

EMC Test Report

Product: Fan heater

Model: All models refer to Model Number(s) on page 3

Applicant: Ningbo Baogong Electrical Appliance Co., Ltd

Fuhai Industrial Zone 315332 Cixi, Ningbo, Zhejiang
PEOPLE'S REPUBLIC OF CHINA



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Add value.
Inspire trust.

In accordance with EN IEC 55014-1,
EN IEC 55014-2, EN IEC 61000-3-2 and
EN 61000-3-3

COMMERCIAL-IN-CONFIDENCE

Issue Date: Mar. 20, 2023

Report Number: 878882213003-01

RESPONSIBLE FOR	NAME	SIGNATURE	DATE
Approved By	Qin Li		Mar. 20, 2023
Prepared By	Li ZHANG		Mar. 20, 2023

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD Product Service control rules.

EXECUTIVE SUMMARY

Two samples of this product were tested and found to be in compliance with EN IEC 55014-1:2021, EN IEC 55014-2:2021, EN IEC 61000-3-2:2019/A1:2021 and EN 61000-3-3:2013/A2:2021.

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TÜV SÜD Certification and Testing
(China) Co., Ltd. Ningbo branch

Building 2, No. 350, Jinghua Road,
Jinghua Dream Space II, Gaoxin
District Ningbo 315000 P.R. China

Phone: +86 0574 27966658
www.tuv-sud.cn



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Contents

1	Report Summary	3
1.1	Report Modification Record.....	3
1.2	Introduction.....	3
1.3	Brief Summary of Results	4
1.4	Product Information	5
1.5	Deviations from the Standard.....	6
1.6	Test Location.....	6
2	Test Details	7
2.1	Conducted Disturbance.....	7
2.2	Discontinuous Disturbance	14
2.3	Disturbance power	19
2.4	Harmonic current emission	24
2.5	Flicker	34
3	Test Equipment Information	40
3.1	General Test Equipment Used.....	40
4	Measurement Uncertainty	40
5	Photographs	41



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1 Report Summary

1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Issue	Description of Change	Date of Issue
1	First Issue	Mar. 20, 2023

1.2 Introduction

The information contained in this report is intended to show verification of the EMC Qualification Approval Testing of the requirements of the standards for the tests listed in Section 1.3.

Applicant	Ningbo Baogong Electrical Appliance Co., Ltd
Address	Fuhai Industrial Zone 315332 Cixi, Ningbo, Zhejiang PEOPLE'S REPUBLIC OF CHINA
Manufacturer	Same as above
Address	Same as above
Factory	Same as above
Address	Same as above
Model Number(s)	IFH01-20H, IFH01-20H-13, IFH01-20H-13-1, IFH01-33H-13, IFH05-33H, IFH01-33H, BGP1402-02, BGP1402-03, BGP1911-28, IFH01-20H-23, IFH01-28H-23, IFH01-30H-23, IFH01-20H-23D
Rated Voltage	AC 220-240V
Rated Frequency	50Hz
Rated Input Power	2000W (IFH01-20H, IFH01-20H-13, IFH01-20H-13-1, BGP1402-02, IFH01-20H-23, IFH01-20H-23D) 2800W (BGP1911-28, IFH01-28H-23) 3000W (IFH01-33H-13, IFH05-33H, BGP1402-03, IFH01-30H-23) 3300W (IFH01-33H)
Sample Number(s)	NIB-712523-1, NIB-712523-2
Number of Samples Tested	2
Test Specification	EN IEC 55014-1:2021, EN IEC 55014-2:2021, EN IEC 61000-3-2:2019/A1:2021 and EN 61000-3-3:2013/A1:2021.
Date of Receipt of EUT	03/07/2023
Start of Test	03/07/2023
Finish of Test	03/10/2023
Name of Engineer(s)	Li ZHANG



1.3 Brief Summary of Results

The sample's mentioned in this report is/are submitted/ supplied/ manufactured by client. The laboratory therefore assumes no responsibility for accuracy of information on the brand name, model number, origin of manufacture, consignment or any information supplied.

A brief summary of the tests carried out in accordance with EN IEC 55014-1, EN IEC 55014-2, EN IEC 61000-3-2 and EN 61000-3-3 is shown below.

Section	Specification	Clause	Test Description	Result	Comments/Base Standard
AC Powered Power on, mid & max output power, mid & max temperature					
2.1	EN IEC 55014-1:2021	4.3.3.6	Conducted Disturbance	Pass (Minimum limit margin: >6 dB)	
2.3	EN IEC 55014-1:2021	4.3.4.4	Disturbance power	Pass (Minimum limit margin: >6 dB)	
2.4	EN IEC 61000-3-2:2019/A1:2021	7	Harmonic current emission	Pass	
AC Powered Power on, mid output power, mid temperature					
2.2	EN IEC 55014-1:2021	4.4	Discontinuous Disturbance	Pass	
AC Powered Power on, max output power, max temperature, switch on/off					
2.5	EN 61000-3-3:2013/A2:2021	5	Flicker	Pass	



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1.4 Product Information

1.4.1 Technical Description

NOTICE: This report is a SUPPLEMENT OF PROJECT 878882213003-00. This report is not valid without the report of 878882213003-00.

According to client's request and declaration:

1. Four new models IFH01-20H-23, IFH01-28H-23m IFH01-30H-23 and IFH01-20H-23D were added on the E8A attestation and report.
2. The new models IFH01-28H-23 and IFH01-30H-23 have same electrical structure and motor except for rated power.
3. The new model IFH01-20H-23D is same as original certified model IFH01-20H-23 except that the new model IFH01-20H-23D with the Anti-toppling switch.

So models IFH01-20H-23 and IFH01-30H-23 were chosen to perform all the tests.

Tests are performed under mid & max output power, mid & max temperature, the worst test results are recorded below.

Due to the fact that the EUT contains no electronic control circuitry (Category I), they are deemed to fulfill the relevant immunity requirements without testing (EN IEC 55014-2:2021, clause 4.2 & 7.2.2)

1.4.2 EUT Port/Cable Identification

Port	Max Cable Length specified	Usage	Type	Screened
AC Powered Power on, mid & max output power, mid & max temperature				
AC mains port	1.0 m	Power cord	3 core	No

1.4.3 Test Configuration

Configuration	Description
AC Powered	AC 220-240V, 50Hz

1.4.4 Modes of Operation

Mode	Description
AC Powered Power on, mid & max output power, mid & max temperature	The EUT was Power on, mid & max output power, mid & max temperature.
switch on/off	The EUT was switch on/off.

1.4.5 Monitoring of Performance

The EUT works normally.

1.4.6 Performance Criteria

Performance 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 specified by



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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 reasonable expect from the apparatus if used as intended.

Performance 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 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 to persist after test. 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 reasonable expect from the apparatus if used as intended.

Performance 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 instruction for use.

1.5 Deviations from the Standard

No deviations from the applicable test standard were made during testing.

1.6 Test Location

The following tests were performed at TÜV SÜD Certification and Testing (China) Co., Ltd. Ningbo branch

Address:

Building 2, No. 350,
Jinghua Road, Jinghua Dream Space II,
Gaoxin District Ningbo 315000 P.R. China

Test Name	Name of Engineer(s)
Conducted Disturbance	Qiliang CHEN
Discontinuous Disturbance	Qiliang CHEN
Disturbance power	Qiliang CHEN
Harmonic current emission	Qiliang CHEN
Flicker	Qiliang CHEN

2 Test Details

2.1 Conducted Disturbance

2.1.1 Specification Reference

EN IEC 55014-1:2021, Clause 4.3.3.6

2.1.2 Equipment Under Test

IFH01-20H-23, IFH01-30H-23

2.1.3 Date of Test

03/10/2023

2.1.4 Test Method

Table-top EUT shall be placed:

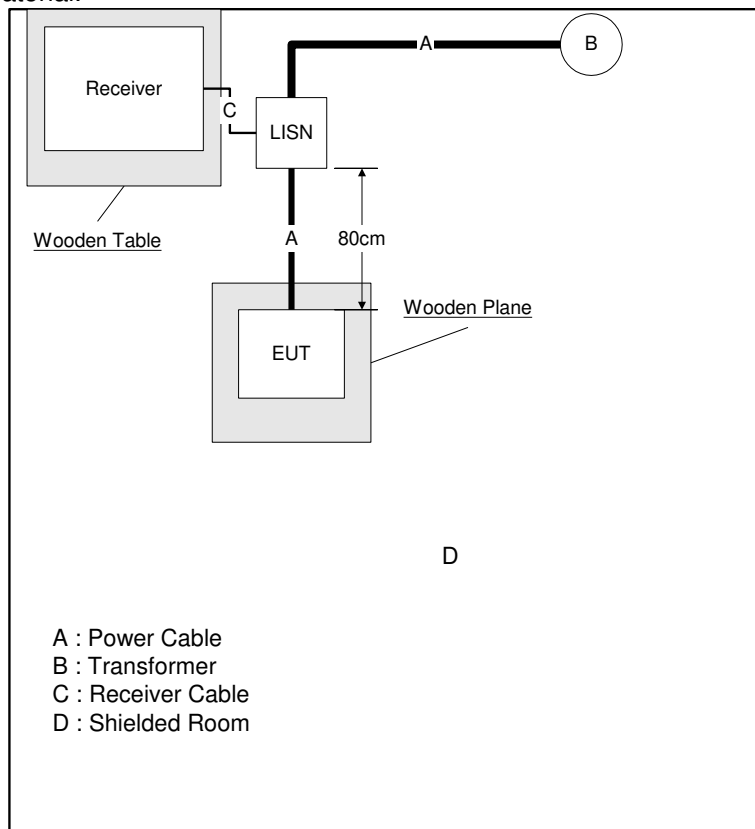
- at a distance of $(0,4 \pm 0,05)$ m from a RGP of at least $2 \text{ m} \times 2 \text{ m}$ in size;
- at a distance of 0,8 m from the AMN, and
- shall be kept at least 0,8 m from any other earthed conducting surface.

The RGP shall be either horizontal or vertical.

Floor standing EUT shall be:

- placed at a height of $(0,12 \pm 0,04)$ m above a horizontal RGP of at least $2 \text{ m} \times 2 \text{ m}$ in size,
- placed at a distance of 0,8 m from the AMN,
- kept at least 0,8 m from any other earthed conducting surface, and
- placed in a manner to ensure that the RGP extends at least 0,5 m beyond the EUT boundaries

Parts supporting the EUT and its parts at the required height shall be made of non-conductive material.





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2.1.5 Environmental Conditions

Ambient Temperature 20-25 °C
 Relative Humidity 40-60 %
 Atmospheric Pressure 1010-1040 mbar

2.1.6 Specification Limits

Household appliances and equipment causing similar disturbances and regulating controls incorporating semiconductor devices						
Frequency range	Disturbance voltage at main terminals		Disturbance voltage at associated ports		Disturbance current at associated ports	
MHz	Quasi-peak dB μ V	Average dB μ V	Quasi-peak dB μ V	Average dB μ V	Quasi-peak dB μ A	Average dB μ A
0.15 to 0.5	66 to 56	59 to 46	80	70	40 to 30	30 to 20
0.5 to 5	56	46	74	64	30	20
5 to 30	60	50	74	64		

2.1.7 Test Results

Results for Configuration and Mode: AC Powered/Power on, max output power, max temperature

Performance assessment of the EUT made during this test: Pass.

Detailed results are shown below.

150k-30MHz Conducted Emission Test

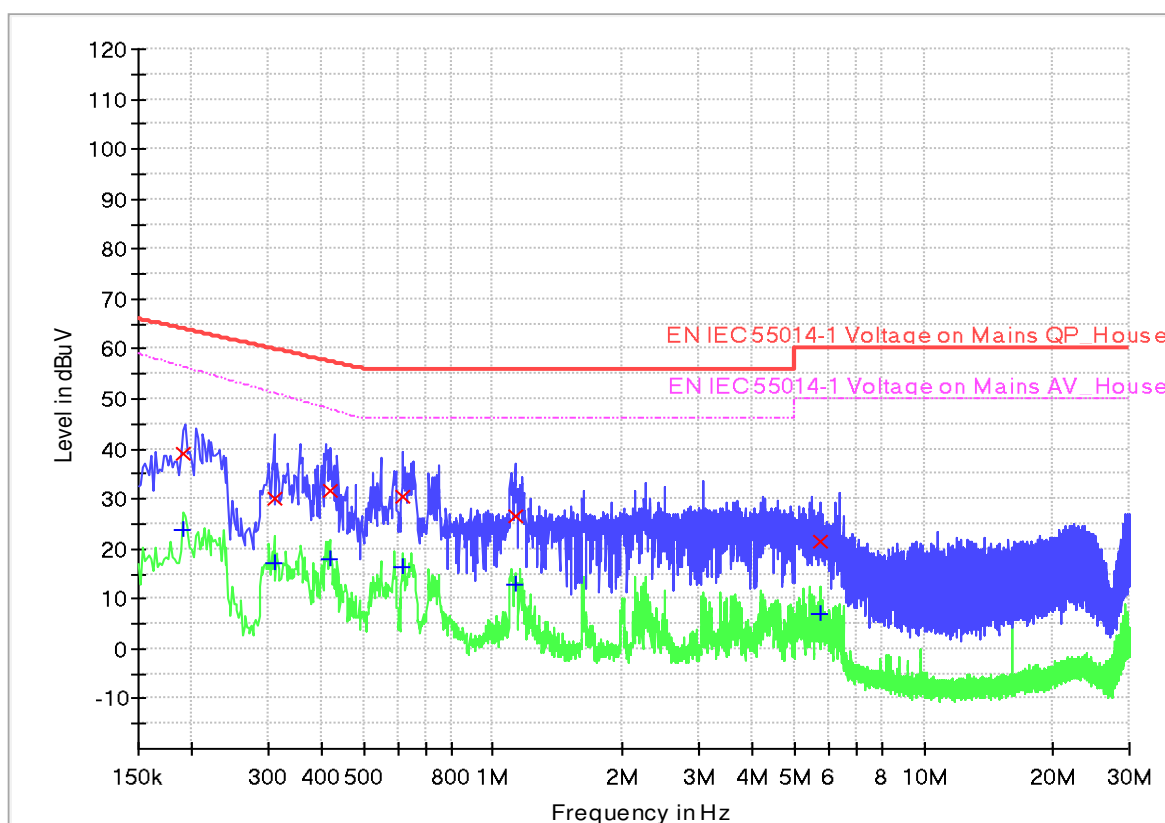
EUT Information

EUT Name: Fan Heater
 Model: IFH01-20H-23
 Client: Ningbo Baogong Electrical Appliance Co.,Ltd
 Op Cond: Power on, max output power, max temperature, AC 230V/50Hz, T23.4, H44.5%, P102.6kPa
 Operator: Qiliang Chen
 Standard: EN IEC 55014-1
 Comment: Phase L
 Sample No.: NIB-712523-1

Scan Setup: ENV216_150kHz-30MHz_Preview [EMI conducted]

Hardware Setup: ENV216(Filter ON)
 Receiver: [ESR 3]
 Level Unit: dBuV

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
150 kHz - 30 MHz	2 kHz	PK+ ; AVG	9 kHz	0.01 s	0 dB



Limit and Margin

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBuV)	Margin - CAV (dB)	Limit - CAV (dBuV)
0.190000	39.2	23.7	1000.0	9.000	L1	9.7	24.857	64.037	32.748	56.448
0.310000	30.1	17.2	1000.0	9.000	L1	9.7	29.880	59.970	33.932	51.162
0.416000	31.5	17.9	1000.0	9.000	L1	9.7	26.038	57.528	30.046	47.986
0.616000	30.6	16.2	1000.0	9.000	L1	9.7	25.390	56.000	29.780	46.000
1.122000	26.6	12.8	1000.0	9.000	L1	9.7	29.410	56.000	33.220	46.000
5.730000	21.6	7.0	1000.0	9.000	L1	9.7	38.370	60.000	42.960	50.000

