



Japan Test Report

Test Report

On Behalf of

Shanghai Ogino Biotechnology Co., Ltd.

For

Chihiros Heater Pro

Model No.: Heater Pro, Heater, Heater 2, Heater Pro 2, Heater Max,
Heater Max 2, Heater Ultra, Heater Ultra 2

Prepared For: Shanghai Ogino Biotechnology Co., Ltd.
Rm.330, Bldg.3, No.2028, Jianshe Rd., Jianshe County, Chongming District,
Shanghai, China

Prepared By: Shenzhen HUAKE Testing Technology Co., Ltd.
1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping,
Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

Date of Test: Dec. 23, 2024 ~ Jan. 08, 2025

Date of Report: Jan. 08, 2025

Report Number: HK2501030057-E



Test Result Certification

Applicant's Name : Shanghai Ogino Biotechnology Co., Ltd.
Address : Rm.330, Bldg.3, No.2028, Jianshe Rd., Jianshe County,
Chongming District, Shanghai, China
Manufacturer's Name : Shanghai Ogino Biotechnology Co., Ltd. CIXI branch
Address : Room 1-1, Building 7, No. 598, Gaoke Avenue, Cixi High-tech
Industrial Development Zone, Zhejiang Province, China
Trade Mark : Chihiros Aquatic Studio
Product Name : Chihiros Heater Pro
Model and/or type reference : Heater Pro, Heater, Heater 2, Heater Pro 2, Heater Max, Heater
Max 2, Heater Ultra, Heater Ultra 2
Standards : Article 2 paragraph 1 item(19)

This publication may be reproduced in whole or in part for non-commercial purposes as long as the Shenzhen HUAKE Testing Technology Co., Ltd. is acknowledged as copyright owner and source of the material. Shenzhen HUAKE Testing Technology Co., Ltd. takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.

Date of Test :
Date (s) of Performance of Tests : Dec. 23, 2024 ~ Jan. 08, 2025
Date of Issue : Jan. 08, 2025
Test Result : Pass

Testing Engineer :

Len Liao

(Len Liao)

Technical Manager :

Sliver Wan

(Sliver Wan)

Authorized Signatory :

Jason Zhou

(Jason Zhou)

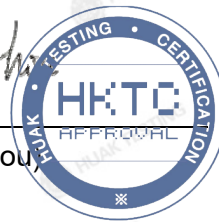


**Table of Contents****Page**

1 . Summary of Test Results	5
1.1 Information of the Test Laboratory	6
1.2 Measurement Uncertainty	6
2 . General Information	7
2.1 General Description of EUT	7
2.2 Description of Test Modes	9
2.3 Test Conditions	10
2.4 Block Diagram Showing the Configuration of System Tested	10
2.5 Description of Support Units (Conducted Mode)	11
2.6 Equipments List for All Test Items	12
3 . RF Shielding Method	13
4 . Test Result	14
4.1 Frequency Error	14
4.2 . Antenna Power	17
4.3 . Occupied Bandwidth	19
4.4 . Unwanted Emission Intensity Measurement	22
4.5 . Imitation of Collateral Emission of Receiver Measurement	31
4.6 . Transmission Antenna Gain (EIRP Antenna Power) Measurement	36
4.7 . Transmission Radiation Angle Width (3dB Beam width) Measurement	38
4.8 . Radio Interference Prevention Capability Measurement	40
4.9 . Carrier Sensing Function	42
5 . Test Setup Photos of the EUT	43
6. Photos of the EUT	44



**** Modified History ****

Revision	Description	Issued Data	Remark
Revision 1.0	Initial Test Report Release	Jan. 08, 2025	Jason Zhou



1. Summary of Test Results

Test procedures according to the technical standards:

Part	Rule Section	Description of Test	Result
4.1	Appendix No.43 of MIC Notification No 88 section 3	Frequency Error	Complies
4.3	Appendix No.43 of MIC Notification No 88 section 4	Occupied Bandwidth (99%)	Complies
4.4	Appendix No.43 of MIC Notification No 88 section 5	Unwanted Emission Intensity	Complies
4.2	Appendix No.43 of MIC Notification No 88 section 6	Antenna Power Error	Complies
4.5	Appendix No.43 of MIC Notification No 88 section 7	Limitation of Collateral Emission of Receiver	Complies
4.6	Appendix No.43 of MIC Notification No 88 section 8	Transmission Antenna Gain (EIRP Antenna Power)	N/A
4.7	Appendix No.43 of MIC Notification No 88 section 11	Transmission Radiation Angle Width (3dB Beam width)	N/A
4.8	Appendix No.43 of MIC Notification No 88 section 12	Radio Interference Prevention Capability	Complies
4.9	/	Carrier Sense Capability	N/A

NOTE:

- (1) "N/A" denotes test is not applicable in this Test Report.
- (2) MIC Public Notice 88:2023, annex 1 and annex 43.
- (3) MIC Ordinance Regulating Radio Equipment Section 4.17 of Article 49.20.
- (4) Referenced in the standard ARIB STD-T66.



1.1 Information of the Test Laboratory

Shenzhen HUAKE Testing Technology Co., Ltd.

Add.: 1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

Testing Laboratory Authorization :

A2LA Accreditation Code is 4781.01.

FCC Designation Number is CN1229.

Canada IC CAB identifier is CN0045.

CNAS Registration Number is L9589.

1.2 Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately **95** %.

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 2.71\text{dB}$
2	Radiated Emission Test	$\pm 3.35\text{dB}$
3	RF Power, Conducted	$\pm 0.37\text{dB}$
4	Spurious Emissions, Conducted	$\pm 0.11\text{dB}$
5	All Emissions, Radiated(<1G)	$\pm 3.90\text{dB}$
6	All Emissions, Radiated(>1G)	$\pm 4.28\text{dB}$



2. General Information

2.1 General Description of EUT

Equipment	Chihiros Heater Pro
Model Name	Heater Pro
Series Models	Heater, Heater 2, Heater Pro 2, Heater Max, Heater Max 2, Heater Ultra, Heater Ultra 2
Model Difference	All model's the function, software and electric circuit are the same, only with a product model named different. Test sample mode: Heater Pro.
Trade Mark	Chihiros Aquatic Studio
Antenna Type	PCB Antenna
Antenna Gain	-0.58dBi
Operation Frequency	2402-2480MHz
Number of Channels	40CH
Modulation Type	GFSK
Power Source	AC 100-120V, 50/60Hz
Power Rating	AC 100-120V, 50/60Hz
Firmware Version	V2
Hardware Version	V2

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2. Antenna gain Refer to the antenna specifications.
3. The cable loss data is obtained from the supplier.
4. The test results in the report only apply to the tested sample.
5. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain(dBi)	NOTE
1	N/A	N/A	PCB Antenna	N/A	-0.58	



6.

Channel List							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2402	11	2422	21	2442	31	2462
02	2404	12	2424	22	2444	32	2464
03	2406	13	2426	23	2446	33	2466
04	2408	14	2428	24	2448	34	2468
05	2410	15	2430	25	2450	35	2470
06	2412	16	2432	26	2452	36	2472
07	2414	17	2434	27	2454	37	2474
08	2416	18	2436	28	2456	38	2476
09	2418	19	2438	29	2458	39	2478
10	2420	20	2440	30	2460	40	2480



2.2 Description of Test Modes

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possibly have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	CH01:2402MHz
Mode 2	CH20:2440MHz
Mode 3	CH40:2480MHz



2.3 Test Conditions

The BT module was tested while in a continuous transmitter/receiver mode.
The EUT was tuned to a low, middle, and high channel for all tests. For all test case pre/scans were completed in all Modes to determine worst case levels.

Power Supply Voltage Fluctuation Test

Voltage mode	Input Voltage	Radio Unit Voltage
AC Input	AC 99V	3.31V
	AC 110V	3.30V
	AC 121V	3.30V
Note: 1 The radio unit Voltage with the module regulator IC regulator. 2 The radio unit less than 1%, so the test only rated voltage (Normal voltage) with the battery.		

During the input supply voltage to the EUT from the external power source is varied by +/- 10%, if output voltage had been confirmed that the fluctuation of power supply to the RF circuit of EUT (excluding power source) is equal to or less than +/-1%. Exempt extremely high and low supply voltage condition test, EUT only operated in normal voltage to test all regulations.

2.4 Block Diagram Showing the Configuration of System Tested

Mode 1:





2.5 Description of Support Units (Conducted Mode)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Trade Mark	Model/Type No.	Specification	Note
E-1	Chihiros Heater Pro	Chihiros Aquatic Studio	Heater Pro	N/A	EUT

Item	Shielded Type	Ferrite Core	Length	Note

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (3) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.

