FCC PART 18 TEST REPORT

Report No.:	SET2022-02618
Product Name:	Microwave Oven
Trade Name:	Midea, ZLINE
Model No. :	TM034DYY-PHN1, TM034DYYY-PHN1, MWD-30, MWD-30-SS, MWD-30-BS
FCC ID :	VG8TM034DYYM
Applicant:	Guangdong Midea Kitchen Appliances Manufacturing Co., Ltd.
Received Date:	2022.03.09
Test Data:	2022.03.09-2022.03.23
Issued by:	CCIC Southern Testing Co., Ltd.
Lab Location:	ElectronicTestingBuilding,No.43ShaheRoad,Xili Street, Nanshan District, Shenzhen, Guangdong, China **Tel:** 86 755 26627338 **Fax:** 86 755 26627238

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Test Report

Product Name.....	Microwave Oven
Model No.	TM034DYY-PHN1, TM034DYYY-PHN1, MWD-30, MWD-30-SS, MWD-30-BS
Trade name	Midea, ZLINE
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 ..... Ruihong Xie

Ruihong Xie Test Engineer 2022.03.23

Reviewed by ..... Chris You

Chris You Senior Engineer 2022.03.23

Approved by ..... Shuangwen Zhang

2022.03.23

Shuangwen Zhang, Manager

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Change History		
Issue	Date	Reason for change
1.0	2022.03.23	First edition

1. GENERAL INFORMATION

1.1 GENERAL DESCRIPTION OF EUT

EUT Name ..... :	Microwave Oven
Trade Name……..:	Midea, ZLINE
Brand Name……:	N/A
Hardware Version..... :	N/A
Software Version ..... :	N/A
Model……..:	TM034DYY-PHN1, TM034DYYY-PHN1, MWD-30, MWD-30-SS, MWD-30-BS model designations as follows: T: Touch type keypad; M: Microwave function; 0: Indicates the microwave output power is 1000W, 34: Indicates cavity capacity is 34 liters, D: Indicate the design No., YY or YYY: Y= 0-9 or A-Z or blank, indicate different appearance; -P: Indicates Painted (Steel) Cavity, H: Humidity sensor, N1: Indicate the design No. Model of TM034D4HL-PHN1 was selected for final testing.
Power Supply ..... :	120V AC/60Hz
Rated input Power(microwave):	1500W
Rated output Power(microwave):	1000W
Frequency..... :	2450MHz (Class B /Group 2)
Magnetron Model..... :	2M539H
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 April 19th, 2023.

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 April 19th, 2023.

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)

2. EQUIPMENTS LIST

A. Equipment List:

Description	Manufacturer	Model	Serial No.	Calibration Date	Calibration Due. Date
Test Receiver	KEYSIGHT	ESR3	A181103297	2021.07.14	2022.06.24
LISN	ROHDE&SCHWARZ	NSLK 8127	A210803670	2021.04.03	2022.08.10
Shield Room	Xinju Electronics	L9000*W4500*H3100	A181003230	2021.09.05	2024.07.29
EMI Test Receiver	ROHDE&SCHWARZ	ESIB7	A0501375	2021.06.23	2022.05.23
Broadband Ant.	ETC	MCTD2786	A150402240	2021.03.05	2024.03.03
3M Anechoic Chamber	Albatross	SAC-3MAC 9*6*6m	A0412375	2019.03.26	2023.03.25
EMI Test Receiver	ROHDE&SCHWARZ	ESW26	A180502935	2021.08.12	2022.08.01
5M Anechoic Chamber	Albatross	SAC-5MAC 12.8x6.8x6.4m	A0304210	2019.03.25	2023.03.24
EMI Horn Ant.	ROHDE&SCHWARZ	HF906	A0304225	2019.04.17	2022.04.17
Spectrum Analyzer	ROHDE&SCHWARZ	ESW26	A180502935	2021.08.12	2022.08.02

3. EMC EMISSION TEST

3.1 Test Procedure

Test Requirement: 47 CFR PART 18
Test Method: FCC/OST MP-5:1986
Power Supply: AC 120V/ 60Hz
Frequency Range: 2445-2473MHz
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 1000 mL 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	2448.9-2472.3
Line Voltage	2441.7-2474.5

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 700mL 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

There was no microwave leakage exceeding a power level of 0.20 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	AC120/60Hz

3.3.2 EUT Operating mode

Test the EUT in microwave mode with full power.

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	280	21.7	9.7	32.1	120	808.26

Formula:

$$P = \frac{4.2 \times mw(T_2 - T_1) + 0.9 \times mc(T_2 - T_0)}{t}$$

P is the microwave power output, in watts

Mw is the mass of the water, in grams

Mc is the mass of the container, in grams

T0 is the ambient temperature, in degrees Celsius

T1 is Initial temperature of the water, in degrees Celsius

T2 is final temperature of the water, in degrees Celsius

T is heating time, in seconds, excluding the magnetron filament heating-up time

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:

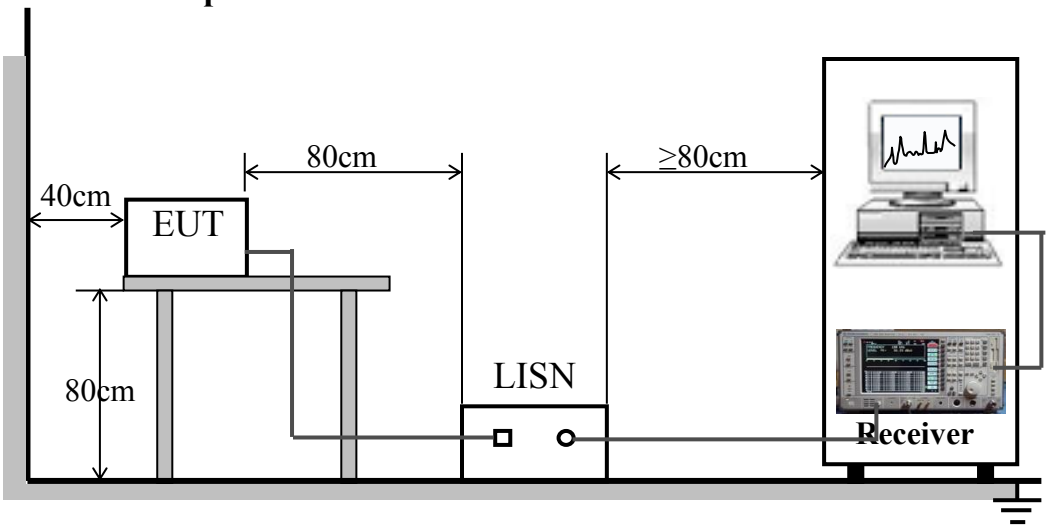
a) The limit decreases linearly with the logarithm of the frequency in therange 0.05 MHz to 0.5 MHz.

