

## 4 Frequently Asked Questions (FAQ)

### 4.1 What and how to find my PC's IP and MAC address?

IP address is the identifier for a computer or device on a TCP/IP network. Networks using the TCP/IP protocol route messages based on the IP address of the destination. The format of an IP address is a 32-bit numeric address written as four numbers separated by periods. Each number can be zero to 255. For example, 191.168.1.254 could be an IP address.

The MAC (Media Access Control) address is your computer's unique hardware number. (On an Ethernet LAN, it's the same as your Ethernet address.) When you're connected to the Internet from your computer (or host as the Internet protocol thinks of it), a correspondence table relates your IP address to your computer's physical (MAC) address on the LAN.

To find your PC's IP and MAC address,

- ✓ Open the Command program in the Microsoft Windows.
  - ✓ Type in *ipconfig /all* then press the *Enter* button.
- Your PC's IP address is the one entitled IP Address and your PC's MAC address is the one entitled Physical Address.

### 4.2 What is Wireless LAN?

A wireless LAN (WLAN) is a network that allows access to Internet without the need for any wired connections to the user's machine.

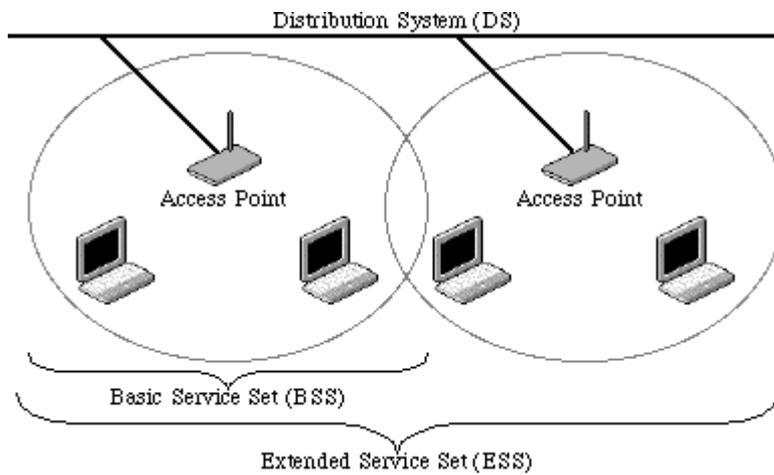
### 4.3 What are ISM bands?

ISM stands for Industrial, Scientific and Medical; radio frequency bands that the Federal Communications Commission (FCC) authorized for wireless LANs. The ISM bands are located at 915 +/- 13 MHz, 2450 +/- 50 MHz and 5800 +/- 75 MHz.

### 4.4 How does wireless networking work?

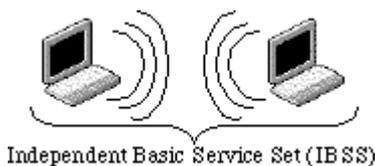
The 802.11 standard define two modes: infrastructure mode and ad hoc mode. In infrastructure mode, the wireless network consists of at least one access point connected to the wired network infrastructure and a set of wireless end stations. This configuration is called a Basic Service Set (BSS). An Extended Service Set (ESS) is a set of two or more BSSs forming a single subnetwork. Since most corporate WLANs require access

to the wired LAN for services (file servers, printers, Internet links) they will operate in infrastructure mode.



Example 1: wireless Infrastructure Mode

Ad hoc mode (also called peer-to-peer mode or an Independent Basic Service Set, or IBSS) is simply a set of 802.11 wireless stations that communicate directly with one another without using an access point or any connection to a wired network. This mode is useful for quickly and easily setting up a wireless network anywhere that a wireless infrastructure does not exist or is not required for services, such as a hotel room, convention center, or airport, or where access to the wired network is barred (such as for consultants at a client site).



Example 2: wireless Ad Hoc Mode

#### 4.5 What is BSSID?

A six-byte address that distinguishes a particular a particular access point from others. Also know as just SSID. Serves as a network ID or name.

#### 4.6 What is ESSID?

The Extended Service Set ID (ESSID) is the name of the network you want to access. It is used to identify different wireless networks.

#### 4.7 What are potential factors that may causes interference?

Factors of interference:

- Obstacles: walls, ceilings, furniture... etc.
- Building Materials: metal door, aluminum studs.
- Electrical devices: microwaves, monitors and electrical motors.

