FCC Test Report

Report No.:	RWAP202400188A
Applicant:	Guangdong Midea Kitchen Appliances Manufacturing Co., Ltd
Address:	No.6, Yong An Road, Beijiao, Shunde, Foshan,Guangdong,China
Product Name:	Microwave oven
Product Model:	EC9P042BB-S
Multiple Models:	EC9P04##-S, EC9P04***-S
Trade Mark:	Midea
FCC ID:	VG8XC9P04YYKE
Standards:	FCC CFR Title 47 Part 18
Test Date:	2024-02-20 to 2024-02-21
Test Result:	Complied
Report Date:	2024-03-20

Reviewed by: **Approved by:**

Frank Yin
Project Engineer

Jacob Kong
Manager

Prepared by:

World Alliance Testing & Certification (Shenzhen) Co., Ltd

No. 1002, East Block, Laobing Building, Xingye Road 3012, Xixiang street, Bao'an District, Shenzhen, Guangdong, People's Republic of China

NVLAP TESTING NVLAP LAB CODE 600335-0

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3. This sample tested is in compliance with the limits of the above regulation.

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5. The information marked "#" is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report. Customer model name, addresses, names, trademarks etc. are included.

Revision History

Version No.	Issued Date	Description
00	2024-03-20	*Original*

Contents

1 General Information

1.1 Client Information

Applicant:	Guangdong Midea Kitchen Appliances Manufacturing Co., Ltd
Address:	No.6, Yong An Road, Beijiao, Shunde, Foshan,Guangdong,China
Manufacturer:	Guangdong Midea Kitchen Appliances Manufacturing Co., Ltd
Address:	No.6, Yong An Road, Beijiao, Shunde, Foshan,Guangdong,China

1.2 Product Description of EUT

The EUT is Microwave Over operate on 2450MHz ISM frequency Band.

Sample Serial Number	62-1 (assigned by WATC)
Sample Received Date	2024-02-19
Sample Status	Good Condition
Operating Frequency Range	2450MHz±50.0 MHz
Power Supply	AC 120V/60Hz
Microwave Rated Input Power#	1500W
Microwave Rated Output Power#	900W
Modification	Sample No Modification by the test lab

1.3 Related Submittal(s)/Grant(s)

No Related Submittal(s)/Grant(s)

1.4 Measurement Uncertainty

Parameter		Expanded Uncertainty (Confidence of 95%(U = 2Uc(y)))
AC Power Lines Conducted Emissions		±3.14dB
Radiated emission	Below 1GHz	±4.84dB
	Above 1GHz	±5.44dB
Frequency Error		150Hz

Note 1: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Note 2: The Decision Rule is based on simple acceptance with ISO Guide 98-4:2012 Clause 8.2 (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

1.5 Laboratory Location

World Alliance Testing & Certification (Shenzhen) Co., Ltd

No. 1002, East Block, Laobing Building, Xingye Road 3012, Xixiang street, Bao'an District, Shenzhen, Guangdong, People's Republic of China

Tel: +86-755-29691511, Email: qa@watc.com.cn

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 463912, the FCC Designation No. : CN5040.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0160.

1.6 Test Methodology

FCC CFR 47 Part 18

FCC OST MP-5-1986

2 Description of Measurement

2.1 Test Configuration

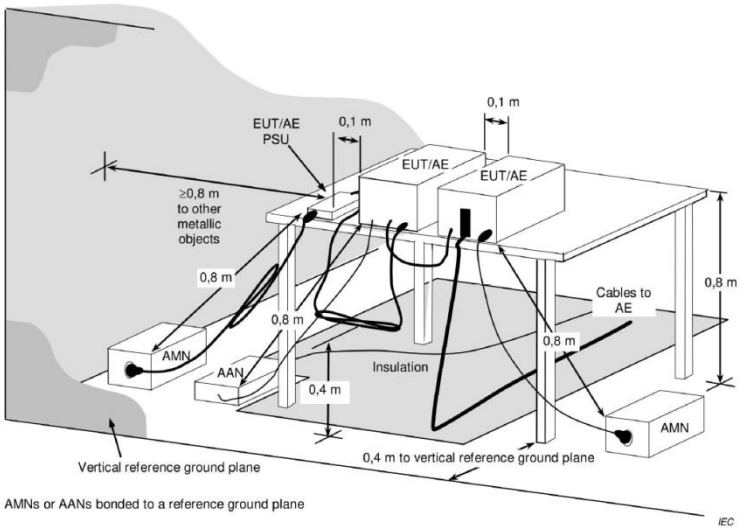
Test Mode:	
Microwave	The EUT was operate at the maximum microwave output power, according to FCC OST MP-5-1986 section 4.1, a quantity of water in a beaker was put in the oven cooking cavity during test

2.2 Test Auxiliary Equipment

Manufacturer	Description	Model	Serial Number
Xiangbo	Glass Beaker	unknown	unknown

