# WLAN Outdoor Bridge

# User Manual

Version 1.0

# Table of Contents

# Preface

This guide is for the networking professional who installs and manages the outdoor product hereafter referred to as the “device”. To use this guide, you should have experience working with the TCP/IP configuration and be familiar with the concepts and terminology of wireless local area networks.

# Certification Declaration

## FCC Radiation Norm

### Federal Communication Commission Interference Statement

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.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

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 transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

IMPORTANT NOTE: FCC Radiation Exposure Statement: This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna shall not be less than 20cm (8 inches) during normal.

# CE Radiation Norm

This equipment has been tested and found to comply with the limits of the European Council Directive 99/5/EC on the approximation of the law of the member states relating to EN 300 328, EN 301 489-1, EN 301 489-17 and EN60950.

# FCC & CE Compliance Statement

These limits are designed to provide reasonable protection against radio interference in a residential environment. This equipment can generates, uses and 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 is found by turning the equipment ON and OFF, the user is encouraged to try to reduce the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and the receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connect to
- Consult a dealer or an experienced technician for assistance

# CAUTION!

The Federal Communication Commission warns the user that changes or modifications to the unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

# 1. Outdoor AP Installation

## Packing List

Before you start to install the ODU, make sure the package contains the following items：

- Wireless Outdoor Bridge unit * 1
- Mounting Kit * 1
- Waterproof (IP67) RJ-45 Cable (30M) * 1
- Waterproof (IP66) RF Cable (1M) * 1
- Power Over Ethernet Kit * 1
- Ground Wire * 1
- 2.5” /4” U bolts * 2 and Anchor * 4
- 6 dBi omni directional antenna * 1 (separated package)
- RJ-45 Cable (1.5M) * 1

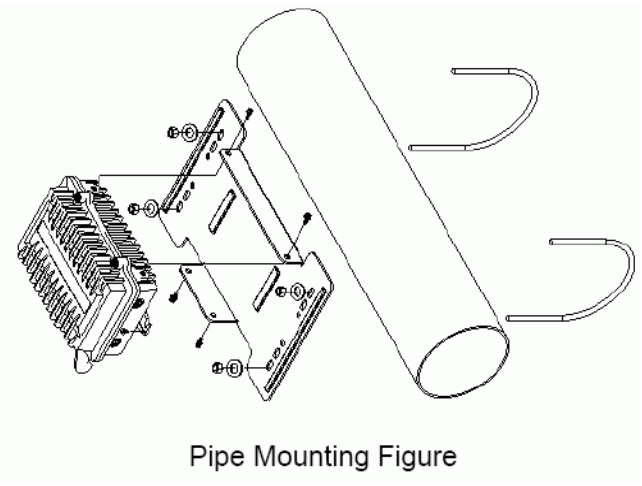
# Hardware Installation

Once you check off everything from the package, you can start to install the ODU. You can mount to a pipe, a pole or to the side of a building. The steps are showed in the following：

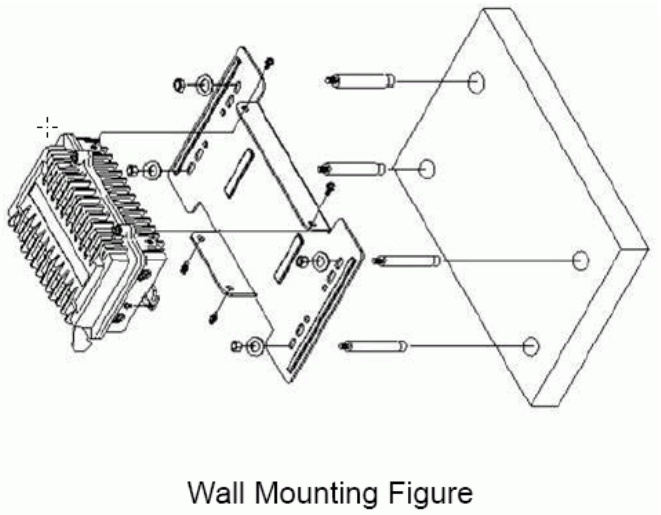
1. You must mount the ODU into the bracket first.

**Note: ALL the 4 screws had been tightened onto the ODU and Bracket**

2. You can use the 2 or 4 inches U bolt to mount on the pipe, depending on the radius of the pipe. (Wall mounting is referred to Wall Mounting Figure) The two U bolts must be mounted tightly. Be aware of not over-tight the U bolt.

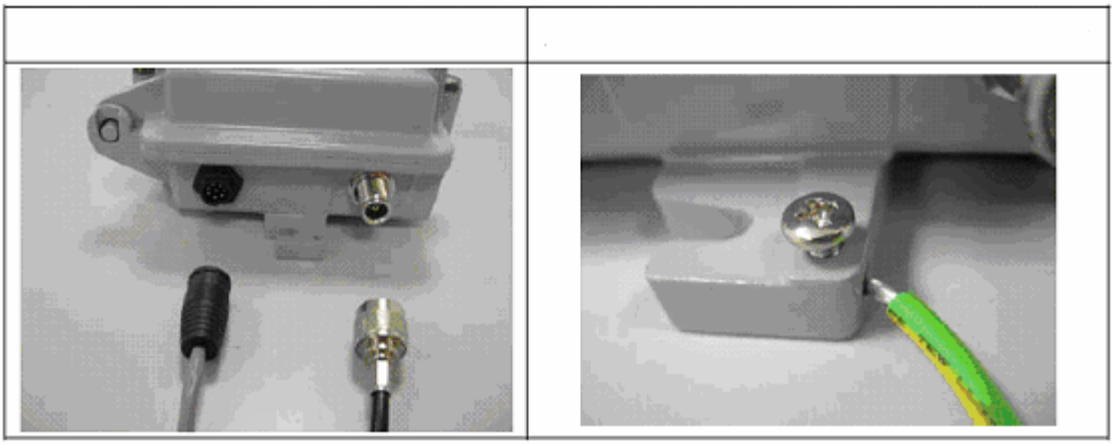


Pipe Mounting Figure

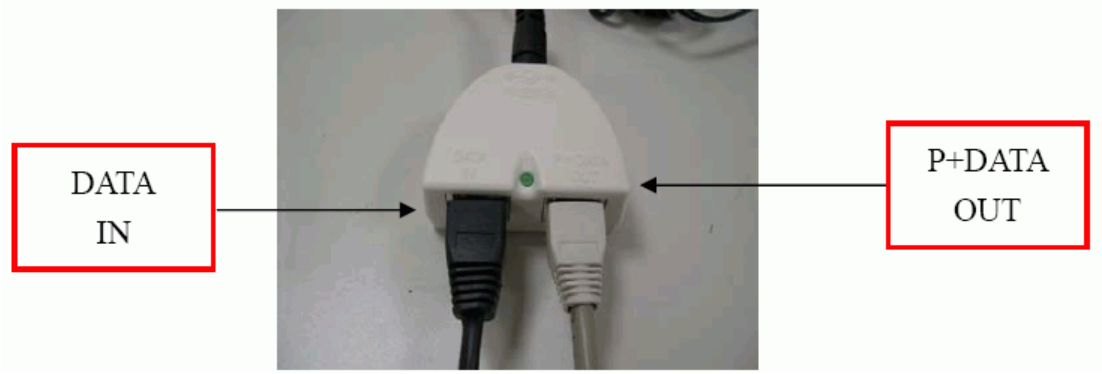


Wall Mounting Figure

3.. After checking the ODU is mounted well, you can connect the following two cables: the Waterproof RJ-45 network cable to “P+ DATA OUT” port of ODU and the RF cable to antenna port. Additional waterproof tool, such as waterproof tape, is recommended to use to enhance the waterproof function. It is suggested to have a lightening protector between antenna and antenna port. Connecting the ground wire as the figure of “ODU ground wire connection.”



4. Plug the other end of the waterproof RJ-45 cable to the PoE device. The PoE device is guaranteed only in indoor environment.



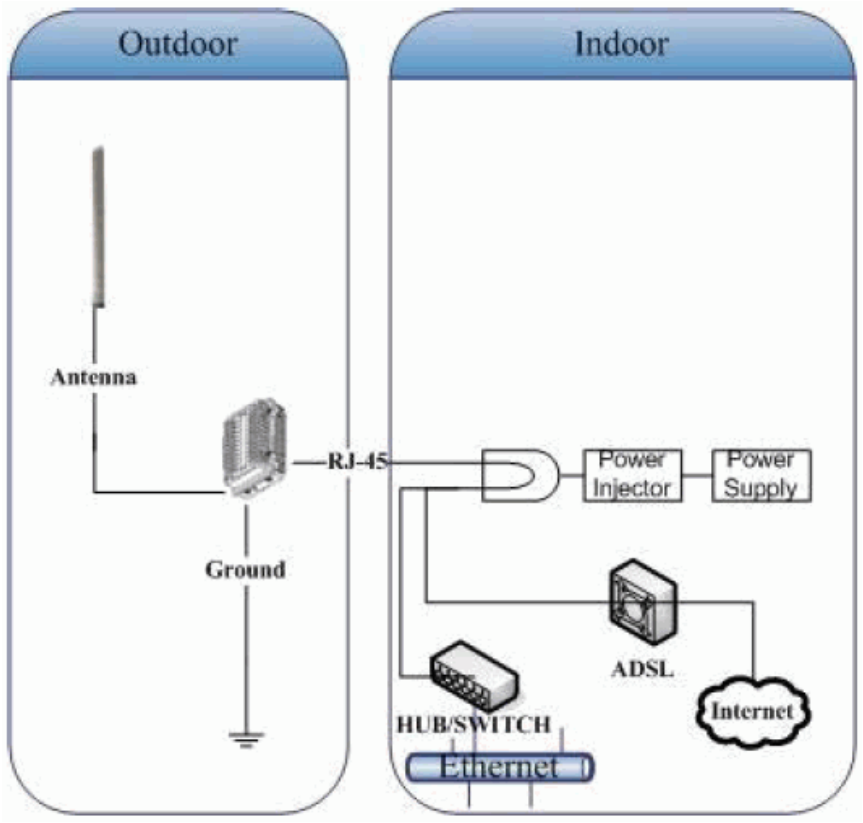

**Caution: DON’T plug the power cord into PoE device before you finish install the antenna and Ground wire to ensure the safety.**

If the RJ-45 cable’s length is not long enough to connect to your network
device for indoor parts installation, you can extend the cable length. However, make sure the maximum length of the RJ-45 cable is shorter than
100M (about 109 yards) for normal operation under IEEE 802.3 standards. When you plug the regular RJ-45 cable into the PoE device, you should use the regular RJ-45 cable to plug into the “DATA IN” of “Power Over Ethernet Kit” to connect to hub/switch or use the crosslink RJ-45 cable (Not included in the Packing List) to connect with user’s PC

The waterproof RJ-45 cable must be connected to the “P+DATA OUT” port.

**Caution:Be careful! Don't plug the two cables inversely. It will damage the devices**

We recommend you refer to the following illustration as a guideline for hardware installation.



# 2. First Time Configuration

## Before Start to Configure

There are two ways to configure the device, one is through web-browser, and the other is through Secure Shell CLI interface. To access the configuration interfaces, make sure you are using a computer connected to the same network as the device. The default IP address of the device is

192.168.2.254, and the subnet-mask is 255.255.255.0.

The device has three operation modes (Router/Bridge/WISP). In bridge mode, also known as AP Client, you can access the device by both WLAN (Wireless Local Area Network) and wired LAN. And in router/WISP modes, the device can be accessed by both WLAN and WAN. The default IP addresses for the device are 192.168.2.254(for LAN), 172.1.1.1(for WAN), so you need to make sure the IP address of your PC is in the same subnet as the device, such as 192.168.2.X (for LAN), 172.1.1.X (for WAN).

Please note that the DHCP server inside the device is default to up and running. Do not have multiple DHCP servers in your network environment, otherwise it will cause abnormal situation.

We also provide an auto-discovery tool which is for finding out the IP of the device. In case, you've forgot the IP of the device or the IP of the device has been changed, you can use the tool to find out the IP of the device even your PC is not in the same subnet as the device is.

Knowing the Network Application

OUTDOOR AP can act as the following roles, and it supports WDS (Wireless Distribution System) function.

- Access Point
- WDS (Wireless Repeater)
- Bridge/Router
- WISP
- AP Client

The device provides 3 different operation modes and the wireless radio of device can act as AP/Client/WDS. The operation mode is about the communication mechanism between the wired Ethernet NIC and wireless NIC, the following is the types of operation mode.

### Router

The wired Ethernet (WAN) port is used to connect with ADSL/Cable modem and the wireless NIC is used for your private WLAN. The NAT is existed between the 2
NIC and all the wireless clients share the same public IP address through the WAN port to ISP. The default IP configuration for WAN port is static IP. You can access the web server of device through the default WAN IP address 172.1.1.1 and modify the setting base on your ISP requirement.

### Bridge

The wired Ethernet and wireless NIC are bridged together. Once the mode is selected, all the WAN related functions will be disabled.

### WISP (Wireless ISP)

This mode can let you access the AP of your wireless ISP and share the same public IP address form your ISP to the PCs connecting with the wired Ethernet port of the device. To use this mode, first you must set the wireless radio to be client mode and connect to the AP of your ISP then you can configure the WAN IP configuration to meet your ISP requirement.

The wireless radio of the device acts as the following roles.

### AP (Access Point)

he wireless radio of device serves as communications “hub” for wireless clients and provides a connection to a wired LAN.

### AP Client

This mode provides the capability to connect with the other AP using infrastructure/Ad-hoc networking types. With bridge operation mode, you can directly connect the wired Ethernet port to your PC and the device becomes a wireless adapter. And with WISP operation mode, you can connect the wired Ethernet port to a hub/switch and all the PCs connecting with hub/switch can share the same public IP address from your ISP.

### WDS (Wireless Distribution System)

This mode serves as a wireless repeater; the device forwards the packets to another AP with WDS function. When this mode is selected, all the wireless clients can’t survey and connect to the device. The device only allows the WDS connection.

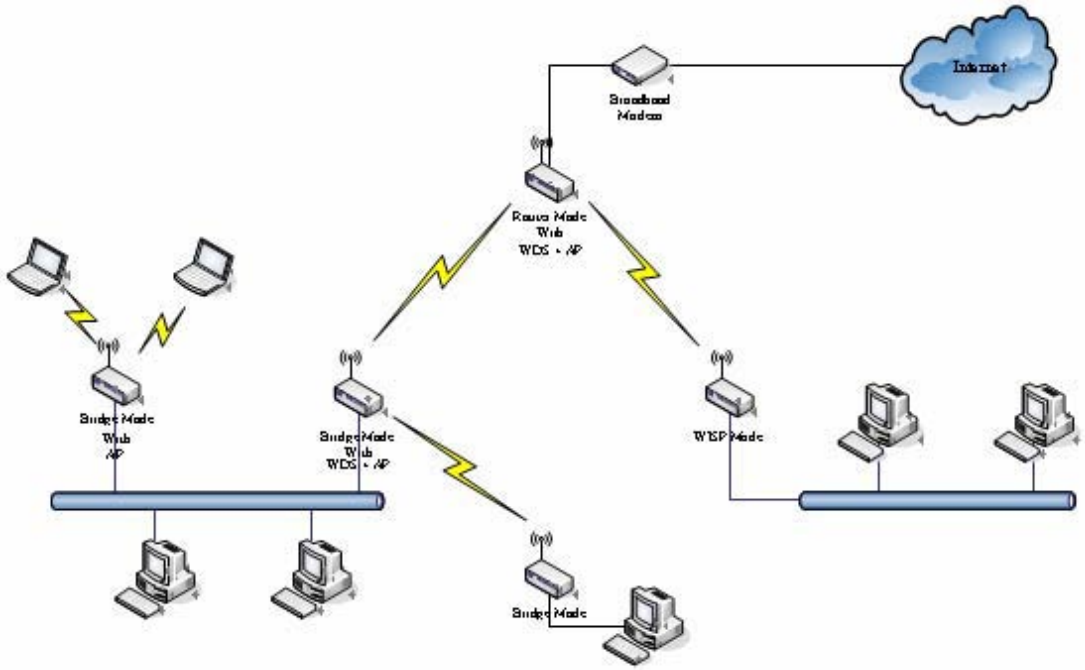
**WDS+AP**

This mode combines WDS plus AP modes, it not only allows WDS connections but also the wireless clients can survey and connect to the device.