150k-30MHz Conducted Emission Test

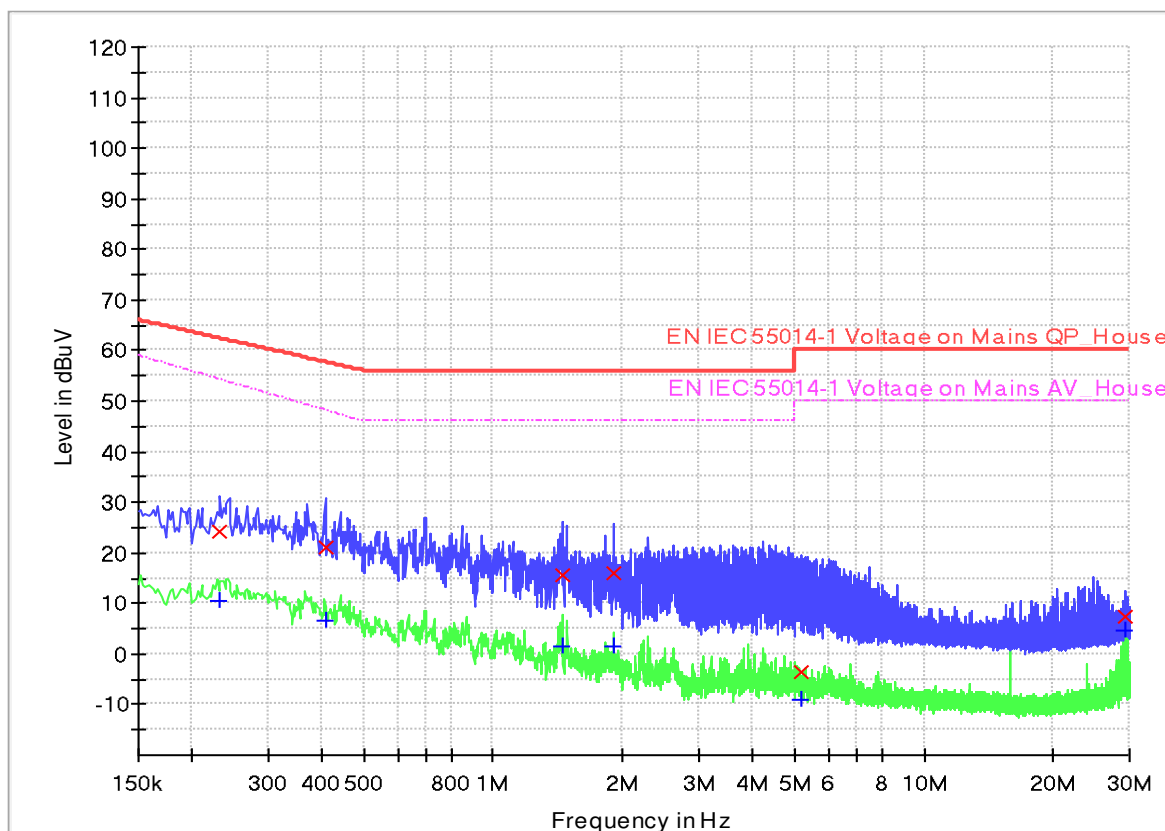
EUT Information

EUT Name: Fan Heater
 Model: IFH01-20H-23
 Client: Ningbo Baogong Electrical Appliance Co.,Ltd
 Op Cond: Power on, max output power, max temperature, AC 230V/50Hz, T23.4, H44.5%, P102.6kPa
 Operator: Qiliang Chen
 Standard: EN IEC 55014-1
 Comment: Phase N
 Sample No.: NIB-712523-1

Scan Setup: ENV216_150kHz-30MHz_Preview [EMI conducted]

Hardware Setup: ENV216(Filter ON)
 Receiver: [ESR 3]
 Level Unit: dBuV

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
150 kHz - 30 MHz	2 kHz	PK+ ; AVG	9 kHz	0.01 s	0 dB



Limit and Margin

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBuV)	Margin - CAV (dB)	Limit - CAV (dBuV)
0.232000	24.1	10.4	1000.0	9.000	N	9.7	38.308	62.378	43.861	54.291
0.408000	20.9	6.7	1000.0	9.000	N	9.7	36.809	57.689	41.526	48.196
1.452000	15.5	1.4	1000.0	9.000	N	9.7	40.490	56.000	44.610	46.000
1.902000	16.1	1.7	1000.0	9.000	N	9.7	39.950	56.000	44.330	46.000
5.170000	-3.4	-9.1	1000.0	9.000	N	9.7	63.420	60.000	59.140	50.000
29.188000	7.4	4.8	1000.0	9.000	N	9.8	52.590	60.000	45.250	50.000

150k-30MHz Conducted Emission Test

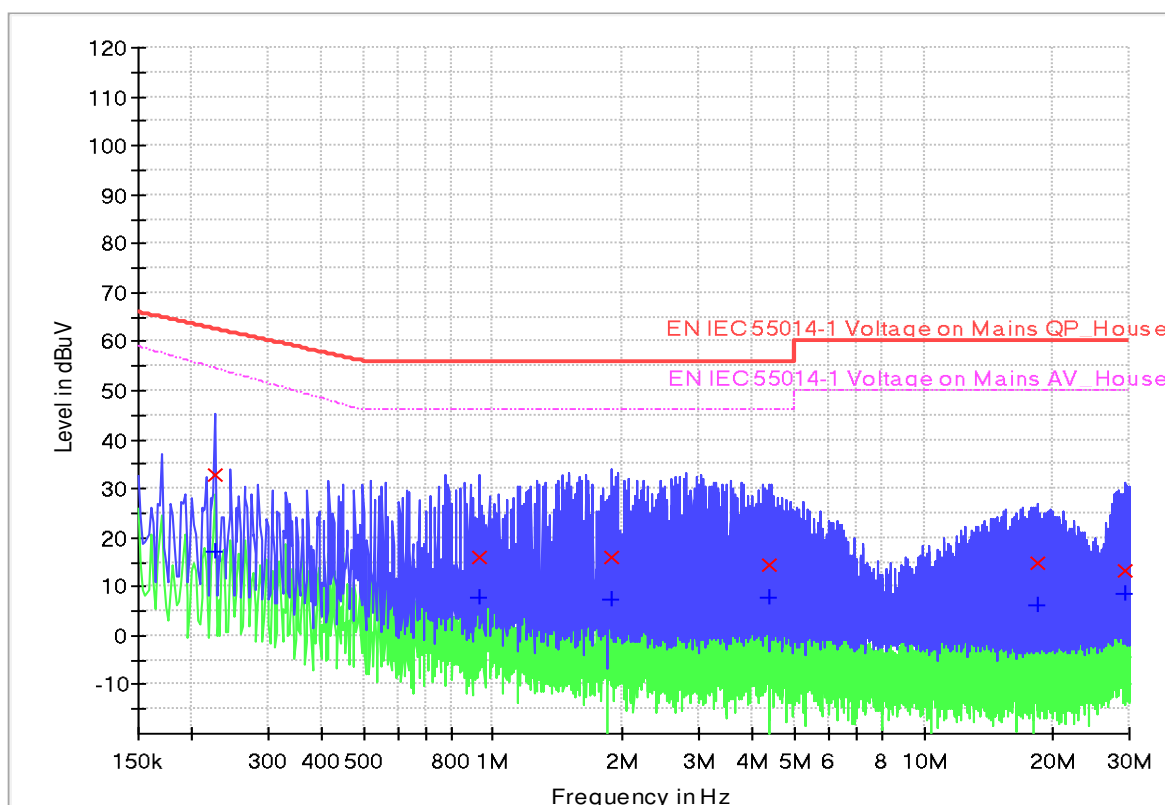
EUT Information

EUT Name: Fan Heater
 Model: IFH01-30H-23
 Client: Ningbo Baogong Electrical Appliance Co.,Ltd
 Op Cond: Power on, max output power, max temperature, AC 230V/50Hz, T23.4, H44.5%, P102.6kPa
 Operator: Qiliang Chen
 Standard: EN IEC 55014-1
 Comment: Phase L
 Sample No.: NIB-712523-2

Scan Setup: ENV216_150kHz-30MHz_Preview [EMI conducted]

Hardware Setup: ENV216(Filter ON)
 Receiver: [ESR 3]
 Level Unit: dBuV

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
150 kHz - 30 MHz	2 kHz	PK+ ; AVG	9 kHz	0.001 s	0 dB



Limit and Margin

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBuV)	Margin - CAV (dB)	Limit - CAV (dBuV)
0.226000	32.8	17.1	1000.0	9.000	L1	9.7	29.825	62.595	37.434	54.574
0.928000	16.2	7.6	1000.0	9.000	L1	9.7	39.830	56.000	38.400	46.000
1.890000	16.0	7.5	1000.0	9.000	L1	9.7	39.970	56.000	38.550	46.000
4.358000	14.3	7.9	1000.0	9.000	L1	9.7	41.680	56.000	38.120	46.000
18.468000	14.9	6.4	1000.0	9.000	L1	9.8	45.110	60.000	43.650	50.000
29.264000	13.1	8.6	1000.0	9.000	L1	9.7	46.880	60.000	41.360	50.000

150k-30MHz Conducted Emission Test

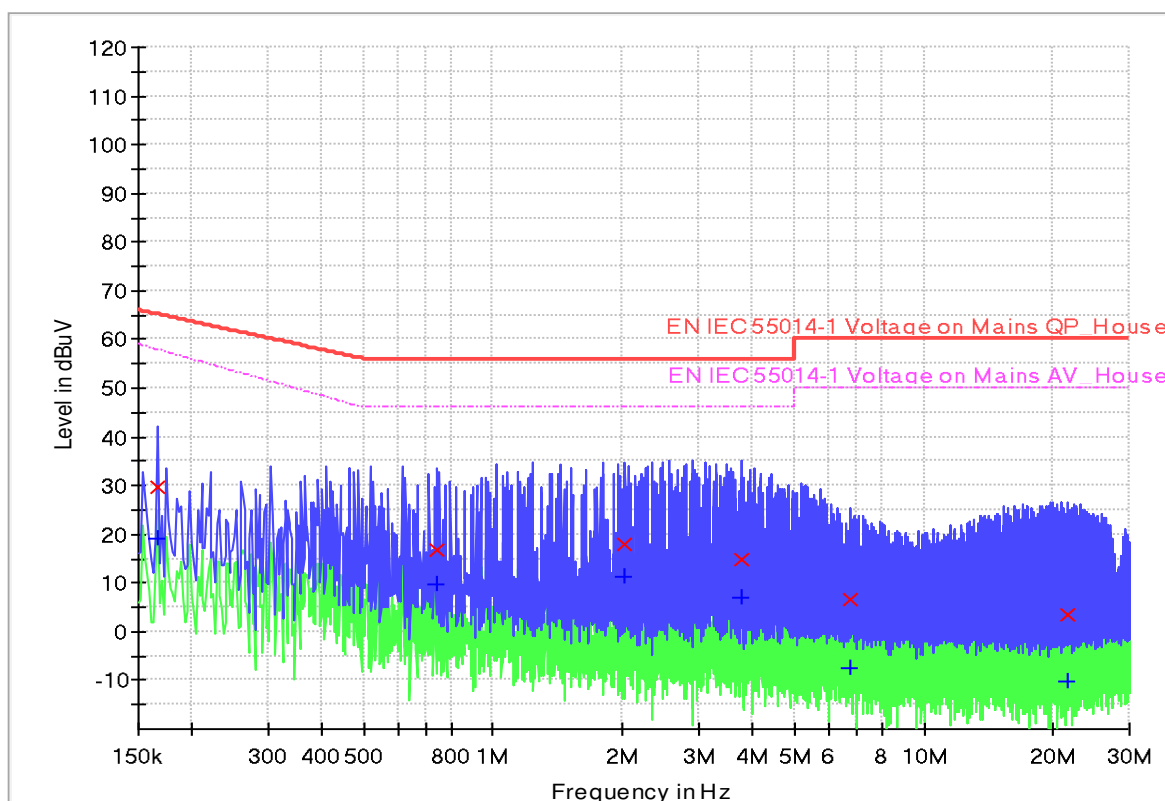
EUT Information

EUT Name: Fan Heater
 Model: IFH01-30H-23
 Client: Ningbo Baogong Electrical Appliance Co.,Ltd
 Op Cond: Power on, max output power, max temperature, AC 230V/50Hz, T23.4, H44.5%, P102.6kPa
 Operator: Qiliang Chen
 Standard: EN IEC 55014-1
 Comment: Phase N
 Sample No.: NIB-712523-2

Scan Setup: ENV216_150kHz-30MHz_Preview [EMI conducted]

Hardware Setup: ENV216(Filter ON)
 Receiver: [ESR 3]
 Level Unit: dBuV

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
150 kHz - 30 MHz	2 kHz	PK+ ; AVG	9 kHz	0.001 s	0 dB



Limit and Margin

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBuV)	Margin - CAV (dB)	Limit - CAV (dBuV)
0.166000	29.6	19.1	1000.0	9.000	N	9.7	35.558	65.158	38.816	57.906
0.742000	16.7	9.9	1000.0	9.000	N	9.7	39.340	56.000	36.120	46.000
2.026000	17.9	11.3	1000.0	9.000	N	9.7	38.060	56.000	34.670	46.000
3.780000	14.7	7.1	1000.0	9.000	N	9.7	41.290	56.000	38.880	46.000
6.712000	6.8	-7.3	1000.0	9.000	N	9.7	53.230	60.000	57.310	50.000
21.642000	3.3	-10.1	1000.0	9.000	N	9.8	56.680	60.000	60.090	50.000



Test Setup

2.1.8 Test Location

This test was carried out in shielded room 120.

2.2 Discontinuous Disturbance

2.2.1 Specification Reference

EN IEC 55014-1:2021, Clause 4.3.3.6

2.2.2 Equipment Under Test

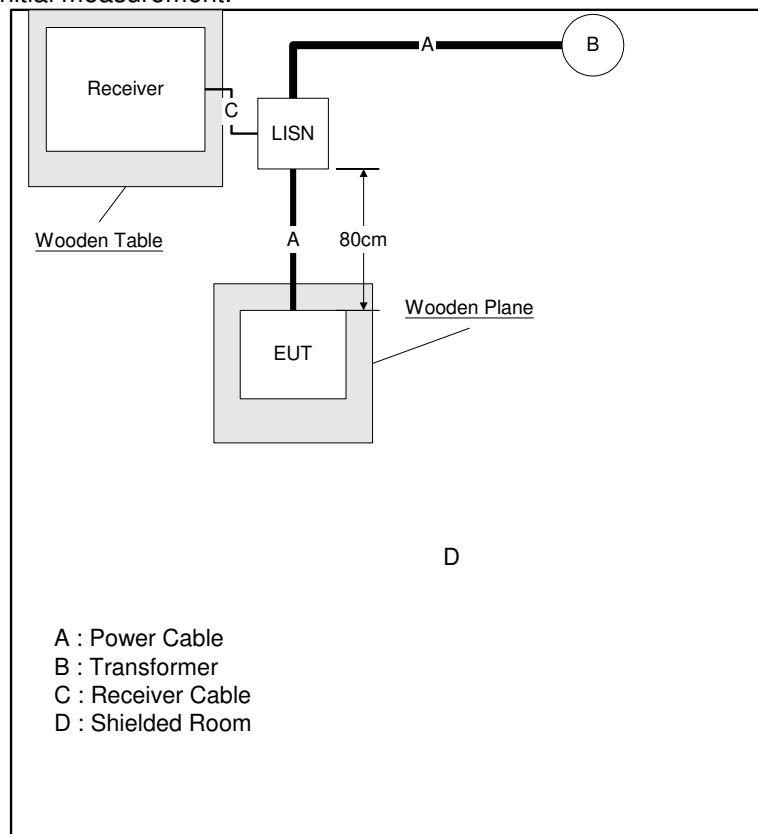
IFH01-20H-23, IFH01-30H-23

2.2.3 Date of Test

03/10/2023

2.2.4 Test Method

All power was connected to the EUT through an Artificial Mains Network (AMN). Conducted disturbance voltage measurements on mains lines were made at the output of the AMN. An initial measurement was made in an observation period of 120 minutes, or the time to register 40 clicks. The clicks obtained was compared against the corresponding click limit L_q for the required 4 individual frequencies. The test was repeated in similar period as the initial measurement. The number of clicks during the second measurement should not exceed a quarter of that measured during the initial measurement.