2.3 Test Setup

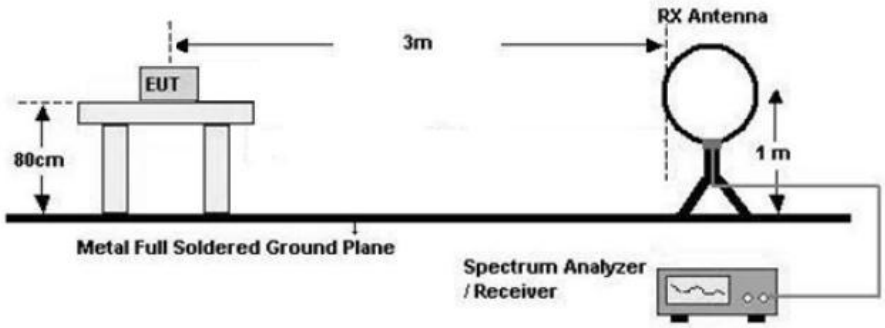
1) Conducted emission measurement:



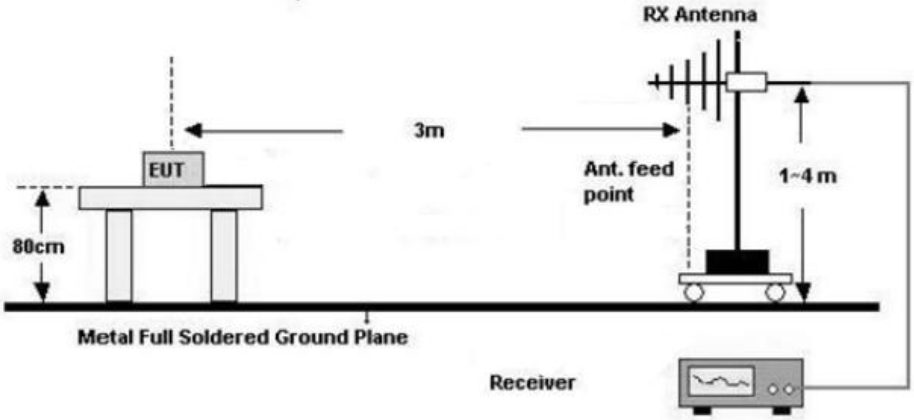
Note: The 0.8 m distance specified between EUT/AE/PSU and AMN/AAN, is applicable only to the EUT being measured. If the device is AE then it shall be >0.8 m.

2) Radiated emission measurement:

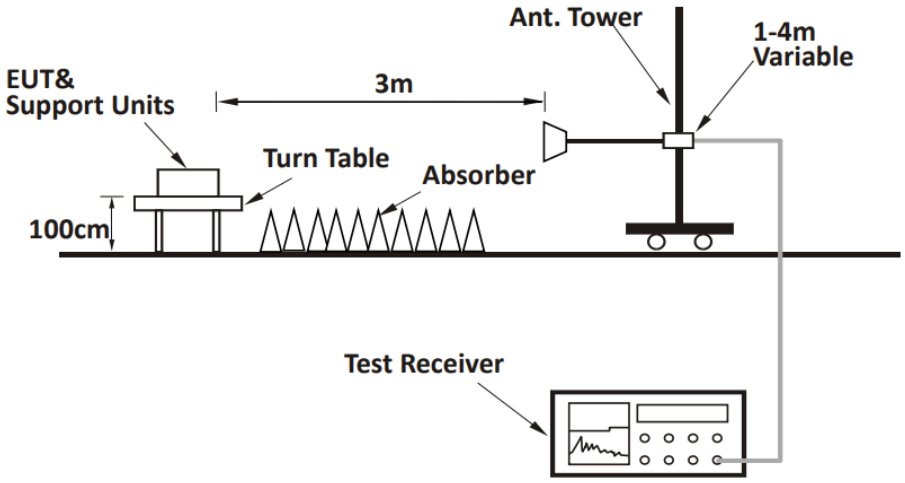
Below 30MHz (3m SAC)



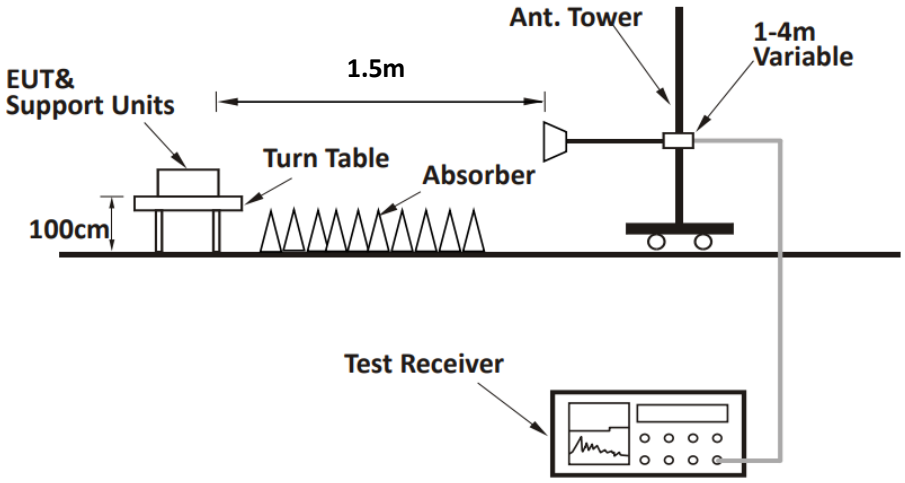
30MHz-1GHz (3m SAC)



