XPC660-PIE-U
User manual

Version number V1.0

2024-11-20

Directory

1、Product Introduction

XPC660-PIE-U The network card is based on industrial-grade dual-radio (2.4+5.8G) WIFI6 module as client.

XPC660 The Wi-Fi6 core board uses a pure domestic chip RF chip + CPU solution, and has undergone a large number of on-site verifications, and the product is stable and reliable.

The purely domestic chip solution avoids the risks of information security and supply chain security.

On the basis of WiFi6, XPC660 cooperates and develops driver technology with the original chip manufacturer to adapt to a variety of industrial environment application scenarios, streamlines the integration of the complete router solution into the 30*80mm circuit board, and provides MiniPCIE interface to connect with the main control system.

The custom Mini PCIE interface provides USB3.0 communication with the host, and at the same time reserves a 1000M network port definition, two serial ports TTL, compact structure, rich functions and powerful.

The XPC660 integrates a low-power USB 2.0 to 10/100/1000M Fast Ethernet controller wireless adapter for USB to 2.4G+5.8G wireless bridging function. The core board makes full use of the advantages of fast wireless roaming of the wireless module to solve the problem of WIFI network roaming in the AGV industry and ensure stable and fast wireless roaming in a complex WIFI network environment.

The XPC660-PIE-U has a compact hardware design, which reduces the workload of development, testing and production, enables users to quickly connect their products, reduces development and production costs, and shortens the time to market.

The XPC660-PIE-U is driven by an industrial-grade USB Ethernet controller chip and a commercial-grade wireless network card, which has good adaptability and compatibility, and the driver is stable and reliable. At present, the USB driver supports most operating systems on the market, including Windows XP/Vista/7/8/10, Linux kernel 6x/5.x/4.x/3.x/2.6x drivers, and Apple Mac system drivers are supported.

The XPC660-PIE-U hardware design is compatible with the standard Mini PCI-E full-height card mounting holes, compatible with PCIE part of the pin definition, and the system can control the pins to adjust the module status.

1. Domestic WIF16 RF + CPU chip solution, safe and controllable
2. 2.4+5.8G Double RF,802.11a/b/g/n/ac/ax protocol
3. 20/40/ MHz
4. It supports high-speed data transmission and active roaming, and the roaming time is less than 100ms
5. Supports active roaming with Radio threshold optimization
6. Supports enterprise-grade wireless encryption/certificate encryption
7. Web Configuration/Command Line Configuration/- Key Diagnostics
8. The driver can be adapted to Windows, Linux and various operating systems• USB3.0, compatible with USB2.0
9. Integrates 1 GE interface and 2 Uart
10. Mini PCIE interface, 30*80mm

2、Purpose of documentation

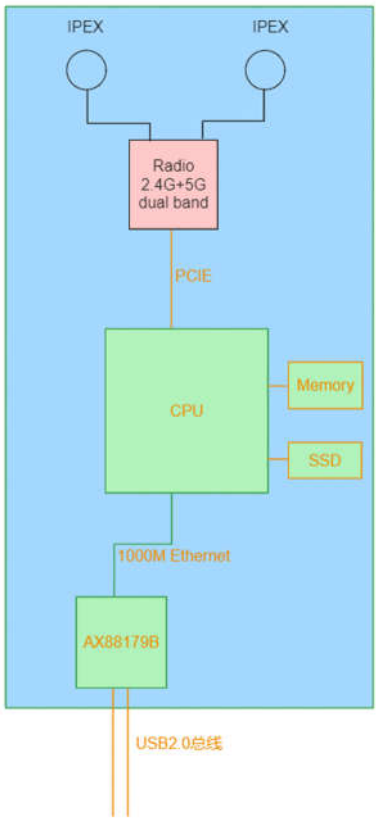
Users can refer to the manual to complete the hardware wiring of the device, complete the configuration of the first power-on, as well as the application modes supported by the wireless core board, simple troubleshooting methods when encountering problems, and obtain logs.

The document will introduce typical application cases, and engineers can complete the parameter configuration of the wireless core board according to the case introduction and their actual needs.

3、Hardware introduction

3.1 Basic Instructions

XPC660-PIE-U is a non-standard Mini-PCIE wireless core board, which is compatible with Mini PCIE package definition and mounting fixed holes. The wireless core board has a built-in system master controller and Radio chip, and an integrated USB to network port chip to realize the USB-to-wireless bridging function.



XPC660Core board block diagram

XPC660 Core board block diagram

The XPC660-PIE-U interface definition is compatible with most MiniPCIE pin definitions, and the interface definitions include:

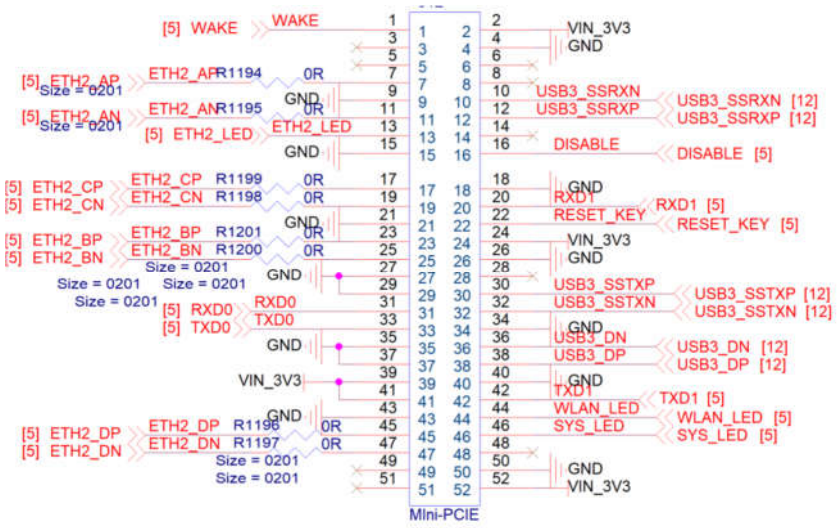
- USB2.0 interface (Device)
- USB3.0 High-speed interface (Device)
- TTL0

- TTL1
- SYS status pin
- WLAN connection status pin
- Reset/Default Control pins
- 2 U.FL antenna interface

Front

Back

3.2 Hardware pin definition



Pins	Description	IO
GE_AP	Gigabit Ethernet MDI interface	
GE_AN	Gigabit Ethernet MDI interface	
GE_BP	Gigabit Ethernet MDI interface	
GE_BN	Gigabit Ethernet MDI interface	
GE_CP	Gigabit Ethernet MDI interface	
GE_CN	Gigabit Ethernet MDI interface	
GE_DP	Gigabit Ethernet MDI interface	
GE_DN	Gigabit Ethernet MDI interface	
USB3_SSTXP	USB3.0 Send differential pairs	O
USB3_SSTXN		O
USB3_SSRXN	USB3.0 Receive differential pairs	I
USB3_SSRXP		I
USB3_DN	USB2.0 Differential pairs	IO
USB3_DP		IO
TXD0	UART0 Data Transmission	O
RXD0	UART0 Data Reception	I
TXD1	UART1 Data Transmission	O
RXD1	UART1 Data Reception	I
WLAN_LED	Wireless indicator, high for connected, low for unconnected	O
SYS_LED	System indicator light, the system outputs high level for normal operation after powering on, otherwise low level	O
GE_LED	Ethernet indicator with low output when connected	O
DISABLE	Turn off the wireless network card function, and the low level is active	I
WAKE	Wake up the wireless card, active high	I
RESET_KEY	The wireless network card is reset, and the low level is active	I
RESERVE	Reserve pins	IO

3.3 Hardware design recommendations

A TTL from the CPU is connected to the TTL interface of the core board for configuration or background status information acquisition.

Extract the GPIO from the CPU to the NIC Reset _PCIE pin, and restart the NIC synchronously when the system restarts.

From the GPIO to the Wlan_ LEDs and SYS_LED from the CPU, you can obtain the running status and networking status of the NIC.

3.3.1 Hardware interfaces

Based on the Openwrt operating system, the XPC660-PIE-U is deeply optimized for hardware CPU and radio frequency, so that the hardware and software can be completely autonomous and controllable. This chapter focuses on the software functions that can be implemented by the XPC660-PIE-U

3.3.2 USB to wireless function

XPC660-PIE-U wireless core board, the router system is integrated into a 30*80mm circuit board, using USB to 1000M Ethernet chip, and finally realizing the USB to 2.4G+5G dual radio WIFI bridging function.

The USB port provides a universal interface for the wireless core board, which is convenient for integration into Linux and Windows systems。The USB interface chip adopts the AX88179B of Taiwan's AsiaInfo, and the operating system does not need to be re-adapted to the driver, and can be plug and play

Pin name	Description	Pins
USB3_SSTXP	USB3.0 Send differential pairs	30
USB3_SSTXN		32
USB3_SSRXN	USB3.0 Receive differential pairs	10
USB3_SSRXP		12
USB3_DN	USB2.0 Differential pairs	36
USB3_DP		38

3.3.3 Serial port to WIFI transparent transmission function

The XPC660-PIE-U wireless core board provides two TTL interfaces, TTL1 is the debugging interface, which is convenient for engineers to directly debug and configure the core board through the TTL interface. TTL0 can provide the serial port transparent transmission function, and can provide networking function for the serial port of the single-chip microcomputer. The core board of the wireless integrates TCP/UDP function, and finally realizes the transparent transmission and forwarding of data from the serial port to the network.

