



Shenzhen CTL Testing Technology Co., Ltd.  
Tel: +86-755-89486194 E-Mail: ctl@ctl-lab.com

## TEST REPORT

EN 55014-1 / EN 55014-2

Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus.

Part 1: Emission / Part 2: Immunity – Product family standard

Report Reference No.....	CTL2007312128-E
Compiled by ( position+printed name+signature).....	File administrators Darben Pan
Supervised by ( position+printed name+signature).....	Technique principal Ivan Xie
Approved by ( position+printed name+signature).....	Manager Tracy Qi
Date of issue.....	Sep. 23, 2020
Testing Laboratory Name.....	Shenzhen CTL Testing Technology Co., Ltd
Address.....	Floor 1-A, Baisha Technology Park, No.3011, Shahexi Road, Nanshan District, Shenzhen, China 518055
Web.....	www.ctl-lab.com
Testing location/ procedure.....	Full application of Harmonised standards <input checked="" type="checkbox"/> Partial application of Harmonised standards <input type="checkbox"/> Other standard testing methods <input type="checkbox"/>
Applicant's name.....	TonKey Electrical Technology Co.Ltd
Address.....	12 building, nanling road, Shajing town, Baoan district, SZ city, GD, PRC
Test specification:	
Standard.....	EN 55014-1: 2017 EN 55014-2: 2015 EN 61000-3-2: 2019 EN 61000-3-3: 2013+A1: 2019
Non-standard test method.....	/
TRF Originator.....	Shenzhen CTL Testing Technology Co., Ltd
<b>Shenzhen CTL Testing Technology Co., Ltd</b> This publication may be reproduced in whole or in part for non-commercial purposes as long as the Shenzhen CTL Testing Technology Co., Ltd is acknowledged as copyright owner and source of the material. Shenzhen CTL Testing Technology Co., Ltd takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.	
Test item description.....	Heating pad
Trade Mark.....	N/A
Rating.....	AC 230V~240V
Result.....	Pass

**EMC -- TEST REPORT**

<b>Test Report No. :</b>	<b>CTL2007312128-E</b>	Sep. 23, 2020
		Date of issue

Equipment under Test : Heating pad

Model No. : SN-L

Listed Models : TK-HP3016, TK-HP2412, TK-HP1616, TK-HP1612, HB-L, FT-1616, FT-3016, FT-01A, SN-S

**Applicant** : **TonKey Electrical Technology Co.Ltd**

Address : 12 building, nanling road, Shajing town, Baoan district, SZ city, GD, PRC

**Manufacturer** : **OnKey Electronic Technology Co.Ltd**

Address : 4-5 Floor, A2 Building, No.639 FuSheng road, DaLang Town., DongGuan, GD. PRC

<b>Test Result</b>	<b>Pass</b>
--------------------	-------------

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.

## History of this test report

Report No.	Version	Description	Issued Date
CTL2007312128-E	V1.0	Initial Issued Report	Sep. 23, 2020

## Contents

<b>1. TEST STANDARDS .....</b>	<b>5</b>
<b>2. SUMMARY .....</b>	<b>6</b>
2.1. General Remarks.....	6
2.2. Equipment Under Test.....	6
2.3. Description of test modes.....	6
2.4. Short description of the Equipment under Test (EUT).....	6
2.5. Description of Support units.....	7
2.6. Performance level.....	7
<b>3. TEST ENVIRONMENT .....</b>	<b>8</b>
3.1. Address of the test laboratory.....	8
3.2. Test Facility.....	8
3.3. Test Description.....	9
3.4. Statement of the measurement uncertainty.....	9
3.5. Equipments Used during the Test.....	10
<b>4. TEST CONDITIONS AND RESULTS .....</b>	<b>12</b>
4.1. Conducted disturbance.....	12
4.2. Disturbance power.....	15
4.3. Harmonic current.....	17
4.4. Voltage fluctuations and flicker.....	20
4.5. Electrostatic discharge.....	22
4.6. Electrical fast transients / Burst.....	24
4.7. Surge.....	26
4.8. Conducted disturbances induced by radio-frequency fields.....	28
4.9. Voltage dips and short interruptions.....	30
<b>5. TEST SETUP PHOTOS .....</b>	<b>31</b>
<b>6. PHOTOS OF THE EUT .....</b>	<b>33</b>

## 1. TEST STANDARDS

The tests were performed according to following standards:

[EN 55014-1: 2017](#) Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus -- Part 1: Emission

[EN 55014-2: 2015](#) Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus -- Part 2: Immunity - Product family standard

[EN 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  $\leq 16$  A per phase and not subject to conditional connection



## 2.5. Description of Support units

The EUT has been tested as a dependent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

- - supplied by the manufacturer
- - supplied by the lab

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.

## 2.6. Performance level

### Definition related to the performance level:

- based on the used product standard
- based on the declaration of the manufacturer, requestor or purchaser

#### **Criterion A:**

Definition: normal performance within limits specified by the manufacturer, requestor or purchaser:

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:**

Definition: temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the equipment under test recovers its normal performance, without operator intervention:

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:**

Definition: temporary loss of function or degradation of performance, the correction of which requires operator intervention:

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.

### 3. TEST ENVIRONMENT

#### 3.1. Address of the test laboratory

Shenzhen CTL Testing Technology Co., Ltd.  
Floor 1-A, Baisha Technology Park, No. 3011, Shahexi Road, Nanshan, Shenzhen 518055 China

#### 3.2. Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

**Certificated by CNAS**

**Registration No.:CNAS L7497**

**Date of issue:Oct. 24, 2019**

**Valid until:Feb. 14, 2024**

**Certificated by A2LA, USA**

**Registration No.:4343.01**

**Date of registration: December 27, 2017**

#### **IC Registration No.: 9618B**

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration No.: 9618B on November 13, 2013.

#### **FCC-Registration No.: 399832**

Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 399832, December 08, 2017.



### 3.3. Test Description

Emission Measurement		
Conducted Disturbance	EN 55014-1: 2017	PASS
Power Clamp Radiation	EN 55014-1: 2017	PASS
Harmonic Current	EN 61000-3-2: 2019	PASS
Voltage Fluctuation and Flicker	EN 61000-3-3: 2013+A1: 2019	PASS
Immunity Measurement		
Electrostatic Discharge	EN 55014-2: 2015 EN 61000-4-2:2009	PASS
Electrical Fast Transient/Burst Test	EN 55014-2: 2015 EN 61000-4-4:2012	PASS
Surge Test	EN 55014-2: 2015 EN 61000-4-5: 2014+A1: 2017	PASS
Conducted Susceptibility Test	EN 55014-2: 2015 EN 61000-4-6:2014	PASS
Voltage Dips and Interruptions Test	EN 55014-2: 2015 EN 61000-4-11: 2014+A1: 2017	PASS

Remark:

1. The test result PASS and /or FAIL has no relationship with the measurement uncertainty.

### 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 Shenzhen CTL Testing Technology Co., Ltd. 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.