**2.6 Equipments List for All Test Items**

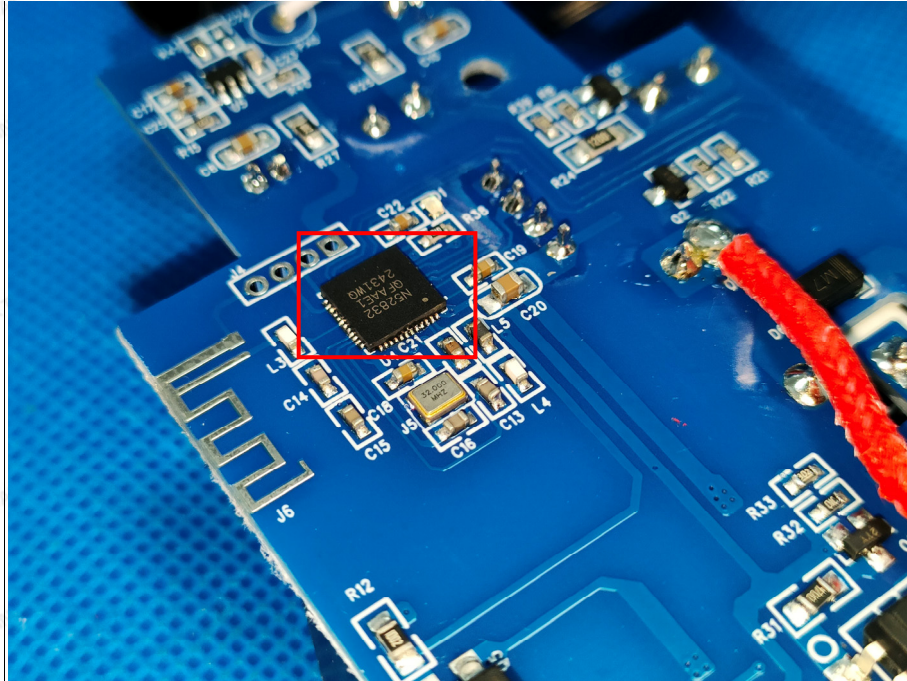
Item	Equipment	Manufacturer	Calibration Institution	Model No.	Serial No.	Equipment Number	Last Cal.	Cal. Interval
1	Spectrum analyzer	Agilent	Guangzhou LiSai Metrology & Test Co.,Ltd.	N9020A	101431	HKE-025	2024/02/20	1 Year
2	Spectrum analyzer	R&S	Guangzhou LiSai Metrology & Test Co.,Ltd.	FSV3044	25984	HKE-126	2024/02/20	1 Year
3	RF Automatic control unit	Tonscend	Guangzhou LiSai Metrology & Test Co.,Ltd.	JS0806-2	71557	HKE-060	2024/02/20	1 Year
4	High pass filter unit	Tonscend	Guangzhou LiSai Metrology & Test Co.,Ltd.	JS0806-F	17155	HKE-055	2024/02/20	1 Year
5	Wireless Communication Test Set	R&S	Guangzhou LiSai Metrology & Test Co.,Ltd.	CMU200	105255	HKE-026	2024/02/20	1 Year
6	Wireless Communication Test Set	R&S	Guangzhou LiSai Metrology & Test Co.,Ltd.	CMW500	103974	HKE-027	2024/02/20	1 Year
7	RF Test Software	Tonscend	/	JS1120-3 Version 3.5.39	/	HKE-083	/	/

Note: The calibration agency listed on the table corresponds to item ii c) of Article 24-2 paragraph 4.



3. RF Shielding Method

We apply the product for Japan RF certification. Number of terminals is 48, Terminal pitch is 1 mm. It is not easily removed. Please refer to following for photo for details. Red circle part of the RF module soldered on the PCB.





4. Test Result

4.1 Frequency Error

4.1.1 Limit

Item	Limits
Frequency Error	+/-50ppm

4.1.2 Measuring Instruments and Setting

The following table is the setting of Spectrum Analyzer.

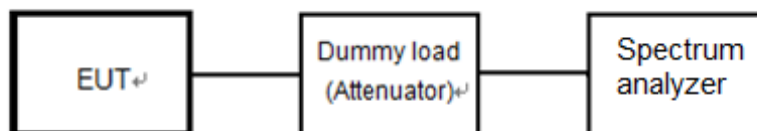
Spectrum Parameter	Setting
Attenuation	Auto
RB / VB	10KHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.1.3 Test Procedures

- (1) In the case of unmodulated signal (continuous or continuous burst), measure the frequency directly by a spectrum analyzer.
- (2) In the case of burst waves, the measurement shall be done for enough time in order to obtain the enough measuring accuracy, and the average of the measured values becomes the final value.
- (3) In the case of a test mode with a specific frequency spectrum, measure the frequency of the specific spectrum by a spectrum analyzer.
- (4) In the cases above, if the frequency equivalent to the test frequency is not directly measured in principle, it shall be obtained by necessary calculation.

In the case of modulated signal, if there is no specific spectrum measurable by a spectrum analyzer but a specific dip is observed, it is allowed to measure the frequency with the signal generator (synthesized). That is, observe a signal of the signal generator concurrently (or alternately) with the tested signal using the spectrum analyzer while setting the frequency of the signal generator to the position of the dip on the screen of the spectrum analyzer, and determine the frequency of the signal generator at the time as a measured value.

4.1.4 Test Setup Layout



4.1.5 EUT Operation during Test

The EUT was placed on the test table and programmed in un-modulation function.



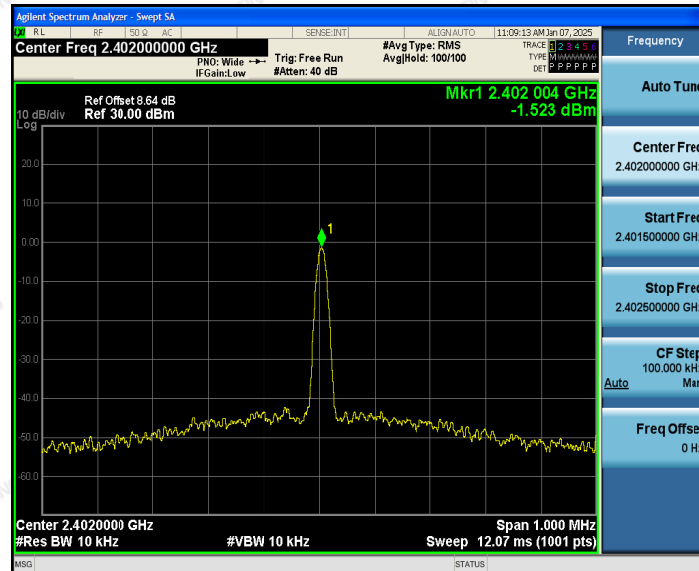
4.1.6 Test Result

EUT:	Chihiros Heater Pro	Test Date:	Jan. 07, 2025
Temperature:	25°C	Tested by:	Len Liao
Humidity:	55 % RH	Test Voltage	Normal Voltage
Operation Mode:	Normal Voltage- Carrier Tx Mode		

Mode	CH	Measured	Tolerance	Result	Limit
		MHz	MHz	ppm	ppm
Carrier	CH01:2402MHz	2402.004	0.004	1.665	+/-50
	CH20:2440MHz	2440.004	0.004	1.639	+/-50
	CH40:2480MHz	2480.004	0.004	1.613	+/-50

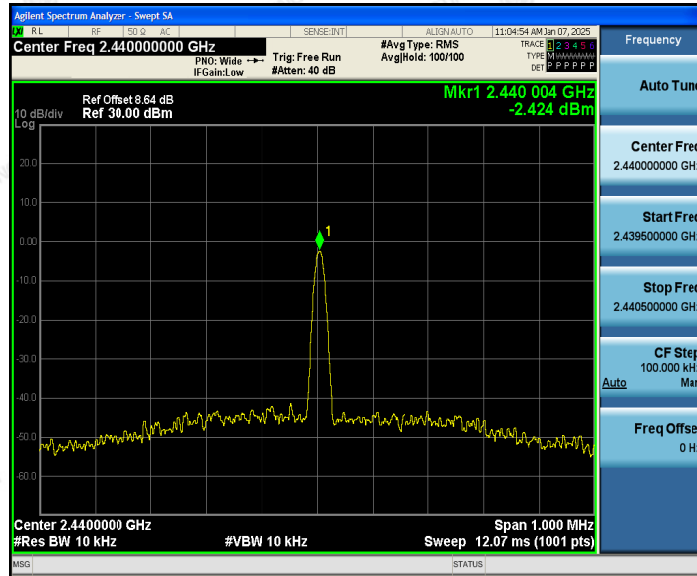
Conclusion : PASS

CH01:2402MHz:

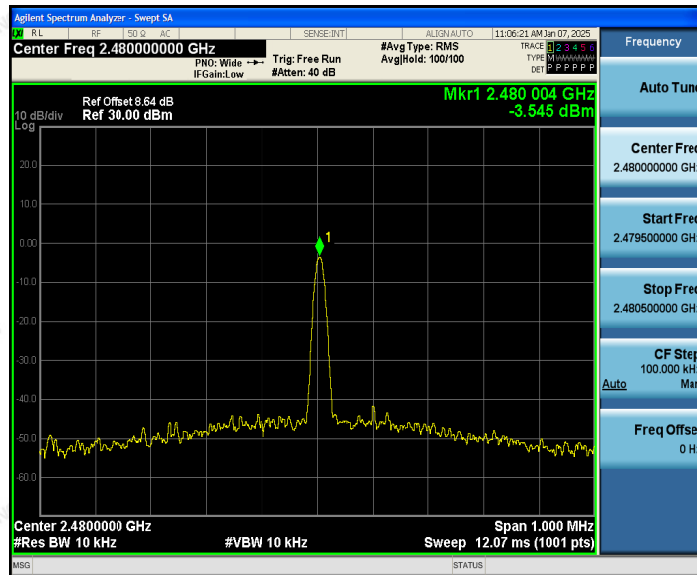




CH20:2440MHz:



CH40:2480MHz:





4.2. Antenna Power

4.2.1 Limit

Item	Limits
Antenna Power Density	$\leq 3\text{mW/MHz}$ (FH form 2427 - 2470.75 MHz) $\leq 10\text{mW/MHz}$ (OFDM,DS from 2400~2483.5MHz) $\leq 10\text{mW}$ (Other from 2400~2483.5MHz)
Antenna Power Error	+20% (Base on manufacturer declare antenna power density)

4.2.2 Measuring Instruments and Setting

1. The EUT was placed on a table which is 0.8m above ground plane.
2. The EUT was directly connected to the Power meter.

4.2.3 Test Setup Layout



4.2.4 EST Deviation

- (1) Configure EUT and assistant system according clause 2.2 and 4.3.
 - (2) Set EUT work in test mode as described in clause 2.2.
 - (3) Connect the power meter for testing, find the peak power and record it.
- Note: The cable loss and attenuator loss have been put into spectrum analyzer as amplitude offset.



