

# FCC Test Report

**Report No.:** RWA0202400008A

**Applicant:** Whirlpool Microwave Products Development Limited.

**Address:** 17th Fl, Elite Centre, 22 Hung To Rd, Kwun Tong, Hong Kong

**Product Name:** Household microwave oven

**Product Model:** YKMMF730P

**Multiple Models:** N/A

**Trade Mark:** Whirlpool

**FCC ID:** PR4FLUSHP2Y

**Standards:** FCC CFR Title 47 Part 18

**Test Date:** 2024-01-08

**Test Result:** Complied

**Report Date:** 2024-01-09

**Reviewed by:**

**Approved by:**

*Abel Chen*

*Jacob Kong*

Abel Chen

Project Engineer

Jacob Kong

Manager

**Prepared by:**

World Alliance Testing and 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



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## Revision History

Version No.	Issued Date	Description
00	2024-01-09	Original

# Contents

<b>1</b>	<b>General Information .....</b>	<b>4</b>
1.1	Client Information .....	4
1.2	Product Description of EUT .....	4
1.3	Related Submittal(s)/Grant(s).....	4
1.4	Measurement Uncertainty .....	4
1.5	Laboratory Location.....	5
1.6	Test Methodology .....	5
<b>2</b>	<b>Description of Measurement.....</b>	<b>6</b>
2.1	Test Configuration.....	6
2.2	Test Auxiliary Equipment .....	6
2.3	Test Setup.....	6
2.4	Test Procedure .....	8
2.5	Measurement Method.....	9
2.6	Measurement Equipment .....	9
<b>3</b>	<b>Test Results .....</b>	<b>11</b>
3.1	Test Summary.....	11
3.2	Limit .....	12
3.3	Operating frequencies .....	13
3.4	Power Output Measurement .....	14
3.5	AC Line Conducted Emissions Test Data.....	15
3.6	Radiated emission Test Data.....	17
3.7	Radio frequency exposure .....	21
<b>4</b>	<b>Test Setup Photo.....</b>	<b>22</b>
<b>5</b>	<b>E.U.T Photo.....</b>	<b>23</b>

# 1 General Information

## 1.1 Client Information

Applicant:	Whirlpool Microwave Products Development Limited.
Address:	17th Fl, Elite Centre,22 Hung To Rd,Kwun Tong, Hong Kong
Manufacturer:	Whirlpool Microwave Products Development Limited.
Address:	17th Fl, Elite Centre,22 Hung To Rd,Kwun Tong, Hong Kong

## 1.2 Product Description of EUT

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

Sample Serial Number	29-1(assigned by WATC)
Sample Received Date	2024-01-08
Sample Status	Good Condition
Operating Frequency Range	2450MHz $\pm$ 50.0 MHz
Power Supply	AC 120V/60Hz
Microwave Rated Input Power <sup>#</sup>	1500W
Microwave Rated Output Power <sup>#</sup>	850W
Modification	Sample No Modification by the test lab

## 1.3 Related Submittal(s)/Grant(s)

No Related Submittal(s)/Grant(s)
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## 1.4 Measurement Uncertainty

Parameter		Expanded Uncertainty (Confidence of 95%(U = 2Uc(y)))
AC Power Lines Conducted Emissions		$\pm$ 3.14dB
Radiated emission	Below 1GHz	$\pm$ 4.84dB
	Above 1GHz	$\pm$ 5.44dB
Frequency Error		150Hz
<p><b>Note 1:</b> 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.</p> <p><b>Note 2:</b> 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.)</p>		

## 1.5 Laboratory Location

World Alliance Testing and 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](mailto: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

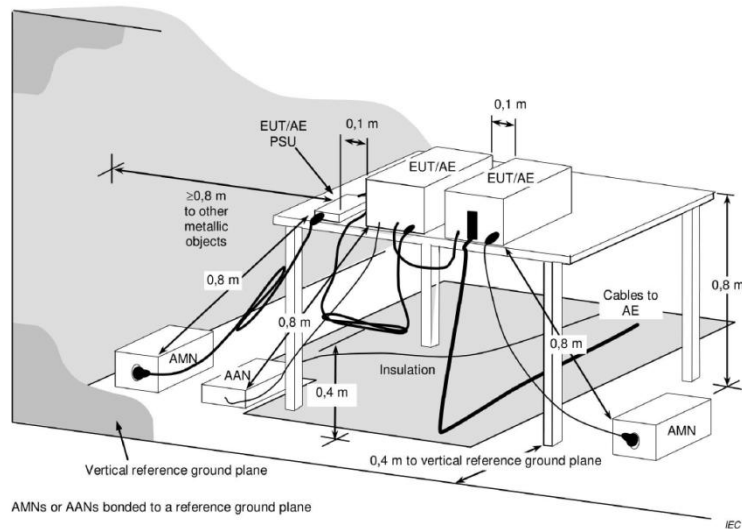
Test Mode:	
Microwave	The EUT was operate at the maximum microwave output power, according to FCC OST MP-5-1986 section 4.1, a quantity of water in a beaker was put in the oven cooking cavity during test

