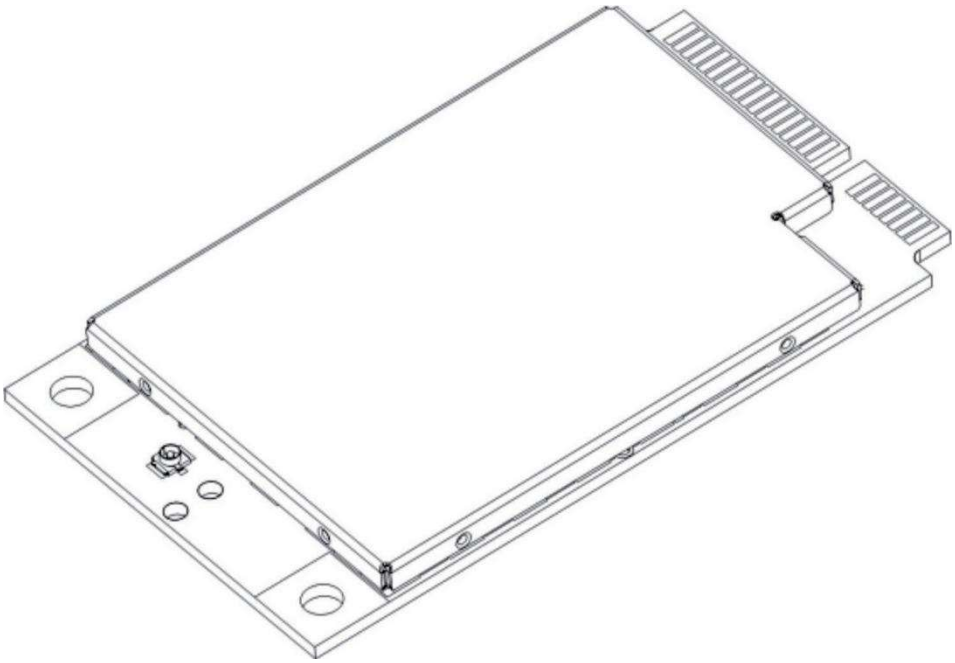
B100

LoRa Gateway Module Specifications

V1.0



(the image is only a reference)

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Preamble

B100 is an 8-channel LoRa/LoRaWAN gateway module designed with Semtech's SX1302 (Compatible with LBT function) , and customers can easily integrate modules into their own platforms to design their own customized LoRa/LoRaWAN gateway based on its small size and Mini-PCie connector function.This document will introduce important information about the hardware design of this module .Please read the application specifications carefully before use , and we will also modify the contents of thismanual according to the development needs.

