



Security level:

☐A: Top Secret

☐B: Confidential

☐C: Authorized for disclosure

D: Public

Effective Date:

Product manual

ZT9612-USB Module

Wi-Fi Dual-band 2T2R + Bluetooth5.2
Combo Module

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CHANGE RECORD

Revision History

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1	1.0	Initial version		

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1. Overview

1.1. Brief Introduction

ZT9612-USB Module One is a high-performance embedded Wi-Fi6 wireless communication module. Dual-frequency wireless protocol in line with 802.11a /b/g/n/ac/ax 2T2R standard and Bluetooth 2.1BR/EDR+BLE 5.2 dual-mode standard, support USB2.0/USB3.0 interface, support STA and soft AP mode. ZT9612-USB Module adopts ZT9612U chip, and integrates RF, Balun, PA, LNA, power management modules of WLAN 2T2RMAC, WLAN 2T2R baseband, Bluetooth baseband, WLAN and BT. ZT9612U is highly integrated, which reduces the difficulty of users. The compact structure optimizes the size of the module design to the maximum extent, and provides customers with a complete Wi-Fi and BT wireless connection scheme with high reliability and performance.

ZT9612-UUB module has the advantages of fast transmission rate, low delay, large number of device connections, strong anti-interference ability, etc. It can be applied to video multimedia, Internet of Things, mobile devices, smart home and many other fields.

1.2. Overview of the module

Module name	ZT9612-USB Module
Product Description	WiFi6 Dual-band 2T2R+BT 5.2 Combo
VID/PID	350B/9612
Dimensions	L x W x H: 15 x 13 x 2.3mm
WiFi interface	Usb/start
BT interface	usb
Operating temperature	-30° C to 70° C
Storage temperatur	-40° C to 85° C
Antenna interface	RPSMA-K

2. Product Features

2.1. Basic Features

1. SMD 50PIN
 - 2, module integrated 48MHz crystal oscillator and duplex
 - 3, support 802.11a/b/g/n/ac/ax protocol standard
 - 4, support 802.11ac/ax 2*2 wave2 MU-MIMO
 - 5, complete 802.11n 2*2 MIMO solution
 - 6, support 802.11h DFS, TPC, spectrum measurement
- Support 802.11k

2.2. Master control interface

- 1, Wi-Fi channel support USB2.0/USB3.0 interface
- 2, Bluetooth channel support USB2.0 and HS-UART interface

2.3.MAC Features

- 1, support aggregate frame function: A-MSDU, A-MPDU
- 2, low latency BA
- 3, support TWT
- 4, support low power mechanism
- 5, support STA, AP and STA/AP coexistence mode
- 6, support Wi-Fi Direct for point-to-point transmission applications
7. Support BSR and QueueSizeofQos
- 8, support Bluetooth coexistence
- 9, support multiple BSSID for wireless bridge function

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Support MIMO EDCA mechanism

- 11, support DFS
- 12, support SIFS packet transmission and reception

13, support BSS coloring

2.4.PHY Features

1, Support 20MHz/40MHz/80MHz bandwidth

2. 2.4G and 5G bands are supported

3. Support short GI

4, 802.11b:DQPSK, DBPSK, CCK; 802.11a/g/n:64-QAM, 16-QAM, QPSK, BPSK;
802.11ac:256-QAM, 64-QAM, 16-QAM, QPSK, BPSK;
802.11ax:1024-QAM, 256-QAM, 64-QAM, 16-QAM, QPSK, BPSK

5, support STBC

6. Support LDPC

7, support temperature real-time calibration

8. Wi-Fi supports 2 TX and 2 RX channels

9, support Beamforming transmit and receive

2.5.BT features

1, support BLE5.2

2, support BT2.1+EDR

3, support Bluetooth and Wi-Fi coexist

4, support both LE and BR/EDR

2.6.Other

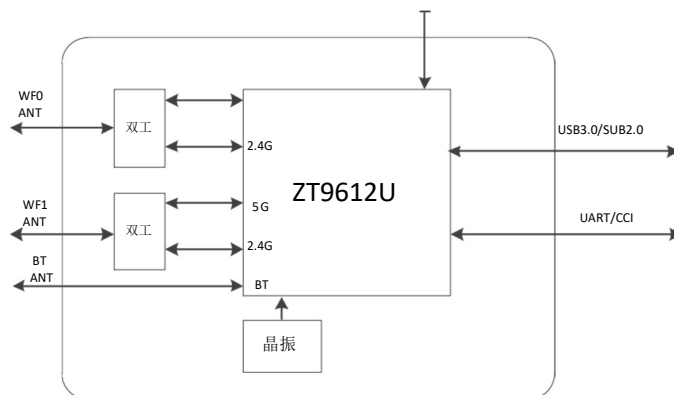
1, single supply 3.3V power supply

2, support 48MHz crystal

3, the operating temperature range $-30^{\circ}\text{C}\sim+70^{\circ}\text{C}$

3. System block diagram

+3.3V



4. Technical specifications

4.1. 2.4GHz RF performance

Rf Characteristics	Description		
Meet the standard	IEEE 802.11b /g/n/ac/ax		
Frequency range	2.400 GHz – 2.4835 GHz (2.4 GHz ISM band)		
Supported bandwidth	20M/40M		
Support channel	CH1-CH14		
Test item	Test conditions	Typical Values	
Transmit output power vs EVM	802.11 b / 11 m	20dBm±2dB	-19dB
	11g/54M	18dBm±2dB	-33dB
	11n/MCS7	18dBm±2dB	-35dB
	11ac/VHT20_MCS8	16dBm±2dB	-38dB
	11ac/VHT40_MCS9	16dBm±2dB	-35dB
	11ax/HE20_MCS11	14dBm±2dB	-40dB
	11ax/HE40_MCS11	14dBm±2dB	-40dB
Transmit spectrum template	Meet IEEE standards		
Frequency error	±20ppm		
Reception sensitivity	802.11b/20M/1Mbps@8% PER	-98	
	802.11b/20M/11Mbps@8% PER	-91	
	802.11g/20M/6Mbps@10% PER	-95	
	802.11g/20M/54Mbps@10% PER	-78	
	802.11n/20M/MCS0@10% PER	-95	
	802.11n/20M/MCS7@10% PER	-77	
	802.11n/40M/MCS0@10% PER	-91	

