

# Yuyao Tongtai Electric Co., Ltd.

# TEST REPORT

## SCOPE OF WORK:

EMC directive (2014/30/EU) – EMC report

## Model:

FT2001, details refer to Page 7

## REPORT NUMBER

171101667SHA-001/Amendment1

## ISSUE DATE

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## DOCUMENT CONTROL NUMBER

TTRF55014-01\_V1  
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## Summary

The equipment complies with the requirements according to the following standard(s) or Specification:

**\*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 61000-3-2:2014**: Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current  $\leq 16A$  per phase)

**EN 61000-3-3:2013**: 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  $\leq 16A$  per phase and not subject to conditional connection

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### Revision History

Report No.	Version	Description	Issued Date
171101667SHA-V1	Rev. 01	Initial issue of report	February 08, 2018

## Measurement result summary

TEST ITEM	TEST RESULT	NOTE
Mains terminal continuous disturbance voltage	Pass	
Mains terminal discontinuous disturbance voltage/click	Pass	
Continuous disturbance power	Pass	
Radiated Emission <sup>(1)</sup>	Pass	
Harmonics	Pass	
Voltage fluctuation-Flicker	Pass	
Electrostatic Discharge (ESD)	Pass	
RF electromagnetic field susceptibility	NA	
Electric Fast Transient /Burst (EFT/B)	Pass	
Surge	Pass	
Injected Current	Pass	
Voltage dips and interruption	Pass	

Notes:

1. The item(s) in "bold & italic" means the additional tests has been performed, and test result will be listed in the ANNEX of this amendment report.
2. NA=Not Applicable.
3. Determination of the test conclusion is based on IEC Guide 115 in consideration of measurement uncertainty.

<sup>(1)</sup> As for in the disturbance power test all emission readings from the EUT are lower than the applicable limits (Table 7) reduced by the margin (Table 8) and the maximum clock frequency is less than 30MHz, the EUT is deemed to comply with the Radiated Emission requirement without test.

## 1. GENERAL INFORMATION

### 1.1 Description of Equipment Under Test (EUT)

Product name : Toaster for household use

Type/Model : FT2001, FT2001-T, FT2001-BW, FT2001-T-BW, FT2001A, FT2001A-T, FT2001A-BW, FT2001A-T-BW, FT2001B, FT2001B-T, FT2001B-BW, FT2001B-T-BW, FT2002, FT2002-BW, FT2002-T, FT2002-T-BW, FT2003, FT2003-T, FT2003-FL, FT2003-BW, FT2003-T-BW, FT2003-T-FL, FT2003-FL-BW, FT2003-T-FL-BW, FT2003A, FT2003A-T, FT2003A-BW, FT2003A-T-BW, FT2004, FT2004-BW, FT2004-FL, FT2004-FL-BW, FT2004-T, FT2004-T-BW, FT2004-T-FL, FT2004-T-FL-BW, FT4003, FT4003-BW, FT4003-FL, FT4003-FL-BW, FT4003-T, FT4003-T-BW, FT4003-T-FL, FT4003-T-FL-BW

Description of EUT : The appliances covered in this test report are considered as toasters intended to household and indoor use. All models incorporate bare heating element, integrated circuit, all-pole disconnection switch. FT2001 series, FT2001B series are same except for minor different shape of top metal. FT2001 series, FT2001A series are same except for different control PCB, so do FT2003 series and FT2003A series. FT2001 series, FT2003 series are same except for different appearance, so do FT2001A series and FT2003A series. FT4003 series has two more slots than FT2003 series. Suffix “-T” in the model name indicates the model has a PCB with metal shrapnel switch. Suffix “-BW” in the model name indicates the model employed a device for heating rolls. Suffix “-FL” in the model name for FT2003 series, FT2004 series, FT4003 series indicates the model has a PCB with 3 LED lights, and without suffix “-FL” in the model name for FT2003 series, FT2004 series, FT4003 series indicates the model has a PCB with 2 LED lights.

Rating : 220-240V~, 50/60Hz, Class I  
FT2001, FT2001-T, FT2001-BW, FT2001-T-BW, FT2001A, FT2001A-T, FT2001A-BW, FT2001A-T-BW, FT2001B, FT2001B-T, FT2001B-BW, FT2001B-T-BW, FT2003, FT2003-T, FT2003-FL, FT2003-BW, FT2003-T-BW, FT2003-T-FL, FT2003-FL-BW, FT2003-T-FL-BW, FT2003A, FT2003A-T, FT2003A-BW, FT2003A-T-BW: 650-750W;  
FT2002, FT2002-BW, FT2002-T, FT2002-T-BW : 700-850W;  
FT4003, FT4003-BW, FT4003-FL, FT4003-FL-BW, FT4003-T, FT4003-T-BW, FT4003-T-FL, FT4003-T-FL-BW: 1300-1500W  
FT2004, FT2004-BW, FT2004-FL, FT2004-FL-BW, FT2004-T, FT2004-T-BW, FT2004-T-FL, FT2004-T-FL-BW: 750-900W

Brand name : NIL

Mains lead : 0.8m, (un)shielded, (non)detachable

Data cable : /

EUT type :  Table-top  
 Floor standing

EUT is toy, defined as  Category A  
 Category B  
 Category C  
 Category D  
 Category E

Sample received date : September 12, 2018

Sample Identification : /  
No.

Date of test : September 12, 2018- September 25, 2018

**Amendment 1:**

The original test report ref. No. 171101667SHA-001 dated February 08, 2018 was modified on October 16, 2018 to include the following additions and/or changes:

- (1) "\*" means the standard has been updated by the new standards listed in this report, and there is no difference on this kind of products between the new standard and the old one. No additional testing is required accordingly.
- (2) Added 37 models: FT2001-T, FT2001-BW, FT2001-T-BW, FT2001A-T, FT2001A-BW, FT2001A-T-BW, FT2001B-T, FT2001B-BW, FT2001B-T-BW, FT2002-BW, FT2002-T, FT2002-T-BW, FT2003-T, FT2003-FL, FT2003-BW, FT2003-T-BW, FT2003-T-FL, FT2003-FL-BW, FT2003-T-FL-BW, FT2003A-T, FT2003A-BW, FT2003A-T-BW, FT2004, FT2004-BW, FT2004-FL, FT2004-FL-BW, FT2004-T, FT2004-T-BW, FT2004-T-FL, FT2004-T-FL-BW, FT4003-BW, FT4003-FL, FT4003-FL-BW, FT4003-T, FT4003-T-BW, FT4003-T-FL, FT4003-T-FL-BW. All models have the similar construction and critical component, some characteristic as following: Suffix "-T" in the model name indicates the model has a PCB with metal shrapnel switch. Suffix "-BW" in the model name indicates the model employed a device for heating rolls. Suffix "-FL" in the model name for FT2003 series, FT2004 series, FT4003 series indicates the model has a PCB with 3 LED lights, and without suffix "-FL" in the model name for FT2003 series, FT2004 series, FT4003 series indicates the model has a PCB with 2 LED lights.

Therefore, we test FT2004 and the worst test data is listed in the report as representative. This amendment test report should be read in conjunction with the based test report.



## 1.2 Description of Test Facility

Name : Intertek Testing Services Shanghai

Address : Building 86, No. 1198 Qinzhou Road(North), Shanghai 200233, P.R. China

Telephone : 86 21 61278200

Telefax : 86 21 54262353

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

- CNAS Accreditation Lab  
Registration No. CNAS L0139
- FCC Accredited Lab  
Designation Number: CN1175
- IC Registration Lab  
Registration code No.: 2042B-1
- VCCI Registration Lab  
Registration No.: R-4243, G-845, C-4723, T-2252
- NVLAP Accreditation Lab  
NVLAP LAB CODE: 200849-0
- A2LA Accreditation Lab  
Certificate Number: 3309.02

## 2. TEST SPECIFICATIONS

### 2.1 Normative Standards

IEC 61000-4-2:2008: Electromagnetic Compatibility (EMC) – Part 4-2: testing and measurement techniques – electrostatic discharge immunity test

IEC 61000-4-3:2006+A1:2007+A1:2010: Electromagnetic Compatibility (EMC) – Part 4-3: testing and measurement techniques – radiated, radio frequency, electromagnetic field immunity test

IEC 61000-4-4:2012: Electromagnetic Compatibility (EMC) – Part 4-4: testing and measurement techniques – electric fast transient/burst immunity test

IEC 61000-4-5:2014: Electromagnetic Compatibility (EMC) – Part 4-5: testing and measurement techniques – section 5: surge immunity test

IEC 61000-4-6:2013: Electromagnetic Compatibility (EMC) – Part 4-6: testing and measurement techniques – section 6: immunity to conducted disturbance, induced by radio frequency field

IEC 61000-4-11:2004: Electromagnetic Compatibility (EMC) – Part 4-11: testing and measurement techniques –voltage dips, short interruption and voltage variations immunity test

IEC 61000-4-22:2010: Electromagnetic compatibility (EMC) – Part 4-22: Testing and measurement techniques – Radiated emissions and immunity measurements in fully anechoic rooms (FARs)

**Note: there are no magnetic sensitive components included in this EUT and magnetic field immunity test according to EN 61000-4-8 is therefore not required.**

## 2.2 Mode of operation during the test

Within this test report, EUT was tested under all available operation modes and tested under its rating voltage and frequency. Other voltage and frequency is specified if used.

## 2.3 Test Peripherals used

Item No	Description	Band and Model	S/No
1	-	-	-

## 2.4 Record of climatic conditions

Test Item	Temperature (°C)	Relative Humidity (%)	Pressure (Kpa)
Mains terminal continuous disturbance voltage	24	42	NA
Mains terminal discontinuous disturbance voltage/click	24	42	NA
Continuous disturbance power	24	42	NA
Radiated Emission	NA	NA	NA
Harmonics	24	42	NA
Voltage fluctuation-Flicker	24	42	NA
Electrostatic Discharge (ESD)	23	41	101
RF electromagnetic field susceptibility	NA	NA	NA
Electric Fast Transient /Burst (EFT/B)	23	41	NA
Surge	23	41	NA
Injected Current	23	41	NA
Voltage dips and interruption	23	41	NA

Notes: NA =Not Applicable

## 2.5 Instrument list

Conducted Emission/Disturbance Power/Tri-loop Test/CDN method					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
<input checked="" type="checkbox"/>	Test Receiver	R&S	ESCS 30	EC 2107	2019-09-12
<input checked="" type="checkbox"/>	A.M.N.	R&S	ESH2-Z5	EC 3119	2019-07-17
<input type="checkbox"/>	A.M.N.	R&S	ENV 216	EC 3393	2019-07-04
<input type="checkbox"/>	A.M.N.	R&S	ENV4200	EC 3558	2019-06-10
<input checked="" type="checkbox"/>	Absorbing clamp	R&S	MDS 21	EC 2108	2019-06-19
<input type="checkbox"/>	CDN	Frankonia	CDN M2M316	EC 5969	2019-03-15
<input type="checkbox"/>	CDN	Schaffner	CDN M316	EC 2113-1	2019-07-16
<input type="checkbox"/>	Attenuator	Weinschel	68-6-44	EC 3043-9	2019-02-05
<input type="checkbox"/>	Tri-loop	Schwarzbeck	HXYZ 9170	EC 3384	2018-10-11
<input type="checkbox"/>	Voltage Probe	Schwarzbeck	TK9420	EC 4888	2019-09-11
<input type="checkbox"/>	Current probe	R&S	EZ-17	EC 3221	2019-03-14
<input type="checkbox"/>	I.S.N.	FCC	FCC-TLISN-T2-02	EC 3754	2019-02-05
<input type="checkbox"/>	I.S.N.	FCC	FCC-TLISN-T4-02	EC 3755	2019-02-05
<input type="checkbox"/>	I.S.N.	FCC	FCC-TLISN-T8-02	EC 3756	2019-02-05
Radiated Emission					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
<input type="checkbox"/>	Test Receiver	R&S	ESIB 26	EC 3045	2019-09-12
<input type="checkbox"/>	Bilog Antenna	TESEQ	CBL 6112D	EC 4206	2019-06-10
<input type="checkbox"/>	Pre-amplifier	R&S	Pre-amp 18	EC5262	2019-06-10
<input type="checkbox"/>	Horn antenna	R&S	HF 906	EC 3049	2018-11-17
<input type="checkbox"/>	Horn antenna	ETS	3117	EC 4792-1	2019-01-09
<input type="checkbox"/>	Horn antenna	TOYO	HAP18-26W	EC 4792-3	2019-07-09
<input type="checkbox"/>	Pre-amplifier	R&S	Pre-amp 18	EC5262	2019-06-10
<input type="checkbox"/>	Active loop antenna	Schwarzbeck	FMZB1519	EC 5345	2019-03-07
Harmonics / Flicker / Low-frequency immunity test					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
<input type="checkbox"/>	Harmonic-flicker	CI	5001ix-PACS-1	EC 2110	2018-11-08
<input checked="" type="checkbox"/>	Three phase Harmonic-flicker system	EM TEST	PFS 503N	EC 5383-1	2019-09-10
		EM TEST	DPA 503N	EC 5383	2019-01-31
ESD					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
<input checked="" type="checkbox"/>	ESD generator	TESEQ	NSG 437	EC 4792-4	2019-03-22

EFT/Surge Voltage Dips					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
<input checked="" type="checkbox"/>	Conduct immunity system	EM TEST	UCS 500M6B	EC 2958	2019-04-07
<input checked="" type="checkbox"/>	Automatic transformer	EM TEST	MV2616	EC 2957	2019-04-07
<input type="checkbox"/>	Capacity clamp	EM TEST	HFK	EC 2959	2019-02-13
<input type="checkbox"/>	Surge generator	EM TEST	TSS 500M2F	EC 2960	2019-08-07
<input type="checkbox"/>	Surge generator	EM TEST	TSS 500M4	EC 2961	2019-01-05
<input type="checkbox"/>	Surge Coupling network	EM TEST	CNV 504M	EC 2958-2	2019-02-05
<input type="checkbox"/>	Surge Coupling network	EM TEST	CNV 504S1	EC 2958-1	2019-02-05
<input type="checkbox"/>	DIPs generator	SANKI	SKS-1130GT	EC 5033	2019-01-04
<input type="checkbox"/>	Ring wave generator	SANKI	SKS-1206GB	EC 5033-1	2019-01-04
<input type="checkbox"/>	EFT generator	SANKI	SKS-0404IB	EC 5033-3	2019-03-08
<input type="checkbox"/>	Surge generator	SANKI	SKS-0506GB-30	EC 5033-2	2019-03-08
Conducted Immunity					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
<input checked="" type="checkbox"/>	Signal generator	R&S	SML 01	EC 2338	2019-09-10
<input checked="" type="checkbox"/>	Power amplifier	AR	75A250	EC 3043-1	2019-07-15
<input checked="" type="checkbox"/>	Attenuator	EM TEST	ATT6/75	EC 3043-3	2019-02-05
<input checked="" type="checkbox"/>	CDN	Frankonia	CDN M2M316	EC 5969	2019-03-15
<input type="checkbox"/>	CDN	Schaffner	CDN M316	EC 2113-1	2019-07-29
<input type="checkbox"/>	CDN	EM TEST	CDN T2	EC 4970	2019-09-06
<input type="checkbox"/>	CDN	EM TEST	CDN T4	EC 3043-4	2019-02-05
<input type="checkbox"/>	CDN	EM TEST	CDN M1/16A	EC 4792-6	2018-10-08
<input type="checkbox"/>	CDN	EM TEST	CDN M1/16A	EC 4792-7	2019-09-06
<input type="checkbox"/>	CDN	EM TEST	CDN M1/32A	EC4792-10	2019-02-05
<input type="checkbox"/>	CDN	EM TEST	CDNM3N/16A	EC 4792-12	2019-02-05
<input type="checkbox"/>	CDN	EM TEST	CDNM3N/32A	EC 4792-13	2019-02-05
<input type="checkbox"/>	CDN	EM TEST	CDN T8-RJ45	EC 4792-15	2019-09-06
<input type="checkbox"/>	EM clamp	EM TEST	EM 101	EC 3043-6	2018-12-07
<input type="checkbox"/>	DDC	AR	DC 2600	EC 3043-5	2019-02-05
Radiated Immunity					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
<input type="checkbox"/>	Signal generator	R&S	SMR 20	EC 3044-1	2019-02-23

