WLT5283M BLE transparent transmission module

Module Specification sheet

Latest version | V1.2

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About this Manual

The "WLT5283m Module Specification" provides an introduction to the basic functions of the WLT5283m module, including the electrical specifications of the module, RF performance, pin size, and reference schematic design. Readers can refer to this document for the overall functional parameters of the module have a detailed understanding of the application.

Revision history

Version Information Management

Version Number	Time	Updating records	Editor
V1.0	2021.03.24	Initial version	Yan Peng
V1.1	2021.6.11	Optimized Format	Guo Zhenxing
V1.2	2023.6.9	Update company address information	Lv Yanxue

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Step 1 Overview

The WLT5283M is a Bluetooth Low Power transparent transmission module from Wi-linktech. The module is mainly used in the Internet of Things data communication, through a wealth of peripheral interfaces to achieve data collection and control. In transparent transmission mode, the user's product can quickly dock with the module and communicate with the mobile device to realize the intelligent control and management of the product.

WLT5283M is based on the Bluetooth Low Power 5.0 protocol, which can be used for transparent and encrypted point-to-point data transmission, and users do not need to care about the transmission protocol, only need to make simple Settings to communicate.

The module supports BLE (Up to Bluetooth 5.0) and BLE Mesh. Built-in 512kB FLASH supports dynamic stack and protocol Profile configuration, and product features can be configured via software, providing ultimate flexibility. Hardware OTA upgrades are also supported, allowing convenient product features to be rolled out and upgraded.

Figure 1-1: WLT5283M module

1.1. Functional features

- Bluetooth 5.0 compliant.
- Low power mode supports 1Mbps, 2Mpbs rates
- Transmit power: -20~+4dBm
- Receive sensitivity: -96dBm@BLE 1Mbps
- Support UART
- interface support AT command
- Support APP parameter configuration onboard
- high performance PCB antenna, and support external antenna
- Stamp hole pin, easy and reliable
- welding ultra-small package:

11x16mm

- Operating temperature: -40℃~+85℃

WLT5283M module only needs to connect VCC,GND,TX,RX four lines to complete the data transparent transmission function, and also supports the use of AT instruction to modify the default name and other related parameters (for details, please see the WLT5283M User Manual document).

After the module is configured, you can use the relevant mobile phone software to test the transparent transmission function. Android users can download the official test software of Wi-linktech " Wi-linktech Test software" by searching through Baidu's mobile assistant. Apple users are recommended to use light blue from the mobile phone store, as shown in Figure 1-2:

Figure 1-2: Testing the software

Wi-linktech has been engaged in the field of Bluetooth for many years, and has strong research and development strength, which can easily realize the interconnection of users' Bluetooth devices, data transmission and other applications. Based on WLT5283M standard version module, we can customize and design Bluetooth module according to customer requirements, and provide corresponding hardware and software support. For details, please contact our company http://www.wi-linktech.com/ or customer service.

Application field

Personal Devices:

Wearable, mouse and keyboard, remote-controlled toys;

Retail logistics:

Electronic shelf labels, cold chain transport;

Smart home:

Lighting, sensors, smart locks, remote controls, lawn mowers, smart robots, smart printers, lifting tables and chairs;

Industrial control:

Specialized printers, medical equipment;

2.Electrical specifications

Table 2-1: Maximum rated parameters

Item	Symbol	Min	Max	Unit
Supply voltage	VDD	0	3.6	V
Pin input voltage	Vin	0.3	VDD + 0.3	V
Pin output voltage	Vout	0	VDD	V
Storage temperature	Tstr	- 65.	150	ºC
Welding temperature	Tsld	-	260	ºC

> Note:
>
> 1. The electrical characteristics listed are target specifications and are for reference only. Some data may be updated based on actual test results.
> 2. The voltage values shown are based on GND in the module. Any voltage that exceeds the "maximum rating" may cause permanent damage to the device.

