

EMC Test Report



Applicant: VESYNC (Singapore) Pte. Ltd.

Product: Air Fryer

Model: CAF-DC111-AEU, CAF-DC111-AUK,
CAF-DC111-XXXX, CAF-DC121-AEUR,
CAF-DC121-XXXX (Where X denotes blank,
0 to 9 or A to Z; stands for different pattern on
the enclosure of product)

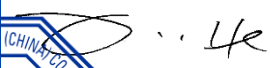
**Add value.
Inspire trust.**

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

Prepared for: VESYNC (Singapore) Pte. Ltd.
6 Raffles Quay, #14-06, Singapore 048580, SINGAPORE

COMMERCIAL-IN-CONFIDENCE

Report Number: 68.710.24.0355.01

RESPONSIBLE FOR	NAME	SIGNATURE	DATE
Approved by	Jessie He		2025-01-23
Prepared by	Myron Yu		2025-01-23

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

EXECUTIVE SUMMARY

A sample of this product was 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+A1:2019+A2:2021.

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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	2025-01-23

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	VESYNC (Singapore) Pte. Ltd.
Address	6 Raffles Quay, #14-06, Singapore 048580, SINGAPORE
Manufacturer	VESYNC (Singapore) Pte. Ltd.
Address	6 Raffles Quay, #14-06, Singapore 048580, SINGAPORE
Factory	Zhejiang Biyi Electric Appliance Co.,Ltd
Address	88 Road Yuzhaojiang, Chengdong Development Area, 315400 Yuyao City, PEOPLE'S REPUBLIC OF CHINA
Model Number(s)	CAF-DC111-AEU, CAF-DC111-AUK, CAF-DC111-XXXX, CAF- DC121-AEUR, CAF-DC121-XXXX (Where X denotes blank, 0 to 9 or A to Z; stands for different pattern on the enclosure of product)
Product Type	Air Fryer
Trademark	
Test Specification	The product complies with the corresponding EMC requirements of EU and UK legislation – Directive 2014/30/EU and Electromagnetic Compatibility Regulations 2016 EN IEC 55014-1:2021, EN IEC 55014-2:2021, EN IEC 61000-3-2:2019+A1:2021, EN 61000-3-3:2013+A1:2019+A2:2021
Date of Receipt of EUT	2024-12-16
Start of Test	2024-12-18
Finish of Test	2024-12-24
Name of Engineer(s)	Myron Yu

1.3 Brief Summary of Results

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

Specification	Clause	Test Description	Result	Comments/Base Standard
EN IEC 55014-1:2021	4.3.3.6	Conducted Disturbance at Mains Terminals	Pass	---
EN IEC 55014-1:2021	4.3.4.4	Disturbance Power	N/A	Note 1
EN IEC 55014-1:2021	4.3.4.5	Radiated Disturbance	Pass	---
EN IEC 55014-1:2021	4.4.2	Discontinuous Disturbance	Pass	---
EN IEC 61000-3-2:2019+A1:2021	7	Harmonic Current Emission	Pass	---
EN 61000-3-3:2013+A1:2019+A2:2021	5	Flicker	Pass	---
EN IEC 55014-2:2021	5.1	Electrostatic Discharge	Pass	IEC 61000-4-2
EN IEC 55014-2:2021	5.2	Fast Transients	Pass	IEC 61000-4-4
EN IEC 55014-2:2021	5.3	Injected Currents, 0.15 MHz to 230 MHz	N/A	IEC 61000-4-6, Note 2
EN IEC 55014-2:2021	5.4	Injected Currents, 0.15 MHz to 80 MHz	Pass	IEC 61000-4-6
EN IEC 55014-2:2021	5.5	Radio frequency electromagnetic fields	Pass	IEC 61000-4-3
EN IEC 55014-2:2021	5.6	Surges	Pass	IEC 61000-4-5
EN IEC 55014-2:2021	5.7	Voltage Dips	Pass	IEC 61000-4-11

Note 1: Radiated test applied from 30 MHz to 1000 MHz, no disturbance power measurement applied.

Note 2: The product is mains operated equipment and containing highest clock frequency is 32MHz, which is classed as category IV equipment as described in EN IEC 55014-2 clause 4, and immunity test requirements refer to EN IEC 55014-2 clause 7.2.5.

1.4 Product Information

- Air Fryer for household and indoor use only.
- Appliance with SOD type thermal cut-out which operates only once.
- All models have similar construction, the model deviation as following:
- CAF-DC111-AEU and CAF-DC111-AUK are the basic models, CAF-DC111-XXXX are the same as the basic models except that the model name, sales channels and pattern on the product enclosure are different.
- CAF-DC111-AEU, CAF-DC111-AUK and CAF-DC111-XXXX with 6 main function buttons switch group indicator lamp on control PCB.
- CAF-DC121-AEUR is the basic model, CAF-DC121-XXXX are the same as the basic models except that the model name, sales channels and pattern on the product enclosure are different.
- CAF-DC121-AEUR and CAF-DC121-XXXX with 7 main function buttons switch group indicator lamp on control PCB.
- Unless otherwise specified, CAF-DC121-AEUR was chosen as the representative model to perform all the tests.

1.4.1 Technical Description

Ratings	: 220-240V ~, 50Hz, 2630W or 220-240V ~, 60Hz, 2630W
Protection class	: I

1.4.2 Test Configuration

Test Configuration	Description
AC powered	230VAC; 50Hz

1.4.3 Modes of Operation

Test Mode	Description
ON (max)	The EUT is powered on and operated continuously at maximum settings.
ON (mid)	The EUT is powered on and operated continuously at middle-range settings.

1.4.4 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 (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

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 (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. During the test, degradation of performance is allowed, however no change of actual operating state or stored data is allowed to persist after the 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 reasonably 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 instructions for use.

1.5 Deviations from the Standard

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

1.6 Test Location

Test Site:

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch

Address:

Building 12&13, Zhiheng Wisdomland Business Park,
Guankou Erlu, Nantou, Nanshan District,
Shenzhen, 518052 China

Test Name	Name of Engineer(s)
Conducted Disturbance at Mains Terminals	Leo Wei
Radiated Disturbance	Lillie Huang
Discontinuous Disturbance	Timothy Wang
Harmonic Current Emissions	Jerry Tian
Flicker	Jerry Tian
Electrostatic Discharge	Felix Jiang
Fast Transients	Qasem Pang
Injected Currents	Jerry Tian
Radio frequency electromagnetic fields	Reader Sang
Surges	Qasem Pang
Voltage Dips	Qasem Pang

2 Test Details

2.1 Conducted Disturbance at Mains Terminals

2.1.1 Specification Reference

EN IEC 55014-1:2021, Clause 4.3.3.6

2.1.2 Equipment Under Test

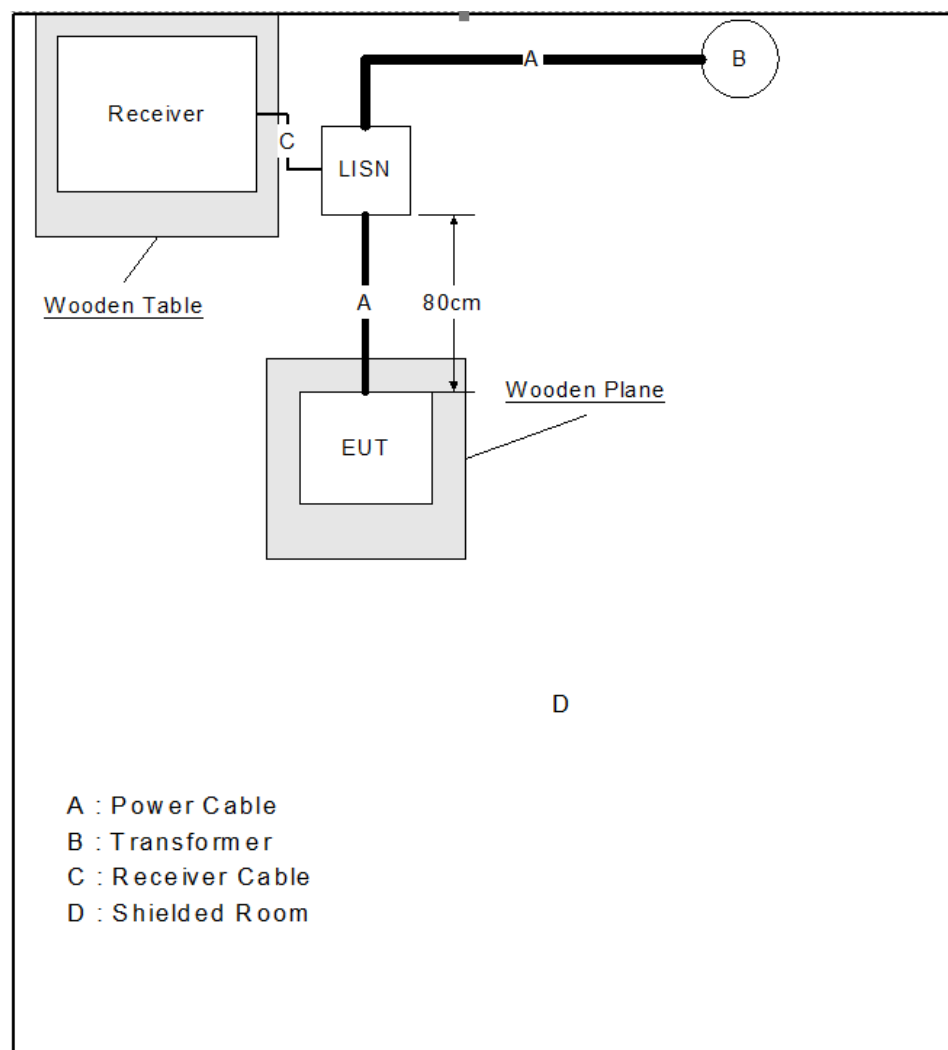
CAF-DC121-AEUR

2.1.3 Date of Test

2024-12-19

2.1.4 Test Method

The EUT was placed on a non-conductive table 0.8m above a reference ground plane. 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. The AMN was placed 0.8m from the boundary of the EUT and bonded to the reference ground plane.



2.1.5 Environmental Conditions

Ambient Temperature	23.4 °C
Relative Humidity	47.1 %
Atmospheric Pressure	1015 mbar

2.1.6 Specification Limits

Household appliances and equipment causing similar disturbances and regulating controls incorporating semiconductor devices				
Frequency range	At main terminals dB(μV)		At load terminals and additional terminals dB(μV)	
MHz	Quasi-peak	Average	Quasi-peak	Average
0.15 to 0.5	66 to 56	59 to 46	80	70
0.5 to 5	56	46	74	64
5 to 30	60	50	74	64

Remark for test data:

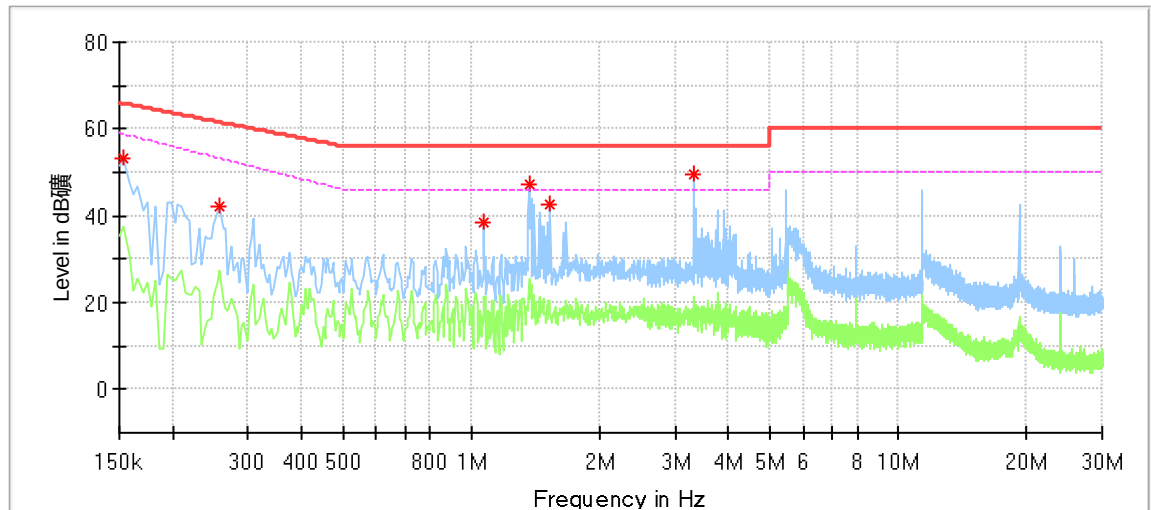
Level=Reading Level + Correction Factor

Correction Factor=Cable Loss + LISN Factor

(The Reading Level is recorded by software which is not shown in the sheet)

2.1.7 Test Results

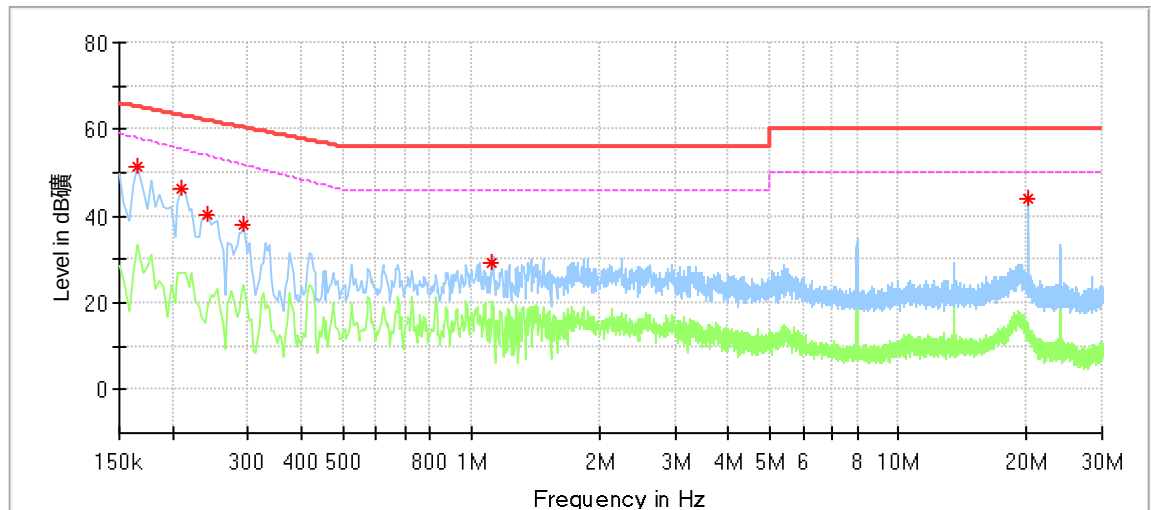
M/N : CAF-DC121-AEUR
 Test Mode : ON (max)
 Test Condition : AC powered (230VAC/50Hz)
 Test Terminal : Power Line, Live
 Remark : Test with ZHAOLI fan motor



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.154000	53.44	---	65.78	12.34	L1	9.67
0.258000	42.37	---	61.50	19.13	L1	9.67
1.070000	38.60	---	56.00	17.40	L1	9.70
1.366000	47.10	---	56.00	8.90	L1	9.70
1.534000	42.43	---	56.00	13.57	L1	9.71
3.322000	49.44	---	56.00	6.56	L1	9.76

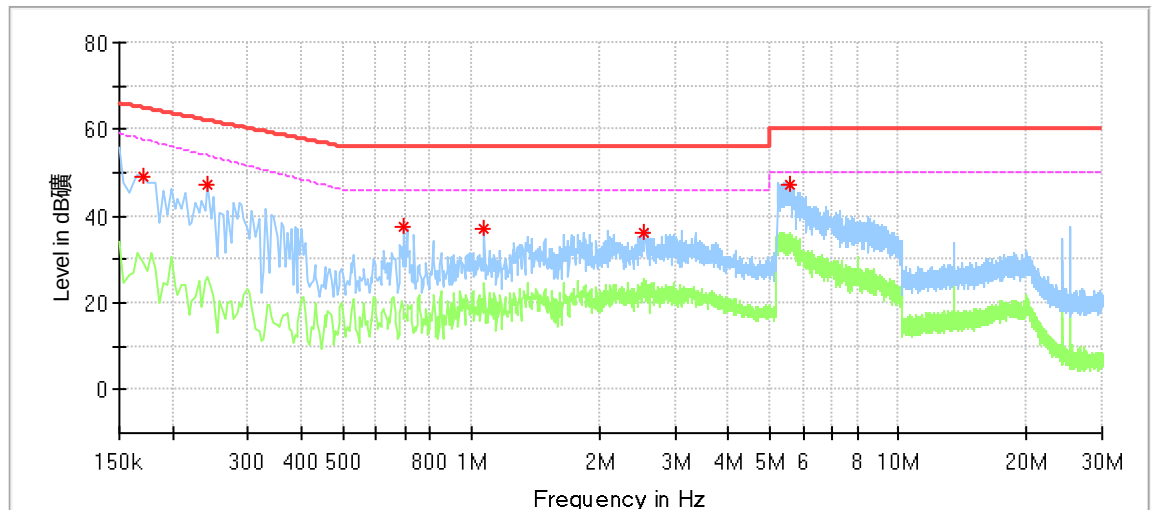
M/N : CAF-DC121-AEUR
 Test Mode : ON (max)
 Test Condition : AC powered (230VAC/50Hz)
 Test Terminal : Power Line, Neutral
 Remark : Test with ZHAOLI fan motor



Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)
0.166000	51.35	---	65.16	13.81	N	9.67
0.210000	46.30	---	63.21	16.90	N	9.66
0.242000	40.34	---	62.03	21.69	N	9.66
0.294000	37.92	---	60.41	22.49	N	9.66
1.122000	29.22	---	56.00	26.78	N	9.68
20.030000	44.12	---	60.00	15.88	N	10.18

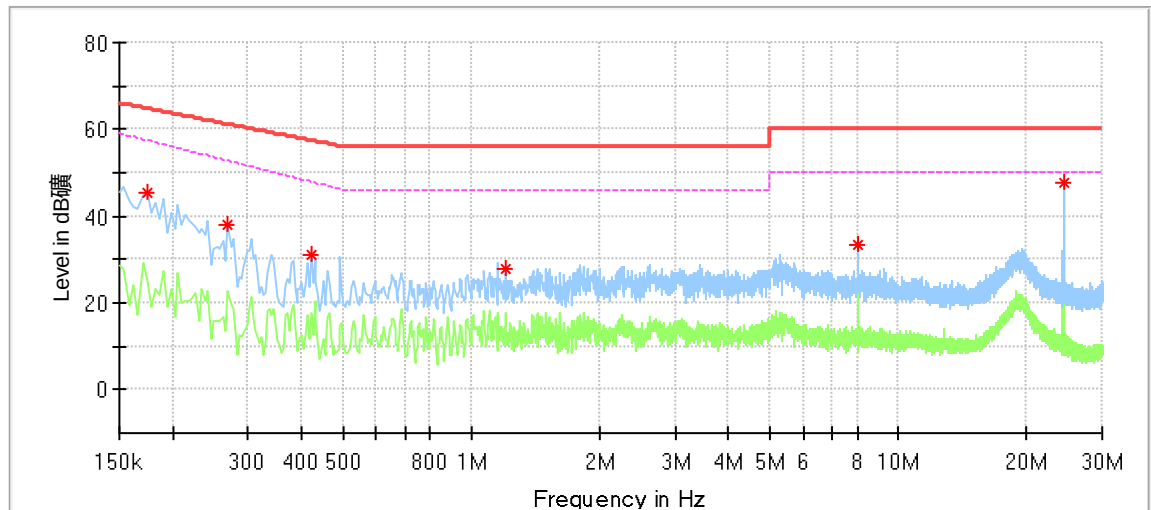
M/N : CAF-DC121-AEUR
 Test Mode : ON (max)
 Test Condition : AC powered (230VAC/50Hz)
 Test Terminal : Power Line, Live
 Remark : Test with NIDEC fan motor



Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)
0.170000	49.21	---	64.96	15.75	L1	9.67
0.242000	47.15	---	62.03	14.87	L1	9.67
0.698000	37.48	---	56.00	18.52	L1	9.68
1.074000	36.99	---	56.00	19.01	L1	9.70
2.534000	36.05	---	56.00	19.95	L1	9.75
5.550000	47.36	---	60.00	12.64	L1	9.83

M/N : CAF-DC121-AEUR
 Test Mode : ON (max)
 Test Condition : AC powered (230VAC/50Hz)
 Test Terminal : Power Line, Neutral
 Remark : Test with NIDEC fan motor



Critical Freqs

Frequency (MHz)	MaxPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)
0.174000	45.37	---	64.77	19.40	N	9.66
0.270000	37.81	---	61.12	23.31	N	9.66
0.422000	31.06	---	57.41	26.35	N	9.66
1.202000	27.70	---	56.00	28.30	N	9.68
8.022000	33.21	---	60.00	26.79	N	9.88
24.326000	47.85	---	60.00	12.15	N	10.16



Test Setup

2.1.8 Test Location

This test was carried out in conducted emission shielded room.

2.2 Radiated Disturbance

2.2.1 Specification Reference

EN IEC 55014-1:2021, Clause 4.3.4.5

2.2.2 Equipment Under Test

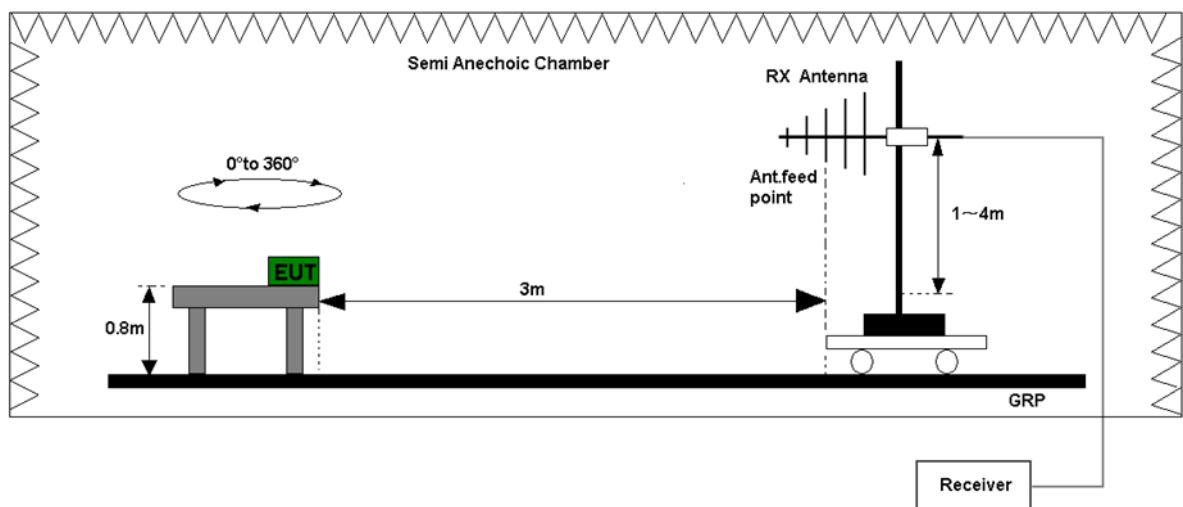
CAF-DC121-AEUR

2.2.3 Date of Test

2024-12-23

2.2.4 Test Method

The EUT was set up in a semi-anechoic chamber on a remotely controlled turntable and placed on a non-conductive table 0.8m above a reference ground plane. A prescan of the EUT emissions profile was made while varying the antenna-to-EUT azimuth and antenna-to-EUT polarization using a peak detector; measurements were taken at a 3m distance. Using the prescan list of the highest emissions detected, their bearing and associated antenna polarization, the EUT was then formally measured using a Quasi-Peak detector. The readings were maximized by adjusting the antenna height, polarization and turntable azimuth, in accordance with the specification.