<input type="checkbox"/>	Power amplifier	AR	250W1000B	EC 5818-2	2019-04-19
<input type="checkbox"/>	Power amplifier	BONN	BLMA1060-100	EC 5818-4	2019-04-18
<input type="checkbox"/>	Log-period antenna	AR	AT 1080	EC 3044-7	2019-01-03
<input type="checkbox"/>	Horn antenna	AR	AT 4002	EC 3044-8	2018-11-30
<input type="checkbox"/>	Horn antenna	Schwarzbeck	STLP 9149	EC5881	2019-06-19
<input type="checkbox"/>	Field meter	AR	FL7006	EC 5818-1	2019-05-10
<input type="checkbox"/>	Power sensor	Keysight	N1914A	EC 5818-3	2019-04-18
<b>RF test</b>					
<b>Used</b>	<b>Equipment</b>	<b>Manufacturer</b>	<b>Type</b>	<b>Internal no.</b>	<b>Due date</b>
<input type="checkbox"/>	PXA Signal Analyzer	Keysight	N9030A	EC 5338	2019-03-05
<input type="checkbox"/>	Power sensor	Agilent	U2021XA	EC 5338-1	2019-03-05
<input type="checkbox"/>	Vector Signal Generator	Agilent	N5182B	EC 5175	2019-03-05
<input type="checkbox"/>	Spectrum analyzer	R&S	CMW500	EC5944	2018-12-07
<input type="checkbox"/>	MXG Analog Signal Generator	Agilent	N5181A	EC 5338-2	2019-03-05
<input type="checkbox"/>	Mobile Test System	Litepoint	lqxel	EC 5176	2019-01-05
<input type="checkbox"/>	Test Receiver	R&S	ESCI 7	EC 4501	2019-09-12
<b>Test Site</b>					
<b>Used</b>	<b>Equipment</b>	<b>Manufacturer</b>	<b>Type</b>	<b>Internal no.</b>	<b>Due date</b>
<input checked="" type="checkbox"/>	Shielded room	Zhongyu	-	EC 2838	2019-01-07
<input checked="" type="checkbox"/>	Shielded room	Zhongyu	-	EC 2839	2019-01-14
<input type="checkbox"/>	Semi-anechoic chamber	Albatross project	-	EC 3048	2019-05-24
<input type="checkbox"/>	Fully-anechoic chamber	Albatross project	-	EC 3047	2019-05-24
<b>Additional instrument</b>					
<b>Used</b>	<b>Equipment</b>	<b>Manufacturer</b>	<b>Type</b>	<b>Internal no.</b>	<b>Due date</b>
<input type="checkbox"/>	Spectrum analyzer	Agilent	E7402A	EC 2254	2019-09-12
<input checked="" type="checkbox"/>	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 2323	2019-06-07
<input checked="" type="checkbox"/>	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 3324	2019-04-15
<input checked="" type="checkbox"/>	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 3325	2019-03-28
<input checked="" type="checkbox"/>	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 3326	2019-03-28
<input checked="" type="checkbox"/>	Pressure meter	YM3	Shanghai Mengde	EC 3320	2019-06-27
<b>Discontinuous Disturbance Voltage</b>					
<b>Used</b>	<b>Equipment</b>	<b>Manufacturer</b>	<b>Type</b>	<b>Internal no.</b>	<b>Due date</b>

<input checked="" type="checkbox"/>	Click meter	AFJ	DDA55	EC 5320	2019-03-08
<input checked="" type="checkbox"/>	A.M.N.	AFJ	LS16C	EC 5320-1	2018-12-07
<input checked="" type="checkbox"/>	Shielded room	Zhongyu	-	EC 2838	2019-01-07

## 2.6 Measurement Uncertainty

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted emission at mains ports	9kHz ~ 150kHz	3.52 dB
	150kHz ~ 30MHz	3.19 dB
Continuous disturbance voltage at telecom ports	150kHz ~ 30MHz	3.64 dB
Continuous disturbance current at telecom ports	150kHz ~ 30MHz	2.62 dB
Mains terminal discontinuous disturbance voltage/click	-	3.76 dB
Continuous disturbance power	30MHz ~ 300MHz	4.35 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	4.90 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.02 dB
	6GHz ~ 18GHz	5.28 dB
Harmonic current emission	-	3.90%
Voltage fluctuations and flicker	-	10.34%
ESD	-	6.65%
Radiated susceptibility	-	2.38%
EFT test at main terminal	-	11.57%
EFT test at signal/telecom terminal	-	11.62%
Surge test at main terminal	-	11.57%
Injected current test at main terminal	-	1.88 dB
Injected current test at unshielded signal terminal	-	3.41 dB
Voltage dips and interruption	-	6.05%



## Emission Test

### 3. Mains/Load/Control Terminal Continuous Disturbance Voltage

**Test result:                      PASS**

#### 3.1 Terminal Voltage Limits for the frequency range 9kHz to 30MHz

##### 3.1.1 General limits

Frequency range (MHz)	Mains ports		Associated ports			
	Disturbance voltage		Disturbance voltage		Disturbance current	
	Limits dB(μV) Quasi-peak    Average		Limits dB(μV) Quasi-peak    Average		Limits dB(μV) Quasi-peak    Average	
0.15 ~ 0.5	66 ~ 56 *	59 ~ 46 *	80	70	40 ~ 30 *	30 ~ 20 *
0.5 ~ 5.0	56	46	74	64	30	20
5.0 ~ 30	60	50	74	64		

Notes:  
 1. \* means the limit decreasing linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.  
 2. If the quasi-peak measurements meet the average limit, the EUT shall be deemed to meet both limits and the measurements using the average detector need not be carried out.

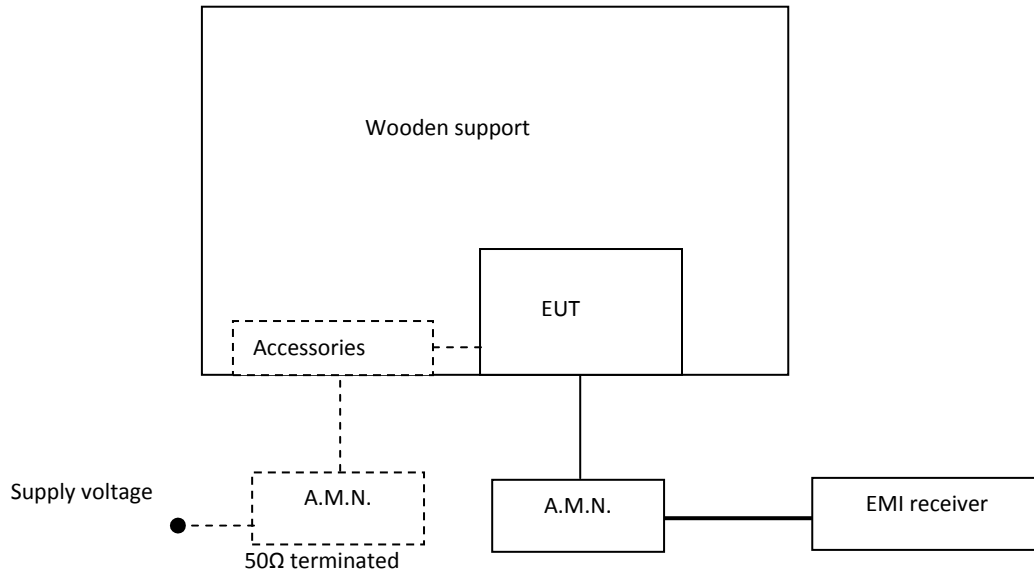
##### 3.1.2 Limits for mains port of tools

Frequency range (MHz)	P ≤ 700 W		700 W < P ≤ 1 000 W		P > 1 000 W	
	Limits dB(μV)		Limits dB(μV)		Limits dB(μV)	
	Quasi-peak	Average	Quasi-peak	Average	Quasi-peak	Average
0.15-0.35	66-59*	59-49*	70-63*	63-53*	76-69*	69 ~ 59 *
0.35-5	59	49	63	53	69	59
5-30	64	54	68	58	74	64

Notes:  
 1. \* means the limit decreasing linearly with the logarithm of the frequency in the range 0.15MHz to 0.35MHz.  
 2. If the quasi-peak measurements meet the average limit, the EUT shall be deemed to meet both limits and the measurements using the average detector need not be carried out.

### 3.2 Block Diagram of Test Setup

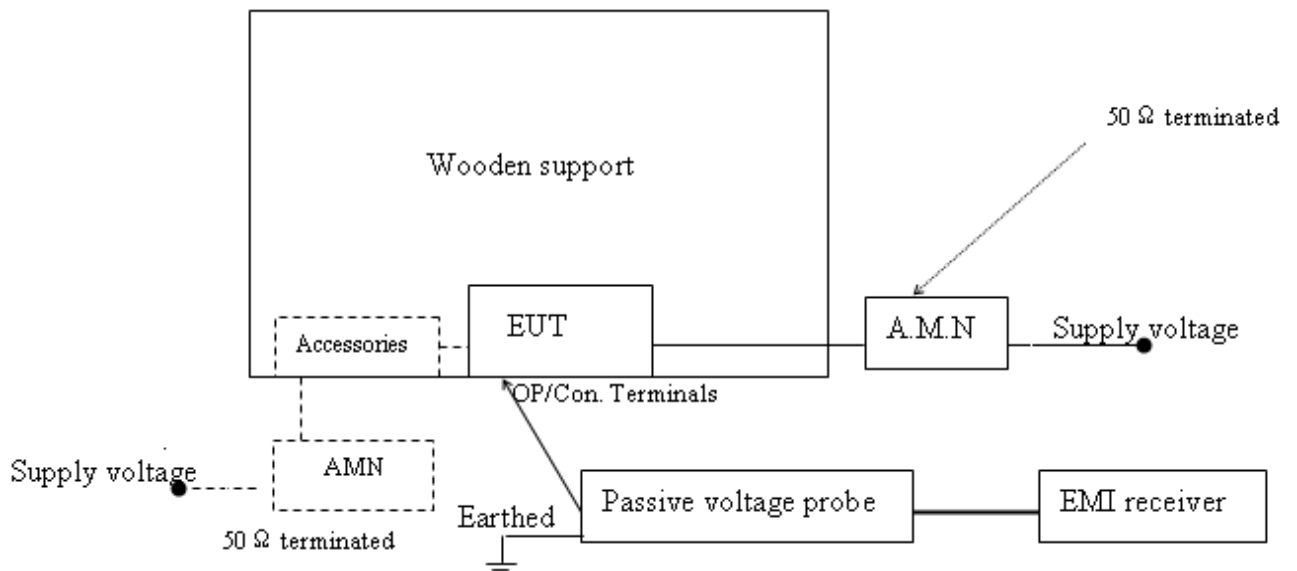
At mains terminal



For table top equipment, wooden support is 0.8m height table

For floor standing equipment, wooden support is 0.1m height rack.

At Associated ports



Note:   
 ————— : power line  
 ————— : signal line  
 - - - - - : means the test setup while available

### **3.3 Test Setup and Test Procedure**

Measurement was performed in shielded room, and instruments used were according to clause 5.1 of EN 55014-1 if applicable.

Detailed test procedure and arrangement was according to clause 5.2 of EN 55014-1.

Measurement methods was according to clause 5.4 of EN 55014-1.

Operation conditions of EUT was according to clause 6 of EN 55014-1.

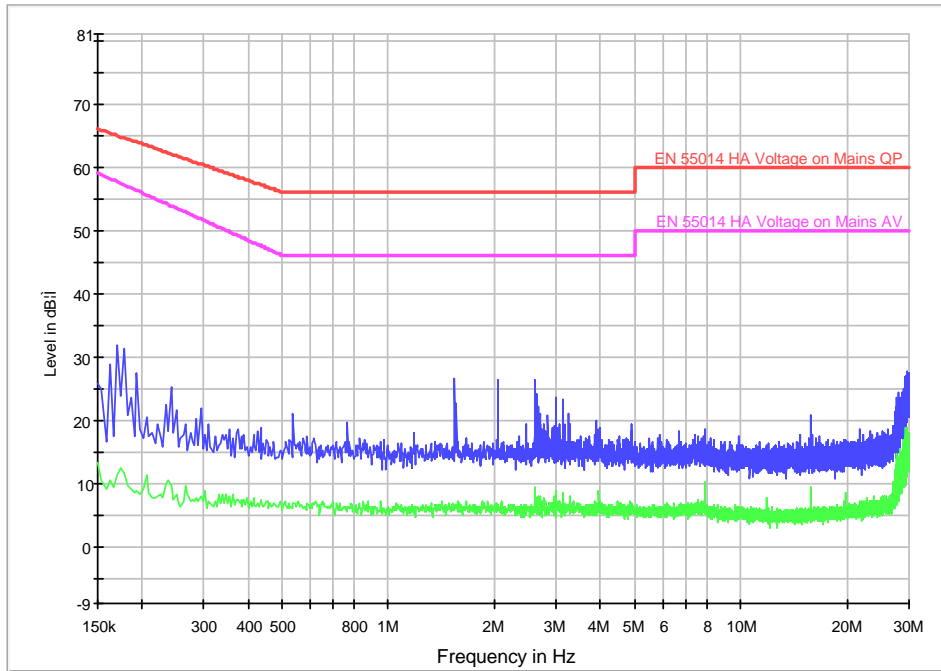
Frequency range 150kHz – 30MHz was checked and EMI receiver measurement bandwidth was set to 9kHz.

### 3.4 Test Protocol

**For Mains ports: Pass**

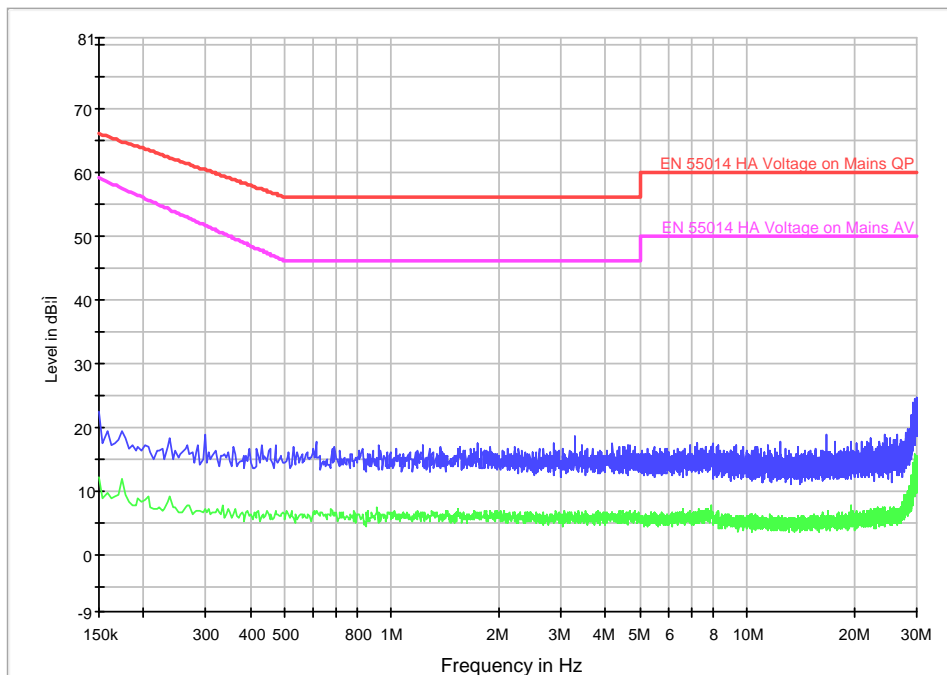
L-Line

EN 55014 Voltage HA on Mains



N-Line

EN 55014 Voltage HA on Mains



Frequency (MHz)	Quasi-peak			Average		
	Corrected Reading (dBuV)	Limit (dBuV)	Margin (dB)	Corrected Reading (dBuV)	Limit (dBuV)	Margin (dB)
0.160000	*	65.46	*	*	58.30	*
0.240000	*	62.10	*	*	53.93	*
0.550000	*	56.00	*	*	46.00	*
1.000000	*	56.00	*	*	46.00	*
1.400000	*	56.00	*	*	46.00	*
2.000000	*	56.00	*	*	46.00	*
3.500000	*	56.00	*	*	46.00	*
6.000000	*	60.00	*	*	50.00	*
10.000000	*	60.00	*	*	50.00	*
22.000000	*	60.00	*	*	50.00	*
30.000000	*	60.00	*	*	50.00	*

Note: \* means the emission level 10dB lower than the relevant limit.

**For Associated ports: NA**

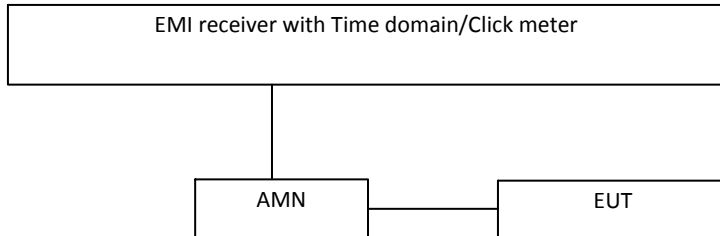
Frequency (MHz)	Quasi-peak			Average		
	Corrected Reading (dBuV)	Limit (dBuV)	Margin (dB)	Corrected Reading (dBuV)	Limit (dBuV)	Margin (dB)

Note: \* means the emission level 20dB below the relevant limit.

## 4. Mains terminal discontinuous disturbance voltage/click

Test result: **PASS**

### 4.1 Block Diagram of Test Setup



### 4.2 Test Setup and Test Procedure

Measurement was performed in shielded room, and instruments used were according to clause 5.1 of EN 55014-1 if applicable.

Detailed test procedure and arrangement was according to clause 5.2 of EN 55014-1.

Measurement methods was according to clause 5.4 of EN 55014-1.

Operation conditions of EUT was according to clause 6 of EN 55014-1.

0.15MHz, 0.5MHz, 1.4MHz and 30MHz were spot checked, and upper quartile methods used during measurement.

The final judgment of test result was according to figure 6 of EN 55014-1.