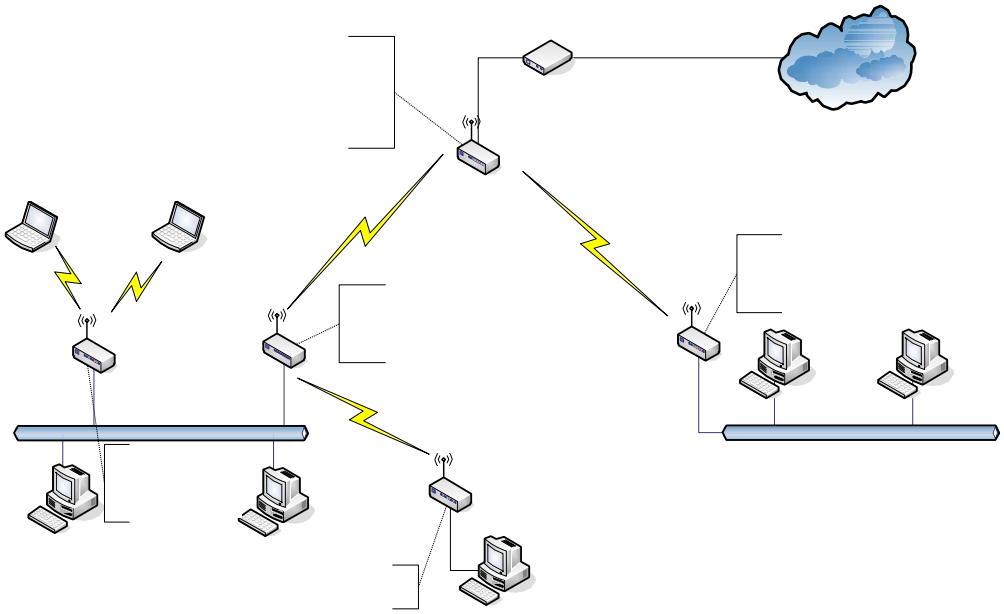
The following table shows the supporting combination of operation and wireless radio modes.

| | Bridge | Router | WISP |
|---|---|---|---|
| AP | V | V | X |
| WDS | V | V | X |
| Client | V | X | V |
| AP+WDS | V | V | X |

Hereafter are some topologies of network application for your reference.



## Examples of Configuration



This example demonstrates how to set up a network with different device configurations. There are 2 DHCP servers (DEV1/DEV4) in the network to control the IP configuration of 2 domains (192.168.2.x/192.168.3.x). Once the setting is done, all the PCs can visit Internet through DEV1.

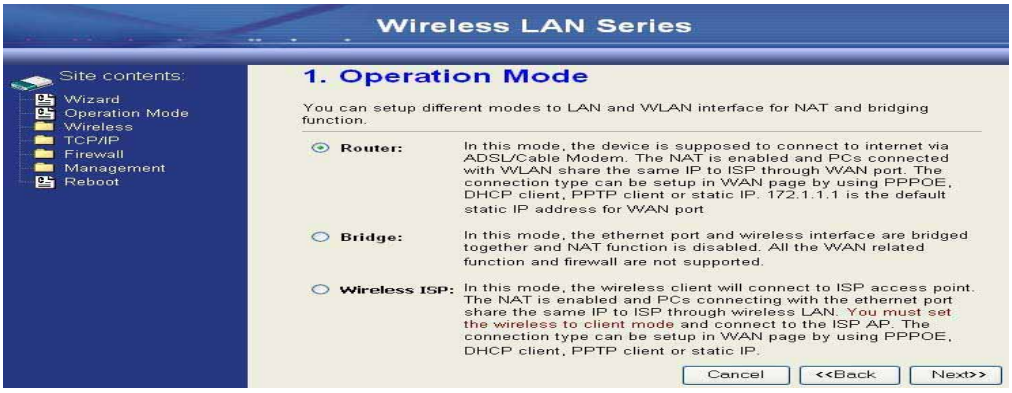
We assume all the devices keep the factory default setting. To make sure that user can continuing press the rest button for more than 5 seconds to restore the factory default setting.

The following descriptions show the steps to configure DEV1 to DEV5.

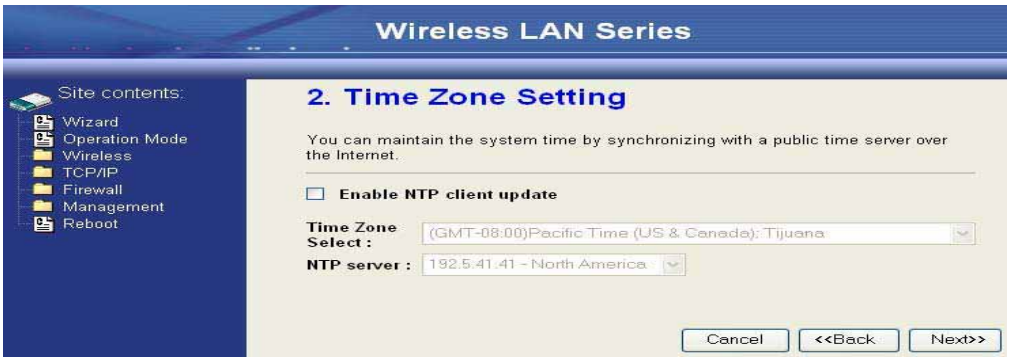
## Configure DEV1:

1. Connect the ADSL modem to Ethernet port of device using Ethernet cable.
2. Access the web server (http://192.168.2.254) of device from the wireless station.
3. Use Wizard page to setup device.

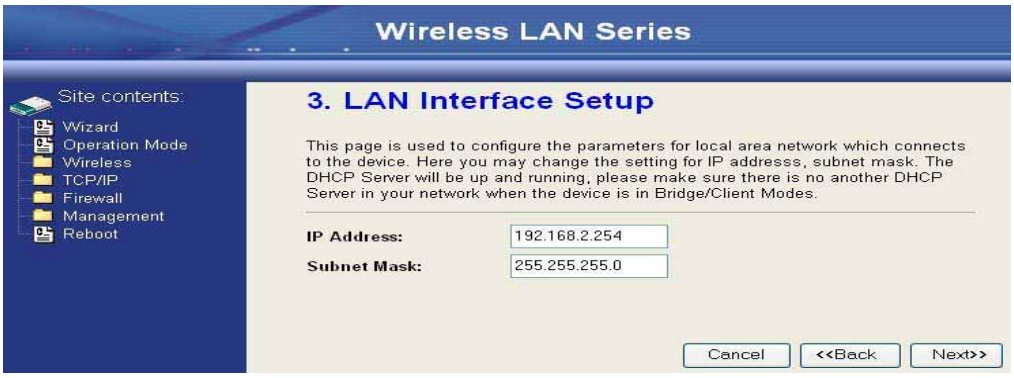

4. Press “Next>>” button then set the “Operation Mode” to “Router” mode.



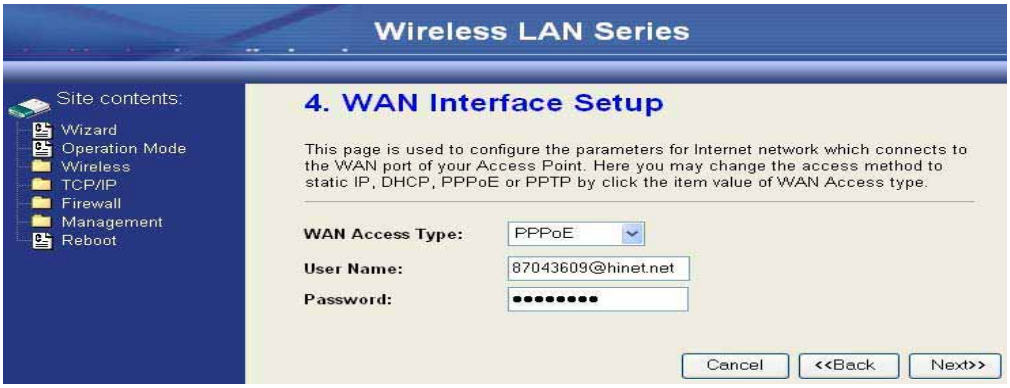
5. Press “Next>>” button then disable “Time Zone” function.



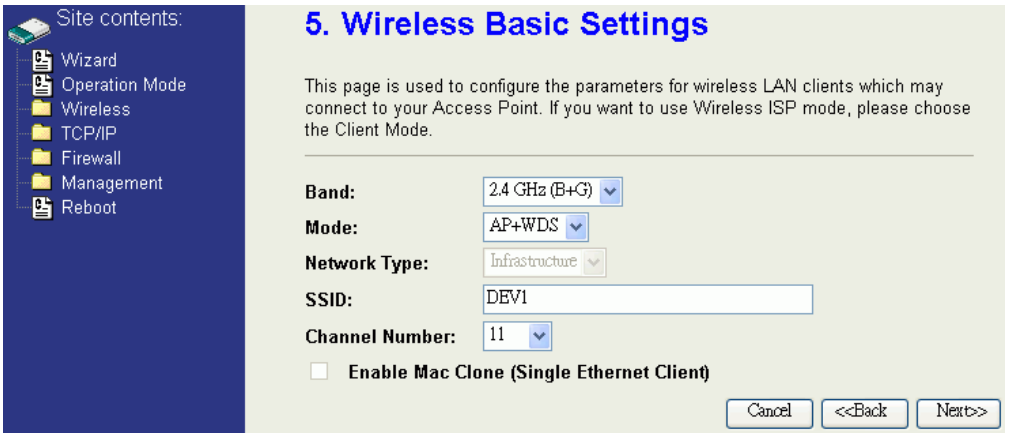

6. Press “Next>>” button then set the IP address of LAN interface.



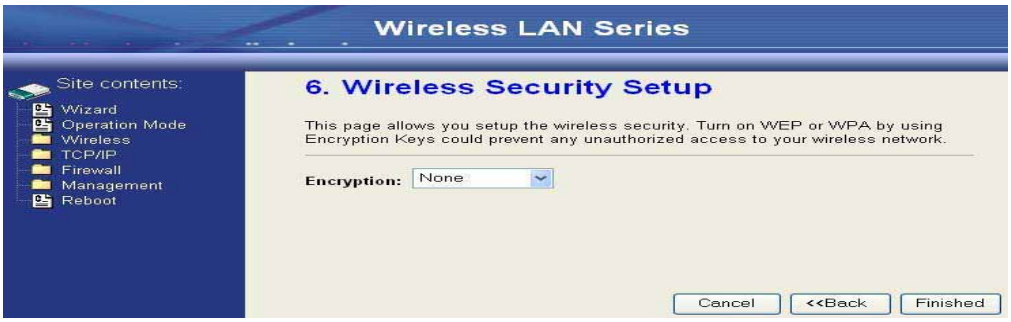

7. Press “Next>>” button then select the “PPPoE” for “WAN Access Type” and fill in the “User Name” and “Password” fields.



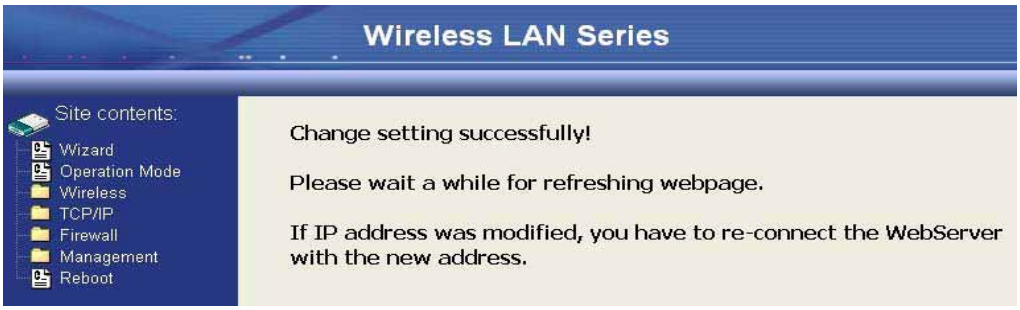
8. Press “Next>>” button then select the “AP+WDS” for “mode” and change the SSID to “DEV1”.



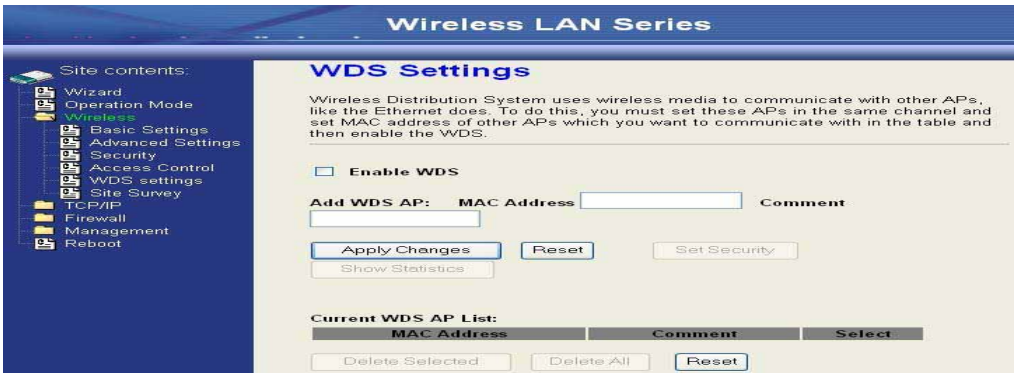

9. Press “Next>>” button then select “None” for “Encryption” then press“Finished” button.



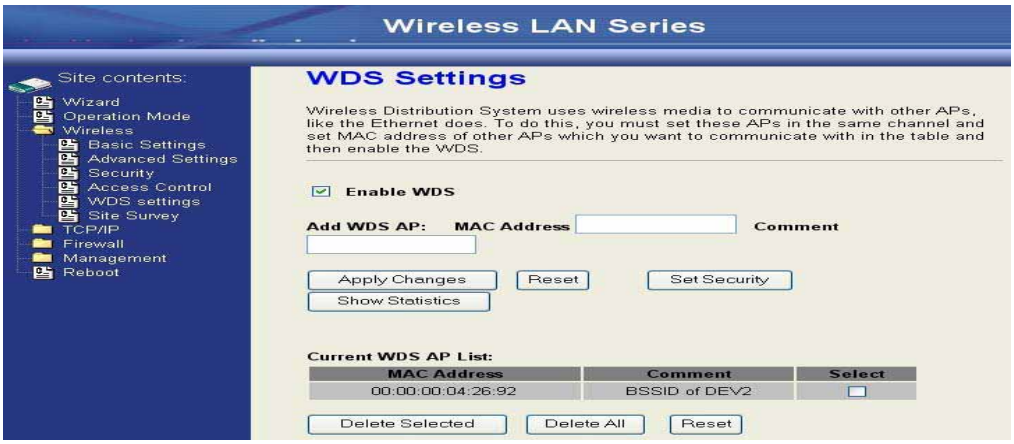

10. Wait for refreshing web page.



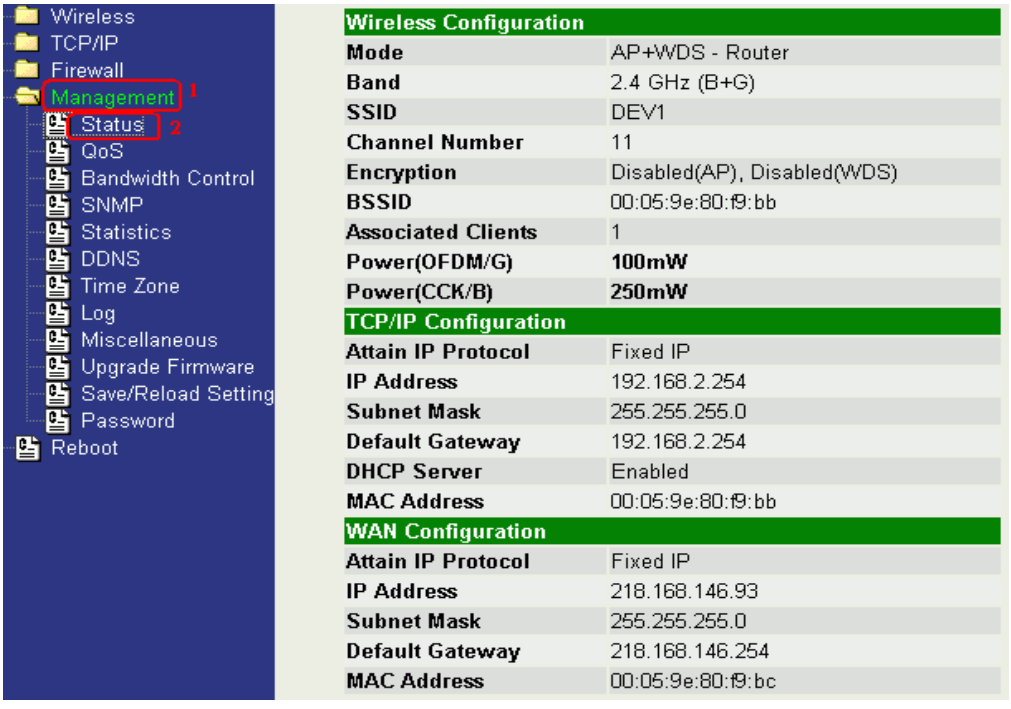
11. Use “WDS Settings” page to configure WDS.




