NEXCOM

User Manual

Light Industrial Access Point

IWF2220

V1.2

Copyright & Disclaimer

Copyright

The contents of this publication may not be reproduced in any part or as a whole, stored, transcribed in an information retrieval system, translated into any language, or transmitted in any form or by any means, mechanical, magnetic, electronic, optical, photocopying, manual, or otherwise, without the prior written permission of NEXCOM, INC.

Disclaimer

NEXCOM, INC. does not assume any liability arising out the application or use of any products, or software described herein. Neither does it convey any license under its parent rights not the parent rights of others. NEXCOM further reserves the right to make changes in any products described herein without notice. The publication is subject to change without notice.

Trademarks

NEXCOM is a registered trademark of NEXCOM, INC. Other trademarks mentioned in this publication are used for identification purposes only and may be properties of their respective owners.

FCC Statement:

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.

For product available in the USA/Canada market, only channel 1~11 can be operated. Selection of other channels is not possible.

This device and it's antennas(s) must not be co-located or operating in conjunction with any other antenna or transmitter except in accordance with FCC multi-transmitter product procedures.

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

IMPORTANT NOTE:

FCC Radiation Exposure Statement:

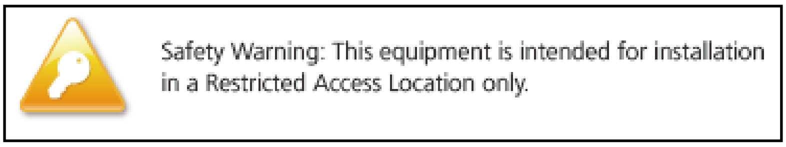
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Warning!

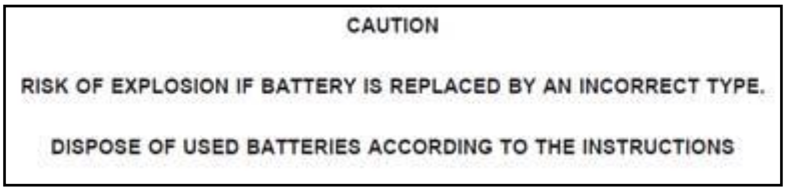
You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

1. Handling the unit: carry the unit with both hands and handle it with care.

2. Maintenance: to keep the unit clean, use only approved cleaning products or cleans with a dry cloth.



Safety Warning: This equipment is intended for installation in a Restricted Access Location only.



CAUTION

RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE.

DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS

Table of Contents

1. Before You Start

1.1 Preface

This manual is intended for using by system integrators, field engineers and network administrators to help them set up Access Points in their network environments. It contains step by step procedures and pictures to guide users with basic network system knowledge to complete the installation.

1.2 Document Conventions

⚠	Represents essential steps, actions, or messages that should not be ignored.
» **Note:**	Contains related information that corresponds to a topic.
SAVE	Indicates that clicking this button will save the changes you made, but you must reboot the system for the changes to take effect.
CLEAR	Indicates that clicking this button will clear what you have set before the settings are applied.

1.3 Package Content

The standard package of IWF2220 includes:

NEXCOM IWF2220	x1
CD-ROM (with User's Manual and QIG)	x1
Ethernet Cable	x1
Power cord	x1
Power Adaptor (12V)	x1
Detachable Antenna	x4

⚠ *It is recommended to keep the original packing materials for possible future shipment when repair or maintenance is required. Any returned product should be packed in its original packaging to prevent damage during delivery.*

2. System Overview and Getting Started

2.1 Introduction of NEXCOM Access Points

Indoor – IWF2220

The **NEXCOM's Enterprise Access Point IWF Series** are embedded with 802.11 a/b/g/n MIMO technology, designed for seamless wireless connectivity in enterprise or industrial environments of all dimensions. IWF2220 features dual radio RF cards to offer flexible implementations needed for the growing wireless networking applications. The IWF Series make wireless communication fast, secure and easy. They support business grade security, namely 802.1X, and Wi-Fi Protected Access (WPA and WPA2). By pushing a purposely built button, the WES (Press-n-Connect) feature makes it easy to bridge wireless links of multiple access points for forming a wider wireless network coverage.

The IWF Series also features multiple ESSIDs with VLAN tags and multiple Virtual APs, great for enterprise applications, such as separating traffic from different departments using different ESSIDs. The PoE LAN port is able to receive power from Power over Ethernet (PoE) sourcing devices.

⚠

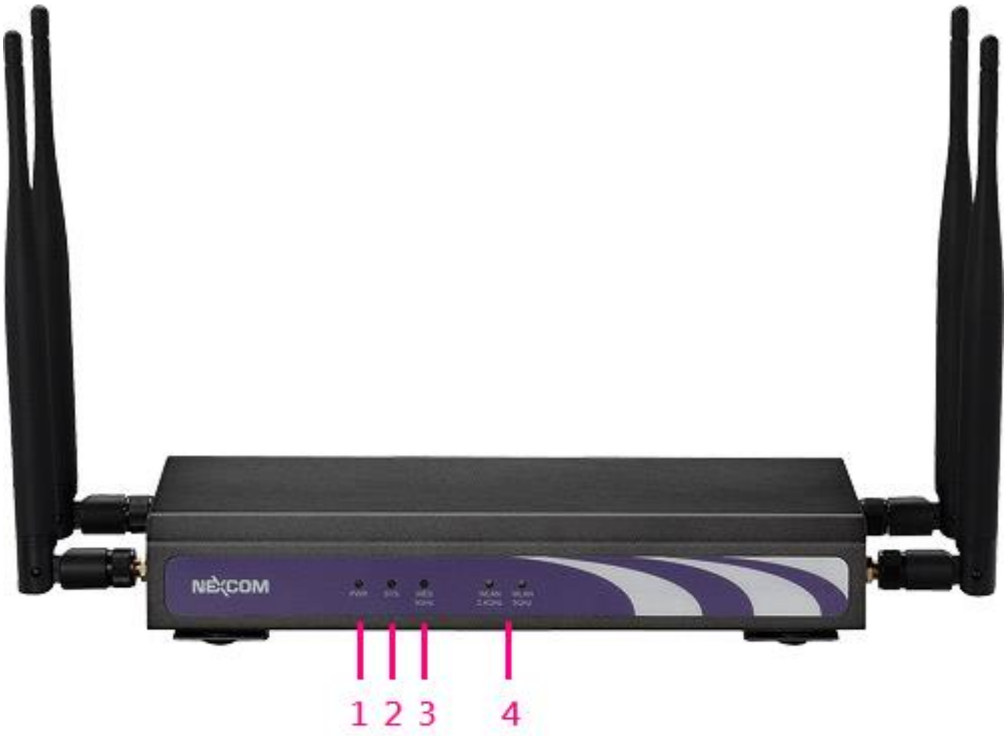
- *Please note that screenshots are taken from APs which feature dual RF cards. Single RF Card APs can be configured in the same manner from the User Interface.*

2.2 Hardware Description

This section depicts the hardware information including all panel description.

IWF2220

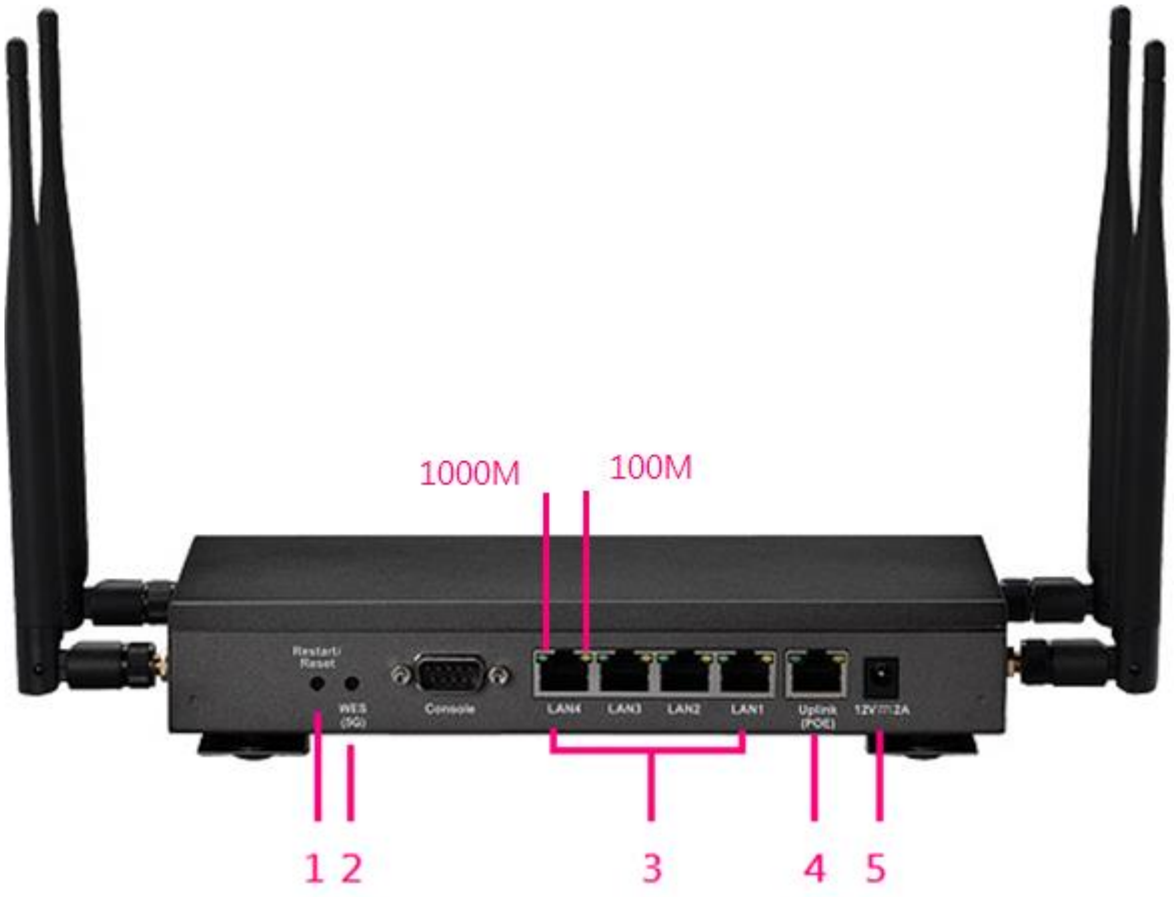
Front Panel



IWF2220 Front Panel

<table>
<tr><td>1</td><td><b>Power LED</b></td><td>On indicates power on.</td></tr>
<tr><td>2</td><td><b>Status LED</b></td><td>On indicates the system is ready.</td></tr>
<tr><td>3</td><td><b>WES LED</b></td><td>For indicating WDS connection status.
<table>
<tr><td></td><td>Master (Press for more than 3 seconds)</td><td>Slave (Press once and then release right away)</td></tr>
<tr><td>WES Negotiate</td><td>BLINKING SLOWLY (Green)</td><td>BLINKING RAPIDLY (Green)</td></tr>
<tr><td>WES Success</td><td>LED (Green) ON</td><td>LED (Green) ON</td></tr>
<tr><td>WES Fail/Timeout</td><td>LED (Green) OFF</td><td>LED (Green) OFF</td></tr>
</table></td></tr>
<tr><td>4</td><td><b>Wireless LED (2.4 / 5 GHz)</b></td><td>On indicates wireless network interface is ready for service.</td></tr>
</table>

Rear Panel



IWF2220 Rear Panel

1	**Restart / Reset**	Press once to restart the system; to reset the system to factory default settings, hold for more than 5 seconds.
2	**WES Button (RF B)**	WDS Easy Setup. Press the button to build up a WDS link with another peer. 4 WDS links can be set up per RF card. Note that the WES Button only runs on the 5 GHz RF Card B.
3	**LAN 1~4 Ports**	The ports for connections with LAN side devices.
4	**Uplink Port (PoE)**	The port for uplink connection to another gateway or device. PoE (802.3at) is supported.
5	**12V ⎓ 2A**	Power Socket for the power adaptor

2.3 Hardware Installation

Please follow the steps mentioned below to install the hardware of **IWF2220**:

Step 1. Place the IWF2220 at the best location. The best location is usually at the center of your intended wireless network.

Step 2. Connect the IWF2220 to your network device. Connect one end of the Ethernet cable to the Uplink port of IWF2220 and the other end of the cable to a switch, a router, or a hub. IWF2220 is then connected to your existing wired LAN network.

Step 3. There are two ways to supply power to IWF2220

a) Connect the DC power adaptor to the IWF2220 power jack socket.

b) The IWF2220 Uplink port is capable of receiving DC currents. Connect a (IEEE 802.3at-compliant) PSE device (e.g. a PoE-switch) to the Uplink port of IWF2220 with the Ethernet cable.

Now, the Hardware Installation is complete.

⚠
- *Please use only the power adapter supplied with the package. Using a different power adapter may damage this system.*
- *To verify the wired connection between the AP and your switch / router / hub, please also check the LED status indicator of the respective network devices.*

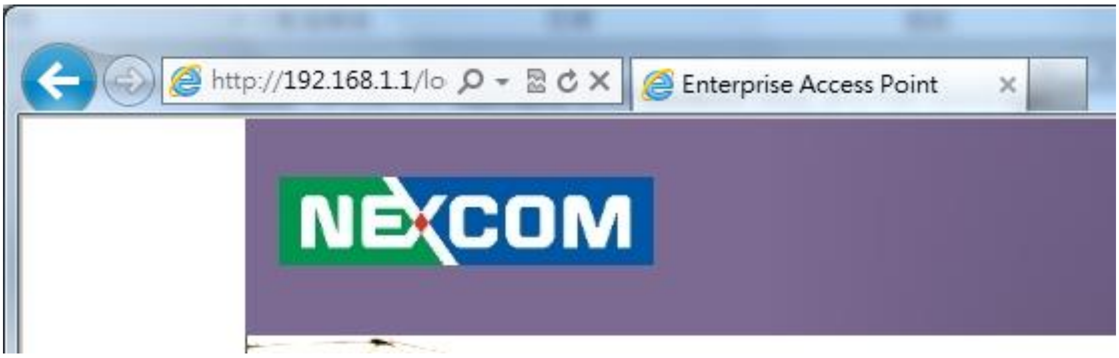
2.4 Access Web Management Interface

NEXCOM Access Points support web-based configuration. When hardware installation is complete, the AP can be configured through a PC by using a web browser.

The default values of the AP's LAN IP Address and Subnet Mask are:

IP Address: *192.168.1.1*

Subnet Mask: *255.255.255.0*



Example of entering the AP's default IP Address into a web browser

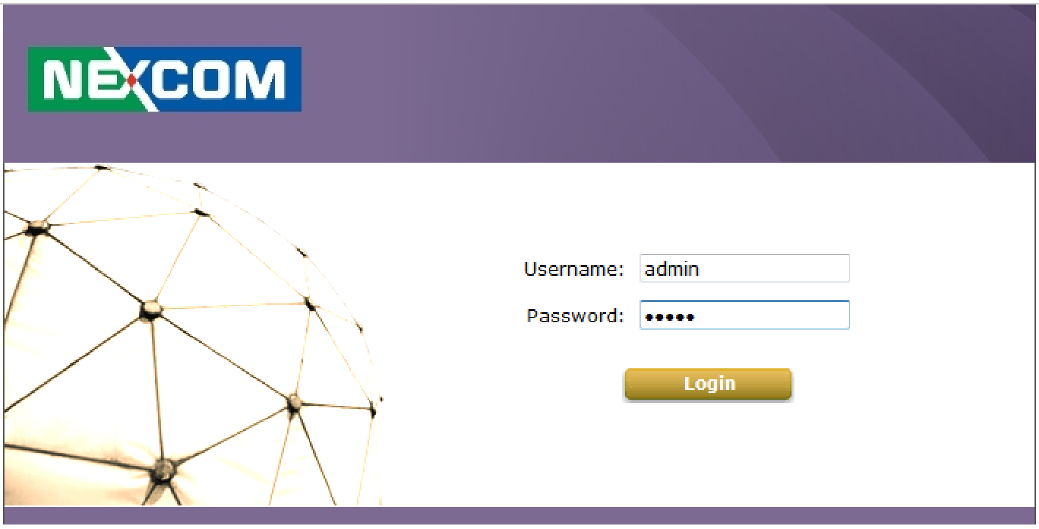
- To access the web management interface (WMI), connect the administrator PC to the LAN port of the AP via an Ethernet cable. Then, set a static IP Address on the same subnet mask as the AP in TCP/IP settings of your PC, such as the following example:

  IP Address: *192.168.1.100*

  Subnet Mask: *255.255.255.0*

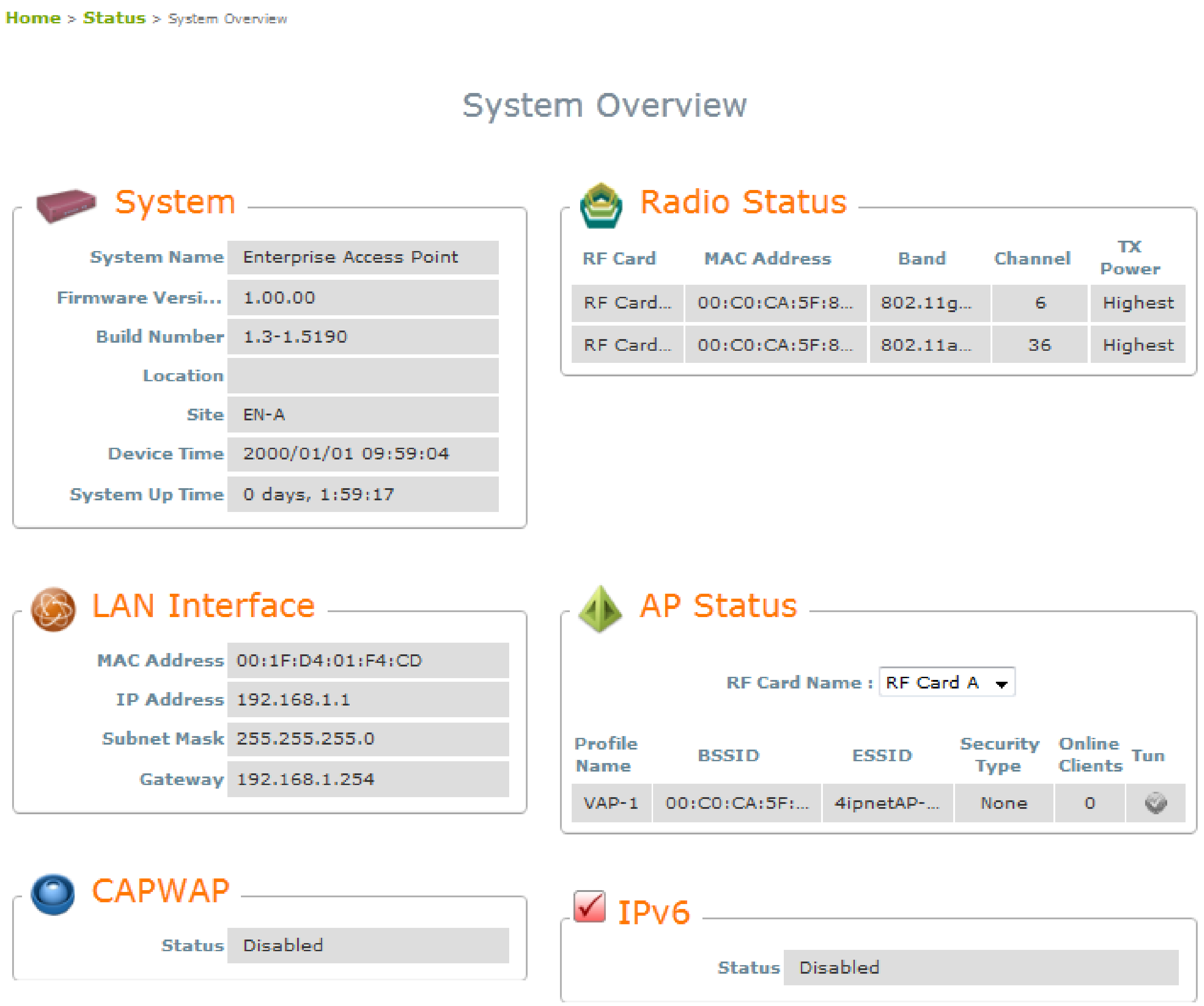
Note: Please note that the IP Address used should not overlap with the IP Addresses of any other device within the same network to avoid IP conflict.