Solutions to overcome the interferences:

- ✓ Minimizing the number of walls and ceilings.
- ✓ Position the WLAN antenna for best reception.
- ✓ Keep WLAN devices away from other electrical devices, eg: microwaves, monitors, electric motors, ... etc.
- ✓ Add additional WLAN Access Points if necessary.

#### 4.8 What are the Open System and Shared Key authentications?

IEEE 802.11 supports two subtypes of network authentication services: open system and shared key. Under open system authentication, any wireless station can request authentication. The station that needs to authenticate with another wireless station sends an authentication management frame that contains the identity of the sending station. The receiving station then returns a frame that indicates whether it recognizes the sending station. Under shared key authentication, each wireless station is assumed to have received a secret shared key over a secure channel that is independent from the 802.11 wireless network communications channel.

#### 4.9 What is WEP?

An optional IEEE 802.11 function that offers frame transmission privacy similar to a wired network. The Wired Equivalent Privacy generates secret shared encryption keys that both source and destination stations can use to alert frame bits to avoid disclosure to eavesdroppers.

WEP relies on a secret key that is shared between a mobile station (e.g. a laptop with a wireless Ethernet card) and an access point (i.e. a base station). The secret key is used to encrypt packets before they are transmitted, and an integrity check is used to ensure that packets are not modified in transit.

#### 4.10 What is Fragment Threshold?

The proposed protocol uses the frame fragmentation mechanism defined in IEEE 802.11 to achieve parallel transmissions. A large data frame is fragmented into several

fragments each of size equal to fragment threshold. By tuning the fragment threshold value, we can get varying fragment sizes. The determination of an efficient fragment threshold is an important issue in this scheme. If the fragment threshold is small, the overlap part of the master and parallel transmissions is large. This means the spatial reuse ratio of parallel transmissions is high. In contrast, with a large fragment threshold, the overlap is small and the spatial reuse ratio is low. However high fragment threshold leads to low fragment overhead. Hence there is a trade-off between spatial re-use and fragment overhead.

Fragment threshold is the maximum packet size used for fragmentation. Packets larger than the size programmed in this field will be fragmented.

If you find that your corrupted packets or asymmetric packet reception (all send packets, for example). You may want to try lowering your fragmentation threshold. This will cause packets to be broken into smaller fragments. These small fragments, if corrupted, can be resent faster than a larger fragment. Fragmentation increases overhead, so you'll want to keep this value as close to the maximum value as possible.

#### 4.11 What is RTS (Request To Send) Threshold?

The RTS threshold is the packet size at which packet transmission is governed by the RTS/CTS transaction. The IEEE 802.11-1997 standard allows for short packets to be transmitted without RTS/CTS transactions. Each station can have a different RTS threshold. RTS/CTS is used when the data packet size exceeds the defined RTS threshold. With the CSMA/CA transmission mechanism, the transmitting station sends out an RTS packet to the receiving station, and waits for the receiving station to send back a CTS (Clear to Send) packet before sending the actual packet data.

This setting is useful for networks with many clients. With many clients, and a high network load, there will be many more collisions. By lowering the RTS threshold, there may be fewer collisions, and performance should improve. Basically, with a faster RTS threshold, the system can recover from problems faster. RTS packets consume valuable bandwidth, however, so setting this value too low will limit performance.

#### 4.12 What is Beacon Interval?

In addition to data frames that carry information from higher layers, 802.11 includes management and control frames that support data transfer. The beacon frame, which is a type of management frame, provides the "heartbeat" of a wireless LAN, enabling

stations to establish and maintain communications in an orderly fashion.

Beacon Interval represents the amount of time between beacon transmissions. Before a station enters power save mode, the station needs the beacon interval to know when to wake up to receive the beacon (and learn whether there are buffered frames at the access point).

#### 4.13 What is Preamble Type?

There are two preamble types defined in IEEE 802.11 specification. A long preamble basically gives the decoder more time to process the preamble. All 802.11 devices support a long preamble. The short preamble is designed to improve efficiency (for example, for VoIP systems). The difference between the two is in the Synchronization field. The long preamble is 128 bits, and the short is 56 bits.

#### 4.14 What is SSID Broadcast?

Broadcast of SSID is done in access points by the beacon. This announces your access point (including various bits of information about it) to the wireless world around it. By disabling that feature, the SSID configured in the client must match the SSID of the access point.

