



中国认可
国际互认
检测
TESTING
CNAS L2291



Access to the World

TEST REPORT

Product Name : HOTO Electric Precision Screwdriver Set
Model Number : QWLSD010

Prepared for : Shanghai HOTO Technology Co., Ltd.
Address : Building 45, No. 50 Moganshan Rd, Putuo District,
Shanghai, PRC, 200060

Prepared by : EMTEK (SHENZHEN) CO., LTD.
Address : Building 69, Majialong Industry Zone, Nanshan District,
Shenzhen, Guangdong, China

Tel: (0755) 26954280
Fax: (0755) 26954282

Report Number : ENS2107160108E00201R
Date(s) of Tests : June 21, 2021 to June 26, 2021
Date of issue : July 24, 2021



TABLE OF CONTENT

Test Report Description	Page
1. SUMMARY OF TEST RESULTS.....	6
2. GENERAL INFORMATION	7
2.1. Description of Device (EUT).....	7
2.2. Independent Operation Modes.....	7
2.3. Test Manner.....	7
2.4. Description of Support Device.....	8
2.5. Description of Test Facility.....	8
2.6. Measurement Uncertainty	8
3. MEASURING DEVICE AND TEST EQUIPMENT	9
3.1. For Power Line Conducted Emission Measurement.....	9
3.2. For Radiated Emission Measurement.....	9
3.3. For Harmonic Current / Flicker Measurement.....	9
3.4. For Electrostatic Discharge Immunity Test	9
3.5. For RF Strength Susceptibility Test	10
3.6. For Electrical Fast Transient / Burst Immunity Test.....	10
3.7. For Surge Immunity Test	10
3.8. For Injected Current Susceptibility Test.....	11
3.9. For Voltage Dips and Interruptions Test	11
4. POWER LINE CONDUCTED EMISSION MEASUREMENT	12
4.1. Block Diagram of Test Setup	12
4.2. Measurement Standard and Limits.....	12
4.3. EUT Configuration of Measurement.....	12
4.4. Test Procedure	13
4.5. Measuring Results	13
5. RADIATED EMISSION MEASUREMENT.....	16
5.1. Block Diagram of Test Setup	16
5.2. Measurement Standard and Limits.....	16
5.3. EUT Configuration of Measurement.....	17
5.4. Test Procedure	17
5.5. Measuring Results.....	17
6. HARMONIC CURRENT EMISSION MEASUREMENT	20
6.1. Block Diagram of Test Setup	20
6.2. Measuring Standard	20
6.3. Operation Condition of EUT	20
6.4. Measuring Results.....	20
7. VOLTAGE FLUCTUATION AND FLICKER MEASUREMENT	21
7.1. Block Diagram of Test Setup	21
7.2. Measuring Standard	21
7.3. Operation Condition of EUT	21
7.4. Measuring Results.....	21
8. IMMUNITY PERFORMANCE CRITERIA DESCRIPTION	23
9. ELECTROSTATIC DISCHARGE IMMUNITY TEST	24
9.1. Block Diagram of Test Setup	24
9.2. Test Standard.....	24
9.3. Severity Levels and Performance Criterion.....	24
9.4. Operating Condition of EUT	25

9.5. Test Procedure	25
9.6. Test Results	25
10. RF FIELD STRENGTH SUSCEPTIBILITY TEST	27
10.1. Block Diagram of Test Setup	27
10.2. Test Standard.....	27
10.3. Severity Levels and Performance Criterion.....	28
10.4. Operating Condition of EUT	28
10.5. Test Procedure	28
10.6. Test Results	28
11. ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST.....	30
11.1. Block Diagram of Test Setup	30
11.2. Test Standard.....	30
11.3. Severity Levels and Performance Criterion.....	30
11.4. Operating Condition of EUT	30
11.5. Test Procedure	31
11.6. Test Results	31
12. SURGE IMMUNITY TEST	33
12.1. Block Diagram of Test Setup	33
12.2. Test Standard.....	33
12.3. Severity Levels and Performance Criterion.....	33
12.4. Operating Condition of EUT	33
12.5. Test Procedure	34
12.6. Test Results	34
13. INJECTED CURRENTS SUSCEPTIBILITY TEST	36
13.1. Block Diagram of Test Setup	36
13.2. Test Standard.....	36
13.3. Severity Levels and Performance Criterion.....	36
13.4. Operating Condition of EUT	37
13.5. Test Procedure	37
13.6. Test Results	37
14. VOLTAGE DIPS AND INTERRUPTIONS TEST	39
14.1. Block Diagram of Test Setup	39
14.2. Test Standard.....	39
14.3. Severity Levels and Performance Criterion.....	39
14.4. Operating Condition of EUT	40
14.5. Test Procedure	40
14.6. Test Results	40
15. PHOTOGRAPHS.....	42
15.1. Photos of Conducted Emission Measurement	42
15.2. Photo of Radiated Emission Measurement.....	43
15.3. Photo of Harmonic / Flicker Measurement.....	44
15.4. Photo of Electrostatic Discharge Test.....	44
15.5. Photo of RF Strength Susceptibility Test	45
15.6. Photo of Electrical Fast Transient / Burst Test.....	45
15.7. Photo of Surge Test.....	46
15.8. Photo of Injected Currents Susceptibility Test	46
15.9. Photo of Voltage Dips and Interruption Test.....	47

APPENDIX (Photos of the EUT) (3 pages)

TEST REPORT DESCRIPTION

Applicant : Shanghai HOTO Technology Co., Ltd.
Manufacturer : Shanghai HOTO Technology Co., Ltd.
Trade Mark : N/A
EUT : HOTO Electric Precision Screwdriver Set
Model No. : QWLSD010
Rating : DC 5V from adapter, DC 3.7V by internal battery

Measurement Procedure Used:

EN 55014-1: 2017+A11:2020
EN IEC 61000-3-2: 2019
EN 61000-3-3: 2013+A1:2019
EN 55014-2: 2015
(IEC 61000-4-2:2008, IEC 61000-4-3:2006+A1:2007+A2:2010, IEC 61000-4-4:2012,
IEC 61000-4-5:2014, IEC 61000-4-6:2013, IEC 61000-4-11:2004)

The device described above is tested by EMTEK (SHENZHEN) CO., LTD. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and EMTEK (SHENZHEN) CO., LTD. is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the EN55014-1, EN61000-3-2, EN61000-3-3, EN55014-2 requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of EMTEK (SHENZHEN) CO., LTD.

Date of Test : June 21, 2021 to June 26, 2021

Prepared by : Jessie Hu
Jessie Hu/Editor

Reviewer : Kaimin Guo
Kaimin Guo/Supervisor

Approved & Authorized Signer : Lisa Wang
Lisa Wang/Manager

Modified Information

Version	Report No.	Revision date	Summary
Ver.1.0	ENS2107160108E00201R	/	Original Version



1. SUMMARY OF TEST RESULTS

EMISSION			
Description of Test Item	Standard	Limits	Results
Conducted Disturbance at Mains Terminals	EN 55014-1: 2017+A11:2020	Table 5	Pass
Disturbance Power	EN 55014-1: 2017+A11:2020	Table 7	N/A
Click	EN 55014-1: 2017+A11:2020	Section 4	N/A(Note 2)
Radiated Emission	EN 55014-1: 2017+A11:2020	Table 9	Pass
Harmonic Current Emission	EN IEC 61000-3-2: 2019	Class B	N/A
Voltage Fluctuation and Flicker	EN 61000-3-3: 2013+A1:2019	Section 5	Pass
IMMUNITY (EN 55014-2:2015)			
Description of Test Item	Basic Standard	Performance Criteria	Results
Electrostatic Discharge (ESD)	IEC 61000-4-2:2008	B	Pass
Radio-Frequency, Continuous Radiated Disturbance	IEC 61000-4-3:2006+A1: 2007+A2: 2010	A	Pass
EFT/B Immunity	IEC 61000-4-4:2012	B	Pass
Surge Immunity	IEC 61000-4-5:2014	B	Pass
Conducted RF Immunity	IEC 61000-4-6:2013	A	Pass
Voltage Dips, 60% Reduction	IEC 61000-4-11:2004	C	Pass
Voltage Dips, 30% Reduction		C	Pass
Voltage Interruptions		B	Pass
Note: 1. N/A is an abbreviation for Not Applicable. 2. Please see clause 5.4.3(Exceptions from the click definition) for EN 55014-1 Rules and Regulation, The purpose of mains connection or disconnection only(the switch)			

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

EUT	: HOTO Electric Precision Screwdriver Set
Model Number	: QWLSD010
Sample number	: 1#
Test Voltage	: DC 5V from adapter, DC 3.7V
Applicant	: Shanghai HOTO Technology Co., Ltd.
Address	: Building 45, No. 50 Moganshan Rd, Putuo District, Shanghai, PRC, 200060
Manufacturer	: Shanghai HOTO Technology Co., Ltd.
Address	: Building 45, No. 50 Moganshan Rd, Putuo District, Shanghai, PRC, 200060
Factory	: Dongguan Charles Electrical Technology Co., Ltd.
Address	: No. 6 Huanggongkeng Road, Tongsha Industrial zone, Dongcheng district, Dongguan city, 523127, Guangdong province, China
Date of Received	: June 21, 2021
Date of Test	: June 21, 2021 to June 26, 2021

Note: This report change trademark, EUT name, model number and appearance of product is based on ES210617026E, this change does not affect the test results, and its original data and records refer to ES210617026E.