Table 2-2: Recommended operating conditions

Item	Symbol	Min	Typ.	Max	Unit
Supply voltage	VDD	1.7	3.3	3.6	V
Supply voltage rise time (from 1.6V to 2.8V)	TR	-	-	10	ms
Operating temperature range	Topr	- 40	-	85	ºC

Table 2-3: Operating current (VDD=3.3V, T=25 ° C)

Item	Sym.	Min	Typ.	Max	Unit	Condition
RX	IRx	-	5.4	-	mA	Whole Module Working
TX	ITx	-	5.3	-	mA	Whole Module Working @0dBm With DCDC enable
Sleep		-	8	-	uA	

Table 2-4: Broadcast current (VDD= 3.3v, T=25 ° C,10dBm)

Item	Min	Typ	Max	Unit	Condition
Dormant broadcast	-	174	-	uA	The broadcast interval is
Wake up broadcast	-	8.6	-	mA	The broadcast interval is

Table 2-5: Connection current (VDD= 3.3v, T=25 ° C,10dBm)

Item	Min	Typ	Max	Unit	Condition
Wake without broadcast	-	8.56	-	mA	500ms between connections
Wake up connection	-	8.66	-	mA	

Table 2-6: n pin input/output characteristics (VDD=3.3V, T=25 ° C)

Item	Sym.	Min	Typ.	Max	Unit	Condition
Enter high	VIH	0.84	VDD	VDD	V	
Enter low	VIL	VSS	VSS	0.36	V	
Output high	VOH	1.88	VDD	VDD	V	
Output low	VOL	VSS	VSS	0.47	V	

Table 2-7: RF performance parameters

Item	Sym.	Min	Typ.	Max	Unit	Condition
Frequency	Freq.	2402	2480		MHz	1MHz programmable
Data rate	BLE/2.4G Proprietary 1Mbps, ±250kHz deviation BLE/2.4G Proprietary 2Mbps, ±500kHz deviation BLE 125kbps, ±250kHz deviation BLE 500kbps, ±250kHz deviation					

3.Bluetooth specifications

Table 3-1: BLE 1Mbps RF_Rx performance
(±250kHz deviation)

Item	Sym.	Min	Typ.	Max	Unit	Condition
Sensitivity	1Mbps	-	- 96.	-	dBm	
Frequency offset error	-	- 100.	-	+ 100	KHz	
Same frequency	-	-	- 11	-	dB	Received signal
Image suppression	-	-	37	-	dB	Received signal
In-band blocking suppression (modulated interference)	±1 MHz offset	-	A third	-	dB	Received signal strength -67dBm
	±2 MHz offset	-	37/39	-	dB	
	>=3 MHz offset	-	42	-	dB	

Table 3-2: BLE 1Mbps RF_Tx performance

Item	Sym.	Min.	Typ.	Max.	Unit	Condition
Maximum output power	-	-	4	-	dBm	
Minimum output power	-	-	- 20	-	dBm	
Programmable power	-	55	55	55	dB	
20dB modulation bandwidth	-	-	2.5	-	MHz	

Table 3-3: BLE 2Mbps RF_Rx performance
(±500kHz deviation)

Item	Sym.	Min.	Typ.	Max.	Unit	Condition
Sensitivity	2Mbps	-	- 93.	-	dBm	
Frequency offset error	-	- 100.	-	+ 100	KHz	
Same frequency	-	-	- 10	-	dB	Received signal
Image suppression	-	-	25	-	dB	Received signal
In-band blocking suppression (modulated interference)	±2 MHz offset	-	6/6	-	dB	Received signal strength -67dBm
	±4 MHz offset	-	39/38	-	dB	
	>=4 MHz offset	-	42	-	dB	

Table 3-4: BLE 2Mbps RF_Tx performance

Item	Sym.	Min.	Typ.	Max.	Unit	Condition
Maximum output power	-	-	4	-	dBm	
Minimum output power	-	-	- 20	-	dBm	
Programmable power	-	55	55	55	dB	
20dB modulation bandwidth	-	-	1.4	-	MHz	

4.Pin instruction

4.1Connection diagram

Module supports UART port for communication, transmission and reception of data through TX and RX. And support hardware RTS and CTS flow control function.