**4.3 Test Protocol**

Frequency (MHz)	0.15	0.5	1.4	30.0
Permitted limit for continuous interference (dB $\mu$ V)	66.0	56.0	56.0	60.0
Counted click number	38	40	0	0
Observed time (min)	30	30	30	30
Click duration (ms)	<10	<10	-	-
Click rate N	<5	<5	<5	<5
Factor	-	-	-	-
Permitted limits for clicks (dB $\mu$ V)	-	-	-	-
Counted clicks exceeding the limits	-	-	-	-
Test result	Pass	Pass	Pass	Pass
Any other descriptions: The click rate is less than 5, the caused clicks have a duration is less than 10ms, so it is deemed to comply with the limits without further testing.				

## 5. Continuous disturbance power

Test result: **PASS**

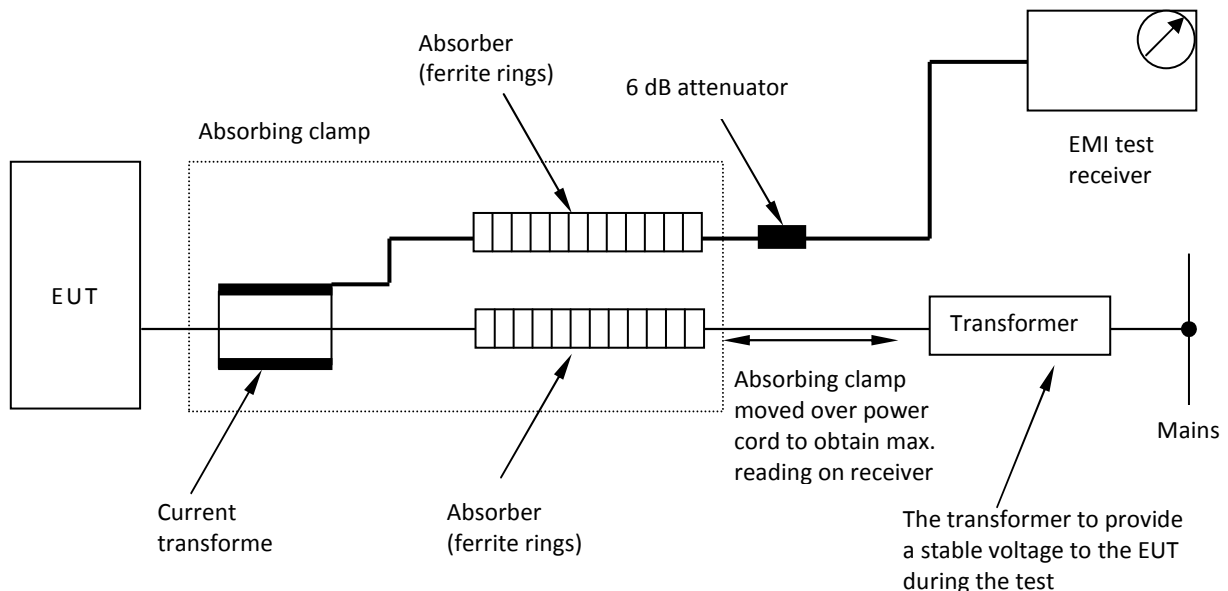
### 5.1 Continuous disturbance power limit

Frequency range (MHz)	General		P ≤ 700 W		700 W < P ≤ 1 000 W		P > 1 000 W	
	Limits dB(pW) Quasi-peak	Limits dB(pW) Average	Limits dB(pW) Quasi-peak	Limits dB(pW) Average	Limits dB(pW) Quasi-peak	Limits dB(pW) Average	Limits dB(pW) Quasi-peak	Limits dB(pW) Average
30-300	45-55*	35-45*	45-55*	35-45*	49-59*	39-49*	55-65*	45 55*

Notes:

- \* means the limit decreasing linearly with the logarithm of the frequency in the range 30MHz to 300MHz.
- If the quasi-peak measurements meet the average limit, the EUT shall be deemed to meet both limits and the measurements using the average detector need not be carried out.

### 5.2 Block diagram of test set up



### 5.3 Test Procedure

Measurement was performed in shielded room, and instruments used were according to clause 5.1 of EN 55014-1 if applicable.

Detailed test procedure and arrangement was according to clause 5.3 of EN 55014-1.

Measurement methods was according to clause 5.4 of EN 55014-1.

Operation conditions of EUT was according to clause 6 of EN 55014-1.

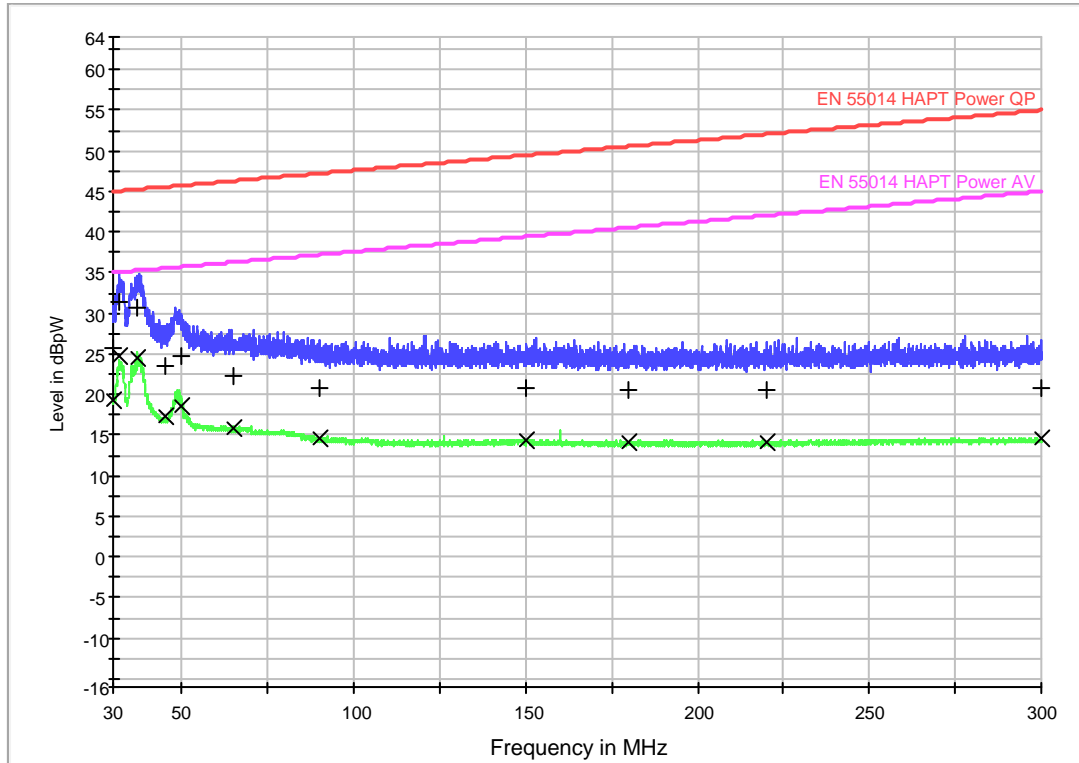
Frequency range 30MHz – 300MHz was checked and EMI receiver measurement bandwidth was set to 120kHz.



**5.4 Test Protocol**

**For Mains ports: Pass**

EN 55014 Power HAPT



Frequency (MHz)	Quasi-peak			Average		
	Corrected Reading (dBuV)	Limit (dBuV)	Margin (dB)	Corrected Reading (dBuV)	Limit (dBuV)	Margin (dB)
30.000000	25.64	45.00	19.36	19.20	35.00	15.80
31.920000	31.46	45.07	13.61	24.85	35.07	10.22
37.120000	30.62	45.26	14.64	24.48	35.26	10.78
45.000000	23.62	45.56	21.94	17.26	35.56	18.30
50.000000	24.85	45.74	20.89	18.50	35.74	17.24
65.000000	22.31	46.30	23.99	15.93	36.30	20.37
90.000000	20.88	47.22	26.34	14.53	37.22	22.69
150.000000	20.67	49.44	28.77	14.29	39.44	25.15
180.000000	20.47	50.56	30.09	14.12	40.56	26.44
220.000000	20.50	52.04	31.54	14.15	42.04	27.89
300.000000	20.88	55.00	34.12	14.54	45.00	30.46

**For Associated ports: NA**

Frequency (MHz)	Quasi-peak			Average		
	Corrected Reading (dBpW)	Limit (dBpW)	Margin (dB)	Corrected Reading (dBpW)	Limit (dBpW)	Margin (dB)
Note: * means the emission level 20dB below the relevant limit.						

## 6. Radiated emission

**Test result: PASS**

As for in the disturbance power test all emission readings from the EUT are lower than the applicable limits (Table 7) reduced by the margin (Table 8) and the maximum clock frequency is less than 30MHz, the EUT is deemed to comply with the Radiated Emission requirement without test.

### 6.1 Limit

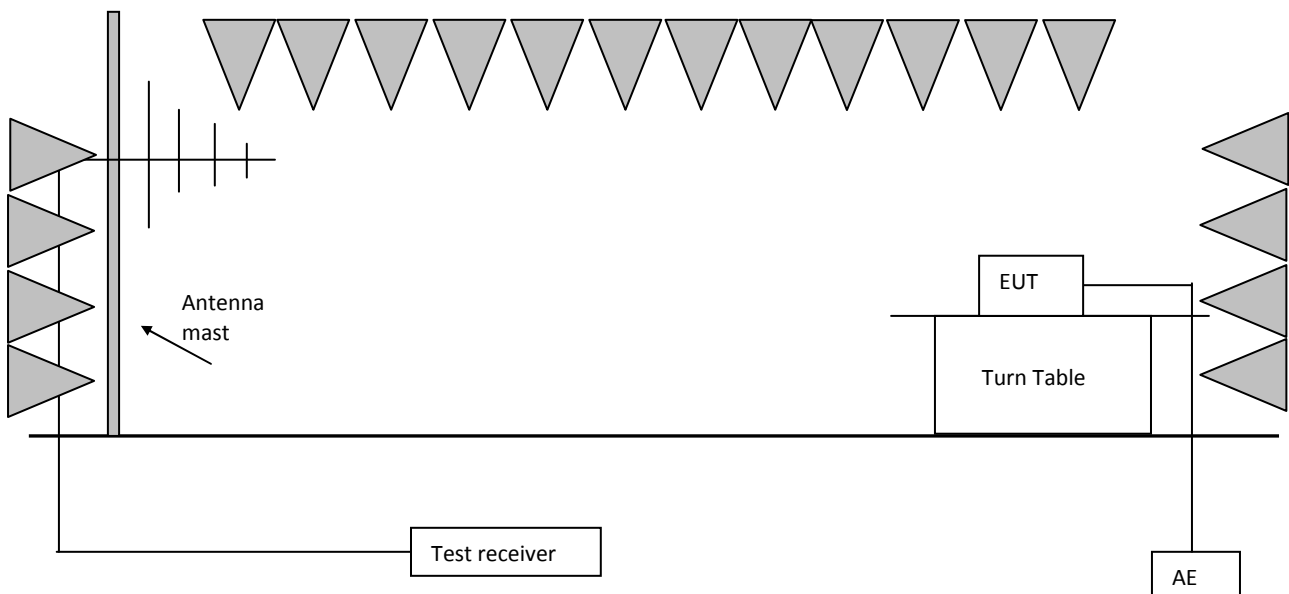
Radiated emission limit from frequency range 30MHz – 1000MHz

Frequency (MHz)	Permitted limit in dB $\mu$ V/m (Quasi-peak) of Measurement Distance 3m	Permitted limit in dB $\mu$ V/m (Quasi-peak) of Measurement Distance 10m
30 ~ 230	40	30
230 ~ 300	47	37

Notes:

- For the measurement distance other than 3m and 10m, the limit is varied according to 20dB/10 decades.
- The gray rows are selected items.

### 6.2 Block diagram and test set up



The measurement was applied in a semi-anechoic chamber.  
Operation conditions of EUT was according to clause 6 of EN 55014-1.  
Measurement was performed according to clause 10 of CISPR 32.  
Setting of EUT is according to clause 5.3.4.3 of EN 55014-1.  
The bandwidth setting on test receiver was 120kHz.  
The frequency range from 30MHz to 300MHz was checked.

**6.3 Test Protocol**

Horizontal

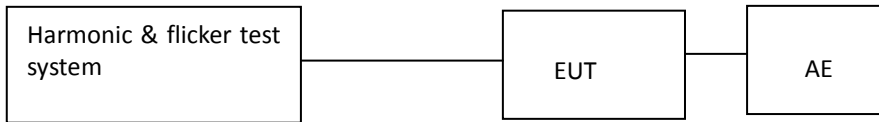
Vertical

Polarization	Frequency (MHz)	Corrected Reading (dBuV/m)	Corrected Factor (dB/m)	Limits (dBuV/m)	Margin (dBuV/m)
Horizontal					
Vertical					

## 7. Harmonics

Test result: **PASS**

### 7.1 Block Diagram of Test Setup



### 7.2 Test Setup and Test Procedure

Harmonics of the fundamental current were measured up to 40 order harmonics using a digital power meter with an analogue output and frequency analyser which was integrated in the harmonic & flicker test system. The measurements were carried out under steady conditions.

- Measuring instrumentation according to IEC 61000-4-7:2002+A1:2008
- This product is not defined as lighting equipment, and has rated power less than 75W, therefore, no limit apply according to EN 61000-3-2
- The EUT is kitchen machines as listed in the scope of IEC 60335-2-14, therefore, is deemed to conform to the harmonic current limits of this standard without further testing.

### 7.3 Test Protocol

#### Power and THD results - DS: 1

True power P:	843.2W	Apparent power S:	843.2VA
Reactiv power Q:	5.015var	Power factor:	1.000
THD (U):	0.001	THD (I):	0.005
Crest Factor (U):	1.414	Crest Factor (I):	1.418

#### Average harmonic current results

Hn	I <sub>eff</sub> [A]	% of Limit	Limit [A]	Result
1	3.630			
2	11.836E-3			PASS
3	8.937E-3			PASS
4	5.933E-3			PASS
5	4.052E-3			PASS
6	1.032E-3			PASS
7	1.532E-3			PASS
8	1.503E-3			PASS
9	1.294E-3			PASS
10	881.529E-6			PASS
11	1.301E-3			PASS
12	897.222E-6			PASS
13	962.899E-6			PASS
14	1.032E-3			PASS
15	1.052E-3			PASS
16	741.472E-6			PASS
17	1.507E-3			PASS
18	866.643E-6			PASS
19	905.340E-6			PASS
20	719.536E-6			PASS
21	1.173E-3			PASS
22	744.161E-6			PASS
23	1.464E-3			PASS
24	674.021E-6			PASS
25	699.765E-6			PASS
26	750.546E-6			PASS
27	1.353E-3			PASS
28	874.590E-6			PASS
29	1.149E-3			PASS
30	715.652E-6			PASS
31	781.614E-6			PASS
32	864.549E-6			PASS
33	1.201E-3			PASS
34	673.460E-6			PASS
35	961.248E-6			PASS
36	681.029E-6			PASS
37	850.301E-6			PASS
38	673.947E-6			PASS
39	1.390E-3			PASS
40	682.533E-6			PASS

**Maximum harmonic current results**

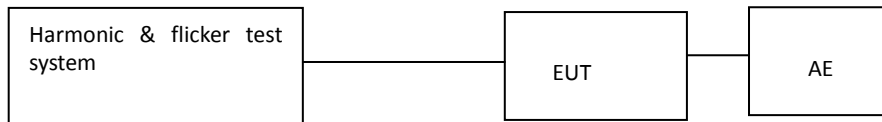
Hn	I <sub>eff</sub> [A]	% of Limit	Limit [A]	Result
1	3.650			
2	12.369E-3			PASS
3	9.418E-3			PASS
4	6.226E-3			PASS
5	4.423E-3			PASS
6	1.214E-3			PASS
7	1.746E-3			PASS
8	1.740E-3			PASS
9	1.636E-3			PASS
10	1.155E-3			PASS
11	1.489E-3			PASS
12	1.111E-3			PASS
13	1.356E-3			PASS
14	1.157E-3			PASS
15	1.364E-3			PASS
16	866.231E-6			PASS
17	1.734E-3			PASS
18	1.063E-3			PASS
19	1.079E-3			PASS
20	875.169E-6			PASS
21	1.509E-3			PASS
22	890.634E-6			PASS
23	1.699E-3			PASS
24	831.886E-6			PASS
25	842.089E-6			PASS
26	1.047E-3			PASS
27	1.743E-3			PASS
28	1.083E-3			PASS
29	1.399E-3			PASS
30	870.170E-6			PASS
31	917.636E-6			PASS
32	1.001E-3			PASS
33	1.413E-3			PASS
34	900.713E-6			PASS
35	1.123E-3			PASS
36	847.658E-6			PASS
37	1.041E-3			PASS
38	823.243E-6			PASS
39	1.635E-3			PASS
40	851.364E-6			PASS

Harmonic currents less than 0.6% of the input current measured under the test conditions, or less than 5 mA, whichever is greater, are disregarded.

## 8. Voltage Fluctuations-Flicker

Test result: **PASS**

### 8.1 Block Diagram of Test Setup



### 8.2 Test Setup and Test Procedure

#### 8.2.1 Definition

Flicker: impression of unsteadiness of visual sensation induced by a light stimulus whose luminance or spectral distribution fluctuates with time.

Pst: Short-term flicker severity.

