FCC PART 18TEST REPORT

Report No.:	SET2022-08618
Product Name:	Microwave Oven
Trade Name:	Midea
Model No.:	XM131AYY, XM131AYYY, XM131AYY-P(E), XM131AYYY-P(E), EM131A5C-YY, EM131A5C-YYY, EM131A5C-YYYY
FCC ID:	VG8XM131AYY
Applicant:	Guangdong Midea Kitchen Appliances Manufacturing Co., Ltd.
Received Date:	2022.06.27
Test Data:	2022.06.29-2022.07.06
Issued by:	CCIC Southern Testing Co., Ltd.
Lab Location:	Electronic Testing Building, No.43 Shahe Road, 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. .... XM131AYY, XM131AYYY, XM131AYY-P(E), XM131AYYY-P(E), EM131A5C-YY, EM131A5C-YYY, EM131A5C-YYYY

Trade name .... Midea

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 2022.07.06

Reviewed by .... Chris You

Chris You Senior Engineer 2022.07.06

Approved by .... Shuangwen Zhang

2022.07.06

Shuangwen Zhang, Manager

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Change History		
Issue	Date	Reason for change
1.0	2022.07.06	First edition

1. GENERAL INFORMATION

1.1 GENERAL DESCRIPTION OF EUT

EUT Name.............................:	Microwave Oven
Trade Name………………..:	Midea
Model………………………..:	XM131AYY, XM131AYYY, XM131AYY-P(E), XM131AYYY-P(E), EM131A5C-YY, EM131A5C-YYY, EM131A5C-YYYY model designations as follows: X= E or A; “E” stands for Film type keypad, “A” stands for Rotating type knob; M: indicates microwave function; 131: "1" indicates the microwave output power is 1100W, “31” indicates cavity capacity is 31 liters; A: indicates the design No.; YY/YYY/-YY/-YYY/-YYYY: “Y” = 0-9, A-Z or blank, indicates different appearance; -P(E): Indicates cavity type; The models of XM131AYY, XM131AYYY, XM131AYY-P(E), XM131AYYY-P(E), EM131A5C-YY, EM131A5C-YYY, EM131A5C-YYYY are identical to EM131A2SV-E except for model number and appearances. Model of EM131A2SV-E was selected for the final testing.
Power Supply ....:	120V AC/60Hz
Rated input Power(microwave):	1550W
Rated output Power(microwave):	1100W
Frequency ....:	2450MHz (Class B/Group 2)
Magnetron Model..................:	2M392J
Magnetron Manufacturer ....:	WITOL
Description of Support Units:	-Load for power output measurement: 1100 milliliters of water in the beaker located in the center of the oven. -Load for frequency measurement: 1100 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 770 and the other of 330 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: 770 milliliters of water, with the beaker located in the center of the oven.

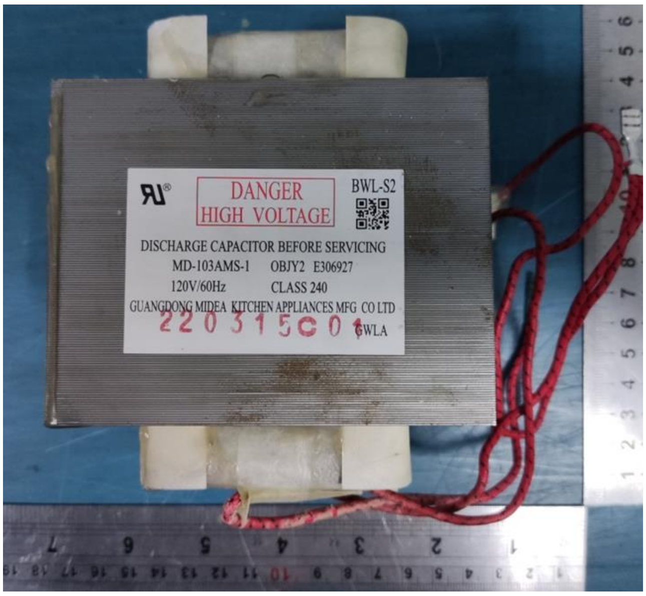
Note 1: The EUT have the following typical setups during the test:
Setup1: Microwave heating mode (According to FCC PART 18);

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

Note 3: This is an updated report based the original report #: "SET2020-08527" and which re-tested on June 29th, 2022 to July 6th, 2022. Differences between two reports as below:

- Difference for High-voltage transformer as below:

New high-voltage transformer



Original high-voltage transformer

Note: Difference only for model number, The new high-voltage transformer is MD-103AMS-1, the original is MD-103AMR-1.

- Added a plastic waveguide cover.

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	2022.06.24	2023.05.19
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	2022.05.23	2023.04.17
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.	ETC	1209	A150402241	2021.01.02	2024.01.01
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: 2433-2475MHz
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 1100mL 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 1100mL 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	2438.1-2484.3
Line Voltage	2446.1-2487.6

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 770mL 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 0.57 m W/cm^2Observed 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)
1100	280	20.3	9.7	31.2	120	850.64

Formula:

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

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:

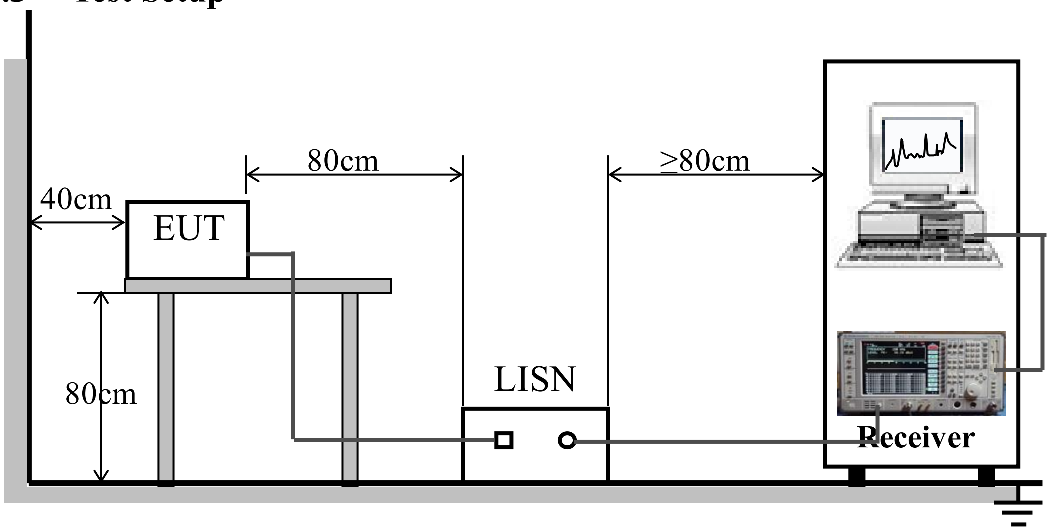
a) The limit decreases linearly with the logarithm of the frequency in therange 0.05 MHz to 0.5 MHz.

