●SEA2600-M01

User Manual

1. Overview

SEA2600-M01 modules are Wi-SUN wireless communication modules designed based on the chip VC7350. It is integrated with Cortex-M3 MCU, 2MB Flash, 256KB SRAM, UART/SPI/I2C, WDT and Timer, etc. It has the characteristics of interoperability, reliability and high speed. The advanced wireless Mesh communication technology meets the Wi-SUN standard and is widely used in wireless intelligent public networks and related applications.

2 Product information
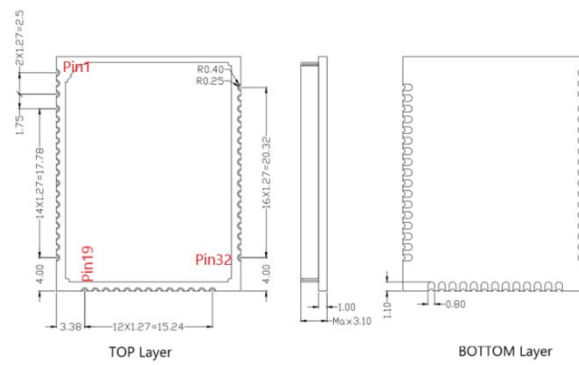
2.1 Product dimension description

Figure 2 Dimensional drawing (unit mm)
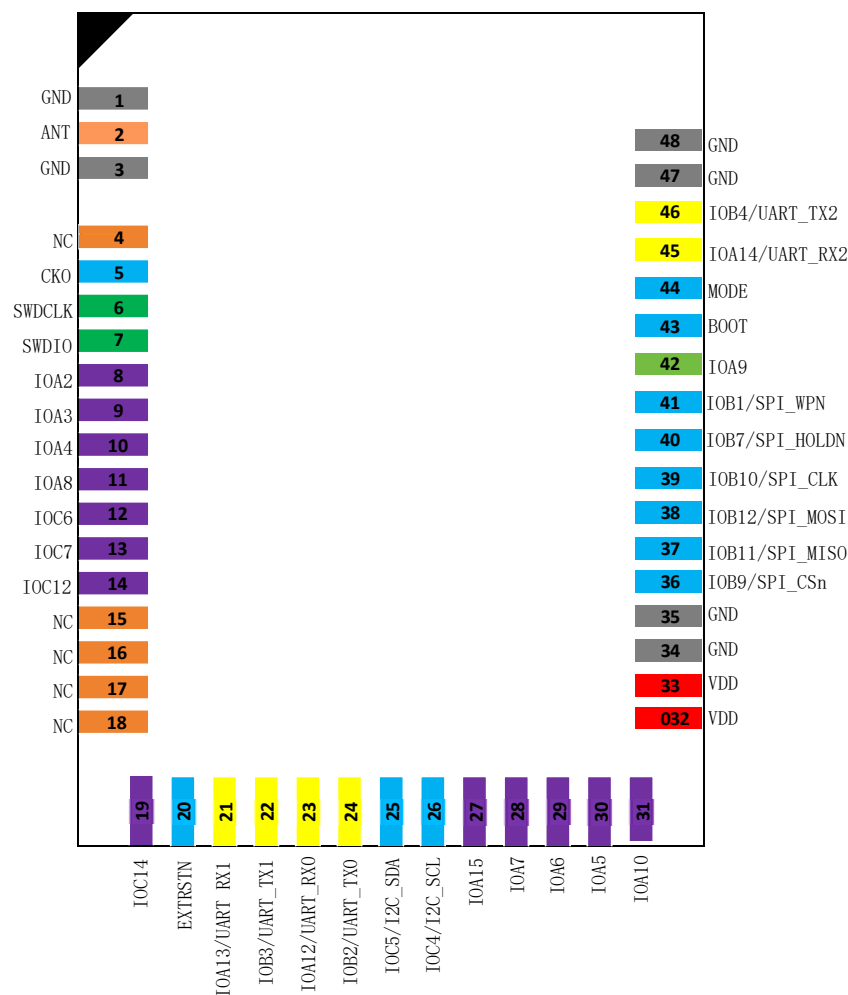
3 Pin Definitions

3.1 Pin Layout

Figure 3 Pin Layout of SEA2600-M01 (Top View)

3.1. 1 Pin Definitions

Form 5 Pin Definitions

PinNo.	Pin Name	Description	Pin Type	Remark
1	GND	Ground	Ground	
2	ANT	Antenna pin	I/O	
3	GND	Ground	Ground	-
4	NC	-		
5	CKO	Clock signal output	I/O	
6	SWDCLK	SWD clock signal	I/O	MODE = 0 This pin is a SWCLK function MODE = 1 This pin is a general purpose IO, IOA0
7	SWDIO	SWD data signal	I/O	MODE = 0 This pin is a SWIO function MODE = 1 This pin is a general purpose IO, IOA1
8	IOA2	GPIO/External Interrupt 2/ ADC Channel 2	I/O	
9	IOA3	GPIO/External Interrupt 3/ ADC Channel 3	I/O	
10	IOA4	GPIO/External Interrupt 4/ ADC Channel 4	I/O	
11	IOA8	GPIO/External Interrupt 8/ ADC Channel 5	I/O	
12	IOC6	GPIO/ADC Channel 6	I/O	
13	IOC7	GPIO	I/O	
14	IOC12	GPIO/ADC Channel 7	I/O	
15	NC	-		
16	NC	-		
17	NC	-		
18	NC	-		
19	IOC14	GPIO	I/O	
20	EXTRSTN	Reset pin	I	Default internal pull-up 51K resistor
21	IOA13/UARTRX1	Debug serial port	I/O	RX internal pull-up 10K resistor
22	IOB3/UARTTX1	Debug serial port	I/O	
23	IOA12/UARTRX0	Data serial port	I/O	RX internal pull-up 10K resistor
24	IOB2/UARTTX0	Data serial port	I/O	
25	IOC5/I2C _ SDA	GPIO/I2C _ SDA	I/O	
26	IOC4/I2C _ SCL	GPIO/I2C _ SCL	I/O	
27	IOA15	GPIO/External Interrupt 15	I/O	