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

4.1.2 Test Procedure

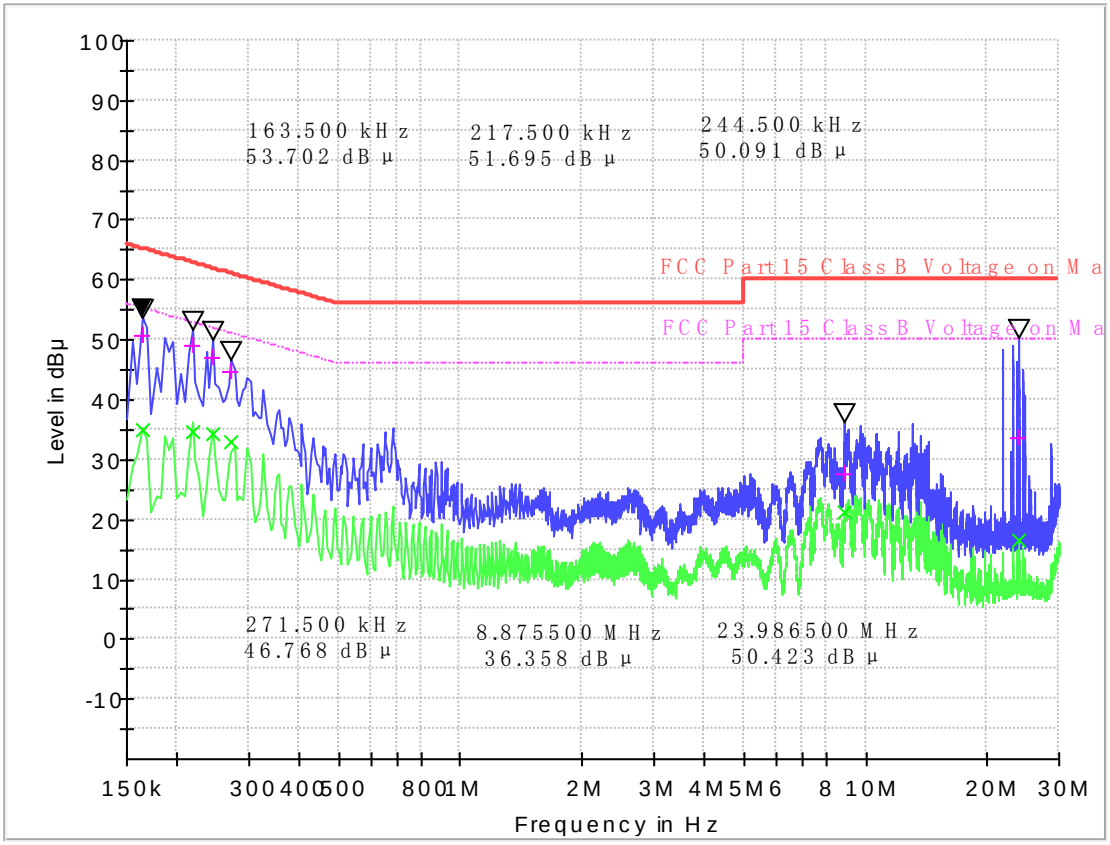
The EUT is placed on a 0.8m high insulating table, which stands on the grounded conducting floor, and keeps 0.4m away from the grounded conducting wall. The EUT is connected to the power mains through a LISN which provides 50Ω/50μH of coupling impedance for the measuring instrument. The Common Antenna 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:

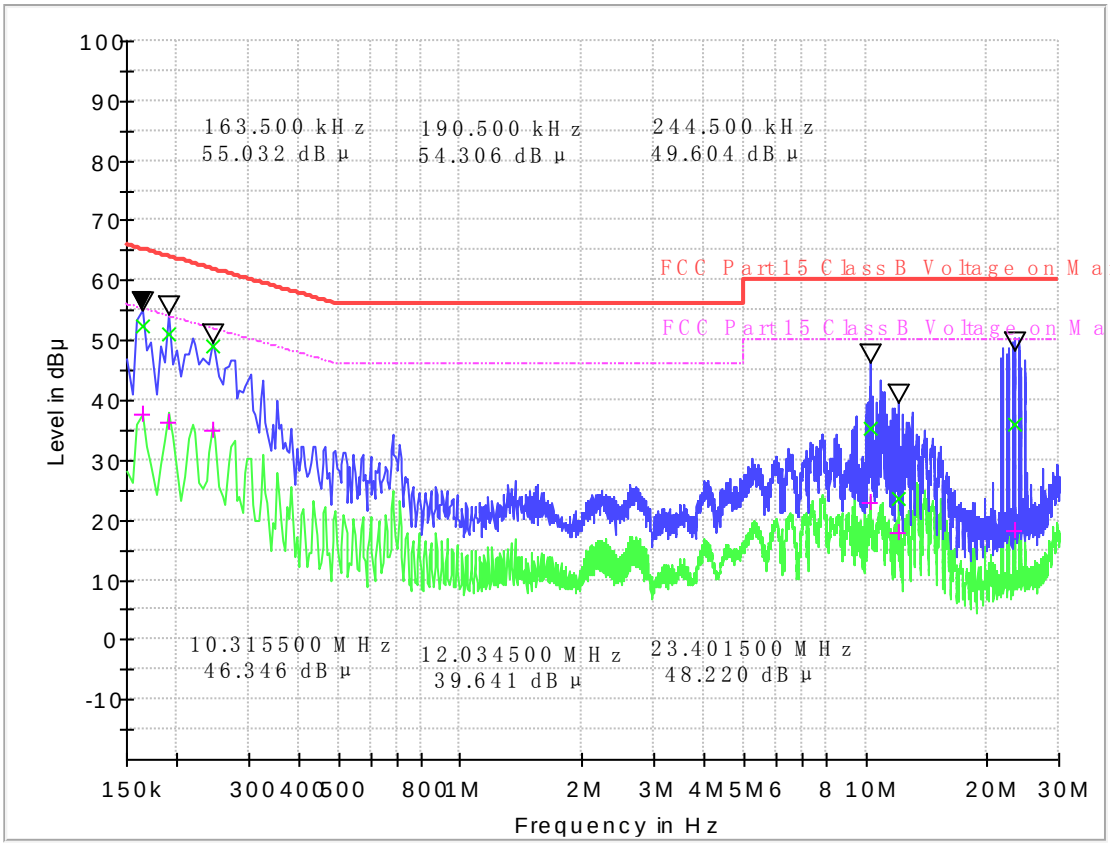
Mains terminal disturbance voltage, Setup1,L phase



(Plot A: L Phase)

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Cabel Loss (dB)	Corr. (dB)	Margin - QPK	Limit - QPK	Margin - AV	Limit - AV (dBµV)
0.163500	50.57	34.85	0.1	10.3	14.71	65.3	20.43	55.3
0.217500	48.99	34.72	0.1	10.3	13.92	62.9	18.19	52.9
0.244500	47.20	34.40	0.2	10.3	14.74	61.9	17.54	51.9
0.271500	44.76	32.97	0.2	10.3	16.31	61.1	18.10	51.1
8.875500	27.65	21.36	0.2	10.5	32.35	60.0	28.64	50.0
23.98650	33.48	16.68	0.3	11.7	26.52	60.0	33.32	50.0

Mains terminal disturbance voltage, Setup 1, N phase



(Plot B: N Phase)

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Cabel Loss (dB)	Corr. (dB)	Margin - QPK	Limit - QPK	Margin - AV	Limit - AV (dBµV)
0.163500	52.38	37.49	0.1	10.2	12.90	65.3	17.79	55.3
0.190500	50.97	36.19	0.2	10.3	13.04	64.0	17.82	54.0
0.244500	48.94	34.86	0.2	10.3	13.00	61.9	17.08	51.9
10.31550	35.36	22.84	0.3	10.6	24.64	60.0	27.16	50.0
12.03450	23.61	17.76	0.2	10.7	36.39	60.0	32.24	50.0
23.40150	36.04	18.28	0.2	11.6	23.96	60.0	31.72	50.0

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:

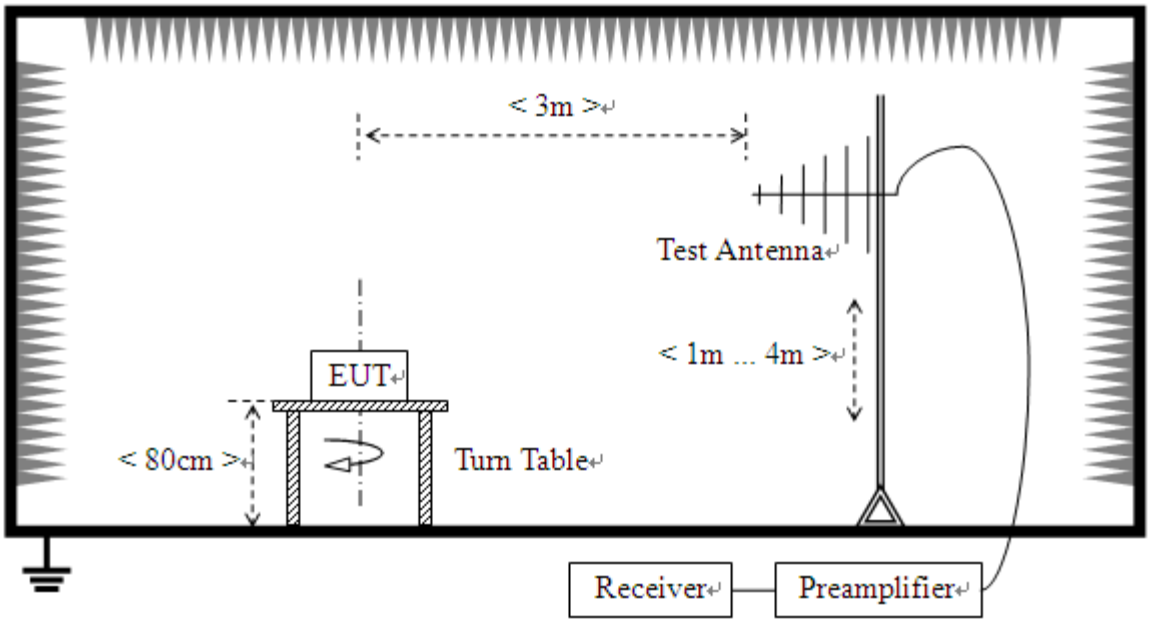
RF Power generated by equipment(watts)	Field strength limit(uV/m) @300m
Below 500	25
500or more	25*SQRT(power/500)

Power =808.26W

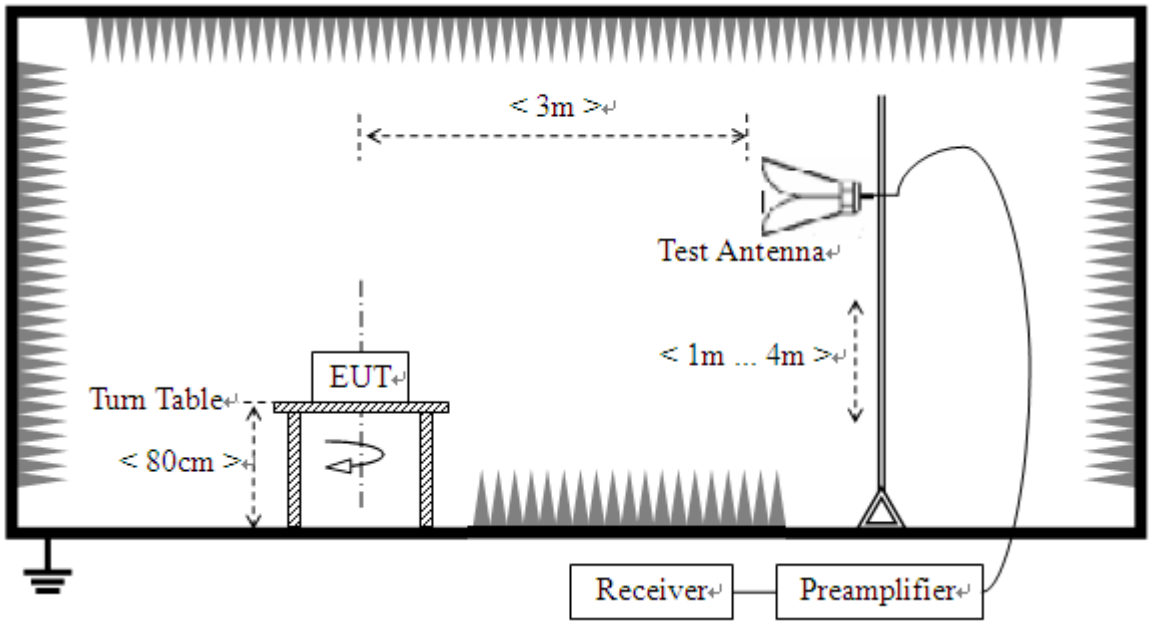
Limit=20lg(25*SQRT(power/500))+20lg(300/3) @ 3m distance.

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.

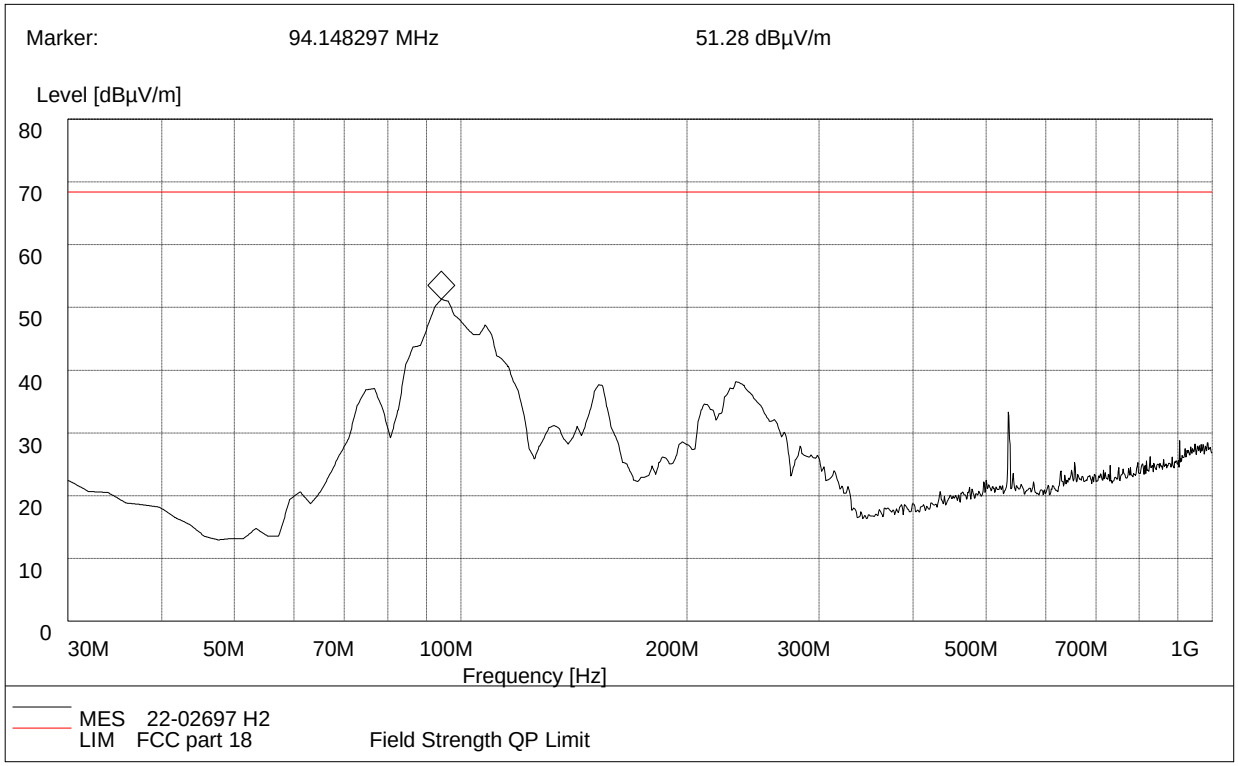
e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.