2.2.5 Environmental Conditions

Ambient Temperature	20-25 °C
Relative Humidity	40-60 %
Atmospheric Pressure	1010-1040 mbar



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2.2.6 Specification Limits

Frequency Range (MHz)	Click Limit Values (dBμV)	
	N < 0.2	0.2 ≤ N < 30
0.15	110dBμV	66dBμV + 20 log (30/N)
0.5	100dBμV	56dBμV + 20 log (30/N)
1.4	100dBμV	56dBμV + 20 log (30/N)
30	104dBμV	60dBμV + 20 log (30/N)
Note: N refers to click rate		

2.2.7 Test Results

Results for Configuration and Mode: AC Powered/Power on, mid output power, mid temperature

Performance assessment of the EUT made during this test: Pass.

Detailed results are shown below.



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Discontinuous Disturbance Test

EUT Information

EUT Name: Fan Heater
 Model: IFH01-20H-23
 Client: Ningbo Baogong Electrical Appliance Co.,Ltd
 Op Cond: Power on, mid output power, mid temperature, AC 230V/50Hz, T23.4, H44.5%, P102.6kPa
 Operator: Qiliang Chen
 Standard: EN IEC 55014-1
 Sample No.: NIB-712523-1

Test Duration	2:00:00	LISN Phase L1	Attenuation [dB]	35
Overload:	No			
Frequency	150 kHz	500 kHz	1.4 MHz	30 MHz
Clicks (≤10 ms)	0	0	0	0
Clicks (>10 ms ≤ 20 ms)	0	0	0	0
Clicks (> 20 ms ≤ 200 ms)	0	0	0	0
Click Rate [1/min]	0.00	0.00	0.00	0.00
Continuous Disturbances	0	0	0	0
L [dBuV]	66	56	56	60
Lq [dBuV]	110	100	100	104
Clicks > Lq	0	0	0	0
Clicks > Lq [%]	0	0	0	0
Max. Allowed Nr. of Clicks > Lq	-	-	-	-
Fridge Rules	0	0	0	0
600 ms Rule used	NO	NO	NO	NO
Overall Correction	0	0	0	0
Margin for PK Detector	0	0	0	0
Result	PASSED	PASSED	PASSED	PASSED



China

Discontinuous Disturbance Test

EUT Information

EUT Name: Fan Heater
 Model: IFH01-30H-23
 Client: Ningbo Baogong Electrical Appliance Co.,Ltd
 Op Cond: Power on, mid output power, mid temperature, AC 230V/50Hz, T23.4, H44.5%, P102.6kPa
 Operator: Qiliang Chen
 Standard: EN IEC 55014-1
 Sample No.: NIB-712523-2

Test Duration	2:00:00	LISN Phase L1	Attenuation [dB]	35
Overload:	No			
Frequency	150 kHz	500 kHz	1.4 MHz	30 MHz
Clicks (≤10 ms)	0	0	0	0
Clicks (>10 ms ≤ 20 ms)	0	0	0	0
Clicks (> 20 ms ≤ 200 ms)	0	0	0	0
Click Rate [1/min]	0.00	0.00	0.00	0.00
Continuous Disturbances	0	0	0	0
L [dBuV]	66	56	56	60
Lq [dBuV]	110	100	100	104
Clicks > Lq	0	0	0	0
Clicks > Lq [%]	0	0	0	0
Max. Allowed Nr. of Clicks > Lq	-	-	-	-
Fridge Rules	0	0	0	0
600 ms Rule used	NO	NO	NO	NO
Overall Correction	0	0	0	0
Margin for PK Detector	0	0	0	0
Result	PASSED	PASSED	PASSED	PASSED



Test Setup

2.2.8 Test Location

This test was carried out in shielded room 120.

2.3 Disturbance power**2.3.1 Specification Reference**

EN IEC 55014-1:2021, Clause 4.3.3.6

2.3.2 Equipment Under Test

IFH01-20H-23, IFH01-30H-23

2.3.3 Date of Test

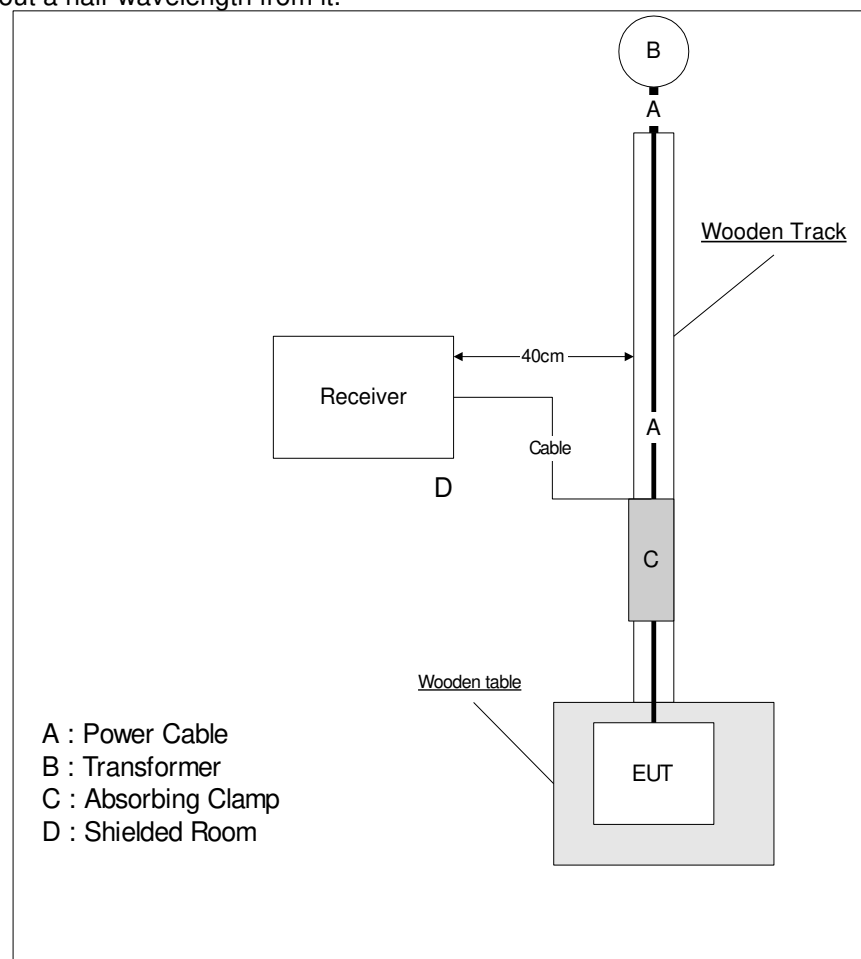
03/07/2023

2.3.4 Test Method

The distance between the clamp test set-up (the EUT, the mains lead and the absorbing clamp) and any other conductive objects (including persons, walls and ceiling, but excluding the floor) shall be at least 0,8 m. The EUT shall be placed on a non-metallic support parallel to the floor.

The height of the support (e.g. pallet) shall be $(0,12 \pm 0,04)$ m for floor standing EUT and $(0,8 \pm 0,05)$ m for table-top EUT.

The absorbing clamp shall be clamped around the lead under test and, at each test frequency, moved along the lead in order to find the position that gives the maximum indication. The maximum value is found between a position adjacent to the EUT and a distance of about a half-wavelength from it.





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2.3.5 Environmental Conditions

Ambient Temperature 20-25 °C
Relative Humidity 40-60 %
Atmospheric Pressure 1010-1040 mbar

2.3.6 Specification Limits

Disturbance power limits for frequency range 30MHz to 300MHz		
Frequency range	Household and similar appliances dB(pW)	
MHz	Quasi-peak	Average
30 to 300	45 to 55	35 to 45

Margin when performing disturbance power measurement in the frequency range 30MHz to 300MHz		
Frequency range	Household and similar appliances dB(pW)	
MHz	Quasi-peak	Average
	Increasing linearly with the frequency from	
200 to 300	0 to 10 dB	0

2.3.7 Test Results

Results for Configuration and Mode: AC Powered/Power on, max output power, max temperature

Performance assessment of the EUT made during this test: Pass.

Detailed results are shown below

Line Under Test: Power line



China

30M-300MHz Disturbance Power Test

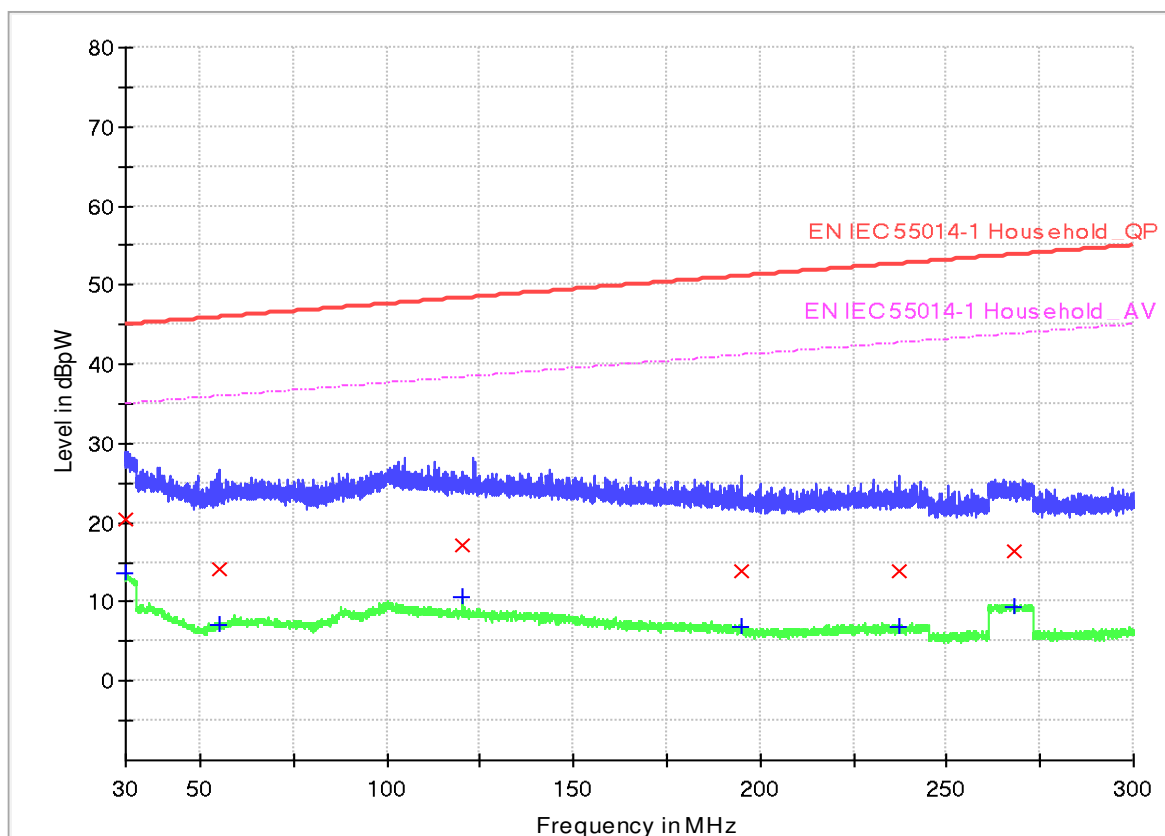
EUT Information

EUT Name: Fan Heater
 Model: IFH01-20H-23
 Client: Ningbo Baogong Electrical Appliance Co.,Ltd
 Op cond: Power on, max output power, max temperature, AC 230V/50Hz, T21.9, H42.1%, P102.5kPa
 Operator: Qiliang CHEN
 Test Spec: EN IEC 55014-1
 Comment: AC line
 Sample No.: NIB-712523-1

Scan Setup: MDS21_30MHz-300MHz_Preview [EMI conducted]

Hardware Setup: MDS21
 Receiver: [ESR 3]
 Level Unit: dBpW

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 300 MHz	40 kHz	PK+ ; AVG	120 kHz	0.01 s	0 dB



Limit and Margin

Frequency (MHz)	QuasiPeak (dBpW)	CAverage (dBpW)	Meas. Time (ms)	Bandwidth (kHz)	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBpW)	Margin - CAV (dB)	Limit - CAV (dBpW)
30.000000	20.4	13.7	1000.0	120.000	9.1	24.6	45.0	21.3	35.0
55.320000	14.1	7.0	1000.0	120.000	7.3	31.9	45.9	28.9	35.9
120.000000	17.2	10.5	1000.0	120.000	8.2	31.2	48.3	27.8	38.3
194.880000	13.9	6.9	1000.0	120.000	5.5	37.3	51.1	34.2	41.1
237.440000	13.8	6.9	1000.0	120.000	5.5	38.9	52.7	35.8	42.7
267.760000	16.4	9.5	1000.0	120.000	5.7	37.5	53.8	34.3	43.8

30M-300MHz Disturbance Power Test

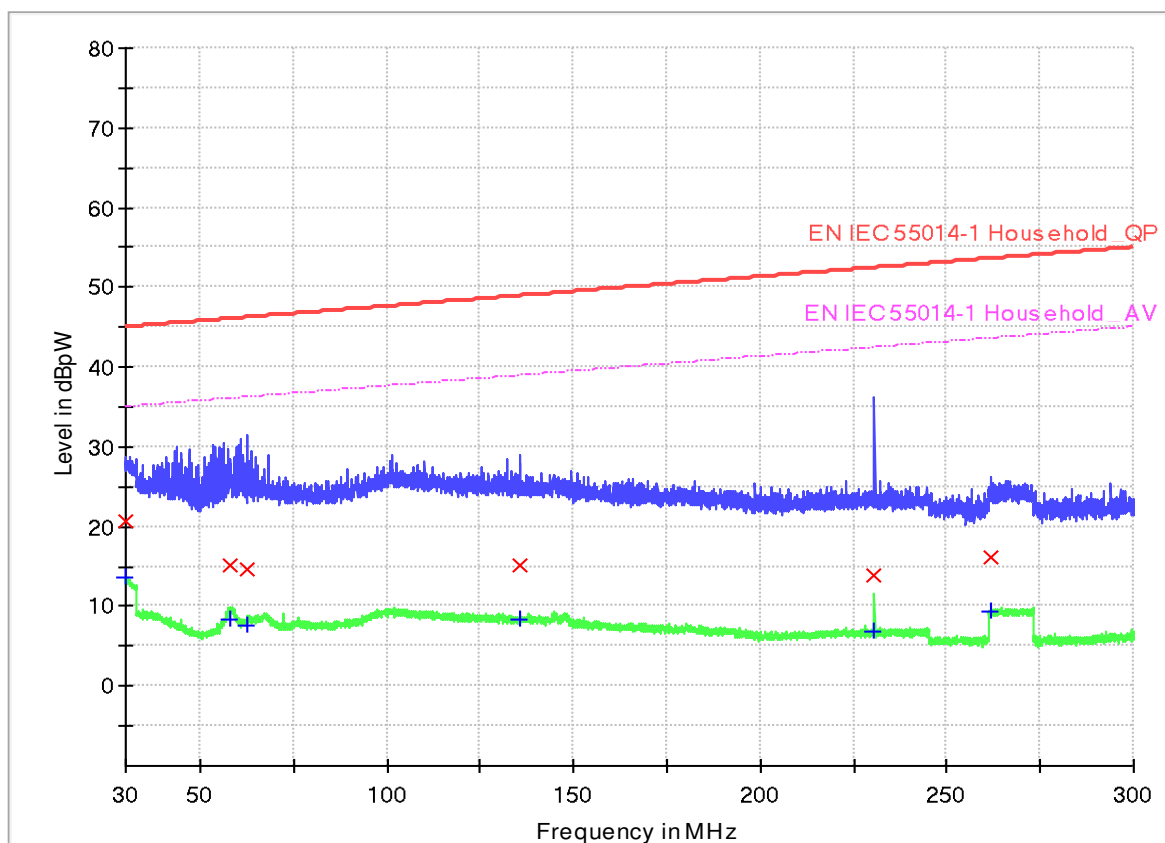
EUT Information

EUT Name: Fan Heater
 Model: IFH01-30H-23
 Client: Ningbo Baogong Electrical Appliance Co.,Ltd
 Op cond: Power on, max output power, max temperature, AC 230V/50Hz, T21.9, H42.1%, P102.5kPa
 Operator: Qiliang CHEN
 Test Spec: EN IEC 55014-1
 Comment: AC line
 Sample No.: NIB-712523-2