### 2.2 Test Auxiliary Equipment

Manufacturer	Description	Model	Serial Number
Xiangbo	Glass Beaker	unknown	unknown

### 2.3 Test Setup

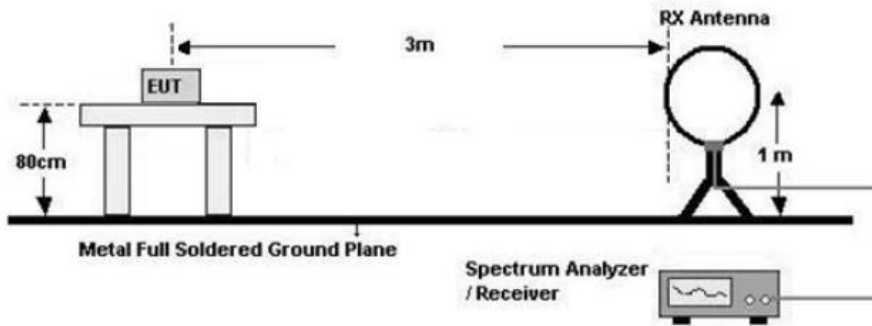
#### 1) Conducted emission measurement:



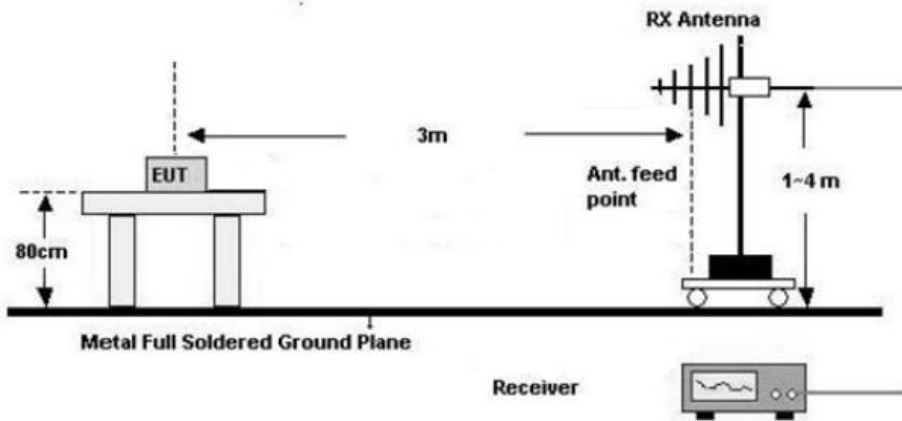
**Note:** The 0.8 m distance specified between EUT/AE/PSU and AMN/AAN, is applicable only to the EUT being measured. If the device is AE then it shall be >0.8 m.

**2) Radiated emission measurement:**

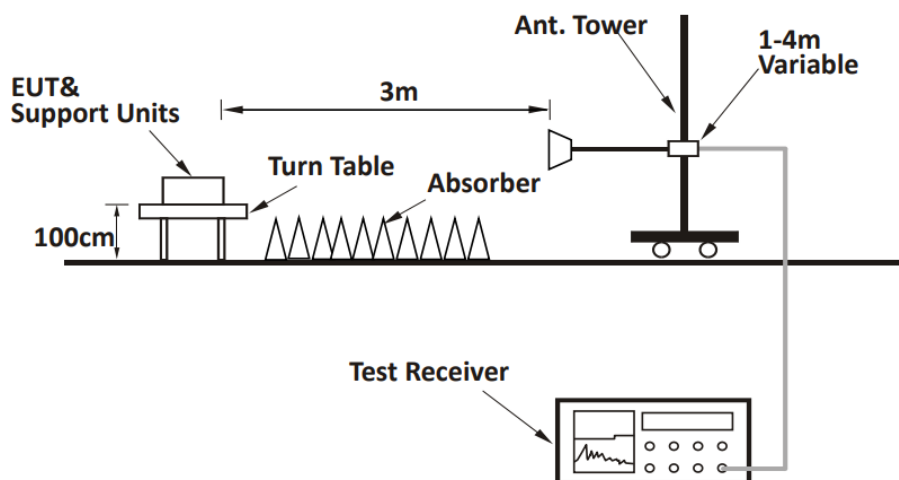
Below 30MHz (3m SAC)