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

4.1.2 Test Procedure

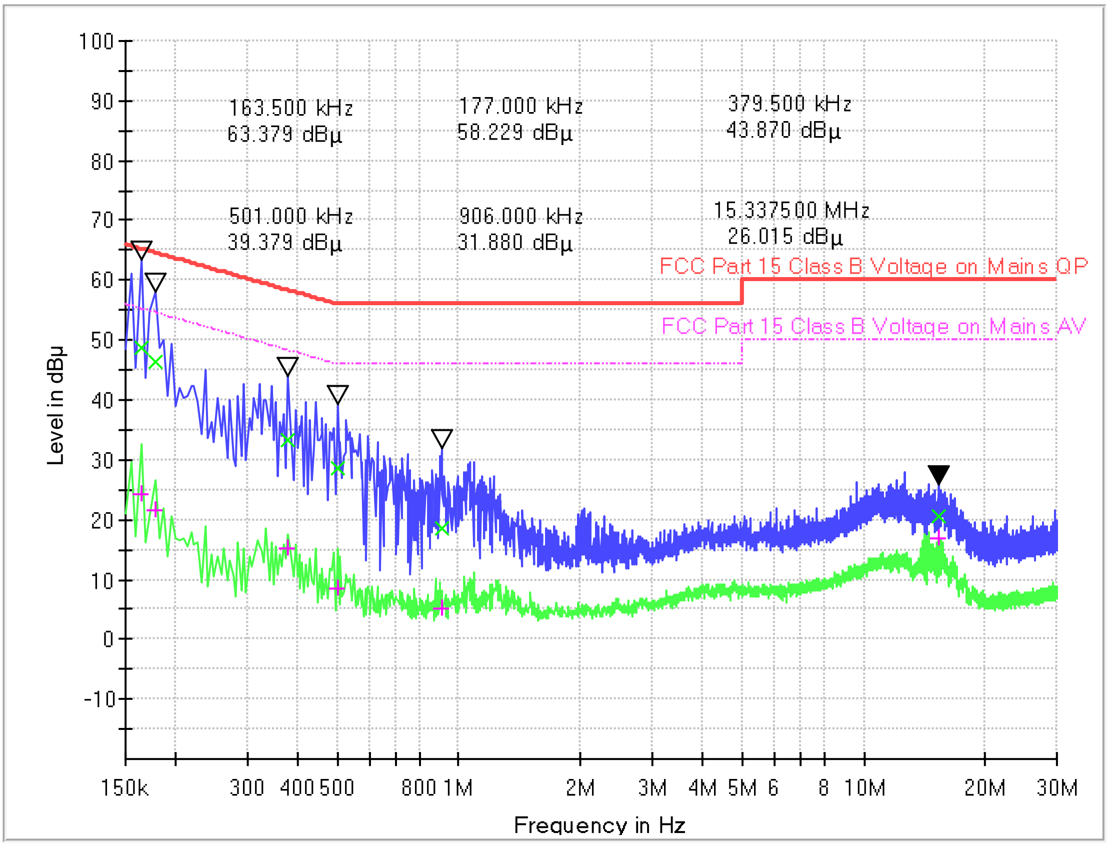
The EUT is placed on a 0.8m high insulating table, which stands on the grounded conducting floor, and keeps 0.4m away from the grounded conducting wall. The EUT is connected to the power mains through a LISN which provides 50Ω/50µH of coupling impedance for the measuring instrument. The Common Antenna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

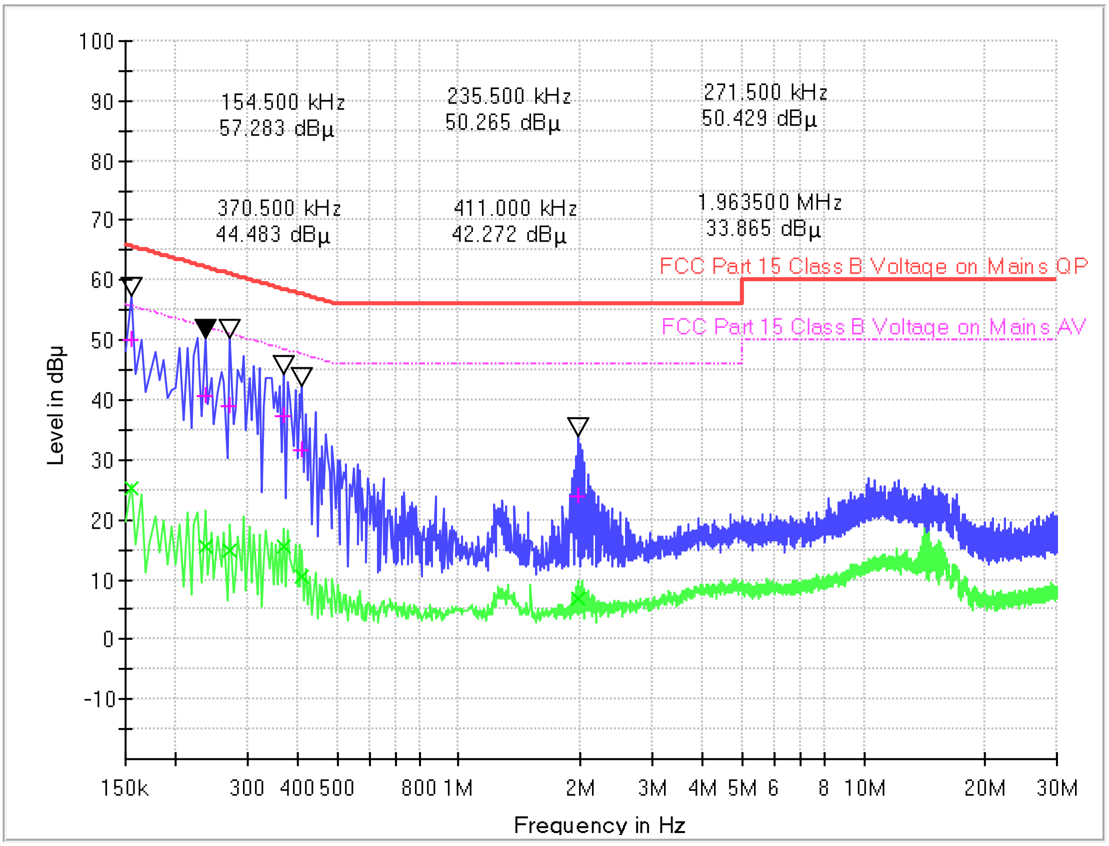
Mains terminal disturbance voltage, Setup1,L phase



(Plot A: L Phase)

Frequency (MHz)	Quasi Peak (dB µ V)	Average (dB µ V)	Cabel Loss (dB)	Corr. (dB)	Margin - QPK	Limit - QPK	Margin - AV	Limit - AV (dB µ V)
0.163500	48.75	24.29	0.1	10.3	16.53	65.3	30.99	55.3
0.177000	46.25	21.65	0.1	10.3	18.38	64.6	32.98	54.6
0.379500	33.27	15.18	0.1	10.3	25.02	58.3	33.11	48.3
0.501000	28.65	8.56	0.2	10.2	27.35	56.0	37.44	46.0
0.906000	18.61	5.10	0.1	10.2	37.39	56.0	40.90	46.0
15.33750	20.54	16.92	0.2	10.9	39.46	60.0	33.08	50.0

Mains terminal disturbance voltage, Setup 1, N phase



(Plot B: N Phase)