2.2.5 Environmental Conditions

Ambient Temperature	24.1 °C
Relative Humidity	51.1 %
Atmospheric Pressure	1020 mbar

2.2.6 Specification Limits

Radiated disturbance limits in the frequency range 30MHz to 1000MHz at a measuring distance of 3 m	
Frequency range MHz	Quasi-peak limits dB(μV/m)
30 to 230	40
230 to 1000	47

Remark for test data:

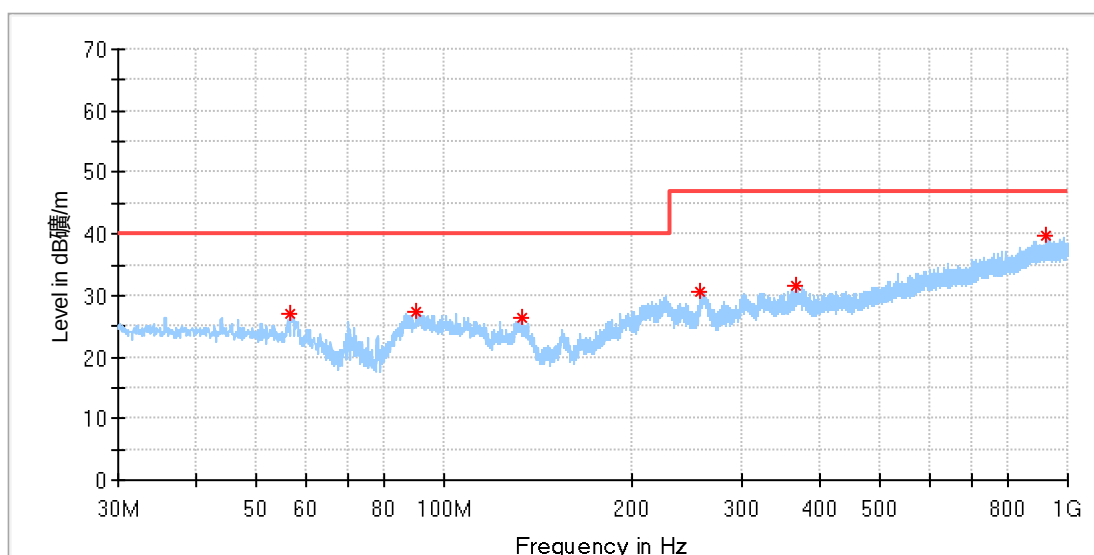
Level=Reading Level + Correction Factor

Correction Factor=Antenna Factor + Cable Loss

(The Reading Level is recorded by software which is not shown in the sheet)

2.2.7 Test Results

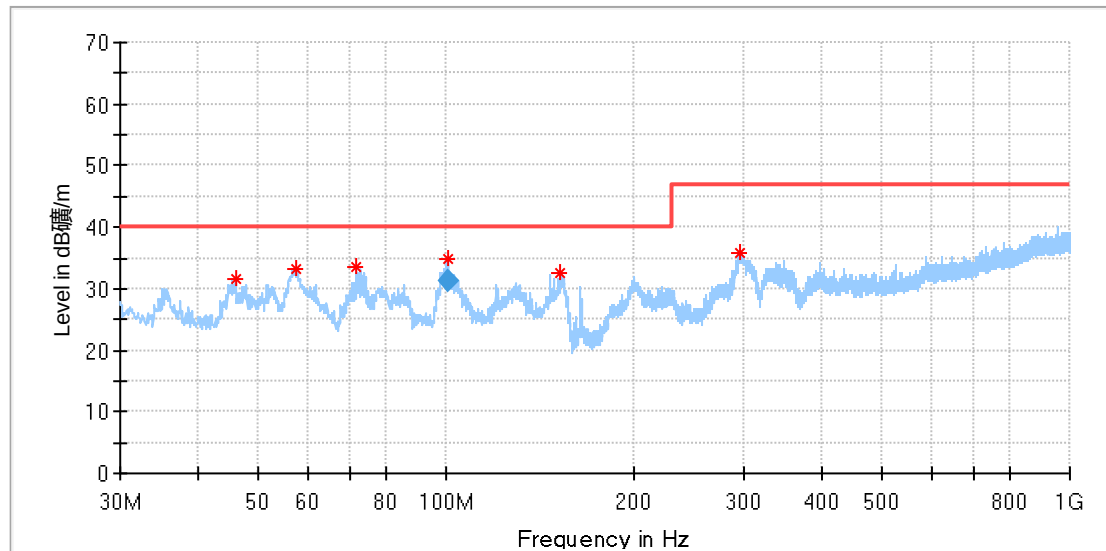
M/N : CAF-DC121-AEUR
 Test Mode : ON (max)
 Test Condition : AC powered (230VAC/50Hz)
 Test Specification : Horizontal
 Remark : Test with ZHAOLI fan motor



Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
56.675000	26.99	40.00	13.01	100.0	H	146.0	19.81
90.382500	27.24	40.00	12.76	200.0	H	330.0	18.32
132.820000	26.23	40.00	13.77	200.0	H	270.0	16.09
257.525625	30.68	47.00	16.32	100.0	H	301.0	20.48
366.468750	31.56	47.00	15.44	200.0	H	123.0	22.80
924.703750	39.66	47.00	7.34	100.0	H	259.0	32.49

M/N : CAF-DC121-AEUR
 Test Mode : ON (max)
 Test Condition : AC powered (230VAC/50Hz)
 Test Specification : Vertical
 Remark : Test with ZHAOLI fan motor



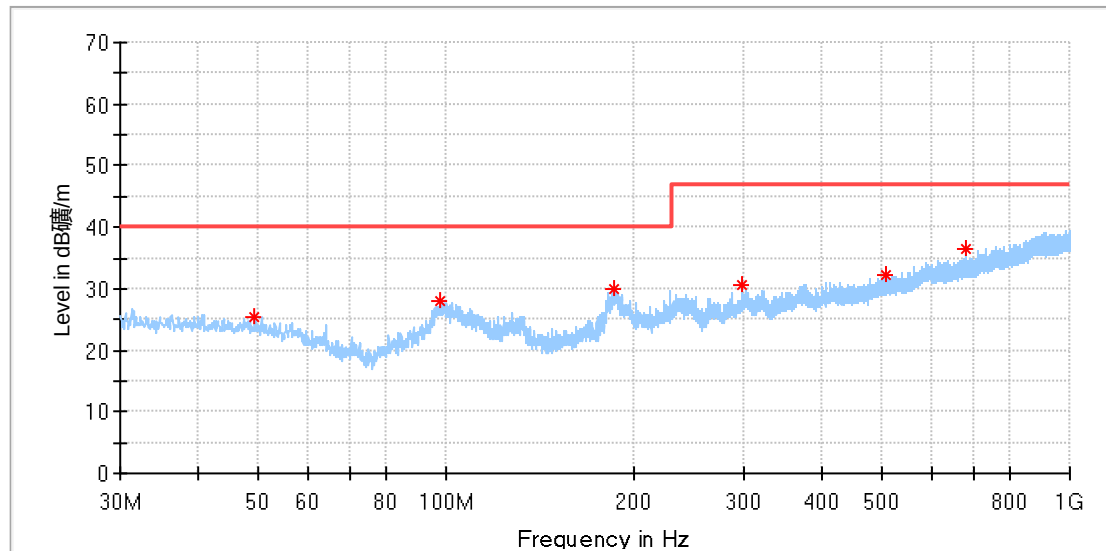
Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
45.883750	31.54	40.00	8.46	100.0	V	36.0	21.19
57.584375	33.37	40.00	6.63	100.0	V	0.0	19.52
71.710000	33.43	40.00	6.57	100.0	V	212.0	15.16
100.446250	34.80	40.00	5.20	100.0	V	146.0	20.03
152.765625	32.59	40.00	7.41	100.0	V	212.0	15.66
295.355625	35.82	47.00	11.18	200.0	V	153.0	21.55

Final_Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
100.446250	31.10	40.00	8.90	100.0	V	146.0	20.03

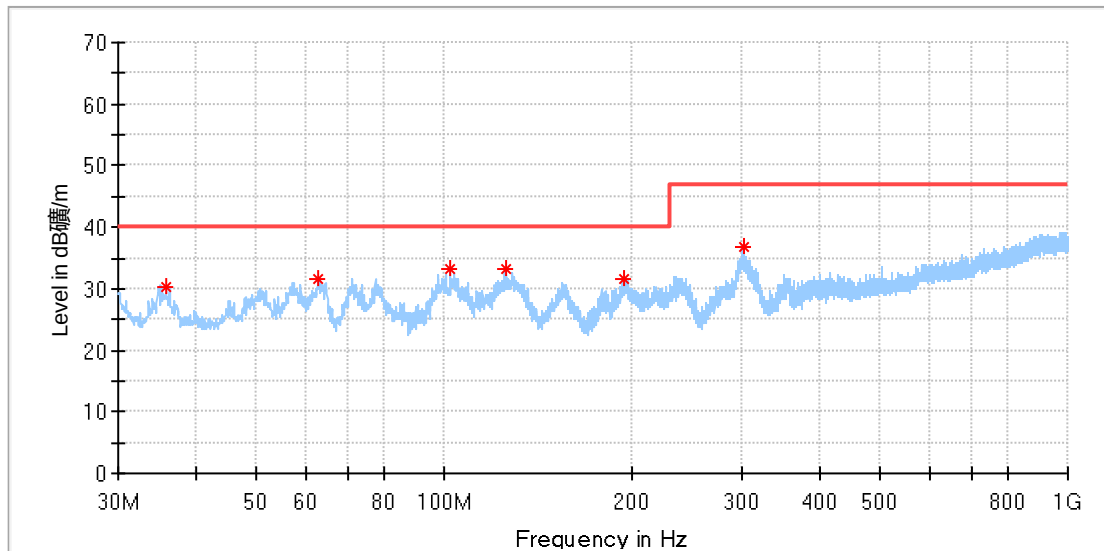
M/N : CAF-DC121-AEUR
 Test Mode : ON (max)
 Test Condition : AC powered (230VAC/50Hz)
 Test Specification : Horizontal
 Remark : Test with NIDEC fan motor



Critical Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
49.339375	25.24	40.00	14.77	100.0	H	82.0	21.11
98.081875	27.88	40.00	12.12	200.0	H	168.0	19.68
186.351875	29.91	40.00	10.09	100.0	H	118.0	17.63
297.113750	30.74	47.00	16.26	100.0	H	38.0	21.59
506.755000	32.14	47.00	14.86	100.0	H	0.0	26.12
682.688750	36.40	47.00	10.60	100.0	H	0.0	29.10

M/N : CAF-DC121-AEUR
 Test Mode : ON (max)
 Test Condition : AC powered (230VAC/50Hz)
 Test Specification : Vertical
 Remark : Test with NIDEC fan motor



Critical Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
35.820000	30.43	40.00	9.57	100.0	V	324.0	21.29
62.798125	31.70	40.00	8.30	100.0	V	243.0	17.71
102.204375	33.11	40.00	6.89	100.0	V	52.0	19.89
125.181250	33.15	40.00	6.85	100.0	V	96.0	16.90
194.293750	31.43	40.00	8.57	200.0	V	139.0	18.63
301.418125	36.86	47.00	10.14	200.0	V	131.0	21.66



Test Setup

2.2.8 Test Location

This test was carried out in 3m anechoic chamber.

2.3 Discontinuous Disturbance

2.3.1 Specification Reference

EN IEC 55014-1:2021, Clause 4.4.2

2.3.2 Equipment Under Test

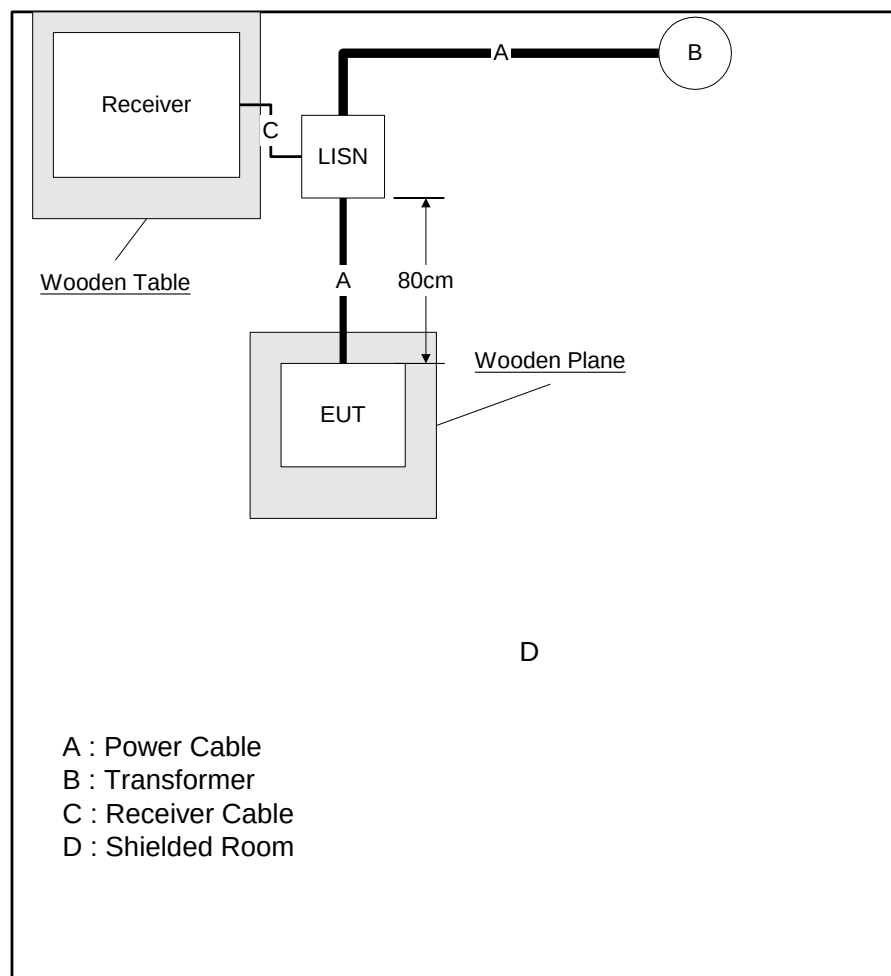
CAF-DC121-AEUR

2.3.3 Date of Test

2024-12-18

2.3.4 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.



2.3.5 Environmental Conditions

Ambient Temperature	23.7 °C
Relative Humidity	34.4 %
Atmospheric Pressure	1020 mbar

2.3.6 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

2.3.7 Test Results

M/N : CAF-DC121-AEUR
 Test Mode : ON (max)
 Test Condition : AC powered (230VAC/50Hz)
 Test Terminal : AC power line
 Remark : Test with ZHAOLI fan motor

Test Duration:	0:33:03	LISN Phase: N	Attenuation [dB]:	35
Overload:	No			
Frequency	150 kHz	500 kHz	1.4 MHz	30 MHz
Clicks (≤ 10 ms)	24	40	8	0
Clicks (> 10 ms ≤ 20 ms)	0	0	0	0
Clicks (> 20 ms ≤ 200 ms)	0	0	0	0
Click Rate [1/min] (user-defined)	5.00	5.00	5.00	5.00
Continuous Disturbances	0	0	0	0
L [dBuV]	66	56	56	60
Lq [dBuV]	82	72	72	76
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	9.53	9.54	9.55	9.77
Margin for PK Detector	0	0	0	0
Result	PASSED	PASSED	PASSED	PASSED

M/N : CAF-DC121-AEUR
 Test Mode : ON (max)
 Test Condition : AC powered (230VAC/50Hz)
 Test Terminal : AC power line
 Remark : Test with NIDEC fan motor

Test Duration:	0:37:20	LISN Phase:	N	Attenuation [dB]:	35
Overload:	No				
Frequency	150 kHz	500 kHz	1.4 MHz	30 MHz	
Clicks (≤ 10 ms)	22	40	18	0	
Clicks (> 10 ms ≤ 20 ms)	0	0	0	0	
Clicks (> 20 ms ≤ 200 ms)	0	0	0	0	
Click Rate [1/min] (user-defined)	5.00	5.00	5.00	5.00	
Continuous Disturbances	0	0	0	0	
L [dBuV]	66	56	56	60	
Lq [dBuV]	82	72	72	76	
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	9.53	9.54	9.55	9.77	
Margin for PK Detector	0	0	0	0	
Result	PASSED	PASSED	PASSED	PASSED	



Test Setup

2.3.8 Test Location

This test was carried out in conducted emission shielded room.

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

CAF-DC121-AEUR

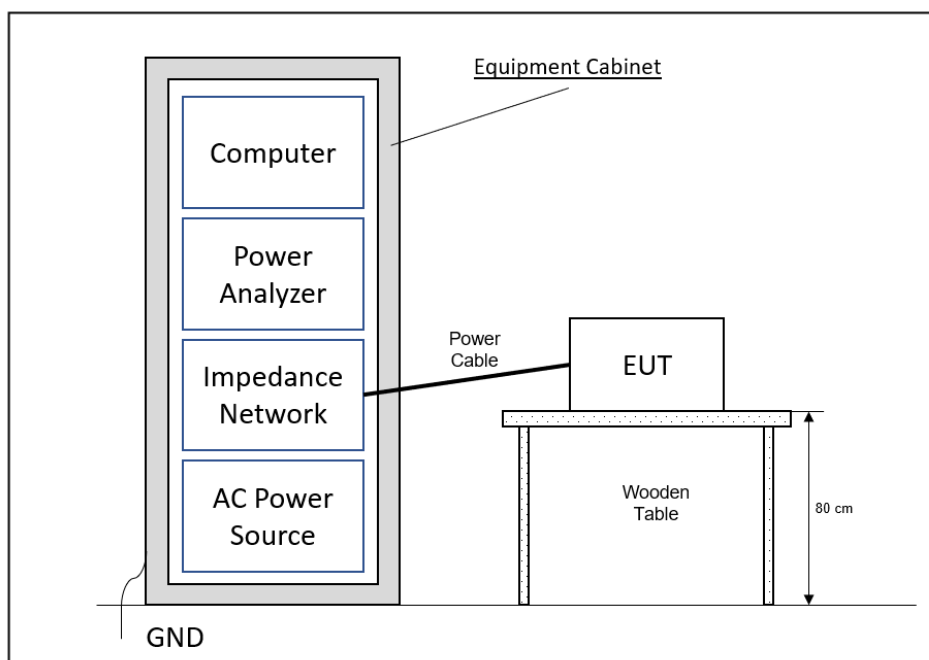
2.4.3 Date of Test

2024-12-23

2.4.4 Test Method

Harmonic current test should be conducted with the user's operation control or automatic programs set to the mode expected to produce the maximum total harmonic current under normal operating conditions.

Specific test conditions for the measurement of harmonic currents associated with some types of equipment are given in test equipment list.



2.4.5 Environmental Conditions

Ambient Temperature	23.0 °C
Relative Humidity	33.9 %
Atmospheric Pressure	1024 mbar

2.4.6 Specification Limits

Limits for class A Equipment	
Harmonic order n	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
$15 \leq n \leq 39$	$0.15(15/n)$
Even harmonics	
2	1.08
4	0.43
6	0.30
$8 \leq n \leq 40$	$0.23(8/n)$

2.4.7 Test Results

Results for Configuration and Mode: AC powered / ON (max).

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

Detailed results are shown below.

Test Report

Test Object : CAF-DC121-AEUR
Test Standard : IEC 61000-3-2 (Edition 5.1)
Limits for harmonic current emissions (equipment input current < 16 A per phase)
Tester : Derreck
Company : TUV SUD SZ EMC Lab
Test Date : 12/23/2024 5:08:18 PM

Test Object / Product

Name : CAF-DC121-AEUR Operation Mode : ON (max)
Description : With ZHAOLI fan motor

Measures & Analysis

Measure Window :	8 periods	Voltage Range :	500 V
Refresh Interval :	2 s	Current Range :	50 A
Sampling Rate :	6.4 kS/s		
Scaled Window :	Rectangular	Current Probe :	Internal (Ratio: 27 mV/A, Number of turns: 1, PhaseCompensation: -0.75)
According :	IEC 61000-3-2 (Edition 5.1) Limits for harmonic current emissions (equipment input current < 16 A per phase)		

Standard Specific Results for IEC 61000-3-2 (Edition 5.1)

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
Main Line:	230 V, 50 Hz
Classification:	Class A
Appli. of Limits:	less than or equal to 150 % (Without POHC Enhancement)
Grouping:	not applied
Test Duration:	2 min 30.08 s

Check Harmonics 2..40			
<i>First detected harmonic order > 150 %</i>			
Line 1:	None		
<i>Harmonics orders > 150 %</i>			
Line 1:	None		
<i>Harmonics orders with average > 100 %</i>			
Line 1:	None		

Measured values			
<i>Fundamental Current</i>			
Line 1:	11.23 A		
<i>Active input Power</i>			
Line 1:	2589.231 W *		
<i>Circuit power factor</i>			
Line 1:	1 *		

* Absolute value.

Prerequisite for simplified method fulfilled			
<i>First time window with THD(I) > 15 %</i>			
Line 1:	None		
<i>Time window with max THD(I) > 15 %</i>			
Line 1:	None		
<i>Current emission below 60 % of the applicable limits</i>			
Line 1:	No		
<i>Active Input Power</i>			
Line 1:	2589 W *		

* Absolute value.

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	10.073				11.227				
2	0.002	0.168	1.080	n/a	0.017	1.039	1.620	n/a	PASS
3	0.124	5.412	2.300	PASS	0.146	4.230	3.450	PASS	PASS
4	0.003	0.807	0.430	n/a	0.009	1.333	0.645	n/a	PASS
5	0.116	10.135	1.140	PASS	0.136	7.952	1.710	PASS	PASS
6	0.003	1.056	0.300	n/a	0.006	1.443	0.450	n/a	PASS
7	0.107	13.933	0.770	PASS	0.124	10.741	1.155	PASS	PASS
8	0.003	1.254	0.230	n/a	0.005	1.576	0.345	n/a	PASS
9	0.095	23.853	0.400	PASS	0.109	18.145	0.600	PASS	PASS
10	0.003	1.595	0.184	n/a	0.005	1.666	0.276	n/a	PASS
11	0.084	25.372	0.330	PASS	0.094	19.060	0.495	PASS	PASS
12	0.002	1.339	0.153	n/a	0.004	1.635	0.230	n/a	PASS
13	0.069	33.064	0.210	PASS	0.076	24.100	0.315	PASS	PASS
14	0.003	2.491	0.131	n/a	0.004	2.189	0.197	n/a	PASS
15	0.056	37.163	0.150	n/a	0.061	27.109	0.225	n/a	PASS
16	0.002	1.617	0.115	n/a	0.003	1.940	0.173	n/a	PASS
17	0.046	34.637	0.132	n/a	0.048	24.236	0.199	n/a	PASS
18	0.002	2.147	0.102	n/a	0.003	2.198	0.153	n/a	PASS
19	0.031	25.774	0.118	n/a	0.035	19.859	0.178	n/a	PASS
20	0.002	2.104	0.092	n/a	0.003	2.136	0.138	n/a	PASS
21	0.026	24.209	0.107	n/a	0.028	17.502	0.161	n/a	PASS
22	0.002	2.243	0.084	n/a	0.003	2.266	0.125	n/a	PASS
23	0.018	18.100	0.098	n/a	0.019	12.992	0.147	n/a	PASS
24	0.002	2.134	0.077	n/a	0.002	2.168	0.115	n/a	PASS
25	0.017	18.713	0.090	n/a	0.019	13.736	0.135	n/a	PASS
26	0.001	1.757	0.071	n/a	0.002	2.001	0.106	n/a	PASS
27	0.015	17.977	0.083	n/a	0.018	14.588	0.125	n/a	PASS
28	0.001	1.952	0.066	n/a	0.002	2.069	0.099	n/a	PASS
29	0.014	18.394	0.078	n/a	0.017	14.972	0.116	n/a	PASS
30	0.001	2.039	0.061	n/a	0.002	2.046	0.092	n/a	PASS
31	0.015	21.107	0.073	n/a	0.019	17.040	0.109	n/a	PASS
32	0.001	2.089	0.058	n/a	0.002	2.310	0.086	n/a	PASS
33	0.011	16.118	0.068	n/a	0.016	15.529	0.102	n/a	PASS
34	0.001	2.043	0.054	n/a	0.002	1.916	0.081	n/a	PASS
35	0.013	20.252	0.064	n/a	0.015	15.940	0.096	n/a	PASS
36	0.001	2.216	0.051	n/a	0.002	2.232	0.077	n/a	PASS
37	0.007	11.834	0.061	n/a	0.011	11.592	0.091	n/a	PASS
38	0.001	2.481	0.048	n/a	0.002	2.422	0.073	n/a	PASS
39	0.009	14.772	0.058	n/a	0.010	11.619	0.087	n/a	PASS
40	0.001	2.059	0.046	n/a	0.001	2.152	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.

