BW1251
Dual Radio 2.4GHz/5GHz Access Point

www.browan.com

User's Guide V1.0

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Within the band between 5.15 and 5.25 GHz (5GHz radio channels 34 to 48) the U-NII devices are restricted to indoor operations to reduce any potential harmful interference to MSS operations.

FCC Warning

FCC 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.

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.

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.

FCC 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 20cm between the radiator & your body.

If this device is going to be operated in 5.15 ~ 5.25GHz frequency range, then it is restricted in indoor environment only.

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

The availability of some specific channels and/or operational frequency bands are country dependent and are firmware programmed at the factory to match the intended destination. The firmware setting is not accessible by the end user.

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About this Guide

Purpose

This document provides information and procedures on hardware installation, setup, configuration, and management of the BROWAN high performance Dual Radio 2.4GHz/5GHz AP BW1251.

Prerequisite Skills and Knowledge

To use this document effectively, you should have a working knowledge of Local Area Networking (LAN) concepts and wireless Internet access infrastructures. In addition, you should be familiar with the following:

- Hardware installers should have a working knowledge of basic electronics and mechanical assembly, and should understand related local building codes.
- Network administrators should have a solid understanding of software installation procedures for network operating systems under Microsoft Windows 95, 98, Millennium, 2000, NT, and Windows XP and general networking operations and troubleshooting knowledge.

Conventions Used in this Document

The following typographic conventions and symbols are used throughout this document:

	Very important information. Failure to observe this may result in damage.
	Important information that should be observed.
	Additional information that may be helpful but which is not required.
bold	Menu commands, buttons and input fields are displayed in bold
`code`	File names, directory names, form names, and system-generated output such as error messages are displayed in constant-width type
<value>	Placeholder for certain values, e.g. user inputs
[value]	Input field format, limitations, and/or restrictions.

Help Us to Improve this Document!

If you should encounter mistakes in this document or want to provide comments to improve the manual please send e-mail directly to:

manuals@browan.com

BROWAN Technical Support

If you encounter problems when installing or using this product, please consult the BROWAN website at www.browan.com for:

- Direct contact to the BROWAN support centers.
- Frequently Asked Questions (FAQ).
- Download area for the latest software, user documentation and product updates.

Chapter 1 – Introduction

Thank you for choosing the BROWAN Dual Radio Access Point BW1251.

The BROWAN BW1251 operates simultaneously in both 5 GHz and 2.4 GHz frequency bands and is fully compliant to 802.11b/g and 802.11a standard with its high performance and enhanced security. The two Dual-Band radio (a/g + a/g) feature supplies the furthest in flexibility and makes sure low interference and large coverage. The a+g operation mode and Multiple BSSID that this product provides differentiate it from traditional indoor AP product.

Two radios are under firmware controlled not to use the same channel or a channel which is separated less than 4 channels and is not user changeable.

Product Overview

Flexibility and High performance

BROWAN BW1251 is built as a high-performance and feature-rich indoor Access Point. With two dual-band radios operating AP, Bridge and Repeater working modes can provide the furthest flexible wireless network deployment:

- Simultaneously supports 802.11a/b/g in one platform
- Dual AP configuration for high client density environment
- Dual AP configuration for supporting all kinds of client (11a/b/g)
- Mix of AP and Bridge configuration for enhancing wireless coverage by wireless repeating and wireless bridging

Secure and Reliable Wireless Networking

BROWAN's BW1251 supports and meets all security requirements of wide area networking professionals for secured wireless network:

- Supports VLAN, up to 16 VLAN ID per Radio
- IEEE 802.1x/EAP with password, certificates and SIM card (EAP/TLS, EAP/PEAP, EAP/SIM and EAP/TTLS)
- 64bits/128bits static and dynamic WEP key
- Supports Wi-Fi protected Access (WPA/WPA2) with AES and TKIP
- Layer 2 Isolation for preventing snooping on the same radio
- MAC ACL for preventing illegal attacking from Internet
- Hidden SSID broadcast to prevent illegal users connection

Strong Anti-interference

Dynamic Channel Allocation (DCA) solution automatically selects optimal operational frequency channel during power up and periodically monitors the environment and adjusts for the best operational channel.

Multiple BSSID

Support up to 16 BSSID per radio and each can be configured independently to support different range of security policy, authentication methods, RADIUS servers and VLAN IDs. Each BSSID can be set by its priority on a basis of 802.1p tag or 802.11e EDCA which enables WLAN client device to access wireless link QoS capabilities.

Simple Installation

Support IEEE 802.3af Power-over-Ethernet as well as external power supply by power adaptor. This reduces the cost and the effort of installation and maintenance dramatically.

Easy Remote Management and Maintenance

BROWAN's BW1251 supports remote management with HTTPS, CLISH and SNMP:

- Web-based user interface with HTTPS request and CLISH configuration with SSHv2 request supplies a secure remote management
- BROWAN's Network Management System supplies the system management solution
- DHCP Server/DHCP Relay/DHCP Client service supplies flexibility for different network setup
- Remote software upgrade via HTTPS

Management Option

You can use the Access Point management systems through the following interfaces:

- Web-browser interface with HTTPS
- Command Line Interface (CLI) with optional SSH
- Simple Network Management Protocol

This user's guide provides detailed description of the management for the web-browser interface.

Features Highlight

Super AP

Multiple BSSID (up to 16)

- SSID per BSSID
- Enabled or Disabled Hidden SSID per BSSID
- VLAN ID per BSSID
- QoS priority per BSSID based on 802.1p or EDCA
- AAA way per BSSID, 802.1x and web login
- Co-existence of 802.1x and web login
- Security policy per BSSID
- WPA pass-through
- RADIUS server per BSSID
- Traffic priority per BSSID

AAA

- RADIUS client supporting
- 802.1x supporting(EAP/TLS,EAP/TTLS, EAP/PEAP and EAP/SIM)

- Accounting supporting (RFC 2866)

Security

- Static 64/128bits WEP, Dynamic 64/128bits WEP
- WPA/TKIP and WPA/AES support
- MAC ACL
- Access Control (accept rule and deny rule) based on MAC address
- Layer 2 Isolation
- Hidden SSID

Management

- Secure management via HTTPS, CLISH, SNMP
- Standard MIB and BROWAN Private MIB
- BROWAN NMS Support
- Detail Client Survey
- Network interface statistics
- Remote firmware update via WEB UI
- Backup/Restore configuration file
- DHCP Server
- Kickstart Tool
- Bridge/Client Diagnostic tool
- NTP support and setting time manually

Maintenance

- Software watchdog

Super Bridge

- 802.11a/b/g compliant
- 108Mbps raw data rate supporting
- Up to 8 bridge links supporting
- Special radio for Bridge
- WPA/PSK over Bridge link

Chapter 2 - Installation

This chapter provides installation instructions for the hardware and software components of the Access Point BW1251. It also includes the procedures for the following tasks:

- Hardware Introduction (LEDs, Connectors)
- Connecting the Access Point
- Software Installation

The Product Package

The product deliverables:

- BW1251 Dual Radio 2.4GHz/5GHz Access Point
- Detachable Antennas (Dual Band Dipole Antenna with R-TNC connector)
- Ethernet cable,1.5m
- RS232 Cable
- External power supply
- USA type Power Cord
- EU type Power Cord
- Screw Bag (Robber Foot is included)
- Release Post
- Installation CD containing:
  - BW1251 User's Guide in PDF format
  - KickStart Utility
  - Bridge/Client Diagnostic Utility
  - Product Firmware
  - Release Notes
  - Adobe Acrobat Readers
- Printed 3 Years Warranty Statement Card

If any of these items is missing or damaged, please contact your reseller or BROWAN sales representative.

Hardware Introduction

General Overview

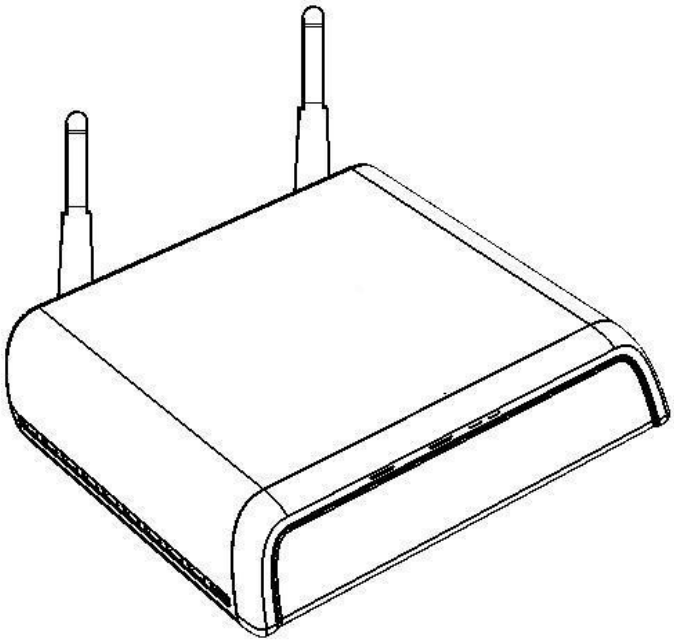


Figure 1 – BW1251 General View

The front panel of BW1251 contains:

- There are 4 indicator lights (**LEDs**) that help to describe the state of various networking and connection operations.

The rear panel of BW1251 contains:

- **Connectors** which enable you to make different network connections for the device
- **Reset** button enables you to reboot or reset the device configuration to the factory defaults

Press the **Reset** button for **less** than **5** seconds to **reboot** the device.

Press the **Reset** button for **more** than **5** seconds to **set** the device **to factory defaults**.

Bottom Cover

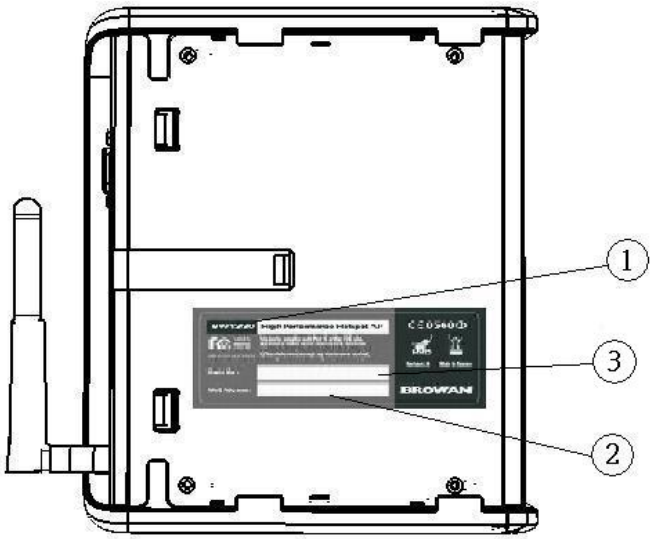


Figure 2 –Bottom Cover of the BW1251

The Bottom Cover of the BW1251 contains:

1. **Back Label** with Model and Device name. The official device name is **Dual Radio 2.4GHz/5GHz Access Point**, model **BW1251**.
2. **Serial Number label** of the device.
3. **MAC address label** of the device. The MAC label shows the WLAN1 interface MAC address of the device.

LEDs

The BW1251 Access Point has 4 LEDs located on the front panel:

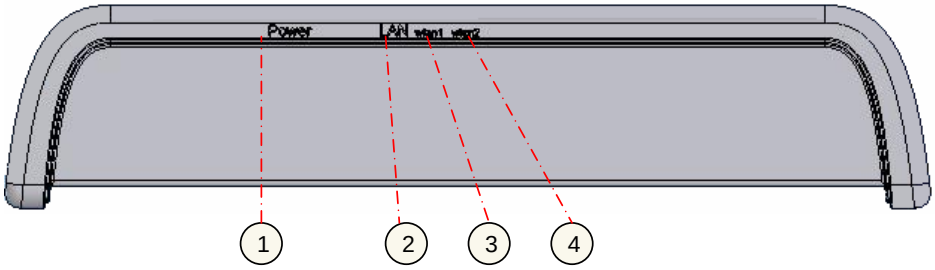


Figure 3 – LEDs of the BW1251

The various states of the LEDs indicate different networking and connection operations as follows:

Item	LED	Color	Status	Indication
1	Power	Green	On	BW1251 is active/working
			Blink	BW1251 is booting
2	LAN	Green	On	BW1251 Ethernet Port Link Active
			Blink	BW1251 Ethernet Port is Transmitting and Receiving data
3	Wireless1	Green (802.11g module is functional)	On	BW1251 WLAN1 RF card Active
			Blink	BW1251 WLAN1 RF card is Transmitting and Receiving data
		Amber (802.11a module is functional)	On	BW1251 WLAN1 RF card Active
			Blink	BW1251 WLAN1 RF card is Transmitting and Receiving data
4	Wireless2	Green (802.11g module is functional)	On	BW1251 WLAN2 RF card Active
			Blink	BW1251 WLAN2 RF card is Transmitting and Receiving data
		Amber (802.11a module is functional)	On	BW1251 WLAN2 RF card Active
			Blink	BW1251 WLAN2 RF card is Transmitting and Receiving data

Connectors

The BW1251 has several connectors on the rear panel:

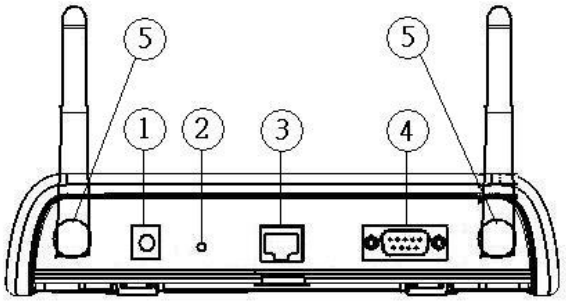


Figure 4 – Connectors

Descriptions of the connectors are given in the following table:

Item	***Connector***	***Description***
1	Power Jack	For DC12V power supply
2	Reset button	Reboot or reset to factory defaults. Press the reset bottom for **less** than **5** seconds to **reboot** the Access Point. Press the reset bottom for **more** than 5 seconds to reset the Access Point to **factory defaults**
3	LAN	Connect to the RJ45 port of your laptop for configuration or connect to the PoE device for power supply and network connection
4	Console	For console connection
5	R-TNC Connector	For Antenna connection

Stand

The BW1251 is designed to stand alone. Refer to the direction of red arrow to release and insert the stand on the back of BW1251.

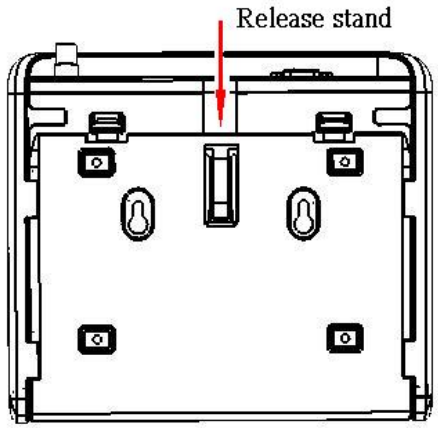


Figure 5 – release stand

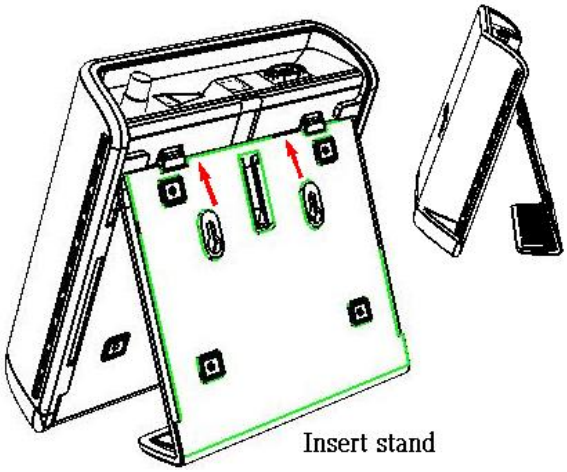


Figure 6 – insert stand

Wall Mount

BW1251 is also designed for wall mounting. Refer to the step 1 and step 2 to fix the stand on the wall and lock the BW1251 on it.

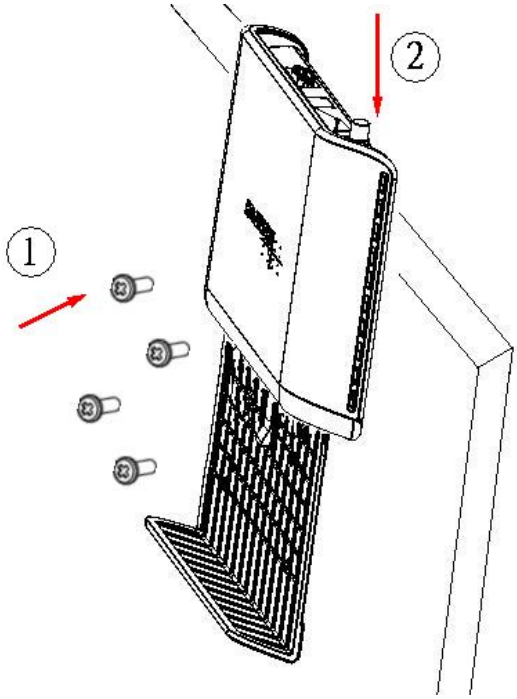


Figure 7 – wall mount

Connect to the Power Source and Local Network

BW1251 can be powered on by connecting to either one of the following two devices:

- Power-over-Ethernet
- External Power Adapter

Case 1 **Use the Power-over-Ethernet:**

Use the enclosed power cord and any IEEE802.3af Compliant POE Power Source Devices to supply power to your BW1251 Access Point.

Step 1 Place the Access Point on a flat work surface or mount it on the wall.

Use the enclosed 4 screws to put the rear side of the Access Point hanging on the wall.

Step 2 Connect the Ethernet cable from the BW1251 route to an IEEE802.3af compliant Power source Equipment, such as BE3011 POE HUB, E-820 POE Switch products of BROWAN.

Step 3 If you use the BE3011 POE HUB, please connect the BW1251 LAN port to the DATA&POWER OUT port of BE3011 and connect the BE3011 DATA-IN port to the switch or hub in the local network.

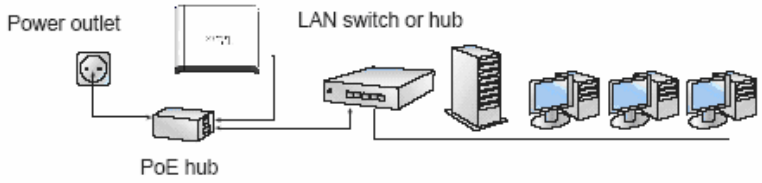


Figure 8 – Connect BW1251 to Power source and network by PoE HUB

Case 2 **Use External Power Adapter**

Step 1 Place the Access Point on a flat work surface or mount it on the wall.

Step 2 Use the enclosed Ethernet cable to connect the LAN port of the Access Point to the Switch or hub in the local network.

Step 3 Connect the power supply to the Access Point.

Software Installation

Initialization

There are two ways to connect to the BW1251's web service: either entering the BW1251's IP address and subnet (default networks settings) into the browser or launch the **KickStart** utility provided on your product CD.

The default network settings for your new access point are:

```
LAN port:            IP 192.168.2.2       subnet 255.255.255.0
```

Software Introduction: KickStart

The BROWAN **KickStart** is a software utility included on the Installation CD.

The utility automatically detects access points or access controllers installed on your network regardless of its host IP address and lets you configure each unit's IP settings. The feature list for the **KickStart** utility is listed below:

- Scanning your subnet for all connected APs, ACs
- Quick access to your AP via HTTPS, telnet, SSH

To install the **KickStart** utility, insert the Installation CD into your CD-ROM drive. Find and install the utility from the product CD into the computer.

If the Installation CD does not start automatically, please run "**autorun.exe**" manually from the root directory of the installation CD.

Access Your BW1251

There are two ways to connect to your BW1251's web service:

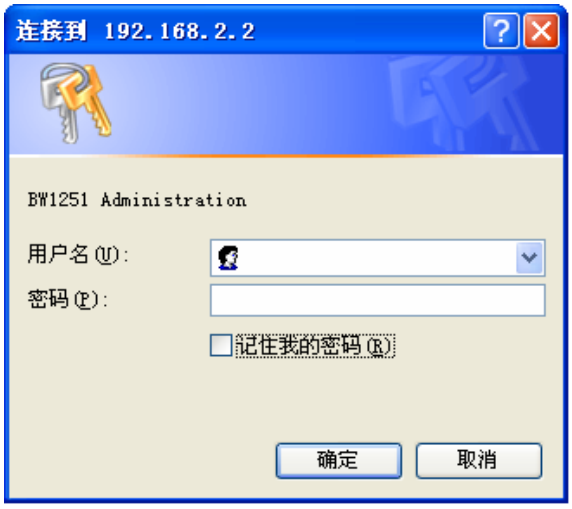
- Use the **Web browser**.
- Launch the **KickStart** utility on your product CD.