- Launch the web browser on your PC and enter the IP Address of the AP (**192.168.1.1**) at the address field, and then press ***Enter***. The following Administrator Login Page will appear. Enter "admin" for both the **Username** and **Password** fields, and then click ***Login***.


Username: admin
Password: •••••

Administrator Login Page

- After a successful login into AP, a **System Overview** page of the Web Management Interface (WMI) will appear.



Home > Status > System Overview

System Overview

System

System Name	Enterprise Access Point
Firmware Versi...	1.00.00
Build Number	1.3-1.5190
Location	
Site	EN-A
Device Time	2000/01/01 09:59:04
System Up Time	0 days, 1:59:17

Radio Status

RF Card	MAC Address	Band	Channel	TX Power
RF Card...	00:C0:CA:5F:8...	802.11g...	6	Highest
RF Card...	00:C0:CA:5F:8...	802.11a...	36	Highest

LAN Interface

MAC Address	00:1F:D4:01:F4:CD
IP Address	192.168.1.1
Subnet Mask	255.255.255.0
Gateway	192.168.1.254

AP Status

RF Card Name : RF Card A

Profile Name	BSSID	ESSID	Security Type	Online Clients	Tun
VAP-1	00:C0:CA:5F:...	4ipnetAP-...	None	0	●

CAPWAP

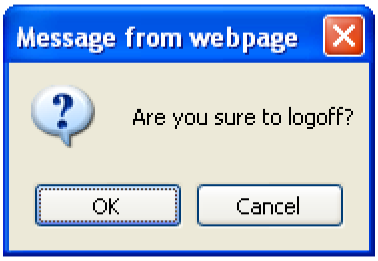
Status: Disabled

IPv6

Status: Disabled

The Web Management Interface - System Overview Page

- To logout, simply click on the ***Logout*** button at the upper right hand corner of the interface to return to the Administrator Login Page. Click ***OK*** to logout.



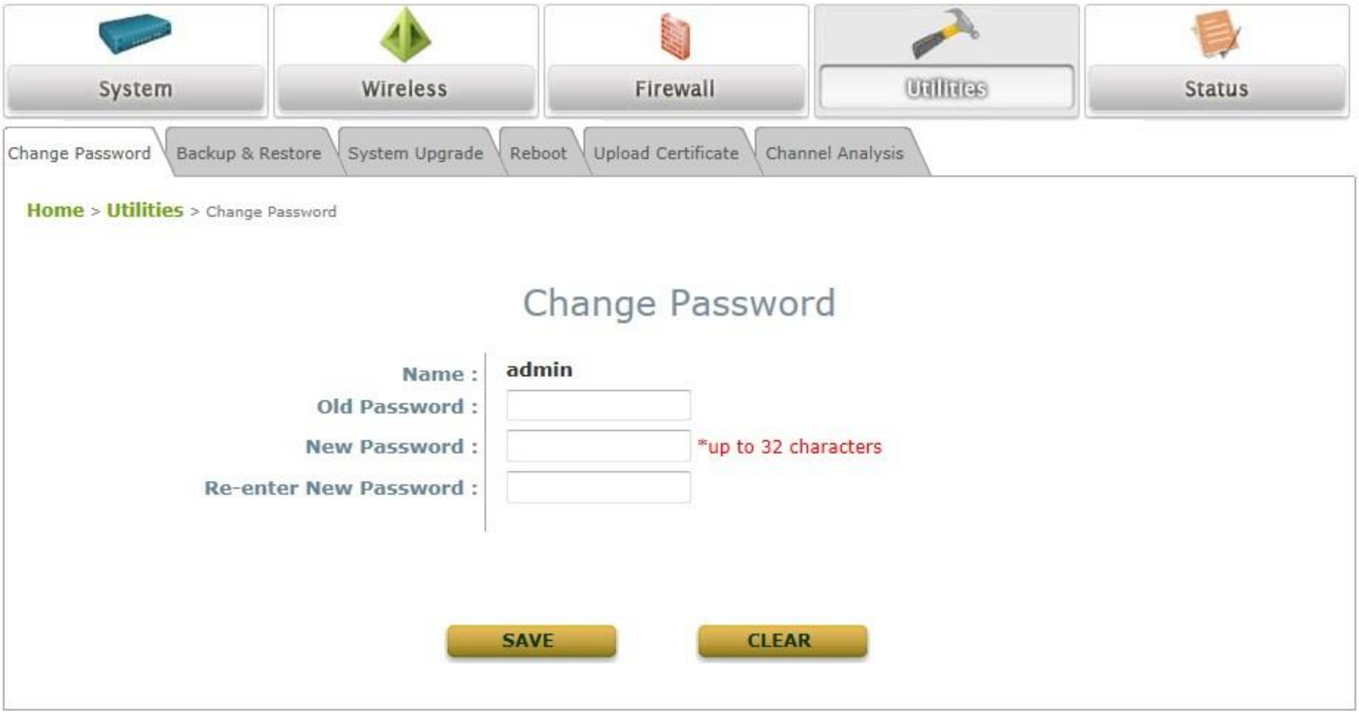
Message from webpage

Are you sure to logoff?

Logout Prompt

For security reasons, it is strongly recommended to change the administrator's password upon the completion of all configuration settings

Please follow the following steps to change the administrator's password:



Change Password

Name : admin

Old Password :

New Password : *up to 32 characters

Re-enter New Password :

Change Password Page

- Click on the **Utilities** icon on the main menu, and select the **Change Password** tab.
- Enter the old password and then a new password with a length of up to 32 characters, and retype it in the **Re-enter New Password** field.

Congratulation!

Now, the NEXCOM Access Point is installed and configured successfully.

- *It is strongly recommended to make a backup copy of your configuration settings.*
- *After the AP's network configuration is completed, please remember to change the IP Address of your PC Connection Properties back to its original settings in order to ensure that your PC functions properly in its real network environments.*

3. Connect your AP to your Network

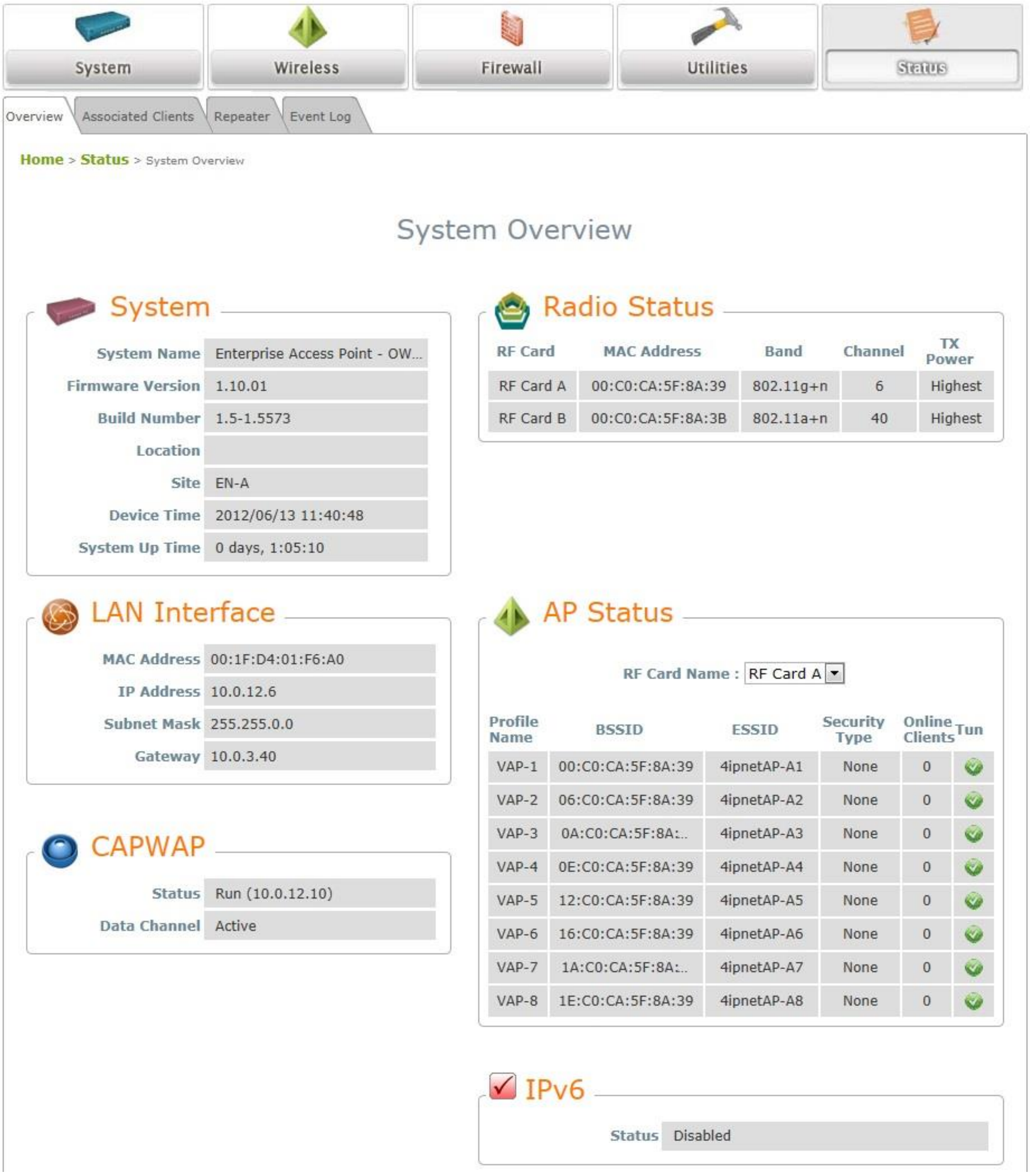
The following instructions depict how to establish the wireless coverage of your network. The AP will connect to the network through its LAN port and provide wireless access to your network.

After having prepared the AP's hardware for configuration, set the TCP/IP settings of administrator's computer to have a static **IP Address** of 192.168.1.10 and **Subnet Mask** of 255.255.255.0.

Step 1: Configuring the AP's System Information

- Enter the AP's default IP Address (**192.168.1.1**) into the URL of a web browser.
- Log in using **Username: admin** and **Password: admin**.

  The Web Management Interface will appear as shown below.



Home > Status > System Overview

System Overview

System

System Name	Enterprise Access Point - OW...
Firmware Version	1.10.01
Build Number	1.5-1.5573
Location	
Site	EN-A
Device Time	2012/06/13 11:40:48
System Up Time	0 days, 1:05:10

Radio Status

RF Card	MAC Address	Band	Channel	TX Power
RF Card A	00:C0:CA:5F:8A:39	802.11g+n	6	Highest
RF Card B	00:C0:CA:5F:8A:3B	802.11a+n	40	Highest

LAN Interface

MAC Address	00:1F:D4:01:F6:A0
IP Address	10.0.12.6
Subnet Mask	255.255.0.0
Gateway	10.0.3.40

AP Status

RF Card Name : RF Card A

Profile Name	BSSID	ESSID	Security Type	Online Clients	Tun
VAP-1	00:C0:CA:5F:8A:39	4ipnetAP-A1	None	0	✓
VAP-2	06:C0:CA:5F:8A:39	4ipnetAP-A2	None	0	✓
VAP-3	0A:C0:CA:5F:8A:..	4ipnetAP-A3	None	0	✓
VAP-4	0E:C0:CA:5F:8A:39	4ipnetAP-A4	None	0	✓
VAP-5	12:C0:CA:5F:8A:39	4ipnetAP-A5	None	0	✓
VAP-6	16:C0:CA:5F:8A:39	4ipnetAP-A6	None	0	✓
VAP-7	1A:C0:CA:5F:8A:..	4ipnetAP-A7	None	0	✓
VAP-8	1E:C0:CA:5F:8A:39	4ipnetAP-A8	None	0	✓

CAPWAP

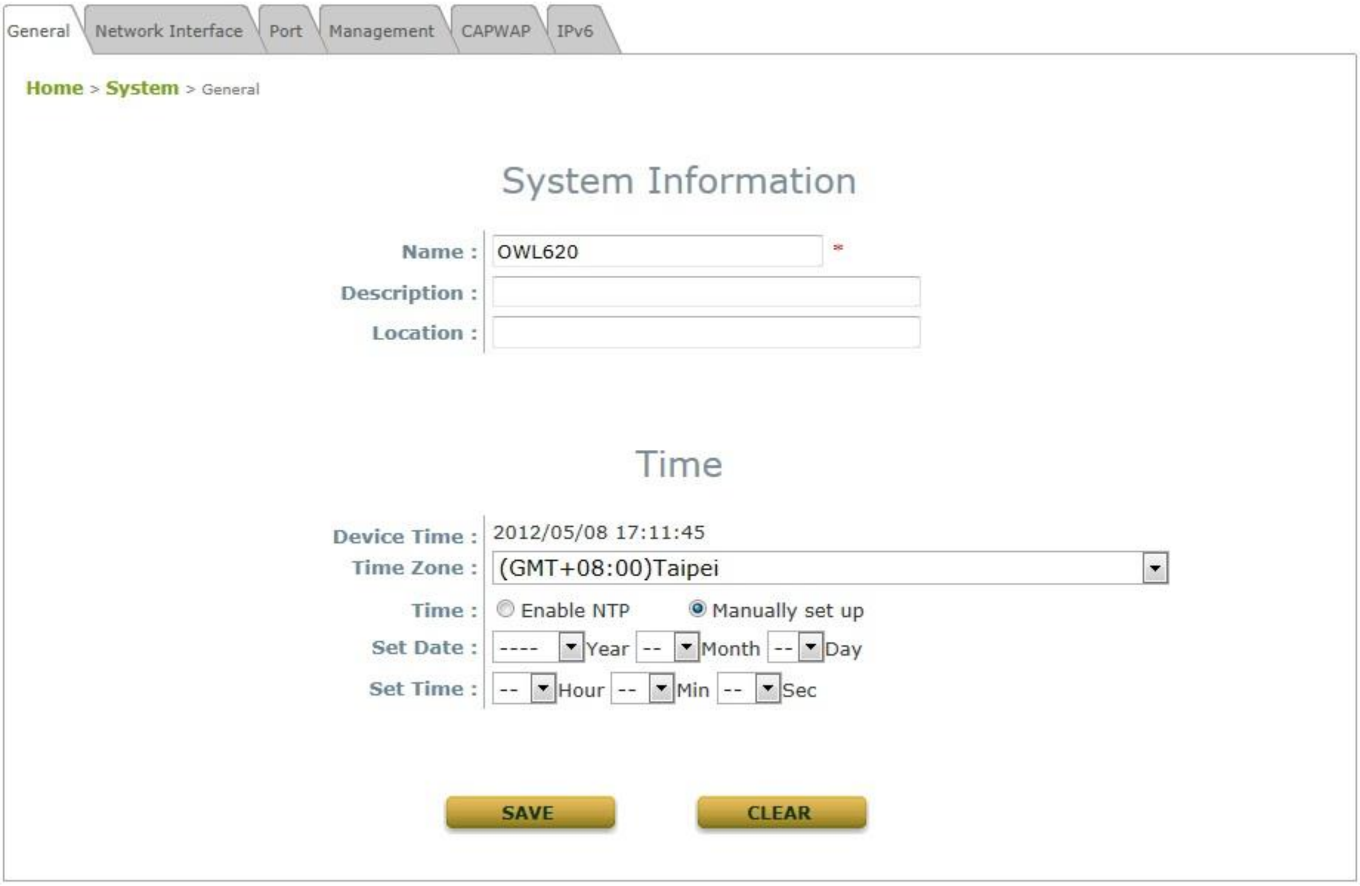
Status	Run (10.0.12.10)
Data Channel	Active

IPv6

Status	Disabled

Web Management Interface Main Page (System Overview)

From here, click on the **System** icon to get to the following page. On this Page you can make entries to the **Name**, **Description**, and **Location** fields as well as set the device's time.



System Information

Name : OWL620 *
Description :
Location :

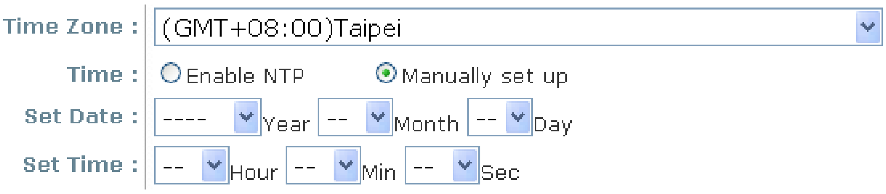
Time

Device Time : 2012/05/08 17:11:45
Time Zone : (GMT+08:00)Taipei
Time : ○ Enable NTP ● Manually set up
Set Date : ---- Year -- Month -- Day
Set Time : -- Hour -- Min -- Sec

System Information Page

There are two methods of setting up the time: Manual (indicated by the option **Set Date** & **Time**) and NTP.