Plt: long-term flicker severity.

dc: maximum steady state voltage change during an observation period.

dmax: maximum absolute voltage change during an observation period.

d(t): time function of the relative r.m.s. voltage change evaluated as a single value for each successive half period between zero-crossings of the source voltage, except during time interval in which the voltage is a steady-state condition for at least 1s.

#### 8.2.2 Test condition

The EUT was set to produce the most unfavorable sequence of voltage changes.



### 8.3 Test Protocol

The tested object operated under the operating condition specified in EN 61000-3-3  
The following limits apply

- the value of Pst shall not be greater than 1,0.
- the value of Plt shall not be greater than 0,65.
- Tmax, the accumulated time value of d(t) with a deviation exceeding 3,3 % during a single voltage change at the EUT terminals, shall not exceed 500 ms.
- the maximum relative steady-state voltage change, dc, shall not exceed 3,3 %.
- the maximum relative voltage change dmax, shall not exceed:
  - 4% without additional conditions.
  - 6 % for equipment which is:
    - switched manually, or
    - switched automatically more frequently than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds), or manual restart, after a power supply interruption.
  - 7 % for equipment which is:
    - attended whilst in use (for example: hair dryers, vacuum cleaners, kitchen equipment such as mixers, garden equipment such as lawn mowers, portable tools such as electric drills), or
    - switched on automatically, or is intended to be switched on manually, no more than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds) or manual restart, after a power supply interruption.
  - for manual switch, dmax is measured in accordance with Annex B of standard, average dmax is calculated from 24 times measurement.
  - According to EN 61000-3-3 clause 6.1 & A.2, the EUT is either unlikely to produce significant voltage fluctuations/flicker or no limit and test were required by technical analysis and sample evaluation on the product.
  - The rate power of the EUT is no greater than 75W, which is unlikely to produce significant voltage fluctuations or flicker by technical analysis and evaluation. So it is deemed to fulfil the requirements without testing.

	EUT values	Limit	Result
Pst	0.096	1.00	PASS
dc [%]	0.681	3.30	PASS
dmax [%]	0.701	7.00	PASS
dt [s]	0.000	0.50	PASS

## Immunity Test

### Performance criteria

The performance criteria are based on the general criteria of the standard and derived from the product specification

**Criterion A:** Normal Performance within limits specified by the manufacturer, request or purchaser.

**Criterion B:** Continue to operate as intended after the test. No degradation of performance or loss of function. During the test degradation of performance is allowed, however no change of actual operating state or stored date.

**Criterion C:** Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

### Categories of apparatus

- Category I (fulfill the relevant immunity requirements without testing)
- Category II (Shall fulfill the tests: ESD, EFT, Inject current, Surge, Dips)
- Category III (Shall fulfill the tests: ESD, EM fields\*)
- Category IV (Shall fulfill the tests: ESD, EFT, Inject current, Surge, Dips, EM fields)

Note: \*only applicable to the ride on toys operating with electronic devices.

## 9. Electrostatic Discharge (ESD)

Test result: **PASS**

### 9.1 Severity Level and Performance Criterion

#### 9.1.1 Test level

1a – Contact discharge		1b – Air discharge	
Level	Test voltage kV	Level	Test voltage kV
1	2	1	2
2	4	2	4
3	6	3	8
4	8	4	15
X	Special	X	Special

Notes:

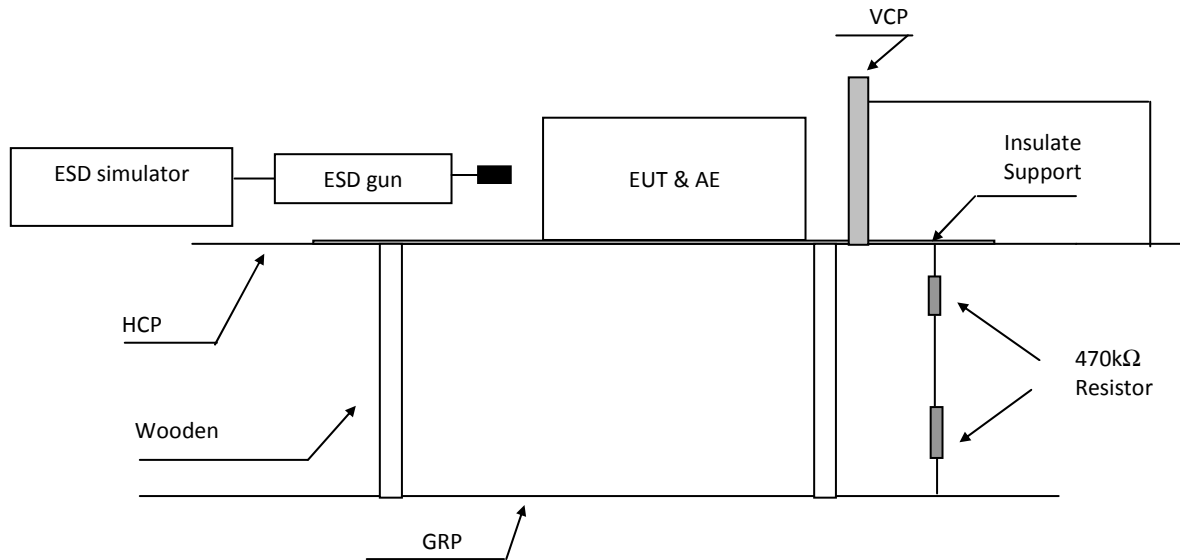
- “X” is an open level. The level has to be specified in the dedicated equipment specification. If higher voltages than those shown are specified, special test equipment may be needed.
- The gray rows were the selected test level.

#### 9.1.2 Performance Criterion

Performance criterion: **B**

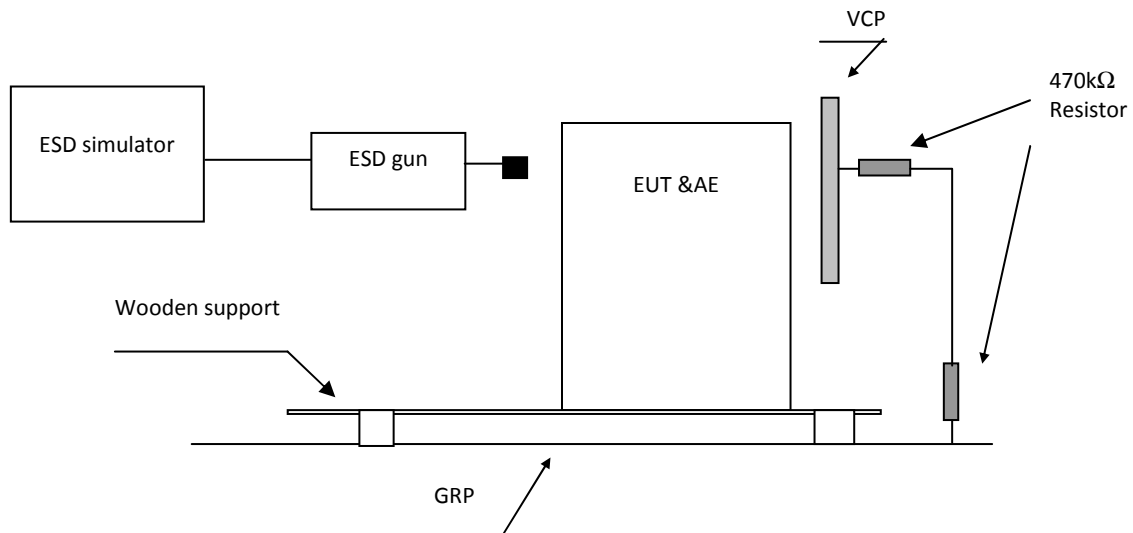
**9.2 Block Diagram of Test Setup**

For table-top equipment



Note: HCP means Horizontal Coupling Plane  
 VCP means Vertical Coupling Plane  
 GRP means Ground Reference Plane  
 Wooden support is a 0.8m height table

For floor standing equipment



Note: VCP means Vertical Coupling Plane  
 GRP means Ground Reference Plane  
 Wooden support is a 0.1m height rack

### **9.3 Test Setup and Test Procedure**

Measurement was performed in shielded room.

Measurement and setting of EUT was applied according to IEC 61000-4-2 Clause 7.

The test method and equipment was specified by IEC 61000-4-2 with the modifications by EN 55014-2 clause 5.1.

## 9.4 Test Protocol

Direct discharges were applied at the following selected points:

Test point #	Test level [kV]	Air/Contact	Polarity (+/-)	Pass/Fail/NA	Comment
A	2/4	Contact	+/-	Pass	All touchable screws of enclosure
B	2/4	Contact	+/-	Pass	Accessible metal parts of the EUT
C	2/4/8	Air	+/-	Pass	Air gap of the switch, button
D	2/4/8	Air	+/-	Pass	The air in-taking opening
E	2/4/8	Air	+/-	Pass	Slots around the EUT

Indirect contact discharges were applied to the VCP and the HCP at the following selected points:

For table top equipment

Point	Description	Point	Pass/Fail/NA
HCP f	0,1m from the front of the EUT	Edge of centre, corner on HCP	Pass
HCP b	0,1m from the back of the EUT	Edge of centre, corner on HCP	Pass
HCP r	0,1m from the right side of the EUT	Edge of centre, corner on HCP	Pass
HCP l	0,1m from the left side of the EUT	Edge of centre, corner on HCP	Pass
VCP f	0,1m from the front of the EUT	Edge of centre, corner on VCP	Pass
VCP b	0,1m from the back of the EUT	Edge of centre, corner on VCP	Pass
VCP r	0,1m from the right of the EUT	Edge of centre, corner on VCP	Pass
VCP l	0,1m from the left of the EUT	Edge of centre, corner on VCP	Pass

For floor standing equipment

Point	Description	Point	Pass/Fail/NA
VCP f	0,1m from the front of the EUT	Edge of centre, corner on VCP	-
VCP b	0,1m from the back of the EUT	Edge of centre, corner on VCP	-
VCP r	0,1m from the right of the EUT	Edge of centre, corner on VCP	-
VCP l	0,1m from the left of the EUT	Edge of centre, corner on VCP	-

**Observation:** All the functions were operated as normal during and after test.

**Conclusion:** The EUT met the requirements of Performance Criterion A.

## 10. Electromagnetic field susceptibility

Test result: **NA**

### 10.1 Severity Level and Performance Criterion

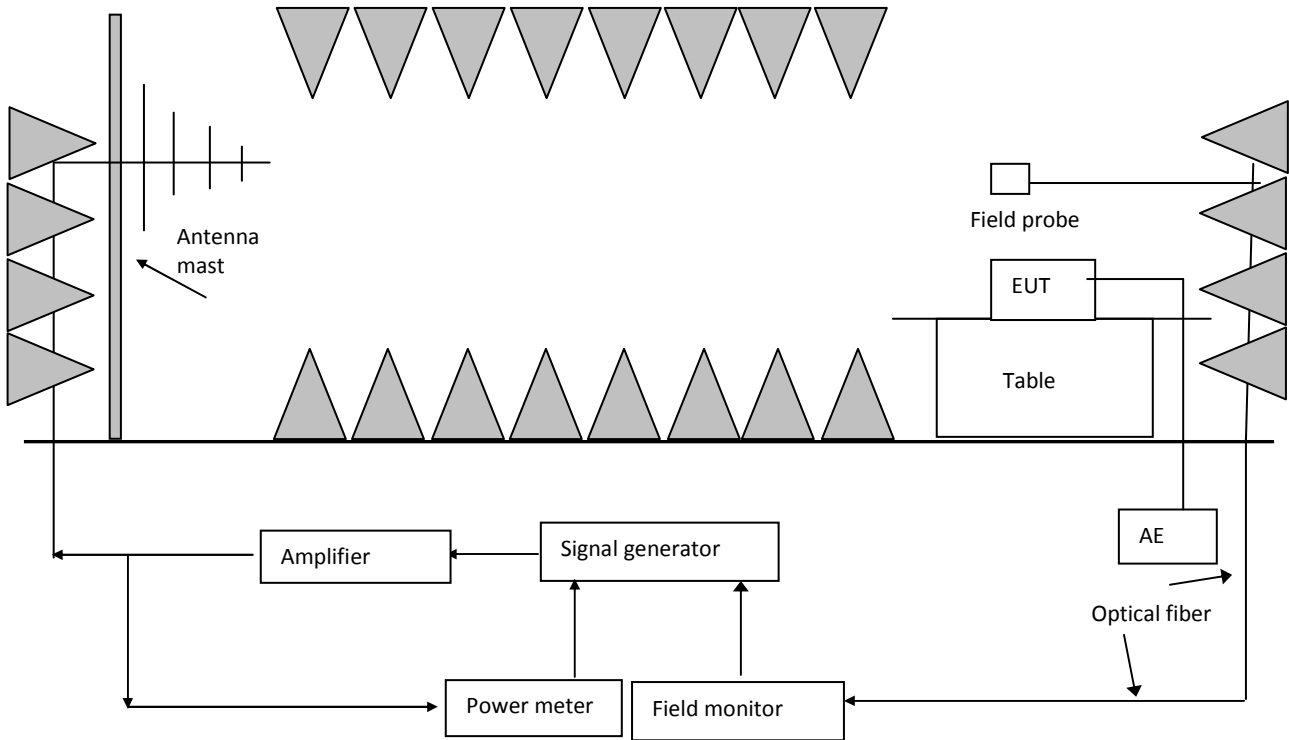
#### 10.1.1 Test level

Level	Test field strength V/m
1	1
2	3
3	10
X	Special
Notes: 1. X is an open test level. This level may be given in the product specification. 2. The gray row is the selected test level.	

#### 10.1.2 Performance Criterion

Performance criterion: **A**

### 10.2 Block diagram of test setup



### 10.3 Test Setup and Test Procedure

Measurement was performed in full-anechoic chamber.

Measurement and setting of EUT was applied according to IEC 61000-4-3 clause 7.

The test method and equipment was specified by IEC 61000-4-3 with additions and modifications by EN 55014-2 clause 5.5.

### 10.4 Test Protocol

Test no.:	Frequency (MHz)	Polarization	Test level V/m	Modulation	Exposed location	Pass/Fail/NA	Comment
1	80-1000	H & V	3	1kHz, 80%, SW, AM, 1% step size	All sides	-	-

**Observation:**

**Conclusion:**



## 11. Electric Fast Transient/Burst Immunity Test

Test result: **PASS**

### 11.1 Severity Level and Performance Criterion

#### 11.1.1 Test level

Open circuit output test voltage ( $\pm 10\%$ ) and repetition rate of the impulses ( $\pm 20\%$ )				
Level	Input and output a.c. power ports		Input and output d.c. power ports Signal lines and control lines ports	
	Voltage peak kV	Repetition rate kHz	Voltage peak kV	Repetition rate kHz
1	0.5	5	0.25	5
2	1	5	0.5	5
3	2	5	1	5
4	4	5	2	5
X	Special	Special	Special	Special

Notes :

1. "X" is an open level. The level has to be specified in the dedicated equipment specification.
2. The gray rows were the selected test level.