Scan Setup: MDS21_30MHz-300MHz_Preview [EMI conducted]

Hardware Setup: MDS21
 Receiver: [ESR 3]
 Level Unit: dBpW

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 300 MHz	40 kHz	PK+ ; AVG	120 kHz	0.01 s	0 dB



Limit and Margin

Frequency (MHz)	QuasiPeak (dBpW)	CAverage (dBpW)	Meas. Time (ms)	Bandwidth (kHz)	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBpW)	Margin - CAV (dB)	Limit - CAV (dBpW)
30.000000	20.6	13.7	1000.0	120.000	9.1	24.5	45.0	21.3	35.0
58.120000	15.2	8.3	1000.0	120.000	7.6	30.9	46.0	27.7	36.0
62.640000	14.6	7.7	1000.0	120.000	7.7	31.6	46.2	28.5	36.2
135.760000	15.1	8.2	1000.0	120.000	7.7	33.8	48.9	30.7	38.9
230.640000	13.8	6.9	1000.0	120.000	5.5	38.6	52.4	35.6	42.4
261.960000	16.3	9.4	1000.0	120.000	5.7	37.3	53.6	34.2	43.6



Test Setup

2.3.8 Test Location

This test was carried out in shielded room 119.

2.4 Harmonic current emission

2.4.1 Specification Reference

EN IEC 61000-3-2:2019/A1:2021, Clause 7

2.4.2 Equipment Under Test

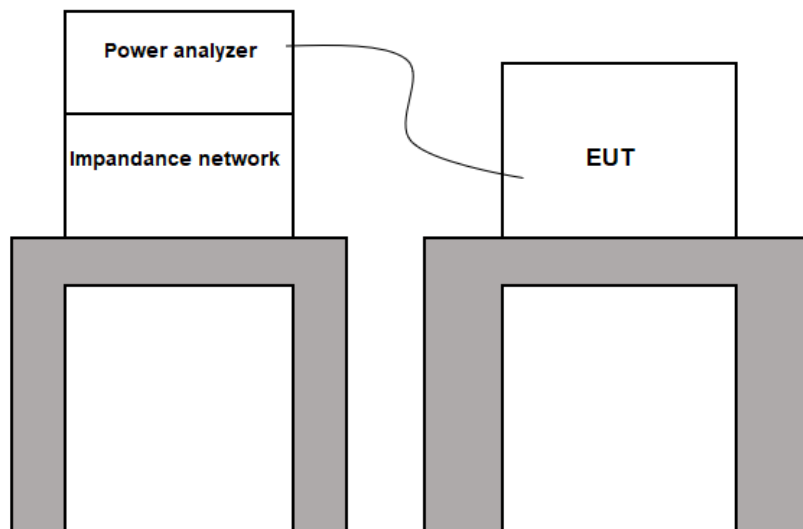
IFH01-20H-23, IFH01-30H-23

2.4.3 Date of Test

03/07/2023

2.4.4 Test Method

Harmonic components shall be measured in accordance with the requirements given in Annex A of EN IEC 61000-3-2 for the test circuit and the supply source.



2.4.5 Environmental Conditions

Ambient Temperature	20-25 °C
Relative Humidity	40-60 %
Atmospheric Pressure	1010-1040 mbar



China

2.4.6 Specification Limits

Limits for class A Equipment	
Harmonic order h	Maximum permissible harmonic current A
Odd harmonics	
3	2.30
5	1.14
7	0.77
9	0.40
11	0.33
13	0.21
$15 \leq h \leq 39$	$0.15(15/h)$
Even harmonics	
2	1.08
4	0.43
6	0.30
$8 \leq h \leq 40$	$0.23(8/h)$

2.4.7 Test Results

Results for Configuration and Mode: AC Powered/Power on, max output power, max temperature

Performance assessment of the EUT made during this test: Pass.

Detailed results are shown below.



China

Test Report

Report Number : 878882213003-01

Test Object : Fan Heater IFH01-20H-23 Power on, max output power, max temperature

Test Standard : IEC 61000-3-2 (Edition 5.1)
Limits for harmonic current emissions (equipment input current < 16 A per phase)

Tester : Qiliang Chen

Test Date : 3/7/2023 9:02:34 PM

Climatic Conditions

Temperature : 22 °C Pressure : 103 kPa Humidity : 52 %

Standard Group: Industry

Standard Name: IEC 61000-3-2 (Edition 5.1)
Limits for harmonic current emissions (equipment input current < 16 A per phase)

Device Under Test: **PASS**

Power Source: **PASS**

Connection Type: L - N

Classification: Class A

Appli. of Limits: less than or equal to 150 % (Without POHC Enhancement)

Check Harmonics 2..40

First detected harmonic order > 150 %

Line 1: **None**

Harmonics orders > 150 %

Line 1: **None**

Harmonics orders with average > 100 %

Line 1: **None**

Measured values

Fundamental Current

Line 1: 8.125 A

Active input Power

Line 1: 1876.9 W *

Circuit power factor

Line 1: 1 *

* Absolute value.



China

Current Test Result

Average and Maximum harmonic current results									
Hn	Average				Maximum				Harmonic Result
	I _{eff} [A]	of Limit [%]	Limit [A]	Result	I _{eff} [A]	of Limit [%]	Limit [A]	Result	
1	8.120				8.125				
2	0.007	0.604	1.080	n/a	0.007	0.448	1.620	n/a	PASS
3	0.003	0.145	2.300	n/a	0.004	0.126	3.450	n/a	PASS
4	0.002	0.514	0.430	n/a	0.003	0.445	0.645	n/a	PASS
5	0.003	0.221	1.140	n/a	0.003	0.167	1.710	n/a	PASS
6	0.002	0.675	0.300	n/a	0.002	0.528	0.450	n/a	PASS
7	0.002	0.207	0.770	n/a	0.002	0.172	1.155	n/a	PASS
8	0.001	0.553	0.230	n/a	0.001	0.429	0.345	n/a	PASS
9	0.001	0.308	0.400	n/a	0.002	0.275	0.600	n/a	PASS
10	0.001	0.541	0.184	n/a	0.001	0.428	0.276	n/a	PASS
11	0.001	0.232	0.330	n/a	0.001	0.206	0.495	n/a	PASS
12	0.001	0.708	0.153	n/a	0.001	0.571	0.230	n/a	PASS
13	0.001	0.438	0.210	n/a	0.001	0.370	0.315	n/a	PASS
14	0.001	0.736	0.131	n/a	0.001	0.592	0.197	n/a	PASS
15	0.001	0.718	0.150	n/a	0.001	0.597	0.225	n/a	PASS
16	0.001	0.815	0.115	n/a	0.001	0.677	0.173	n/a	PASS
17	0.001	0.776	0.132	n/a	0.001	0.682	0.199	n/a	PASS
18	0.001	0.768	0.102	n/a	0.001	0.679	0.153	n/a	PASS
19	0.001	0.719	0.118	n/a	0.001	0.548	0.178	n/a	PASS
20	0.001	0.790	0.092	n/a	0.001	0.639	0.138	n/a	PASS
21	0.001	0.763	0.107	n/a	0.001	0.661	0.161	n/a	PASS
22	0.001	1.115	0.084	n/a	0.001	0.938	0.125	n/a	PASS
23	0.001	1.011	0.098	n/a	0.001	0.801	0.147	n/a	PASS
24	0.001	0.846	0.077	n/a	0.001	0.692	0.115	n/a	PASS
25	0.001	0.910	0.090	n/a	0.001	0.733	0.135	n/a	PASS
26	0.001	1.199	0.071	n/a	0.001	1.014	0.106	n/a	PASS
27	0.001	1.137	0.083	n/a	0.001	0.891	0.125	n/a	PASS
28	0.001	1.073	0.066	n/a	0.001	0.850	0.099	n/a	PASS
29	0.001	0.885	0.078	n/a	0.001	0.721	0.116	n/a	PASS
30	0.001	1.137	0.061	n/a	0.001	0.914	0.092	n/a	PASS
31	0.001	0.979	0.073	n/a	0.001	0.778	0.109	n/a	PASS
32	0.001	1.492	0.058	n/a	0.001	1.296	0.086	n/a	PASS
33	0.001	1.290	0.068	n/a	0.001	1.040	0.102	n/a	PASS
34	0.001	1.338	0.054	n/a	0.001	1.066	0.081	n/a	PASS
35	0.001	1.644	0.064	n/a	0.001	1.311	0.096	n/a	PASS
36	0.001	1.270	0.051	n/a	0.001	1.068	0.077	n/a	PASS
37	0.001	1.692	0.061	n/a	0.001	1.407	0.091	n/a	PASS
38	0.001	1.559	0.048	n/a	0.001	1.229	0.073	n/a	PASS
39	0.001	1.643	0.058	n/a	0.001	1.352	0.087	n/a	PASS
40	0.001	1.704	0.046	n/a	0.001	1.317	0.069	n/a	PASS

Note: 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.



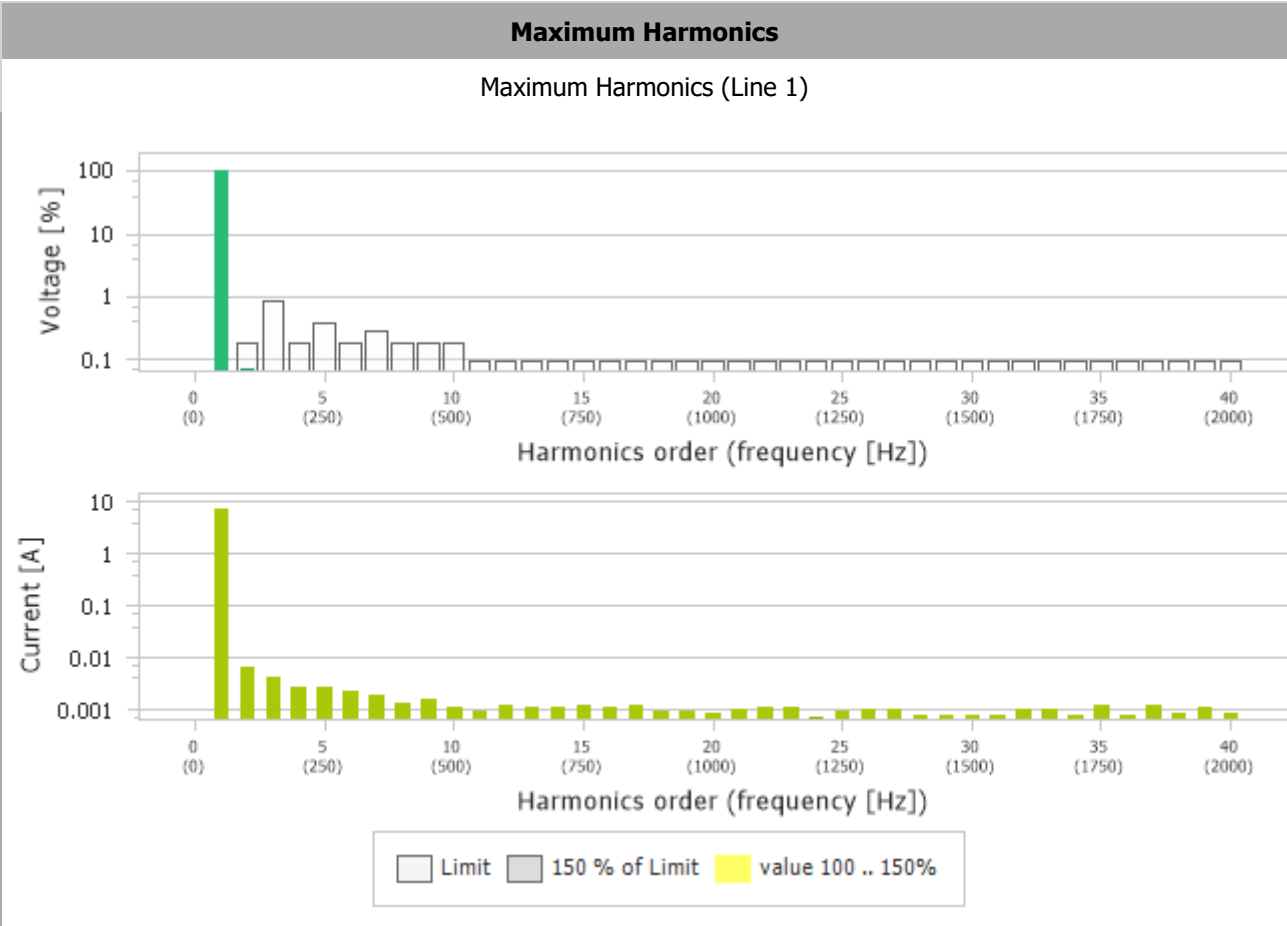
China

Voltage Source Verification

Harmonic voltage results				
Hn	Ueff [V]	Ueff [%]	Limit [%]	Result
1	231.029	100.447		
2	0.168	0.073	0.200	PASS
3	0.049	0.021	0.900	PASS
4	0.072	0.031	0.200	PASS
5	0.041	0.018	0.400	PASS
6	0.048	0.021	0.200	PASS
7	0.042	0.018	0.300	PASS
8	0.038	0.017	0.200	PASS
9	0.045	0.020	0.200	PASS
10	0.031	0.014	0.200	PASS
11	0.028	0.012	0.100	PASS
12	0.028	0.012	0.100	PASS
13	0.029	0.013	0.100	PASS
14	0.025	0.011	0.100	PASS
15	0.023	0.010	0.100	PASS
16	0.020	0.009	0.100	PASS
17	0.020	0.009	0.100	PASS
18	0.017	0.008	0.100	PASS
19	0.019	0.008	0.100	PASS
20	0.018	0.008	0.100	PASS
21	0.018	0.008	0.100	PASS
22	0.017	0.008	0.100	PASS
23	0.014	0.006	0.100	PASS
24	0.015	0.007	0.100	PASS
25	0.014	0.006	0.100	PASS
26	0.012	0.005	0.100	PASS
27	0.022	0.010	0.100	PASS
28	0.015	0.007	0.100	PASS
29	0.017	0.007	0.100	PASS
30	0.018	0.008	0.100	PASS
31	0.012	0.005	0.100	PASS
32	0.018	0.008	0.100	PASS
33	0.019	0.008	0.100	PASS
34	0.009	0.004	0.100	PASS
35	0.014	0.006	0.100	PASS
36	0.008	0.004	0.100	PASS
37	0.011	0.005	0.100	PASS
38	0.014	0.006	0.100	PASS
39	0.016	0.007	0.100	PASS
40	0.014	0.006	0.100	PASS



China





China

Test Report

Report Number : 878882213003-01

Test Object : Fan Heater IFH01-30H-23 Power on, max output power, max temperature

Test Standard : IEC 61000-3-2 (Edition 5.1)
Limits for harmonic current emissions (equipment input current < 16 A per phase)

Tester : Qiliang Chen

Test Date : 3/7/2023 3:26:09 PM

Climatic Conditions

Temperature : 22 °C Pressure : 103 kPa Humidity : 52 %

Standard Group: Industry

Standard Name: IEC 61000-3-2 (Edition 5.1)
Limits for harmonic current emissions (equipment input current < 16 A per phase)

Device Under Test: **PASS**

Power Source: **PASS**

Connection Type: L - N

Classification: Class A

Appli. of Limits: less than or equal to 150 % (Without POHC Enhancement)

Check Harmonics 2..40

First detected harmonic order > 150 %

Line 1: **None**

Harmonics orders > 150 %

Line 1: **None**

Harmonics orders with average > 100 %

Line 1: **None**

Measured values

Fundamental Current

Line 1: 12.531 A

Active input Power

Line 1: 2891.679 W *

Circuit power factor

Line 1: 1 *

* Absolute value.