Pin name	Description	Pins
RXD0	UART0 Data Reception	31
TXD0	UART0 Data Transmission	33

RXD1	UART1 Data Reception	20
TXD1	UART1 Data Transmission	42

3.3.4 Gigabit Ethernet interface

The XPC660-PIE-U wireless core board provides a GE interface, plus simple circuitry, which can be expanded to an RJ45 network port.

The network port can be shorted to the resistor to completely disconnect the physical link and prevent interference with other signals on the motherboard.

Pins	Description	Pins
GE_AP	Gigabit Ethernet MDI interface	7
GE_AN	Gigabit Ethernet MDI interface	11
GE_BP	Gigabit Ethernet MDI interface	23
GE_BN	Gigabit Ethernet MDI interface	25
GE_CP	Gigabit Ethernet MDI interface	17
GE_CN	Gigabit Ethernet MDI interface	19
GE_DP	Gigabit Ethernet MDI interface	45
GE_DN	Gigabit Ethernet MDI interface	47

3.3.5 System pins

Through the system pins, the working status of the wireless core board can be monitored, the core board can be restarted and restored to factory settings.

Pin name	Description	Pins
WLAN_LED	Wireless indicator, high for connected, low for unconnected	O
SYS_LED	System indicator light, the system outputs high level for normal operation after powering on, otherwise low level	O
GE_LED	Ethernet indicator with low output when connected	O
RESET_KEY	The wireless network card is reset, and the low level is active Press for 2 seconds to reboot the system Press and hold for 6 seconds to restore the configuration to factory settings	I

3.3.6 Wireless features

Base frequency	2.412-2.742 GHz 4.900-5.730 GHz
Bandwidth	20/40 MHz
MIMO	2.4G(2×2) 5G(2×2)
Modulation	OFDMA, 1024-QAM
Data rates	802.11b:1,2,5.5,11 Mbps

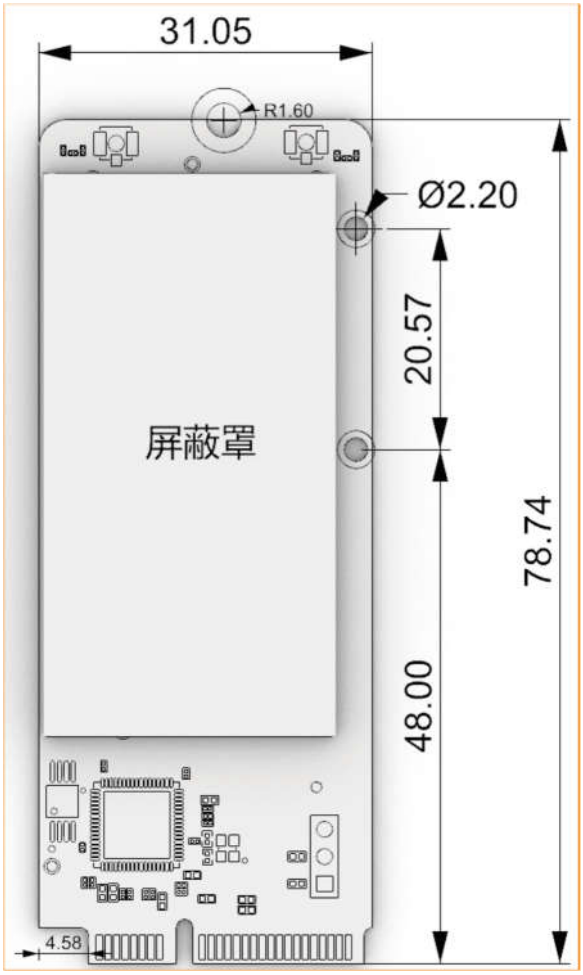
are supported	802.11g: 6,9,12,18,24,36,48,54 Mbps
	802.11n: MCS0,MCS1,MCS2,MCS3,MCS4,MCS5,MCS6,MCS7
	802.11ac:MCS0,MCS1,MCS2,MCS3,MCS4,MCS5,MCS6,MCS7,MCS8,MCS9
	802.11ax:MCS0,MCS1,MCS2,MCS3,MCS4,MCS5,MCS6,MCS7,MCS8,MCS9,MCS10,MCS11
Typical transmit power(± 2dBm)	2.4G:
	802.11b@1Mbps ：23dBm
	802.11b@11Mbps：22dBm
	802.11n,HT20@MCS0 ：21dBm
	802.11n,HT20@MCS7 ：16dBm
	802.11ac,VHT20@MCS0 ：21dBm
	802.11ac,VHT20@MCS9 ：15.5dBm
	802.11ax,HE20@MCS0 ：21dBm
	802.11ax,HE20@MCS11 ：15dBm
	802.11ax,HE40@MCS0 ：21dBm
	802.11ax,HE40@MCS11 ：14.5dBm
	5G:
	802.11a@6Mbps ：18dBm
	802.11a@54Mbps：16dBm
	802.11n,HT20@MCS0 ：17dBm
	802.11n,HT20@MCS7 ：14dBm
	802.11ac,VHT20@MCS0 ：17dBm
	802.11ac,VHT20@MCS9 ：14dBm
	802.11ax,HE20@MCS0 ：17dBm
	802.11ax,HE20@MCS11 ：14dBm
	802.11ax,HE40@MCS0 ：17dBm
	802.11ax,HE40@MCS11 ：12.5dBm
Receive sensitivity(±2dBm)	2.4G:
	802.11b,2ss@1Mbps ：-95dBm 802.11b,2ss@11Mbps：-82.5dBm
	802.11n,HT20,2ss@MCS0 ：-93dBm
	802.11n,HT20,2ss@MCS7 ：-78dBm
	802.11ac,VHT20,2ss@MCS0 ：-89dBm
	802.11ac,VHT20,2ss@MCS9 ：-75dBm
	802.11ax,HE20,2ss@MCS0 ：-91dBm
	802.11ax,HE20,2ss@MCS11 ：-71dBm
	802.11ax,HE40,2ss@MCS0 ：-91dBm
	802.11ax,HE40,2ss@MCS11 ：-67dBm
	5G:
	802.11a,2ss@6Mbps ：-94dBm 802.11a,2ss@54Mbps ：-79dBm 802.11n,HT20,2ss@MCS0 ：-90dBm
	802.11n,HT20,2ss@MCS7 ：-75dBm
	802.11ac,VHT20,2ss@MCS0 ：-90dBm
	802.11ac,VHT20,2ss@MCS9 ：-69dBm
	802.11ax,HE20,2ss@MCS0 ：-89dBm
	802.11ax,HE20,2ss@MCS11 ：-67dBm

	802.11ax,HE40,2ss@MCS0 ： -89.5dBm
	802.11ax,HE40,2ss@MCS11 ： -65dBm

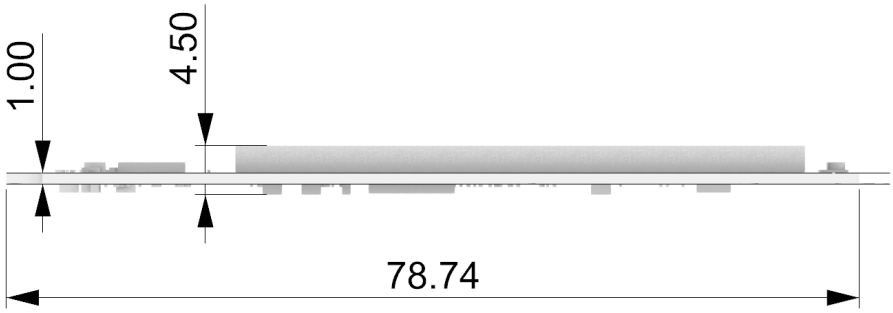
3.3.7 Electrical properties

The module is powered by 3.3VDC and needs to ensure good power supply and good pin contact.

3.3.8 Package and size description



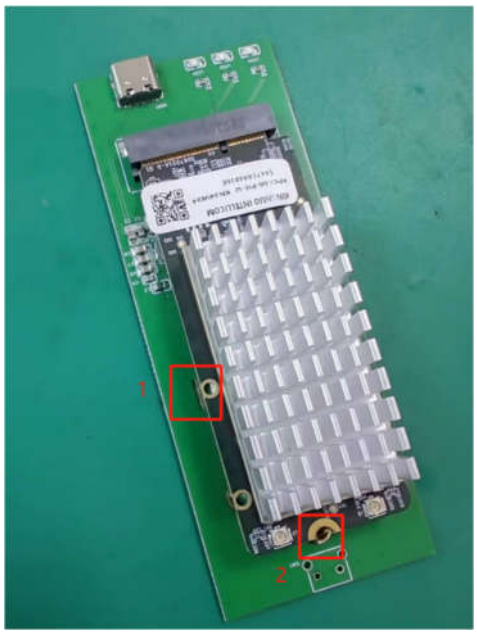
Front



Side

3.3.9 Mounting and fixing

The wireless core board is a non-standard Mini PCIE shape, compatible with Mini PCIE full-height card mounting holes, and the mounting screws are fastened.