Above 1-18GHz(3m FAC)



Above 18GHz (3m FAC)



2.4 Test Procedure

Conducted emission:

1. The E.U.T is placed on a non-conducting table 40cm from the vertical ground plane and 80cm above the horizontal ground plane (Please refer to the block diagram of the test setup and photographs).
2. Both sides of A.C. line are checked for maximum conducted interference.
3. Line conducted data is recorded for both Line and Neutral

Radiated Emission Procedure:

a) For 30MHz-1GHz:

1. The EUT was placed on the tabletop of a rotating table 0.8 m the ground at a 3 m semi anechoic chamber. The measurement distance from the EUT to the receiving antenna is 3 m.
2. EUT works in each mode of operation that needs to be tested. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations.

b) For above 1GHz:

1. The EUT was placed on the tabletop of a rotating table 0.8 m the ground at a 3 m fully anechoic room. The measurement distance from the EUT to the receiving antenna is 3 m.
2. EUT works in each mode of operation that needs to be tested，and having the EUT continuously working. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations.
3. Open the test software to control the test antenna and test turntable. Perform the test, save the test results, and export the test data.

2.5 Measurement Method

Description of Test	Measurement Method
AC Line Conducted Emissions	FCC OST MP-5-1986 Section 7
Radiated emission	FCC OST MP-5-1986 Section 5
Operating frequencies	FCC OST MP-5-1986 Section 4.5
Power Output Measurement	FCC OST MP-5-1986 Section 4.3
Radio frequency exposure requirements	FCC OST MP-5-1986 Section 3.1

2.6 Measurement Equipment

Manufacturer	Description	Model	Management No.	Calibration Date	Calibration Due Date
AC Line Conducted Emission Test					
ROHDE& SCHWARZ	EMI TEST RECEIVER	ESR	101817	2023/7/3	2024/7/2
R&S	LISN	ENV216	101748	2023/8/1	2024/7/31
N/A	Coaxial Cable	NO.12	N/A	2023/7/3	2024/7/2
Farad	Test Software	EZ-EMC	Ver. EMEC-3A1	/	/
Radiated Emission Test					
R&S	EMI test receiver	ESR3	102758	2023/7/3	2024/7/2
ROHDE& SCHWARZ	SPECTRUM ANALYZER	FSV40-N	101608	2023/7/3	2024/7/2
SONOMA INSTRUMENT	Low frequency amplifier	310	186014	2023/7/12	2024/7/11
COM-POWER	preamplifier	PAM-118A	18040152	2023/8/21	2024/8/20
COM-POWER	Amplifier	PAM-840A	461306	2023/8/8	2024/8/7
ETS	Passive Loop Antenna	6512	29604	2023/7/7	2024/7/6
SCHWARZBECK	Log - periodic wideband antenna	VULB 9163	9163-872	2023/7/7	2024/7/6
Astro Antenna Ltd	Horn antenna	AHA-118S	3015	2023/7/6	2024/7/5
Ducommun technologies	Horn Antenna	ARH-4223-02	1007726-03	2023/7/10	2024/7/9
Oulitong	Band Reject Filter	OBSF-2400-2483.5-50N	OE02103119	2023/9/15	2024/9/14
N/A	Coaxial Cable	N/A	NO.9	2023/8/8	2024/8/7
N/A	Coaxial Cable	N/A	NO.10	2023/8/8	2024/8/7
N/A	Coaxial Cable	N/A	NO.11	2023/8/8	2024/8/7
Audix	Test Software	E3	191218 V9	/	/

Operating frequencies Test					
ROHDE& SCHWARZ	SPECTRUM ANALYZER	FSV40-N	101608	2023/7/3	2024/7/2
Astro Antenna Ltd	Horn antenna	AHA-118S	3015	2023/7/6	2024/7/5
N/A	Coaxial Cable	N/A	NO.9	2023/8/8	2024/8/7
N/A	Coaxial Cable	N/A	NO.10	2023/8/8	2024/8/7
N/A	Coaxial Cable	N/A	NO.11	2023/8/8	2024/8/7
Audix	Test Software	E3	191218 V9	/	/
Power Output Test					
YOKOGAWA	Digital Power Meter	253503	25BW3075	2023/8/24	2024/8/23
Victor	Digital Thermometer	6801	100730669	2023/12/1	2024/11/30
Radio frequency exposure					
ETS	Microwave Survery Meter	1501	N/A	2023/10/11	2024/10/10

Note: All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or International standards.