1 Functional block diagram of module

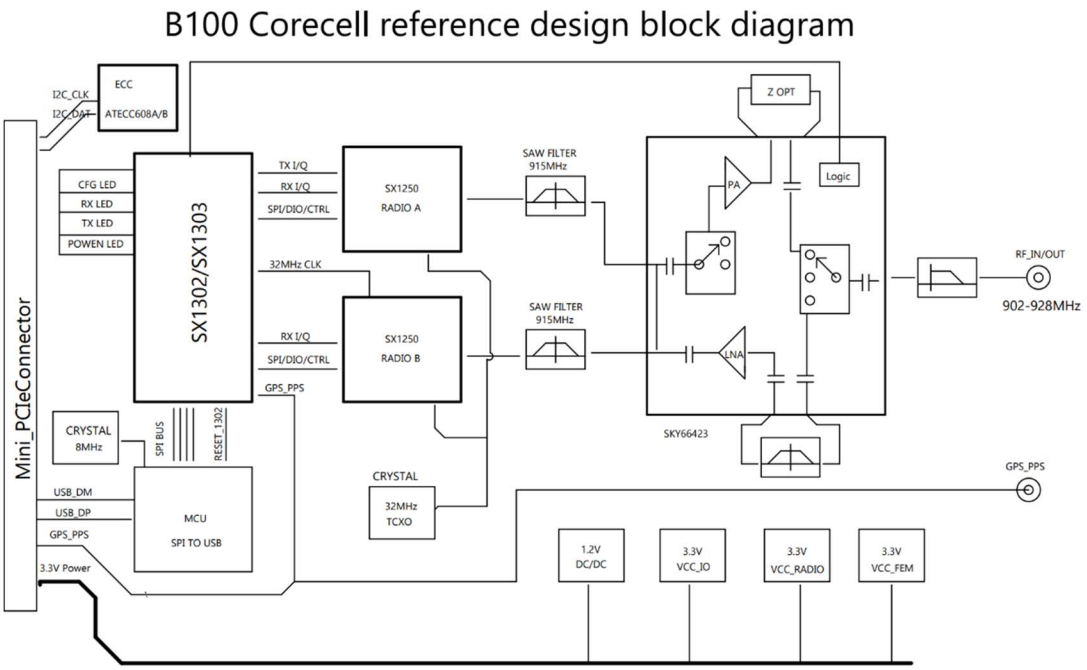


FIG. 1 Functional block diagram of module hardware

2.Interface application description

2.1 Distribution diagram of module pin

The module USES standard Mini-Pcie 52Pin gold finger package; the antenna ends is the Ipex connectorwith impedance of 50 Ω .

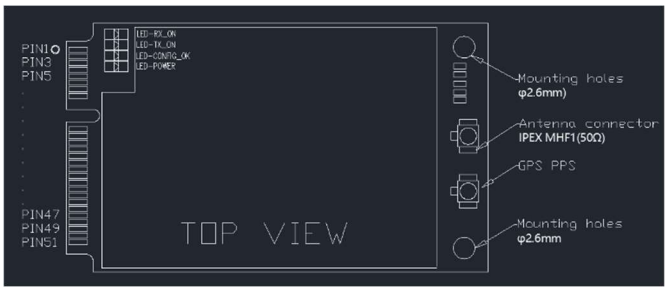


FIG.2 Module pin diagram (top view)

FIG.3 Module pin diagram (bottom view)

2.2 Module pin description

Pin name	Pin number	IO	Description	Remarks
Power interface				
VCC	2,24,39,41,52	I	Module power input pin VCC 3.3V, VDC(33V±0.2V)	Current load capacity≥ 500 Ma
GND	4,9,15,18,21,26,27, 29,34,35,37,40,43,50		Ground connection	
SPI				
HOST_SCK	3	I	SX1302/SX1261 SPI clock signal	Option
HOST_MISO	5	I	SX1302/SX1261 SPI data output	Option
HOST_MOSI	6	O	SX1302/SX1261 SPI data input	Option
HOST_CSN	7	I	SX1302 SPI chip select signal	Option
SX1261_NSS	17	I	SX1261 SPI chip select signal	Option
GPIO				
POW ER_EN	48	IO	Sx1250 Power supply enable	
SX1261_DI01	46	IO	SX1261 general IO 1	
SX1261_DI02	44	IO	SX1261 general IO 2	
GPIO 8	32	IO	SX1302 general IO 8	
GPIO 6	30	IO	ECC RESET	Option
SX1261_BUSY	23	IO	SX1261 Busy indicator	
NC				
NC	8,10,11,12,13,14,16, 17 ,20,22,23,25,28,31, 33,42,45,47,49,51			
SX13 02_RESET	1	I	Sx1302 reset pin	Option
SX1 261_RESET	22	I	SX1261 reset pin	Option
GPS_IN	19	I	GPS second pulse signal input	
Urat				
SX1302_UART1_RX	12	IO	DEBUG_JTCK-SWCLK-->TX	
SX1302_ UART1_TX	14	IO	DEBUG_JTMS-SWDIO-->RX	
USB				
USB DP	38	IO	USB DP	
USB DM	36	IO	USB DM	

Table 1Pin Description

2.3 Reference design

It is strongly recommended that the capacitances of 220uF // 220uF // 100nF // 100pF should be placed as close to the Power input pin (Pin2,24,39,41,52) of the Mini-PCie connector as possible in the layout!