If first method is preferred, please follow these instructions:

Step 1 Configure local PC with a static IP address at the range of 192.168.2.1~254 with subnet mask 255.255.255.0. Connect the BW1251 to local PC on the same physical network. Open web browser of the local PC and enter the default IP address of the BW1251 on the address bar: https://192.168.2.2

Step 2 Enter the BW1251 administrator login credential to access the Web management page.

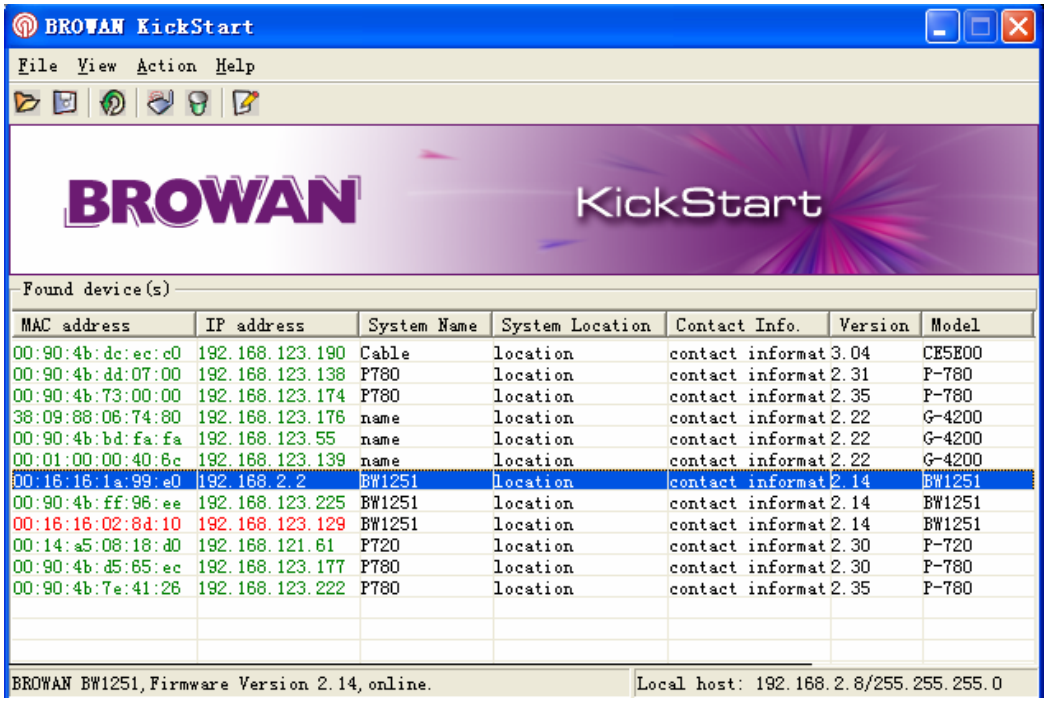
The default administrator log on settings for all access point interfaces are:
User Name: **admin**
Password: **admin01**



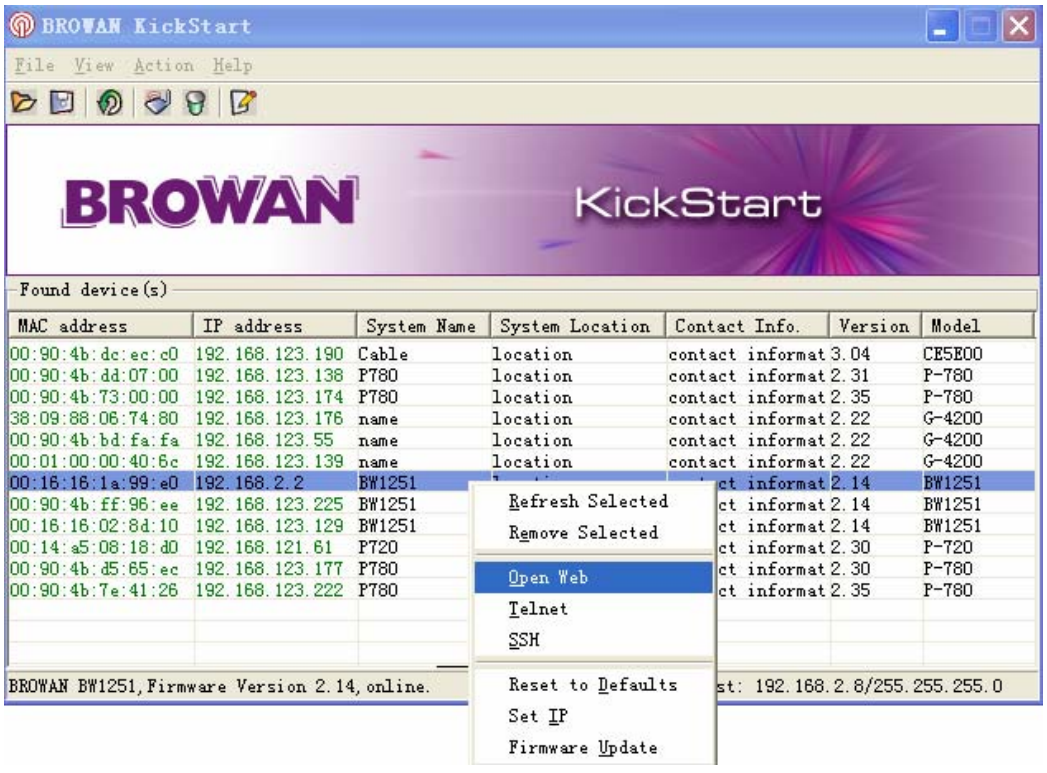
Step 3 After successfully logging on, you will see the main page of the BW1251's **Web user interface**:

If second method is prefered, please follow the instructions:

Step 1 Install the **KickStart** utility from the **product CD**. Click **Start > Programs > BROWAN > KickStart** to launch the application. If the BW1251 device is connected to your network, the utility will automatically find your BW1251:



Step 2 Select your controller and right click. Select **Open WEB** item to launch the web management interface through the secure https connection:



Step 3 Enter the BW1251 administrator login credential to access the **web management** interface.

The default administrator log on settings for all access point interfaces are:
User name: **admin**
Password: **admin01**

Step 4 After successfully logging on, you will see the **web interface**.

Chapter 3 – Application Mode

The two Dual-Band radios (a/g + a/g) supply the furthest flexible application. Three application modes are supplied by BW1251:

- AP + AP mode
- AP + Bridge mode

AP + AP Mode

AP + AP configuration can be for client density environment.

The typical recommended usage is: 11g AP + 11a AP.

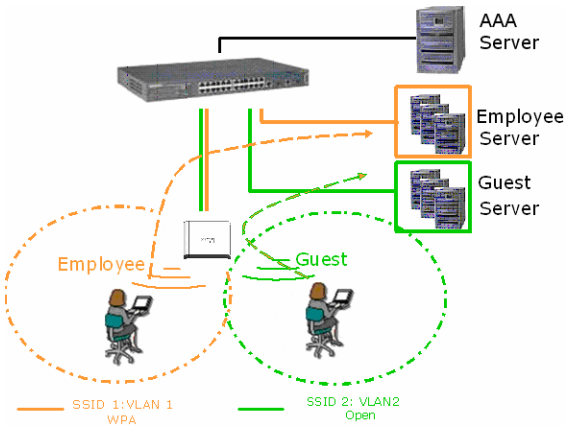


Figure 9 – AP +AP application mode

AP + Bridge Mode

AP + Bridge configuration is for environment with last mile issue.

The typical recommended usage is: 11g AP + 11a Bridge.

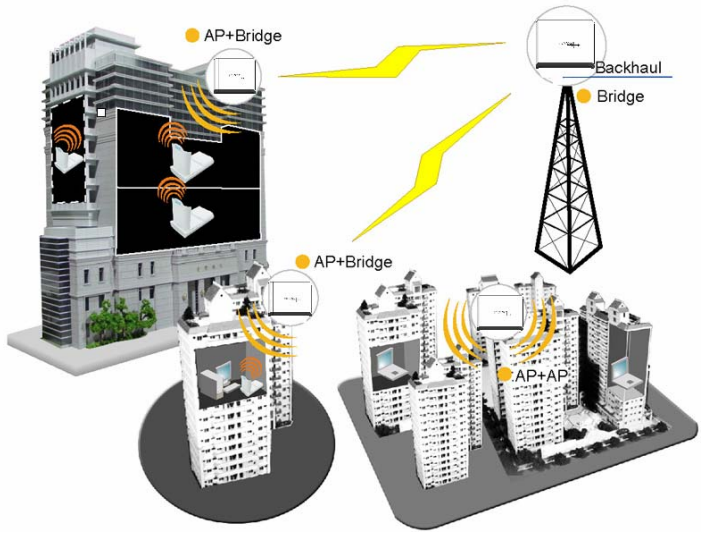


Figure 10 – AP +Bridge application mode

Because of the antenna interference, the performance will deteriorate dramatically if the same band (2.4GHz or 5GHz) is used on both RF modules. It is strongly recommended that one RF module uses 2.4GHz and the other uses 5GHz.

Chapter 4 – Reference Manual

This chapter contains web management reference information.

The **web management** main menu consists of the following sub menus:

- **Status** – device status
- **Network** – device settings affecting networking
- **Wireless** – device settings related to the wireless part of the BW1251
- **System** – device system settings directly applicable to the BW1251
- **Exit** – exiting the web management UI and closing the browser window

Web Interface

The main **web management** menu is displayed at the top of the page after successfully logging into the system (see the figure below). From this menu all essential configuration pages are accessed.

Figure 11 – Main Configuration Management Menu

The **web management** menu has the following structure:

Status

Device Status – showing the status related with the whole device

Wireless Status – showing the status of the two radios

Interface Statistics – showing the status of each network interface

Network

Interface – TCP/IP settings of BW1251 LAN (Bridge) port

RADIUS Server – specifying the settings of RADIUS server used by 802.1x or WPA

DHCP Settings– specifying the settings of DHCP server or DHCP relay service

NTP Settings – NTP settings of BW1251

Time Settings – Setting time manually

Wireless

Basic – specifying the basic settings related with wireless part

Advance – specifying the settings of multiple BSSID or Bridge

WEP – specifying the WEP settings related with static WEP encryption

MAC ACL – MAC ACL settings for BW1251

System

Security – setting access permission to your BW1251

SNMP – SNMP service

Telnet – Telnet/SSH service

Configuration – system configuration utilities, including Backup/Upload configuration

Reset – rebooting device and restoring systems to the factory default

Upgrade – Upgrading the firmware remotely

In the following sections, short references for all menu items are presented.

Status

Status | Device Status

The *device status* page shows important information of the BW1251, its system status and network configuration.

System	
System Version	BW1251.WHT.2.14.2804
Uptime	0 day(s) 03:36
System Time	1970/01/01/ 03:35
Wlan1 MAC	00:16:16:1a:99:e0
Wlan2 MAC	00:16:16:1a:99:f0
Free System Memory	35,972 K bytes
Total System Memory	63,388 K bytes

Network	
LAN Mode	static-IP
LAN IP	192.168.2.2
LAN Mask	255.255.255.0
Gateway	0.0.0.0
VLAN	Disabled
VLAN ID	

Note:

Figure 12 – Device Status

System Version – displaying the current firmware version of the BW1251

This is important information when seeking support from BROWAN and preparing firmware upgrading

Uptime – indicating the time, expressed in days, hours and minutes since the system was last rebooted.

System Time – showing the current time of the BW1251.

Wlan1 MAC / Wlan2 MAC – showing the MAC addresses of the two wireless interfaces of the BW1251

Free System Memory – indicating the memory currently available in the BW1251

Total System Memory – indicating the total memory in the BW1251

LAN Mode – indicating whether static IP or DHCP client is used for BW1251 LAN IP address

LAN IP – showing the LAN IP address of BW1251

LAN Mask – showing the LAN Network Mask of BW1251

Gateway – showing the default gateway of BW1251

VLAN – specifying whether to manage this device via VLAN.

VLAN ID – specifying VLAN ID when managing this device via VLAN.

Status | Wireless Status

The *wireless status* shows the information related to BW1251's two wireless interfaces.

Radio1	
Channel	11
Domain	WORLD
Mode	AP
Band	2.4GHz(Mixed 11g)
Layer2 Isolation	disabled
Total Connected Clients	1
Antenna Gain	2 dBi
Output Power	19 dBm
MAC ACL	disabled

Radio2	
Channel	60
Domain	WORLD
Mode	AP
Band	5GHz(11a)
Layer2 Isolation	disabled
Total Connected Clients	0
Antenna Gain	2 dBi
Output Power	18 dBm
MAC ACL	disabled

Figure 13 – Wireless Status

Radio1 / Radio2 – the wireless interfaces of the BW1251

Channel – indicating the channel in use.

Domain – indicating regulatory domain set on the BW1251

Mode – the mode used for the wireless interface (AP or Bridge)

Band – specifying which band is in use for the wireless interface

Layer2 Isolation – specifying the status of Layer2 Isolation service on the wireless interface

Total Connected Clients – indicating number of the clients currently connected to your BW1251

Antenna Gain – indicating antenna Gain value.

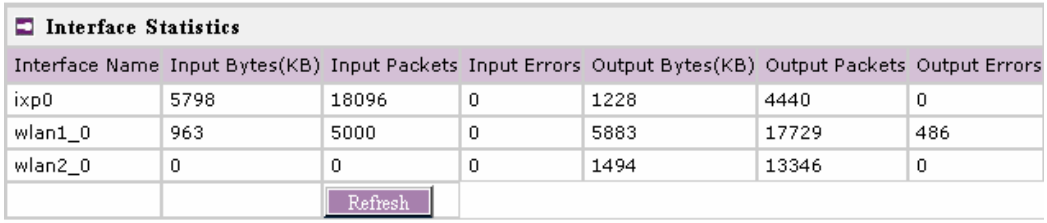
Output Power – indicating output power of the RF card, not including antenna gain.

MAC ACL – indicating the status of MAC ACL feature on BW1251

格式化: 字型: (中文) 新細明體, (中文) 中文 (台灣)

Status | Interface Statistics

The *Interface Statistics* shows each network interface status, including Input / Output bytes, packets or error.



Interface Statistics

Interface Name	Input Bytes(KB)	Input Packets	Input Errors	Output Bytes(KB)	Output Packets	Output Errors
ixp0	5798	18096	0	1228	4440	0
wlan1_0	963	5000	0	5883	17729	486
wlan2_0	0	0	0	1494	13346	0
		Refresh				

Note:

Figure 14 – Interface Statistics

Interface Name – showing the name of each network interface, where ixp0 is related to LAN interface, wlan1_x is related to WLAN1 sub-interface and wlan2_x is related to WLAN2 sub-interface.

Input Bytes (KB) – showing the total number of bytes received on the network interface. The byte number is displayed in KB.

Input Packets – showing the number of packets received on the network interface.

Input Errors – showing the number of packets containing errors preventing them from being received correctly.

Output Bytes (KB) – showing the total number of bytes transmitted out of the network interface. The byte number is displayed in KB.

Output Packets – showing the number of packets transmitted out of the network interface.

Output Errors – shows the number of packets containing errors preventing them from being transmitted out correctly.

Refresh – getting the updated network interface information.

Network

Network | Interface

The interface configured is bridge device, therefore only one interface is displayed here for configuration.

Bridge interface and its settings are listed on the **Interface** page.

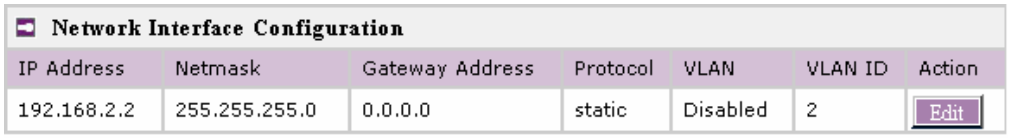


Figure 15 – Interface Configuration Table

To change network interface (bridge) configuration properties, click the **Edit** button in the **Action** column. The **status** can be changed now:

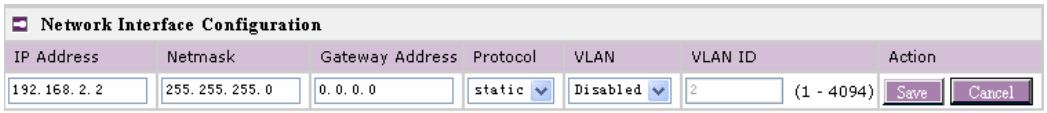


Figure16 – Edit Interface Configuration Settings

IP Address – specifying new interface IP address [in digits and dots notation, e.g. 192.168.123.70].

Netmask – specifying the subnet mask [[0-255].[0-255].[0-255].[0-255]].These numbers are a binary mask of the IP address, which defines IP address order and the number of IP addresses in the subnet.

Gateway Address – interface gateway. For Bridge type interfaces, the gateway is always the gateway router.

Protocol – specifying **static** for setting IP address manually and **dhcp** for getting IP address dynamically acting as DHCP client.

When **dhcp** is used for getting IP address, Kickstart is strongly recommended to find your device.

VLAN – specifying whether to manage this device via VLAN.

VLAN ID – specifying VLAN ID when managing this device via VLAN.

Save – saving the entered values.

Cancel – restoring all previous values

Change status or leave the default state if no editing is necessary and click the **Save** button.

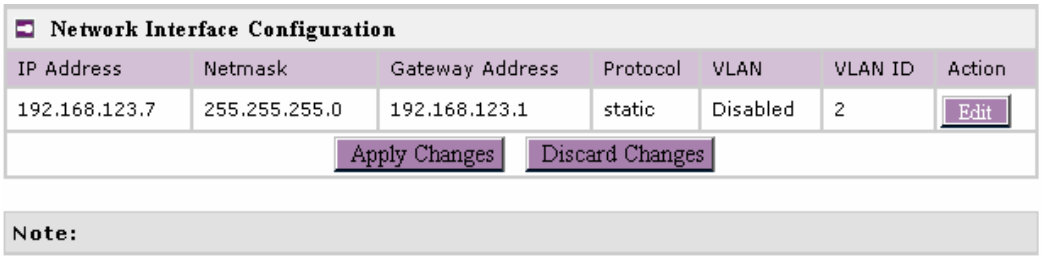


Figure 57 – Apply or Discard Interface Configuration Changes

Apply Changes – saving all changes in the **interface** table at once.

Discard Changes – restoring all previous values.

Every time the settings are changed, the BW1251 needs to be restarted to apply all settings changes when clicking **Apply Changes**. Request for server reboot appears:

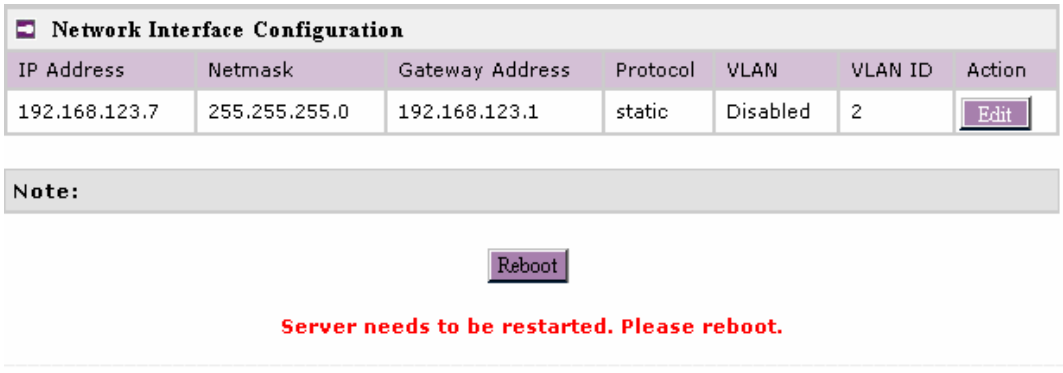


Figure 18 – Reboot Server

Reboot – restarting the server and applying the changes.

If there is no other setting needed to be modified, click the **Reboot** button to apply all modifications.
And if there are still other setting modifications needed, go ahead to finish all changes and then click **Reboot** button to restart and apply all settings together.

