FCC PART18 TEST REPORT

Report No.:	20240617G10517X-E
Product Name:	Microwave Oven
Trade Name:	Midea, GE APPLIANCES
Model No. :	EM831C##-P(GE), EM831C***-P(GE), PCHK11S1WBB, PCHK11S1WWW, PCHK11S1WSS
FCC ID :	VG8EM831CYYGEW
Applicant:	Guangdong Midea Kitchen Appliances Manufacturing Co., Ltd
Received Date:	2024.06.14
Test Data:	2024.06.14-2024.06.19
Issued by:	CCIC Southern Testing Co., Ltd.
Lab Location:	Electronic Testing Building,No.43ShaheRoad,Xili Street, Nanshan District, Shenzhen, Guangdong, China **Tel:** 86-755-26627338 **E-Mail:** manager@ccic-set.com

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Test Report

Product Name:	Microwave Oven
Model No. :	EM831C##-P(GE), EM831C***-P(GE), PCHK11S1WBB, PCHK11S1WWW, PCHK11S1WSS
Trade name :	Midea, GE APPLIANCES
Applicant:	Guangdong Midea Kitchen Appliances Manufacturing Co., Ltd.
Applicant Address:	No.6, Yong An Road, Beijiao, Shunde, Foshan, China
Manufacturer:	Guangdong Midea Kitchen Appliances Manufacturing Co., Ltd.
Manufacturer Address:	No.6, Yong An Road, Beijiao, Shunde, Foshan, China
Test Standards:	47 CFR Part 18
Test Result:	PASS

Tested by : Sun Jiaohui

Sun Jiaohui Test Engineer 2024.06.20

Reviewed by: Chris You

Chris You Senior Engineer 2024.06.20

Approved by: Yang Fan

2024.06.20

Yang Fan, Manager

TABLE OF CONTENTS

Change History		
Issue	Date	Reason for change
1.0	2024.06.20	First edition

1. GENERAL INFORMATION

1.1 GENERAL DESCRIPTION OF EUT

EUT Name ..... :	Microwave Oven
Trade Name……..:	Midea, GE APPLIANCES
Model……..:	EM831C##-P(GE), EM831C***-P(GE), PCHK11S1WBB, PCHK11S1WWW, PCHK11S1WSS model designations as follows: E: Film type keypad; M: Indicates Microwave; 831: "8" indicates the microwave output power is 800W, "31" indicates cavity capacity is 31 liters; C: Indicates the design No.; ##/***: "#", "*" = 0-9, A-Z or blank, indicates different appearance; -P (GE): Wi-Fi function. Models of "PCHK11S1WBB, PCHK11S1WWW, PCHK11S1WSS" with trade mark as "GE APPLIANCES", they are identical to Midea model EM831C5H-P(GE) except for model name, trade mark and appearance. Model of EM831C5H-P(GE) was chosen for the final testing.
Power Supply ..... :	120VAC/60Hz
Rated input Power(microwave):	1200W
Rated output Power(microwave):	800W
Frequency..... :	2450MHz (ClassB/Group 2)
Magnetron Model..... :	2M519J
Magnetron Manufacturer ... :	WITOL
Description of Support Units :	-Load for power output measurement: 1000 milliliters of water in the beaker located in the center of the oven. -Load for frequency measurement: 1000 milliliters of water in the beaker located in the center of the oven. -Load for measurement of radiation on second and third harmonic: Two loads, one of 700 and the other of 300 milliliters, of water are used. Each load is tested both with the beaker located in the center of the oven and with it in the right front corner. -Load for all other measurements: 700 milliliters of water, with the beaker located in the center of the oven.

Note 1: The EUT have the following typical setups during the test:

Setup1: Microwave heating mode(According to FCC PART 18);

Note 2: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

1.2 Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 18:

No.	Identity	Document Title
1	47 CFR Part 18	Radio Frequency Devices

Test detailed items/section required by FCC rules and results are as below:

Emission			
Standard	Item	Class / Severity	Result
47 CFR PART 18	Conducted Emission (150 kHz to 30 MHz)	18.307(b)	PASS
	Radiated Emission (30 MHz to1 GHz)	18.305(b)	PASS

1.3 Facilities and Accreditations

1.3.1 Facilities

CNAS-Lab Code: L1659

CCIC-SET is a third party testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L1659.

FCC-Registration No.: CN1283

CCIC Southern Testing Co., Ltd EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Designation Number: CN1283, valid time is until Jun 30, 2025.

ISED Registration: 11185A-1

CCIC Southern Testing Co., Ltd. EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 11185A-1 on Aug. 04, 2016, valid time is until Jun 30, 2025.

A2LA Code: 5721.01

CCIC-SET is a third party testing organization accredited by A2LA according to ISO/IEC 17 025. The accreditation certificate number is 5721.01.

1.3.2 Test Environment Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15°C- 35°C
Relative Humidity (%):	25% -75%
Atmospheric Pressure (kPa):	86kPa-106kPa

1.3.3 Measurement Uncertainty

The uncertainty is calculated using the methods suggested in the "Guide to the Expression of Uncertainty in Measurement" (GUM) published by ISO.

Uncertainty of Conducted Emission:	Uc = 3.2 dB (k=2)
Uncertainty of Radiated Emission:(30MHz~1GHz)	Uc = 5.8 dB (k=2)
Uncertainty of Radiated Emission:(1~18GHz)	Uc = 5.1 dB (k=2)
Radiation Hazard Measurement	Uc = 2.4 dB (k=2)

2. EQUIPMENTS LIST

A. Equipment List:

Description	Manufacturer	Model	Serial No.	Calibration Date	Calibration Due. Date
Test Receiver	Rohde & Schwarz	ESIB26	A0304218	2023.10.20	2024.10.19
LISN	ROHDE&SCHWARZ	NSLK 8127	A210803670	2024.05.24	2025.05.23
Shield Room	Xinju Electronics	L9000*W4500*H3100	A181003230	2023.07.30	2026.07.29
EMI Test Receiver	ROHDE&SCHWARZ	ESIB7	A0501375	2024.02.28	2025.02.28
Broadband Ant.	ETC	MCTD2786	A150402240	2024.06.01	2025.05.31
3M Anechoic Chamber	Albatross	SAC-3MAC 9*6*6m	A0412375	2024.02.27	2027.02.27
EMI Test Receiver	ROHDE&SCHWARZ	ESW26	A180502935	2024.05.24	2025.05.23
5M Anechoic Chamber	Albatross	SAC-5MAC 12.8x6.8x6.4m	A0304210	2023.08.02	2026.08.01
EMI Horn Ant.	ETC	MCTD-1209	A150402241	2024.05.18	2025.05.17
Spectrum Analyzer	ROHDE&SCHWARZ	ESW26	A180502935	2024.05.24	2025.05.23
Portable Spectrometer	ROHDE&SCHWARZ	FSH8	A140401672	2024.02.13	2025.02.12
Prode	ROHDE&SCHWARZ	TSEMF-B1	A140401671	2024.02.14	2025.02.13

3. EMC EMISSION TEST

3.1 Test Procedure

Test Requirement: 47 CFR PART 18

Test Method: FCC/OST MP-5:1986

Power Supply: 120VAC/60Hz

Frequency Range: 2400-2500MHz

Detector: Peak

Limit: ISM equipment may be operated at any frequency above 9KHz and the frequency band 2400-2500MHz is allocated for use by ISM equipment

ISM frequency	Tolerance
6.78 MHz	±15.0 kHz
13.56 MHz	±7.0 kHz
27.12 MHz	±163.0 kHz
40.68 MHz	±20.0 kHz
915 MHz	±13.0 MHz
2,450 MHz	±50.0 MHz
5,800 MHz	±75.0 MHz
24,125 MHz	±125.0 MHz
61.25 GHz	±250.0 MHz
122.50 GHz	±500.0 MHz
245.00 GHz	±1.0 GHz

3.1.1 Frequency For Normal Voltage

The operating frequency was measured using a spectrum analyzer. Starting with the EUT at room temperature, a 1000mL water load was placed in the center of the oven and the oven was operated at maximum output power. The fundamental operating frequency was monitored until the water load was reduced to 20 percent of the original load.

3.1.2 Frequency For Line Voltage

The EUT was operated / warmed by at least 10 minutes of use with a 1000mL water load at room temperature at the beginning of the test. Then the operating frequency was monitored as the input voltage was varied between 80 and 125 percent of the nominal rating.

3.1.3 Measurement data

Operating Mode	Frequency(MHz)
Normal Voltage	2433.2-2470.3
Line Voltage	2433.6-2470.7

3.2 RADIATION HAZARD TEST

3.2.1 Test Setup

The EUT was set-up according to the FCC MP-5 and FCC Part 18 for radiation hazard measurement. The measurement was using a microwave leakage meter to measure the radiation leakage in the as-received condition with the oven door closed A 700 mL water load in a breaker was located in the center of the oven and the microwave oven was set to maximum power. While the oven operating, the microwave meter will check the leakage and then record the maximum leakage.

3.2.2 Limit

A maximum of 1.0mW/cm^{2}is allowed in according with the applicable FCC standards

3.2.3 Test results

Test location	Test result（mW/cm^2）	Limit(mW/cm^2)	Verdict
Left side	0.24	1.0	Pass
Right side	0.33	1.0	Pass
Front	0.36	1.0	Pass
Rear	0.21	1.0	Pass

There was no microwave leakage exceeding a power level of 0.36 m W/cm^{2}Observed at any point 5cm or more from the external surface of the oven

3.3 RF OUTPUT POWER MEASUREMENT

3.3.1 Test Standard

Test Requirement	47 CFR PART 18
Test Method	FCC/OST MP-5:1986
Power Supply	120VAC/60Hz

3.3.2 EUT Operating mode

Test the EUT in microwave mode with full power.
A quantity of 1 000 g -/+5 g of water is added to the container and its actual mass obtained. The food support for microwave heating is placed in the center of the support immediately. The oven is operated and the time for the water temperature to attain 20 -/+2 ˚C is measured. The oven is then switched off and the final water temperature is measured with in 60s

3.3.3 Test Data

Mass of Water(g)	Mass of the container(g)	ambient temperature (℃)	Initial temperature(℃)	Final temperature(℃)	Heating Time(S)	Output Power(Watt)
1000	377	24.2	10.3	19.8	60	647.7

Formula:

The microwave power output is calculated from the formula

〈A1〉

$$P = \frac{4{,}187 \cdot m_w (T_1 - T_0) + 0{,}55 \cdot m_c (T_1 - T_A)}{t}$$

where

P is the microwave power output, (W);

m_w is the mass of the water, (g);

m_c is the mass of the container, (g);

T_A is the ambient temperature, (°C);

T_0 is the initial temperature of the water, (°C);

T_1 is the final temperature of the water, (°C);

t is the heating time, in seconds, excluding the magnetron filament heating-up time. 〈A1〉

The microwave power output is stated in watts, rounded to the nearest 50 W.

