

RB931A

User Manual

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Date	November 5, 2024
Series	RB931x
Hardware Compatibility	Product Line
Software Compatibility	All
Document Type	☒ Datasheet ☐ APN (Application Note) ☐ TN (Technical Note) ☐ TR (Technical Report)
Content Level	☐ Basic ☒ Intermediate ☐ Advanced
Confidentiality	☒ Public ☐ Private

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Document History

VERSION	DATE	UPDATES
00.01	November 5, 2024	Creation

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Legal Notice

Important Notice

Due to the nature of wireless communications, transmission and reception of data can never be guaranteed. Data may be delayed, corrupted (i.e., have errors) or be totally lost. Although significant delays or losses of data are rare when wireless devices such as the Rolling Wireless modem are used in a normal manner with a well-constructed network, the Rolling Wireless modem should not be used in situations where failure to transmit or receive data could result in damage of any kind to the user or any other party, including but not limited to personal injury, death, or loss of property. Rolling Wireless accepts no responsibility for damages of any kind resulting from delays or errors in data transmitted or received using the Rolling Wireless modem, or for failure of the Rolling Wireless modem to transmit or receive such data.

Safety and Hazards

Do not operate the Rolling Wireless modem in areas where cellular modems are not advised without proper device certifications. These areas include environments where cellular radio can interfere such as explosive atmospheres, medical equipment, or any other equipment which may be susceptible to any form of radio interference. The Rolling Wireless modem can transmit signals that could interfere with this equipment. Do not operate the Rolling Wireless modem in any aircraft, whether the aircraft is on the ground or in flight. In aircraft, the Rolling Wireless modem **MUST BE POWERED OFF**. When operating, the Rolling Wireless modem can transmit signals that could interfere with various onboard systems.

NOTE: Some airlines may permit the use of cellular phones while the aircraft is on the ground and the door is open. Rolling Wireless modems may be used at this time.

The driver or operator of any vehicle should not operate the Rolling Wireless modem while in control of a vehicle. Doing so will detract from the driver or operator's control and operation of that vehicle. In some states and provinces, operating such communications devices while in control of a vehicle is an offence.

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1 Introduction

1.1 Description

This document defines the electrical characteristics, RF performance, structural dimensions, and application environment of the RB931x Bluetooth connectivity module series. You may refer to the definitions below regarding the classification of the product.

- RB931x product series includes variants of: RB931A

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2 Product Overview

2.1 Product Information

RB931x is a Bluetooth 5.4 HCI automotive module, based on a QCA8695AU chipset with high performance.

Table 1. Maximum Transmission Rate

ITEM	RB931A
Chipset	QCA8695AU
Bluetooth EDR	3Mbps ¹
BLE	2Mbps ¹

1. The data speed value is theoretical and has not been tested yet.

2.2 General Features

The following table lists the specifications of the RB931x module.

Table 2. RB931x Specifications

ITEM	SPECIFICATIONS
Input Power Supplies	One main power supply: 1.8V(VDD_1V8) Interface voltage: 1.8V(VDDIO_1V8)
Protocol	BT5.4(BR, EDR, BLE): PBAP, HFP ¹ , A2DP ¹ , BLE ¹

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ITEM	SPECIFICATIONS
Modem	GFSK, 8-DPSK, π/4-DQPSK
Interface	• PCM/I2S Digital Audio Interface • BT_EN • HCI UART • SPI • HOST WAKEUP
Antenna interface	• 1 antenna port
Physical feature ²	Dimension: 23±0.1 mm × 23 mm±0.1 × 3.03±0.25 mm
Temperature	Operating temperature: -40°C to +85°C
RoHS	RoHS compliant

1. Not tested yet
2. TBD tolerance

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3 Application Interfaces

3.1 Overview

RB931x module is designed with 112 LGA pads that can be used for platform development.

- Power supply
- HCI UART
- PCM interface for Audio
- SPI
- Antenna interface

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3.2 Power Supply

RB931x provides power supply input pins as the following table.

Table 3. Power Pins

PIN NAME	IO	PIN NO.	DESCRIPTION	MAXIMUM CURRENT
VDD_1V8	PI	105, 106	1.8V VDD power supply input	150mA
VDDIO_1V8	PI	71	I/O voltage, 1.71V-1.89V, nominal value 1.8V	20mA
GND	-		Ground. All GND pins must be grounded.	-

3.3 Antenna Interfaces

3.3.1 RF Antenna Interface Configuration

RB931x provides single antenna interfaces that support 2.4 GHz. The antenna interface is defined in the following table.

Table 4. Antenna Interface Definition

PIN NAME	PIN	FREQUENCY	IO	REMARKS
BT_RF	37	2402 to 2480 MHz	AIO	50Ω impedance

3.3.2 Reference Design

RB931x series modules provide a Bluetooth antenna interface. The PCB routing between the RF antenna and the host is implemented using a microstrip with impedance controlled within 50Ω. The following figure shows the reference design. The PI matching Network should be adjusted based on RF parameters.

