

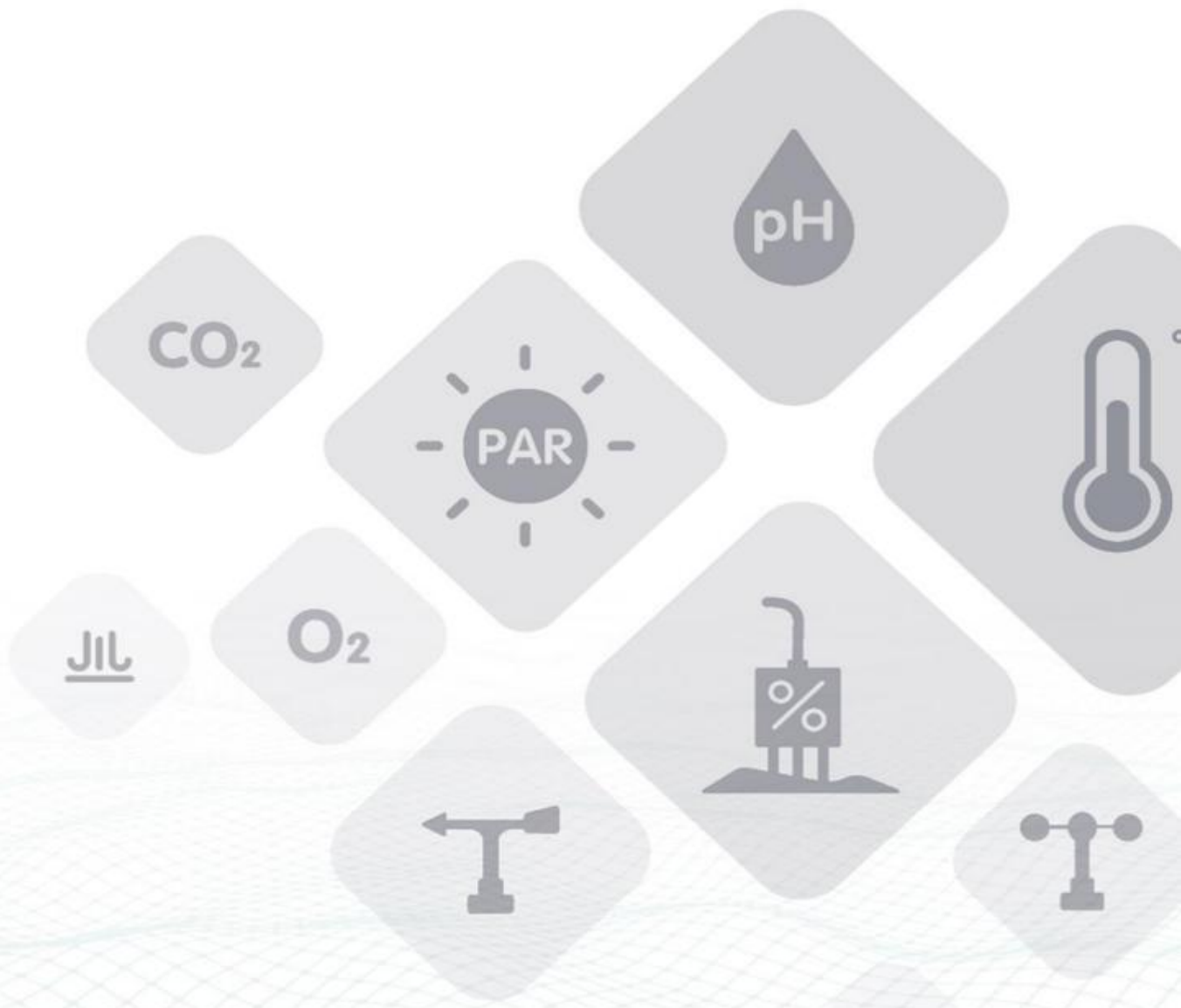


SENSECAP

Wio-SX1262-LF Wireless Module Datasheet (V1)

Version: V1.1

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1 Introduction



Wio-SX1262-LF Wireless Module is a low-cost, ultra-low power, ultra-small size LoRaWAN[®] module . The module uses ST system on chip STM32WLE5JC, integrated high-performance LoRa[®] SX126X IP and ultra-low power consumption of MCU. The target application of this module is wireless sensor networks and other Internet of Things devices, especially battery-powered low power consumption and long-distance occasions.