Some wireless devices don't work properly if SSID isn't broadcast (for example the D-link DWL-120 USB 802.11b adapter). Generally if your client hardware supports operation with SSID disabled, it's not a bad idea to run that way to enhance network security. However it's no replacement for WEP, MAC filtering or other protections.

## 5 Configuration Examples

### 5.1 Example One – PPPoE on the WAN

Sales division of Company ABC likes to establish a WLAN network to support mobile communication on sales' Notebook PCs. MIS engineer collects information and plans the WLAN Broadband Router implementation by the following configuration.

*WAN configuration:*

*PPPoE*

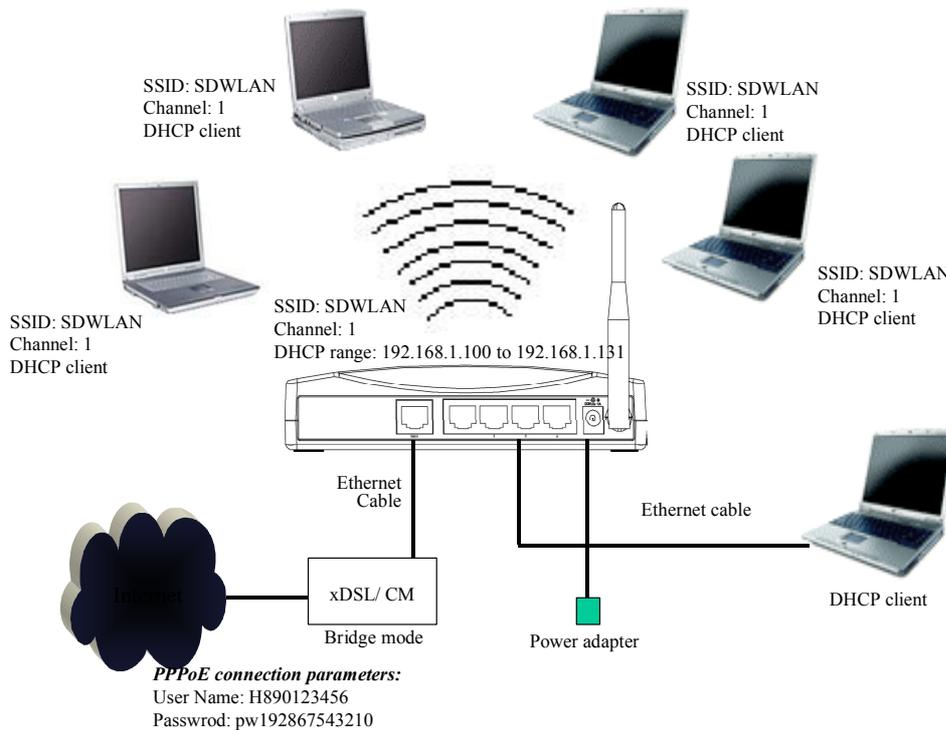
<i>User Name</i>	<b>H890123456</b>
<i>Password</i>	<b>PW192867543210</b>

*LAN configuration*

<i>IP Address</i>	<b>192.168.1.254</b>
<i>Subnet Mask</i>	<b>255.255.255.0</b>
<i>Default Gateway</i>	<b>0.0.0.0</b>
<i>DHCP Client Range</i>	<b>192.168.1.100 – 192.168.1.131</b>

*WLAN configuration*

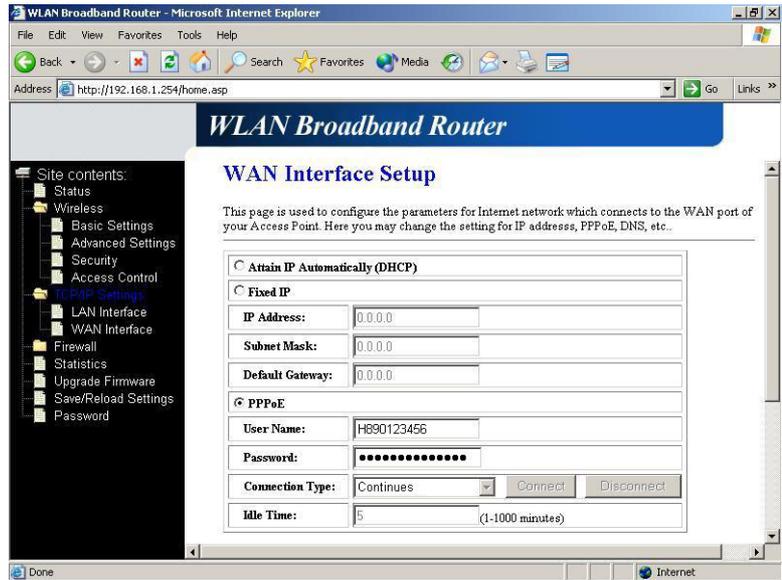
<i>SSID</i>	<b>SDWLAN</b>
<i>Channel Number</i>	<b>1</b>