3 Test Results

3.1 Test Summary

FCC Rules	Description of Test	Result
FCC §18.307	AC Line Conducted Emissions	Compliance
FCC §18.305	Radiated emission	Compliance
FCC §18.301 FCC OST MP-5 §3.2	Operating frequencies	Compliance
FCC OST MP-5 §4.3	Power Output Measurement	Reporting only
FCC §18.313, §2.1091; §1.1310	Radio frequency exposure requirements	Compliance

Note: This is a Class II Permissive Change test report. The applicant declared the difference between EUT and original device (Granted on 2024/03/11) as below:

1. Change the computer board
2. Change the EMI filter board
3. Change the appearance
4. Change the model number

The microwave frequency, rated input& output power was not change

3.2 Limit

<table>
<tr><th>Test items</th><th>Limit</th></tr>
<tr><td>AC Line Conducted Emissions</td><td>
<table>
<tr><th rowspan="2">Frequency of emission (MHz)</th><th colspan="2">Conducted limit (dBµV)</th></tr>
<tr><th>Quasi-peak</th><th>Average</th></tr>
<tr><td>0.15–0.5</td><td>66 to 56 *</td><td>56 to 46 *</td></tr>
<tr><td>0.5–5</td><td>56</td><td>46</td></tr>
<tr><td>5–30</td><td>60</td><td>50</td></tr>
</table>
* Decreases with the logarithm of the frequency.
</td></tr>
<tr><td>Radiated emission</td><td>
<table>
<tr><th>Equipment</th><th>Operating frequency</th><th>RF Power generated by equipment (watts)</th><th>Field strength limit (uV/m)</th><th>Distance (meters)</th></tr>
<tr><td>Any type unless otherwise specified (miscellaneous)</td><td>Any ISM frequency</td><td>Below 500
500 or more</td><td>25
25 × SQRT(power/500)</td><td>300
[1]300</td></tr>
</table>
</td></tr>
<tr><td>Operating frequencies</td><td>§18.301
Within ISM frequency band 2400-2500MHz</td></tr>
<tr><td>Radio frequency exposure requirements</td><td>§1.1310
<table>
<tr><th>Frequency range (MHz)</th><th>Electric field strength (V/m)</th><th>Magnetic field strength (A/m)</th><th>Power density (mW/cm^2)</th><th>Averaging time (minutes)</th></tr>
<tr><td colspan="5">(ii) Limits for General Population/Uncontrolled Exposure</td></tr>
<tr><td>0.3–1.34</td><td>614</td><td>1.63</td><td>*(100)</td><td><30</td></tr>
<tr><td>1.34–30</td><td>824/f</td><td>2.19/f</td><td>*(180/f^2)</td><td><30</td></tr>
<tr><td>30–300</td><td>27.5</td><td>0.073</td><td>0.2</td><td><30</td></tr>
<tr><td>300–1,500</td><td></td><td></td><td>f/1500</td><td><30</td></tr>
<tr><td>1,500–100,000</td><td></td><td></td><td>1.0</td><td><30</td></tr>
</table>
f = frequency in MHz. * = Plane-wave equivalent power density.
</td></tr>
</table>

3.3 Operating frequencies

Test Date:	2024-02-20	Test By:	Bard Huang
Environment condition:	Temperature: 22.5°C; Relative Humidity:75%; ATM Pressure: 100.9kPa		

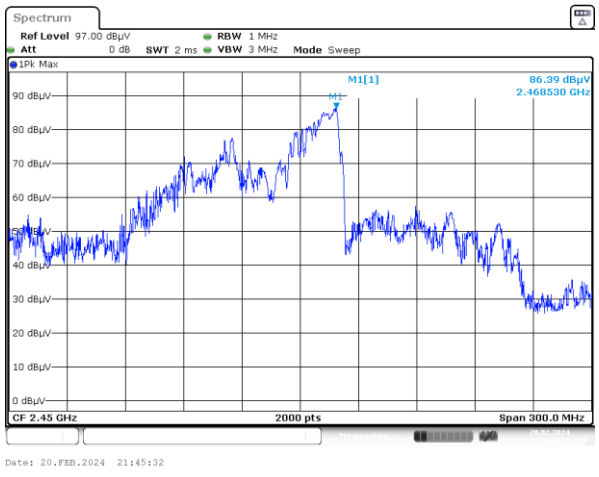
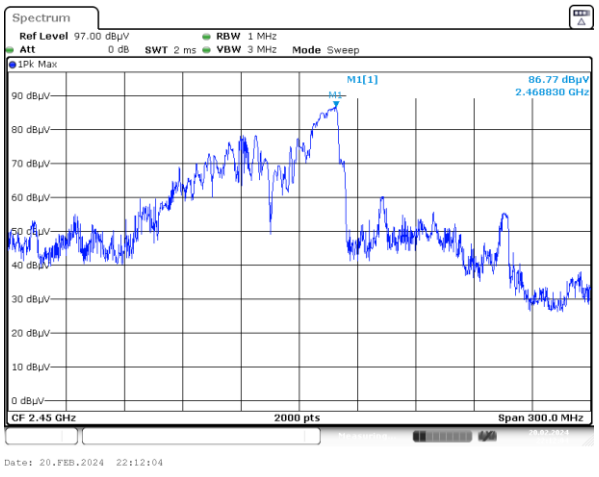
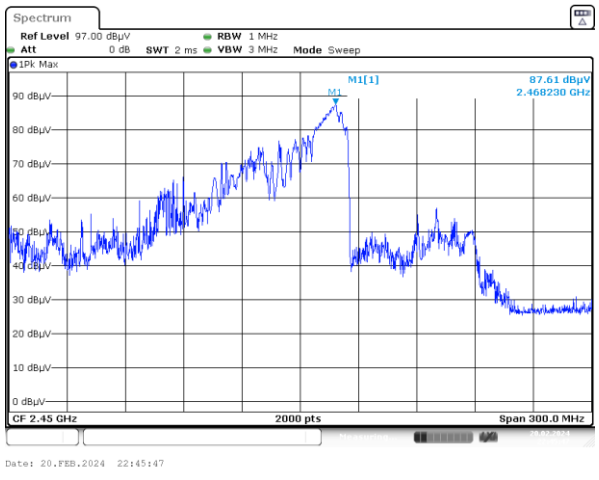
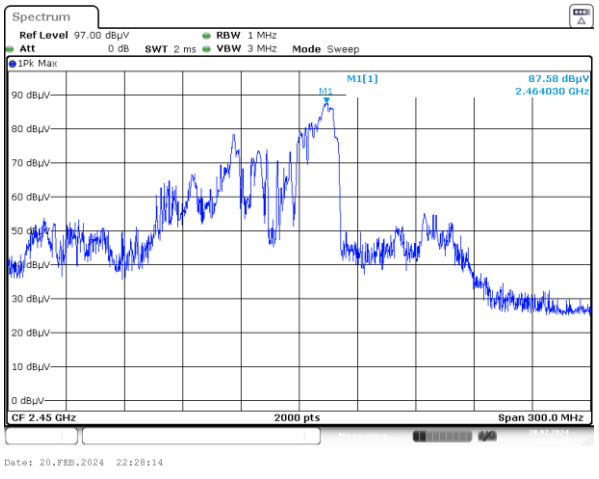
Variation in Operating Frequency with Time