Voltage Source Verification

Harmonic voltage results				
Hn	Ueff [V]	Ueff [%]	Limit [%]	Result
1	230.965	100.419		
2	0.055	0.024	0.200	PASS
3	0.077	0.033	0.900	PASS
4	0.020	0.009	0.200	PASS
5	0.050	0.022	0.400	PASS
6	0.036	0.016	0.200	PASS
7	0.073	0.032	0.300	PASS
8	0.020	0.009	0.200	PASS
9	0.045	0.020	0.200	PASS
10	0.016	0.007	0.200	PASS
11	0.087	0.038	0.100	PASS
12	0.019	0.008	0.100	PASS
13	0.073	0.032	0.100	PASS
14	0.023	0.010	0.100	PASS
15	0.101	0.044	0.100	PASS
16	0.021	0.009	0.100	PASS
17	0.089	0.039	0.100	PASS
18	0.012	0.005	0.100	PASS
19	0.099	0.043	0.100	PASS
20	0.017	0.007	0.100	PASS
21	0.077	0.034	0.100	PASS
22	0.012	0.005	0.100	PASS
23	0.050	0.022	0.100	PASS
24	0.010	0.005	0.100	PASS
25	0.075	0.033	0.100	PASS
26	0.013	0.006	0.100	PASS
27	0.072	0.031	0.100	PASS
28	0.010	0.004	0.100	PASS
29	0.065	0.028	0.100	PASS
30	0.006	0.003	0.100	PASS
31	0.064	0.028	0.100	PASS
32	0.007	0.003	0.100	PASS
33	0.074	0.032	0.100	PASS
34	0.008	0.004	0.100	PASS
35	0.074	0.032	0.100	PASS
36	0.007	0.003	0.100	PASS
37	0.073	0.032	0.100	PASS
38	0.013	0.006	0.100	PASS
39	0.059	0.026	0.100	PASS
40	0.013	0.006	0.100	PASS

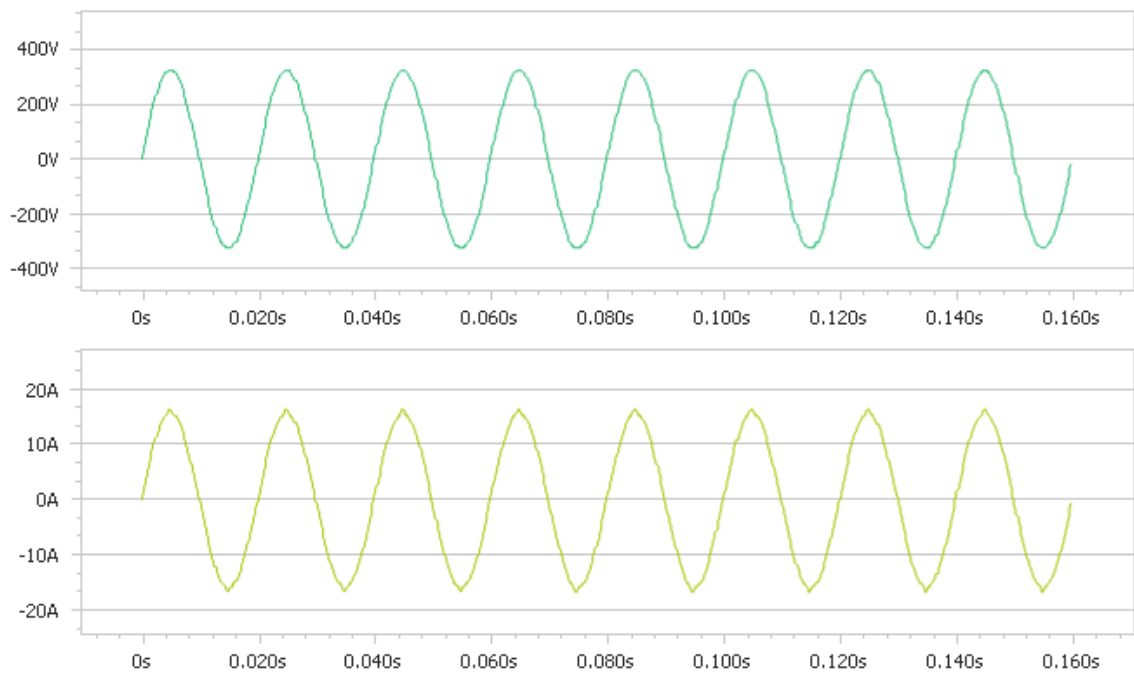
Time Window 1

Power Values of Time Window 1 (Line 1)

	Line 1
Measuring Time	0 s
Frequency	50 Hz
Voltage RMS	230.6 V
Current RMS	11.23 A
Peak Current	16.52 A
Fundamental Current	11.23 A
Voltage Crest Factor	1.414
Current Crest Factor	1.471
Active Power P	2.589e+3 W
Reactive Power Q	-35.62 var
Apparent Power S	2.589e+3 VA
Power Factor	0.9999
Displacement Factor	1.000
Phi	-0.8 °
Total Harmonic Distortion Voltage (THDV)	1.063e-3
Total Harmonic Distortion Current (THDC)	0.01489
Total Harmonic Current (THC)	0.1672 A
Instantaneous Partial Odd Harmonic Current (Inst. POHC)	0.04024 A

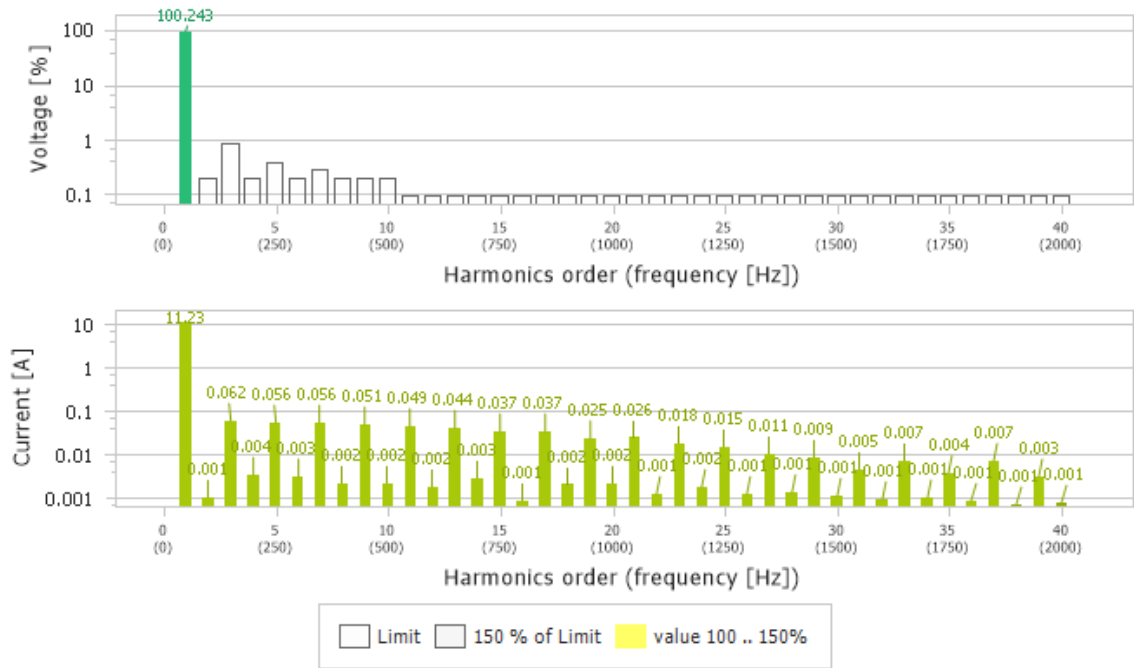


Time Domain of Time Window 1



Harmonics of Time Window 1 (Line 1)

Harmonics of Time Window 1



Maximum / Average Values

		Line 1
<i>Maximum Values</i>		
	Frequency	50 Hz
	Voltage RMS	230.9 V
	Current RMS	11.23 A
	Peak Current	16.85 A
	Fundamental Current	11.23 A
	Current Crest Factor	4.410
	Active Power P	2.589e+3 W
	Power Factor	0.9999
	Total Harmonic Current (THC)	0.3018 A
	Instantaneous Partial Odd Harmonic Current (Inst. POHC)	0.06521 A
	Total Harmonic Distortion Current (THDC)	0.02687
<i>Average Values</i>		
	Total Harmonic Current (THC)	0.2647 A
	Instantaneous Partial Odd Harmonic Current (Inst. POHC)	0.04900 A
	Total Harmonic Distortion Current (THDC)	0.02357

Test Report

Test Object : CAF-DC121-AEUR

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

Tester : Derreck

Company : TUV SUD SZ EMC Lab

Test Date : 12/23/2024 4:52:27 PM

Test Object / Product

Name : CAF-DC121-AEUR Operation Mode : ON (max)

Description : With Nidec fan motor

Measures & Analysis

Measure Window : 8 periods Voltage Range : 500 V

Refresh Interval : 2 s Current Range : 50 A

Sampling Rate : 6.4 kS/s

Scaled Window : Rectangular Current Probe : Internal
(Ratio: 27 mV/A,
Number of turns: 1,
PhaseCompensation: -0.75)

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

Standard Specific Results for IEC 61000-3-2 (Edition 5.1)

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
Main Line:	230 V, 50 Hz
Classification:	Class A
Appli. of Limits:	less than or equal to 150 % (Without POHC Enhancement)
Grouping:	not applied
Test Duration:	2 min 30.08 s

Check Harmonics 2..40			
<i>First detected harmonic order > 150 %</i>			
Line 1:	None		
<i>Harmonics orders > 150 %</i>			
Line 1:	None		
<i>Harmonics orders with average > 100 %</i>			
Line 1:	None		

Measured values			
<i>Fundamental Current</i>			
Line 1:	11.251 A		
<i>Active input Power</i>			
Line 1:	2594.107 W *		
<i>Circuit power factor</i>			
Line 1:	1 *		

* Absolute value.

Prerequisite for simplified method fulfilled			
<i>First time window with THD(I) > 15 %</i>			
Line 1:	None		
<i>Time window with max THD(I) > 15 %</i>			
Line 1:	None		
<i>Current emission below 60 % of the applicable limits</i>			
Line 1:	No		
<i>Active Input Power</i>			
Line 1:	2594 W *		

* Absolute value.

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	7.508				11.251				
2	0.003	0.250	1.080	n/a	0.018	1.110	1.620	n/a	PASS
3	0.134	5.843	2.300	PASS	0.161	4.654	3.450	PASS	PASS
4	0.003	0.785	0.430	n/a	0.012	1.804	0.645	n/a	PASS
5	0.125	11.002	1.140	PASS	0.148	8.677	1.710	PASS	PASS
6	0.003	1.040	0.300	n/a	0.008	1.754	0.450	n/a	PASS
7	0.116	15.031	0.770	PASS	0.136	11.818	1.155	PASS	PASS
8	0.003	1.302	0.230	n/a	0.007	2.162	0.345	n/a	PASS
9	0.103	25.738	0.400	PASS	0.122	20.283	0.600	PASS	PASS
10	0.003	1.650	0.184	n/a	0.007	2.537	0.276	n/a	PASS
11	0.089	27.103	0.330	PASS	0.103	20.822	0.495	PASS	PASS
12	0.002	1.531	0.153	n/a	0.006	2.493	0.230	n/a	PASS
13	0.074	35.231	0.210	PASS	0.084	26.757	0.315	PASS	PASS
14	0.003	2.449	0.131	n/a	0.006	2.803	0.197	n/a	PASS
15	0.059	39.645	0.150	n/a	0.067	29.909	0.225	n/a	PASS
16	0.002	1.898	0.115	n/a	0.004	2.484	0.173	n/a	PASS
17	0.048	35.990	0.132	n/a	0.053	26.469	0.199	n/a	PASS
18	0.002	2.239	0.102	n/a	0.003	2.221	0.153	n/a	PASS
19	0.033	28.279	0.118	n/a	0.037	20.963	0.178	n/a	PASS
20	0.002	2.153	0.092	n/a	0.003	2.107	0.138	n/a	PASS
21	0.027	25.368	0.107	n/a	0.029	18.203	0.161	n/a	PASS
22	0.002	2.346	0.084	n/a	0.003	2.491	0.125	n/a	PASS
23	0.021	21.234	0.098	n/a	0.023	15.617	0.147	n/a	PASS
24	0.002	2.261	0.077	n/a	0.003	2.368	0.115	n/a	PASS
25	0.019	21.404	0.090	n/a	0.023	16.702	0.135	n/a	PASS
26	0.001	2.087	0.071	n/a	0.002	2.167	0.106	n/a	PASS
27	0.018	21.114	0.083	n/a	0.022	17.559	0.125	n/a	PASS
28	0.001	2.239	0.066	n/a	0.003	2.675	0.099	n/a	PASS
29	0.017	21.784	0.078	n/a	0.021	18.104	0.116	n/a	PASS
30	0.001	2.300	0.061	n/a	0.003	2.967	0.092	n/a	PASS
31	0.016	22.266	0.073	n/a	0.020	18.240	0.109	n/a	PASS
32	0.001	2.395	0.058	n/a	0.003	3.465	0.086	n/a	PASS
33	0.013	19.086	0.068	n/a	0.017	16.516	0.102	n/a	PASS
34	0.001	2.305	0.054	n/a	0.003	3.240	0.081	n/a	PASS
35	0.012	19.343	0.064	n/a	0.016	16.164	0.096	n/a	PASS
36	0.001	2.459	0.051	n/a	0.003	3.291	0.077	n/a	PASS
37	0.009	14.179	0.061	n/a	0.011	12.455	0.091	n/a	PASS
38	0.001	2.458	0.048	n/a	0.002	3.137	0.073	n/a	PASS
39	0.008	13.777	0.058	n/a	0.011	12.222	0.087	n/a	PASS
40	0.001	2.175	0.046	n/a	0.002	2.663	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.

Voltage Source Verification

Harmonic voltage results				
Hn	Ueff [V]	Ueff [%]	Limit [%]	Result
1	231.004	100.436		
2	0.055	0.024	0.200	PASS
3	0.077	0.034	0.900	PASS
4	0.021	0.009	0.200	PASS
5	0.058	0.025	0.400	PASS
6	0.036	0.016	0.200	PASS
7	0.079	0.034	0.300	PASS
8	0.024	0.010	0.200	PASS
9	0.048	0.021	0.200	PASS
10	0.015	0.007	0.200	PASS
11	0.093	0.040	0.100	PASS
12	0.019	0.008	0.100	PASS
13	0.074	0.032	0.100	PASS
14	0.024	0.010	0.100	PASS
15	0.100	0.044	0.100	PASS
16	0.024	0.010	0.100	PASS
17	0.093	0.040	0.100	PASS
18	0.012	0.005	0.100	PASS
19	0.099	0.043	0.100	PASS
20	0.020	0.009	0.100	PASS
21	0.081	0.035	0.100	PASS
22	0.012	0.005	0.100	PASS
23	0.050	0.022	0.100	PASS
24	0.014	0.006	0.100	PASS
25	0.078	0.034	0.100	PASS
26	0.010	0.004	0.100	PASS
27	0.069	0.030	0.100	PASS
28	0.007	0.003	0.100	PASS
29	0.071	0.031	0.100	PASS
30	0.006	0.003	0.100	PASS
31	0.065	0.028	0.100	PASS
32	0.008	0.004	0.100	PASS
33	0.074	0.032	0.100	PASS
34	0.009	0.004	0.100	PASS
35	0.078	0.034	0.100	PASS
36	0.009	0.004	0.100	PASS
37	0.072	0.031	0.100	PASS
38	0.015	0.007	0.100	PASS
39	0.063	0.028	0.100	PASS
40	0.013	0.005	0.100	PASS

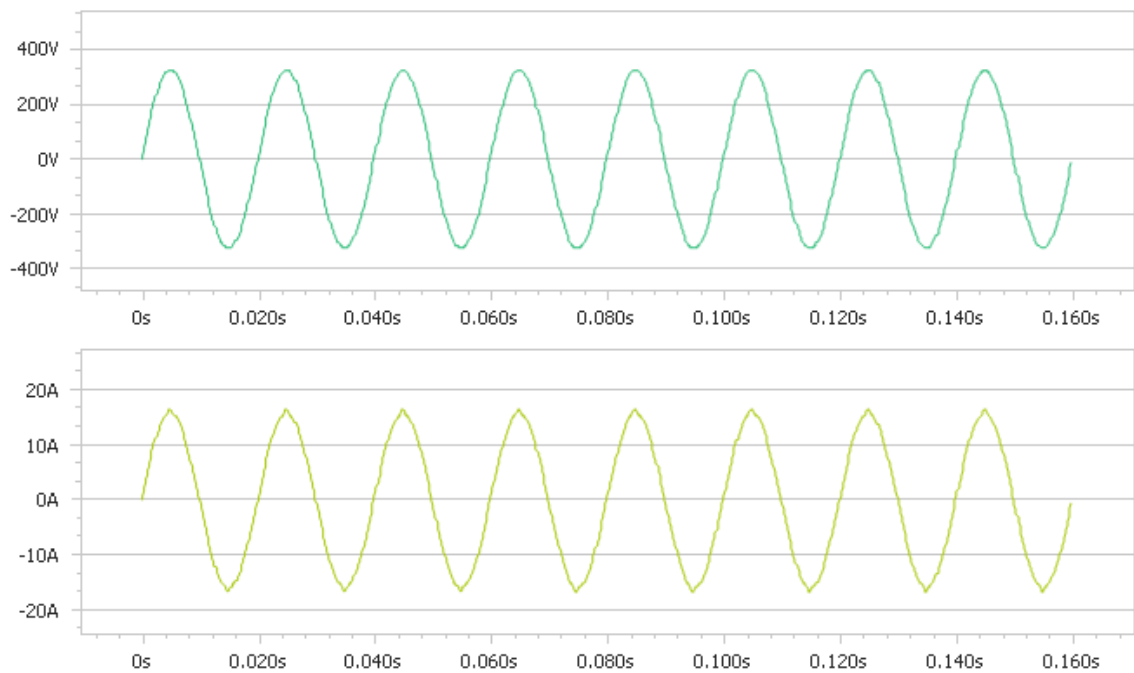
Time Window 1

Power Values of Time Window 1 (Line 1)

	Line 1
Measuring Time	0 s
Frequency	50 Hz
Voltage RMS	230.6 V
Current RMS	11.24 A
Peak Current	16.55 A
Fundamental Current	11.24 A
Voltage Crest Factor	1.414
Current Crest Factor	1.472
Active Power P	2.592e+3 W
Reactive Power Q	-35.55 var
Apparent Power S	2.592e+3 VA
Power Factor	0.9999
Displacement Factor	1.000
Phi	-0.8 °
Total Harmonic Distortion Voltage (THDV)	1.057e-3
Total Harmonic Distortion Current (THDC)	0.01504
Total Harmonic Current (THC)	0.1692 A
Instantaneous Partial Odd Harmonic Current (Inst. POHC)	0.04240 A

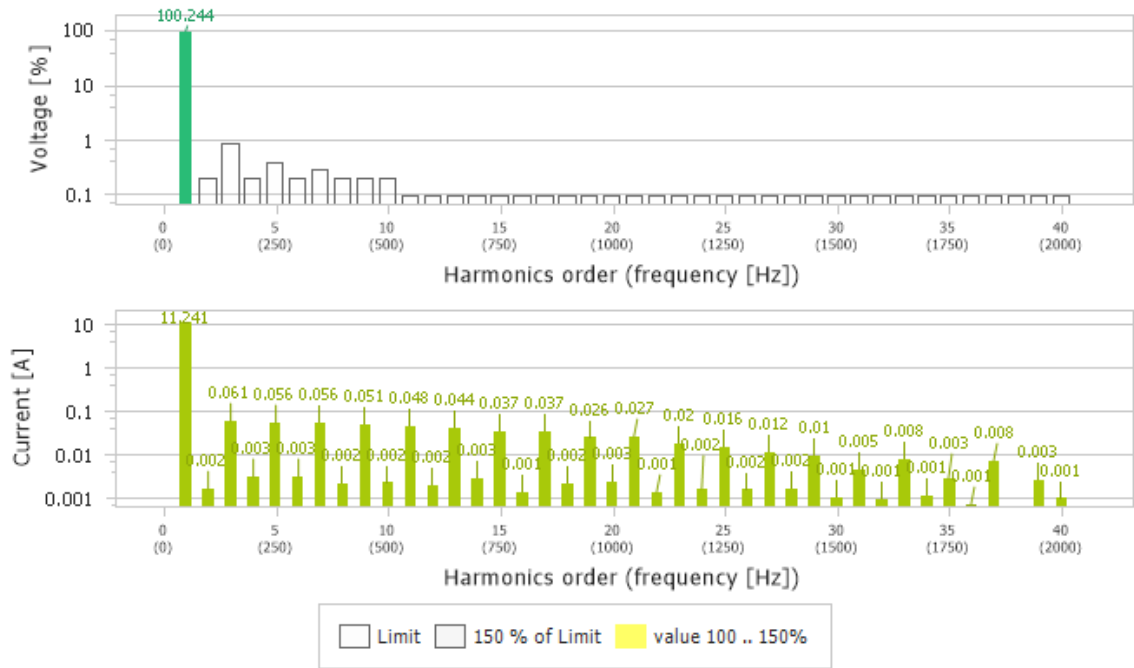


Time Domain of Time Window 1



Harmonics of Time Window 1 (Line 1)

Harmonics of Time Window 1



Maximum / Average Values

		Line 1
<i>Maximum Values</i>		
	Frequency	50 Hz
	Voltage RMS	231.0 V
	Current RMS	11.27 A
	Peak Current	17.04 A
	Fundamental Current	11.30 A
	Current Crest Factor	4.339
	Active Power P	2.605e+3 W
	Power Factor	0.9999
	Total Harmonic Current (THC)	0.3335 A
	Instantaneous Partial Odd Harmonic Current (Inst. POHC)	0.07335 A
	Total Harmonic Distortion Current (THDC)	0.02964
<i>Average Values</i>		
	Total Harmonic Current (THC)	0.2853 A
	Instantaneous Partial Odd Harmonic Current (Inst. POHC)	0.05412 A
	Total Harmonic Distortion Current (THDC)	0.02536



Test setup

2.4.8 Test Location

This test was carried out in Harmonic Flicker Test area.

2.5 Flicker

2.5.1 Specification Reference

EN 61000-3-3:2013+A1:2019+A2:2021, Clause 5

2.5.2 Equipment Under Test

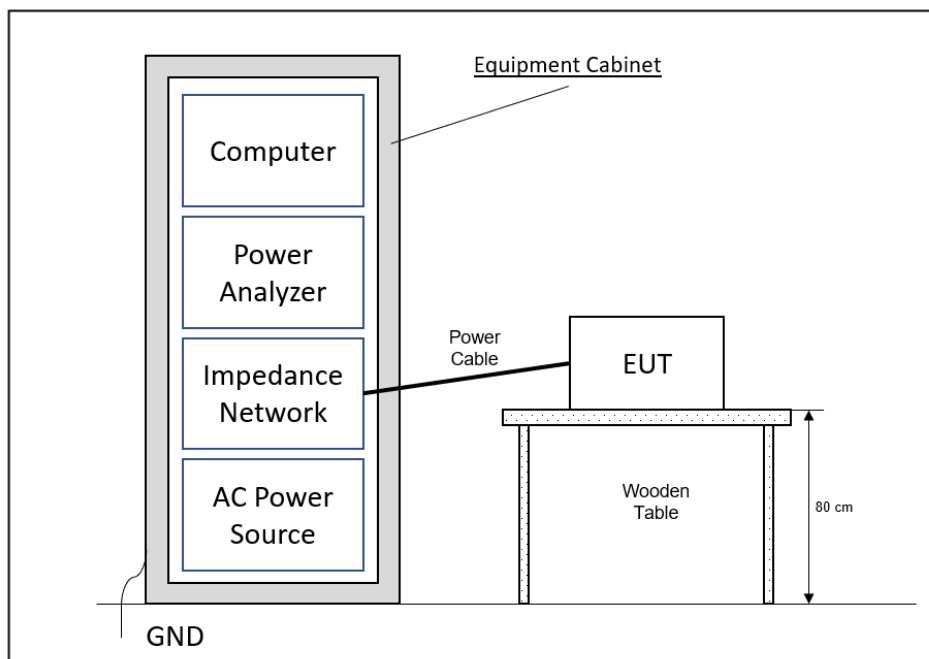
CAF-DC121-AEUR

2.5.3 Date of Test

2024-12-23

2.5.4 Test Method

Flicker test should be conducted with the user's operation controls or automatic programs set to the mode expected 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	23.0 °C
Relative Humidity	33.9 %
Atmospheric Pressure	1024 mbar

2.5.6 Specification Limits

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

The value of P_{lt} 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

- a) 4% without additional conditions
- b) 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
- c) 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

2.5.7 Test Results

Results for Configuration and Mode: AC powered / ON (max).