Wio-SX1262-LF Wireless Module is mainly suitable for long-distance, ultra-low-power applications such as wireless meter reading, sensor networks, and other low-power wide-area IoT scenarios.

1.1 Feature

- Low power consumption: as low as 2.1uA sleep current (WOR mode)
- low cost:
- Small size: 12mm X 12mm * 2.5mm 28 pins SMT
- High performance:
 - TXOP=10dBm@434MHz
 - TXOP=22dBm@470MHz
- -136.5dBm sensitivity for SF12 with 125KHz BW
- 158 dB link budget, suitable for long distance
- interface
 - UART
 - I2C
 - ADC
 - SWD

1.2 Module Information

Part Number	TX Power
Wio-SX1262-LF	22dBm@ 433MHz; 10dBm@ 470MHz; with IPEX

2 Description

Wio-SX1262-LF Wireless Module is embedded with high-performance STM32WLE5JC, which is very suitable for the design of various IoT nodes.

The Wio-SX1262-LF Wireless Module module supports (G) FSK mode and LoRa®. 62.5kHz, 125kHz, 250kHz and 500kHz bandwidth can be used in LoRa® mode.

Based on the powerful functions and rich peripherals of STM32WLE5JC, the module provides UART, I2C, SPI, ADC and GPIOs for users to choose according to the application. If you need to upgrade the built-in AT command firmware, please use the two-wire interface (UART) to complete the programming based on the boot mode; and customers can develop the software based on the internal MCU of the module to complete the program erasure and programming through SWD.



Figure 1 Wio-SX1262-LF Wireless Module Schematic diagram

2.1 Pin definition

Table 1 Wio-SX1262-LF Wireless Module pinout

Number	Name	Type	Description
1	VCC	-	Supply voltage for the module
2	GND	-	Ground
3	PA13	I	SWDIO of SWIM for program download
4	PA14	I/O	SWCLK of SWIM for program download
5	PB15	I/O	SCL of I2C2 from MCU
6	PA15	I/O	SDA of I2C2 from MCU
7	PB4	I/O	MCU GPIO
8	PB3	I/O	MCU GPIO
9	PB7	I/O	UART1_RX from MCU
10	PB6	I/O	UART1_TX from MCU
11	PB5	I/O	MCU GPIO
12	PC1	I/O	MCU GPIO ; LPUART1_TX from MCU
13	PC0	I/O	MCU GPIO ; LPUART1_RX from MCU
14	GND	-	Ground
15	RFIO	I/O	RF input/output
16	GND	-	Ground
17	RST	I/O	Reset trigger input for MCU
18	PA3	I/O	MCU GPIO; USART2_RX from MCU
19	PA2	I/O	MCU GPIO; USART2_TX from MCU
20	PB10	I/O	MCU GPIO
21	PA9	I/O	MCU GPIO
22	GND	-	Ground
23	PA0	I/O	MCU GPIO
24	PB13	I/O	SPI2_SCK from MCU; Boot pin (Active low)
25	PB9	I/O	SPI2_NSS from MCU
26	PB14	I/O	SPI2_MISO from MCU
27	PA10	I/O	SPI2_MOSI from MCU
28	PB0	I/O	Unavailable; Suspended treatment