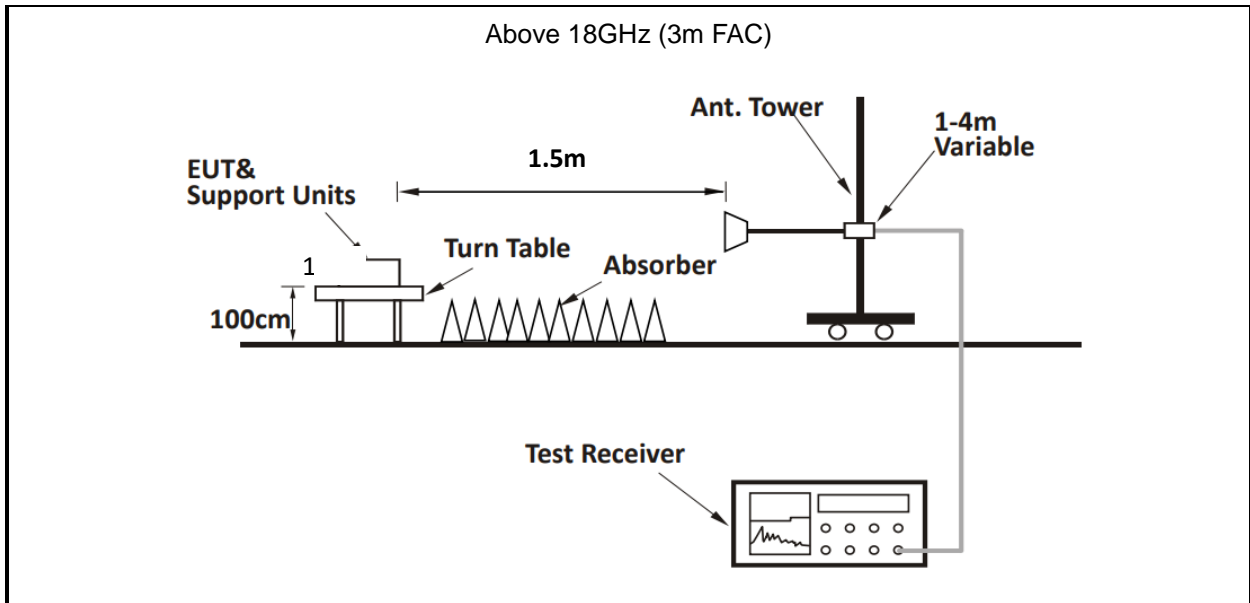


30MHz-1GHz (3m SAC)



Above 1-18GHz(3m FAC)





## 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-2400-24 83.5-50N	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

### 3.2 Limit

Test items	Limit				
AC Line Conducted Emissions	Frequency of emission (MHz)		Conducted limit (dBµV)		
			Quasi-peak	Average	
	0.15–0.5		66 to 56 *	56 to 46 *	
	0.5–5		56	46	
	5–30		60	50	
	* Decreases with the logarithm of the frequency.				
Radiated emission	Equipment	Operating frequency	RF Power generated by equipment (watts)	Field strength limit (µV/m)	Distance (meters)
	Any type unless otherwise specified (miscellaneous)	Any ISM frequency	Below 500 500 or more	25 25 × SQRT(power/500)	300 1300
Operating frequencies	§18.301 Within ISM frequency band 2400-2500MHz				
Radio frequency exposure requirements	§1.1310				
	Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
	(ii) Limits for General Population/Uncontrolled Exposure				
	0.3–1.34	614	1.63	*(100)	<30
	1.34–30	824/f	2.19/f	*(180/f <sup>2</sup> )	<30
	30–300	27.5	0.073	0.2	<30
	300–1,500			f/1500	<30
1,500–100,000			1.0	<30	
	f = frequency in MHz. * = Plane-wave equivalent power density.				