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

Detailed results are shown below.



Test Report

Test Object :	CAF-DC121-AEUR
Test Standard :	IEC 61000-3-3 (Ed3-2) - General Test conditions (230V - 50Hz)
Tester :	Derreck
Company :	TUV SUD SZ EMC Lab
Test Date :	12/23/2024 5:22:25 PM

Test Object / Product

Name :	CAF-DC121-AEUR	Operation Mode :	ON (max)
Description :	With ZHAOLI fan motor		

Flicker Results

Standard Specific Results for IEC 61000-3-3 (Edition 3.2)

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:	General Test Conditions
Analysis Status:	PASS

Flicker Measurements Settings	
Main Line:	230V, 50Hz
Flicker Meter:	230V / 50Hz
Flicker Impedance:	Zref
Observation Time:	1 × 10 min
Measurements:	1

Flicker Measurements						
	Last V_{rms} [V]	P_{it}	Max P_{st}	Max d_c [%]	Max d_{max} [%]	Max T_{max} [s]
Line 1:	230.957	0.232	0.532	2.063	2.208	0
Limits:		0.65	1	3.3	4	0.5
Results:		PASS	PASS	PASS	PASS	PASS

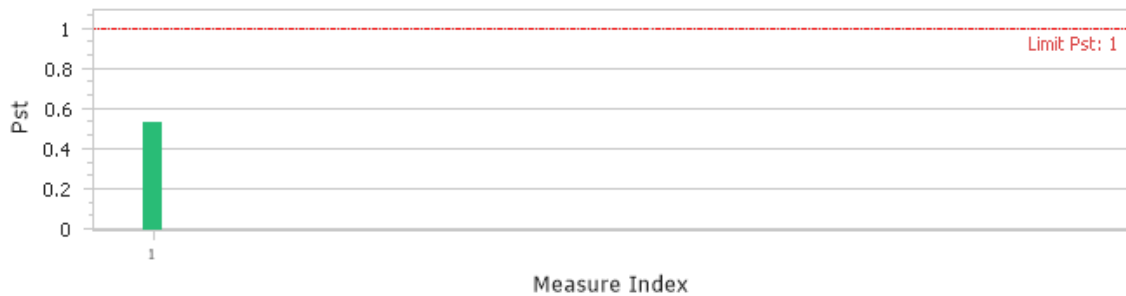
Flicker Individual Measurements												
Measurement	P_{st} []			d_c [%]			d_{max} [%]			T_{max} [s]		
	Value	Limit	Result	Value	Limit	Result	Value	Limit	Result	Value	Limit	Result
#1	0.53	1.00	PASS	2.06	3.30	PASS	2.21	4.00	PASS	0.00	0.50	PASS

Pst Data

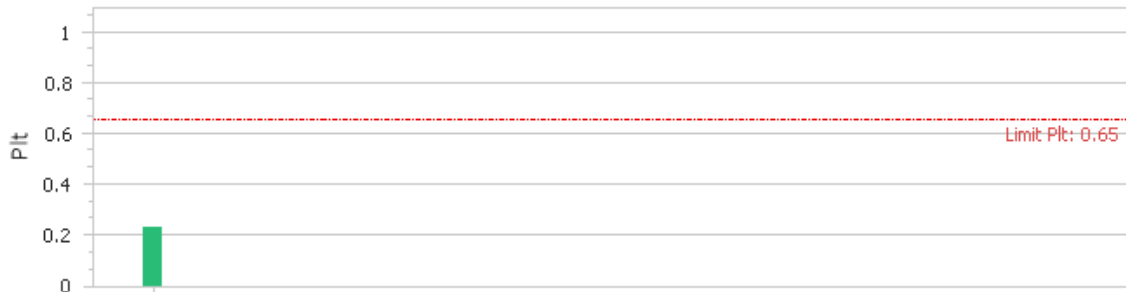
Flicker (Line 1)

Meas. No.	P0,1	P1s	P3s	P10s	P50s	Pst	dc [%]	dmax [%]	Tmax [s]
1	4.015	2.145	0.497	0.035	0.022	0.532	2.063	2.208	0

Short-term Flicker Severity (Pst)



Long-term Flicker Severity (Plt)





Test Report	
Test Object :	CAF-DC121-AEUR
Test Standard :	IEC 61000-3-3 (Ed3-2) - General Test conditions (230V - 50Hz)
Tester :	Derreck
Company :	TUV SUD SZ EMC Lab
Test Date :	12/23/2024 4:45:23 PM

Test Object / Product			
Name :	CAF-DC121-AEUR	Operation Mode :	ON (max)
Description :	With Nidec fan motor		

Flicker Results

Standard Specific Results for IEC 61000-3-3 (Edition 3.2)

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:	General Test Conditions
Analysis Status:	PASS

Flicker Measurements Settings	
Main Line:	230V, 50Hz
Flicker Meter:	230V / 50Hz
Flicker Impedance:	Zref
Observation Time:	1 × 10 min
Measurements:	1

Flicker Measurements						
	Last V_{rms} [V]	P_{it}	Max P_{st}	Max d_c [%]	Max d_{max} [%]	Max T_{max} [s]
Line 1:	228.637	0.214	0.489	1.051	1.192	0
Limits:		0.65	1	3.3	4	0.5
Results:		PASS	PASS	PASS	PASS	PASS

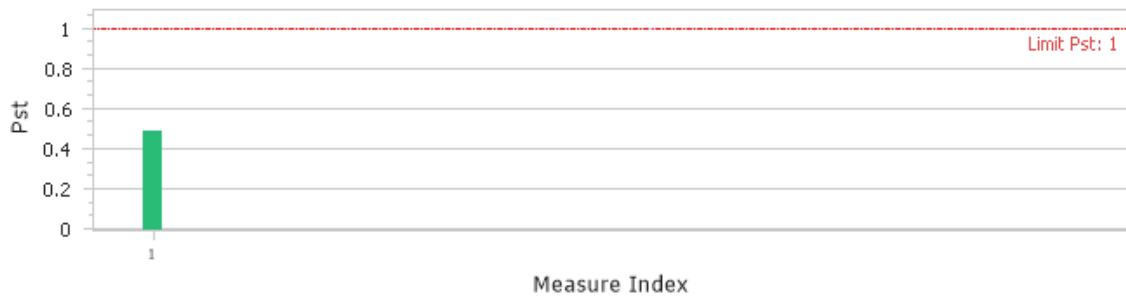
Flicker Individual Measurements												
Measurement	P_{st} []			d_c [%]			d_{max} [%]			T_{max} [s]		
	Value	Limit	Result	Value	Limit	Result	Value	Limit	Result	Value	Limit	Result
#1	0.49	1.00	PASS	1.05	3.30	PASS	1.19	4.00	PASS	0.00	0.50	PASS

Pst Data

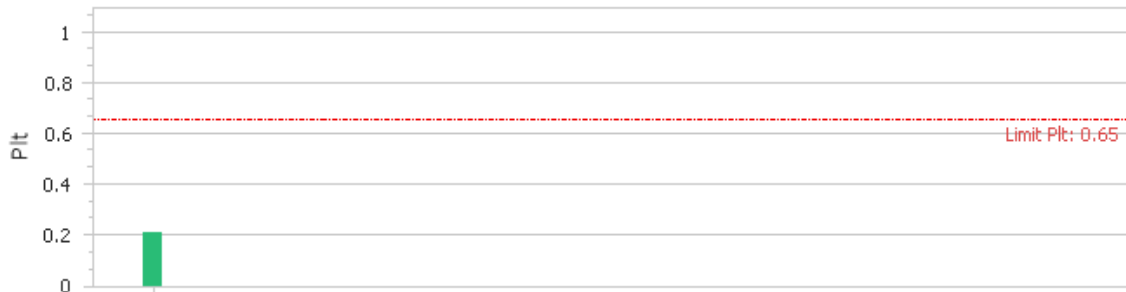
Flicker (Line 1)

Meas. No.	P0,1	P1s	P3s	P10s	P50s	Pst	dc [%]	dmax [%]	Tmax [s]
1	3.773	1.723	0.312	0.029	0.021	0.489	1.051	1.192	0

Short-term Flicker Severity (Pst)



Long-term Flicker Severity (Plt)





Test setup

2.5.8 Test Location

This test was carried out in Harmonic Flicker Test area.

2.6 Electrostatic Discharge

2.6.1 Specification Reference

EN IEC 55014-2:2021, Clause 5.1

2.6.2 Equipment Under Test

CAF-DC121-AEUR

2.6.3 Date of Test

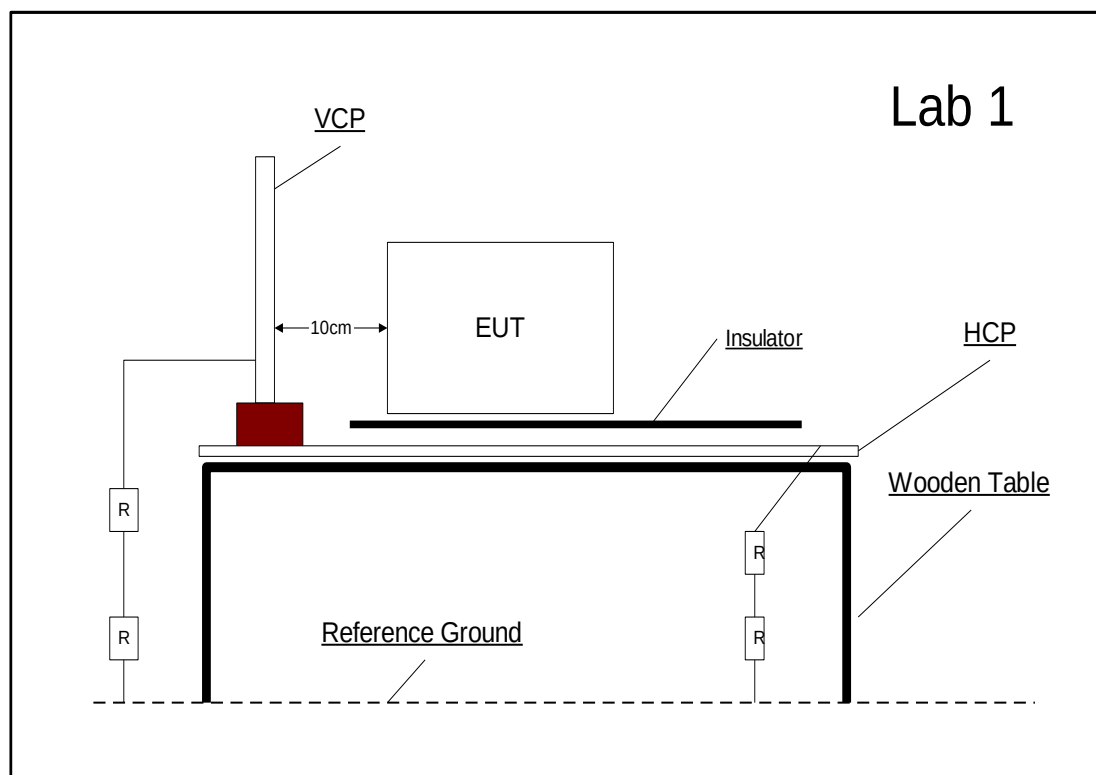
2024-12-24

2.6.4 Test Method

The equipment under test including associated cabling was configured on but insulated from, using a 0.5mm isolator, a horizontal coupling plane fitted to the top of a 0.8m non-conductive table for table-top equipment; and on a 0.1m insulated support for floor standing equipment; above a ground reference plane all within a test laboratory.

Using the air discharge method for non-metallic parts, contact discharge method for metallic parts with both vertical and horizontal couple plane discharge methods for the sides of the equipment under test, the required electrostatic discharge voltage levels in both voltage polarities were applied at the detailed pulse repartition rate.

During this testing any anomalies in the equipment under tests performance was recorded.



2.6.5 Environmental Conditions

Ambient Temperature	22.7 °C
Relative Humidity	44.9 %
Atmospheric Pressure	1023 mbar

2.6.6 Specification Limits

Required Test Levels				
Discharge type	Discharge Level (kV)		Number of discharges per location (each polarity)	Performance Criteria
	Positive	Negative		
Air – Direct	8	8	10	B
Contact – Direct	4	4	10	B
Contact – Indirect	4	4	10	B
Tests with other (lower) test levels than those given in Table are not required.				

2.6.7 Test Results

Results for Configuration and Mode: AC powered / ON (mid).

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

Detailed results are shown below.

Tabulated Results for Electrostatic Discharge											
Test Points	Discharge Type	2kV		4kV		6kV		8kV		15kV	
		+	-	+	-	+	-	+	-	+	-
HCP	Contact	N/A	N/A	A	A	N/A	N/A	N/A	N/A	N/A	N/A
VCP	Contact	N/A	N/A	A	A	N/A	N/A	N/A	N/A	N/A	N/A
Each conductive location touchable by hand	Contact	N/A	N/A	A	A	N/A	N/A	N/A	N/A	N/A	N/A
Each nonconductive location touchable by hand	Air	N/A	N/A	N/A	N/A	N/A	N/A	A	A	N/A	N/A

N/A: Not Applicable

A: No observable change during and after testing.



Test Setup

2.6.8 Test Location

This test was carried out in ESD room.

2.7 Fast Transients

2.7.1 Specification Reference

EN IEC 55014-2:2021, Clause 5.2

2.7.2 Equipment Under Test

CAF-DC121-AEUR

2.7.3 Date of Test

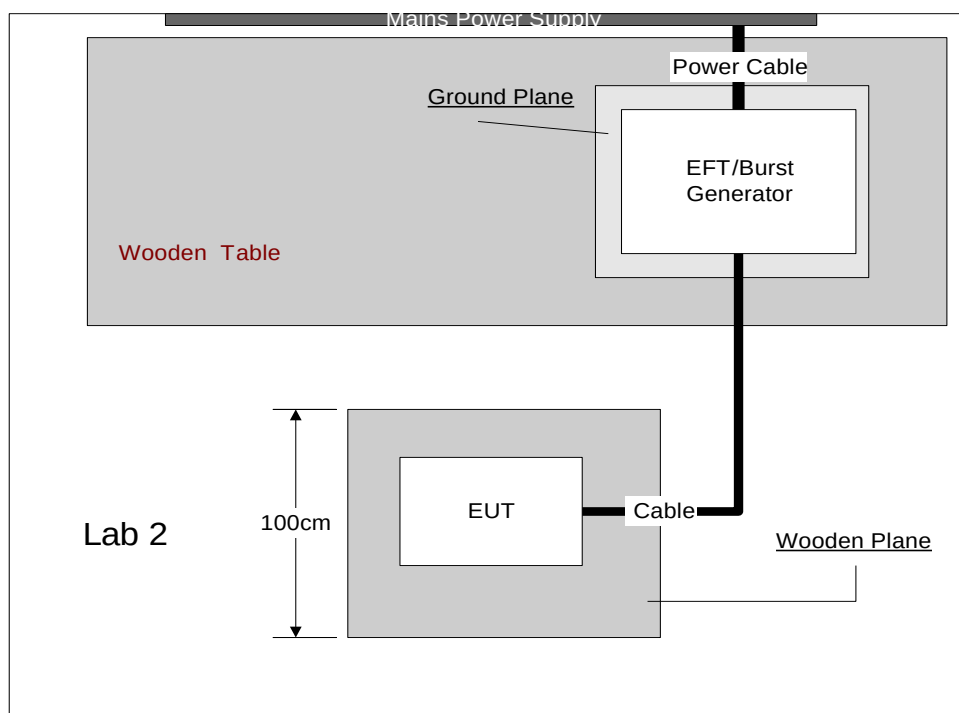
2024-12-23

2.7.4 Test Method

The equipment under test including associated cabling was configured on but insulated from, using a 0.1 m isolator, a horizontal coupling plane fitted to the top of a 0.8 m non-conductive table for table-top equipment; and on a 0.1 m insulated support for floor standing equipment; above a ground reference plane all within a test laboratory.

Using a CDN for power ports, capacitive coupling clamp for signal and control ports and a 33nF coupling capacitor for earth ports, the required fast transient burst voltage levels in both voltage polarities were applied at the detailed pulse repartition rate and duration of test.

During this testing any anomalies in the equipment under tests performance was recorded.



2.7.5 Environmental Conditions

Ambient Temperature	20.4 °C
Relative Humidity	33.6 %
Atmospheric Pressure	1024 mbar

2.7.6 Specification Limits

Required Test Levels Input and output a.c. power ports					
Line Under Test	Level (kV)	Repetition Rate (kHz)	Test Duration	Coupling Method	Performance Criteria
Input and output a.c. power ports	± 1.0	5	2 min per polarity	Direct	B
For extra low voltage a.c. ports and output a.c. ports, this testing is only applicable to ports interfacing with cables whose total length may exceed 3 m according to the manufacturer's functional specification.					

2.7.7 Test Results

Results for Configuration and Mode: AC powered / ON (mid).

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

Detailed results are shown below.

Tabulated Results for Fast Transients					
Line under test	Test Level	Repetition Rate	Test Duration	Coupling Method	Result
Power line	± 1.0 kV	5 kHz	2 min	Direct	Pass (A)

A: No observable change during and after testing.



Test Setup

2.7.8 Test Location

This test was carried out in EMS Test Location.

2.8 Injected Currents

2.8.1 Specification Reference

EN IEC 55014-2:2021, Clause 5.3

2.8.2 Equipment Under Test

CAF-DC121-AEUR

2.8.3 Date of Test

2024-12-24

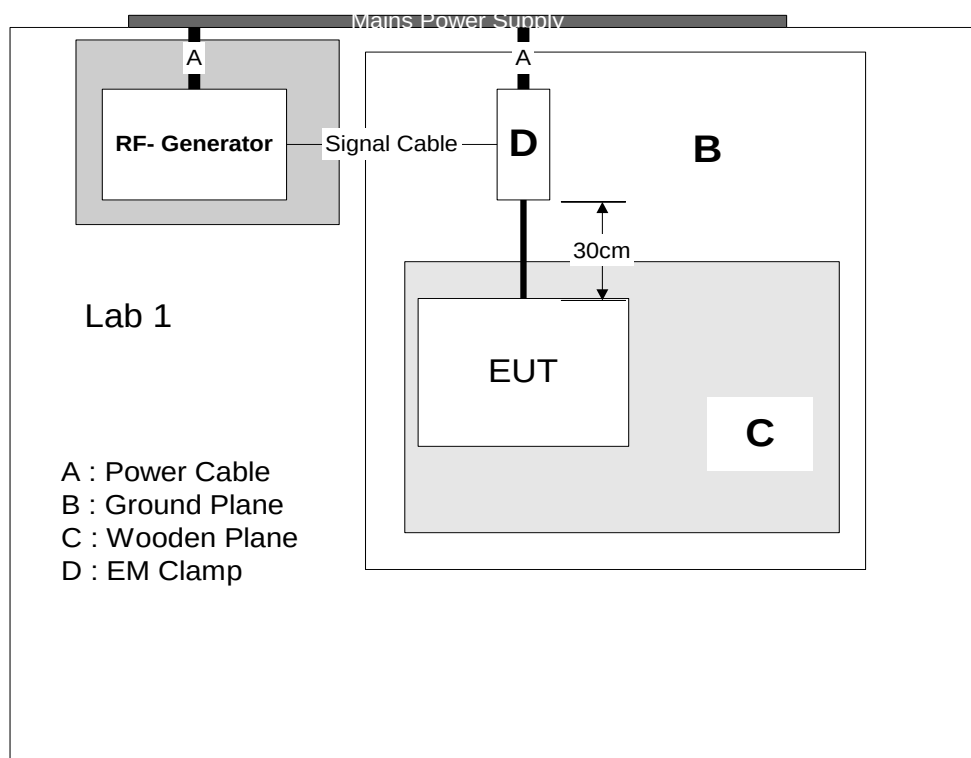
2.8.4 Test Method

The equipment under test was configured, on but insulated from, using a 0.1 m isolator, a horizontal coupling plane fitted to the top of a 0.1 m non-conductive table for table-top equipment, above a ground reference plane all within a test laboratory.

All associated cabling was configured, on but insulated from, using a 50 mm isolator, the same horizontal coupling plane as the equipment under test.

Using CDNs, EM Clamps or current clamps as appropriate, the power ports and applicable signal and control ports were subjected to the required, pre calibrated RF injected signal strength, modulated as described, swept over the frequency range of test.

During this testing any anomalies in the equipment under tests performance was recorded.



2.8.5 Environmental Conditions

Ambient Temperature	22.8 °C
Relative Humidity	32.4 %
Atmospheric Pressure	1021 mbar

2.8.6 Specification Limits

Required Test Levels Input and output a.c. power ports						Performance Criteria
Line Under Test	Frequency Range (MHz)	Level (V)	Modulation	Step Size (%)	Dwell (s)	
Input and output a.c. power ports	0.15 to 80	3	AM (80 %,1 kHz, sine wave)	1	3	A
For extra low voltage a.c ports and output a.c. ports, this testing is only applicable to ports interfacing with cables whose total length may exceed 3 m according to the manufacturer's functional specification.						

2.8.7 Test Results

Results for Configuration and Mode: AC powered / ON (mid).

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

Detailed results are shown below.

Tabulated Results for Injected Currents						
Line under test	Test Level	Step	Dwell Time	Coupling Method	Modulation	Result
Power line	3V	1%	3s	CDN	1kHz, 80%	Pass (A)

A: No observable change during and after testing.



Test Setup

2.8.8 Test Location

This test was carried out in EMS Test Location.

2.9 Radio Frequency Electromagnetic Fields

2.9.1 Specification Reference

EN IEC 55014-2:2021, Clause 5.5

2.9.2 Equipment Under Test

CAF-DC121-AEUR

2.9.3 Date of Test

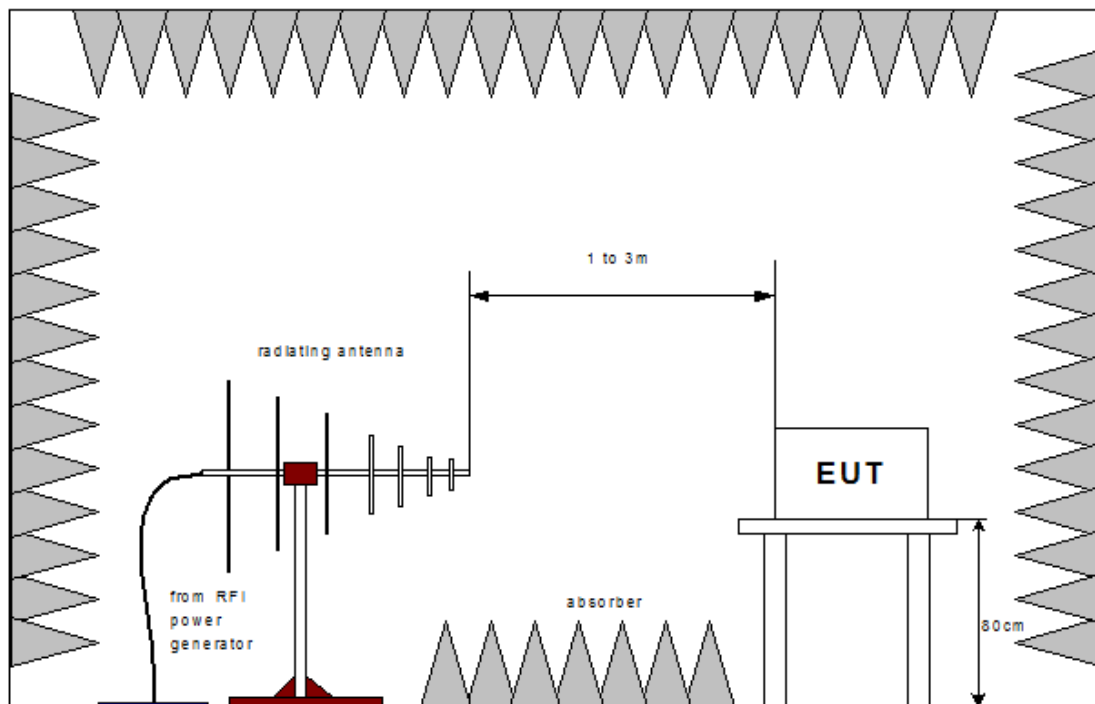
2024-12-19

2.9.4 Test Method

The equipment under test including associated cabling was configured, on a 0.8 m non-conductive table for table-top equipment and on a 0.1 m insulated support for floor standing equipment; with a pre-calibrated semi anechoic chamber.