2.2. Independent Operation Modes

- A. On
1. Charging
 2. ON (CW)
 3. ON (CCW)

2.3. Test Manner

Test Items	Test Voltage	Operation Modes	Worst case
Conducted disturbance at mains Terminals	DC 5V from adapter	Mode A.1	Mode A.1
Radiated Emission	DC 5V from adapter DC 3.7V	Mode A.	Mode A.3 (DC 3.7V)
EMS	DC 5V from adapter, DC 3.7V	Mode A	/

2.4. Description of Support Device

Adapter : Manufacturer: Aohai
 Model: A121A-050200U-EU3
 Input: 100-240~50/60Hz, 0.35A
 Output: 5.0V ==2A

2.5. Description of Test Facility

Site Description
 EMC Lab. : **Accredited by CNAS**
 The Certificate Registration Number is L2291.
 The Laboratory has been assessed and proved to be in compliance with
 CNAS-CL01 (identical to ISO/IEC 17025:2017)

Accredited by FCC
 Designation Number: CN1204
 Test Firm Registration Number: 882943

Accredited by A2LA
 The Certificate Number is 4321.01.

Accredited by Industry Canada
 The Conformity Assessment Body Identifier is CN0008

Name of Firm : EMTEK (SHENZHEN) CO., LTD.
 Site Location : Building 69, Majialong Industry Zone, Nanshan District, Shenzhen,
 Guangdong, China

2.6. Measurement Uncertainty

Test Item	Uncertainty
Conducted Emission Uncertainty	: 3.16dB(9k~150kHz Conduction 2#) 2.90dB(150k-30MHz Conduction 2#)
Radiated Emission Uncertainty (3m 1# Chamber)	: 4.46dB (30M~1GHz Polarize: H) 5.04dB (30M~1GHz Polarize: V)
Uncertainty for Flicker test	: 0.07%
Uncertainty for Harmonic test	: 1.8%
Uncertainty for R/S Test	: 2.10dB(80MHz-200MHz) 1.76dB(200MHz-1000MHz)
Uncertainty for C/S Test	: 1.45dB(Using CDN Test) 2.37dB(Using EM Clamp Test)
Uncertainty for test site temperature and humidity	: 0.6°C 4%

3. MEASURING DEVICE AND TEST EQUIPMENT

3.1. For Power Line Conducted Emission Measurement

Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
<input checked="" type="checkbox"/>	EMI Test Receiver	Rohde & Schwarz	ESCI	101045	May 15, 2021	1 Year
<input checked="" type="checkbox"/>	PULSE LIMTER	Rohde & Schwarz	ESH3-Z2	100107	May 15, 2021	1 Year
<input checked="" type="checkbox"/>	AMN	Rohde & Schwarz	ESH3-Z5	100191	May 15, 2021	1 Year

3.2. For Radiated Emission Measurement

Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
<input checked="" type="checkbox"/>	Pre-Amplifier	HP	8447F	2944A07999	May 15, 2021	1 Year
<input checked="" type="checkbox"/>	EMI Test Receiver	Rohde & Schwarz	ESCI	101414	May 15, 2021	1 Year
<input checked="" type="checkbox"/>	Bilog Antenna	Schwarzbeck	VULB9163	712	Sep 22, 2019	2 Year

3.3. For Harmonic Current / Flicker Measurement

Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
<input checked="" type="checkbox"/>	45KVA AC Power source	Teseq	NSG 1007-45/45KVA	1305A02873	May 16, 2021	1 Year
<input checked="" type="checkbox"/>	Signal conditioning Unit	Teseq	CCN 1000-3	1305A02873	May 16, 2021	1 Year
<input checked="" type="checkbox"/>	Impedance network	Teseq	INA2197/37A	1305A02873	May 16, 2021	1 Year
<input checked="" type="checkbox"/>	Impedance network	Teseq	INA 2196/75A	1305A02874	May 16, 2021	1 Year
<input type="checkbox"/>	Proflin 2100 AC Switching Unit	Teseq	NSG 2200-3	A22714	May 16, 2021	1 Year

3.4. For Electrostatic Discharge Immunity Test

Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
<input checked="" type="checkbox"/>	ESD Tester	TESEQ AG	NSG 438A	130	May 15, 2021	1 Year

3.5. For RF Strength Susceptibility Test

Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
<input checked="" type="checkbox"/>	Power Amplifier	MILMEGA	AS0102-55	1018770	May 15, 2021	1 Year
<input checked="" type="checkbox"/>	50ohm Diode Power Sensor	BOONTON	51011EMC	34236	May 16, 2021	1 Year
<input checked="" type="checkbox"/>	RF Power Meter. Dual Channel	BOONTON	4232A	10539	May 15, 2021	1 Year
<input checked="" type="checkbox"/>	Log.-Per. Antenna	SCHWARZBECK	VULP 9118E	811	N/A	N/A
<input checked="" type="checkbox"/>	Signal Generator	Agilent	N5181A	MY50145187	May 15, 2021	1 Year
<input checked="" type="checkbox"/>	50ohm Diode Power Sensor	BOONTON	51011EMC	36164	May 15, 2021	1 Year
<input type="checkbox"/>	Broad-Band Horn Antenna	SCHWARZBECK	STLP 9149	9149-227	N/A	N/A
<input checked="" type="checkbox"/>	Field Strength Meter	DARE	RSS1006A	10I00037SNO22	May 16, 2021	1 Year
<input checked="" type="checkbox"/>	Multi-function interface system	DARE	CTR1009B	12I00250SNO72	N/A	N/A
<input checked="" type="checkbox"/>	Automatic switch group	DARE	RSW1004A	N/A	N/A	N/A
<input checked="" type="checkbox"/>	Power Amplifier	MILMEGA	AS1860-50	1059346	May 15, 2021	1 Year
<input checked="" type="checkbox"/>	Power Amplifier	MILMEGA	80RF1000-175	1059345	May 15, 2021	1 Year

3.6. For Electrical Fast Transient / Burst Immunity Test

Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
<input checked="" type="checkbox"/>	Burst Tester	HAEFELY	PEFT4010	080981-16	May 16, 2021	1 Year
<input type="checkbox"/>	Coupling Clamp	HAEFELY	IP-4A	147147	May 16, 2021	1 Year

3.7. For Surge Immunity Test

Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
<input checked="" type="checkbox"/>	Controller	HAEFELY	Psurge 8000	174031	May 16, 2021	1 Year
<input checked="" type="checkbox"/>	Impulse Module	HAEFELY	PIM 100	174124	May 16, 2021	1 Year
<input checked="" type="checkbox"/>	Coupling Decoupling	HAEFELY	PCD 130	172181	May 16, 2021	1 Year
<input type="checkbox"/>	Coupling Module	HAEFELY	PCD122	174354	May 16, 2021	1 Year
<input type="checkbox"/>	Impulse Module	HAEFELY	PIM 120	174435	May 16, 2021	1 Year
<input type="checkbox"/>	Coupling Module	HAEFELY	PCD 126A	174387	May 16, 2021	1 Year
<input type="checkbox"/>	Impulse Module	HAEFELY	PIM 110	174391	May 16, 2021	1 Year

3.8. For Injected Current Susceptibility Test

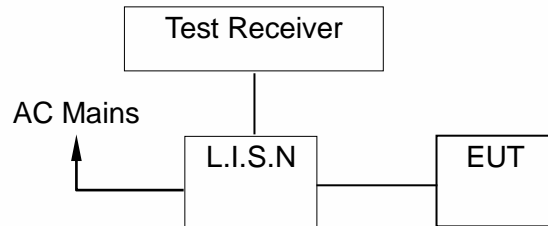
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
<input checked="" type="checkbox"/>	Continuous Wave Simulator	EMTEST	CWS500C	0900-12	May 15, 2021	1 Year
<input checked="" type="checkbox"/>	CDN	EMTEST	CDN-M2	510010010010	May 16, 2021	1 Year
<input type="checkbox"/>	CDN	EMTEST	CDN-M3	0900-11	May 15, 2021	1 Year
<input type="checkbox"/>	EM Injection Clamp	EMTEST	F-2031-23MM	368	May 15, 2021	1 Year
<input checked="" type="checkbox"/>	Attenuator	EMTEST	100W 6dB DC-3G	/	May 15, 2021	1 Year
<input type="checkbox"/>	Signal Generator	R&S	SMB100A	103041	May 15, 2021	1 Year
<input type="checkbox"/>	CDN	LUTHI	CDN L-801 M2/M3	2606	May 15, 2021	1 Year

