

# ZM2410P0-ATS

## Zigbee Wireless Network Module Specification

V1.00      Date: 2012/05/18

Item	Contents
Terms	Zigbee module, ZM2410P0-ATS
Abstract	This document mainly describes the hardware and usage of the ZM2410P0-ATS Zigbee module.

## Revision History

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Version	Rev. Date	Modifications
V1.00	2012-05-18	Original version
V1.00	2012-05-18	Translated to English

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## Chapter 1: Overview

ZM2410P0-ATS is a 2.4GHz low power Zigbee module developed by Guangzhou ZHIYUAN Electronics Stock Co., Ltd. It integrates complex RF circuit to a compact size board and provides built-in communication protocol in its 8051 core. The transmission protocol of it is fully transparent to user; it provides support to the remote on-air firmware upgrade and remote module configuration. ZM2410P0-ATS module can save user's development time on wireless communications, further reduce the time to market of user's products, make them more competitive to others.



**Figure 1-1: Photo of ZM2410P0-ATS module**

For different application field, the module has different communication protocols. The factory default protocol is P2P (Point-to-Point) protocol.

**Table 1-1: Communication Protocols**

Protocol	Name	Features	Notices
Point-to-Point (P2P)	ZLG	Supports point-to-point, point-to-multipoint wireless communication	Factory default
Wireless networking	ZLGNET	Supports up to 20 levels of router, wireless peer-to-peer network; example application: street lamp controller	
Wireless voice	ZLGV	Supports wireless voice transmission	

The protocol described in this document is P2P communication protocol, if user wants to know more about the ZLGNET communication protocol, please download the

*Zigbee peer-to-peer wireless network communication protocol firmware ZLGnet*  
document on our website.

## Chapter 2: Hardware

This chapter describes the hardware of ZM2410P0-ATS.

### 2.1 Physical size

Units: mm

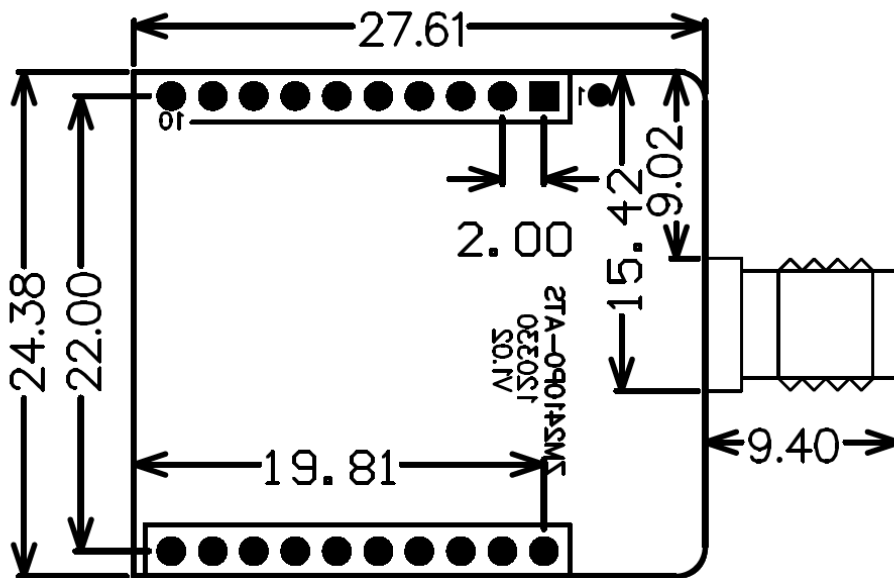
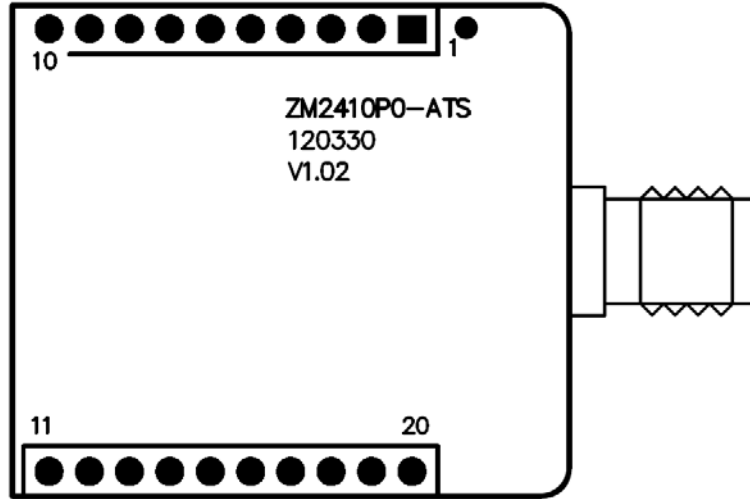