All four side of the equipment under test were subjected to the required RF field strength, modulated as described, swept over the frequency range of test with the antenna positioned in both horizontal and vertical polarizations.

During this testing any anomalies in the equipment under tests performance was recorded.



2.9.5 Environmental Conditions

Ambient Temperature	23.1 °C
Relative Humidity	35.9 %
Atmospheric Pressure	1020 mbar

2.9.6 Specification Limits

Required Test Levels					
Frequency Range (MHz)	Level (V/m)	Modulation	Step Size (%)	Dwell (s)	Performance Criteria
80 to 1000	3	AM (80 %,1 kHz, sine wave)	1	1	A
Note 1. EUT powered at one of the Nominal input voltages and frequencies					

2.9.7 Test Results

Results for Configuration and Mode: AC powered / ON (mid).

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

Detailed results are shown below.

Tabulated Results for Radio Frequency Electromagnetic Fields (80 - 1000 MHz)					
Side of the equipment under test	Antenna polarization	Test Level	Dwell Time	Measuring Distance	Result
All sides	Horizontal	3 V/m	1 s	3 m	Pass (A)
All sides	Vertical	3 V/m	1 s	3 m	Pass (A)

A: No observable change during and after testing.



Test Setup

2.9.8 Test Location

This test was carried out in 3m anechoic chamber.

2.10 Surges

2.10.1 Specification Reference

EN IEC 55014-2:2021, Clause 5.6

2.10.2 Equipment Under Test

CAF-DC121-AEUR

2.10.3 Date of Test

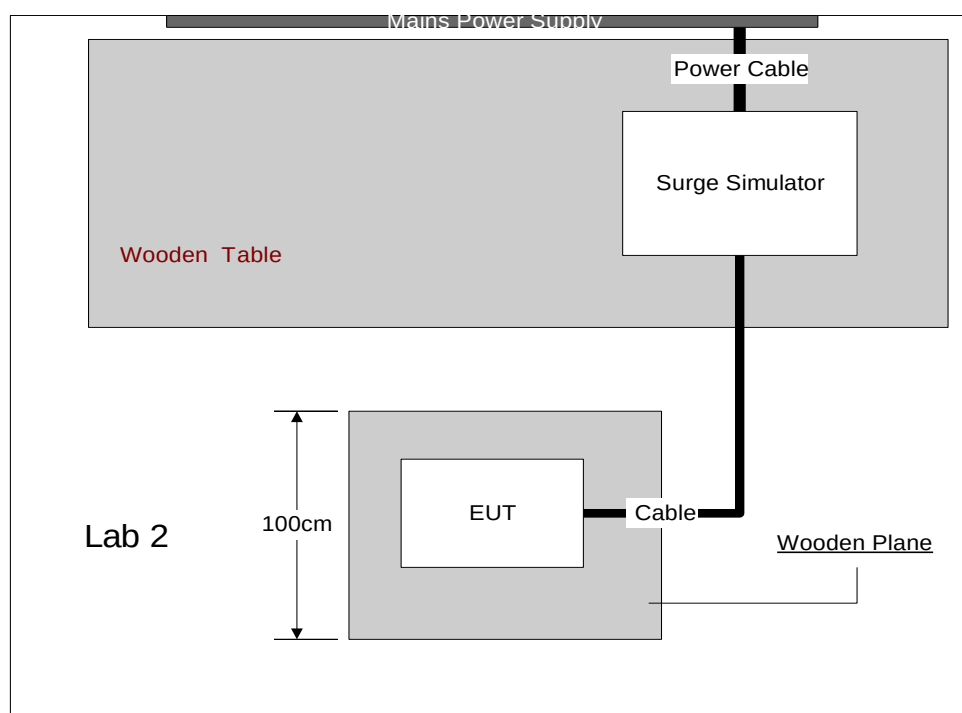
2024-12-24

2.10.4 Test Method

The equipment under test including associated cabling was configured, on a 0.8 m non-conductive table for table-top equipment and on a 0.1 m insulated support for floor standing equipment above a ground reference plane all within a test laboratory.

Using CDNs for power ports and appropriate coupling methods for applicable signal and control ports, the required number of surges was applied for each surge voltage level using both positive and negative surge voltage polarities. Surges were applied at the power line frequency phase angles and repartition rates detailed.

During this testing any anomalies in the equipment under tests performance was recorded.



2.10.5 Environmental Conditions

Ambient Temperature	22.6 °C
Relative Humidity	32.4 %
Atmospheric Pressure	1025 mbar

2.10.6 Specification Limits

Required Test Levels Input a.c. power ports		
Characteristics	Test Levels	Performance Criteria
Wave-shape data Test levels line to line with 2Ω impedance line to earth with 12Ω impedance	1.2/50 μs ± 1.0 kV ±2.0 kV	B
Tests with other (lower) test levels than those given in Table are not required.		

2.10.7 Test Results

Results for Configuration and Mode: AC powered / ON (mid).

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

Detailed results are shown below.

Tabulated Results for Surges							
Line Name	Coupling	Level	Polarity	Phase Angle	No of Pulses	Repetition Rate	Result
Power line	Live to Neutral	1.0kV	NEGATIVE	270 deg	5	60 sec	Pass (A)
Power line	Live to Neutral	1.0kV	POSITIVE	90 deg	5	60 sec	Pass (A)
Power line	Live to Earth	2.0kV	NEGATIVE	270 deg	5	60 sec	Pass (A)
Power line	Live to Earth	2.0kV	POSITIVE	90 deg	5	60 sec	Pass (A)
Power line	Neutral to Earth	2.0kV	NEGATIVE	270 deg	5	60 sec	Pass (A)
Power line	Neutral to Earth	2.0kV	POSITIVE	90 deg	5	60 sec	Pass (A)

A: No observable change during and after testing.



Test Setup

2.10.8 Test Location

This test was carried out in EMS Test Location.

2.11 Voltage Dips

2.11.1 Specification Reference

EN IEC 55014-2:2021, Clause 5.7

2.11.2 Equipment Under Test

CAF-DC121-AEUR

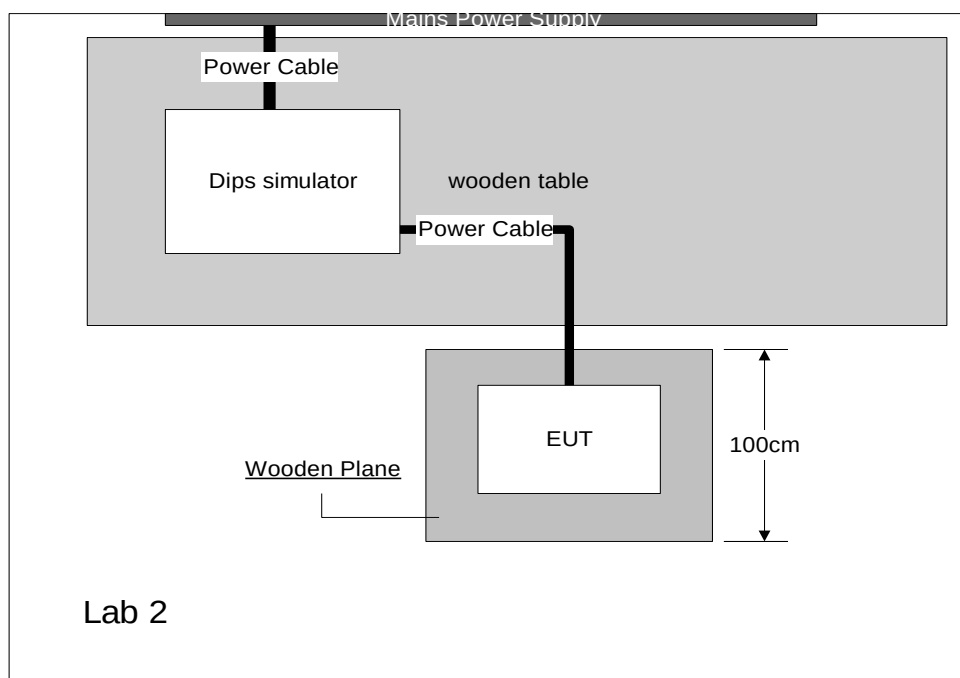
2.11.3 Date of Test

2024-12-24

2.11.4 Test Method

The equipment under test including associated cabling was configured, on a 0.8 m non-conductive table for table-top equipment and on a 0.1 m insulated support for floor standing equipment above a ground reference plane all within a test laboratory.

Using a programmable power supply the equipment under test was subjected to the detailed supply voltage dips and interruptions. The required supply phase synchronization and test repetition rate, detailed, was controlled by the programmable power supply. During this testing any anomalies in the equipment under tests performance was recorded.



2.11.5 Environmental Conditions

Ambient Temperature	23.3 °C
Relative Humidity	48.7 %
Atmospheric Pressure	1018 mbar

2.11.6 Specification Limits

Voltage Dips				
Voltage Dips in % U _T	Test level in % U _T	Durations		Performance Criteria
		50Hz	60Hz	
100	0	½ cycle	½ cycle	C
60	40	10 cycles	12 cycles	C
30	70	25 cycles	30 cycles	C
U _T is the rated voltage of the Equipment Under Test				

2.11.7 Test Results

Results for Configuration and Mode: AC powered / ON (mid).

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

Detailed results are shown below.

Tabulated Results for Voltage Dips					
Line under test	Vnom	Operating Frequency	Test Level	Duration	Result
Power line	230 VAC	50 Hz	0% of Vnom	½ cycle	Pass (A)
Power line	230 VAC	50 Hz	40% of Vnom	10 cycles	Pass (A)
Power line	230 VAC	50 Hz	70% of Vnom	25 cycles	Pass (A)

A: No observable change during and after testing.



Test Setup

2.11.8 Test Location

This test was carried out in EMS Test Location.

3 Test Equipment Information

3.1 General Test Equipment Used

Conducted Disturbance, CSR #2

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 3	68-4-74-19-002	102590	1	2025-5-13
LISN	Rohde & Schwarz	ENV216	68-4-87-19-001	102472	1	2025-5-12
LISN	Rohde & Schwarz	ENV4200	68-4-87-14-001	100249	1	2025-5-13
Attenuator	Shanghai Huaxiang	TS2-26-3	68-4-81-16-003	080928189	1	2025-5-11
Cable	OUQIAO	RG142	68-4-90-19-005-A20	----	----	----
Test software	Rohde & Schwarz	EMC32	68-4-90-19-005-A01	Version10.35.02	N/A	N/A
Shielding Room	TDK	CSR #2	68-4-90-19-005	----	3	2025-10-15

Radiated Disturbance, SAC-3 #1

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 7	68-4-74-19-001	102176	1	2025-5-13
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	68-4-80-14-002	707	1	2025-7-2
Attenuator	Mini-circuits	UNAT-6+	68-4-81-21-001	15542	1	2025-5-11
Cable	HUBER-SUHNER	RG214	68-4-90-14-001-A20	----	----	----
3m Semi-anechoic chamber	TDK	SAC-3 #1	68-4-90-14-001	----	3	2026-10-25
Test software	Rohde & Schwarz	EMC32	68-4-90-14-001-A10	Version10.35.02	N/A	N/A

Discontinuous Disturbance, CSR #2

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 3	68-4-74-19-002	102590	1	2025-5-13
LISN	Rohde & Schwarz	ENV216	68-4-87-19-001	102472	1	2025-5-12
Cable	OUQIAO	RG142	68-4-90-19-005-A20	----	----	----
Test software	Rohde & Schwarz	Click Rate Analyzer	68-4-90-19-005-A10	Version 2.4.6	N/A	N/A
Shielding Room	TDK	CSR #2	68-4-90-19-005	----	3	2025-10-15

Harmonic Test / Flicker Test

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
Harmonic flicker test system	Ametek	DPA500N	68-4-74-22-001	P2148258408	1	2025-5-29
Test software	Ametek	NET. control	68-4-74-22-001-A02	Version 3.2.3	N/A	N/A

**Electrostatic Discharge**

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
Electrostatic Discharge Simulator	Noiseken	ESS-B3011A	68-4-75-23-001	ESS2224425	1	2025-3-24

Fast Transients

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
Immunity simulator	EMTEST	EFT 500	68-4-75-14-006	1094-37	1	2025-5-12

Injected Currents

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
Continuous Wave Simulator	EMTEST	CWS 500N1	68-4-75-14-002	P1420134224	1	2025-5-13
Attenuator	EMTEST	ATT6/80	68-4-75-14-002-A01	P1402129090	1	2025-5-11
CDN	EMTEST	CDN-M2/M3	68-4-75-14-002-A02	P1420134163	1	2025-5-13
CDN	EMTEST	CDN-M4	68-4-75-14-002-A03	P1346125919	1	2025-5-13
Electromagnetic Injection Clamp	EMTEST	EM101	68-4-75-14-002-A04	P1411132453	1	2025-5-12
Current injection probe	TESEQ	CIP 9136A	68-4-27-22-001	63664	1	2025-5-12
Test software	EMTEST	icd.control	68-4-75-14-002-A10	Version 5.2.9	N/A	N/A

Radio Frequency Electromagnetic Fields

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
Signal Generator	Rohde & Schwarz	SMB100A	68-4-48-14-002	177600	1	2025-5-11
Power Amplifier	Rohde & Schwarz	BBA100	68-4-28-14-001	101238	1	2025-5-12
Log-Periodic Antenna	Rohde & Schwarz	HL046E	68-4-80-14-009	100160	N/A	N/A
Power Meter	Rohde & Schwarz	NRP2	68-4-32-14-001	103497	1	2025-5-12
Average Power Sensor	Rohde & Schwarz	NRP-Z91	68-4-32-14-001-A01	102538	1	2025-5-12
Average Power Sensor	Rohde & Schwarz	NRP-Z91	68-4-32-14-001-A02	102539	1	2025-5-12
Starprobe Laser-Powered Probe	AMPLIFIER RESEARCH	FL7006/KIT	68-4-27-14-003	0433720	1	2025-7-22
Audio Analyzer	Rohde & Schwarz	UPV	68-4-74-18-001	104348	1	2025-5-11
Cable	OUQIAO	18DLB8	68-4-90-14-002-A20	----	----	----
Fully Anechoic Chamber	TDK	8X4X4	68-4-90-14-002	--	3	2027-8-18

**Surges**

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
Immunity simulator	EMTEST	VCS 500	68-4-75-14-004	1194-15	1	2025-5-12

Voltage Dips

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
Immunity simulator	EMTEST	UCS 500N7	68-4-75-14-001	P1313116005	1	2025-5-12
Motorized Variac	EMTEST	MV2616	68-4-75-14-001-A04	P1401128623	1	2025-5-12
Switch-Box for phase by phase	EMTEST	PFLS 32N1	68-4-75-14-001-A09	P1251107106	N/A	N/A
Test software	EMTEST	iec.control	68-4-75-14-001-A10	Version 5.3.1	N/A	N/A

4 Measurement Uncertainty

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

System Measurement Uncertainty	
Test Items	Extended Uncertainty
Uncertainty for Conducted Emission in new shielding room (68-4-90-19-005) 150kHz-30MHz (for test using AMN ENV216)	3.15dB
Uncertainty for Radiated Emission in 3m chamber (68-4-90-14-001) 30MHz-1000MHz	Horizontal: 4.64dB; Vertical: 4.79dB
Uncertainty Evaluation for Discontinuous Emission in new shielding room (68-4-90-19-005) (for test using AMN ENV216)	3.28dB
Uncertainty for Harmonic test (Single phase 68-4-74-22-001)	1.12%
Uncertainty for Flicker test (Single phase 68-4-74-22-001)	5.97%
Uncertainty for Radio Frequency Electromagnetic Fields	1.78dB
Uncertainty for Injected Currents	1.41dB (CDN), 3.23dB (EM Clamp) 3.41dB (Current Clamp)
Uncertainty for Electrostatic Discharge	The immunity measurement system uncertainty is within standard requirement and is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a level of confidence of approximately 95%.
Uncertainty for Fast Transients	
Uncertainty for Surges	
Uncertainty for Voltage Dips	

Measurement Uncertainty Decision Rule:

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115: 2023, clause 4.3.3 and 4.3.4.

5 Photographs

Details of: General view (for all models)



Details of: Controller panel view (for CAF-DC111-AEU, CAF-DC111-AUK and CAF-DC111-XXXX use only)



Details of: Controller panel view (for CAF-DC121-AEUR and CAF-DC121-XXXX use only)



Details of: General view (for all models)



Details of: Top view (for all models)



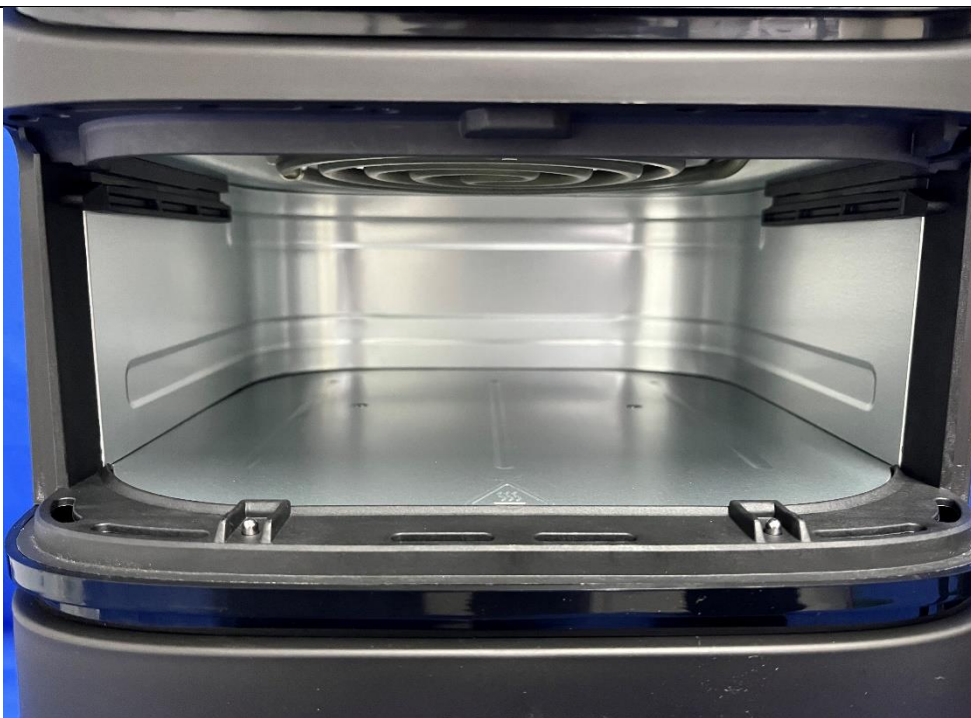
Details of: Left side view (for all models)



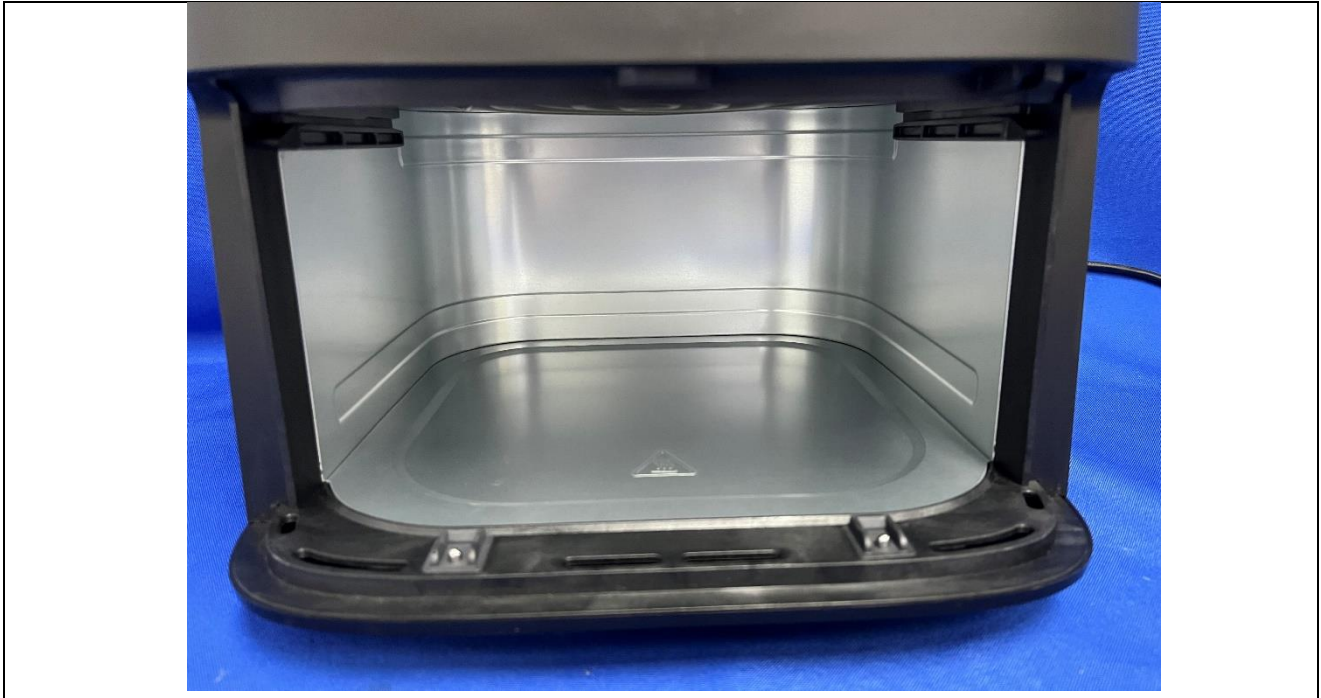
Details of: Right side view (for all models)



Details of: Internal view (for all models)



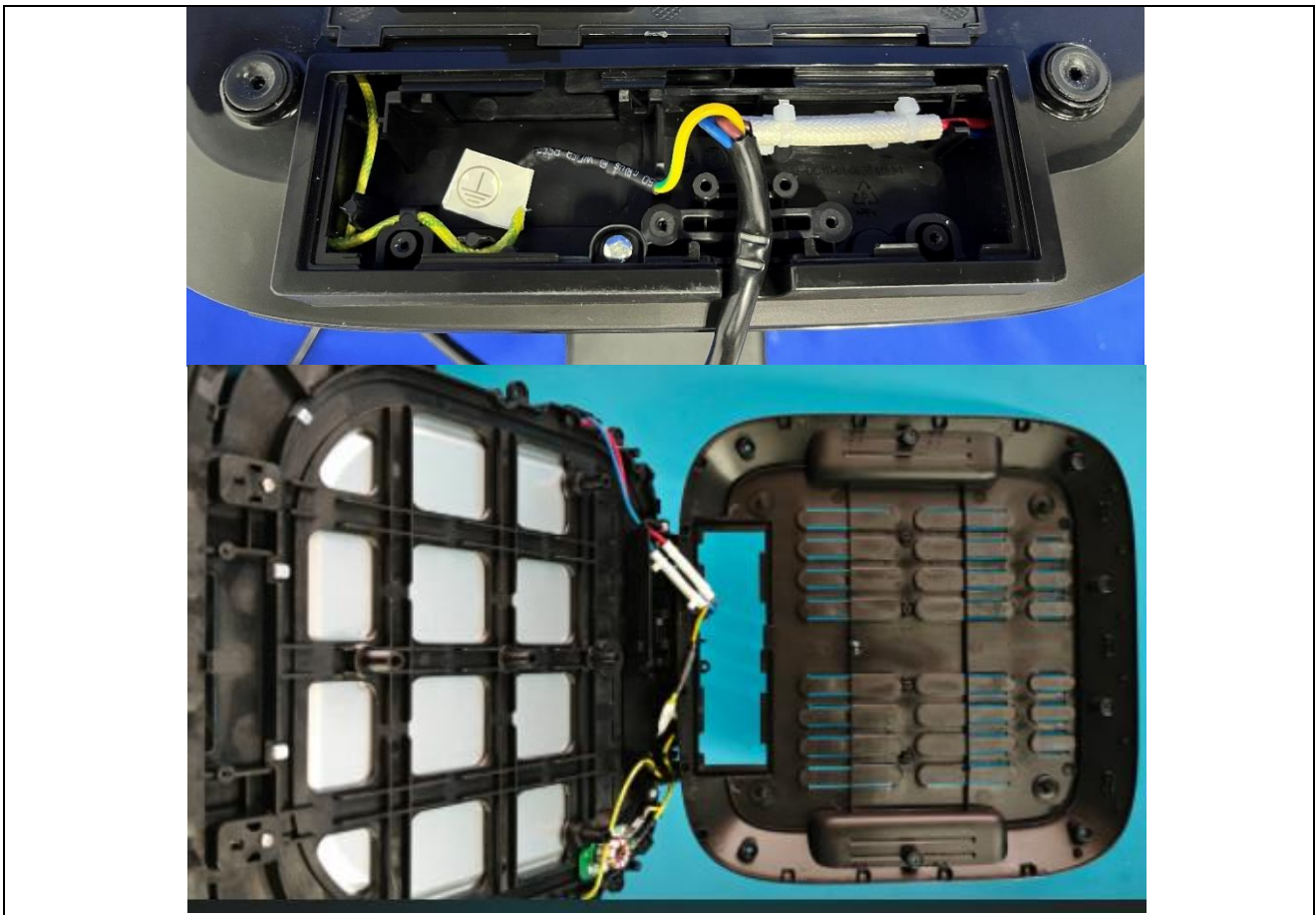
Details of: Internal view (for all models)