### 3.3 Operating frequencies

<b>Test Date:</b>	2024-01-08	<b>Test By:</b>	Luke Li
<b>Environment condition:</b>	Temperature: 25.7°C; Relative Humidity:51%; ATM Pressure: 101.0kPa		

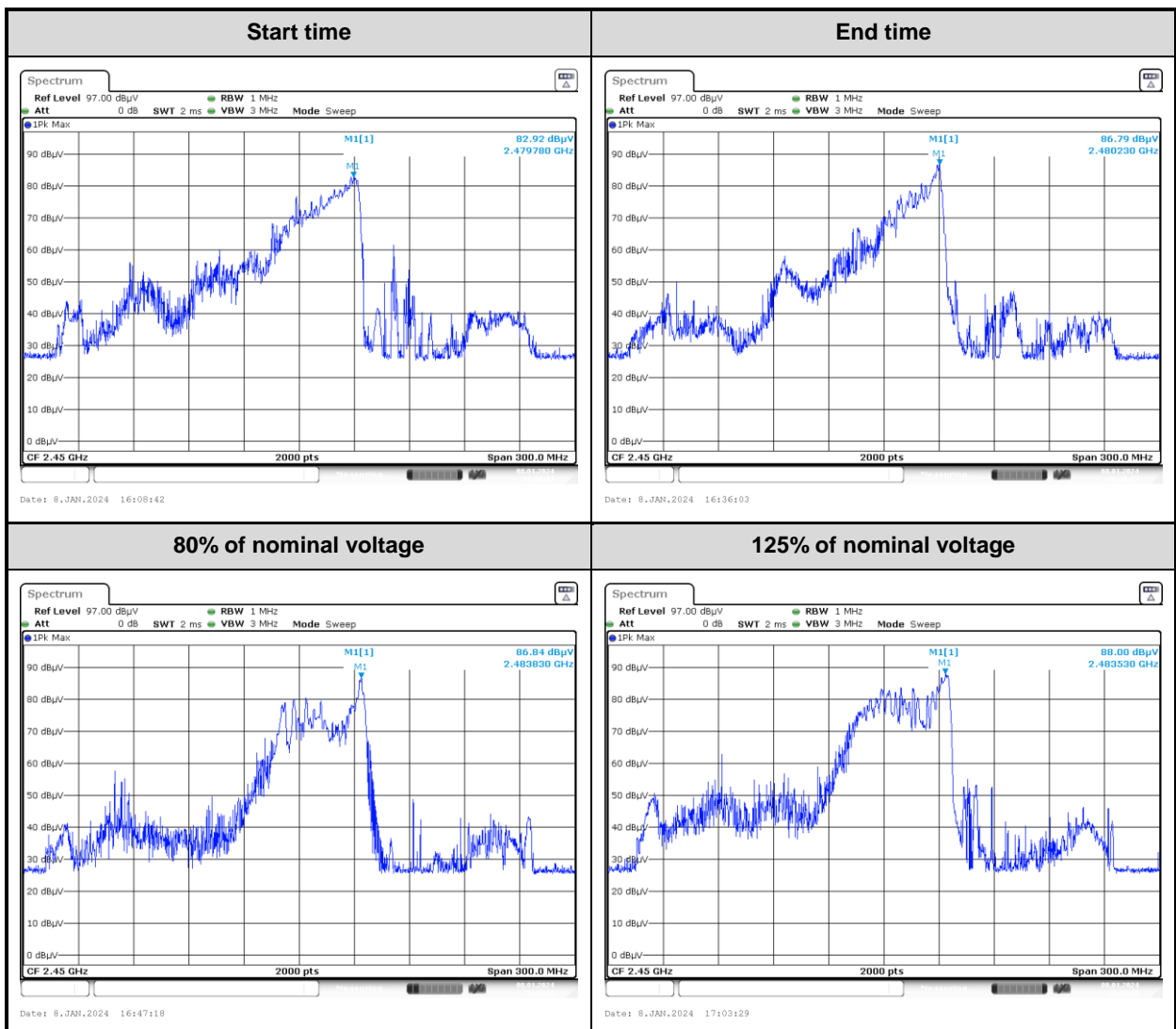
#### Variation in Operating Frequency with Time

Frequency at Start time(MHz)	Frequency at End time(MHz)	Limit(MHz)
2479.78	2480.23	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)
2483.83	2483.53	Within 2400~2500

#### Test Plot:



### 3.4 Power Output Measurement

<b>Test Date:</b>	2024-01-08	<b>Test By:</b>	Lirou Li
<b>Environment condition:</b>	Temperature: 25.1°C; Relative Humidity:54%; ATM Pressure: 101.2kPa		

#### Power Input:

Input Voltage(V <sub>AC</sub> )	Input Current(A)	Input Power(W)	Rated Input Power(W)
117.2	12.9	1511.9	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 (°C)	Initial temperature (°C)	Final temperature (°C)	Heating time (s)	Power output (W)
1000	487	25.1	21.1	32.9	60	858

