Contents [hide]

ITTIM

ITTIM ITM-IOE21-S54PXX0000MV1 1×1 WIFI Module

Modification

Version 1.4

Document release	Date	Modification	Approved
Version 1.0	2022-2-24	Initial release	
Version 1.1	2022-6-10	Update Module TOP View	
Version 1.2	2022-11-16	Updata TX Target Power	
Version 1.3	2022-11-28	Updata WLAN Characteristics	
Version 1.4	2023-10-19	Add Transmit center Frequency Accuracy	

Product Overview

- The module ITM-IOE21-S54PXX0000MV1 is based on TI CC3235 which is a highly integrated 1T1R WLAN module. It supports IEEE 802.11 a/b/g/n standard protocol requirement, besides it provide two UART interface and one SPI interface for customers to use. For second development, there are 256KB of RAM and 32Mbit SPI serial flash inside the module.
- The module ITM-IOE21-S54PXX0000MV1 low power function uses the innovative design techniques and the optimized architecture which best utilizes the advanced process technology to reduce active and idle power, and achieve extreme low power

consumption at sleep state to extend the battery life.
- This compact module ITM-IOE21-S54PXX0000MV1 is a total solution for Wi-Fi technologies. It is specifically developed for camera, air conditioner, refrigerator, floor sweeper, air purifier and other intelligent equipment. It can minimize the resource consumption of CPU and memory for enabling Wi-Fi communication.

Module Hardware Overview

Features

- IEEE 802.11 a/b/g/n (WiFi 2.4GHz+5GHz)1T1R compliant
- Fully integrated and green and RoHS modules include all required clocks, SPI flash, and passives
- Multilayered security features help developers protect identities, data, and software IP
- 256KB of RAM
- 32Mbit SPI serial flash
- **Supports popular interfaces:** 2 UART; 1 SPI; lost of GPIOS
- **Security:** WEP / WPA/ WPA2 PSK/ WPA2 Enterprise / WPA3 Personal
- Hardware accelerator cryptographic engines (AES, DES, SHA/MD5, CRC)

Interface

- **Interface**
  - **Interface:** Half Hole
  - **Antenna:** Half Hole
- **Pin definition**

From Module TOP View

Pin Number	Symbol Name	Status	Pin Description
1	GND	P	Ground
2	GND	P	Ground
3	GPIO10	I/O	General GPIO
4	GPIO11	I/O	General GPIO
5	GPIO14	I/O	General GPIO
6	GPIO15	I/O	General GPIO
7	GPIO16	I/O	General GPIO
8	GPIO17	I/O	General GPIO
9	GPIO12	I/O	General GPIO
10	GPIO13	I/O	General GPIO

11	GPIO22	I/O	General GPIO
12	JTAG_TDI	I	JTAG Input
13	FLASH_SPI_MISO	I	FLASH :SPI Input
14	FLASH_SPI_CS_IN	I	FLASH SPI CS
15	FLASH_SPI_CLK	I	FLASH SPI Clock

16	GND	P	Ground
17	FLASH_SPI_MOSI	O	FLASH SPI Output
18	JTAG_TDO	O	JTAG Output
19	GPIO28	I/O	General GPIO
20	NC	/	Reserved Floating
21	JTAG_TCK	I	JTAG Clock Input
22	JTAG_TMS	I	JTAG Mode Select
23	SOP2	I	Programming Mode Selection Pin (see chip manual) ,Internal 69.8K Pull Down
24	SOP1	I	Programming Mode Selection Pin (see chip manual) ,Internal 69.8K Pull Down
25	NC	/	Reserved Floating

26	NC	/	Reserved Floating
27	GND	P	Ground
28	GND	P	Ground
29	NC	/	Reserved Floating
30	GND	P	Ground
31	RF_BG	I/O	WLAN RF I/O Port
32	GND	P	Ground
33	NC	/	Reserved Floating
34	SOP0	I	Programming Mode Selection Pin (see chip manual) ,Internal 100K Pull Down
35	RESET	I	Reset Pin
36	VBAT_DCDC_ANA	P	3.3V Power Input
37	VBAT_DCDC_PA	P	3.3V Power Input
38	GND	P	Ground
39	NC	/	Reserved Floating
40	VBAT_DCDC_DIG_IO	P	3.3V Power Input
41	NC	/	Reserved Floating
42	GPIO30	I/O	General GPIO
43	GND	P	Ground
44	GPIO0	I/O	General GPIO