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	802.11n/40M/MCS7@10% PER	-75
	802.11ac/20M/MCS0@10% PER	-94
	802.11ac/20M/MCS8@10% PER	-73
	802.11ac/40M/MCS0@10% PER	-92
	802.11ac/40M/MCS9@10% PER	-69
	802.11ax/20M/MCS0@10% PER	-94

	802.11ax/20M/MCS11@10% PER	-66
	802.11ax/40M/MCS0@10% PER	-91
	802.11ax/40M/MCS11@10% PER	-63
	802.11b 10% PER	-2dBm
	802.11g/n 10% PER	-3dBm
	802.11ac/ax 10% PER	-10dBm

4.2. 5GHz RF performance

Rf Characteristics	Description		
Meet the standard	IEEE 802.11a /n/ac/ax		
Frequency range	5.15GHz - 5.85 GHz (5GHz ISM band)		
Supported bandwidth	20M/40M/80M		
Support channel	CH36-CH165		
Test items	Test conditions	Typical Values	
Transmit output power vs EVM	11a/54M	16dBm±2dB	-35dB
	11n/MCS7	16dBm±2dB	-38dB
	11ac/VHT20_MCS8	13dBm±2dB	-38dB
	11ac/VHT40_MCS9	13dBm±2dB	-38dB
	11ac/VHT80_MCS9	13dBm±2dB	-37dB
	11ax/HE20_MCS11	15dBm±2dB	-38dB
	11ax/HE40_MCS11	15dBm±2dB	-38dB
	11ax/HE80_MCS11	13dBm±2dB	-36dB
Transmit spectrum template	Meet IEEE standards		
Frequency error	±20ppm		
Reception sensitivity	802.11a/20M/6Mbps@10% PER	-95	
	802.11a/20M/54Mbps@10% PER	-78	
	802.11n/20M/MCS0@10% PER	-94	
	802.11n/20M/MCS7@10% PER	-77	
	802.11n/40M/MCS0@10% PER	-90	
	802.11n/40M/MCS7@10% PER	-74	
	802.11ac/20M/MCS0@10% PER	-94	

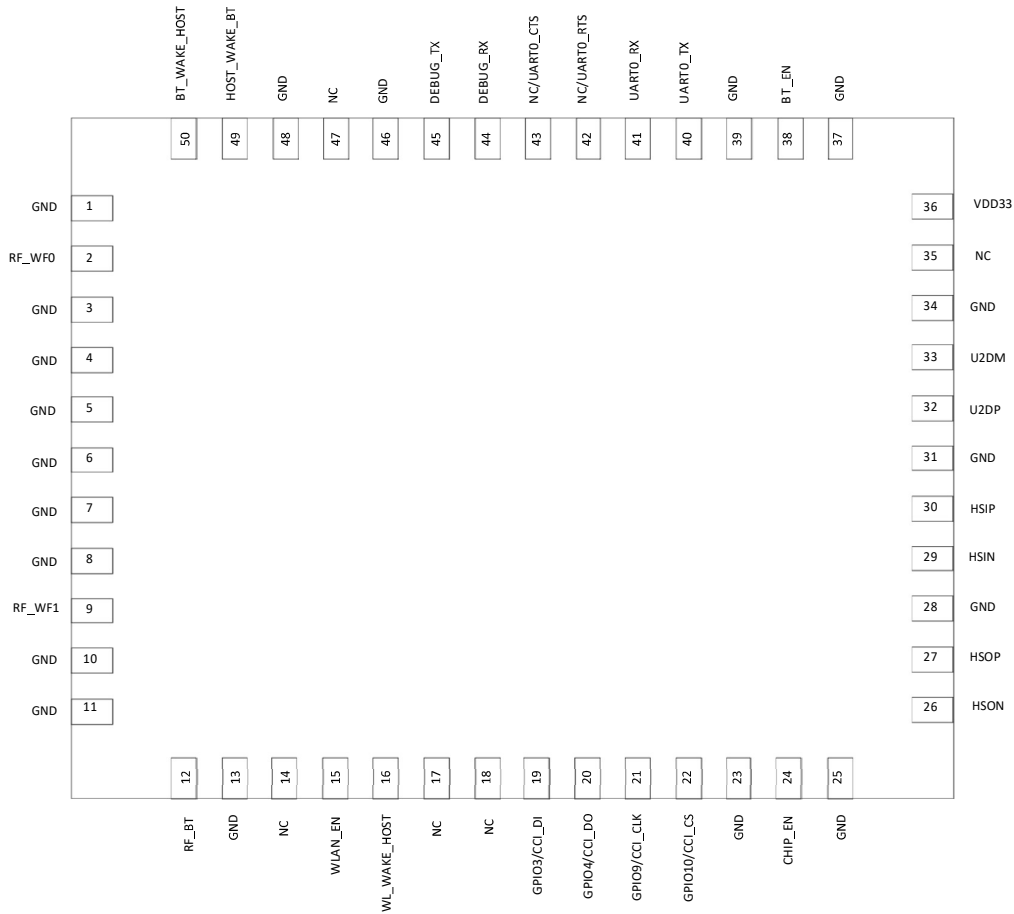
	802.11ac/20M/MCS8@10% PER	-72
	802.11ac/40M/MCS0@10% PER	-91
	802.11ac/40M/MCS9@10% PER	-68
	802.11ac/80M/MCS0@10% PER	-88
	802.11ac/80M/MCS11@10% PER	-64
	802.11ax/20M/MCS0@10% PER	-94
	802.11ax/20M/MCS11@10% PER	-65
	802.11ax/40M/MCS0@10% PER	-90
	802.11ax/40M/MCS11@10% PER	-61
	802.11ax/80M/MCS0@10% PER	-88
	802.11ax/80M/MCS11@10% PER	-60
Maximum receiving level	802.11a 10% PER	-14dBm
	802.11n 10% PER	-14dBm
	802.11ac/ax 10% PER	-14dBm