4. CONDUCTED EMISSION

4.1.1 Conducted Emission Limit

Frequency range (MHz)	Conducted Limit (dBμV)	
	Quasi-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

Note:

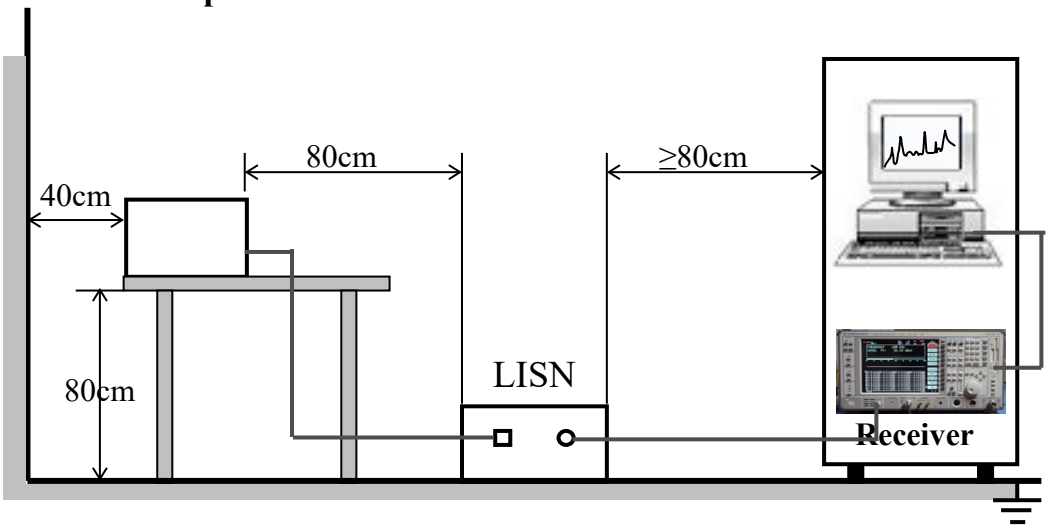
a) The limit decreases linearly with the logarithm of the frequency in therange 0.15 MHz to 0.5 MHz.

b) The lower limit is applicable at the transition frequency.

4.1.2 Test Procedure

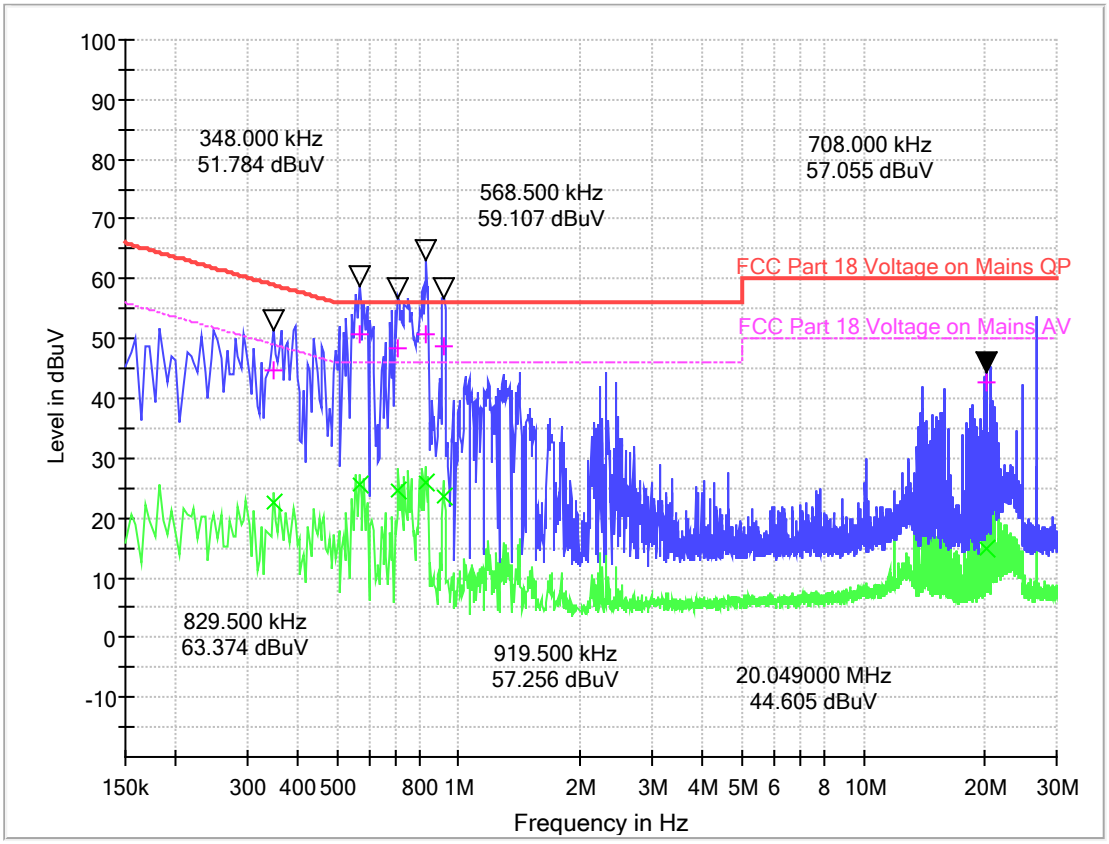
The EUT is placed on a 0.8m high insulating table, which stands on the grounded conducting floor, and keeps 0.4m away from the grounded conducting wall. The EUT is connected to the power mains through a LISN which provides 50Ω/50μH of coupling impedance for the measuring instrument. The Common Antenna is used for the call between the EUT and the System Simulator (SS). A Pulse Limiter is used to protect the measuring instrument. The factors of the whole test system are calibrated to correct the reading.

4.1.3 Test Setup



A. Test Result:

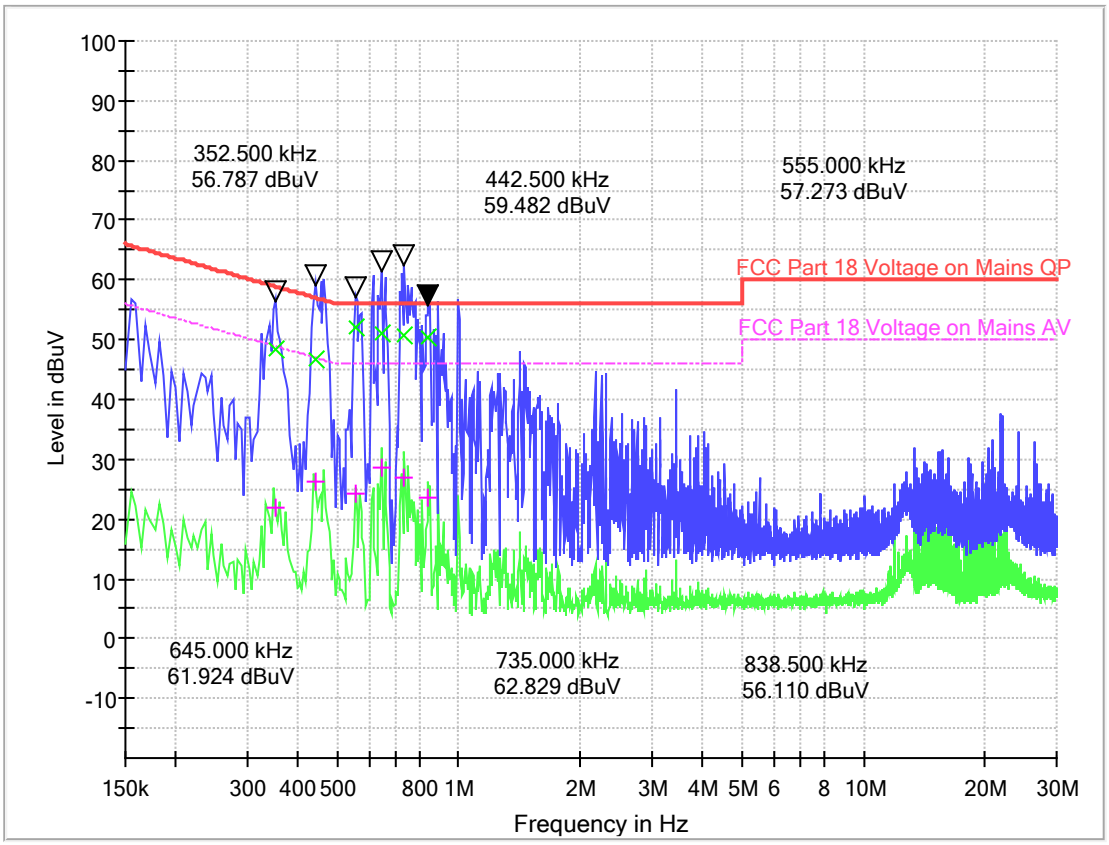
Mains terminal disturbance voltage, Setup1,L phase



(Plot A: L Phase)

Frequency (MHz)	Quasi Peak	Average (dB μV)	Cable Loss (dB)	Corr. (dB)	Margin - QPK	Limit - QPK	Margin - AV	Limit - AV (dB μV)
0.348000	44.69	22.45	0.1	10.1	14.32	59.0	26.56	49.0
0.568500	50.87	25.49	0.1	10.1	5.13	56.0	20.51	46.0
0.708000	48.36	24.46	0.1	10.1	7.64	56.0	21.54	46.0
0.829500	50.74	26.07	0.1	10.1	5.26	56.0	19.93	46.0
0.919500	48.72	23.53	0.2	10.2	7.28	56.0	22.47	46.0
20.049000	42.61	14.89	0.5	10.5	17.39	60.0	35.11	50.0

Mains terminal disturbance voltage, Setup 1, N phase



(Plot B: N Phase)

Frequency (MHz)	Quasi Peak	Average (dB μV)	Cable Loss (dB)	Corr. (dB)	Margin - QPK	Limit - QPK	Margin - AV	Limit - AV (dB μV)
0.352500	48.23	21.93	0.1	10.1	10.67	58.9	26.97	48.9
0.442500	46.63	26.23	0.1	10.1	10.38	57.0	20.78	47.0
0.555000	52.03	24.32	0.1	10.1	3.97	56.0	21.68	46.0
0.645000	51.00	28.53	0.1	10.1	5.00	56.0	17.47	46.0
0.735000	50.78	26.83	0.1	10.1	5.22	56.0	19.17	46.0
0.838500	50.33	23.71	0.1	10.1	5.67	56.0	22.29	46.0

Test Result: PASS

5. RADIATED EMISSION

5.1.1 Radiated Emission Limits

(a) ISM equipment operation on a frequency specified in §18.301 is permitted unlimited radiated energy in the band specified for that frequency.