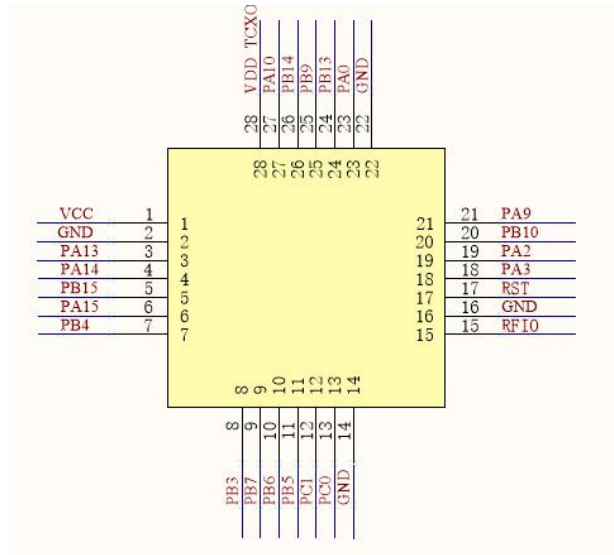


Figure 2 Wio-SX1262-LF Wireless Module Pin arrangement

3 Electrical characteristics

3.1 Absolute Maximum Ratings

Reaching or exceeding the maximum ratings listed in the table below can cause equipment damage.

Item	Description	min	max	unit
VCCmr	Supply voltage	-0.3	+3.9	V
Tmr	Ambient temperature	-40	+85	°C
Pmr	RF input power	-	+10	dBm

3.2 Operating Conditions

Item	Description	min	max	unit
VCCop	Supply voltage	+1.8	+3.6	V
Top	Ambient temperature	-40	+85	°C
Pop	RF input power	-	+10	dBm

3.3 Module specifications

ITEMs	Parameter	Specifications				Unit
Structure	Size	12(W) X 12(L) X 2.5(H)				mm
	Package	28 pins, SMT				
Electrical Characteristics	power supply	3.3V type				V
	Sleep current	2.1uA (WDT on);				uA
	Operation current (Transmitter+MCU)	50mA @10dBm in 434MHz type				mA
		111mA @22dBm in 470MHz type				
	Operation current (Receiver+MCU)	6.7mA @BW125kHz, 434MHz type				mA
		6.7mA @BW125kHz, 470MHz type				
	Output power	10dBm max @434MHz				dBm
		22dBm max @470MHz				
	Sensitivity	@SF12, BW125 kHz				dBm
		Fr (MHz)	min	type	max	
		434	-	-134.5	-136	
		470	-	-136.5	-137.5	
Harmonics	<-36dBm below 1GHz				dBm	
	<-40dBm above 1GHz				dBm	
Interface	RFIO	RF port				
	UART	3 group of UART, include 2 pins				
	I2C	1 group of I2C, include 2 pins				
	ADC	1 ADC Input, include 1 pins, 12-bit 1Msps				
	NRST	Manual reset pin input				
	SPI	1 group of SPI, include 4 pins				

4 Typical RF performance test

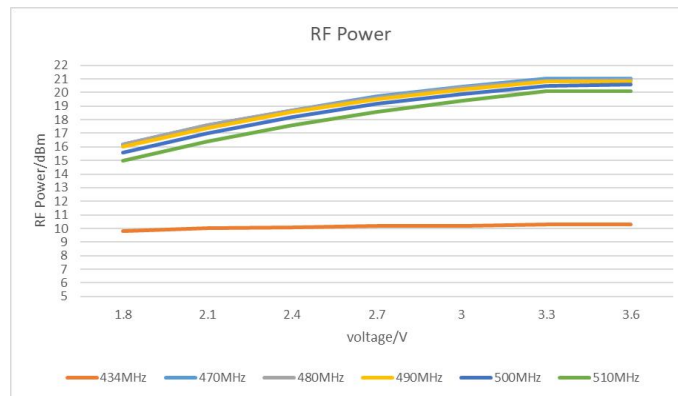


Figure 3 RF Power vs Voltage (434~510 MHz)

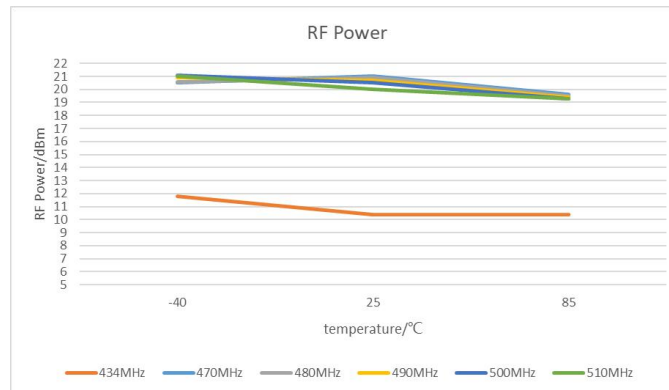


Figure 4 RF Power VS Temperature (434~510 MHz)