4.3. Bluetooth RF performance

Rf Characteristics	Description		
Standard	Bluetooth 2.1BR/EDR+BLE 5.2		
Interfaces	usb		
Frequency range	2400 MHz–2483.5 MHz		
Number of channels	79 (CH0–CH78)		
Method of modulation	GFSK, $\pi/4$ -DQPSK, 8-DPSK		
Detailed specifications			
	Minimum (dBm)	Typical (dBm)	Maximum (dBm)
Output power (Class 2)	10	15	20
Sensitivity @ BER=0.1% GFSK(1Mbps)		–82	
Sensitivity @BER = 0.01% $\pi/4$ -DQPSK (2Mbps)		–80	
Sensitivity @BER =0.01% 8DPSK (3Mbps)		–80	
Maximum input level	GFSK (1Mbps) : –20dBm		
	$\pi/4$ - DQPSK (2 MBPS) : – 20 DBM		
	8DPSK (3Mbps) : –20dBm		

5. Pin definition

5.1.Pin Configuration



5.2. Pin definition description

Pin serial number	Pin name	type	Pin Description	Remarks
1	GND	P	to	
2	RF_WF0	IO	WF0 RF port	
3	GND	P	to	
4	GND	P	to	
5	GND	P	to	
6	GND	P	to	
7	GND	P	to	
8	GND	P	to	
9	RF_WF1	IO	WF1 RF port	

Pin serial number	Pin name	type	Pin Description	Remarks
10	GND	P	to	
11	GND	P	to	
12	RF_BT	IO	Bluetooth RF port	
13	GND	P	to	
14	NC	IO	Undefined	
15	WLAN_EN	IO	WF Enable	
16	WL_WAKE_HOST	0	WF wakes up the host	
17	NC	IO	Undefined	
18	NC	IO	Undefined	
19	GPI03/CCI_DI	IO	CCI data entry	
20	GPI04/CCI_DO	IO	CCI data output	
21	GPI09/CCI_CLK	IO	CCI clock	
22	GPI010/CCI_CS	IO	CCI film selection	
23	GND	P	to	
24	CHIP_EN	IO	Chip Enable	
25	GND	P	to	
26	HS0N	0	USB3.0 TX-	
27	HS0P	0	USB3.0 TX+	
28	GND	P	to	
29	HSIN	I	USB3.0 RX-	
30	HSIP	I	USB3.0 RX+	
31	GND	P	to	
32	U2DP	IO	USB2.0 D+	
33	U2DM	IO	USB2.0 D-	
34	GND	P	to	
35	NC	IO	Undefined	
36	VDD33	P	3.3V power supply	
37	GND	P	to	
38	BT_EN	0	Bluetooth Enable	
39	GND	P	to	
40	UART0_TX	IO	Serial 0	

Pin serial number	Pin name	type	Pin Description	Remarks
			launch	
41	UART0_RX	IO	Serial 0 receive	
42	NC/UART0_RTS	IO	Undefined	
43	NC/UART0_CTS	IO	Undefined	
44	DEBUG_RX	IO	Debug serial port reception	
45	DEBUG_TX	IO	Debug serial port launch	
46	GND	P	to	
47	NC	IO	Undefined	
48	GND	P	to	
49	HOST_WAKE_BT	I	Host wakes up Bluetooth	
50	BT_WAKE_HOST	O	Bluetooth wake up host	