3 Pecification Parameter

Type	B100
Picture of real products	  the image is only a reference
Structure size	50.95*30*4.4mm
Modulation technique	LoRa&FSK
Center frequency	Configurable
Operating frequency	902-928MHz
Channel bandwidth	125/250K/500K HZ
Transmission rate	0.25-50kbps (LoRaWAN standard)
Radio-frequency power	24.43dBm (max) 902-928MHz
Receive sensitivity	-142.5dBm @SF12 /BW,125KHZ(max)
LBT	Reserved
USB	USB 2.0
Power consumption	Idle 12 mA ; TX : 540mA ; RX : 50mA
Operating voltage	VCC: 3.3VDC(±0.2V)
Coverage	7Km in city, 20Km in the open
Operating temperature range	-40~85°C(SX1302)
Operating humidity range	10%-90% RH (no condensation)
Antenna interface	IPEX MHF1 Antenna header (3*3*1.25mm) , 50Ω
Antenna	Can configure omnidirectional/directional type, Empty environment

Table.2 specification parameters of the module

4 Structure size and encapsulation

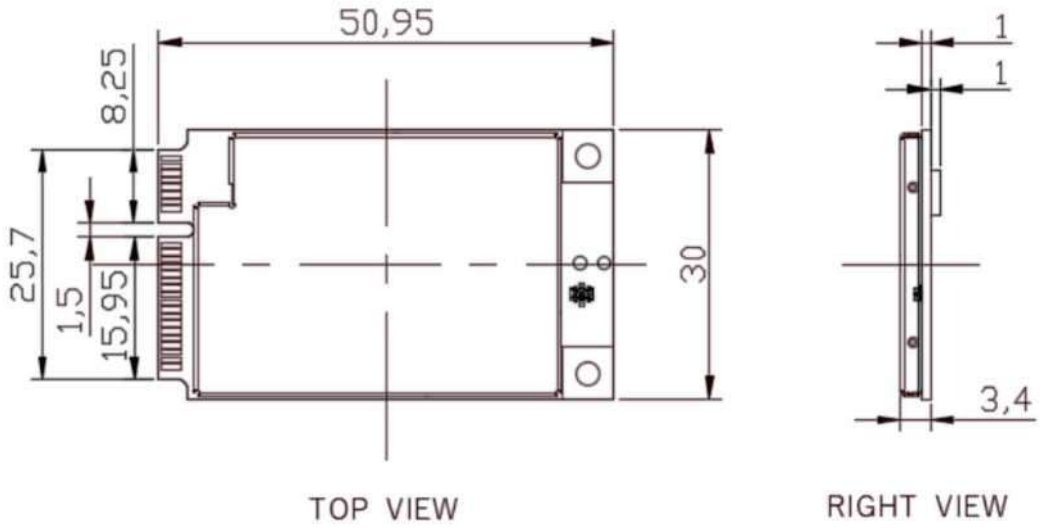


FIG.4 Dimensions of the module

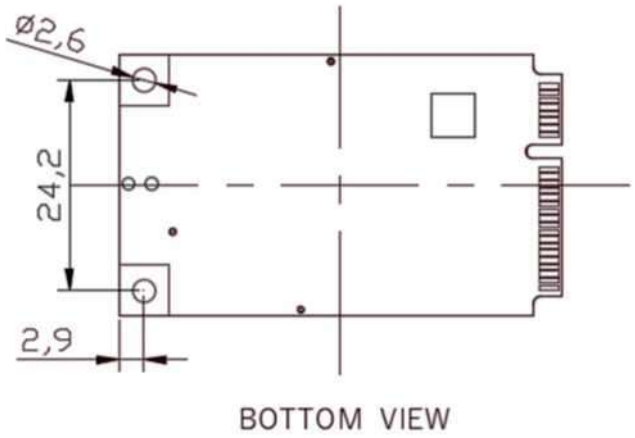


FIG.5 Dimensions (bottom view)

FCC NOTE FOR MODULER STATMENT

1.1 List of applicable FCC rules:
The module complies with FCC Part 15.247.

1.2 Summarize the specific operational use conditions:
The module has been certified for Fix, Mobile, Portable applications.
This transmitter must not be co‐located or operating in conjunction with any other antenna or transmitter.

