WTLRC262-SG Series Datasheet

Included:

WTLRC262-SG1

WTLRC262-SG2

WTLRC262-SG3

Version V1.0.0

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Wireless-Tag Technology Co., Limited.

About this document

This document provides users with datasheets for WTLRC262-SG Series.

Document version

Please download the latest version of the document from Official website.

Revision history

Please find the document revision page to view the revision history.

Clarification

The content of this manual is subject to change due to product version upgrade or other reasons. Wireless-Tag Technology Co., Limited. reserves the right to modify the contents of this manual without any notice or prompting. And makes every effort to provide accurate information in this manual, but Wireless-Tag Technology Co., Limited. does not ensure that the contents of the manual are completely free of errors, and all statements, information and recommendations in this manual do not constitute any express or implied warranty.

Document Revision Log

Number	Version number	Variable state	Change (+/-) description	Author	Dates
1	V1.0.0	C	Create Document	Pall	2023-09-08

*Change status: C - Create, A - Add, M - Modify, D - Delete

CONTENTS

1 Overview

WTLRC262-SG series module is based on ESP32-C2 and SX1262 chip design, support WIFI, BLE and LoRa communication function, highly integrated design simplifies the user's product system complexity, and can provide antenna design support according to the customer's application. Module integrated lora driver, can be extended to support Lorawan protocol, provide driver code to facilitate the secondary development of the user. Module has a small size, low power consumption, long transmission distance, strong anti-interference ability and other characteristics are widely used in smart home, smart industry and other application scenarios.

- 32-bit RISC-V single-core processor up to 120 MHz
- On-chip ROM: 576 KB/SRAM: 272 KB
- Supports IEEE 802.11 b/g/n protocols
- Supports 20 MHz bandwidth in the 2.4 GHz band
- Supports 1T1R mode with data rates up to 72.2 Mbps
- Simultaneously supports Infrastructure BSS Station mode, SoftAP mode, Station + SoftAP mode, and hybrid mode.

-Supports BLE 5.0

- High power mode (20 dBm)
- Rate support 125 kbps, 500 kbps, 1 Mbps, 2 Mbps
- Wi-Fi and Bluetooth coexist and share the same antenna
- Supports LoRa long-distance transmission communication with supported frequency bands:

WTLRC262-SG1: BLE:2402-2480MHz; 2.4G WiFi: 2412-2472MHz; LoRa:433.175MHz
EIRP:BLE:6.14 dBm; 2.4G WiFi: 18.49 dBm
ERP:LoRa:8.813 dBm

WTLRC262-SG2: BLE:2402-2480MHz; 2.4G WiFi: 2412-2472MHz; LoRa:868MHz
EIRP:BLE:6.48 dBm; 2.4G WiFi: 18.42 dBm
ERP:Lora:8.128 dBm

WTLRC262-SG3: BLE:2402-2480MHz; 2.4G WiFi: 2412-2462MHz; LoRa:905.3-925.5MHz

2 Module Dimension Drawing

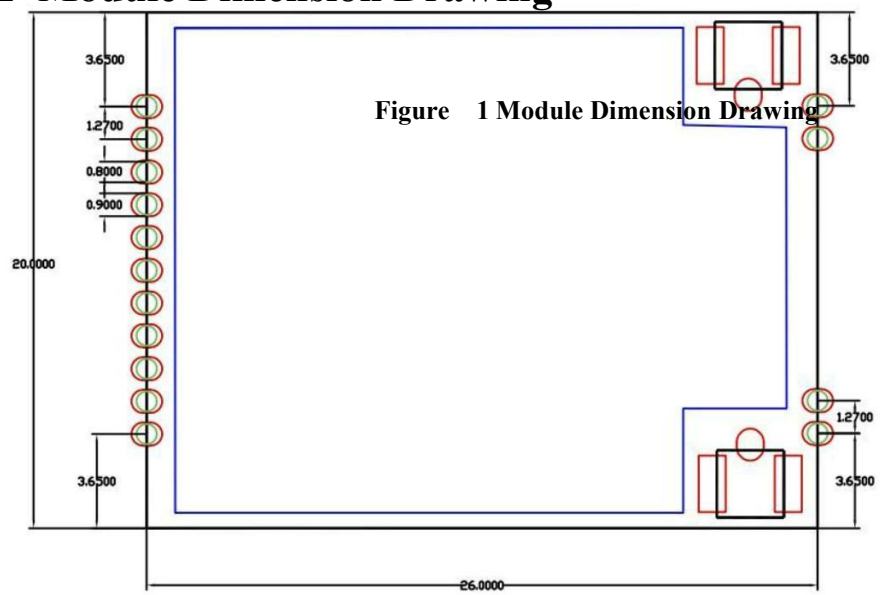
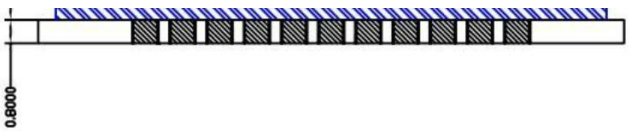