4.2.5 Test Result

EUT:	Chihiros Heater Pro	Test Date:	Jan. 07, 2025
Temperature:	25°C	Tested by:	Len Liao
Humidity:	55 % RH	Test Voltage	Normal Voltage
Operation Mode:	Normal Voltage		

Test Frequency	Antenna Power (dBm)	Result (mW)	Limit (mW)
2402MHz	1.98	1.58	10
2440MHz	1.43	1.39	10
2480MHz	0.86	1.22	10

Test Frequency	Conducted RF Output Power (mW)	Rated Power (mW)	Antenna Power Error (%)
2402MHz	1.58	4	-60.50
2440MHz	1.39	4	-65.25
2480MHz	1.22	4	-69.50
Limit : +20% (Base on manufacturer declare antenna power density)			

Test Frequency	Antenna Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)
2402MHz	1.98	-0.58	1.40	12.14
2440MHz	1.43	-0.58	0.85	12.14
2480MHz	0.86	-0.58	0.28	12.14



4.3. Occupied Bandwidth

4.3.1 Limit

Item	Limits
Occupied Bandwidth:	FH 83.5MHz; OFDM,DS $\leq 26\text{MHz}$; Others $\leq 26\text{MHz}$

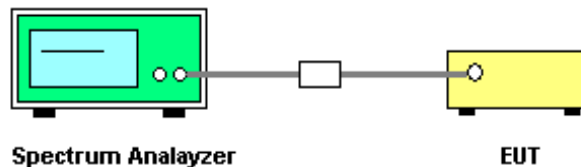
4.3.2 Measuring Instruments and Setting

Spectrum Parameter	Setting
Attenuation	Auto
RB / VB	300kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.3.3 Test Procedures

- Setting of SA is following as: RB: 300kHz / VB: 300kHz / SPAN: 4MHz / AT: 40dB Ref: 30dBm / Sweep time: Auto / Sweep Mode: Continuous sweep / Detect mode: Positive peak / Trace mode: Max hold.
- EUT have transmitted the maximum modulation signal and fixed channelize (For DSSS or OFDM Device) or continuous maximum power of hopping mode (For FHSS Device). SA set to 99% of occupied bandwidth to measure occupied bandwidth. The limit is less than 26MHz (For DSSS or OFDM Device) or 83.5MHz (For FHSS Device).

4.3.4 Test Setup Layout



4.3.5 Test Deviation

There is no deviation with the original standard.

4.3.6 EUT Operation during Test

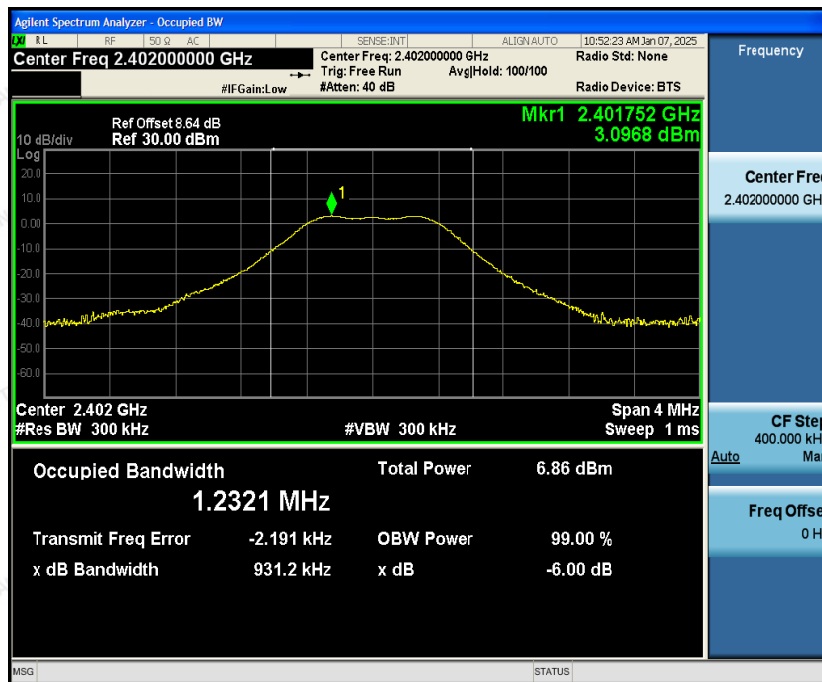
The EUT was programmed to be in continuously transmitting mode.



4.3.7 Test Result

EUT:	Chihiros Heater Pro	Test Date:	Jan. 07, 2025
Temperature:	25°C	Tested by:	Len Liao
Humidity:	55 % RH	Test Voltage	Normal Voltage
Operation Mode:	Normal Voltage		

Test Voltage	Test Frequency (MHz)	Occupied Bandwidth (MHz)
Normal Voltage	2402	1.2321
	2440	1.2266
	2480	1.2293







4.4. Unwanted Emission Intensity Measurement

4.4.1 Limit

Item	Limits
TX Spurious Emission	$\leq 2.5 \mu\text{W}$ ($30\text{MHz} \leq f \leq 1000\text{MHz}$)
	$\leq 2.5 \mu\text{W}$ ($1000\text{MHz} < f \leq 2387\text{MHz}$)
	$\leq 25 \mu\text{W}$ ($2387\text{MHz} < f \leq 2400\text{MHz}$)
	$\leq 25 \mu\text{W}$ ($2483.5\text{MHz} \leq f < 2496.5\text{MHz}$)
	$\leq 2.5 \mu\text{W}$ ($2496.5\text{MHz} \leq f < 12500\text{MHz}$)

4.4.2. Measuring Instruments and Setting

Please refer to section 5 in this report. The following table is the setting of Spectrum Analyzer.

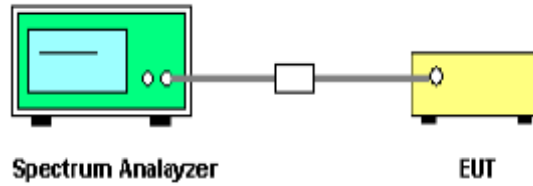
Spectrum Parameter	Setting
Attenuation	Auto
RB / VB	1 MHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.4.3. Test Procedures

1. EUT have transmitted the maximum modulation signal and fixed channelize.
2. Setting of SA is following as: Below 1GHz RB:1MHz / VB:1MHz
Above 1GHz RB:1MHz / VB:1MHz / AT: Auto Ref: Auto / Sweep time: Auto
Sweep Mode: Continuous sweep / Detect mode: Positive peak
Trace mode: Max hold
3. Setting of SA is following as 30MHz and stop frequency 1000MHz Then to mark peak reading value + cable loss shall be less than 2.5μW.
4. Setting of SA is following as 1000MHz and stop frequency 2387MHz Then to mark peak reading value + cable loss shall be less than 2.5μW.
5. SA adjusted to start frequency 2387MHz and stop frequency 2400MHz. Then to mark peak reading value + cable loss shall be less than 25μW.
6. SA adjusted to start frequency 2483.5MHz and stop frequency 2496.5MHz Then to mark peak reading value + cable loss shall be less than 25μW
7. SA adjusted to start frequency 2496.5MHz and stop frequency 12500MHz Then to mark peak reading value + cable loss shall be less than 2.5μW
8. Measure side band spurious as follows: For 2.4GHz band: 2374MHz~2400MHz and 2483.5MHz~2509.5MHz RBW = VBW = 30kHz, Result_Value = Measured_Value + 15.2 [dBm]
9. If the Result_Value is over the requirement, take total sum of 1MHz band centered at the spur frequency like ACLP measurement as Result_Value.



