



Bluetooth Module
LCB-003

Bluetooth Module Manual

Warranty period: 2 years
A/S: 1544-7777

1. INTRODUCTION

1.1 Overview

LCB-003 is a small size and low power module for Bluetooth with PCB antenna. LCB-003 use the nRF52810 solution(Nordic), and it can be applied to air solution etc.

Nordic nRF52810 is a highly integrated single-chip low power Bluetooth network controller. It combines an ARM-Cortex M4 MCU, Bluetooth, and RF in a single chip. It also provides a bunch of configurable GPIOs which are configured as digital peripherals for different applications and control usage.

nRF52810 integrates internal memories for complete Bluetooth functions. The embedded memory configuration also provides simple application developments.

1.2 Key Features

Bluetooth LE

Supported data rates: 1 Mbps Bluetooth® low energy mode

Integrated PCB antenna

SIZE : 35mm x 15mm x 4.3mm

-90 dBm sensitivity in Bluetooth® low energy mode (2.4GHz)

-20 to +4 dBm TX power, configurable in 4 dB steps

On-chip balun (single-ended RF)

20 mA peak current in TX (4 dBm)

15 mA peak current in RX

3. ELECTRICAL SPECIFICATION

3.1 Absolute Maximum Ratings

Description	Min.	Typ	Max.	Unit
Storage Temperature	-30		+80	°C
Storage Humidity (40°C)			85	%

3.2 Operating conditions

Description	Min.	Typ	Max.	Unit
Supply Voltage(BLE)	3.0	3.3	3.4	Vdc
Supply Voltage(Speaker)	4.7	5.0	5.3	Vdc
Ambient Temperature	-20		+50	°C
Ambient Humidity (40°C)			85	%

3.3 Power Supply Voltages

Input power	Unit
VDD_3.3V	3.0V ~ 3.4V
VDD_5.0V	4.7V ~ 5.3V

3.4 Current Consumption

Device State	Code Rate	Output Power	Current Consumption	
			Min	Max
On_Transmit	BLE 4.2 / 1Mbps	4 dBm	12.0 mA	2.0mA
Wake up(Advertising)	BLE 4.2 / 1Mbps	N/A	1.0 mA	1.5mA
Sleep	BLE 4.2 / 1Mbps	N/A	0.2 mA	0.5mA

3.5 Standard Rated Specification

Division	Characteristic
Host Interface	UART
Frequency Range	2.402GHz ~ 2.480GHz (2.4GHz ISM)
Dimension	L x W x H : 35 x 15 x 4.3 (typical) mm
Spread Spectrum	GFSK (Gaussian Frequency Shift Keying)
Data Rate	1 Mbps

3.6 Electrical Specifications for Bluetooth (Radiation TEST)

TX characteristics

Parameter	Description	Min	Typ	Max	Unit
Frequency		2,402		2,480	MHz
Output Power ON_Transmit	Low Energy/ 1Mbps	-20	0	4	dBm
BAND EDGE			-50	-54	dBc
Harmonic Output Power	2nd		-50	-54	dBm/MHz
Harmonic Output Power	3rd		-50	-54	dBm/MHz

RX characteristics

Parameter	Description	Min	Typ	Max	Unit
Frequency		2,402		2,480	MHz
Sensitivity	1Mbps		-90		dBm

5. FCC CERTIFICATION

5.1 FCC Notice

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference and
- (2) This device must accept any interference received, including interference that may cause undesired operation of the device.

Any changes or modifications in construction of this device which are not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

6. IC CERTIFICATION

6.1 Industry Canada Statement

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

(1) This device may not cause interference.

(2) This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence.