Figure 1 Module Dimension Drawing



Unit: mm

3 Pin Definition

3.1 Pin Layout

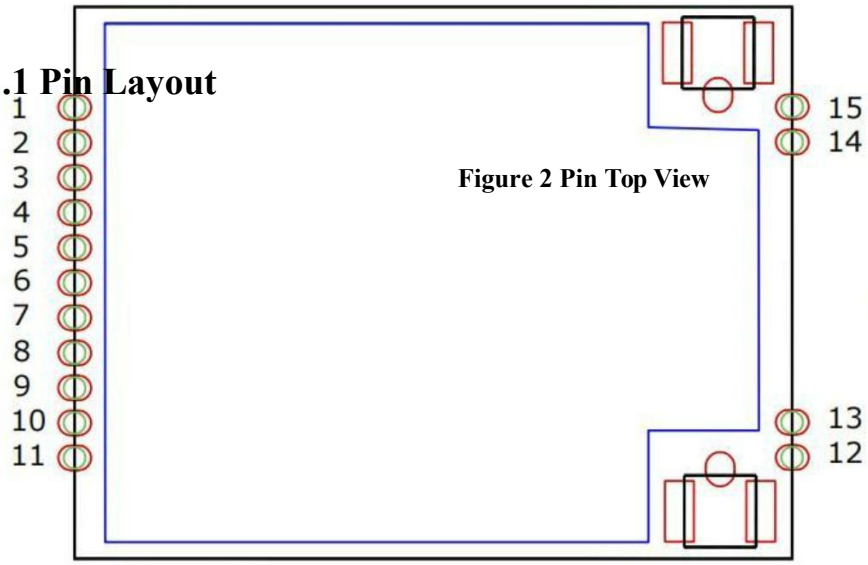


Figure 2 Pin Top View

3.2 Pin Description

The module has a total of 15 pins, refer to Table 1 for specific descriptions.

Table 1 Pin Definitions

Pin Number	Pin Name	descriptive
1	CHIP_EN	Enable pin
2	GPIO0	GPIO
3	GPIO1	GPIO
4	GPIO2	GPIO
5	GPIO8	GPIO
6	GPIO9	GPIO
7	U0RXD	U0RXD, GPIO19
8	U0TXD	U0TXD, GPIO20
9	GND	module power ground
10	3V3	Module Power Input
11	3V3	Module Power Input
12	2.4G_ANT	2.4G antenna
13	GND	module power ground
14	GND	module power ground
15	LORA_ANT	LORA antenna

4 Peripheral Application Design and Consideration

The use of the WTLRC262-SG series modules is required to fulfill the basic operating requirements. This chapter describes how to perform each functional interface circuit design, precautions, and provides a design reference.

4.1 Power Interface

Power supply circuit design and layout, is a very important part of the whole product design, power supply design good or bad affect the performance of the whole product. Please read the power supply design requirements carefully and follow the correct power supply design principles to ensure optimal circuit performance.

Table 2 Power Interface

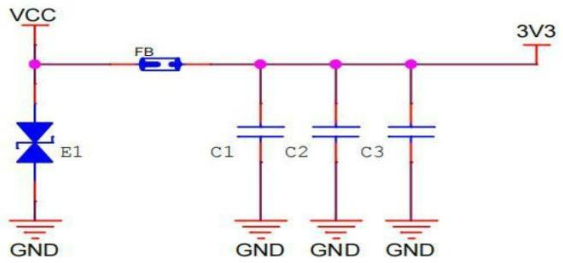
Pin Name	Pin Number	Functional Description	note
3V3	10, 11	Module power input	3.0-3.6V (Default: 3.3V, input current >500mA)
GND	9, 13, 14	Module power supply input ground	Make sure all ground pins are well grounded

4.1.1 3V3 Design Description

Power Supply Design

The WTLRC262-SG series power supply power supply supports 3.0-3.6V power input. The power supply recommended design suggestions are shown in Figure 3;