To reboot at once, click **Reboot** button and wait a moment. And the message of reboot appears as shown below:

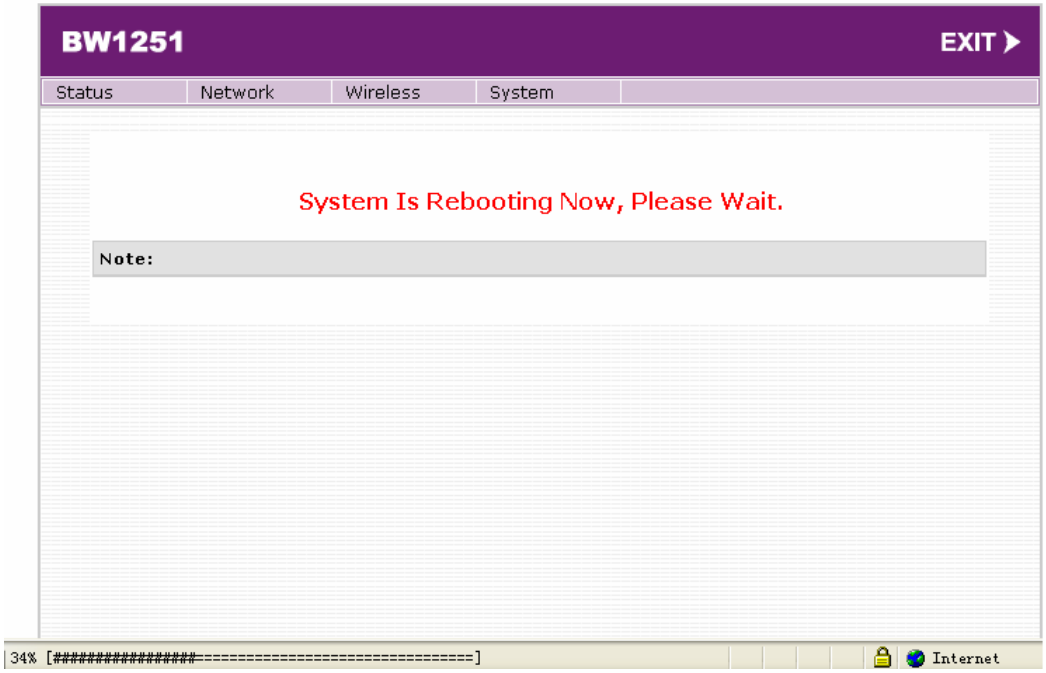


Figure 19 – Reboot Information

Network | RADIUS Server

Up to **32** different RADIUS servers can be configured under the **RADIUS servers** menu.

By default, one **RADIUS** server is specified for the system:

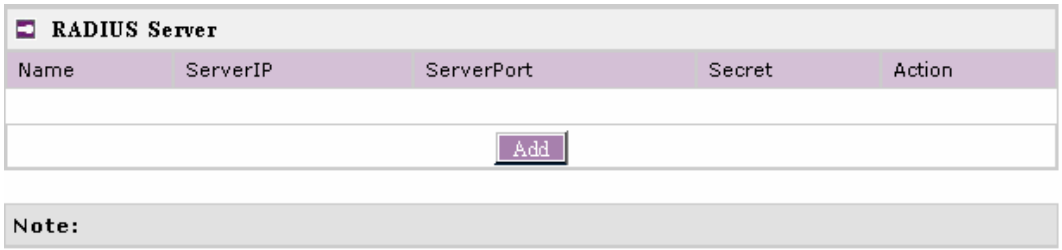


Figure 20 – RADIUS Servers Settings

Add – adding a new RADIUS server.

Click **Add** to configure RADIUS server settings.

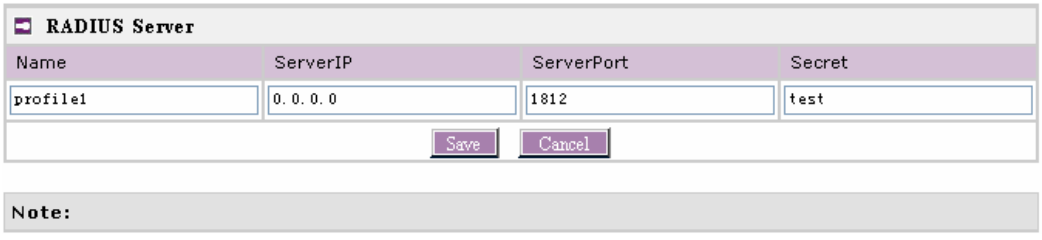


Figure 6 – RADIUS Server's Details

Name – specifying the new RADIUS server name used for selecting RADIUS server.

Server IP – authentication RADIUS server IP address [dots and digits].

Server Port – specifying the network port used to communicate with RADIUS [1-65535].

The default port value for authentication is 1812.
The default port value for accounting is 1813.
The port specified here must be the same with the one on the RADIUS server.

Secret – shared secret string used to make sure the integrity of data frames used for authentication server.

Save – adding a new specified RADIUS server.

Cancel – restoring all previous values

After adding a new RADIUS server or editing an existing one, the following control appears:

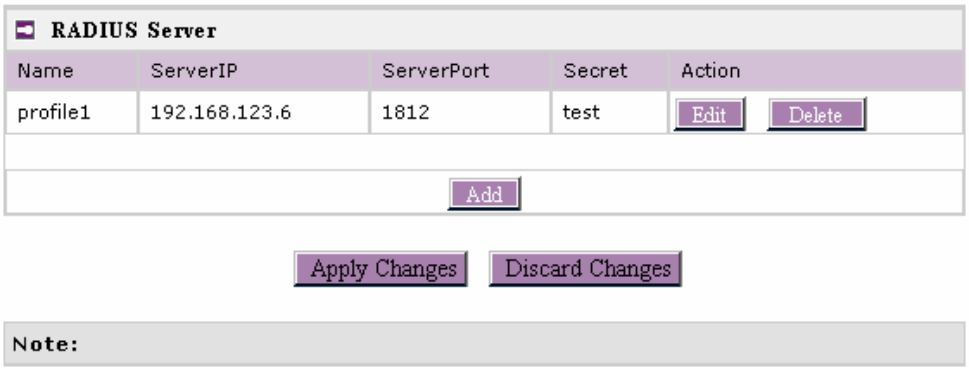


Figure 7 – Apply or Discard RADIUS Server Changes

Edit – editing an existing RADIUS server settings

Delete – deleting an existing RADIUS server settings

Click **Apply Change** to apply all the changes. Then the following page will appear:

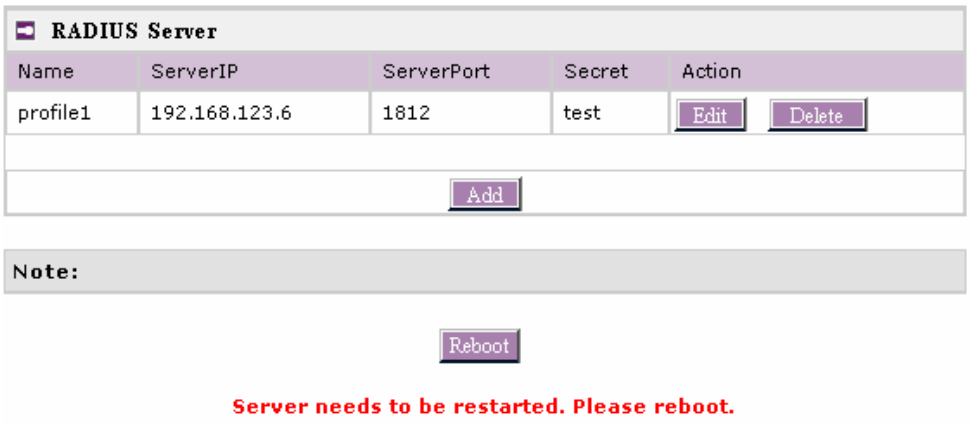


Figure 83 – Reboot Server

Reboot – restarting the access point to apply the changes

If there is no other setting needed to be modified, click the **Reboot** button to apply all modifications.
And if there are still other setting modifications needed, go ahead to finish all changes and then click **Reboot** button to restart and apply all settings together.

Network | DHCP Settings

BW1251 can act as DHCP server or DHCP relay. The DHCP (Dynamic Host Configuration Protocol) service is supported on layer 2 interfaces.

DHCP server and DHCP relay are disabled by default.

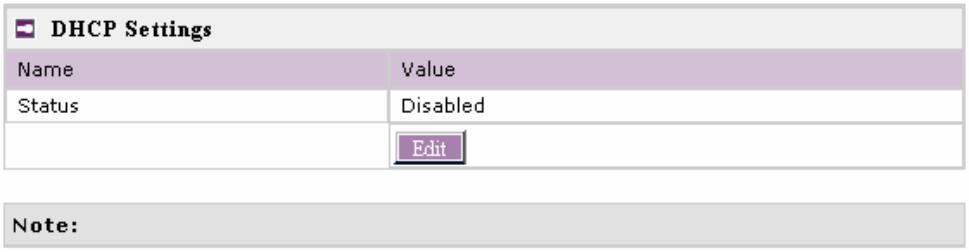


Figure 94 – DHCP Settings

Edit – editing the wireless basic settings

To change DHCP setting properties click the **Edit** button, the DHCP server or DHCP relay service should be configured:

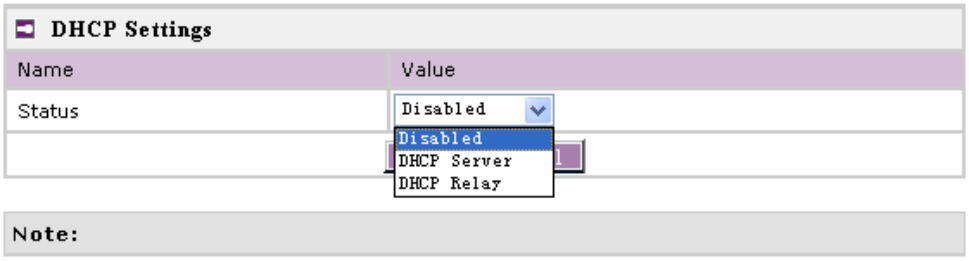


Figure 10 – DHCP Settings

Status – selecting the status from the drop-down menu.

Disabled – disabling the DHCP server service.

DHCP Server – enabling the DHCP server service.

DHCP Relay – enabling the DHCP Relay service.

Choose DHCP Server to enable DHCP server service. Choose DHCP Relay to enable DHCP relay service.

DHCP Server

This DHCP server service enables clients on the LAN to request configuration information, such as IP address from the server. Settings of the DHCP service can be viewed just like the following page.

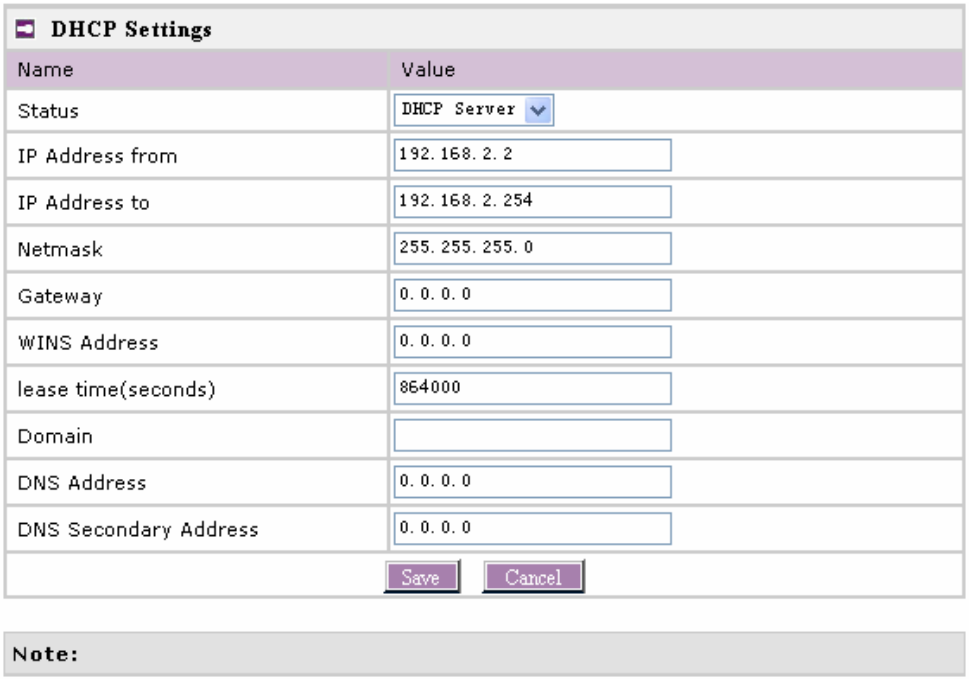


Figure 116 – DHCP server Settings

By default, DHCP server is disabled for BW1251.

IP Address from / IP Address to – specifying the IP address range to be dynamically allocated by the DHCP server.

Netmask – the netmask for IP pool range.

Gateway – the gateway IP for wireless clients.

WINS Address (Windows Internet Naming Service) – specifying the server IP address if it is available on the network [dots and digits].

Lease Time – specifying the IP address lease interval in seconds [1-1000000].

Domain – specifying the DHCP domain name [optional, 1-128 sting].

DNS address – specifying the DNS server's IP address [in digits and dots notation].

DNS secondary address – specifying the secondary DNS server's IP address [in digits and dots notation].

Change status or leave the default state if no editing is necessary and click the **Save** button.

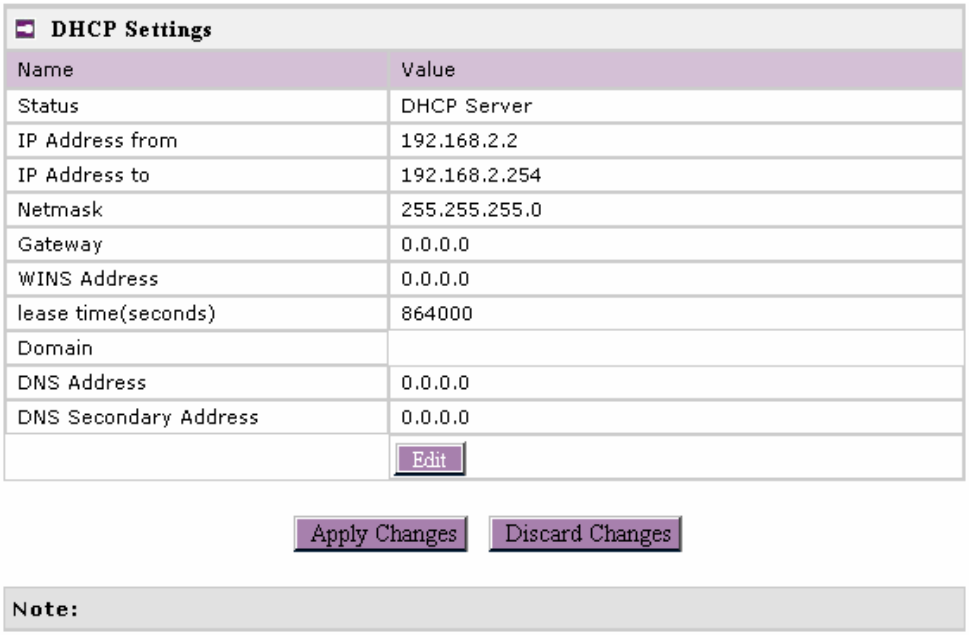


Figure 127 – Apply or Discard DHCP server Settings

The DHCP server settings will be automatically adjusted to match the network interface settings.

The Gateway of DHCP server settings must be same with the Gateway of BW1251

Every time settings are changed, the BW1251 needs to be restarted to apply all settings changes when clicking **Apply Changes**. Request for server reboot appears:

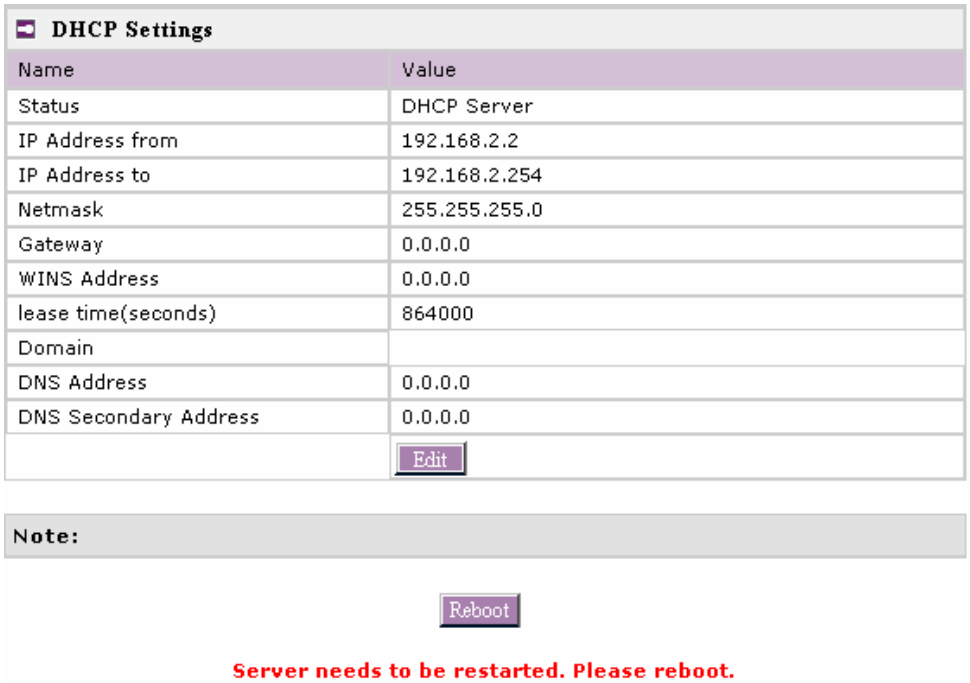


Figure 138 – Reboot information

Reboot – restarting the server and applying the changes.

If there is no other setting needed to be modified, click the **Reboot** button to apply all modifications.
And if there are still other setting modifications needed, go ahead to finish all changes and then click **Reboot** button to restart and apply all settings together.

When BW1251 network Interface uses DHCP to get IP address dynamically, DHCP server service cannot be enabled.

When BW1251 serves as DHCP client to get IP address, the similar WEB UI will appear like the diagram below:

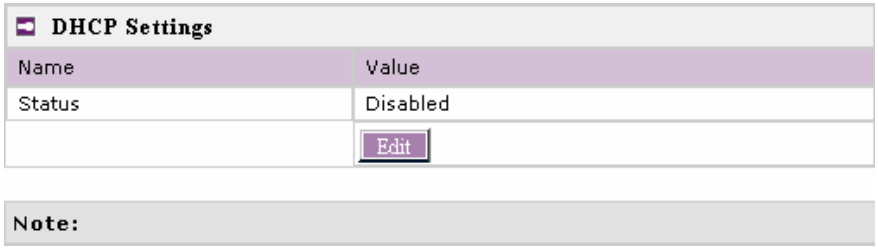


Figure 149 – Warning information

DHCP Relay

To route DHCP through the external server, enable the **DHCP Relay** service.

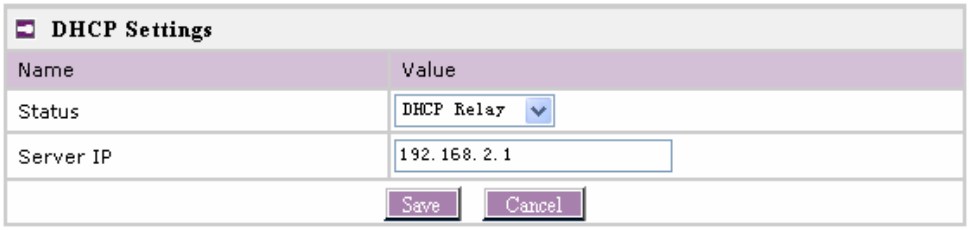


Figure 30 – DHCP Relay settings

Server IP – the IP address of the external DHCP server.

Only one DHCP server can be supported for DHCP relay feature.

Change status or leave the default state if no editing is necessary and click the **Save** button.