注：Hole 1 is a Mini PCIE standard size mounting screw, and M2 screws need to be installed

注：Hole 2 is a custom hole position

The core board has a built-in CPU and RF module, which needs to consider good contact heat dissipation, and the module works at a high temperature of 75°, if the ambient temperature is too high, the module will activate the over-temperature protection to reduce the wireless transmission rate.

The module antenna is 2*2 antenna, 2.4G+5G dual-band in one, supports MIMO, and then considers the antenna layout, it is recommended to separate the two antennas, at the front and rear of the car

4、Operating mode

XPC660-PIE-U provides miniPCIE interface, 2.4G+5G radio frequency, and the software can be configured into a variety of working modes

——STA

The network communication mode is supported, which can meet the data communication requirements of most scenarios

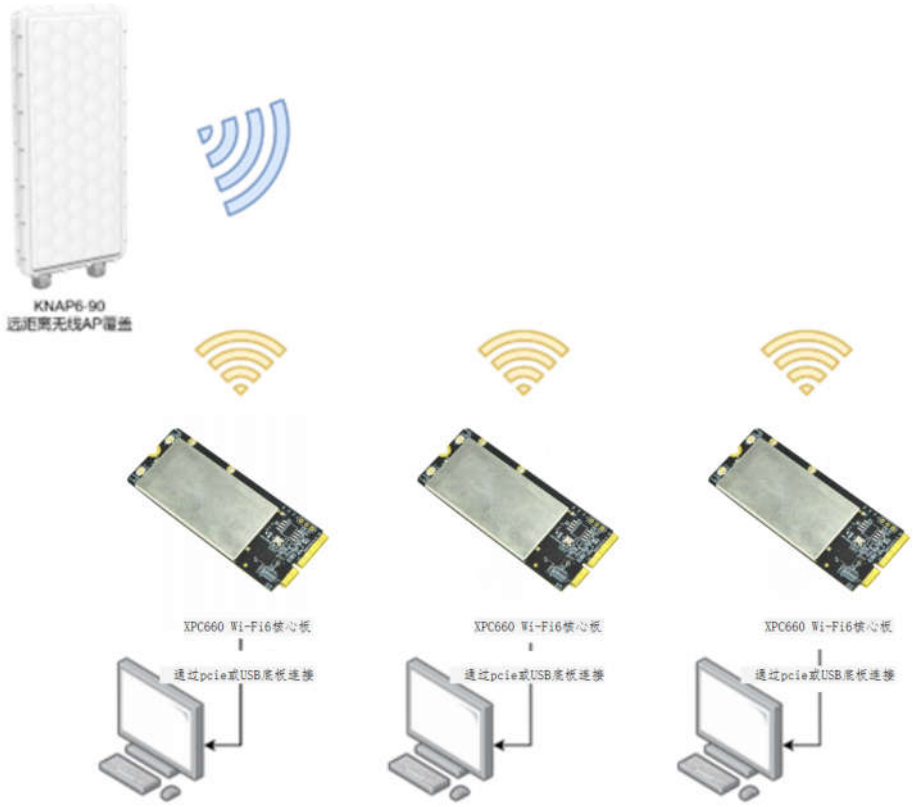
——Wireless bridging

——NAT

4.1 STA mode

As the core board of the WFi6 wireless Module, the XPC660-PIE-U provides the most basic and main mode is the STA mode, which is used as a terminal to connect to a wireless AP and provide wireless networking capabilities for fixed devices or mobile devices.

The XPC660-PIE-U provides 2.4G RF channels and 5G RF channels, corresponding to two network cards in the system, and can be connected to two different frequency bands at the same time.



5、Web page configuration

XPC660-PIE-U has a built-in web page, which can complete status query, parameter configuration, parameter import and export, log export, diagnostic log generation and export, etc.

To log in to the web page for the first time, you need to set a default password

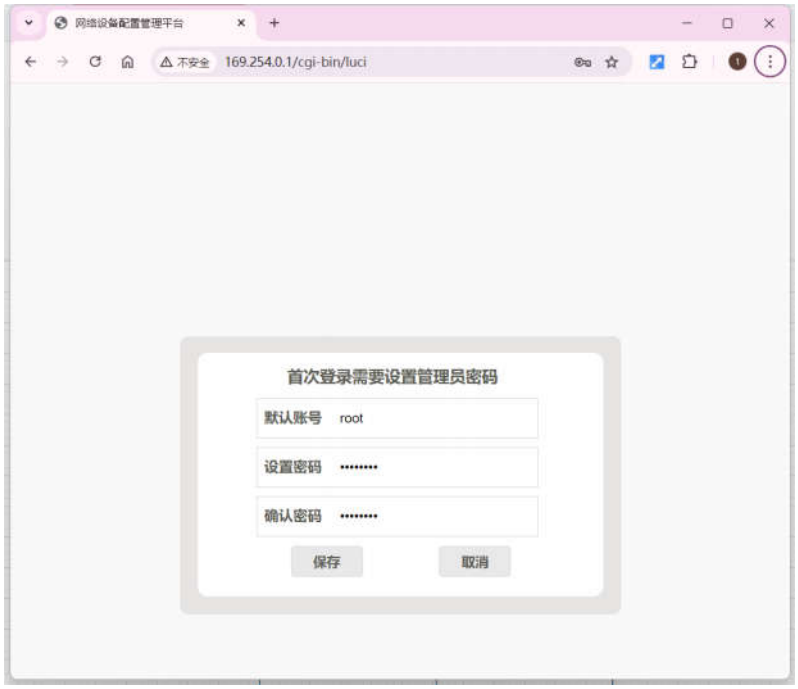
Ethernet port to connect to the computer,

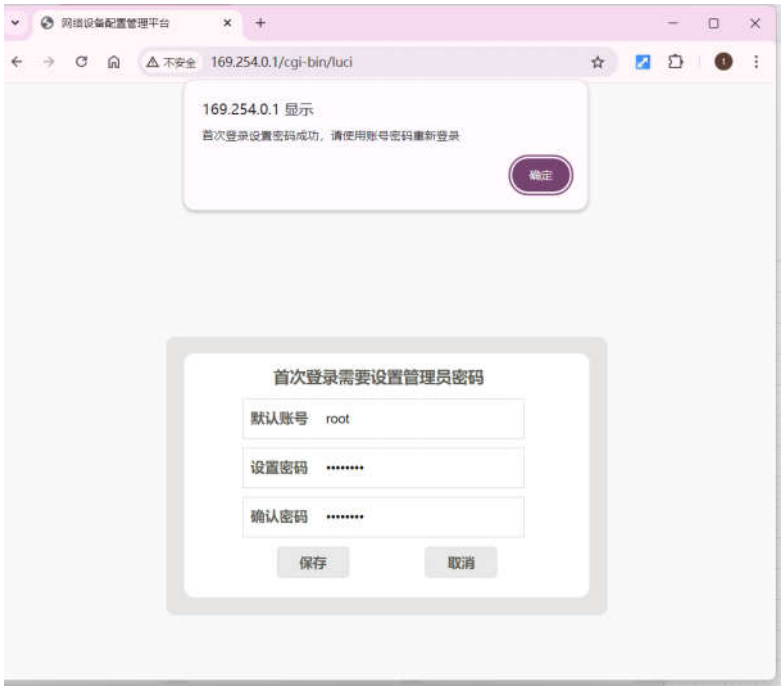
Default address：169.254.0.1

Default username：root

Default password setting rules: The password must contain at least three of the following types: digits, lowercase letters, uppercase letters, and English characters, and be 8~32 characters long