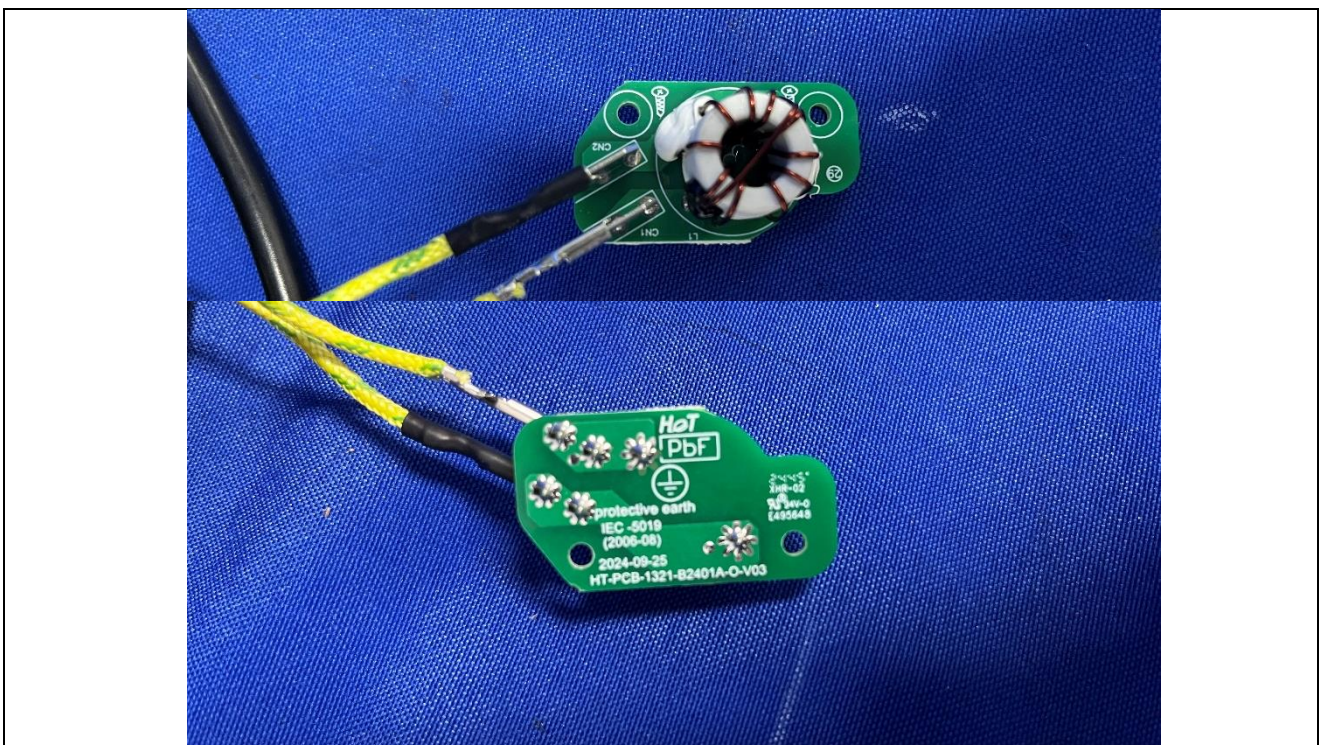
Details of: Bottom view (for all models)



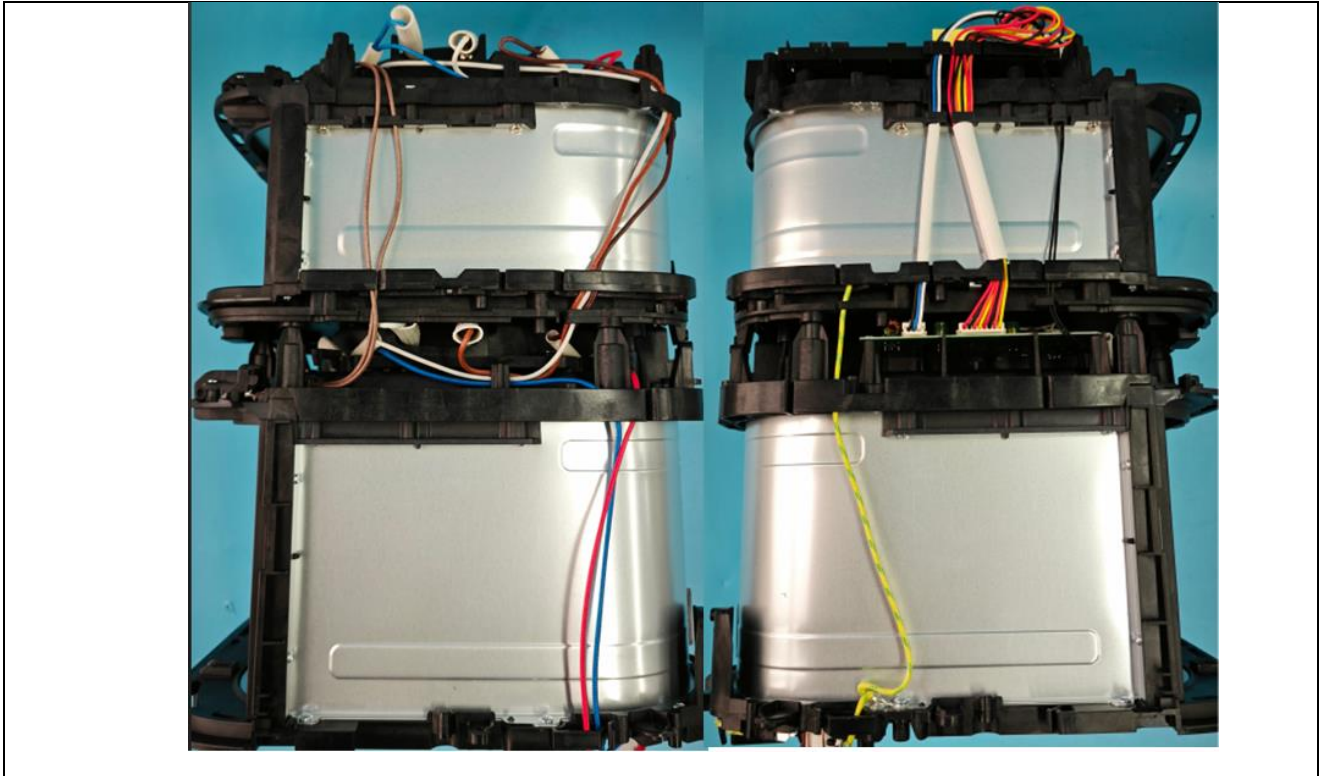
Details of: Internal view (for all models)



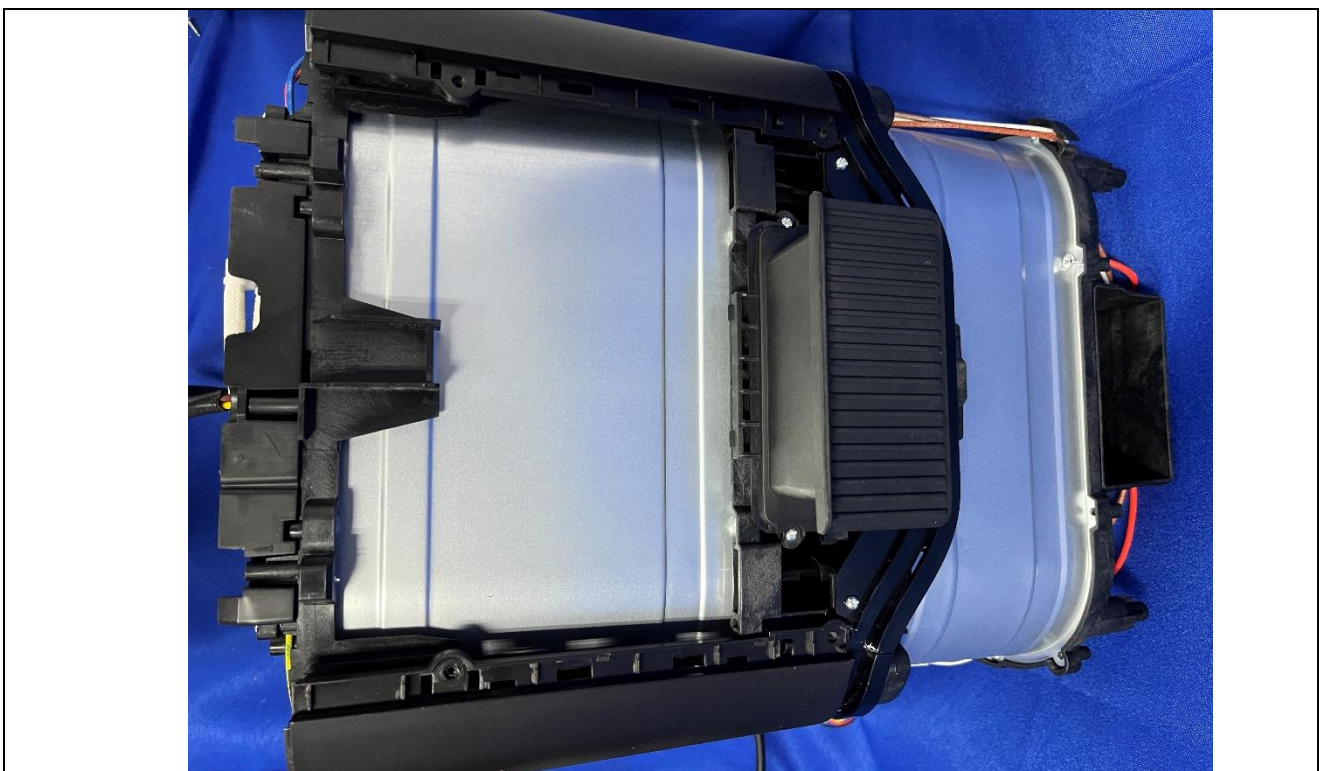
Details of: Earthed terminal PCB view (for all models)



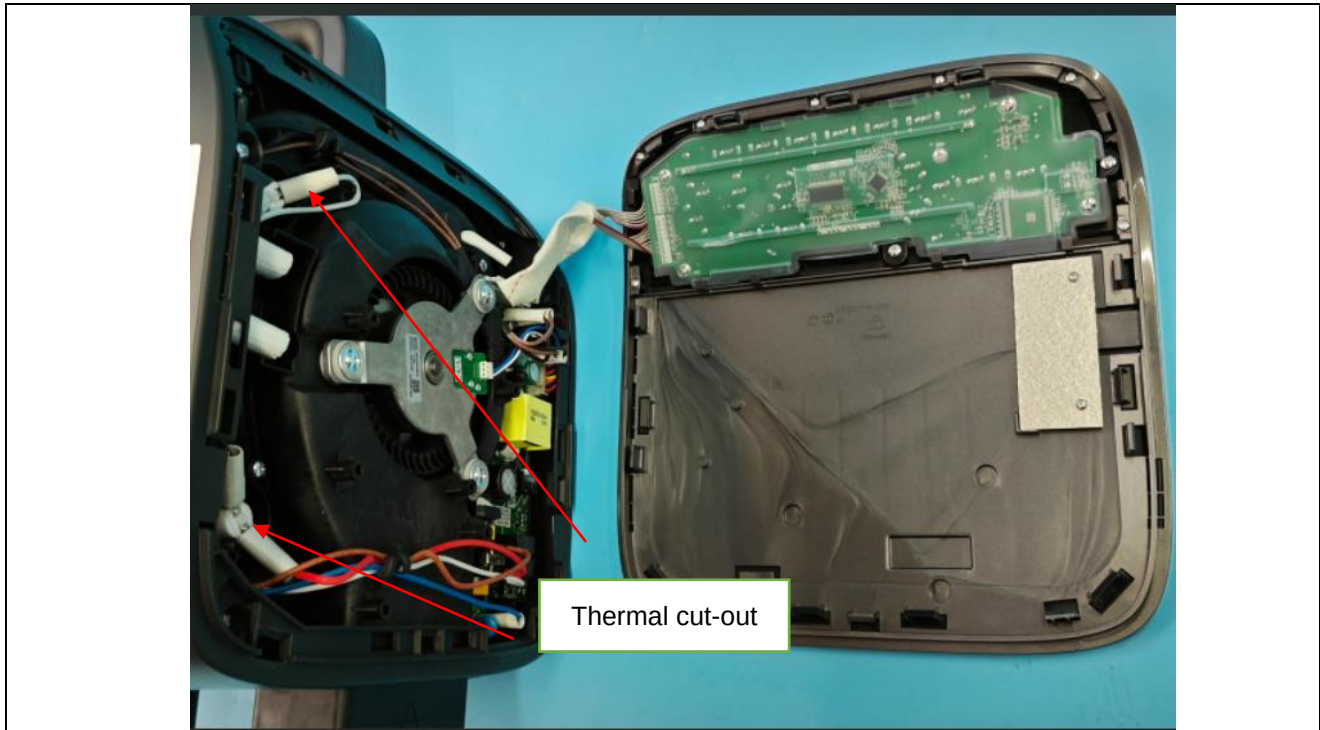
Details of: Internal view (for all models)



Details of: Internal view (for all models)



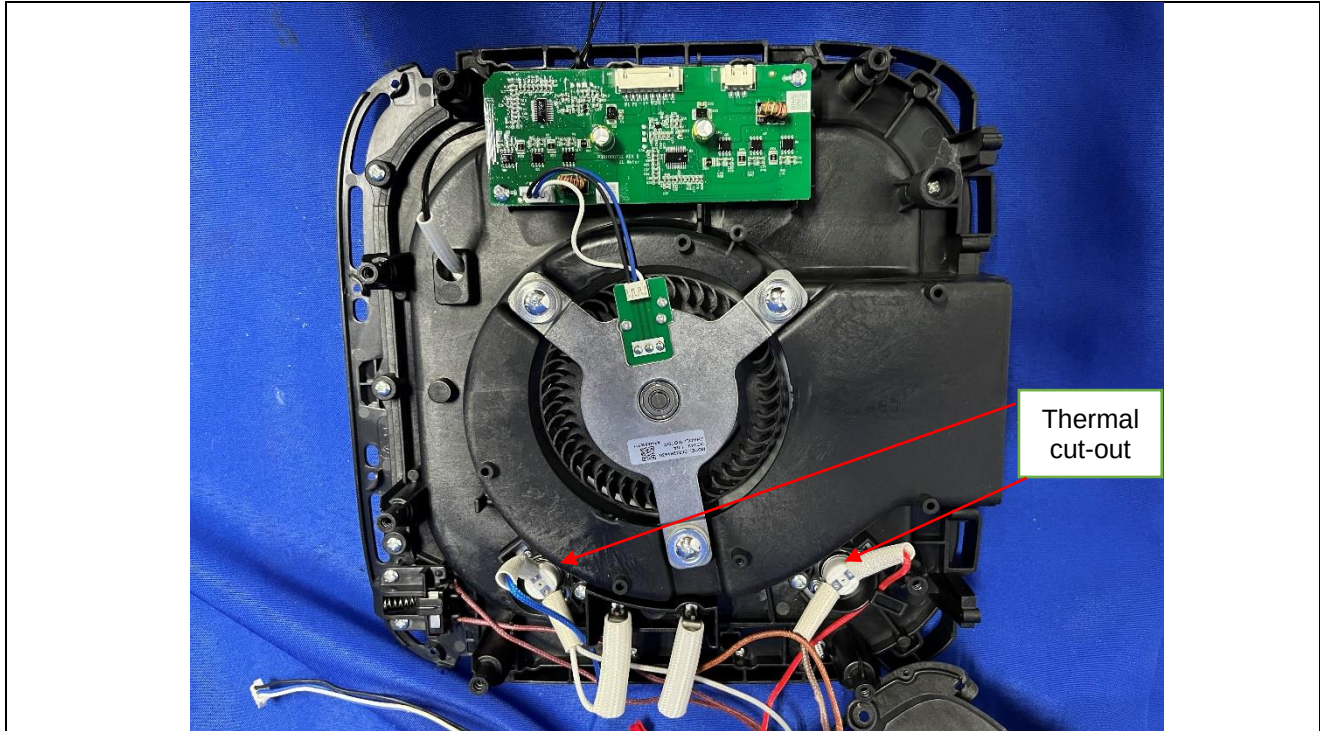
Details of: Internal view (for all models)
With ZHAOLI motor



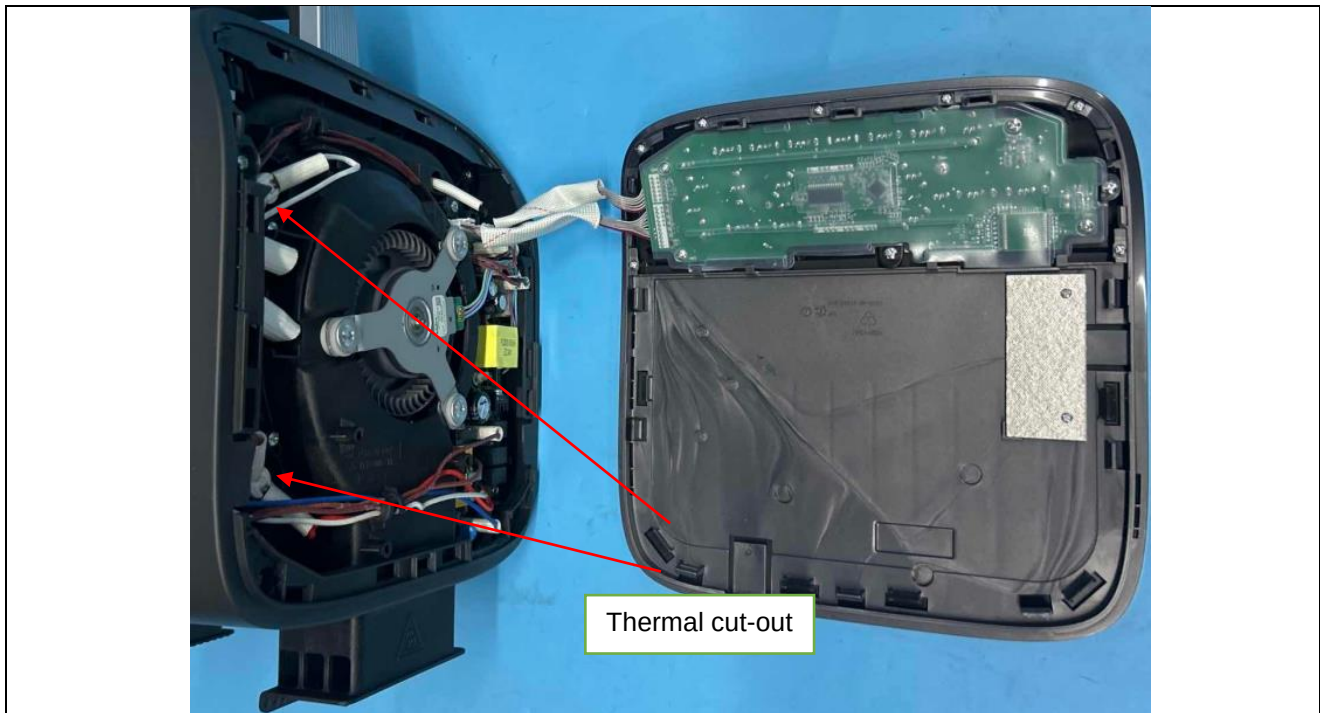
Details of: Internal view (for all models)
With ZHAOLI motor



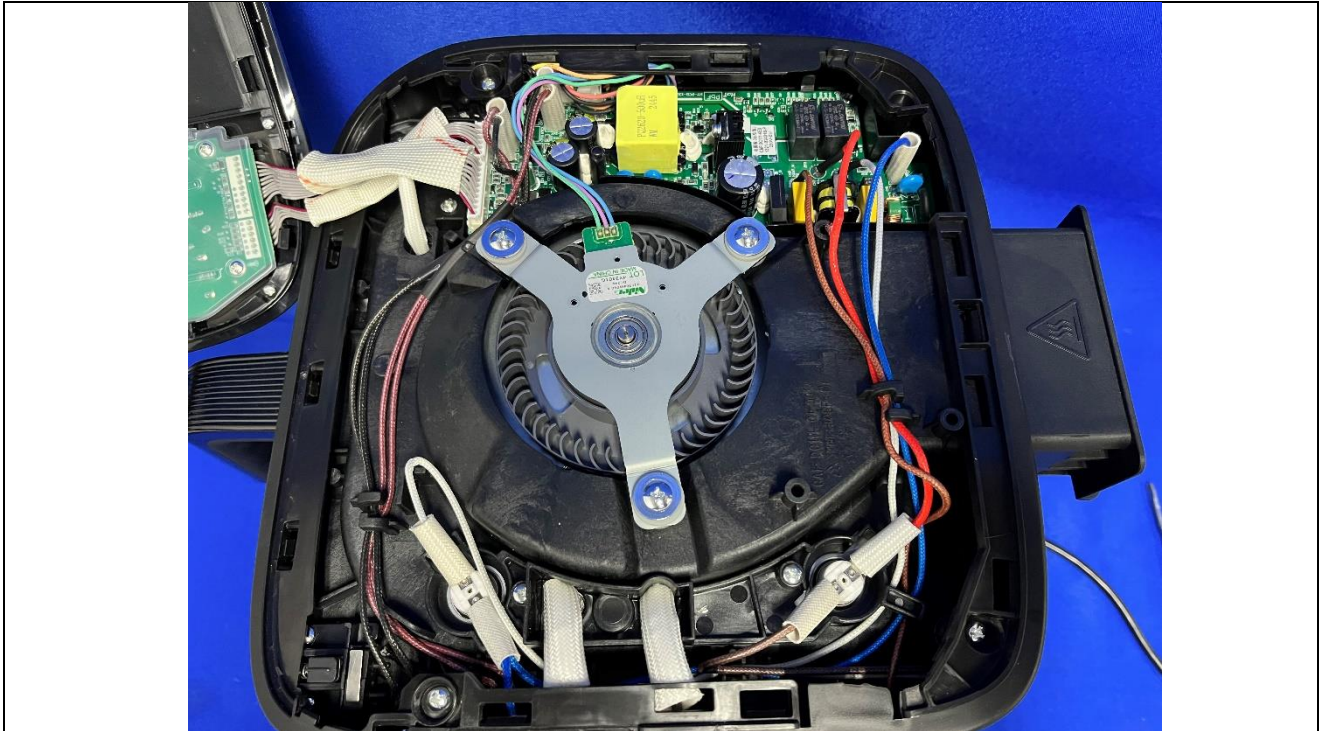
Details of: Internal view (for all models)
With ZHAOLI motor