3.9. For Voltage Dips and Interruptions Test

Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
<input checked="" type="checkbox"/>	45KVA AC Power source	Teseq	NSG 1007-45/45KVA	1305A02873	May 16, 2021	1 Year
<input type="checkbox"/>	Signal conditioning Unit	Teseq	CCN 1000-3	1305A02873	May 16, 2021	1 Year
<input type="checkbox"/>	Impedance network	Teseq	INA2197/37A	1305A02873	May 16, 2021	1 Year
<input type="checkbox"/>	Impedance network	Teseq	INA 2196/75A	1305A02874	May 16, 2021	1 Year
<input checked="" type="checkbox"/>	Proflin 2100 AC Switching Unit	Teseq	NSG 2200-3	A22714	May 16, 2021	1 Year

4. POWER LINE CONDUCTED EMISSION MEASUREMENT

4.1. Block Diagram of Test Setup



4.2. Measurement Standard and Limits

4.2.1. Standard:

EN 55014-1: 2017+A11:2020

4.2.2. Limits

Power line conducted limit:

Frequency (MHz)	Limit (dB μ V)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	66.0 ~ 56.0 *	59.0 ~ 46.0 *
0.50 ~ 5.00	56.0	46.0
5.00 ~ 30.00	60.0	50.0

Remark: * means decreasing linearly with logarithm of frequency.

4.3. EUT Configuration of Measurement

The following equipments are installed on Conducted Emission Measurement to meet EN 55014-1 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

EUT : HOTO Electric Precision Screwdriver Set
 Model Number : QWLSD010

4.4. Test Procedure

The EUT is put on the table, which is 0.8 meter high above the ground and connected to the AC mains through a Line Impedance Stabilization Network (L.I.S.N.). This provided a 50ohm coupling impedance for the tested equipments. Both sides of AC line are checked to find out the maximum conducted emission according to the EN 55014-1 regulations during conducted emission measurement. And the voltage probe had been used for the load terminals measurement according to the EN 55014-1 standard.

The bandwidth of the field strength meter (R&S Test Receiver ESCI) is set at 9kHz.

For single-phase equipment with a rated voltage range in the range between:

- 100 V to 127 V, test at one nominal voltage within this range;
- 200 V to 240 V, test at one nominal voltage within this range;
- 100 V to 240 V, test at two voltages within this range, one test in the range 100 V to 127 V and another test in the range 200 V to 240 V.

The recommended test voltages are 120 V for the range 100 V to 127 V; and 230 V for the range 200 V to 240 V.

During the tests the EUT shall be operated at the rated frequency specified for the equipment. If the equipment has more than one rated frequency (e.g. 50 Hz to 60 Hz), then the EUT shall be tested at one of these frequencies only.

If the equipment has a rated frequency range (e.g. 50 Hz to 60 Hz), then the EUT shall be tested at one frequency within this range

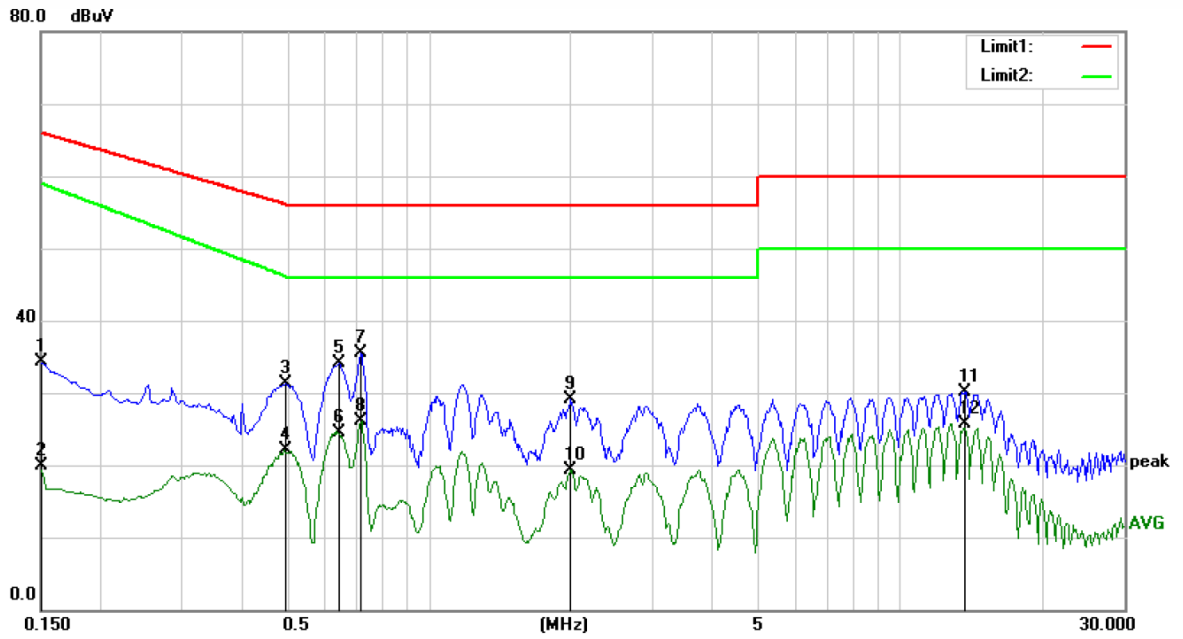
The frequency range from 150kHz to 30MHz is investigated.

4.5. Measuring Results

PASS.

Please see the attached pages.

Temperature	:	24.4 °C
Humidity	:	52%
Atmospheric Pressure	:	101kpa
Test Engineer	:	LQ
Test Date	:	2021-06-21



Site Conduction #2

Phase: **L1**

Temperature: 24.4

Limit: (CE)EN55014 QP

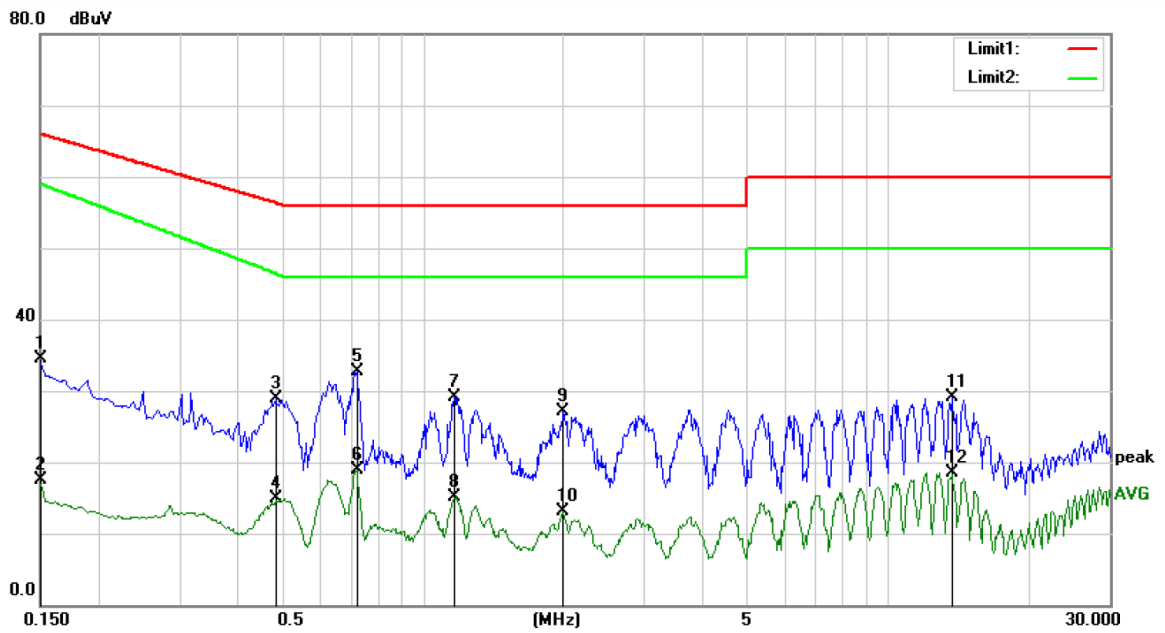
Power: DC 5V from adapter

Humidity: 52 %

Mode: charging

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		0.1500	23.83	10.48	34.31	66.00	-31.69	QP	
2		0.1500	9.48	10.48	19.96	59.00	-39.04	AVG	
3		0.4980	20.86	10.35	31.21	56.03	-24.82	QP	
4		0.4980	11.70	10.35	22.05	46.04	-23.99	AVG	
5		0.6460	23.78	10.35	34.13	56.00	-21.87	QP	
6		0.6460	14.25	10.35	24.60	46.00	-21.40	AVG	
7		0.7180	25.10	10.35	35.45	56.00	-20.55	QP	
8	*	0.7180	15.72	10.35	26.07	46.00	-19.93	AVG	
9		2.0060	18.87	10.32	29.19	56.00	-26.81	QP	
10		2.0060	9.05	10.32	19.37	46.00	-26.63	AVG	
11		13.7180	19.41	10.72	30.13	60.00	-29.87	QP	
12		13.7180	15.04	10.72	25.76	50.00	-24.24	AVG	