Frequency at Start time(MHz)	Frequency at End time(MHz)	Limit(MHz)
2468.530	2468.830	Within 2400~2500

Variation in Operating Frequency with Line Voltage

Frequency at 80% of nominal voltage(MHz)	Frequency at 125% of nominal voltage(MHz)	Limit(MHz)
2468.230	2464.030	Within 2400~2500

Test Plot:

Start time	End time
	
80% of nominal voltage	**125% of nominal voltage**
	

3.4 Power Output Measurement

Test Date:	2024-02-20	Test By:	Lirou Li
Environment condition:	Temperature: 24.9°C; Relative Humidity:79%; ATM Pressure: 101.4kPa		

Power Input:

Input Voltage(V_{AC})	Input Current(A)	Input Power(W)	Rated Input Power(W)
116.5	13.1	1526.2	1500

Note:
Based on the measured input power, the EUT was found to be operating within the intended specifications.

Power Output:

Quantity of Water (ml)	Mass of the container (g)	Ambient temperature (℃)	Initial temperature (℃)	Final temperature (℃)	Heating time (s)	Power output (W)
1000	487	24.9	24.7	37.2	60	927

Formula:

$$P = \frac{4{,}187 \cdot m_w (T_2 - T_1) + 0{,}55 \cdot m_c (T_2 - T_0)}{t}$$

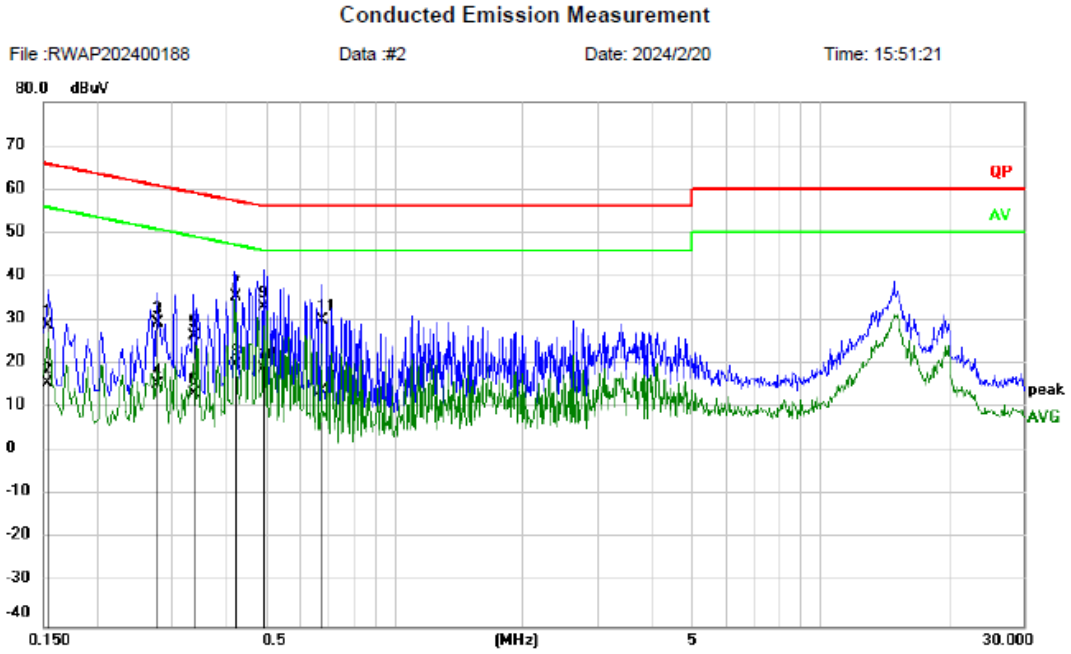
Note:
P is the microwave power output(W)
m_w is the mass of the water(ml)
m_c is the mass of the container(g)
T_0 is the ambient temperature(℃)
T_1 is the initial temperature of water(℃)
T_2 is the final temperature of water(℃)
t is the water heating time(s), excluding the magnetron filament heating-up time