To make it easier to remember, the default password is set to root@123





5.1 Log in to the webpage for the first time

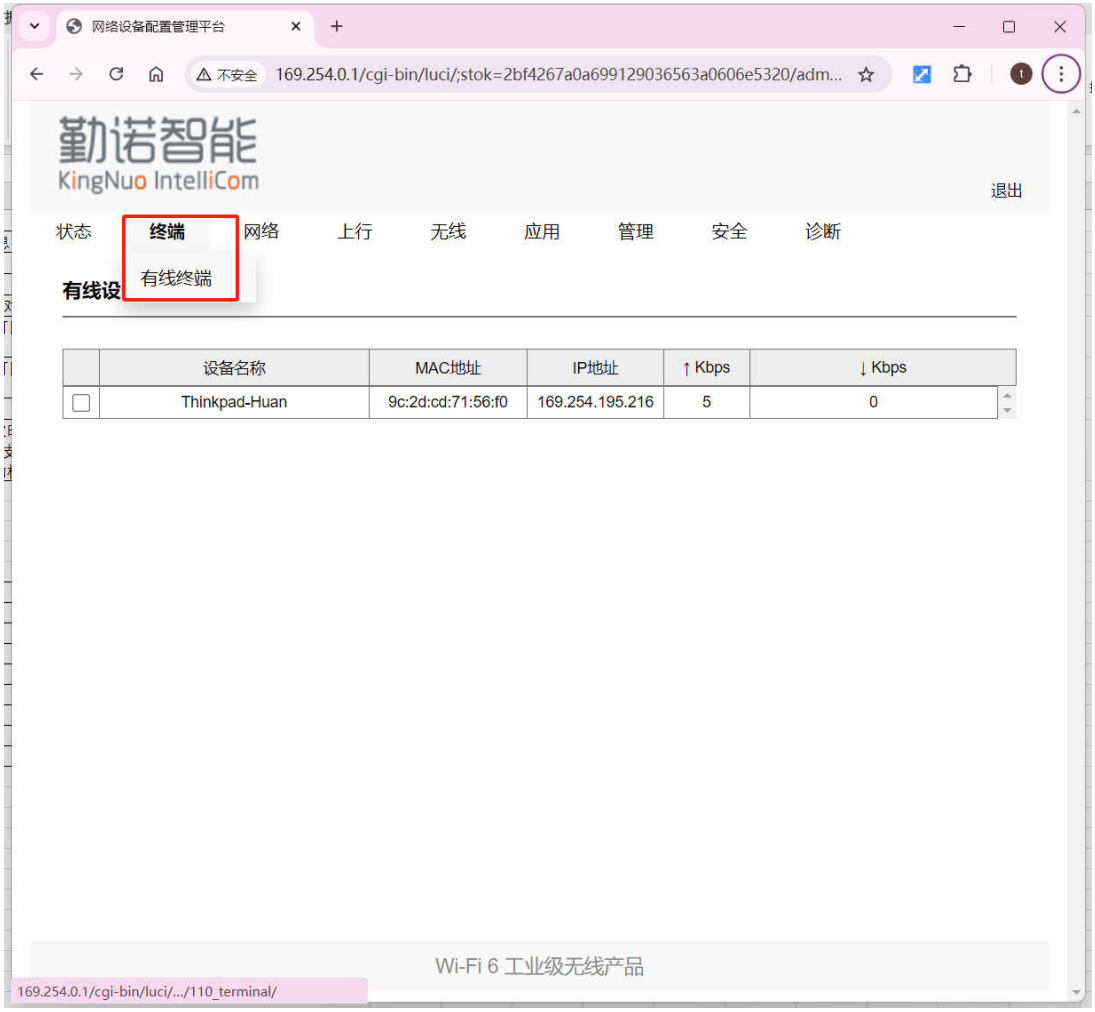
After entering the username and password, you will be taken to the device status page

Product model	XPC660-PIE-U Order the part number for the device
Serial number	The unique SN identifier allows you to query the delivery information of the equipment
Hardware version	Hardware version
Software Version	Software Version
The MAC address of the device	The core board of the wireless is connected to the corresponding MAC address and does not communicate with the outside world
2.4G MAC	2.4 GMAC address, MAC address of external communication, can be added to the customer's on-site whitelist
5.8G MAC	5.8 GMAC address, MAC address of external communication, can be added to the customer's on-site whitelist
Running time	The duration of the operation after power-on
System time	Current device clock. The power-on shows the last last clock, and the clock cannot be saved because the device does not have RTC. The device supports NTP service, and if it is connected to the Internet, it can automatically calibrate the time, or it can manually calibrate the time.

Interface type	2.4G WIFI	The frequency band to which you are currently connected
Interface status	Connected	RF connection status
SSID	xpicowifi-cisco	The name of the wireless network
BSSID	f0:61:c0:18:10:c1	BSSID of the wireless network
Channel	1	channel
Agreement	11ax	Wireless protocols
Negotiation rate	238Mbps	Negotiation rate
Signal strength	-35dB	Connection signal strength
Internet access	Not configuredIP	In bridging mode, the radio does not need to assign an IP address

5.2 Terminal

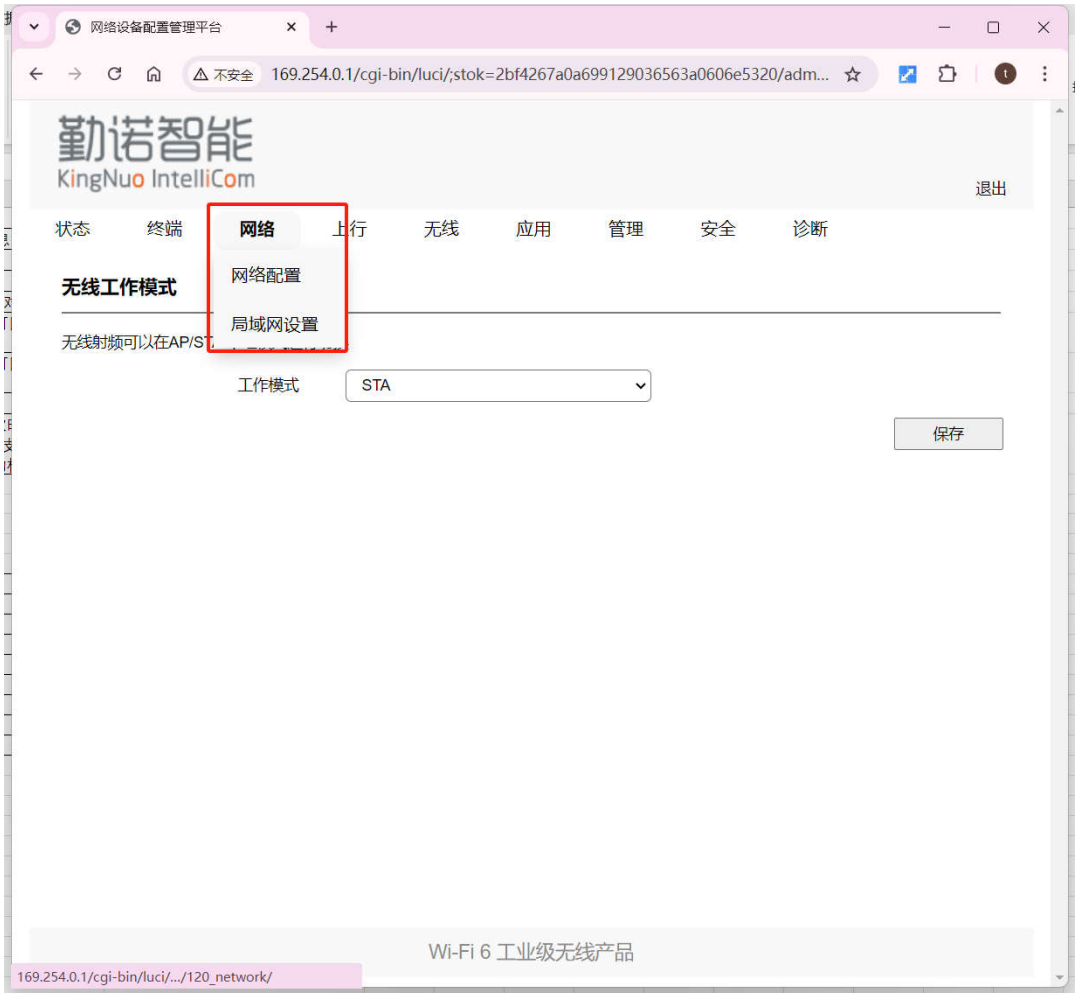
This page displays the information of the devices connected to the network port.



5.3 Internet

This page can set the wireless working mode, and the corresponding network settings, management IP address and NAT settings are required for different working modes.

The default setting is the STA setting.

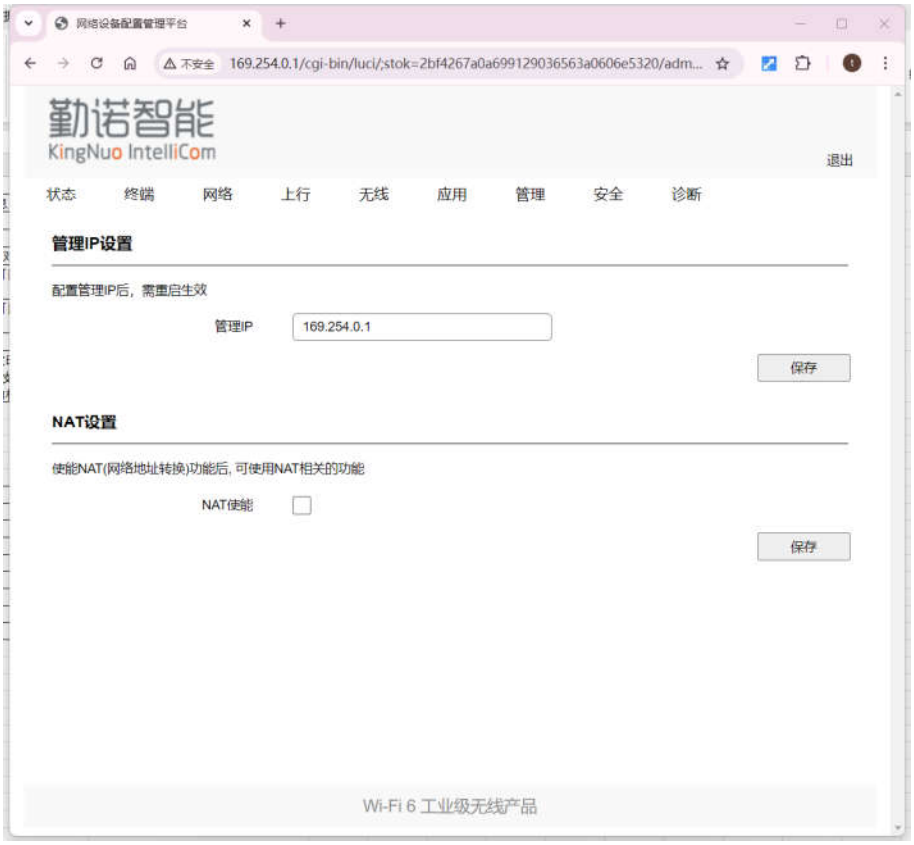


5.3.1 STA Settings - Default settings

The XPC660-PIE-U is in mode by default, and when the radio is connected to an external wireless AP, the XPC660 wireless module will not occupy any IP address and will be transparent in network communication.