China

Current Test Result

Average and Maximum harmonic current results									
Hn	Average				Maximum				Harmonic Result
	I _{eff} [A]	of Limit [%]	Limit [A]	Result	I _{eff} [A]	of Limit [%]	Limit [A]	Result	
1	7.809				12.529				
2	0.008	0.716	1.080	n/a	0.106	6.563	1.620	PASS	PASS
3	0.002	0.105	2.300	n/a	0.089	2.571	3.450	PASS	PASS
4	0.003	0.799	0.430	n/a	0.063	9.773	0.645	n/a	PASS
5	0.003	0.239	1.140	n/a	0.049	2.880	1.710	n/a	PASS
6	0.002	0.762	0.300	n/a	0.040	8.852	0.450	n/a	PASS
7	0.003	0.353	0.770	n/a	0.034	2.947	1.155	n/a	PASS
8	0.002	0.768	0.230	n/a	0.029	8.497	0.345	n/a	PASS
9	0.003	0.629	0.400	n/a	0.027	4.457	0.600	n/a	PASS
10	0.001	0.811	0.184	n/a	0.024	8.534	0.276	n/a	PASS
11	0.002	0.586	0.330	n/a	0.022	4.410	0.495	n/a	PASS
12	0.001	0.854	0.153	n/a	0.020	8.601	0.230	n/a	PASS
13	0.002	0.866	0.210	n/a	0.019	5.881	0.315	n/a	PASS
14	0.001	0.930	0.131	n/a	0.017	8.658	0.197	n/a	PASS
15	0.002	1.024	0.150	n/a	0.016	7.130	0.225	n/a	PASS
16	0.001	0.956	0.115	n/a	0.015	8.607	0.173	n/a	PASS
17	0.001	1.088	0.132	n/a	0.014	7.185	0.199	n/a	PASS
18	0.001	1.067	0.102	n/a	0.013	8.542	0.153	n/a	PASS
19	0.001	0.962	0.118	n/a	0.013	7.187	0.178	n/a	PASS
20	0.001	1.094	0.092	n/a	0.012	8.578	0.138	n/a	PASS
21	0.001	0.989	0.107	n/a	0.012	7.195	0.161	n/a	PASS
22	0.001	1.406	0.084	n/a	0.011	8.754	0.125	n/a	PASS
23	0.001	1.025	0.098	n/a	0.011	7.391	0.147	n/a	PASS
24	0.001	1.254	0.077	n/a	0.010	8.896	0.115	n/a	PASS
25	0.001	1.059	0.090	n/a	0.010	7.546	0.135	n/a	PASS
26	0.001	1.484	0.071	n/a	0.010	9.045	0.106	n/a	PASS
27	0.001	1.274	0.083	n/a	0.010	7.638	0.125	n/a	PASS
28	0.001	1.411	0.066	n/a	0.009	9.227	0.099	n/a	PASS
29	0.001	1.309	0.078	n/a	0.009	7.761	0.116	n/a	PASS
30	0.001	1.502	0.061	n/a	0.009	9.305	0.092	n/a	PASS
31	0.001	1.368	0.073	n/a	0.009	7.841	0.109	n/a	PASS
32	0.001	1.521	0.058	n/a	0.008	9.350	0.086	n/a	PASS
33	0.001	1.354	0.068	n/a	0.008	7.884	0.102	n/a	PASS
34	0.001	1.640	0.054	n/a	0.008	9.662	0.081	n/a	PASS
35	0.001	1.504	0.064	n/a	0.008	7.943	0.096	n/a	PASS
36	0.001	1.669	0.051	n/a	0.007	9.647	0.077	n/a	PASS
37	0.001	1.411	0.061	n/a	0.008	8.235	0.091	n/a	PASS
38	0.001	1.799	0.048	n/a	0.007	9.877	0.073	n/a	PASS
39	0.001	1.628	0.058	n/a	0.007	8.357	0.087	n/a	PASS
40	0.001	1.942	0.046	n/a	0.007	10.033	0.069	n/a	PASS

Note: 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.



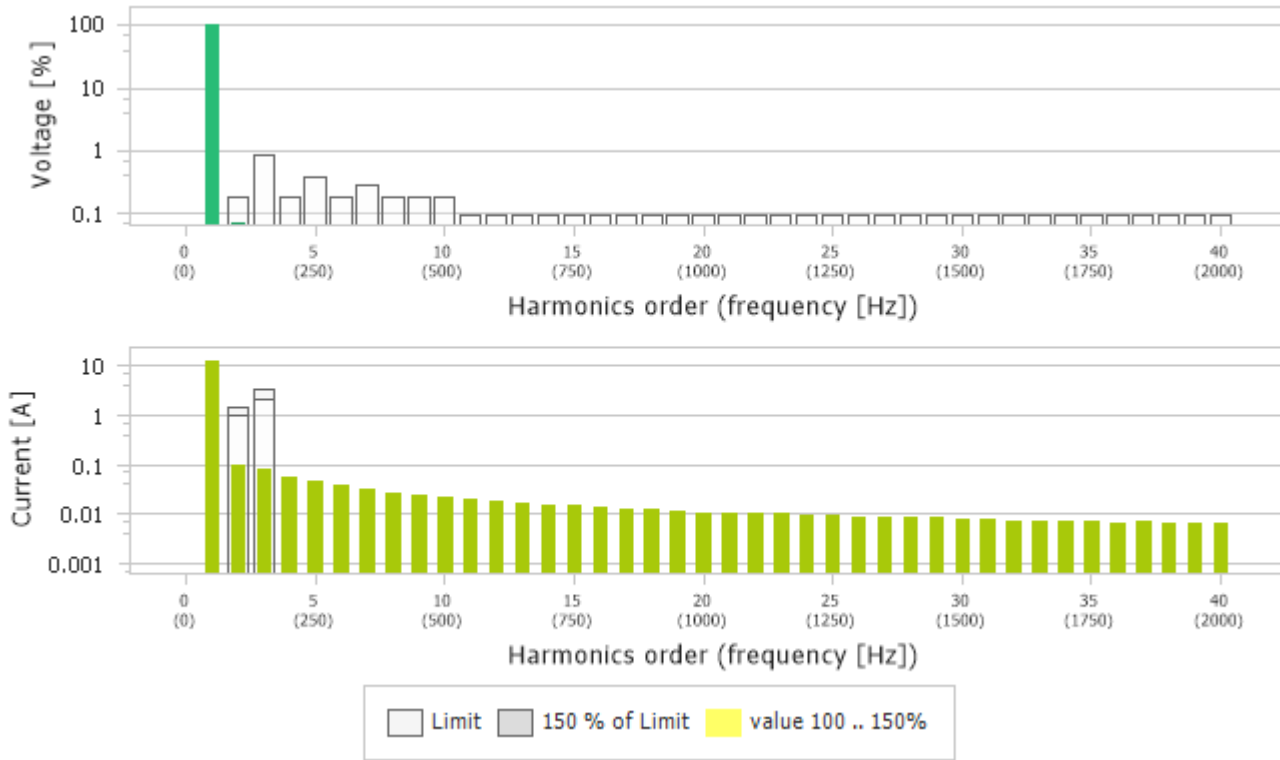
China

Voltage Source Verification

Harmonic voltage results				
Hn	Ueff [V]	Ueff [%]	Limit [%]	Result
1	231.492	100.649		
2	0.169	0.074	0.200	PASS
3	0.050	0.022	0.900	PASS
4	0.075	0.032	0.200	PASS
5	0.043	0.019	0.400	PASS
6	0.048	0.021	0.200	PASS
7	0.045	0.019	0.300	PASS
8	0.037	0.016	0.200	PASS
9	0.051	0.022	0.200	PASS
10	0.032	0.014	0.200	PASS
11	0.029	0.013	0.100	PASS
12	0.027	0.012	0.100	PASS
13	0.030	0.013	0.100	PASS
14	0.024	0.011	0.100	PASS
15	0.028	0.012	0.100	PASS
16	0.021	0.009	0.100	PASS
17	0.025	0.011	0.100	PASS
18	0.019	0.008	0.100	PASS
19	0.018	0.008	0.100	PASS
20	0.019	0.008	0.100	PASS
21	0.022	0.010	0.100	PASS
22	0.019	0.008	0.100	PASS
23	0.019	0.008	0.100	PASS
24	0.016	0.007	0.100	PASS
25	0.019	0.008	0.100	PASS
26	0.014	0.006	0.100	PASS
27	0.026	0.011	0.100	PASS
28	0.018	0.008	0.100	PASS
29	0.021	0.009	0.100	PASS
30	0.019	0.008	0.100	PASS
31	0.015	0.007	0.100	PASS
32	0.018	0.008	0.100	PASS
33	0.021	0.009	0.100	PASS
34	0.012	0.005	0.100	PASS
35	0.017	0.007	0.100	PASS
36	0.012	0.005	0.100	PASS
37	0.016	0.007	0.100	PASS
38	0.016	0.007	0.100	PASS
39	0.018	0.008	0.100	PASS
40	0.017	0.007	0.100	PASS

Maximum Harmonics

Maximum Harmonics (Line 1)



Test setup

2.4.8 Test Location

This test was carried out in Harmonic & Flicker test room 118.

2.5 Flicker

2.5.1 Specification Reference

EN 61000-3-3:2013/A2:2021, Clause 5

2.5.2 Equipment Under Test

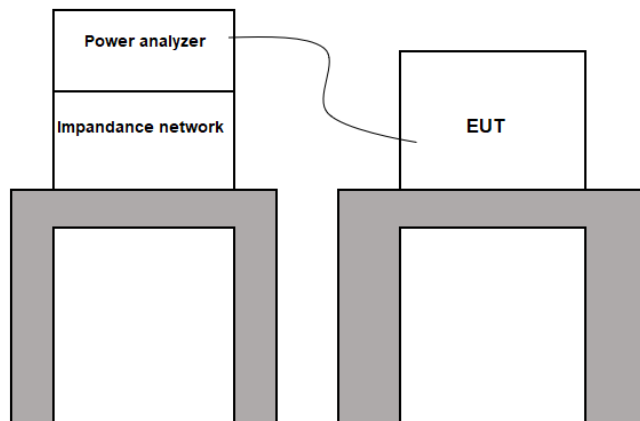
IFH01-20H-23, IFH01-30H-23

2.5.3 Date of Test

03/07/2023

2.5.4 Test Method

For equipment not mentioned in annex A of EN 61000-3-3, controls or automatic programs should be set to produce the most unfavourable sequence of voltage change, using only those combinations of controls and programmes which are mentioned by the manufacturer in the instruction manual, or are otherwise likely to be used



2.5.5 Environmental Conditions

Ambient Temperature	20-25 °C
Relative Humidity	40-60 %
Atmospheric Pressure	1010-1040 mbar

2.5.6 Specification Limits

The value of P_{st} shall not be greater than 1.0

The value of Plt shall not be greater than 0.65

T_{max} , 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 500ms

The maximum relative steady-state voltage change, dc , shall not exceed 3.3%

The maximum relative voltage change d_{max} , 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 start, or manual restart, after a power supply interruption
- 7% for equipment which is:
 - Attended whilst in use, 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 or manual restart, after a power supply interruption



China

2.5.7 Test Results

Results for Configuration and Mode: AC Powered/Power on, max output power,
max temperature, switch on/off

Performance assessment of the EUT made during this test: Pass.

Detailed results are shown below.



China

Test Report

Report Number : 878882213003-01

Test Object : Fan Heater IFH01-20H-23 Power on,max output power,max temperature

Test Standard : IEC 61000-3-3 (Edition 3.2)
Limitation of voltage changes, voltage fluctuations and flicker
in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase
and not subject to conditional connection

Tester : Qiliang Chen

Test Date : 3/7/2023 8:56:51 PM

Climatic Conditions

Temperature : 22 °C Pressure : 103 kPa Humidity : 52 %

Standard Group: Industry

Standard Name: IEC 61000-3-3 (Edition 3.2)
Limitation of voltage changes, voltage fluctuations and flicker
in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase
and not subject to conditional connection

Test Condition: Portable fan heaters

Analysis Status: **PASS**

Flicker Measurements Settings

Main Line:	230V, 50Hz
Flicker Meter:	230V / 50Hz
Flicker Impedance:	Zref
Observation Time:	12 × 10 min
Measurements:	12

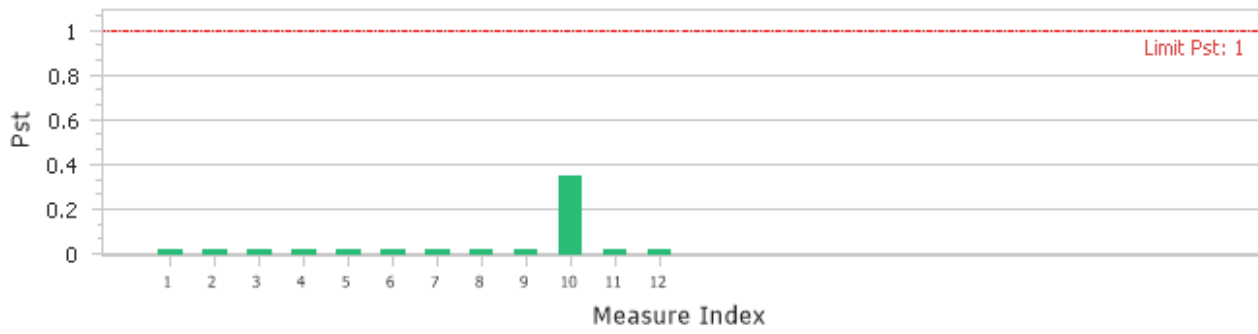
Flicker Measurements

	P_{It}	Max P_{st}	Max d_c	Max d_{max}	Max T_{max}
Line 1:	0.157	0.358	1.628	1.67	0
Limits:	0.65	1	3.3	6	0.5
Results:	PASS	PASS	PASS	PASS	PASS