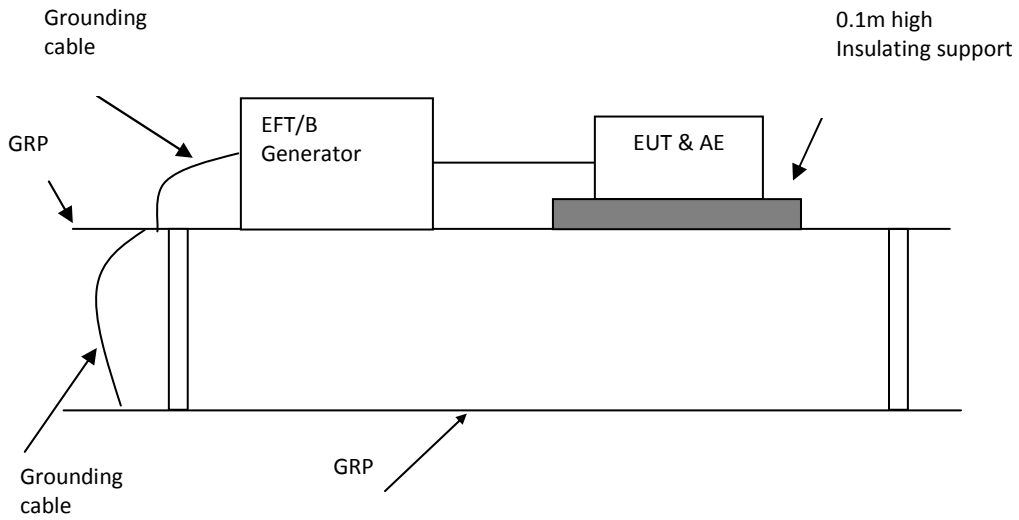
#### 11.1.2 Performance Criterion

Performance criterion **B**

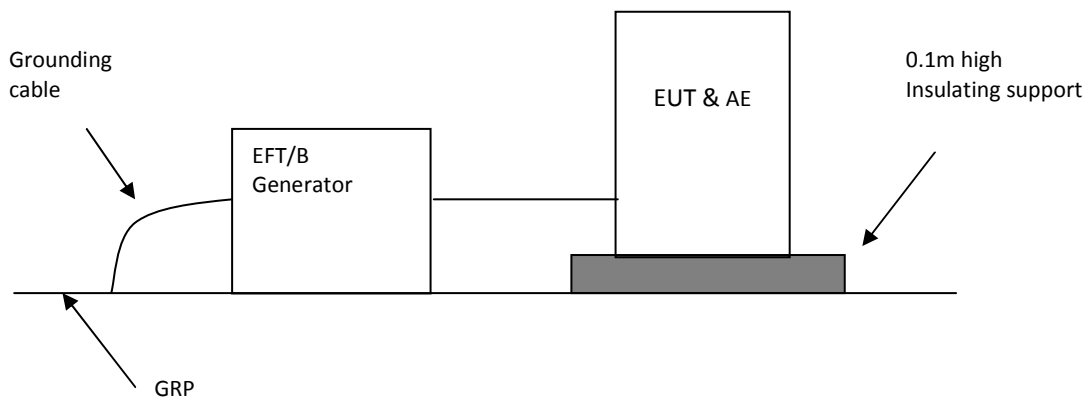
### 11.2 Block Diagram of Test Setup

#### 11.2.1 Block Diagram for input a.c./d.c. power line

For table-top equipment

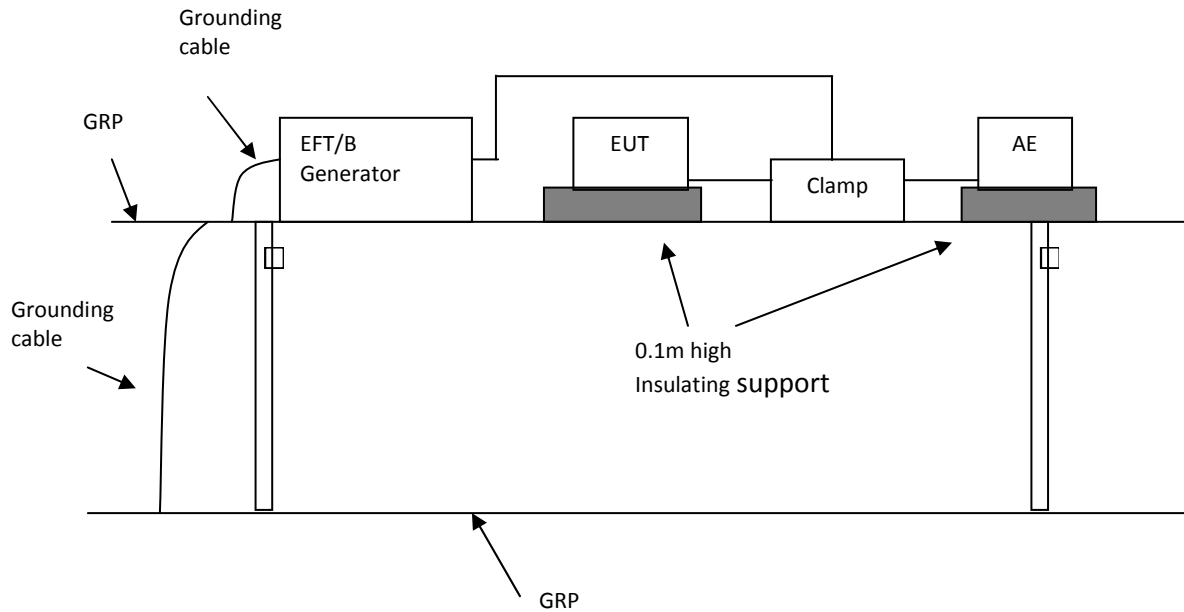


For floor standing equipment

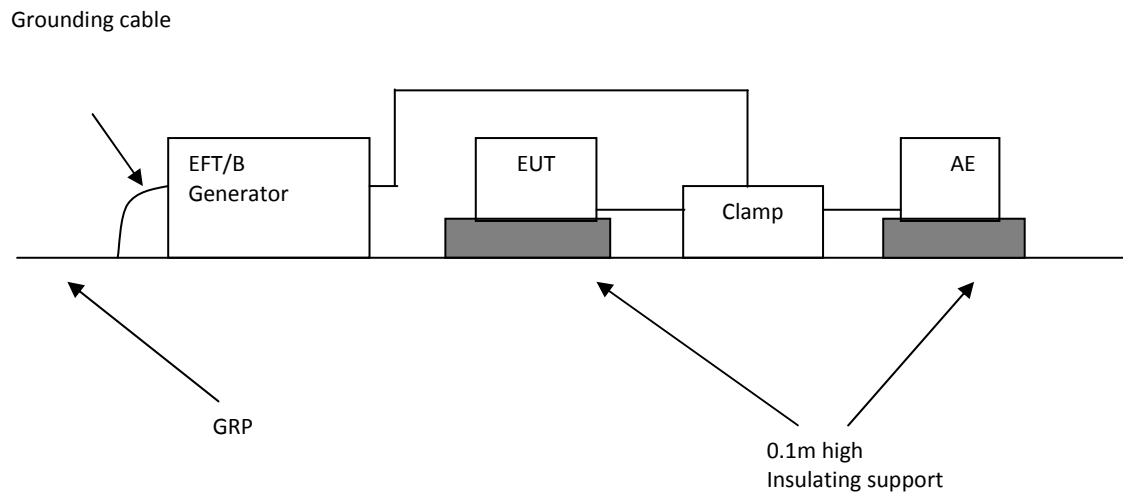


### 11.2.2 Block Diagram for output a.c./d.c. power line or signal/control lines

For table-top equipment



For floor standing equipment



### 11.3 Test Setup and Test Procedure

Measurement was performed in shielded room.

Measurement and setting of EUT was applied according to IEC 61000-4-4 clause 7.

The test method and equipment was specified by IEC 61000-4-4 with additions and modifications by EN 55014-2 clause 5.2.

#### 11.4 Test Protocol

Test No.	Level [kV]	Polarity +/-	Repetition rate kHz	Line for test	Pass/Fail/NA
1	1	+/-	5	a.c. power ports	Pass
2	0.5	+/-	5	d.c. power ports	NA
3	0.5	+/-	5	Signal lines and control lines	NA

**Observation:** All the functions were operated as normal during and after test.

**Conclusion:** The EUT met the requirements of Performance Criterion A.

## 12. Surge Immunity Test

Test result: **PASS**

### 12.1 Severity Level and Performance Criterion

#### 12.1.1 Test level

Level	Open-circuit test voltage $\pm 10\%$ kV
1	0.5
2	1.0
3	2.0
4	4.0
X*	Special

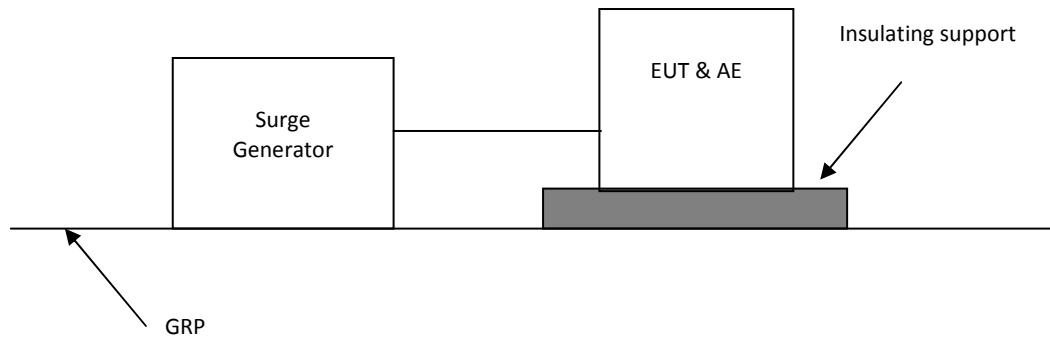
Notes:

- "X" is an open class. This level can be specified in the product Specification
- The gray rows are the selected level.

#### 12.1.2 Performance Criterion

Performance criterion **B**

## 12.2 Block Diagram of Test Setup



## 12.3 Test Setup and Test Procedure

Measurement was performed in shielded room.

Measurement and setting of EUT was applied according to IEC 61000-4-5 clause 7.

The test method and equipment was specified by IEC 61000-4-5 with modifications by EN 55014-2 clause 5.6.

## 12.4 Test Protocol

Test No.	Level [kV]	Polarity +/-	Angle	Line for test	Pass/Fail/NA
1	1	+	90 <sup>0</sup>	a.c. Mains (line to earth)	NA
2	1	-	270 <sup>0</sup>	a.c. Mains (line to earth)	NA
3	1	+	90 <sup>0</sup>	a.c. Mains (line to line)	Pass
4	1	-	270 <sup>0</sup>	a.c. Mains (line to line)	Pass
5	2	+	90 <sup>0</sup>	a.c. Mains (line to earth)	Pass
6	2	-	270 <sup>0</sup>	a.c. Mains (line to earth)	Pass

**Observation:** All the functions were operated as normal during and after test.

**Conclusion:** The EUT met the requirements of Performance Criterion A.

### 13. Immunity to Conducted Disturbances, Induced by Radio-frequency Fields

Test result: **PASS**

#### 13.1 Severity Level and Performance Criterion

##### 13.1.1 Test level

Frequency range 150kHz – 80MHz		
Level	Voltage level (e.m.f.)	
	$U_0$ [dB( $\mu$ V)]	$U_0$ (V)
1	120	1
2	130	3
3	140	10
X	Special	Special

Notes:  
 1. "X" is an open level.  
 2. The gray row is the selected test level.

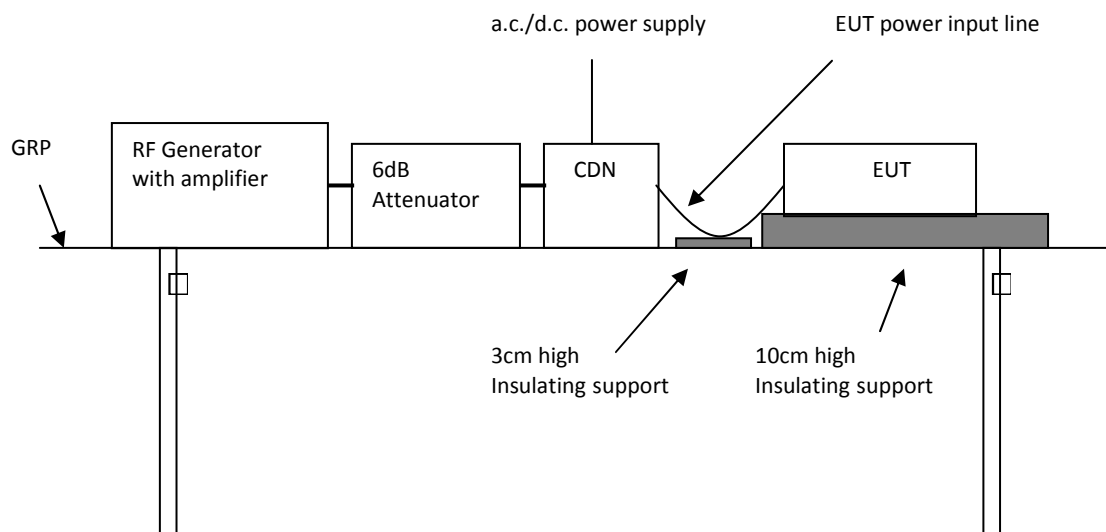
##### 13.1.2 Performance Criterion

Performance criterion: **A**

#### 13.2 Block Diagram of Test Setup

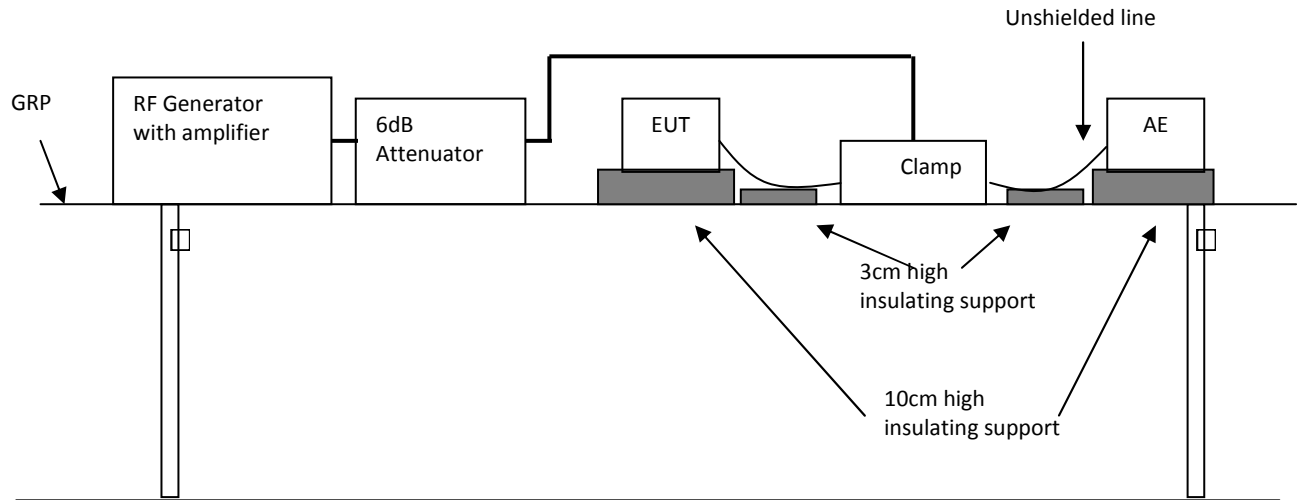
##### 13.2.1 Block Diagram for a.c./d.c input power line

Block Diagram for a.c./d.c input power line

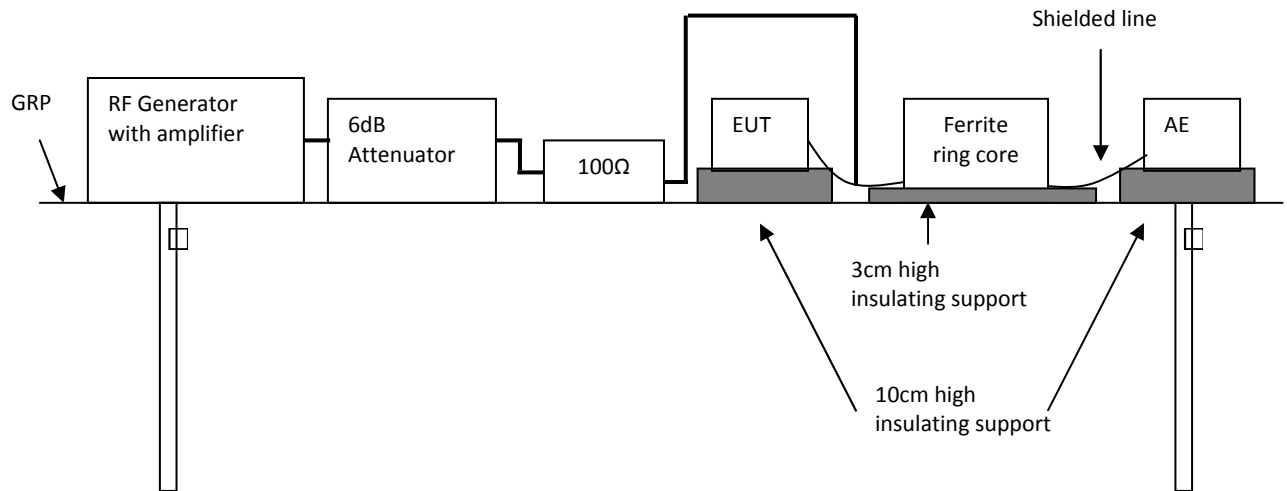


### 13.2.2 Block Diagram for output a.c./d.c. power line or signal/control lines

Unshielded line



Shielded line



### 13.3 Test Setup and Test Procedure

Measurement was performed in shielded room.

Measurement and setting of EUT was applied according to IEC 61000-4-6 clause 7.

The test method and equipment was specified by IEC 61000-4-6 with additions and modifications by EN 55014-2 clause 5.3, 5.4.