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<sub>w</sub>* is the mass of the water(ml)

*m<sub>c</sub>* is the mass of the container(g)

*T<sub>0</sub>* is the ambient temperature( °C)

*T<sub>1</sub>* is the initial temperature of water( °C)

*T<sub>2</sub>* is the final temperature of water( °C)

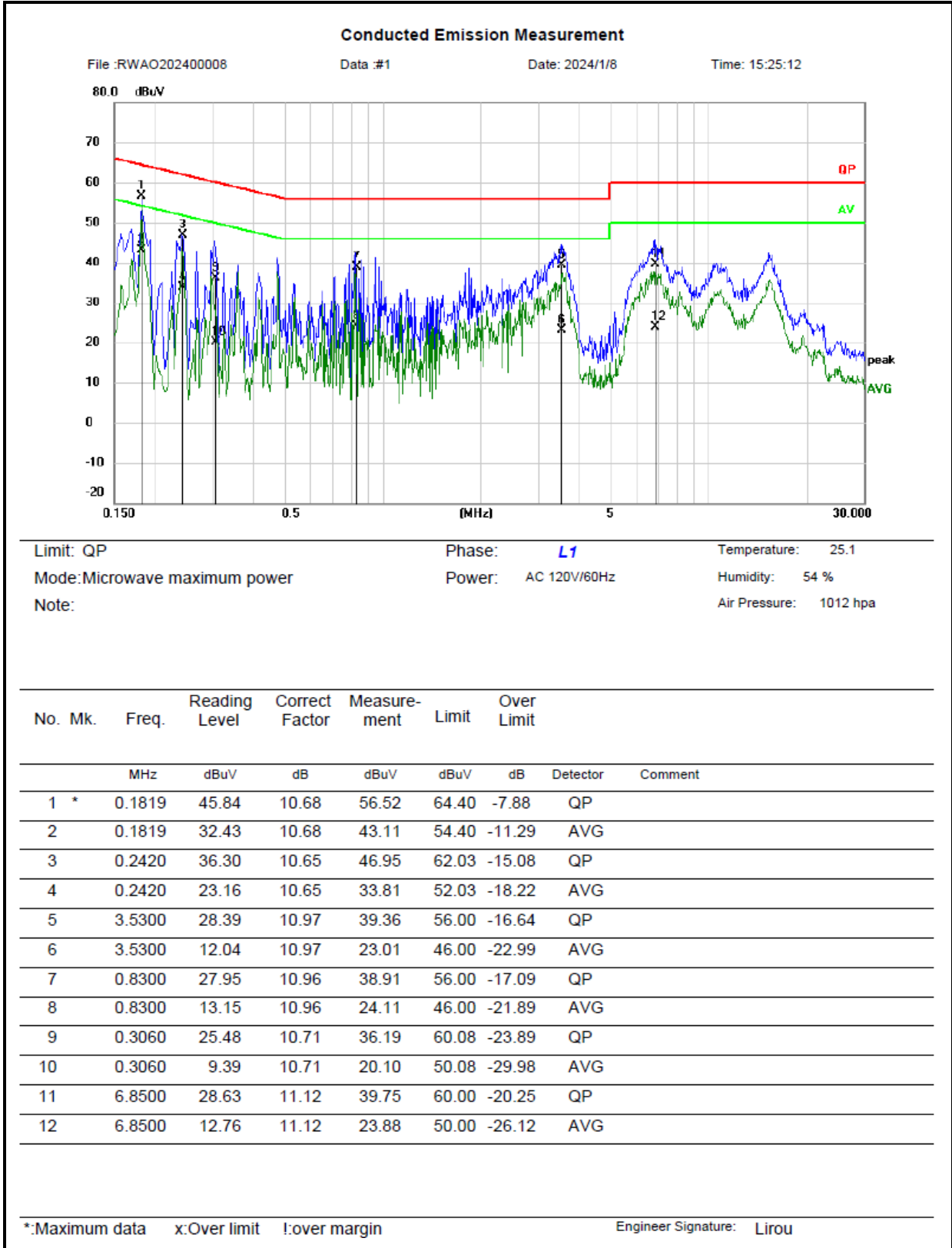
*t* is the water heating time(s), excluding the magnetron filament heating-up time