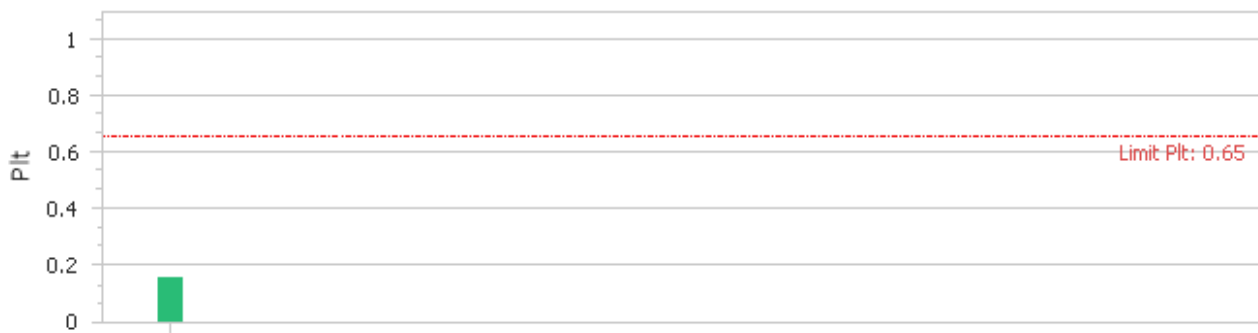


China

Short-term Flicker Severity (Pst) (Line 1)



Long-term Flicker Severity (Plt) (Line 1)





China

Test Report

Report Number : 878882213003-01

Test Object : Fan Heater IFH01-30H-23 Power on,max output power,max temperature

Test Standard : IEC 61000-3-3 (Edition 3.2)
Limitation of voltage changes, voltage fluctuations and flicker
in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase
and not subject to conditional connection

Tester : Qiliang Chen

Test Date : 3/7/2023 10:33:28 PM

Climatic Conditions

Temperature : 22 °C Pressure : 103 kPa Humidity : 52 %

Standard Group: Industry

Standard Name: IEC 61000-3-3 (Edition 3.2)
Limitation of voltage changes, voltage fluctuations and flicker
in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase
and not subject to conditional connection

Test Condition: Portable fan heaters

Analysis Status: **PASS**

Flicker Measurements Settings

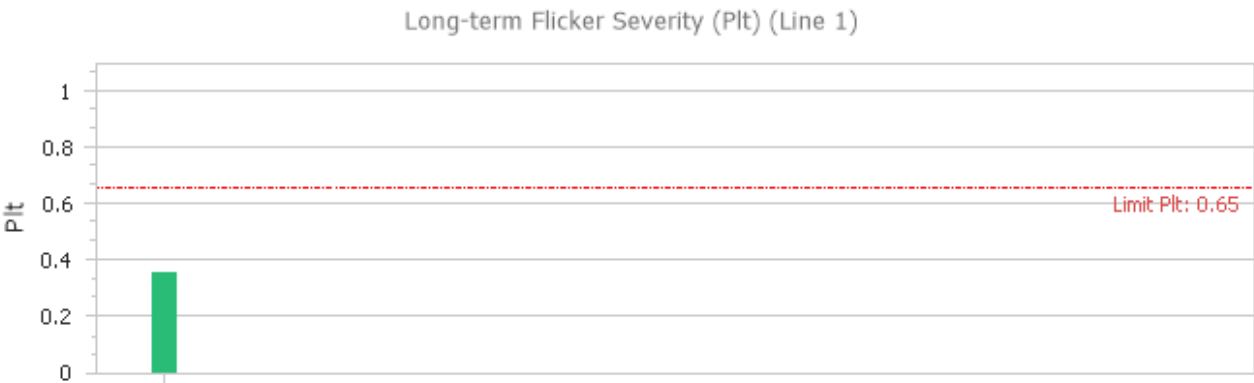
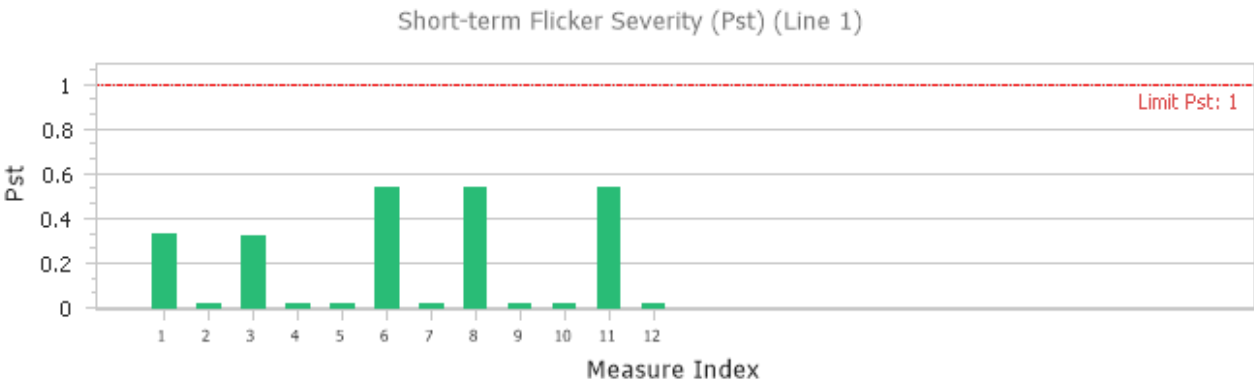
Main Line:	230V, 50Hz
Flicker Meter:	230V / 50Hz
Flicker Impedance:	Zref
Observation Time:	12 × 10 min
Measurements:	12

Flicker Measurements

	P_{It}	Max P_{St}	Max d_c	Max d_{max}	Max T_{max}
Line 1:	0.36	0.548	2.462	2.555	0
Limits:	0.65	1	3.3	66	0.5
Results:	PASS	PASS	PASS	PASS	PASS



China



Test setup

2.5.8 Test Location

This test was carried out in Harmonic & Flicker test room 118.



China

3 Test Equipment Information

3.1 General Test Equipment Used

Instrument	Manufacturer	Type No	TE No	Calibration Date	Calibration Due
Conducted Emission and Discontinuous Disturbance					
EMI test receiver	R & S	ESR3	NIB1910011-YQ-EMC	2022.04.25	2023.04.24
2-Line V-network	R & S	ENV216	NIB1910012-YQ-EMC	2022.04.25	2023.04.24
Disturbance Power					
EMI test receiver	R & S	ESR3	NIB1910015-YQ-EMC	2022.4.25	2023.4.24
Absorbing clamp	R & S	MDS-21	NIB1910017-YQ-EMC	2022.4.25	2023.4.24
Decoupling Clamp	TESEQ	KEMA801B	NIB1911005-YQ-EMC	2022.4.25	2023.4.24
Harmonic current emission and Flicker					
Harmonic-flicker test system	EM test	DPA 500N	NIB1911001-YQ-EMC	2022.4.25	2023.4.24
AC/DC power source	EM test	NetWave 7-400	NIB1911002-YQ-EMC	2022.4.25	2023.4.24

4 Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

Test Name	Measurement Uncertainty
Conducted Disturbance	150kHz to 30 MHz, 2.58dB
Disturbance power	30MHz to 300MHz, 3.11dB

Measurement Uncertainty Decision Rule

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115: 2021, clause 4.4.3 and 4.5.1.

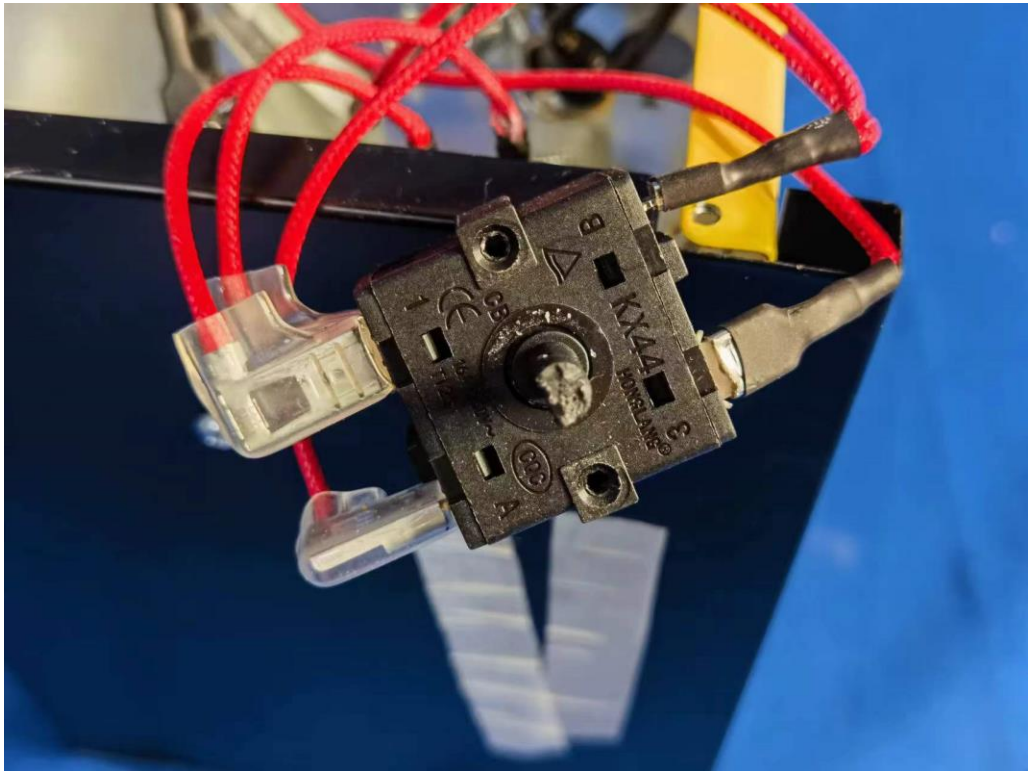
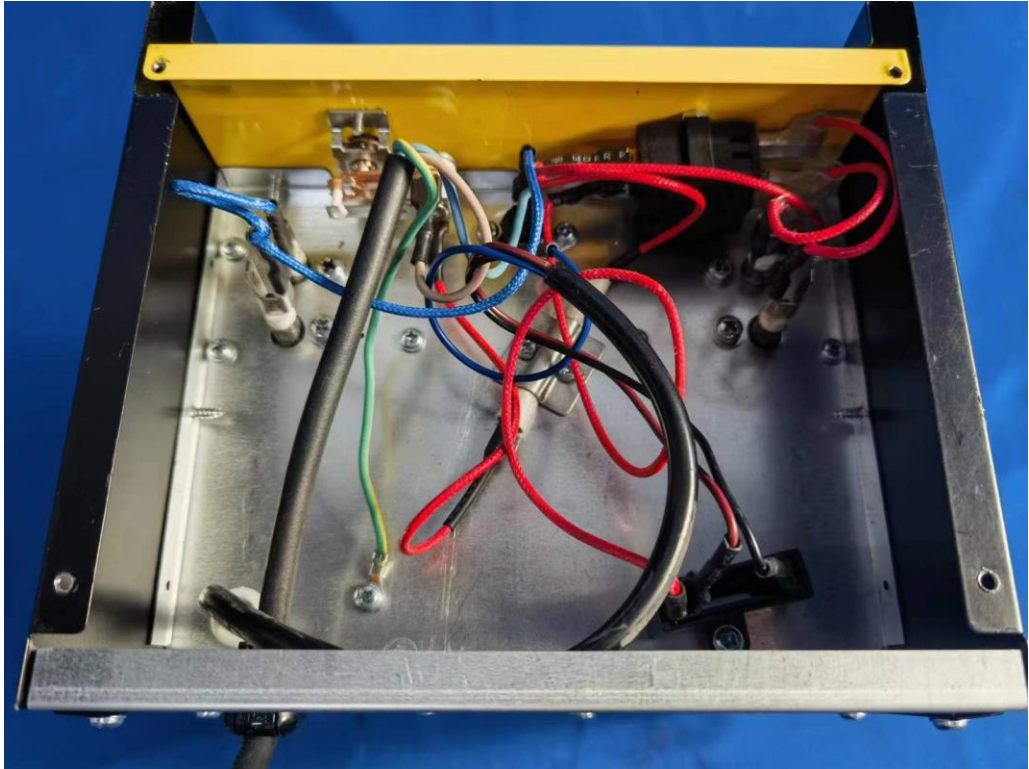
5 Photographs

IFH01-20H-23



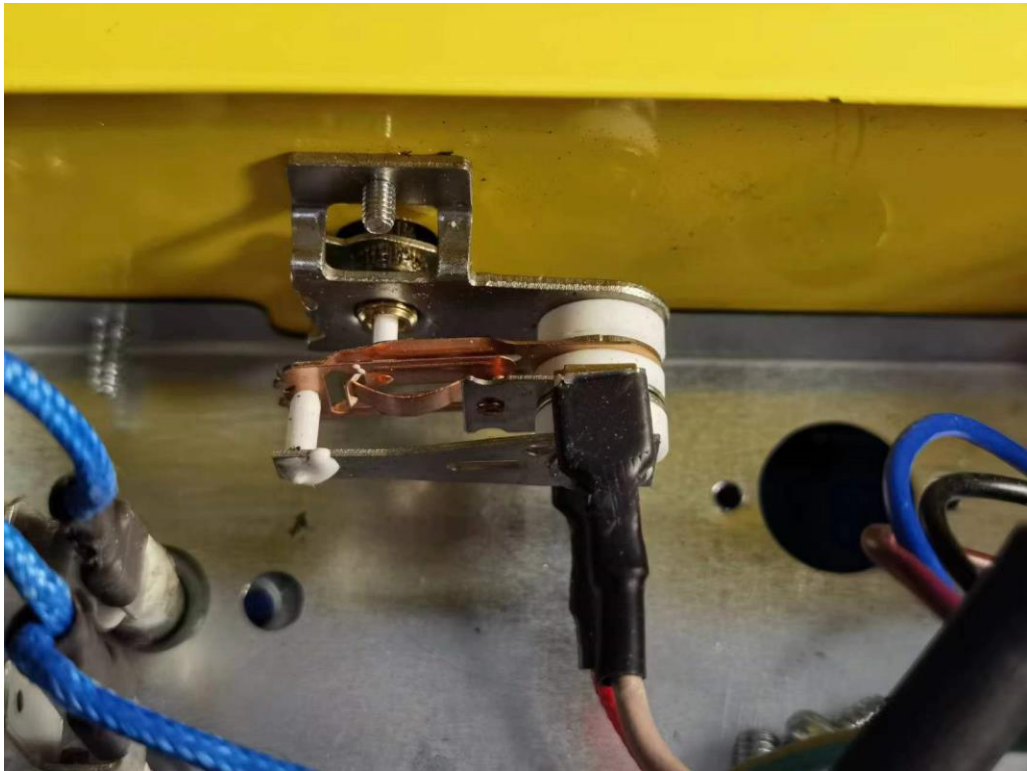
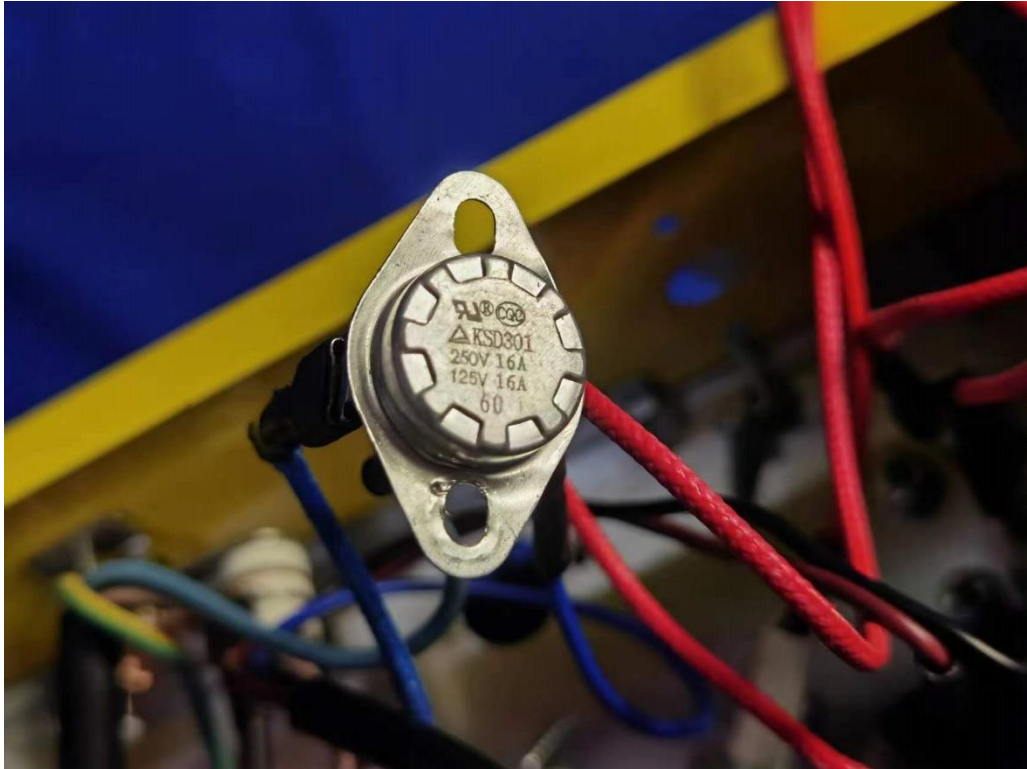