Hereafter the best measurement capability for CTL laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission(chamber 1)	30~1000MHz	±3.20dB	(1)
Radiated Emission(chamber 2)	30~1000MHz	±3.53dB	(1)
Radiated Emission	Above 1GHz	±4.32dB	(1)
Conducted Emission	0.15~30MHz	±2.66dB	(1)
Disturbance Power	30~300MHz	±2.90dB	(1)

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

### 3.5. Equipments Used during the Test

Conducted Emission						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	1166.5950.03	2020/05/18	2021/05/17
2	LISN	ROHDE & SCHWARZ	ESH2-Z5	860014/010	2020/05/15	2021/05/14
3	Limitator	HP	11947A	N/A	2020/05/15	2021/05/14
Software:						
Name of Software:				Version:		
ES-K1				V1.71		

Harmonic Current/ Voltage Fluctuation and Flicker						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1	Harmonic And Flicker Analyzer	Voltech	PM6000	N/A	2020/05/15	2021/05/14
Software:						
Name of Software:				Version:		
IEC61000-3 for PM6000				Release 1.24.12		

Electrostatic Discharge						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1	ESD Simulator	TESEQ AG	NSG 437	1058	2019/09/24	2020/09/23

Electrical Fast Transient/Surge/Dips						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1	Ultra Compact Simulator	HAEFELY	ECOMPACT4	174887	2019/09/23	2020/09/22
Software:						
Name of Software:				Version:		
EMV Check 2000				V1.27b		

Conducted Susceptibility (CS) :						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1	Conducted Disturbances test system	SCHLODER	CDG 6000	N/A	2020/05/15	2021/05/14
2	Amplifier	SCHLODER	4N100W-6DB	N/A	2020/05/15	2021/05/14
3	CDN	SCHLODER	CDN M2+M3	A2210225/2 013	2020/05/15	2021/05/14
Software:						
Name of Software:				Version:		
IEC/EN61000-4-6 Application software 10KHz Version				1.2.0(25.03.2013)		

Disturbance Power						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	1166.5950.03	2020/05/18	2021/05/17
2	Absorbing Clamp	Luthi	MDS 21	4035	2020/05/29	2021/05/28
Software:						
Name of Software:				Version:		
ES-K1				V1.71		

## Remark:

1. The test result PASS and /or FAIL has no relationship with the measurement uncertainty.

## 4. TEST CONDITIONS AND RESULTS

### 4.1. Conducted disturbance

For test instruments and accessories used see section 3.5.

#### 4.1.1. Description of the test location

Test location: Conduction Lab

#### 4.1.2. Limits of disturbance

##### General limits

Frequency range	Mains ports		Associated ports			
	Disturbance voltage		Disturbance voltage		Disturbance current	
MHz	Quasi-peak dB $\mu$ V	Average dB $\mu$ V	Quasi-peak dB $\mu$ V	Average dB $\mu$ V	Quasi-peak dB $\mu$ V	Average dB $\mu$ V
0.15 to 0.50	Decreasing linearly with the logarithm of the frequency from: 66 to 56		80	70	Decreasing linearly with the logarithm of the frequency from: 40 to 30	
0.50 to 5	56	46	74	64	30	20
5 to 30	60	50	74	64		

The lower limit applies at the transition frequencies.

##### Limits for mains port of tools

Frequency range	P $\leq$ 700 W		700W < P $\leq$ 1000 W		P > 1000 W	
	Quasi-peak dB $\mu$ V	Average dB $\mu$ V	Quasi-peak dB $\mu$ V	Average dB $\mu$ V	Quasi-peak dB $\mu$ V	Average dB $\mu$ V
0,15 to 0,35	Decreasing linearly with the logarithm of the frequency from: 66 to 59					
0,35 to 5	59	49	63	53	69	59
5 to 30	64	54	68	58	74	64

The lower limit applies at the transition frequencies.

**Key**  
P = rated power of the motor only.

Note: (1) The tighter limit shall apply at the edge between two frequency bands.

#### 4.1.3. Description of the test set-up

According to clause 5.2.2.2 in EN 55014-1: 2017 "the general principle to be followed in the application of the artificial hand is that the metal foil shall be wrapped around all handles" and "when the casing of the appliance is of insulating material, metal foil shall be wrapped round the handles", application of the artificial hand is used.

##### 4.1.3.1. Operating Condition

The EUT shall operate in the mode of operation described in Section 2.3, and the maximum emanating results are recorded.

#### 4.1.4. Test result

Frequency range	0.15-30MHz	Environmental conditions	Temperature	25°C
Detector function & Resolution bandwidth	Quasi-Peak, Average 9kHz		Humidity	55.0%RH

The requirements are **Fulfilled**

**Remarks:** The limits are kept. For detailed results, please see the following page(s).

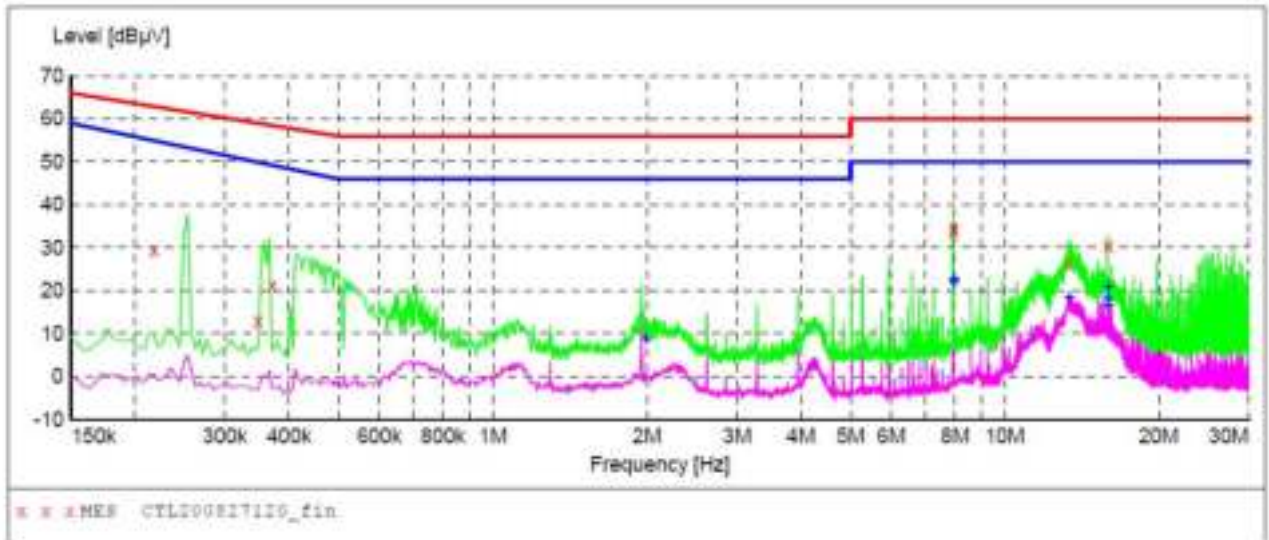
Shenzhen CTL Testing Technology Co., Ltd.