Frequency (MHz)	Quasi Peak (dB µ V)	Average (dB µ V)	Cabel Loss (dB)	Corr. (dB)	Margin - QPK	Limit - QPK	Margin - AV	Limit - AV (dB µ V)
0.154500	49.94	25.20	0.1	10.2	15.81	65.8	30.55	55.8
0.235500	40.64	15.59	0.1	10.3	21.61	62.3	36.66	52.3
0.271500	39.12	14.96	0.2	10.3	21.95	61.1	36.11	51.1
0.370500	37.39	15.38	0.2	10.3	21.10	58.5	33.11	48.5
0.411000	31.78	10.45	0.2	10.2	25.85	57.6	37.18	47.6
1.963500	23.94	6.65	0.3	10.2	32.06	56.0	39.35	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:

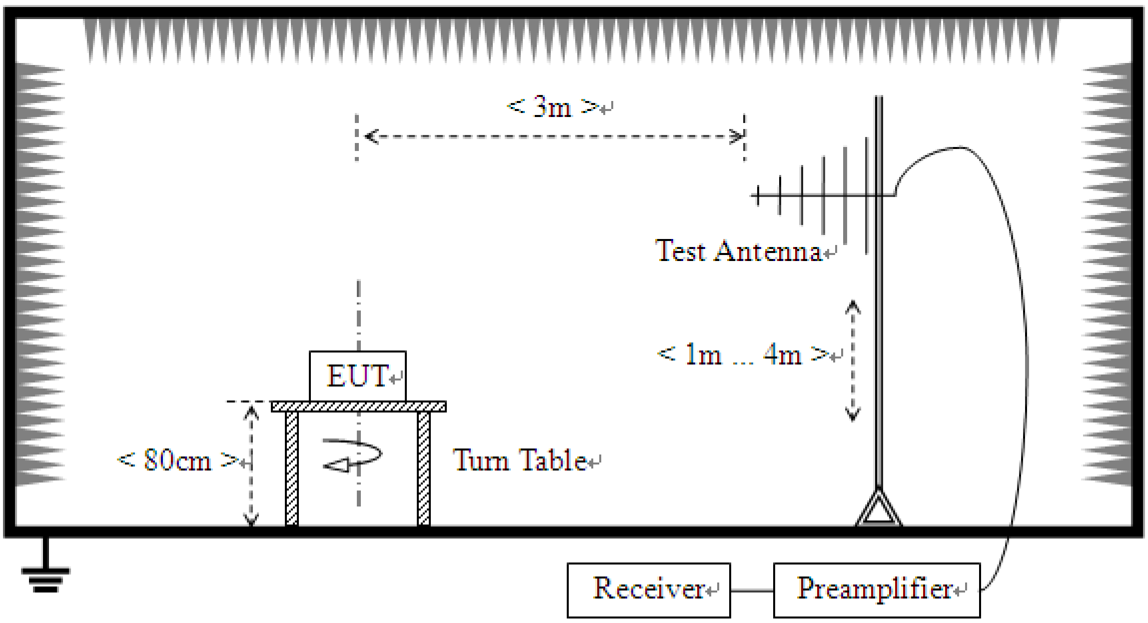
RF Power generated by equipment(watts)	Field strength limit(uV/m) @300m
Below 500	25
500or more	25*SQRT (power/500)

Power =850.64W

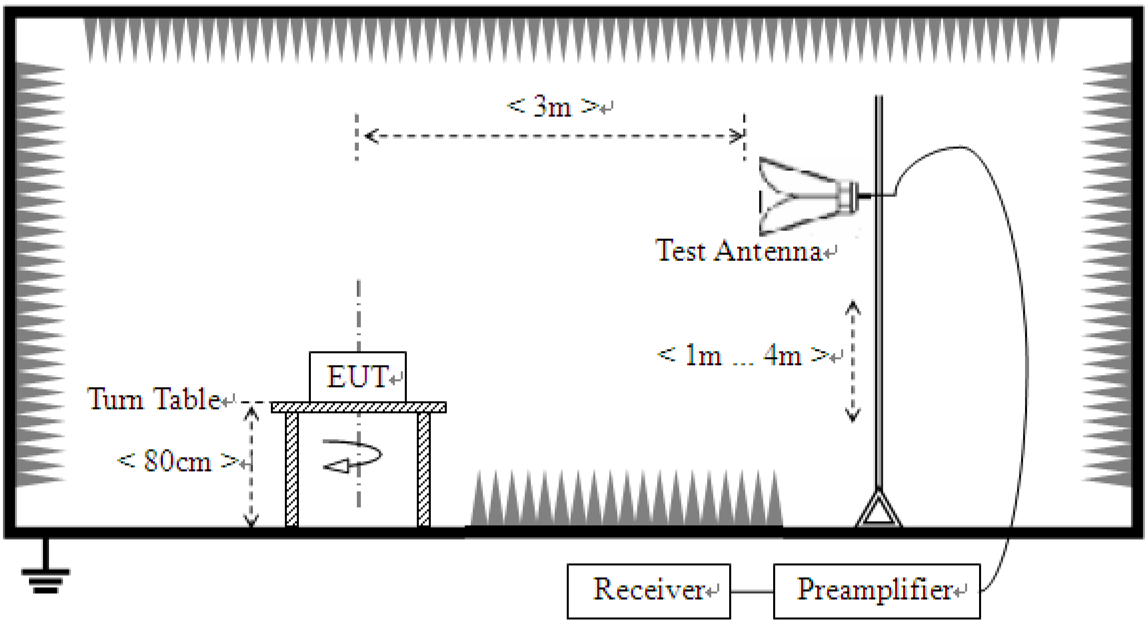
Limit=20lg (25*SQRT (power/500)) +20lg (300/3) @ 3m distance.

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.

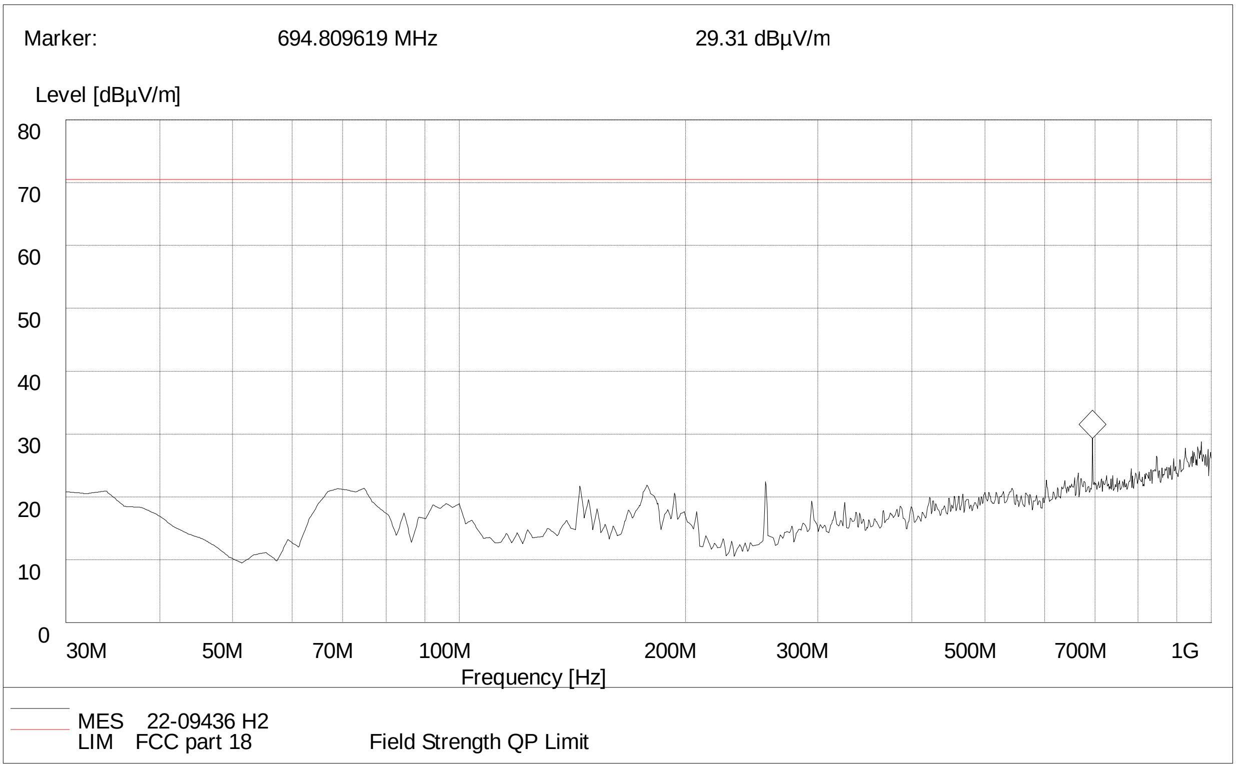
e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.