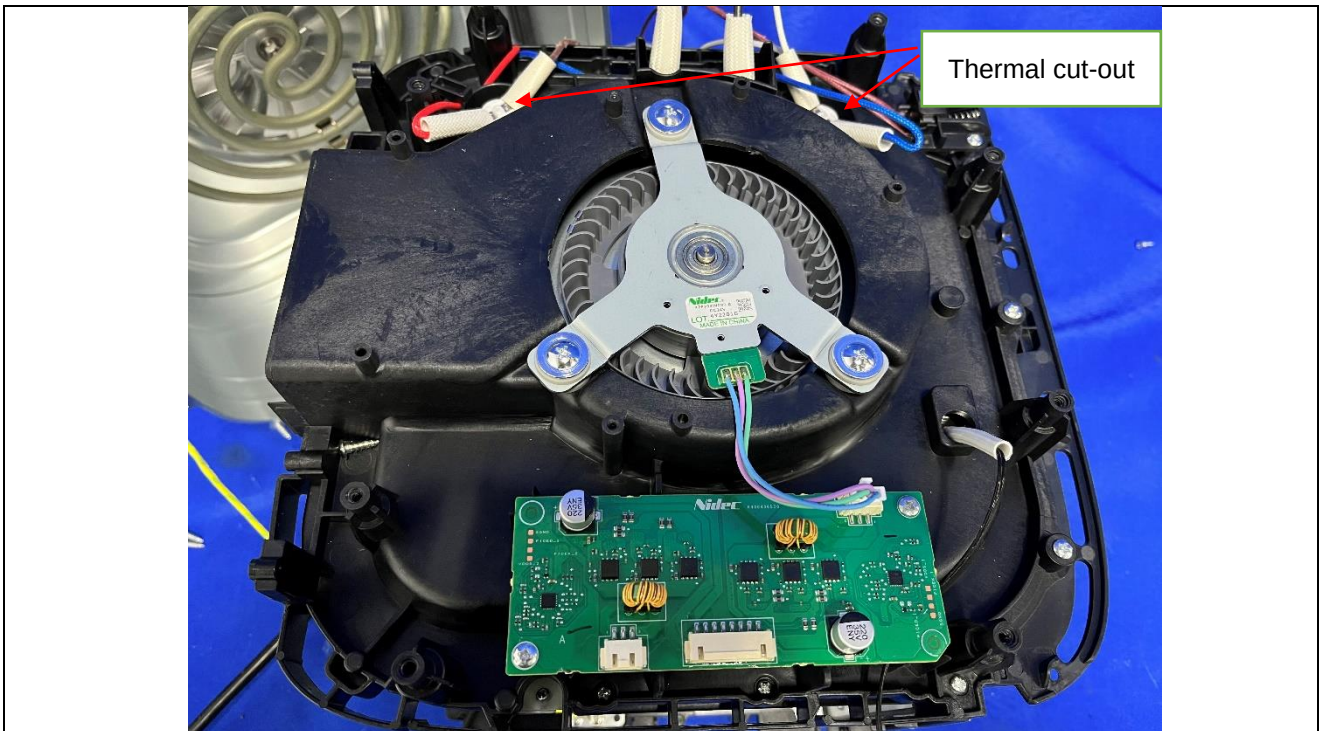
Details of: Internal view (for all models)
With Nidec motor



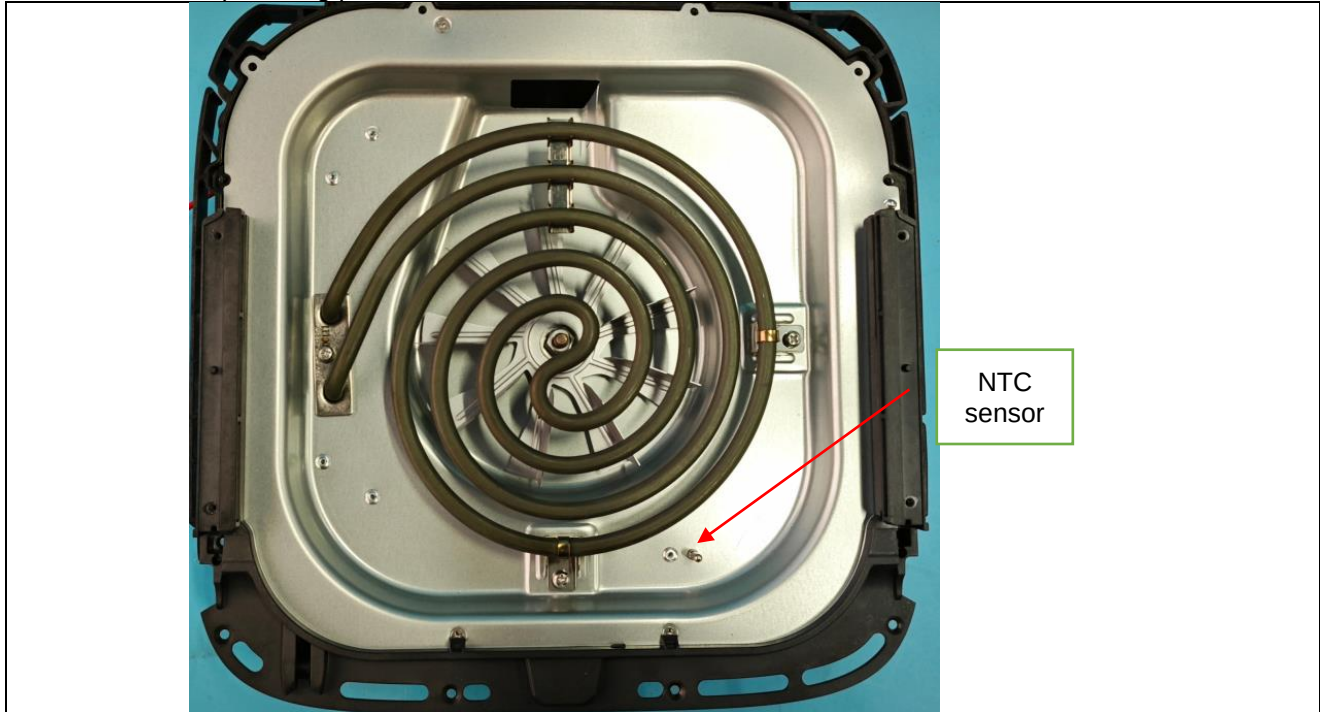
Details of: Internal view (for all models)
With Nidec motor



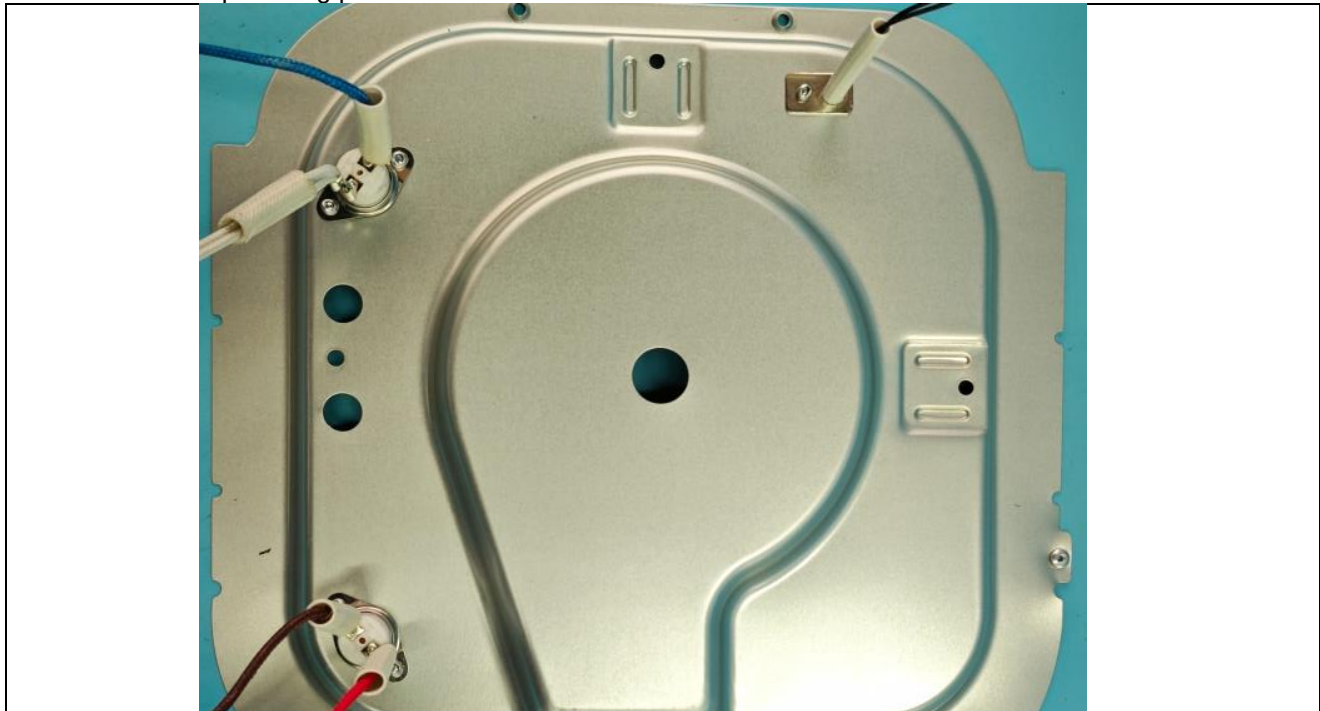
Details of: Internal view (for all models)
With Nidec motor



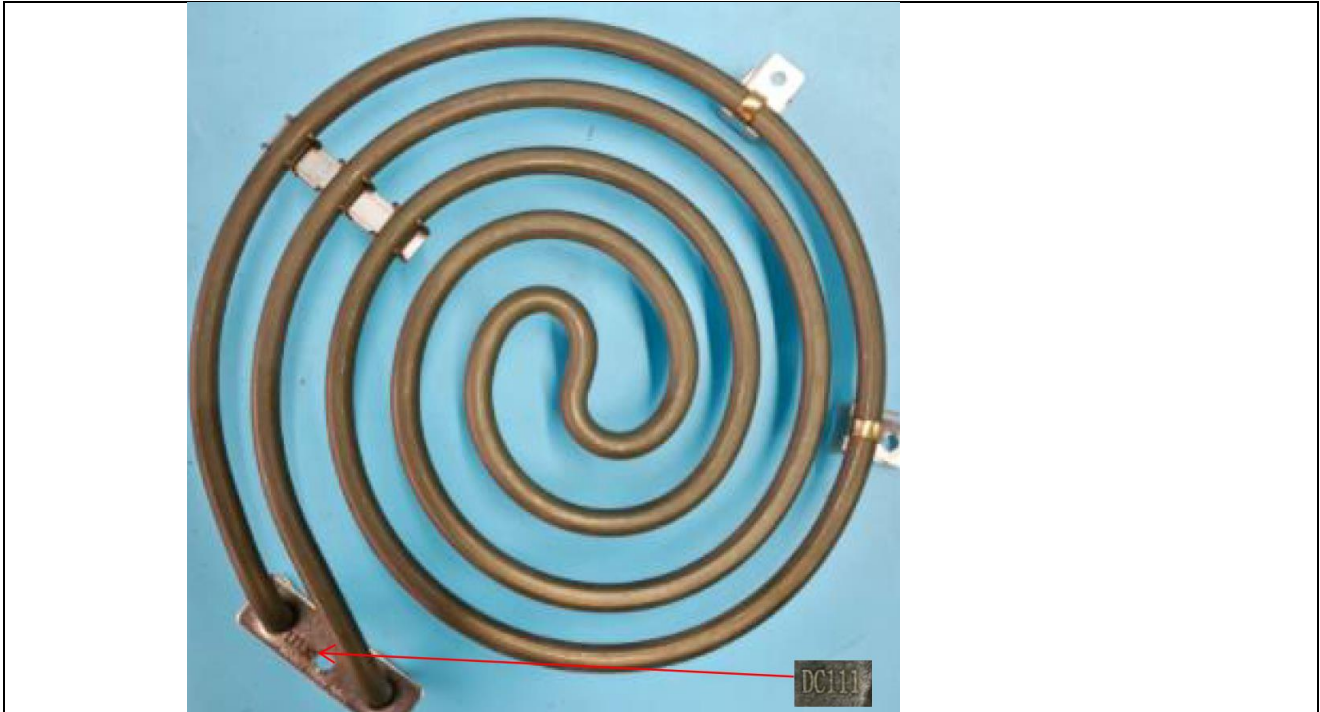
Details of: Internal view (for all models)
Top heating part



Details of: Internal view (for all models)
Top heating part



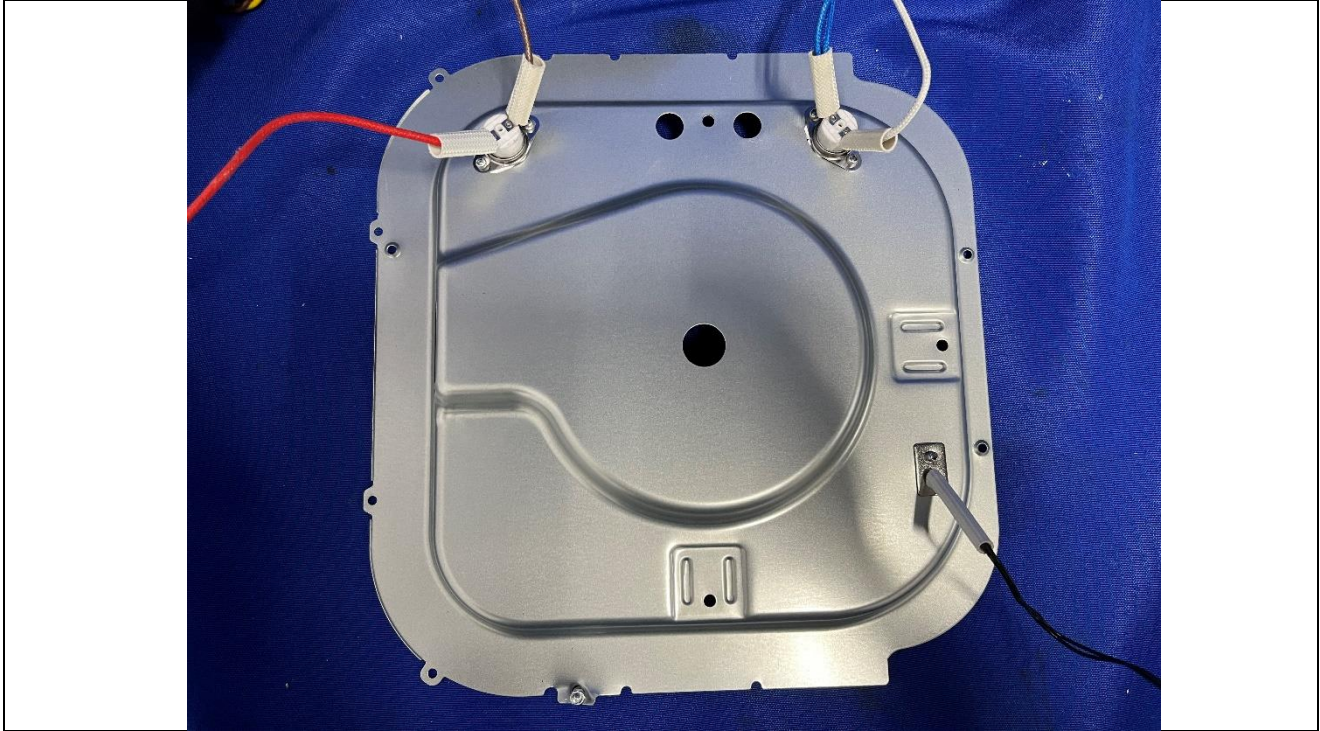
Details of: Top heating element view (for all models)



Details of: Internal view
Middle heating part



Details of: Internal view
Middle heating part



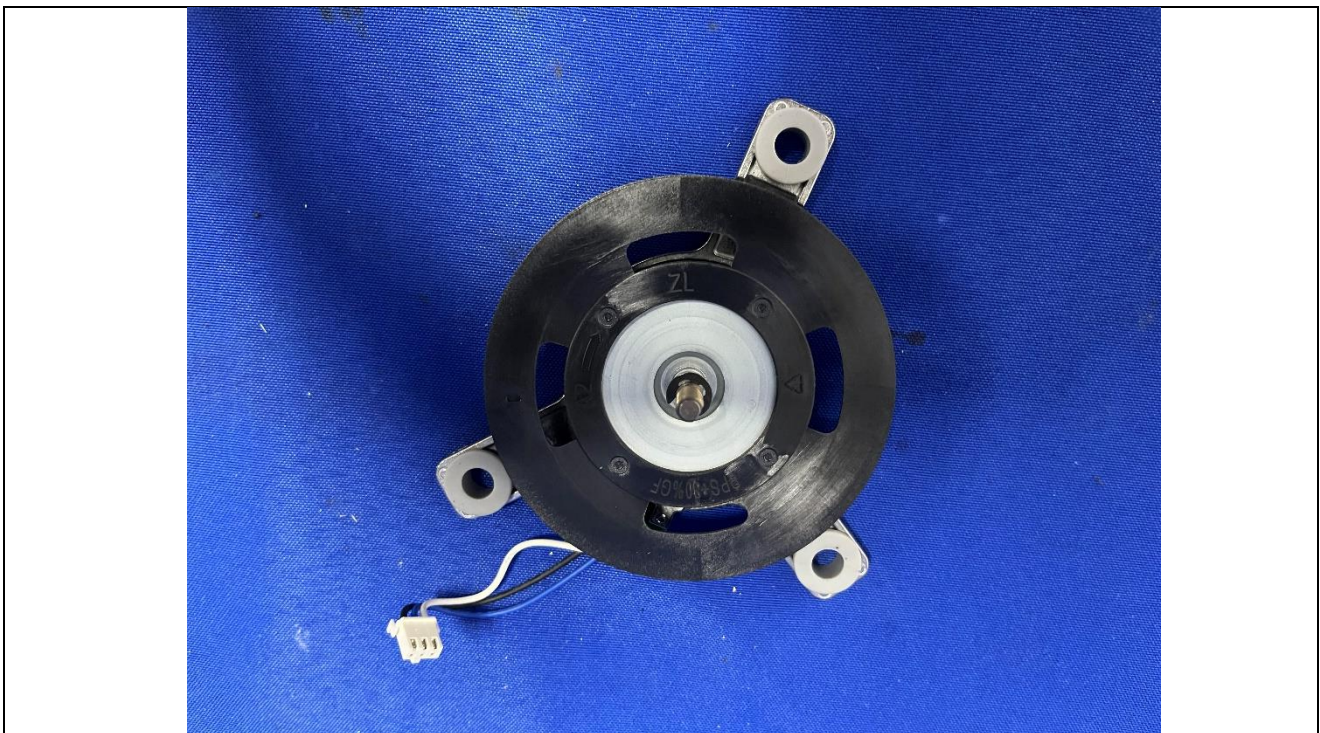
Details of: Middle heating element view (for all models)



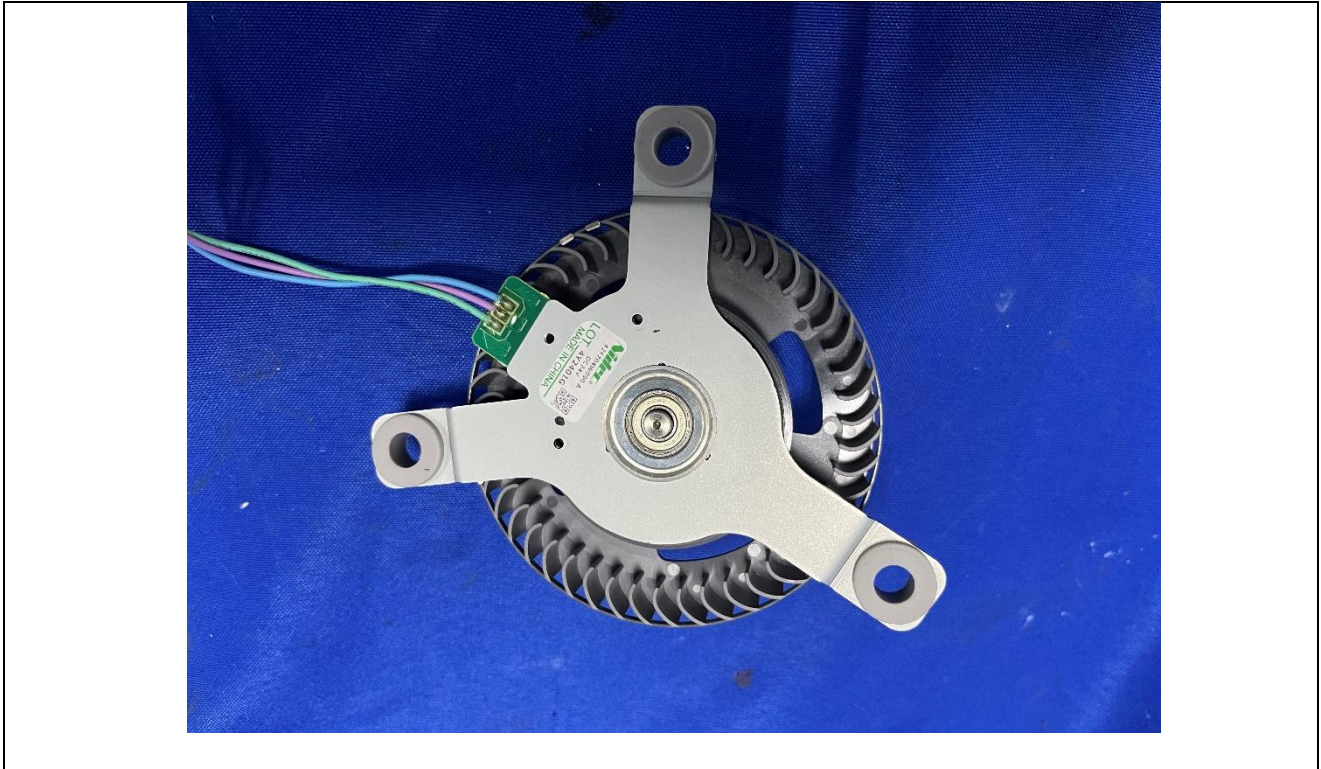
Details of: Motor view (for ZHAOLI motor)



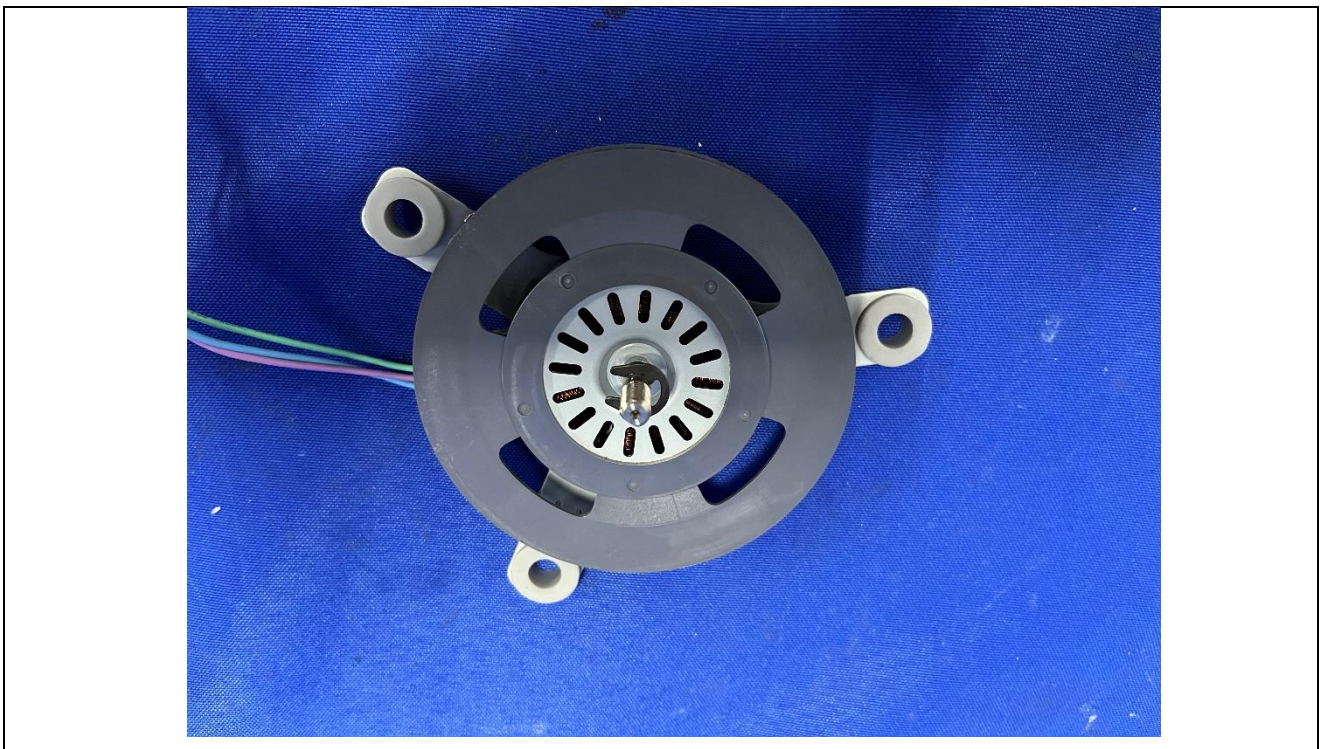
Details of: Motor view (for ZHAOLI motor)