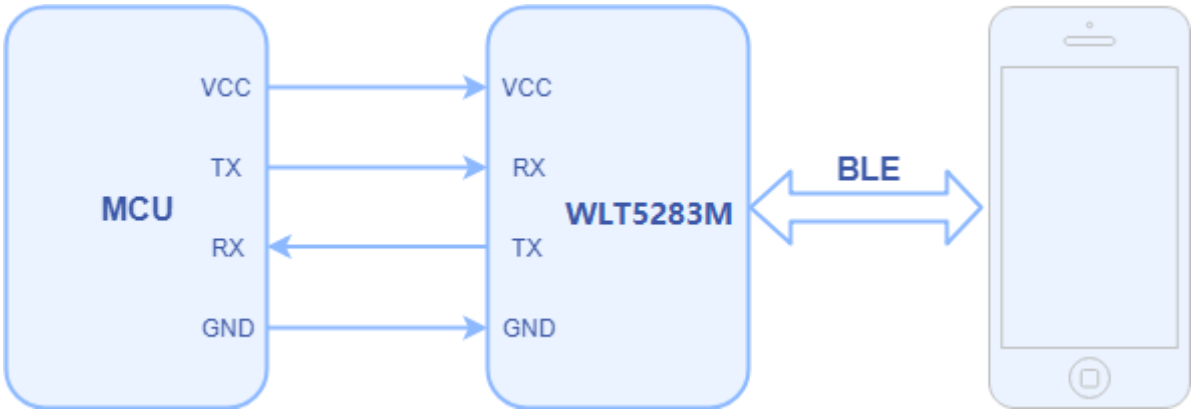


Figure 4-2: UART communication

4.2 Pin definition

PIN #	Pin name	Type	Description
1	NC	NC	NOT CONNECT
2	P0.25	Digital I/O	I/O
3	P0.26	Digital I/O	I/O
4	P0.27	Digital I/O	I/O
5	P0.28	ANALOG	I/O
6	P0.29	ANALOG	I/O
7	P0.30	ANALOG	I/O
8	SWCLK	Digital I/O	SWCLK /Debug
9	SWD	Digital I/O	SWD/Debug
10	GND	GND	Digital Ground
11	P0.31	ANALOG	I/O
12	P0.00	ANALOG	I/O
13	P0.01	ANALOG	I/O
14	P0.02	ANALOG	I/O
15	P0.03	ANALOG	I/O
16	P0.04	ANALOG	I/O
17	P0.05	ANALOG	I/O
18	GND	GND	Digital Ground
19	P0.06	Digital I/O	I/O
20	LDO_IN	POWER	Power supply for Module(1.7 to 3.6V)
21	P0.21 / RST	Digital I/O	Power on reset, active low
22	GND	GND	Digital Ground
23	P0.07	Digital I/O	I/O
24	P0.08	Digital I/O	I/O
25	P0.09	Digital I/O	I/O
26	GND	GND	Digital Ground
27	P0.10	Digital I/O	I/O
28	NC	Digital I/O	NOT CONNECT
29	NC	Digital I/O	NOT CONNECT
30	P0.11	Digital I/O	I/O

PIN #	Pin name	Type	Description
31	P0.12	Digital I/O	I/O
32	P0.13	Digital I/O	I/O
33	P0.14	Digital I/O	I/O
34	P0.15	Digital I/O	I/O
35	P0.16	Digital I/O	I/O
36	P0.17	Digital I/O	I/O(UART_CTS)
37	P0.18	Digital I/O	I/O(UART_RTS)
38	P0.19	Digital I/O	I/O(UART_RXD)
39	P0.20	Digital I/O	I/O(UART_TXD)
40	GND	GND	Digital Ground
41	P0.22	Digital I/O	I/O
42	P0.23	Digital I/O	I/O
43	P0.24	Digital I/O	I/O
44	NC	NC	NOT CONNECT
45	NC	NC	NOT CONNECT
46	NC	NC	NOT CONNECT
47	GND	GND	Digital Ground
48	GND	GND	Digital Ground
49	RF_PIN	ANALOG	External RF antenna outlet
50	NC	NC	NOT CONNECT

> Note: All digital IO works as a GPIO with configurable pull-up/pull-down resistors.