6 Electrical characteristics

6.1 Electrical characteristics

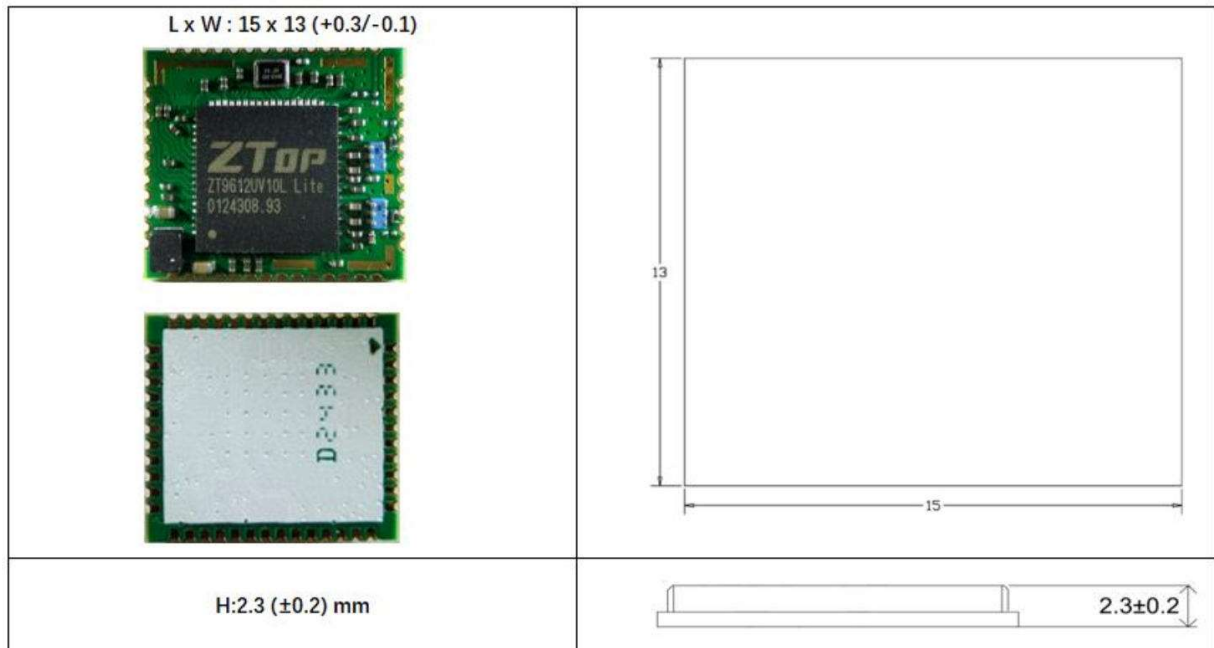
Parameters	Rating
Storage temperature	-40° C ~ +85° C
Operating temperature range	-30° C ~ +70° C
Maximum input power supply voltage	3.6 V
Maximum junction temperature	125° C
Maximum welding temperature	260° C

6.2 Antenna interface

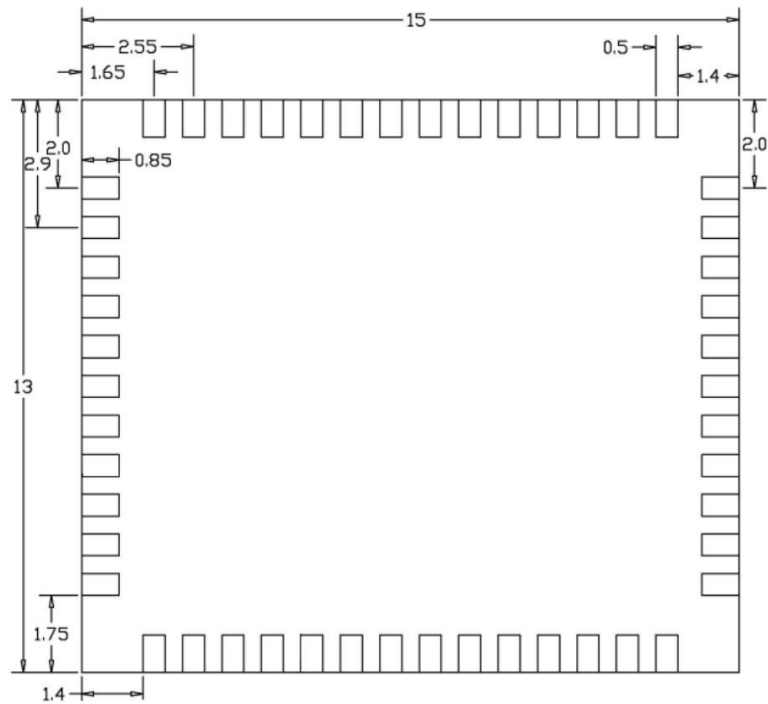
- 1.Frequency:2400~2500MHz;5150~5850MHz
- 2.Input pit:50 ohms
- 3.Gain:5.62dBi
4. Headgear color: TPEE black
5. Connector Color: Black
6. interface:RPSMA-K
7. All materials are RHOS environmentally friendly materials