Figure 2-1: Physical size of ZM2410P0-ATS

## 2.2 Specification of pins

Figure 2-2 shows the pin assignment of ZM2410P0-ATS



**Figure 2-2: Pin assignments**

**Table 2-1: Specification of pins**

Pin #	Name	Description
1	VCC	Power input
2	TXD	UART Transmit pin
3	RXD	UART Receive pin
4	NC	Reserved
5	#REST	Rest Pin, active low pin
6	NC	Reserved
7	NC	Reserved
8	ISP	Short to VCC to enter ISP upgrade mode (factory upgrade only)
9	#SLEEP	Sleep mode, active low pin
10	GND	Power Grounding
11	NC	SPI data input
12	NC	Reserved
13	NC	Reserved
14	NC	Reserved
15	NC	Reserved
16	NC	Reserved
17	NC	Reserved
18	NC	Reserved
19	NC	Reserved
20	NC	Reserved

## 2.3 Hardware parameters

**Table 2-2: Hardware parameters**

Description	ZM2410P0-ATS			Unit
	Min.	Typ.	Max.	
Power supply	5.0	-	5.5	V
Frequency Range	2.405	-	2.480	GHz
Receive sensitivity (1% PER)	-	-97	-99	dBm
Transmit power	5.5	6	7	dBm
Link budget	-	103	-	dBm
Working bandwidth	-	5.0	-	MHz
Wireless output rate	-	250	1000	Kbps
Frequency error range	-96.2	-	96.2	KHz



## Chapter 3: Configuration & Upgrade

Find “Zigbee configuration software” tool within the Product CD and run it, then a user interface window will appear, as Figure 3-1 shows.