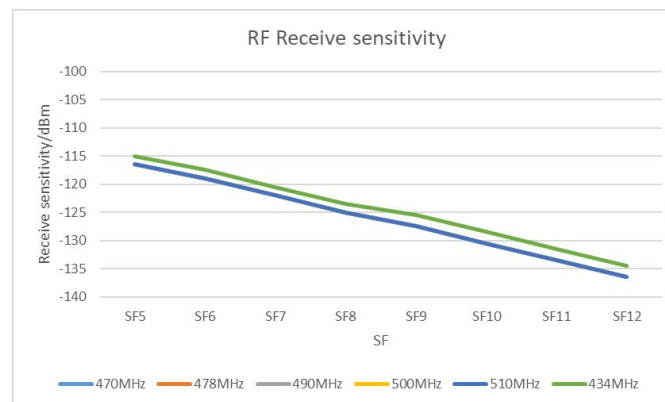


Figure 5 RF Receiver Sensitivity vs Spreading factor (434~510 MHz)

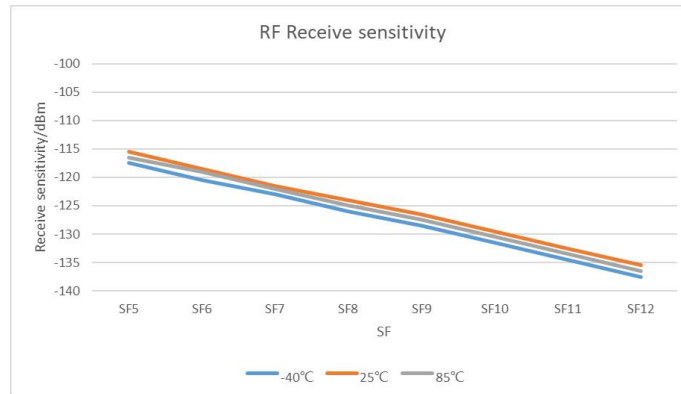


Figure 6 RF Receiver Sensitivity VS Temperature (470 MHz)

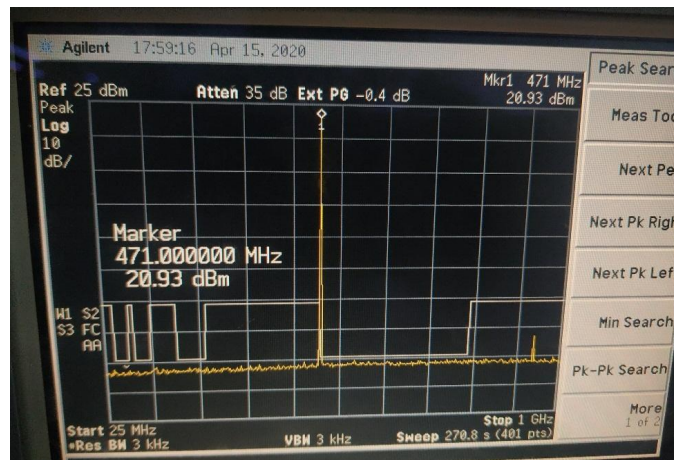


Figure 7 Harmonic (25 MHz~1 GHz) @Frf=470MHz, TXOP=22dBm

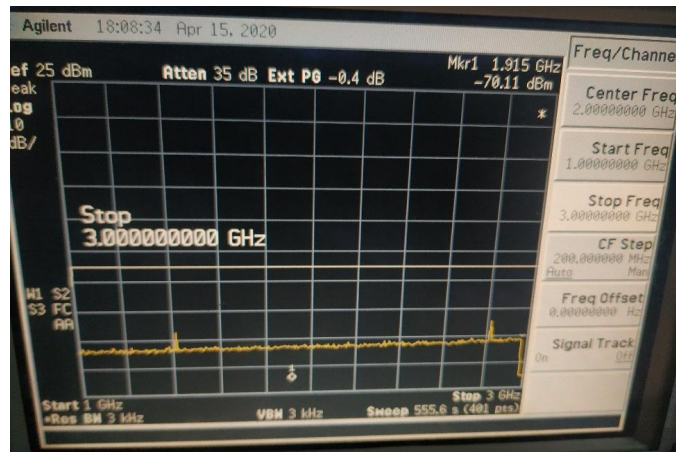


Figure 8 Harmonic (1 GHz~3 GHz)@Frf=470MHz, TXOP=22dBm

5 Application information

5.1 Package information

Unless specified dimension tolerance, the Dimension below will be with tolerance $\pm 0.1\text{mm}$, all the dimension unit is mm.