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:

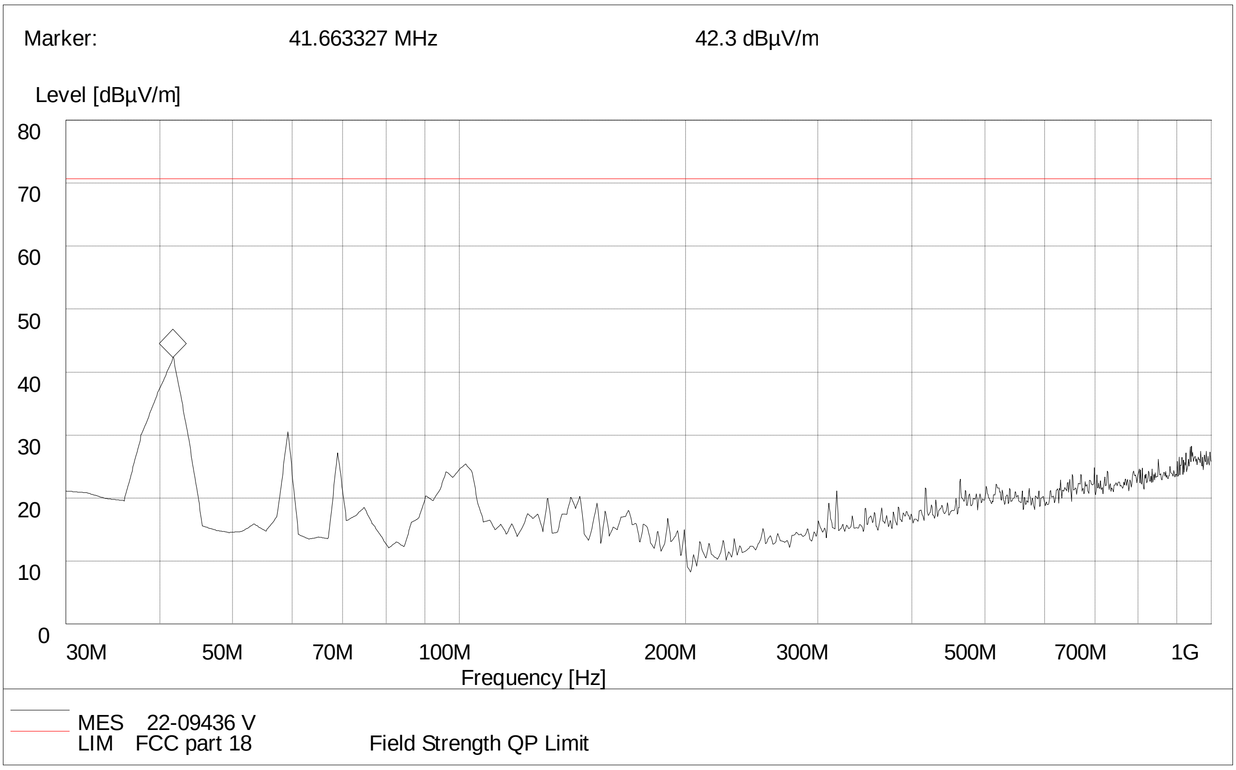
Radiation disturbances, antenna polarization: Setup1, Horizontal



(Plot A: Test Antenna Vertical30M - 1G)

Frequency (MHz)	Quasi Peak (dBµV/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dBµV/m)	Margin (dB)	Antenna	Verdict
32.59	20.16	120.000	100.0	70.27	50.11	Horizontal	Pass
68.23	21.02	120.000	100.0	70.27	49.25	Horizontal	Pass
144.42	21.00	120.000	100.0	70.27	49.27	Horizontal	Pass
177.73	20.64	120.000	100.0	70.27	49.63	Horizontal	Pass
255.63	21.13	120.000	100.0	70.27	49.14	Horizontal	Pass
694.40	28.63	120.000	100.0	70.27	41.64	Horizontal	Pass

Radiation disturbances, antenna polarization: Setup1, Vertical



(Plot B: Test Antenna Horizontal30M - 1G)

Frequency (MHz)	Quasi Peak (dBμV/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dBμV/m)	Margin (dB)	Antenna	Horizontal
41.43	42.66	120.000	100.0	70.27	27.61	Vertical	Pass
59.49	30.52	120.000	100.0	70.27	39.75	Vertical	Pass
68.29	26.29	120.000	100.0	70.27	43.98	Vertical	Pass
101.36	25.30	120.000	100.0	70.27	44.97	Vertical	Pass
144.71	20.51	120.000	100.0	70.27	49.76	Vertical	Pass
317.64	21.34	120.000	100.0	70.27	48.93	Vertical	Pass

