

RF Exposure Evaluation Report

Applicant: Balena Ltd.

Address of Applicant: 6th Floor, One London Wall London, London, EC2Y 5EB
United Kingdom

Equipment Under Test (EUT)

Product Name: balenaFin

Model No.: v1.1

HVIN: FINV10

Trade mark: balenaFin

Canada IC: 26817-FIN0110

Applicable standards: RSS-102 Issue 5 March 2015

Date of sample receipt: 23 Aug., 2019

Date of Test: 24 Aug., to 26 Dec., 2019

Date of report issue: 12 Jan., 2021

Test Result: PASS*

Authorized Signature:



Bruce Zhang
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the JYT product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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2 Version

Version No.	Date	Description
00	18 Dec., 2020	Original
01	12 Jan., 2021	Add HVIN

Tested by: Carey Chen
Test Engineer

Date: 12 Jan., 2021

Reviewed by: Winner Zhang
Project Engineer

Date: 12 Jan., 2021

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4 General Information

4.1 Client Information

Applicant:	Balena Ltd.
Address:	6th Floor, One London Wall London, London, EC2Y 5EB United Kingdom
Manufacturer:	Balena Ltd.
Address:	6th Floor, One London Wall London, London, EC2Y 5EB United Kingdom
Factory:	Fae Technology S.p.a.
Address:	Via C. Battisti, 136 Gazzaniga (BG) 24025 - Italia

4.2 General Description of E.U.T.

Product Name:	balenaFin
Model No.:	v1.1
Operation Frequency:	2.4G Wi-Fi: 2412MHz~2472MHz 5.2G Wi-Fi Band 1: 5180MHz~5240MHz 5.3G Wi-Fi Band 2: 5260MHz~5320MHz 5.6G Wi-Fi Band 3: 5500MHz~5700MHz 5.8G Wi-Fi Band 4: 5725MHz~5875MHz Bluetooth/ BLE: 2402MHz~2480MHz
Modulation technology:	802.11b: DSSS, 802.11a/g/n/ac: OFDM Bluetooth BDR /BLE: GFSK, Bluetooth EDR: π /4-DQPSK, 8DPSK
Antenna Type:	Internal Antenna External Antenna
Antenna gain:	Internal Antenna: 1dBi External Antenna: 2dBi
Test Sample Condition:	The test samples were provided in good working order with no visible defects.

4.3 Operating Modes

Operating mode	Detail description
BLE mode	Keep the EUT in continuously transmitting in BLE mode
BT mode	Keep the EUT in continuously transmitting in BT mode
2.4G WIFI mode	Keep the EUT in continuously transmitting in 2.4G WIFI mode
5G WIFI mode	Keep the EUT in continuously transmitting in 5G WIFI mode

4.4 Additions to, deviations, or exclusions from the method

No

4.5 Laboratory Facility

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

- **FCC - Designation No.: CN1211**

JianYan Testing Group Shenzhen Co., Ltd. has been accredited as a testing laboratory by FCC(Federal Communications Commission). The test firm Registration No. is 727551.

- **ISED – CAB identifier.: CN0021**

The 3m Semi-anechoic chamber of JianYan Testing Group Shenzhen Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

- **A2LA - Registration No.: 4346.01**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: <https://portal.a2la.org/scopepdf/4346-01.pdf>

4.6 Laboratory Location

JianYan Testing Group Shenzhen Co., Ltd.

Address: No.110~116, Building B, Jinyuan Business Building, Xixiang Road, Bao'an District, Shenzhen, Guangdong, China

Tel: +86-755-23118282, Fax: +86-755-23116366

Email: info@ccis-cb.com, Website: <http://www.ccis-cb.com>

5 Technical Requirements Specification in RSS-102

5.1 Limits

According to RSS-102 Issue 5 March 2015, RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

- below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $22.48/f^{0.5}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

Frequency Range (MHz)	Exemption Limits (W)
< 20	1
20 ~ 48	$22.48/f^{0.5}$
48 ~ 300	0.6
300 ~ 6000	$1.31 \times 10^{-2} f^{0.6834}$
> 6000	5

5.2 Result

Internal Antenna:

Frequency (MHz)	Output power (dBm)	Gain (dBi)	E.I.R.P (dBm)	Distance (cm)	Max. tune-up Power (dBm)	Max. Power (mW)	Output power level (mW)
2.4G Wi-Fi 802.11b mode							
2412.00	13.12	1	14.12	25.00	14.50	28.18	2684.03
5.2G Wi-Fi 802.11g mode							
5180.00	4.65	1	5.65	25.00	6.00	3.98	4525.27
5.3G Wi-Fi 802.11n(HT20) mode							
5260.00	2.97	1	3.97	25.00	4.00	2.51	4572.91
5.6G Wi-Fi 802.11n(HT40) mode							
5700.00	3.37	1	4.37	25.00	4.50	2.82	4830.99
BT							
2402.00	3.09	1	4.09	25.00	4.50	2.82	2676.42
BLE							
2402.00	-1.11	1	-0.11	25.00	0.00	1.00	2676.42

External antenna:

Frequency (MHz)	Output power (dBm)	Gain (dBi)	E.I.R.P (dBm)	Distance (cm)	Max. tune-up Power (dBm)	Max. Power (mW)	Output power level (mW)
2.4G Wi-Fi 802.11b mode							
2412.00	13.12	2	15.12	25.00	15.50	35.48	2684.03
5.2G Wi-Fi 802.11g mode							
5180.00	4.65	2	6.65	25.00	7.00	5.01	4525.27
5.3G Wi-Fi 802.11n(HT20) mode							
5260.00	2.97	2	4.97	25.00	5.00	3.16	4572.91
5.6G Wi-Fi 802.11n(HT40) mode							
5700.00	3.37	2	5.37	25.00	5.50	3.55	4830.99
BT							
2402.00	3.09	2	5.09	25.00	5.50	3.55	2676.42
BLE							
2402.00	-1.11	2	0.89	25.00	1.00	1.26	2676.42

Note: Just the worst case mode was shown in report.

Module 2(IC: S123A-BGM111)

Frequency (MHz)	Output power (dBm)	Gain (dBi)	E.I.R.P (dBm)	Distance (cm)	Max. tune-up Power (dBm)	Max. Power (mW)	Output power level (mW)
BLE							
2402.00	3.09	1	4.09	25.00	4.50	2.82	2676.42

Note: Just the worst case mode was shown in report.

5.3 Conclusion

The device is exempt from the RF exposure evaluation.

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