Fibocom SC126-W 5G Wireless Module User Guide

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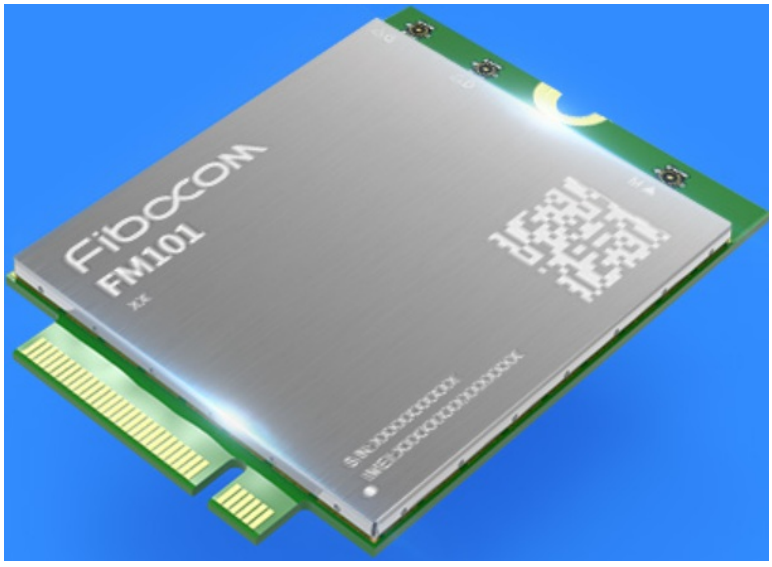

SC126-W Hardware Guide

Version: 1.4

Disclaimer

Contact:

- Website: **https://www.fibocom.com**
- Address: Floor 10-14, Block A, Building 6, Shenzhen International Innovation Valley, Dashiyi Road, Xili Community, Xili Street, Nanshan District, Shenzhen
- Tel: 0755-26733555

Safety Instruction
Do not operate wireless communication products in areas where use of radio is not recommended without proper equipment certification. These areas include environments where radio interference may occur, such as flammable and explosive environments, and medical equipment, aircraft, or any other equipment that may be subject to any form of radio interference. Any driver or operator of a vehicle must not operate a wireless communication product while controlling the vehicle. Doing so will reduce the driver's control and operation of the vehicle, posing a safety risk. The wireless communication product does not guarantee a valid connection under any circumstances, for example, when the (U)SIM is in arrears or invalid. In case of emergency, use the emergency call function in power-on state, and make sure the equipment is in an area with sufficient signal strength.

Contents

Applicable Models

No.	Applicability	Model Description
1	SC126-W	SC126-W: 8GB e.MMC+8Gb LPDDR3X.SDRAM, Wifi frequency band, Linux 5.4, applicable in all over the world

Product Overview

General Description

The SC126 series module is a wireless communication product designed for use in various applications. The module has electrical characteristics, RF performance, and structure size.
The module integrates core components such as Baseband, eMCP, PMU, Transceiver, PA; it supports long distance multi-mode communication such as WIFI/BT short-distance radio transmission technology. The module is embedded with Android operating system and supports various interfaces such as MIPI/USB/UART/SPI/I2C. It is the optimal solution for the core system of wireless smart products. Its corresponding network modes and frequency bands are as follows:

SC126-W supported bands

Mode	Band
WIFI802.11a/b/g/n/ac	2402-2482MHz; 5170-5835MHz
BT5.0	2402-2480MHz

Main Performance

The SC126 series module has the following main performance:

- 8GB e.MMC+8Gb LPDDR3X.SDRAM
- Wifi frequency band
- Linux 5.4 operating system
- Applicable in all over the world

The module is available in LCC + LGA package with 262 pins, including 146 LCC pins and 116 LGA pins. The dimension is 40.5 (±0.15)mm × 40.5 (±0.15)mm × 2.55 (±0.2)mm. It can be embedded in various M2M applications. It is suitable for the development of smart devices such as smart POS, cash registers, robots, UAVs, smart homes, security monitoring, multimedia terminals, ECR, and face payment terminals. The following table describes the detailed performance.