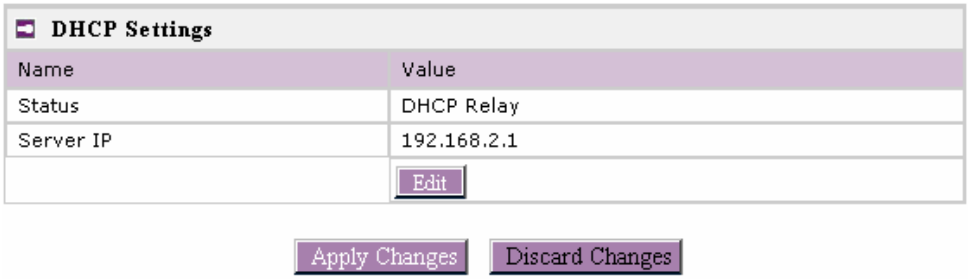


Figure 31 –Apply or Discard DHCP relay Settings

Every time settings are changed, the BW1251 needs to be restarted to apply all settings changes when clicking **Apply Changes**. Request for server reboot appears:

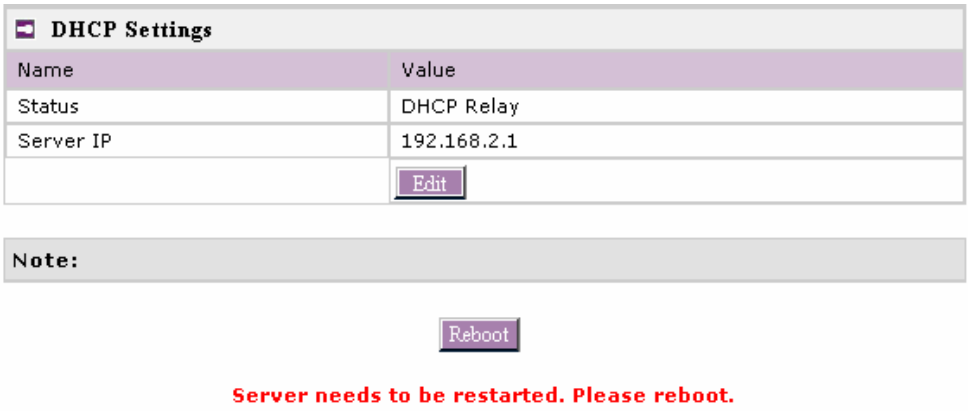


Figure 32 – Reboot information

Reboot – restarting the server and applying the changes.

If there is no other setting needed to be modified, click the **Reboot** button to apply all modifications.
And if there are still other setting modifications needed, go ahead to finish all changes and then click **Reboot** button to restart and apply all settings together.

When BW1251 network interface uses DHCP to get IP address dynamically, DHCP relay service cannot be enabled.

Network | NTP Settings

NTP (Network Time Protocol) is used to synchronize the system time with the selected network NTP server. Use the **Network| NTP Settings** menu to configure the NTP service:

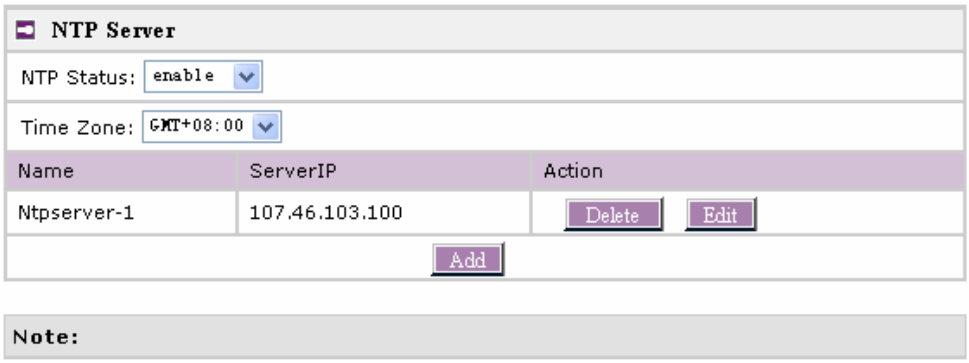


Figure 153 – NTP Settings

NTP Status – enabling or disabling NTP service.

Time Zone – specifying the time zone for NTP service.

Delete – deleting the existed NTP server.

Edit – editing the settings of the existing NTP server.

Add – adding a new NTP server setting to synchronize time.

Clicking the **Add** button to add a new NTP server:

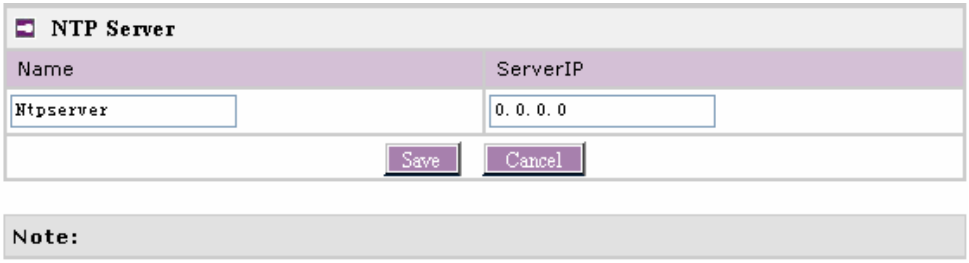


Figure 164 – Add new NTP server setting

Two NTP servers can be configured under **Network | NTP Settings** menu. And only IP address is accepted for NTP server.

It is required to add at least one NTP server before enabling NTP service.

The **Name** of NTP server should be unique.

Change status or leave the default state if no editing is necessary and click the **Save** button.

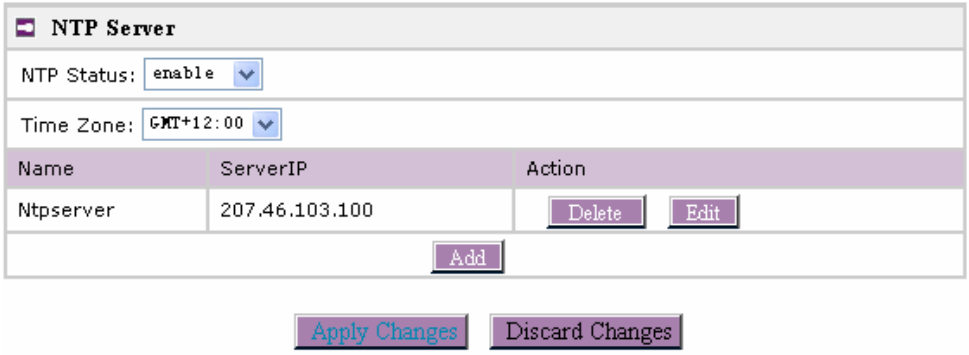


Figure 175 – Apply or Discard NTP server Changes

Choose the Time Zone for your local area time and enable or disable the NTP status

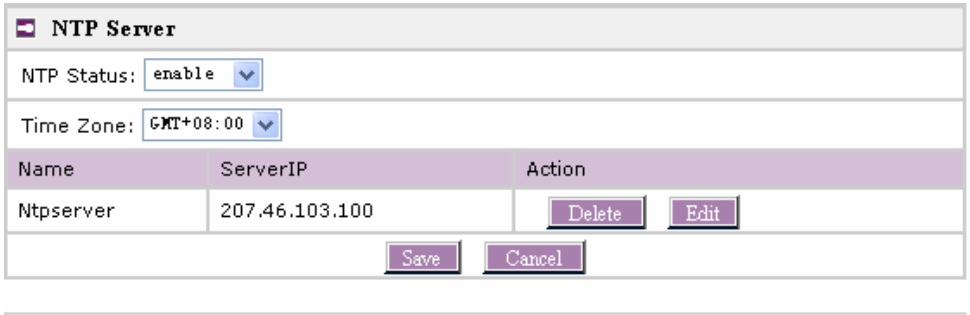


Figure 18 – Edit Time Zone setting/NTP status

Click the **Save** button to save new Time Zone setting.

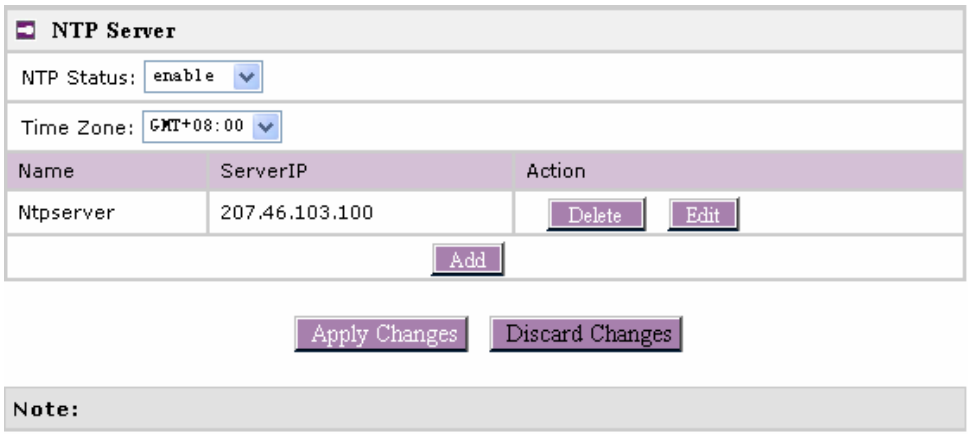


Figure 197 – Apply or Discard Time Zone/NTP status Changes

BW1251 needs to be rebooted to save all configurations. After clicking **Apply Changes**, request for server reboot appears as shown below:

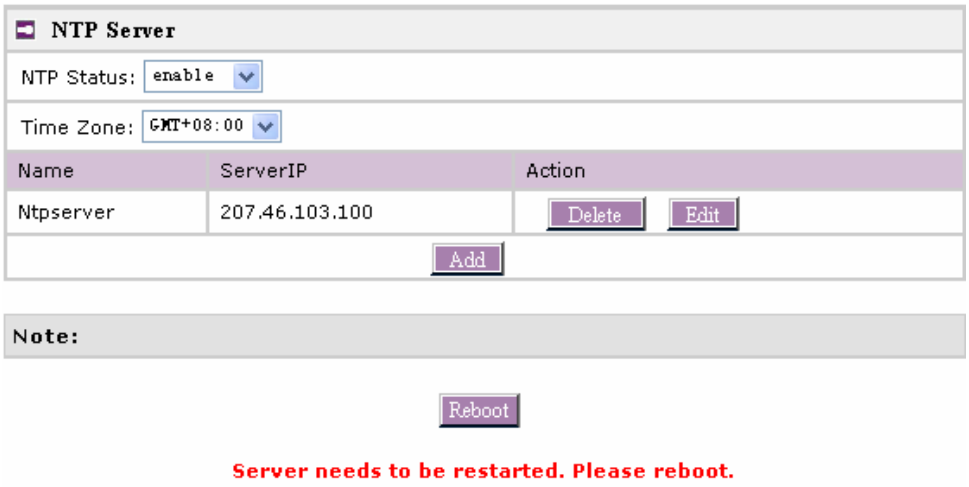


Figure 208 – Reboot information

Reboot – restarting the server and saving the configuration edited

If there is no other setting to be edited, click the **Reboot** button to save all configurations.

And if there are still other settings to be edited, you can ignore the reboot request until you finish all editing,

Network | Time Settings

Configure the system time manually under **Network | Time Settings** menu.

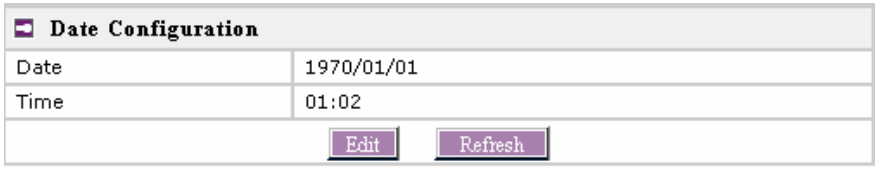


Figure 219 – Time Settings

Click **Edit** to change current system time.

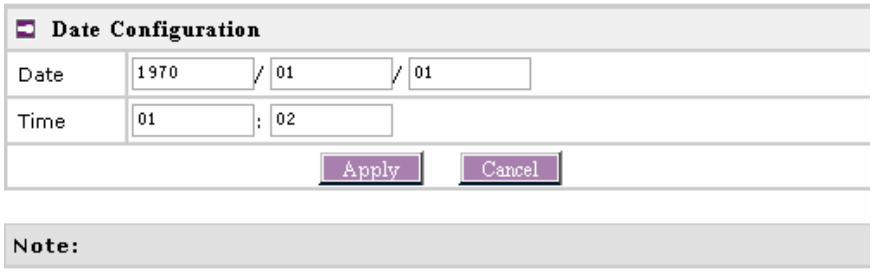


Figure 40 – Edit Date and Time Settings

Change the Date and Time or leave the default value if no editing is necessary and click the **Apply** button. Thus the modified time will be taken effect at once. No reboot is needed.

If NTP is enabled, the local time cannot be modified.

Since BW1251 hasn't RTC (real-time clock), the system time will show 1970/01/01 00:00 every time the device reboots.

Wireless

Wireless | Basic

Use the **wireless | Basic** menu to configure such wireless settings as regulatory domain, channel, band, and power, layer2isolation. Click the **edit** button to change the setting you would like:

Basic Wireless Setting

Radio :	wlan1
Name	Value
Domain	WORLD
Channel	1
Band	2.4GHz(Mixed 11g)
Output Power	19 dBm
Antenna Gain	2 dBi
RTS Threshold	2347 bytes
Layer2 Isolation	disabled
Mode	Bridge
Action	Edit Site Survey

Note:

Figure 41 – Basic Wireless Settings with static channel selection

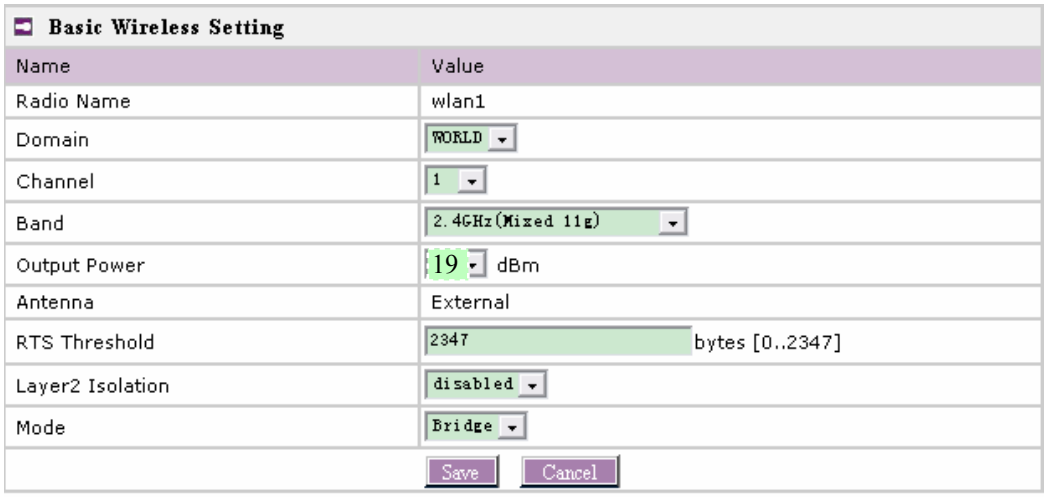


Figure 42 – Basic Wireless Settings with DCA enabled

Radio – specifying which wireless interface of BW1251 is shown.

Domain – showing the regulatory domain.

Static Channel / Auto Channel – showing the channel that the access point will use to transmit and receive information.

If DCA (Dynamic Channel Allocation) is enabled, this will show Auto Channel and its channel number is chosen by auto channel selection.
If use static channel, this will show Static Channel and its channel number.

DCA (Dynamic Channel Allocation) is a very useful feature to help choosing the best channel automatically and reduce interference among many Access Points.

Band – showing the working band on the working radio.

Five bands are supplied: 5GHz (11a), 2.4GHz (Mixed 11g), 2.4GHz (11g only), 2.4GHz (Mixed 11g WiFi) and 2.4GHz (11g only WiFi).

2.4GHz (Mixed 11g) or 2.4GHz (11g only) – the radio will work on 2.4GHz for the better performance. 2.4GHz (11g only) mode only allows 11g client access. 2.4GHz (Mixed 11g) mode allows 11b/11g client access.

2.4GHz (Mixed 11g WiFi) or 2.4GHz (11g only WiFi) – making sure to comply with Wi-Fi.

5GHz (11a) – the radio will work on 5GHz 11a mode.

Output Power - indicating output power of the RF card in dBm, antenna gain is not included.

Antenna – The device use external antenna and it doesn't change for BW1251.

RTS Threshold – showing the value of RTS threshold. The default is 2347, which means that RTS is disabled.

DCA threshold – showing the value (in minutes) of DCA threshold. This threshold is used to judge if there is no wireless users connected during this time. And if yes, BW1251 will monitor the environment and adjust channel to the best operational one.

DCA optional channel – showing the channels only in which auto channel selection (DCA) will be processed to reduce interference.

Only when DCA is enabled, **DCA threshold** and **DCA optional channel** will be shown.

Layer 2 Isolation – showing the status of Layer 2 Isolation service (enabled or disabled)

Mode – showing the mode that the Access Point is in. (AP mode or Bridge mode)

Site Survey – performing survey to show overview information for wireless networks in a local geography

The site survey shows overview information for wireless networks in a local geographic area. Using this survey, administrator can scan for working access points, check their operating channels, and see RSSI levels. To start the scan, simply click the **Site Survey** button.

After clicking **Site Survey**, you will see the following warning message:

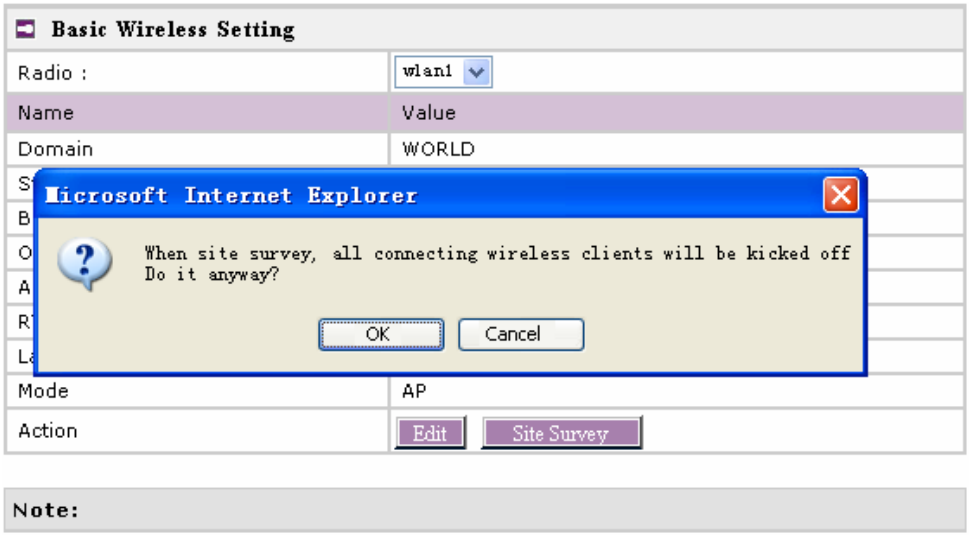


Figure 43 – Site Survey warning

Click OK to continue site survey and get the UI like this:

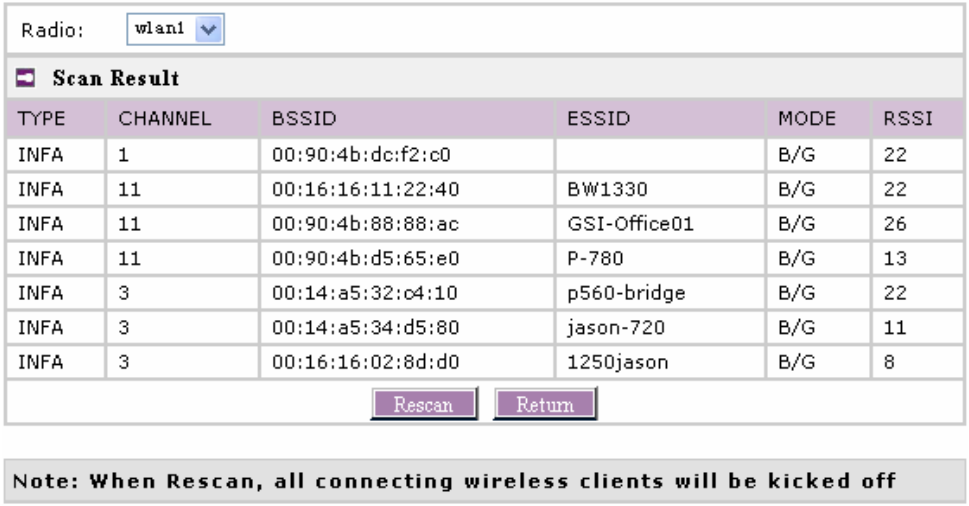


Figure 44 – Site Survey information

To refresh the statistics click the **Rescan** button.

During Site Survey, all wireless clients connected to the BW1251 would be kicked off.
Site Survey takes some minutes to perform. Please wait and don't power off AP during site survey.