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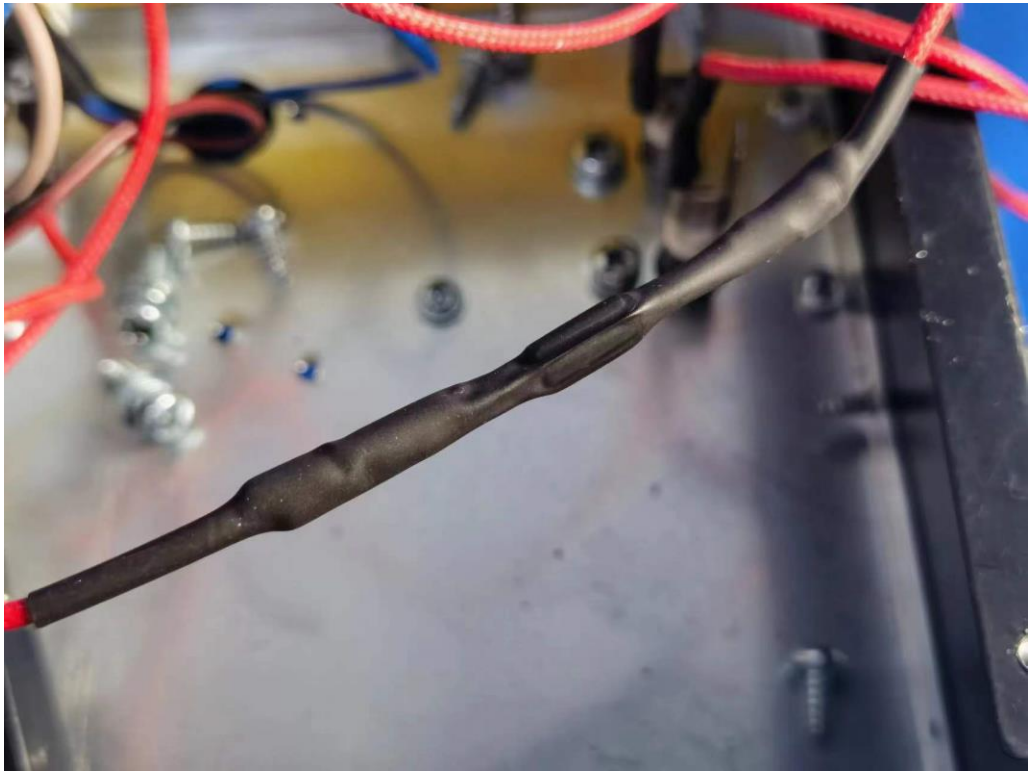
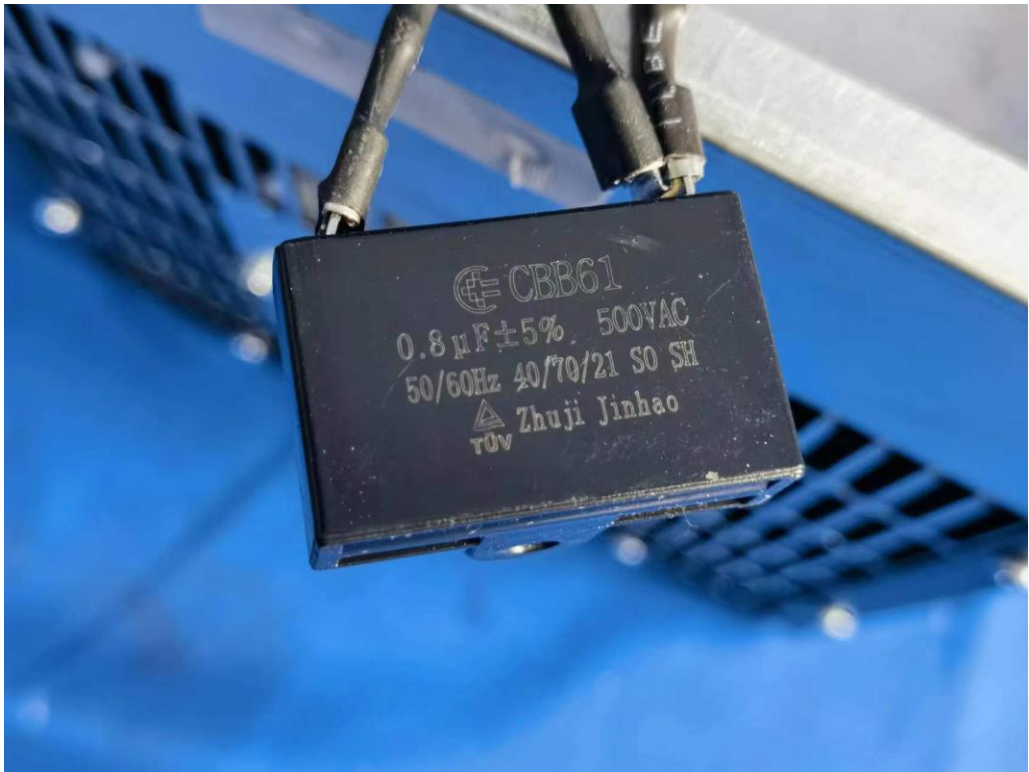


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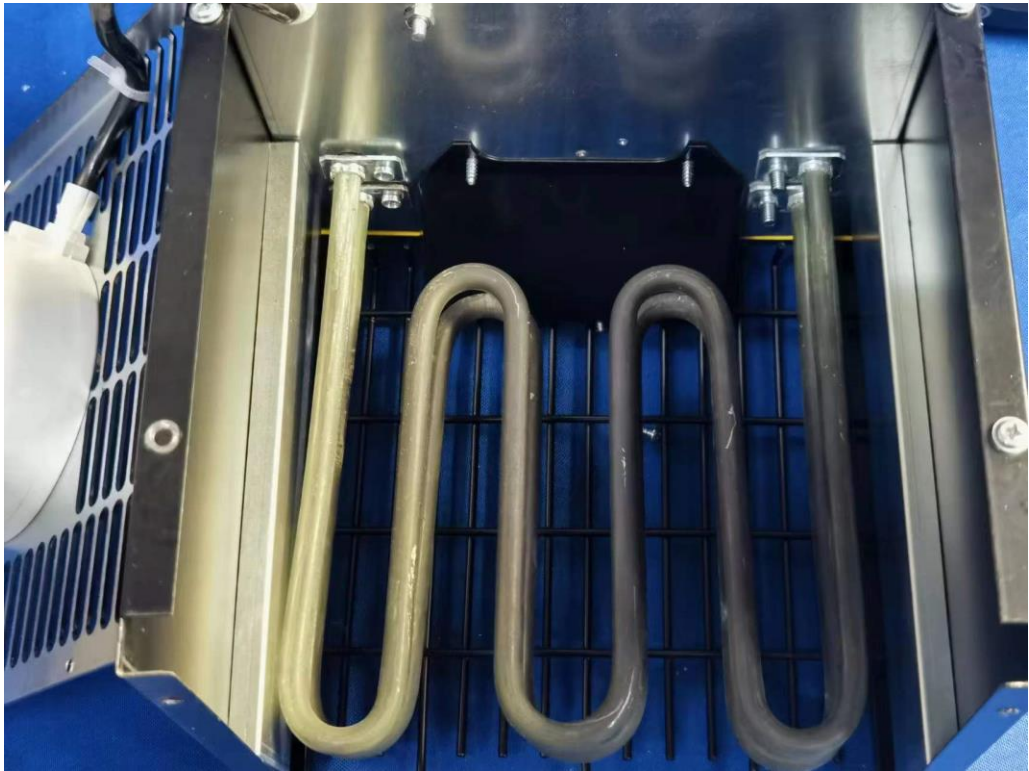
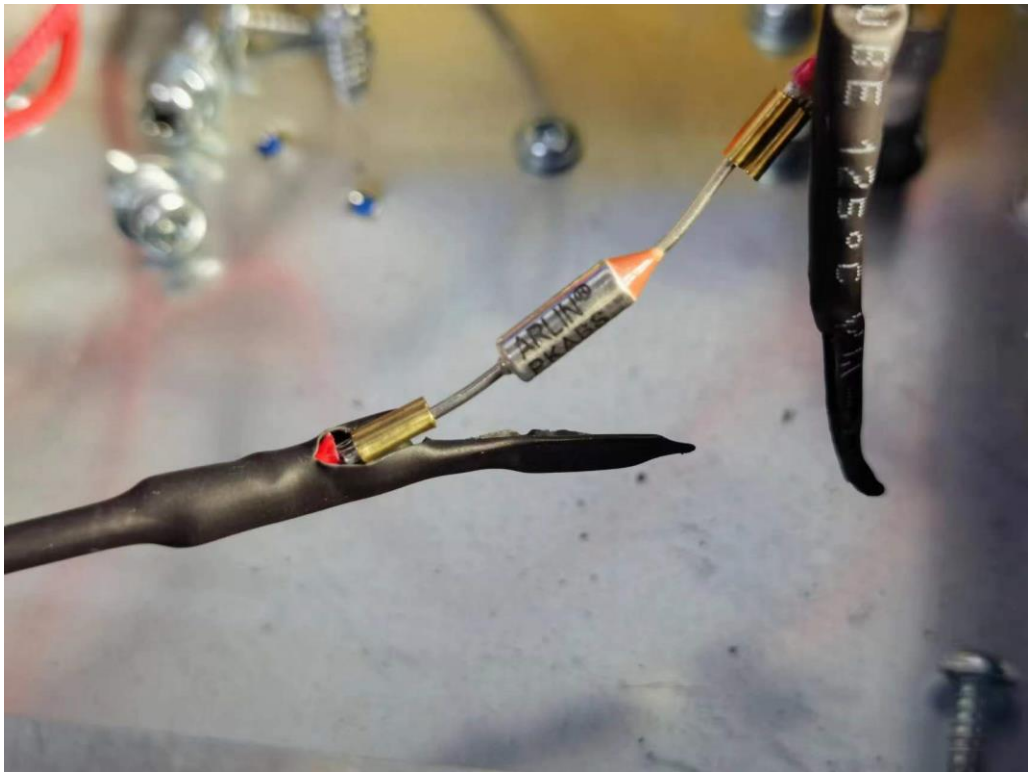


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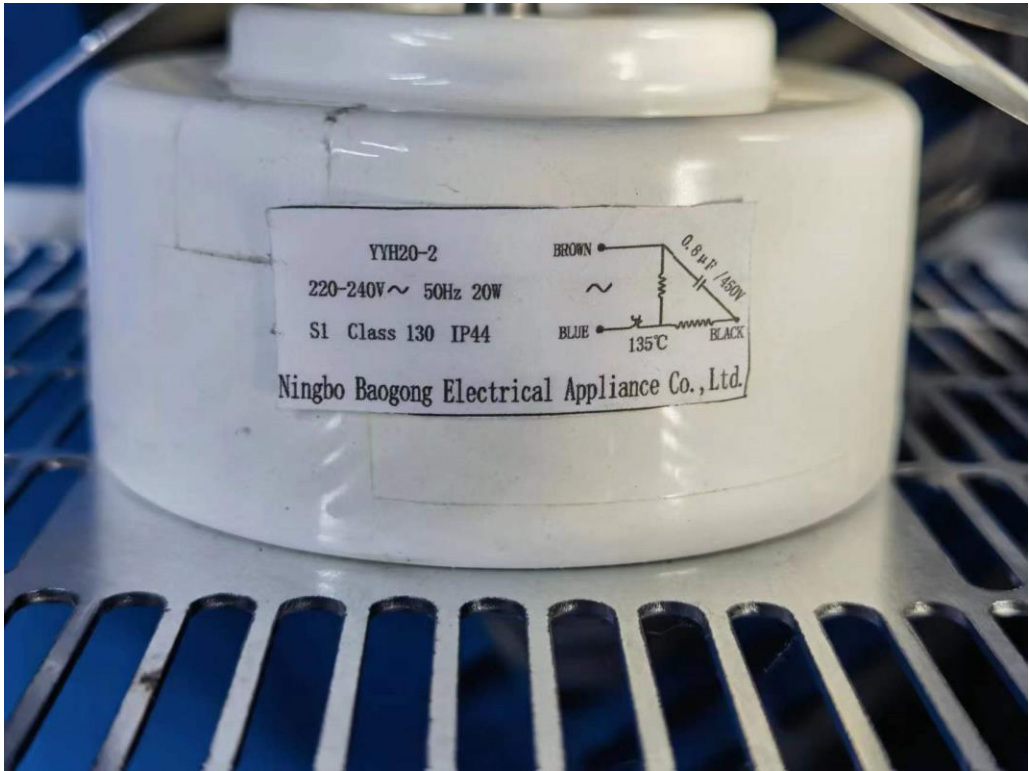
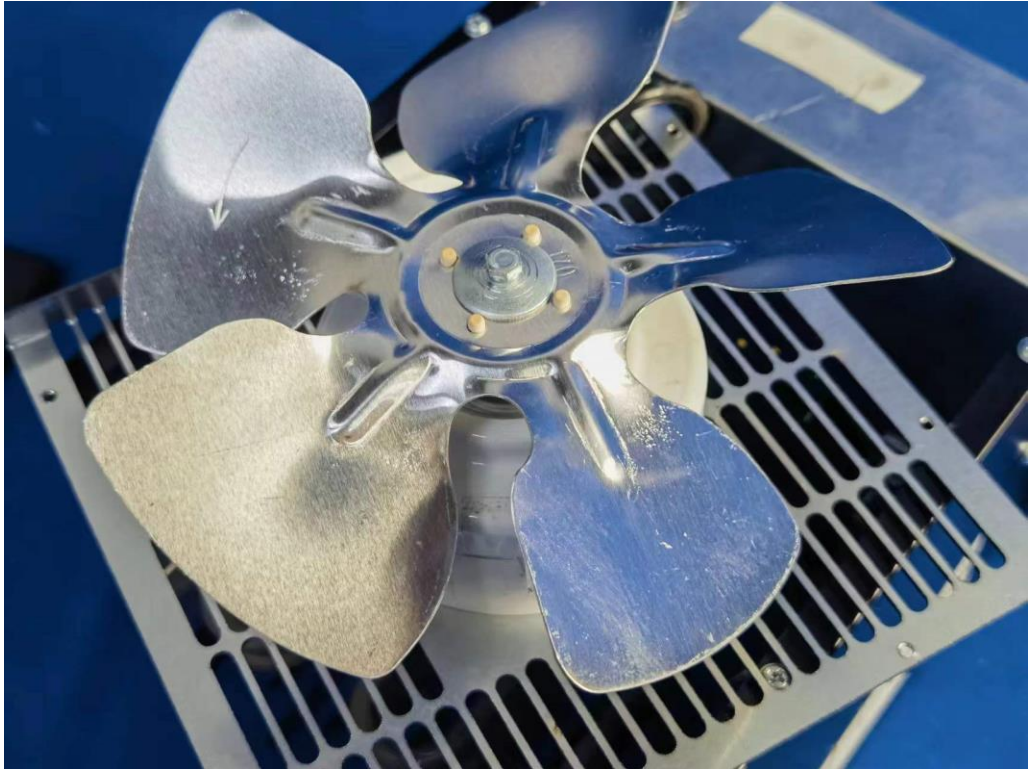