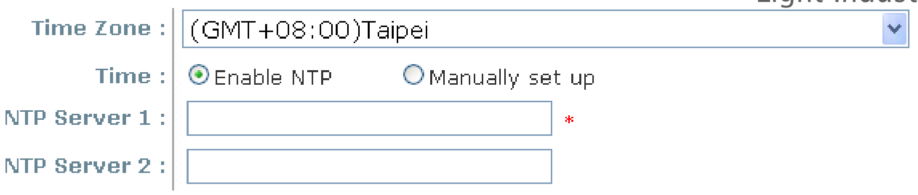
The default is Manual and requires individual setup every time the system starts up. Simply choose a time zone and set the time accordingly. When it is finished, click ***SAVE***.



Time Zone : (GMT+08:00)Taipei
Time : ○ Enable NTP ● Manually set up
Set Date : ---- Year -- Month -- Day
Set Time : -- Hour -- Min -- Sec

Manually Time Setup

The alternative method is **NTP.** Upon selecting **NTP** under the **Time** field, the configuration changes to allow up to two **NTP** servers. Simply enter a local NTP server's IP Address (if available) or search online for an NTP server nearest to you. Set the time zone and click ***SAVE***.



Time Zone : (GMT+08:00)Taipei

Time : ● Enable NTP ○ Manually set up

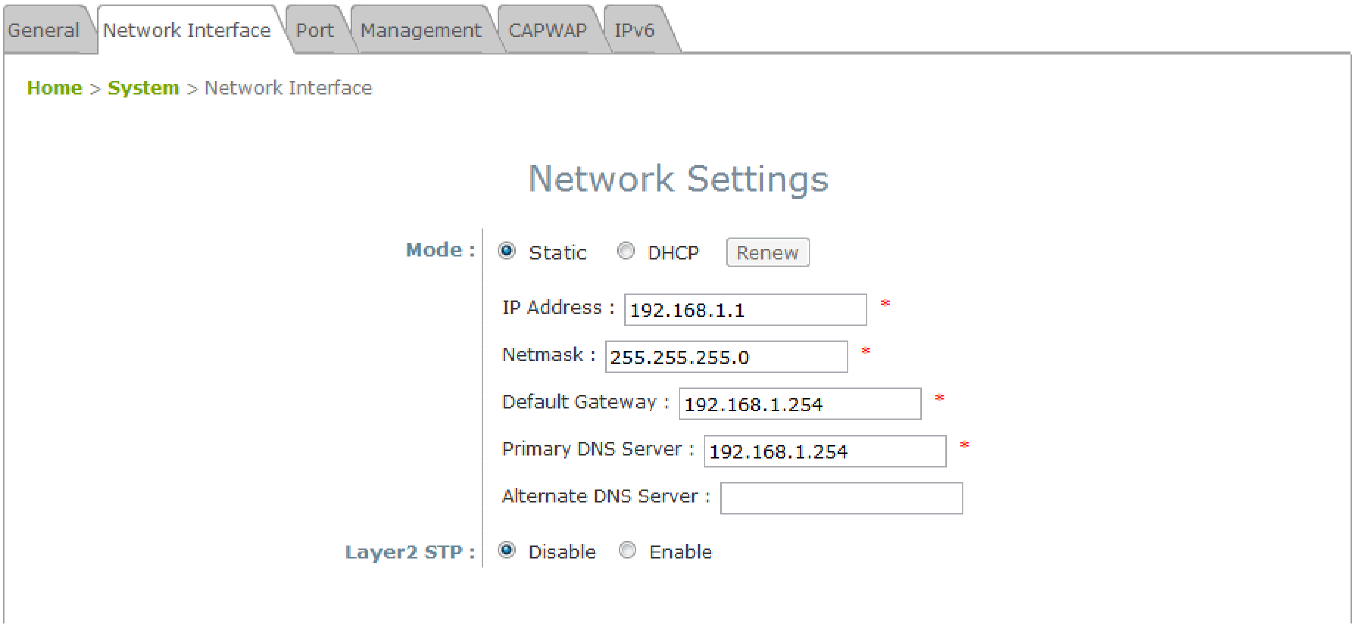
NTP Server 1 : *

NTP Server 2 :

NTP Setup

Step 2: Configuring the AP's Network Settings

While still on this Page, click on the **Network Interface** tab to begin configuration of the network settings.



Home > System > Network Interface

Network Settings

Mode : ● Static ○ DHCP

IP Address : 192.168.1.1 *

Netmask : 255.255.255.0 *

Default Gateway : 192.168.1.254 *

Primary DNS Server : 192.168.1.254 *

Alternate DNS Server :

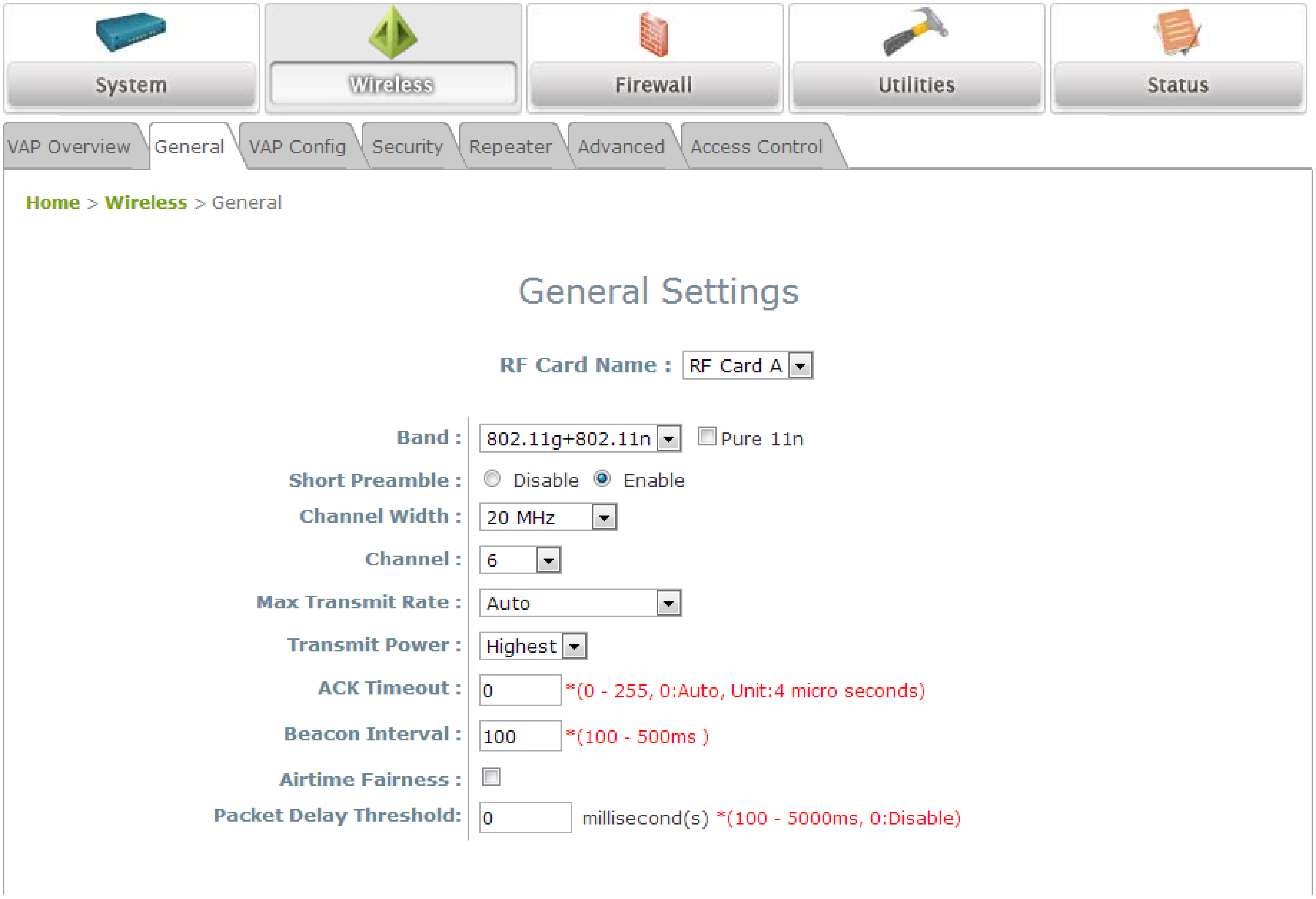
Layer2 STP : ● Disable ○ Enable

Network Settings Page

If the deployment decides that the AP will be getting dynamic IP Addresses from the connected network, set **Mode** to *DHCP*; otherwise, set **Mode** to **Static** and fill in the required fields marked with a red asterisk (**IP Address**, **Netmask**, **Gateway**, and **Primary DNS Server**) with the appropriate values for the network. Click ***SAVE*** when you are finished to save changes that have been made.

Step 3: Configure the AP's Wireless General Settings

Click on the **Wireless** icon followed by the **General** tab. On this page we need to choose the **Band** and **Channel** that we wish to use.



General Settings

RF Card Name : RF Card A

Band : 802.11g+802.11n □ Pure 11n

Short Preamble : ○ Disable ● Enable

Channel Width : 20 MHz

Channel : 6

Max Transmit Rate : Auto

Transmit Power : Highest

ACK Timeout : 0 *(0 - 255, 0:Auto, Unit:4 micro seconds)

Beacon Interval : 100 *(100 - 500ms)

Airtime Fairness : □

Packet Delay Threshold: 0 millisecond(s) *(100 - 5000ms, 0:Disable)

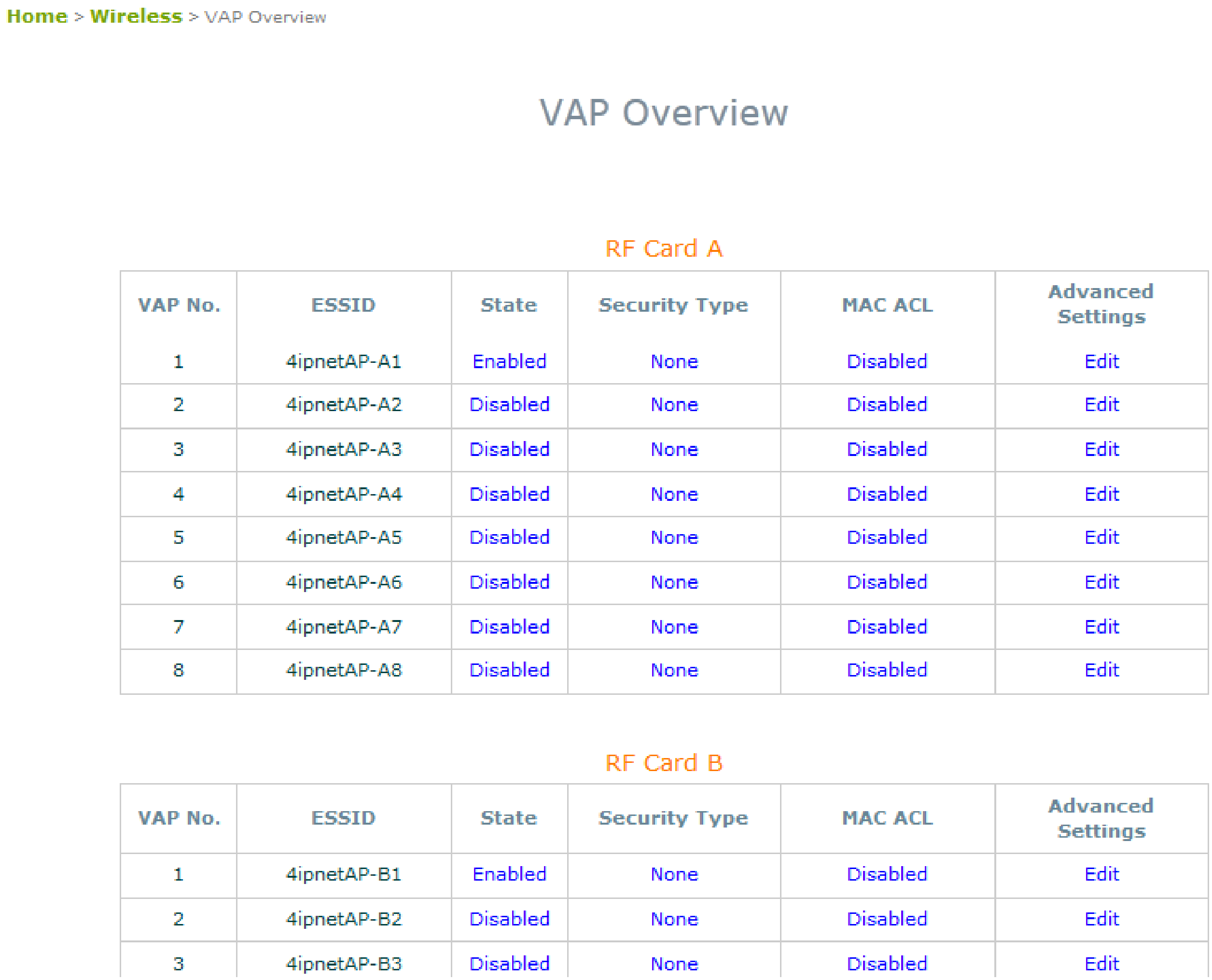
Wireless General Settings Page

On this page, choose the RF card you would like to set up and select the band in which the AP is to broadcast its signal. The rest of the fields are optional and can be configured at another time. Click ***SAVE*** if any changes have been made.

Note: • For IWF2220, the RF Card A supports only 2.4GHz bands (b/g/n) and RF Card B supports only 5GHz bands (a/n).

Step 4: Configuring Wireless Coverage (VAP-1)

To set up the AP’s wireless access, refer to the following VAP-1 configuration (other VAP configuration can refer to the same setup steps as done for VAP-1). Click on the **Overview** tab to proceed.



Home > Wireless > VAP Overview

VAP Overview

RF Card A

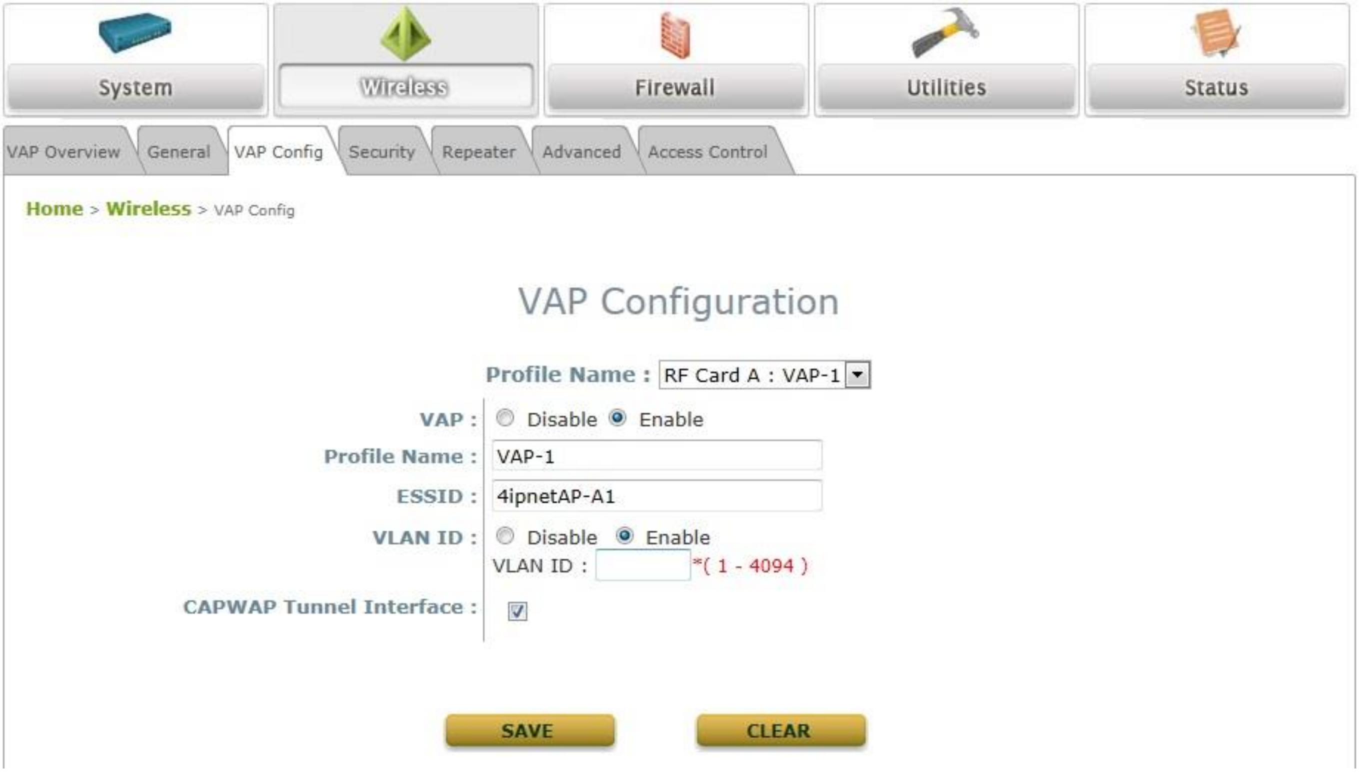
VAP No.	ESSID	State	Security Type	MAC ACL	Advanced Settings
1	4ipnetAP-A1	Enabled	None	Disabled	Edit
2	4ipnetAP-A2	Disabled	None	Disabled	Edit
3	4ipnetAP-A3	Disabled	None	Disabled	Edit
4	4ipnetAP-A4	Disabled	None	Disabled	Edit
5	4ipnetAP-A5	Disabled	None	Disabled	Edit
6	4ipnetAP-A6	Disabled	None	Disabled	Edit
7	4ipnetAP-A7	Disabled	None	Disabled	Edit
8	4ipnetAP-A8	Disabled	None	Disabled	Edit

RF Card B

VAP No.	ESSID	State	Security Type	MAC ACL	Advanced Settings
1	4ipnetAP-B1	Enabled	None	Disabled	Edit
2	4ipnetAP-B2	Disabled	None	Disabled	Edit
3	4ipnetAP-B3	Disabled	None	Disabled	Edit

Virtual AP Overview Page

On this page click the hyperlink in the row and column that corresponds with *VAP-1’s State*. This will bring up the following page.



