



RF EXPOSURE EXEMPT REPORT

APPLICANT : Lierda Science & Technology Group Co.,Ltd
PRODUCT NAME : SB97 BLE Module
MODEL NAME : L-BTMSB97 series, L-BTMSB97-06144-01,
L-BTMSB97-G3PC4-01,
L-BTMSB97-G3PC4
BRAND NAME : lierda
FCC ID : N8NL-BTMSB97
STANDARD(S) : FCC 47CFR Part 2(2.1093)
RECEIPT DATE : 2022-03-02
TEST DATE : 2022-03-03 to 2022-03-26
ISSUE DATE : 2022-03-30

Edited by: Peng Mi
Peng Mi (Rapporteur)
Approved by: Shen Junsheng
Shen Junsheng (Supervisor)

NOTE: This document is issued by Shenzhen Morlab Communications Technology Co., Ltd., the test report shall not be reproduced except in full without prior written permission of the company. The test results apply only to the particular sample(s) tested and to the specific tests carried out which is available on request for validation and information confirmed at our website.





DIRECTORY

- 1. Technical Information..... 3
- 1.1 Applicant and Manufacturer Information..... 3
- 1.2 Equipment Under Test (EUT) Description 3
- 1.3 Applied Reference Documents 4
- 2. Device Category and RF Exposure Limit 5
- 3. RF Output Power..... 6
- 4. RF Exposure Assessment..... 7
- Annex A General Information..... 9

Change History		
Version	Date	Reason for Change
1.0	2022-03-30	First edition



1. Technical Information

Note: Provide by applicant.

1.1 Applicant and Manufacturer Information

Applicant:	Lierda Science & Technology Group Co.,Ltd
Applicant Address:	Room 301, Building No.1, Lierda IoT park, No.1326 Wenyi Xi Road, Hangzhou, Zhejiang Prov., China
Manufacturer:	Lierda Science & Technology Group Co.,Ltd
Manufacturer Address:	No.1326 Wenyi West Road, Hangzhou, Zhejiang Province, China

1.2 Equipment Under Test (EUT) Description

Product Name:	SB97 BLE Module
Sample No.:	1#
Hardware Version:	V02.00
Software Version:	V02.01
Frequency Bands:	Bluetooth: 2402 ~ 2480 MHz
Bluetooth Version:	5.1
Modulation Mode:	GFSK (1Mbps, 2Mbps)
Antenna Type:	Ceramic Antenna
Antenna Gain:	2dBi

Note 1 According to the certificate holder, they declared that the models L-BTMSB97 series, L-BTMSB97-06144-01, L-BTMSB97-G3PC4-01 and L-BTMSB97-G3PC4 only the model numbers are different, everything else is the same. The main measuring model is L-BTMSB97 series, only the results for L-BTMSB97 series were recorded in this report.:



1.3 Applied Reference Documents

Leading reference documents for testing:

Identity	Document Title	Method determination /Remark
FCC 47CFR Part 2(2.1093)	Radio Frequency Radiation Exposure Assessment: portable devices	No deviation
KDB 447498 D04v01	RF Exposure Procedures and Equipment Authorization Policies for Mobile and Portable Devices	No deviation

Note 1: The test item is not applicable.
Note 2: Additions to, deviation, or exclusions from the method shall be judged in the "method determination" column of add, deviate or exclude from the specific method shall be explained in the "Remark" of the above table.
Note 3: When the test result is a critical value, we will use the measurement uncertainty give the judgment result based on the 95% confidence intervals.



2. Device Category and RF Exposure Limit

Per user manual, this device is a SB97 BLE Module. Based on 47CFR 2.1093, this device belongs to portable device category with General Population/Uncontrolled exposure.

Portable Devices:

47CFR 2.1093(b)

For purposes of this section, a portable device is defined as a transmitting device designed to be used so that the radiating structure(s) of the device is/are within 20 centimeters of the body of the user.