**Notes:** The latest version of this software can be downloaded from the product website:

<http://www.embedcontrol.com/products/wuxian/CEL/index.asp>

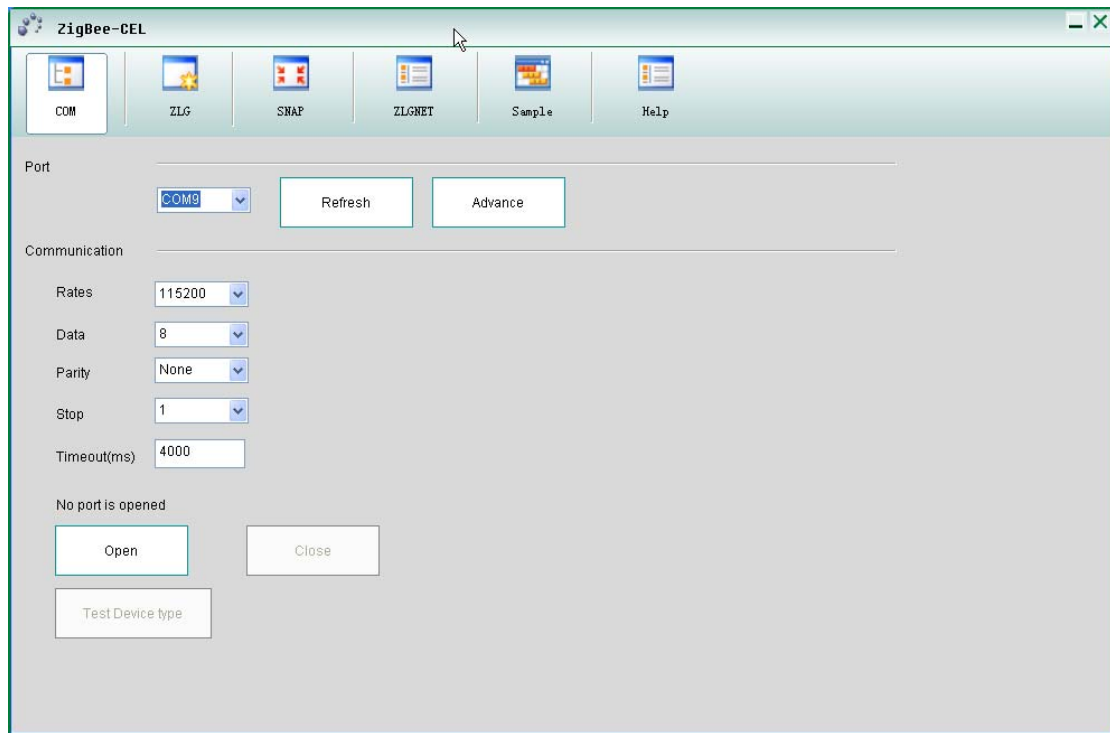


Figure 3-1: Zigbee configuration tool

### 3.1 Local configuration and upgrade

The ZM2410P0-ATS evaluation kit ZM-DEMO provides a USB cable to connect the evaluation board to the PC. So after hardware connection, run the configuration software, set the serial port number to the corresponding COM port on PC, Baud rate at 115200, 8 data bits, 1 stop bit, and no parity bit, click the “connect” button to let the evaluation board enter configuration state.

Under the “Device List” menu, click the “local device” option to configure or upgrade the local devices that connected to the PC.

#### 3.1.1 Get configuration parameters

Single click on the “Get configuration”, then local device and related status information will be shown in the “Device List”, and the current configuration of the evaluation board

will be listed out in the “Configuration Parameters” window, as Figure 3-2 shows.

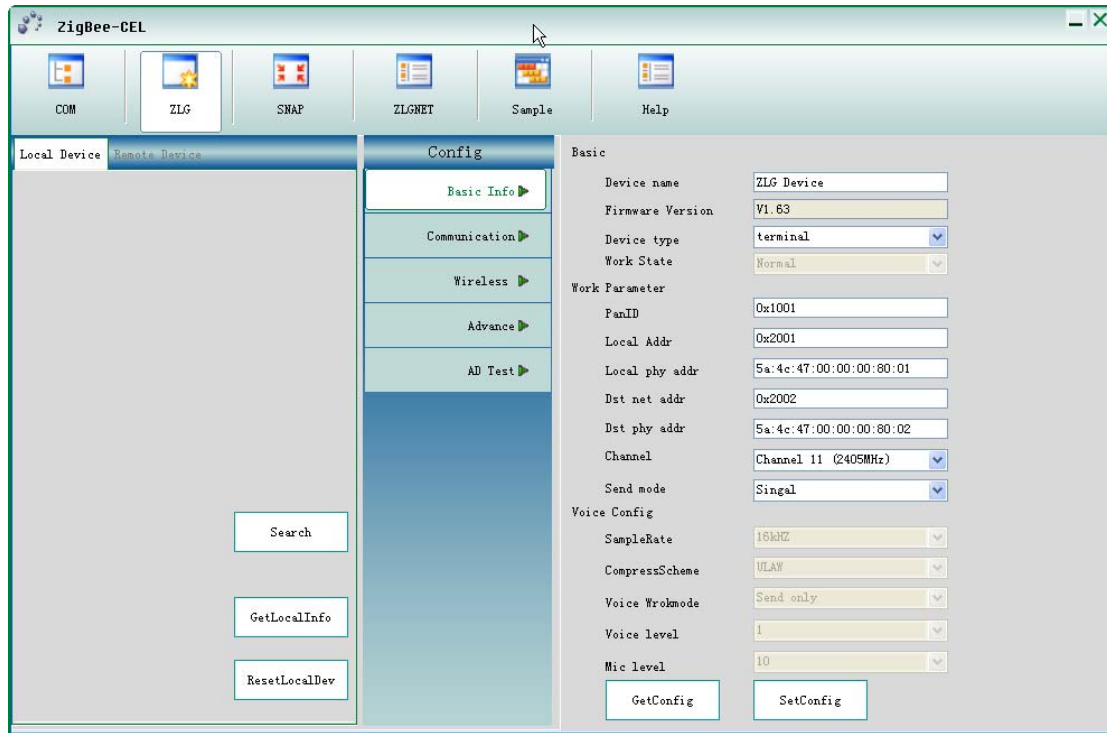


Figure 3-2: Get local settings

### 3.1.2 Modify configuration parameters

The specification for each parameter is listed in Table 3-1.