### 13.4 Test Protocol

EUT is not required for electromagnetic susceptibility

Test No.	Frequency (MHz)	Level V (r.m.s.)	Modulation	Injected point	Pass/Fail/NA
1	0.15~230	3	1kHz, 80%, SW, AM, 1% step size	a.c. power ports	Pass
2	0.15~230	1	1kHz, 80%, SW, AM, 1% step size	d.c. power ports	-
3	0.15~230	1	1kHz, 80%, SW, AM, 1% step size	signal lines and control lines	-

For EUT test Electromagnetic field susceptibility

Test No.	Frequency (MHz)	Level V (r.m.s.)	Modulation	Injected point	Pass/Fail/NA
1	0.15~80	3	1kHz, 80%, SW, AM, 1% step size	a.c. power ports	NA
2	0.15~80	1	1kHz, 80%, SW, AM, 1% step size	d.c. power ports	-
3	0.15~80	1	1kHz, 80%, SW, AM, 1% step size	signal lines and control lines	-

**Observation:** All the functions were operated as normal during and after test.

**Conclusion:** The EUT met the requirements of Performance Criterion A.

## 14. Voltage Dips, Short Interruptions and Voltage Variations Immunity Test

Test result: **PASS**

### 14.1 Severity Level and Performance Criterion

#### 14.1.1 Test level

Test level % U <sub>T</sub>	Voltage dip and short interruptions % U <sub>T</sub>	Duration (in period)	
		50Hz	60Hz
0	100	0.5 cycle	0.5 cycle
40	60	10 cycles	12 cycles
70	30	25 cycles	30 cycles

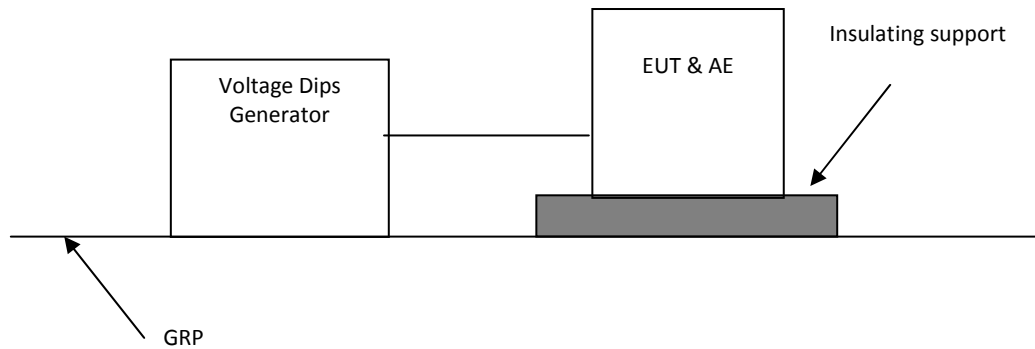
Notes:

1. "\*" for 0.5 period, the test shall be made in positive and negative polarity, i.e. starting at 0° and 180°, respectively.
2. "\*\*\*" means "x" is an open duration. This duration can be given in the product specification. Utilities in Europe have measured dips and short interruptions of duration between ½ a period and 3000 periods, but duration less than 50 periods are most common.
3. If the EUT is tested for voltage dips of 100%, it is generally unnecessary to test for other levels for the same durations. However, for some cases (safeguard systems or electro-mechanical devices) it is not true. The product specification or product committee shall give an indication of the applicability of this note.
4. The gray rows are selected test level.

#### 14.1.2 Performance Criterion

Performance criterion: **C**

### 14.2 Block diagram of test setup



### 14.3 Test Setup and Test Procedure

Measurement was performed in shielded room.

Measurement and setting of EUT was applied according to IEC 61000-4-11 clause 7.

The test method and equipment was specified by IEC 61000-4-11 with additions and modifications by EN 55014-2 clause 5.7.

### 14.4 Test Protocol

Test no.	% $U_T$	Voltage dip and short interruptions % UT	Duration (in periods)	Pass/Fail/NA
1	70	30%	25 cycles at 50Hz	Pass
			30 cycles at 60Hz	Pass
2	40	60%	10 cycles at 50Hz	Pass
			12 cycles at 60Hz	Pass
3	0	100% pos half cycle	0.5 cycle at 50Hz	Pass
			0.5 cycle at 60Hz	Pass
4	0	100% neg half cycle	0.5 cycle at 50Hz	Pass
			0.5 cycle at 60Hz	Pass

**Observation:** At test level of 70%, the EUT worked unsteadily. Once the interference is removed, it recovered its normal mode at once.

**Conclusion:** The EUT met the requirements of Performance Criterion B.

**Appendix I: Photograph of equipment under test**

Photo 1.

Description: Over view of FT2004



Photo 2.

Description: Front view of FT2004



Photo 3.

Description: Side view of FT2004



Photo 4.

Description: Side view of FT2004



Photo 5.

Description: Top view of FT2004



Photo 6.

Description: Bottom view of FT2004



Photo 7.  
Description: Switch knob view of FT2004



Photo 8.  
Description: Internal view of FT2004



Photo 9.

Description: Internal view of FT2004



Photo 10.

Description: Internal view of FT2004

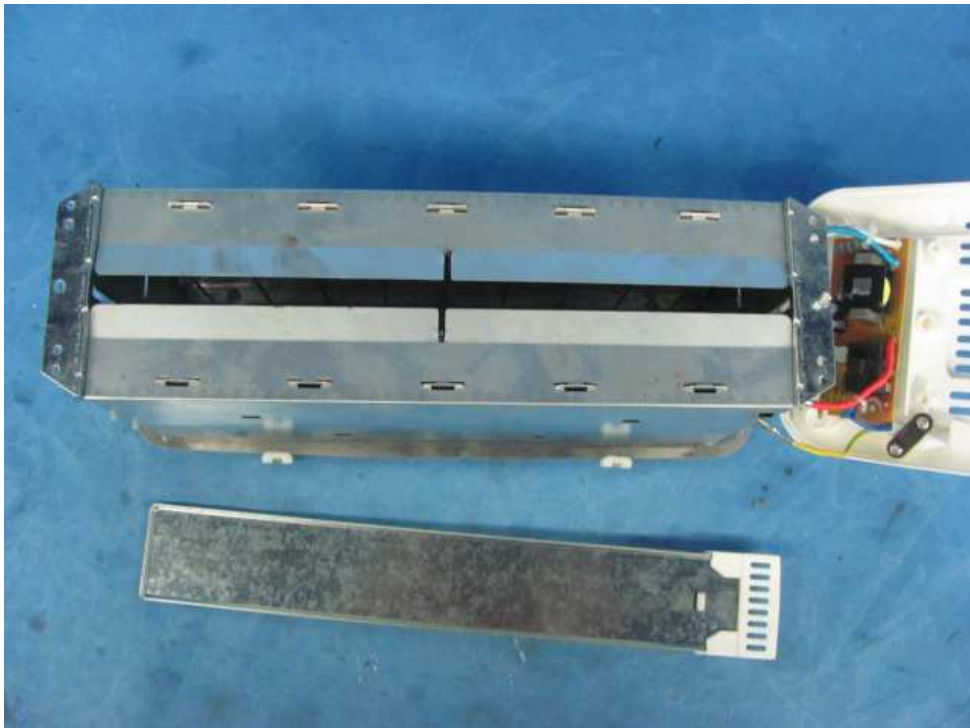




Photo 11.

Description: Heating element view of FT2004

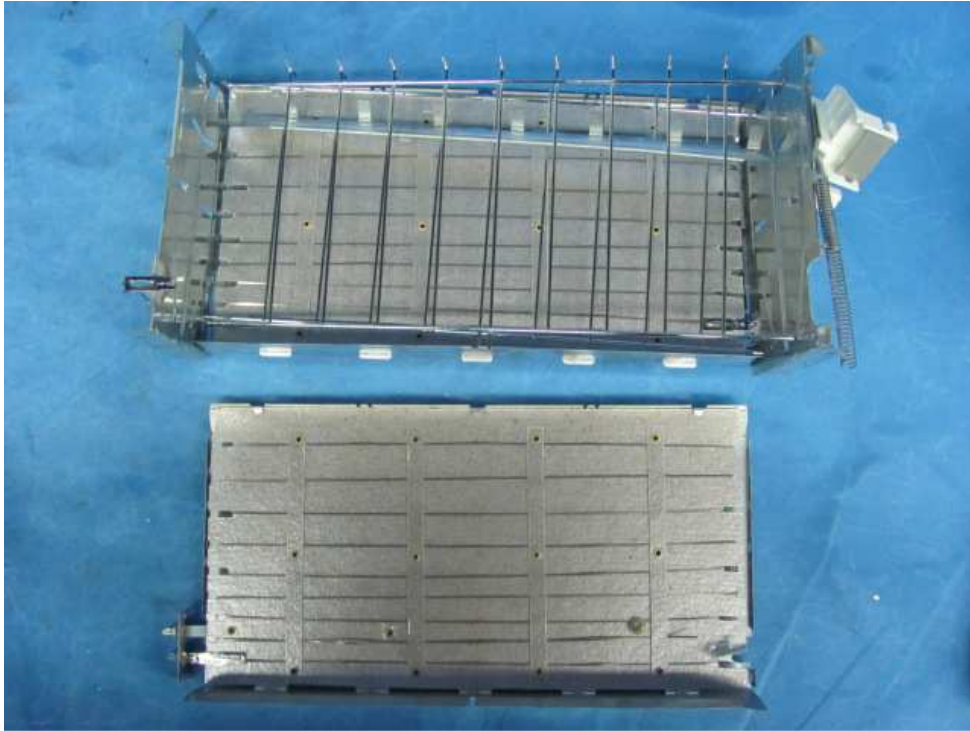


Photo 12.

Description: Power PCB view of FT2004

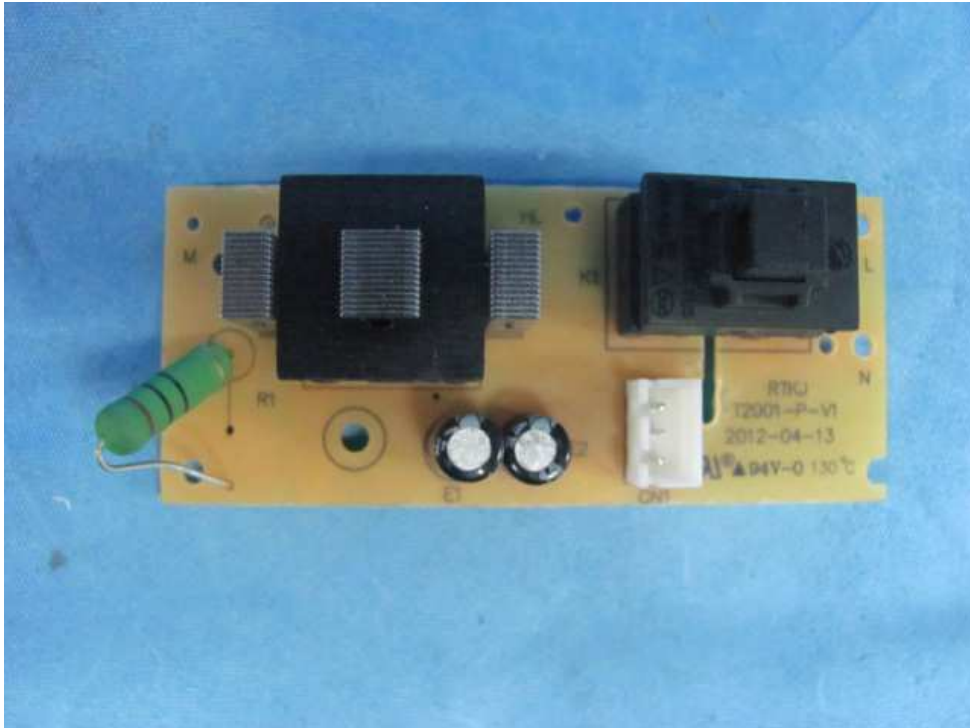


Photo 13.

Description: Power PCB view of FT2004

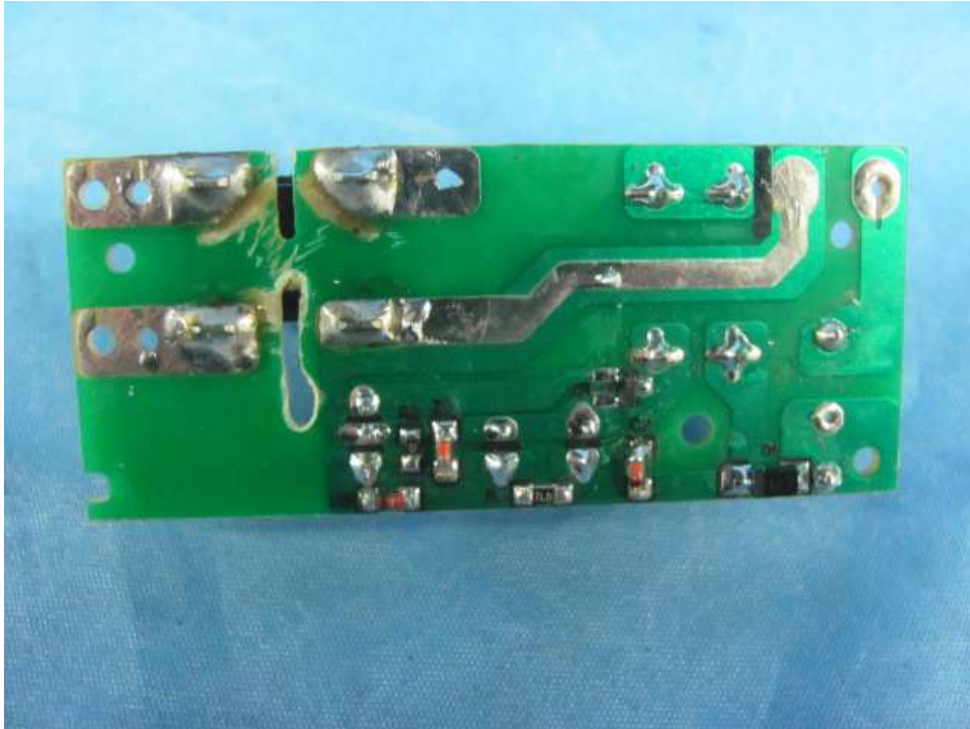


Photo 14.

Description: Control PCB view of FT2004

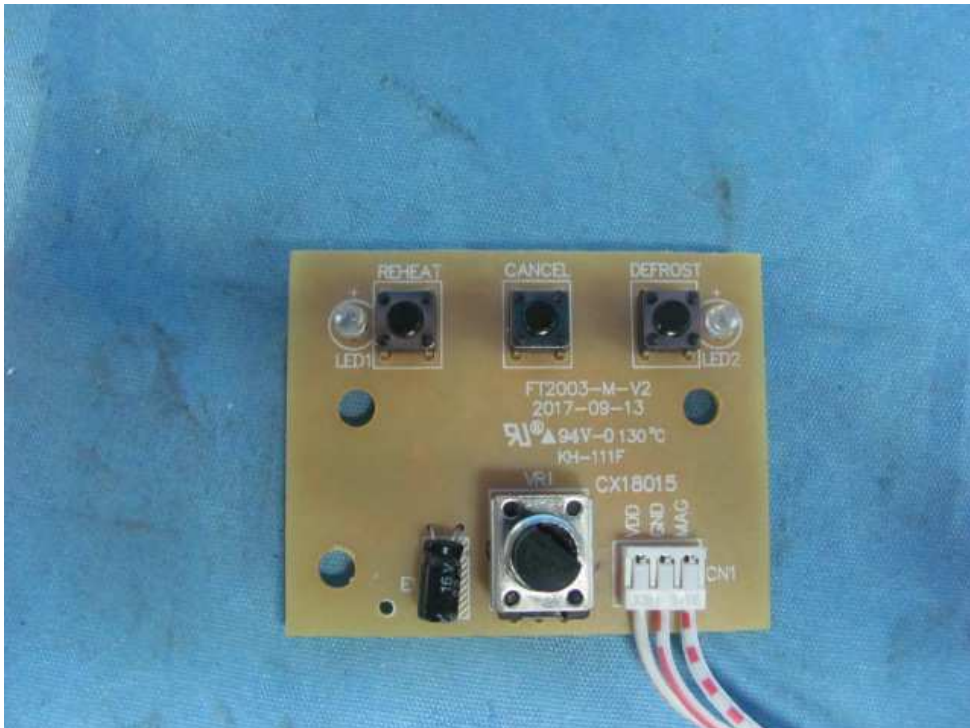


Photo 15.

Description: Control PCB view of FT2004

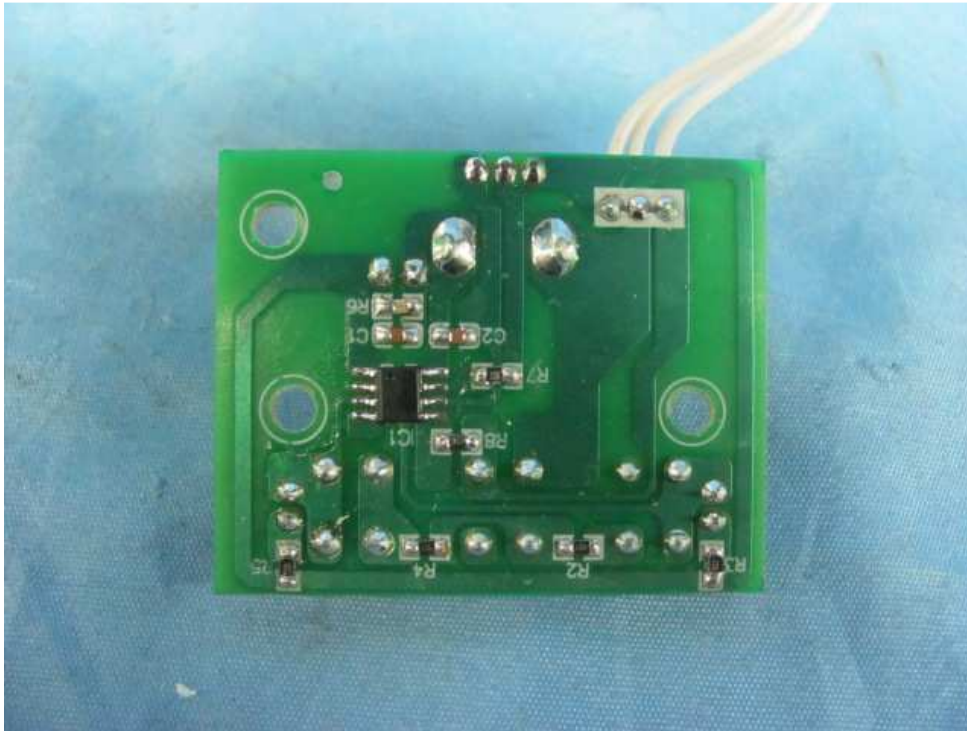


Photo 16.