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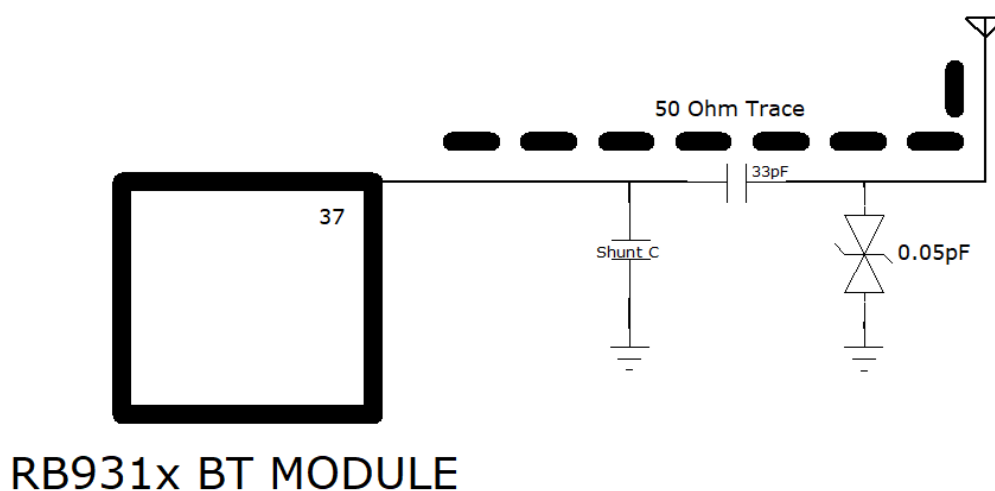


Figure 1. BT Antenna Interface Reference Design

3.3.3 Antenna Specifications Requirements

The RB931x module provides two BT receiving and transmitting antenna interfaces. The following table lists antenna requirements.

Table 5. Antenna Requirements

RB931X MODULE ANTENNA REQUIREMENTS	
ITEM	SPECIFICATIONS
Frequency range	2402MHz to 2480MHz
VSWR	VSWR < 2:1
Antenna efficiency	> 30%
Max input power (W)	(TBD)
Input impedance (Ω)	50
Line insertion loss	< 1.5dB (2402MHz to 2480MHz)
Polarization type	Vertical

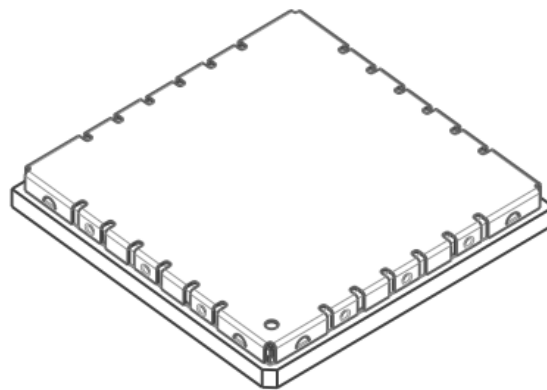
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4 Structural Specification

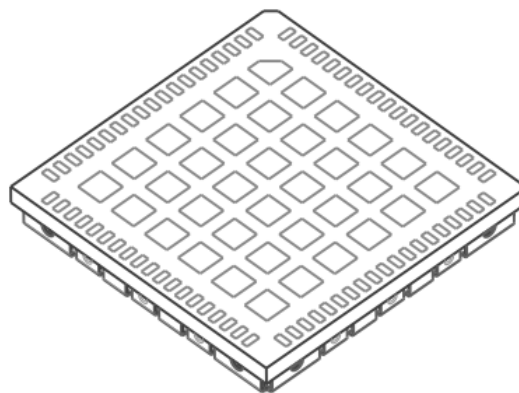
4.1 Product Appearance

The following figures show the appearance of the RB931x module.



TOP

Figure 2. Top View of the Module



BOTTOM

Figure 3. Bottom View of the Module

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5 Warning

5.1 FCC regulatory compliance statement

§15.19 Statement

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.

§15.21 Information to user

Warning: changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

- **List of applicable FCC rules:**

47 CFR Part 15.247

- **Limited module procedures**

This module is a single module.

- **RF exposure considerations**

This Module complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

- **Antennas**

If you desire to increase antenna gain and either change antenna type or use same antenna type certified, a Class II permissive change application is required to be filed by us, or you (host manufacturer) can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application.

- **Label and compliance information**

Please notice that 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: 2AX2URB931A" any similar wording that expresses the same meaning may be used.

§ 15.19 Labelling requirements shall be complied on end user device.

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Labelling rules for special device, please refer to §2.925, § 15.19 (a)(5) and relevant KDB publications. For E-label, please refer to §2.935.

- **Information on test modes and additional testing requirements**

The OEM integrator is responsible for ensuring that the end-user has no manual instruction to remove or install module.

The module is limited to installation in mobile application, a separate approval is required for all other operating configurations, including portable configurations with respect to §2.1093 and difference antenna configurations.

- **FCC other Parts, Part 15B Compliance Requirements for Host product manufacturer**

This modular transmitter is only FCC authorized for the specific rule parts listed on our grant, 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.

Host manufacturer in any case shall ensure host product which is installed and operating with the module is in compliant with Part 15B requirements.

Please note that For a Class B or Class A digital device or peripheral, the instructions furnished the user manual of the end-user product shall include statement set out in §15.105 *Information to the user* or such similar statement and place it in a prominent location in the text of host product manual.

Original texts as following:

For Class B

Note: 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 receiver.
- Connect the equipment into 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.

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5.2 ISED Compliance Statements

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.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique 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;
- (2) 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: 26644-RB931A" 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 : 26644-RW962B est le numéro d'homologation du module.

RF Exposure Compliance

This equipment complies with FCC/IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

Cet équipement est conforme aux limites d'exposition aux radiations IC CNR-102 établies pour un environnement non contrôlé. Cet émetteur ne doit pas être colocalisé ou fonctionner en conjonction avec une autre antenne ou un autre émetteur. Cet équipement doit être installé et utilisé avec une distance minimale de 20cm entre le radiateur et votre corps.

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