4.4.4. Test Setup Layout



4.4.5. Test Deviation

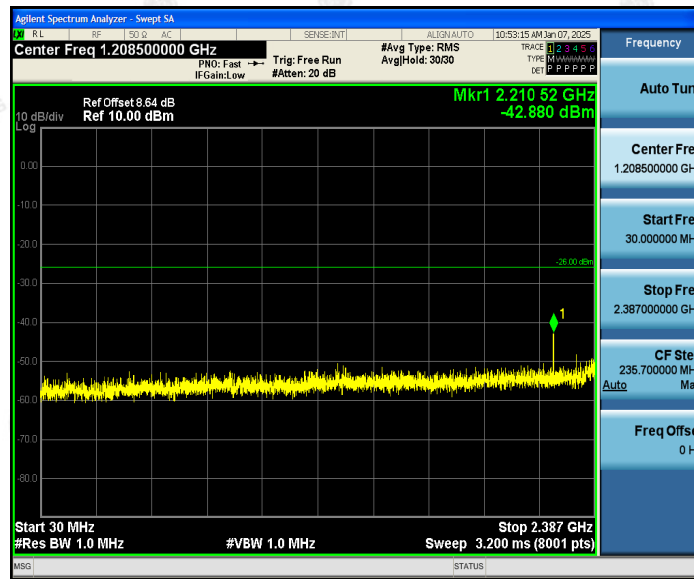
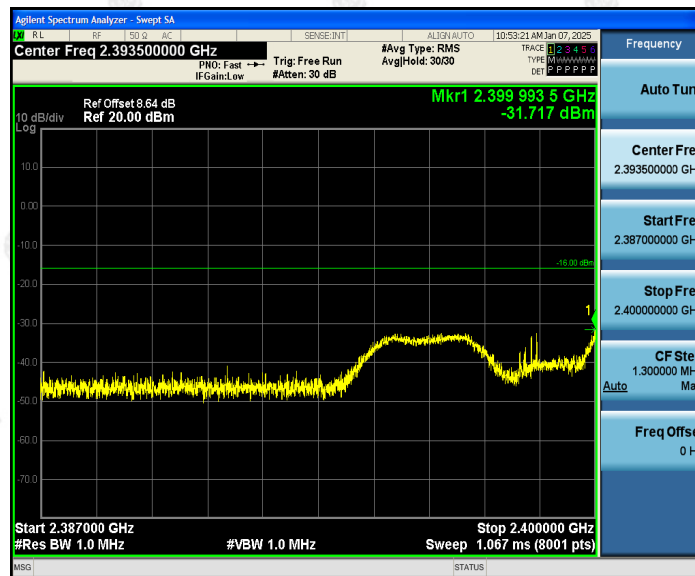
There is no deviation with the original standard.

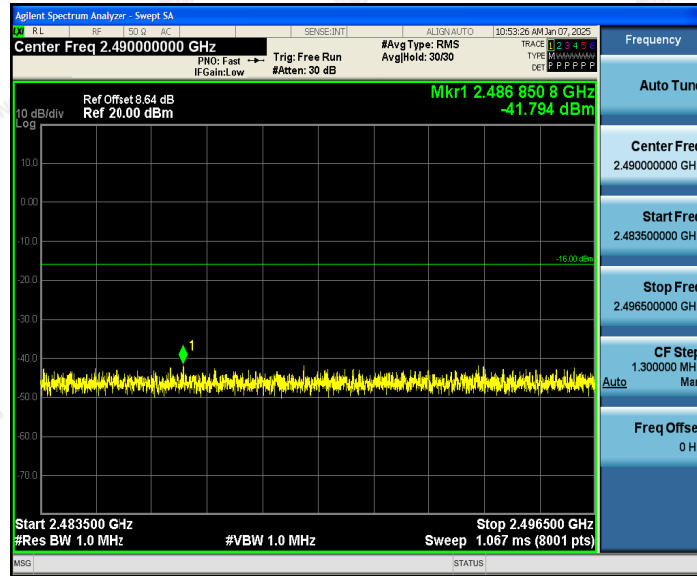
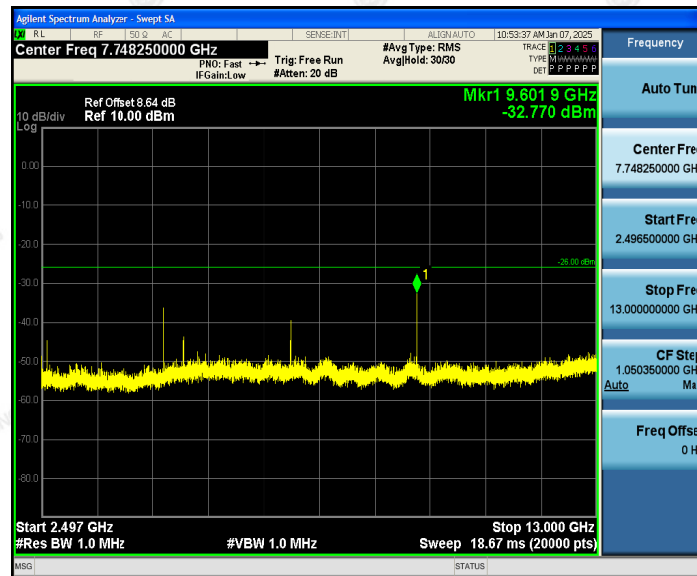


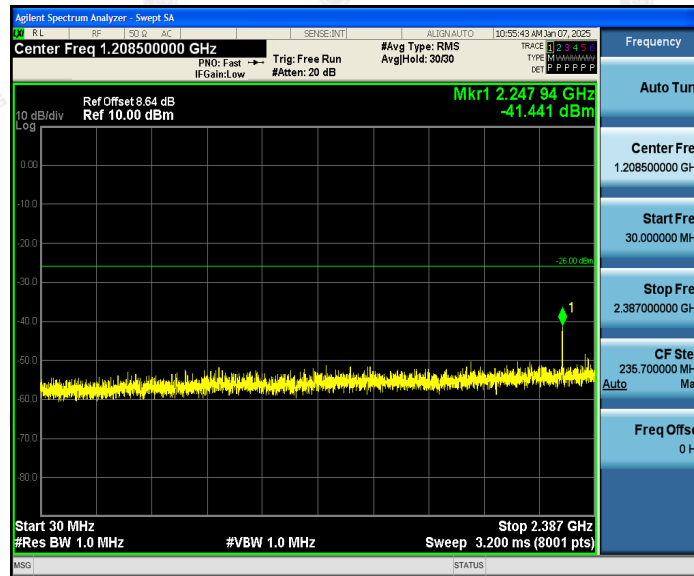
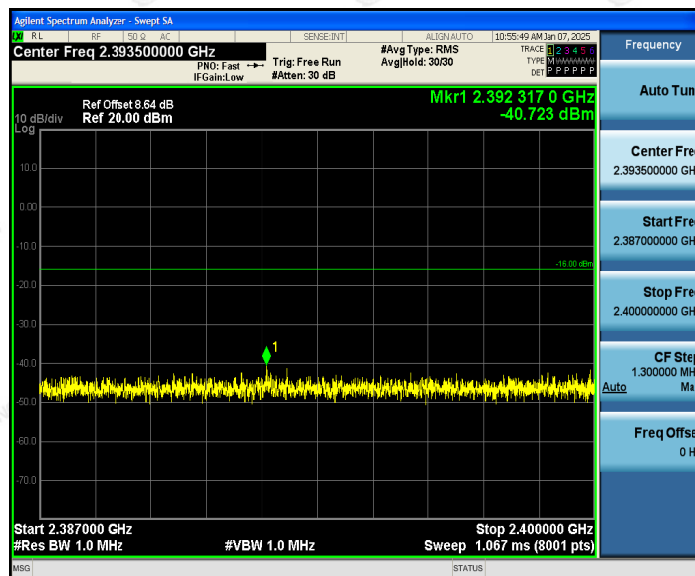
4.4.6. Test Result

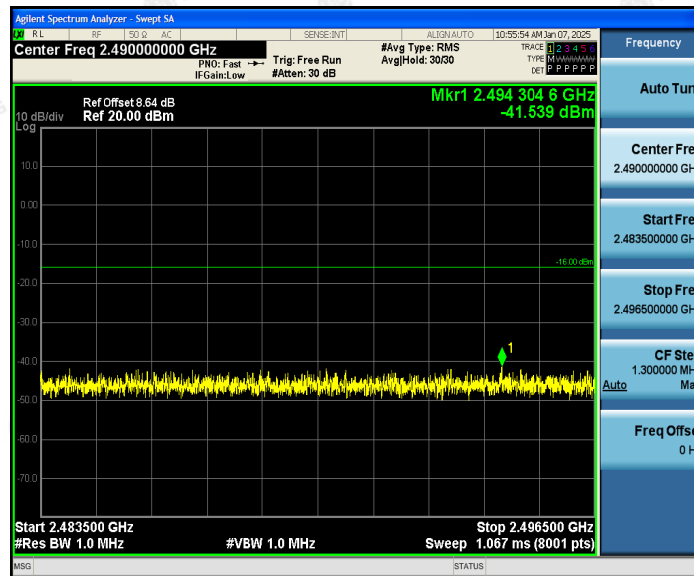
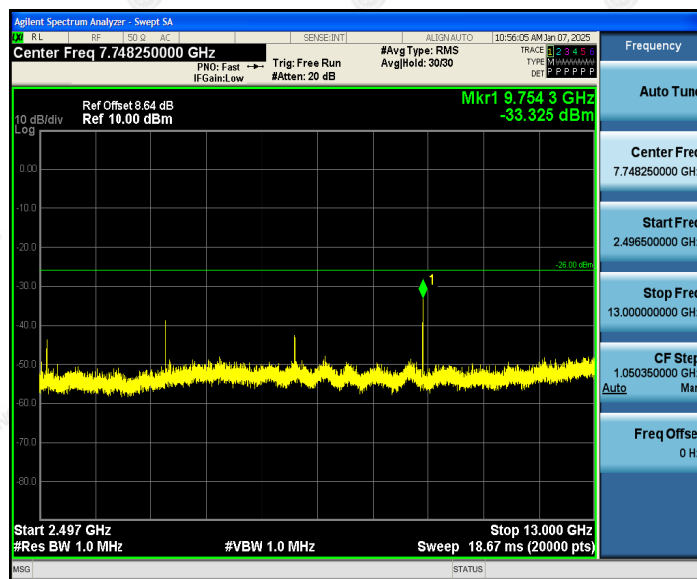
EUT:	Chihiros Heater Pro	Test Date:	Jan. 07, 2025
Temperature:	25°C	Tested by:	Len Liao
Humidity:	55 % RH	Test Voltage	Normal Voltage
Operation Mode:	Normal Voltage		