5.Refer to the design

5.1. Module dimensions

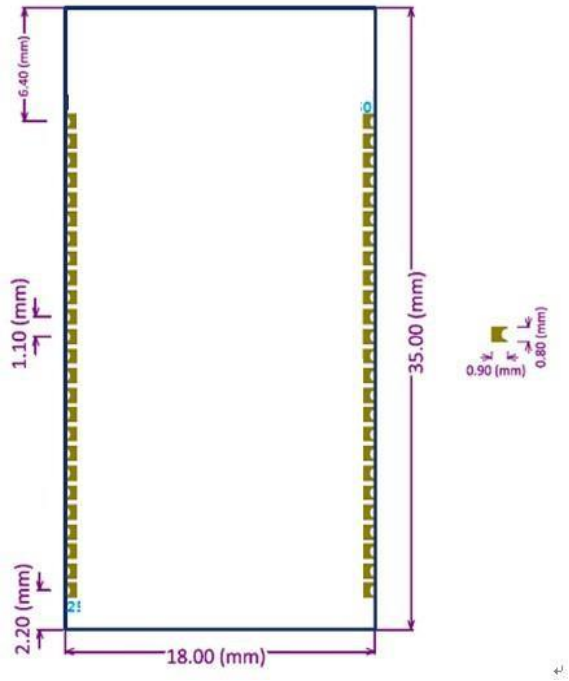


Figure 5-2: Top View (Seen from Top) Bottom View (Seen from Bottom)

Figure 5-3 Module thickness

Module outline dimensions (including process edges)	**Length (X)**	**35.0± 0.3mm**
	Width (Y)	18.0± 0.3mm
Antenna position dimensions	Length (X)	18.0 mm± 0.15 mm
	Width (Y)	5.6 mm± 0.15 mm
PCB thickness	Height (H)	1.00 ± 0.05mm
Total thickness of module (including shield)	Height (H)	3.00 ± 0.1mm

Table 5-1: Module design dimensions Note: Verentone reserves the right to select components from different suppliers to realize the functions of the module. At the same time, all mechanical and electrical specifications and module recognition are guaranteed Certificates are maintained. The design should be carried out within the physical dimensions of the machine as shown in Figure 5-2. All measurements are in millimeters (mm).

5.2. Precautions

Bluetooth works at 2.4GHz frequency, should try to avoid various factors on the wireless transceiver impact, pay attention to the following points:

- Avoid metal for the part of the product housing that encloses the module, and if the housing is metal, consider using an external antenna.
- Metal screws, etc. inside the product should be kept away from the RF portion of the module.
- In order to maximize RF performance, the user motherboard layout should follow the following recommendations:
  - Antenna clearance area: The user motherboard located directly below the antenna area of the module
  - must not have any copper foil wiring (including power, ground, signal layers). Module location: The module should ideally be arranged in a corner of the user's motherboard, with the PCB antenna located at the far end of the motherboard. This position minimizes the headroom area of the antenna.