Figure 3 Recommended Power Supply Design



4.1.2 Power Supply Design Consideration

- It is recommended that magnetic beads be placed on the power input to filter out power supply high frequency noise.
- Module power supply maximum input voltage 3.6V, typical value is 3.3V; VCC recommended alignment width ≥ 1mm or more.
- It is recommended to increase the ESD tube at the module power supply, ESD clamp operating voltage VRWM = 5V, need to be placed close to the power input interface to ensure that the power supply surge voltage into the back-end circuits before that is clamped, to protect the back-end devices and modules;
- C1 can choose 10uF aluminum electrolytic capacitor or ceramic capacitor, can improve the power supply instantaneous high-current current capacity, capacitance withstand voltage value should be greater than the input power supply voltage of more than 1.5 times;
- Place low ESR（Equivalent series resistance） bypass capacitors C2 and C3 near the module position to filter out high frequency interference in the power supply;

4.2 Control Interface

Table 3 Control Interfaces

Pin Name	Pin Number	Functional Description	note
GPIO9	6	GPIO (BOOT pin)	Default pull-up, provides a pull-down when burning, after burning, IO9 needs to be switched back to pull-up
CHIP_EN	1	Reset Input Pin	Active Low

4.3 Peripheral Interface

Module provides a variety of commonly used peripheral interfaces

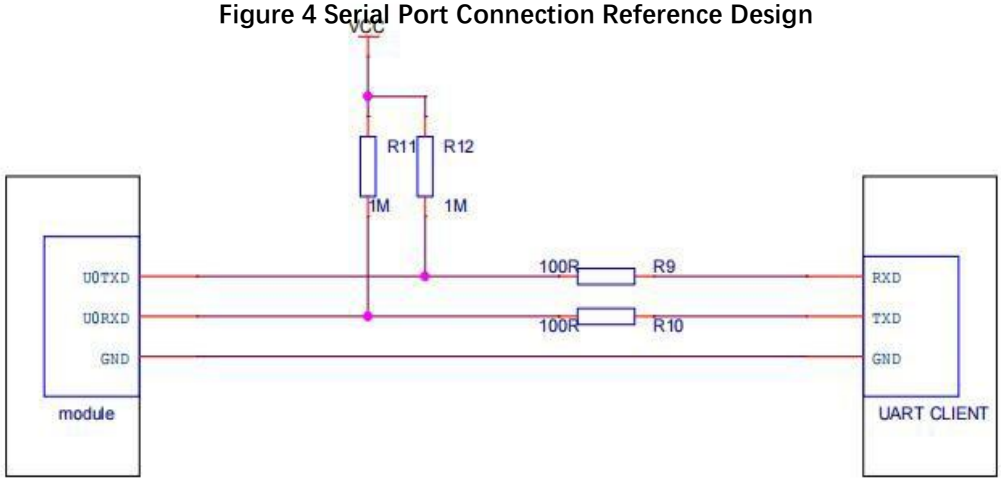
4.3.1 Serial Port interface

Table 4 Serial Port Interface

Pin Name	Pin Number	Functional Description	note
U0RXD	7	serial port reception	
U0TXD	8	serial port sending	

The module can realize the functions of program download, data communication and debugging through the serial port. Customers can choose to use it according to their needs. The recommended serial port connection circuit is shown in Figure 4. It is recommended to reserve pull-up resistors (R11, R12) to prevent the chip from insufficient drive capability for serial communication, and it is recommended to connect a 100 ohm current limiting resistor in series with the RXD and TXD signal lines to prevent pulse current and burn the chip.

Figure 4 Serial Port Connection Reference Design



4.3.2 Serial Port Schematic Design Consideration

- Note the correspondence of the signal flow to the connection.
- Module serial port level is 3.3V, if the UART and MCU logic level does not match, you need to do level conversion

4.4 RF Design Consideration

The WTLRC262-SG series modules require an external antenna for use. The antenna has two wiring methods: compatible with half-hole pads and IPEX seats, and a standard IPEX seats connector is left on the module. The dimensions of the IPEX seats are shown below:

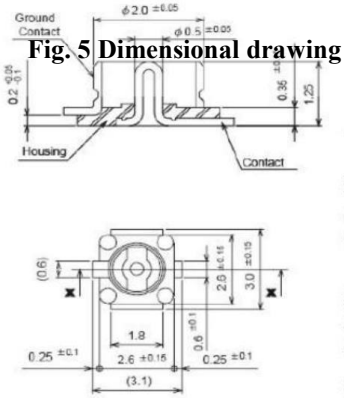


Fig. 5 Dimensional drawing of IPEX seat

FCC Warning

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.

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

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.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.
This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

IMPORTANT NOTES

Co-locating warning:

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

OEM integration instructions:

This device is intended only for OEM integrators under the under the following conditions:
The transmitter module may not be co-located with any other transmitter or antenna.
The module shall be only used with the external antenna(s) that has been originally tested and certified with this module.

As long as the conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).