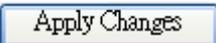


**Figure 3 – Configuration Example One – PPPoE on the WAN**

**Configure the WAN interface:**

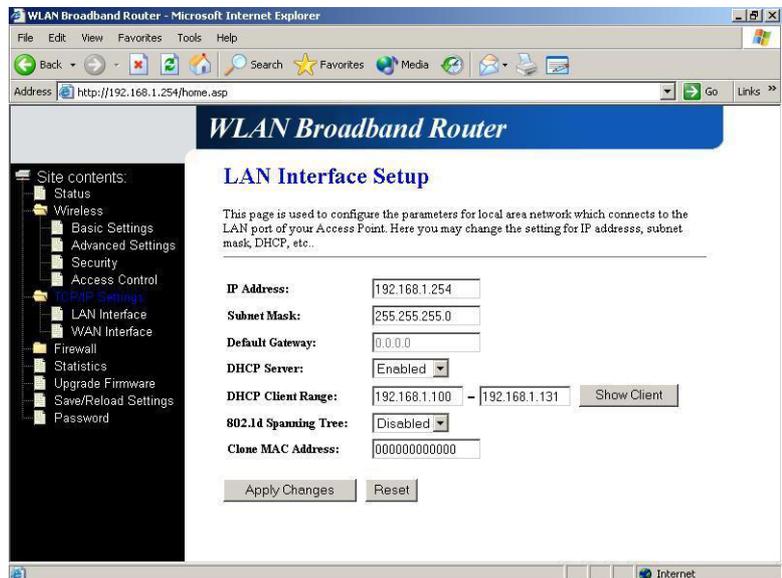
Open WAN Interface Setup page, select PPPoE then enter the User Name “H890123456” and Password “PW192867543210”, the password is encrypted to display on the screen.

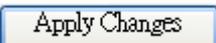


Press  button to confirm the configuration setting.

**Configure the LAN interface:**

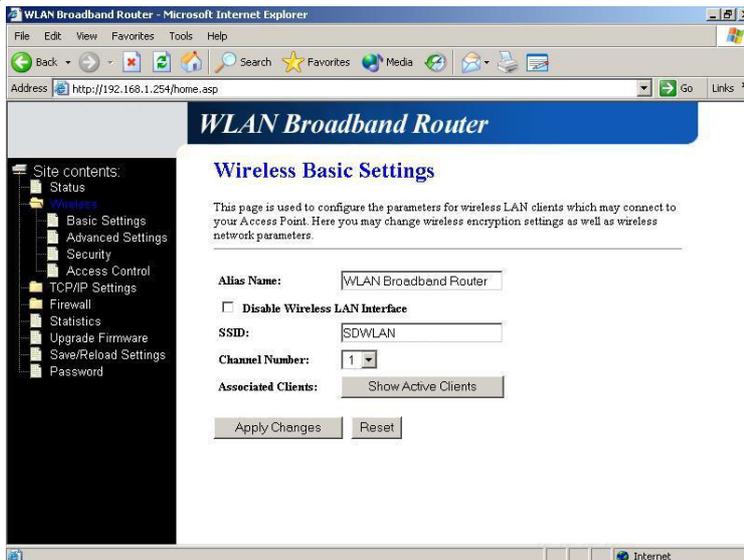
Open LAN Interface Setup page, enter the IP Address “192.168.1.254”, Subnet Mask “255.255.255.0”, Default Gateway “0.0.0.0”, enable DHCP Server, DHCP client range “192.168.1.100” to “192.168.1.131”.

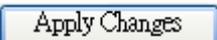


Press  button to confirm the configuration setting.

**Configure the WLAN interface:**

Open WLAN Interface Setup page, enter the SSID "SDWLAN", Channel Number "1".