According to FCC § 18.305, the field strength limit of the outside band emissions is:

Limit=20lg(25*SQRT(Power/500))+20lg(300/3)
=20lg(25*SQRT(927/500))+20lg(300/3)
=70.6dBuV/m @3m distance

3.5 AC Line Conducted Emissions Test Data

Test Date:	2024-02-20	Test By:	Lirou Li
Environment condition:	Temperature: 26.1°C; Relative Humidity:79%; ATM Pressure: 101.4kPa		



Limit: QP
Mode:Microwave
Note: maximum power

Phase: L1
Power: AC 120V/60Hz

Temperature: 26.1
Humidity: 79 %
Air Pressure: 1014 hpa

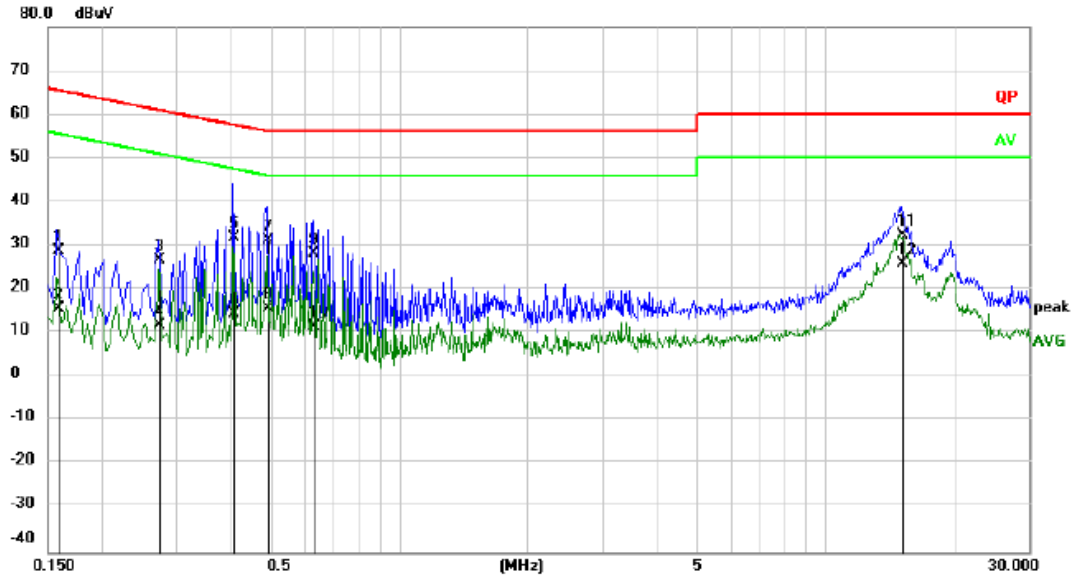
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over Limit		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1539	18.04	10.79	28.83	65.79	-36.96	QP	
2		0.1539	4.83	10.79	15.62	55.79	-40.17	AVG	
3		0.2779	18.80	10.68	29.48	60.88	-31.40	QP	
4		0.2779	4.59	10.68	15.27	50.88	-35.61	AVG	
5		0.3379	15.86	10.73	26.59	59.25	-32.66	QP	
6		0.3379	2.42	10.73	13.15	49.25	-36.10	AVG	
7	*	0.4220	24.62	10.79	35.41	57.41	-22.00	QP	
8		0.4220	9.16	10.79	19.95	47.41	-27.46	AVG	
9		0.4940	22.30	10.81	33.11	56.10	-22.99	QP	
10		0.4940	8.21	10.81	19.02	46.10	-27.08	AVG	
11		0.6780	19.21	10.85	30.06	56.00	-25.94	QP	
12		0.6780	2.87	10.85	13.72	46.00	-32.28	AVG	