Site Conduction #2

Phase: **N**

Temperature: 24.4

Limit: (CE)EN55014_QP

Power: DC 5V from adapter

Humidity: 52 %

Mode: charging

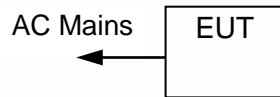
Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1500	24.04	10.48	34.52	66.00	-31.48	QP	
2		0.1500	7.00	10.48	17.48	59.00	-41.52	AVG	
3		0.4820	18.52	10.35	28.87	56.30	-27.43	QP	
4		0.4820	4.63	10.35	14.98	46.40	-31.42	AVG	
5	*	0.7220	22.40	10.35	32.75	56.00	-23.25	QP	
6		0.7220	8.46	10.35	18.81	46.00	-27.19	AVG	
7		1.1700	18.74	10.40	29.14	56.00	-26.86	QP	
8		1.1700	4.66	10.40	15.06	46.00	-30.94	AVG	
9		2.0020	16.76	10.32	27.08	56.00	-28.92	QP	
10		2.0020	2.70	10.32	13.02	46.00	-32.98	AVG	
11		13.7140	18.44	10.72	29.16	60.00	-30.84	QP	
12		13.7140	7.76	10.72	18.48	50.00	-31.52	AVG	

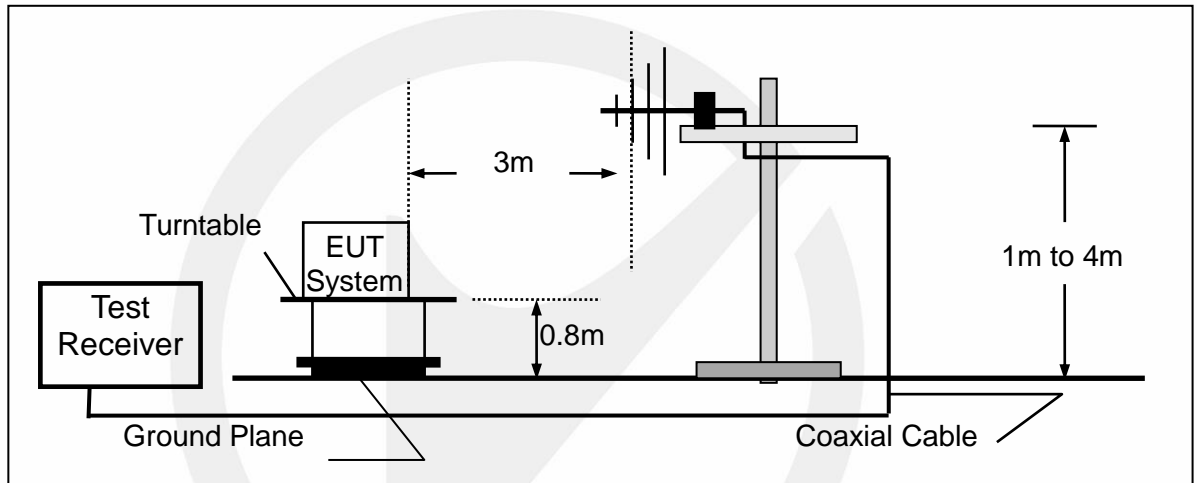
5. RADIATED EMISSION MEASUREMENT

5.1. Block Diagram of Test Setup

5.1.1. Block diagram of EUT system



5.1.2. Block diagram of test setup (In chamber)



5.2. Measurement Standard and Limits

5.2.1. Test Standard

EN 55014-1: 2017+A11:2020

5.2.2. Test 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 μ 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.

5.3. EUT Configuration of Measurement

The EN 55014-1 regulations test method must be used to find the maximum emission during radiated emission measurement.

EUT : HOTO Electric Precision Screwdriver Set
Model Number : QWLSD010

5.4. 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 that 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 is set on test.

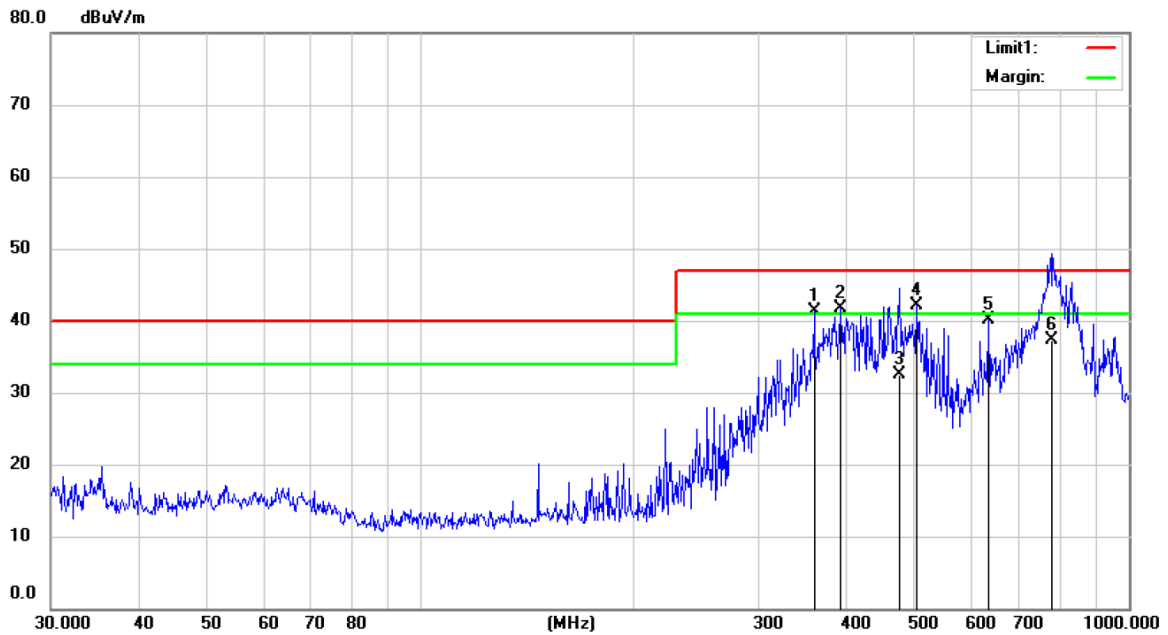
The bandwidth of the Receiver (ESCI) is set at 120kHz.

5.5. Measuring Results

PASS.

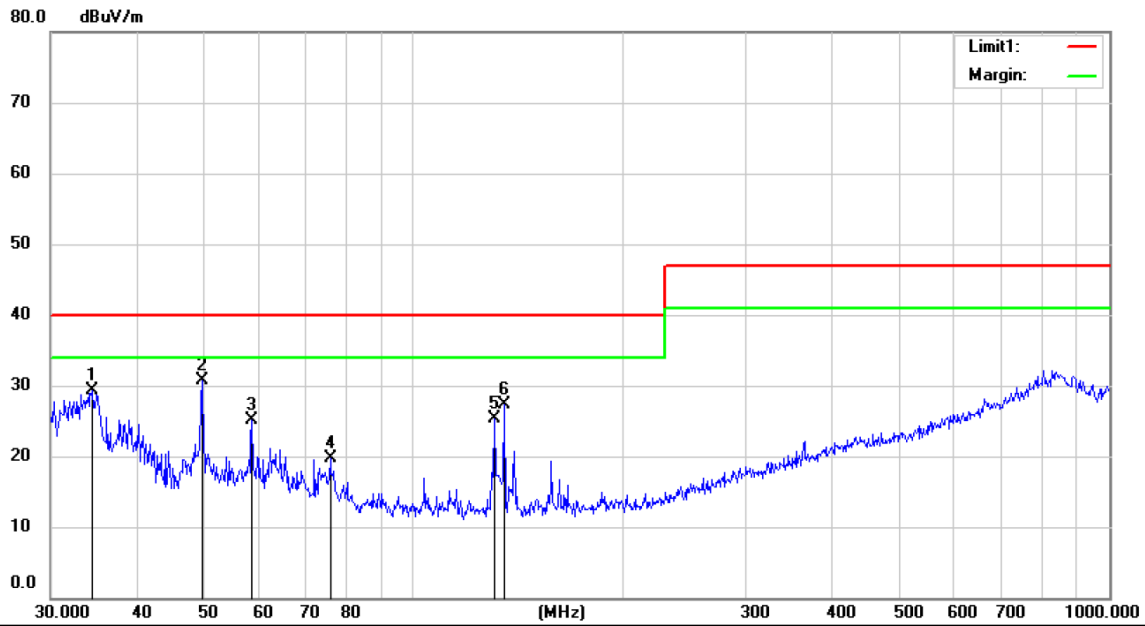
Please see the attached pages.