Press  button to confirm the configuration setting.

### 5.2 Example Two – Fixed IP on the WAN

Company ABC likes to establish a WLAN network to support mobile communication on all employees' Notebook PCs. MIS engineer collects information and plans the WLAN Broadband Router implementation by the following configuration.

*WAN configuration:*

*Fixed IP*

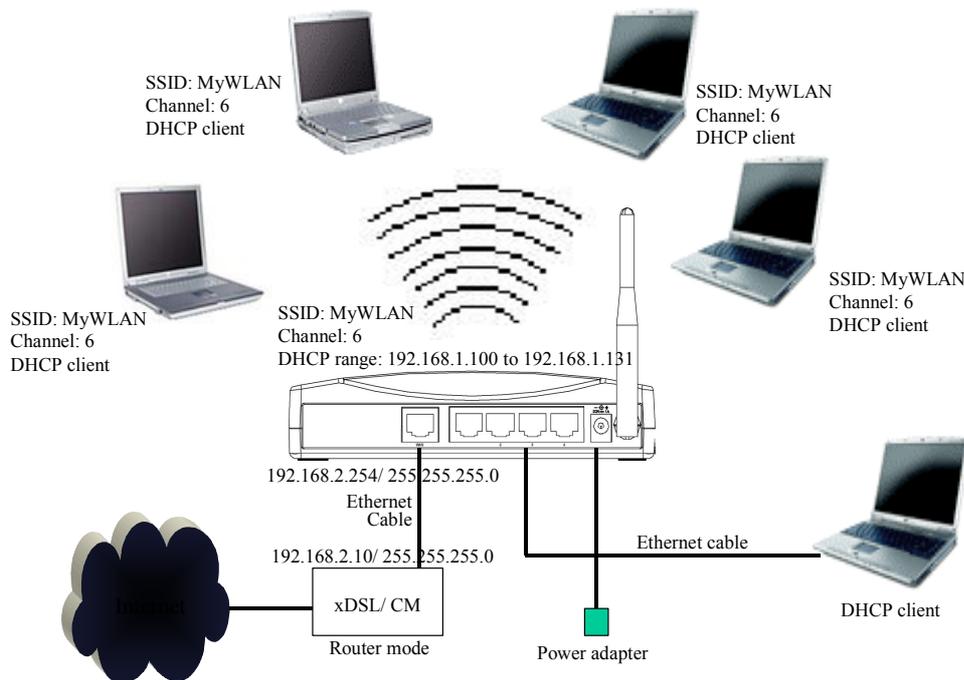
<i>IP Address</i>	<b>192.168.2.254</b>
<i>Subnet Mask</i>	<b>255.255.255.0</b>
<i>Default Gateway</i>	<b>192.168.2.10</b>
<i>DNS Address</i>	<b>168.95.1.1</b>

*LAN configuration*

<i>IP Address</i>	<b>192.168.1.254</b>
<i>Subnet Mask</i>	<b>255.255.255.0</b>
<i>Default Gateway</i>	<b>192.168.2.254</b>
<i>DHCP Client Range</i>	<b>192.168.1.100 – 192.168.1.131</b>

*WLAN configuration*

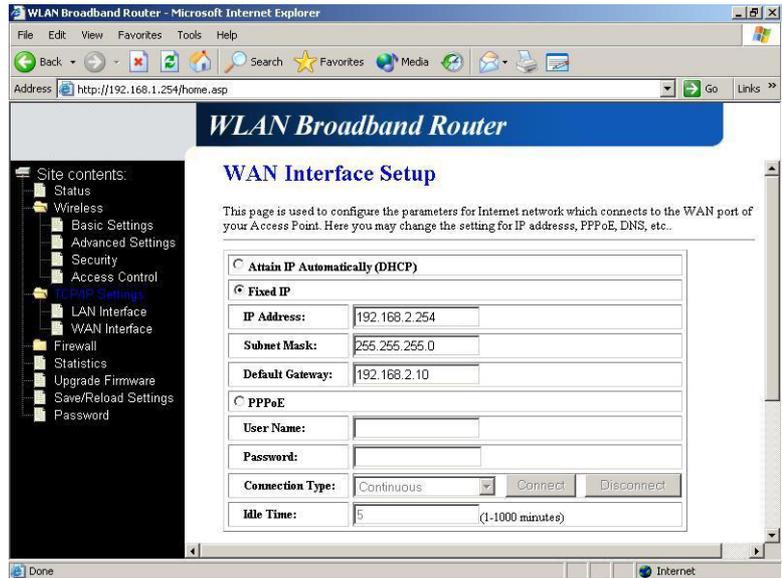
<i>SSID</i>	<b>MyWLAN</b>
<i>Channel Number</i>	<b>6</b>