(b) The field strength levels of emissions which lie outside the bands specified in §18.301,unless otherwise indicated, shall not exceed the following:

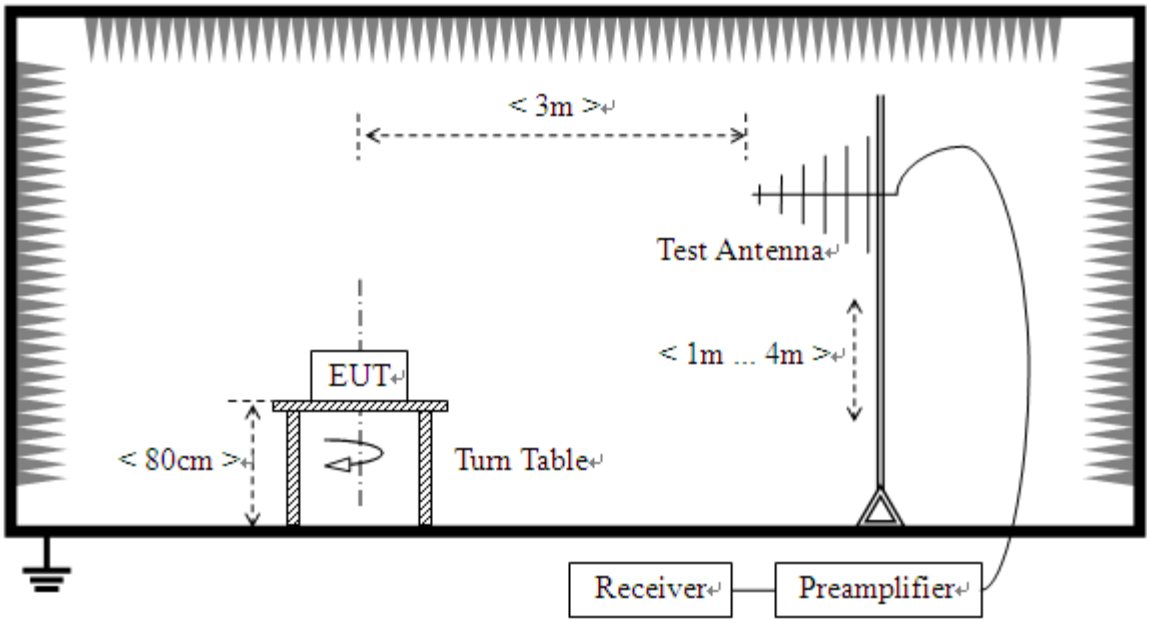
RF Power generated by equipment(watts)	Field strength limit(uV/m) @300m
Below 500	25
500or more	25*SQRT(power/500)

Power =647.7W

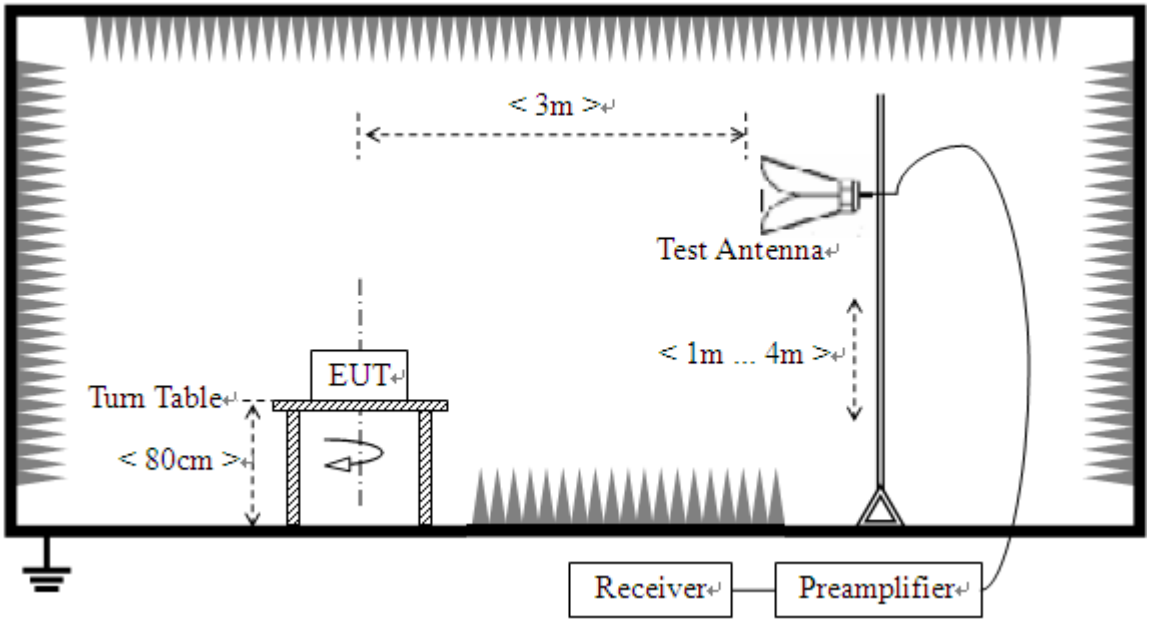
Limit=20lg(25*SQRT(power/500))+20lg(300/3) @ 3m distance.

5.1.2 Test Setup

For radiated emissions from 30MHz to1GHz



For radiated emissions above 1GHz



5.1.3 Test Procedure

a.The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.

b.The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.

c.The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement

d.The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.

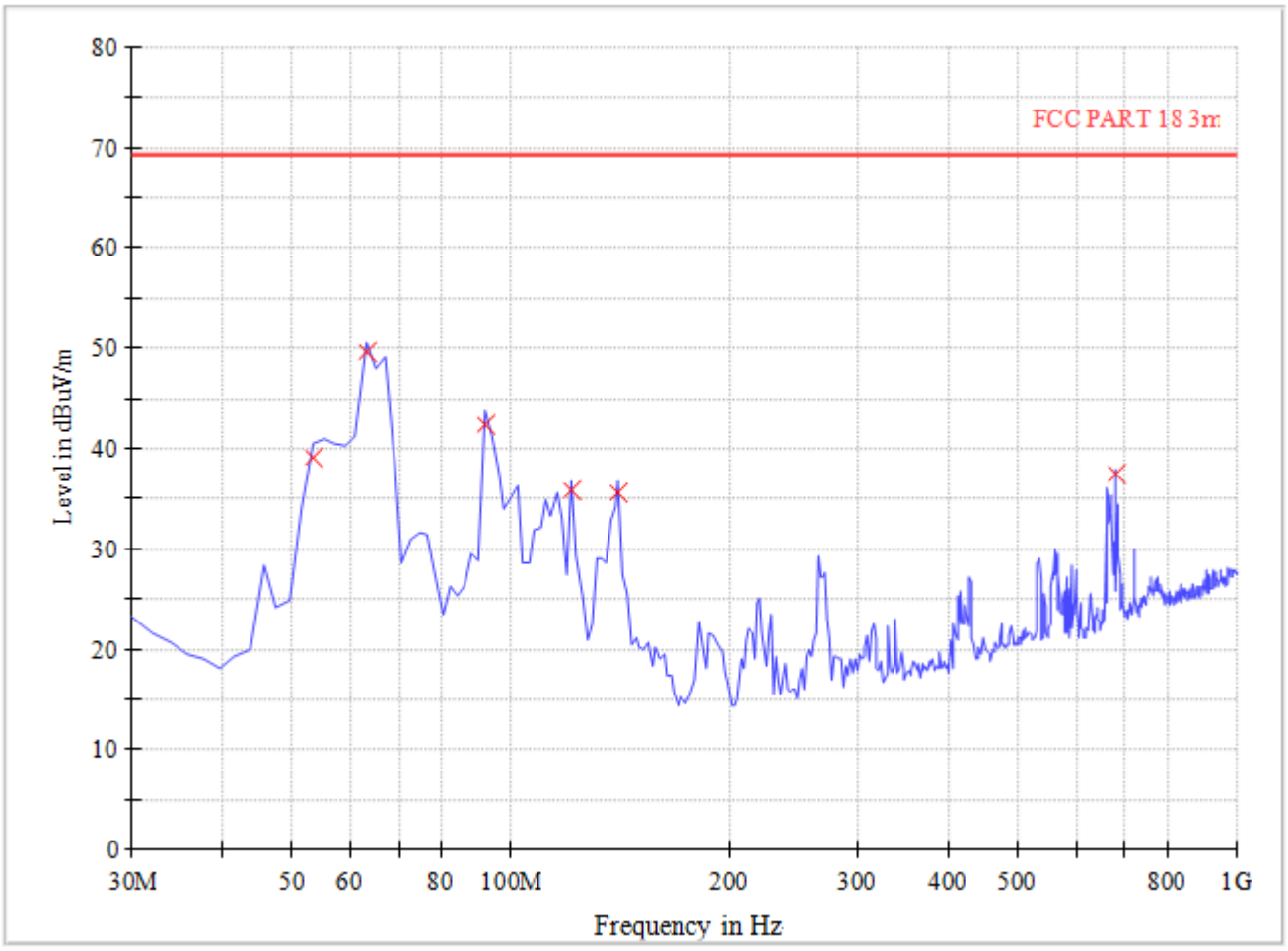
e.If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.