Wio-SX1262-LF Wireless Module has a 28-pin SMD package:

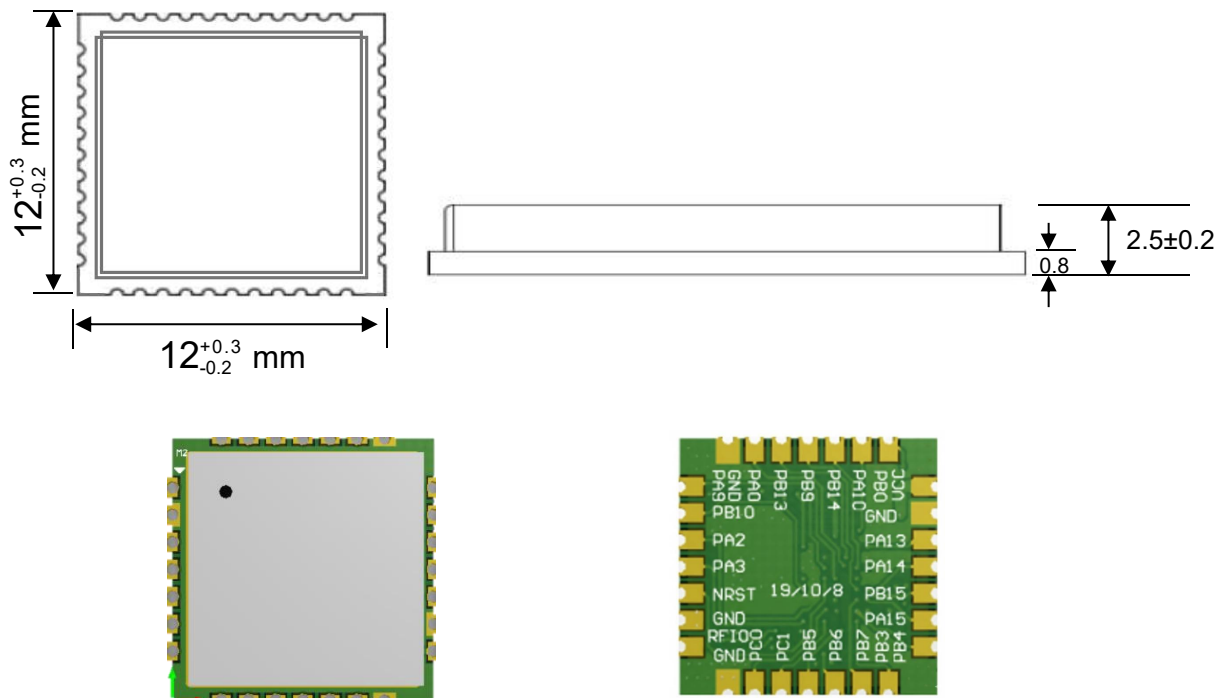


Figure 16 Wio-SX1262-LF Wireless Module Module appearance

The following figure shows the recommended Layout package dimensions.

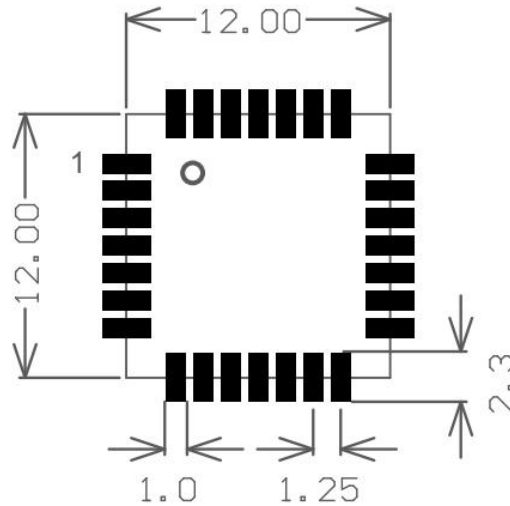


Figure 17 PCB footprint

5.2 External interface of the module

In addition to several necessary GPIO ports and a set of SPI ports used for internal RF transceiver control, other GPIOs of the MCU have been derived, including UART (for AT commands), I2C, ADC, etc. For customers who want to develop software or expand peripherals on the MCU of the module, these rich GPIO interfaces can satisfy most application requirements.

