

Test Report

Report No. : HA0123NB115167EM
Applicant : Ningbo Zhongdi Industry & Trade Co., Ltd.
Address : Jishigang Industry Zone, Haishu District, Ningbo 315171, P. R. China
Trade Mark(s) : Zhongdi
Manufacturer : Same as the applicant
Address : Same as the applicant
Manufacturing site : Same as the applicant
Address : Same as the applicant

Equipment Under Test (EUT):

EUT Name : SOLDERING IRON
Model/Type No. : Refer to page 4-6
Standards : Refer to page 2
Date of Receipt : November 14, 2023
Date of Test : November 15, 2023 to November 27, 2023
Date of Issue : November 28, 2023
Test Result : **PASS***

Prepared By:

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Prepared By



Bill Dong

Engineer

Reviewed By



Milse Xie

Technical Manager

*The test results have been reviewed against the Directives above and found to meet their essential requirement. The results shown in this test report refer only to the sample(s) tested. This document cannot be reproduced except in full, without prior written approval of HATEK.

1 Test Summary

1.1 Test Items

Test Items	Result
Disturbance Voltage on Mains Terminal0.15MHz- 30MHz	P
Discontinuous Disturbance Voltage/Click	P
Continuous Disturbance Power, 30MHz - 300MHz	P
Radiation Emission, 30MHz - 1000MHz	N/A
Harmonic Current	P
Voltage Fluctuations-Flicker	P
ESD	P
Radiated Immunity (80MHz - 1GHz)	N/A
Electrical Fast Transients (EFT)	P
Surge Immunity	P
Injected Currents, 0.15MHz - 230MHz	P
Power Frequency Magnetic Field Immunity	N/A
Voltage Dips and Interruptions	P
Remark:	P: Pass/ F: Fail/ N/A: Not Applicable

1.2 Test Specification

The equipment(s) comply with the requirements according to the following standards:

EN IEC 55014-1:2021 : Electromagnetic compatibility-Requirements for household appliances, electric tools and similar apparatus Part1: Emission;

EN IEC 55014-2:2021 : Electromagnetic compatibility-Requirements for household appliances, electric tools and similar apparatus Part2: Immunity;

EN IEC 61000-3-2:2019+A1:2021: Limits for harmonic current emissions (equipment input current ≤ 16 A per phase);

EN 61000-3-3:2013+A1:2019+A2:2021: 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.

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2 General Information

2.1 Client Information

Applicant : Ningbo Zhongdi Industry & Trade Co., Ltd.

Address : Jishigang Industry Zone, Haishu District, Ningbo 315171, P. R. China

2.2 General Description of E.U.T.

Electrical Rating : AC 220-240V, 50Hz

Protection class : Class I

2.3 Identifies and differences:

Model List:

100W				
ZD-200B(100W)	ZD-733B(100W)	ZD-406(100W)	ZD-401(100W)	ZD-30B(100W)
ZD-707(100W)	ZD-728B(100W)	ZD-701(100W)	ZD-400(100W)	--
90W				
ZD-200B(90W)	ZD-733B(90W)	ZD-401(90W)	ZD-707B(90W)	ZD-728B(90W)
ZD-30B(90W)	ZD-400(90W)	--	--	--
80W				
ZD-37(80W)	ZD-200B(80W)	ZD-706(80W)	ZD-728B(80W)	ZD-701(80W)
ZD-406(K)(80W)	ZD-733B(80W)	ZD-707(80W)	ZD-401(80W)	ZD-30B(80W)
75W				
ZD-200B(75W)	ZD-733B(75W)	ZD-30B(75W)	ZD-706(75W)	--
70W				
ZD-200B(70W)	ZD-401(70W)	ZD-733B(70W)	ZD-707B(70W)	ZD-706(70W)
ZD-728B(70W)	ZD-707(70W)	ZD-400(70W)	ZD-30B(70W)	--
60W				
ZD-200B(60W)	ZD-30B(60W)	ZD-28A(60W)	ZD-30C(60W)	ZD-200C(60W)
ZD-733B(60W)	ZD-32(60W)	ZD-30(60W)	ZD-29T(60W)	ZD-704(60W)
ZD-407(60W)	ZD-707(60W)	ZD-33(60W)	ZD-407S(60W)	ZD-724B(60W)
ZD-721C(60W)	ZD-401(60W)	ZD-707BL(60W)	ZD-707C(60W)	ZD-410(60W)
ZD-725B(60W)	ZD-410A(60W)	ZD-37(60W)	ZD-706(60W)	ZD-738B(60W)
ZD-738BL(60W)	ZD-738C(60W)	ZD-737(60W)	ZD-90B(A) (60W)	ZD-82B(A) (60W)
ZD-81B(A) (60W)	ZD-60(A) (60W)	ZD-551(60W)	ZD-724C(60W)	ZD-31(60W)
ZD-555	ZD-728C(60W)	ZD-728B(60W)	ZD-721B(60W)	ZD-701(60W)
ZD-406(K)(60W)	ZD-26(60W)	ZD-400(60W)	ZD-556	--
50W				