The default address of the XPC660-PIE-U is the address, which can be modified. If you change the default address, the device will restart immediately, and the next time you log in, you need to use the modified address to access the wireless core board.

For example, if the IP address range used by a wireless AP is 192.168.100.1, the management IP address cannot be set to 192.168.100.1



5.3.2 NAT Set up

NAT stands for Network Address Translation. This is a protocol that provides a way for multiple computers on a public network to share a single connection to the Internet.

Features of NAT:

NAT can not only solve the problem of insufficient IP address, but also effectively avoid attacks from outside the network, hide and protect computers inside the network.

——Broadband Sharing: This is the biggest feature of NAT hosting.

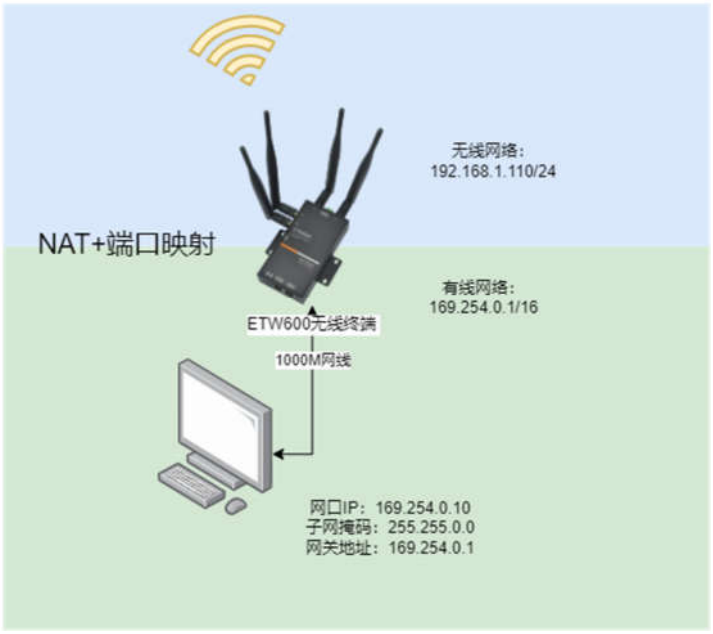
——Security protection: When the PC in NAT is connected to the Internet, the IP address it displays is the public IP of the NAT host, so the client PC certainly has some level of security when it is outside. A portcan is being performed and the source client computer cannot be detected.

As shown below:

If the NAT function is enabled, the device attached to the core board of the wireless is a LAN device, and the IP address can be statically assigned, and the DHCP service function can also be enabled.

Once the NAT function is enabled, the device accessing the wireless end from the wireless core board device is normal.

If you need to access the network service of the wired device from the wireless side, you need to enable the port mapping function.



For example, if PC2 is PC2, you need to log in to 169.254.0.10 via remote SSH

You need to add the corresponding port number to the port map to ensure that the wireless core board forwards the data to the intranet device port.

5.4 Uplink

The uplink interface is 2.4G network and 5.8G network, and the two independent radios can be connected at the same time.

Under normal circumstances, 2.4G network and 5.8G network cannot be connected at the same time, otherwise there will be an inexplicable abnormal situation of the network. Normally, we only need to connect to the 5G uplink network. If you need to cancel the 2.4G network connection, click the [Disconnect] button.

5.4.1 Connect to a wireless network

The image below shows the process of connecting to a wireless network.

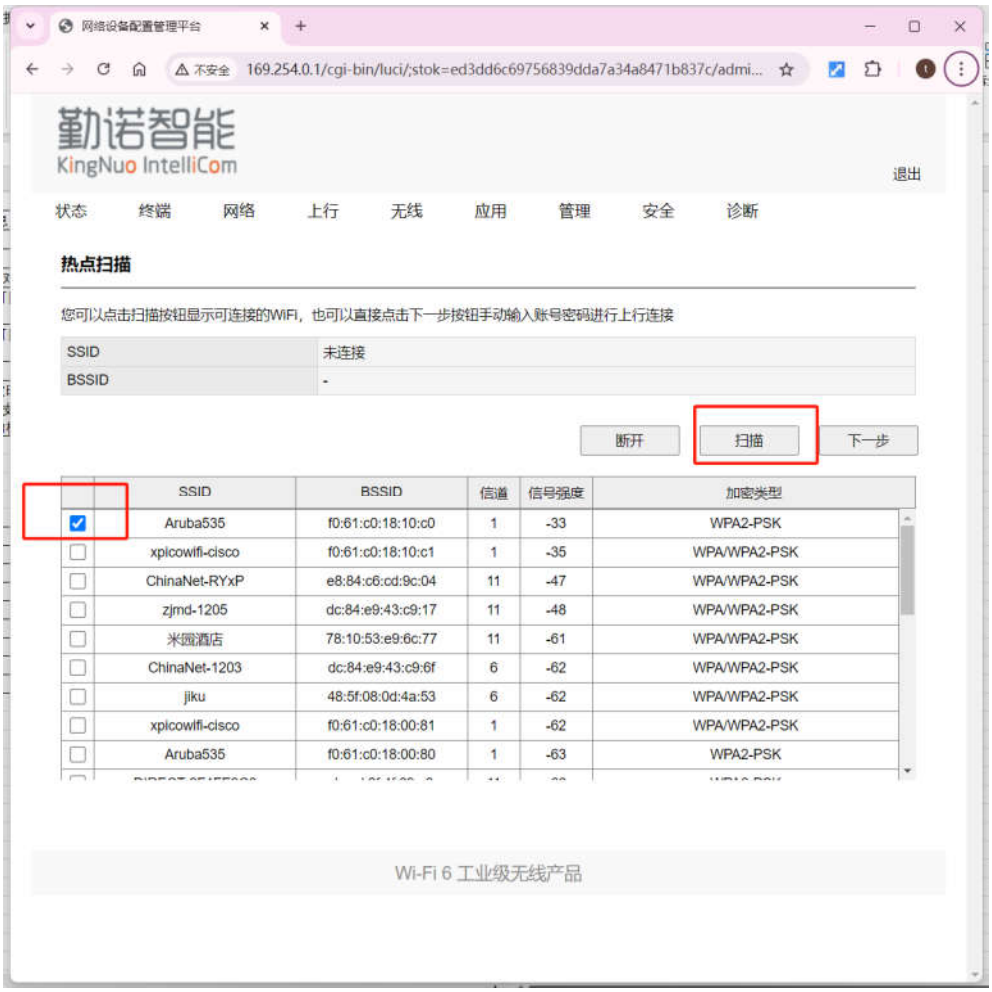
——Click the Scan button, and the information of the wireless AP in the current space

will be refreshed after 3 seconds.

——Select the wireless network you want to connect to

——Click Next to enter the wireless password input box

——Enter the wireless password



For more information about wireless encryption methods, see XPC660-PIE-U CLI-line Configuration Manual

5.4.2 IP Address settings

The XPC660-PIE-U supports both wireless function and NAT mode

When the wireless core board is in the mode, the network port and radio are transparent channels, and there is no need to occupy the IP address resources on the wireless side, so the web page configuration of the XPC660 cannot be accessed through the IP address on the wireless side.