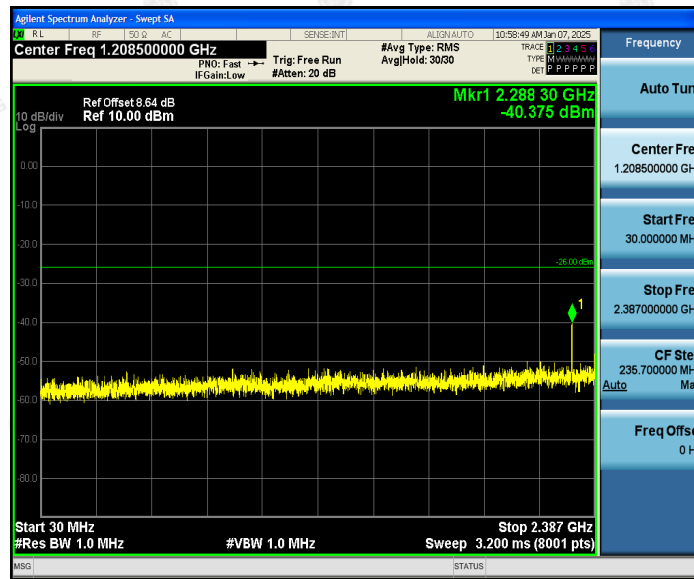
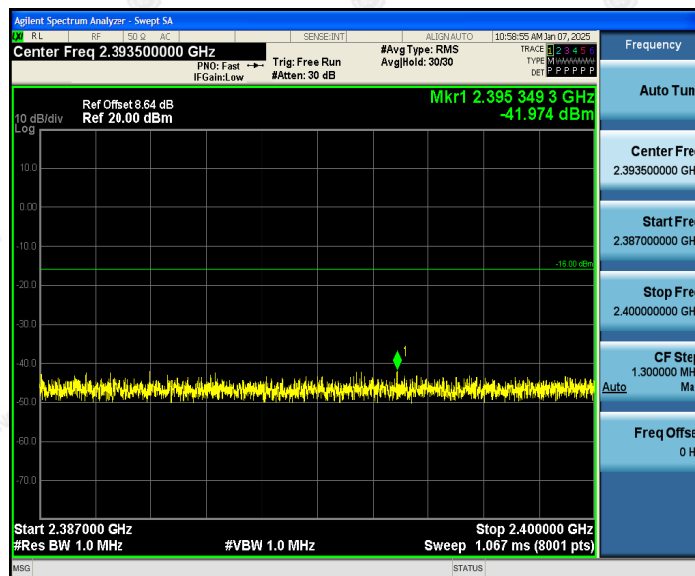
Test Channel	StartFre[MHz]	StopFre[MHz]	Test Fre [MHz]	Max.Level [dBm]	Max.Level[μW]	Limit[μW]	Verdict
2402	30	2387	2210.52	-42.88	0.0515	<2.5	PASS
2402	2387	2400	2399.99	-31.72	0.6730	<25	PASS
2402	2483.5	2496.5	2486.85	-41.79	0.0662	<25	PASS
2402	2496.5	13000	9601.95	-32.77	0.5284	<2.5	PASS
2440	30	2387	2247.94	-41.44	0.0718	<2.5	PASS
2440	2387	2400	2392.32	-40.72	0.0847	<25	PASS
2440	2483.5	2496.5	2494.30	-41.54	0.0701	<25	PASS
2440	2496.5	13000	9754.26	-33.33	0.4645	<2.5	PASS
2480	30	2387	2288.30	-40.38	0.0916	<2.5	PASS
2480	2387	2400	2395.35	-41.97	0.0635	<25	PASS
2480	2483.5	2496.5	2494.03	-41.21	0.0757	<25	PASS
2480	2496.5	13000	9914.44	-32.82	0.5224	<2.5	PASS

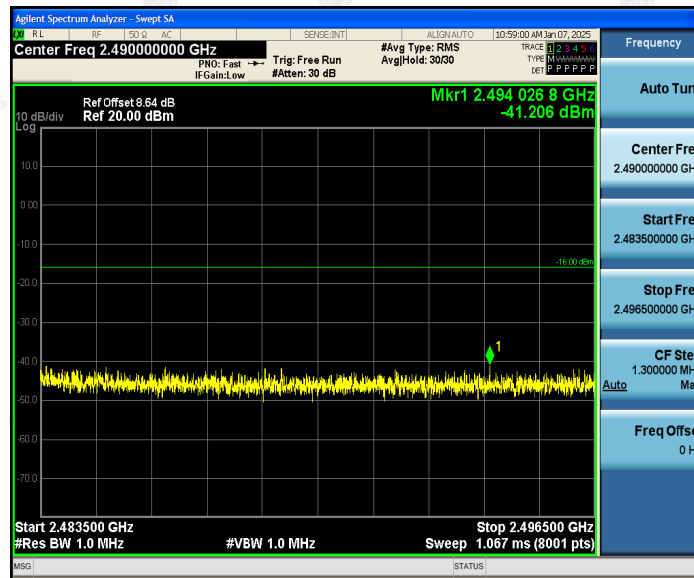
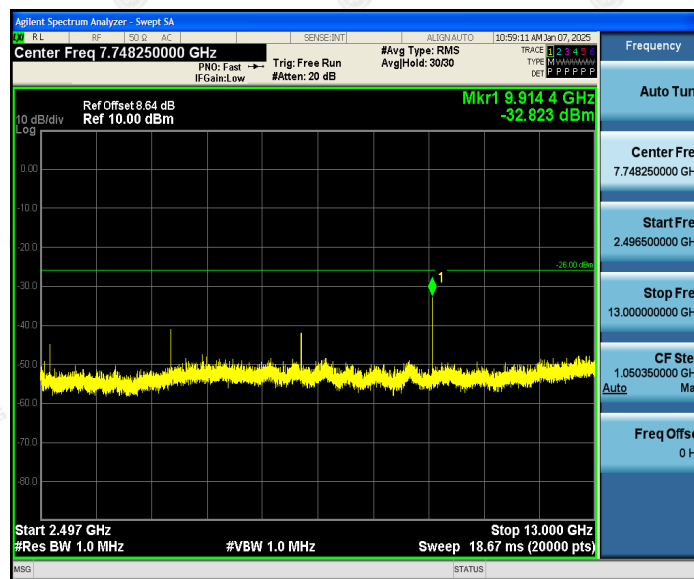
CH 01:2402MHz - Frequency Band 1 ($30 \text{ MHz} \leq f \leq 2387 \text{ MHz}$)CH 01:2402MHz - Frequency Band 3 ($2387 \text{ MHz} < f \leq 2400 \text{ MHz}$)

**CH 01:2402MHz - Frequency Band 4 ($2483.5 \text{ MHz} \leq f < 2496.5 \text{ MHz}$)****CH 01:2402MHz - Frequency Band 5 ($2496.5 \text{ MHz} \leq f < 13 \text{ GHz}$)**

CH 20:2440MHz - Frequency Band 1 (30 MHz $\leq$ f $\leq$ 2387 MHz)CH 20:2440MHz - Frequency Band 3 (2387 MHz < f $\leq$ 2400 MHz)

CH 20:2440MHz - Frequency Band 4 (2483.5 MHz $\leq$ f < 2496.5 MHz)CH 20:2440MHz - Frequency Band 5 (2496.5 MHz $\leq$ f < 13 GHz)

**CH 40:2480MHz- Frequency Band 1 ($30\text{ MHz} \leq f \leq 2387\text{ MHz}$)****CH 40:2480MHz - Frequency Band 3 ($2387\text{ MHz} < f \leq 2400\text{ MHz}$)**

**CH 40:2480MHz - Frequency Band 4 ($2483.5 \text{ MHz} \leq f < 2496.5 \text{ MHz}$)****CH 40:2480MHz- Frequency Band 5 ($2496.5 \text{ MHz} \leq f < 13 \text{ GHz}$)**



4.5. Imitation of Collateral Emission of Receiver Measurement

4.5.1 Limit

Item	Limits
RX Spurious Emission:	$\leq 4\text{nW}$ ($f < 1\text{GHz}$)
	$\leq 20\text{nW}$ ($1\text{GHz} \leq f$)