Voltage Mains Test EN 55014-1

EUT: SN-L  
 Manufacturer: OnKey Electronic Technology Co.Ltd  
 Operating Condition: WORKING  
 Test Site: /  
 Operator: ZGH  
 Test Specification: AC 230V/50Hz  
 Comment: /  
 Start of Test: 2020-8-27 / 10:47:14

SCAN TABLE: "Voltage (9K-30M)FIN"

Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "CTL200827120\_fin"

2020-8-27 10:50

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.217500	29.40	11.2	63	33.5	QP	L1	GND
0.348000	12.90	11.2	59	46.1	QP	L1	GND
0.370500	21.10	11.2	59	37.4	QP	L1	GND
7.948500	33.80	11.0	60	26.2	QP	L1	GND
7.957500	34.60	11.0	60	25.4	QP	L1	GND
13.357500	26.10	10.9	60	33.9	QP	L1	GND
15.922500	30.60	11.0	60	29.4	QP	L1	GND

MEASUREMENT RESULT: "CTL200827120\_fin2"

2020-8-27 10:50

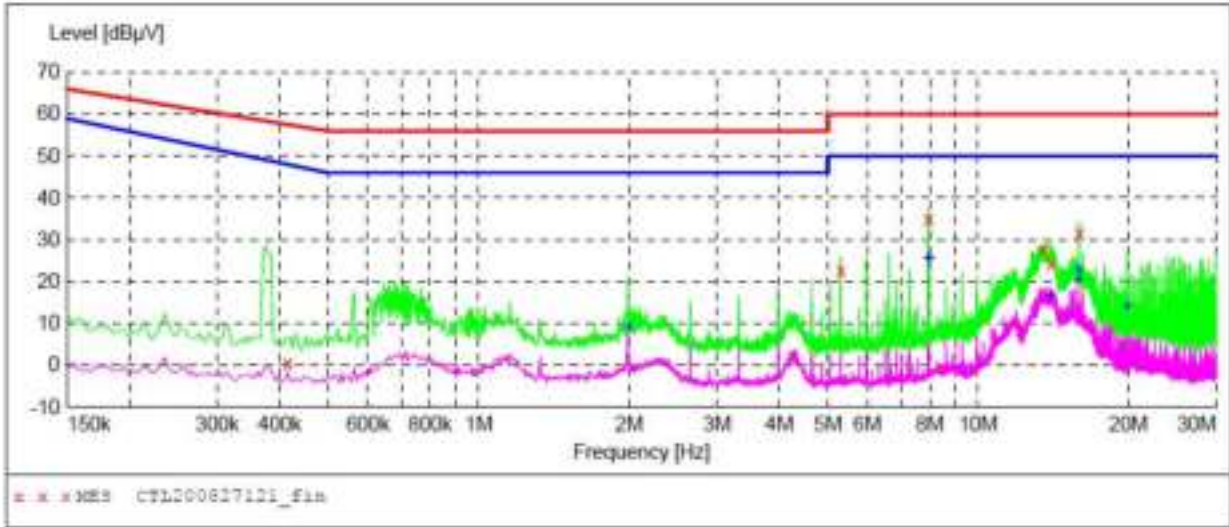
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
1.995000	8.80	11.2	46	37.2	AV	L1	GND
7.953000	21.90	11.0	50	28.1	AV	L1	GND
7.957500	22.90	11.0	50	27.1	AV	L1	GND
13.362000	18.30	10.9	50	31.7	AV	L1	GND
15.895500	16.50	11.0	50	33.5	AV	L1	GND
15.900000	18.10	11.0	50	31.9	AV	L1	GND
15.927000	21.00	11.0	50	29.0	AV	L1	GND

Shenzhen CTL Testing Technology Co., Ltd.

Voltage Mains Test EN 55014-1

EUT: SN-L  
 Manufacturer: OnKey Electronic Technology Co.Ltd  
 Operating Condition: WORKING  
 Test Site: /  
 Operator: SGH  
 Test Specification: AC 230V/50Hz  
 Comment: /  
 Start of Test: 2020-8-27 / 10:54:22

SCAN TABLE: "Voltage (9K-30M)FIN"  
 Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "CTL200827121\_fin"

2020-8-27 10:56

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.415500	0.50	11.2	58	57.0	QP	N	GND
5.307000	22.80	11.2	60	37.2	QP	N	GND
7.962000	35.10	11.0	60	24.9	QP	N	GND
13.497000	27.70	10.9	60	32.3	QP	N	GND
13.983000	24.30	10.9	60	35.7	QP	N	GND
15.927000	31.80	11.0	60	28.2	QP	N	GND

MEASUREMENT RESULT: "CTL200827121\_fin2"

2020-8-27 10:56

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
1.995000	9.10	11.2	46	36.9	AV	N	GND
7.962000	25.30	11.0	50	24.7	AV	N	GND
7.966500	25.80	11.0	50	24.2	AV	N	GND
13.902000	16.50	10.9	50	33.5	AV	N	GND
15.927000	20.50	11.0	50	29.5	AV	N	GND
15.931500	22.80	11.0	50	27.2	AV	N	GND
19.918500	14.10	11.2	50	35.9	AV	N	GND



### 4.2. Disturbance power

For test instruments and accessories used see section 3.5.