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:

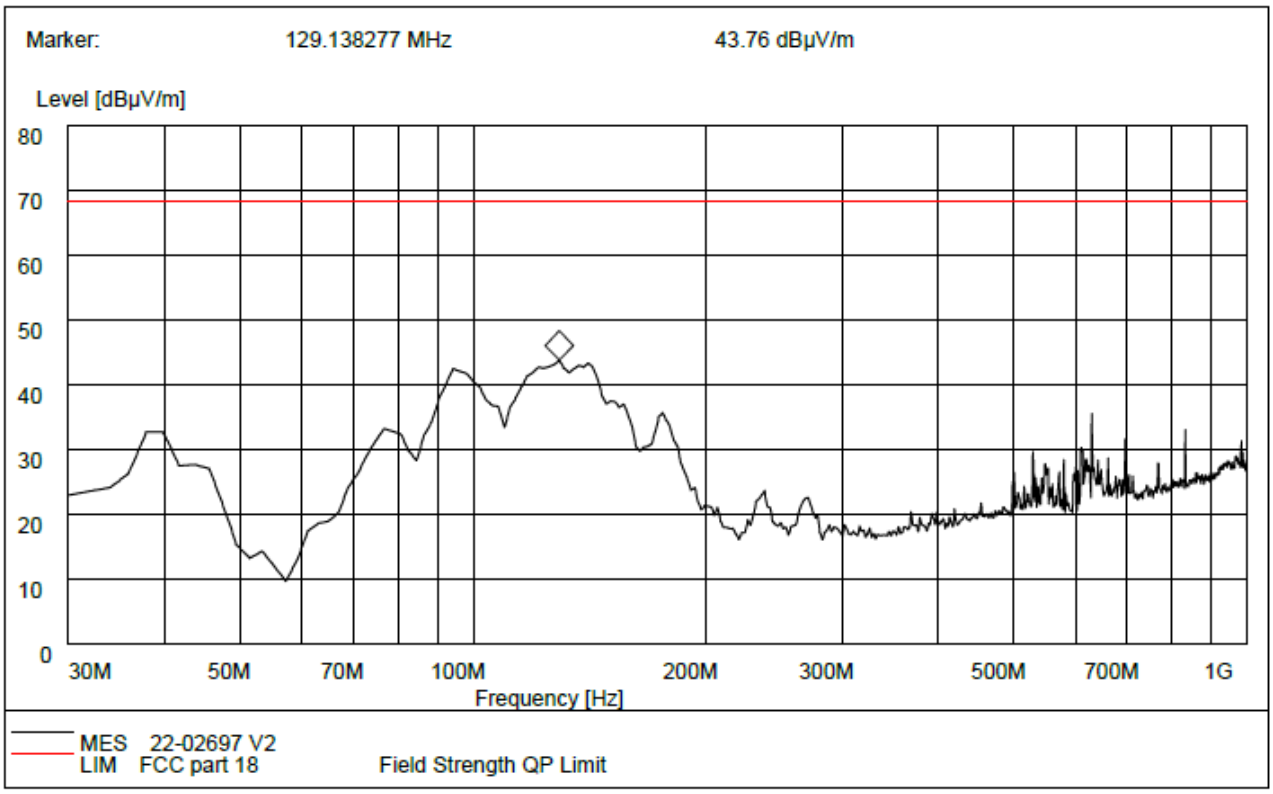
Radiation disturbances, antenna polarization:Setup1,Horizontal



(Plot A: Test Antenna Vertical30M - 1G)

Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dBµV/m)	Margin (dB)	Antenna	Verdict
76.65	30.14	120.000	100.0	70.04	39.90	Horizontal	Pass
94.14	48.40	120.000	100.0	70.04	21.64	Horizontal	Pass
107.75	46.57	120.000	100.0	70.04	23.47	Horizontal	Pass
152.45	35.33	120.000	100.0	70.04	34.71	Horizontal	Pass
236.05	36.81	120.000	100.0	70.04	33.23	Horizontal	Pass
269.09	28.45	120.000	100.0	70.04	41.59	Horizontal	Pass

Radiation disturbances, antenna polarization:Setup1,Vertical



(Plot B: Test Antenna Horizontal30M - 1G)

Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dBµV/m)	Margin (dB)	Antenna	Horizontal
39.14	30.27	120.000	100.0	70.04	39.77	Vertical	Pass
94.23	38.08	120.000	100.0	70.04	31.96	Vertical	Pass
129.13	42.19	120.000	100.0	70.04	27.85	Vertical	Pass
140.80	42.15	120.000	100.0	70.04	27.89	Vertical	Pass
175.79	34.30	120.000	100.0	70.04	35.74	Vertical	Pass
76.65	30.57	120.000	100.0	70.04	39.47	Vertical	Pass

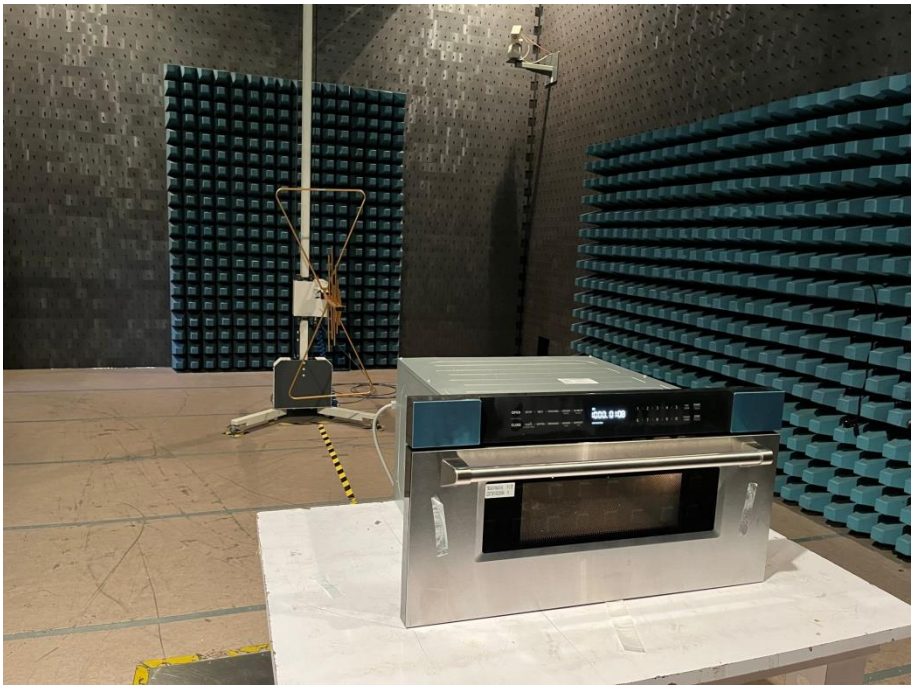
Above 1GHz, Setup1

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1187.04	61.20	-14.87	70.04	8.84	100	120	Horizontal
2	1233.80	58.51	-14.62	70.04	11.53	100	246	Horizontal
3	2436.85	58.83	-9.78	70.04	11.21	100	251	Horizontal
4	2636.65	51.94	-8.91	70.04	18.10	100	33	Horizontal
5	4239.30	52.38	-2.23	70.04	17.66	100	321	Horizontal
6	6687.92	58.32	2.21	70.04	11.72	100	81	Horizontal