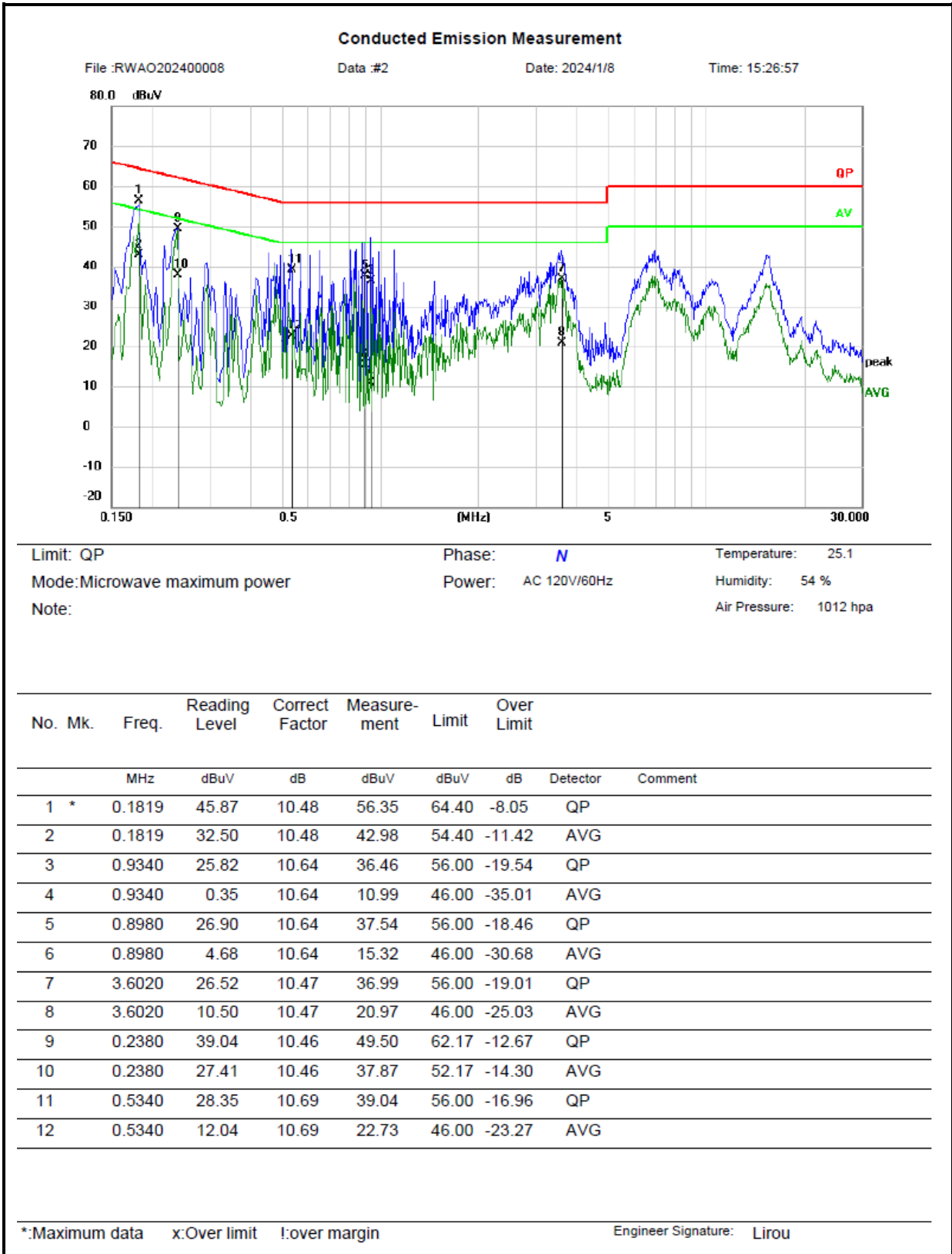
According to FCC § 18.305, the field strength limit of the outside band emissions is:

$$\begin{aligned} \text{Limit} &= 20\lg(25 \cdot \text{SQRT}(\text{Power}/500) + 20\lg(300/3)) \\ &= 20\lg(25 \cdot \text{SQRT}(858/500) + 20\lg(300/3)) \\ &= 70.3\text{dBuV/m @3m distance} \end{aligned}$$

### 3.5 AC Line Conducted Emissions Test Data

<b>Test Date:</b>	2024-01-08	<b>Test By:</b>	Lirou Li
<b>Environment condition:</b>	Temperature: 25.1°C; Relative Humidity:54%; ATM Pressure: 101.2kPa		