f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note: Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

Test Result:

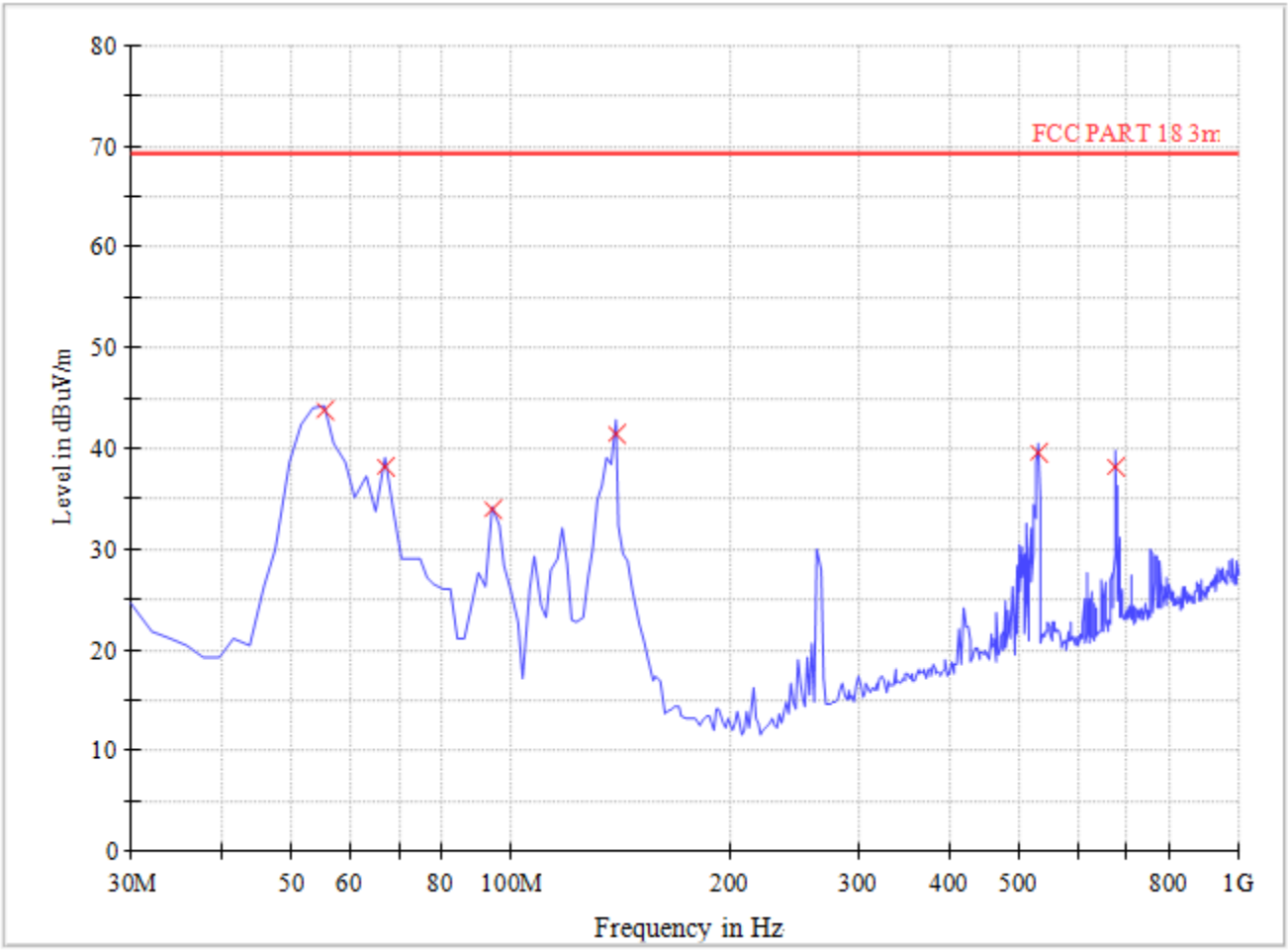
Radiation disturbances, antenna polarization:Setup1,Horizontal



(Plot A: Test Antenna Horizontal 30M - 1G)

Frequency (MHz)	Quasi Peak (dBµV/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dBµV/m)	Margin (dB)	Antenna	Verdict
53.32	39.00	120.000	100.0	69.08	30.08	Horizontal	Pass
63.04	49.63	120.000	100.0	69.08	19.45	Horizontal	Pass
92.20	42.30	120.000	100.0	69.08	26.78	Horizontal	Pass
121.36	35.73	120.000	100.0	69.08	33.35	Horizontal	Pass
140.80	35.58	120.000	100.0	69.08	33.50	Horizontal	Pass
681.20	37.42	120.000	100.0	69.08	31.66	Horizontal	Pass

Radiation disturbances, antenna polarization: Setup1, Vertical



(Plot B: Test Antenna Vertical 30M - 1G)

Frequency (MHz)	Quasi Peak (dBμV/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dBμV/m)	Margin (dB)	Antenna	Verdict
55.28	43.65	120.000	100.0	69.08	25.43	Vertical	Pass
66.92	38.14	120.000	100.0	69.08	30.94	Vertical	Pass
94.16	33.92	120.000	100.0	69.08	35.16	Vertical	Pass
138.84	41.39	120.000	100.0	69.08	27.69	Vertical	Pass
531.52	39.42	120.000	100.0	69.08	29.66	Vertical	Pass
677.32	38.06	120.000	100.0	69.08	31.02	Vertical	Pass

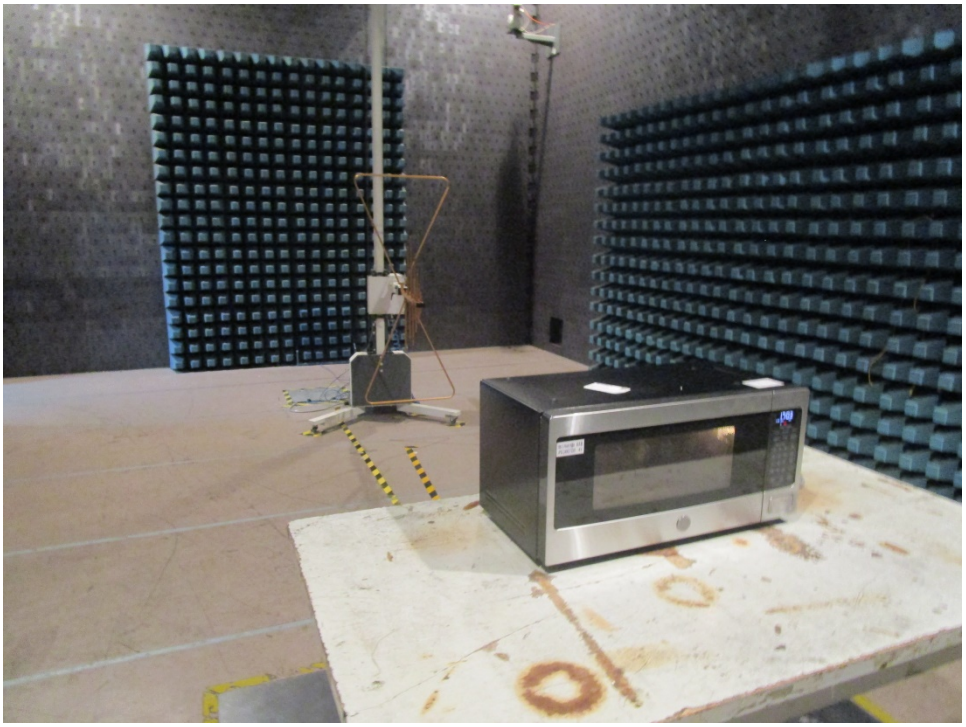
Above 1GHz, Setup1

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2419.86	59.68	-10.74	69.08	9.40	100	354	Vertical
2	3151.04	46.09	-8.03	69.08	22.99	100	115	Vertical
3	3724.93	45.63	-5.92	69.08	23.45	100	51	Vertical
4	4808.95	52.38	-1.44	69.08	16.70	100	112	Vertical
5	7219.30	54.92	2.35	69.08	14.16	100	137	Vertical
6	10445.86	54.62	5.50	69.08	14.46	100	304	Vertical

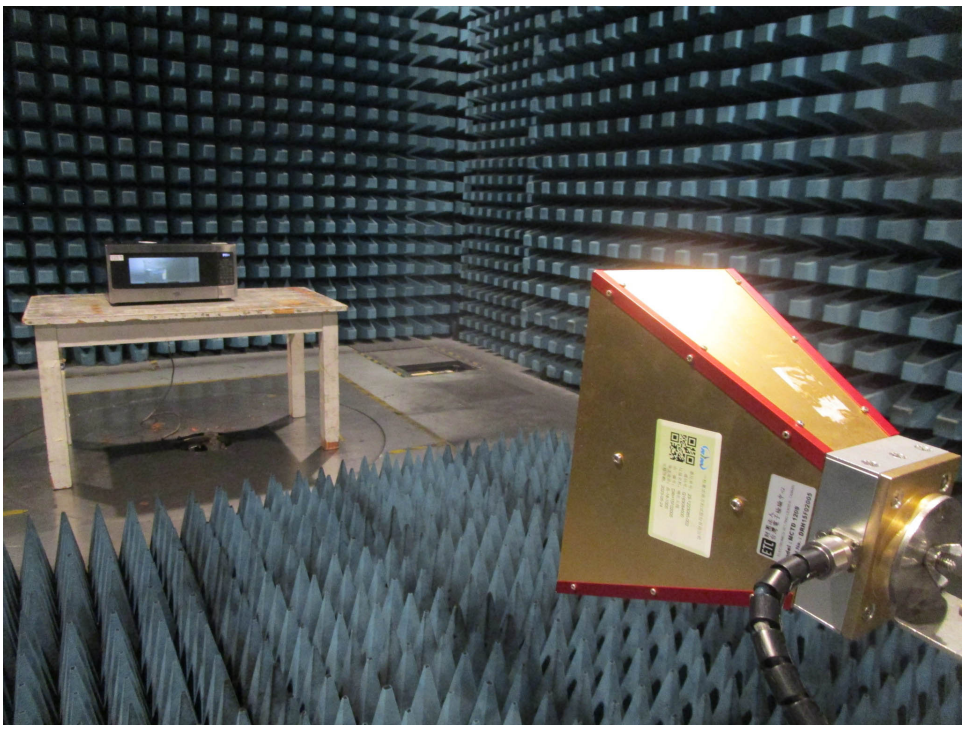
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2402.85	58.11	-10.72	69.08	10.97	100	321	Horizontal
2	3376.34	49.92	-7.55	69.08	19.16	100	336	Horizontal
3	3729.18	50.92	-5.91	69.08	18.16	100	304	Horizontal
4	4804.70	55.53	-1.43	69.08	13.55	100	312	Horizontal
5	6169.29	55.70	0.33	69.08	13.38	100	275	Horizontal
6	9187.55	54.94	3.87	69.08	14.14	100	312	Horizontal