12. Enable WDS function and add the BSSID of DEV2 to “Current WDS AP List”.




13. Since we access the device by wireless connection, it may temporarily disconnect when applying the WDS setting. After re-connecting to the device, use the “Status” page to check the settings.



## Configure DEV2:

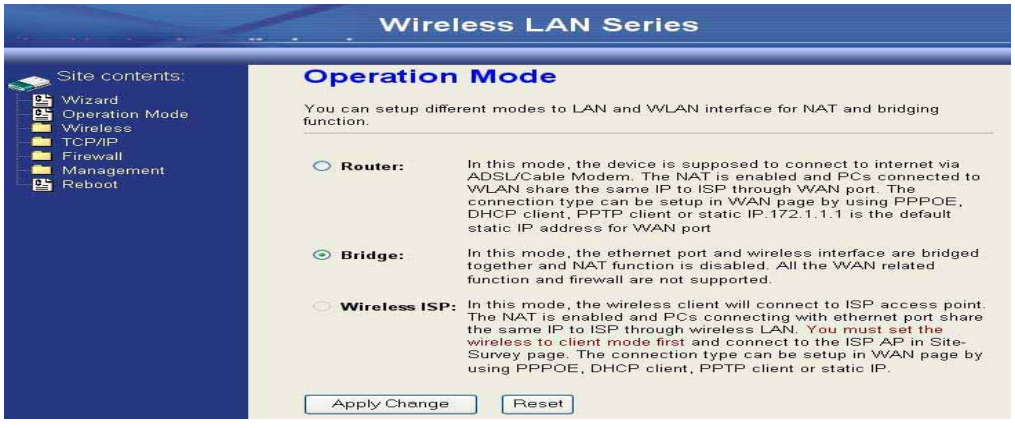
1. Access the web server (http://192.168.2.254). of device from the Ethernet port.

**Caution**

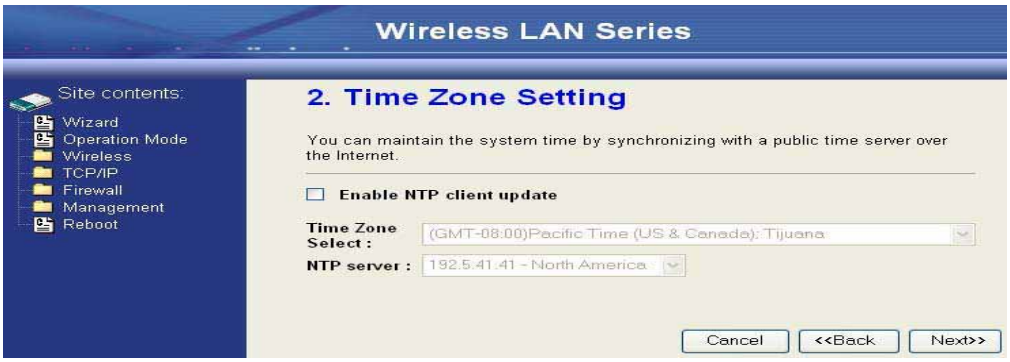
If you configure multiple devices in the same PC, since the devices have the same default IP address but different MAC addresses, it may cause you not able to access the web server of device. If the situation happens, please try to clean the ARP table of your PC by DOS command “arp –d” then you can access the web server of device using the default IP address.

2. Use Wizard page to setup device.

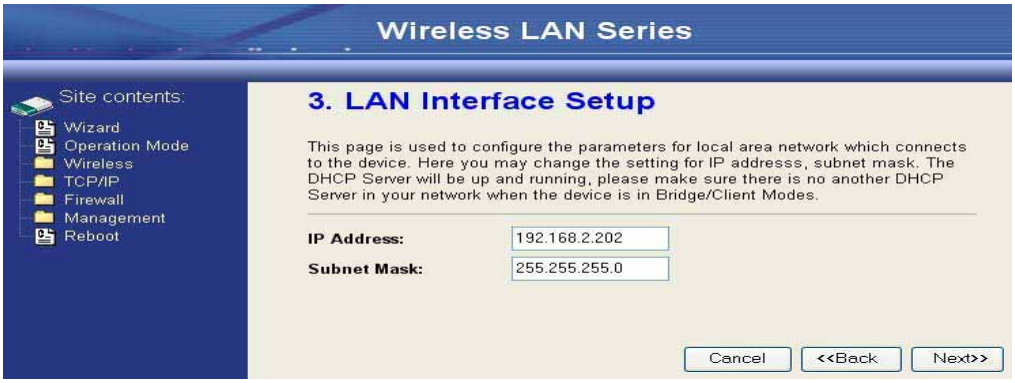

3. Press “Next>>” button then set the “Operation Mode” to “Bridge” mode.



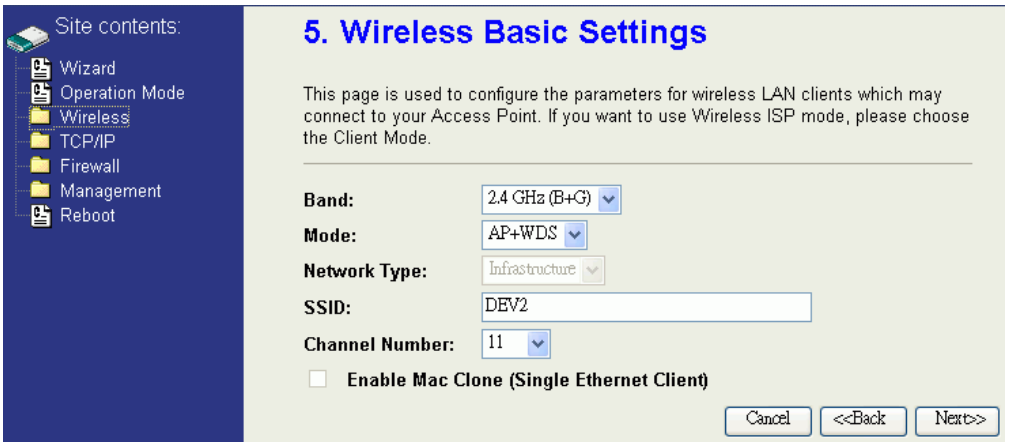
4. Press “Next>>” button then disable “Time Zone” function.




5. Press “Next>>” button then set the IP address of LAN interface.

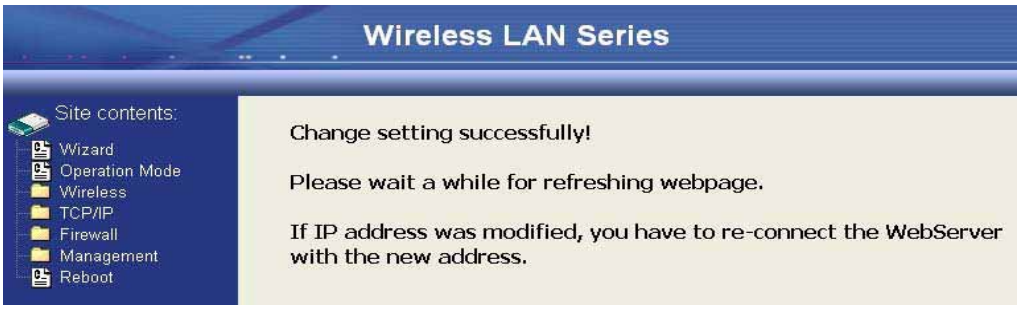



6. Press “Next>>” button then select the “AP+WDS” for “mode” and change the SSID to “DEV2”.

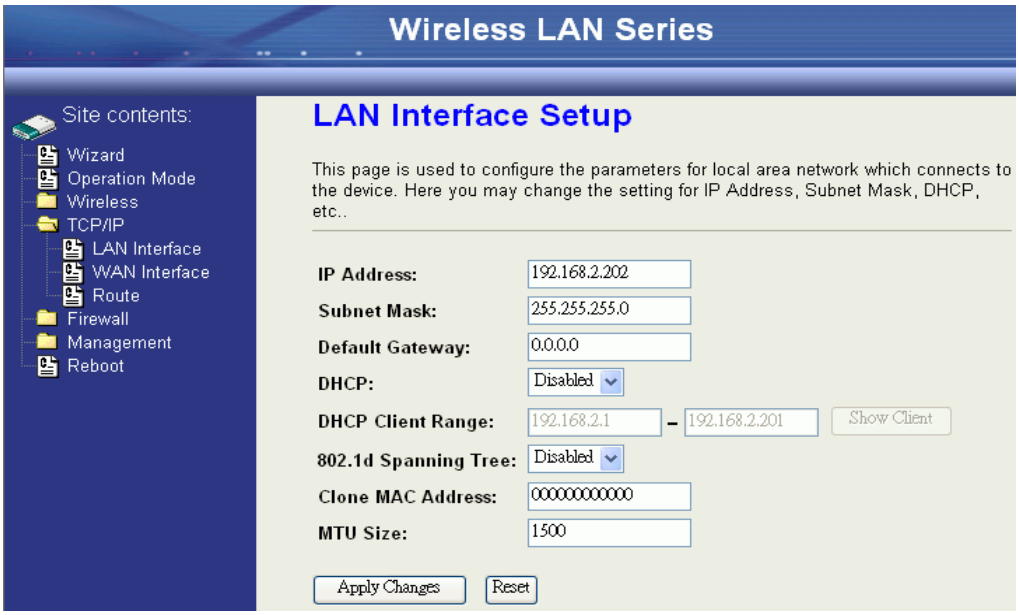


7. Press “Next>>” button then select “None” for “Encryption” then press “Finished” button.

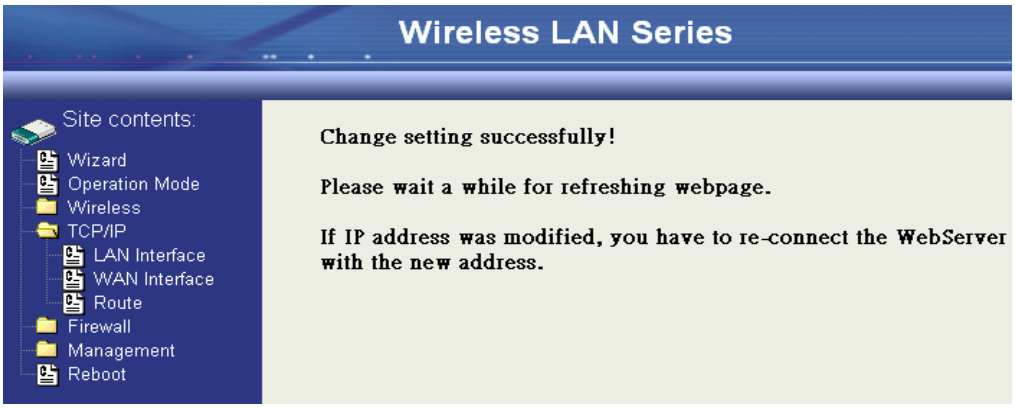

8. Wait for refreshing web page.



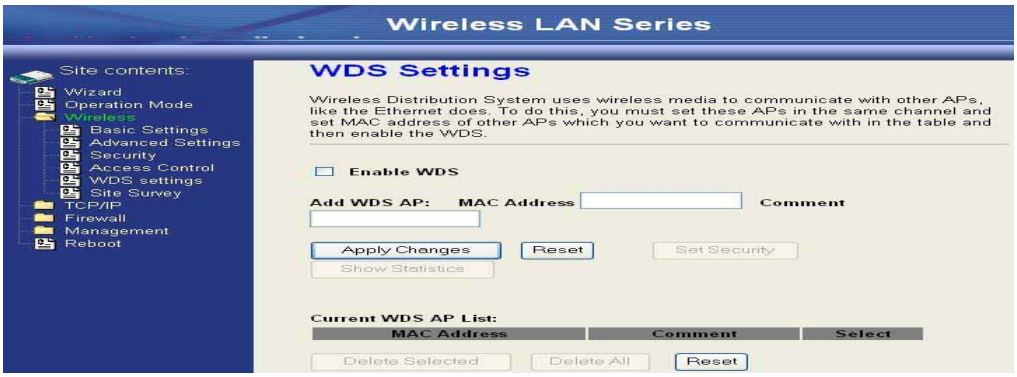

9. Access the web server by new IP address “192.168.2.202” then use “LAN Interface” page to disable DHCP Server.



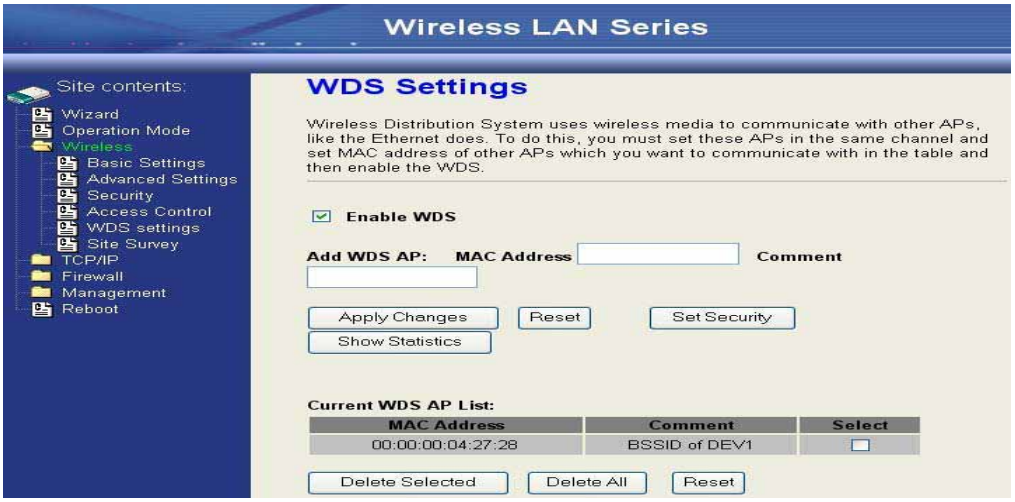
10. Wait for refreshing web page.