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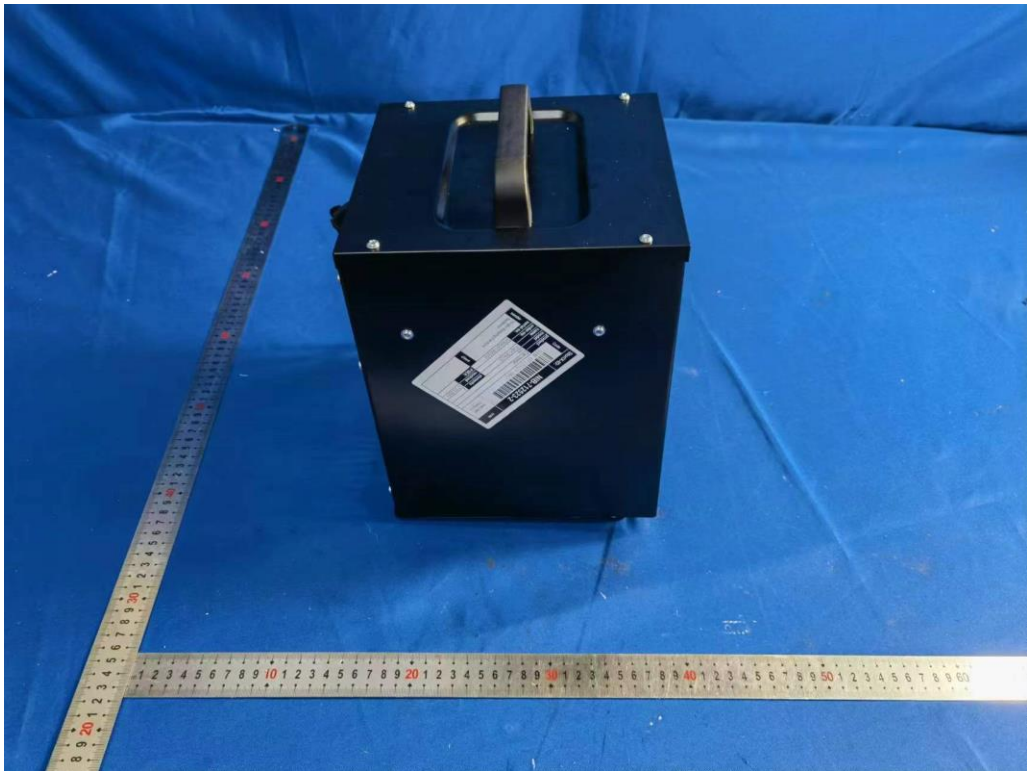
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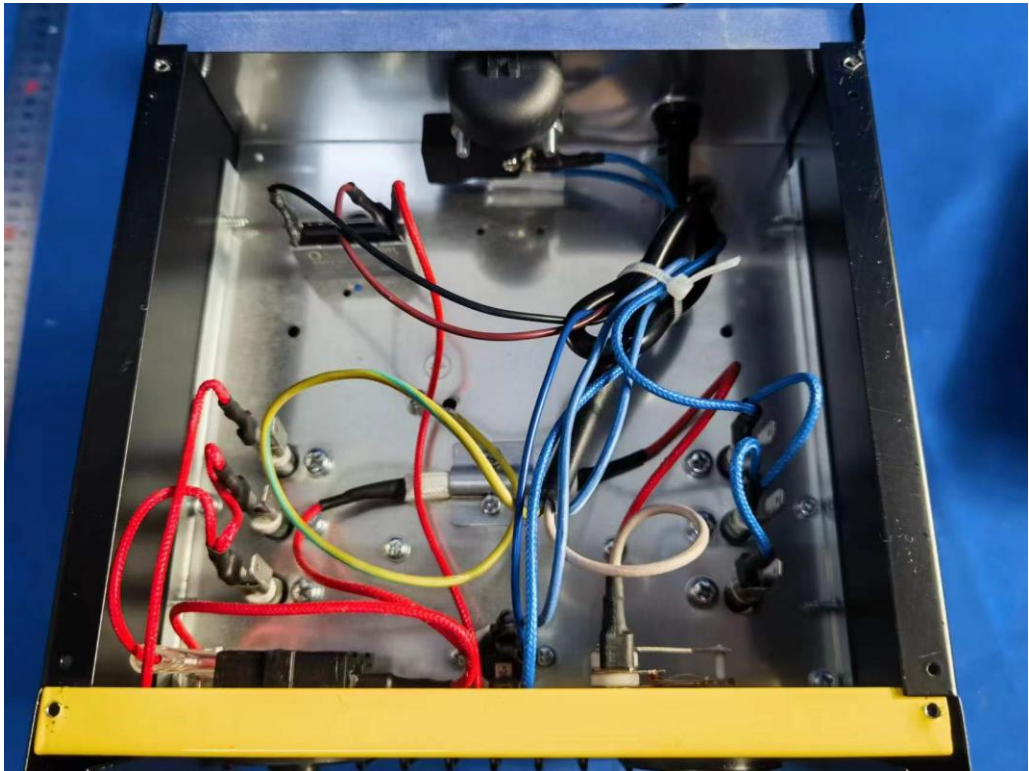
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IFH01-30H-23



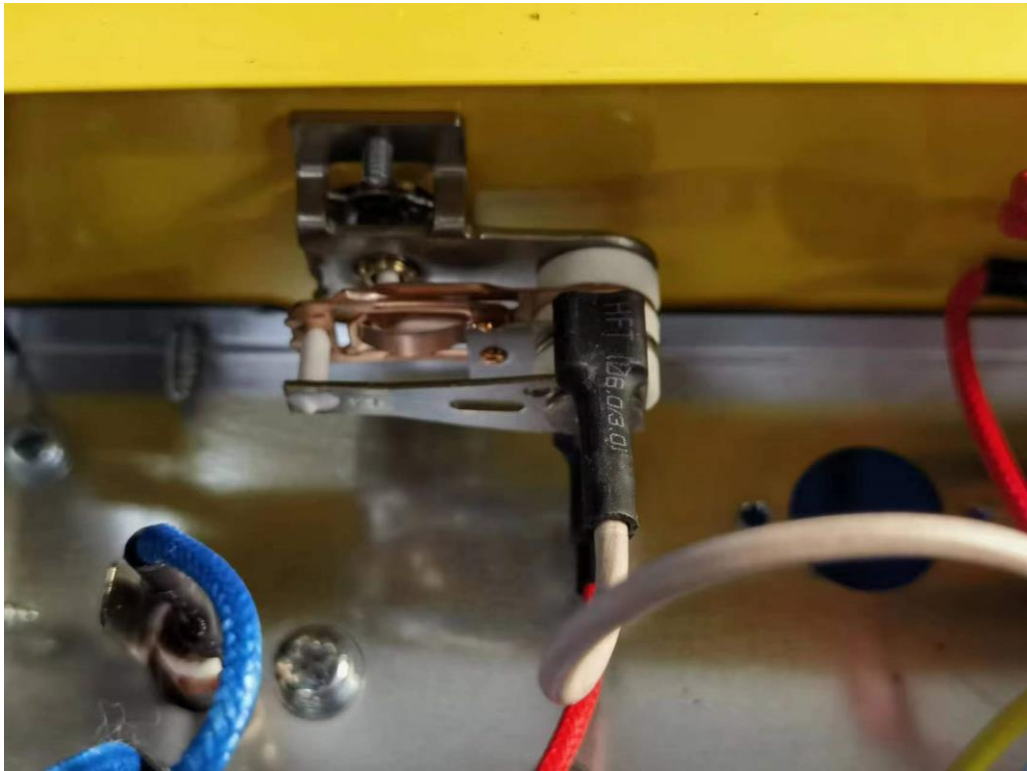
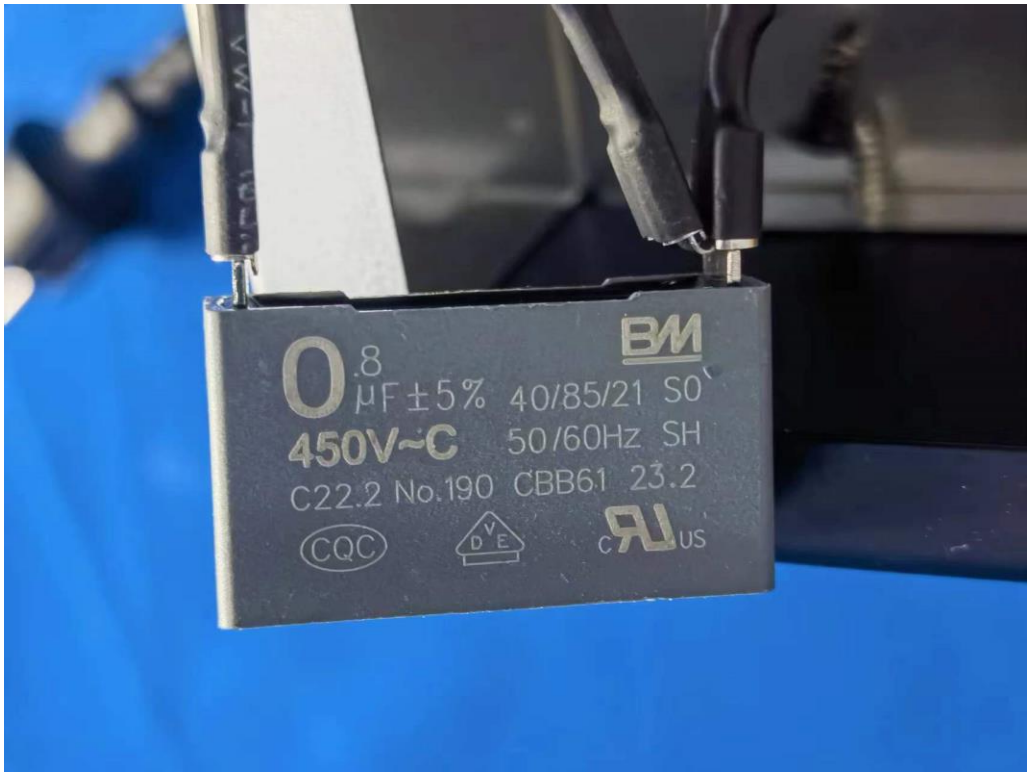


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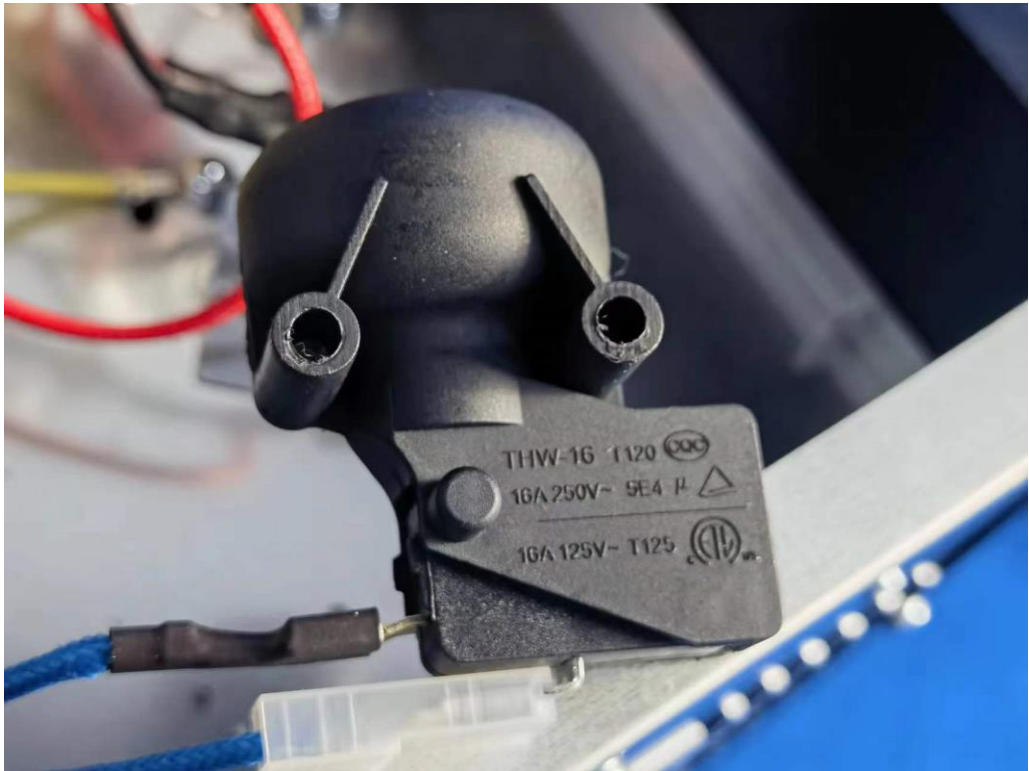
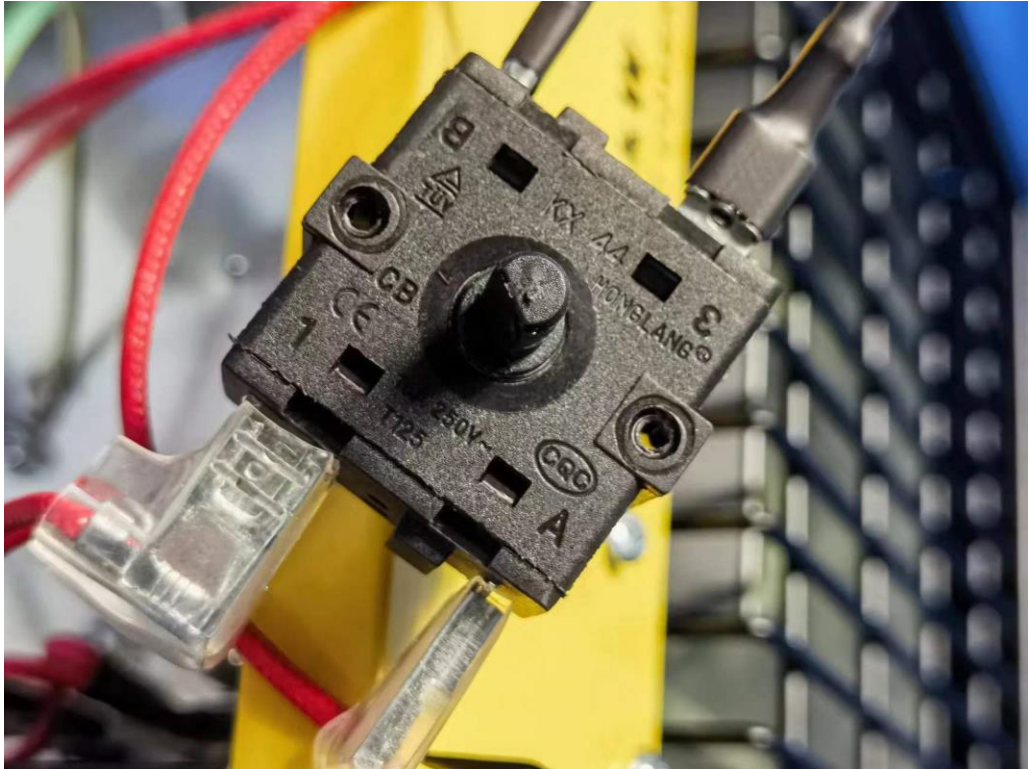
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