7. Package and Dimensions

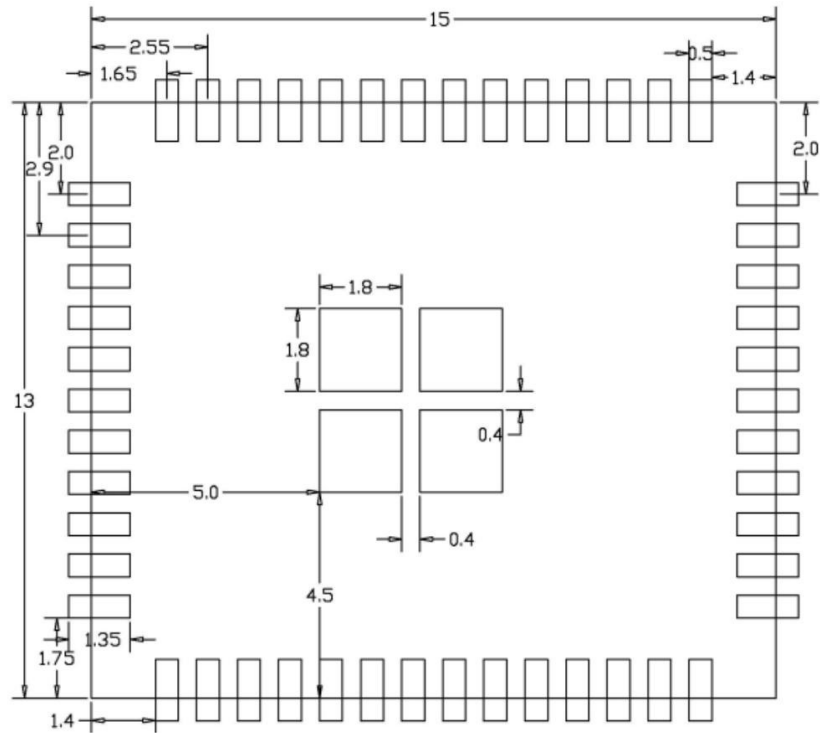
7.1. Physical pictures



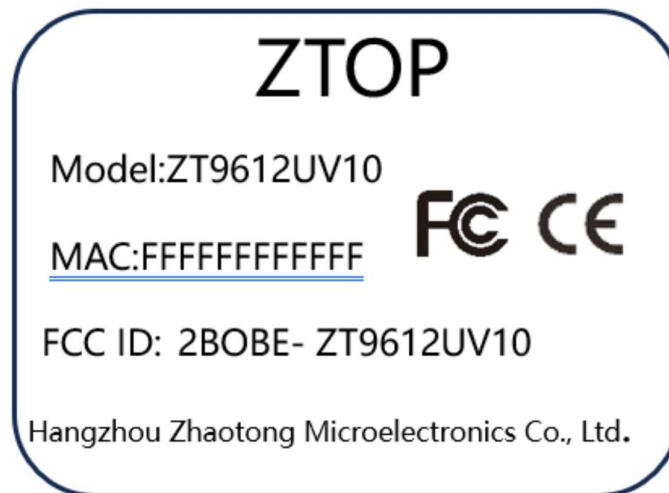
7.2. Mechanical dimensions



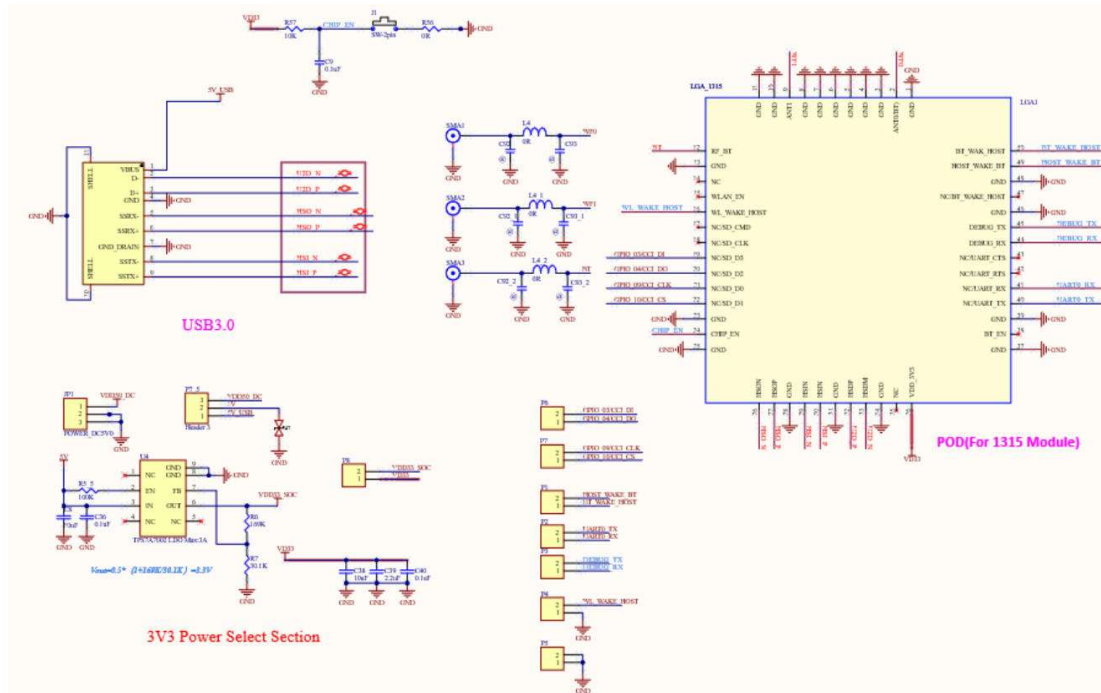
7.3. Recommended pad size



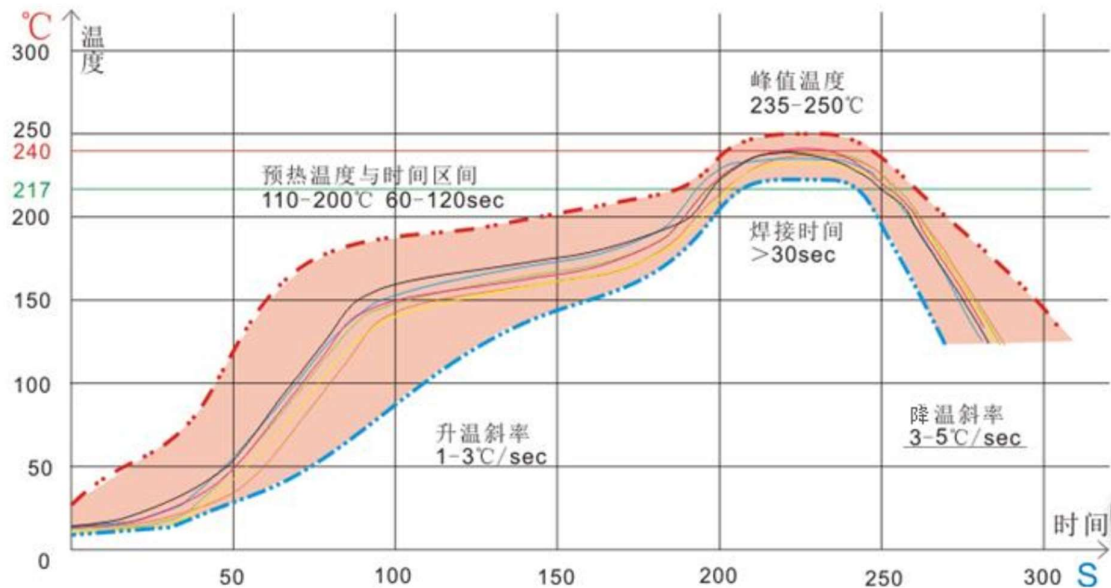
7.4. electronic labeling



8. Reference design



9. Welding conditions



Heating zone: temperature: $<150^{\circ}\text{C}$, time: between 60 ~ 90 seconds, slope control between 1 ~ 3°C/S .

