



# **2.4G LoRa Wireless Module**

## **User Manual**

### **WS2G4**

**2024-6-19**

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## 1. INTRODUCTION

The 2.4G LoRa WS2G4 wireless module is a transparent wireless serial port module developed by the Arcotech Solar, based on the SEMTECH integrated 2.4G LoRa transceiver chip SX1280. It provides long-distance serial communication and features built-in MCU and PA, as well as support for user parameter power-off storage and automatic filtering of module configuration messages. Additionally, it supports user transparent messages and wireless configuration parameters of other modules.

Application:

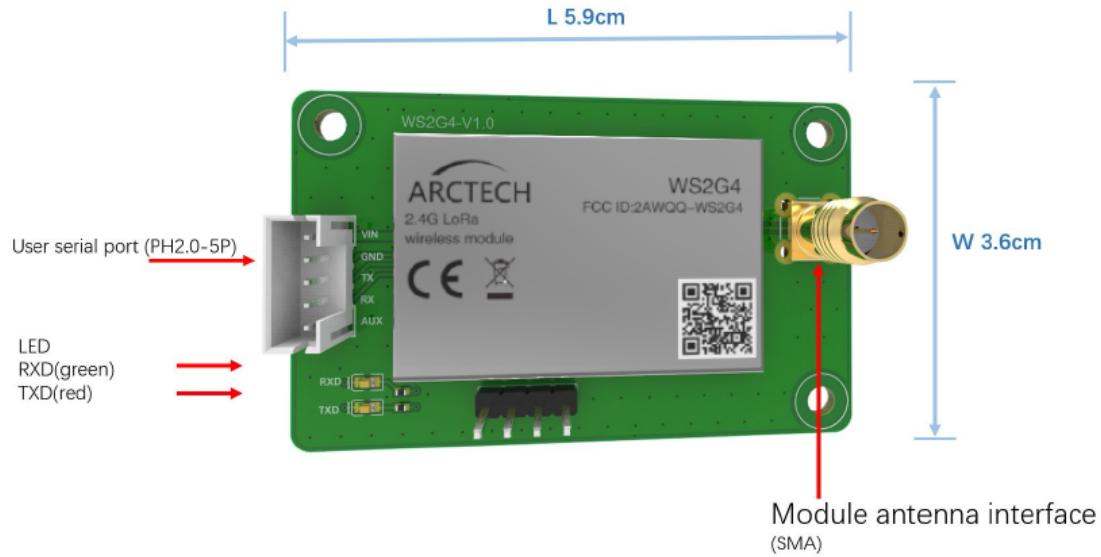
- Serial port communication between control box and communication box
- Other products with long-distance serial port communication requirements

## 2. SPECIFICATION PARAMETER

SPECIFICATION		performance
Supply voltage		5V~6V
Operating temperature		-30~60℃
Dimension		L 5.9cm × W 3.6cm
Antenna interface		RP-SMA
Operating wireless frequency		2402MHz~2479Mhz
Power dissipation	TX	Max 115mA@5V
	RX	TYP 15mA@5V
E-Field level		Max 100.43dBμV/m
Receiving sensitivity		Typ -111dBm
Communication rate	Air rate(LoRa)	10Kbps
		20Kbps/30Kbps
		40Kbps/50Kbps
	Serial baud rate	9600bps
		19200bps
		38400bps
		57600bps
		115200bps
Wireless subcontract size		32, 64, 128, 240(bytes)
Serial port cache size		1024 bytes
Communication distance		Typ 800m

### 3. APPEARANCE DIAGRAM AND PIN DEFINITION

#### 3.1 Dimensional appearance



#### 3.2 Pin definition

Pin name	Pin function
5V	Device power supply, connect to the 5Vsupply voltage
GND	Supply ground
TX	Serial port data out pin
RX	Serial port data in pin
AUX	Alternate function pin

## 4. FORWARDING PERFORMANCE

Air Rate (bps)	Serial baud rate (bps)	240bytes Transmission time (±1ms)
10K	9600	722
	19200	472
	28400	346
	57600	304
	115200	262
20K/30K	9600	614
	19200	363
	38400	237
	57600	195
	115200	153
40K/50K	9600	559
	19200	308
	38400	182
	57600	141
	115200	99

**Caution**

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

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.