28	IOA7	GPIO/External Interrupt 7	I/O	
29	IOA6	GPIO/External Interrupt 6	I/O	
30	IOA5	GPIO/External Interrupt 5	I/O	
31	IOA10	GPIO/External Interrupt 10	I/O	
32	VDD	Power supply	Power	
33	VDD	Power supply	Power	
34	GND	Ground	Ground	
35	GND	Ground	Ground	
36	IOB9/SPI _ CSn	SPI _ CSn	I/O	
37	IOB11/SPI _ MISO	SPI _ MISO	I/O	
38	IOB12/SPI _ MOSI	SPI _ MOSI	I/O	
39	IOB10/SPI _ CLK	SPI _ CLK	I/O	
40	IOB7/SPI _ HOLDN	SPI _ HOLDN	I/O	
41	IOB1/SPI _ WPN	SPI _ WPN	I/O	
42	IOA9	GPIO/External Interrupt 9	I/O	
43	BOOT	Start mode selection	Input	Default internal pull-up, BOOT = 0: Embedded flash boot. BOOT = 1: Internal ROM boot
44	MODE	Mode selection	Input	Default internal pull-up, MODE = 0: Debug mode MODE = 1: Normal mode
45	IOA14/UARTRX2	GPIO/Serial Port 2	I/O	
46	IOB4/UARTTX2	GPIO/Serial Port 2	I/O	
47	GND	Ground	Ground	
48	GND	Ground	Ground	

4 Electrical Characteristics

Table 3 Working parameters

Main parameters	Performance			Remark
	Minimum Value	Typical value	Maximum value	
Operating voltage (V)	4.0	-	4.5	Out of range may cause permanent damage to the module
Operating frequency band (MHz)	902.2	915	927.8	
Transmit power consumption (mA)	400	-	-	
Receivepower consumption (mA)	40	-	-	
Transmit power (dBm)	-	-	28.57	Customizable transmit power
Receive sensitivity (dBm)	-	-	-110	
Communication rate (bps)	-	-	600k	
Modulation mode	FSK			
Interface Type	Stamp hole			1.27 mm pitch
Communication protocol	UART			
Interface level	3.3 V			
Overall dimensions (mm)	28*22*3.1			
Standard	Wi-SUN			
RF port characteristic impedance (Ω)	50			
Operating Temperature (℃)	-40	-	85	

Table 4 IO Electrical Characteristics

Main parameters	Performance 1			V DDIO	Remark
	Minimum Value	Typical value	Maximum value		
V IH (V)	2.0	-	3.6	3.3 V	_
V IL (V)	0.3	-	0.8	3.3 V	_
V OH (V)	2.4	-	-	3.3 V	-
V OL (V)	-	-	0.4	3.3 V	_

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.

RF Exposure Statement

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 and your body.

FCC Label Instructions

If using a permanently affixed label, the modular transmitter must be labeled with its own FCC identification number, and, 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 FCC ID: 2BNCESEA2600-M01".

Any similar wording that expresses the same meaning may be used. The Grantee may either provide such a label, an example of which must be included in the application for equipment authorization, or, must provide adequate instructions along with the module which explain this requirement.

OEM Guidance

1. Applicable FCC rules

This device complies with part 15.247 of the FCC Rules.

2. The specific operational use conditions

This module can be used in IoT devices. The input voltage to the module is nominally DC 4V-4.5V. The operational ambient temperature of the module is -40 °C ~ 85 °C. the external antenna is allowed, such as Rod antenna and PCB Antenna and FPC Antenna.

3. Limited module procedures

N/A

4. Trace antenna design

N/A

5. RF exposure considerations

The 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 and your body. If the equipment built into a host as a portable usage, the additional RF exposure evaluation may be required as specified by 2.1093.

6. Antenna

Model name: SAA32315D; Antenna type: Rod antenna; Peak antenna gain: 0.42 dBi

Model name: SAA32315C; Antenna type: PCB antenna; Peak antenna gain: 2.35 dBi

Model name: SAA32315B; Antenna type: FPC antenna; Peak antenna gain: 2.38 dBi

7. Label and compliance information

An exterior label on OEM's end product can use wording such as the following: "Contains Transmitter Module FCC ID: 2BNCESEA2600-M01" or "Contains FCC ID: 2BNCESEA2600-M01"

8. 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 .

9.   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 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.