Temperature	:	29.5 °C
Humidity	:	48%
Atmospheric Pressure	:	101kpa
Test Engineer	:	XXH
Test Date	:	2021-06-22



Site 3m Chamber #1 Polarization: **Horizontal** Temperature: 29.5 C
 Limit: (RE)EN55014 3M Power: DC3.7V Humidity: 48 %
 Mode:CCW
 Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	!	359.6586	48.84	-7.45	41.39	47.00	-5.61	QP		
2	!	392.6110	48.25	-6.64	41.61	47.00	-5.39	QP		
3		475.0824	38.06	-5.56	32.50	47.00	-14.50	QP		
4	*	502.4988	47.14	-4.97	42.17	47.00	-4.83	QP		
5		633.9073	42.55	-2.36	40.19	47.00	-6.81	QP		
6		781.6598	36.02	1.38	37.40	47.00	-9.60	QP		

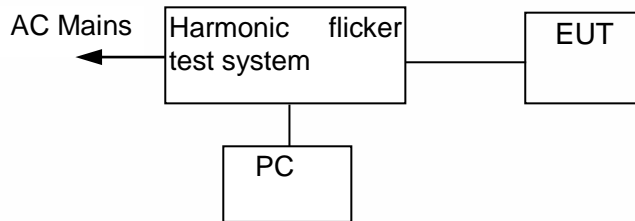


Site 3m Chamber #1 Polarization: **Vertical** Temperature: 29.5 C
 Limit: (RE)EN55014 3M Power: DC3.7V Humidity: 48 %
 Mode:CCW
 Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		34.4115	43.23	-14.02	29.21	40.00	-10.79	QP		
2	*	49.5762	42.80	-12.11	30.69	40.00	-9.31	QP		
3		58.4331	37.20	-12.07	25.13	40.00	-14.87	QP		
4		75.7114	34.00	-14.29	19.71	40.00	-20.29	QP		
5		130.6650	39.60	-14.24	25.36	40.00	-14.64	QP		
6		134.9727	41.46	-14.20	27.26	40.00	-12.74	QP		

6. HARMONIC CURRENT EMISSION MEASUREMENT

6.1. Block Diagram of Test Setup



6.2. Measuring Standard

EN IEC 61000-3-2: 2019 CLASS B

6.3. Operation Condition of EUT

6.3.1. Setup the EUT as shown on Section 6.1.

6.3.2. Turn on the power of all equipment.

6.3.3. Let the EUT work in measuring mode (Charging) and measure it.

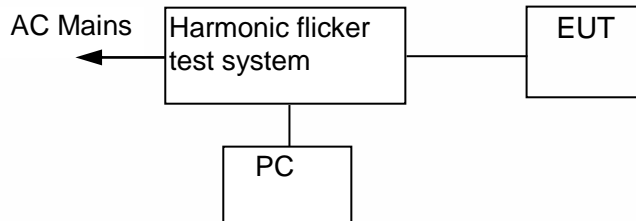
6.4. Measuring Results

N/A.

Because power of EUT less than 75W, According standard EN 61000-3-2, Harmonic current unnecessary to test.

7. VOLTAGE FLUCTUATION AND FLICKER MEASUREMENT

7.1. Block Diagram of Test Setup



7.2. Measuring Standard

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

7.3. Operation Condition of EUT

7.3.1. Setup the EUT as shown on Section 7.1.

7.3.2. Turn on the power of all equipment.

7.3.3. Let the EUT work in measuring mode (Charging) and measure it.

7.4. Measuring Results

PASS.

Please see the attached page.

Flicker Test Summary per EN/IEC61000-3-3 Ed. 3.0 (2013) (Run time)

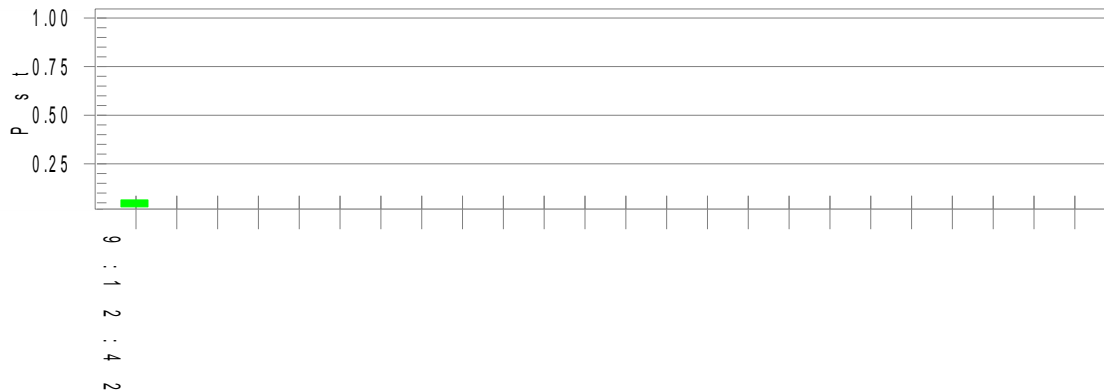
EUT: HOTO Electric Precision Screwdriver Set
 Test category: All parameters (European limits)
 Test date: 6/23/2021
 Test duration (min): 10
 Comment: Charging
 Customer: Shanghai HOTO Technology Co., Ltd.

Tested by: ZYX
 Test Margin: 100
 End time: 09:12:48
 Start time: 09:02:21
 Data file name: F-000583.cts_data

Test Result: Pass Status: Test Completed

Pst_i and limit line

European Limits



Parameter values recorded during the test:

Vrms at the end of test (Volt):	230.27			
T-max (mS):	0	Test limit (mS):	500.0	Pass
Highest dc (%):	0.00	Test limit (%):	3.30	Pass
Highest dmax (%):	0.00	Test limit (%):	4.00	Pass
Highest Pst (10 min. period):	0.064	Test limit:	1.000	Pass

8. IMMUNITY PERFORMANCE CRITERIA DESCRIPTION

Performance Level

The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance level by its manufacturer or the requestor of the test, or the agreed between the manufacturer and the purchaser of the product.

Definition related to the performance level:

1. Based on the used product standard
2. Based on the declaration of the manufacturer, requestor or purchaser

Criterion 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 intended. 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.

Criterion 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.

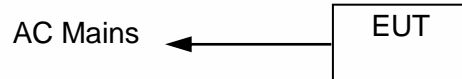
Criterion C:

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

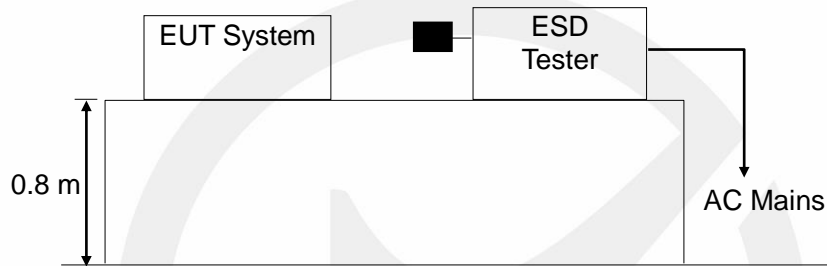
9. ELECTROSTATIC DISCHARGE IMMUNITY TEST

9.1. Block Diagram of Test Setup

9.1.1. Block diagram of EUT System



9.1.2. Block diagram of ESD test setup



9.2. Test Standard

EN 55014-2:2015
 (IEC 61000-4-2:2008 Severity Level: 3 / Air Discharge: $\pm 8\text{kV}$
 Level: 2 / Contact Discharge: $\pm 4\text{kV}$)

9.3. Severity Levels and Performance Criterion

9.3.1. 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

9.3.2. Performance criterion: B

9.4. Operating Condition of EUT

9.4.1. Setup the EUT as shown in Section 9.1.

9.4.2. Turn on the power of all equipment.

9.4.3. Let the EUT work in test mode (Charging, ON (CW), ON (CCW)) and test it.

9.5. Test Procedure

9.5.1. 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.

9.5.2. Contact Discharge:

All procedure shall be the same as Section 9.5.1. except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

9.5.3. 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.

9.5.4. Indirect discharge for vertical coupling plane

At least 10 singles 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×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.

9.6. Test Results

PASS.

Please refer to the following page.