Table 3-1: Configuration parameters

Configuration item	Description	Range	Notice
Device Name	Name of the device	Within 16 bytes	User defined string
Firmware version	Firmware version		
Device type	Device type	Terminal, router, or Zignet device	Each of them corresponding to a different function
Channel	Channel number	11~26	
PanID	Network number	0x000~0xffff	Hexadecimal value
Local network address		0x000~0xffff	Hexadecimal value
Local Physical Address	Local MAC address	N/A	Format: xx:xx:xx:xx:xx:xx:xx:xx
Destination Network Address	Destination network address for point-to-point communication	0x000~0xffff	Hexadecimal value
Destination Physical Address	Destination MAC address for point-to-point communication	N/A	Format: xx:xx:xx:xx:xx:xx:xx:xx
Transmit rate		250K, 500K and 1M	

Configuration item	Description	Range	Notice
Transmit power		-50dbm~8dbm	For P0 module, the displayed value is output value; For P2 module, when the displayed value is 8dBm, the actual output is 20dBm
Times of retry	Times of retry if transmit fails	0~255	Decimal value
Retry interval	Delay time before each retry	0~255	Decimal value
Unit :10ms	Time unit of retry interval	0~255	Decimal value
Serial port Baud rate		1200~460800	
Number of serial data bit		5, 7 or 8	
Number of serial parity bit		0~4	
Number of serial stop bit		1	

After modification, click the “Change settings” button to confirm the modification, then a password dialogue will pop-up, enter the password (initial password: “88888”) and click OK to proceed. It is suggested that to read out the settings after modification to check whether the modification is successful.

**Notes:** To achieve point-to-point communication using 2 evaluation kits, then PanID, channel number and transmission rate should be identical to each other, the destination network address and destination physical address should be the address on the other side.

### 3.1.3 Firmware Upgrade

Single click on the “upgrade” button, then a password dialogue will pop up, enter the password (initial password is “88888”) and click OK to proceed, then the upgrade dialogue will pop up, as Figure 3-3 shows.



Figure 3-3: Upgrade firmware dialogue

Click “Browse...” and find the firmware file “ZICM2410 Eva Kit firmware Zigbee\_P2P\_Vx.xx.bin” (where x.xx is the version of the firmware). Click “upgrade” button to start the upgrade; if the upgrade is successfully complete, an

upgrade successful dialogue pop up.

## 3.2 On air remote configuration and upgrade

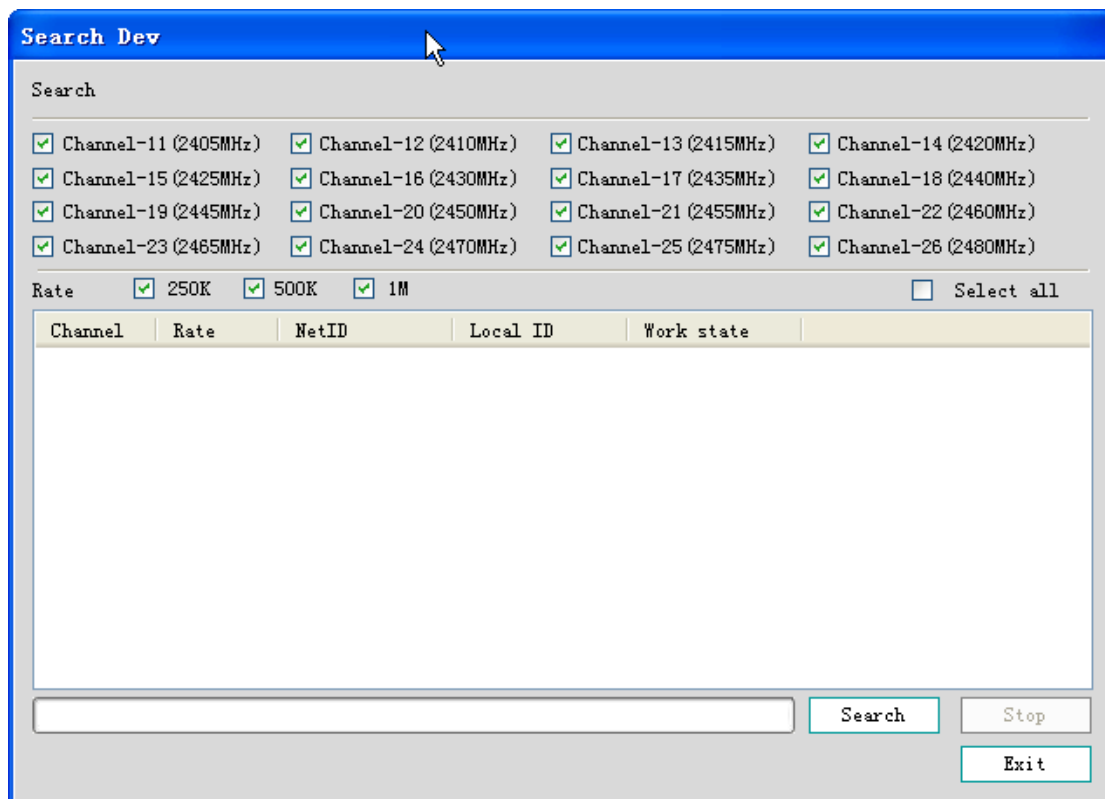
The evaluation kit supports the on air remote configuration and upgrade. Following is a demonstration on using evaluation board 1 to perform on air remote configuration to evaluation board 2.

