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 Anbotek 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	:	ECOFLOW
Rating(s)	:	Input: 3.3V⎓

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. 17, 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	:	ECOFLOW
Test Power Supply	:	DC 3.3V battery inside
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	:	☒ BT BLE
Support Rate	:	☒ 1Mbps ☐ 2Mbps
Operation Frequency	:	2402~2480MHz
Number of Channel	:	40 Channels
Modulation Type	:	GFSK
Antenna Type	:	FPC Antenna
Antenna Gain(Peak)	:	3.0 dBi (Provided by customer)
Rated output Power	:	2.0 mW 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**	09	2420	18	2438	27	2456	36	2474
01	2404	10	2422	**19**	**2440**	28	2458	37	2476
02	2406	11	2424	20	2442	29	2460	38	2478
03	2408	12	2426	21	2444	30	2462	**39**	**2480**
04	2410	13	2428	22	2446	31	2464		
05	2412	14	2430	23	2448	32	2466		
06	2414	15	2432	24	2450	33	2468		
07	2416	16	2434	25	2452	34	2470		
08	2418	17	2436	26	2454	35	2472		

Note: EUT was tested with channel 00, 19 and 39.

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 3.30V	DC 3.30V	DC 3.30V
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 Anbotek 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 Anbotek 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 Anbotek 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	N/A
	Spurious Emissions	Complies
	Carrier sensing function	N/A
	Interference prevention function	Complies
	Secondary Radiated Emissions	Complies
	Dwell Time	N/A
	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=1.5MHz, Span=4MHz, Sweep time=Auto, Detector mode =Positive peak
2. Measure of average burst power
   Test Frequency: frequency of peak power
   RBW=VBW≥99% Occupy Bandwidth, 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=300KHz
Span=4MHz
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%) And Factor Test

6.1. Test Limit

Test Limit	Spread bandwidth: ≥500KHz

6.2. Test Setup



6.3. Test Procedure

Test Frequency= test channel
RBW=VBW=300KHz
Span=4MHz
Sweep time=Auto
Detector mode=Positive peak
Indication mode=Max hold

6.4. Test Data

N/A.

Note: BT BLE is the non DSSS, FHSS, FHSS+DSSS, FHSSS +OFDM device. So spread bandwidth is not need to be test.

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

Pass

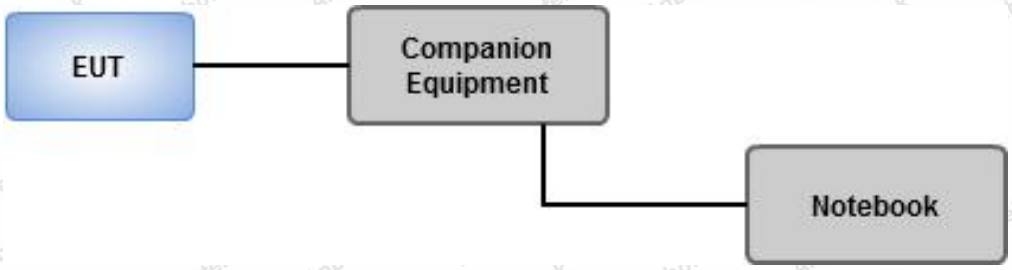
Please refer to Appendix E of the Appendix Test Data.

8. Interference prevention function

8.1. Test Limit

Test Limit	The identification code shall be 48 bits long

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
BLE	A7:28:3C:54:A6:B2	Pass

9. Secondary Radiated Emissions Test

9.1. Test Limit

Frequency Range	Test Limit
30~ 1000MHz	≤4.0nW (-54dBm)
1000~ 12500MHz	≤20nW (-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.

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 ----------