Electrostatic Discharge Test Results

EMTEK (SHENZHEN) CO., LTD.

Applicant	: Shanghai HOTO Technology Co., Ltd.		
EUT	: HOTO Electric Precision Screwdriver Set	Test Date	: 2021-06-23
M/N	: QWLSD010	Temperature	: 25.8°C
Power Supply	: DC 5V from adapter, DC 3.7V	Humidity	: 49%
Air discharge	: ± 8.0kV	Atmospheric Pressure	: 101kPa
Contact discharge:	: ± 4.0kV	Criterion	: B
Test Mode	: Charging, ON (CW), ON (CCW)		
Location	Kind A-Air Discharge C-Contact Discharge	Result	
TYPEC	C	A	
BUTTON/SLOT/TYPEC/METAL	A	A	
HCP of all sides	C	A	
VCP of front	C	A	
VCP of rear	C	A	
VCP of left	C	A	
VCP of right	C	A	
Note:			

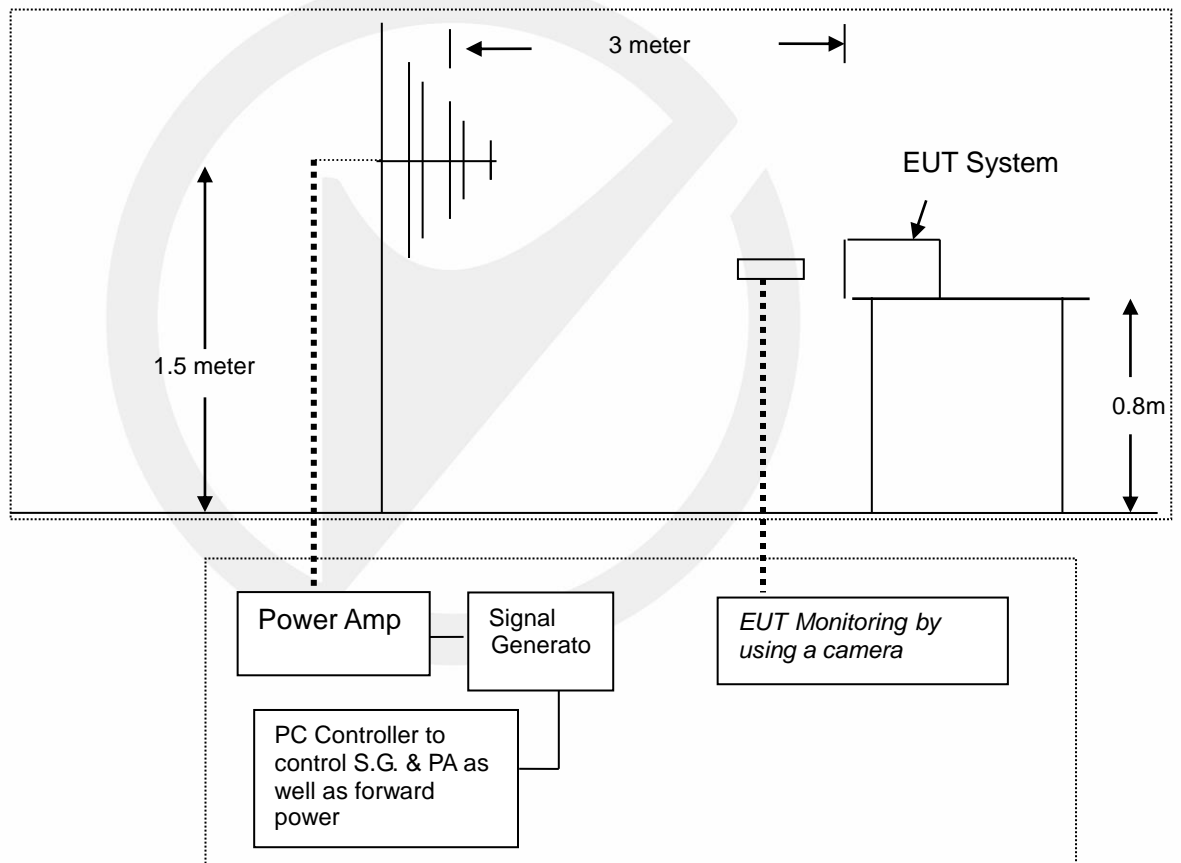
10. RF FIELD STRENGTH SUSCEPTIBILITY TEST

10.1. Block Diagram of Test Setup

10.1.1. Block diagram of EUT system



10.1.2. Block diagram of RS test setup



10.2. Test Standard

EN 55014-2:2015

(IEC 61000-4-3: 2006+A1: 2007+A2: 2010, Severity Level: 2, 3 V/m)

10.3. Severity Levels and Performance Criterion

10.3.1. Severity Levels

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

10.3.2. Performance Criterion: A

10.4. Operating Condition of EUT

10.4.1. Setup the EUT as shown on Section 10.1.

10.4.2. Turn on the power of all equipments.

10.4.3. Let the EUT work in measuring mode (ON (CW), ON (CCW)) and measure it.

10.5. Test Procedure

The EUT are placed on a table that is 0.8 meter high above the ground. The EUT is set 3 meters away from the transmitting antenna that 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 camera is used to monitor it.

All the scanning conditions are as following:

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

10.6. Test Results

PASS.

Please refer to the following page.

RF Field Strength Susceptibility Test Results

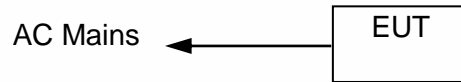
EMTEK (SHENZHEN) CO., LTD.

Applicant : Shanghai HOTO Technology Co., Ltd.		Test Date : 2021-06-23	
EUT : HOTO Electric Precision Screwdriver Set		Temperature : 20.7°C	
M/N : QWLSD010		Humidity : 46%	
Field Strength : 3 V/m		Criterion : A	
Power Supply : DC 3.7V		Frequency Range : 80MHz to 1000MHz	
Test Mode : ON (CW), ON (CCW)			
Modulation: <input type="checkbox"/> None <input type="checkbox"/>		Pulse <input type="checkbox"/> AM 1kHz 80%	
Frequency Rang 1: 80~ 1000MHz		Frequency Rang 2: N/A	
Steps	1%		
	Horizontal	Vertical	Vertical
Front	A	A	
Right	A	A	
Rear	A	A	
Left	A	A	
Test Equipment : 1. Signal Generator : N5181A (Agilent) 2. Power Amplifier : 80RF1000-175 (MILMEGA) & AS1860-50 (MILMEGA) 3. Log.-Per.Antenna: VULP9118E (SCHWARZBECK) 4. RF Power Meter. Dual Channel: 4232A (BOONTON) 5. Field Strength Meter: RSS1006A (DARE)			
Note:			

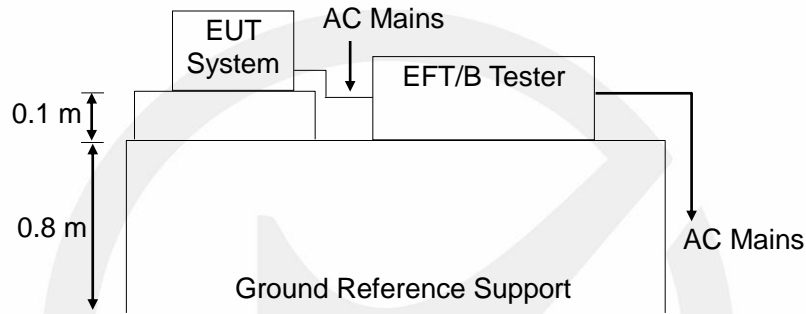
11. ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST

11.1. Block Diagram of Test Setup

11.1.1. Block Diagram of EUT System



11.1.2. EFT Test Setup



11.2. Test Standard

EN 55014-2:2015
(IEC 61000-4-4:2012, Severity Level: 2, 1kV)

11.3. Severity Levels and Performance Criterion

11.3.1. Severity level

Level	Open Circuit Output Test Voltage $\pm 10\%$	
	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

11.3.2. Performance criterion: B

11.4. Operating Condition of EUT

11.4.1. Setup the EUT as shown in Section 11.1.

11.4.2. Turn on the power of all equipment.

11.4.3. Let the EUT work in test mode (Charging) and test it.

11.5. Test Procedure

The EUT is put on the table that 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.

11.5.1. For input and output AC power ports:

The EUT is connected to the power mains by using a coupling device that 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.

11.5.2. For signal lines and control lines ports:

No I/O ports. It's unnecessary to test.

11.5.3. For DC output line ports:

It's unnecessary to test.

11.6. Test Results

PASS.

Please refer to the following page.

Electrical Fast Transient/Burst Test Results

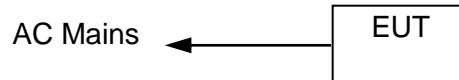
EMTEK (SHENZHEN) CO., LTD.