Performance specifications

Performance	Description
Power Supply	DC: 3.5-4.4V, typical voltage: 3.8V

Performance	Description
Application processor	ARM® Cortex-A53 Quad-core 64-bit CPU up to 2.0GHz
Memory	8Gb LPDDR4X+8GB eMMC Flash[1] 16Gb LPDDR4X+16GB eMMC Flash 16Gb LPDDR4X+32GB eMMC Flash
WLAN features	Support 2.4G and 5G WLAN wireless communication, support 802.11a, 802.11b, 802.11g, 802.11n and 802.11ac, the maximum rate is up to 433Mbps
Bluetooth features	BT5.0 (BR/EDR + BLE)
Satellite positioning	GPS/GLONASS/BeiDou
LCD Interface	4-Lane MIPI_DSI interface Support for 1080P maximally
Camera interface	Two 4-Lane MIPI_CSI interfaces, which can be configured as 4+4 Lanes or 4+2+1 Lanes ISPx2 (13MP+13MP or 25MP)
Audio interface	Input: 3 analog MIC inputs Output: Stereo headphone output Differential receiver output Differential Lineout output, which requires an external audio PA
USB interface	One USB 3.1 interface that is downward compatible with USB 2.0 interface USB 3.1 interface supports the SS (5 Gbps) mode but does not support software download. USB 2.0 interface supports the HS (480 Mbps) mode and software download, and is downward compatible with FS and LS interface. USB supports the OTG function and HUB extensible interface supports USB OTG.
(U)SIM interface	Two (U)SIM card interfaces, support (U)SIM card: 1.8/3V adaptive

Performance	Description
	Support dual-SIM dual-standby and hot plugging
UART interface	Three UART serial interfaces, with the maximum rate up to 4Mbps One 4-line serial interface, supports hardware flow control One 2-line serial interface One 2-lane debug serial interface
SDIO Interface	Support SD3.0 and 4-bit SDIO; SD card supports hot plugging
I²C interface	4 sets of I²C interfaces for TP, camera, sensor, etc.
ADC Interfaces	One general ADC
RTC	Support
Antenna Interface	WIFI/BT antenna
Physical characteristics	Dimensions: 40.5 (±0.15)mm × 40.5 (±0.15)mm × 2.55 (±0.2)mm Packaging: 146 LCC pins +116 LGA pins Weight: ~9.7 g
Temperature range	Operating temperature: -30°C to 75°C[2)] Storage temperature: -40°C to -85°C
Software update	USB/OTA/SD
RoHS	RoHS compliant

1. The storage capacity varies according to the actual model.
2. When the module is operating within this temperature range, the functions of it are normal and the relevant performance meets the 3GPP standard.

Product Usage Instructions

Before using the SC126 series module, please read the safety instructions provided in the user manual.

To use the module, follow these steps:

1. Ensure that the module is properly installed in the device.
2. Connect the device to a power source and turn it on.
3. If necessary, connect the device to a network using the Wifi frequency band.
4. Use the device according to its intended purpose. Note that the module does not guarantee a valid connection under all circumstances, such as when the (U)SIM is in arrears or invalid.
5. In case of emergency, use the emergency call function in power-on state and ensure that the device is in an area with sufficient signal strength.

If you encounter any issues with the SC126 series module, refer to the user manual or contact Fibocom Wireless Inc. for assistance.

Trademark Statement

Description

This document describes the electrical characteristics, RF performance, structure size, application environment, etc. of SC126 series module (hereinafter referred to as module).With the assistance of the document and other instructions, the developers can quickly understand the hardware functions of the module and develop products.