If you need to configure a wireless core board device, you have two options:

——Enable the trunk function

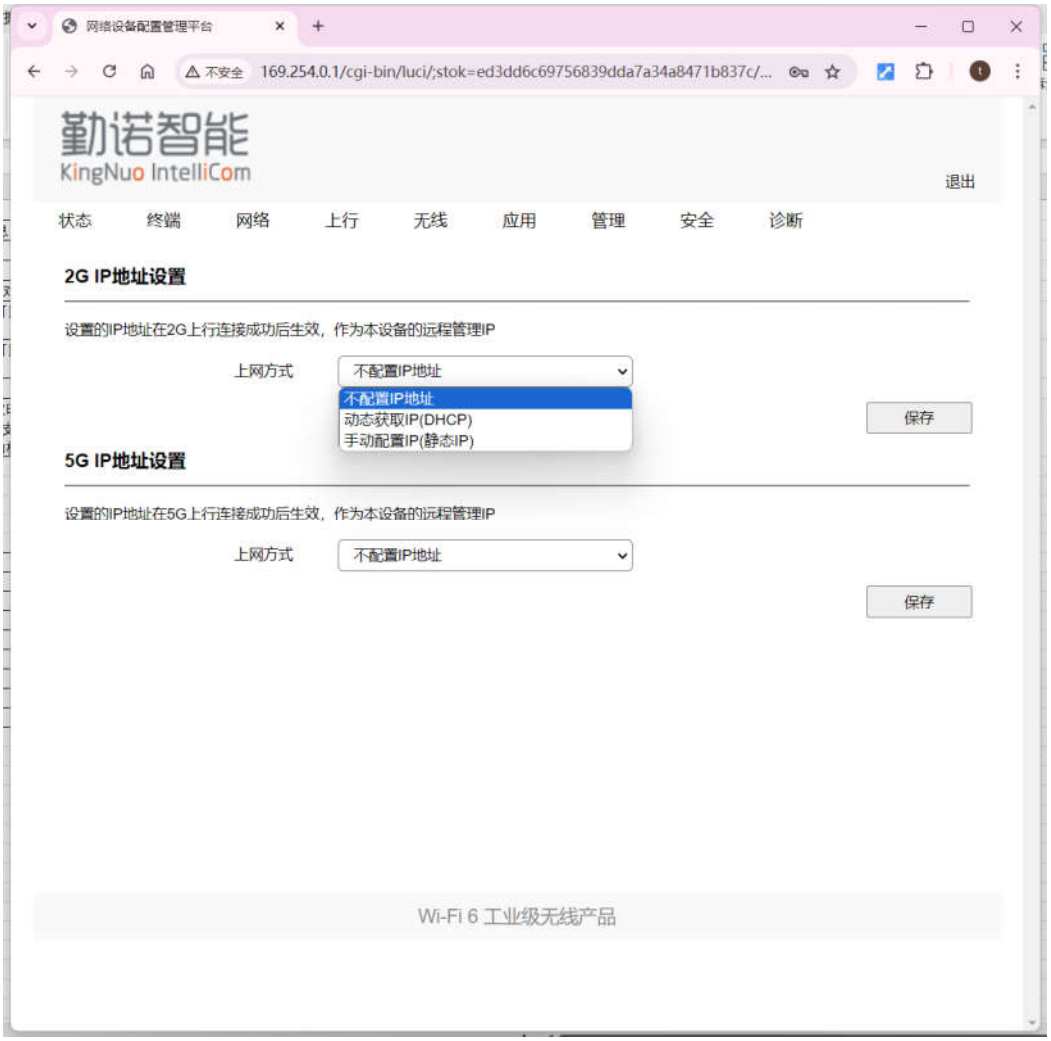
——The interface accesses the default IP address

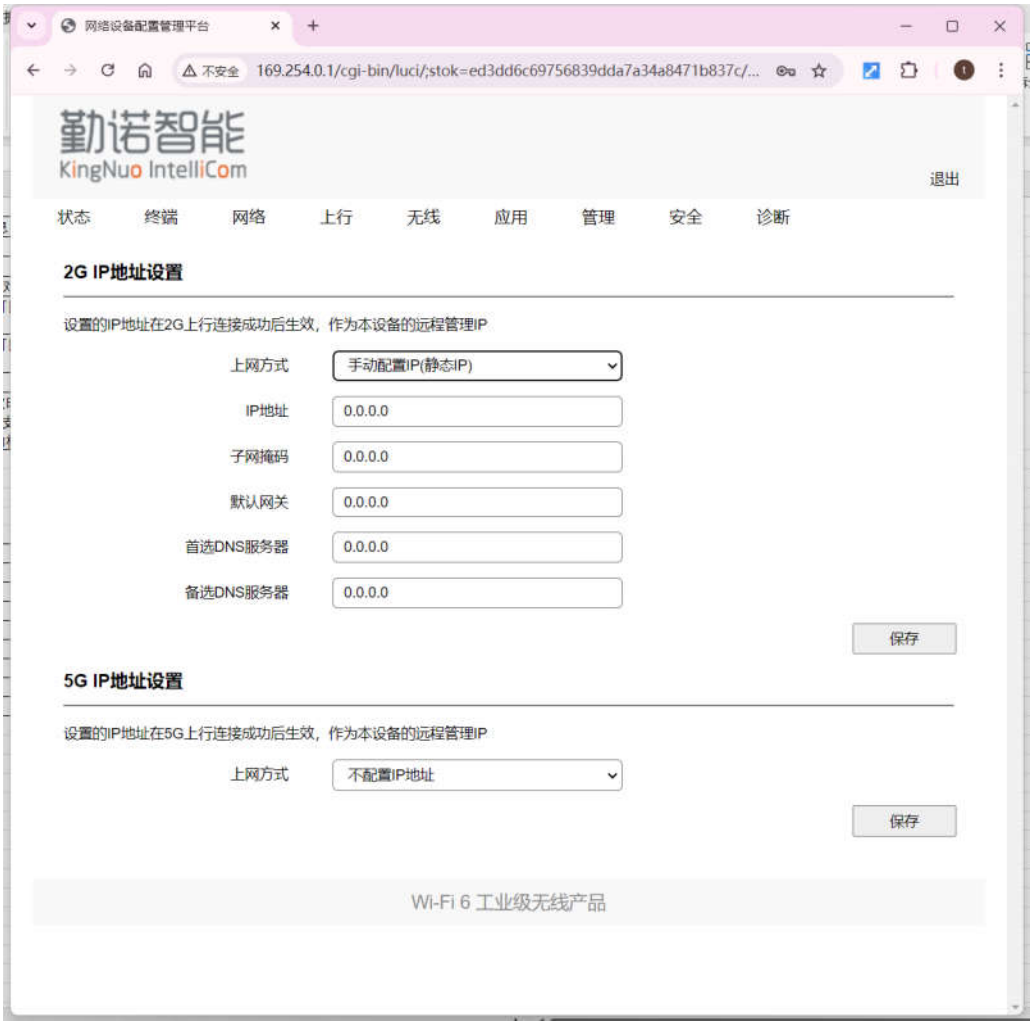
When the wireless core board is in NAT mode, the radio will obtain the IP address from the AP, which can be set on this page.

The wireless core board is 2.4G and 5G are independent RF addresses, so they are set up separately. You need to configure the corresponding configuration based on the frequency of the wireless AP in the field.

——DHCP dynamic acquisition

——Static IP address




网络设备配置管理平台
不安全
169.254.0.1/cgi-bin/luci/;stok=ed3dd6c69756839dda7a34a8471b837c/...
勤诺智能
KingNuo IntelliCom
退出
状态
终端
网络
上行
无线
应用
管理
安全
诊断
2G IP地址设置
设置的IP地址在2G上行连接成功后生效，作为本设备的远程管理IP
上网方式
手动配置IP(静态IP)
IP地址
0.0.0.0
子网掩码
0.0.0.0
默认网关
0.0.0.0
首选DNS服务器
0.0.0.0
备选DNS服务器
0.0.0.0
保存
5G IP地址设置
设置的IP地址在5G上行连接成功后生效，作为本设备的远程管理IP
上网方式
不配置IP地址
保存
Wi-Fi 6 工业级无线产品