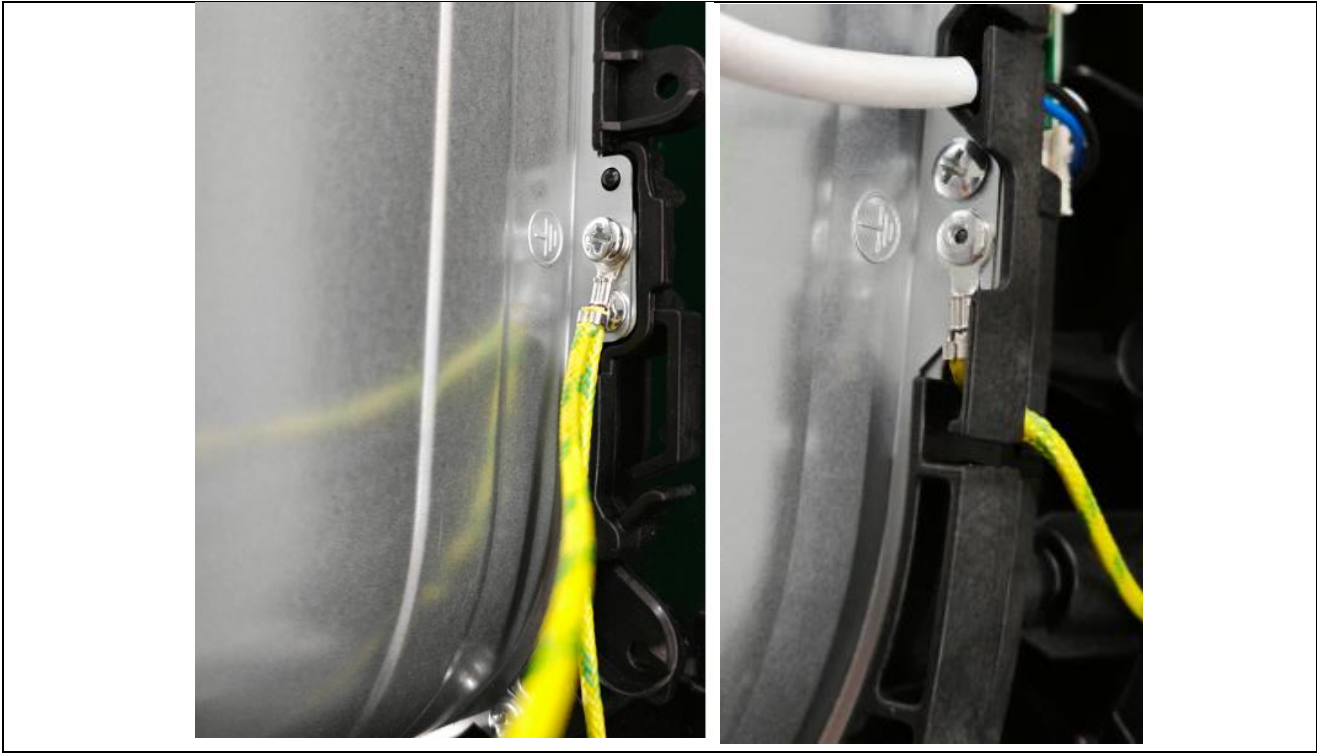
Details of: Motor view (for Nidec motor)



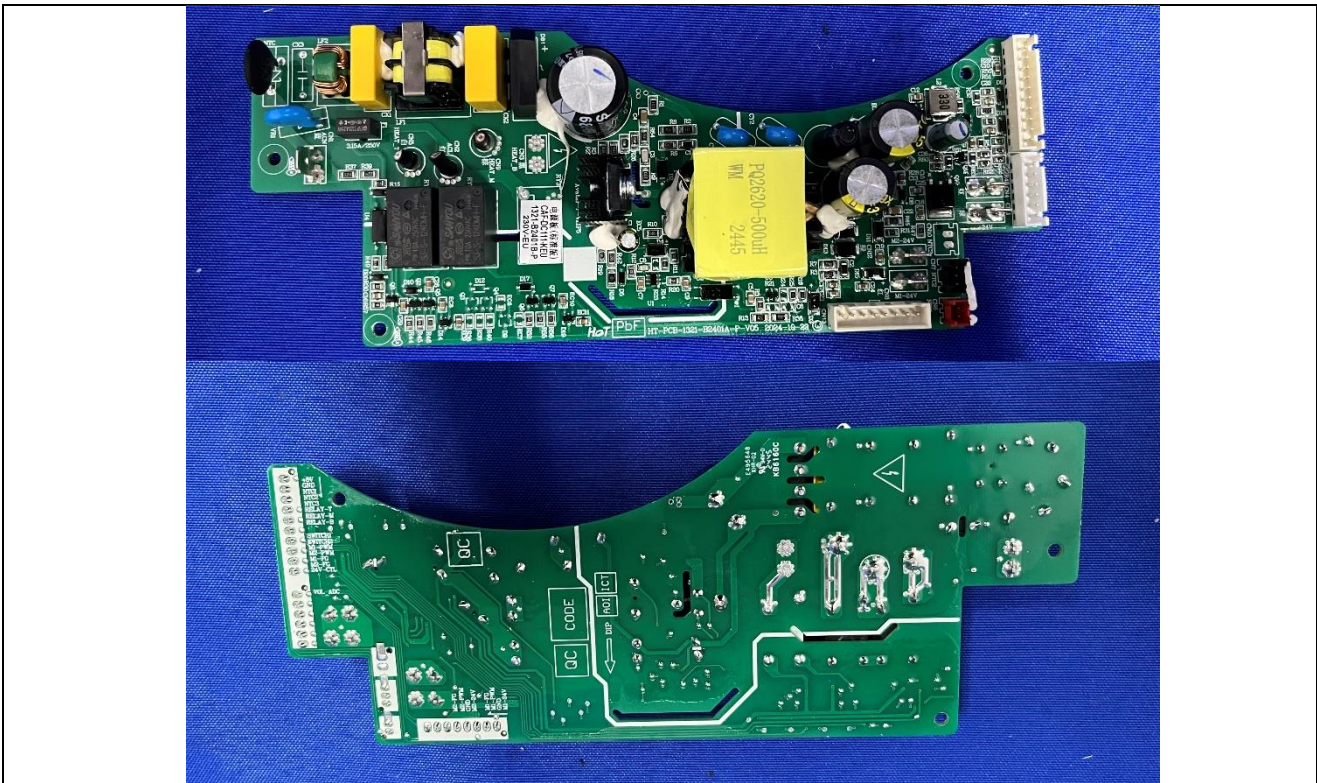
Details of: Motor view (for Nidec motor)



Details of: Earthing terminal view (for all models)



Details of: Main PCB view (for all models)



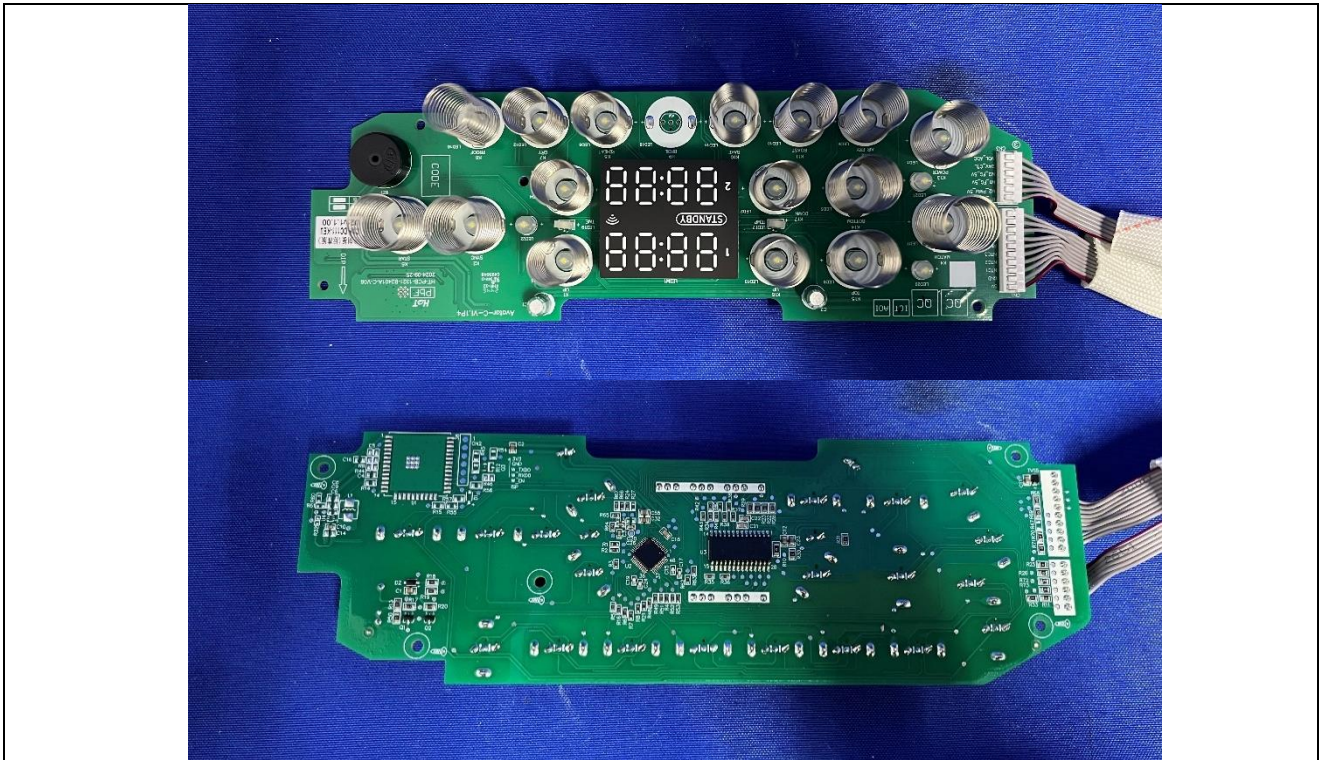
Details of: Controller PCB internal view (for CAF-DC111-AEU, CAF-DC111-AUK and CAF-DC111-XXXX use only)



Details of: Controller PCB internal view (for CAF-DC111-AEU, CAF-DC111-AUK and CAF-DC111-XXXX use only)



Details of: Controller PCB view (for CAF-DC111-AEU, CAF-DC111-AUK and CAF-DC111-XXXX use only)



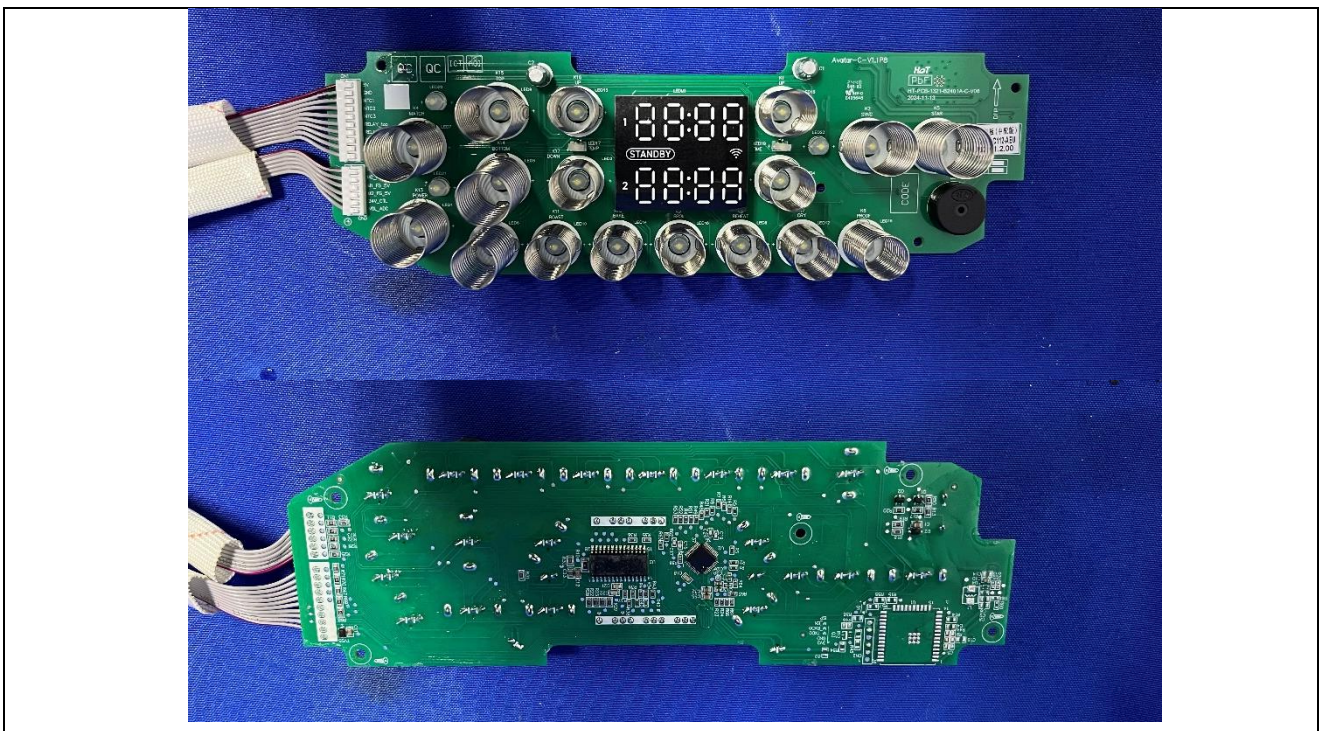
Details of: Controller PCB internal view (for CAF-DC121-AEUR and CAF-DC121-XXXX use only)



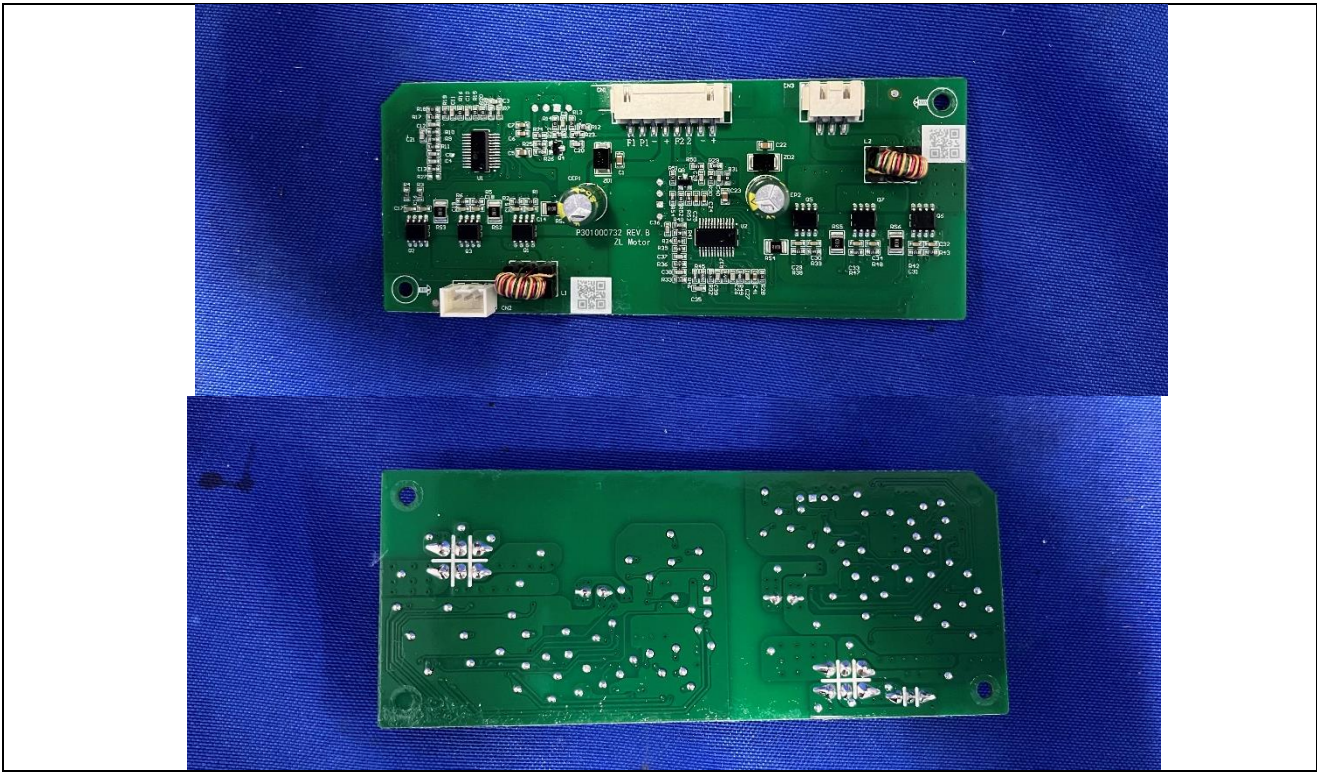
Details of: Controller PCB internal view (for CAF-DC121-AEUR and CAF-DC121-XXXX use only)



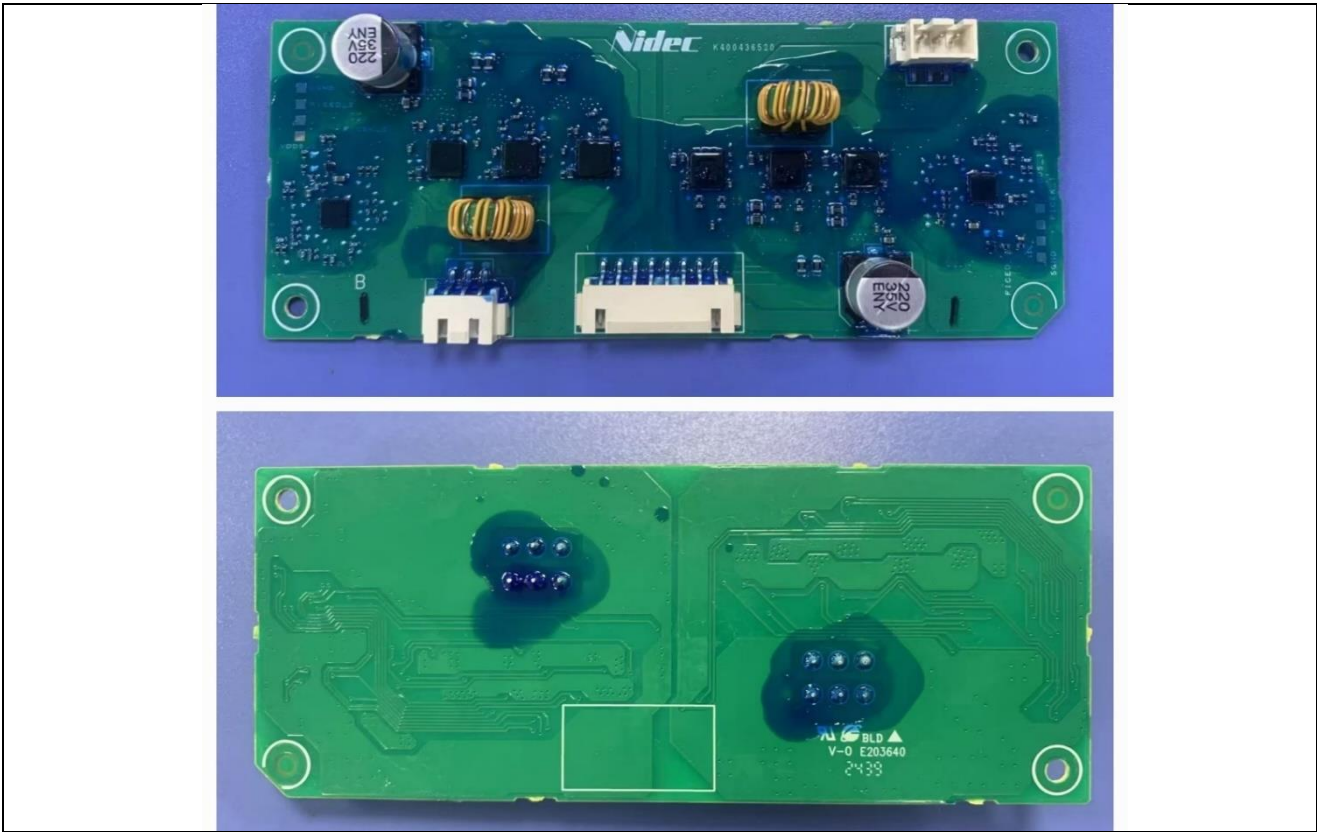
Details of: Controller PCB view (for CAF-DC121-AEUR and CAF-DC121-XXXX use only)



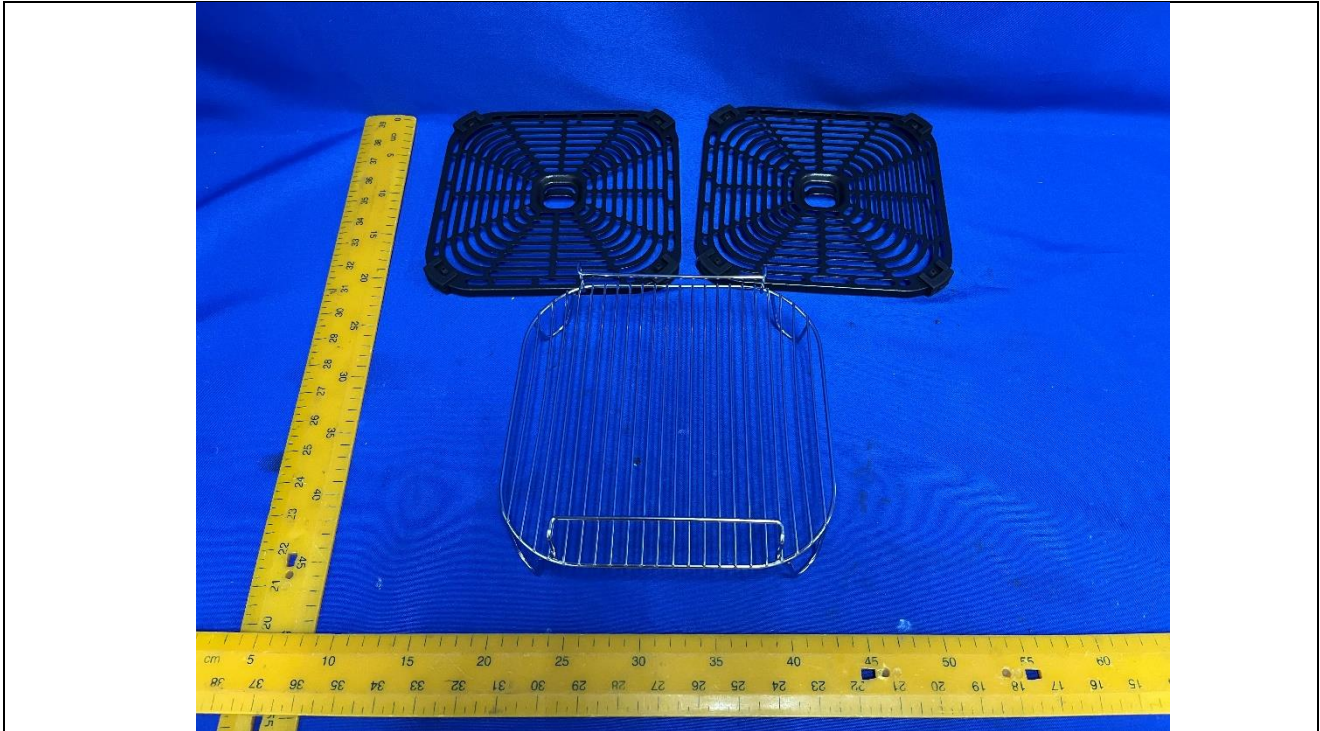
Details of: Motor Controller PCB view (for ZHAOLI motor)



Details of: Motor Controller PCB view (for Nidec motor)



Details of: Accessory view (for all models)



---END OF TEST REPORT---