Applicant: <u>Shanghai HOTO Technology Co., Ltd.</u>		Test Date : <u>2021-06-23</u>	
EUT : <u>HOTO Electric Precision Screwdriver Set</u>		Temperature : <u>25.2°C</u>	
M/N : <u>QWLSD010</u>		Humidity : <u>51%</u>	
Power Supply : <u>DC 5V from adapter</u>		Criterion : <u>B</u>	
Test Mode : <u>Charging</u>			
Line : <input checked="" type="checkbox"/> AC Mains		Line : <input type="checkbox"/> Signal <input type="checkbox"/> I/O Cable	
Coupling : <input checked="" type="checkbox"/> Direct		Coupling : <input type="checkbox"/> Capacitive	
Test Time : 120s			
Line	Test Voltage	Result(+)	Result(-)
L	1kV	A	A
N	1kV	A	A
PE			
L、N	1kV	A	A
L、PE			
N、PE			
L、N、PE			
Signal Line			
DC Line			
Note:			
Test Equipment		Burst Tester Model : PEFT 4010	

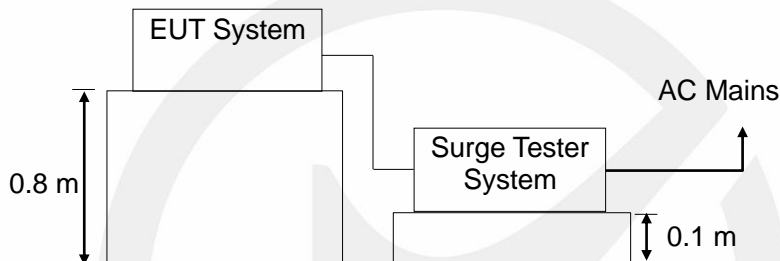
12. SURGE IMMUNITY TEST

12.1. Block Diagram of Test Setup

12.1.1. Block Diagram of EUT System



12.1.2. Surge Test Setup



12.2. Test Standard

EN 55014-2:2015
(IEC 61000-4-5:2014, Severity Level: Line to Line: Level 2, 1.0kV)

12.3. Severity Levels and Performance Criterion

12.3.1. Severity level

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

12.3.2. Performance criterion: B

12.4. Operating Condition of EUT

12.4.1. Setup the EUT as shown in Section 12.1.

12.4.2. Turn on the power of all equipment.

12.4.3. Let the EUT work in test mode (Charging) and test it.

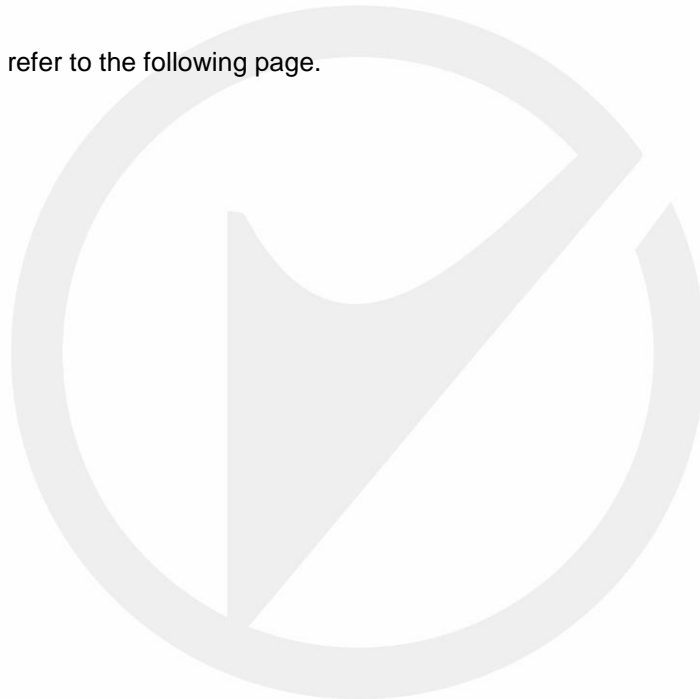
12.5. Test Procedure

- 1) Set up the EUT and test generator as shown on Section 12.1.2.
- 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.

12.6. Test Results

PASS.

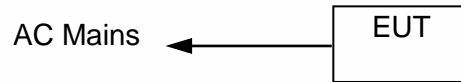
Please refer to the following page.



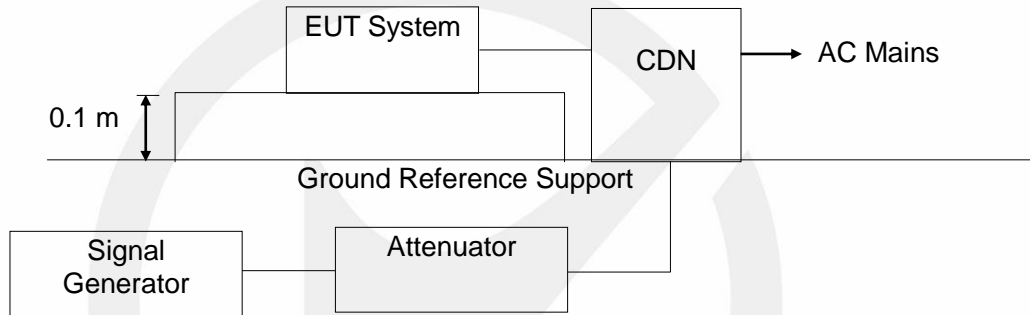
13. INJECTED CURRENTS SUSCEPTIBILITY TEST

13.1. Block Diagram of Test Setup

13.1.1. Block Diagram of EUT System



13.1.2. Block Diagram of Test Setup



13.2. Test Standard

EN 55014-2:2015
(IEC 61000-4-6:2013, Severity Level: Level 2, 3V (r.m.s.), 0.15MHz ~ 230MHz)

13.3. Severity Levels and Performance Criterion

13.3.1. Severity level

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

13.3.2. Performance criterion: A

13.4. Operating Condition of EUT

13.4.1. Setup the EUT as shown in Section 13.1.

13.4.2. Turn on the power of all equipment.

13.4.3. Let the EUT work in test mode (Charging) and test it.

13.5. Test Procedure

- 1) Set up the EUT, CDN and test generators as shown on Section 13.1.2.
- 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 to 230MHz 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.

13.6. Test Results

PASS.

Please refer to the following page.

Injected Currents Susceptibility Test Results

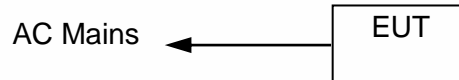
EMTEK (SHENZHEN) CO., LTD.

Applicant : <u>Shanghai HOTO Technology Co., Ltd.</u>				
EUT : <u>HOTO Electric Precision Screwdriver Set</u>			Test Date: <u>2021-06-23</u>	
M/N : <u>QWLSD010</u>			Temperature : <u>25.2°C</u>	
Power Supply : <u>DC 5V from adapter</u>			Humidity : <u>51%</u>	
Test Mode : <u>Charging</u>			Criterion : <u>A</u>	
Frequency Range (MHz)	Injected Position	Strength (Unmodulated)	Criterion	Result
0.15 ~ 230	AC Mains	3V	A	A
Test Mode : <u>N/A</u>				
Frequency Range (MHz)	Injected Position	Strength (Unmodulated)	Criterion	Result
Remark : 1. Modulation Signal:1kHz 80% AM Measurement Equipment : Simulator: CWS 500 (SWITZERLAND EMTEST) CDN : <input checked="" type="checkbox"/> CDN-M2 (SWITZERLAND EMTEST) <input type="checkbox"/> CDN-M3 (SWITZERLAND EMTEST)			Note:	

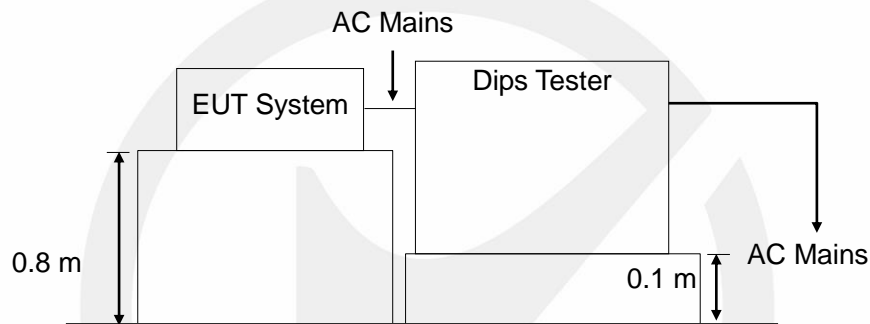
14. VOLTAGE DIPS AND INTERRUPTIONS TEST

14.1. Block Diagram of Test Setup

14.1.1. Block Diagram of EUT System



14.1.2. Dips Test Setup



14.2. Test Standard

EN 55014-2:2015(IEC 61000-4-11:2004)

14.3. Severity Levels and Performance Criterion

14.3.1. Severity level

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

14.3.2. Performance criterion: B & C

14.4. Operating Condition of EUT

- 14.4.1. Setup the EUT as shown in Section 14.1.
- 14.4.2. Turn on the power of all equipment.
- 14.4.3. Let the EUT work in test mode (Charging) and test it.