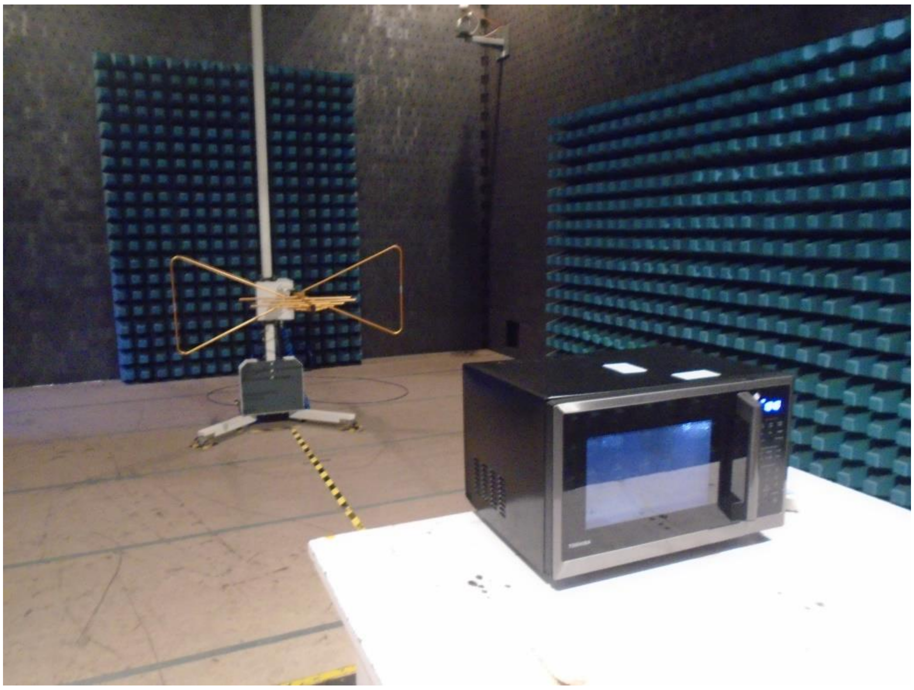
Above 1GHz, Setup1

NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2288.07	51.83	-11.62	70.27	18.44	100	274	Vertical
2	4881.22	62.39	-1.68	70.27	7.88	100	310	Vertical
3	5773.94	55.82	-1.08	70.27	14.45	100	249	Vertical
4	8044.01	59.33	3.25	70.27	10.94	100	137	Vertical
5	14735.1	62.55	8.03	70.27	7.72	100	331	Vertical
6	17183.7	57.94	10.10	70.27	12.33	100	224	Vertical

NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1748.18	45.95	-13.17	70.27	24.32	100	59	Horizontal
2	2458.11	58.54	-10.79	70.27	11.73	100	304	Horizontal
3	4813.20	56.72	-1.45	70.27	13.55	100	224	Horizontal
4	7032.25	52.82	2.07	70.27	17.45	100	139	Horizontal
5	9842.21	59.06	4.70	70.27	11.21	100	100	Horizontal
6	12286.5	59.91	5.82	70.27	10.36	100	64	Horizontal

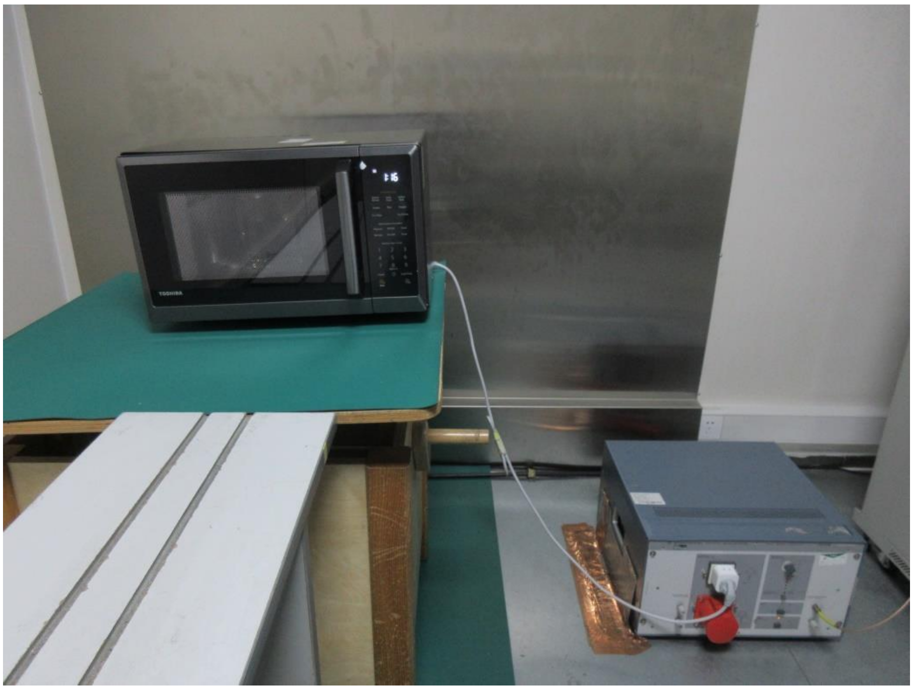
APPENDIX I：PHOTOGRAPHS OF EMC TEST CONFIGURATION

1. Radiated Emission Measurement below 1GHz



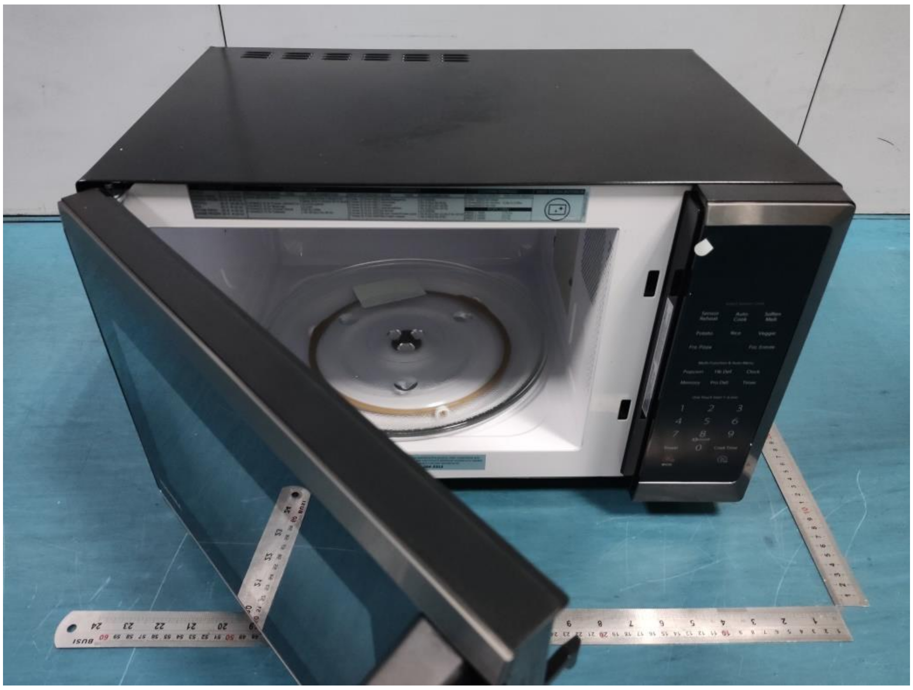
2. Radiated Emission Measurement above 1GHz