5.3 Refer to the PCB package

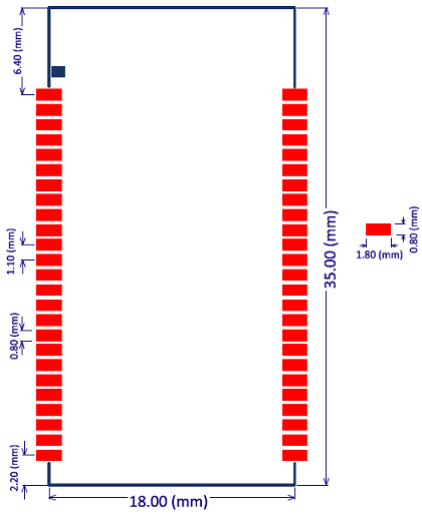


Figure 5-5: Reference package dimensions

6. Reflux parameter recommendation

Backflow parameters can be set as follows

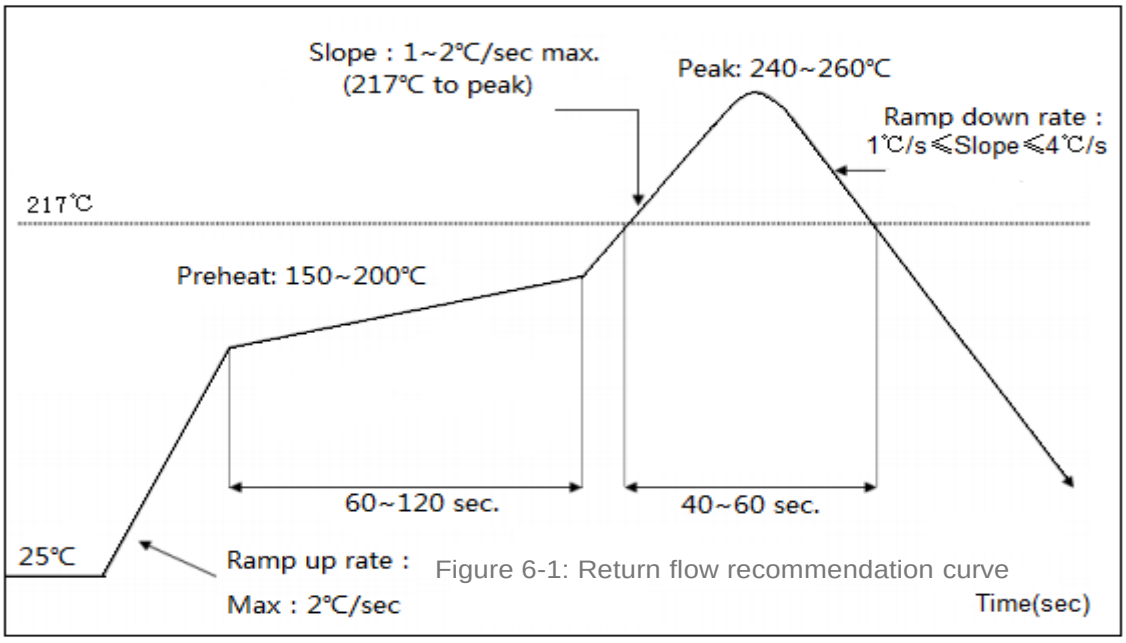


Figure 6-1: Return flow recommendation curve

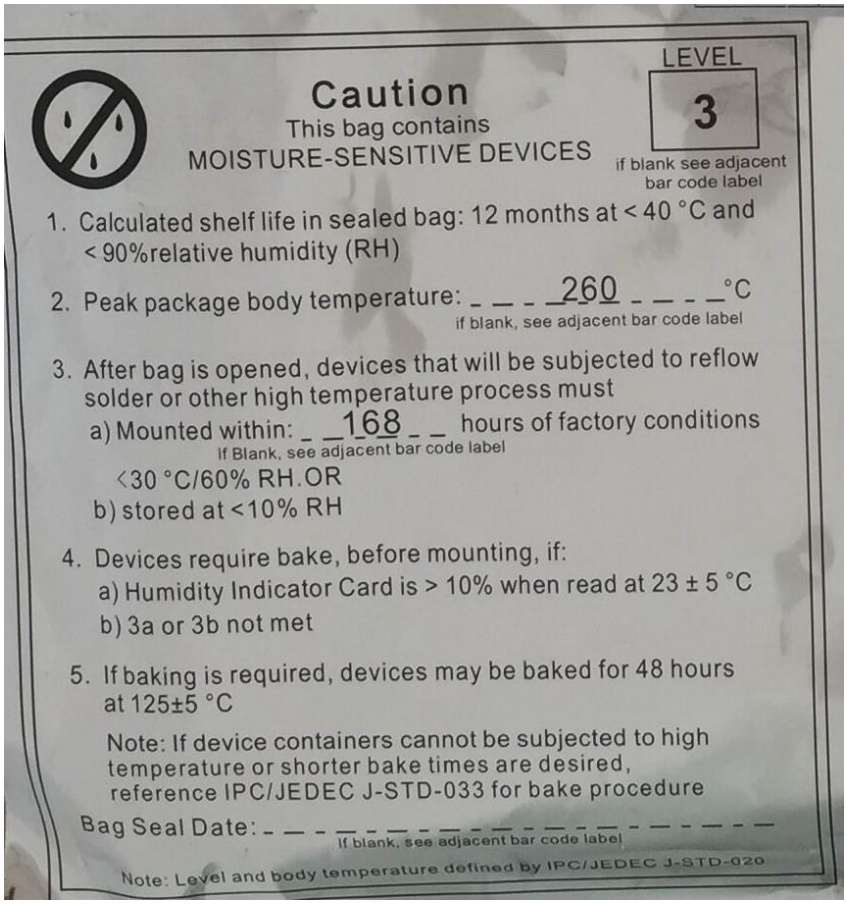
Temperature range	Time	Key parameters
Preheat zone(<150℃)	60-120S	Ramp uprate:≤2S
Uniform temperature zone(150-200℃)	60-120S	Ramp uprate:<1S
Recirculation zone(>217℃)	40-60S	Peak:240-260℃
Cooling zone	Rampdown rate:1℃/s≤Slope≤4℃/s	