**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

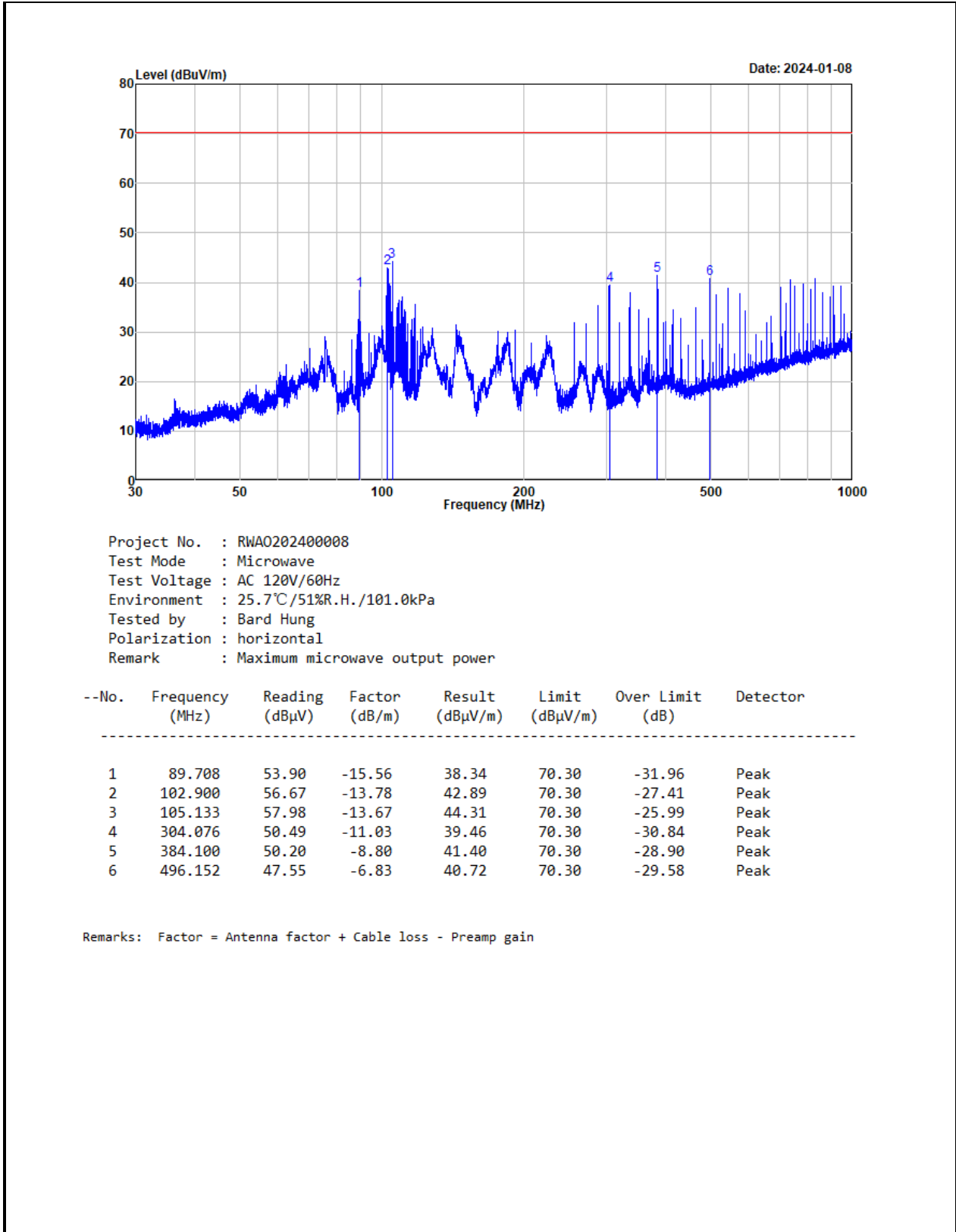
9 kHz-30MHz:

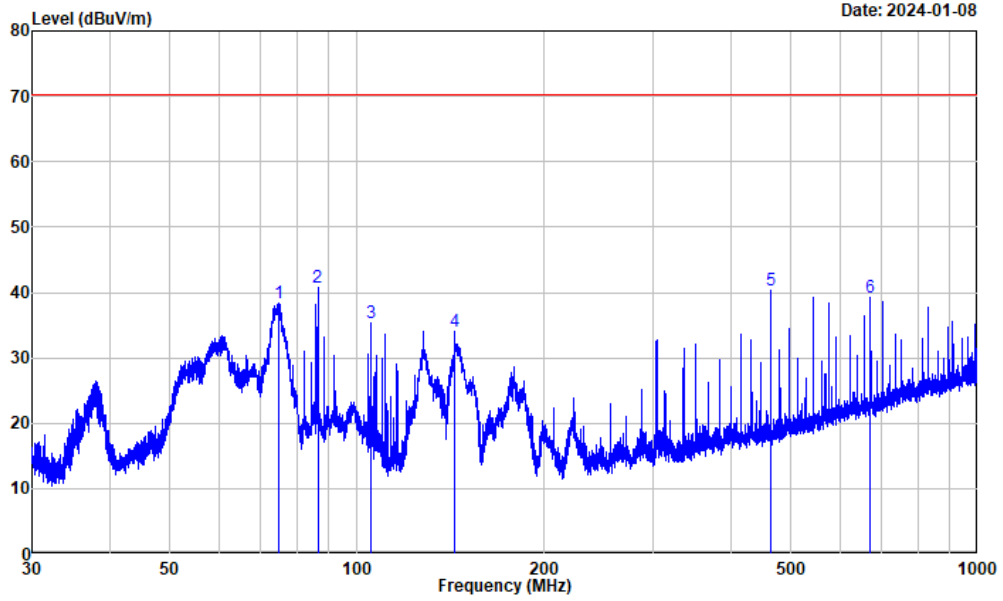
<b>Test Date:</b>	2024-01-08	<b>Test By:</b>	Bard Huang
<b>Environment condition:</b>	Temperature: 25.7°C; Relative Humidity:51%; ATM Pressure: 101.0kPa		

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

**30MHz-1GHz:**

<b>Test Date:</b>	2024-01-08	<b>Test By:</b>	Bard Huang
<b>Environment condition:</b>	Temperature: 25.7°C; Relative Humidity:51%; ATM Pressure: 101.0kPa		





Date: 2024-01-08

Project No. : RWA020240008  
 Test Mode : Microwave  
 Test Voltage : AC 120V/60Hz  
 Environment : 25.7°C/51%R.H./101.0kPa  
 Tested by : Bard Hung  
 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	75.051	56.07	-17.67	38.40	70.30	-31.90	Peak
2	86.541	57.30	-16.54	40.76	70.30	-29.54	Peak
3	105.503	48.92	-13.67	35.25	70.30	-35.05	Peak
4	144.019	51.36	-17.36	34.00	70.30	-36.30	Peak
5	463.970	48.07	-7.71	40.36	70.30	-29.94	Peak
6	672.255	42.98	-3.71	39.27	70.30	-31.03	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:**

<b>Test Date:</b>	2024-01-08	<b>Test By:</b>	Luke Li
<b>Environment condition:</b>	Temperature: 25.7°C; Relative Humidity:51%; ATM Pressure: 101.0kPa		

Frequency (MHz)	Reading level (dBμV)	Polar	Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
2352.176	40.46	horizontal	-1.75	38.71	70.30	-31.59	Average
2547.774	39.07	horizontal	-1.77	37.30	70.30	-33.00	Average
3976.488	41.68	horizontal	-2.14	39.54	70.30	-30.76	Average
2352.176	41.47	vertical	-1.75	39.72	70.30	-30.58	Average
2564.782	40.05	vertical	-1.76	38.29	70.30	-32.01	Average
4191.561	44.06	vertical	-1.98	42.08	70.30	-28.22	Average
Second and third harmonic							
700ml Water							
4962.981	44.89	horizontal	0.96	45.85	70.30	-24.45	Average
7437.719	42.30	horizontal	3.11	45.41	70.30	-24.89	Average
4962.981	43.29	vertical	0.96	44.25	70.30	-26.05	Average
7437.719	42.84	vertical	3.11	45.95	70.30	-24.35	Average
300ml Water							
4959.380	45.92	horizontal	0.93	46.85	70.30	-23.45	Average
7447.324	42.59	horizontal	3.11	45.70	70.30	-24.60	Average
4955.328	44.25	vertical	0.90	45.15	70.30	-25.15	Average
7451.375	44.65	vertical	3.11	47.76	70.30	-22.54	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

<b>Test Date:</b>	2024-01-08	<b>Test By:</b>	Lirou Li
<b>Environment condition:</b>	Temperature: 25.1°C; Relative Humidity:54%; ATM Pressure: 101.2kPa		

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 0.1mW/cm<sup>2</sup> observed at any point 5 cm or more from the external surface of the oven.

A maximum of 1.0mW/cm<sup>2</sup> 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 RWAO202400008 test setup photo

## 5 E.U.T Photo

Please refer to the attachment RWAO202400008 External photo and RWAO202400008 Internal photo

**---End of Report---**