45	NC	/	Reserved Floating
46	GPIO1	I/O	General GPIO
47	GPIO2	I/O	General GPIO
48	GPIO3	I/O	General GPIO
49	GPIO4	I/O	General GPIO
50	GPIO5	I/O	General GPIO
51	GPIO6	I/O	General GPIO
52	GPIO7	I/O	General GPIO
53	GPIO8	I/O	General GPIO
54	GPIO9	I/O	General GPIO

Electrical Specification

Recommended operating rating

Element	Min	Typ	Max	Unit
VDD	2.3	3.3	3.6	(V)

DC Characteristics

PARAMETER		TEST CONDITIONS		MIN	TYP	MAX	UNIT
MCU ACTIVE	NWP ACTIVE	TX	6 OFDM		318		mA
			54 OFDM		293		
		RX	54 OFDM		67		
	NWP idle connected				15.3		
MCU SLEEP	NWP ACTIVE	TX	6 OFDM		315		mA
			54 OFDM		290		
		RX	54 OFDM		64		
	NWP idle connected				12.2		
MCU LPDS	NWP ACTIVE	TX	6 OFDM		312		mA
			54 OFDM		287		
		RX	54 OFDM		61		
	NWP LPDS	SRAM Retention	64 KB		120		µA
			256 KB		135		
	NWP idle connected				710		
MCU SHUTDOWN	MCU shutdown				1		µA
MCU HIBERNATE	MCU hibernate				5.5		µA
Peak calibration current		V_{BAT} = 3.6 V			290		mA
		V_{BAT} = 3.3 V			310		
		V_{BAT} = 2.7 V			310		
		V_{BAT} = 2.3 V			365		

Environment Storage Condition

Environment condition	
Temperature	Operating Temperature: -20 deg.C ~85deg.C
	Storage Temperature: -40 deg.C ~85 deg.C
Humidity	Operating Humidity: 20% ~90% (Non-condensing)
	Storage Humidity: 5% ~95% (Non-condensing)

RF Specification

WLAN Characteristics

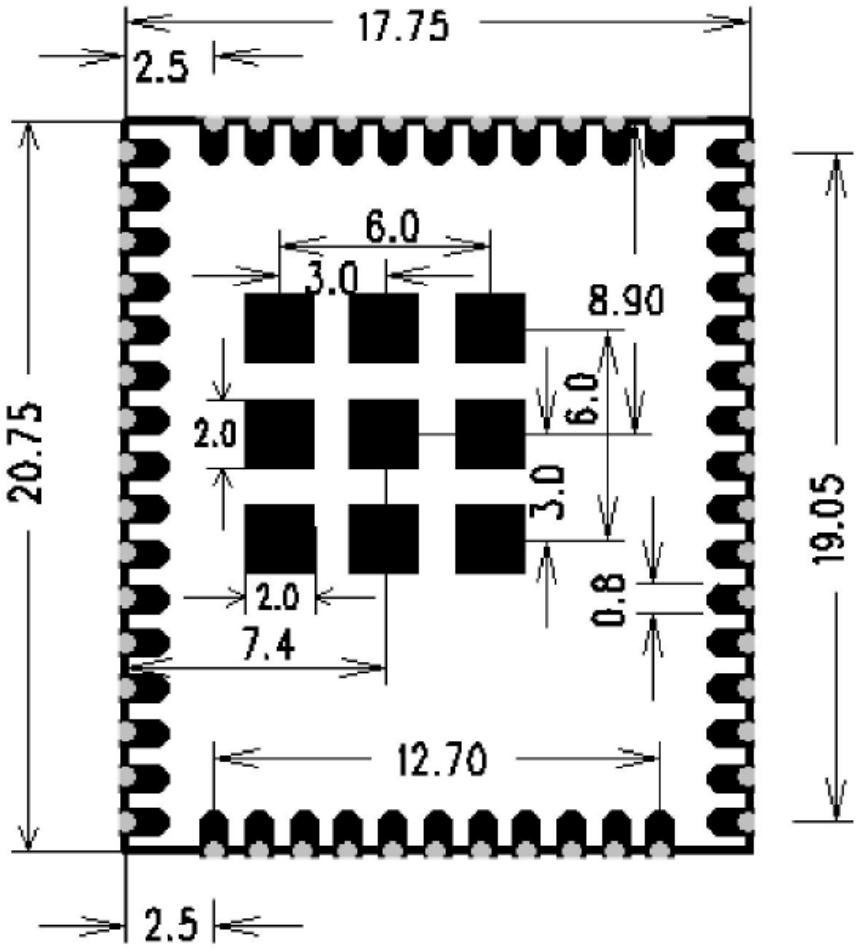
Mode	Protocols	Description
Modulation Method	802.11 b	DSSS With DQPSK,DBPSK,CCK
	802.11 a/g	OFDM With 16-QAM,64-QAM,QPSK,BPSK