5.3 Reference design based on Wio-SX1262-LF Wireless Module module

Wio-SX1262-LF Wireless Module embeds the global LoRaWAN® protocol and AT instruction set. This will make the design of LoRaWAN® nodes based on this module very easy. The following is a typical reference design that uses Wio-SX1262-LF Wireless Module to quickly start a LoRaWAN® application. Just connect UART and NRST to the host MCU and send AT commands.

In addition, Pin 24 grounding of the module will force the module to enter Boot upgrade mode.

[illegible]

2) The maximum transmission time (dwell time of the channel) and duty cycle of the node depends on the frequency band used and local regulations

Wio-SX1262-LF Wireless Module module integrates ST ultra-low power IC STM32WLE5JC. The current is only 2.1uA in sleep mode, this module is very suitable for various applications of LoRaWAN®.

6.2 Design LoRaWAN® wireless sensor based on Wio-SX1262-LF Wireless Module

Wio-SX1262-LF Wireless Module is an AT instruction set that encapsulates the global LoRaWAN® standard protocol. The customer only needs a very simple MCU as the main control, and can control the Wio-SX1262-LF Wireless Module through the serial port, thereby easily implementing the LoRaWAN® protocol. This helps customers quickly bring sensor products to the LoRaWAN® market.

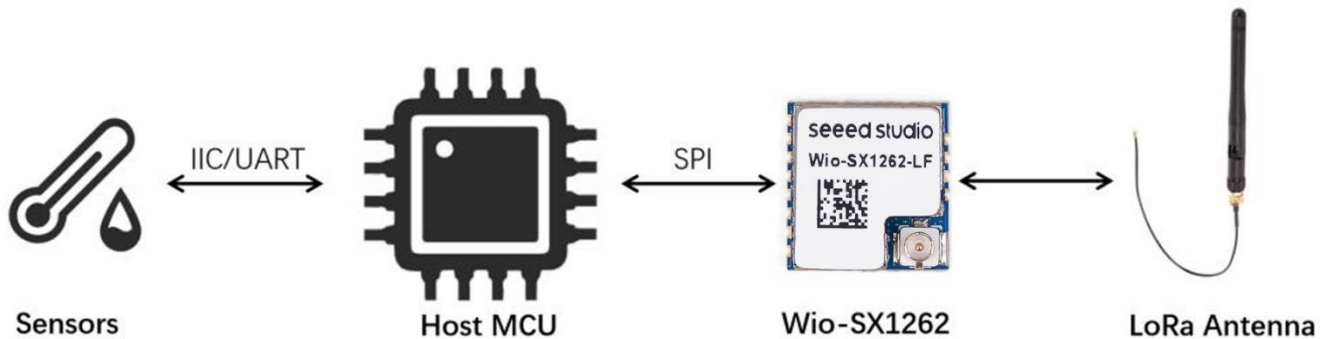


Figure 19 Design of LoRaWAN® wireless sensor based on Wio-SX1262-LF Wireless Module module

7 ODM & OEM Services

With decades of ODM & OEM experience, our engineers and product experts are proficient in delivering customization service for popular open-source hardware platforms – NVIDIA® Jetson™, Raspberry Pi®, Beagleboard®, and more. Use the LoRa® module to create industrial-grade sensors or development boards for rapid AIoT implementation. We're dedicated to supporting you and streamlining your idea-to-product journey. We are ready to bring your product concept to the market with Seeed Studio's industrial capabilities from design, manufacturing, testing, certification, global distribution, and marketplace. To design with the LoRa® module, please contact iot@seeed.cc