Preheating constant temperature zone: temperature: $150^{\circ}\text{C} \sim 200^{\circ}\text{C}$, time: 60-120 seconds between, slope between 0.3-0.8 $^{\circ}\text{C/S}$.

Reflow welding zone: peak temperature $235^{\circ}\text{C} \sim 250^{\circ}\text{C}$ (recommended peak temperature

< 245°C), time 30–70 seconds.

Cooling zone: temperature: 217°C~170°C, slope between 3 ~ 5°C/S.

Solder is tin silver copper alloy lead-free solder (SAC305).

Note: The reflux curve should seek to balance the board and components without compromising the quality of the solder joints.

RF Exposure

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


RED Declaration of Conformity

Hereby, Hangzhou Zhaotong Microelectronics Co., Ltd., declares that this device is in compliance with the essential requirements and other relevant provisions of Directive 2014 / 53 / EU. The full text of the EU declaration of conformity is available at the following internet address: WWW.ZTOPMICRO.COM.

Restrictions in the 5 GHz band:

According to Article 10 (10) of Directive 2014/53/EU, the packaging shows that this radio equipment will be subject to some restrictions when placed on the market in Belgium (BE), Bulgaria (BG), the Czech Republic (CZ), Denmark (DK), Germany (DE), Estonia (EE), Ireland (IE), Greece (EL), Spain (ES), France (FR), Croatia (HR), Italy (IT), Cyprus (CY), Latvia (LV), Lithuania (LT), Luxembourg (LU), Hungary (HU), Malta (MT), Netherlands (NL), Austria (AT), Poland (PL), Portugal (PT), Romania (RO), Slovenia (SI), Slovakia (SK), Finland (FI), Sweden (SE), Turkey (TR), Norway, Switzerland (CH), Iceland (IS), and Liechtenstein (LI).

The WLAN function for this device is restricted to indoor use only when operating in the 5150 to 5350 MHz frequency range.

	ES	LU	RO	CZ	FR	HU	SI
	DK	HR	BE	BG	DE	EE	IE
	EL	IT	Cy	LV	LT	SK	MT
	NL	AT	PL	PT	FI	SE	TR
	NO	CH	IS	LI			

10 . Requirement per KDB996369 D03

2.1 General

Sections 2.2 through 2.10 describe the items that must be provided in the integration instructions for host product manufacturers (e.g., OEM instruction manual) to use when integrating a module in a host product. Modular transmitter applicants should include information in their instructions for all these items indicating clearly when they are not applicable. For example, information on trace antenna designs could indicate “not applicable.” This framework simplifies a TCB’s review process by providing a clear process for reviewing a modular transmitter certification application.

If the modular transmitter is only approved for use by the grantee in its own products and not intended for sale to third parties, the integration instructions may not be detailed but this must be declared in the filing. In that case, it is permitted to place the instructions in the theory-of-operation exhibit folder using long-term confidentiality. The applicant must include a statement in the filing that the module is not for sale and the user manual integration instructions are internal confidential manufacturing documents. The grant of certification for such a modular transmitter must be limited.

2.2 List of applicable FCC rules

List the FCC rules that are applicable to the modular transmitter. These are the rules that specifically establish the bands of operation, the power, spurious emissions, and operating fundamental frequencies. DO NOT list compliance to unintentional-radiator rules (Part 15 Subpart B) since that is not a condition of a module grant that is extended to a host manufacturer. See also Section 2.10 below concerning the need to notify host manufacturers that further testing is required. 3

Explanation: This module meets the requirements of FCC part 15C(15.247,15.407).it specifically establish the 6dB Bandwidth, Peak Output Power, Radiated Spurious Emission, Power Spectral Density, Restricted Band of Operation and Band Edge (Out of Band Emissions)

2.3 Summarize the specific operational use conditions Describe use conditions

that are applicable to the modular transmitter, including for example any limits on antennas, etc. For example, if point-to-point antennas are used that require reduction in power or compensation for cable loss, then this information must be in the instructions. If the use condition limitations extend to professional users, then instructions must state that this information also extends to the host manufacturer's instruction manual. In addition, certain information may also be needed, such as peak gain per frequency band and minimum gain, specifically for master devices in 5 GHz DFS bands.

Explanation: This module has three Reverse SMA type connect antenna. The is unique antenna , Please refer to the antenna.6.2

2.4 Limited module procedures

If a modular transmitter is approved as a "limited module," then the module manufacturer is responsible for approving the host environment that the limited module is used with. The manufacturer of a limited module must describe, both in the filing and in the installation instructions, the alternative means that the limited module manufacturer uses to verify that the host meets the necessary requirements to satisfy the module limiting conditions.

A limited module manufacturer has the flexibility to define its alternative method to address the conditions that limit the initial approval, such as: shielding, minimum signaling amplitude, buffered modulation/data inputs, or power supply regulation. The alternative method could include that the limited module manufacturer reviews detailed test data or host designs prior to giving the host manufacturer approval. This limited module procedure is also applicable for RF exposure evaluation when it is necessary to demonstrate compliance in a specific host. The module manufacturer must state how control of the product into which the modular transmitter will be installed will be maintained such that full compliance of the product is always ensured. For additional hosts other than the specific host originally granted with a limited module, a Class II permissive change is required on the module grant to register the additional host as a specific host also approved with the module.