ZD-733B(50W)	ZD-707BL(50W)	ZD-707C(50W)	ZD-410(50W)	ZD-407(50W)
ZD-200C(50W)	ZD-972H(50W)	ZD-30C(50W)	ZD-30(50W)	ZD-401(50W)
ZD-707B(50W)	ZD-407S(50W)	ZD-28(50W)	ZD-32(50W)	ZD-725B(50W)
ZD-410A(50W)	ZD-724B(50W)	ZD-721C(50W)	ZD-706(50W)	ZD-738B(50W)
ZD-738BL(50W)	ZD-738C(50W)	ZD-737(50W)	ZD-200B(50W)	ZD-728B(50W)
ZD-721B(50W)	ZD-707(50W)	ZD-400(50W)	ZD-30B(50W)	ZD-724C(50W)
ZD-200N(50W)	ZD-707N(50W)	ZD-707NL(50W)	ZD-724N(50W)	ZD-30CN(50W)
ZD-701N(50W)	ZD-739(50W)	ZD-409	ZD-738N(50W)	ZD-728N(50W)
40W				
ZD-707BL(40W)	ZD-200B(40W)-	ZD-37(40W)	ZD-733B(40W)	ZD-28A(40W)
ZD-707C(40W)	ZD-30C(40W)	ZD-210(40W)	ZD-200C(40W)	ZD-410(40W)
ZD-407(40W)	ZD-707(40W)	ZD-30(40W)	ZD-712(40W)	ZD-36(40W)
ZD-26(40W)	ZD-29T(40W)	ZD-704(40W)	ZD-401(40W)	ZD-211(40W)
ZD-30B(40W)	ZD-33(40W)	ZD-407S(40W)	ZD-725B(40W)	ZD-410A(40W)
ZD-724B(40W)	ZD-32(40W)	ZD-706(40W)	ZD-972B	ZD-972A
ZD-972H	ZD-738B(40W)	ZD-738BL(40W)	ZD-738C(40W)	ZD-737(40W)
ZD-707A(40W)	ZD-972Q	ZD-724C(40W)	ZD-410B(40W)	ZD-707B(40W)
ZD-70	ZD-31(40W)	ZD-722B(40W)	ZD-723B(40W)	ZD-729B(40W)
ZD-728C(40W)	ZD-728B(40W)	ZD-721B(40W)	ZD-721C(40W)	ZD-701(40W)
ZD-406(K)(40W)	ZD-400(40W)	ZD-972M	ZD-972L	ZD-972G
ZD-200N(40W)	ZD-707N(40W)	ZD-707NL(40W)	ZD-724N(40W)	ZD-703N(40W)
ZD-30CN(40W)	ZD-701N(40W)	ZD-35N(40W)	ZD-705N(40W)	ZD-739(40W)
ZD-409(40W)	ZD-738N(40W)	ZD-721N(40W)	ZD-728N(40W)	ZD-90
ZD-80(A)	ZD-81N(A)	ZD-90(A)	ZD-82N(A)	ZD-70DA
ZD-70DB	ZD-70D	ZD-717A	--	--
30W				
ZD-707BL(30W)	ZD-37(30W)	ZD-733B(30W)	ZD-28A(30W)	ZD-707C(30W)
ZD-30C(30W)	ZD-210(30W)	ZD-200C(30W)	ZD-410(30W)	ZD-407(30W)
ZD-707(30W)	ZD-30(30W)	ZD-712(30W)	ZD-36(30W)	ZD-26(30W)
ZD-29T(30W)	ZD-704(30W)	ZD-401(30W)	ZD-211(30W)	ZD-30B(30W)
ZD-33(30W)	ZD-407S(30W)	ZD-410A(30W)	ZD-32(30W)	ZD-706(30W)
ZD-726C(30W)	ZD-60(A) (30W)	ZD-707A(30W)	ZD-81B(A) (30W)	ZD-738B(30W)
ZD-738BL(30W)	ZD-738C(30W)	ZD-737(30W)	ZD-90B(A) (30W)	ZD-82B(A) (30W)
ZD-972Q	ZD-724C(30W)	ZD-200B(30W)	ZD-410B(30W)	ZD-707B(30W)
ZD-406(K)(30W)	ZD-400(30W)	ZD-31(30W)	ZD-722B(30W)	ZD-723B(30W)
ZD-724B(30W)	ZD-729B(30W)	ZD-728C(30W)	ZD-728B(30W)	ZD-721B(30W)
ZD-721C(30W)	ZD-701(30W)	ZD-23(30W)	ZD-738N(30W)	ZD-721N(30W)
ZD-200N(30W)	ZD-707N(30W)	ZD-707NL(30W)	ZD-724N(30W)	ZD-703N(30W)
ZD-30CN(30W)	ZD-35N(30W)	ZD-701N(30W)	ZD-705N(30W)	ZD-739(30W)
ZD-21(30W)	ZD-22(30W)	--	--	--

25W				
ZD-728B(25W)	ZD-406(K)(25W)	ZD-400(25W)	ZD-724B(25W)	ZD-738B(25W)
ZD-707BL(25W)	ZD-37(25W)	ZD-733B(25W)	ZD-28A(25W)	ZD-707C(25W)
ZD-30C(25W)	ZD-210(25W)	ZD-200C(25W)	ZD-407(25W)	ZD-707(25W)
ZD-707(25W)	ZD-30(25W)	ZD-712(25W)	ZD-36(25W)	ZD-26(25W)
ZD-29T(25W)	ZD-704(25W)	ZD-401(25W)	ZD-211(25W)	ZD-30B(25W)
ZD-33(25W)	ZD-407S(25W)	ZD-32(25W)	ZD-726C(25W)	ZD-706(25W)
ZD-738BL(25W)	ZD-738C(25W)	ZD-737(25W)	ZD-200B(25W)	ZD-410(25W)
ZD-200N(25W)	ZD-707N(25W)	ZD-707NL(25W)	ZD-724N(25W)	ZD-703N(25W)
ZD-30CN(25W)	ZD-35N(25W)	ZD-701N(25W)	ZD-705N(25W)	ZD-739(25W)
ZD-21(25W)	ZD-22(25W)	ZD-738N(25W)	ZD-23(25W)	ZD-721N(25W)
ZD-728N(25W)	ZD-81CN(A)	ZD-722N(A)	ZD-723N(A)	ZD-729N
20W				
ZD-738B(20W)	TS-33	ZD-707(20W)	ZD-30B(20W)	ZD-726C(20W)
ZD-200N(20W)	ZD-707N(20W)	ZD-707NL(20W)	ZD-724N(20W)	ZD-703N(20W)
ZD-30CN(20W)	ZD-35N(20W)	ZD-701N(20W)	ZD-705N(20W)	ZD-739(20W)
ZD-21(20W)	ZD-22(20W)	ZD-23(20W)	ZD-738N(20W)	ZD-721N(20W)
ZD-417(20W)	ZD-416G(20W)	--	--	--
15W				
ZD-707(15W)	ZD-406(15W)	ZD-30B(15W)	ZD-738B(15W)	ZD-726C(15W)
ZD-417(15W)	ZD-416G(15W)	--	--	--
8W				
ZD-972D	ZD-972E	ZD-972F	--	--

All models are the same, just different in appearance and power.

Therefore, we test ZD-707(100W) and the worst test data is listed in the report as representative.

2.4 Environment

- ☒ Residential (domestic) environment
- ☒ Commercial and light-industrial environment
- ☐ Industrial environment
- ☐ Medical environment.

2.5 Submitted Documents

Constructional Data Form for EMC

Circuit diagram, user's manual, labels and construction drawings etc.