Edit – editing the wireless basic settings

To change basic wireless setting properties, click the **Edit** button in the **Action** column. The **status** can be changed now:

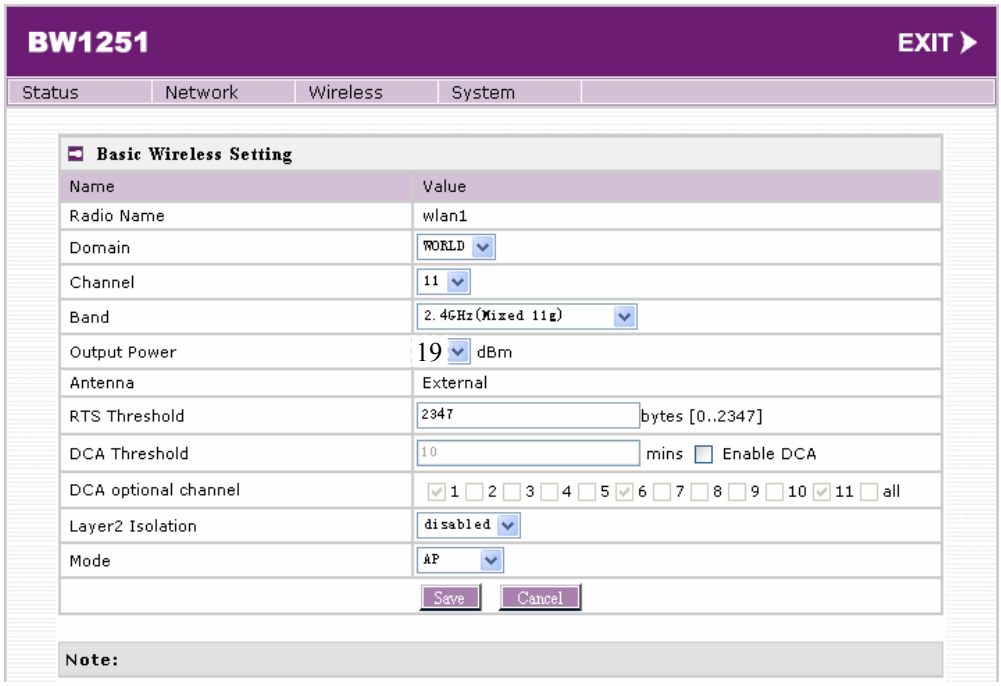


Figure 45 – Edit Basic Wireless Settings with static channel selection

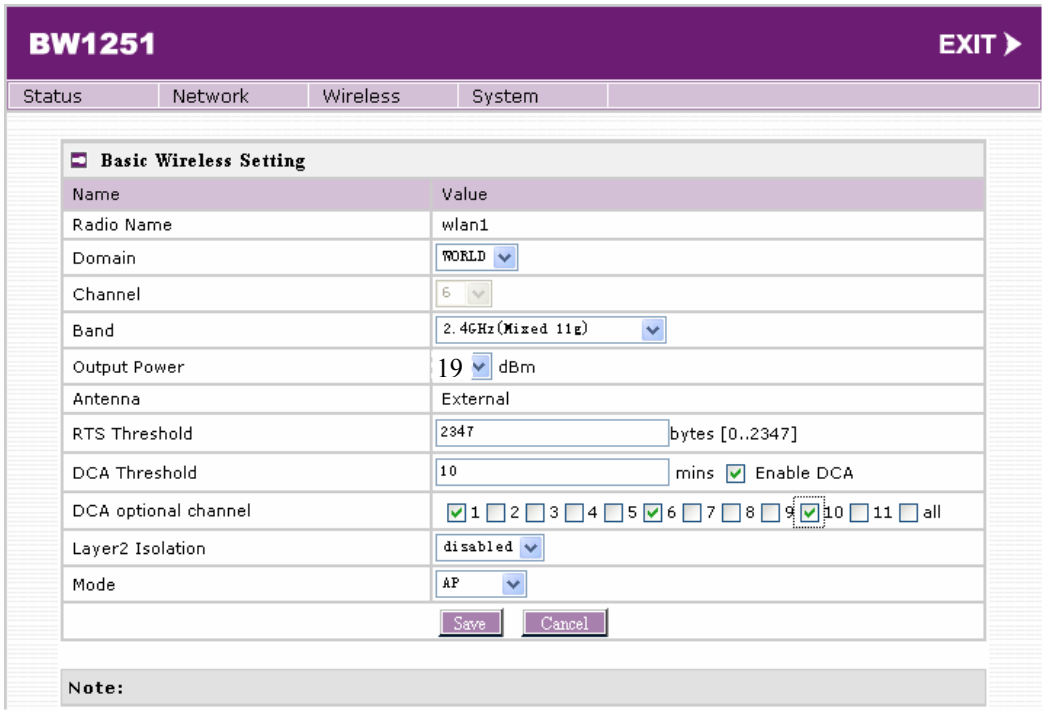


Figure 46 – Edit Basic Wireless Settings with DCA enabled

Radio Name – specifying the wireless interface of the BW1251

Domain – selecting the regulatory domain according to your country

The full frequency range between 2.4 GHz and 5 GHz is not permitted for use in all countries. Depending on your selection of regulatory domains, the available frequency channels will vary.

Before changing radio settings manually, make sure that your settings comply with the government regulations. At all times, it's the responsibility of the end-user to ensure that the installation complies with local radio regulations. Refer to the Appendix:

General Configuration Settings	
Administrator Username	admin
Administrator Password	admin01
Get Community	Public
Set Community	Private
Network Configuration Settings	
IP address	(static IP) 192.168.2.2
Subnet mask	255.255.255.0
Gateway	0.0.0.0
Service Configuration Settings	
DHCP server	Disable
DHCP relay	Disable
NTP service	Disable
Telnet service	Enable
SSH service	Enable
Wireless Configuration Settings	
RF Card 1(WLAN1)	
Default Mode	11g Access Point
Regulatory Domain	World
SSID	BW1251g
Default channel	1
RTS Threshold	2347 bytes
RF Output Power	19dBm
Authentication Type	Open System
MAC ACL	Disable
Encryption	Off
Security Policy	Disable
RF Card 2(WLAN2)	
Default Mode	11a Access Point
Regulatory Domain	World
SSID	BW1251a
Default channel	36
RTS Threshold	2347 bytes
Output Power	18dBm
Authentication Type	Open System
MAC ACL	Disable
Encryption	Off

Security Policy	Disable

C) Regulatory Domain/Channels**.**

Channels – selecting the channel that the access point will use to transmit and receive information. If one channel is defined, it acts as the default channel. Channels list will vary depending on selected regulatory domain and selected band. Multiple frequency channels are used to avoid interference between two radios of this AP, and between nearby access points. If you wish to operate more than one access point in the overlapping coverage areas, we recommend a distance of at least four channels between the chosen channels. For example, for three Access Points in close proximity choose channels 1, 6 and 11 for 11b/g or channels 36, 40 and 64 for 11a.

Band – working band on the working radio.

Five bands are supplied: 5GHz (11a), 2.4GHz (Mixed 11g), 2.4GHz (11g only), 2.4GHz (Mixed 11g WiFi) and 2.4GHz (11g only WiFi).

If 2.4GHz (Mixed 11g) or 2.4GHz (11g only) is selected, the radio will work on 2.4GHz for the better performance. 2.4GHz (11g only) mode only allows 11g client access. 2.4GHz (Mixed 11g) mode allows 11b/11g client access.

2.4GHz (Mixed 11g WiFi) or 2.4GHz (11g only WiFi) can make sure to be compatible with Wi-Fi.

If 5GHz (11a) is selected, the radio will work on 5GHz 11a mode.

Output Power - indicating output power of the RF card in dBm, antenna gain is not included.

Total Output Power (EIRP) = Antenna Gain + RF card output power

The range of the EIRP varies with channel and regulatory domain.

Antenna – showing the type of Antenna.

RTS Threshold – when set, this settings specifies the maximum packet size beyond the RTS/CTS mechanism invoked. The value range of this is [0 …2347]. The default is 2347, which means that RTS is disabled.

Enable DCA – Enabling or Disabling DCA service. DCA can help choosing the best working channel automatically. And static channel selection will be forbidden if DCA is enabled.

DCA(Dynamic Channel Allocation) solution automatically selects the optimal operational frequency channel during power up and periodically monitors the environment and adjusts for the best operational frequency channel.

DCA service is available only under 2.4GHz band.

DCA threshold – specifying the value (in minutes) of DCA threshold. This threshold is used to judge if there is no wireless user connected during this time. And if yes, BW1251 will monitor the environment and adjust channel for the best operational one.

If wireless network environment is stable, which means auto channel selection isn't needed frequently, set a big value for DCA threshold to gain a stable wireless users' connection.

If wireless network environment changes continually, frequent auto channel selection is needed, set a relatively small value for DCA threshold to let channel change based on wireless environment.

Wireless users will be kicked off when DCA is processing (site survey and new operational frequency channel takes effect).

DCA optional channel – specifying the channels only in which auto channel selection (DCA) chooses to reduce interference reference.

Only when DCA is enabled, **DCA threshold** and **DCA optional channel** will be shown.

Layer 2 Isolation – layer2 wireless client separation. Connected clients with user isolation function enabled cannot access each other directly. The clients are isolated from each other using their MAC addresses [enabled/disabled].

Mode – two modes are supplied: AP mode and Bridge mode.

Change status or leave the default state if no editing is necessary and click the **Save** button.

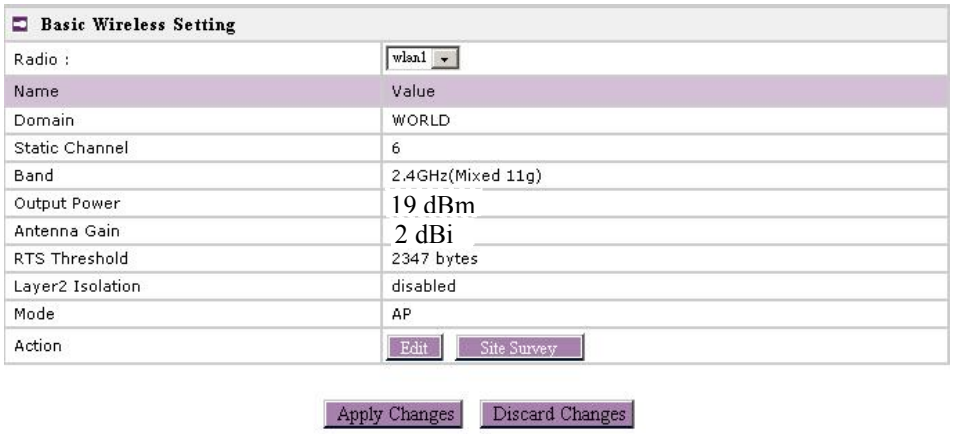


Figure 47 – Apply or Discard Basic Wireless Settings with Static Channel selection

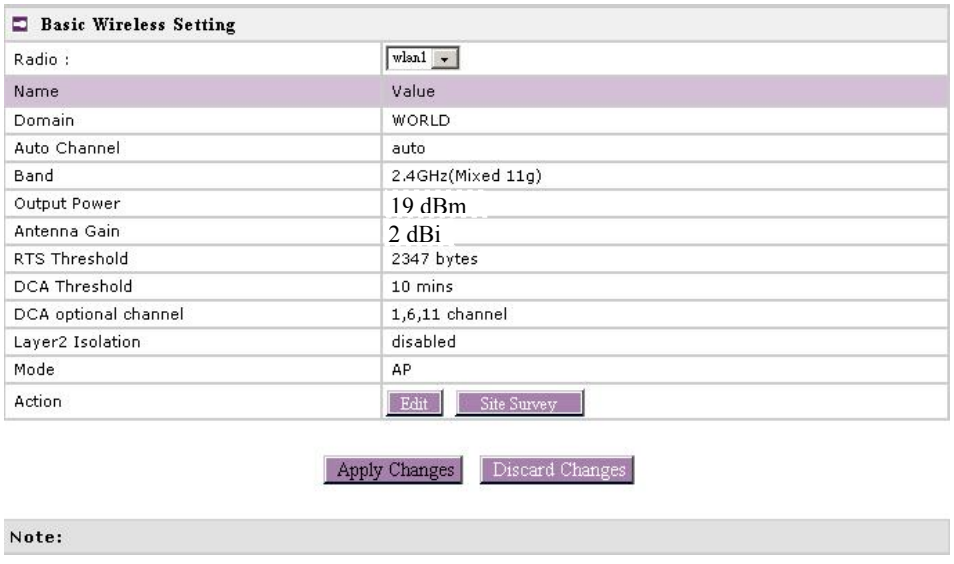


Figure 48 – Apply or Discard Basic Wireless Settings with DCA enabled

Every time settings are changed, the BW1251 needs to be restarted to apply all settings changes when clicking **Apply Changes**. Request for server reboot appears:

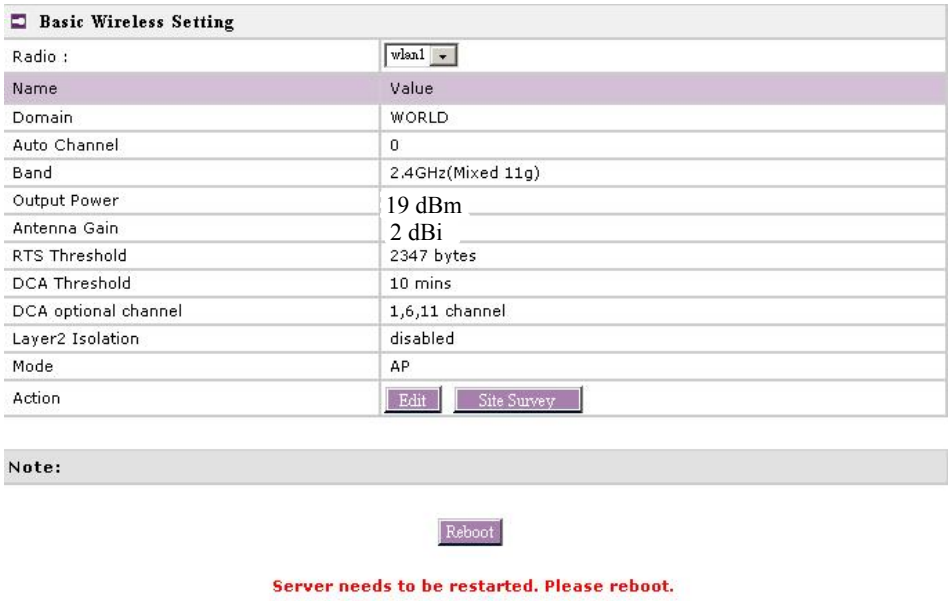


Figure 49 – Reboot Server

Reboot – restarting the server and applying the changes.

If there is no other setting to be edited, click the **Reboot** button to save all configurations.

And if there are still other settings to be edited, you can ignore the reboot request until you finish all editing,

Wireless | Advance

BW1251 supports **Multiple BSSID (MBSSID)** function. You can configure up to 16 BSSIDs per radio on BW1251 and assign different configuration settings to each BSSID. For wireless users, they can think BW1251 as a single AP with multi services supported, including different security policy, different VLAN ID, different authentication etc. All the BSSIDs are active at the same time, which means that client devices can be associated to the access point for specific service. Use the **Wireless | Advance** menu to configure properties related to Multiple BSSID, including configure SSID, Hidden SSID, VLAN, and Security for each SSID.

Each BSSID can have its own SSID. In this case, Multiple BSSIDs are the same with Multiple ESSIDs. Wireless users can think BW1251s as multiple virtual APs, each supporting different service, and connecting one SSID for the special services.

Also, BW1251 supports **Bridge** function, it can support up to 8 **Bridge links** per radio. Different bridge link can use different WEP key index.

AP Mode:

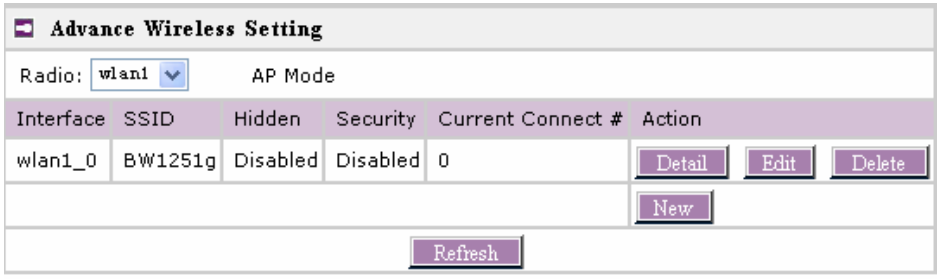


Figure 50 – Advanced Wireless Setting (AP Mode)

Radio – specifying which RF card (wlan1 or wlan2) is needed to be configured since BW1251 has two Dual-Band radios

Mode – specifying the operation mode of BW1251 (AP or Bridge)

Interface – choosing the specified **MBSSID** entry you want to configure. Each Interface maps to a BSSID

Hidden – showing the status of Hidden SSID feature

Security – showing which security policy is used for this **MBSSID** entry

Current Connect # – showing the number of current wireless clients who are connected with this MBSSID

New – creating a new **MBSSID** entry

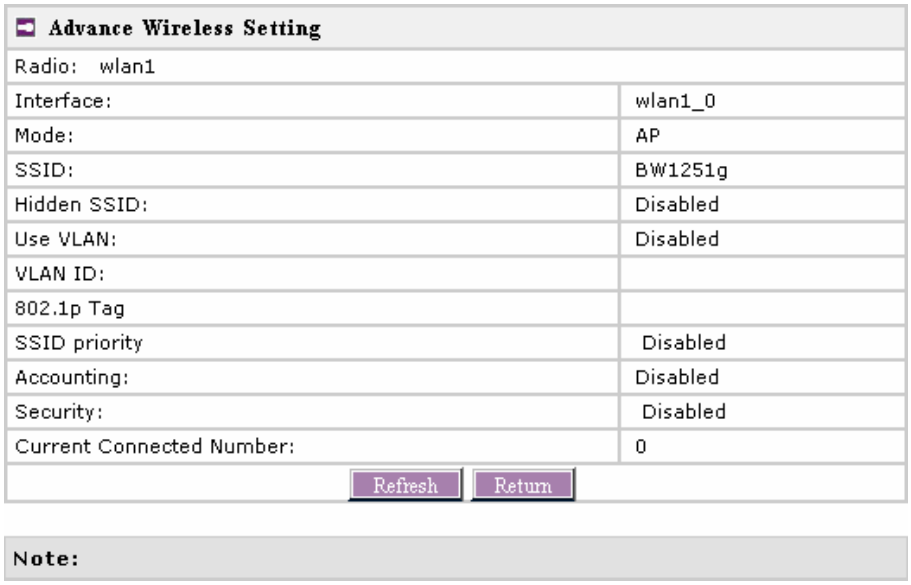
Detail – showing the detail information of this **MBSSID** entry

Edit – editing the selected **MBSSID** entry you want to configure

Delete – deleting the selected **MBSSID** entry. In AP mode, you cannot delete the last entry

Refresh – rescanning the WEB page to get the newer information

Clicking Detail, a page like the following will appear:



Advance Wireless Setting

Radio: wlan1	
Interface:	wlan1_0
Mode:	AP
SSID:	BW1251g
Hidden SSID:	Disabled
Use VLAN:	Disabled
VLAN ID:	
802.1p Tag	
SSID priority	Disabled
Accounting:	Disabled
Security:	Disabled
Current Connected Number:	0

Refresh Return

Note:

Figure 51 – Detail for MBSSID entry

Radio – showing which radio (WLAN1 or WLAN2) is displayed

Interface – showing the sub-interface of specified Radio

Mode – Showing the operation mode of the sub-interface

SSID – Showing the SSID value of the sub-interface

Hidden SSID – Showing the enabled/disabled status of Hidden SSID service

Use VLAN – Showing if VLAN is used for the sub-interface

VLAN ID – showing the VLAN ID specified when VLAN is used

802.1p Tag – Showing the 802.1p tag for the sub-interface when 802.1p is used

SSID priority – Showing the traffic priority specified for this sub-interface (BSSID/SSID), 0 means the normal priority

Accounting – Showing the enabled/disabled status of accounting service

Security – Showing the security policy specified for this sub-interface

Current Connect Number – Showing the number of the clients currently connected with this sub-interface

Detail – showing the MAC addresses of the clients current connected

Refresh – rescanning the WEB page to get the newer information

Return – returning to the wireless advance settings page

Click **Detail** to check the detail information of the connected client as shown below:

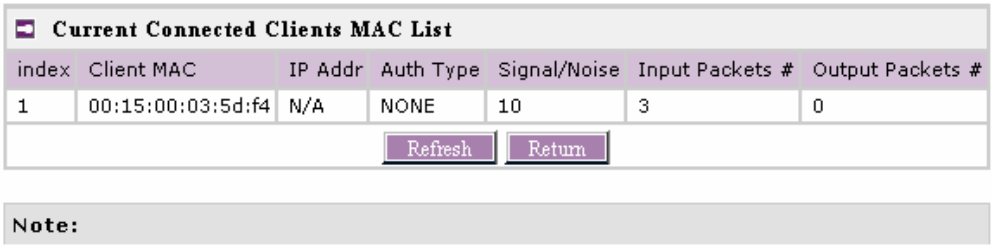


Figure 52 – Detail information of connected client

Client MAC – showing the connected client's MAC address

IP Addr – showing the IP address of the connected client

Auth Type – showing the security policy that the connected client uses

Signal/Noise – showing the SNR value of the connected client

Input Packets – showing the number of packets transmitted by the connected client

Output Packets – showing the number of packets destined to the connected client

Clicking **New** or **Edit** on AP mode, the settings of MBSSID entry appears:

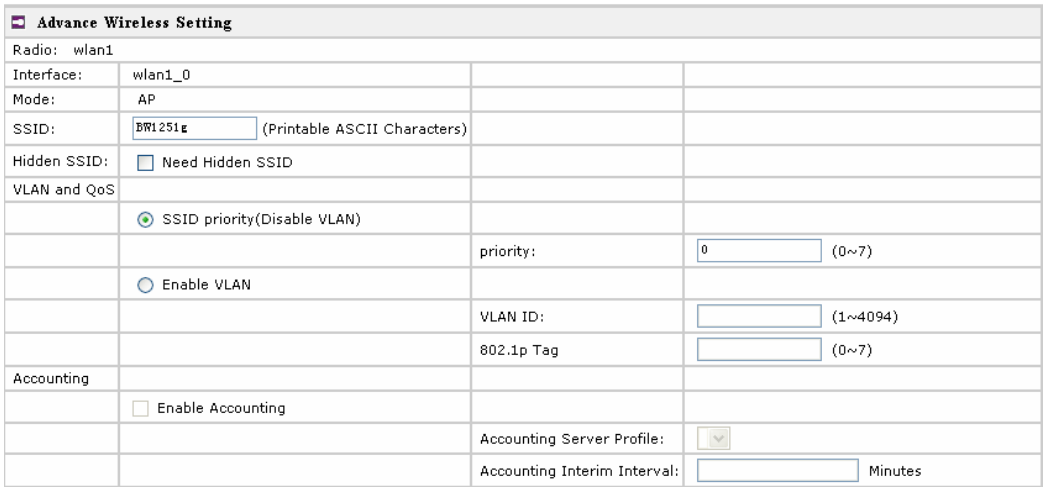


Figure 53 – Multiple BSSID Setting -1

Radio – showing which RF card (wlan1 or wlan2) is being configured.