APPENDIX I：PHOTOGRAPHS OF EMC TEST CONFIGURATION

1. Radiated Emission Measurement below 1GHz

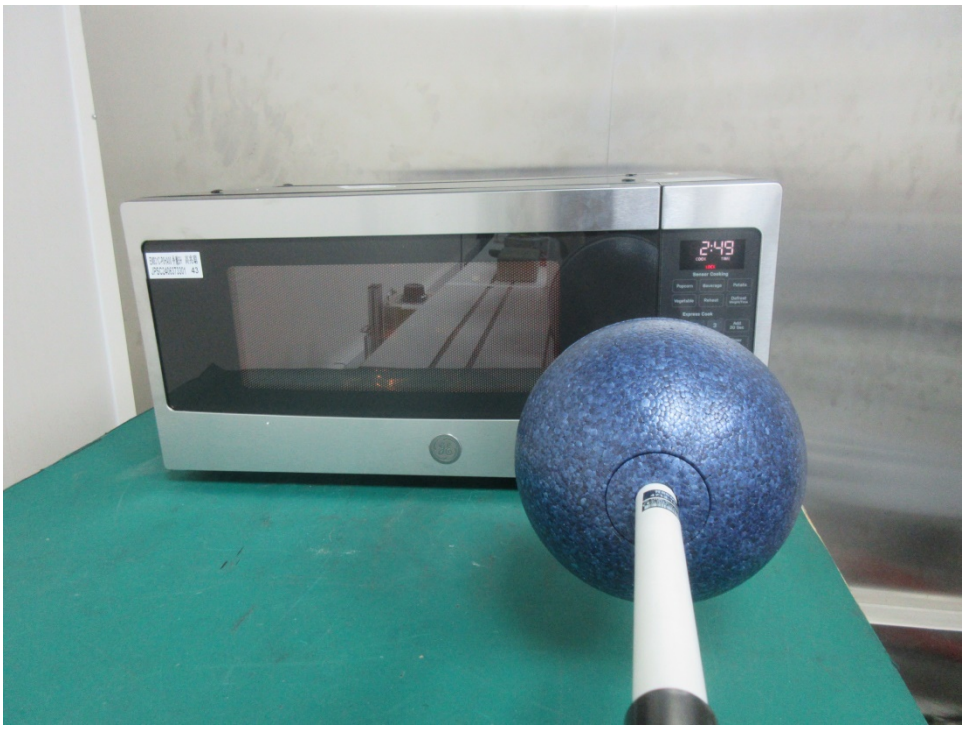


2. Radiated Emission Measurement above 1GHz



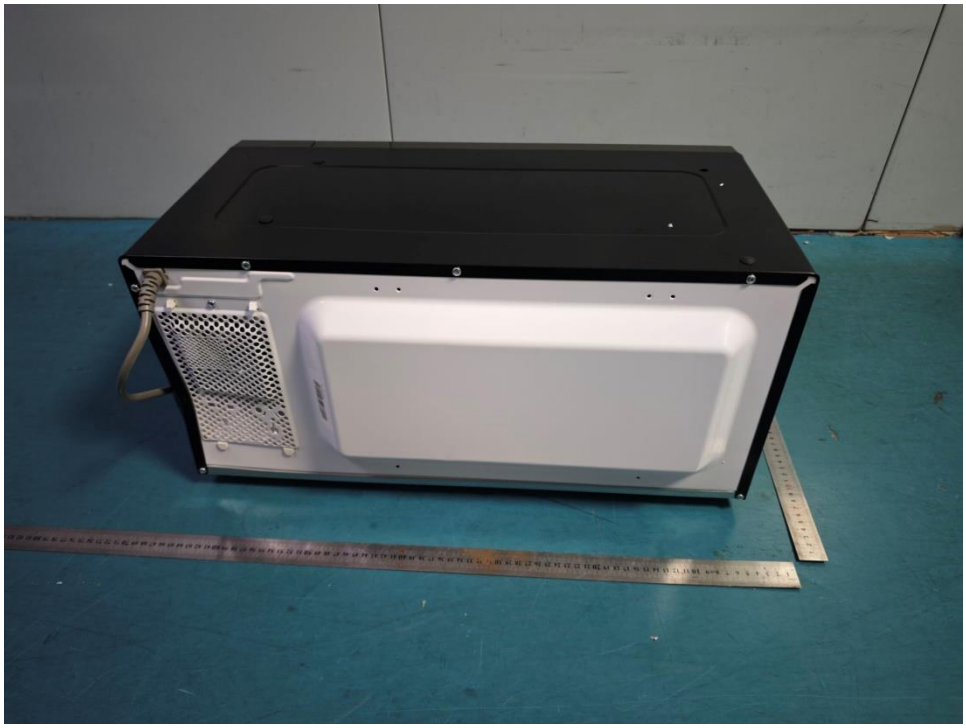
3. Conducted emission at AC mains input/output port Measurement

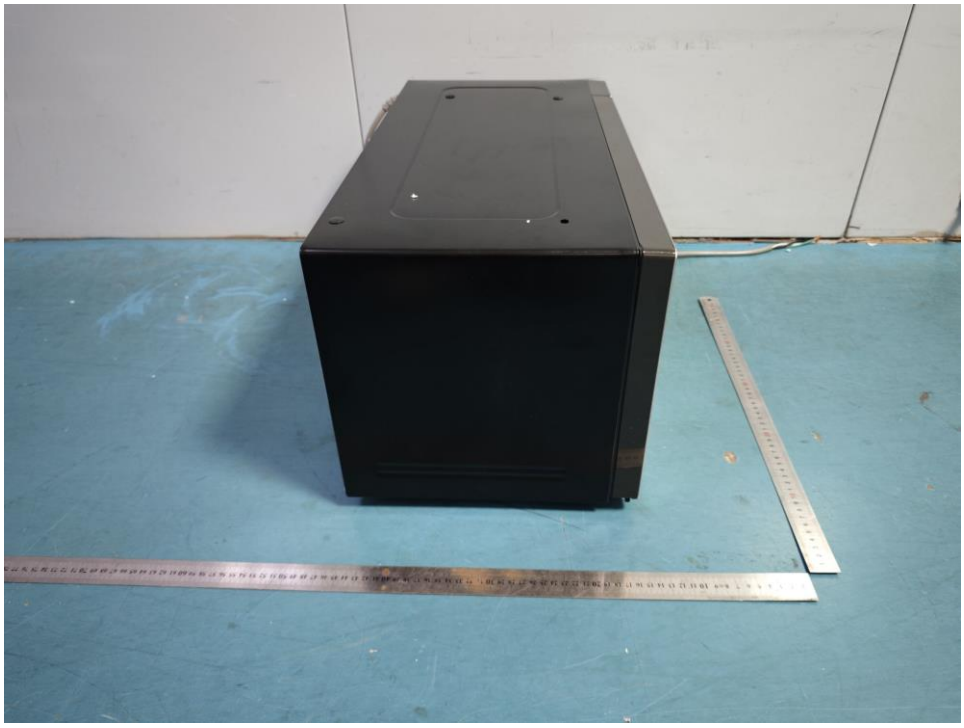
4. Radiation Hazard Test



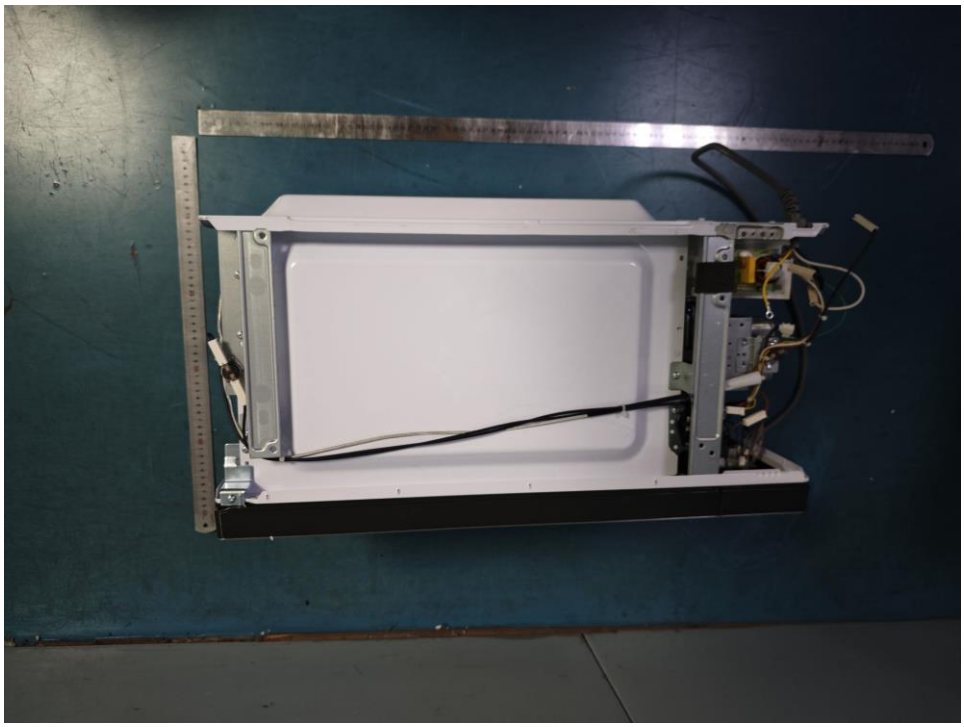
APPENDIX II: PHOTOGRAPHS OF PRODUCT PHOTO