3 Test Facility and Instrument list

3.1 Test Facility

All the tests done in this report are subcontracted to Shenzhen Most Technology Service Co., Ltd. (No.5, 2nd Langshan Road, North District, Hi-tech Industrial Park, Nanshan, Shenzhen, Guangdong. China)

3.2 Instrument list

Table 1: List of Test and Measurement Equipment of Laboratory

Shielding Room - Disturbance Voltage Test				
Equipment	Manufacturer	Model	Serial No.	Due Date
Receiver	R&S	ESR3	102043	08/25/2024
LISN	R&S	ENV216	102058	08/25/2024
Absorbing Clamp	R&S	MDS21	100789	06/10/2024
ESD Simulator	EM-TEST	ESD 30N	P1526159867	11/17/2024
3M Chamber & Accessory Equipment	TDK	SAC-3	----	---
Signal Generator	R&S	SMB100A	179680	08/25/2024
Stacked double Log.-Per. Antenna	R&S	HL046E	-----	N/A
Power Amplifier	R&S	BBA150-BC1000	102131	08/25/2024
Power Amplifier	BONN	1060-400/100D	1610682	N/A
Stacked Double Log-Per Antenna	SCHWARZBEC K	STLP9149	9149435	N/A
Compact Generator	EM-TEST	UCS500N7	P1608172945	08/25/2024
coupling/decoupling network	EM-TEST	CNI503B7	P1626181212	08/25/2024
Motorized Variac	EM-TEST	MV2616	P1532162313	08/25/2024
Signal Generator	R&S	SMC100A	105636	08/25/2024
Power Amplifier	R&S	BBA150A200 B250	102124	08/25/2024
Attenuator	Bird	300-A-FFN-06	1617	08/25/2024
CDN	FCC	FCC-801-M2/M3-16A	170209	08/25/2024
Harmonic & Flicker System	EM-TEST	DPA 503N& AIF 503N32.1	P1545166605 & P1613178045	08/25/2024
Multifunction AC/DC Power Source	EM-TEST	NetWave 30-400	P1613178144	08/25/2024

3.3 Measurement Uncertainty

Conducted Emission (9-150KHz)	:	U = 3.6 dB
Conducted Emission (150K-30MHz)	:	U = 3.6 dB
Disturbance Power	:	U = 3.6 dB
Radiated Emission (30-1000MHz)	:	U = 4.5 dB
Radiated Emission (1- 6GHz)	:	U = 5.5dB
Expanded Measurement Uncertainty (K=2)		

4 Test Results EMISSION

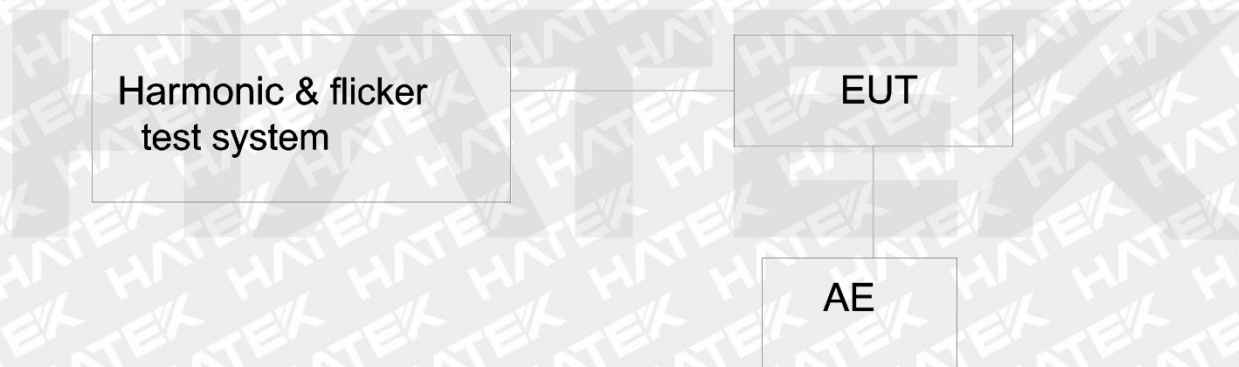
4.1 Emission in the Frequency Range from 0 kHz to 30 MHz

4.1.1 Harmonics on AC Mains

General test information

Temperature	: 25°C
Relative Humidity	: 51 %RH
Test procedure	: EN IEC 61000-3-2:2019+A1:2021
Test duration	: 2.5min
Harmonic order	: 2 – 40 th
Frequency range	: 0 – 2kHz
Test result	: Pass

Block Diagram of Test Set up



Test Procedure

The harmonics on AC Mains in the frequency from 0 to 2 kHz were measured in accordance with EN IEC 61000-3-2:2019+A1:2021.

The measurement of Harmonics of the fundamental current were measured up to 40 order harmonics using a digital power meter with an analogue output and frequency analyser which was integrated in the harmonic & flicker test system. This equipment is in compliance with the requirements of EN IEC 61000-3-2:2019+A1:2021.

The results indicated in the following tables and figures were those measured and recorded by an automatic measuring system.

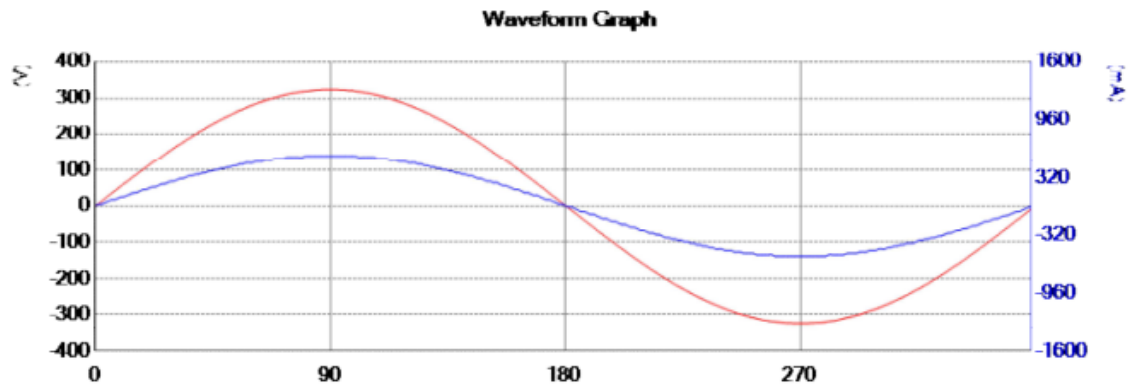
Table 2: Harmonic currents measurement result

Equipment category: Class A;