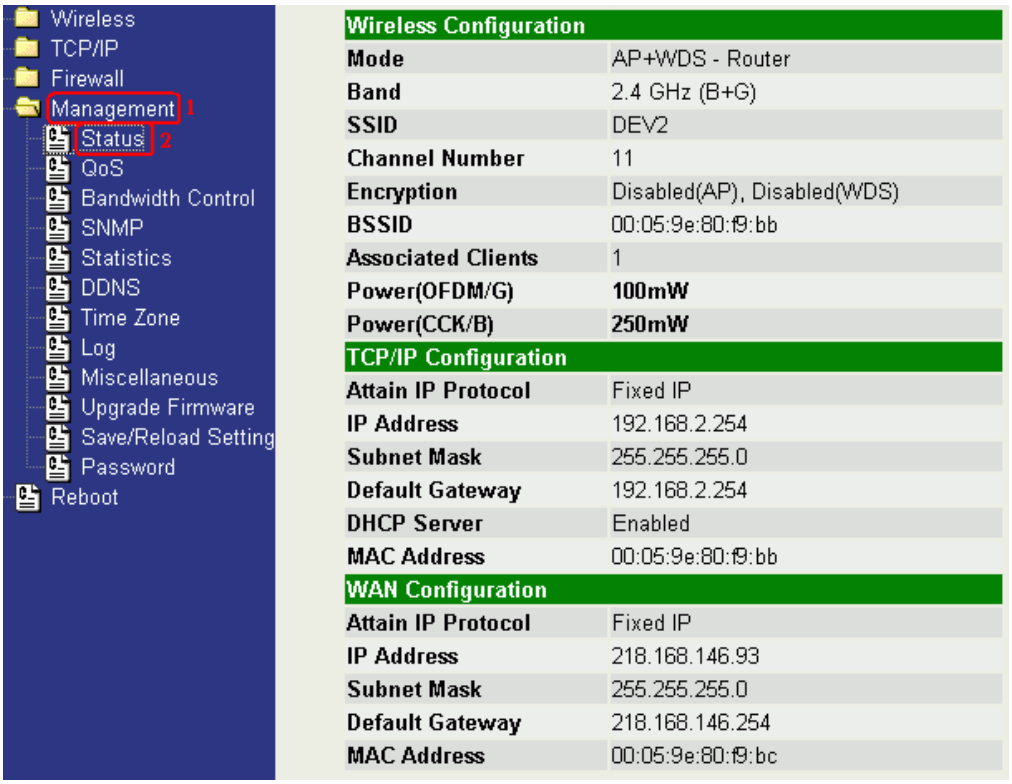

11. Use “WDS Settings” page to configure WDS.




12. Enable WDS function and add the BSSID of DEV1 to “Current WDS AP List”.



13. Use the “Status” page to check the settings.



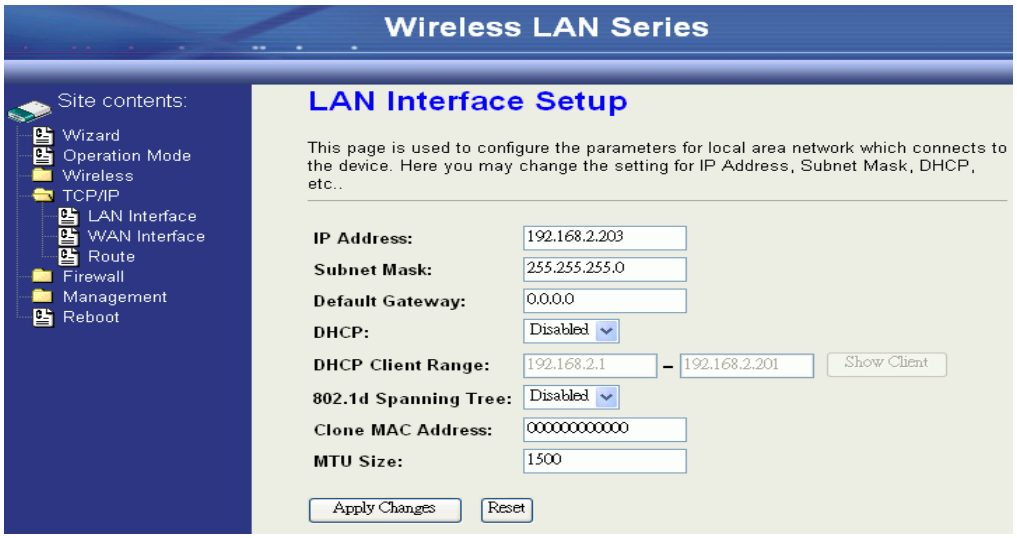
**Configure DEV3:**

1. Access the web server (http://192.168.2.254) of device from the Ethernet port.

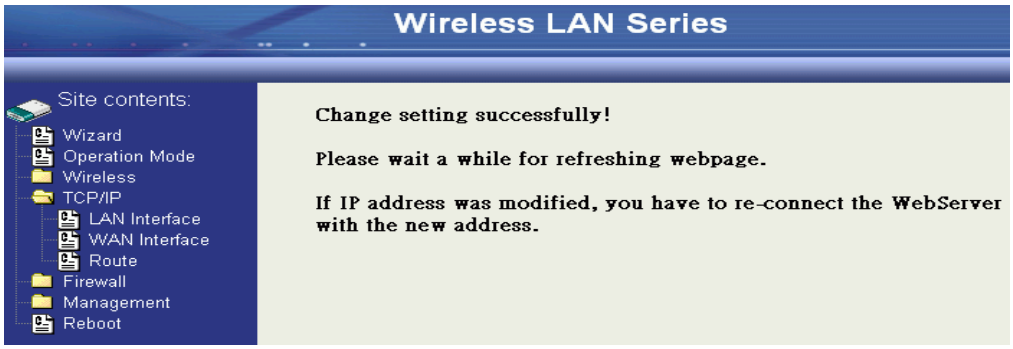
**Caution**

If you configure multiple devices in the same PC, since the devices have the same default IP address but different MAC addresses, it may cause you not able to access the web server of device. If the situation happens, please try to clean the ARP table of your PC by DOS command "arp –d" then you can access the web server of device using the default IP address.

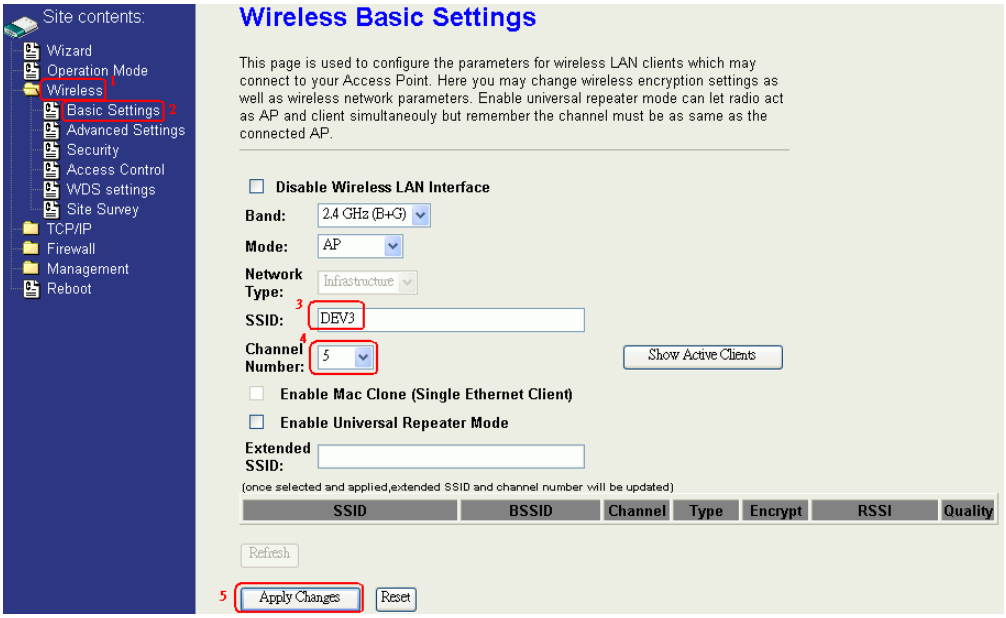
2. Use "LAN Interface" page to set the IP address of LAN interface and disable
   DHCP server.




3. Wait for refreshing web page.



4. Access the web server by new IP address “192.168.2.203” then use “Basic
   Settings” page to change SSID and CHANNEL.




5. Use the “Status” page to check the settings.

**Configure DEV4:**

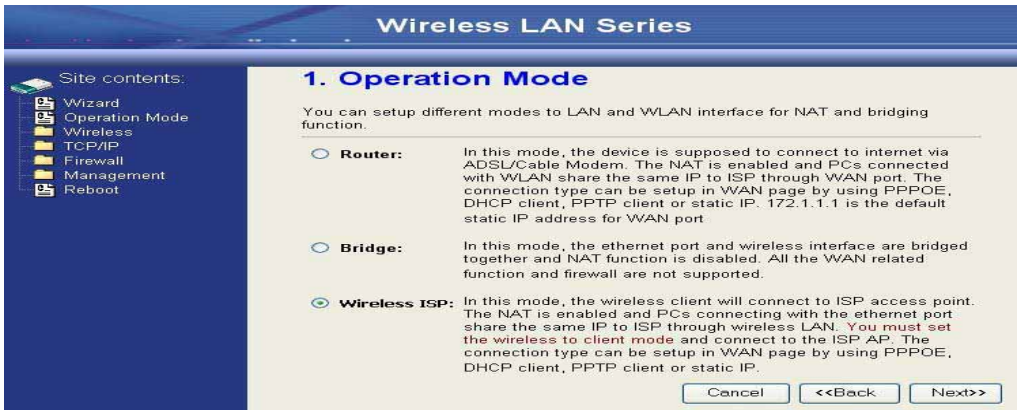
1. Access the web server (http://192.168.2.254) of device from the Ethernet port.

**Caution**

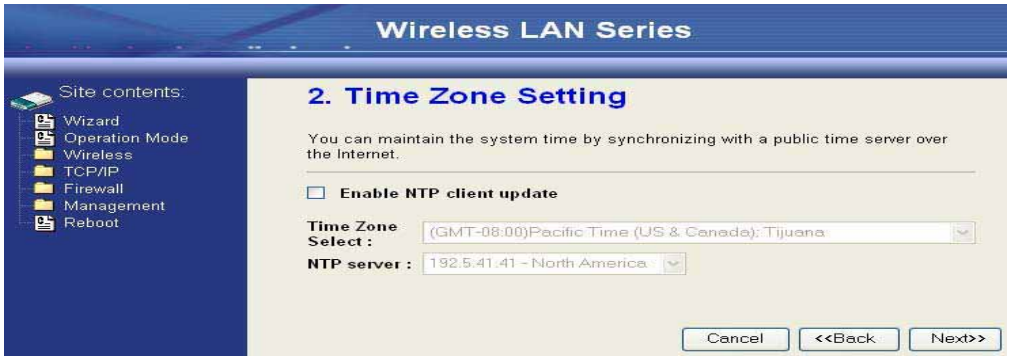
If you configure multiple devices in the same PC, since the devices have the same default IP address but different MAC addresses, it may cause you unable to access the web server of device. If the situation happens, please try to clean the ARP table of your PC by DOS command “arp –d” then you can access the web server of device using the default IP address.

2. Use Wizard page to setup device.

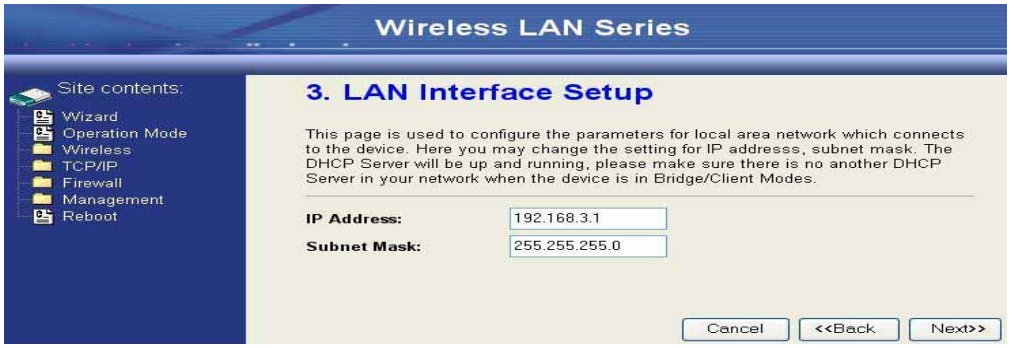

3. Press “Next>>” button then set the “Operation Mode” to “Wireless ISP” mode.



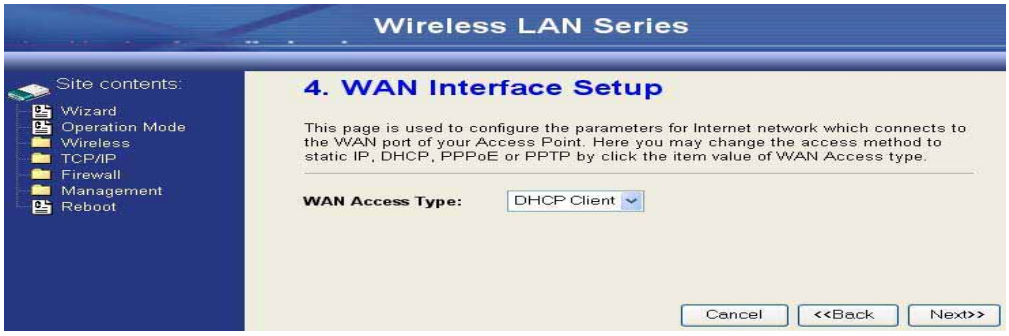
4. Press “Next>>” button then disable “Time Zone” function.