	802.11 n	OFDM With 16-QAM,64-QAM,QPSK,BPSK
Data Rate	802.11 b	1,2,5.5,11Mbps
	802.11 g	6,9,12,18,24,36,48,54Mbps
	802.11 n	MCS0~MCS7
Tx Power	802.11 a	12±1.5dBm @5GHz,54Mbps
	802.11 b	16.3±1.5dBm @2.4GHz,11Mbps
	802.11 g	12.5±1.5dBm @2.4GHz,54Mbps
	802.11 n	11±1.5dBm @2.4GHz,MCS7 11 ±1.5dBm @5GHz,MCS7
Rx Sensitivity	802.11 a	-72dBm±1dBm @5GHz,54Mbps,OFDM,10%PER
	802.11 b	-86.5dBm±1.5dBm @2.4GHz,11Mbps,CCK,8%PER
	802.11 g	-73dBm±1.5dBm @2.4GHz,54Mbps,OFDM,10%PER
	802.11 n	-70dBm±1.5dBm @2.4GHz,MCS7,OFDM,10%PER -68dBm±1.5dBm @5GHz,MCS7,OFDM,10%PER
Transmit Frequency Accuracy	802.11 a	±12ppm @5GHz
	802.11 b	±12ppm @2.4GHz
	802.11 g	±12ppm @2.4GHz
	802.11 n	±12ppm @2.4GHz ±12ppm @5GHz

Mechanical Specifications

PCB Assembly Dimension:

- **Dimension (L x W x H):**
  - **L:** 20.75mm*
  - **W:** 17.75mm*
  - **H:** 2.40mm (±0.15mm)



FCC

A FCC Radiation Exposure 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.

Warning: changes or modifications not expressly approved by the party responsible for

compliance could void the user's authority to operate the equipment. This Module complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Labelling instruction for Host Product integrator

Please notice that 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: 2BN5S-2503R." any similar wording that expresses the same meaning may be used. Installation Notice to Host Product Manufacturer The OEM integrator is responsible for ensuring that the end-user has no manual instructions to remove or install module. The module is limited to installation in mobile application, a separate approval is required for all other operating configurations, including portable configurations with respect to §2.1093 and different antenna configurations. Antenna configurations.

Antenna Change Notice to Host manufacturer

If you desire to increase antenna gain and either change antenna type or use same antenna type certified, a Class II permissive change application is required to be filed by us, or you (host manufacturer) can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application. FCC other Parts, Part 15B Compliance Requirements for Host product manufacturer This modular transmitter is only FCC authorized for the specific rule parts listed on our grant, 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. Host manufacturer in any case shall ensure host product which is installed and operating with the module is in compliant with Part 15B requirements.

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.

B ISED Regulatory Compliance

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s).

Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

This equipment complies with IC RSS – 102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance 20cm between the radiator and your body. Cet éauipement est conforme aux limites d'exposition aux radiations IC CNR – 102 établies pour un environnement non contrólé, Cet équipement doit être installe et utilisé avec une distance minimale de 20cm entre le radiateur et votre corps. Please note that if the IC 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 IC: 33667-2503R." any similar wording that expresses the same meaning may be used.

Documents / Resources

	ITTIM ITM-IOE21-S54PXX0000MV1 1x1 WIFI Module [pdf] Owner's Manual ITM-IOE21-S54PXX0000MV1, ITM-IOE21-S54PXX0000MV1 1x1 WIFI Module, 1x1 WIFI Module, WIFI Module, Module

References

- User Manual

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1x1 WIFI Module, ITM-IOE21-S54PXX0000MV1, ITM-IOE21-S54PXX0000MV1 1x1 WIFI Module, ITTIM, Module, WiFi module

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