5.5 Wireless

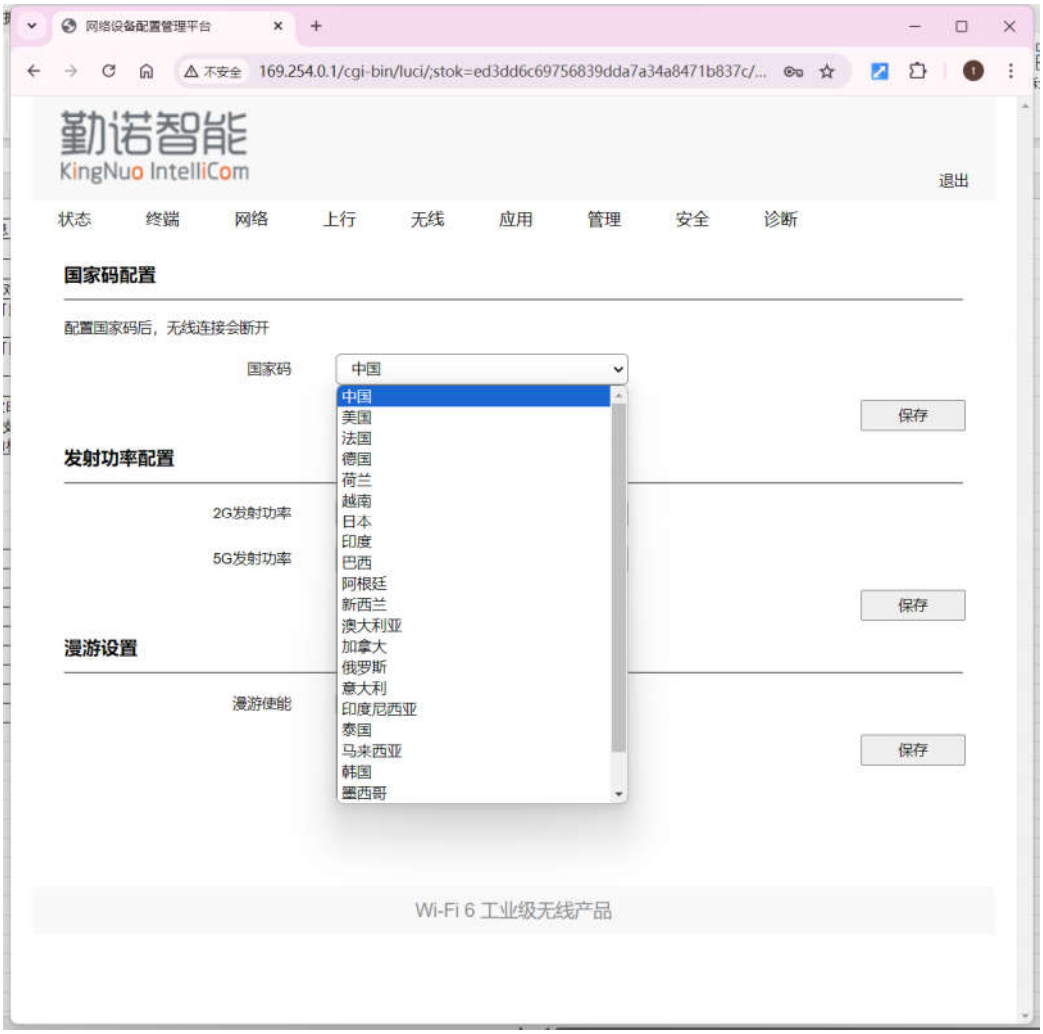
On the wireless settings page, you can modify the country code, RF transmit power, and roaming parameters supported by the terminal.

5.5.1 Country code

Different country codes correspond to different wireless channels, please refer to the following wiki link for details

https://zh.wikipedia.org/wiki/%E6%97%A0%E7%BA%BF%E5%B1%80%E5%9F%9F%E7%BD%91%E4%BF%A1%E9%81%93%E5%88%97%E8%A1%A8

Please note: Please proceed with caution as the wireless connection will be disconnected after changing the country code.



5.5.2 Transmit power settings

You can set the radio frequency transmit power of the wireless core board in the range of 1-25

5.5.3 Wireless roaming settings

The XPC660-PIE-U supports fast wireless roaming and active roaming switching.

Roaming switching principle: The signal strength of the wireless AP currently connected to the wireless core board is compared with the roaming threshold.

If the absolute value of the wireless signal strength of the current connection is greater than the roaming threshold, the core board of the wireless starts the roaming mechanism and scans the surrounding wireless AP models. If it detects that the absolute signal strength of the wireless AP is less than the roaming threshold-roaming difference, roaming switching is performed.

2.4 GHz frequency band threshold: the threshold of roaming handover, the current wireless network meets the handover conditions, this parameter determines the frequency of switching, and the specific parameters need to be modified according to the on-site wireless environment.

2.4 GHz band roaming difference: the threshold value of roaming switching, the signal of the currently connected wireless AP is less than the value, and the roaming handover mechanism needs to be modified according to the on-site wireless environment.

5 GHz frequency band threshold: the threshold of roaming switching, the current wireless network meets the switching conditions, this parameter determines the frequency of switching, and the specific parameters need to be modified according to the on-site wireless environment;

5 GHz band roaming difference: the threshold value of roaming switching, the signal of the currently connected wireless AP is less than the value, and the roaming handover mechanism needs to be modified according to the on-site wireless environment.

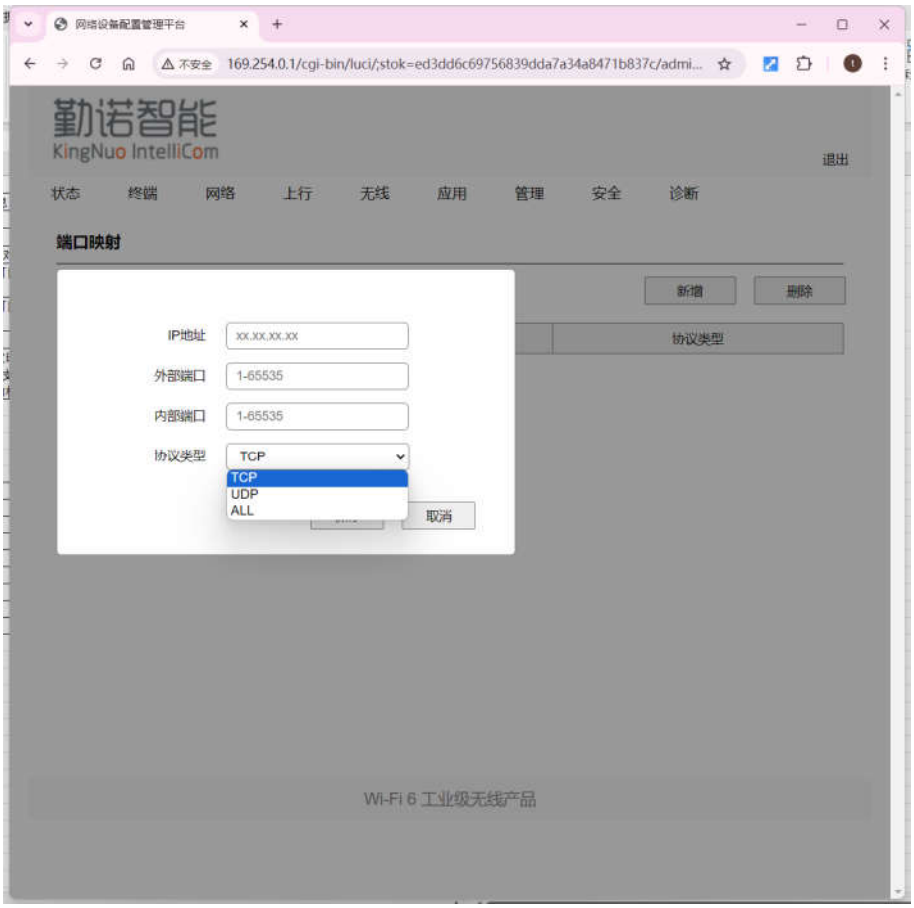
5.6 Apply

This page configures port mapping and clock synchronization。

5.6.1 Port mapping

When NAT is enabled, if you want to access the network port service from the wireless terminal, you need to add the port number of the corresponding service. For details, please refer to NAT Settings.


网络设备配置管理平台
不安全
169.254.0.1/cgi-bin/luci/;stok=ed3dd6c69756839dda7a34a8471b837c/admi...
勤诺智能
KingNuo IntelliCom
退出
状态
终端
网络
上行
无线
应用
管理
安全
诊断
端口映射
新增
删除
协议类型
IP地址
xx.xx.xx.xx
外部端口
1-65535
内部端口
1-65535
协议类型
TCP
保存
取消
Wi-Fi 6 工业级无线产品


网络设备配置管理平台
不安全
169.254.0.1/cgi-bin/luci/;stok=ed3dd6c69756839dda7a34a8471b837c/admi...
勤诺智能
KingNuo IntelliCom
退出
状态
终端
网络
上行
无线
应用
管理
安全
诊断
端口映射
新增
删除
协议类型
IP地址
xx.xx.xx.xx
外部端口
1-65535
内部端口
1-65535
协议类型
TCP
TCP
UDP
ALL
取消
Wi-Fi 6 工业级无线产品

5.6.2 System time

If the wireless core board is connected to the Internet, the time can be automatically calibrated through the NTP service.

If the device is powered back on, the clock saved before the power off will be used as the starting clock.

5.7 Manage

XPC660-PIE-U supports web restart, factory reset, web upgrade, logs everywhere, user addition, and change web login password。

5.7.1 Device management

When the device restarts, the XPC660-PIE-U is powered on and restarts in about 15 seconds, and it takes about 30 seconds to automatically refresh and enter the web page through the web page.

Restore factory settings, tap Restore factory settings, the device will automatically restart, and all parameters will be cleared.

The default IP address for a network port is 169.254.0.1

Default username: root

The password is generally set to root@123

5.7.2 Web page upgrades

If the XPC660-PIE-U fails during the upgrade, you need to export the logs and submit them to the manufacturer's engineer to view the specific failure cause and provide the corresponding solution.

In general, the cause of the failure can be analyzed through logs.

5.7.3 Configure import and export

XPC660-PIE-U支持配置导入导出。

The export format is Json format, and the configuration file can be imported into multiple devices, simplifying the configuration process.

5.7.4 log file

XPC660-PIE-U Support log export。

A maximum of 5,000 lines can be stored in a log file, and the log file is recorded in a loop.

