

Japan Specified Radio Test Report

Client Name : EcoFlow Inc..

Client Address : Plant A202, Founder Technology Industrial
Park, Shiyan Sub-district, Bao'an District
Shenzhen, Guangdong 518000 China

Product Name : Wi-Fi & Bluetooth Internet of Things Module

Report Date : Aug. 24, 2022

Shenzhen Anbotech Compliance Laboratory Limited



Shenzhen Anbotech Compliance Laboratory Limited

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TEST REPORT

Applicant : EcoFlow Inc.
Manufacturer : EcoFlow Inc.
Product Name : Wi-Fi & Bluetooth Internet of Things Module
Model No. : ESP32-WROOM-32UE
Trade Mark : 
Rating(s) : Input: 3.3V $\overline{\text{---}}$

Test Standard(s) : **MIC Notice No.88 Annex43**
Certificate regulation article 2, paragraph 1, item 19

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the MIC Notice No.88 Annex43 and Certificate regulation article 2, paragraph 1, item 19 requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

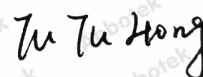
Date of Receipt

Jul. 27, 2022

Date of Test

Jul. 27~Aug. 09, 2022

Prepared By



(TuTu Hong)

Approved & Authorized Signer



(Kingkong Jin)



Revision History

Report Version	Description	Issued Date
R00	Original Issue.	Aug. 24, 2022




1. General Information

1.1. Client Information

Applicant	:	EcoFlow Inc.
Address	:	Plant A202, Founder Technology Industrial Park, Shiyan Sub-district, Bao'an District Shenzhen, Guangdong 518000 China
Manufacturer	:	EcoFlow Inc.
Address	:	Plant A202, Founder Technology Industrial Park, Shiyan Sub-district, Bao'an District Shenzhen, Guangdong 518000 China

1.2. Description of Device (EUT)

Product Name	:	Wi-Fi & Bluetooth Internet of Things Module
Model No.	:	ESP32-WROOM-32UE
Trade Mark	:	
Test Power Supply	:	DC 3.3V
Test Sample No.	:	1-2-1(Normal Sample), 1-2-2(Engineering Sample)
Hardware Version	:	V0.1.3
Software Version	:	V2.0.0.54
Adapter	:	N/A

RF Specification

Operation Mode	:	<input checked="" type="checkbox"/> BT BDR <input checked="" type="checkbox"/> BT EDR
Operation Frequency	:	2402~2480MHz
Number of Channel	:	79 Channels
Modulation Type	:	GFSK, π /4DQPSK, 8DPSK
Antenna Type	:	FPC Antenna
Antenna Gain(Peak)	:	3.0 dBi (Provided by customer)
Rated output Power	:	0.02 mW/MHz Max.

Remark: 1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.



1.3. Auxiliary Equipment Used During Test

Description	Rating(s)
CH340 USB TO TTL UART	Model: MCS-71 Pro Manufacturer: Mercury electronics technologies
Notebook	Manufacturer: ASUS Model: S4300F Input: 19V3.42A CMIIT ID:2018AJ2842

1.4. Description of Test Configuration

The EUT has been tested under typical operating condition. The Applicant provides software to control the EUT for staying in continuous transmitting and receiving mode for testing.

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
00	2402	17	2419	34	2436	51	2453	68	2470
01	2403	18	2420	35	2437	52	2454	69	2471
02	2404	19	2421	36	2438	53	2455	70	2472
03	2405	20	2422	37	2439	54	2456	71	2473
04	2406	21	2423	38	2440	55	2457	72	2474
05	2407	22	2424	39	2441	56	2458	73	2475
06	2408	23	2425	40	2442	57	2459	74	2476
07	2409	24	2426	41	2443	58	2460	75	2477
08	2410	25	2427	42	2444	59	2461	76	2478
09	2411	26	2428	43	2445	60	2462	77	2479
10	2412	27	2429	44	2446	61	2463	78	2480
11	2413	28	2430	45	2447	62	2464		
12	2414	29	2431	46	2448	63	2465		
13	2415	30	2432	47	2449	64	2466		
14	2416	31	2433	48	2450	65	2467		
15	2417	32	2434	49	2451	66	2468		
16	2418	33	2435	50	2452	67	2469		

Note: EUT was tested with channel 0, 39 and 78.