Use the USB cable provided by the evaluation kit to connect evaluation board 1 to PC, then run the configuration software, set the serial port number to the corresponding serial port, Baud rate at 115200, 8 data bits, 1 stop bit, and no parity bit, then click “connect” to let the evaluation board 1 to enter the configuration state.

Use battery or PC to power evaluation board 2.

### 3.2.1 Get configuration parameters

Click the “Network Device” button under the “Device List”, then a “Search Device” button will appear besides it, as Figure 3-5 shows. Click this “Search Device” button, then a search window will pop up, as Figure 3-4 shows.



**Figure 3-4: Search nearby devices window**

Select the channel number and communication rate, and then click “Search” button to search nearby device. After searching, the device found by the hardware will be listed out in the device list window, as Figure 3-5 shows.

Within the device list, select required device, and click the “Get settings” button to get

the parameter settings of the selected device as Figure 3-5 shows.

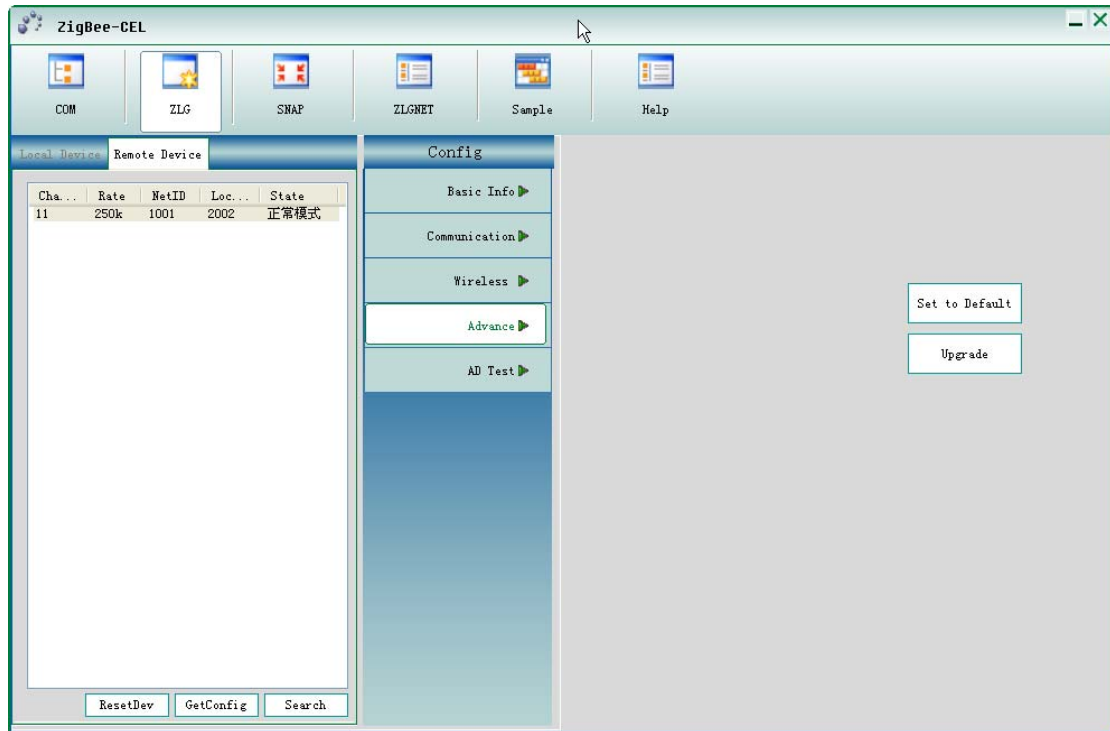


Figure 3-5: Network device found by the search device function

### 3.2.2 Change parameter settings

Just select the device within the device list, then user may modify its parameter settings; the procedure is the same with the local parameter settings modification.