VAP Configuration

Profile Name : RF Card A : VAP-1

VAP : ○ Disable ● Enable

Profile Name : VAP-1

ESSID : 4ipnetAP-A1

VLAN ID : ○ Disable ● Enable

VLAN ID : *(1 - 4094)

CAPWAP Tunnel Interface : ☑

VAP Configuration Page (RF Card A : VAP-1 shown)

The desired VAP profile can be selected from the drop-down menu of Profile Name and VAP-1 configuration will serve as an example for all other VAPs. Before proceeding further, please make sure that the VAP field is marked *Enable*; afterwards, enter an ESSID to represent the WLAN associated with AP's VAP-1. It is suggested that Profile Name is used to describe what this particular VAP will be used for; otherwise, leave it as default. VLAN ID can be chosen at another time. Click *SAVE* to save all changes up to this point and *Reboot* the system to apply these revised settings.

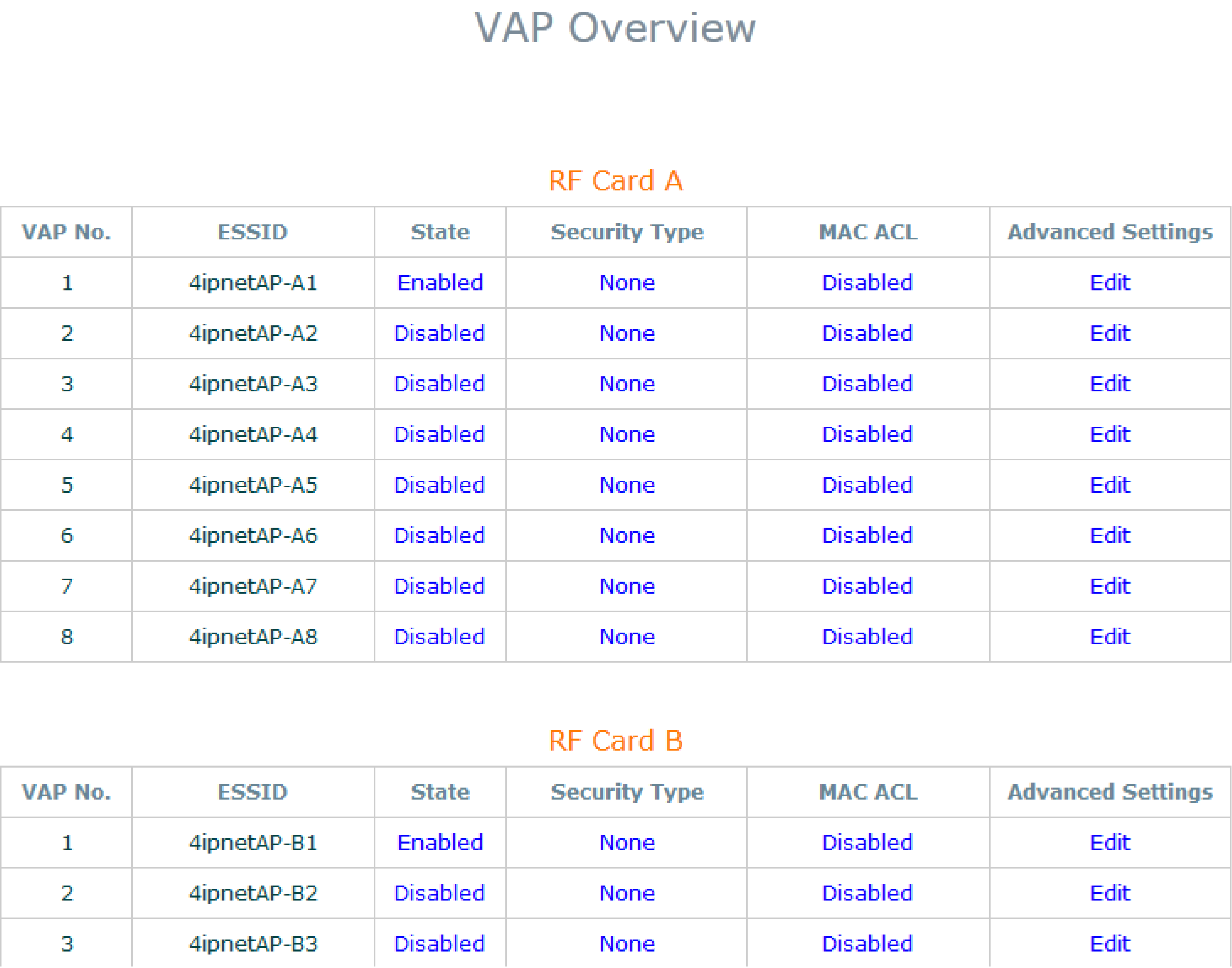
Congratulations!

After reboot, the AP can start to operate with these revised settings.

4. Adding Virtual Access Points

The AP possesses the feature of multi-ESSID; namely, it can behave as multiple virtual access points, providing different levels of services from the same physical AP device.

Please click on the **Wireless** icon to review the **VAP Overview** page.



VAP Overview

RF Card A

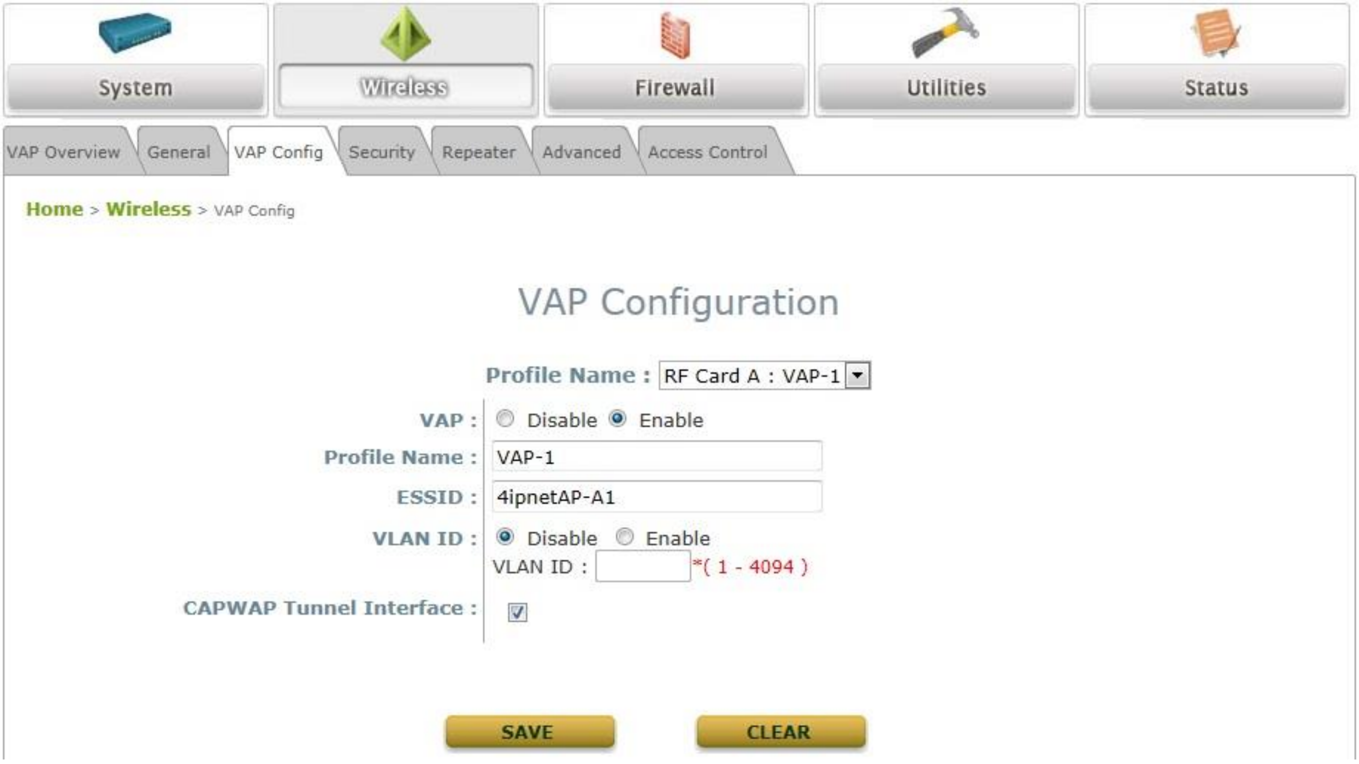
VAP No.	ESSID	State	Security Type	MAC ACL	Advanced Settings
1	4ipnetAP-A1	Enabled	None	Disabled	Edit
2	4ipnetAP-A2	Disabled	None	Disabled	Edit
3	4ipnetAP-A3	Disabled	None	Disabled	Edit
4	4ipnetAP-A4	Disabled	None	Disabled	Edit
5	4ipnetAP-A5	Disabled	None	Disabled	Edit
6	4ipnetAP-A6	Disabled	None	Disabled	Edit
7	4ipnetAP-A7	Disabled	None	Disabled	Edit
8	4ipnetAP-A8	Disabled	None	Disabled	Edit

RF Card B

VAP No.	ESSID	State	Security Type	MAC ACL	Advanced Settings
1	4ipnetAP-B1	Enabled	None	Disabled	Edit
2	4ipnetAP-B2	Disabled	None	Disabled	Edit
3	4ipnetAP-B3	Disabled	None	Disabled	Edit

VAP Overview Page

To proceed with specific VAP configuration, click on the corresponding cell in the **State** column and row of the VAP; the particular VAP's Configuration page will then appear for further configuration.



VAP Configuration

Profile Name : RF Card A : VAP-1

VAP :	○ Disable ● Enable
Profile Name :	VAP-1
ESSID :	4ipnetAP-A1
VLAN ID :	● Disable ○ Enable VLAN ID : ____ *(1 - 4094)
CAPWAP Tunnel Interface :	☑

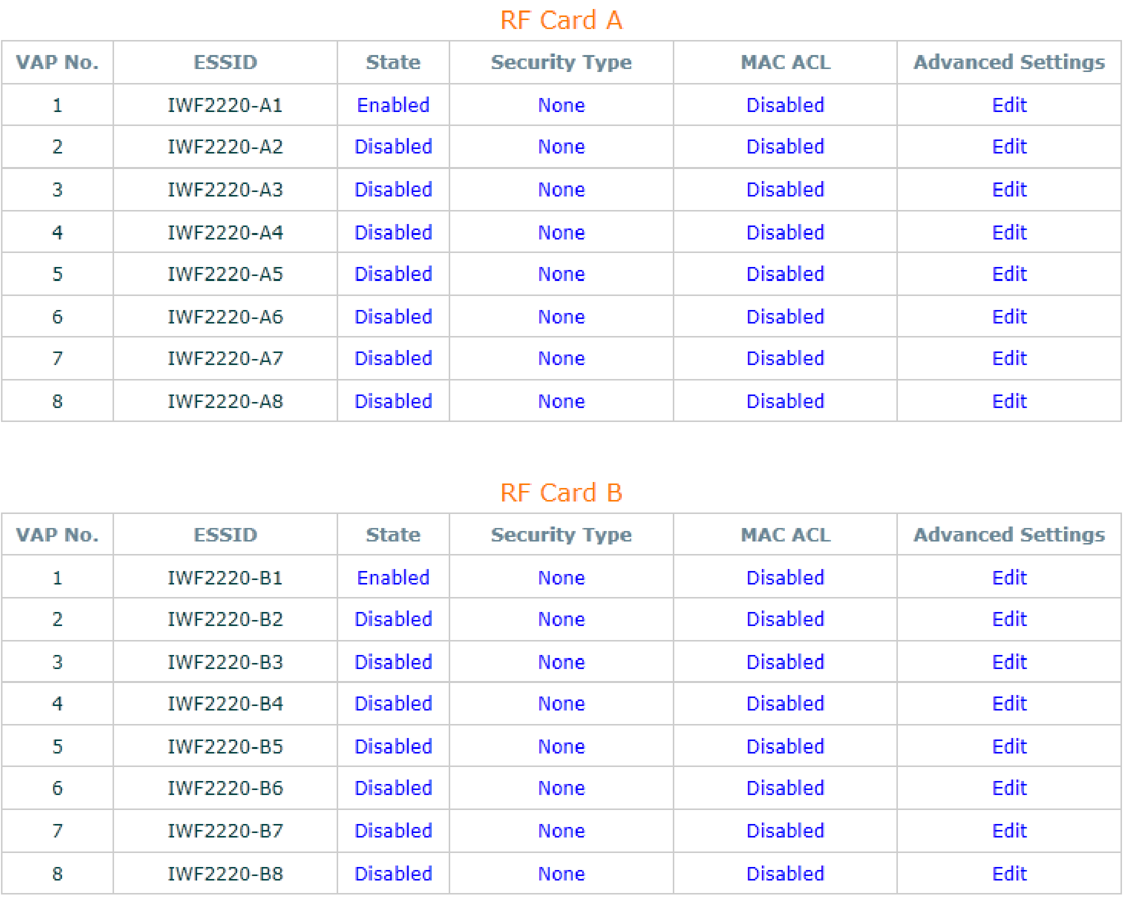
VAP Configuration Page (VAP-1 shown)

Please select the desired RF card and VAP profile from the drop-down menu of Profile Name. Choose ***Enable*** for the **VAP** field. Pick a descriptive **Profile Name** and an appropriate **ESSID** for clients to associate to. A **VLAN ID** can be provided to indicate the traffic through this particular VAP. It may allow further management/control (e.g. access rights and Internet usage, etc) of each VAP with a management gateway. Click ***SAVE*** and then ***Reboot*** for the changes to take effect.

5. Securing the AP

Different VAP may require different levels of security. These instructions will guide the user through setting up different types of security for a particular VAP. Simply repeat the following steps for other VAP with security requirement.

Step 1: Ensure the intended VAP is Enabled



RF Card A

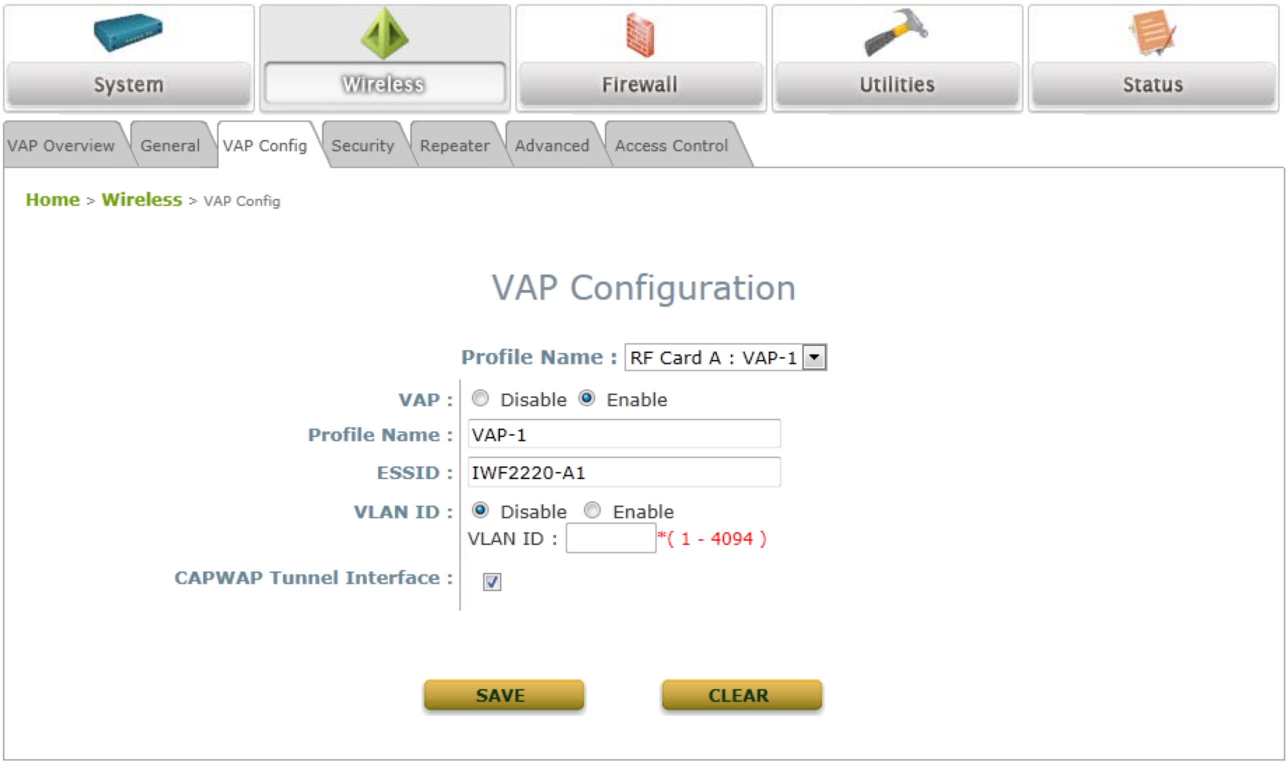
VAP No.	ESSID	State	Security Type	MAC ACL	Advanced Settings
1	IWF2220-A1	Enabled	None	Disabled	Edit
2	IWF2220-A2	Disabled	None	Disabled	Edit
3	IWF2220-A3	Disabled	None	Disabled	Edit
4	IWF2220-A4	Disabled	None	Disabled	Edit
5	IWF2220-A5	Disabled	None	Disabled	Edit
6	IWF2220-A6	Disabled	None	Disabled	Edit
7	IWF2220-A7	Disabled	None	Disabled	Edit
8	IWF2220-A8	Disabled	None	Disabled	Edit

RF Card B

VAP No.	ESSID	State	Security Type	MAC ACL	Advanced Settings
1	IWF2220-B1	Enabled	None	Disabled	Edit
2	IWF2220-B2	Disabled	None	Disabled	Edit
3	IWF2220-B3	Disabled	None	Disabled	Edit
4	IWF2220-B4	Disabled	None	Disabled	Edit
5	IWF2220-B5	Disabled	None	Disabled	Edit
6	IWF2220-B6	Disabled	None	Disabled	Edit
7	IWF2220-B7	Disabled	None	Disabled	Edit
8	IWF2220-B8	Disabled	None	Disabled	Edit

VAP Overview Page

On the **VAP Overview** page, check the table to confirm the VAP State. If it is ***Enabled***, skip to **Step 2**. If not, click on to proceed with **VAP Configuration** for that particular VAP.