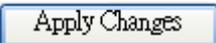


**Figure 4 – Configuration Example Two – Fixed IP on the WAN**

**Configure the WAN interface:**

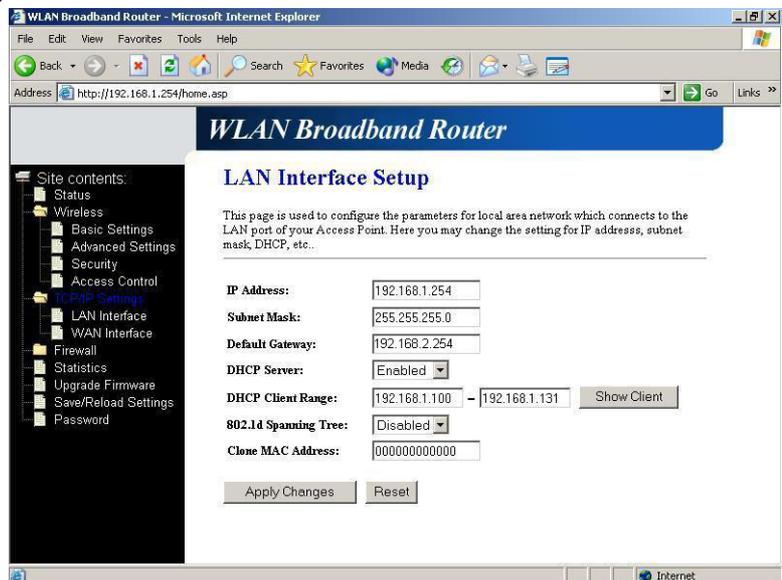
Open WAN Interface Setup page, select Fixed IP then enter IP Address “192.168.2.254”, subnet mask “255.255.255.0”, Default gateway “192.168.2.10”.

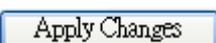


Press  button to confirm the configuration setting.

**Configure the LAN interface:**

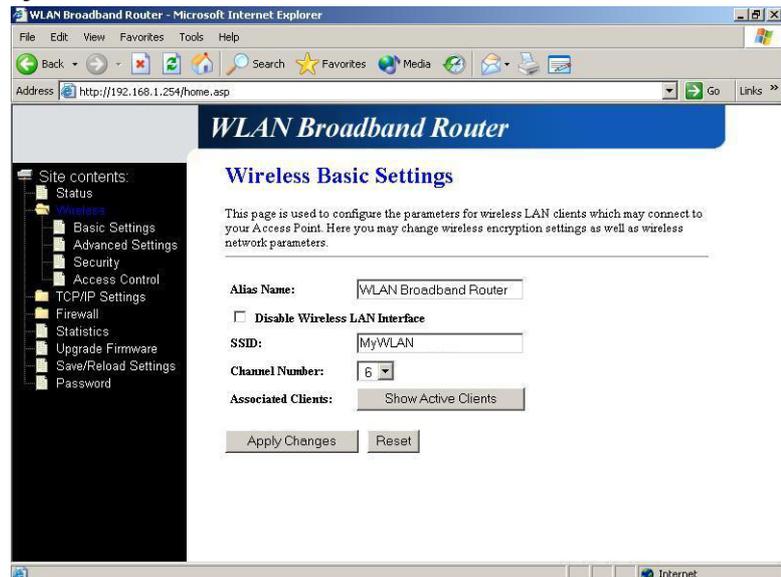
Open LAN Interface Setup page, enter the IP Address “192.168.1.254”, Subnet Mask “255.255.255.0”, Default Gateway “192.168.2.254”, enable DHCP Server, DHCP client range “192.168.1.100” to “192.168.1.131”.



Press  button to confirm the configuration setting.

**Configure the WLAN interface:**

Open WLAN Interface Setup page, enter the SSID "MyWLAN", Channel Number "6".



Press  button to confirm the configuration setting.