*:Maximum data x:Over limit !:over margin

Engineer Signature: Lirou

Conducted Emission Measurement

File :RWAP202400188 Data :#1 Date: 2024/2/20 Time: 15:42:19



Limit: QP
Mode:Microwave
Note: maximum power

Phase: N
Power: AC 120V/60Hz

Temperature: 26.1
Humidity: 79 %
Air Pressure: 1014 hpa

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over Limit		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1582	18.40	10.58	28.98	65.56	-36.58	QP	
2		0.1582	5.13	10.58	15.71	55.56	-39.85	AVG	
3		0.2740	16.35	10.50	26.85	61.00	-34.15	QP	
4		0.2740	1.23	10.50	11.73	51.00	-39.27	AVG	
5		0.4100	21.26	10.66	31.92	57.65	-25.73	QP	
6		0.4100	3.80	10.66	14.46	47.65	-33.19	AVG	
7		0.4900	20.44	10.70	31.14	56.17	-25.03	QP	
8		0.4900	4.92	10.70	15.62	46.17	-30.55	AVG	
9		0.6300	17.66	10.61	28.27	56.00	-27.73	QP	
10		0.6300	0.89	10.61	11.50	46.00	-34.50	AVG	
11		15.1260	21.48	10.88	32.36	60.00	-27.64	QP	
12	*	15.1260	14.94	10.88	25.82	50.00	-24.18	AVG	

*:Maximum data x:Over limit !:over margin

Engineer Signature: Lirou

Remark:

Measurement (dBuV)= Reading Level (dBuV) + Correct Factor(dB)

Correct Factor (dB)= LISN Voltage Division Factor (dB)+ Cable loss(dB)

Over Limit = Measurement – Limit

3.6 Radiated emission Test Data

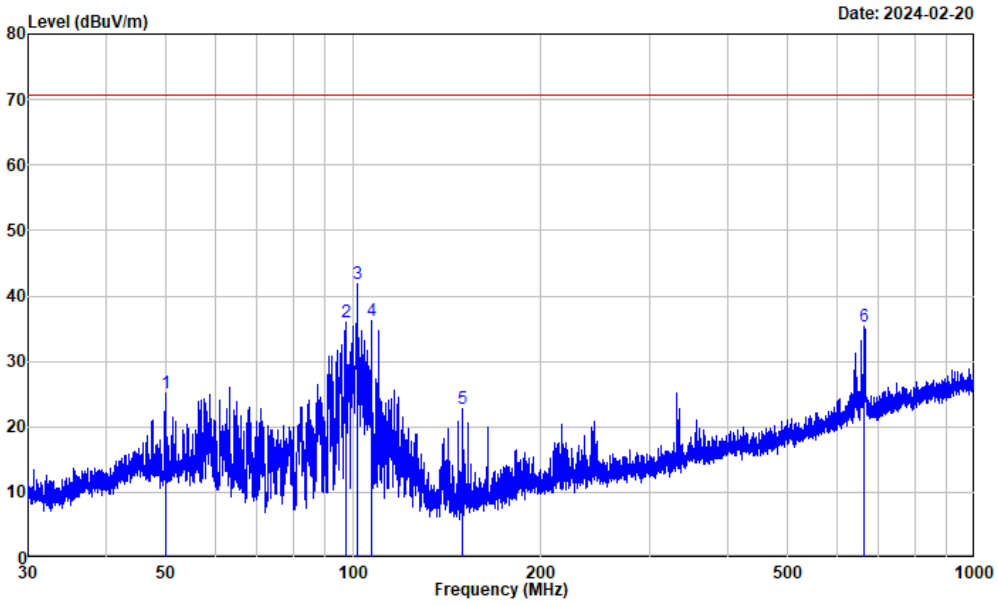
9 kHz-30MHz:

Test Date:	2024-02-20	**Test By:**	Bard Huang
Environment condition:	Temperature: 22.5°C; Relative Humidity:75%; ATM Pressure: 100.9kPa		

For radiated emissions below 30MHz, there were no emissions found within 20dB of limit.

30MHz-1GHz:

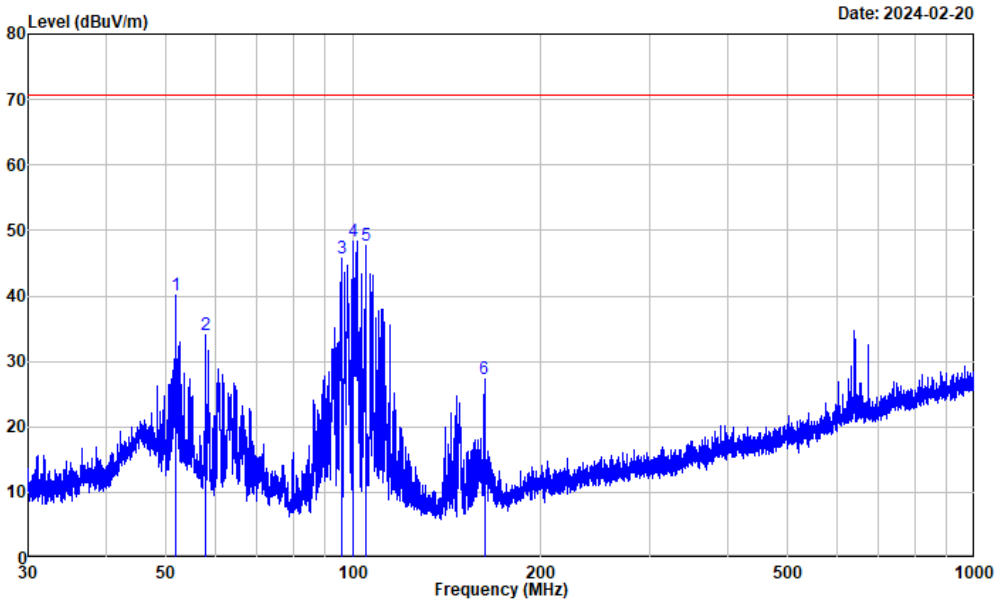
Test Date:	2024-02-20	Test By:	Bard Huang
Environment condition:	Temperature: 22.5°C; Relative Humidity:75%; ATM Pressure: 100.9kPa		