VAP Configuration

Profile Name : RF Card A : VAP-1

VAP : ○ Disable ● Enable

Profile Name : VAP-1

ESSID : IWF2220-A1

VLAN ID : ● Disable ○ Enable
VLAN ID : *(1 - 4094)

CAPWAP Tunnel Interface : ☑

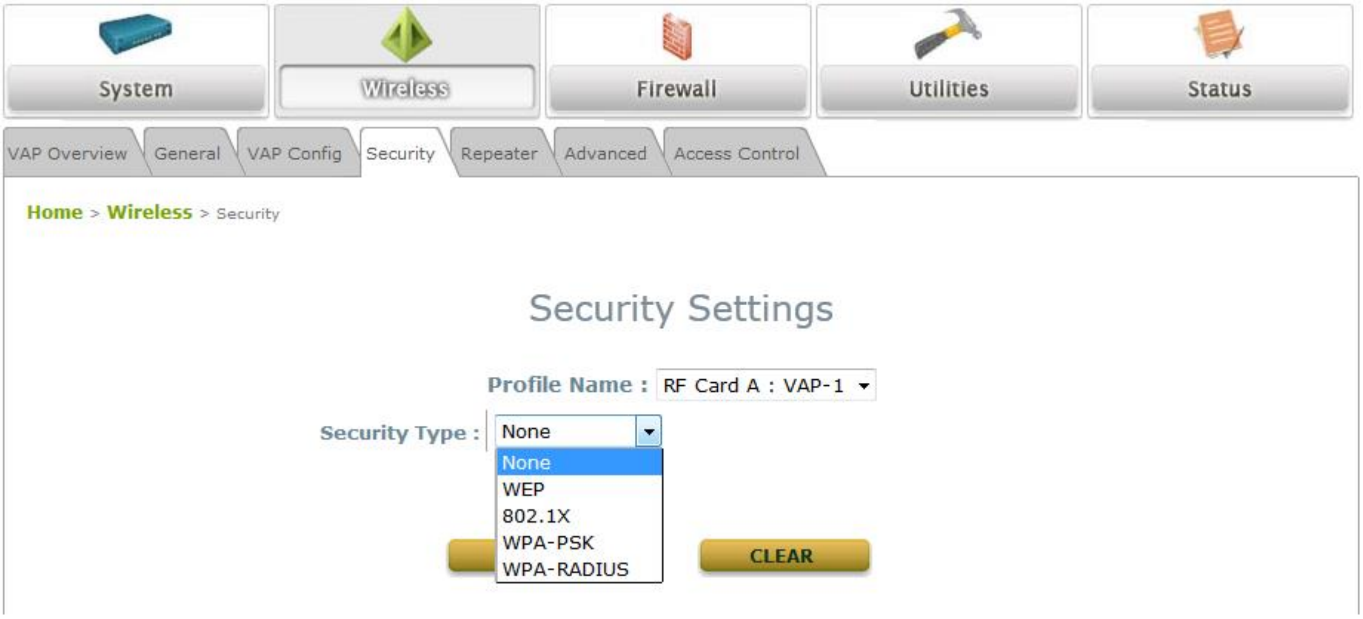
VAP Configuration Page (RF Card A : VAP-1 as shown for example)

Select **Enable** for the **VAP** field and click ***SAVE***. Click the **Overview** tab to return to the previous table to begin the next step.

Step 2: Configure Security Settings for your VAP

The following instructions will guide the user to set up wireless security with a specific VAP. If only restricted access of certain MAC addresses is desired, skip to Step3. MAC restriction can be coupled with wireless security to provide extra protection.

First, click on the corresponding cell in the column labeled **Security Type**. This hyperlink will direct the user to the following **Security Settings** page.

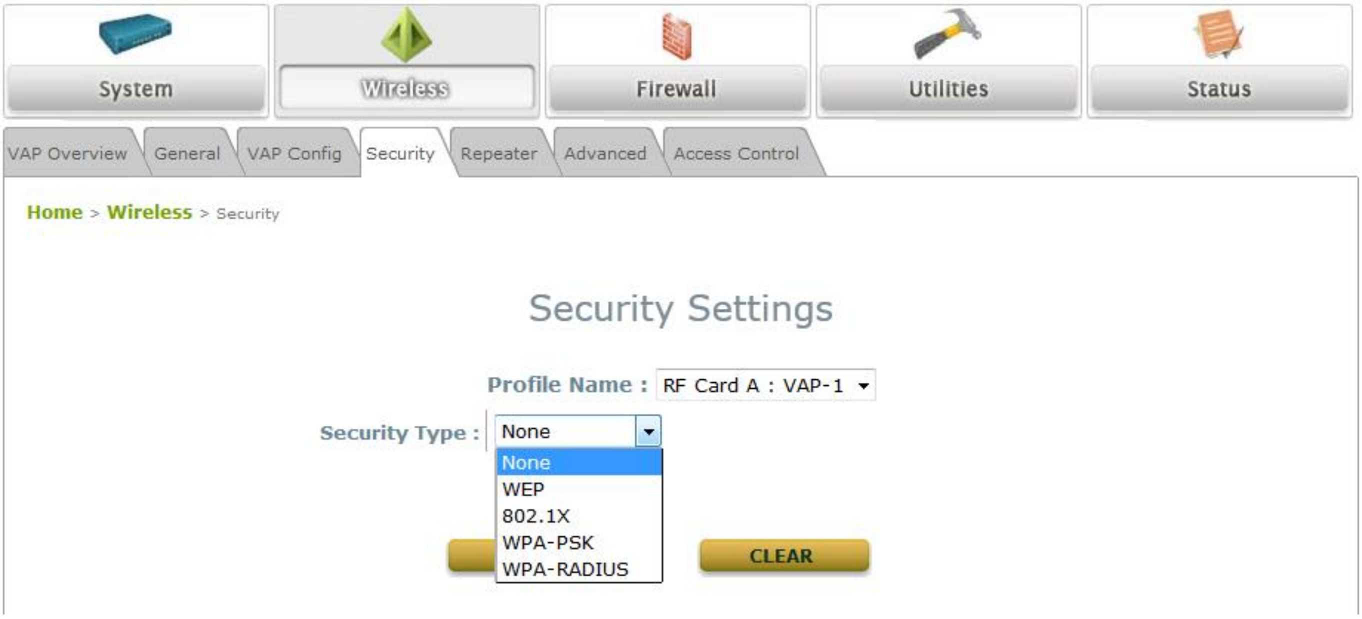


Security Settings Page (RF Card A : VAP-1 shown)

Select the desired **Security Type** from the drop-down menu, which includes **None**, **WEP**, **802.1X**, **WPA-PSK**, and **WPA-RADIUS**.

⚠
- *802.11g+802.11n band does not support WEP nor WPA-PSK running TKIP. When the Security Type is set as such, the RF is only able to run 'g' band.*

- **None:** Authentication is not required and data is not encrypted during transmission when this option is selected. This is the default setting as shown in the following figure.



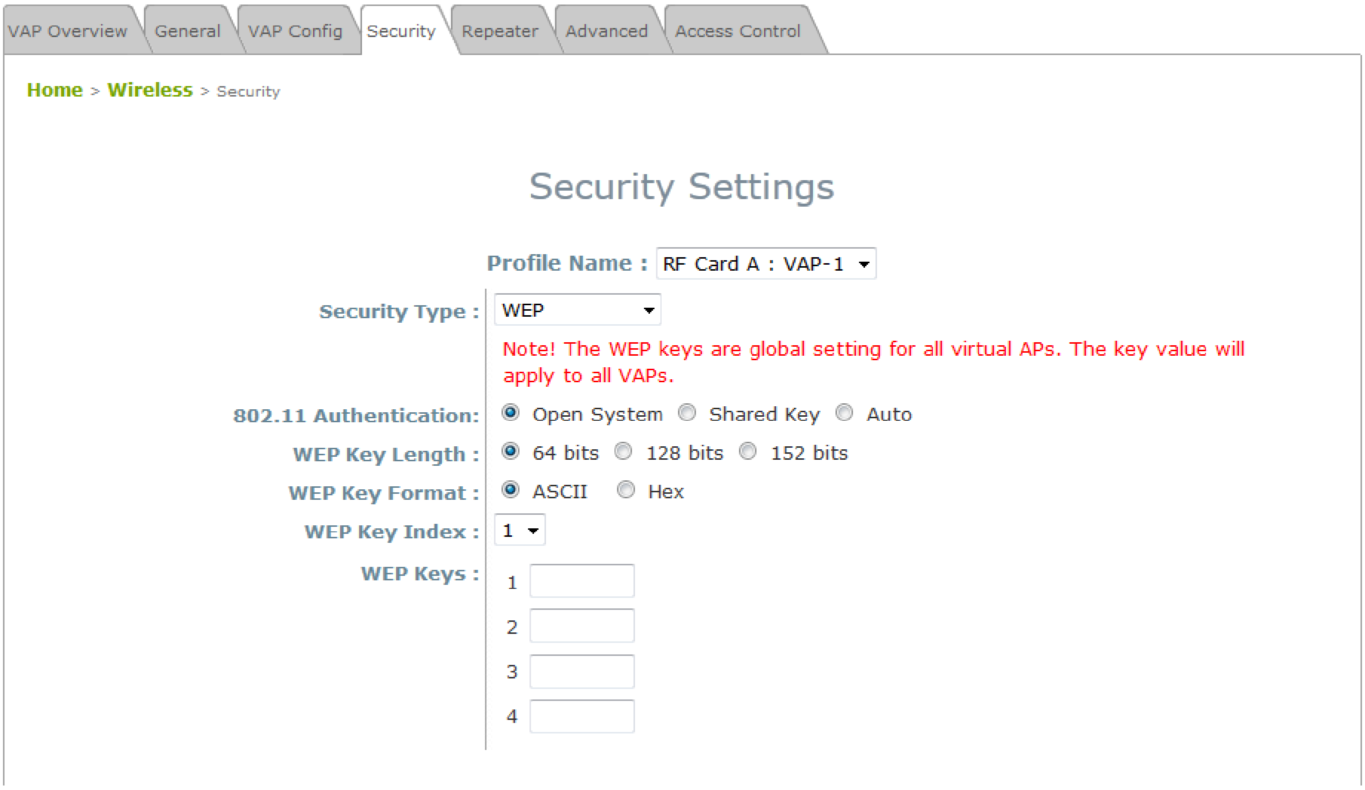
Security Settings

Profile Name : RF Card A : VAP-1

Security Type : None

Security Settings: None

- **WEP:** WEP (Wired Equivalent Privacy) is a data encryption mechanism with key length selected from 64-bit, 128-bit, or 152-bit.



Security Settings

Profile Name : RF Card A : VAP-1

Security Type : WEP

Note! The WEP keys are global setting for all virtual APs. The key value will apply to all VAPs.

802.11 Authentication: ● Open System ○ Shared Key ○ Auto

WEP Key Length : ● 64 bits ○ 128 bits ○ 152 bits

WEP Key Format : ● ASCII ○ Hex

WEP Key Index : 1

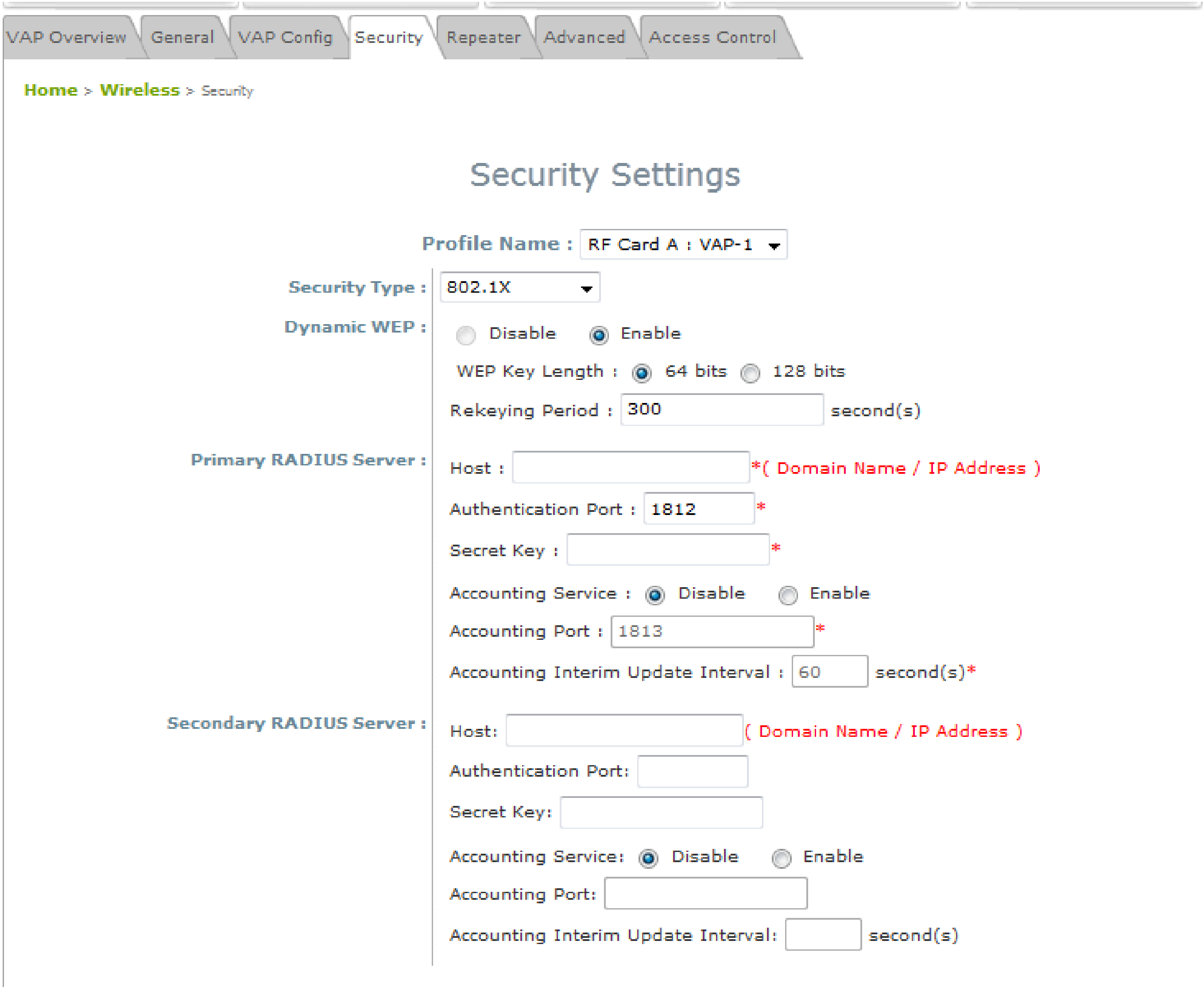
WEP Keys :
1
2
3
4

Security Settings: WEP

- **802.11 Authentication:** Select from **Open System**, **Shared Key**, or **Auto**.

- **WEP Key Length:** Select a key length from **64-bit**, **128-bit**, **152-bit**.
- **WEP Key Format:** Select from **ASCII** or **Hex** format for the WEP key.
- **WEP Key Index:** Select a key index from 1 through 4. The WEP key index is a number that specifies which WEP key is used for the encryption of wireless frames during data transmission.
- **WEP Keys:** Provide the pre-defined WEP key value; the system supports up to 4 sets of WEP keys.

- **802.1X:** When **802.1X Authentication** is selected, RADIUS authentication and enhanced dynamic WEP are provided.



Security Settings

Profile Name : RF Card A : VAP-1

Security Type : 802.1X

Dynamic WEP : ○ Disable ● Enable
WEP Key Length : ● 64 bits ○ 128 bits
Rekeying Period : 300 second(s)

Primary RADIUS Server :
Host : *(Domain Name / IP Address)
Authentication Port : 1812 *
Secret Key : *
Accounting Service : ● Disable ○ Enable
Accounting Port : 1813 *
Accounting Interim Update Interval : 60 second(s)*

Secondary RADIUS Server :
Host: (Domain Name / IP Address)
Authentication Port:
Secret Key:
Accounting Service: ● Disable ○ Enable
Accounting Port:
Accounting Interim Update Interval: second(s)

Security Settings: 802.1X Authentication

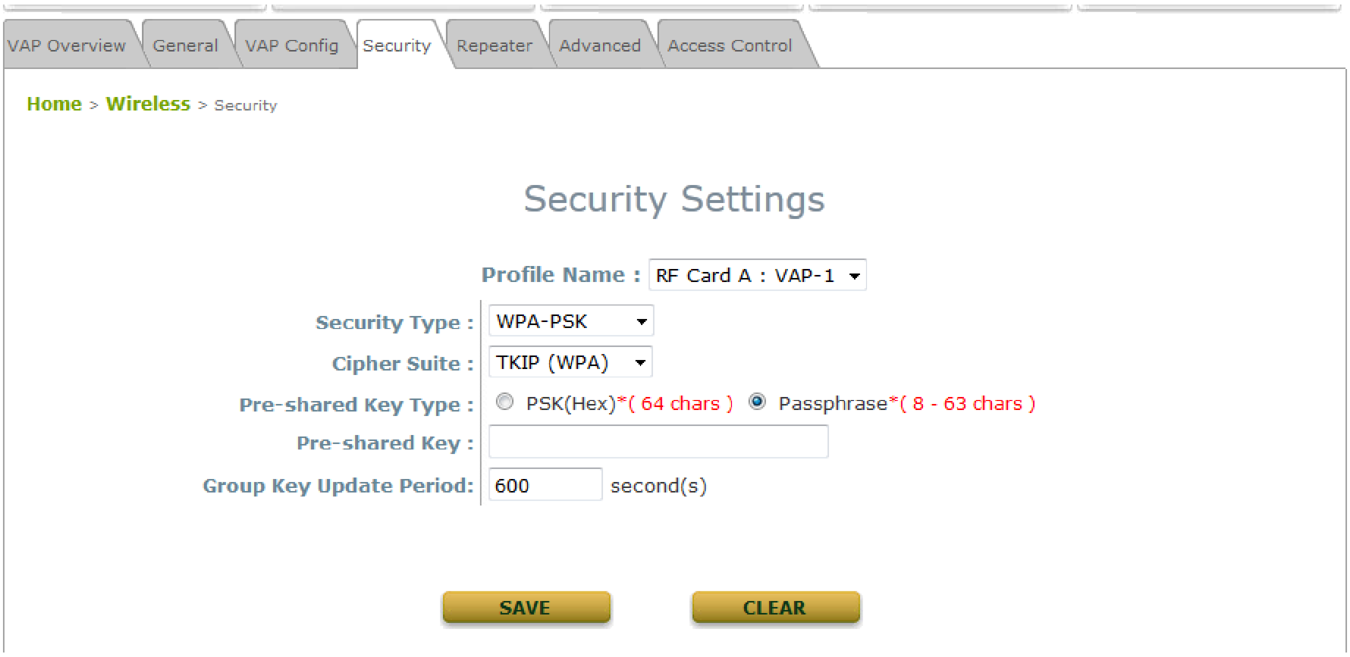
- **Dynamic WEP Settings:**
  - **Dynamic WEP:** For 802.1X security type, Dynamic WEP is always enabled to automatically generate WEP keys for encryption.
  - **WEP Key Length:** Select a key length from **64-bits** or **128-bits**.