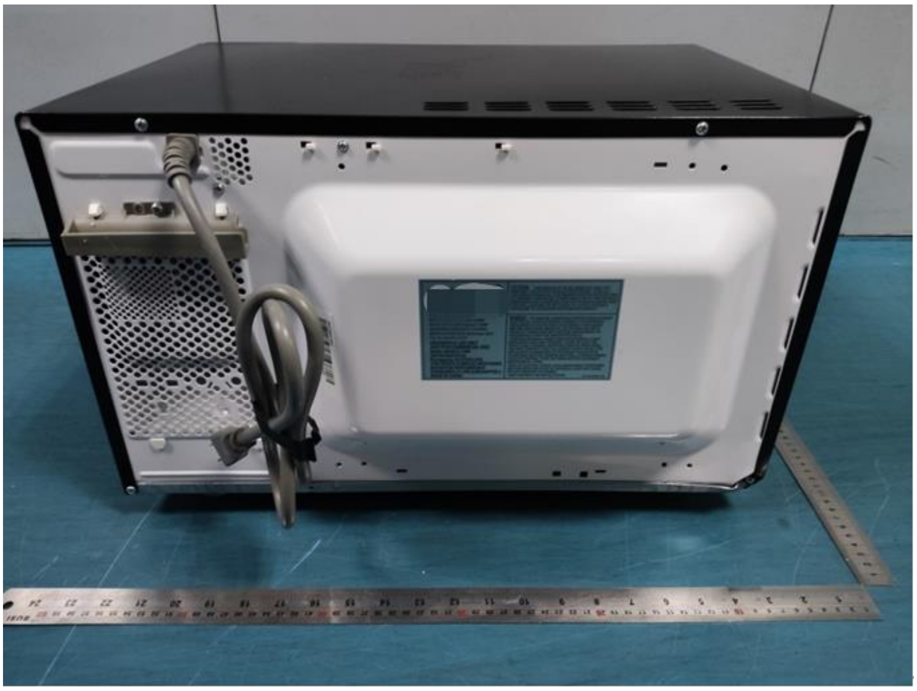
3. Conducted emission at AC mains input/output port Measurement