1.5. Test Conditions

	Normal Test Conditions
Temperature	15°C - 35°C
Relative Humidity	20% - 75%
Pressure Range	86-106kPa

1.6. Test Voltage

Power Supply Voltage Fluctuation Test

Voltage Fluctuation Test	Normal Voltage	High Voltage +10% of Normal Voltage	Low Voltage -10% of Normal Voltage
Input To EUT	DC 3.3V	DC 3.63V	DC 2.97V
Output To RF Module	DC 3.3V	DC 3.3V	DC 3.3V
Voltage Variation (%)	--	0.00%	0.00%

Note: Voltage Variation (%)=(Output high or Low Voltage - Output Normal Voltage)/ Output Normal Voltage* 100

For extreme voltage test, we have tested the relationship between the external power supply and RF IC power supply. Base on the test results, only the normal voltage was selected to perform all items.

1.7. Test Equipment List

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	MAX Spectrum Analysis	Agilent	N9020A	MY51170037	Oct. 22, 2021	1 Year
2.	MXA Spectrum Analysis	KEYSIGHT	N9020A	MY53280032	Oct. 22, 2021	1 Year
3.	DC Power Supply	IVYTECH	IV3605	1804D360510	Oct. 22, 2021	1 Year
4	MXG RF Vector Signal Generator	Agilent	N5182A	MY47420647	Feb.28, 2022	1 Year



1.8. Description of Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

FCC-Registration No.: 184111

Shenzhen Anbotech Compliance Laboratory Limited, 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. Registration No. 184111.

ISED-Registration No.: 8058A

Shenzhen Anbotech Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (ISED) Innovation, Science and Economic Development Canada. The acceptance letter from the ISED is maintained in our files. Registration 8058A.

Test Location

Shenzhen Anbotech Compliance Laboratory Limited.

1/F, Building D, Sogood Science and Technology Park, Sanwei community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.518102



2. Summary Of Test Results

Test Standard	Description of Test	Result
Article 2 Paragraph 1 Item 19	Frequency Tolerance	Complies
	Antenna power	Complies
	Antenna Power Tolerance	Complies
	Occupied Bandwidth	Complies
	Spread Bandwidth	Complies
	Spurious Emissions	Complies
	Carrier sensing function	N/A
	Interference prevention function	Complies
	Secondary Radiated Emissions	Complies
	Dwell Time	Complies
	Transmission Radiated Angle Width (3dB Beam Bandwidth)	N/A
	Antenna Absolute Gain	N/A

Note:

(1) N/A is an abbreviation for Not Applicable.

(2) This device have more than 1 subcarrier in 1MHz, compliance with the requirement.



3. Frequency Tolerance Test

3.1. Test Limit

Test Limit	±50 ppm
------------	---------

3.2. Test Setup



3.3. Test Procedure

Test Frequency= test channel

RBW=VBW=10KHz

Span=1MHz

Sweep time=Auto

Detector mode=Positive peak

Indication mode=Max hold

3.4. Test Data

PASS

Please refer to Appendix A of the Appendix Test Data.



4. Antenna Power Test

4.1. Test Limit

No.	Moduation type	Test Limit
(1)	FH, FH+DS , FH+OFDM (2427 - 2470.75 MHz)	3mW/MHz
(2)	OFDM OBW≤26MHz, DS, FH other than (1)	10mW/MHz
(3)	OFDM (OBW 26-40MHz)	5mW/MHz
(4)	Other than (1)&(2)&(3)	10mW
(5)	Tolerance	-80% ~ +20%

4.2. Test Setup



4.3. Test Configuration

1. Search Frequency of Peak Power

Test Frequency: test channel,

RBW=VBW=1MHz, Span=40MHz, Sweep time=Auto, Detector mode =Positive peak

2. Measure of average burst power

Test Frequency: frequency of peak power

RBW=VBW=1MHz, Span=0Hz, Sweep time=Auto, Detector mode=RMS

3. Antenna power= average burst power

4.4. Test Data

Pass

Please refer to Appendix B of the Appendix Test Data.



5. Occupied Bandwidth (99%) Test

5.1. Test Limit

Modulation type	Limit
FH:	83.5MHz or less
FH + DS:	83.5MHz or less
FH + OFDM:	83.5MHz or less
OFDM:	40MHz or less
Others:	26MHz or less

5.2. Test Setup



5.3. Test Procedure

Test Frequency= test channel

RBW=VBW=1MHz

Span=83.5MHz

Sweep time=Auto

Detector mode=Positive peak

Indication mode=Max hold

5.4. Test Data

PASS

Please refer to Appendix C of the Appendix Test Data.

