Photo 13

EUT Photo 14



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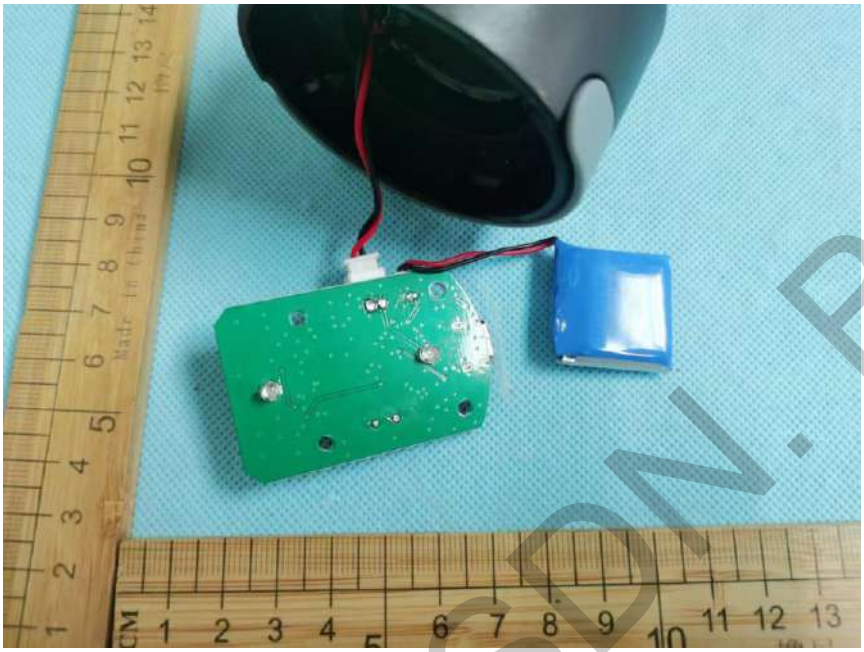
EUT Photo 15



EUT Photo 16

※※※※※ END OF REPORT ※※※※※

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