4.5.2 Measuring Instruments And Setting

Please refer to section 5 in this report. The following table is the setting of Spectrum Analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
RB	100 kHz (below 1GHz emissions) 1 MHz (above 1GHz emissions)
VB	100 kHz (below 1GHz emissions) 1 MHz (above 1GHz emissions)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.5.3 Test Procedures

1. EUT have the continuous reception mode and fixed only one channelize.
2. Setting of SA is following as RB / VB: 100 kHz (below 1GHz emissions) / 1 MHz (above 1GHz emissions) /
AT: Auto / Ref: Auto / Sweep time: Auto / Sweep Mode: Continuous sweep / Detect mode: Positive peak / Trace mode: Max hold
3. SA set RB: 100kHz and VB: 100kHz. Then adjust to start frequency 30MHz and stop frequency 1000MHz. Search to mark peak reading value + cable loss shall be less than 4nW
4. SA set RB: 1MHz and VB: 1MHz. Then adjust to start frequency 1000MHz and stop frequency 12500MHz. Search to mark peak reading value + cable loss shall be less than 20nW
5. If power level of lower emissions are more than 1/10 of limit (.0.4nW for $f < 1\text{GHz}$, 2nW for $f \geq 1\text{GHz}$), all those are to be indicated in the 2nd and 3rd lines. If others are 1/10 or less more of the limit, no necessary to be indicated.

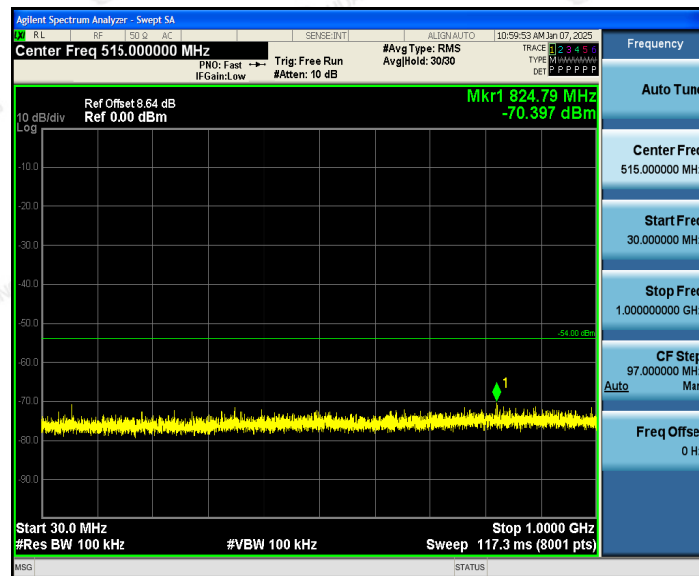


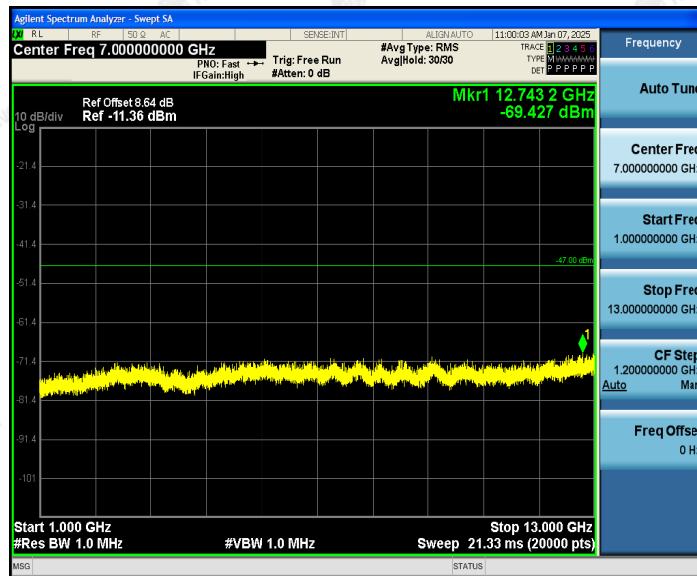
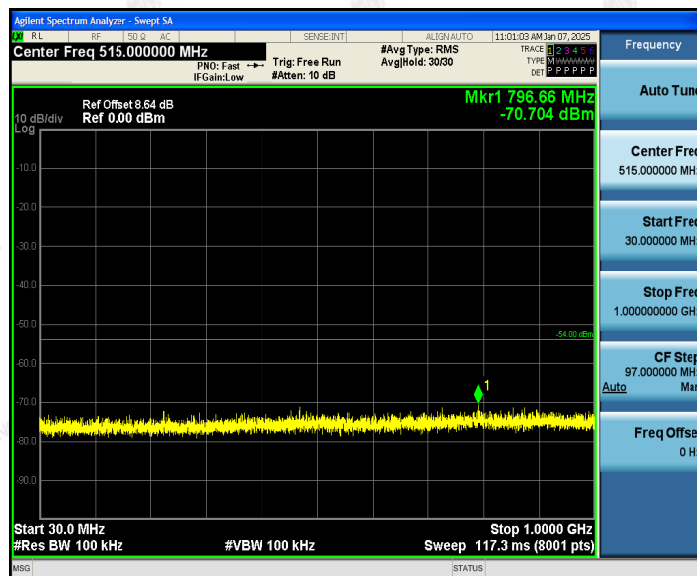
4.5.4 Test Result

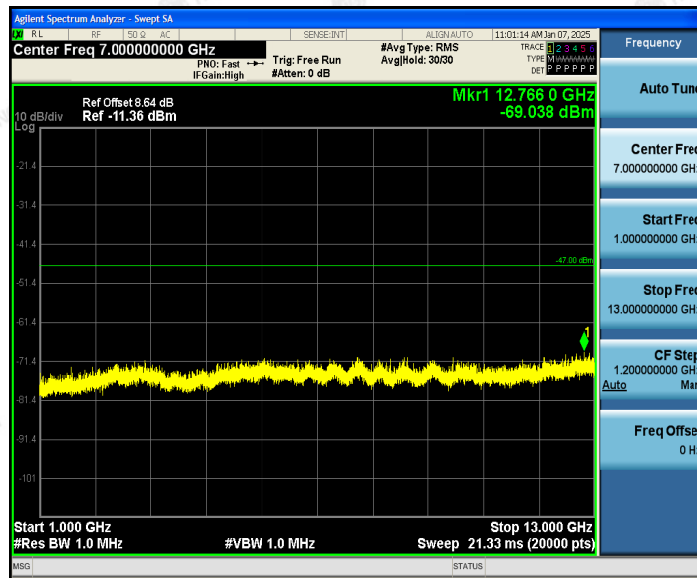
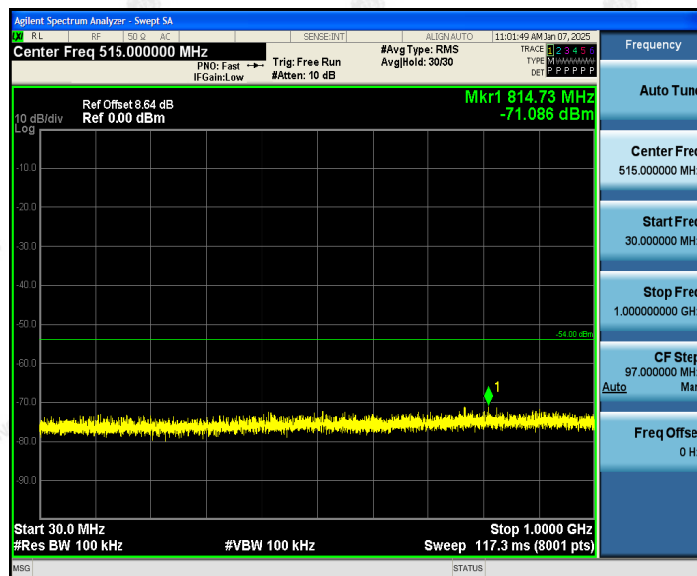
EUT:	Chihiros Heater Pro	Test Date:	Jan. 07, 2025
Temperature:	25°C	Tested by:	Len Liao
Humidity:	55 % RH	Test Voltage	Normal Voltage
Operation Mode:	Normal Voltage		

The worst test channel of all channels was showed as the follow:

Test Channel	StartFre[MHz]	StopFre[MHz]	Test Fre [MHz]	Max.Level[dBm]	Max.Level[nW]	Limit[nW]	Verdict
2402	30	1000	824.79	-70.40	0.09	<4	PASS
2402	1000	13000	12743.19	-69.43	0.11	<20	PASS
2440	30	1000	796.66	-70.70	0.09	<4	PASS
2440	1000	13000	12765.99	-69.04	0.12	<20	PASS
2480	30	1000	814.73	-71.09	0.08	<4	PASS
2480	1000	13000	12817.59	-68.33	0.15	<20	PASS