Explanation: The module is a limited single module. There is no shield shell.

2.5 Trace antenna designs

For a modular transmitter with trace antenna designs, see the guidance in Question 11 of KDB Publication 996369 D02 FAQ – Modules for Micro-Strip Antennas and traces. The integration information shall include for the TCB review the integration instructions for the following aspects: layout of trace design, parts list (BOM), antenna, connectors, and isolation requirements. 4

- a) Information that includes permitted variances (e.g., trace boundary limits, thickness, length, width, shape(s), dielectric constant, and impedance as applicable for each type of antenna);
- b) Each design shall be considered a different type (e.g., antenna length in multiple(s) of frequency, the wavelength, and antenna shape (traces in phase) can affect antenna gain and must be considered);
- c) The parameters shall be provided in a manner permitting host manufacturers to design the printed circuit (PC) board layout;
- d) Appropriate parts by manufacturer and specifications; e) Test procedures for design verification; and
- f) Production test procedures for ensuring compliance.

The module grantee shall provide a notice that any deviation(s) from the defined parameters of the antenna trace, as described by the instructions, require that the host product manufacturer must notify the module grantee that they wish to change the antenna trace design. In this case, a Class II permissive change application is required to be filed by the grantee, or the host manufacturer can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application.

Explanation: This module has three Reverse SMA type connect antenna. The is unique antenna ,

Please refer to the antenna.6.2 And report for antenna details.

2.6 RF exposure considerations

It is essential for module grantees to clearly and explicitly state the RF exposure conditions that permit a host product manufacturer to use the module. Two types of instructions are required for RF exposure information: (1) to the host product manufacturer, to define the application conditions (mobile, portable – xx cm from a person's body); and (2) additional text needed for the host product manufacturer to provide to end users in their end-product manuals. If RF exposure statements and use conditions are not provided, then the host product manufacturer is required to take responsibility of the module through a change in FCC ID (new application)

Explanation: This module complies with FCC RF radiation exposure limits set forth for an uncontrolled environment, this equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body." This module is designed to comply with the FCC statement, FCC ID: **2BOBE- ZT9612UV10**.

2.7 Antennas

A list of antennas included in the application for certification must be provided in the instructions. For modular transmitters approved as limited modules, all applicable professional installer instructions must be included as part of the information to the host product manufacturer. The antenna list shall also identify the antenna types (monopole, PIFA, dipole, etc. (note that for example an "omni-directional antenna" is not considered to be a specific "antenna type")).

For situations where the host product manufacturer is responsible for an external connector, for example with an RF pin and antenna trace design, the integration instructions shall inform the installer that unique antenna connector must be used on the Part 15 authorized transmitters used in the host product.

The module manufacturers shall provide a list of acceptable unique connectors.

Explanation: The EUT has three **Reverse SMA type connect antenna**.

2.8 Label and compliance information

Grantees are responsible for the continued compliance of their modules to the FCC rules. This includes advising host product manufacturers that they need to provide a physical or e-label stating "Contains FCC ID" with their finished product. See Guidelines for Labeling and User Information for RF Devices – KDB Publication 784748

Explanation: The host system using this module, should have label in a visible area indicated the following texts: Contains FCC ID: **2BOBE- ZT9612UV10**.

2.9 Information on test modes and additional testing requirements⁵

Additional guidance for testing host products is given in KDB Publication 996369 D04 Module Integration Guide. Test modes should take into consideration different operational conditions for a stand-alone modular transmitter in a host, as well as for multiple simultaneously transmitting modules or other transmitters in a host product.

The grantee should provide information on how to configure test modes for host product evaluation for different operational conditions for a stand-alone modular transmitter in a host, versus with multiple, simultaneously transmitting modules or other transmitters in a host.

Grantees can increase the utility of their modular transmitters by providing special means, modes, or instructions that simulates or characterizes a connection by enabling a transmitter. This can greatly simplify a host manufacturer's determination that a module as installed in a host complies with FCC requirements.

Explanation: **This Module** can increase the utility of our modular transmitters by providing instructions that simulates or characterizes a connection by enabling a transmitter.

2.10 Additional testing, Part 15 Subpart B disclaimer

The grantee should include a statement that 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 circuitry), 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. 6

Explanation: The module without unintentional-radiator digital circuitry, so the module does not require an evaluation by FCC Part 15 Subpart B. The host should be evaluated by the FCC Subpart B.

11. Class II Permissive Change (C2PC) Test Plan for Host Devices

Test plan for Class II Permissive Changes (C2PC) on FCC ID: 2BOBE- ZT9612UV10.

For BT(2402-2480MHz):

- 1) Output power. (FCC Part 15.247)
- 2) Output Power Spectral Density. (FCC Part 15.247)
- 3) AC Conducted Emission. (FCC Part 15.207)
- 4) Radiated Emission (FCC Part 15.205&209, FCC Part 15.247(d))
- 5) Host cannot change the RF Exposure use conditions. If use conditions is changed the separate approval shall be required.

Note:

1. These tests be based on C63.10 and FCC Part 15.247 as guidance, according to the operating frequency High, mid and low channel test.
2. For these tests, all modes (GFSK, $\pi/4$ -DQPSK, 8DPSK) need to be tested.

For BLE(2402-2480MHz):

- 1) Output power. (FCC Part 15.247)
- 2) Output Power Spectral Density. (FCC Part 15.247(d))
- 3) AC Conducted Emission. (FCC Part 15.207)
- 4) Radiated Emission (FCC Part 15.205&209)
- 5) Host cannot change the RF Exposure use conditions. If use conditions is changed the separate approval shall be required.