14.5. Test Procedure

- 1) Set up the EUT and test generator as shown on Section 14.1.2.
- 2) The interruption is introduced at selected phase angles with specified duration.
- 3) Record any degradation of performance.

14.6. Test Results

PASS.

Please refer to the following page.



Voltage Dips and Interruptions Test Results

EMTEK (SHENZHEN) CO., LTD.

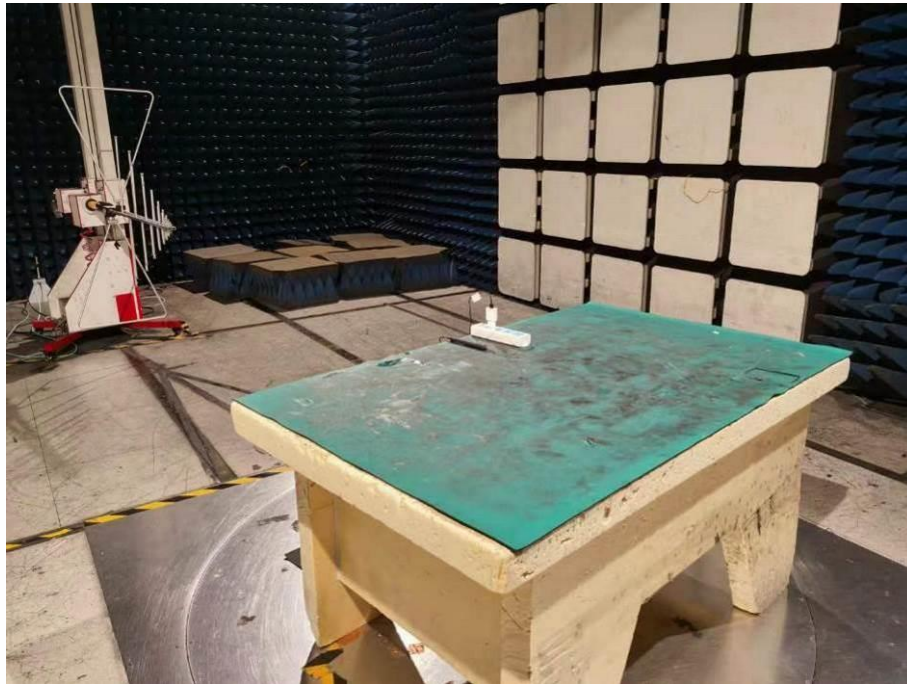
Applicant : <u>Shanghai HOTO Technology Co., Ltd.</u>				
EUT : <u>HOTO Electric Precision Screwdriver Set</u>			Test Date : <u>2021-06-23</u>	
M/N : <u>QWLSD010</u>			Temperature : <u>25.2°C</u>	
Power Supply : <u>DC 5V from adapter</u>			Humidity : <u>51%</u>	
Test Mode: <u>Charging</u>				
Test Level % U _T	Voltage Dips & Voltage Interruptions % U _T	Duration (in periods)	Criterion <input type="checkbox"/> A <input checked="" type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D	Result
0	100	0.5P	B	A
40	60	10P	C	A
70	30	25P	C	A
Note:				

15. PHOTOGRAPHS

15.1. Photos of Conducted Emission Measurement



15.2.Photo of Radiated Emission Measurement



15.3.Photo of Harmonic / Flicker Measurement



15.4.Photo of Electrostatic Discharge Test



15.5.Photo of RF Strength Susceptibility Test



15.6.Photo of Electrical Fast Transient / Burst Test



15.7.Photo of Surge Test



15.8.Photo of Injected Currents Susceptibility Test

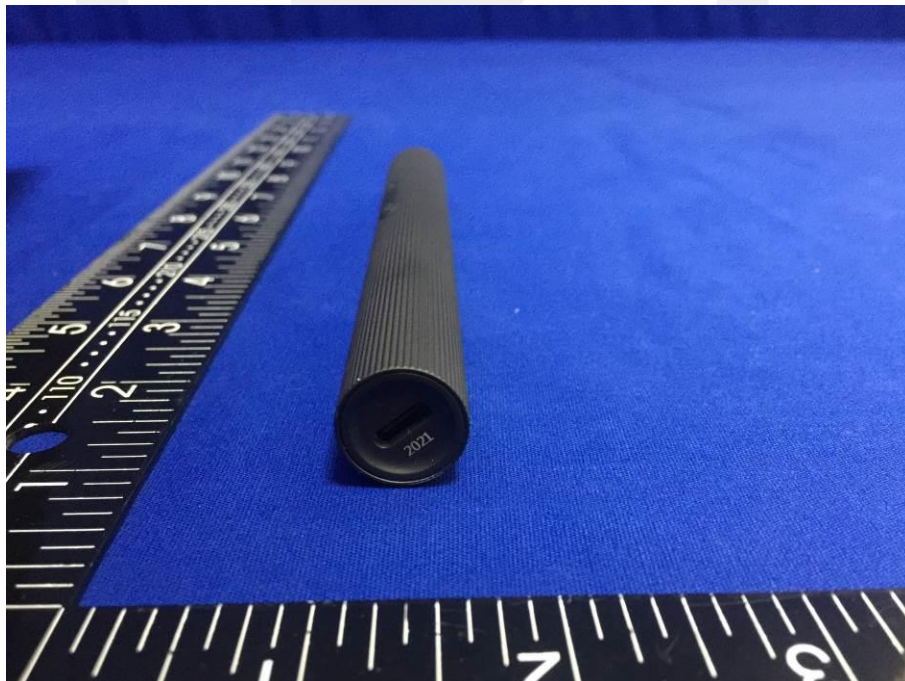
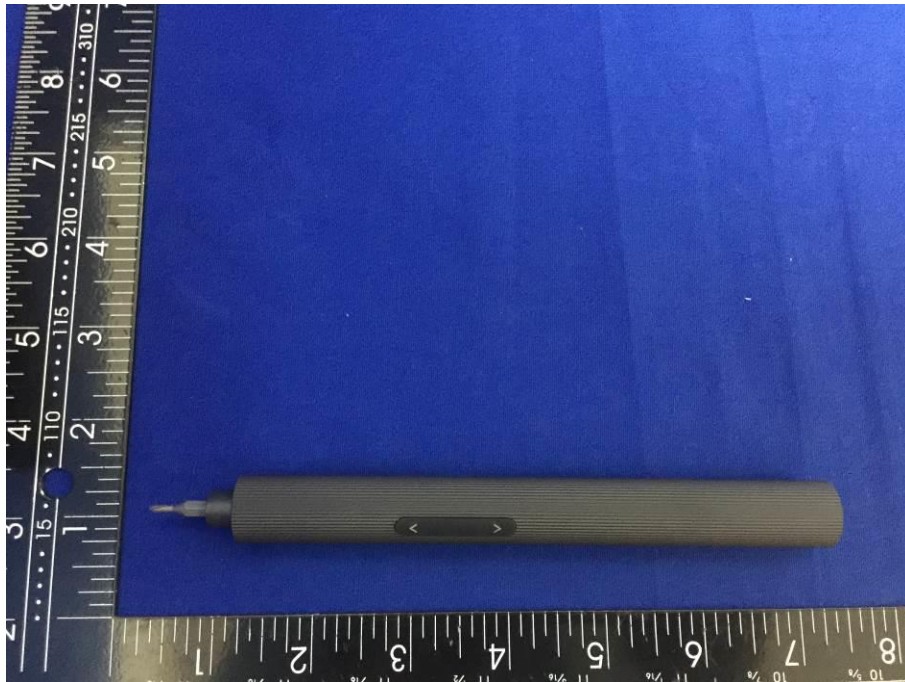


15.9.Photo of Voltage Dips and Interruption Test



APPENDIX: Photos of EUT







End of Report

Statement

- 1 . This report will be void without authorized signature or special seal for testing report.
- 2 . This report shall not be copied partly without authorization.
- 3 . The test results or observations are applicable only to tested sample. Client shall be responsible for representativeness of the sample and authenticity of the material.
- 4 . The observations or tests with special mark fall outside the scope of accreditation, and are only used for purpose of commission, research, training, internal quality control etc.
- 5 . The test results or observations are provided in accordance with measured value, without taking risks caused by uncertainty into account. Without explicit stipulation in special agreements, standards or regulations, EMTEK shall not assume any responsibility.
- 6 . Objections shall be raised within 20 days from the date receiving the report.