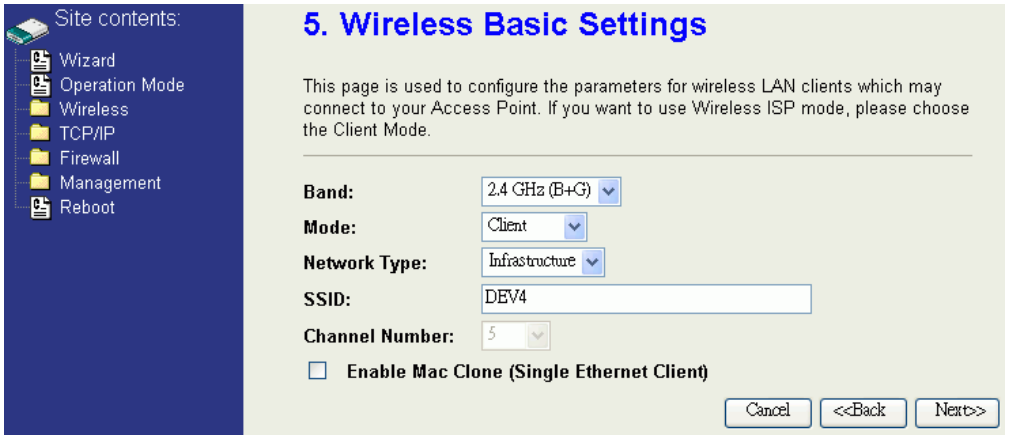

5. Press “Next>>” button then set the IP address of LAN interface.



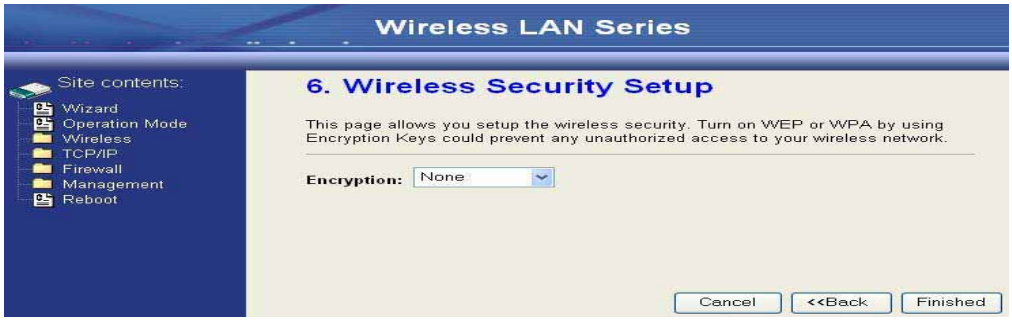

6. Press “Next>>” button then select the “DHCP Client” for “WAN Access Type”.



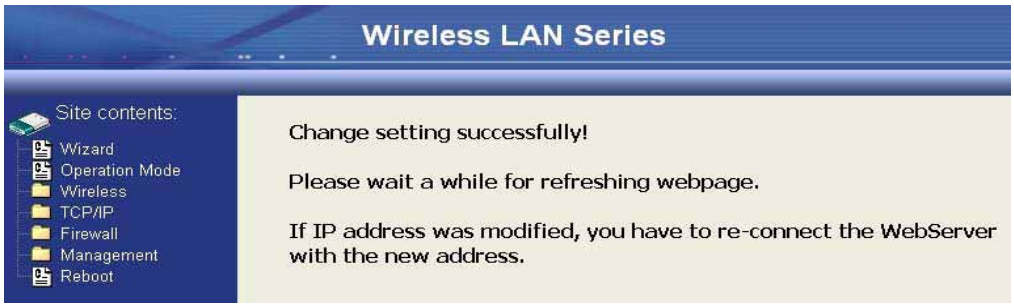

7. Press “Next>>” button then select the “Client” for “mode” and change the SSID to “DEV4”.



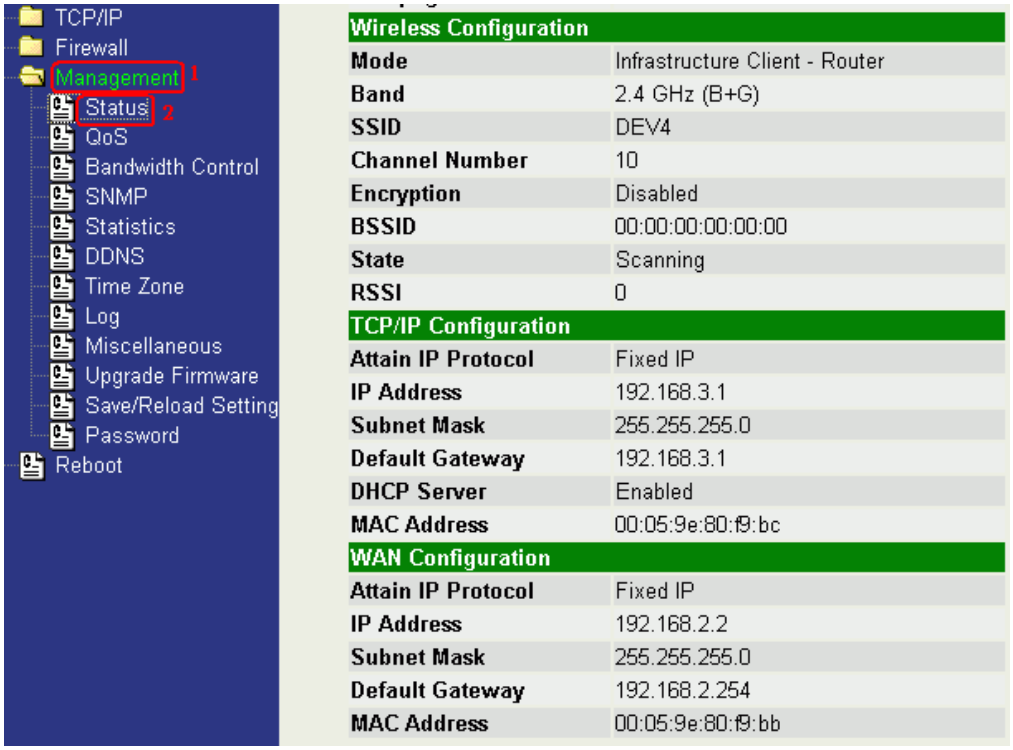
8. Press “Next>>” button then select “None” for “Encryption” then press “Finished” button.



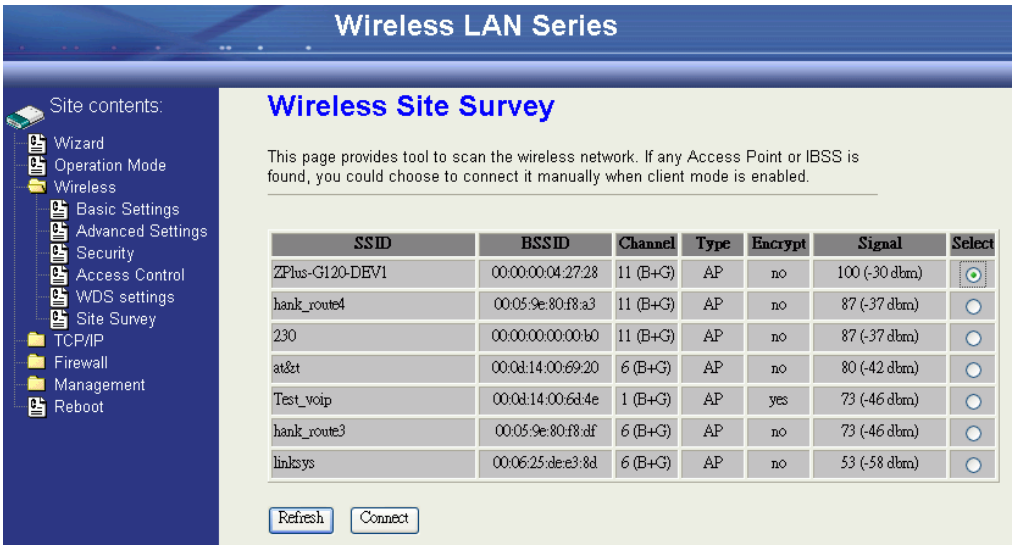

9. Wait for refreshing web page.




10. Change the IP address of your PC to 192.168.3.x then access the web server by the new IP address “192.168.3.1” and use “Status” page check the setting.



11. If the “State” of “Wireless Configuration” is not “Connected” or you want to refresh the “RSSI “, please use “Site Survey” page to re-connect a AP.



## Configure DEV5:

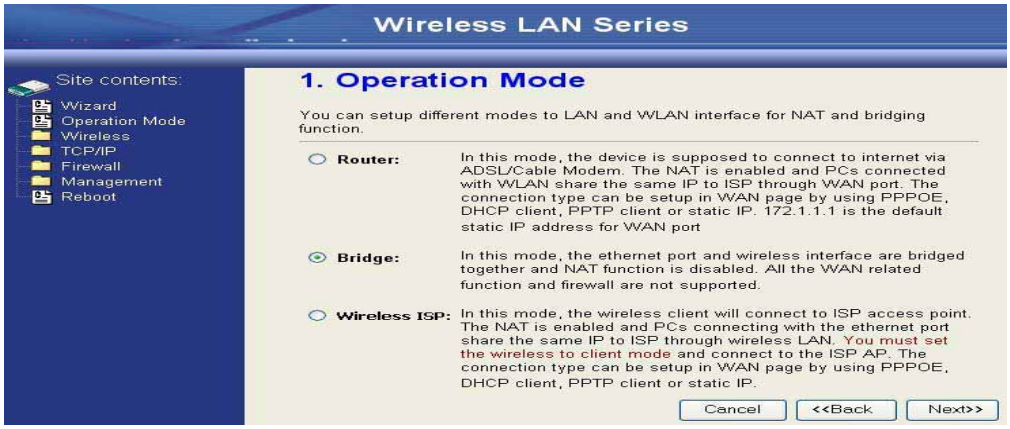
1. Access the web server (http://192.168.2.254) of device from the Ethernet port.

**Caution**

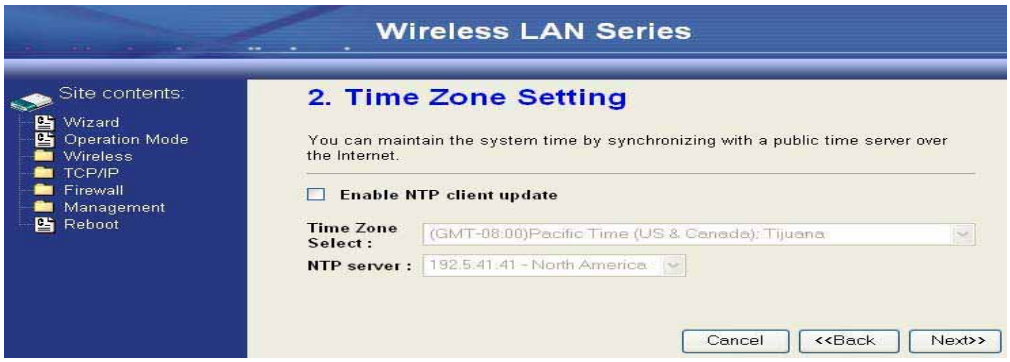
If you configure multiple devices in the same PC, since the devices have the same default IP address but different MAC addresses, it may cause you unable to access the web server of device. If the situation happens, please try to clean the ARP table of your PC by DOS command “arp –d” then you can access the web server of device using the default IP address.

2. Use Wizard page to setup device.

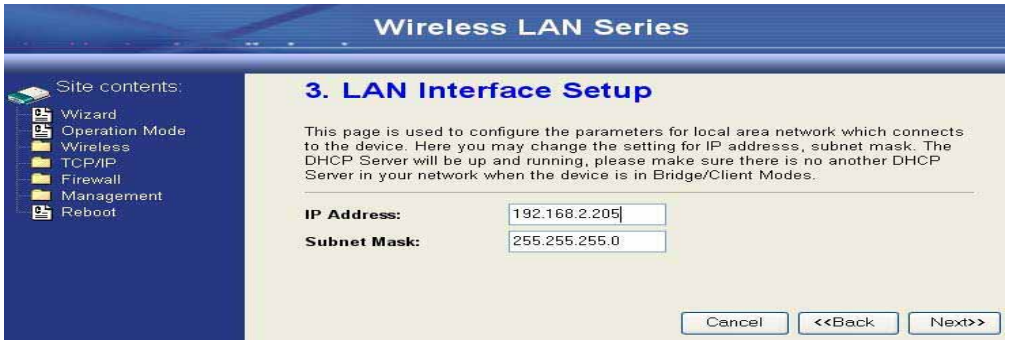

3. Press “Next>>” button then set the “Operation Mode” to “Wireless ISP” mode.



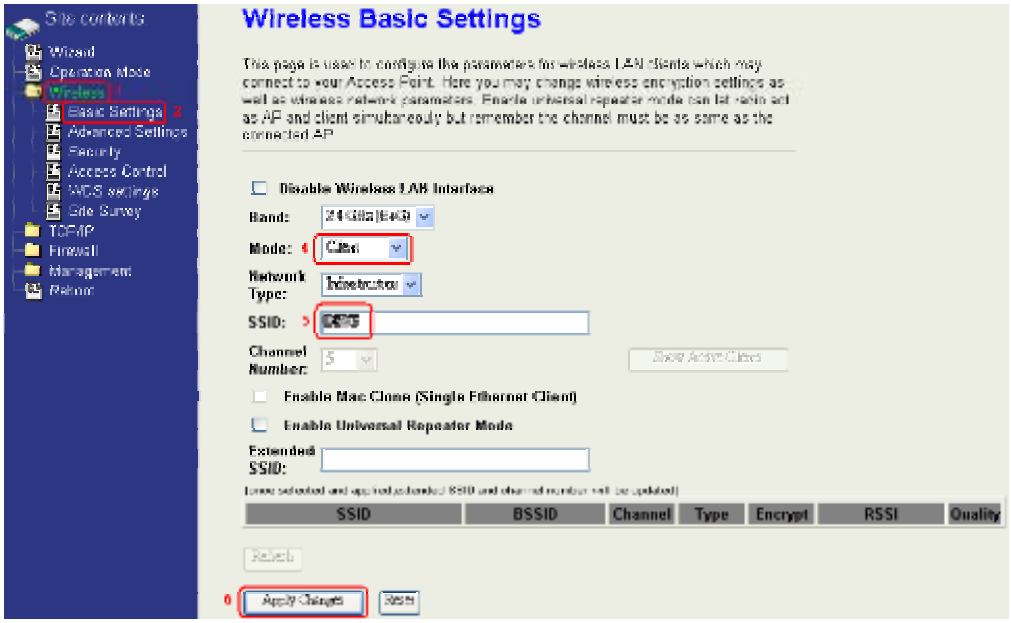
4. Press “Next>>” button then disable “Time Zone” function.