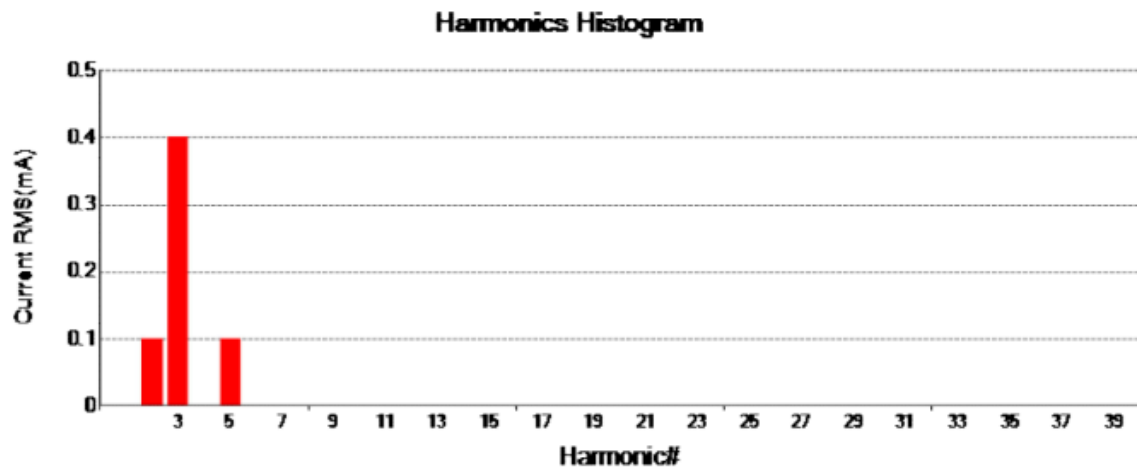
Test Result: **Pass**

Source qualification(Power On Load): **Idle - Pass**

Current & voltage waveforms



Harmonics and Class A



Test Result: **Pass**

Source qualification(Power On Load): **Idle - Pass**

THC(mA): 0.600

I - THD(%): 0.2

POHC(mA):0.000

POHC Limit(mA):251.353

Parameter values during test:

V_{RMS} (Volts): 230.9

Frequency(Hz): 50.0

I_{RMS}(mA): 368.9

Crest Factor: 1.415

Power (Watts): 85.8

Power Factor: 1.000

Harm#	Harms(filtered) (mA)	Limit (mA)	Harms(avg) (mA)	100%Limit	Harms(max) (mA)	150%Limit	Status
I Fund	369.700						
2	0.100	1080.000	0.200	0.019	0.200	0.012	Pass
3	0.400	2300.000	0.500	0.022	0.500	0.014	Pass
4	0.000	430.000	0.100	0.023	0.000	0.000	Pass
5	0.100	1140.000	0.100	0.009	0.100	0.006	Pass
6	0.000	300.000	0.000	0.000	0.000	0.000	Pass
7	0.000	770.000	0.100	0.013	0.100	0.009	Pass
8	0.000	230.000	0.000	0.000	0.000	0.000	Pass
9	0.000	400.000	0.000	0.000	0.000	0.000	Pass
10	0.000	184.000	0.000	0.000	0.000	0.000	Pass
11	0.000	330.000	0.000	0.000	0.000	0.000	Pass
12	0.000	153.300	0.000	0.000	0.000	0.000	Pass
13	0.000	210.000	0.000	0.000	0.000	0.000	Pass
14	0.000	131.400	0.000	0.000	0.000	0.000	Pass
15	0.000	150.000	0.000	0.000	0.000	0.000	Pass
16	0.000	115.000	0.000	0.000	0.000	0.000	Pass
17	0.000	132.400	0.000	0.000	0.000	0.000	Pass
18	0.000	102.200	0.000	0.000	0.000	0.000	Pass
19	0.000	118.400	0.000	0.000	0.000	0.000	Pass
20	0.000	92.000	0.000	0.000	0.000	0.000	Pass
21	0.000	107.100	0.000	0.000	0.000	0.000	Pass
22	0.000	83.600	0.000	0.000	0.000	0.000	Pass
23	0.000	97.800	0.000	0.000	0.000	0.000	Pass
24	0.000	76.700	0.000	0.000	0.000	0.000	Pass
25	0.000	90.000	0.000	0.000	0.000	0.000	Pass
26	0.000	70.800	0.000	0.000	0.000	0.000	Pass
27	0.000	83.300	0.000	0.000	0.000	0.000	Pass
28	0.000	65.700	0.000	0.000	0.000	0.000	Pass
29	0.000	77.600	0.000	0.000	0.000	0.000	Pass
30	0.000	61.300	0.000	0.000	0.000	0.000	Pass
31	0.000	72.600	0.000	0.000	0.000	0.000	Pass
32	0.000	57.500	0.000	0.000	0.000	0.000	Pass
33	0.000	68.200	0.000	0.000	0.000	0.000	Pass
34	0.000	54.100	0.000	0.000	0.000	0.000	Pass
35	0.000	64.300	0.000	0.000	0.000	0.000	Pass
36	0.000	51.100	0.000	0.000	0.000	0.000	Pass
37	0.000	60.800	0.000	0.000	0.000	0.000	Pass
38	0.000	48.400	0.000	0.000	0.000	0.000	Pass
39	0.000	57.700	0.000	0.000	0.000	0.000	Pass
40	0.000	46.000	0.000	0.000	0.000	0.000	Pass

Note: All harmonics are below the minimum limits and are ignored.

4.1.2 Voltage changes, voltage fluctuations and flicker on AC mains

General test information

Test procedure	:	EN 61000-3-3:2013+A1:2019+A2:2021
Temperature	:	25°C
Relative Humidity	:	51 %RH
Test result	:	Pass

Block Diagram of Test Set up



Test Procedure

According to the A.10 of the EN 61000-3-3:2013+A1:2019+A2:2021:

According to the characteristics of the sample, as specified by clause 5 of the basic standard, following limits apply:

- the value of P_{st} shall not be greater than 1.0;
- the value of P_{lt} shall not be greater than 0.65;
- the value of $d(t)$ during a voltage change shall not exceed 3.3% for more than 500ms;
- the relative steady-state voltage change, d_c , shall not exceed 3.3%;
- the maximum relative voltage change d_{max} , shall not exceed 4%.

The measurement was carried in accordance with Annex B of the basic standard and the EUT was set to produce the most unfavorable sequence of voltage changes.

Following are the measurement results obtained via an automatic testing system.