Mode – showing the current operation mode of BW1251 (AP or Bridge).

Interface – showing the current **MBSSID** | **Bridge link** entry

SSID – a unique ID for your wireless network. It is case sensitive and must not exceed 32 characters. The default SSID is "BW1251" but you should change this to a personal wireless network name. The SSID is important for clients when connecting to the access point. All client stations must have their client SSID settings configured and must use the same SSID.

Each MBSSID entry (BSSID) can have its own SSID. And SSID can be same for different BSSID

Hidden SSID – when enabled, the SSID of this Interface is invisible in the networks list while scanning the available networks for wireless client (SSID is not broadcasted with its Beacons). When disabled, the AP's SSID is visible in the available networks list [enabled/disabled]. By default, the Hidden SSID is disabled.

VLAN and QoS – specifying VLAN policy or QoS policy. Data priority is based on (B) SSID and is implemented by 802.11e EDCA or 802.1p tag.

SSID priority (Disable VLAN) – specifying the data priority, which is implemented according to 802.11e EDCA and making sure the wireless downlink QoS. This priority is based on (B) SSID, which means different BSSID can have different data priority and the data of the same BSSID has the same priority.

This data priority only makes sure the priority of downlink (from AP to wireless client).

8 levels priorities are supplied. 1, 2, 0, 3, 4, 5, 6, 7 are from the lowest priority to the highest priority.

And if no special QoS is needed, leave **priority** to the default (0). 0 means normal priority.

Enable VLAN – when enabled, the outgoing packets from this SSID device will be tagged with VLAN ID and 802.1p tag (If have).

VLAN ID – configuring VLAN ID for each Multiple SSID devices. Valid numbers are from 1 to 4094.

802.1p Tag – configuring 802.1p Tag for remote APC's or Router's QoS uses. Valid numbers are from 0 to 7.

VLAN ID and 802.1p tag must cooperate with remote Router or APC.

Accounting – Controlling the status of accounting service

Enable Accounting – enabling or disabling the accounting service.

Accounting service only can be enabled when the security policy using RADIUS server is chosen. The security policies using RADIUS server include 802.1x, WPA, WPA2, WPA2 MIXED and MAC auth.

Accounting Server Profile – specifying which RADIUS server is used for accounting service. If there's no RADIUS server, please configure **Network | RADIUS Servers** Web UI first.

Accounting Interim Interval – specifying the value (in minutes) which is used for interim-accounting interval, which is helpful for statistics.

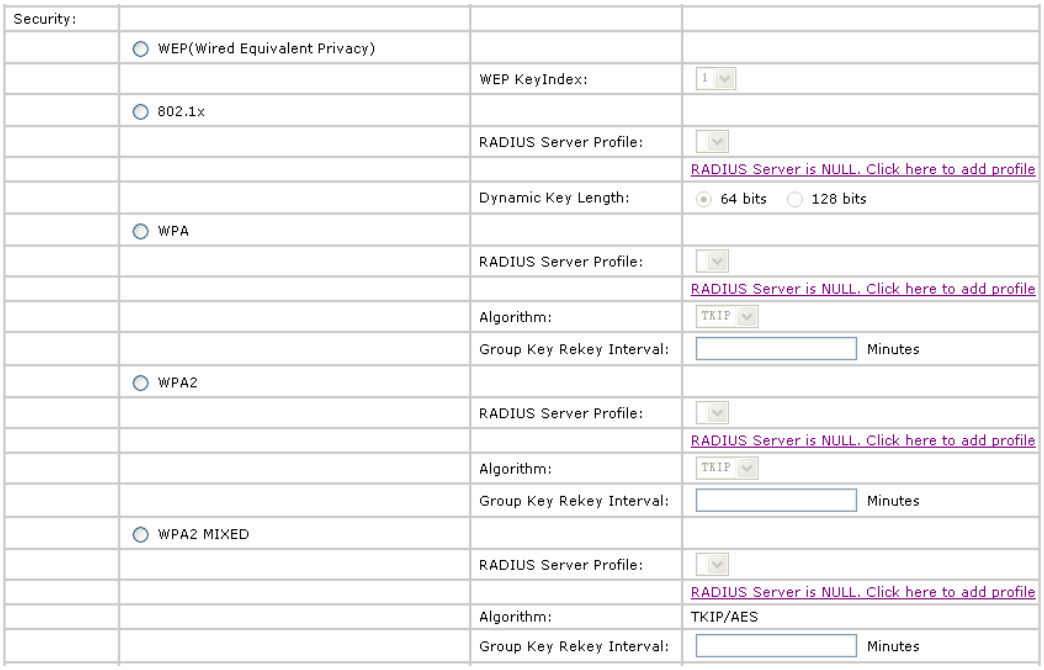


Figure 54 – Multiple BSSID Setting – 2

Security – specifying the security policy.

WEP – when selected, the privacy of MSSID entry will be set to WEP (Wired Equivalent Privacy).

WEP Key Index – selecting the default key Index to make it the Default key and encrypt the data before being transmitted. All stations, including this MSSID Entry, always transmit data encrypted using this Default Key. The key number (1, 2, 3, 4) is also transmitted. The receiving station will use the key number to determine which key to use for decryption. If the key value does not match with the transmitting station, the decryption will fail. The key value is set in **Wireless | WEP** web page.

802.1x – when selected, the MSSID entry will be configured as an 802.1x authenticator. It supports multiple authentication types based on EAP (Extensible Authentication Protocol) like EAP-TLS, EAP-TTLS, EAP-PEAP, EAP-SIM. The privacy will be configured as dynamic WEP.

RADIUS Server Profile – selecting the default radius server name. If not, please configure Network | RADIUS Servers Web page first.

Dynamic Key Length – selecting the dynamic 64-bits / 128-bits encryption.

WPA – Wi-Fi Protected Access, When selected, the encrypt method will be WPA with RADIUS Sever.

WPA2 – when selected, the security policy will be WPA2 with RADIUS server. In this mode, WPA client is not permitted to connect.

WPA2 MIXED – when selected, WPA2 client and WPA client are all permitted to connect.

RADIUS Server Profile – selecting the default radius server name. If not, please configure Network | RADIUS Servers Web page first.

Algorithm – choosing WPA algorithm (TKIP, AES).

Group Key Rekey Interval – specifying amount of minutes and WPA automatically will generate a new Group Key.

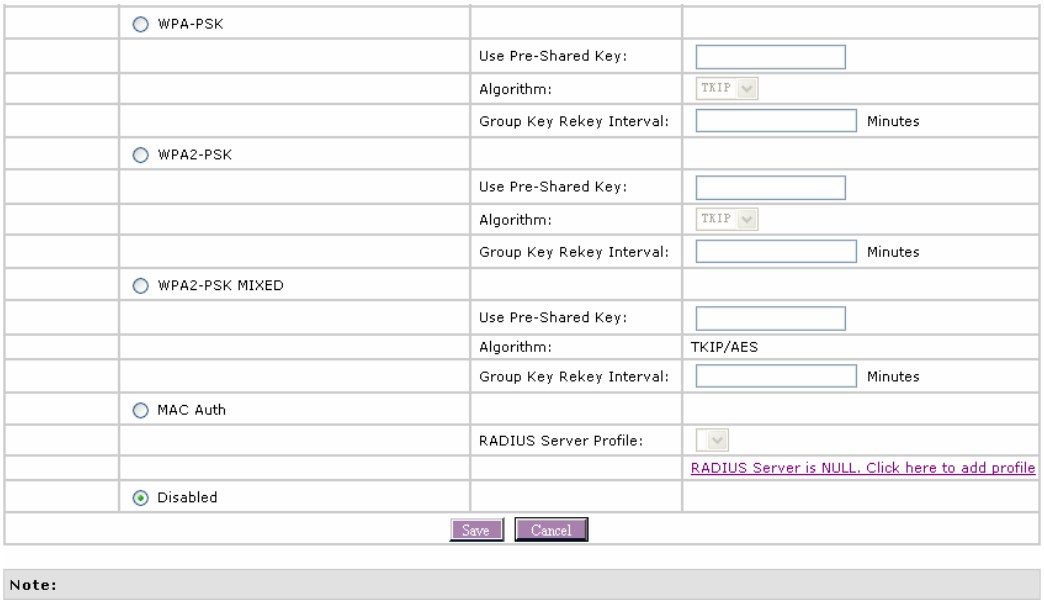


Figure 55 – Multiple BSSID Setting – 3

WPA-PSK – when selected, the encrypt method will be WPA without RADIUS server.

WPA2-PSK – when selected, the security policy will be WPA2 PSK without RADIUS server. In this mode, only WPA2 PSK client can connect with AP and WPA PSK client is not permitted to connect.

WPA2-PSK MIXED – when selected, WPA2 PSK and WPA PSK are all permitted to connect with AP.

Use Pre-Shared Key – specifying more than 8 characters and less than 64 characters for WPA with pre-shared key encryption.

Algorithm – same as **WPA**.

Group Key Rekey Interval – same as **WPA**.

MAC Auth – when selected, the MAC address of wireless client will be passed to RADIUS server for PAP authentication when it connects with BW1251. The MAC address of wireless client acts as username and password.

RADIUS Server Profile – selecting the default radius server name. If not, please configure Network | RADIUS Servers web page first

Disabled – when selected, you don't select any security policy.

Bridge Mode

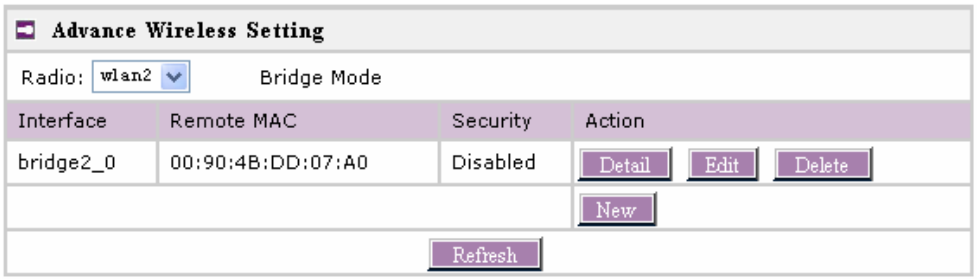


Figure 56 – Advanced Wireless Setting (Bridge Mode)

Radio – specifying which RF card (wlan1 or wlan2) is needed to be configured since BW1251 has two Dual-Band radios

Mode – specifying the operation mode of BW1251 (AP or Bridge)

Interface – choosing the specified **Bridge link** entry you want to configure.

Remote MAC – specifying the remote peer's MAC address of this Bridge

Security – specifying which security policy is used

New – creating a new **Bridge link** entry

Detail – showing the detail information of this **Bridge link** entry

Edit – editing the selected **Bridge link** entry you want to configure

Delete – deleting the selected **Bridge link** entry.

Clicking **Detail**, a page shown below will appear:

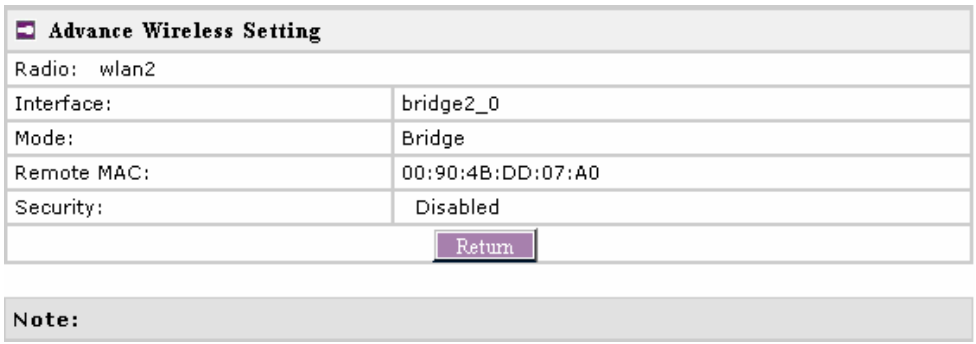


Figure 57 – Detail of one bridge entry

Clicking **Edit** to edit an existing bridge link or **New** to add a new bridge link**,** you can see the figure like this.

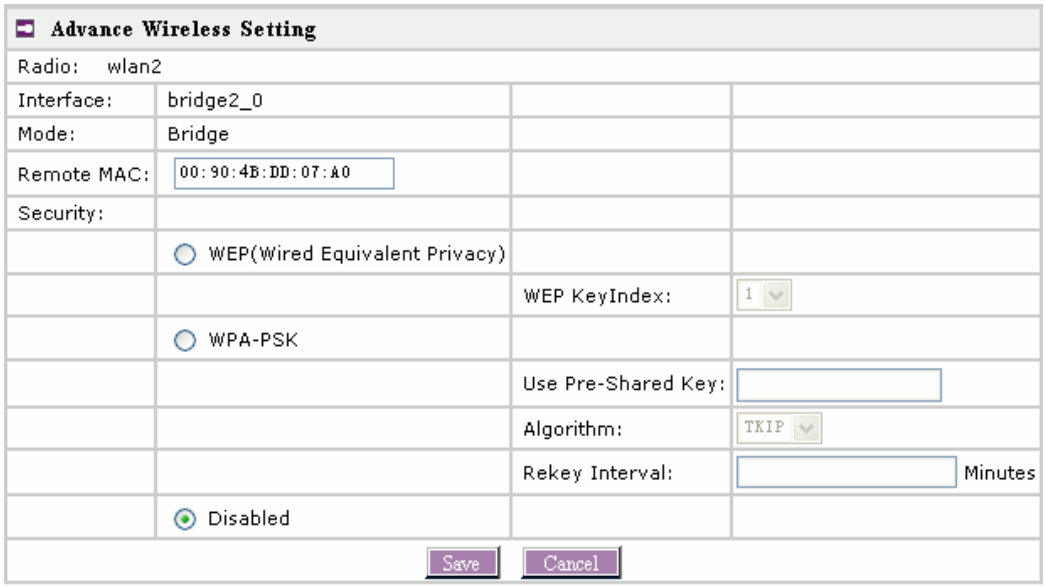


Figure 58 – Bridge Link Setting

Remote MAC – adding a remote peer's MAC address you want to configure as a bridge link

Security – specifying WEP or WPA-PSK (TKIP or AES) used for security policy. WPA-PSK or static WEP can be used for encrypt each bridge link

Each Bridge link can have its own WEP key/key Index for encryption.
By default, four WEP keys are all set to "6161616161". They can be modified in **Wireless | WEP**.

Wireless | WEP

Use the **Wireless | WEP** menu to configure static WEP settings.

This menu only sets static WEP key value related with 4 key indexes for each RF card (wlan1 or wlan2). Enabling or Disabling static WEP is in the **Wireless | Advance** menu.

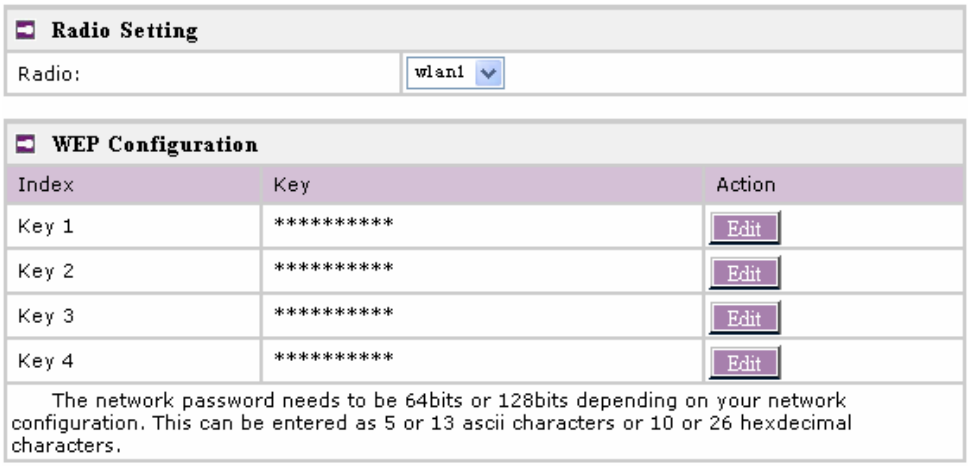


Figure 59 – WEP Settings

Radio – specifying which RF card (wlan1 or wlan2) is needed to be set.

Click **Edit** to edit the existing **wepkey1** to **wepkey4**.

By default, four WEP keys are all set to “6161616161”. They can be modified according to real need.