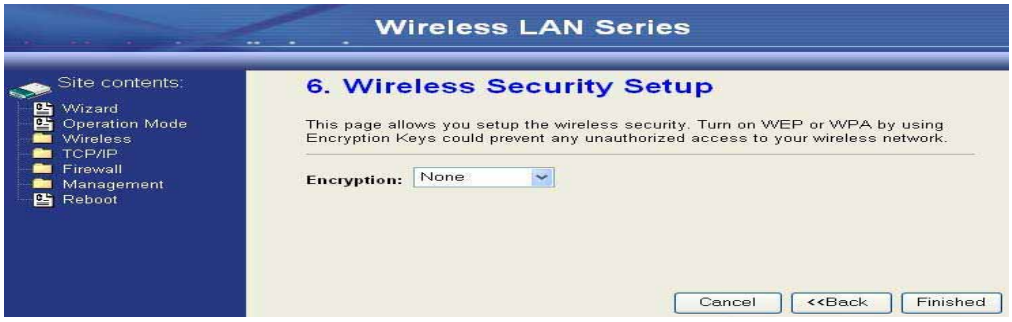

5. Press “Next>>” button then set the IP address of LAN interface.



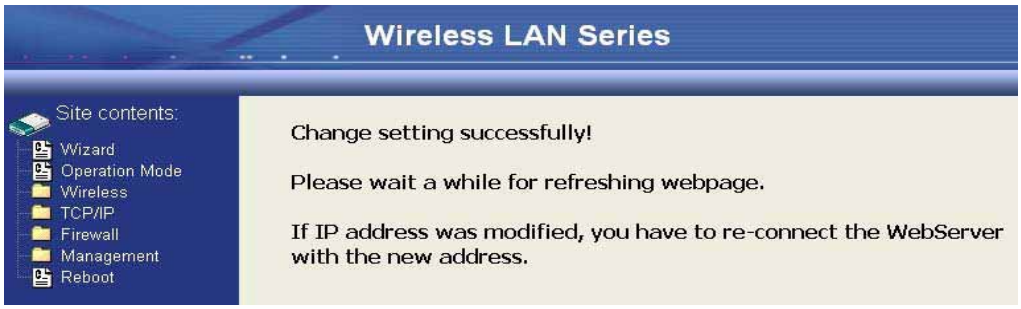

6. Press “Next>>” button then select the “Client” for “mode” and change the SSID to “DEV5”.



7. Press “Next>>” button then select “None” for “Encryption” then press “Finished” button.

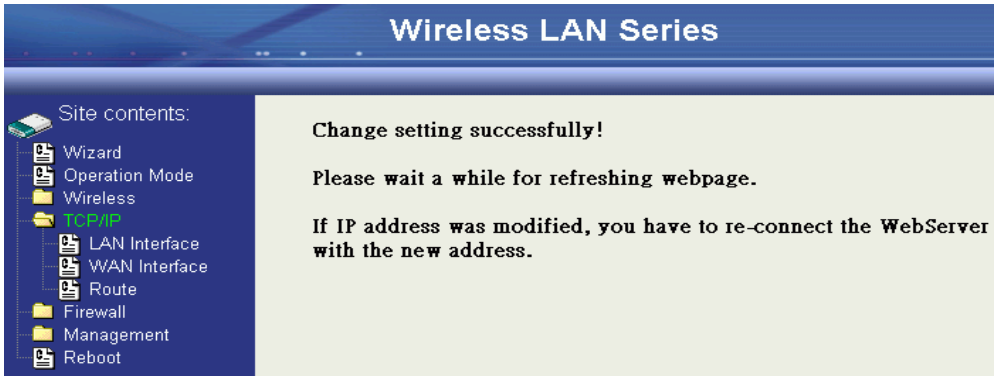



8. Wait for refreshing web page.

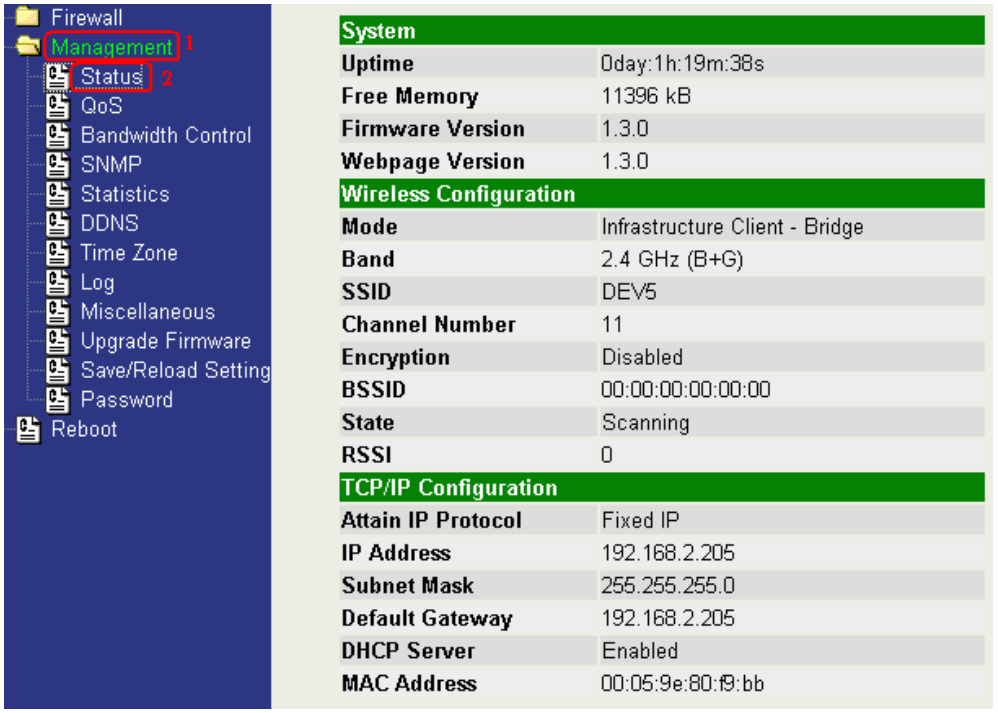



9. Access the web server by the new IP address “192.168.2.205” and use “LAN
Interface” page to disable DHCP Server.

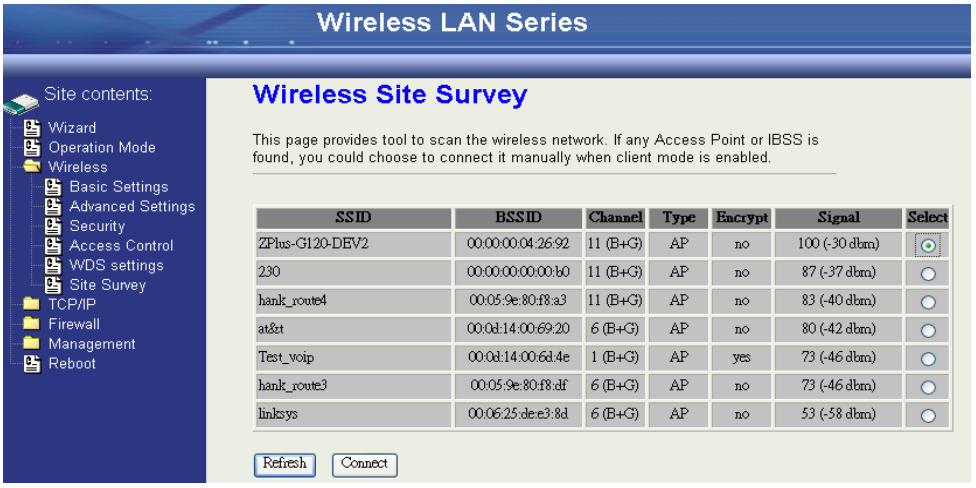
10. Wait for refreshing webpage



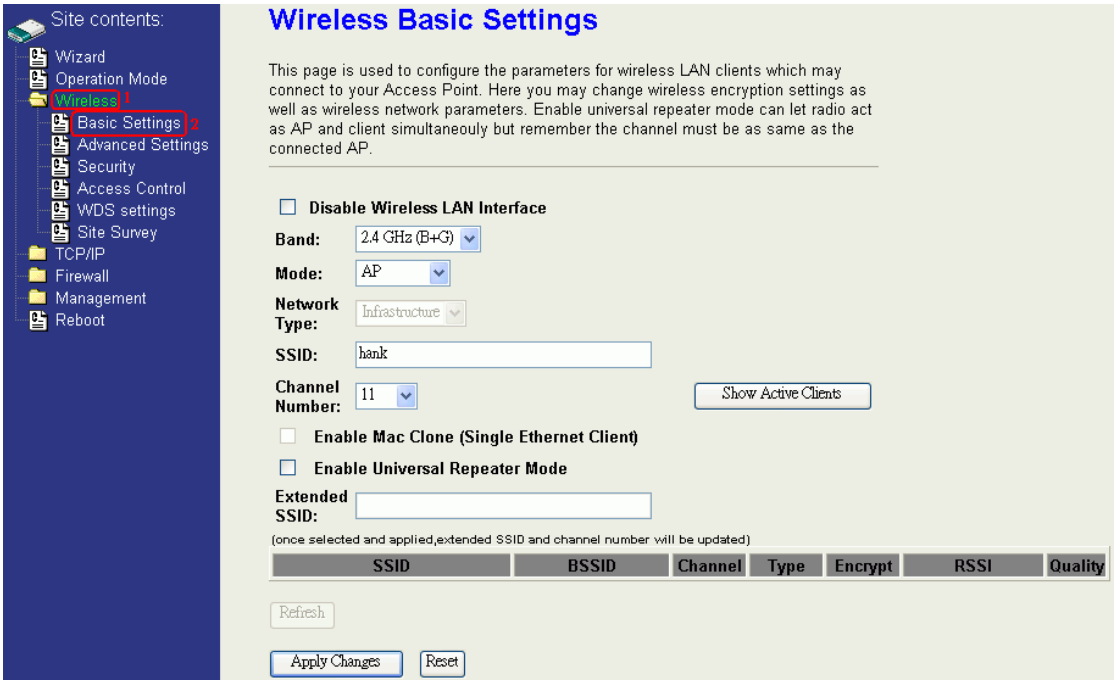

11. Use “State” page to check setting.




12. If the “State” of “Wireless Configuration” is not “Connected” or you want to refresh the “RSSI “, please use “Site Survey” page to re-connect a AP.



## Basic Settings




Disable Wireless LAN Interface

Disable the wireless interface of device

Band:

The device supports 2.4GHz(B), 2.4GHz(G) and 2.4GHz(B+G) mixed modes.

Mode:

The radio of device supports different modes as following:

1. **AP**

   The radio of device acts as an Access Point to serves all wireless clients to join a wireless local network.

2. **Client**

   Support Infrastructure and Ad-hoc network types to act as a wireless adapter.

3. **WDS**

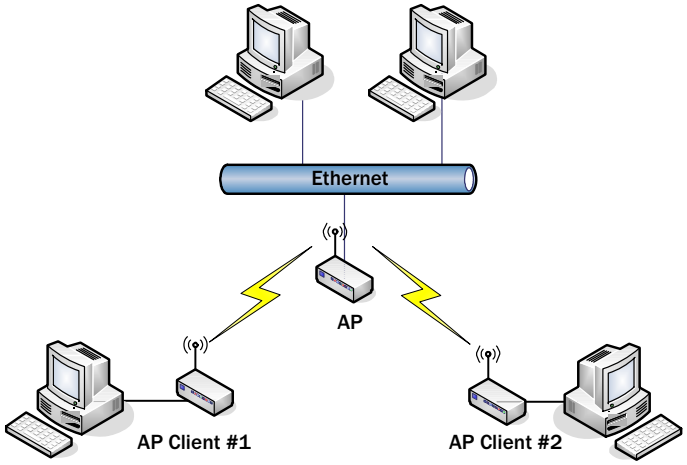
   Wireless Distribution System, this mode serves as a wireless repeater, only devices with WDS function supported can connect to it, all the wireless clients can't survey and connect the device when the mode is selected.

4. **AP+WDS**

   Support both AP and WDS functions, the wireless clients and devices with WDS function supported can survey and connect to it.

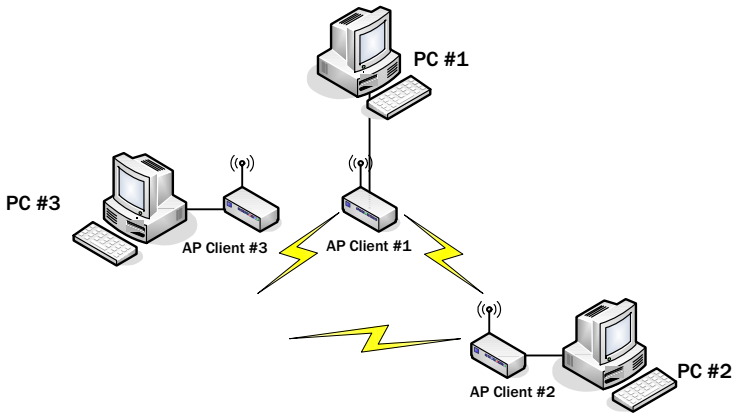
**Infrastructure:**

This type requires the presence of 802.11b/g Access Point. All communication is done via the Access Point.




**Ad Hoc:**

This type provides a peer-to-peer communication between wireless stations. All the communication is done from Client to Client without any Access Point involved. Ad Hoc networking must use the same SSID and channel for establishing the wireless connection.




In client mode, the device can't support the Router mode function including Firewall and WAN settings.

**SSID:**

The SSID is a unique identifier that wireless networking devices use to establish and maintain wireless connectivity. Multiple access point/bridges on a network or sub-network can use the same SSID. SSIDs are case sensitive and can contain up to 32 alphanumeric characters. Do not include spaces in your SSID.

**Channel Number**

The following table is the available frequencies (in MHz) for the 2.4-GHz radio:

| Channel No. | frequency | Country Domain |
|---|---|---|
| 1 | 2412 | Americas, EMEA, Japan, and China |
| 2 | 2417 | Americas, EMEA, Japan, and China |
| 3 | 2422 | Americas, EMEA, Japan, Israel, and China |
| 4 | 2427 | Americas, EMEA, Japan, Israel, and China |
| 5 | 2432 | Americas, EMEA, Japan, Israel, and China |
| 6 | 2437 | Americas, EMEA, Japan, Israel, and China |
| 7 | 2442 | Americas, EMEA, Japan, Israel, and China |
| 8 | 2447 | Americas, EMEA, Japan, Israel, and China |
| 9 | 2452 | Americas, EMEA, Japan, Israel, and China |
| 10 | 2457 | Americas, EMEA, Japan, and China |
| 11 | 2462 | Americas, EMEA, Japan, and China |
| 12 | 2467 | EMEA and Japan only |
| 13 | 2472 | EMEA and Japan only |
| 14 | 2484 | Japan only |

When set to “Auto”, the device will find the least-congested channel for use.

**Associated Client**

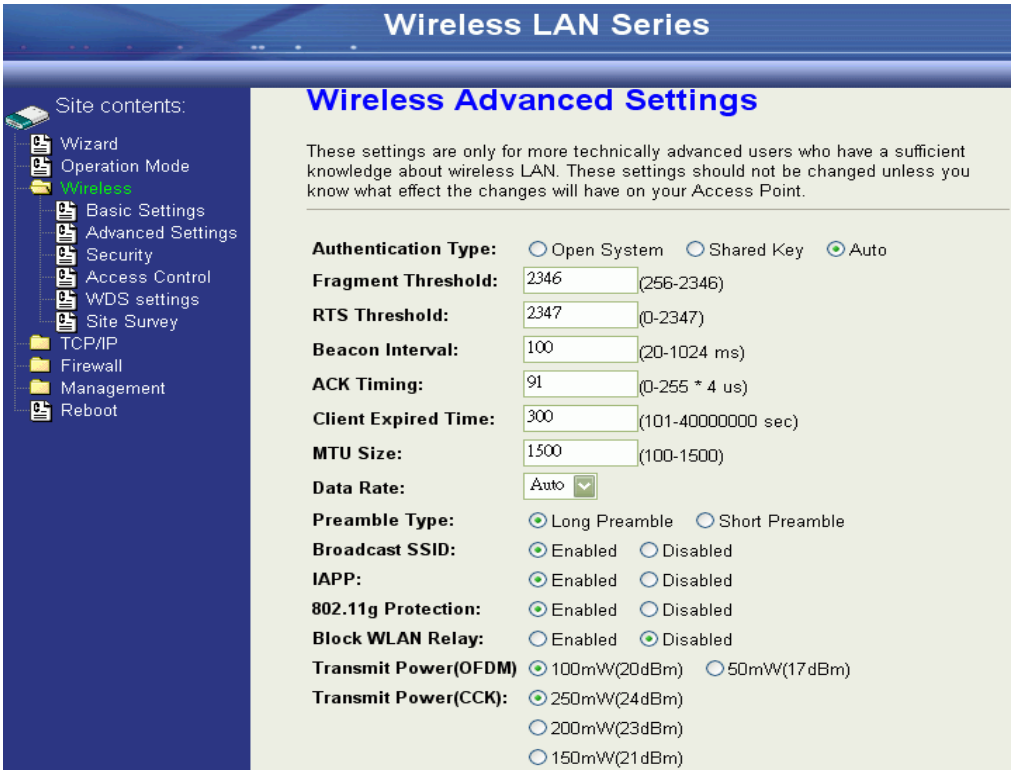
Show the information of active wireless client stations that connected to the device.

# Advanced Settings

These settings are only for more technically advanced users who have sufficient knowledge about wireless LAN. These settings should not be changed unless you know what effect the changes will have on your device. The default setting is optimized for the normal operation. For specific application, setting configuration will required highly attention to reach optimistic condition.

**Note：**

**Any unreasonable value change to default setting will reduce the throughput of the device.**




### Authentication Type

The device supports two Authentication Types “Open system” and “Shared Key”. When you select “Share Key”, you need to setup “WEP” key in “Security” page (See the next section). The default setting is “Auto”. The wireless client can associate with the device by using one of the two types.

### Fragment Threshold

The fragmentation threshold determines the size at which packets are fragmented (sent as several pieces instead of as one block). Use a low setting in areas where communication is poor or where there is a great deal of radio interference. This function will help you to improve the network performance.

**RTS Threshold**

The RTS threshold determines the packet size at which the radio issues a request to send (RTS) before sending the packet. A low RTS Threshold setting can be useful in areas where many client devices are associating with the device, or in areas where the clients are far apart and can detect only the device and not each other. You can enter a setting ranging from 0 to 2347 bytes.

**Data Rate**

The standard IEEE 802.11b/11g supports 1, 2, 5.5, 11 / 6, 9, 12, 18, 24, 36, 48 and 54 Mbps data rates. You can choose the rate that the device uses for data transmission. The default value is "auto". The device will use the highest possible selected transmission rate.

**Beacon Interval**

The beacon interval is the amount of time between access point beacons in mini-seconds. The default beacon interval is 100.

**Broadcast SSID**

Broadcasting the SSID will let your wireless clients find the device automatically. If you are building a public Wireless Network, disable this function can provide better security. Every wireless stations located within the coverage of the device must connect this device by manually configure the SSID in your client settings.

**Int. Roaming**

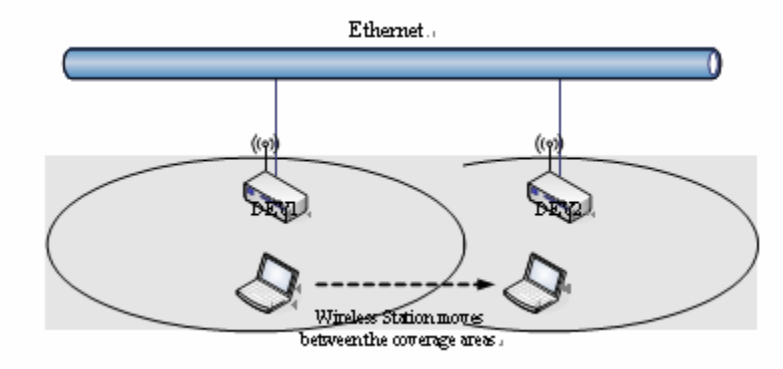
This function will let Wireless Stations roam among a network environment with multiple devices. Wireless Stations are able to switch from one device to another as they move between the coverage areas. Users can have more wireless working range. An example as the following figure
You should comply with the following instructions to roam among the wireless coverage areas.

**Note**：

**For implementing the roaming function, the setting MUST comply the following two items.**

**All the devices must be in the same subnet network and the SSID must be the same.**

**If you use the 802.1x authentication, you need to have the user profile in these devices for the roaming station.**




### Block WLAN Relay (Isolate Client)

The device supports isolation function. If you are building a public Wireless Network, enable this function can provide better security. The device will block packets between wireless clients (relay). All the wireless clients connected to the device can't see each other.

### Transmit Power

The device supports four transmission output power levels 250, 200, 150 and 100mW for CCK (802.11b) mode and two transmission output power levels 100 and 50mW for OFDM (802.11g) mode. User can adjust the power level to change the coverage of the device. Every wireless stations located within the coverage of the device also needs to have the high power radio. Otherwise the wireless stations only can survey the device, but can't establish connection with device.