Logging:

———The time node of the device when the device is powered on and off

———Software version number

———The status of the radio association

———The radio disconnection status and the fault code

———Network port connection status

———Roaming status

———Roaming process

———Roaming switching time

5.7.5 User management

You can add a non-admin account for device status detection.


网络设备配置管理平台
不安全
169.254.0.1/cgi-bin/luci/;stok=ed3dd6c69756839dda7a34a8471b837c/admi...
勤诺智能
KingNuo IntelliCom
退出
状态
终端
网络
上行
无线
应用
管理
安全
诊断
修改密码
为当前用户修改密码
旧密码
新密码
确认密码
保存
Wi-Fi 6 工业级无线产品

5.8 Safe


网络设备配置管理平台
不安全
169.254.0.1/cgi-bin/luci/;stok=ed3dd6c69756839dda7a34a8471b837c/admi...
勤诺智能
KingNuo IntelliCom
退出
状态
终端
网络
上行
无线
应用
管理
安全
诊断
防火墙
防火墙是因特网和家庭网络之间的安全屏障。启用防火墙后，因特网和家庭网络之间所有的通信数据都要经过防火墙扫描，可以有效保护您的网络安全。
防火墙使能
保存
Wi-Fi 6 工业级无线产品

5.9 Diagnosis

5.9.1 Ssh

XPC660-PIE-U supports SSH function, you can log in to the device through SSH to complete all configurations and status acquisition, please refer to the XPC660-PIE-U Command Line Configuration Manual for specific operations

5.9.2 diagnosis

If you encounter an anomaly, you can check the logs everywhere on the Diagnostics page.

Diagnostic logs can export all equipment status and surrounding environment information, which helps R&D to conduct a comprehensive analysis of problems.

During the diagnostic export process, the wireless network will be disconnected.

After the diagnostic function is performed, the device needs to be restarted.

Normally, you don't need to perform diagnostic logs frequently.

6、Command-line configuration

The command-line configuration can fully operate the XPC660-PIE-U, view the status, configure parameters, and view logs, so you can quickly modify and configure the network card in batches by mastering the command line, and have the effect of doing twice the result with half the effort.

This manual will describe the specific operation methods in detail, and give the configuration sequence chain and final screenshots of commonly used configuration items, so that engineers can complete individual modifications and configurations through the manual guidance.

Command line configuration needs to be done through Telnet/SSH tools, so engineers need to understand how to use telnet tools in advance.

6.1 sd_call Introduction to commands

The format of the sd_call command is as follows:

Format	sd_call { -r | -w | -rw } { api_name } [varg]
Examples of use	sd_call -rexample sd_call -rexample '{ "char" :"1" }' sd_call -w example '{ "short":"2" , "ip" :"192.168.10.1"}' sd_call -rw example '{ "int" :"3" , "mac":"00:01:02:03:A5:5A"}'

6.2 For more information, please refer to the XPC660-PIE-U CLI Configuration Manual

7、Typical configuration examples

Based on extensive site requirements analysis, the following typical configuration is most commonly used.

8、Contact

If you have any problems in use, you can call the engineer or send a log or diagnostic file by email

Liu ： 13917051151/hliu@kingnuosh.com

OEM/Integrators Installation Manual

Important Notice to OEM integrators

1. This module is limited to OEM installation ONLY.
2. This module is limited to installation in mobile or fixed applications, according to Part 2.1091(b).
3. The separate approval is required for all other operating configurations, including portable configurations with respect to Part 2.1093 and different antenna configurations
4. For FCC Part 15.31 (h) and (k): The host manufacturer is responsible for additional testing to verify compliance as a composite system. When testing the host device for compliance with Part 15 Subpart B, the host manufacturer is required to show compliance with Part 15 Subpart B while the transmitter module(s) are installed and operating. The modules should be transmitting and the evaluation should confirm that the module's intentional emissions are compliant (i.e. fundamental and out of band emissions). The host manufacturer must verify that there are no additional unintentional emissions other than what is permitted in Part 15 Subpart B or emissions are complaint with the transmitter(s) rule(s).

The Grantee will provide guidance to the host manufacturer for Part 15 B requirements if needed.

Important Note

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 to SHANGHAI KINGNUO 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 USI, or the host manufacturer can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application.

End Product Labeling

When the module is installed in the host device, the FCC/IC ID label must be visible through a window on the final device or it must be visible when an access panel, door or cover is easily re-moved. If not, a second label must be placed on the outside of the final device that contains the following text: “Contains FCC ID: 2BNUI-XPC660PIEU”

“Contains IC: “

The FCC ID/IC ID can be used only when all FCC/IC compliance requirements are met.

Antenna Installation

(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.

(3) Only antennas of the same type and with equal or less gains as shown below may be used with this module. Other types of antennas and/or higher gain antennas may require additional authorization for operation.

Antenna type	2.4GHz band Peak Gain (dBi)	5.2GHz band Peak Gain (dBi)	5.3GHz band Peak Gain (dBi)	5.5GHz band Peak Gain (dBi)	5.8GHz band Peak Gain (dBi)
Dipole	2.57dBi	2.75dBi	2.30dBi	2.60dBi	2.02dBi

Unique antenna connector must be used on the Part 15 authorized transmitters used in the host product.

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC/IC authorization is no longer considered valid and the FCC ID/IC ID cannot 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 FCC/IC authorization.

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.

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

This module has been tested and found to comply with part 15.247 and 15.407 requirements for Modular Approval.

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, 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.

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 licence-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.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:
(1) l'appareil ne doit pas produire de brouillage, et
(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement."

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.

Déclaration d'exposition aux radiations:

Cet équipement est conforme aux limites d'exposition aux rayonnements ISED établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

RSS-247 Section 6.4 (5) (6) (for local area network devices, 5GHz)

The device could automatically discontinue transmission in case of absence of information to transmit, or operational failure. Note that this is not intended to prohibit transmission of control or signaling information or the use of repetitive codes where required by the technology.

The device for operation in the band 5150–5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems;
The maximum antenna gain permitted for devices in the bands 5250–5350 MHz and 5470–5725 MHz shall comply with the e.i.r.p. limit; and
The maximum antenna gain permitted for devices in the band 5725–5825 MHz shall comply with the e.i.r.p. limits specified for point-to-point and non point-to-point operation as appropriate.

L'appareil peut interrompre automatiquement la transmission en cas d'absence d'informations à transmettre ou de panne opérationnelle. Notez que ceci n'est pas destiné à interdire la transmission

d'informations de contrôle ou de signalisation ou l'utilisation de codes répétitifs lorsque cela est requis par la technologie.

Le dispositif utilisé dans la bande 5150-5250 MHz est réservé à une utilisation en intérieur afin de réduire le risque de brouillage préjudiciable aux systèmes mobiles par satellite dans le même canal;
Le gain d'antenne maximal autorisé pour les dispositifs dans les bandes 5250-5350 MHz et 5470-5725 MHz doit être conforme à la norme e.r.p. limite; et
Le gain d'antenne maximal autorisé pour les appareils de la bande 5725-5825 MHz doit être conforme à la norme e.i.r.p. les limites spécifiées pour un fonctionnement point à point et non point à point, selon le cas.

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.

Cet appareil est conçu uniquement pour les intégrateurs OEM dans les conditions suivantes: (Pour utilisation de dispositif module)

1) L'antenne doit être installée de telle sorte qu'une distance de 20 cm est respectée entre l'antenne et les utilisateurs, et
2) Le module émetteur peut ne pas être coïmplanté avec un autre émetteur ou antenne.

Tant que les 2 conditions ci-dessus sont remplies, des essais supplémentaires sur l'émetteur ne seront pas nécessaires. Toutefois, l'intégrateur OEM est toujours responsable des essais sur son produit final pour toutes exigences de conformité supplémentaires requis pour ce module installé.

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.

NOTE IMPORTANTE:

Dans le cas où ces conditions ne peuvent être satisfaites (par exemple pour certaines configurations d'ordinateur portable ou de certaines co-localisation avec un autre émetteur), l'autorisation du Canada n'est plus considéré comme valide et l'ID IC ne peut pas être utilisé sur le produit final. Dans ces circonstances, l'intégrateur OEM sera chargé de réévaluer le produit final (y compris l'émetteur) et l'obtention d'une autorisation distincte au Canada.

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:XXXX”.

Plaque signalétique du produit final

Ce module émetteur est autorisé uniquement pour une utilisation dans un dispositif où l'antenne peut être installée de telle sorte qu'une distance de 20cm peut être maintenue entre l'antenne et les utilisateurs. Le produit final doit être étiqueté dans un endroit visible avec l'inscription suivante: "Contient des IC: XXXX ".

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.

Manuel d'information à l'utilisateur final

L'intégrateur OEM doit être conscient de ne pas fournir des informations à l'utilisateur final quant à la façon d'installer ou de supprimer ce module RF dans le manuel de l'utilisateur du produit final qui intègre ce module.

Le manuel de l'utilisateur final doit inclure toutes les informations réglementaires requises et avertissements comme indiqué dans ce manuel.