- **Re-keying Period:** The time interval for the dynamic WEP key to be updated; the time unit is in seconds.

RADIUS Server Settings (A redundant server can also be added to the system):

- **Host:** Enter the IP address or domain name of the RADIUS server.
- **Authentication Port:** The port number used by the RADIUS server. Specify a port number or use the default, 1812.
- **Secret Key:** The secret key for the system to communicate with the RADIUS server.
- **Accounting Service:** Enabling this option allows accounting of login and logouts through the RADIUS server.
- **Accounting Port:** The port number used by the RADIUS server for accounting purposes. Specify a port number or use the default, 1813.
- **Accounting Interim Update Interval:** The system will update accounting information to the RADIUS server every interval period.

- **WPA-PSK:** Provides shared key authentication in WPA data encryption.



Security Settings

Profile Name : RF Card A : VAP-1

Security Type : WPA-PSK

Cipher Suite : TKIP (WPA)

Pre-shared Key Type : ○ PSK(Hex)*(64 chars) ● Passphrase*(8 - 63 chars)

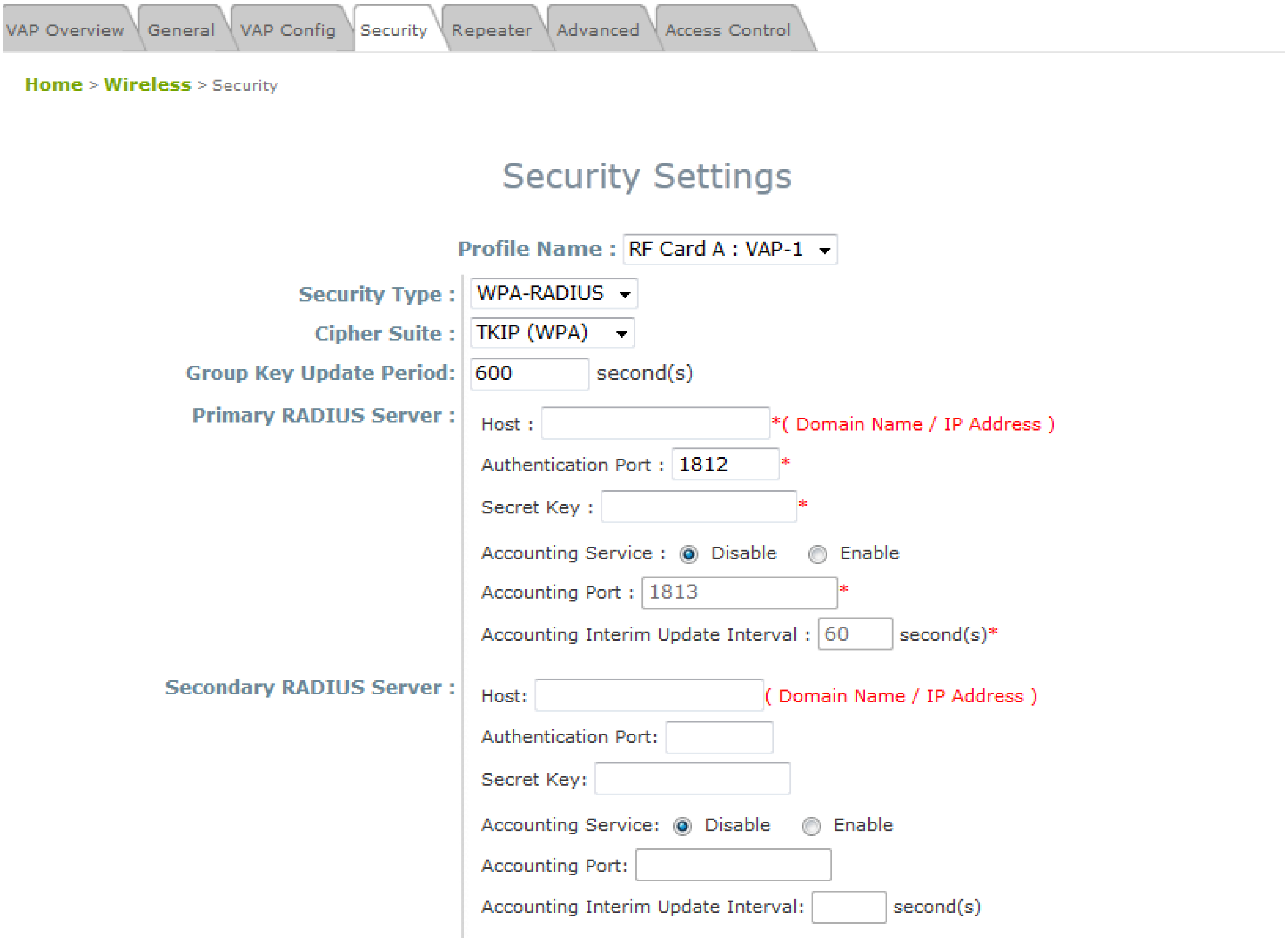
Pre-shared Key :

Group Key Update Period: 600 second(s)

Security Settings: WPA-PSK

- **Cipher Suite:** Select an encryption method from **TKIP (WPA)**, **AES (WPA)**, **TKIP (WPA2)**, **AES (WPA2)**, or **Mixed**.
- **Pre-shared Key Type:** Select a pre-shared key type: **PSK (Hex)** or **Passphrase**.
- **Pre-shared Key:** Enter the key value for the pre-shared key; the format of the key value depends on the key type selected.
- **Group Key Update Period:** The time interval for the Group Key to be renewed; the time unit is in seconds.

- **WPA-RADIUS:** Authenticates users by RADIUS and provides WPA data encryption.



Security Settings

Profile Name : RF Card A : VAP-1

Security Type : WPA-RADIUS

Cipher Suite : TKIP (WPA)

Group Key Update Period: 600 second(s)

Primary RADIUS Server :

Host : *(Domain Name / IP Address)

Authentication Port : 1812 *

Secret Key : *

Accounting Service : ● Disable ○ Enable

Accounting Port : 1813 *

Accounting Interim Update Interval : 60 second(s)*

Secondary RADIUS Server :

Host: (Domain Name / IP Address)

Authentication Port:

Secret Key:

Accounting Service: ● Disable ○ Enable

Accounting Port:

Accounting Interim Update Interval: second(s)

Security Settings: WPA-RADIUS

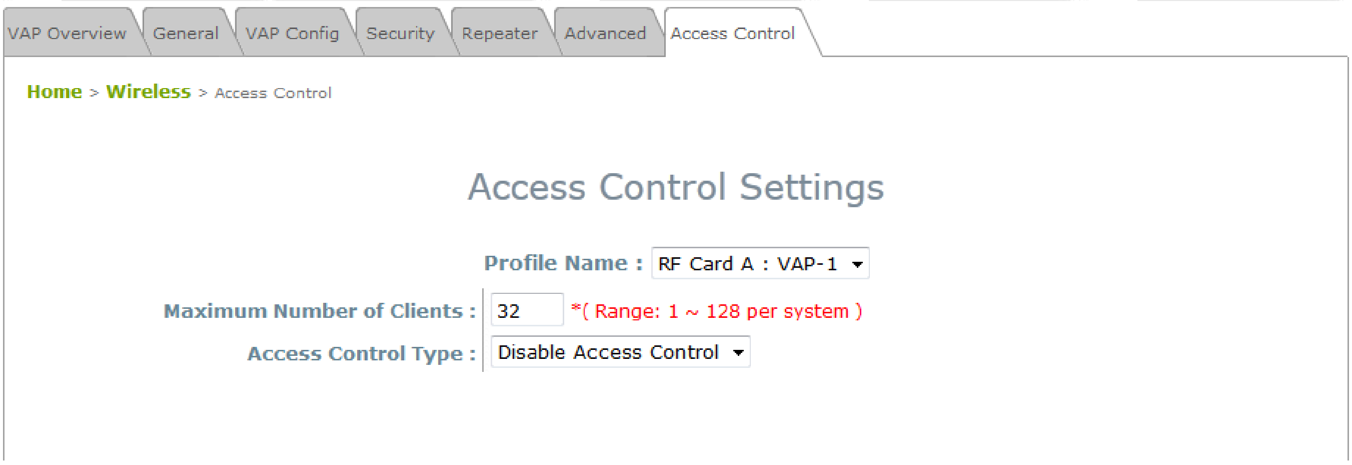
- **WPA Settings:**
  - **Cipher Suite:** Select an encryption method from **TKIP (WPA)**, **AES (WPA)**, **TKIP (WPA2)**, **AES (WPA2)**, or **Mixed**.
  - **Group Key Update Period:** The time interval for the Group Key to be renewed; the time unit is in seconds.
- **RADIUS Server Settings:**
  - **Host:** Enter the IP address or domain name of the RADIUS server.
  - **Authentication Port:** The port number used by the RADIUS server. Specify a port number or use the default, 1812.
  - **Secret Key:** The secret key for the system to communicate with the RADIUS server.
  - **Accounting Service:** Enabling this option allows accounting of login and logouts through the RADIUS server.
  - **Accounting Port:** The port number used by the RADIUS server for accounting purposes. Specify a port number or use the default, 1813.
  - **Accounting Interim Update Interval:** The system will update accounting information to the

RADIUS server every interval period.

When these configurations are finished and MAC restriction is not needed, click ***SAVE*** and ***Reboot*** the system. Otherwise, click on the **Overview** tab and proceed to the next step.

Step 3: Configuring MAC ACL (Access Control List)

Clicking on the hyperlink corresponding with intended VAP in the **MAC ACL** column will bring the user to the **Access Control Settings** page.



Access Control Settings

Profile Name : RF Card A : VAP-1

Maximum Number of Clients : 32 *(Range: 1 ~ 128 per system)

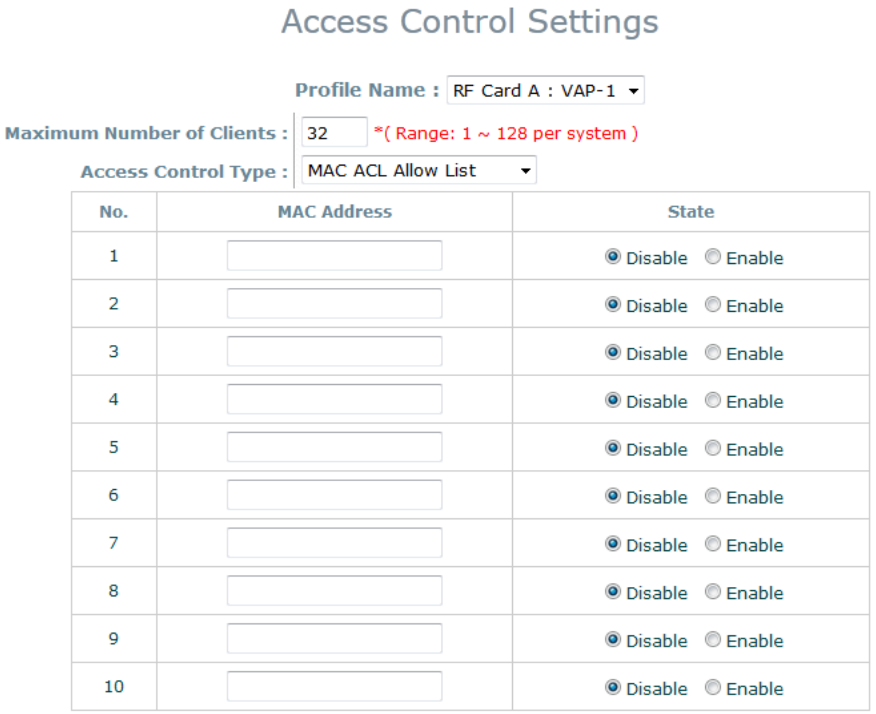
Access Control Type : Disable Access Control

Access Control Settings Page

Please choose among **Disable**, **Allow**, **Deny**, and **RADIUS ACL** from the drop-down menu of **Access Control Type**.

1) **Disable Access Control:** This means that there is no restriction for client devices to access the system.

2) **MAC ACL Allow List:** This means that only the client devices (identified by their MAC addresses) listed in the **Allow List** (“allowed MAC addresses”) are granted with access to the system. The administrator can temporarily block any allowed MAC address by checking Disable, until the administrator renews the listed MAC.



Access Control Settings

Profile Name : RF Card A : VAP-1

Maximum Number of Clients : 32 *(Range: 1 ~ 128 per system)

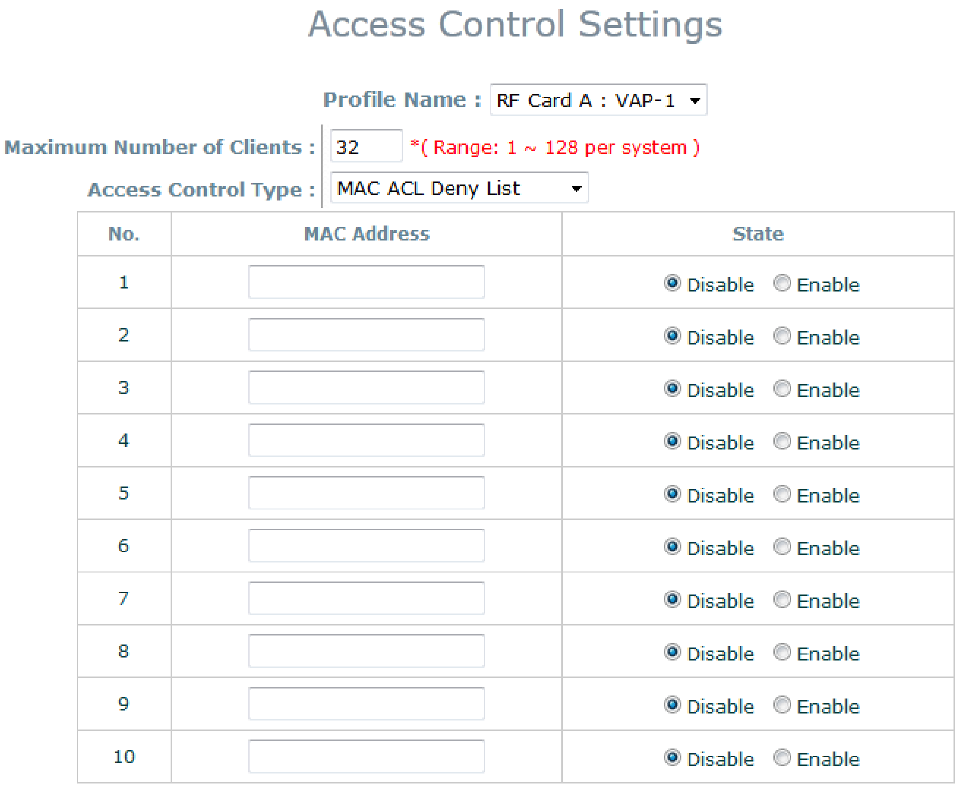
Access Control Type : MAC ACL Allow List

No.	MAC Address	State
1		● Disable ○ Enable
2		● Disable ○ Enable
3		● Disable ○ Enable
4		● Disable ○ Enable
5		● Disable ○ Enable
6		● Disable ○ Enable
7		● Disable ○ Enable
8		● Disable ○ Enable
9		● Disable ○ Enable
10		● Disable ○ Enable

MAC ACL Allow List

An empty Allow List means that there are no allowed MAC addresses. Make sure at least the MAC of the modifying system is included (e.g. network administrator's computer).

3) **MAC ACL Deny List:** This means that all client devices are granted with access to the system except those listed in the **Deny List** ("denied MAC addresses"). The administrator can allow any denied MAC address to connect to the system temporarily by checking ***Enable***.



Access Control Settings

Profile Name : RF Card A : VAP-1

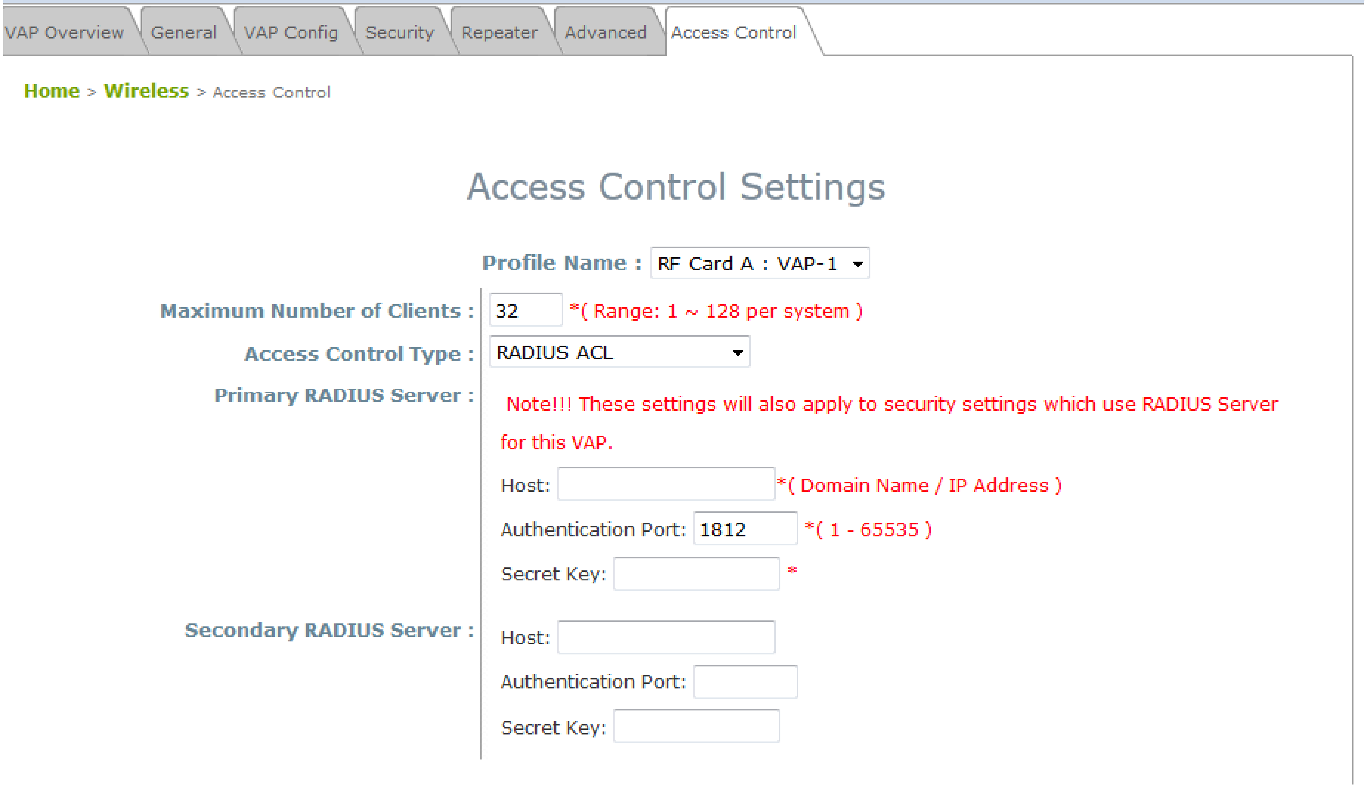
Maximum Number of Clients : 32 *(Range: 1 ~ 128 per system)

Access Control Type : MAC ACL Deny List

No.	MAC Address	State
1		● Disable ○ Enable
2		● Disable ○ Enable
3		● Disable ○ Enable
4		● Disable ○ Enable
5		● Disable ○ Enable
6		● Disable ○ Enable
7		● Disable ○ Enable
8		● Disable ○ Enable
9		● Disable ○ Enable
10		● Disable ○ Enable

MAC ACL Deny List

RADIUS ACL: Authenticate incoming MAC addresses by an external RADIUS server. When RADIUS ACL is selected, all incoming MAC addresses will be authenticated by an external RADIUS server. Please note that each VAP MAC ACL and its security type (shown on the **Security Settings** page) share the same RADIUS configuration.