1.3 Limited module procedures:
The module has its own RF shielding, which belong to signal module Standard requires:
Clear and specific instructions describing the conditions, limitations and procedures for third‐parties to use and/or integrate the module into a host device (see Comprehensive integration instructions below).
Resolve: Supply example as follows:
Installation Notes:
1) B100 Module Power supply range is DC 3.1V~3.5V, when you use B100 Module design product, the power supply cannot exceed this range.
2) When connect B100 Module to the host device, the host device must be power off.
3) Make sure the module pins correctly installed.
4) Make sure that the module does not allow users to replace or demolition.

1.4 Trace antenna designs:
Not applicable.

1.5 RF exposure considerations:
This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. The antenna(s) used for this transmitter must not be collocated or operating in conjunction with any other antenna or transmitter.
Note: the host product manuals must include a statement in order to alert the users of FCC RF exposure compliance.

1.6 Antennas

Antenna Type	Frequency range	Gain (dBi)
Vertical Antenna	902MHz-928MHz	4

The antenna is permanently attached, can’t be replaced.

1.7 Label and compliance information
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.
Warning: Changes or modifications to this unit not expressly approved by the party responsible for

compliance could void the user’ s authority to operate the equipment.
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 andused 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.

The system integrator must place an exterior label on the outside of the final product housing the B100 Modules. Below is the content that must be included on this label.
The host product Labeling Requirements:
NOTICE: The host product must make sure that FCC labeling requirements are met. This includes clearly visible exterior label on the outside of the final product housing that displays the contents shown in below:

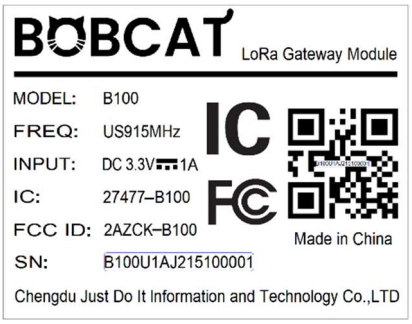
Contains FCC ID:2AZCK-B100

1.8 Information on test modes and additional testing requirements:
When testing host product, the host manufacture should follow FCC KDB Publication 996369 D04 Module Integration Guide for testing the host products. The host manufacturer may operate their product during the measurements. In setting up the configurations, if the pairing and call box options for testing does not work, then the host product manufacturer should coordinate with the module manufacturer for access to test mode software.

1.9 Additional testing, Part 15 Subpart B disclaimer:
The modular transmitter is only FCC authorized for the specific rule parts (FCC Part 15.247) list on the grant, 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. The final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed when contains digital circuity.

1.10 Information on test modes and additional testing requirements:
When testing host product, the host manufacture should follow FCC KDB Publication 996369 D04 Module Integration Guide for testing the host products. The host manufacturer may operate their product during the measurements.

FCC Label：



（the Serial Number is only a reference）

FCC Caution

This device complies with part 15 of the FCC Rules. Operation is subject to the followingtwo 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 forcompliance could void the user's authority to operate the equipment.

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 receiveris connected.

-Consult the dealer or an experienced radio/TV technician for help.

RF warning for Mobile device:

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

IC Warning

This device complies with Industry Canada licence-exempt RSS standard(s). Operation issubject to the following two conditions:

(1) This device may not cause interference, and

(2) This device must accept any interference, including interference that may causeundesired operation of the device.

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

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