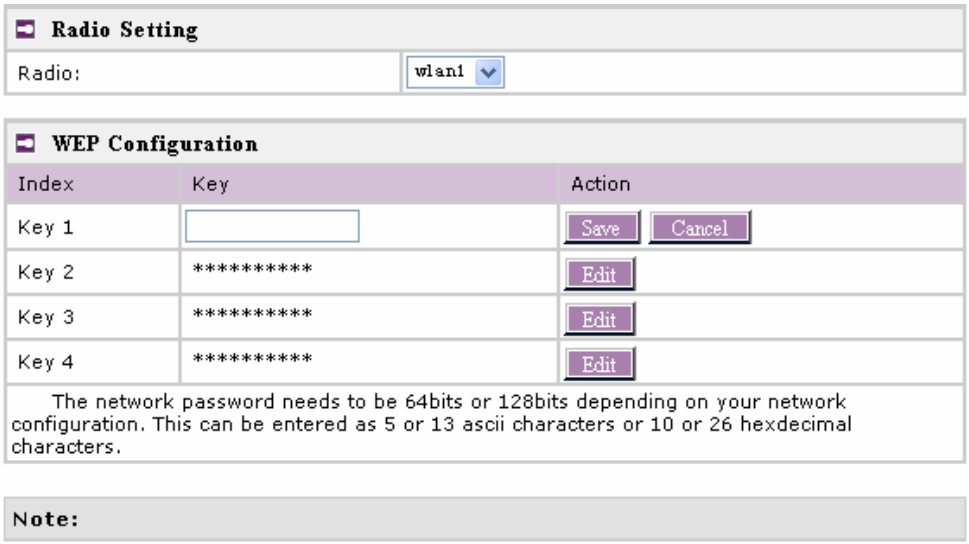


Figure 60 – Edit WEP Key

Wireless | MAC ACL

Use the **MAC ACL** service to control the default access to the wireless interface of the BW1251 or define special access rules for mobile clients. Configure the ACL using the Wireless | MAC ACL menu:

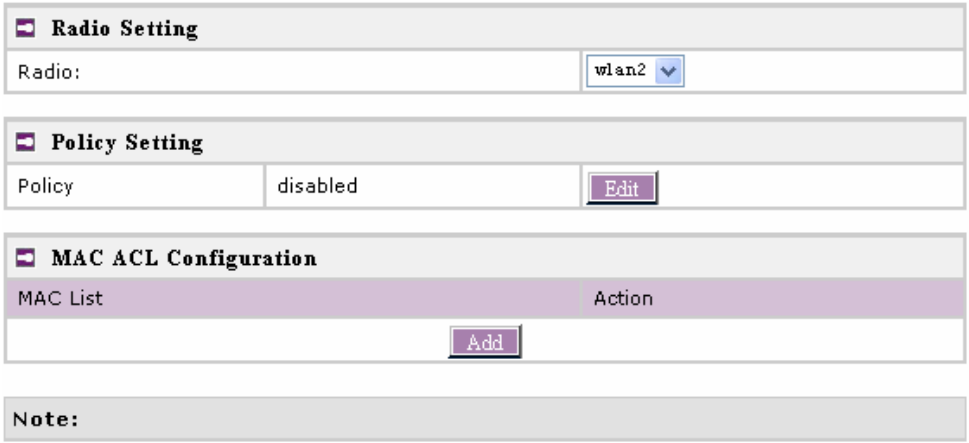


Figure 61 – MAC ACL Service

Radio – two wireless interfaces wlan1 and wlan2 can be selected for each radio's MAC ACL rules.

Only AP mode has the MAC ACL service. MAC ACL service.is not available for Bridge mode.

Policy Setting – **edit** button is to choose to Allow, Deny or disable the access control service on device. By default, the ACL service is disabled and all wireless clients connected to the BW1251 are allowed (no ACL rules are applied to the wireless clients).

Selecting **Allow** means only the wireless clients whose MAC addresses are listed on the **MAC List** would be permitted to access this AP. Other wireless clients cannot access this AP.

Selecting **Deny** means only the wireless clients whose MAC addresses are listed on the **MAC List** would be prevented from accessing. Other wireless clients can access this AP.

Selecting **Disabled** means no ACL service.

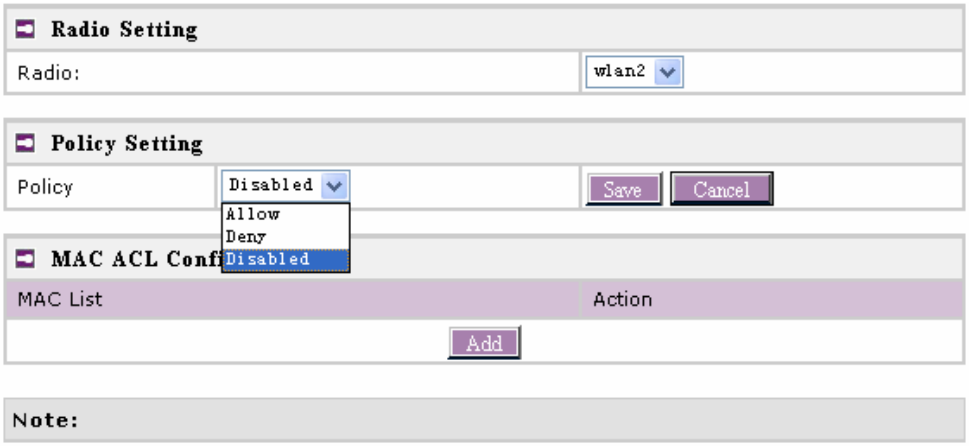


Figure 62 – MAC ACL settings

You must create **MAC List** to work with **Policy** setting. The access control list is based on the network device's MAC address. In the MAC ACL Configuration table, you only need to specify the MAC address of wireless client. Click the Add button to create a new MAC entry:

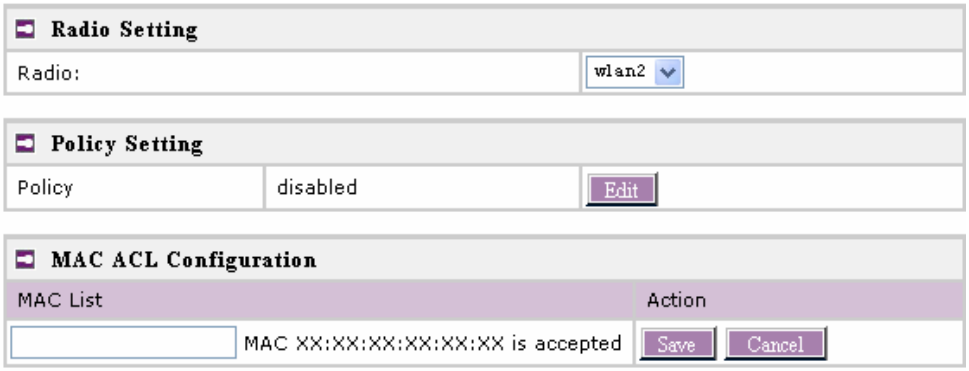


Figure 63 – Add MAC entry

MAC Address – the physical address of the network device (MAC address) you need to configure. The format is a list of colon separated hexadecimal numbers (for example: 00:AA:A2:5C:89:56).

Save – saving the new MAC entry.

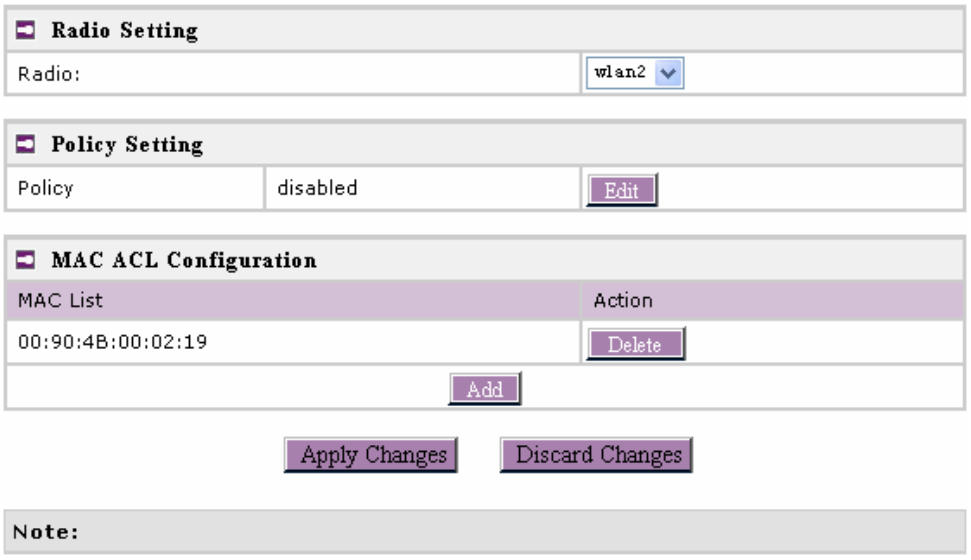


Figure 64 – Apply or Discard MAC ACL Configuration Changes

Apply Changes – saving all changes made in the **interface** table at once.

Discard Changes – restoring all previous values.

Every time settings are changed, the BW1251 needs to be restarted to apply all settings changes when clicking **Apply Changes**. Request for server reboot appears:

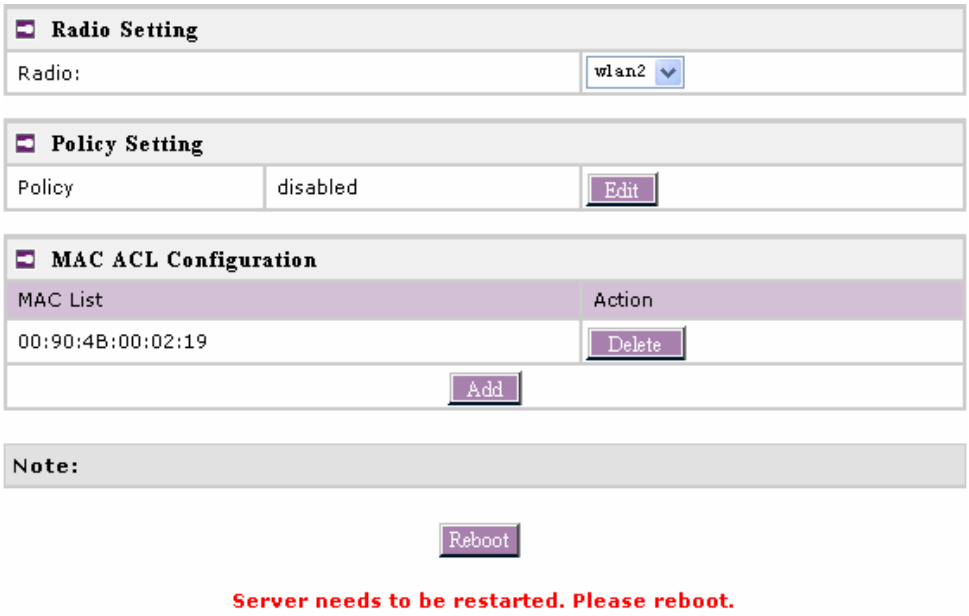


Figure 65 – Reboot Server

Reboot – restarting the server and applying the changes.

If there is no other setting to be edited, click the **Reboot** button to save all configurations.
And if there are still other settings to be edited, you can ignore the reboot request until you finish all editing,

System

System | Security

Use the **System | Security** service to configure the name and password of administrator:

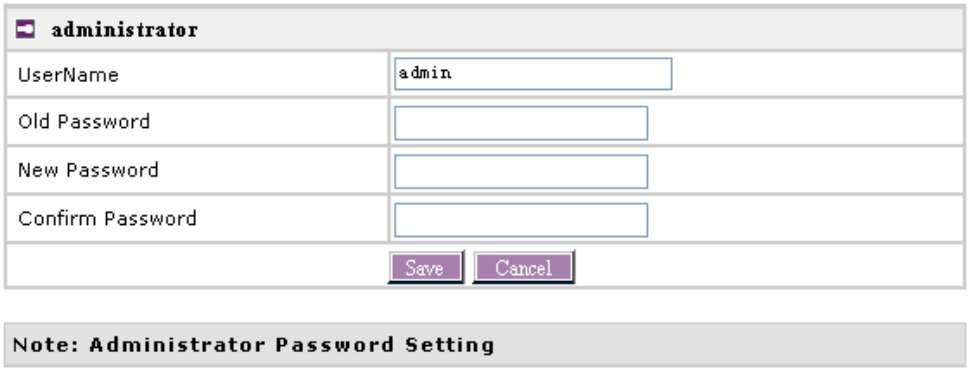


Figure 66 – system security settings

User Name – administrator username for access to BW1251 (e.g. web interface, CLI mode) [1-32 symbols, spaces not allowed].

Old Password – old password value.

New Password – new password value used for user authentication in the system [4-8 characters, spaces are not allowed].

Confirm Password – password confirmation to verify its accuracy.

Save – saving new administrator settings.

Default administrator logon settings are:

User Name: **admin**

Password: **admin01**

Password length is from 4 to 8 characters.

After filling in the right Old password and the New Password, click the **Save** button to take effect immediately.

After clicking **Save** button, the below UI will be shown to notify that the new password setting has been taken place:

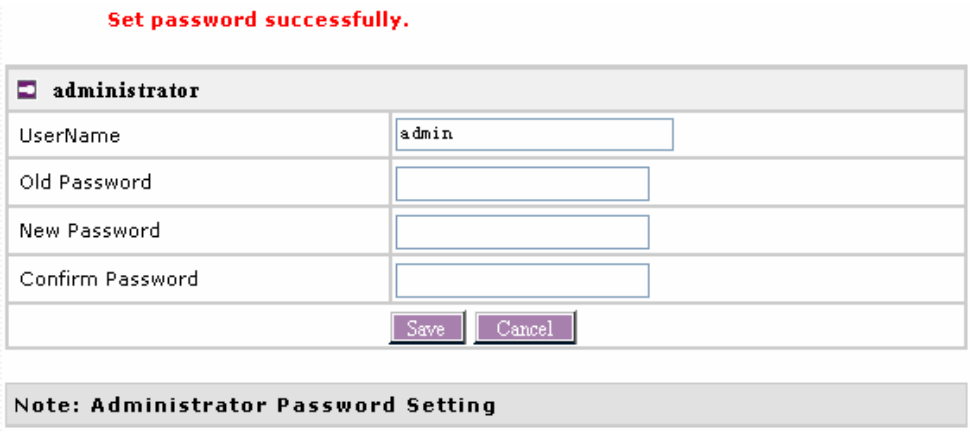


Figure 67 – system security settings save and take effect successfully

System | SNMP

SNMP is the standard protocol that regulates network management over the Internet. To communicate with SNMP manager you must set up the same **SNMP** communities and identifiers on both ends: manager and agent.

Use the **System | SNMP** menu to change current SNMP configuration.

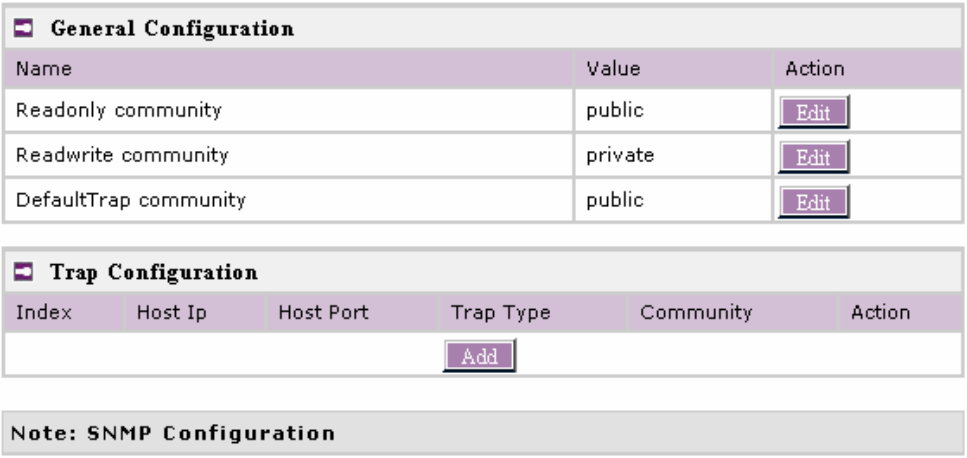


Figure 68 – SNMP settings

Readonly community – community name is used in SNMP version 1 and version 2c. Read-only (public) community allows reading values, but denies any attempt to change values [1-32 all ASCII printable characters, no spaces].

Readwrite community – community name is used in SNMP version 1 and version 2c. Read-write (private) community allows to read and (where possible) change values [1-32 all ASCII printable characters, no spaces].

Default Trap community – the default SNMP community name used for traps without specified communities. The default community by most systems is "public". The community string must match the community string used by the SNMP network management system (NMS) [1-32 all ASCII printable characters, no spaces].

Trap Configuration Table:

You can configure your SNMP agent to send **SNMP Traps** (and/or inform notifications) under the defined host (SNMP manager) and community name (optional).

Figure 69 – SNMP Trap table settings

Click **Add** to add a new SNMP manager or **Delete** to delete a specific SNMP manager. Clicking **Add**:

Figure 70 – Add SNMP Trap

Host IP – entering the SNMP manager's IP address [dots and digits].

Host Port – entering the port number the trap messages should be send through [number].

Trap Type – selecting trap message type [v1/v2/inform].

Community – specifying the community name at an SNMP trap message. This community will be used in trap messages to authenticate the SNMP manager. If not defined, the default trap community name will be used (specified in the SNMP table) [1-32 all ASCII printable characters, no spaces].

Save – saving all current settings

Cancel – restoring the last settings

System | Telnet

Use **System | Telnet** menu to manage the telnet/SSH service of your BW1251.

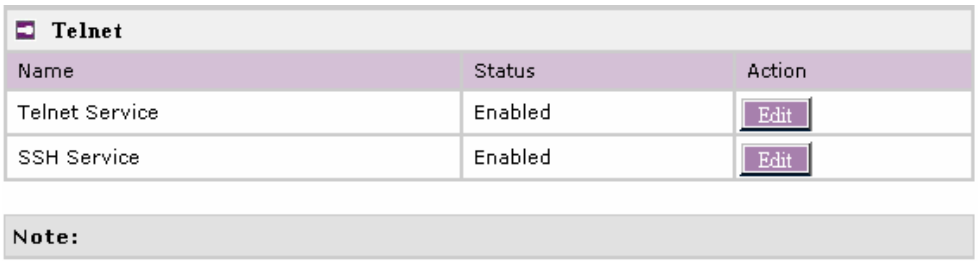


Figure 71 – System Configuration settings

Telnet Service – Enabling or disabling telnet service of BW1251

SSH Service – Enabling or disabling SSH service of BW1251.

The default of these two services are all **Enabled**. The current IETF SSH (SSHv2) is supported for security of accessing BW1251 via telnet/CLISH.

System | Configuration

Use the **System | Configuration** menu to configure such system utilities:

- **Backup** – downloading current working system configuration for backup
- **Upload/Restore** – uploading system configuration to restore

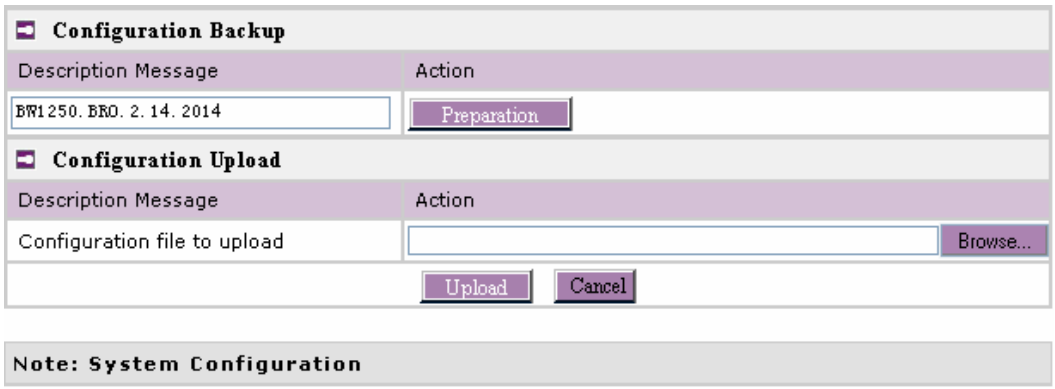


Figure 72 – System Configuration settings

You can save your current device configuration file locally using the **Backup** menu under the **System | Configuration | Backup** menu:

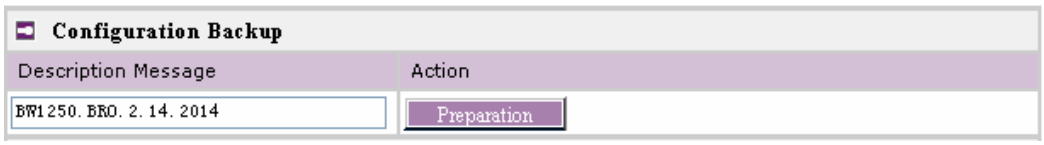


Figure 73 – Backup settings

Such device configuration is saved in the specific format file (.cfg).

Description Message shows the current version of firmware.

Click the **Preparation** button to start saving the configuration file.

Click the **Download** button to download the current working configuration into your local PC.

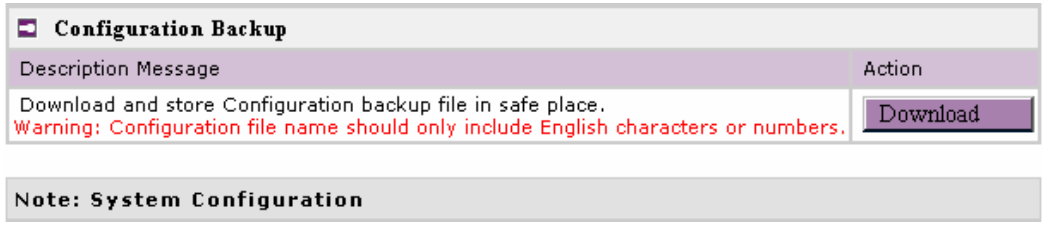


Figure 74 – Download system configuration

A configuration file name will be required when you download/save the configuration file. And please remember the configuration file name should only include characters or numbers. Otherwise, this configuration file cannot be uploaded to BW1251.