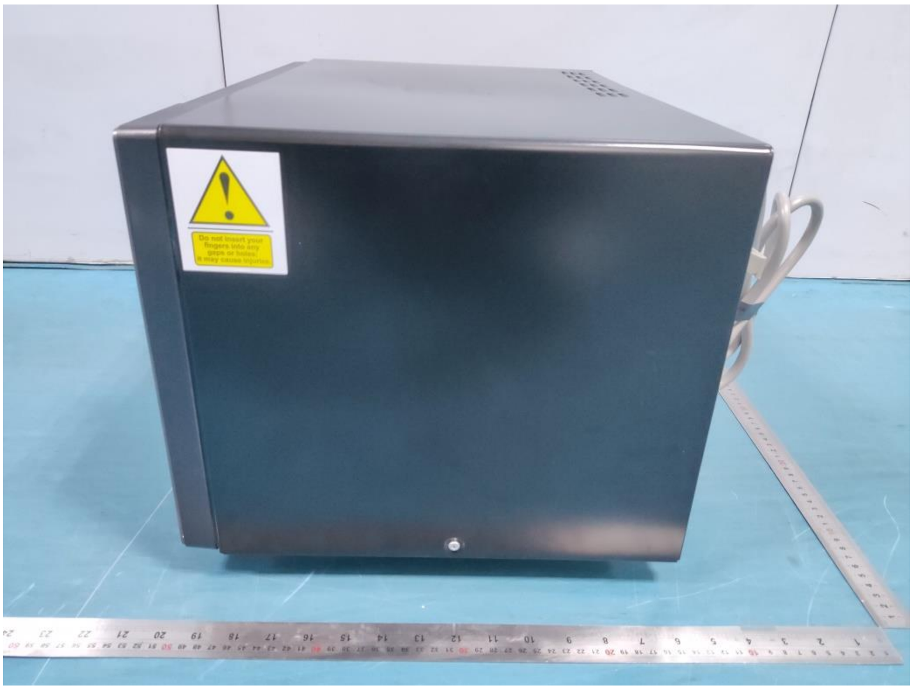


APPENDIX II: PHOTOGRAPHS OF PRODUCT PHOTO

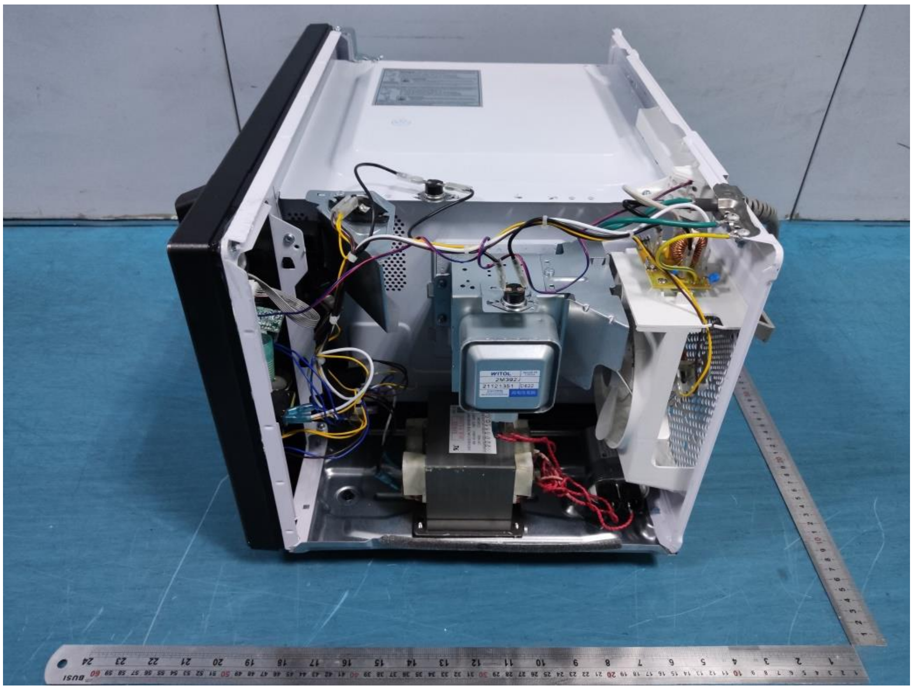
External Photo

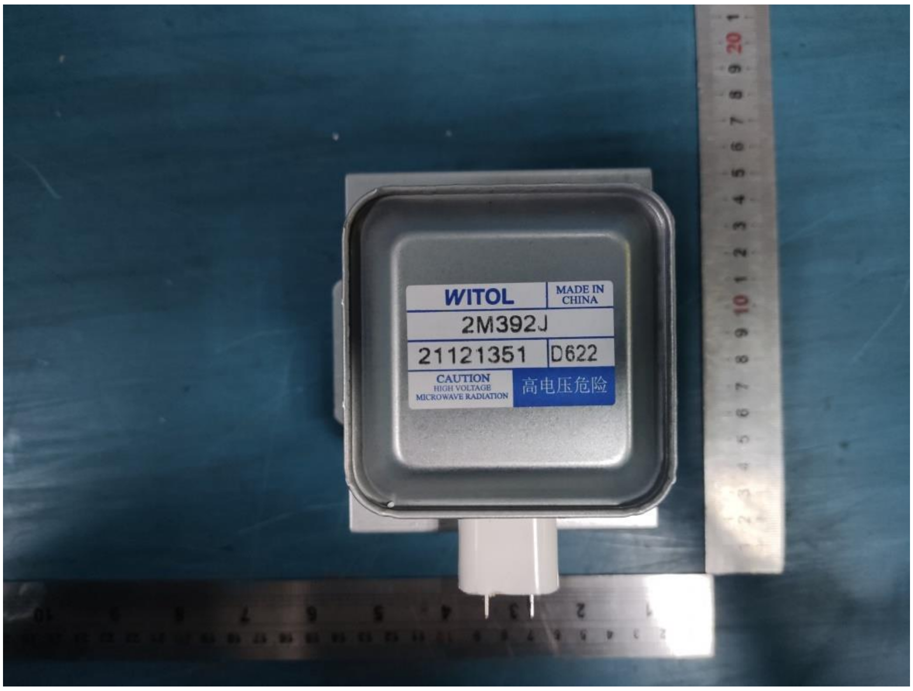


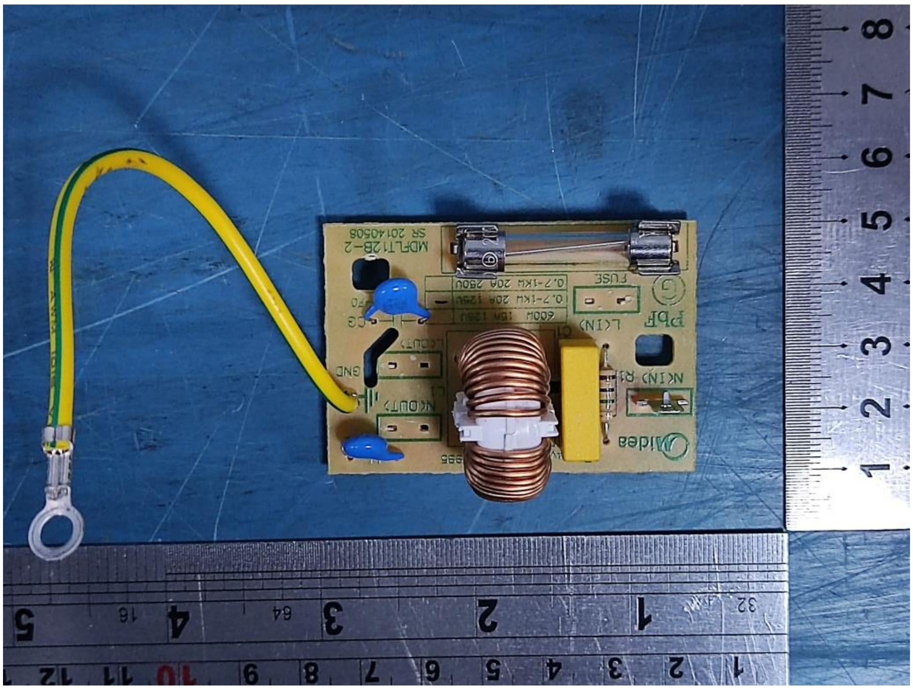


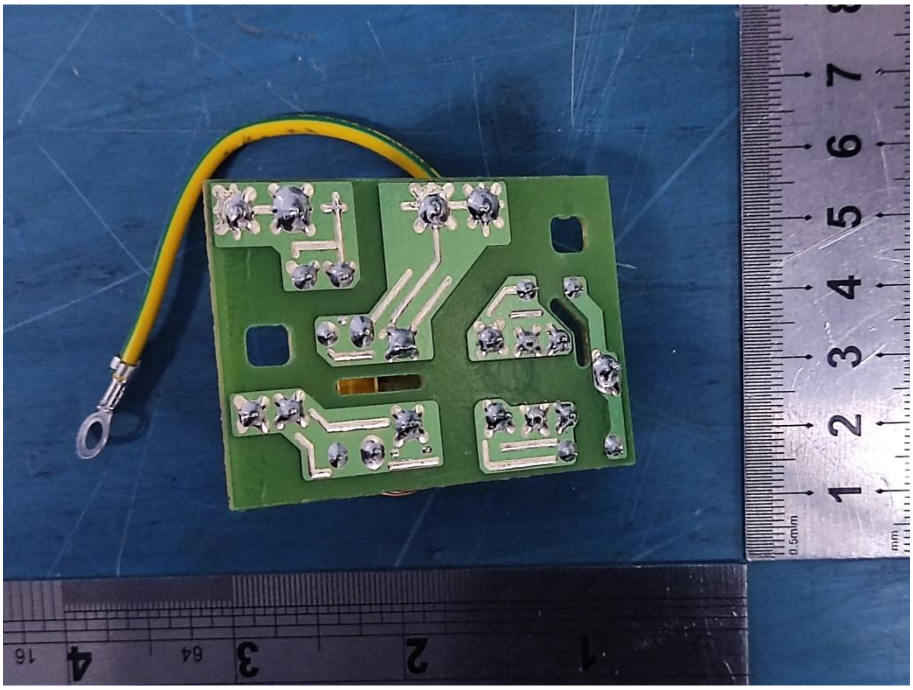


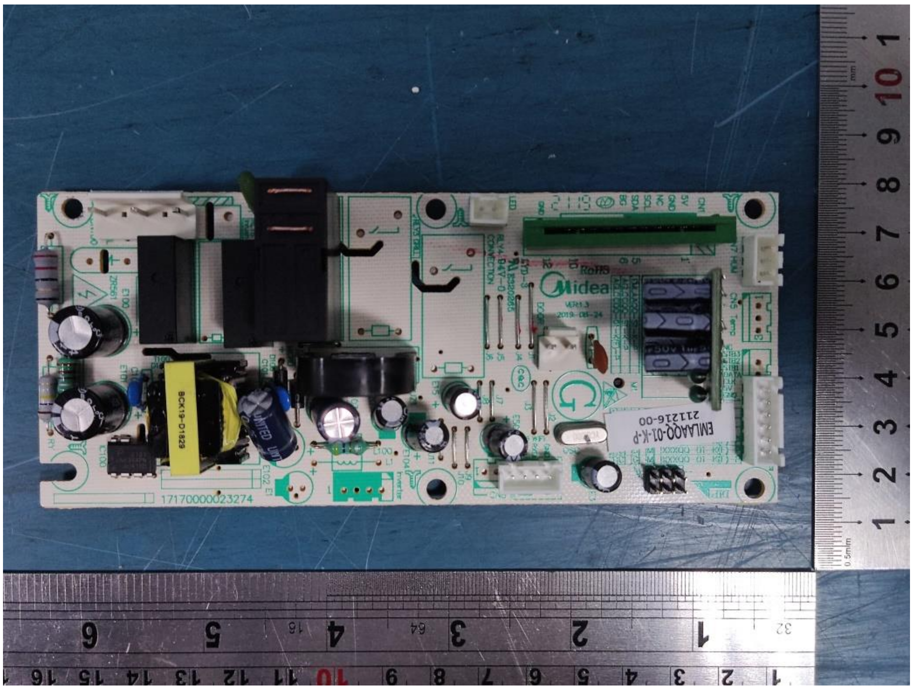
Internal Photo