#### 4.2.1. Description of the test location

Test location: Conduction Lab

#### 4.2.2. Limits of disturbance

Frequency range	General		Tools					
			P ≤ 700 W		700 W < P ≤ 1 000 W		P > 1 000 W	
MHz	Quasi-peak dBpW	Average dBpW	Quasi-peak dBpW	Average dBpW	Quasi-peak dBpW	Average dBpW	Quasi-peak dBpW	Average dBpW
30 to 300	Increasing linearly with the frequency from:							
	45 to 55	35 to 45	45 to 55	35 to 45	49 to 59	39 to 49	55 to 65	45 to 55

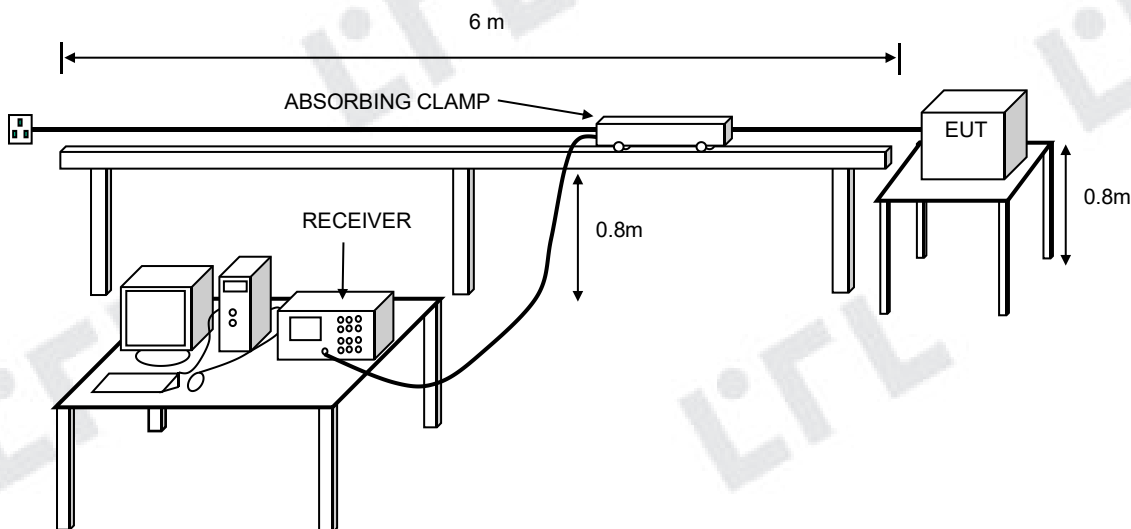
**Key**  
P = rated power of the motor only.

The EUT shall be also deemed to comply with the requirement of this standard in the frequency range from 300 MHz to 1 000 MHz without further testing if both conditions 1) and 2) below are fulfilled:

- 1) the disturbance power emission from the EUT is lower than the limits of the above table reduced by the values of the follow Table;
- 2) the maximum clock frequency is less than 30 MHz

Frequency range	General		Tools					
			P ≤ 700 W		700 W < P ≤ 1 000 W		P > 1 000 W	
MHz	Quasi-peak dBpW	Average dBpW	Quasi-peak dBpW	Average dBpW	Quasi-peak dBpW	Average dBpW	Quasi-peak dBpW	Average dBpW
200 to 300	Increasing linearly with the frequency from:							
	0 to 10	0	0 to 10	0	0 to 10	0	0 to 10	0

#### 4.2.3. Description of the test set-up



#### 4.2.4. Test result

<b>Frequency range</b>	30-300MHz	<b>Environmental conditions</b>	<b>Temperature</b>	25°C
<b>Detector function &amp; Resolution bandwidth</b>	Quasi-Peak 120kHz		<b>Humidity</b>	55.0%RH

The requirements are **Fulfilled**  
**Remarks:** The limits are kept. For detailed results, please see the following page(s).

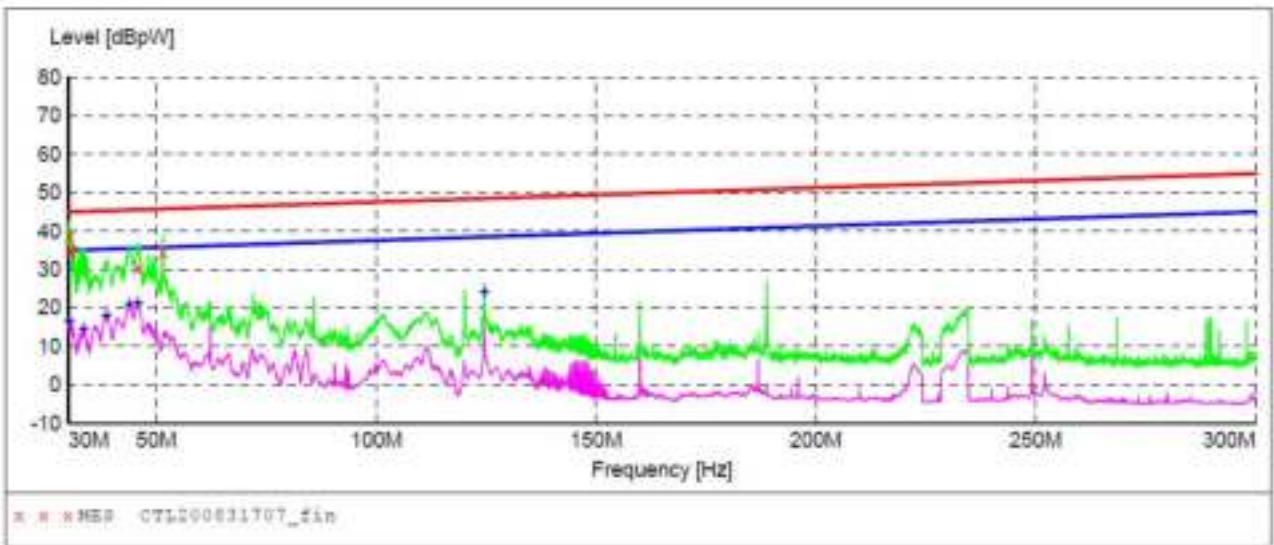
Shenzhen CTL Testing Technology Co., Ltd

Power Clamp Test EN 55014-1

EUT: SN-L  
 Manufacturer: OnKey Electronic Technology Co.Ltd  
 Operating Condition: WORKING  
 Test Site: /  
 Operator: ZGH  
 Test Specification: AC 230V/50Hz  
 Comment: /  
 Start of Test: 2020-8-31 / 11:44:33

SCAN TABLE: "POWER(30M-300M) FIN"

Short Description:



MEASUREMENT RESULT: "CTL200831707\_fin"

2020-8-31 11:46

Frequency MHz	Level dBpW	Transd dB	Limit dBpW	Margin dB	Det.	Position cm
30.180000	38.80	0.8	45	6.2	QP	0.0
30.480000	35.00	0.8	45	10.0	QP	0.0
30.780000	34.90	0.8	45	10.1	QP	0.0
45.900000	30.20	3.9	46	15.4	QP	0.0
51.480000	34.60	3.8	46	11.2	QP	0.0

MEASUREMENT RESULT: "CTL200831707\_fin2"

2020-8-31 11:46

Frequency MHz	Level dBpW	Transd dB	Limit dBpW	Margin dB	Det.	Position cm
30.180000	16.80	0.8	35	18.2	AV	0.0
33.480000	14.50	1.0	35	20.6	AV	0.0
38.640000	18.10	3.1	35	17.2	AV	0.0
43.800000	20.90	3.8	36	14.6	AV	0.0
45.780000	21.40	3.9	36	14.2	AV	0.0
124.560000	24.20	-1.9	39	14.3	AV	0.0



### 4.3. Harmonic current

. For test instruments and accessories used see section 3.5.

