



Product model: Z2101AX-B/C/D/E

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## 产品规格书

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## **1 Summary**

### **1.1 Brief overview**

This document describes the electrical characteristics, RF performance, dimensions and application environment of the Z2101AX. Under the introduction of this document, end users or developers can quickly understand the hardware functions of Z2101AX.

Z2101AX is a 5G/4G+WIFI6 home CPE router. It accesses the Internet through 5G/4G mobile communication dial-up or 1000Mbps WAN port, and then shares the Internet network through wireless WiFi 6 and 1000Mbps wired LAN.

### **1.2 Reference standards**

Relevant standard specifications:

USB3.0/USB2.0 bus standard

PCI- Express bus standard

SIM/USIM interface standard

IEEE802.11n/g/b/a/ac/ax

IEEE802.3/802.3u/802.ab

PCI Express M.2 Specification Rev1.1

5G/4G mobile communication standard, which is determined by the selected 5G/4G mobile communication module

## 2 Product Picture

B



C



D



E





### 3 Main features of the product

- Using MT7621A scheme, MIPS dual-core CPU, the main frequency is up to 880MHZ
- Using independent WIFI6 chip, MT7905D and MT7975D, the rate is up to 1800Mbps
- Using high-speed 256MB DDR3, with 16MB Nor Flash
- 1WAN+3LAN 1000M adaptive network port, support auto flip (Auto MDI/MDIX)..
- Support "one-key flashing mode", that is, long press the reset button to enter the rescue flashing mode...
- Built-in M.2/Mini-PCIE standard interface (choose one of the two), which can be used to connect to 5G/4G mobile communication modules
- External standard SIM card (large card) interface and built-in eSIM (QFN-8 6mmx5mm) card interface, support SIM/USIM card
- External high-gain WIFI antenna, wireless signal 360 degrees without dead angle

## 4 Hardware function

### 4.1 Introduction to the hardware interface

Ports	WAN* 1, 1000Mbps (Auto MDI/MDIX) IEEE 802.3/802.3u/802.ab
	LAN*3, 1000Mbps (Auto MDI/MDIX) IEEE 802.3/802.3u/802.ab
SIM slot	Spring type SIM slot*1, QFN-8(6mmx5mm) eSIM*1, Support SIM/USIM
Power adapter	DC5.0*2.1MM slot
Button	Reset button* 1, MESH button*1
Antennas	Onnidirectional External 5dbi 2.4G antennas*2
	Onnidirectional External 5dbi 5.8G antennas*2
	Onnidirectional External 5dbi 5G/4G antennas(5G antennas* 4, 4G antennas*2)

#### 4.2 Introduction to indicator lights

MESH LED	<p>1. The red light is on during the boot process, the boot is complete, the red light is off and the green light is on</p> <p>2. Press the mesh button to enter the mesh pairing state, the green light flashes once a second, and the other lights are off</p> <p>3. The main equipment network is normal, the green light and blue light are on at the same time (cyan)</p> <p>The slave device MESH is successfully connected, and the distance is longer, the green light and the red light are on at the same time (orange), the distance is suitable for the green light and the blue light is on at the same time (cyan)</p>
WAN LED	When connecting the WAN ports, the LED light will be always on, and the LED will be flashing when there is data communication
LAN1 LED	When connecting the LAN ports, the LED light will be always on, and the LED will be flashing when there is data communication
LAN2 LED	When connecting the LAN ports, the LED light will be always on, and the LED will be flashing when there is data communication
LAN3 LED	When connecting the LAN ports, the LED light will be always on, and the LED will be flashing when there is data communication
4G/5G LED	When insert SIM card, the LED light will be always on, and the LED will be flashing when there is data communication
POWR LED	when the power supply is normal, the power indicator is always on, and it won't be on when the power supply is abnormal.

#### 4.3 Introduction to the hardware platform

Processor	MT7621A MIPS Dual Core CPU, 880MHZ main frequency
WIFI chipset	MT7905D+MT7975D IEEE 802.11n/g/b/a/ac/ax, max speed up to 1800Mbps
RAM	DDR3 256MB
Flash	Nor Flash 16MB
	NAND Flash



#### 4.4 Introduction to hardware watchdog function

This hardware product is designed with a hardware watchdog function. The hardware watchdog will automatically turn on after power-on, and detect the heartbeat level output by the routing system that jumps once per second. If the routing system itself fails (such as a crash), it will also Naturally, the heartbeat level can no longer be output. At this time, if the hardware watchdog does not detect the heartbeat level within 120 seconds, it will shut down itself for 15 seconds and then restart the entire system.

When the routing system is operating normally, but the 5G/4G module dialing is abnormal, the routing system will control the power supply of the 5G/4G module through GPIO and let the module automatically restart to fix the 5G/4G dialing abnormal problem.

Hardware watchdog specific functions	
Routing system is abnormal	Module dialing abnormal
Restart the whole system	Only restart the module

#### 5 5G/4G mobile communication function

This product has a built-in M.2/MiniPCIE interface, which can be used to expand 5G/4G mobile communication functions. The built-in M.2/PCIE interface supports USB3.0 and USB 2.0 buses. 5G mobile communication supports NSA or SA, and which frequency bands are specifically supported by the selected 5G module. At present, this product has completed the joint debugging with Fibocom's FM150 series modules.