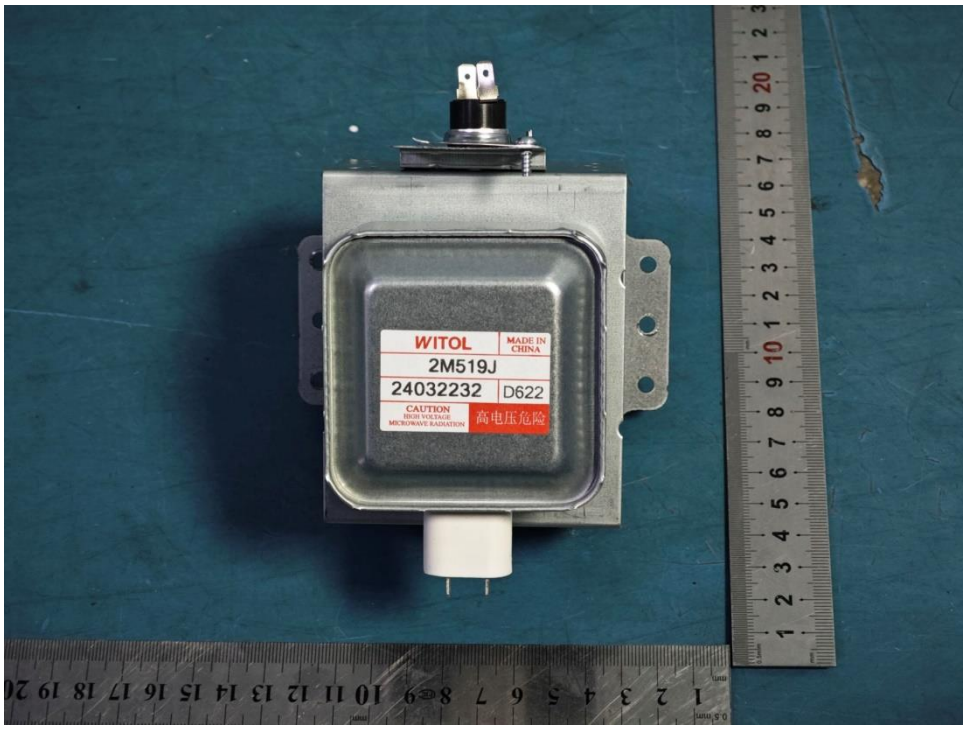
External Photo

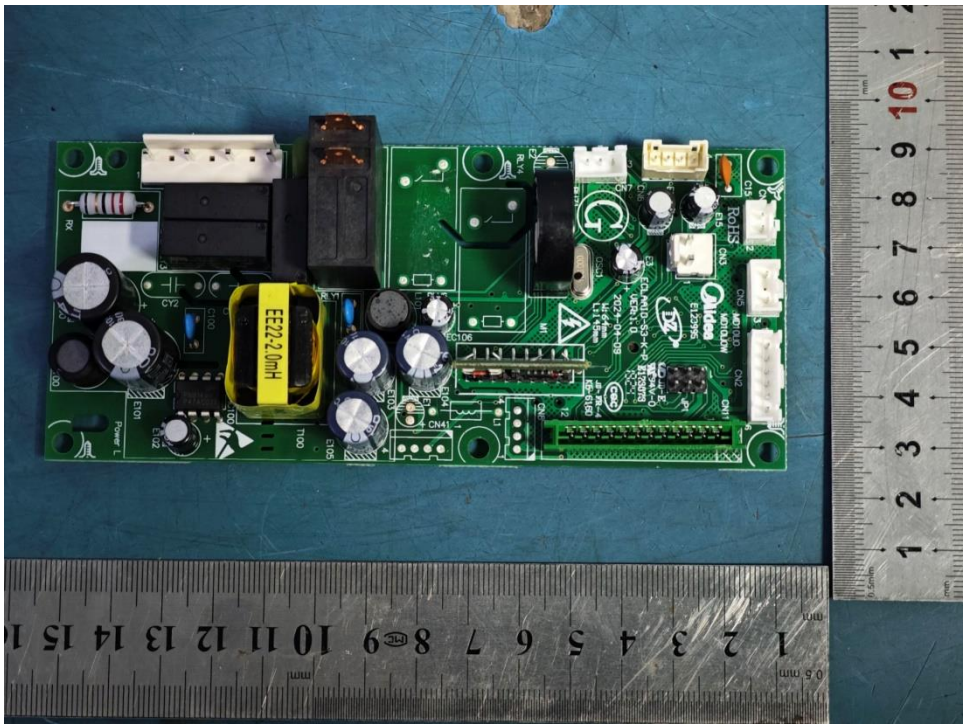


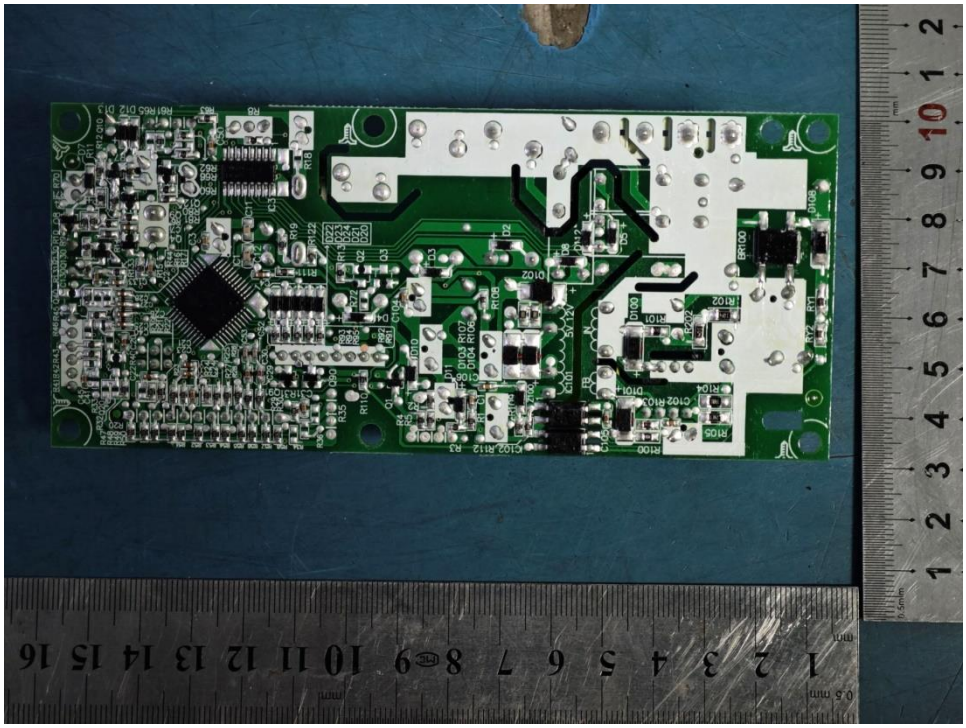


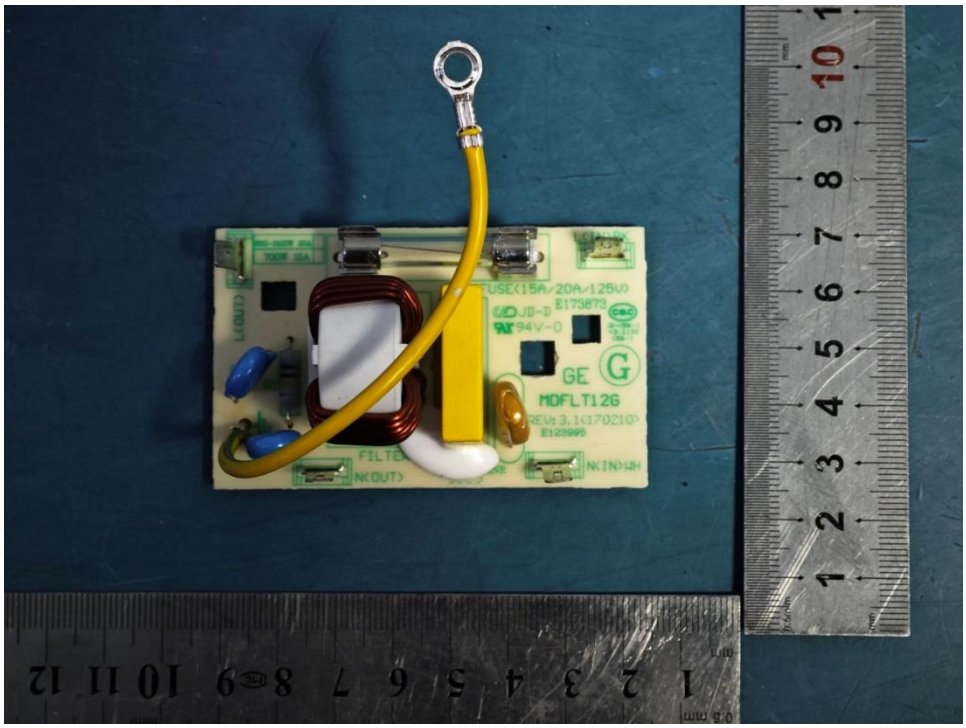
Internal Photo

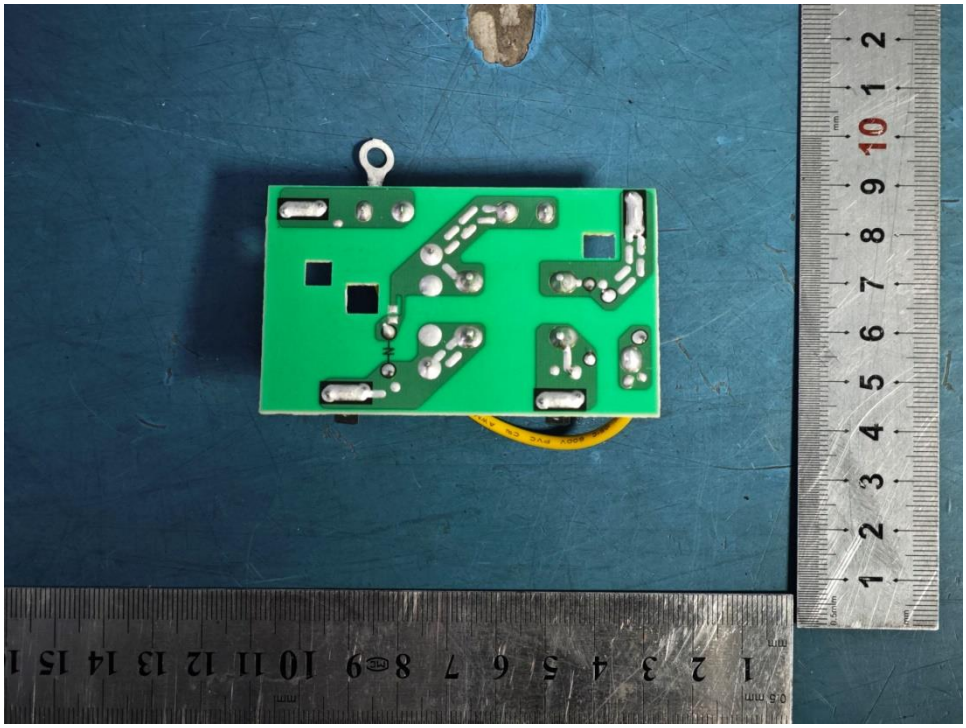


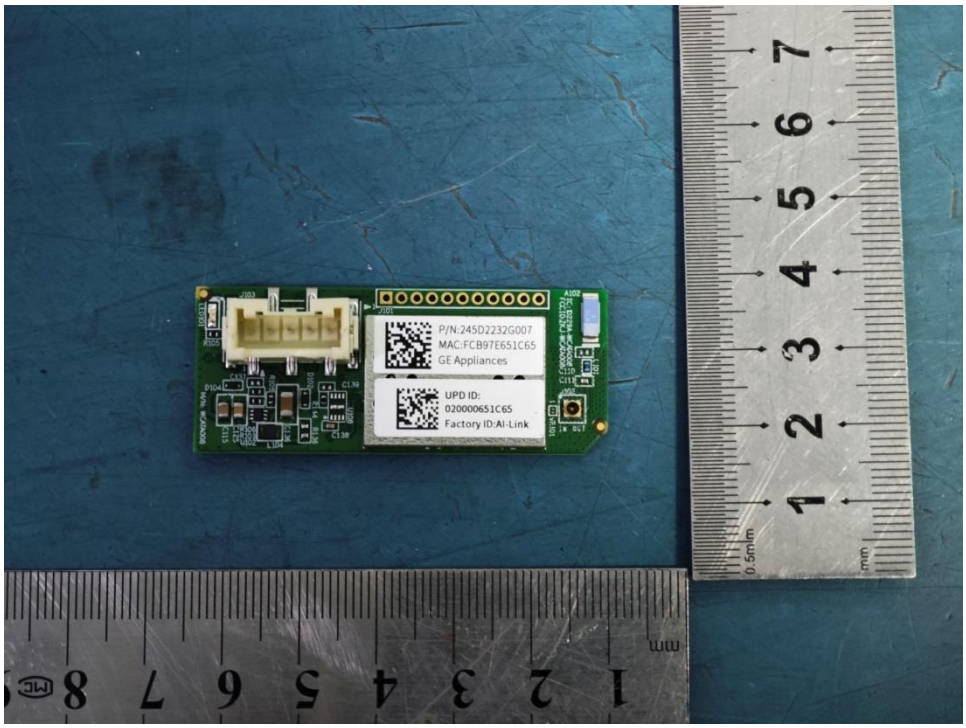


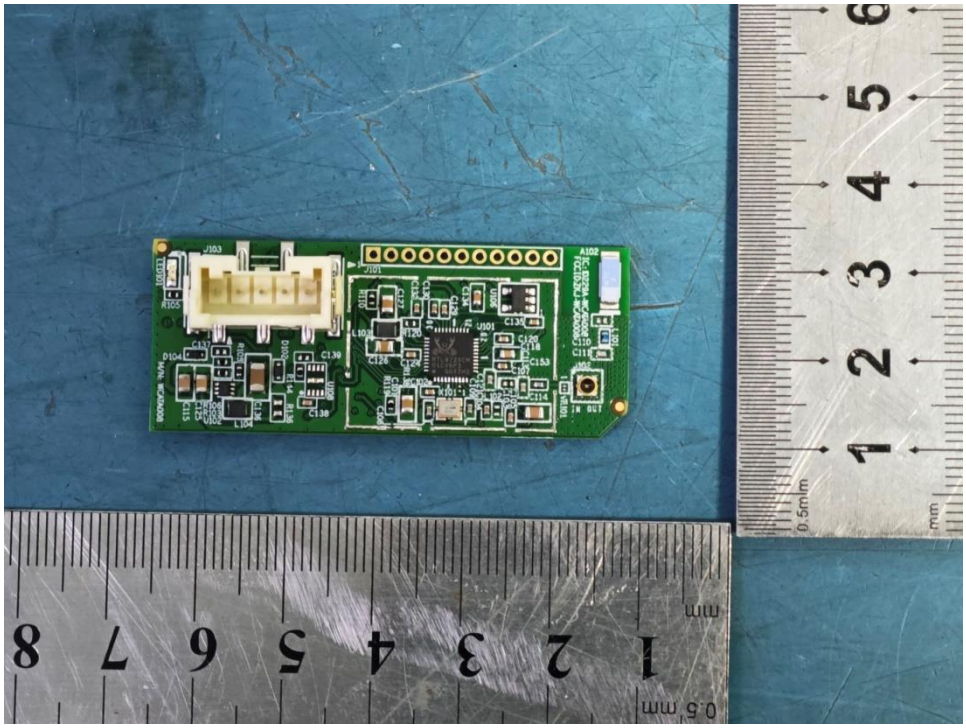

EE22-2.0mH