#### 4.3.1. Description of the test location

Test location: Harmonic & Flicker Test Room

#### 4.3.2. Limits of harmonic current

Test configuration and procedure see clause 7.1 of standard EN 61000-3-2:2019

#### 4.3.3. Description of the test set-up

The EUT shall operate in the mode of operation described in Section 2.3, and the maximum emanating results are recorded.

#### 4.3.4. Test result

The requirements are **Fulfilled**

**Remarks:** The limits are kept. For detailed results, please see the following page(s).

<b>Product:</b> SN-L <b>Serial no:</b> <b>Description:</b> <b>Test Date:</b> 2020 Aug 28 13:47 <b>Result Name:</b>		2020 Aug 28 13:51 Page 1 of 1	
<b>Type of Test:</b> EN61000-2006 Harmonics inc. interharmonics to EN61000-4-7:2002 <b>Limits:</b> Class A <b>Power Analyzer:</b> Voltech PM6000 SN: 200006700717 Firmware version: v1.22.07RC6 Channel(s): 1. SN: 090015502540, 26 Adjusted Date: 20 JUN 2013 2. SN: None Adjusted Date: None 3. SN: None Adjusted Date: None 4. SN: None Adjusted Date: None 5. SN: None Adjusted Date: None 6. SN: None Adjusted Date: None Start(s): 1. SN: 091024303146, 4 Adjusted Date: 20 JUN 2013 2. SN: None Adjusted Date: None 3. SN: None Adjusted Date: None 4. SN: None Adjusted Date: None 5. SN: None Adjusted Date: None 6. SN: None Adjusted Date: None		<b>AC Source:</b> Mains / Manual Source	
<b>Harmonic Results Against Chosen Limits:</b>  <div style="font-size: 2em; color: green; text-align: center;"><b>PASS</b></div>		<b>Notes:</b>	
<b>Test Parameter Details</b>		<b>User Entered</b>	
Operating Frequency:		50	49.9840
Operating Voltage:		230	230.6568
Specified Power:		0.0000	107.7966
Fundamental Current:		0.1600	0.4833
Power Factor:		0.5860	0.9232
Average Input Current:			0.3789
Maximum POHC:			0.0091
POHC Limit:			0.2514
Maximum THC:			0.0808
Minimum Power:		75	
Class Multiplier:		1.0000	
Test Duration:		00:02:30	

<b>CTL</b>		2020 Aug 28 13:51 Page 1 of 1
Product:	SN-L	
Serial no:		
Description:		
Result Name:		
Voltech IEC61000-3 Windows Software 1.24.12		Test Date: 2020 Aug 28 13:47
Type of Test:	Fluctuating Harmonics Test - Worst Case Table (2006)	
Power Analyzer:	Voltech PM6000 SN: 200006700717 Firmware version: v1.22.07RC6	
Channel(s):	1. SN: 090015502540, 20 Adjusted Date: 20 JUN 2013 2. SN: None Adjusted Date: None	
	3. SN: None Adjusted Date: None 4. SN: None Adjusted Date: None	
	5. SN: None Adjusted Date: None 6. SN: None Adjusted Date: None	
Shunt(s):	1. SN: 091024303148, 4 Adjusted Date: 20 JUN 2013 2. SN: None Adjusted Date: None	
	3. SN: None Adjusted Date: None 4. SN: None Adjusted Date: None	
	5. SN: None Adjusted Date: None 6. SN: None Adjusted Date: None	
AC Source:	Mains / Manual Source	
Overall Result:	PASS	

Class	Class A
Class Multiplier	1

Harmon	Limit 1	Limit 2	Average Reading	<L1 <L2	Max Reading	<L2	Pass FAIL	Harmon	Limit 1	Limit 2	Average Reading	<L1 <L2	Max Reading	<L2	Pass FAIL
2	1.0800A	1.5200A	51.34mA	✓✓	64.56mA	✓	Pass	3	2.3000A	3.4500A	23.31mA	✓✓	28.11mA	✓	Pass
4	430.0mA	645.0mA	15.58mA	✓✓	20.11mA	✓	Pass	5	1.1400A	1.7100A	12.63mA	✓✓	15.23mA	✓	Pass
6	300.0mA	450.0mA	9.661mA	✓✓	12.62mA	✓	Pass	7	770.0mA	1.1500A	5.217mA	✓✓	10.91mA	✓	Pass
8	230.0mA	345.0mA	7.275mA	✓✓	9.300mA	✓	Pass	9	490.0mA	690.0mA	7.072mA	✓✓	8.445mA	✓	Pass
10	184.0mA	276.0mA	5.665mA	✓✓	7.422mA	✓	Pass	11	330.0mA	495.0mA	6.094mA	✓✓	7.486mA	✓	Pass
12	153.0mA	230.0mA	4.774mA	N/A	6.298mA	✓	Pass	13	210.0mA	315.0mA	5.224mA	✓✓	6.209mA	✓	Pass
14	131.4mA	157.1mA	4.059mA	N/A	5.320mA	✓	Pass	15	150.0mA	225.0mA	4.659mA	N/A	5.262mA	✓	Pass
16	115.0mA	172.5mA	3.995mA	N/A	4.711mA	N/A	N/A	17	132.3mA	198.5mA	4.161mA	N/A	4.750mA	N/A	N/A
18	102.2mA	153.3mA	3.165mA	N/A	4.201mA	N/A	N/A	19	118.4mA	177.6mA	3.675mA	N/A	4.234mA	N/A	N/A
20	92.00mA	138.0mA	2.869mA	N/A	3.750mA	N/A	N/A	21	97.1mA	145.7mA	3.403mA	N/A	3.840mA	N/A	N/A
22	83.63mA	125.4mA	2.612mA	N/A	3.410mA	N/A	N/A	23	97.62mA	146.7mA	3.012mA	N/A	3.474mA	N/A	N/A
24	76.66mA	115.0mA	2.433mA	N/A	3.136mA	N/A	N/A	25	90.00mA	135.0mA	2.900mA	N/A	3.360mA	N/A	N/A
26	70.78mA	106.1mA	2.225mA	N/A	2.899mA	N/A	N/A	27	83.33mA	125.0mA	2.475mA	N/A	2.588mA	N/A	N/A
28	65.71mA	98.57mA	2.070mA	N/A	2.678mA	N/A	N/A	29	77.58mA	116.3mA	2.443mA	N/A	2.620mA	N/A	N/A
30	61.33mA	92.00mA	1.943mA	N/A	2.531mA	N/A	N/A	31	72.58mA	108.8mA	2.184mA	N/A	2.562mA	N/A	N/A
32	57.50mA	86.25mA	1.831mA	N/A	2.395mA	N/A	N/A	33	68.18mA	102.2mA	2.141mA	N/A	2.577mA	N/A	N/A
34	54.11mA	81.17mA	1.732mA	N/A	2.259mA	N/A	N/A	35	64.28mA	96.42mA	1.964mA	N/A	2.362mA	N/A	N/A
36	51.11mA	76.66mA	1.639mA	N/A	2.149mA	N/A	N/A	37	60.61mA	91.21mA	1.899mA	N/A	2.189mA	N/A	N/A
38	48.42mA	72.63mA	1.569mA	N/A	2.075mA	N/A	N/A	39	57.03mA	86.53mA	1.748mA	N/A	2.026mA	N/A	N/A
40	46.00mA	69.00mA	1.492mA	N/A	1.967mA	N/A	N/A								

<L1 : Reading is below limit 1

<L2 : Reading is below limit 2

N/A : Harmonic current below 0.6% of rated current or 5mA, whichever is greater, are disregarded.