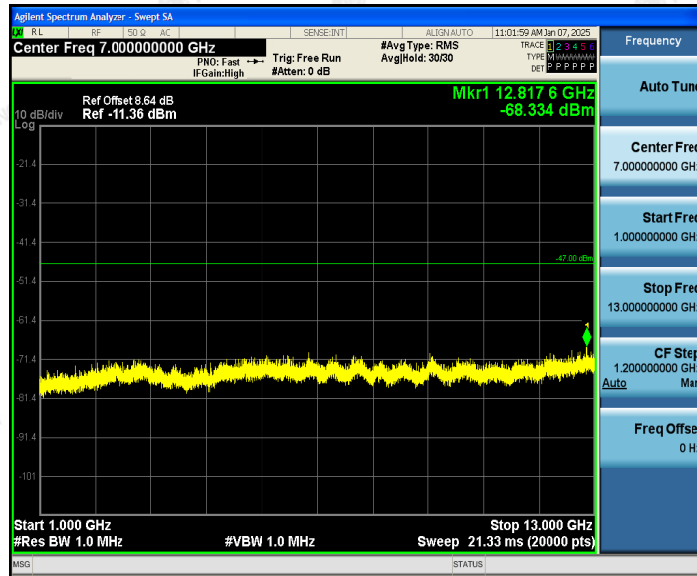
CH 01:2402MHz-RX-Frequency Band 1 (30 MHz $\leq$ f < 1000 MHz)

CH 01:2402MHz-RX-Frequency Band 2 ($1000 \text{ MHz} \leq f < 13000 \text{ MHz}$)CH 20:2440MHz-RX-Frequency Band 1 ($30 \text{ MHz} \leq f < 1000 \text{ MHz}$)

CH 20:2440MHz-RX-Frequency Band 2 ($1000 \text{ MHz} \leq f < 13000 \text{ MHz}$)CH 40:2480MHz-RX-Frequency Band 1 ($30 \text{ MHz} \leq f < 1000 \text{ MHz}$)



CH 40:2480MHz-RX-Frequency Band 2 (1000 MHz $\leq$ f < 13000 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by HUAKE, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.cer-mark.com>.

TEL : +86-755 2302 9901 FAX : +86-755 2302 9901 E-mail : service@cer-mark.com

Add: 1-2F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China



4.6. Transmission Antenna Gain (EIRP Antenna Power) Measurement

4.6.1 Limit

Item	Limits
EIRP Power Density	$\leq 6.91\text{dBm/MHz}$ (FH form 2427 - 2470.75 MHz) $\leq 12.14\text{dBm/MHz}$ (OFDM,DS from 2400~2483.5MHz) $\leq 12.14\text{dBm}$ (Other from 2400~2483.5MHz)
Note: This test item is not applied for radio equipment with equivalent isotropic radiation power lower than 12.14dBm/MHz, but Antenna Power(Conducted) limit is 10 mW/MHz (10 dBm/MHz), So the test item will not be applied to the transmission antenna which has a gain of 2.14dBi or less	

4.6.2 Measuring Instruments and Setting

Please refer to section 5 in this report. The following table is the setting of spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
RB/VB	1 MHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

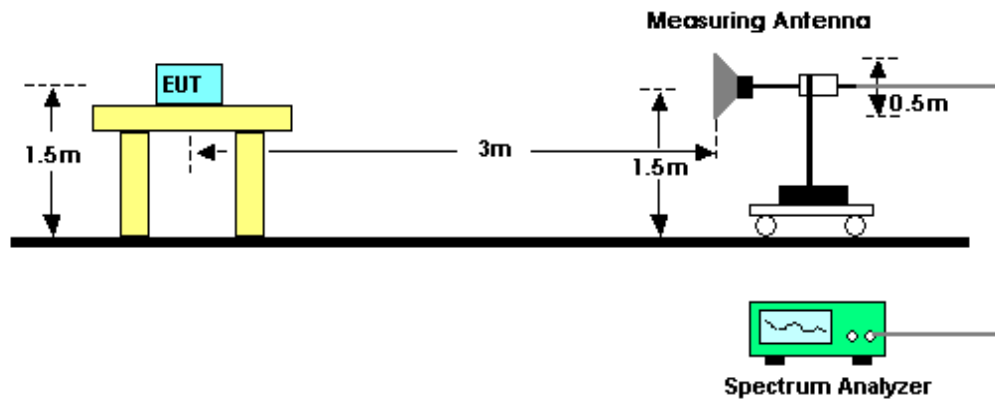
4.6.3 Test Procedures

1. Set EUT and measuring antenna at the same height and roughly facing each other.
2. Move the measuring antenna height up and down within $\pm 50\text{cm}$ of EUT height and swing it to find the maximum output of the measuring antenna. The output level at the spectrum analyzer is read as "E".
3. Remove the EUT from the turn table and put the replacing antenna facing to measuring antenna at same height. Set the standard signal generator (SSG) at same frequency and transmit on then receive the signal
4. Swing the replacing antenna give a maximum receiving level.
5. Move the measuring antenna height up and down within $\pm 50\text{cm}$ of replacing antenna height and swing it to find the maximum receiving level.
6. Set SSG output power at Pt to give the equivalent output level of "E" or calculate Pt with SSG output which gives the nearest of "E" and difference ($\pm 1\text{dB}$). Record the Pt.
7. Calculate EIRP by the formula below $\text{EIRP} = G_t - L + P_t$.
 Gt: gain of replacing antenna (dBi)
 L: feeder loss between SSG and replacing antenna
 Pt: Output power of the SSG
8. If the antenna for the EUT has circular polarization, sum of V-field and H-field will be result if measuring antenna is linear polarization.

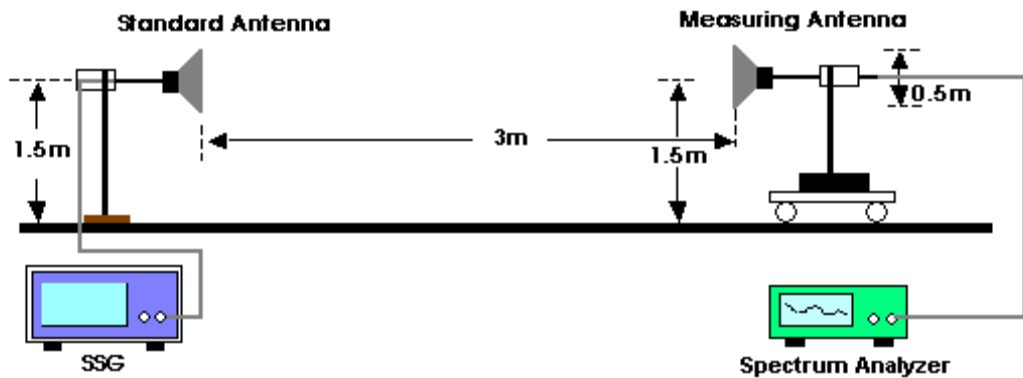


4.6.4 Test Setup Layout

For EUT Radiation Measurement



For Standard Antenna Measurement



4.6.5 Test Deviation

There is no deviation with the original standard.

4.6.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.6.7 Results of Transmission Antenna Gain

Note: This test item will not be applied to the transmission antenna which has a gain of 2.14 dBi or less.



4.7. Transmission Radiation Angle Width (3dB Beam width) Measurement

4.7.1 Limit

Item	Limits
3dB antenna beam width	$360/A$ (If $A < 1$; then $A = 1$) $A = \{\text{EIRP Power [mW]} / 16.36 \text{ for DS, OFDM}\}$ or $A = \{\text{EIRP Power [mW]} / 4.9 \text{ for FH}\}$
Note: This test item is not applied for radio equipment with equivalent isotropic radiation power lower than 12.14dBm/MHz, but Antenna Power(Conducted) limit is 10 mW/MHz (10 dBm/MHz), So the test item will not be applied to the transmission antenna which has a gain of 2.14dBi or less	

4.7.2 Measuring Instruments and Setting

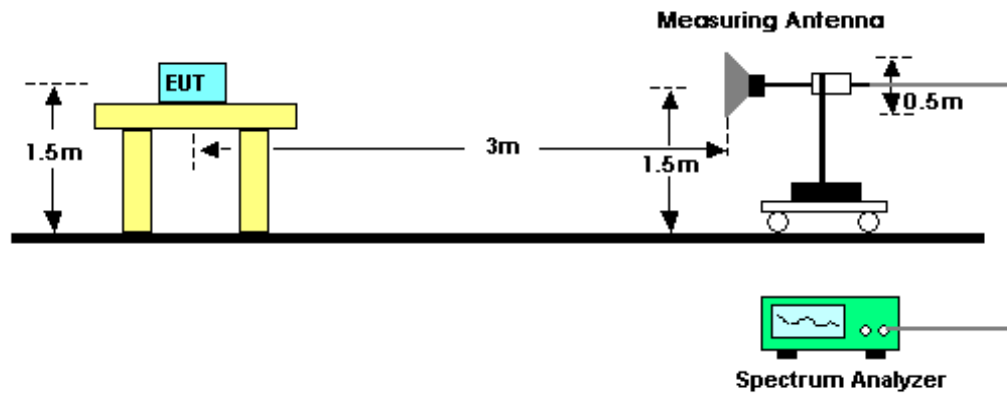
Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	0 MHz
RB	1 MHz
VB	1 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.7.3 Test Procedures

1. Set EUT and measuring antenna at the same height and roughly facing each other.
2. Set spectrum analyzer with condition in section 4.7.2 and tune reference level to observe receiving signal position.
3. Rotate directions of the EUT horizontally and vertically to find the maximum receiving power.
4. Move the measuring antenna height up and down within $\pm 50\text{cm}$ of EUT height and swing it to find the maximum output of measuring antenna. The output level at the spectrum analyzer is read as "E"
5. Calculate permitted radiation angle in horizontal and vertical using EIRP measured in another test method.
6. Calculate 3dB antenna beam width by the formula below $360/A$ (If $A < 1$; then $A = 1$).
 $A = \{\text{EIRP Power [mW]} / 16.36 \text{ for DS, OFDM}\}$ or
 $A = \{\text{EIRP Power [mW]} / 4.9 \text{ for FH}\}$



4.7.4 Test Setup Layout



4.7.5 Test Deviation

There is no deviation with the original standard.