Description: Earthing view of FT2004

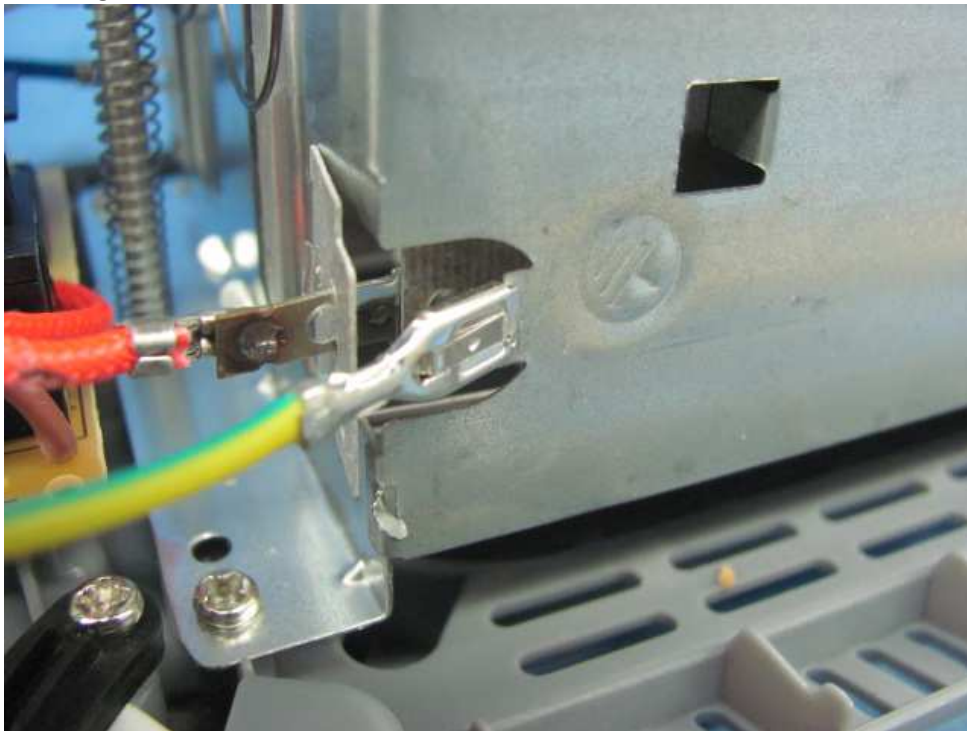


Photo 17.

Description: Control PCB view of FT2003 series, FT2004 series, FT4003 series with suffix "-T-FL"

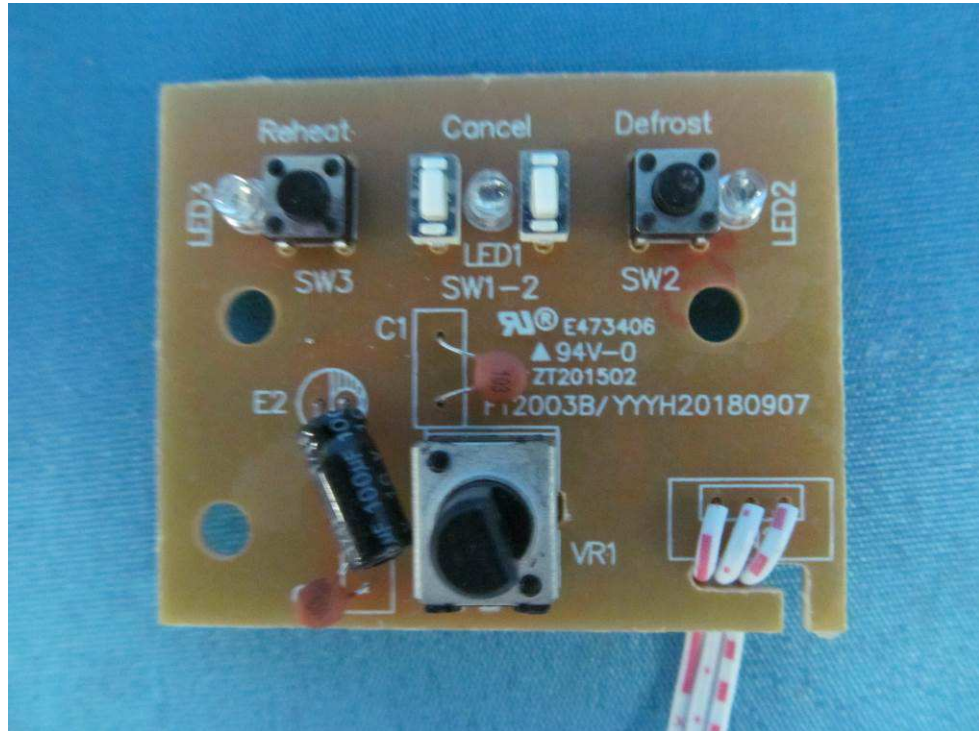


Photo 18.

Description: Control PCB view of FT2003 series, FT2004 series, FT4003 series with suffix "-FL"



Photo 17.

Description: Control PCB view of FT2003 series, FT2004 series, FT4003 series with suffix “-FL”

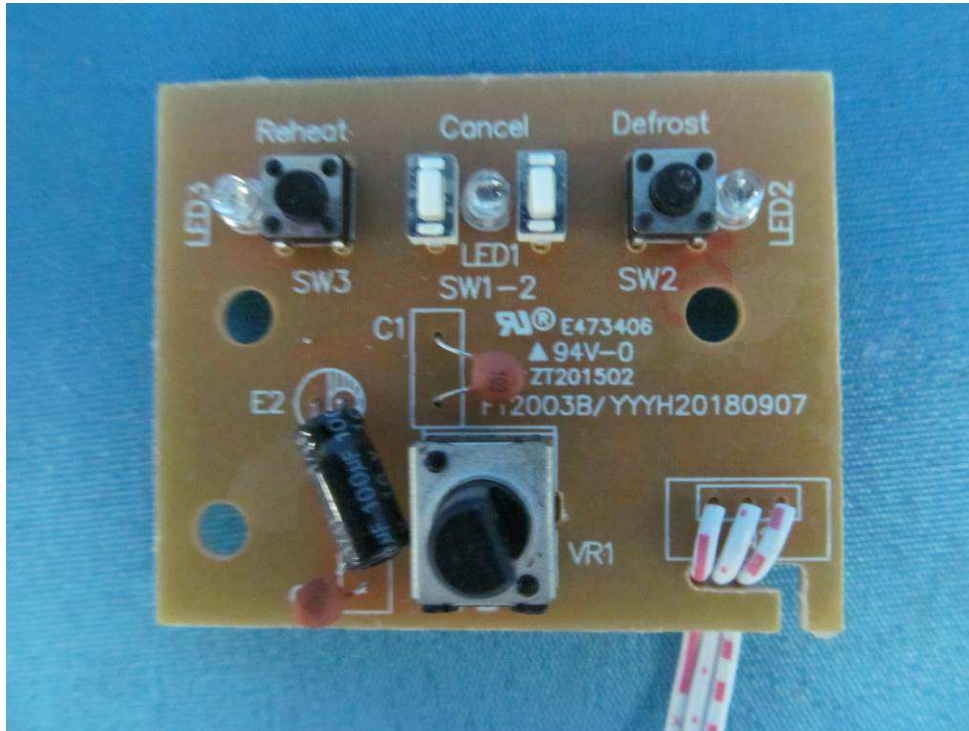


Photo 18.

Description: Control PCB view of FT2003 series, FT2004 series, FT4003 series with suffix “-FL”

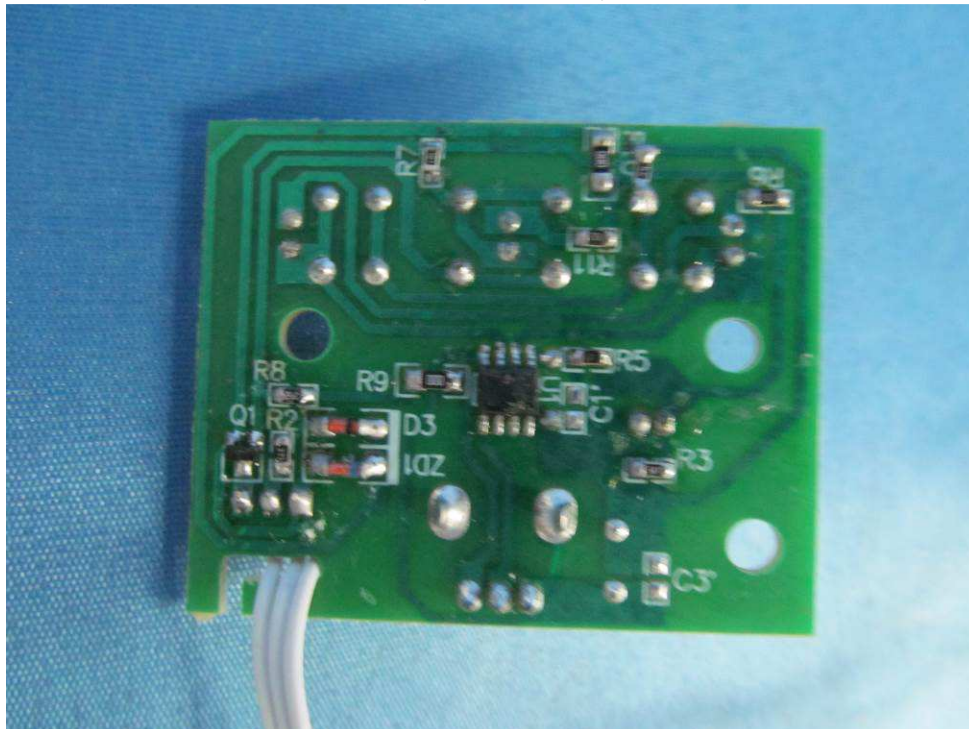


Photo 21.

Description: Power PCB view of FT2001 series, FT2001A series, FT2001B series, FT2002 series, FT2003 series, FT2003A series, FT2004 series, FT4003 series with suffix "-T"

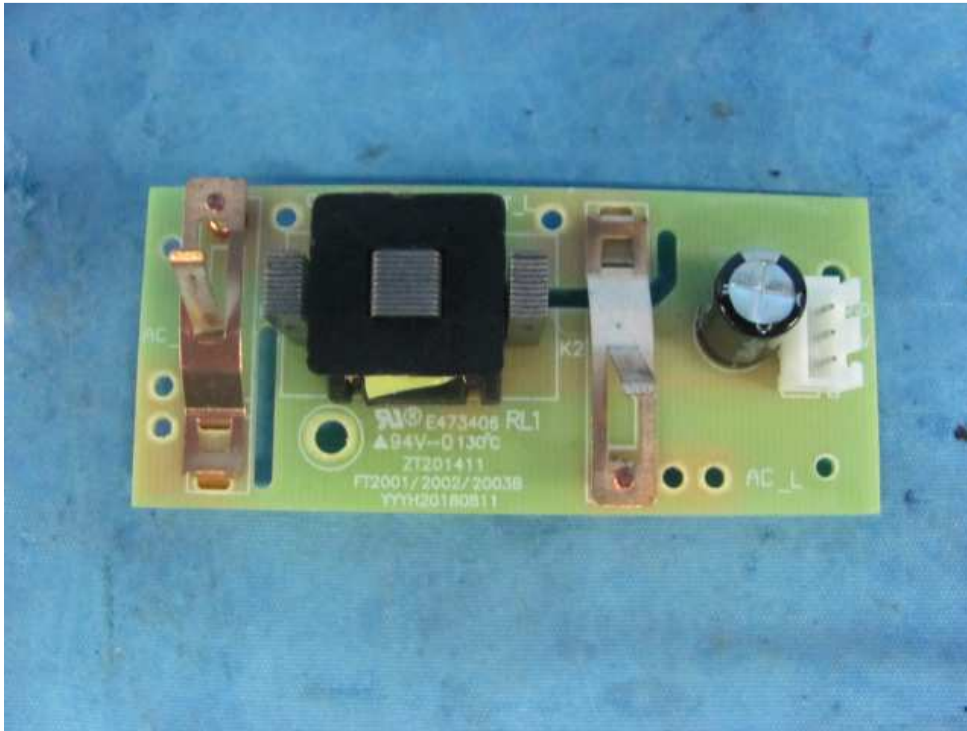


Photo 22.

Description: Power PCB view of FT2001 series, FT2001A series, FT2001B series, FT2002 series, FT2003 series, FT2003A series, FT2004 series, FT4003 series with suffix "-T"

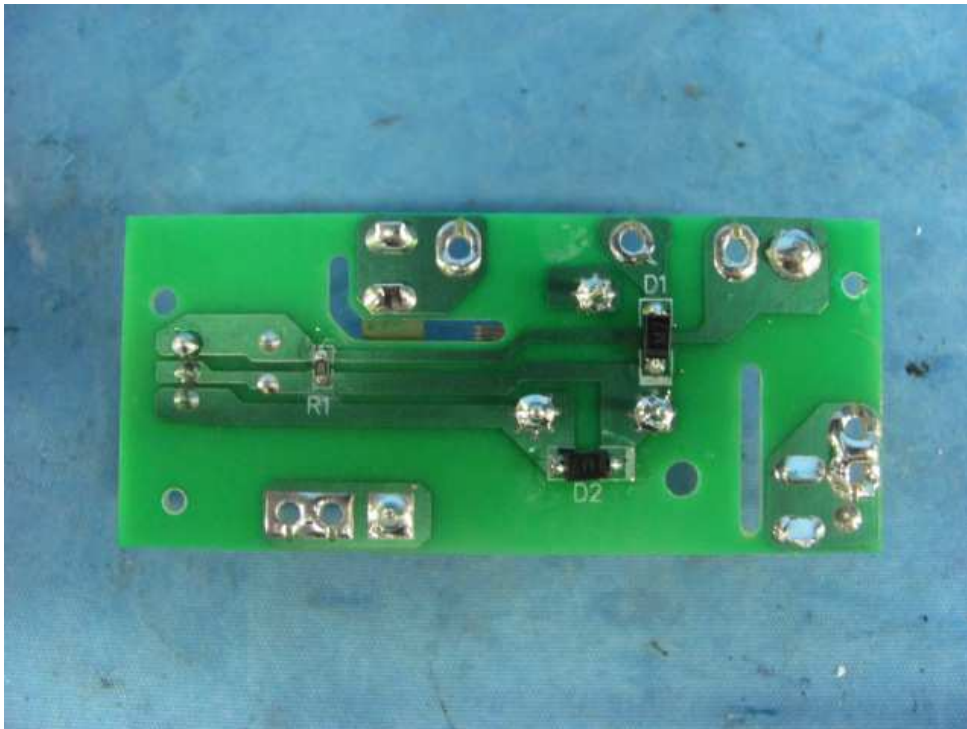


Photo 23.

Description: Control PCB view of FT2001 series, FT2001B series with suffix “-T”

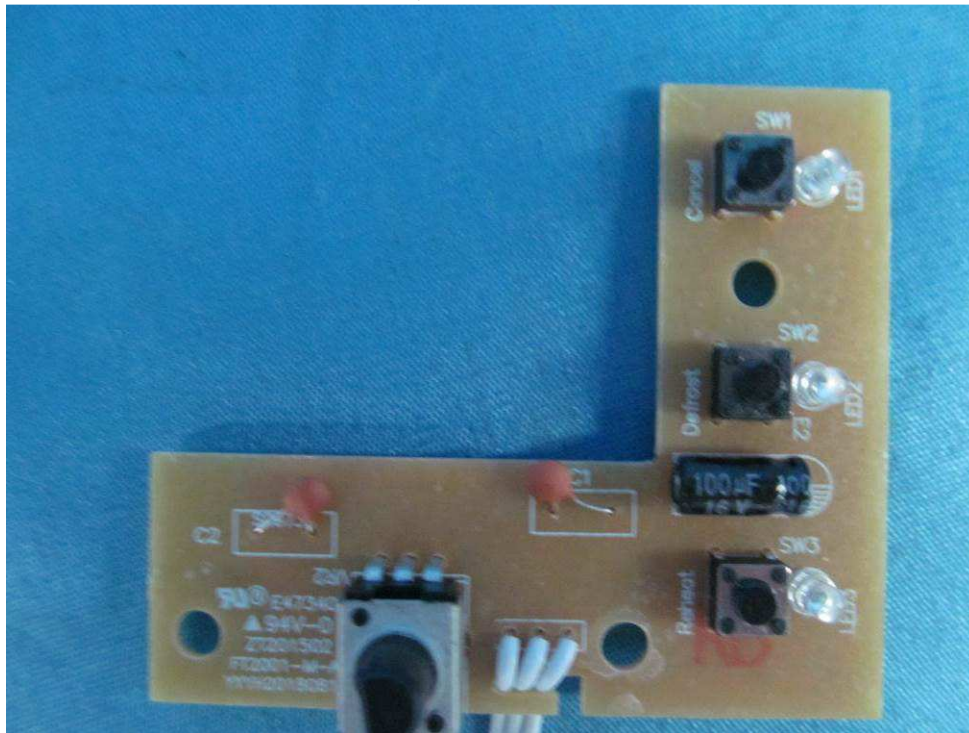


Photo 24.