### 3.2.3 Firmware upgrade

Just select the device within the device list, then user may remotely upgrade its firmware; the procedure is the same with the local firmware upgrade.

## Chapter 4: Configuration Commands

This chapter describes the way to change the configuration of the module without powering down the module. The new configuration can become effective without the need to reset the module.

There are two ways to configure the module: serial port configuration and wireless remote configuration. Both of them can send configuration commands to configure module. The major purpose of using configuration command is to provide a convenient way for PC side or microcontroller to configure module. For example, when module is used as a node for data collection, the low layer microcontroller in the system can send out A/D read command to the module on each node to collect A/D conversion results.

A control command includes a frame header (0xDE 0xDF 0xEF), function code, and the related parameter or data. All data values are hexadecimal values, the function codes are listed in Table 3-1.

**Table 4-1: Function Codes**

Function code	Description	Parameter	Notes
0xD1	Change channel	0x0B~0x1A	
0xD2	Change destination address	0x00 0x00~0xFF 0xFF	
0xD3	Include source address in packet header	0x01: included; 0x00: not included	
0xD4	Configure GPIO Input/Output direction	Two bytes for network address; One byte for direction: 1 for input, 0 for output	Can configure local or remote GPIO direction.
0xD5	Read GPIO	Two bytes for network address;	Can read local or remote GPIO state
0xD6	Set GPIO voltage level	Two bytes for network address; One byte for voltage level: 1 for HIGH, 0 for LOW	Can set local or remote GPIO voltage level
0xD7	Read A/D conversion values	Two bytes for network address; One byte for A/D converter channel number: 0~1	Can read local or remote AD
0xD9	Set communication mode	00: single cast; 01: broadcast	

For example, to read A/D converter channel 0 voltage value from node 2002, user can send out the following character string to any Zigbee module that stays within the same network segment with the target module.

```
0xDE 0xDF 0xEF 0xD7 0x20 0x02 0x00
```

## Chapter 5: FAQ & Answers

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1. Why there is no signal when the module is put to the ground in distance?

Because the zigbee module is based on 2.4GHz frequency, the RF signal will be absorb by the ground if the module is too close to the ground. We suggest that the installation site of the module should be 0.5 meter higher than the ground, or use a longer external antenna.

2. After power up, why all four LED lights up?

All four LED lights up means that error condition exists:

1. Low battery power;
2. The toggle switch on the bottom right corner is switched to the ISP mode;
3. P00~P04 are opened in JP2 jumper;
4. Firmware program missing.

If it is the last situation, please call our technical support or sales engineer to solve the problem

3. How to get latest update of the product

User can browse our product website to download the latest updates about the product: <http://www.embedcontrol.com/products/wuxian/CEL/index.asp>

## **Important compliance information for North American users**

The ZM2410P0-ATS Module has been granted modular approval for mobile applications. Integrators may use the ZM2410P0-ATS Module in their final products without additional FCC certification if they meet the following conditions. Otherwise, additional FCC approvals must be obtained.

1. At least 20cm separation distance between the antenna and the user's body must be maintained at all times.
2. To comply with FCC regulations limiting both maximum RF output power and human exposure to RF radiation, the maximum antenna gain including cable loss in a mobile-only exposure condition must not exceed 2.15dBi in the 2.4G band.
3. The ZM2410P0-ATS Module and its antenna must not be co-located or operating in conjunction with any other transmitter or antenna within a host device.
4. A label must be affixed to the outside of the end product into which the ZM2410P0-ATS Module is incorporated, with a statement similar to the following: For ZM2410P0-ATS: This device contains FCC ID: ODH-ZMATS.
5. A user manual with the end product must clearly indicate the operating requirements and conditions that must be observed to ensure compliance with current FCC RF exposure guidelines.

The end product with an embedded -ZM2410P0-ATS Module may also need to pass the FCC Part 15 unintentional emission testing requirements and be properly authorized per FCC Part 15.

**Note: If this module is intended for use in a portable device, you are responsible for separate approval to satisfy the SAR requirements of FCC Part 2.1093.**

### **FCC NOTICE:**

This device complies with Part 15 of the FCC Rules [and with RSS-210 of Industry Canada].

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.

Changes or modifications made to this equipment not expressly approved by Guangzhou ZHIYUAN Electronics Stock Co., Ltd.. may void the FCC authorization to operate this equipment.