Access Control Settings

Profile Name : RF Card A : VAP-1

Maximum Number of Clients : 32 *(Range: 1 ~ 128 per system)

Access Control Type : RADIUS ACL

Primary RADIUS Server :

Note!!! These settings will also apply to security settings which use RADIUS Server for this VAP.

Host: *(Domain Name / IP Address)

Authentication Port: 1812 *(1 - 65535)

Secret Key: *

Secondary RADIUS Server :

Host:

Authentication Port:

Secret Key:

RADIUS ACL

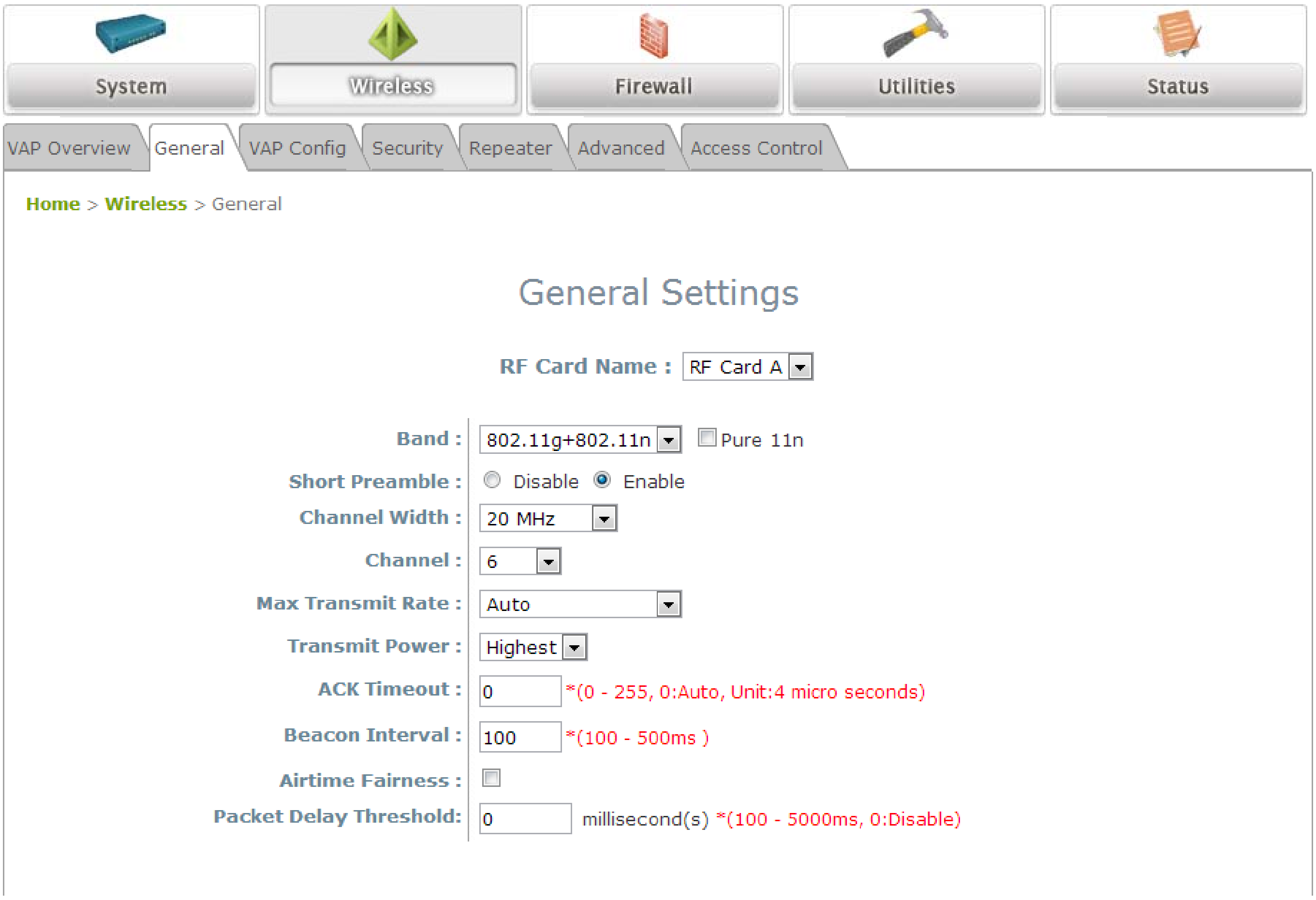
Click ***SAVE*** and ***Reboot*** upon completing the related configurations to take effect.

6. Creating a WDS Bridge between two APs

WDS link creation is convenient for extending network coverage where running wires is not an option, effectively transferring the traffic to the other end of WLAN/LAN through the AP. Since this is a peer to peer connection, both APs will be configured the same way.

Step 1: Make sure the Band and Channel are matched between the WDS peers

In order to create a valid WDS link, the two APs must be configured to use the same channel and band for their wireless settings. Click the **Wireless** icon and then **General** tab to go to the following page.



General Settings

RF Card Name : RF Card A

Band : 802.11g+802.11n □ Pure 11n

Short Preamble : ○ Disable ● Enable

Channel Width : 20 MHz

Channel : 6

Max Transmit Rate : Auto

Transmit Power : Highest

ACK Timeout : 0 *(0 - 255, 0:Auto, Unit:4 micro seconds)

Beacon Interval : 100 *(100 - 500ms)

Airtime Fairness : □

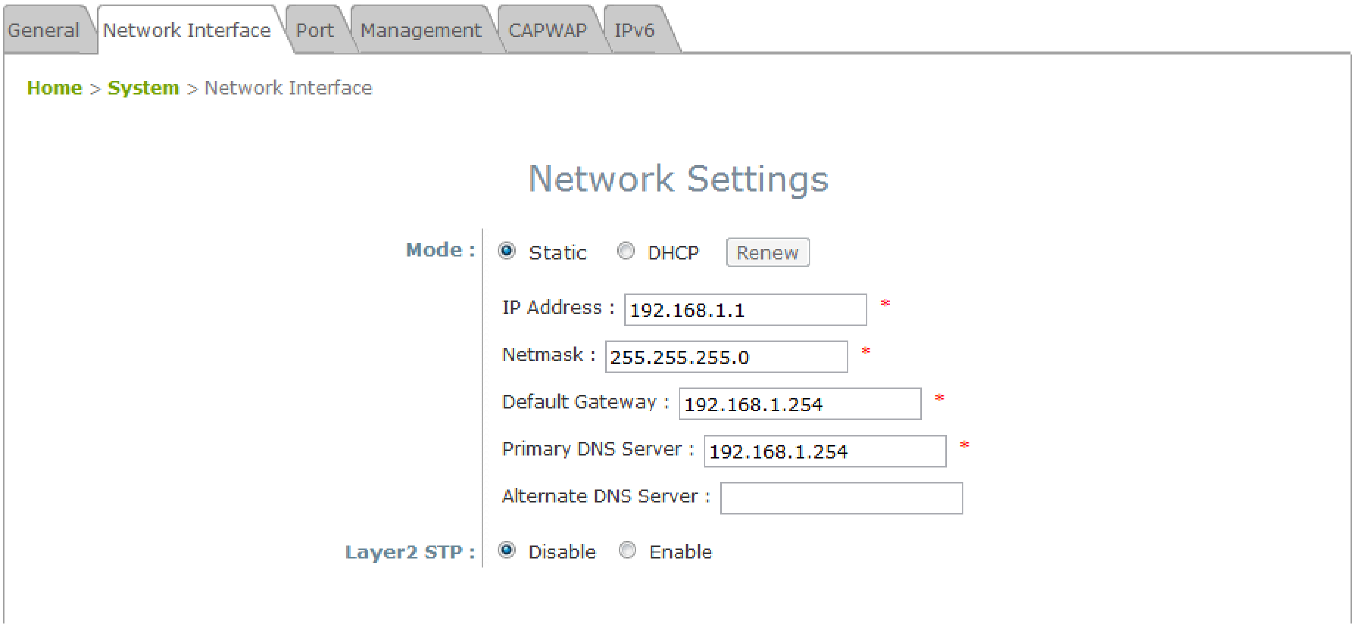
Packet Delay Threshold: 0 millisecond(s) *(100 - 5000ms, 0:Disable)

Wireless General Settings Page

Please make sure both APs are using the same **Band** and **Channel** in order to establish a successful WDS link. Click ***SAVE*** if any changes have been made.

Step 2: Prevent Loops when Connecting Multiple APs

When many APs are linked in this manner, undesired loops may form to lower overall WLAN performance. To prevent such occurrence, please make sure Layer 2 STP is enabled.
To turn on this feature, please click on the **System** icon and the **Network Interface** tab.



Home > System > Network Interface

Network Settings

Mode : ● Static ○ DHCP Renew

IP Address : 192.168.1.1 *

Netmask : 255.255.255.0 *

Default Gateway : 192.168.1.254 *

Primary DNS Server : 192.168.1.254 *

Alternate DNS Server :

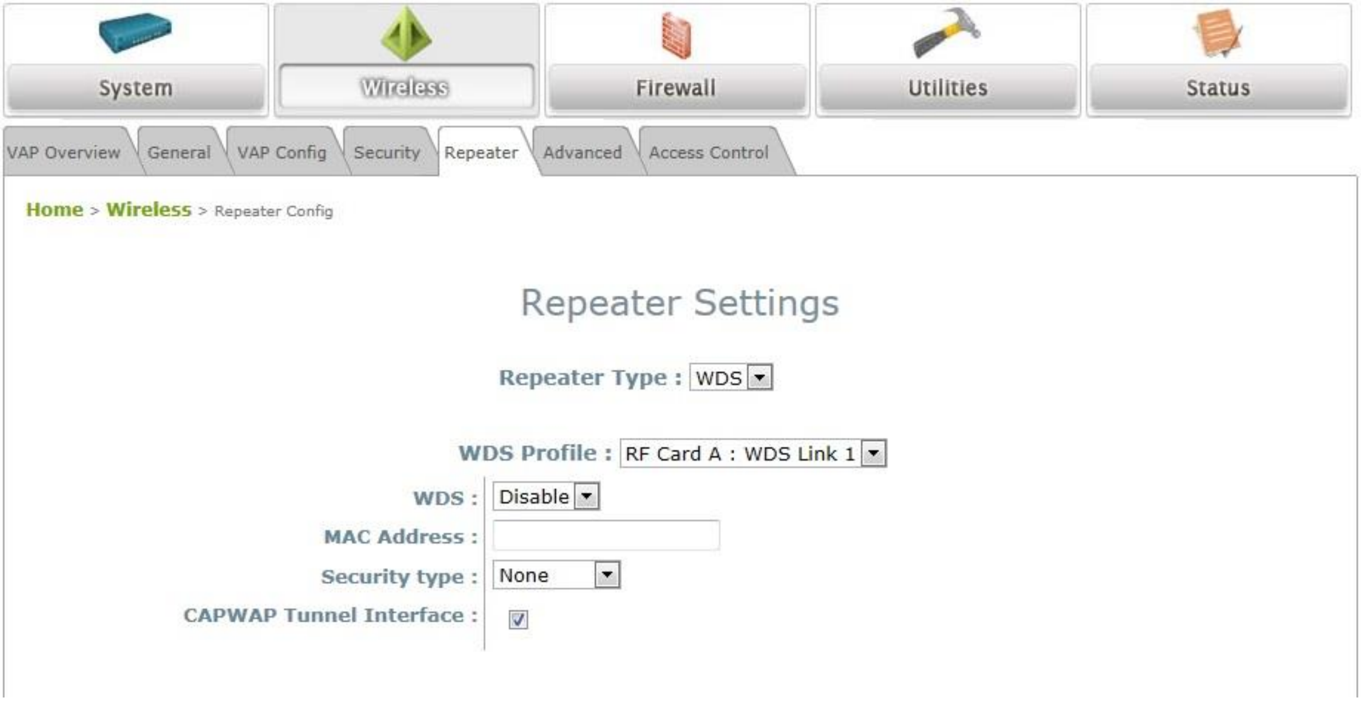
Layer2 STP : ● Disable ○ Enable

Network Settings Page

Please select ***Enable*** in the field labeled **Layer2 STP**. This will prevent data from looping or creating a broadcast storm. Click ***SAVE*** when completed, and then ***Reboot*** to allow updated settings to take effect.

Step 3: Building the WDS Link

To extend the wireless coverage, each RF card supports up to 4 WDS links for connecting wirelessly to other WDS-capable APs (peer APs). By default, all WDS profiles are disabled.



Repeater Settings

Repeater Type : WDS

WDS Profile : RF Card A : WDS Link 1

WDS : Disable

MAC Address :

Security type : None

CAPWAP Tunnel Interface : ☑

1. Click on the **Wireless** button on the main menu.
2. Select the **Repeater Settings** tab.
3. Choose **WDS** as the **Repeater Type**.
4. Choose the desired WDS profile:

(a) Enable **WDS**.

(b) Enter the **MAC Address** (peer AP) and then Click **SAVE**.

If you are using another NEXCOM APs as the peer AP, simply repeat the above-mentioned steps to configure another peer AP(s).

7. Web Management Interface Configuration

This chapter will guide the user through the AP's detailed settings. The following table shows all the User Interface (UI) functions of NEXCOM's Enterprise Access Points. The Web Management Interface (WMI) is the page where the status is displayed, control is issued and parameters are configured. In the Web Management Interface; there are two main interface areas: **Main Menu** and **Working Area**. The **Working Area** occupies the major area of the WMI, displayed in the center of the interface. It is also referred to as the configuration page. The **Main Menu**, on the top of the WMI, allows the administrator to traverse to various management functions of the system. The management functions are grouped into branches: **System**, **Wireless**, **Firewall**, **Utilities**, and **Status**.

Table 1 NEXCOM Access Points' Function Organization

OPTION	FUNCTION
System	General
	Network Interface
	Port
	Management
	CAPWAP
	IPv6
Wireless	VAP Overview
	General
	VAP Config
	Security
	Repeater
	Advanced
	Access Control
Firewall	Firewall List
	Service
	Advanced
Utilities	Change Password
	Backup & Restore
	System Upgrade
	Reboot
	Upload Certificate
	Channel Analysis

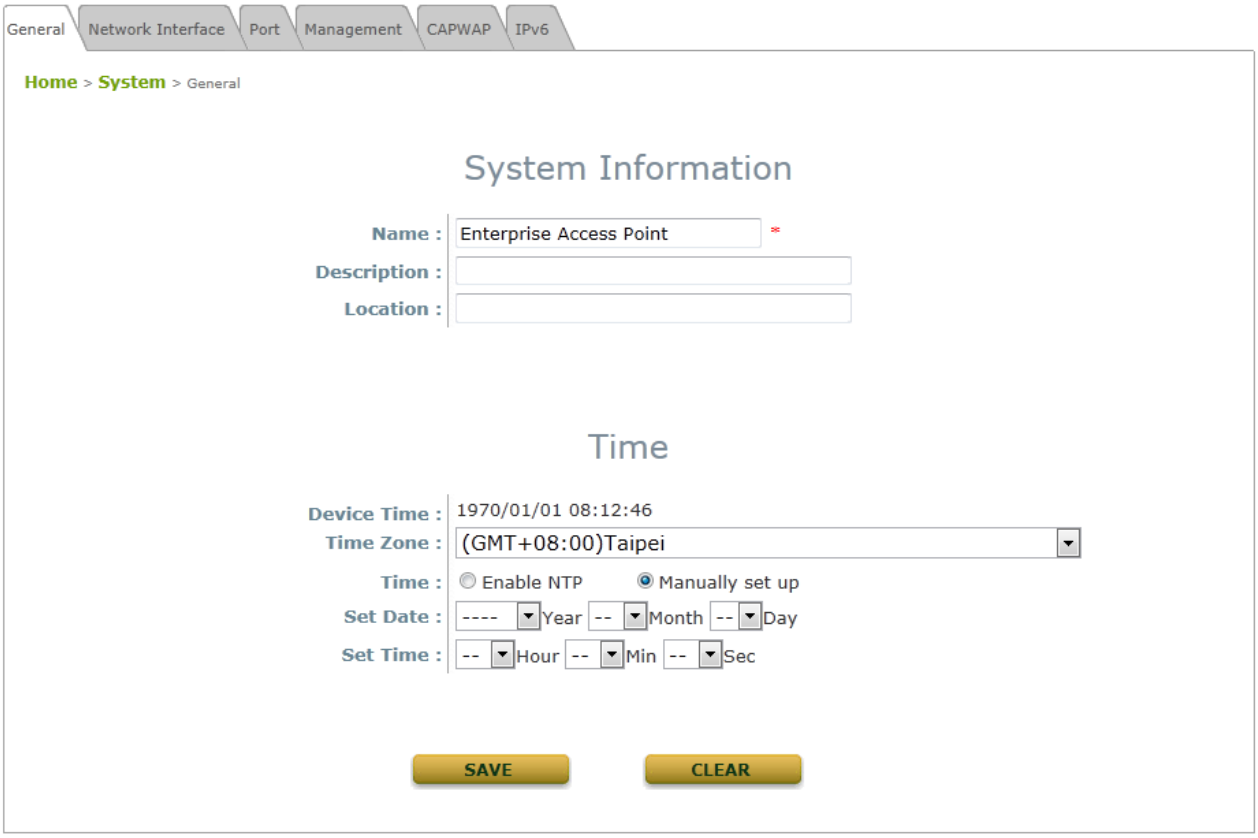
Status	Overview
	Associated Clients
	WDS Link Status
	Event Log

⏩ **Note:** On each configuration page, you may click ***SAVE*** to save the changes of your configured settings, but you must reboot the system for the changes to take effect. After clicking ***SAVE***, the following message will appear: **"Some modification has been saved and will take effect after Reboot."**
All online users will be disconnected during reboot or restart.