You can upload saved configuration file any time you want to restore this configuration to the device by using the **Browse** button. Select the configuration file and upload it on the device:

Figure 75 – Configuration Upload/Restore

Click **Upload** to upload the specified configuration file and then the UI below appears

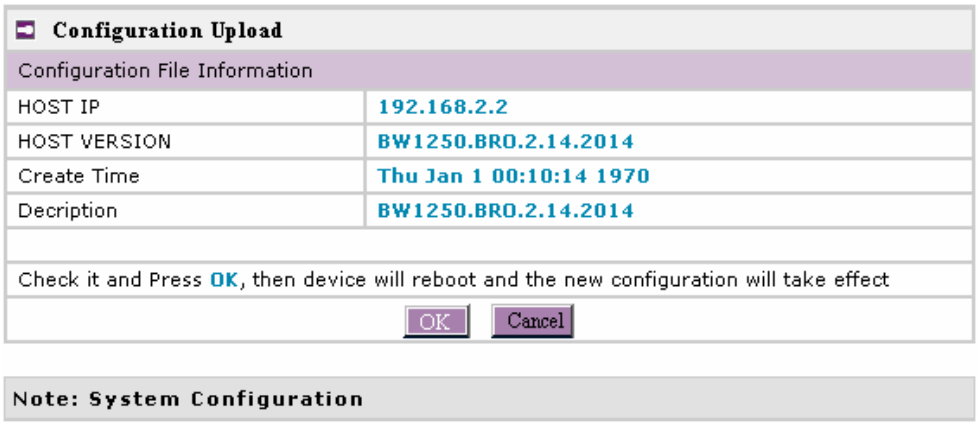


Figure 76 – configuration information

HOST IP – showing the IP address in the configuration file that needs to be uploaded.

Please remember this IP address for accessing BW1251 after the configuration file is uploaded.

HOST VERSION – showing the firmware version in the configuration file that needs to be upload.

OK – applying configuration setting to the device.

If everything is right, click the **OK** button for upload/restore.

System | Reset

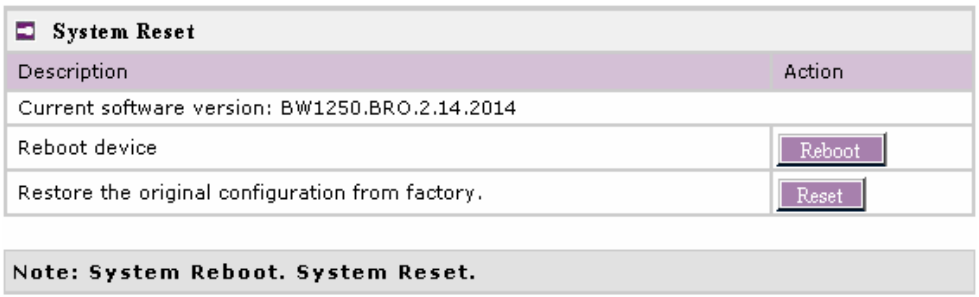


Figure 77 – System Reset setting

Reboot – rebooting the device

Reset – resetting the System to the Factory Defaults

To reboot the device, click **Reboot** and then the confirming message below appears:

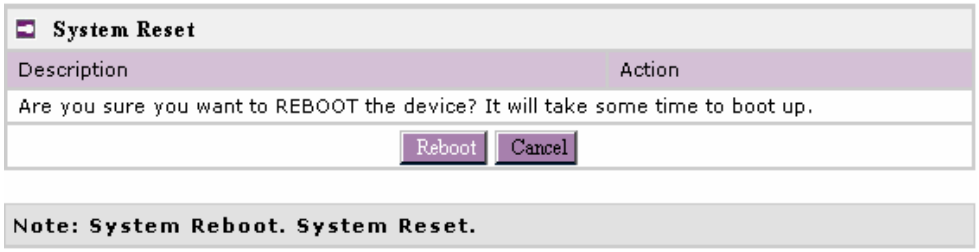


Figure 78 – Reboot the device

To reset device to the factory defaults, click **Reset** on *Figure 77* – System Reset setting and then the below appears to confirm:

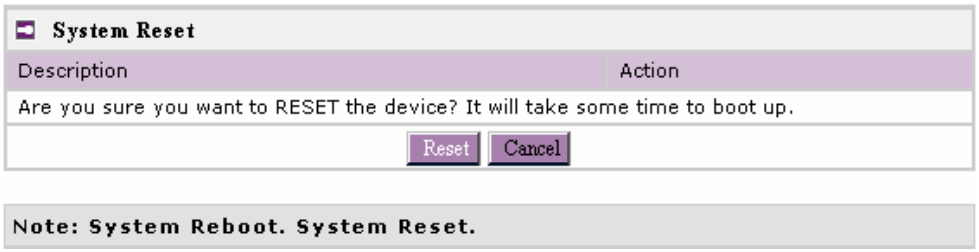


Figure 79 – Reset the device

Please note that all settings including the administrator settings will be set back to the factory default when **Reset** is selected.

System | Upgrade

Check for new product updates at the BROWAN website: http://www.browan.com

Upload – Update your device firmware.

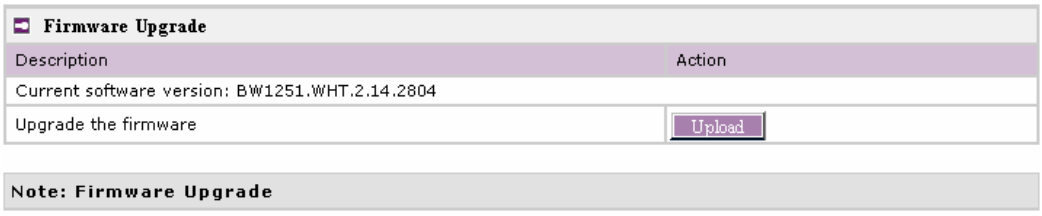


Figure 80 – Firmware Upgrade

Click the **Upload**, and then the following will appear. Specify the full path to the new firmware image and click the **Upload** button:

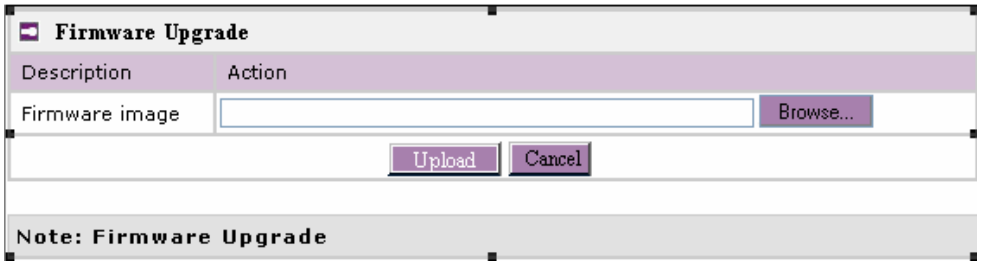


Figure 81 – Firmware Upgrade

To flash the uploaded firmware image to upgrade the firmware is done by clicking the **Upgrade** button.

Please make sure the firmware is correct for BW1251. Otherwise the upgrade will be failed.

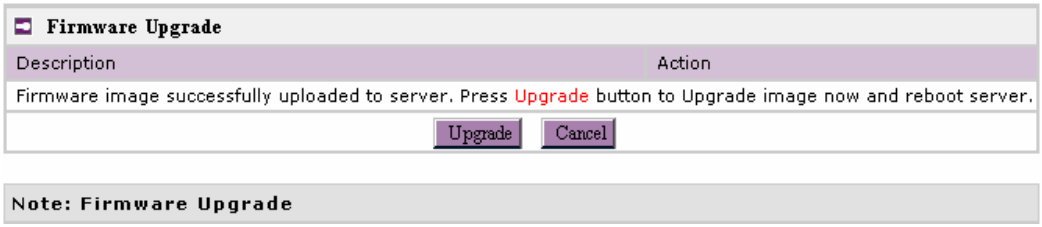


Figure 82– Device Statistics

Do not switch off or do not disconnect the BW1251 from the power supply during the firmware update process or the device might crash. It is recommended to use the Ethernet connection (not wireless) for the firmware update process.

Appendix

A) Specification

Wireless		
Standard	IEEE 802.11b(DSSS), IEEE 802.11g(OFDM) and IEEE 802.11a(OFDM)	
Data Rate	802.11a: 54,48,36,24,18,12,9,6Mbps;802.11g: 54,48,36,24,12,9,6,11,5,5,2,1Mbps (auto fall back)	
Transmit Power (adjustable RF power)	Max. 19 dBm ± 1.5dBm @ 2.4GHz Max. 18 dBm ± 1.5dBm @ 5 GHz (Maximum power will vary by channel, rate and regulatory domain)	
Antenna	Two 2dBi dual band dipole antennas, R-TNC connectors	
Encryption	WPA/WPA2（TKIP and CCMP-AES）, Dynamic/static 64bits and 128bits WEP	
Bridge	Up to 8 bridge links	
Interface		
LAN	10/100Mb Ethernet, auto sensing, RJ-45	
Console	1×DB-9 Male (RS232) for serial configuration	
Management		
Interfaces	HTTPs, Secure Telnet(SSHv2), SNMP	
Software Update	Remote software update via HTTPs	
Reset	H/W and S/W remote restore factory default	
Physical Specification		
Dimension	205 mm x 160 mm x 45 mm	
Weight	600g	
Environment Specification		
	Temperature	Humidity
Operating	0 to +50°C	20% to 90%, non-condensing
Power Supply		
POE	48V, IEEE802.3af,Power adapter Jack	
Power adaptor	External power supply, input: 100-240 VAC, 50-60Hz and output: 12VDC	
LEDs		
4 LEDs	Power, LAN, WLAN1, WLAN2	
Warranty		
3 years		
Package Contents		
▪ BW1251 Dual Radio 2.4GHz/5GHz Access Point	▪ CD-ROM with KickStart utility, User Manuals (*.pdf)	
▪ Warranty Card	▪ Ethernet cable 1.5m	
▪ International power supply	▪ USA type Power Cord	
▪ EU type Power Cord	▪	

Related Products

Controllers:	**BE9040 SMB** Access Controller
Access Points:	**BW2250** 54Mb Dual-bang outdoor Access Point

B) Factory Defaults for the BW1251

General Configuration Settings	
Administrator Username	admin
Administrator Password	admin01
Get Community	Public
Set Community	Private
Network Configuration Settings	
IP address	(static IP) 192.168.2.2
Subnet mask	255.255.255.0
Gateway	0.0.0.0
Service Configuration Settings	
DHCP server	Disable
DHCP relay	Disable
NTP service	Disable
Telnet service	Enable
SSH service	Enable
Wireless Configuration Settings	
RF Card 1(WLAN1)	
Default Mode	11g Access Point
Regulatory Domain	World
SSID	BW1251g
Default channel	1
RTS Threshold	2347 bytes
RF Output Power	19dBm
Authentication Type	Open System
MAC ACL	Disable
Encryption	Off
Security Policy	Disable
RF Card 2(WLAN2)	
Default Mode	11a Access Point
Regulatory Domain	World
SSID	BW1251a
Default channel	36
RTS Threshold	2347 bytes
Output Power	18dBm
Authentication Type	Open System
MAC ACL	Disable
Encryption	Off
Security Policy	Disable

C) Regulatory Domain/Channels/Power

Channels and Maximum output power for the BW1250 11g radio:

Channels Identifiers	Frequency in MHz	USA, Canada (FCC)	European Union (CE/ETSI)	WORLD (CE&FCC)	Japan (TELEC)
1	2412	•	•	•	•
2	2417	•	•	•	•
3	2422	•	•	•	•
4	2427	•	•	•	•
5	2432	•	•	•	•
6	2437	•	•	•	•
7	2442	•	•	•	•
8	2447	•	•	•	•
9	2452	•	•	•	•
10	2457	•	•	•	•
11	2462	•	•	•	•
12	2467	—	•	—	•
13	2472	—	•	—	•
14	2484	—	—	—	—
Maximum output Power		**19dBm**	**14dBm**	**14dBm**	**14dBm**

For channel 1 and channel 11, the maximum output power will be 19dBm in the case of the setting of domain is FCC.

Channels and Maximum power for the BW1250 11a radio:

Channels Identifiers	Frequency in MHz	USA, Canada (FCC)	European Union (CE/ETSI)	WORLD (CE/FCC)	Japan (TELEC)
U-NII lower band (5150 – 5250 MHz)					
34	5170	—	—	—	•
36	5180	•	•	•	—
38	5190	—	—	—	•
40	5200	•	•	•	—
42	5210	—	—	—	•
44	5220	•	•	•	—
46	5230	—	—	—	•
48	5240	•	•	•	—
Maximum Output Power		**14 dBm**	**17 dBm**	**15 dBm**	**15 dBm**
U-NII middle band (5250 – 5350 MHz)					

52	5260	--	•	•	—
56	5280	--	•	•	—
60	5300	--	•	•	—
64	5320	--	•	•	—
Maximum Output Power		**--**	**17 dBm**	**17 dBm**	**—**
U-NII upper band (5725 – 5875 MHz)					
149	5745	•	—	—	—
153	5765	•	—	—	—
157	5785	•	—	—	—
161	5805	•	—	—	—
165	5825	—	—	—	—
Maximum Output Power		**18dBm**	**17 dBm**	**17 dBm**	**—**

D) Location ID and ISO Country Codes

This list states the **country names** (official short names in English) in alphabetical order as given in ISO 3166-1 **and** the corresponding **ISO 3166-1-alpha-2 code elements**.

It lists 239 official short names and code elements.

Location ID	Country	Location ID	Country
AF	Afghanistan	LI	Liechtenstein
AL	Albania	LT	Lithuania
DZ	Algeria	LU	Luxembourg
AS	American Samoa	MO	Macao
AD	Andorra	MK	Macedonia, the former Yugoslav republic of
AO	Angola	MG	Madagascar
AI	Anguilla	MW	Malawi
AQ	Antarctica	MY	Malaysia
AG	Antigua and Barbuda	MV	Maldives
AR	Argentina	ML	Mali
AM	Armenia	MT	Malta
AW	Aruba	MH	Marshall islands
AU	Australia	MQ	Martinique
AT	Austria	MR	Mauritania
AZ	Azerbaijan	MU	Mauritius
BS	Bahamas	YT	Mayotte
BH	Bahrain	MX	Mexico
BD	Bangladesh	FM	Micronesia, federated states of
BB	Barbados	MD	Moldova, republic of
BY	Belarus	MC	Monaco
BE	Belgium	MN	Mongolia
BZ	Belize	MS	Montserrat
BJ	Benin	MA	Morocco
BM	Bermuda	MZ	Mozambique
BT	Bhutan	MM	Myanmar
BO	Bolivia	NA	Namibia
BA	Bosnia and Herzegovina	NR	Nauru
BW	Botswana	NP	Nepal
BV	Bouvet island	NL	Netherlands
BR	Brazil	AN	Netherlands Antilles
IO	British Indian ocean territory	NC	New Caledonia
BN	Brunei Darussalam	NZ	New Zealand
BG	Bulgaria	NI	Nicaragua

BF	Burkina Faso	NE	Niger
BI	Burundi	NG	Nigeria
KH	Cambodia	NU	Niue
CM	Cameroon	NF	Norfolk island
CA	Canada	MP	Northern Mariana islands
CV	Cape Verde	NO	Norway
KY	Cayman islands	OM	Oman
CF	Central African republic	PK	Pakistan
TD	Chad	PW	Palau
CL	Chile	PS	Palestinian territory, occupied
CN	China	PA	Panama
CX	Christmas island	PG	Papua new guinea
CC	Cocos (keeling) islands	PY	Paraguay
CO	Colombia	PE	Peru
KM	Comoros	PH	Philippines
CG	Congo	PN	Pitcairn
CD	Congo, the democratic republic of the	PL	Poland
CK	Cook islands	PT	Portugal
CR	Costa Rica	PR	Puerto Rico
CI	Côte d'ivoire	QA	Qatar
HR	Croatia	RE	Réunion
CU	Cuba	RO	Romania
CY	Cyprus	RU	Russian federation
CZ	Czech republic	RW	Rwanda
DK	Denmark	SH	Saint Helena
DJ	Djibouti	KN	Saint Kitts and Nevis
DM	Dominica	LC	Saint Lucia
DO	Dominican republic	PM	Saint Pierre and Miquelon
EC	Ecuador	VC	Saint Vincent and the grenadines
EG	Egypt	WS	Samoa
SV	El Salvador	SM	San Marino
GQ	Equatorial guinea	ST	Sao tome and Principe
ER	Eritrea	SA	Saudi Arabia
EE	Estonia	SN	Senegal
ET	Ethiopia	SC	Seychelles
FK	Falkland islands (malvinas)	SL	Sierra Leone
FO	Faroe islands	SG	Singapore
FJ	Fiji	SK	Slovakia
FI	Finland	SI	Slovenia
FR	France	SB	Solomon islands
GF	French Guiana	SO	Somalia

PF	French Polynesia	ZA	South Africa
TF	French southern territories	GS	South Georgia and the south sandwich islands
GA	Gabon	ES	Spain
GM	Gambia	LK	Sri Lanka
GE	Georgia	SD	Sudan
DE	Germany	SR	Suriname
GH	Ghana	SJ	Svalbard and Jan Mayan
GI	Gibraltar	SZ	Swaziland
GR	Greece	SE	Sweden
GL	Greenland	CH	Switzerland
GD	Grenada	SY	Syrian Arab republic
GP	Guadeloupe	TW	Taiwan, province of china
GU	Guam	TJ	Tajikistan
GT	Guatemala	TZ	Tanzania, united republic of
GN	Guinea	TH	Thailand
GW	Guinea-Bissau	TL	Timor-leste
GY	Guyana	TG	Togo
HT	Haiti	TK	Tokelau
HM	Heard island and McDonald islands	TO	Tonga
VA	Holy see (Vatican city state)	TT	Trinidad and Tobago
HN	Honduras	TN	Tunisia
HK	Hong Kong	TR	Turkey
HU	Hungary	TM	Turkmenistan
IS	Iceland	TC	Turks and Caicos islands
IN	India	TV	Tuvalu
ID	Indonesia	UG	Uganda
IR	Iran, Islamic republic of	UA	Ukraine
IQ	Iraq	AE	United Arab emirates
IE	Ireland	GB	United kingdom
IL	Israel	US	United states
IT	Italy	UM	United states minor outlying islands
JM	Jamaica	UY	Uruguay
JP	Japan	UZ	Uzbekistan
JO	Jordan	VU	Vanuatu
KZ	Kazakhstan		Vatican city state see holy see
KE	Kenya	VE	Venezuela
KI	Kiribati	VN	Viet nam
KP	Korea, democratic people's republic of	VG	Virgin islands, British
KR	Korea, republic of	VI	Virgin islands, u.s.
KW	Kuwait	WF	Wallis and Futuna

KG	Kyrgyzstan	EH	Western Sahara
LA	Lao people's democratic republic	YE	Yemen
LV	Latvia	YU	Yugoslavia
LB	Lebanon		Zaire see Congo, the democratic republic of the
LS	Lesotho	ZM	Zambia
LR	Liberia	ZW	Zimbabwe
LY	Libyan Arab Jamahiriya		

E) Antenna Specification

SPECIFICATION

1.	Description	: Dual Band Dipole Antenna With RP-TNC(M)
2.	Customer	: BROWAN COMMUNICATIONS
3.	Model No.	: WSS013
4.	Part No.	: SDW1641A1
5.	Standard	: IEEE 802.11a/b/g Wireless LAN
6.	Antenna Profile	: 143.5 mm length
7.	Color	: Black
8.	Electrical Characteristics	
	Operating Frequency	: 2.4~2.4835 & 5.15~5.35 & 5.725~5.85GHz
	Antenna Type	: Dipole
	Polarization Type	: Linear
	Type of Radiation	: Toroidal
	Antenna Gain	: 2.0 dBi Typical
	Impedance	: 50 Ohm nominal
	V.S.W.R.	: 2.0:1 Max.
9.	Mechanical Characteristics	
	Connector	: RP-TNC(M)
	Core	: N/A
10.	Raw Material	
	Coaxial Cable	: MIL-C-17 RG-178 B/U
	Housing	: TPU
	Hinge	: PC+ALLOY