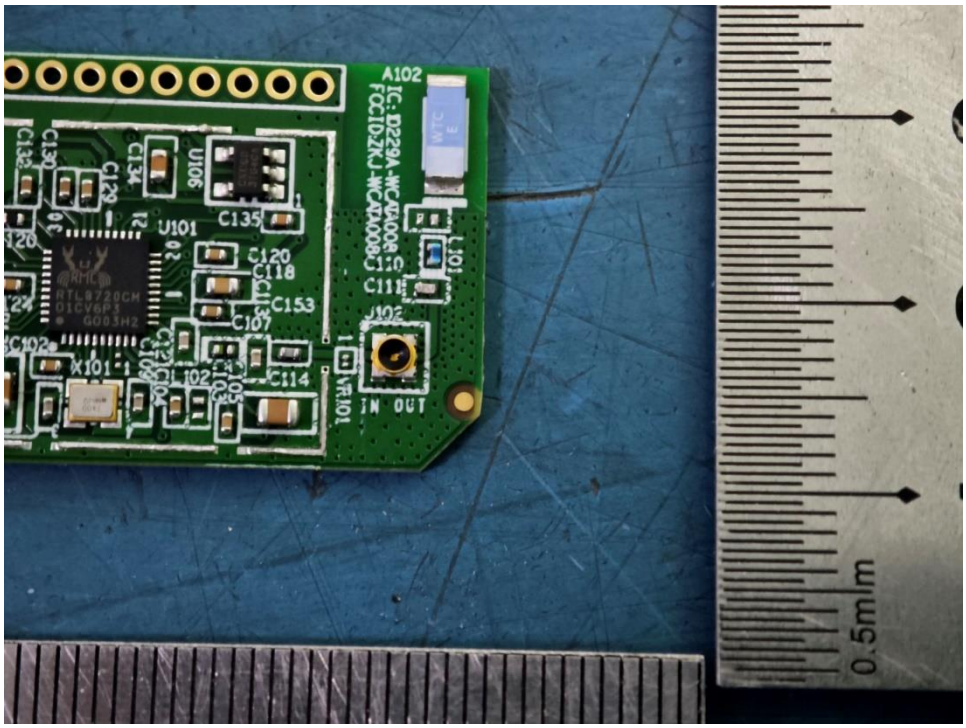


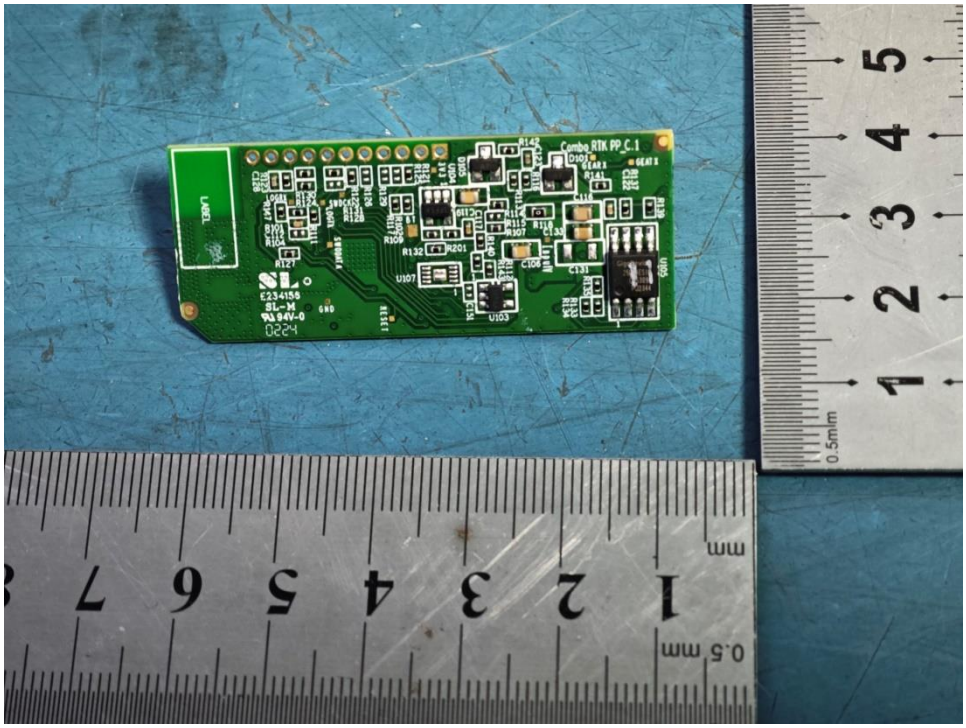

FUSE(15A/20A/125V)
E173873
94V-0
GE
MDFLT12G

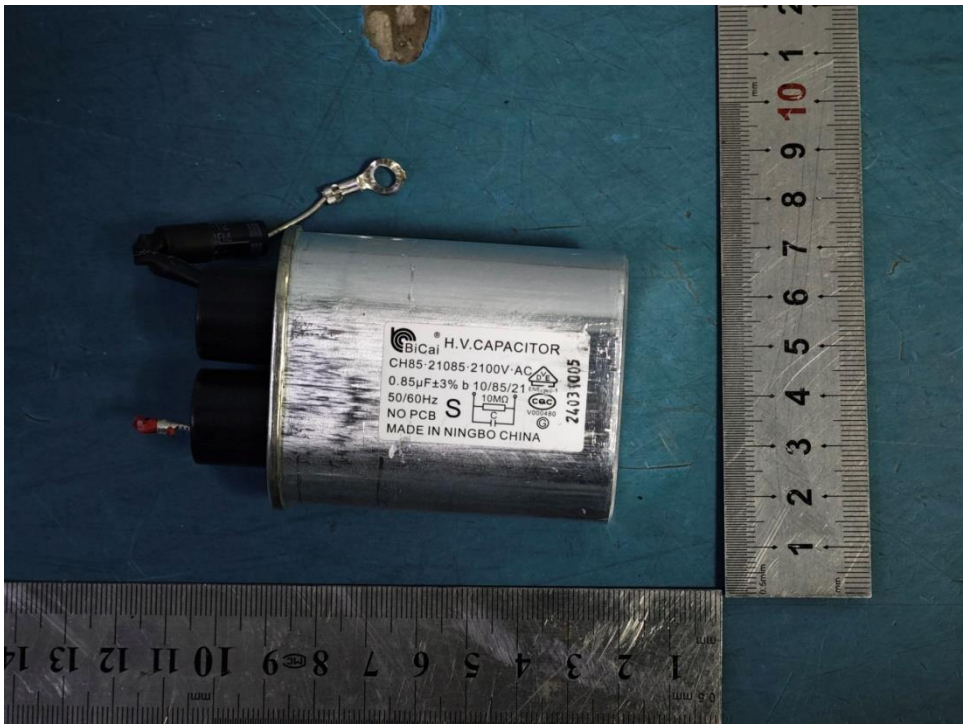


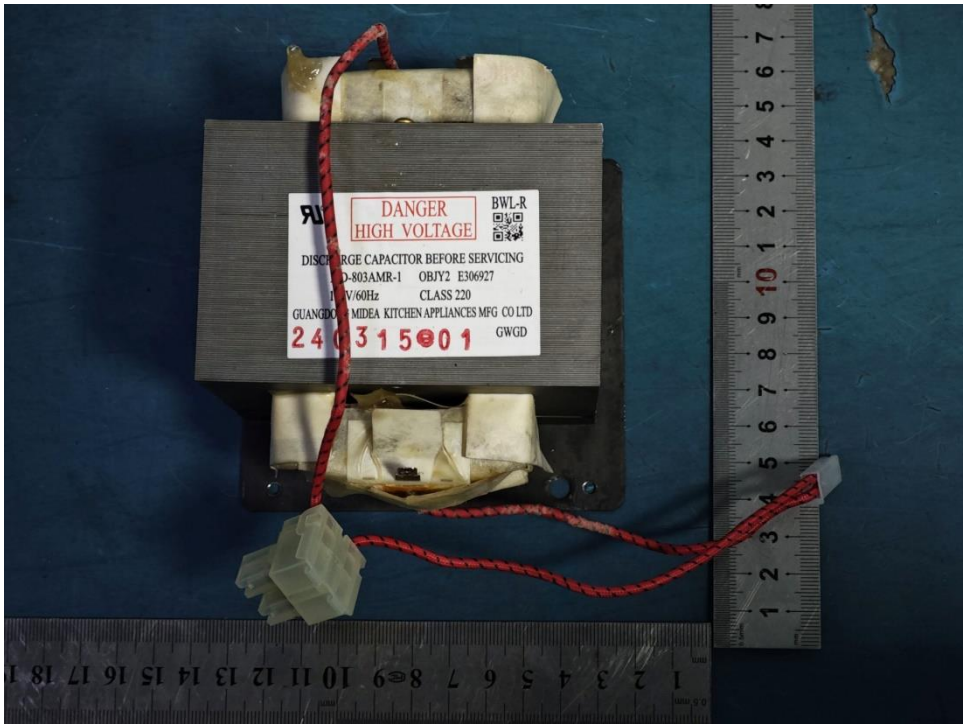

P/N:245D2232G007
MAC:FCB97E651C65
GE Appliances
UPD ID:
020000651C65
Factory ID:AI-Link

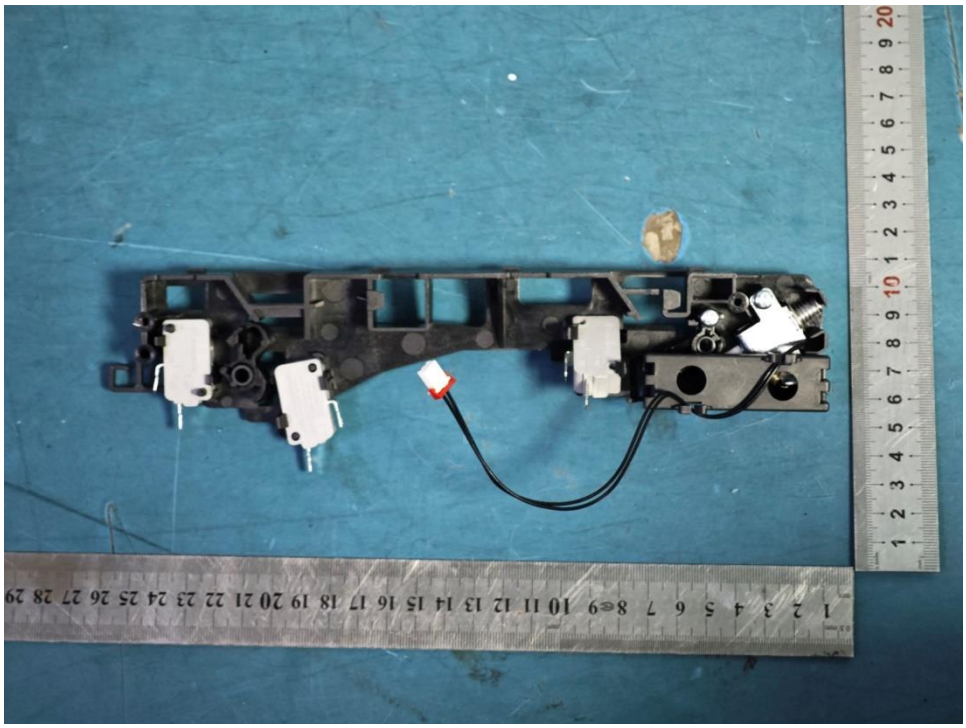


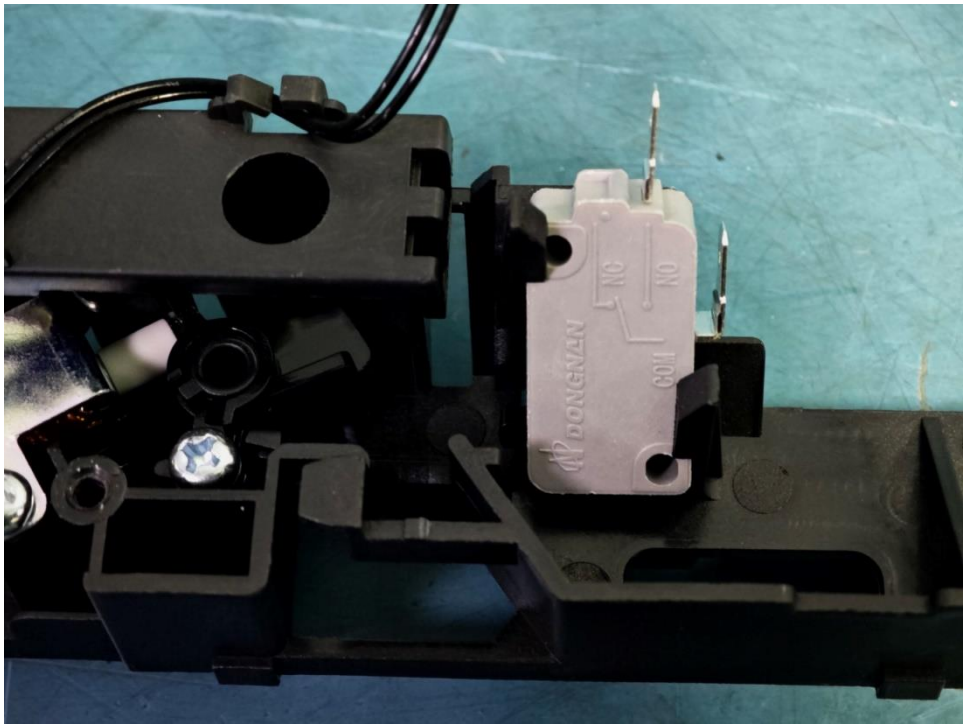

A102
C135
C120
C118
C153
C107
C114
U101
U106
X101
IN OUT
0.5mm


Combo_RTK PP_C_1
0.5mm
mm


BiCai H.V.CAPACITOR
CH85-21085-2100V-AC
0.85μF±3% b 10/85/21
50/60Hz
NO PCB S
MADE IN NINGBO CHINA


DANGER
HIGH VOLTAGE
BWL-R
DISCHARGE CAPACITOR BEFORE SERVICING
OBJY2 E306927
CLASS 220
MIDEA KITCHEN APPLIANCES MFG CO LTD
GWGD





※※※ End of Report ※※※