#### 4.4. Voltage fluctuations and flicker

For test instruments and accessories used see section 3.5.

##### 4.4.1. Description of the test location

Test location: Harmonic & Flicker Test Room

##### 4.4.2. Limits of Voltage Fluctuation and Flicker

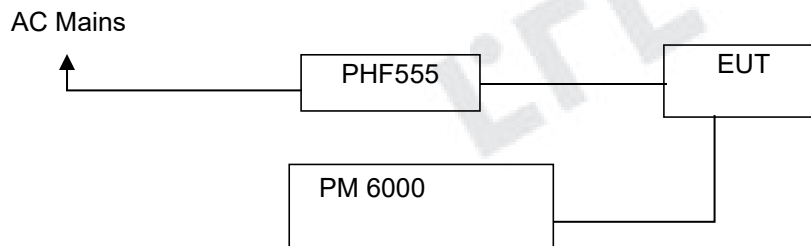
Test configuration and procedure see clause 5 of standard EN 61000-3-3: 2013+A1: 2019.

##### 4.4.3. Description of the test set-up

###### 4.4.3.1. Operating Condition

The EUT shall operate in the mode of operation described in Section 2.3, and the maximum emanating results are recorded.

###### 4.4.3.2. Configuration of test setup



##### 4.4.4. Test result

The requirements are **Fulfilled**

**Remarks:** The limits are kept. For detailed results, please see the following page(s).

<b>CTL</b>	
Product: SN-L	2020 Aug 28 16:01
Serial no:	Page 1 of 1
Description:	
Result Name:	
Voltech IEC61000-3 Windows Software 1.24.12	Test Date: 2020 Aug 28 13:52
Type of Test: Flickermeter Test - Table	
Power Analyzer: Voltech PM6000 SN: 200006700717 Firmware Version: v1.22.07RC6	
Channel(s):	
1. SN: 000015502540, 20 Adjusted Date: 20 JUN 2013 2. SN: None Adjusted Date: None	
3. SN: None Adjusted Date: None 4. SN: None Adjusted Date: None	
5. SN: None Adjusted Date: None 6. SN: None Adjusted Date: None	
Shunt(s):	
1. SN: 001024303148, 4 Adjusted Date: 20 JUN 2013 2. SN: None Adjusted Date: None	
3. SN: None Adjusted Date: None 4. SN: None Adjusted Date: None	
5. SN: None Adjusted Date: None 6. SN: None Adjusted Date: None	
AC Source: Mains / Manual Source	
Overall Result:	Notes:
<b>PASS</b>	Pit test duration 120 minutes Measurement method - Voltage

	Pit
Limit	0.650
Reading	0.474

	Pst	dc (%)	dmax (%)	d(t) > 3.3%(ms)
Limit	1.000	3.300	4.000	500
Reading 1	0.483	0.000	0.633	0
Reading 2	0.483	0.000	0.636	0
Reading 3	0.485	0.000	0.638	0
Reading 4	0.484	0.000	0.632	0
Reading 5	0.483	0.000	0.638	0
Reading 6	0.484	0.000	0.632	0
Reading 7	0.482	0.000	0.626	0
Reading 8	0.483	0.000	0.633	0
Reading 9	0.485	0.000	0.630	0
Reading 10	0.484	0.000	0.632	0
Reading 11	0.484	0.000	0.629	0
Reading 12	0.317	0.000	0.629	0

## 4.5. Electrostatic discharge

For test instruments and accessories used see section 3.5.

### 4.5.1. Description of the test location and date

Test location: 1# EMC Test Room

Date of test: Aug. 31, 2020

Operator: Pan

### 4.5.2. Severity levels of electrostatic discharge

4.5.2.1. Severity level: Contact Discharge at  $\pm 4\text{KV}$  Air Discharge at  $\pm 8\text{KV}$

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

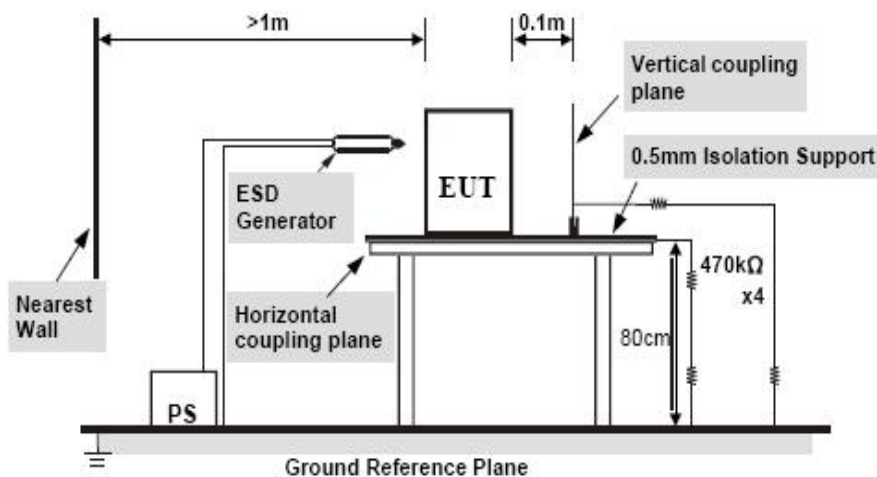
4.5.2.2. Performance criterion: B

### 4.5.3. Description of the test set-up

4.5.3.1. Operating Condition

The EUT shall operate in the mode of operation described in Section 2.3, and the results of the maximum susceptibility are recorded.