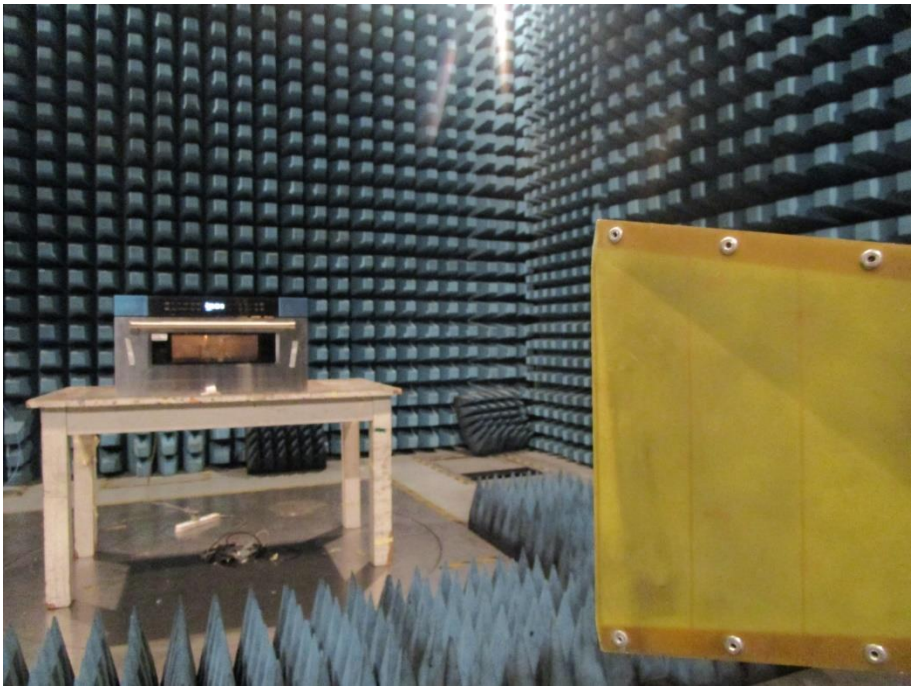
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1233.80	59.77	-14.62	70.04	10.27	100	149	Vertical
2	2067.01	46.80	-11.16	70.04	23.24	100	186	Vertical
3	2215.80	56.32	-10.82	70.04	13.72	100	33	Vertical
4	2356.08	54.38	-10.13	70.04	15.66	100	275	Vertical
5	4264.81	59.62	-1.95	70.04	10.42	100	182	Vertical
6	8660.41	56.25	3.89	70.04	13.79	100	75	Vertical