## 6 Power supply and power consumption description

	Testing Condition	Minimum	Rating	Maximum
Working voltage(V)	$T_A = 25^{\circ}C$	9	12	35
Absolute operating voltage(V)	$T_A = 25^{\circ}C$	8		36
Working Current(A)	$V_{IN}=12V, T_A = 25^{\circ}C$	0.3	0.9	1.5

Please use the ZBT standard power adapter to supply power to this product. If you do not use the ZBT standard power supply, please supply power to this product in strict accordance with the above power specifications and parameters, otherwise the product will be damaged. If the battery or vehicle power supply is used for power supply, please make anti-static and anti surge countermeasures.

## 7 Introduction to WIFI wireless parameters

### 7.1 WIFI EVM standard

	Mode description	index parameter
EVM standard(dBm)	802.11B 11Mbps	$\leq -15\text{ dB}$
	802.11G 54 Mbps	$\leq -25\text{ dB}$
	802.11N HT20@ MCS7	$\leq -28\text{ dB}$
	802.11N HT40@ MCS7	$\leq -28\text{ dB}$
	802.11AC VHT20@ MCS8	$\leq -30\text{ dB}$





	802.11AC VHT40@ MCS9	$\leq -32$ dB
	802.11AC VHT80@ MCS9	$\leq -32$ dB
	802.11AX HE20@MCS 11	$\leq -35$ dB
	802.11AX HE40@MCS 11	$\leq -35$ dB
	802.11AX HE80@MCS 11	$\leq -35$ dB



## 7.2 WIFI 2.4G

Compatible with IEEE 802.11 b/g/n/ac/ax, supports 20MHz, 40MHz, modulation method 1024-QAM / OFDMA, adopts 2T2R MU-MIMO antenna technology, and the highest connection rate is up to 573.5Mbps. The following is an explanation of 2.4G WIFI's power frequency, receiving sensitivity, and transmitting power.

	Instruction	Maximum Value	Rating	Minimum Value
Working Frequency(MHz)		2484		2412
Receiving sensitivity(dBm)	802.11B 11Mbps	-86	-87	-88
	802.11G 54 Mbps	-69	-71	-73
	802.11N HT20@ MCS7	-67	-69	-71
	802.11N HT40@ MCS7	-65	-67	-69
	802.11AC VHT20@ MCS8	-63	-65	-67
	802.11AC VHT40@ MCS9	-61	-63	-65



	802.11AX HE20@MCS11	-62	-64	-66
	802.11AX HE40@MCS11	-60	-62	-64
Transmit power(dBm)	802.11B 11Mbps	22	21	20
	802.11G 54 Mbps	20	19	18
	802.11N HT20@ MCS7	19	18	17
	802.11N HT40@ MCS7	19	18	17
	802.11AC VHT20@ MCS8	18	17	16
	802.11AC VHT40@ MCS9	18	17	16
	802.11AX HE20@MCS11	17	16	15
	802.11AX HE40@MCS11	17	16	15



### 7.3 WIFI 5.8G

Compatible with IEEE 802.11 a/ac/ax, supports 20MHz, 40MHz, 80MHz, modulation method 1024-QAM / OFDMA, adopts 2T2R MU-MIMO antenna technology, and the highest connection rate is up to 1201Mbps. The following is an explanation of the power frequency, receiving sensitivity, and transmitting power of 5.8G WIFI.

	Instruction	Maximum Value	Rating	Minimum Value
Working Frequency(MHz )		5825		5180
Receiving sensitivity(dBm)	802.11G 54 Mbps	-69	-71	-73
	802.11N HT20@ MCS7	-67	-69	-71
	802.11N HT40@ MCS7	-65	-67	-69
	802.11AC VHT20@ MCS8	-63	-65	-67
	802.11AC VHT40@ MCS9	-61	-63	-65
	802.11AC VHT80@ MCS9	-59	-61	-63
	802.11AX HE20@MCS 11	-57	-59	-61
	802.11AX HE40@MCS 11	-55	-57	-59
	802.11AX HE80@MCS 11	-53	-55	-57
Transmit power(dBm)	802.11G 54 Mbps	20	19	18
	802.11N HT20@ MCS7	19	18	17
	802.11N HT40@ MCS7	18	17	16
	802.11AC VHT20@	18	17	16



	MCS8			
	802.11AC VHT40@ MCS9	17	16	15
	802.11AC VHT80@ MCS9	16	15	14
	802.11AX HE20@MCS 11	18	17	16
	802.11AX HE40@MCS 11	17	16	15
	802.11AX HE80@MCS 11	16	15	14

## 8 Introduction to structural parameters and accessories

weight (KG)	TBD	
Enclosure Size	L*W*H=160mm*93mm*31.9mm	
color	Black	
Accessories	Power adapter	12V/2A 1PCS
	User manual	1PCS
	certificate	1PCS
	Ethernet cable	Cat 5 network cable 1PCS



## 9 Product working environment requirements

Working temperature	0℃ - 40℃
Storage temperature	-40℃ - 70℃
Working humidity	10% - 90%RH, Non condensing
Storage humidity	5% - 90%RH, Non condensing

## 10 Software configuration information

Default IP	192.168.1.1
username/password	root/admin
2.4G SSID	WIFI6-XXXXXX (x is the last 6 bits of MAC address), default no password
5.8G SSID	WIFI6-5G-XXXXXX (x is the last 6 bits of MAC address), default no password

The above is the general default configuration information of the product. The WiFi SSID using our OS firmware or openwrt firmware may be different, but the default IP and web login name and password of the product remain unchanged. Please refer to the product description for other detailed software functions.