**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.

# OEM Guidance

- **Applicable FCC rules**

This device complies with part 15.249 of the FCC Rules.

- **The specific operational use conditions**

This module can be used in IoT devices. The input voltage to the module is nominally 5V DC. The operational ambient temperature of the module is -30 °C ~ 60 °C. the external antenna is allowed, such as Sucker antenna.

- **Limited module procedures**

N/A

- **Trace antenna designs**

N/A

- **RF exposure considerations**

The equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

- **Antennas**

Antenna type: Sucker antenna; Peak antenna gain : 3dBi

- **Label and compliance information**

An exterior label on OEM's end product can use wording such as the following: "Contains Transmitter Module FCC ID: 2AWQQ-WS2G4" or "Contains FCC ID: 2AWQQ-WS2G4"

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

The modular transmitter has been fully tested by the module grantee on the required number of channels, modulation types, and modes, it should not be necessary for the host installer to re-test all the available transmitter modes or settings. It is recommended that the host product manufacturer, installing the modular transmitter, perform some investigative measurements to confirm that the resulting composite system does not exceed the spurious emissions limits or band edge limits (e.g., where a different antenna may be causing additional emissions).

The testing should check for emissions that may occur due to the intermixing of emissions with the other transmitters, digital circuitry, or due to physical properties of the host product (enclosure). This investigation is especially important when integrating multiple modular transmitters where the certification is based on testing each of them in a stand-alone configuration. It is important to note that host product manufacturers should not assume that because the modular transmitter is certified that they do not have any responsibility for final product compliance.

If the investigation indicates a compliance concern the host product manufacturer is obligated to mitigate the issue. Host products using a modular transmitter are subject to all the applicable individual technical rules as well as to the general conditions of operation in Sections 15.5, 15.15, and 15.29 to not cause interference. The operator of the host product will be obligated to stop operating the device until the interference have been corrected. The final host / module combination need to be evaluated against the FCC Part 15B criteria for unintentional radiators in order to be properly authorized for operation as a Part 15 digital device.

- **Additional testing, Part 15 Sub part B disclaimer**

The host integrator installing this module into their product must ensure that the final composite product complies with the FCC requirements by a technical assessment or evaluation to the FCC rules, including the transmitter operation and should refer to guidance in KDB 996369. For host products with certified modular transmitter, the frequency range of investigation of the composite system is specified by rule in Sections 15.33(a)(1) through (a)(3), or the range applicable to the digital device, as shown in Section 15.33(b)(1), whichever is the higher frequency range of investigation.

When testing the host product, all the transmitters must be operating. The transmitters can be enabled by using publicly-available drivers and turned on, so the transmitters are active. In certain conditions it might be appropriate to use a technology-specific call box (test set) where accessory 50 devices or drivers are not available. When testing for emissions from the unintentional radiator, the transmitter shall be placed in the receive mode or idle mode, if possible. If receive mode only is not possible then, the radio shall be passive (preferred) and/ or active scanning. In these cases, this would need to enable activity on the communication BUS (i.e., PCIe, SDIO, USB) to ensure the unintentional radiator circuitry is enabled. Testing laboratories may need to add attenuation or filters depending on the signal strength of any active beacons (if applicable) from the enabled radio(s). See ANSI C63.4, ANSI C63.10 and ANSI C63.26 for further general testing details.

The product under test is set into a link/association with a partnering device, as per the normal intended use of the product. To ease testing, the product under test is set to transmit at a high duty cycle, such as by sending a file or streaming some media content.