APPENDIX I：PHOTOGRAPHS OF EMC TEST CONFIGURATION

1. Radiated Emission Measurement below 1GHz



2. Radiated Emission Measurement above 1GHz

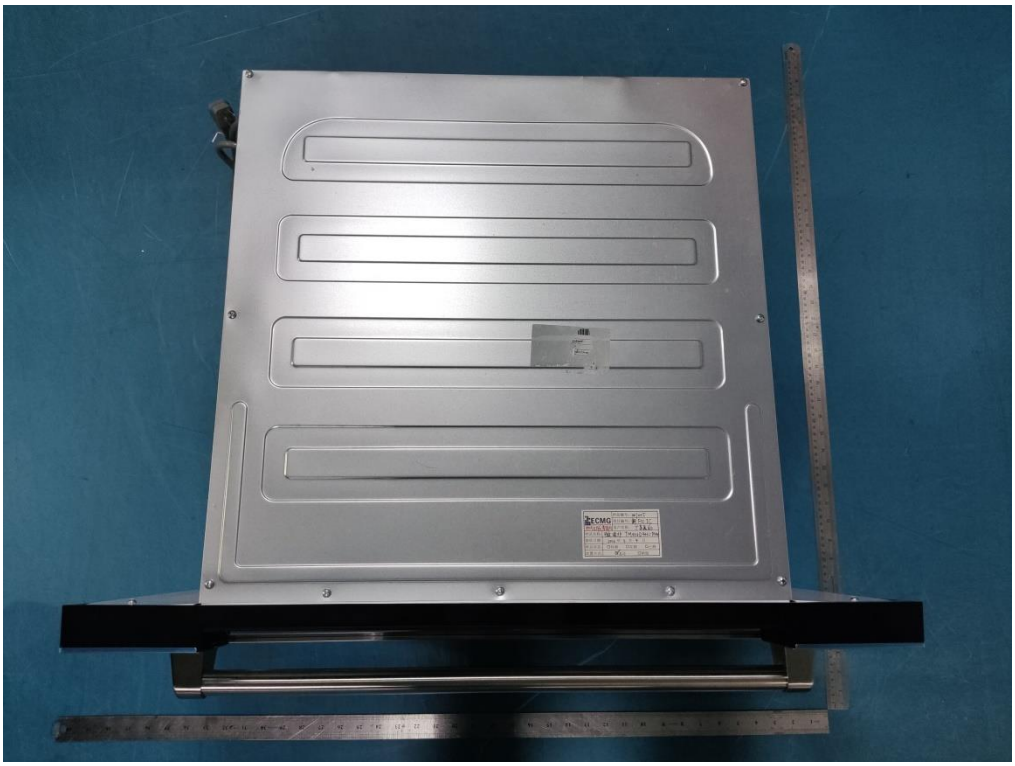


3. Conducted emission at AC mains input/output port Measurement

APPENDIX II: PHOTOGRAPHS OF PRODUCT PHOTO

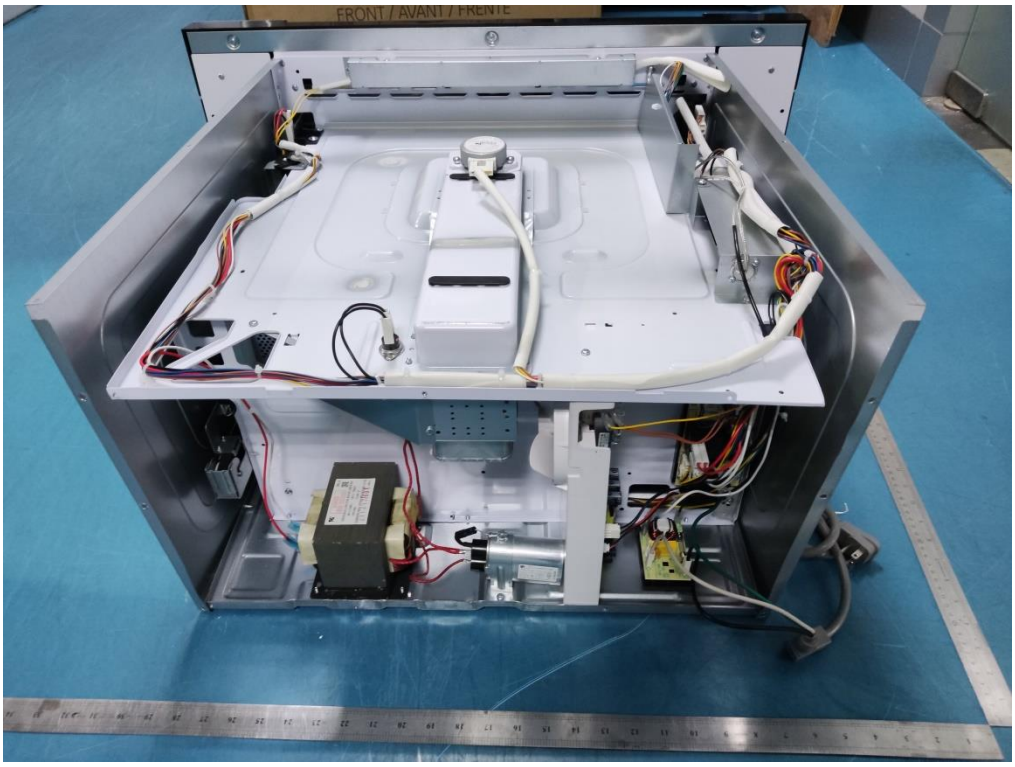
External Photo

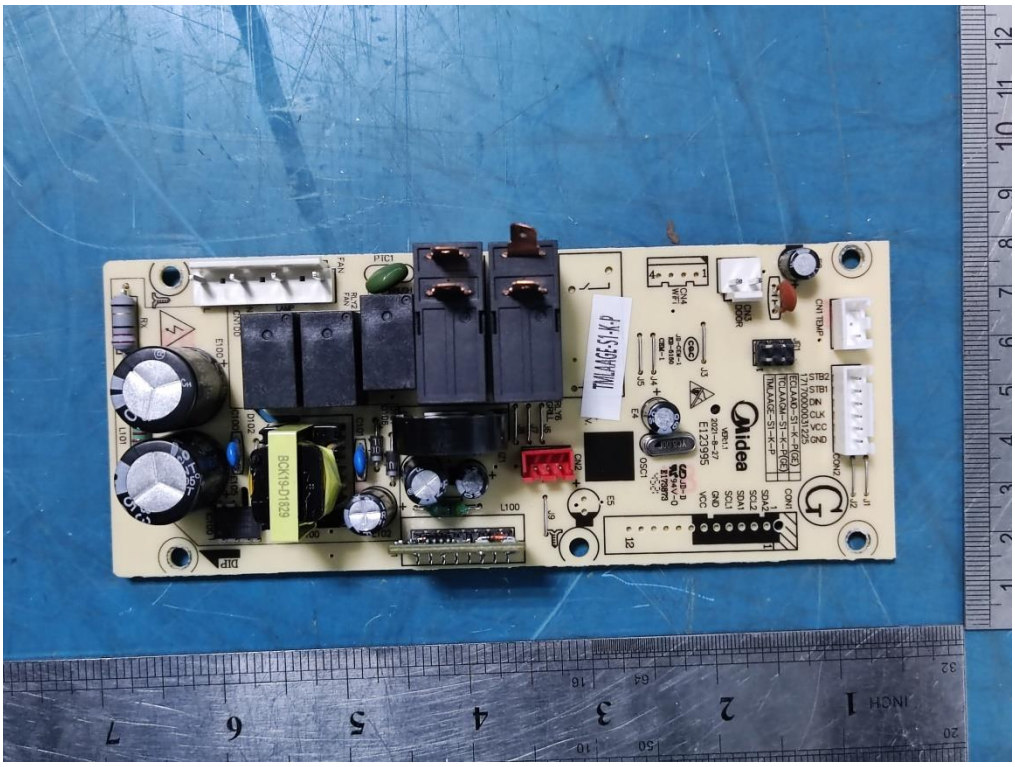

OVER-THE-RANGE OVEN /
HORNO PARA ENCIMA DEL FOGÓN /
FOUR À PLACER EN HAUTEUR