4.5.3.2. Test set-up



**4.5.4. Test specification:**Contact discharge voltage:

- 2 kV
- 4 kV

Air discharge voltage:

- 2 kV
- 4 kV
- 8 kV

Events(every polarity) /per point:

- 10

Time between events:

- 1 s

Type of discharge:

- Direct discharge
  - Air discharge
  - Contact discharge
- Indirect discharge
  - Contact discharge

Polarity:

- Positive
- Negative

Discharge location:

- all external locations accessible by hand
- horizontal coupling plane (HCP)
- vertical coupling plane (VCP)

**4.5.5. Test result**

<b>Environmental conditions</b>	<b>Temperature</b>	24°C
	<b>Humidity</b>	51.0%RH

The requirements are **Fulfilled**Performance Criterion: **B****Remarks:** During the test no deviation was detected to the selected operation mode(s).

#### 4.6. Electrical fast transients / Burst

For test instruments and accessories used see section 3.5.

##### 4.6.1. Description of the test location and date

Test location: 2# EMC Test Room

Date of test: Aug. 31, 2020

Operator: Pan

##### 4.6.2. Severity levels of electrical fast transients / Burst

4.6.2.1. Severity level:  $\pm 1000V$  for AC power supply lines

Open circuit output test voltage and repetition rate of the impulses		
Level	On power port, PE	
	V peak(KV)	Repetition rate (KHz)
1.	0.5	5 or 100
2.	1	5 or 100
3.	2	5 or 100
4.	4	5 or 100
X	Special	Special

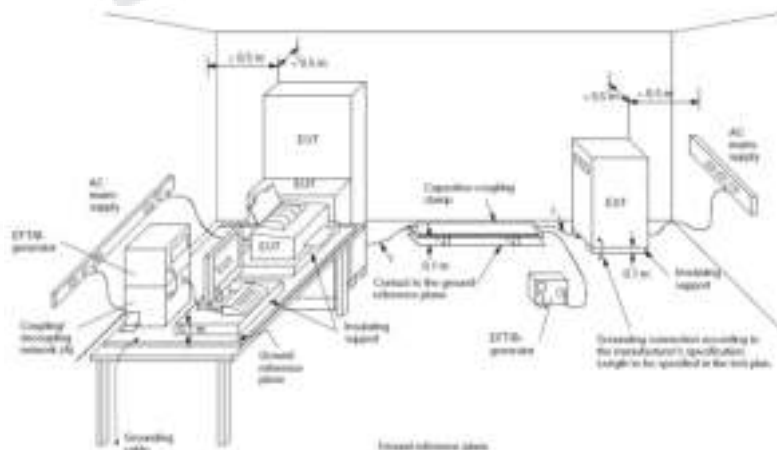
4.6.2.2. Performance criterion: B

##### 4.6.3. Description of the test set-up

4.6.3.1. Operating Condition

The EUT shall operate in the mode of operation described in Section 2.3, and the results of the maximum susceptible results are recorded.

4.6.3.2. Test set-up





**4.6.4. Test specification:**Coupling network:
 0.5 kV     1 kV     2 kV
Coupling clamp:
 0.5 kV     1 kV
Burst frequency:
 5.0 kHz
Coupling duration:
 120 s
Polarity:
 positive                       negative
**4.6.5. Coupling points**

Cable description:

AC power line : L, N, L+N

Screening:

 screened                       unscreened

Status:

 passive                       active

Signal transmission:

 analogue                       digital

Length:

 0.8 m
**4.6.6. Test result**

Environmental conditions	Temperature	25°C
	Humidity	55.0%RH

The requirements are **Fulfilled**Performance Criterion: **B**
**Remarks:**    During the test no deviation was detected to the selected operation mode(s).



**4.7.4. Test specification:**

Pulse amplitude-Power line sym.:  
Source impedance: 2  $\Omega$

0.5 kV     1 kV     2 kV     4 kV

Pulse amplitude-Power line unsym.:  
Source impedance: 12  $\Omega$

0.5 kV     1 kV     2 kV     4 kV

Number of surges:

5 Surges/Phase angle

Phase angle:

0 °     90 °     180 °     270 °

Repetition rate:

60 s

Polarity:

positive     negative

**4.7.5. Coupling points**

Cable description:

AC power line: L+N

Screening:

screened     unscreened

Status:

passive     active

Signal transmission:

analogue     digital

Length:

0.8 m

**4.7.6. Test result**

Environmental conditions	Temperature	25°C
	Humidity	55.0%RH

The requirements are **Fulfilled**

Performance Criterion: **B**

**Remarks:**

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

#### 4.8. Conducted disturbances induced by radio-frequency fields

For test instruments and accessories used see section 3.5.

##### 4.8.1. Description of the test location date

Test location: 3# EMC Test Room

Date of test: Sep. 02, 2020

Operator: Pan

##### 4.8.2. Severity levels of conducted disturbances induced by radio-frequency fields

4.8.2.1. Severity Level: 3V

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

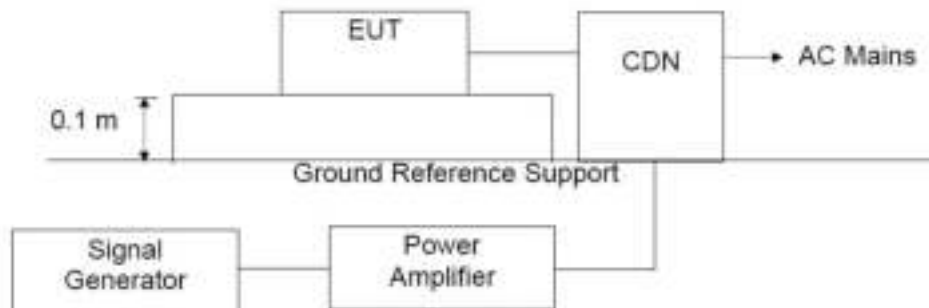
4.8.2.2. Performance criterion: A

##### 4.8.3. Description of the test set-up

4.8.3.1. Operating Condition

The EUT shall operate in the mode of operation described in Section 2.3, and the results of the maximum susceptible results are recorded.