Project No. : RWAP202400188
Test Mode : Microwave
Test Voltage : AC 120V/60Hz
Environment : 22.5℃/75%R.H./100.9kPa
Tested by : Bard Huang
Polarization : horizontal
Remark : maximum microwave output power

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	49.863	37.12	-11.97	25.15	70.60	-45.45	Peak
2	97.385	50.14	-14.25	35.89	70.60	-34.71	Peak
3	101.615	55.57	-13.83	41.74	70.60	-28.86	Peak
4	107.198	49.89	-13.77	36.12	70.60	-34.48	Peak
5	149.647	39.94	-17.23	22.71	70.60	-47.89	Peak
6	664.895	39.18	-3.78	35.40	70.60	-35.20	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain



Project No. : RWAP202400188
Test Mode : Microwave
Test Voltage : AC 120V/60Hz
Environment : 22.5℃/75%R.H./100.9kPa
Tested by : Bard Huang
Polarization : vertical
Remark : maximum microwave output power

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	51.733	52.14	-12.00	40.14	70.60	-30.46	Peak
2	57.852	47.10	-13.00	34.10	70.60	-36.50	Peak
3	95.650	60.07	-14.42	45.65	70.60	-24.95	Peak
4	100.156	62.27	-13.90	48.37	70.60	-22.23	Peak
5	104.644	61.35	-13.67	47.68	70.60	-22.92	Peak
6	162.645	43.87	-16.51	27.36	70.60	-43.24	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain

Remark:

Result = Reading + Factor

Factor = Antenna factor + Cable loss – Amplifier gain

Over Limit = Result – Limit

Above 1GHz:

Test Date:	2024-02-20	**Test By:**	Bard Huang
Environment condition:	Temperature: 22.5°C; Relative Humidity:75%; ATM Pressure: 100.9kPa		

Frequency (MHz)	**Reading level (dBμV)**	**Polar**	**Corrected Factor (dB/m)**	**Corrected Amplitude (dBμV/m)**	**Limit (dBμV/m)**	**Margin (dB)**	**Remark**
2352.176	40.68	horizontal	-1.75	38.93	70.60	-31.67	Average
2547.774	42.06	horizontal	-1.77	40.29	70.60	-30.31	Average
9869.935	37.85	horizontal	4.12	41.97	70.60	-28.63	Average
2369.185	39.41	vertical	-1.75	37.66	70.60	-32.94	Average
2513.757	39.46	vertical	-1.74	37.72	70.60	-32.88	Average
9827.414	38.65	vertical	3.94	42.59	70.60	-28.01	Average
Second and third harmonic							
700ml Water							
4911.956	46.28	horizontal	0.60	46.88	70.60	-23.72	Average
7378.189	40.64	horizontal	3.09	43.73	70.60	-26.87	Average
4928.964	41.11	vertical	0.72	41.83	70.60	-28.77	Average
7403.702	37.52	vertical	3.10	40.62	70.60	-29.98	Average
300ml Water							
4920.210	46.41	horizontal	0.66	47.07	70.60	-23.53	Average
7377.088	40.66	horizontal	3.09	43.75	70.60	-26.85	Average
4914.808	41.59	vertical	0.62	42.21	70.60	-28.39	Average
7228.514	37.10	vertical	3.29	40.39	70.60	-30.21	Average

Remark:

Corrected Amplitude= Reading level + corrected Factor

Corrected Factor = Antenna factor + Cable loss – Amplifier gain

Margin = Corrected Amplitude – Limit

The emission levels of other frequencies that were lower than the limit 20dB not show in test report.

For emissions in 18GHz-25GHz range, all emissions were investigated and in the noise floor level.

3.7 Radio frequency exposure

Test Date:	2024-02-20	Test By:	Lirou Li
Environment condition:	Temperature: 24.9°C; Relative Humidity:79%; ATM Pressure: 101.4kPa		

Radiation leakage was measured in the as-received condition with the oven door closed using a microwave leakage meter.
A 275mL water load was placed in the center of the oven and the oven was operated at maximum output power.

There was no microwave leakage exceeding a power level of **0.12**mW/cm^2 observed at any point 5 cm or more from the external surface of the oven.

A maximum of 1.0mW/cm2 is allowed in accordance with the applicable Federal Standards. Hence, microwave leakage in the as-received condition with the oven door closed was below the maximum allowed.

4 Test Setup Photo

Please refer to the attachment RWAP202400188 test setup photo

5 E.U.T Photo

Please refer to the attachment RWAP202400188 External photo and RWAP202400188 Internal photo

---End of Report---