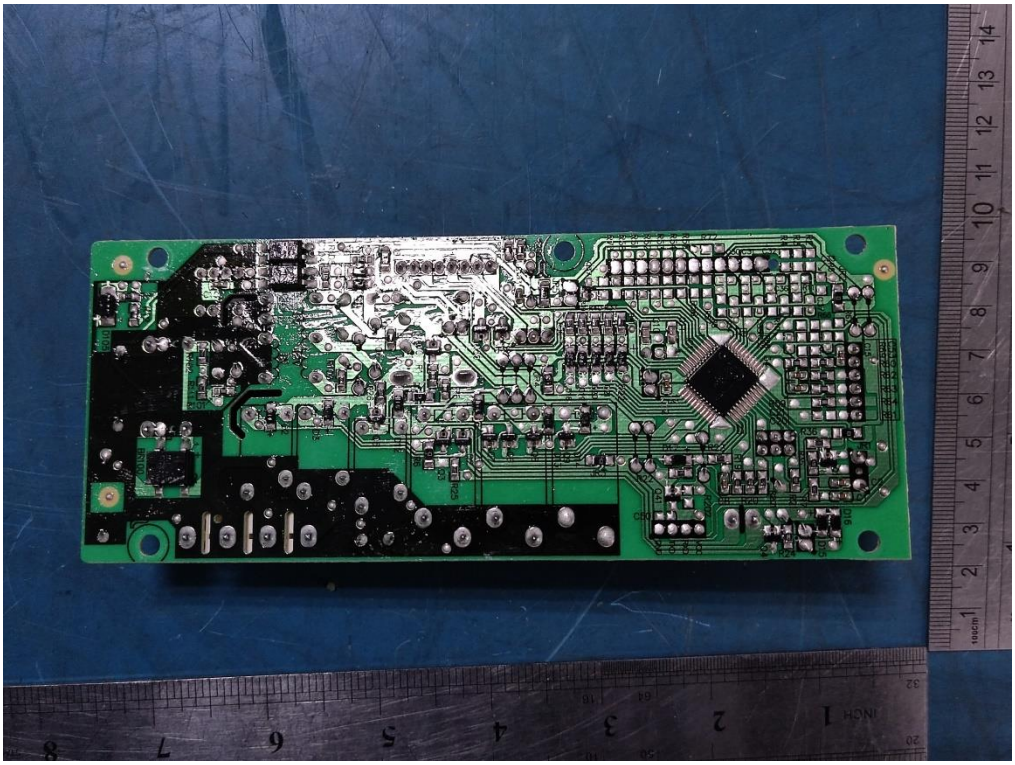


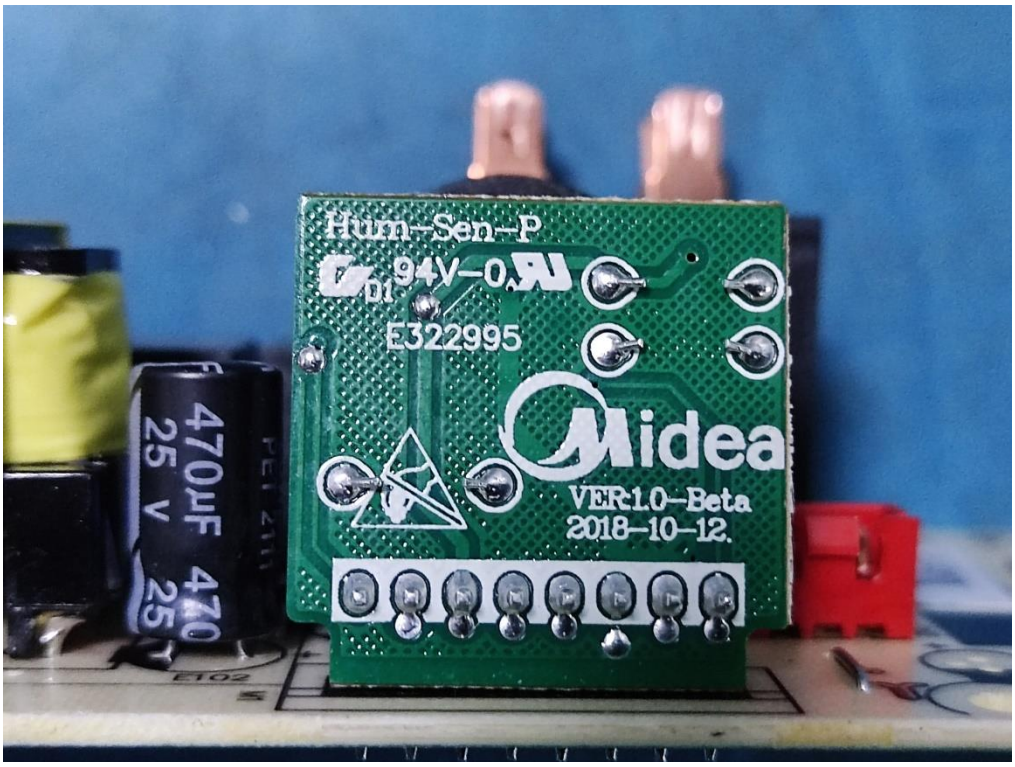

OPEN
CLOSE

Internal Photo





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Midea
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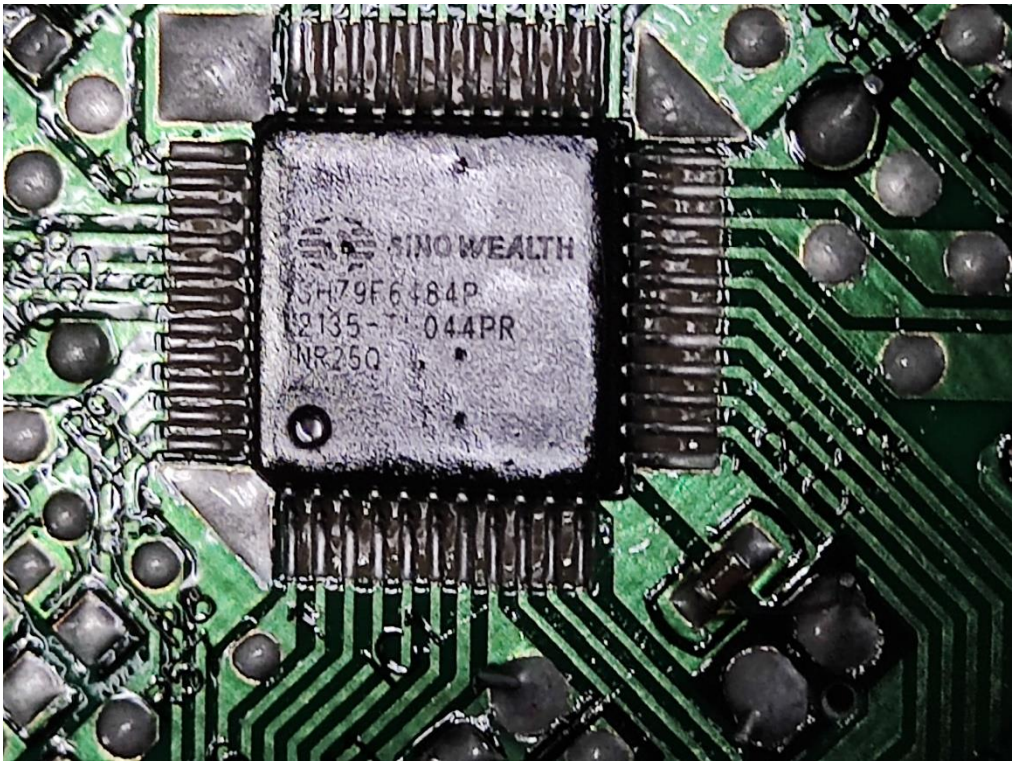
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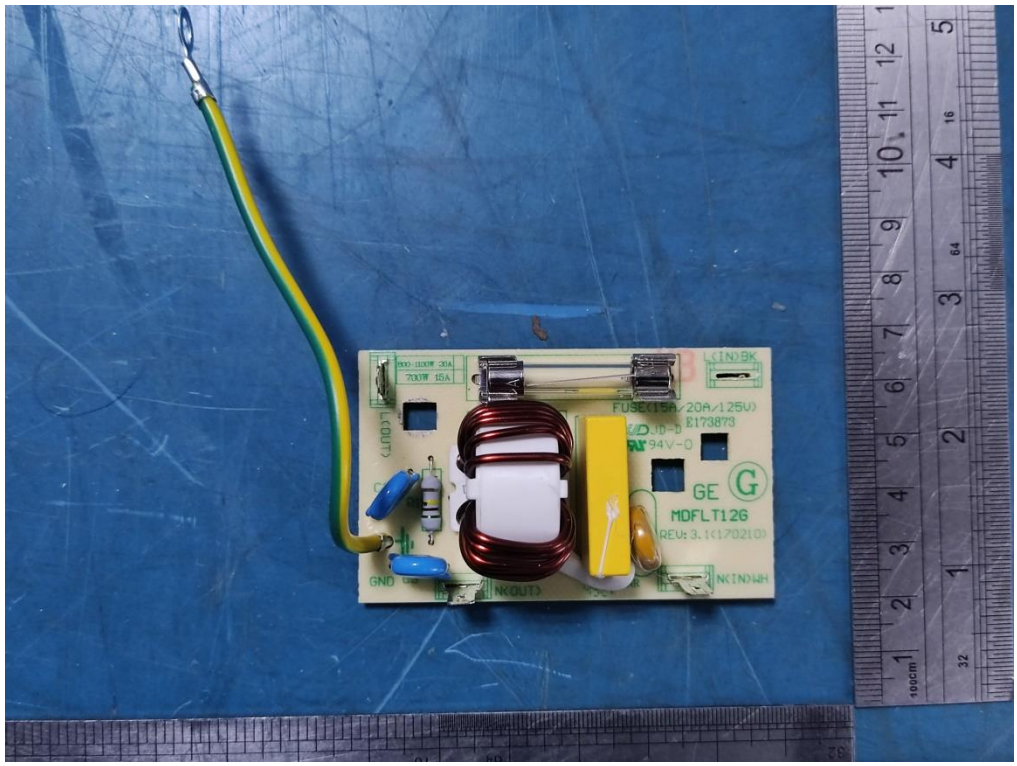
044PR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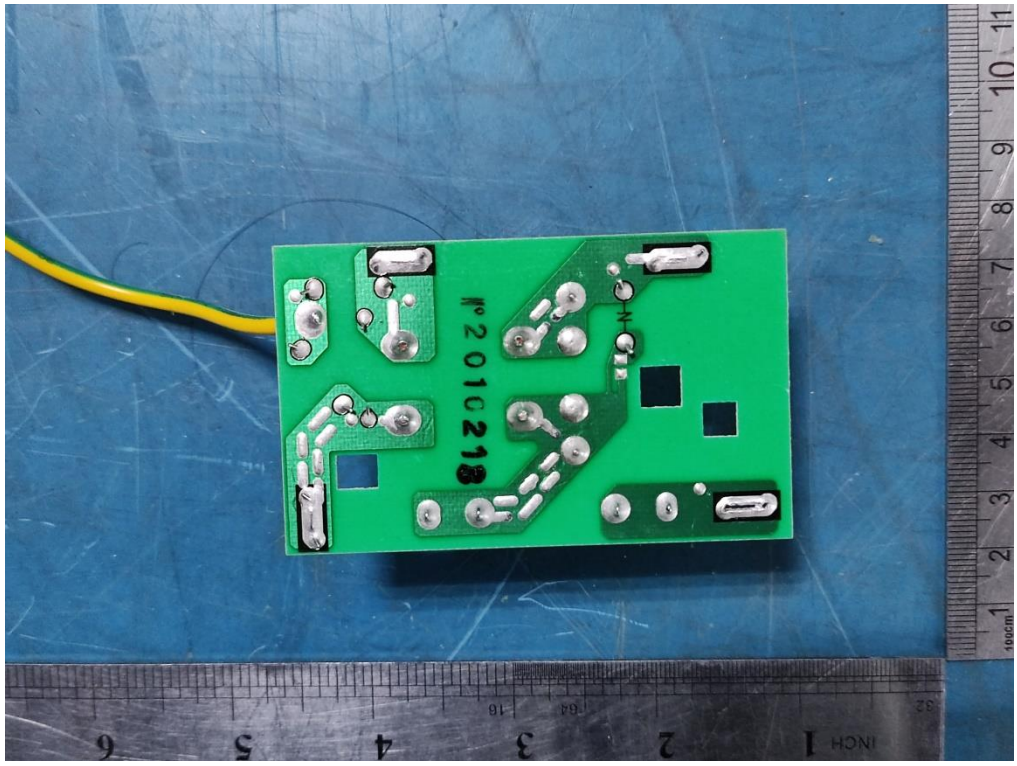
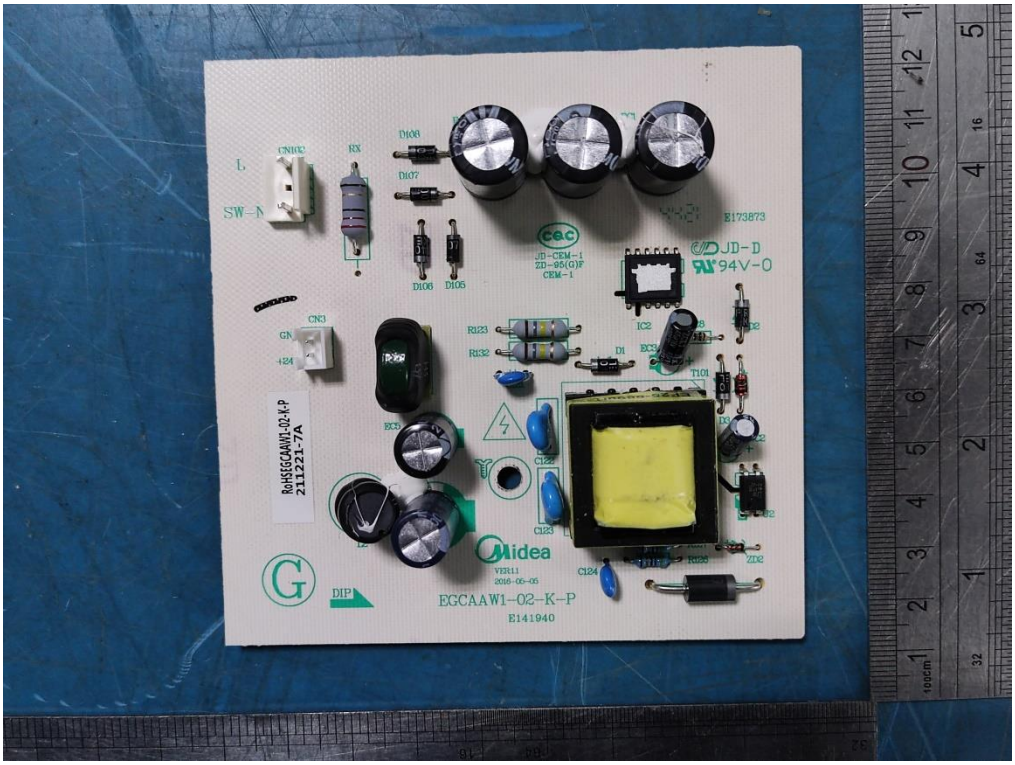
N(IN)WH