4.8.3.2. Test set-up



##### 4.8.4. Test specification:

Frequency range:

- 0.15 MHz to 230 MHz

Test voltage:

- 3 V

Modulation:

- AM: 80 %
- sinusoidal 1000Hz

Frequency step:

- 1 % with 1 s dwell time

#### 4.8.5. Coupling points

Cable description (Port1):

AC power line

Screening:

screened

unscreened

Status:

passive

active

Signal transmission:

analogue

digital

Length:

0.8 m

#### 4.8.6. Test result

Environmental conditions	Temperature	25°C
	Humidity	55.0%RH

The requirements are **Fulfilled**

Performance Criterion: **A**

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



## 5. Test Setup Photos

DISTURBANCE POWER TEST



CONDUCTION EMISSION TEST(0.15MHz-30MHz)



HARMONIC & FLICKER TEST



ESD TEST



EFT TEST&SURGE TEST&VOLTAGE DIPS AND INTERRUPTIONS TEST



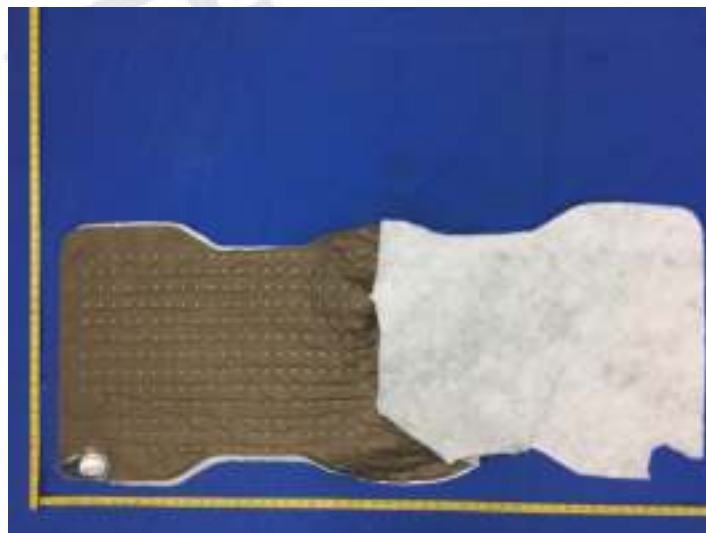
CONDUCTED SUSCEPTIBILITY TEST

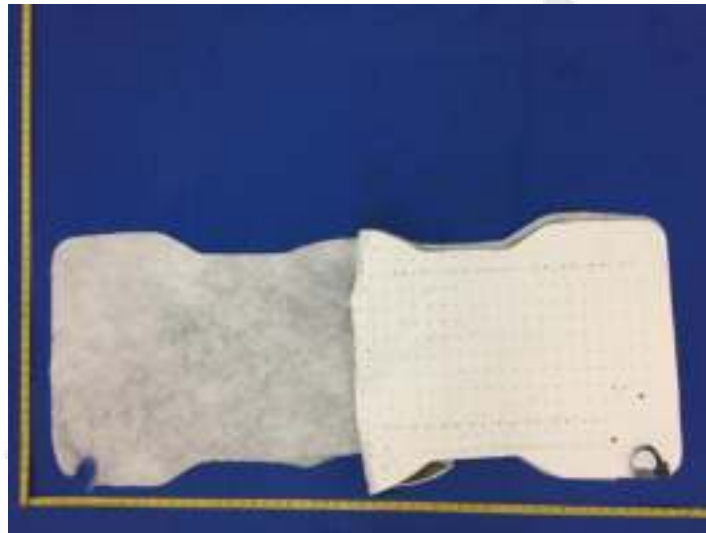


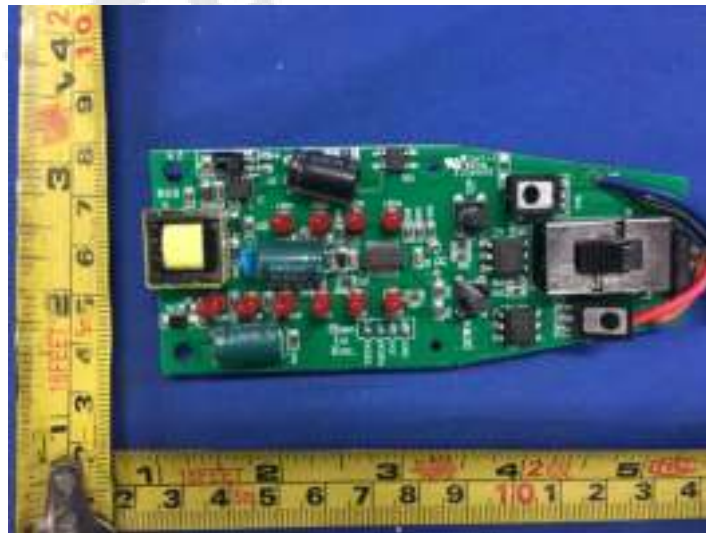
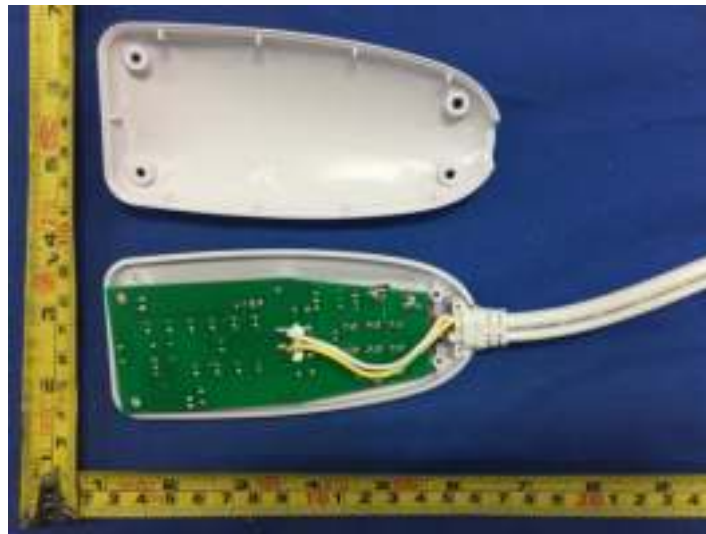


## 6. Photos of the EUT

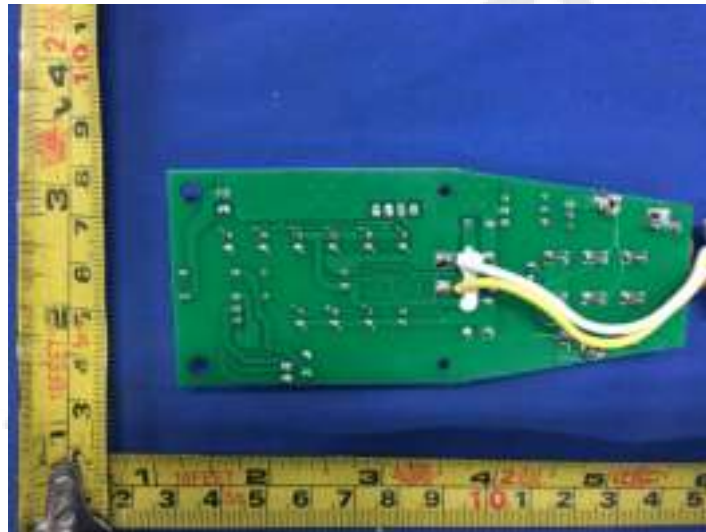












FT-01A, 50W



FT-1616, 50W



FT-3016, 120W



HB-L, 50W



SN-S, 60W



TK-HP1612, 50W



TK-HP1616, 50W



TK-HP2412, 75W



TK-HP3016, 120W

.....**End of Report**.....