Table 3: Voltage fluctuations and flicker measurement results

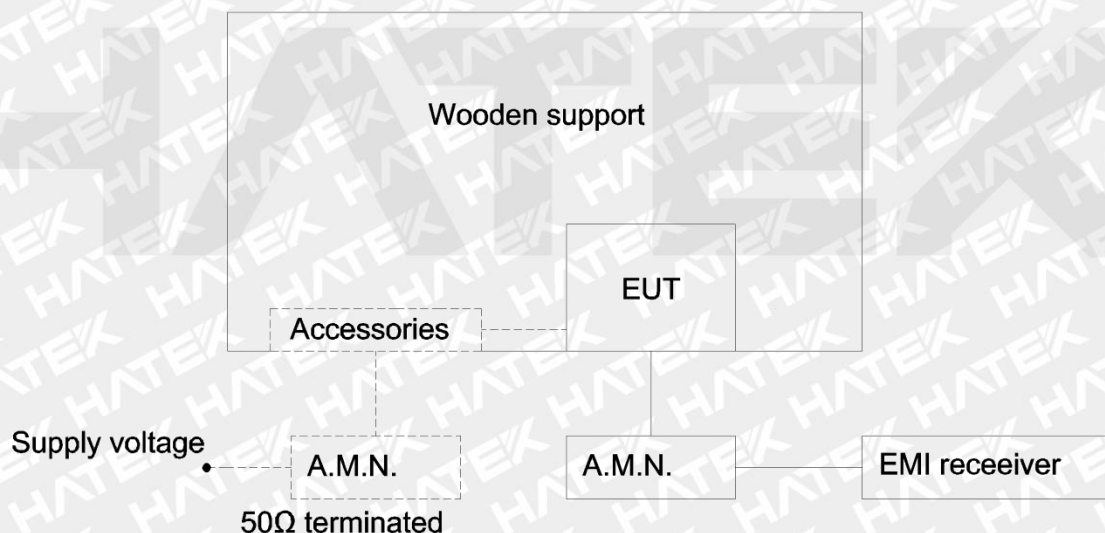
	d_c	$d_{max}(\text{average})$	$d(t)$	P_{st}	P_{lt}
Limits	3.3%	4%	3.3%/500ms	1.0	N/A
Result	0.179%	0.206%	0.00ms	0.223	-

4.1.3 Mains Terminal Continuous Disturbance Voltage

General test information

Test procedure : EN IEC 55014-1:2021 and CISPR 16-1 series standards
 Frequency range : 0.15-30MHz
 Kind of test site : EMC Chamber
 Temperature : 25 °C
 Relative Humidity : 51 %RH
 Operational condition : ON
 Artificial hand : Yes
 Earthing : Through artificial hand to AMN.
 Test result : Pass

Block Diagram of Test Set up



- ☒ For table top equipment, wooden support is 0.8m height.
- ☐ For floor standing equipment, wooden support is 0.1m height.

Test Procedure

The measurement setup was made according to EN IEC 55014-1:2021 in an EMC Chamber.

Prior to the measurements the test object operated about 15 minutes (warm-up) in order to stabilize its operating conditions and to ensure reliable measurement values.

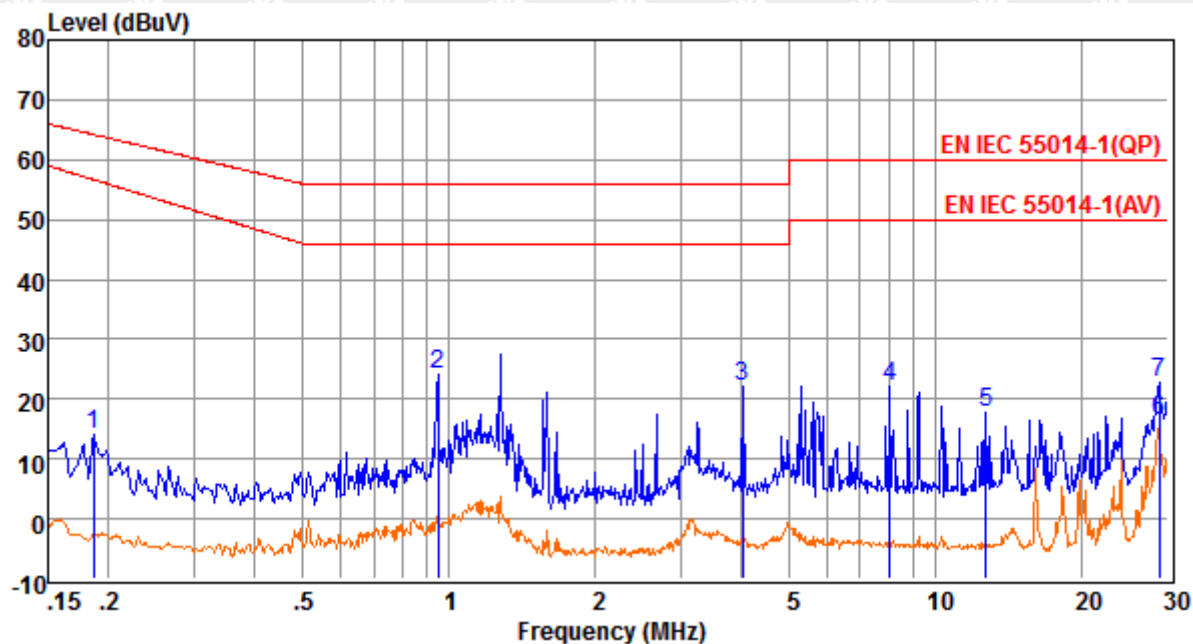
Furthermore an internal calibration with the test receiver was conducted prior to each measurement. And the measurement was made in the state the maximum disturbance was obtained.

The tested object was set-up on a wooden table. The length of the power cord of the tested object was about 1.5m. The EUT was set 0.8m away from the AMN. The cord longer than necessary to be connected to the AMN was folded forth and back parallel so as to form a bundle with a length between 0.3m and 0.4m. The EUT (Equipment under Test) was wrapped with artificial hand that was earthed through the Artificial Mains Network (AMN).

The Interference Voltage was determined according to clause 5 of EN IEC 55014-1:2021 while measuring the line and neutral conductor by turns.

In the Figures, the symbol “+” means Quasi-Peak Value and the symbol “x” means Average Value which was measured in final measurement.