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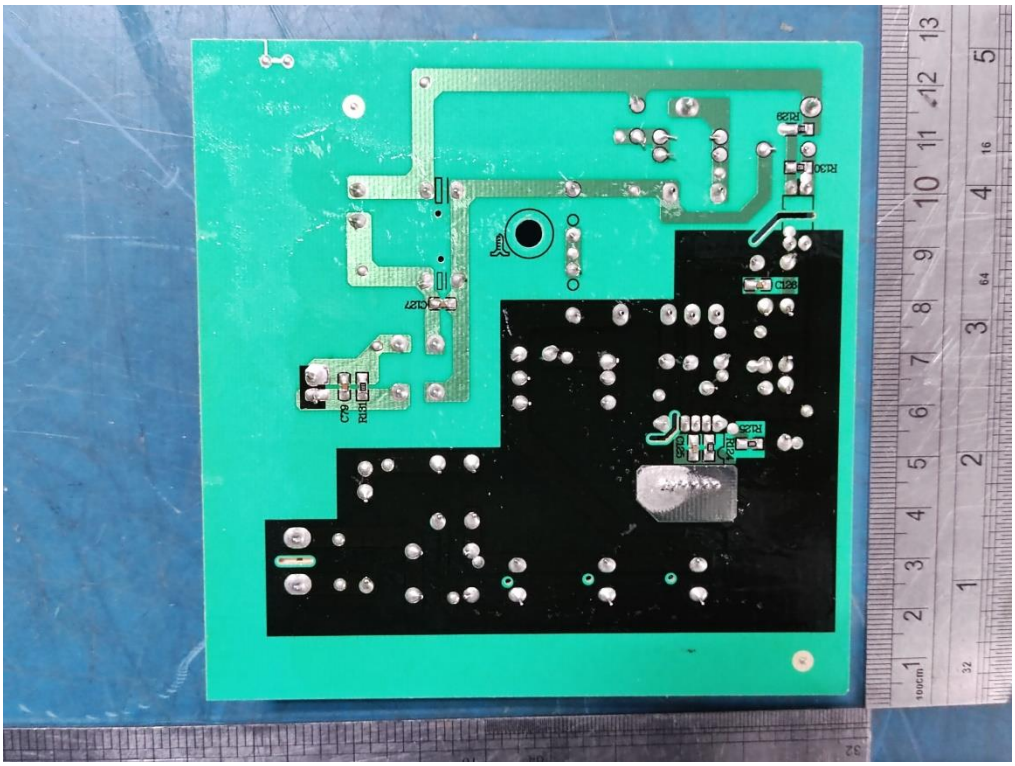
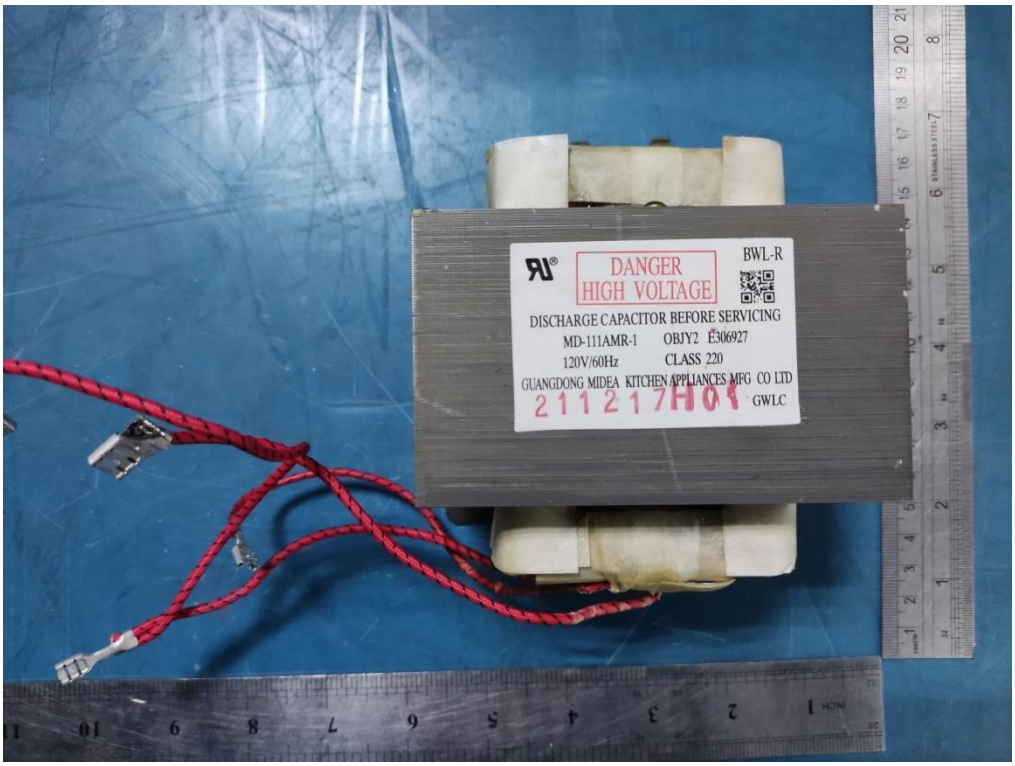
94V-0
Midea





※※※ End of Report ※※※