Table 6-1: Recommended reflux parameters

7 Package size

The WLT5283M module uses a sealed vacuum bag by default. The packing instructions are as follows:

- Sealed vacuum package Shelf life: The shelf life is 12 months. The temperature is <40 ° C and the relative
- humidity is <90% R.H. After unpacking, the installation shall be completed within 168 hours under the
- environment of <30℃ and <60% R.H. d relative humidity. If it does not meet the requirements of 5.2,
- the module needs to be baked before use, and the baking condition is 125±℃ for 8 hours. Product
- handling, storage and processing shall comply with IPC/JEDEC J-STD-033. Please refer to "Caution" on the vacuum bag for the above information.



8. Software application

WLT5283M is a data transmission module that supports transparent transmission mode and command transmission mode. AT+ command set mode allows the user to enter commands through the serial port to configure parameters. For details about the commands, please refer to WLT5283M Software Design Technical Manual. WLT5283M supports customer customization, please contact our company for details.

9 Regulatory Module Integration Instructions

List of applicable FCC rules

This device complies with part 15 of the FCC Rules. Limited

module procedures

Not applicable

Summarize the specific operational use conditions

This module can be applied in Wearable, mouse and keyboard, remote-controlled toys and Electronic shelf labels, cold chain transportThe input voltage to the module should be nominally 1.7-3.6V DC , typical value 3.3V DC and the ambient temperature of the module should not exceed 85℃.

RF exposure considerations

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment .This equipment should be installed and operated with minimum distance 5mm between the radiator& your body. If the device built into a host as a portable usage, the additional RF exposure evaluation may be required as specified by 2.1093.

FCC Radiation Exposure Statement

This modular complies with FCC RF 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.

Label and compliance information

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 Transmitter Module FCC ID: 2AOO6-WLT5283M Or Contains FCC ID: 2AOO6-WLT5283M”

When the module is installed inside another device, the user manual of the host must contain below warning statements:

1. 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.

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

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

The devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product

Additional testing, Part 15 subpart B disclaimer

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 .

The host integrator installing this module into their product mustensure 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.

Frequency spectrum to be investigated

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.

,

FCC Statement

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.

Canada Statement

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (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.

Caution Exposure:

This device meets the exemption from the routine evaluation limits in section 2.5 of RSS102 and users can obtain Canadian information on RF exposure and compliance.

Le dispositif répond à l'exemption des limites d'évaluation de routine dans la section 2.5 de RSS102

et les utilisateurs peuvent obtenir des renseignements canadiens sur l'exposition aux RF et le respect.

This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

Cet équipement doit être installé et utilisé avec une distance minimale de 20 centimètres entre le radiateur et votre corps.

About Us

Founded in 2011, Wi-linktech Communication Technology(Shanghai) Co.LTD is a fast growing Internet of Things wireless communication technology company located in the core area of Zhangjiang High-tech Development Zone in Pudong, Shanghai. The company focuses on providing the world's leading wireless connectivity solutions for the Internet of Things (WiFi/ Bluetooth /BLE/Lora/NB-IOT, etc.), including self-developed and self-branded communication chips, communication modules, communication boards, communication protocol software, mobile phone apps, cloud computing and other parts. The company mainly serves large and medium-sized customers in industrial Internet of Things, automotive, medical and fitness, financial payment and security, high-end consumer electronics, professional Musical Instruments, office equipment and other industries, including more than 40 deeply customized global industry leading customers in China, the United States, Europe, South Korea and other regions, as well as more than 200 large and medium - sized customers with close cooperation.

Adhering to the concept of people-oriented, integrity, responsibility and innovation, the company is committed to becoming a high-tech company with talent and technology as its core competitiveness and sustainable development. The company's core team has more than 10 years of management and technical experience in top 500 US-funded high-tech enterprises, emphasizes sustainable win-win cooperation with customers, combines the company's wireless connectivity and Cloud technology with in-depth customization of customer industry applications, and provides reliable wireless connectivity technical support for continuous product innovation and service innovation for large and medium-sized customers in the era of Internet of Things.

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