Note:

1. These tests be based on C63.10 and FCC Part 15.247 as guidance, according to the operating frequency High, mid and low channel test.
2. For these tests, all modes (BLE 1M, BLE 2M, BLE S=2, BLE S=8) need to be tested.

For 2.4G WIFI(2412-2462MHz):

- 1) Output power. (FCC Part 15.247)
- 2) Output Power Spectral Density. (FCC Part 15.247)
- 3) AC Conducted Emission. (FCC Part 15.207)
- 4) Radiated Emission (FCC Part 15.205/209, FCC Part 15.247(d))
- 5) Host cannot change the RF Exposure use conditions. If use conditions is changed the separate approval shall be required.

Note:

1. These tests be based on C63.10 and FCC Part 15.247 as guidance, according to the operating frequency High, mid and low channel test.
2. For these tests, all modes (802.11b, 802.11g, 802.11HT20, 802.11HT40, 802.11ax20, 802.11ax40) need to be tested.

For 5.2G WIFI(5180-5240MHz):

- 1) Output power. (FCC Part 15.407(a))
- 2) Output Power Spectral Density. (FCC Part 15.407(a))

- 3) AC Conducted Emission. (FCC Part 15.207)
- 4) Radiated Emission (FCC Part 15.205/209. FCC Part 15.407(b)(1))
- 5) Host cannot change the RF Exposure use conditions. If use conditions is changed the separate approval shall be required

Note:

1. These tests be based on C63.10,FCC Part 15.407, KDB 789033 D02 as guidance, according to the operating frequency High, mid and low channel test.
2. For these tests, all modes (IEEE 802.11a, IEEE 802.11n HT20, IEEE 802.11n HT40, IEEE 802.11ac VHT20, IEEE 802.11 ac VHT 40, IEEE 802.11ac VHT 80 ,IEEE 802.11ax HE20, IEEE 802.11ax HE40 , IEEE 802.11 HE80)need to be tested.

For 5.2G WIFI(5260-5320MHz, Client without radar detection):

- 1) Output power. (FCC Part 15.407(a))
- 2) Output Power Spectral Density. (FCC Part 15.407(a))
- 3) AC Conducted Emission. (FCC Part 15.207)
- 4) Radiated Emission (FCC Part 15.205/209. FCC Part 15.407(b)(2))
- 5) Host cannot change the RF Exposure use conditions. If use conditions is changed the separate approval shall be required
- 6) DFS(DFS Detection Threshold, Channel Move Time, Channel Closing Transmission Time, Non-Occupancy Period)

Note:

1. These tests be based on C63.10,FCC Part 15.407, FCC KDB 905462 D02, FCC KDB 905462 D03, KDB 789033 D02 as guidance, according to the operating frequency High, mid and low channel test.
2. For these tests, all modes (IEEE 802.11a, IEEE 802.11n HT20, IEEE 802.11n HT40, IEEE 802.11ac VHT20, IEEE 802.11 ac VHT 40, IEEE 802.11ac VHT 80 ,IEEE 802.11ax HE20, IEEE 802.11ax HE40 , IEEE 802.11 HE80)need to be tested.

For 5.6G WIFI(5500-5720MHz, Client without radar detection):

- 1) Output power. (FCC Part 15.407(a))
- 2) Output Power Spectral Density. (FCC Part 15.407(a))
- 3) AC Conducted Emission. (FCC Part 15.207)
- 4) Radiated Emission (FCC Part 15.205/209. FCC Part 15.407(b)(3))
- 5) Host cannot change the RF Exposure use conditions. If use conditions is changed the separate approval shall be required
- 6) DFS(DFS Detection Threshold, Channel Move Time, Channel Closing Transmission Time, Non-Occupancy Period)

Note:

1. These tests be based on C63.10,FCC Part 15.407, FCC KDB 905462 D02, FCC KDB 905462 D03, KDB 789033 D02 as guidance, according to the operating frequency High, mid and low channel test.
2. For these tests, all modes (IEEE 802.11a, IEEE 802.11n HT20, IEEE 802.11n HT40, IEEE 802.11ac VHT20, IEEE 802.11 ac VHT 40, IEEE 802.11ac VHT 80 ,IEEE 802.11ax HE20, IEEE 802.11ax HE40 , IEEE 802.11 HE80)need to be tested.

For 5.8G WIFI(5745-5825MHz):

- 1) Output power. (FCC Part 15.407(a))
- 2) Output Power Spectral Density. (FCC Part 15.407(a))
- 3) AC Conducted Emission. (FCC Part 15.207)
- 4) Radiated Emission (FCC Part 15.205/209. FCC Part 15.407(b)(4))
- 5) Host cannot change the RF Exposure use conditions. If use conditions is changed the separate approval shall be required

Note:

1. These tests be based on C63.10,FCC Part 15.407, KDB 789033 D02 as guidance, according to the operating frequency High, mid and low channel test.

2. For these tests, all modes (IEEE 802.11a, IEEE 802.11n HT20, IEEE 802.11n HT40, IEEE 802.11ac VHT20, IEEE 802.11 ac VHT 40, IEEE 802.11ac VHT 80 ,IEEE 802.11ax HE20, IEEE 802.11ax HE40 , IEEE 802.11 HE80)need to be tested.

The above is the test plan for each band.

This module does not contain a shield and therefore is limited, requiring the Grantee to file a Class II permissive change for each specific host per the test plan defined in the module integration instructions.

The host integrator can contact the grantee of the C2PC filing through the following contact information.

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