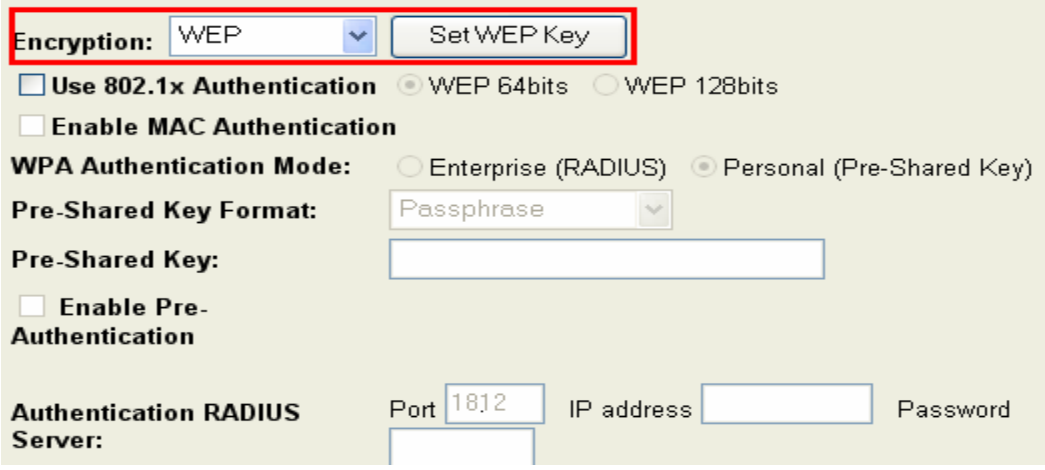
# Configuring Wireless Security

This device provides complete wireless security function include WEP, 802.1x, WPA-TKIP, WPA2-AES and WPA2-Mixed in different mode (see the Security Support Table).

The default security setting of the encryption function is disabled. Choose your preferred security setting depending on what security function you need.


## WEP Encryption Setting

Wired Equivalent Privacy (WEP) is implemented in this device to prevent unauthorized access to your wireless network. The WEP setting must be as same as each client in your wireless network. For more secure data transmission, you can change encryption type to “WEP” and click the “Set WEP Key” button to open the “Wireless WEP Key setup” page.

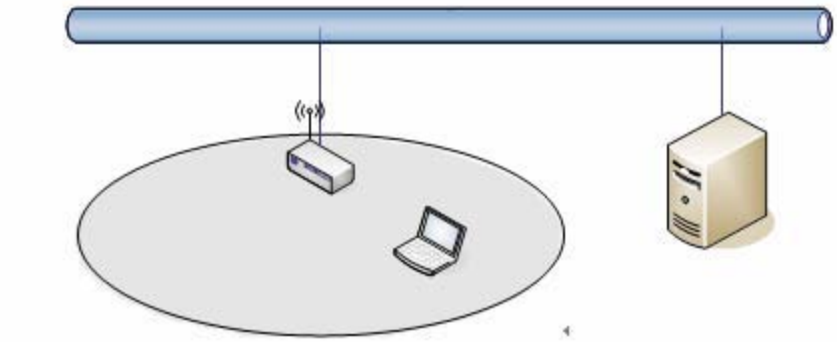


When you decide to use the WEP encryption to secure your WLAN, please refer to the following setting of the WEP encryption:

- 64-bit WEP Encryption：64-bit WEP keys are as same as the encryption method of 40-bit WEP. You can input 10 hexadecimal digits (0~9, a~f or A~F) or 5 ACSII chars.
- 128-bit WEP Encryption：128-bit WEP keys are as same as the encryption method of 104-bit WEP. You can input 26 hexadecimal digits (0~9, a~f or A~F) or 10 ACSII chars.
- The Default Tx Key field decides which of the four keys you want to use in your WLAN environment.

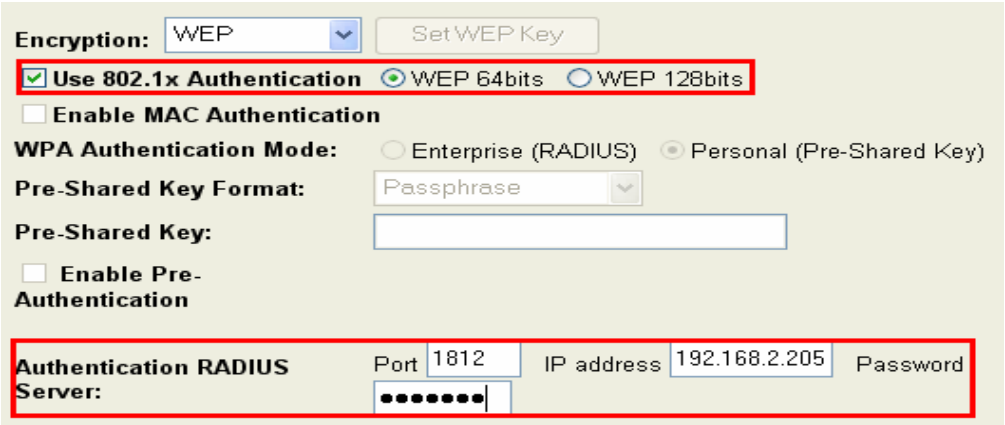

## WEP Encryption with 802.1x Setting

The device supports external RADIUS Server that can secure networks against unauthorized access. If you use the WEP encryption, you can also use the RADIUS server to check the admission of the users. By this way every user must use a valid account before accessing the Wireless LAN and requires a RADIUS or other authentication server on the network. An example is shown as following.



You should choose WEP 64 or 128 bit encryption to fit with your network environment first. Then add user accounts and the target device to the RADIUS server. In the device , you need to specify the IP address、Password

Shared Secret) and Port number of the target RADIUS server.




## WPA Encryption Setting

WPA feature provides a high level of assurance for end-users and administrators that their data will remain private and access to their network restricted to authorized users. You can choose the WPA encryption and select the Authentication Mode.

## WPA Authentication Mode

This device supports two WPA modes. For personal user, you can use the Pre-shared Key to enhance your security setting. This mode requires only an access point and client station that supports WPA-PSK. For Enterprise, authentication is achieved via WPA RADIUS Server. You need a RADIUS or other authentication server on the network.

### Enterprise (RADIUS):

When WPA Authentication mode is Enterprise (RADIUS), you have to add user accounts and the target device to the RADIUS Server. In the device , you need to specify the IP address、Password (Shared Secret) and Port number of the target RADIUS server.

### Pre-Share Key:

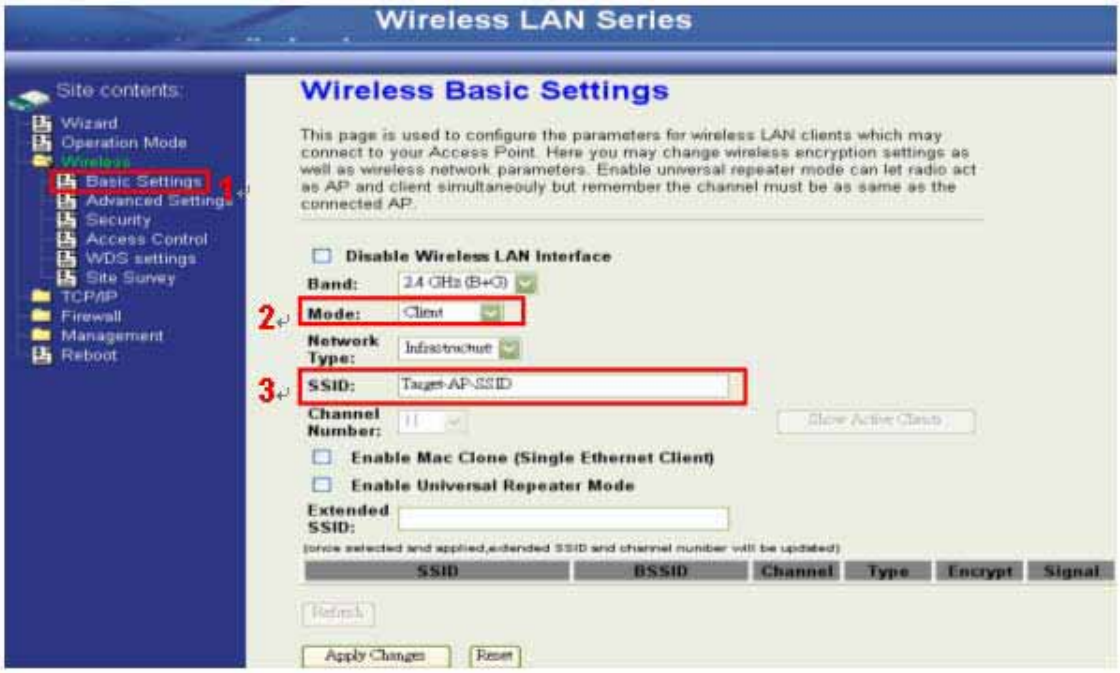
This mode requires only an access point and client station that supports WPA-PSK. The WPA-PSK settings include Key Format, Length and Value. They must be as same as each wireless client in your wireless network. When Key format is Passphrase, the key value should have 8~63 ACSII chars. When Key format is Hex, the key value should have 64 hexadecimal digits (0~9, a~f or A~F).

## Configuring as WLAN Client Adapter

This device can be configured as a wireless Ethernet adapter. In this mode, the device can connect to the other wireless stations (Ad-Hoc network type) or Access Point (Infrastructure network type) and you don't need to install any driver.

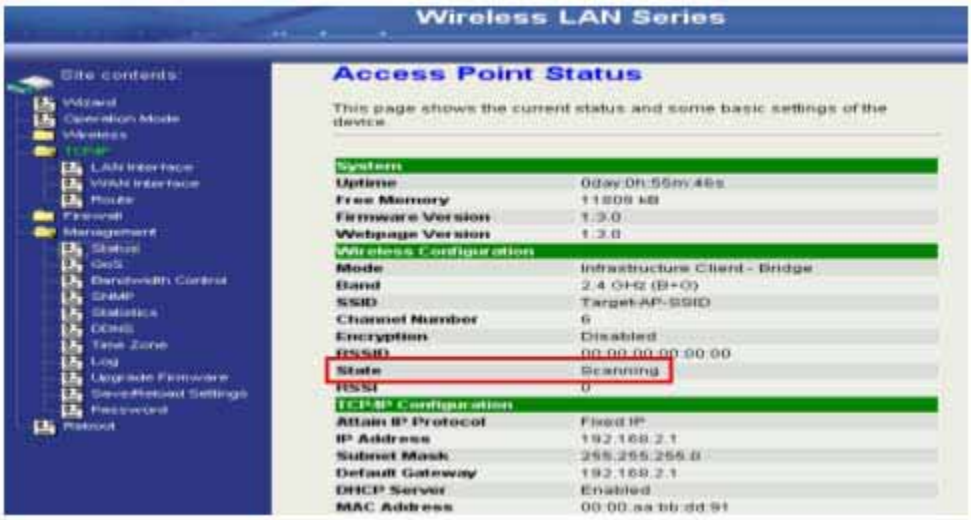
Quick start to configure

**Step 1.** In "Basic Settings" page, change the Mode to "Client" mode. And key in the SSID of the AP you want to connect then press "Apply Changes" button to apply the change.




**Step 2.** Check the status of connection in "Status" web page

The alternative way to configure as following:

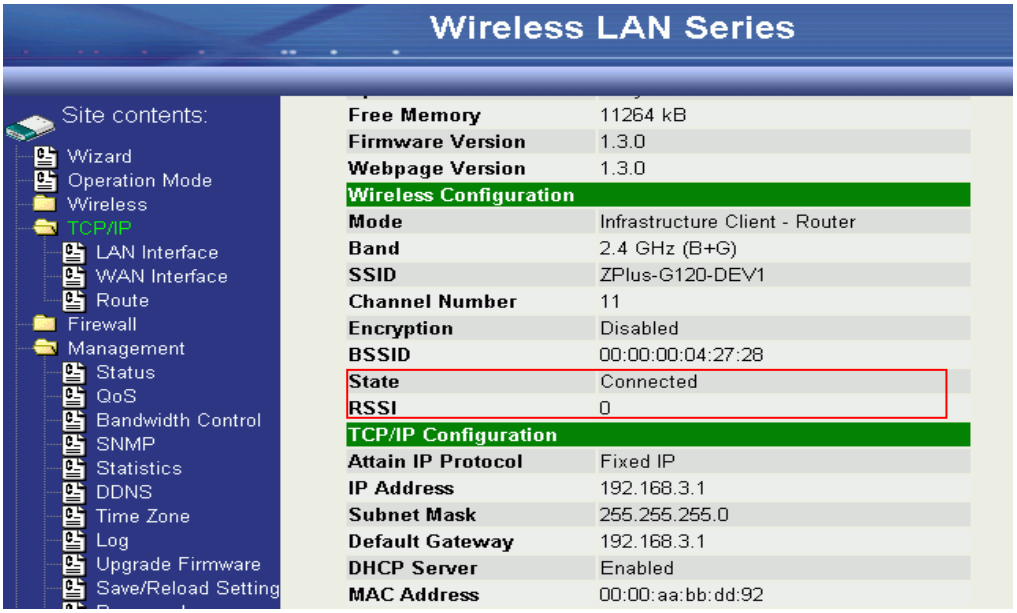


The Alternative way to configure as following:

**Step 1.** In “Wireless Site Survey” page, select one of the SSIDs you want to connect and then press “Connect” button to establish the link.


**Step 2.** If the linking is established successfully. It will show the message “Connect successfully”. Then press “OK”.


**Step 3.** Then you can check the linking information in “Status” page.



**Note ：**

**If the available network requires authentication and data encryption, you need to setup the authentication and encryption before step1 and all the settings must be as same as the Access Point or Station. About the detail authentication and data encryption settings, please refer the security section.**

**Authentication Type**

In client mode, the device also supports two Authentication Types “Open system” and “Shared Key”. Although the default setting is “Auto”, not every Access Points can support “Auto” mode. If the authentication type on the Access Point is knew by user, we suggest to set the authentication type as same as the Access Point.

**Data Encryption**

In client mode, the device supports WEP and WPA Personal/Enterprise except WPA2 mixed mode data encryption. About the detail data encryption settings, please refer the security section.

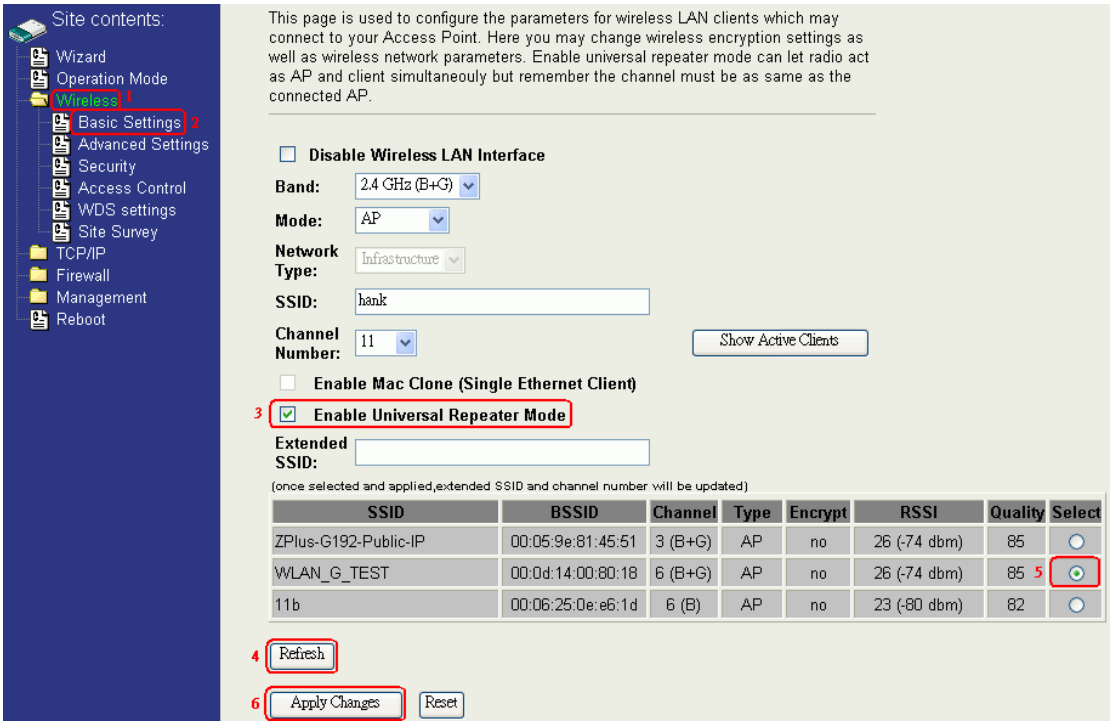
# Configuring Universal Repeater

This device can be configured as a Repeater. In this mode, the device can extend available wireless range of other AP let user can link the network that they want, Also the device working as AP and Repeater same time.