4.7.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.7.7 Test Result of Transmission Radiation Angle Width (3dB Beam width)

This test item will not be applied to the transmission antenna which has a gain of 2.14 dBi or less.



4.8. Radio Interference Prevention Capability Measurement

4.8.1 Limit

Item	Limits
Identification code	≥ 48 bits

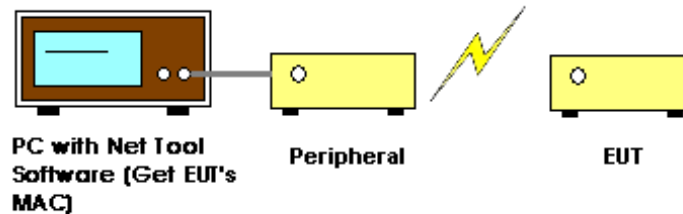
4.8.2 Measuring ID Code Software

Item	Limits
MAC IP List	MAC Scan

4.8.3 Test Procedures

1. In the case that the EUT has the function of automatically transmitting the identification code: a. Transmit the predetermined identification codes from EUT. b. Check the transmitted identification codes with the demodulator.
2. In the case of receiving the identification code: a. Transmit the predetermined identification codes from the counterpart. b. Check if communication is normal. c. Transmit the signals other than predetermined ID codes from the counterpart. d. Check if the EUT stops the transmission, or if it displays that identification codes are different from the predetermined ones.

4.8.4 Test Setup Layout



4.8.5 Test Deviation

There is no deviation with the original standard.

4.8.6 EUT Operation during Test

The EUT was programmed to be in normal transmitting mode.

**4.8.7 Test Result of Radio Interference Prevention Capabilit**

EUT:	Chihiros Heater Pro	Test Date:	Jan. 07, 2025
Temperature:	25°C	Tested by:	Len Liao
Humidity:	55 % RH		
Test result:	CONFORM (MAC IP LIST:DC:F3:BE:30:42:FB)		



4.9. Carrier Sensing Function

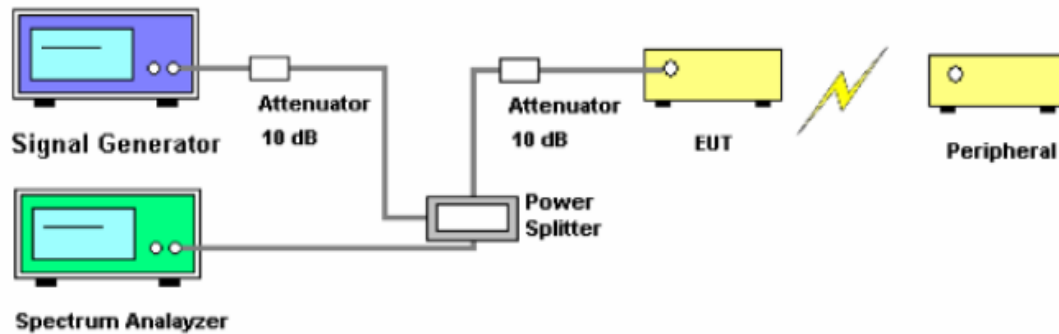
4.9.1 Test Requirement

MIC Notice No.88 Appendix No.43

Article 2, Paragraph 1, Item 19 Rules Section 10

4.9.2 Block Diagram of Test Setup

❖ Measurement System Diagram



❖ Conditions of Application Equipment (EUT)

- The EUT state shall be “normal mode link with wireless router”.

4.9.3 Test Procedure

1. SG adjusted the frequency as same as the EUT transmitted signal and emitted the absence of modulation from SG and power level is $(on\ 22.79+G-20*\log(f)dBm)$ (G is the antenna gain, f is the test frequency).
2. Turn off the RF signal of the SG.
3. EUT have transmitted the maximum modulation signal and fixed channelize.
4. Setting of SA:RBW/VBW=1MHz/1MHz, Span=50MHz, Sweep time=auto, Sweep mode=continuous, Detect mode=positive peak
5. SG RF signal on.
6. EUT shall be stop the transmitted any signal and SG RF signal off, the EUT will be continuous

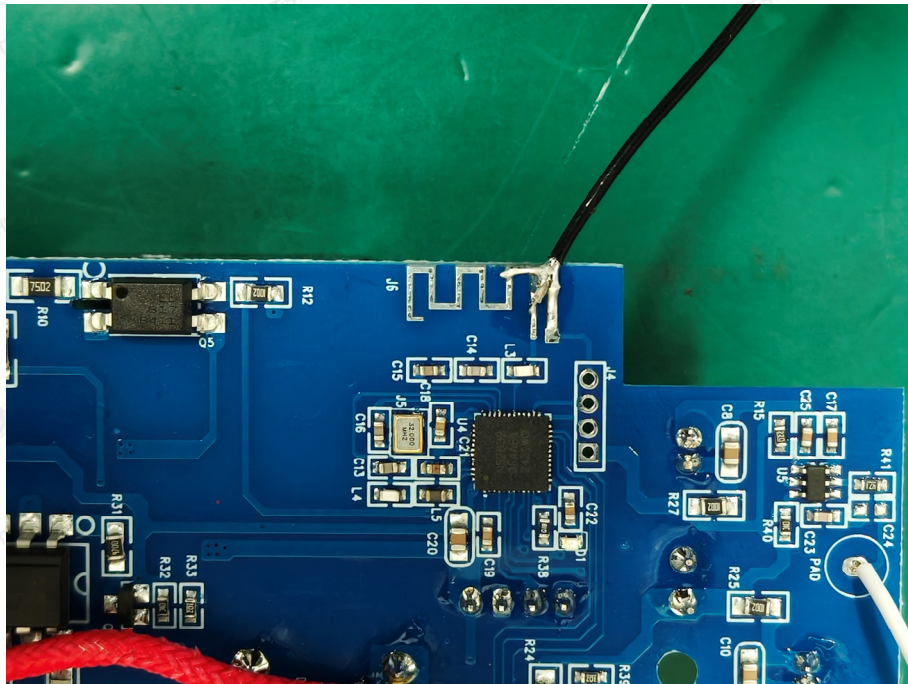
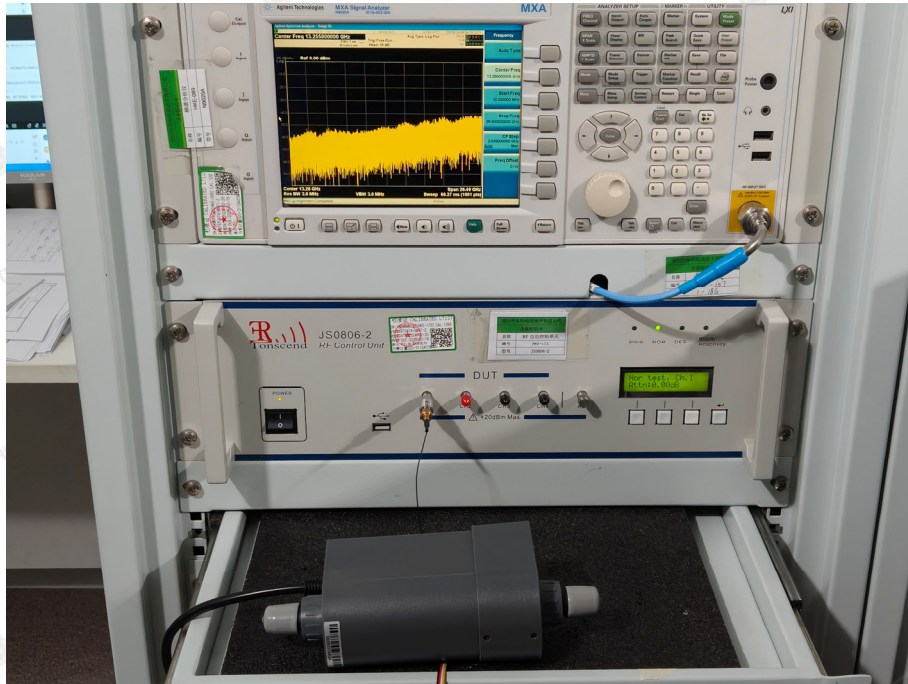
4.9.4 Test Result

EUT:	Chihiros Heater Pro	Test Date:	/
Temperature:	25°C	Tested by:	/
Humidity:	55 % RH		
Test result:	Not applicable other than OFDM modulation.		



5. Test Setup Photos of the EUT

Measurement Photos





6. Photos of the EUT

Reference to the report: ANNEX A of external photos and ANNEX B of internal photos

-----End of report-----