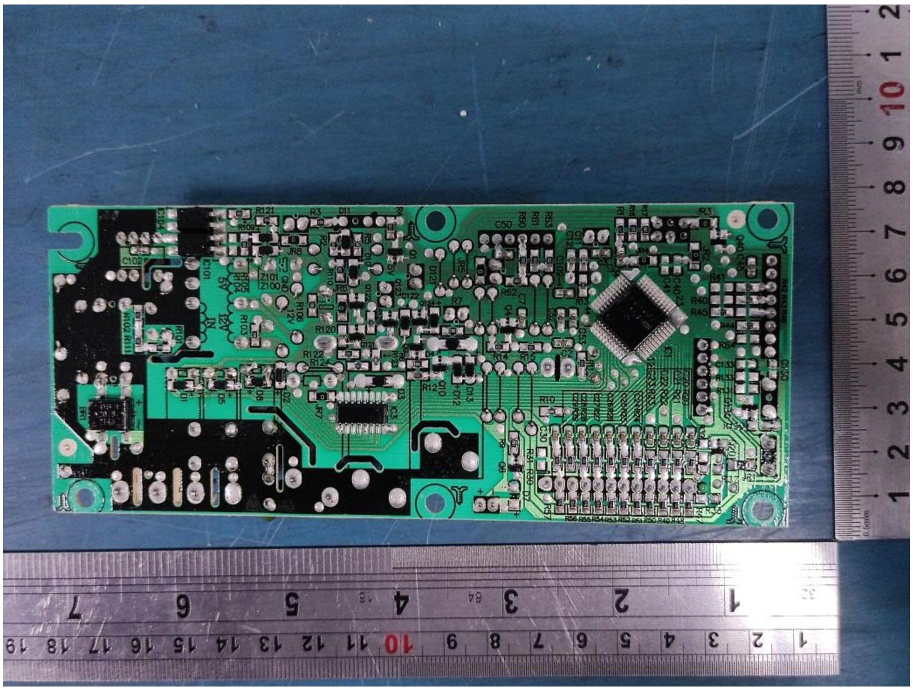


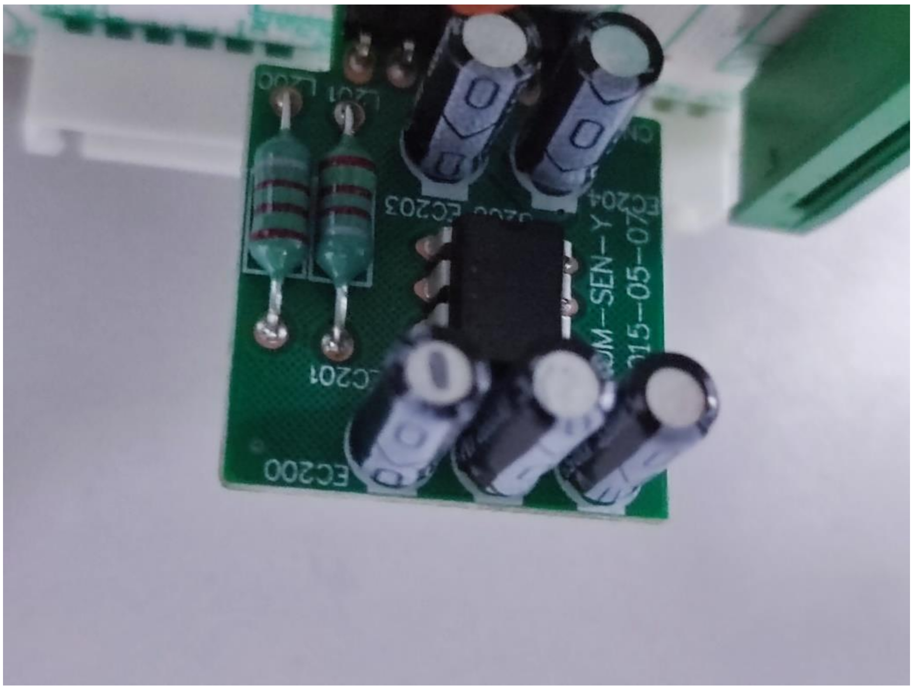


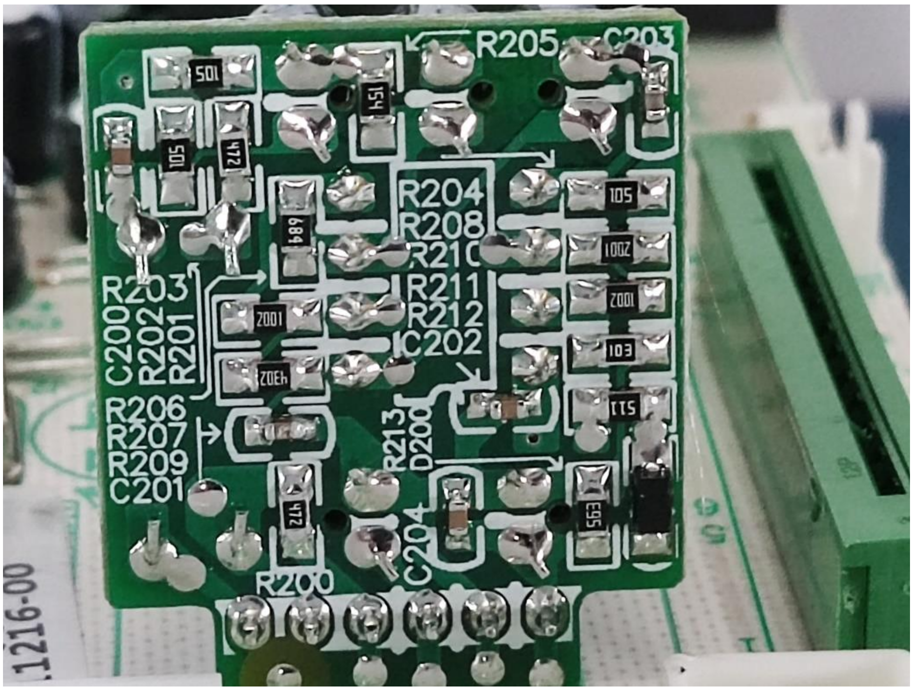








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R204
R208
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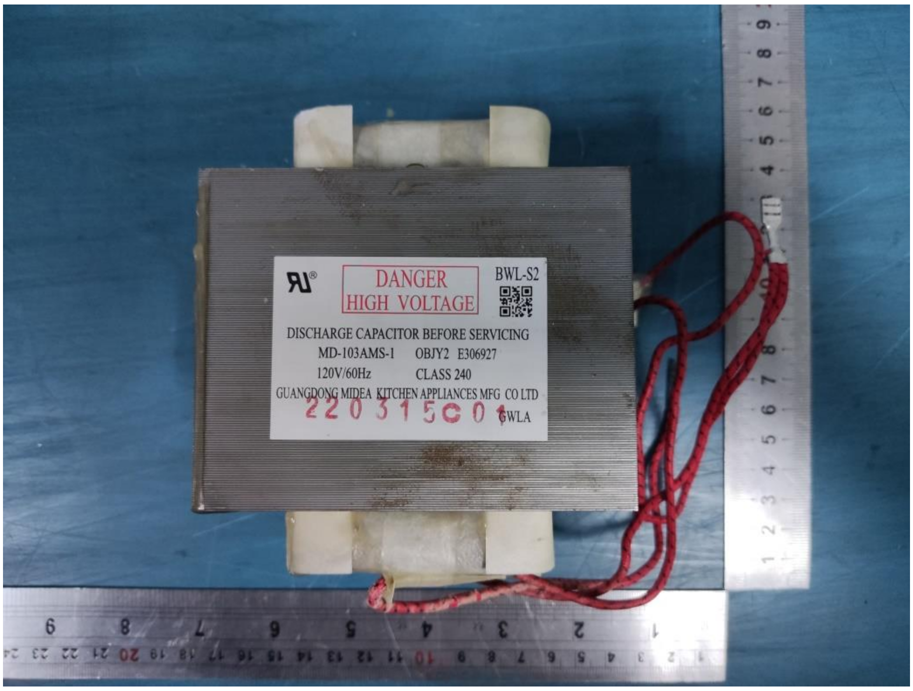

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