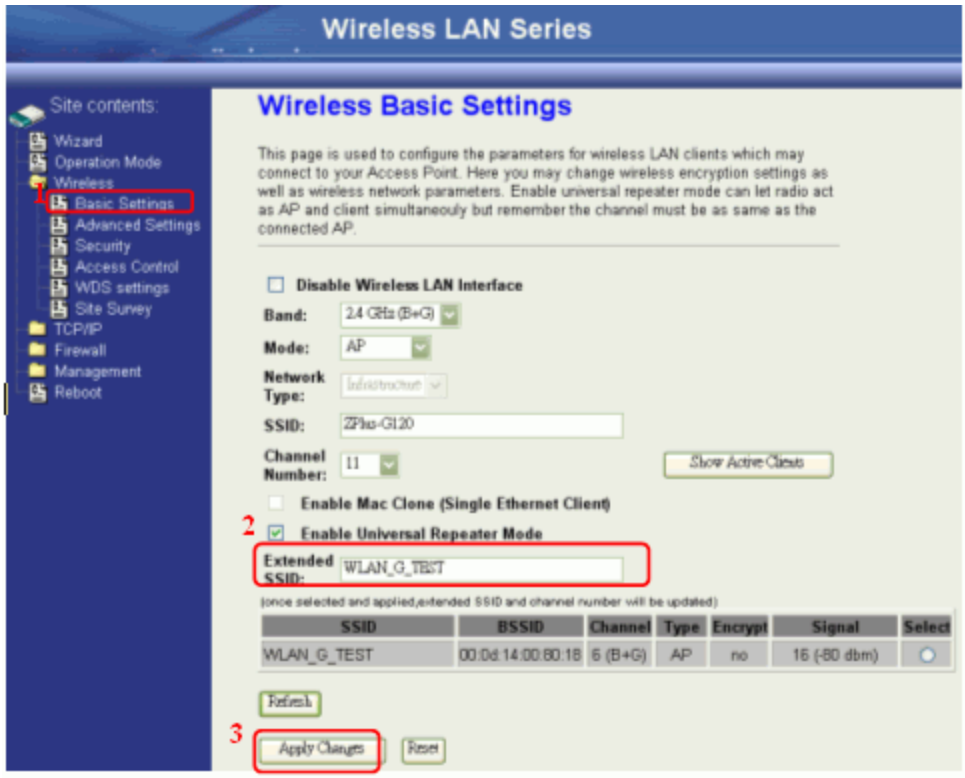
Following two ways describe how to make Universal Repeater effective.

1. Enable Universal Repeater Mode and then select a SSID in the Table that you want. Final click Apply Changes button to take effective. (Click Refresh button to make table renew)

**Note: Under AP、WDS and AP+WDS mode, The Universal Repeater can take effective.**



2. Enter specific SSID in the Extended SSID field and then click Apply Changes button to take effective.



# 3. Configuring WDS

Wireless Distribution System (WDS) uses wireless media to communicate with the other devices, like the Ethernet does. This function allows one or more remote LANs connect with the local LAN. To do this, you must set these devices in the same channel and set MAC address of other devices you want to communicate with in the WDS AP List and then enable the WDS.

When you decide to use the WDS to extend your WLAN, please refer the following instructions for configuration.

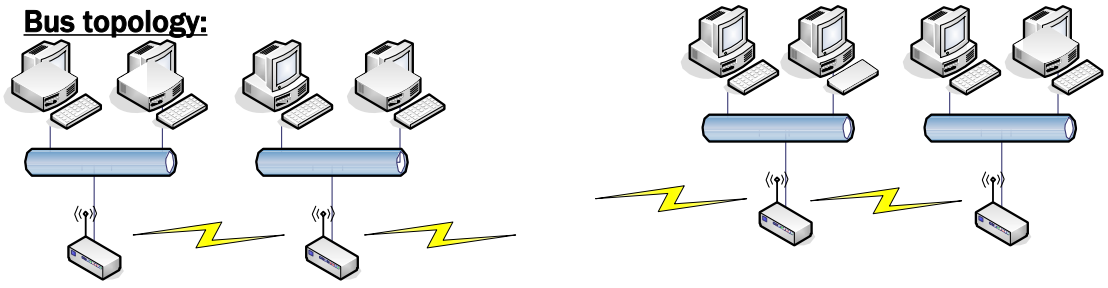
- The bridging devices by WDS must use the same radio channel.
- When the WDS function is enabled, all wireless stations can't connect the device.
- If your network topology has a loop, you need to enable the 802.1d Spanning Tree function.
- You don't need to add all MAC address of devices existed in your network to WDS AP List. WDS AP List only needs to specify the MAC address of devices you need to directly connect to.
- The bandwidth of device is limited, to add more bridging devices will split the more bandwidth to every bridging device.

**WDS network topology**

In this section, we will demonstrate the WDS network topologies and WDS AP List configuration. You can setup the four kinds of network topologies: bus, star, ring and mesh.

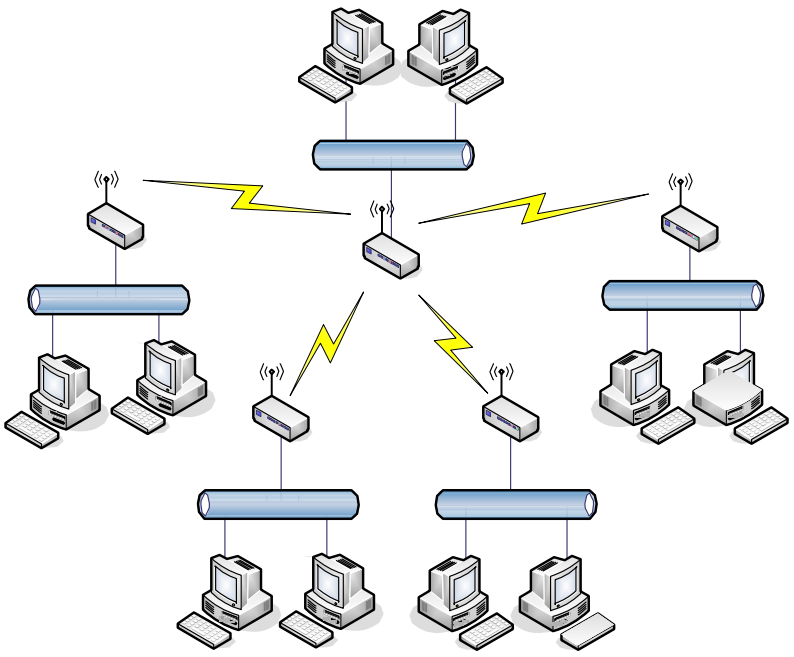
In this case, there are five devices with WDS enabled: WDS1, WDS2, WDS3, WDS4 and WDS5.

**Bus topology:**



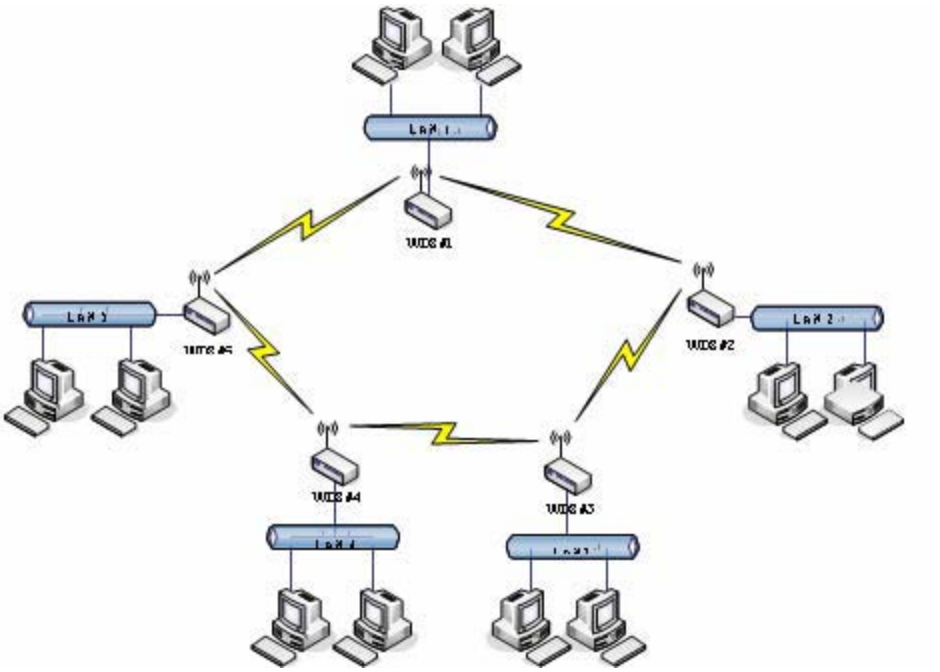
| Device | Entries of WDS AP List | Spanning Tree Protocol Required |
|---|---|---|
| WDS1 | The MAC Address of WDS2 | No |
| WDS2 | The MAC Addresses of WDS1 and WDS3 | No |
| WDS3 | The MAC Addresses of WDS2 and WDS4 | No |
| WDS4 | The MAC Addresses of WDS3 and WDS5 | No |
| WDS5 | The MAC Address of WDS4 | No |

**Star topology**



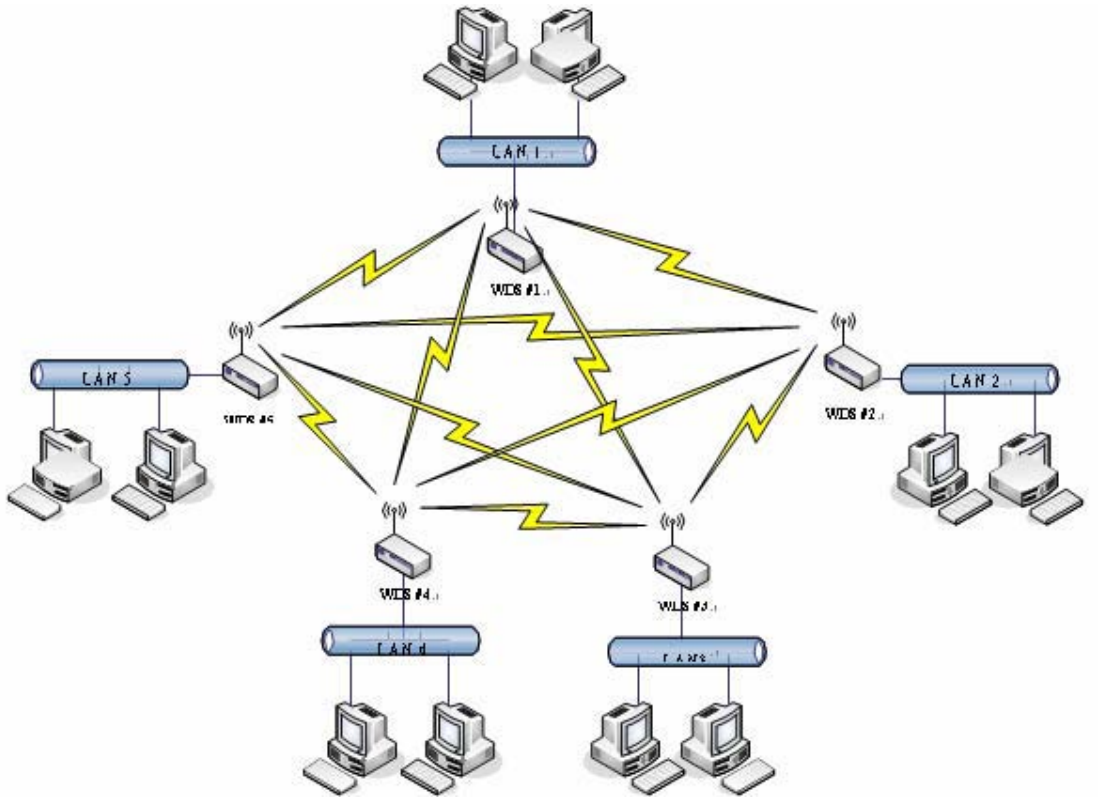
| Device | Entries of WDS AP List | Spanning Tree Protocol Required |
|---|---|---|
| WDS1 | The MAC Address of WDS2, WDS3, WDS4 and WDS5 | No |
| WDS2 | The MAC Address of WDS1 | No |
| WDS3 | The MAC Address of WDS1 | No |
| WDS4 | The MAC Address of WDS1 | No |
| WDS5 | The MAC Address of WDS1 | No |

**Ring topology:**



| Device | Entries of WDS AP List | Spanning Tree Protocol Required |
|---|---|---|
| WDS1 | The MAC Address of WDS2, WDS5 | Yes |
| WDS2 | The MAC Address of WDS1, WDS3 | Yes |
| WDS3 | The MAC Address of WDS2, WDS4 | Yes |
| WDS4 | The MAC Address of WDS3, WDS5 | Yes |
| WDS5 | The MAC Address of WDS4, WDS1 | Yes |

**Mesh topology：**



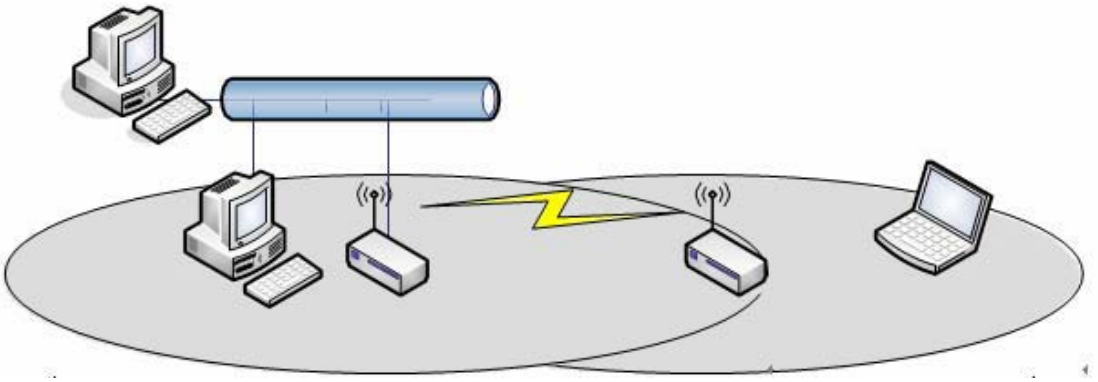

| Device | Entries of WDS AP List | Spanning Tree Protocol Required |
|---|---|---|
| WDS1 | The MAC Address of WDS2, WDS3, WDS4, WDS5 | Yes |
| WDS2 | The MAC Address of WDS1, WDS3, WDS4, WDS5 | Yes |
| WDS3 | The MAC Address of WDS1, WDS2, WDS4, WDS5 | Yes |
| WDS4 | The MAC Address of WDS1, WDS2, WDS3, WDS5 | Yes |
| WDS5 | The MAC Address of WDS1, WDS2, WDS3, WDS4 | Yes |

# WDS Application

### Wireless Repeater

Wireless Repeater can be used to increase the coverage area of another device (Parent AP). Between the Parent AP and the Wireless Repeater, wireless stations can move among the coverage areas of both devices. When you decide to use the WDS as a Repeater, please refer the following instructions for configuration.

- In AP mode, enable the WDS function
- You must set these connected devices with the same radio channel and SSID.
- Choose “WDS+AP” mode.
- Using the bus or star network topology.



| Description | Entries of WDS AP List | Spanning Tree Protocol Requires |
|---|---|---|
| Access Point | The MAC Address of Repeater | Yes |
| Repeater | The MAC Address of Access Point | Yes |

## Wireless Bridge

Wireless Bridge can establish a wireless connection between two or more Wired LANs. When you decide to use the WDS as a Wireless Bridge, please refer the following instructions for configuration.

- In AP mode, enable the WDS function.
- You must set these connected devices with the same radio channel, but you may use different SSID.
- Choose “WDS” mode for only wireless backbone extension purpose.
- You can use any network topology, please refer the WDS topology section.