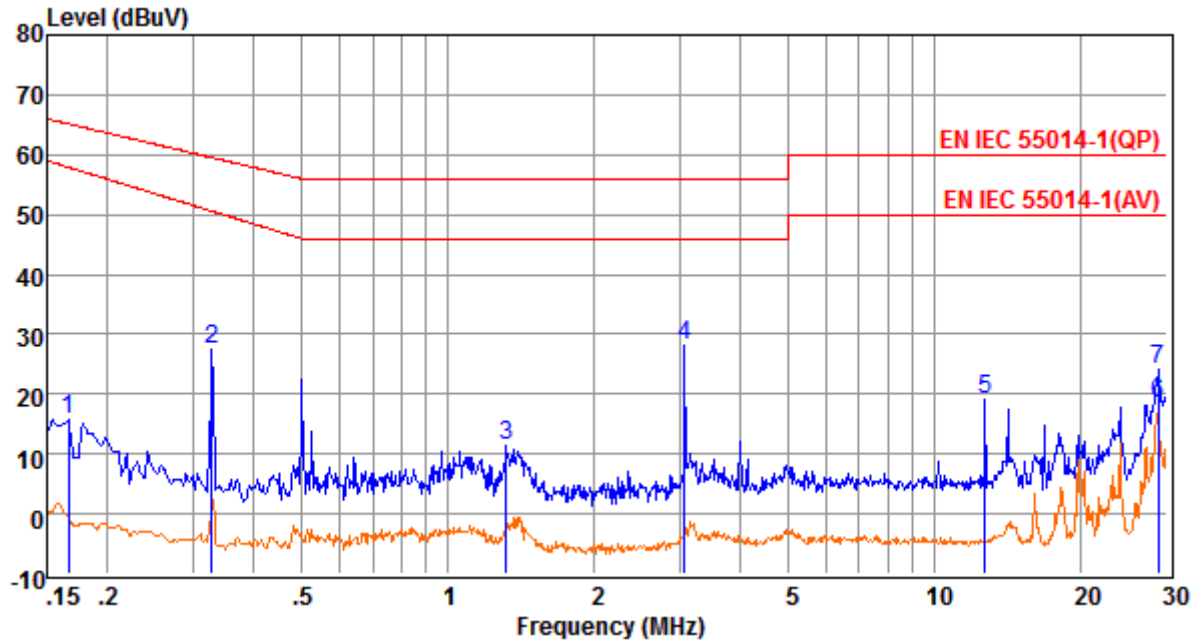
Figure 1: Test Curve of Conducted Emission in the frequency range of 150kHz - 30MHz, L line



	Freq	Reading	LisnFac	CabLos	Measured	Limit	Over	Remark
	MHz	dBpW	dB	dB	dBpW	dBpW	dB	
1	0.19	4.40	9.65	0.00	14.05	64.20	-50.15	Peak
2	0.95	14.49	9.74	0.00	24.23	56.00	-31.77	Peak
3	4.01	12.48	9.77	0.00	22.25	56.00	-33.75	Peak
4	8.06	12.33	9.76	0.00	22.09	60.00	-37.91	Peak
5	12.72	8.19	9.69	0.00	17.88	60.00	-42.12	Peak
6	28.76	6.99	9.60	0.00	16.59	50.00	-33.41	Average
7	28.75	13.03	9.60	0.00	22.63	60.00	-37.37	Peak

Remarks: 1. Measured = Reading + Lisn Factor +Cable Loss.
 2. The emission levels that are 20dB below the official limit are not reported.

Figure 2: Test Curve of Conducted Emission in the frequency range of 150kHz - 30MHz, N line



	Freq	Reading	LisnFac	CabLos	Measured	Limit	Over	Remark
	MHz	dBpW	dB	dB	dBpW	dBpW	dB	
1	0.17	6.05	9.66	0.00	15.71	65.16	-49.45	Peak
2	0.33	17.67	9.75	0.00	27.42	59.53	-32.11	Peak
3	1.32	1.46	9.86	0.00	11.32	56.00	-44.68	Peak
4	3.06	18.39	9.79	0.00	28.18	56.00	-27.82	Peak
5	12.72	9.42	9.63	0.00	19.05	60.00	-40.95	Peak
6	28.75	8.96	9.56	0.00	18.52	50.00	-31.48	Average
7	28.75	14.49	9.56	0.00	24.05	60.00	-35.95	Peak

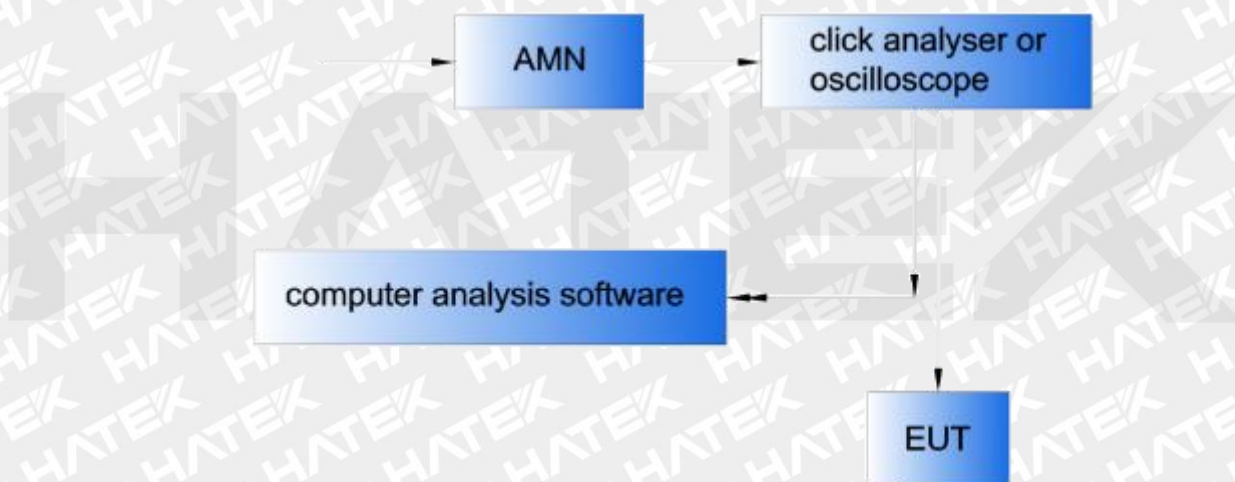
Remarks: 1. Measured = Reading + Lisn Factor +Cable Loss.
 2. The emission levels that are 20dB below the official limit are not reported.

4.1.4 Discontinuous Interference on AC Mains

General test information

Frequency range	: 0.15-30MHz
Kind of test site	: EMC Chamber
Temperature	: 25 °C
Relative Humidity	: 51 %RH
Operational condition	: ON
Port	: Mains
Limit	: EN IEC 55014-1:2021, clause 4.4.2 (Household Appliance)
Test result	: Pass

Block Diagram of Test Set up



Test Procedure

The discontinuous interference on AC mains in the frequency range from 0.15 to 30MHz were measured in accordance to EN IEC 55014-1:2021.