Reference Standards

This product is designed with reference to the following standards:

- 3GPP TS 51.010-1 V10.5.0: Mobile Station (MS) conformance specification; Part 1: Conformance specification
- 3GPP TS 34.121-1 V10.8.0: User Equipment (UE) conformance specification; Radio transmission and reception (FDD); Part 1: Conformance specification
- 3GPP TS 34.122 V10.1.0: Technical Specification Group Radio Access Network; Radio transmission and reception (TDD)
- 3GPP TS 36.521-1 V10.6.0: User Equipment (UE) conformance specification; Radio transmission and reception; Part 1: Conformance testing
- 3GPP TS 21.111 V10.0.0: USIM and IC card requirements
- 3GPP TS 51.011 V4.15.0: Specification of the Subscriber Identity Module -Mobile Equipment (SIM-ME) interface
- 3GPP TS 31.102 V10.11.0: Characteristics of the Universal Subscriber Identity Module (USIM) application
- 3GPP TS 31.11 V10.16.0: Universal Subscriber Identity Module (USIM) Application Toolkit(USAT)
- 3GPP TS 36.124V10.3.0: Electro Magnetic Compatibility (EMC) requirements for mobile terminals and ancillary equipment
- 3GPP TS 27.007 V10.0.8: AT command set for User Equipment (UE)
- 3GPPTS27.005 V10.0.1: Use of Data Terminal Equipment – Data Circuit terminating Equipment (DTE – DCE) interface for Short Message Service (SMS) and Cell Broadcast Service (CBS)
- IEEE 802.11n WLAN MAC and PHY, October 2009 + IEEE 802.11-2007 WLAN MAC and PHY, June 2007
- IEEE Std 802.11b, IEEE Std 802.11a, IEEE Std 802.11g, IEEE Std 802.11n, IEEE Std 802.11ac, IEEE Std 802.11ax;
- IEEE 802.11-2007 WLAN MAC and PHY, June 2007
- Bluetooth Radio Frequency TSS and TP Specification 1.2/2.0/2.0 + EDR/2.1/2.1+ EDR/3.0/3.0 + HS, August 6, 2009
- Bluetooth Low Energy RF PHY Test Specification, RF-PHY.TS/4.0.0, December 15, 2009
- Bluetooth Low Energy RF PHY Test Specification, RF-PHY.TS/4.2.0, November 7, 2014
- Bluetooth Low Energy RF PHY Test Specification, RF-PHY.TS/5.0.2, December 07,2017
- Bluetooth Low Energy RF PHY Test Specification, RF-PHY.TS/5.1.0, December 07,2018

Federal Communication Commission Interference Statement

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.

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 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.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

List of applicable FCC rules
The modular transmitter is only FCC authorized for the specific rule parts (i.e., FCC transmitter rules) listed 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. If the grantee markets their product as being Part 15 Subpart B compliant (when it also contains unintentional-radiator digital circuity), then the grantee shall provide a notice stating that the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

This device is intended only for OEM integrators under the following conditions: (For module device use)

1. The antenna must be installed such that 20 cm is maintained between the antenna and users,
2. The transmitter module may not be co-located with any other transmitter or antenna.

As long as 2 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

Radiation 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 20 cm between the radiator & your body.

Industry Canada Statement
This device complies with Industry Canada's license-exempt RSSs.

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.

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

This device is intended only for OEM integrators under the following conditions: (For module device use)

1. The antenna must be installed such that 20 cm is maintained between the antenna and users, and
2. The transmitter module may not be co-located with any other transmitter or antenna.

As long as 2 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

IMPORTANT NOTE:
In the event that these conditions can not be met (for example certain laptop configurations or colocation with another transmitter), then the Canada authorization is no longer considered valid and the IC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate Canada authorization.

End Product Labeling
This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: “Contains IC:21374-SC126W”.

Manual Information To the End User
The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user’s manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.

Documents / Resources

	Fibocom SC126-W 5G Wireless Module [pdf] User Guide ZMOSC126W, SC126-W, SC126-W 5G Wireless Module, 5G Wireless Module, Wireless Module

References

- Leading 5G Wireless Modules & IoT Solutions | Fibocom