Validity of using the module certification:

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization for this module in combination with the host equipment is no longer considered valid and the FCC ID of the module cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

End product labeling:

The final end product must be labeled in a visible area with the following: “Contains Transmitter Module FCC ID: 2AFOS-WTLRC262-SG3”.

Information that must be placed in the end user manual:

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.

Integration instructions for host product manufactures according to KDB 996369 D03 OEM Manual v01

2.2 List of applicable FCC rules

FCC Part 15 Subpart C 15.247

2.3 Specific operational use conditions

The module is a Bluetooth module with 2.4G WiFi & BLE & LoRa function.

BLE Specification:

Operation Frequency: 2402~2480MHz

Number of Channel: 40

Modulation: GFSK

Type:FPC Antenna

Gain: 5 dBi

WiFi Specification:

Operation Frequency: 2412~2462MHz(only for FCC ID)

Number of Channel: 11(only for FCC ID)

Modulation: DSSS,OFDM

Type: FPC Antenna

Gain: 5 dBi

LoRa Specification:

Operation Frequency: 905.3~925.5MHz (only for FCC ID)

Number of Channel: 3 (only for FCC ID)

Modulation: GFSK

Type: FPC Antenna

Gain: 3.3 dBi

The module can be used for mobile or applications with a maximum antenna. The host manufacturer installing this module into their product must ensure that the final composit product complies with the FCC requirements by a technical assessment or evaluation to the FCC rules, including the transmitter operaition. The host manufacturer has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.

2.4 Limited module procedures

Not applicable.

2.5 Trace antenna designs

Not applicable. The module has its own antenna, and doesn't need a host's printed board microstrip trace antenna etc.

2.6 RF exposure considerations

The module must be installed in the host equipment such that at least 20cm is maintained between the antenna and users' body; and if RF exposure statement or module layout is changed, then the host product manufacturer required to take responsibility of the module through a change in FCC ID or new application. The FCC ID of the module cannot be used on the final product. In these circumstances, the host manufacturer will be responsible for re-evaluating the end product (including the transmitter) and

obtaining a separate FCC authorization.

2.7 Antennas

This device is intended only for host manufacturers under the following conditions: The transmitter module may not be co-located with any other transmitter or antenna; The module shall be only used with the internal antenna(s) that has been originally tested and certified with this module. The antenna must be either permanently attached or employ a 'unique' antenna coupler. As long as the conditions above are met, further transmitter test will not be required. However, the host manufacturer is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc. Antenna Specification are as follows:

BLE:

Type:FPC Antenna

Gain: 5 dBi

Model: WF4212-IPEX 1-10cm

Manufacturer: Dongguan Chuangjie Electronics Co.,LTD

WiFi:

Type: FPC Antenna

Gain: 5 dBi

Model: WF4212-IPEX 1-10cm

Manufacturer: Dongguan Chuangjie Electronics Co.,LTD

LoRa:

Type: FPC Antenna

Gain: 3.3 dBi

Model: NB058-113B-125IX

Manufacturer: Dongguan Chuangjie Electronics Co.,LTD

2.8 Label and compliance information

Host product manufacturers need to provide a physical or e-label stating "Contains Transmitter Module FCC ID: 2AFOS-WTLRC262-SG3" with their finished product.

2.9 Information on test modes and additional testing requirements

BLE Operation Frequency: 2402~2480MHz

Number of Channel: 40

Modulation: GFSK

WIFI Operation Frequency: 2412~2462MHz

Number of Channel: 11

Modulation: DSSS, OFDM

LoRa Specification:

Operation Frequency: 905.3~925.5MHz

Number of Channel: 3

Modulation: GFSK

Host manufacturer must perfom test of radiated & conducted emission and spurious emission, etc according to the actual test modes for a stand-alone modular transmitter in a host, as well as for multiple simultaneously transmitting modules or other transmitters in a host product. Only when all the test results of test modes comply with FCC requirements, then the end product can be sold legally.

2.10 Additional testing, Part 15 Subpart B disclaimer

The modular transmitter is only FCC authorized for FCC Part 15 Subpart C 15.247 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 circuity), 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.

EU:

This device in compliance with the essential requirements and other relevant provisions of Directive 2014/ 53/EU. All essential radio test suites have been carried out. This restriction will be applied to all Member States of European Union.

The device has been evaluated to meet general RF exposure requirements.

The device can be used in portable exposure conditions without restriction.

Declaration of Conformity

Hereby, Wireless-Tag Technology Co., Limited. declares that the product type compliance with Directives 2014/53/EU & 2011/65/EU. The full text of the EU declaration of conformity is available at the following internet address:https:// www.wireless-tag.com.