The measurement setup was made according to EN IEC 55014-1:2021, clause 4.2 in an shielding room. The used measurement equipment was in accordance to CISPR 16-1 series standards.

The test setup is according to clause 5.2 of EN IEC 55014-1:2021.

The clicks were measured when the thermostat of the EUT started or stopped.

The clicks were measured at the frequency of 0.15MHz, 0.5MHz, 1.4MHz and 30MHz.

The tests include RUN A and RUN B. The first one is to detect the Click rate and RUN B is to detect how many clicks overtop the limits that are calculated according the formula below.

For $0.2 \leq N < 30$ the Sensitivity = RUN A + $20 \cdot \log(30/\text{Click rate})$ and for $N < 0.2$ the Sensitivity = RUN A + 44.

Table 4: Click Test Results of RUN A

Measured Frequency (MHz)	0.15	0.5	1.4	30
Sensitivity(dBuV)	66.0	56.0	56.0	60.0
Last Time T(min./sec.)	60	60	60	60
Short Click Number n1	40	30	19	0
Long Click Number n2	0	0	2	0
Total Click Number n=n1+n2	40	30	21	0
Click Rated $N=F \times n/T$	0.22	0.21		

According to the clause 5.4.3.4 of EN 55014-1:2017:

“ - the click rate is not more than 5,
 - none of the caused clicks has a duration longer than 20ms,
 - 90% of the caused clicks have a duration less than or equal 10ms
 shall be verified at one frequency only, 150kHz or 500kHz, at which the higher click rate occurs. If any of these conditions is not satisfied then general assessment in accordance with 5.4.2 applies.”

Therefore this model is deemed to fulfill the relevant requirements.

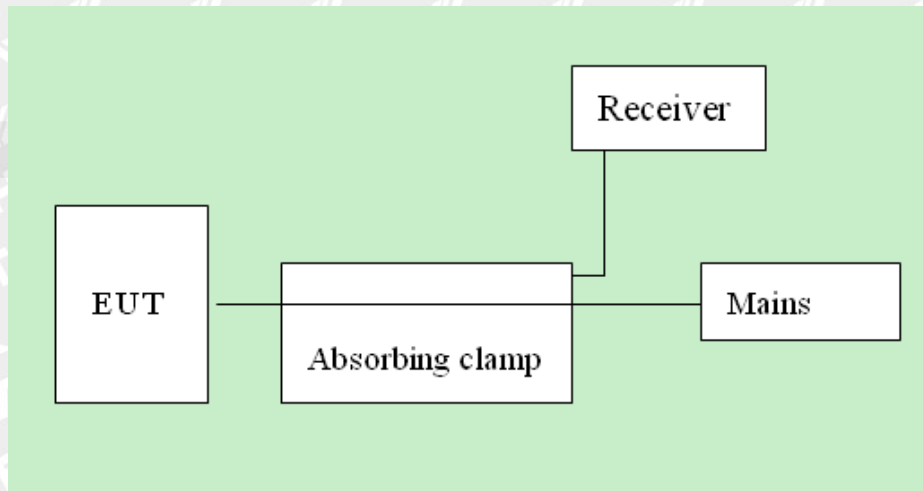
4.2 Emission in the Frequency Range from 30 MHz to 1000 MHz

4.2.1 Disturbance Power on Mains

General test information

Frequency Range	: 30 – 300MHz
Kind of test site	: EMC Chamber
Temperature	: 25 °C
Relative Humidity	: 51 %RH
Operational condition	: ON
Port	: Mains
Limit	: EN IEC 55014-1:2021, clause 4.1.2.1, Household and similar appliances
Test result	: Pass

Block Diagram of Test Set up



- ☒ For table top equipment, wooden support is 0.8m height.
- ☐ For floor standing equipment, wooden support is 0.1m height.

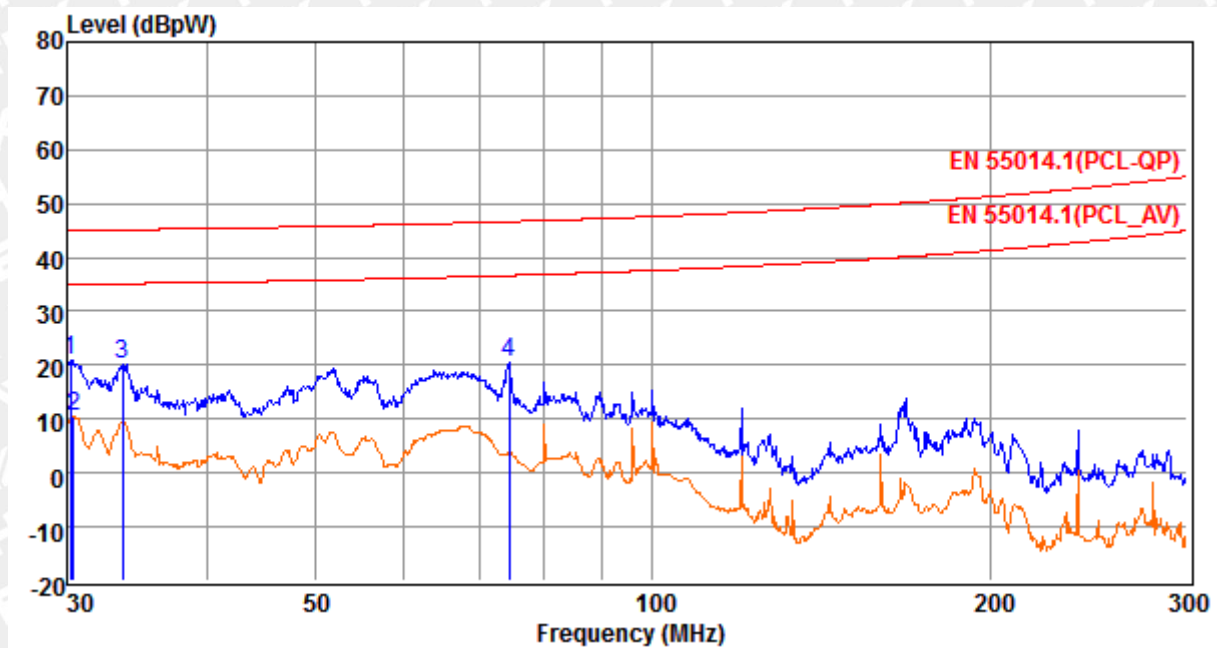
Test Procedure

Furthermore an internal calibration with the test receiver was conducted prior to each measurement.