General Population/Uncontrolled Exposure:

47CFR 2.1093(d) (2)

Limits for General Population/Uncontrolled exposure: 0.08 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 1.6 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 4 W/kg, as averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube). General Population/Uncontrolled limits apply when the general public may be exposed, or when persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or do not exercise control over their exposure. Warning labels placed on consumer devices such as cellular telephones will not be sufficient reason to allow these devices to be evaluated subject to limits for occupational/controlled exposure in paragraph (d)(1) of this section.



3. RF Output Power

<Bluetooth output power>

Mode	Channel	Frequency (MHz)	Average Power (dBm)	
			GFSK	
			1Mbps	2Mbps
Bluetooth LE	CH 00	2402	4.37	4.09
	CH 19	2440	4.60	4.30
	CH 39	2480	4.69	4.39
Tune-up Limit			5.00	5.00

Note:

1. According to KDB 447498, SAR test exclusion conditions are based on source-based time-averaged maximum conducted output power of the RF channel requiring assessment, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions.
2. The average output power is from the report No. SZ22030013W01.

4. RF Exposure Assessment

➤ Standalone Transmission SAR Assessment

1. According to KDB 447498 D04v01 Appendix B, the 1-g SAR test exclusion thresholds at test separation Distances ≤ 20 mm are determined by:
 - a. The thresholds are based on the general population MPE limits with a single perfect reflection, outside of the reactive near-field, and in the main beam of the radiator. For mobile devices that are not exempt per Table B.1 [Table 1 of § 1.1307(b)(1)(i)(C)] at distances from 20 cm to 40 cm and in 0.3 GHz to 6 GHz, evaluation of compliance with the exposure limits in § 1.1310 is necessary if the ERP of the device is greater than $ERP_{20\text{cm}}$ in Formula (B.1) [repeated from § 2.1091(c)(1) and § 1.1307(b)(1)(i)(B)].

$$P_{\text{th}} \text{ (mW)} = ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases} \quad (\text{B. 1})$$

If the ERP is not easily obtained, then the available maximum time-averaged power may be used (i.e., without consideration of ERP only if the physical dimensions of the radiating structure(s) do not exceed the electrical length of $\lambda/4$ or if the antenna gain is less than that of a half-wave dipole.

SAR-based exemptions are constant at separation distances between 20 cm and 40 cm to avoid discontinuities in the threshold when transitioning between SAR-based and MPE-based exemption criteria at 40 cm, considering the importance of reflections.

- b. The SAR-based exemption formula of § 1.1307(b)(3)(i)(B), repeated here as Formula (B.2), applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power or effective radiated power (ERP), whichever is greater, of less than or equal to the threshold P_{th} (mW).

$$P_{\text{th}} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases} \quad (\text{B. 2})$$

where

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right)$$

and f is in GHz, d is the separation distance (cm), and $ERP_{20\text{cm}}$ is per Formula (B.1). The example values shown in Table B.2 are for illustration only.



2. When the device is used, 0.5cm for the most conservative test separation distance was used for evaluating.

Channel	Frequency (GHz)	Separation Distance (cm)	ERP _{20cm}	P _{th} (mW)
CH 39	2.48	0.5	3060	10

3. When standalone SAR is not required to be measured, per FCC KDB 447498 D04v01 Appendix E, the following equation must be used to estimate the standalone 1g SAR.

$$SAR_{est} = 1.6 \cdot P_{ant} / P_{th} \quad [W/kg]$$

$P_{ant} < P_{th}$, where P_{ant} is maximum time-averaged power or effective radiated power (ERP)

Mode	Max. Tune-up Power (dBm)	Exposure Position	Head/Body
		Test Distance (cm)	0.5
Bluetooth	5.0	Estimated SAR (W/kg)	1.77

➤ **Simultaneous SAR Assessment**

This device only incorporates one Bluetooth transmitter, therefore simultaneous SAR assessment is not required.



Annex A General Information

1. Identification of the Responsible Testing Laboratory

Laboratory Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Laboratory Address:	FL.1-3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China
Telephone:	+86 755 36698555
Facsimile:	+86 755 36698525

2. Identification of the Responsible Testing Location

Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Address:	FL.1-3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China

3. Facilities and Accreditations

The FCC designation number is CN1192, the test firm registration number is 226174.

————— END OF REPORT —————