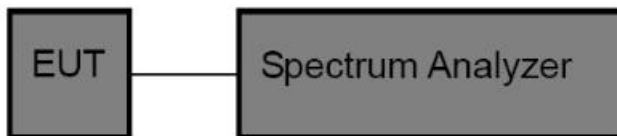


6. Spread-Spectrum Bandwidth (90%) Test

6.1. Test Limit

Test Limit	Spread bandwidth: $\geq 500\text{KHz}$
	Spreading factor: ≥ 5

6.2. Test Setup



6.3. Test Procedure

Test Frequency= test channel

RBW=VBW=1MHz

Span=83.5MHz

Sweep time=Auto

Detector mode=Positive peak

Indication mode=Max hold

6.4. Test Data

Pass

Please refer to Appendix D of the Appendix Test Data.



7. Spurious Emissions Intensity Test

7.1. Test Limit

Frequency Range	Test Limit
≤2387MHz	≤2.5μW (-26dBm)
2387MHz to 2400MHz	≤25μW (-16dBm)
2483.5MHz to 2496.5MHz	≤25μW (-16dBm)
≥2496.5MHz	≤2.5μW (-26dBm)

7.2. Test Setup



7.3. Test Procedure

Test Frequency: test channel,
RBW=VBW=1MHz, Sweep time=Auto, Detector mode=Positive peak

7.4. Test Data

Please refer to Appendix E of the Appendix Test Data.

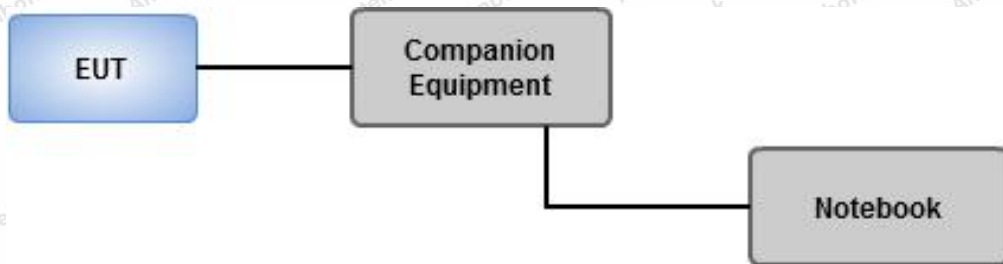


8. Interference Prevention Function

8.1. Test Limit

Test Limit	The identification code shall be 48 bits long
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8.2. Test Setup



8.3. Test Configuration

1. Set EUT under operating mode and link up with companion equipment
2. Check communication status between EUT and companion equipment is normal
3. Record the max. reading.
4. Confirm the MAC address of EUT

8.4. Test Data

Test Mode	ID Code	Test Results
BDR+EDR	A7:28:3C:54:A6:B2	Complies

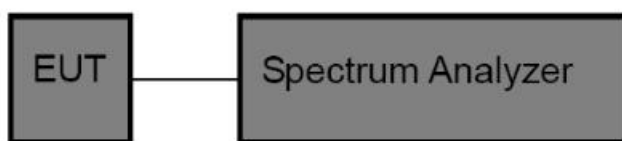


9. Secondary Radiated Emissions Test

9.1. Test Limit

Frequency Range	Test Limit
30~ 1000MHz	$\leq 4.0\text{nW}$ (-54dBm)
1000~ 12500MHz	$\leq 20\text{nW}$ (-47dBm)

9.2. Test Setup



9.3. Test Configuration

Test Frequency: test channel,

Below 1GHz, RBW=VBW=100KHz;

Above 1GHz, RBW=VBW=1MHz,

Sweep time=Auto, Detector mode=Positive peak

9.4. Test Data

Pass

Please refer to Appendix F of the Appendix Test Data.



10. Dwell Time Measurement

10.1. Test Limit

Test Limit	0.4 second or less
------------	--------------------

10.2. Test Setup



10.3. Test Configuration

Test Frequency: test channel,

RBW=VBW=1MHz, Span=0MHz, Detector mode=Positive peak

10.4. Test Data

Pass

Please refer to Appendix G of the Appendix Test Data.



AAPPENDIX I -- TEST SETUP PHOTOGRAPH

Please refer to separated files Appendix I -- Test Setup Photograph

APPENDIX II -- EXTERNAL PHOTOGRAPH

Please refer to separated files Appendix II -- External Photograph

APPENDIX III -- INTERNAL PHOTOGRAPH

Please refer to separated files Appendix III -- Internal Photograph

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