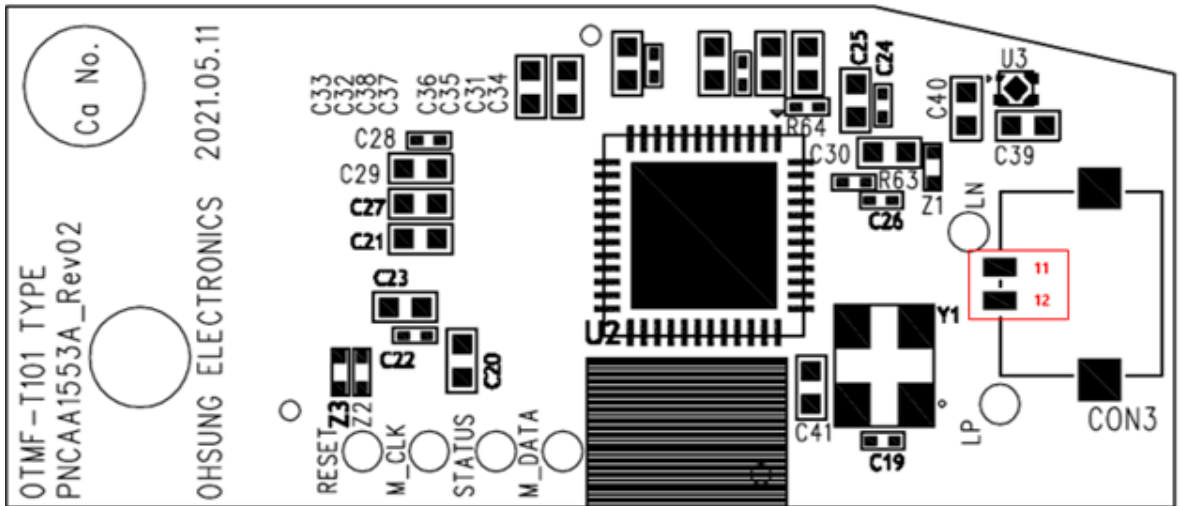
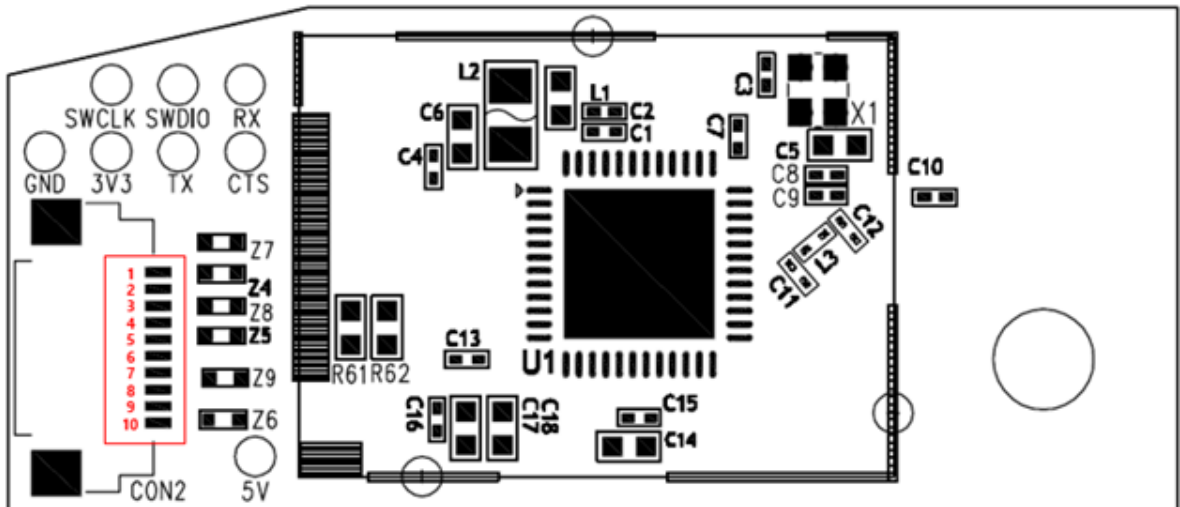
L'exploitation est autorisée aux deux conditions suivantes : (1) L'appareil ne doit pas produire de brouillage, et (2) L'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Please notice that if the IC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: "Contains IC : 2703N-LCB003" any similar wording that expresses the same meaning may be used.

L'étiquette d'homologation d'un module d'Innovation, Sciences et Développement économique Canada devra être posée sur le produit hôte à un endroit bien en vue, en tout temps. En l'absence d'étiquette, le produit hôte doit porter une étiquette sur laquelle figure le numéro d'homologation du module d'Innovation, Sciences et Développement économique Canada, précédé du mot « contient », ou d'une formulation similaire allant dans le même sens et qui va comme suit : Contient IC : 2703N-LCB003 est le numéro d'homologation du mo

Bluetooth module specifications	
Model	LCB-003
Frequency Range	2402 MHz - 2480 MHz
EIRP (Max)	7.07 dBm
Antenna Gain	2.76 dBi

7. PIN MAP



8. PIN Description

Pin No.	Pin Name	I/O	Pin Description
1	UART_TX	I/O	UART_Tx
2	UART_RX	I/O	UART_Rx
3	BLE_STATUS	-	General purpose I/O
4	BLE_RESET	-	General purpose I/O, Reset
5	MIC_CLOCK	-	Microphone Clock
6	MIC_DATA	-	Microphone Data
7	GND	I/O	Ground
8	GND	I/O	Ground
9	VDD_3V3	I/O	Power Supply 3.3V
10	VDD_5V	I/O	Power Supply 5V
11	SPEAKER_LN	-	Speaker output negative, Left
12	SPEAKER_LP	-	Speaker output positive, Left

9. Module Integration Guide

1. Applicable FCC Rules

- a. CFR 47 Part 15.247

2. Operational Condition

The module is limited to OEM installation ONLY. The OEM integrator is responsible for ensuring that the end-user has no manual instruction to remove or install module. A separate approval is required for all other operating configurations, including portable configurations with respect to Part 2.1093, Part 15 Subpart B, and difference antenna configurations.

3. Limited Module Procedure: N/A

4. Trace antenna designs: N/A

5. RF Exposure consideration

This modular complies FCC/ISED RF exposure requirement at 15 mm distance. Any host equipment that has separation distance less than 15 mm shall require additional RF exposure assessment.

6. Antennas

This modular has PCB pattern antenna.

Any changes of antenna designs might require additional assessment.

Antenna type shall be same type and antenna gain shall be less or equal to certified antenna.

7. Label and compliance information

The end user manual shall include all required regulatory information/warning as shown in this manual. If the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module.

This exterior label can use wording such as the following:

“Contains FCC ID : BEJ-LCB003” any similar wording that expresses the same meaning may be used.

8. Information on test modes and additional testing requirements

This modular was tested in standalone configuration. Integration of this modular into a host equipment would require additional testing.

9. Module Integration Guide

9. Additional testing, Part 15 Subpart B disclaimer

The grantee should include a statement that the modular transmitter is only FCC authorized for the specific rule parts (i.e., FCC transmitter rules) listed on the grant, and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. If the grantee markets their product as being Part 15 Subpart B compliant (when it also contains unintentional-radiator digital circuitry), then the grantee shall provide a notice stating that the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.