The tested object was set-up on a wooden bench. The length of the power cord of the test object was about 1.5m. The length of power cord of EUT plus that of the extension cord was approximately 6.0m.

In the Figures, the symbol “+” means Quasi-Peak Value and the symbol “x” means Average Value which was measured in final measurement.

Figure 3: Test Curve of Power Disturbance in the frequency range of 30–300MHz, AC line



	Freq	Reading	LisnFac	CabLos	Measured	Limit	Over	Remark
	MHz	dBpW	dB	dB	dBpW	dBpW	dB	
1	30.21	-2.94	3.47	20.47	21.00	45.02	-24.02	Peak
2	30.42	-13.33	3.44	20.44	10.55	35.03	-24.48	Average
3	33.66	-2.69	2.98	19.98	20.27	45.15	-24.88	Peak
4	74.49	-4.04	3.77	20.77	20.50	46.66	-26.16	Peak

Remarks: 1. Measured = Reading + Lisn Factor +Cable Loss.
 2. The emission levels that are 20dB below the official limit are not reported.

5 Test Results I M M U N I T Y

The immunity test was not necessary for the EUT because it belongs to category I apparatus according to EN IEC 55014-2:2021,1.e.

“Category I: equipment containing no electronic control circuitry.

EXAMPLES Appliances, tools and toys that contain no electronic control circuits and only electromechanical components such as switches, thermostats, brush motors, induction motors, heating elements, lighting toys containing only batteries and LED.

Electrical circuits consisting of passive components (such as radio interference suppression capacitors or inductors, mains transformers, mains frequency rectifiers) are not considered to be electronic control circuitry.”

According to clause 7.2.2 of EN IEC 55014-2:2021, the EUT is deemed to fulfill the relevant immunity requirements without actual testing.

6 Photographs of the EUT

Photograph 1: Set-up for Disturbance Voltage



Photograph 2: Set-up for Disturbance Power



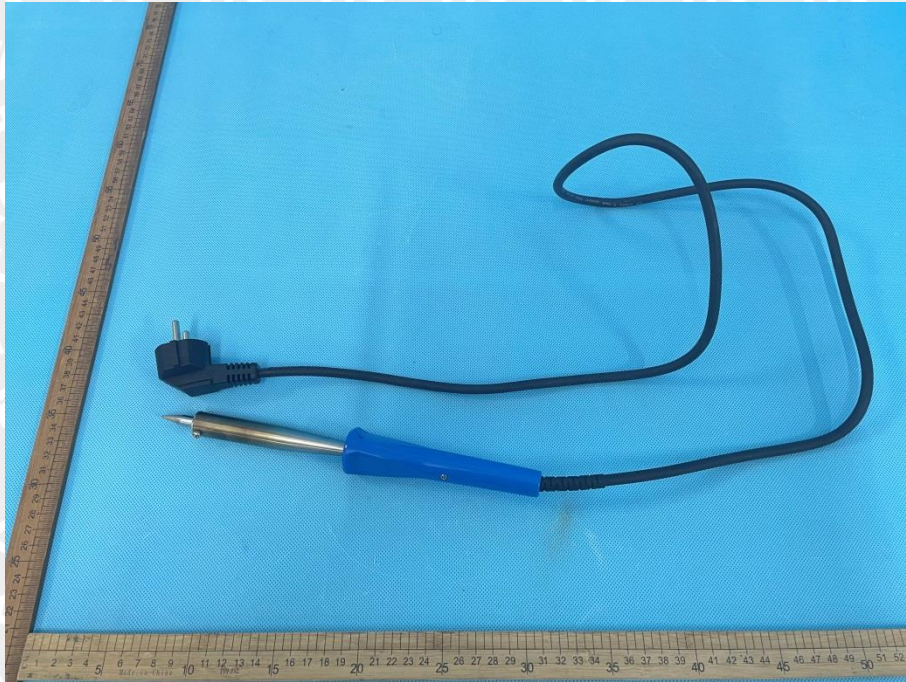
Photograph 3: Set-up for Harmonics, Voltage Fluctuation and Flicker



Photograph 4: Overall view of EUT (ZD-707(100W))



Photograph 5: Overall view of EUT (ZD-707(100W))



Photograph 6: Overall view of EUT (ZD-707(100W))



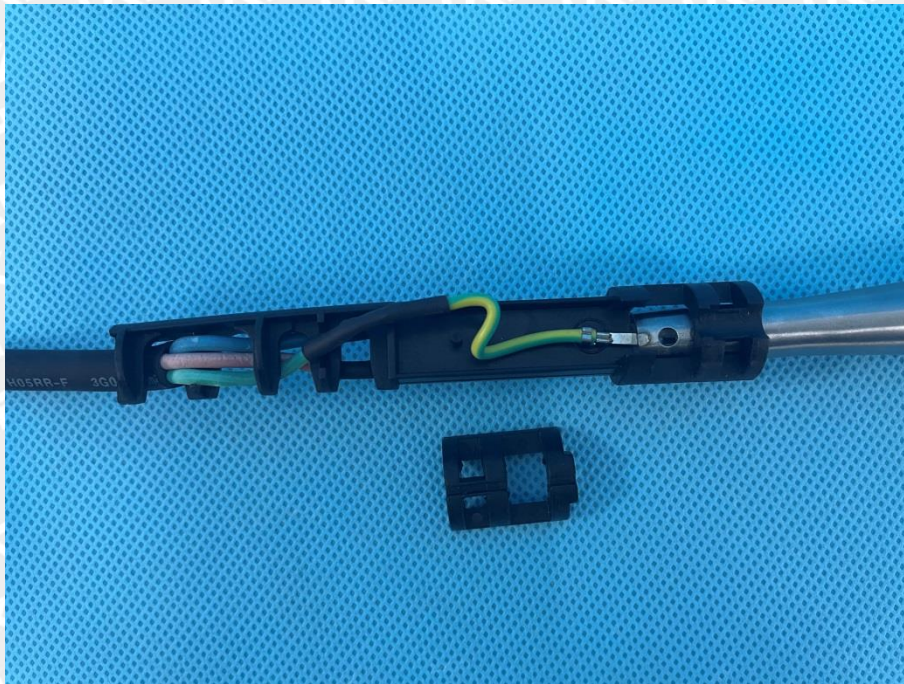
Photograph 7: Overall view of EUT (ZD-707(100W))



Photograph 8: Internal view of EUT (ZD-707(100W))



Photograph 9: Internal view of EUT (ZD-707(100W))



Photograph 10: Internal view of EUT (ZD-707(100W))



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----- End of Test Report -----