Description: Control PCB view of FT2001 series, FT2001B series with suffix “-T”

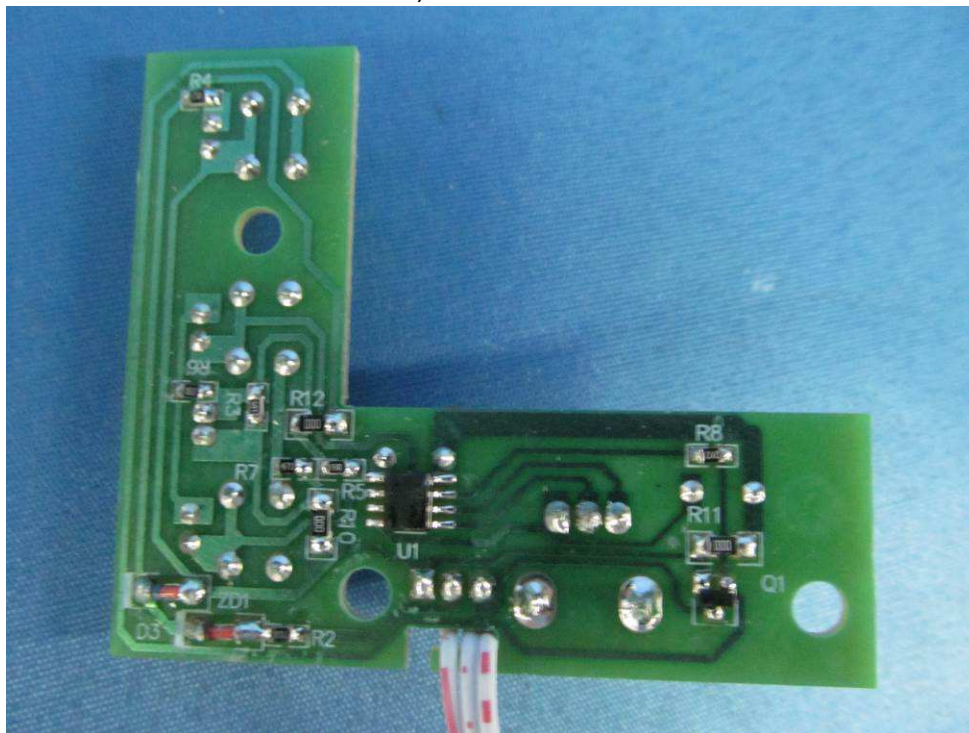


Photo 25.

Description: Control PCB view of FT2001A series with suffix "-T"

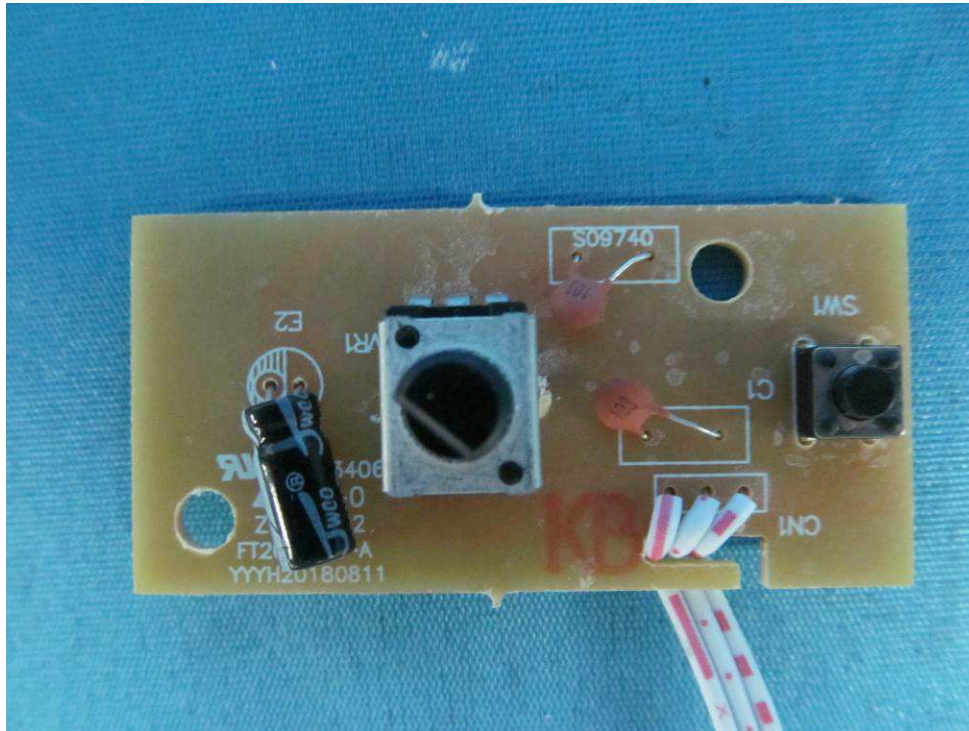


Photo 26.

Description: Control PCB view of FT2001A series with suffix "-T"

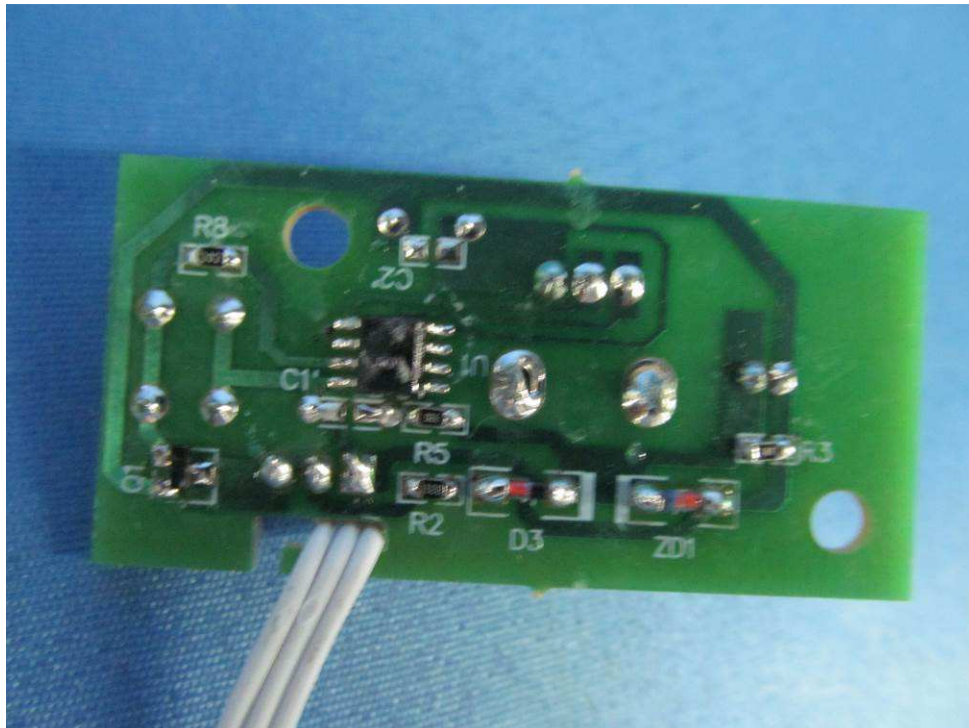




Photo 27.

Description: Control PCB view of FT2002 series with suffix "-T"

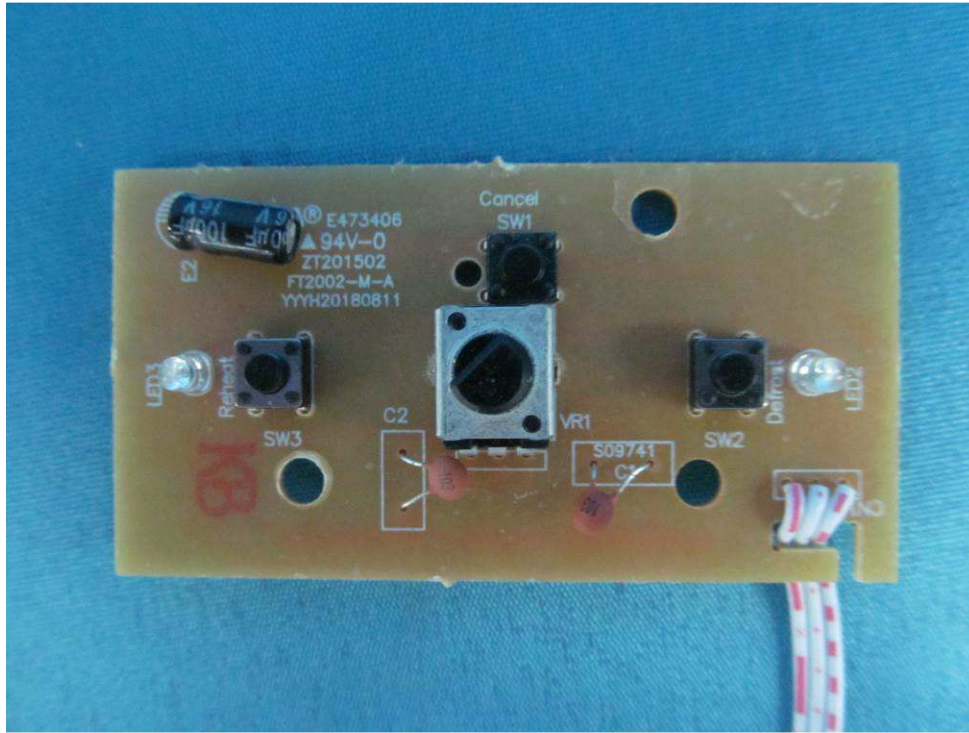


Photo 28.

Description: Control PCB view of FT2002 series with suffix "-T"

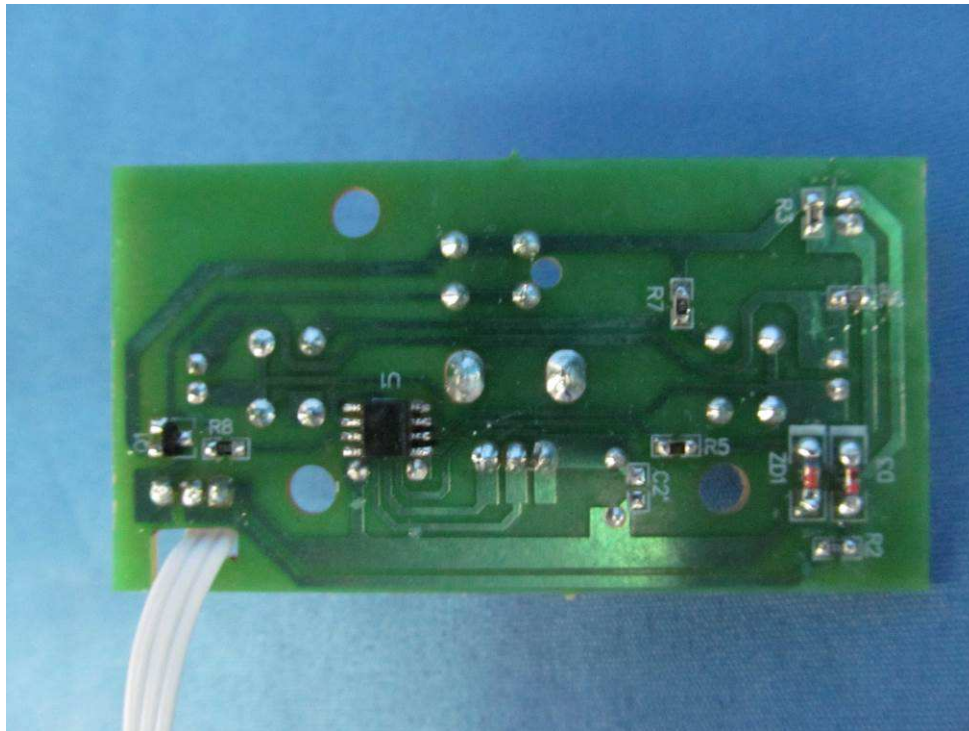


Photo 29.

Description: Control PCB view of FT2003 series, FT2004 series, FT4003 series with suffix "-T"

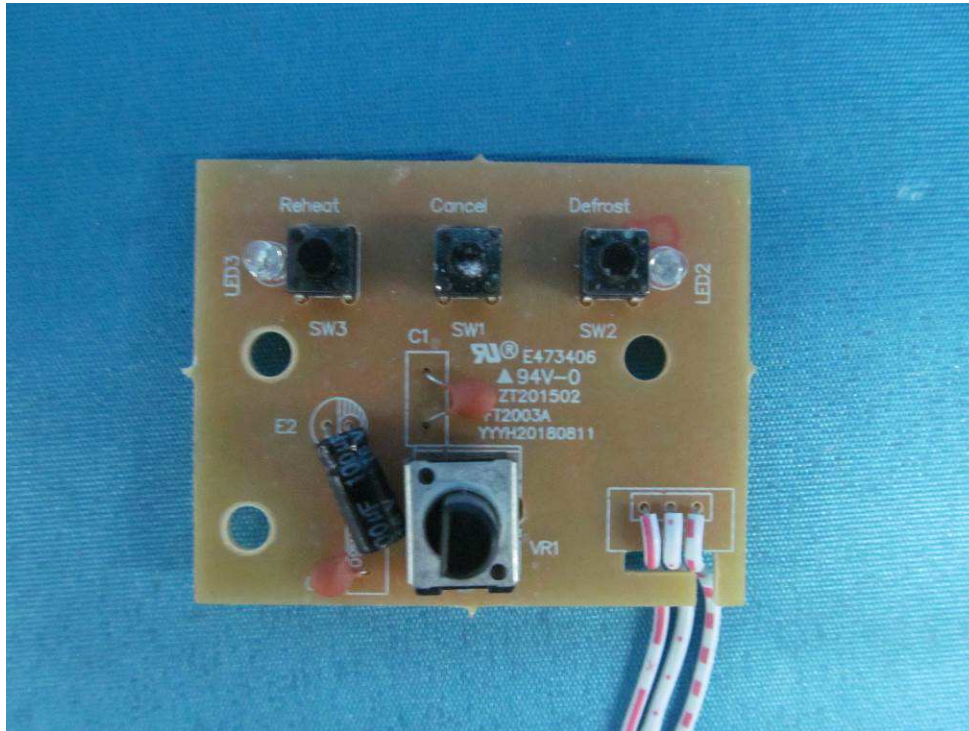


Photo 30.

Description: Control PCB view of FT2003 series, FT2004 series, FT4003 series with suffix "-T"

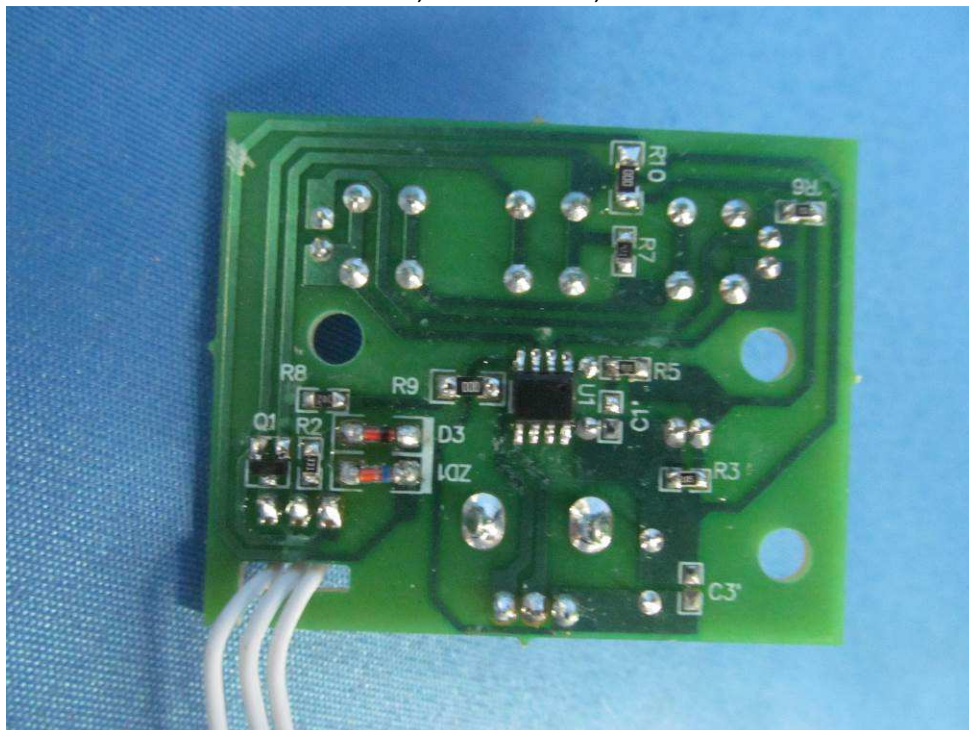


Photo 31.

Description: Over view of FT2001 series, FT2001A series, FT2001B series with suffix “-BW”



Photo 32.

Description: Over view of FT2002 series with suffix “-BW”



Photo 33.

Description: Over view of FT2003 series, FT2003A series with suffix “-BW”



Photo 34.

Description: Over view of FT4003 series with suffix “-BW”



\*\*\*END of the report\*\*\*