7.1 System

Upon clicking the **System** icon, users can utilize this section for general configurations of the devices (e.g. Time Setup, Network Configurations, and System Logs). This section includes the following functions: **General**, **Network Interface**, **Port, Management**, **CAPWAP and IPv6**.

7.1.1 General



System Information

Name : Enterprise Access Point *
Description :
Location :

Time

Device Time : 1970/01/01 08:12:46
Time Zone : (GMT+08:00)Taipei
Time : ○ Enable NTP ● Manually set up
Set Date : ---- Year -- Month -- Day
Set Time : -- Hour -- Min -- Sec

System Information Page

- **System Information**

  For maintenance purposes, it is highly recommended to have the following information stated as clearly as possible:

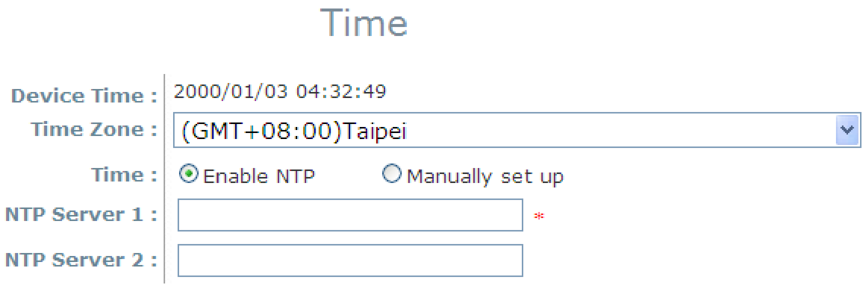
  - **Name:** The system name used to identify this system.
  - **Description:** Further information about the system (e.g. device model, firmware version, and active date).
  - **Location:** The information on geographical location of the system for the administrator to locate the system easily.

- **Time**

  - **Device Time:** Display the current time of the system.
  - **Time Zone:** Select an appropriate time zone from the drop-down list box.
  - **Time:** Synchronize the system time by reachable NTP servers or manual setup.

1) **Enable NTP:**

By selecting **Enabled NTP**, the AP can synchronize its system time with the NTP server automatically. When this method is chosen, at least one NTP server's IP address or domain name must be provided.



Time

Device Time : 2000/01/03 04:32:49

Time Zone : (GMT+08:00)Taipei

Time : ● Enable NTP ○ Manually set up

NTP Server 1 : *

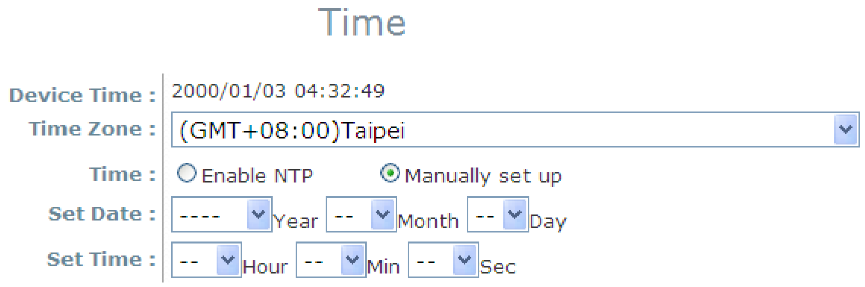
NTP Server 2 :

NTP Time Configuration Fields

Generally, networks should have a common NTP server (internal or external). If there isn't, locate a nearby NTP server on the web.

2) **Manually set up:**

By selecting **Manually set up**, the administrator can manually set the system date and time.



Time

Device Time : 2000/01/03 04:32:49

Time Zone : (GMT+08:00)Taipei

Time : ○ Enable NTP ● Manually set up

Set Date : ---- Year -- Month -- Day

Set Time : -- Hour -- Min -- Sec

Manual Time Configuration Fields

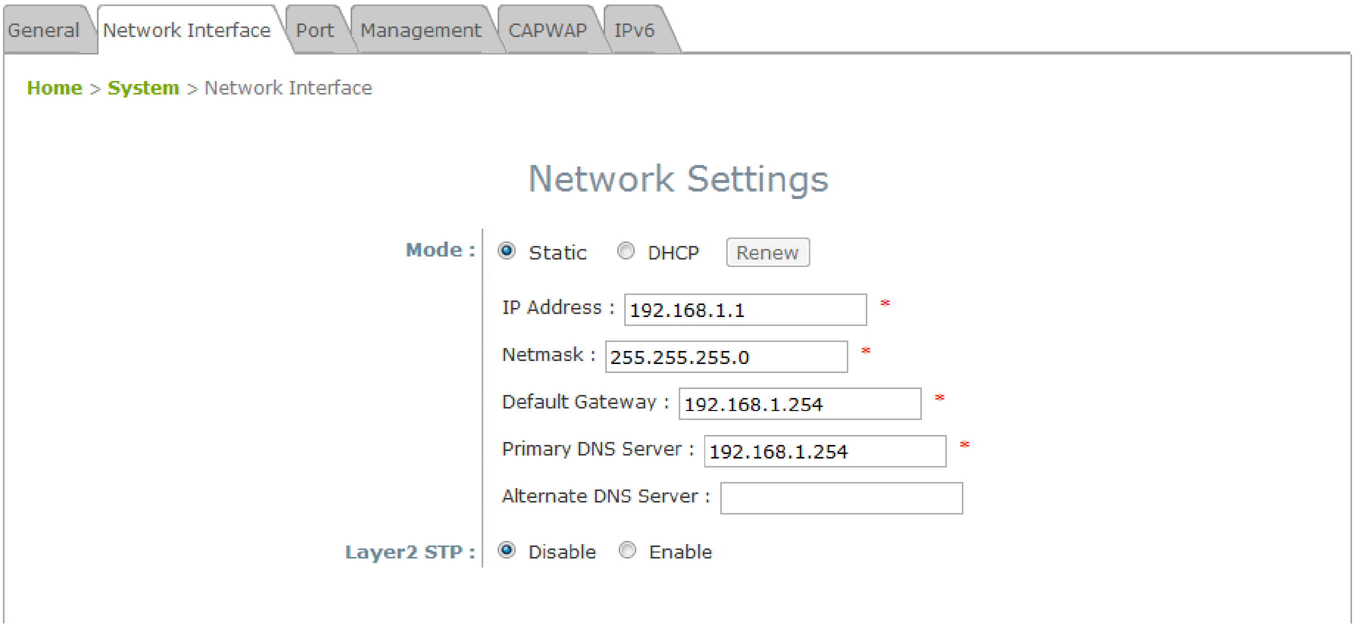
– **Set Date:** Select the appropriate ***Year***, ***Month***, and ***Day*** from the drop-down menu**.**

– **Set Time:** Select the appropriate ***Hour***, ***Min***, and ***Sec*** from the drop-down menu**.**

⚠ *Unless Internet connection or NTP becomes unavailable, it is recommended to use NTP server for time synchronization because system time needs to be reconfigured upon reboot.*

7.1.2 Network Interface

On this page, the network settings of the device can be configured; fields with a red asterisk (i.e. **IP Address**, **Netmask**, **Default Gateway**, and **Primary DNS Server**) are mandatory.



Mode : ● Static ○ DHCP

IP Address : 192.168.1.1 *

Netmask : 255.255.255.0 *

Default Gateway : 192.168.1.254 *

Primary DNS Server : 192.168.1.254 *

Alternate DNS Server :

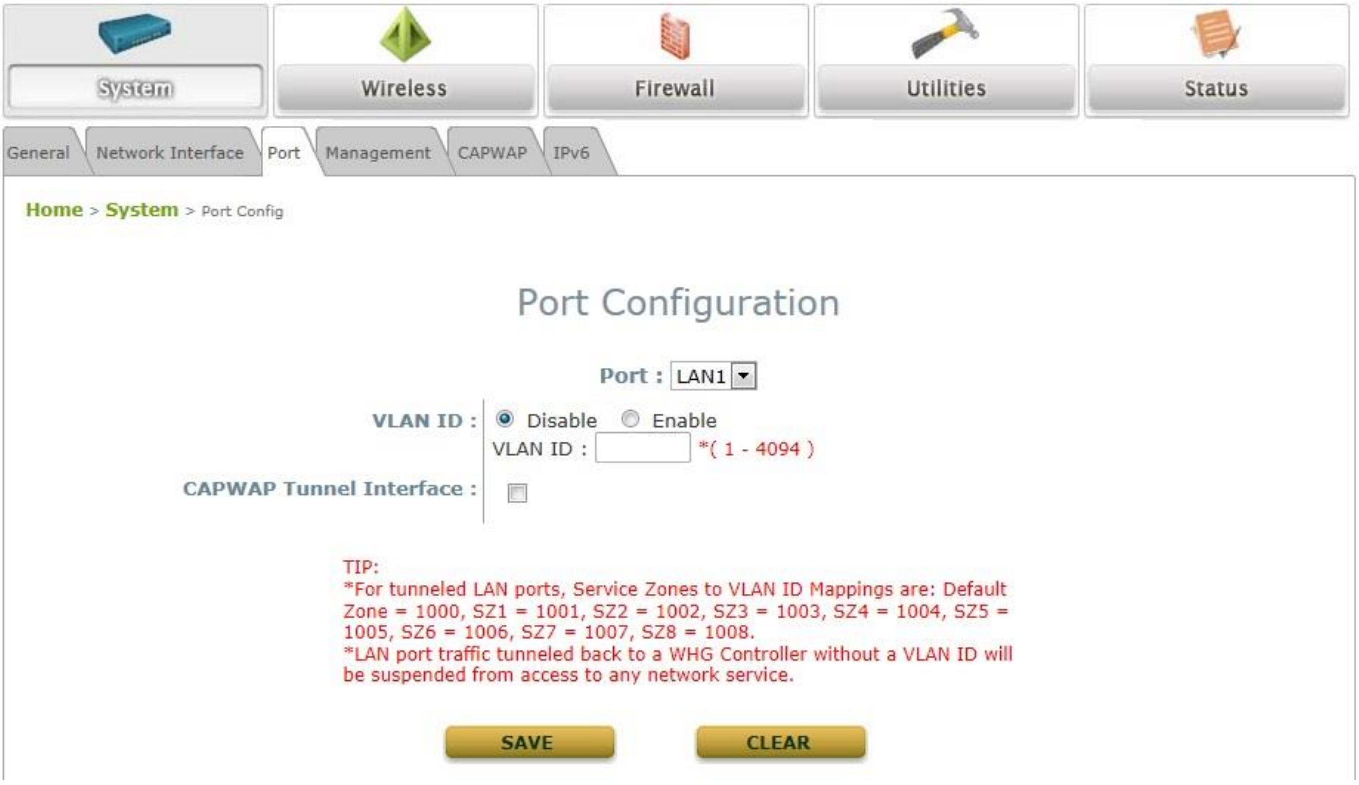
Layer2 STP : ● Disable ○ Enable

Network Settings Page

- **Mode:** Determine the way to obtain the IP address, by ***DHCP*** or ***Static***.
  - **Static:** The administrator can manually set up the static LAN IP address. All required fields are marked with a red asterisk.
    - **IP Address:** The IP address of the LAN port.
    - **Netmask:** The Subnet mask of the LAN port.
    - **Default Gateway:** The Gateway IP address of the LAN port.
    - **Primary DNS Server:** The IP address of the primary DNS (Domain Name System) server.
    - **Alternate DNS Server:** The IP address of the substitute DNS server.
  - **DHCP:** This configuration type is applicable when the system is connected to a network with the presence of a DHCP server; all related IP information required will be provided by the DHCP server automatically.
- **Layer 2 STP:** If the AP is set up to bridge other network components, this option can be enabled to prevent undesired loops because a broadcasting storm may occur in a multi-switch environment where broadcast packets are forwarded in an endless loop between switches. Moreover, a broadcast storm may consume most of the available system resources in addition to available bandwidth. Thus, enabling the Layer 2 STP can lower such undesired occurrence and derive the best available data path for network communication.

7.1.3 Port

The physical Ethernet ports of the AP can be configured to append a VLAN tag for upstream delivery.



Home > System > Port Config

Port Configuration

Port : LAN1

VLAN ID : ● Disable ○ Enable
VLAN ID : ____ *(1 - 4094)

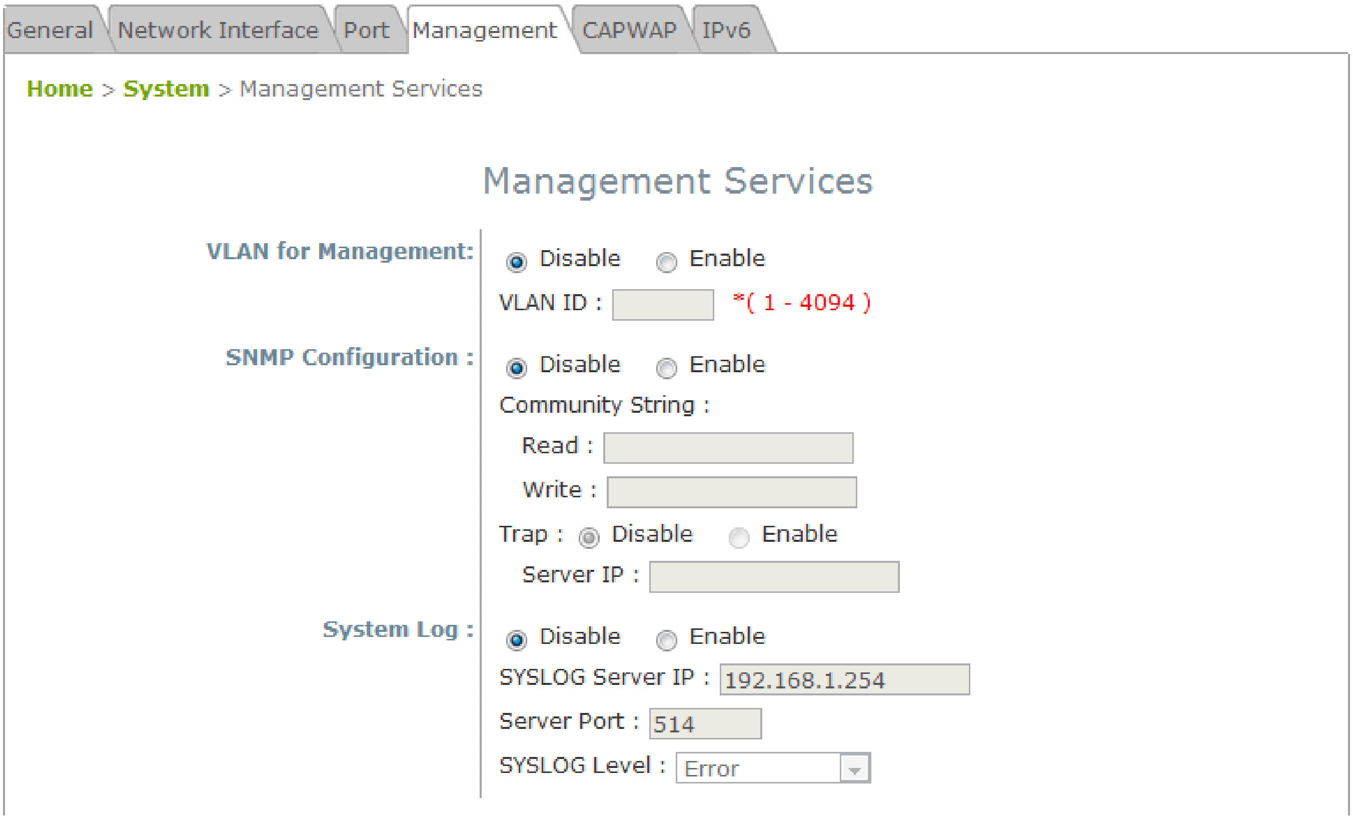
CAPWAP Tunnel Interface : □

TIP:
*For tunneled LAN ports, Service Zones to VLAN ID Mappings are: Default Zone = 1000, SZ1 = 1001, SZ2 = 1002, SZ3 = 1003, SZ4 = 1004, SZ5 = 1005, SZ6 = 1006, SZ7 = 1007, SZ8 = 1008.
*LAN port traffic tunneled back to a WHG Controller without a VLAN ID will be suspended from access to any network service.

- **VLAN ID:** Enable selected implies that network traffic sent upstream from this LAN port will be tagged with the VLAN ID configured in the field below. Disable selected implies that traffic from this LAN port will not be tagged with a VLAN ID.
- **CAPWAP Tunnel Interface:** Select a LAN, VAP or WDS interface to designate its traffic to pass through the CAPWAP Tunnel established between the AP and the controller. For network interfaces that are unchecked, their traffic will be forwarded locally into the internet if this AP is deployed remotely on the WAN side of a controller.
- The 'TIP' in red at the bottom of the page explains that each service zone, from default to Service Zone 8, has its fixed, pre-determined VLAN ID number. Admin needs to enter one of the numbers in order to direct traffic back to a certain service zone.

7.1.4 Management

The management services (e.g. **VLAN for Management**, **SNMP**, and **System log**) can be configured here.



Home > System > Management Services

Management Services

VLAN for Management: ● Disable ○ Enable
VLAN ID : ____ *(1 - 4094)

SNMP Configuration : ● Disable ○ Enable
Community String :
Read : ____
Write : ____
Trap : ● Disable ○ Enable
Server IP : ____

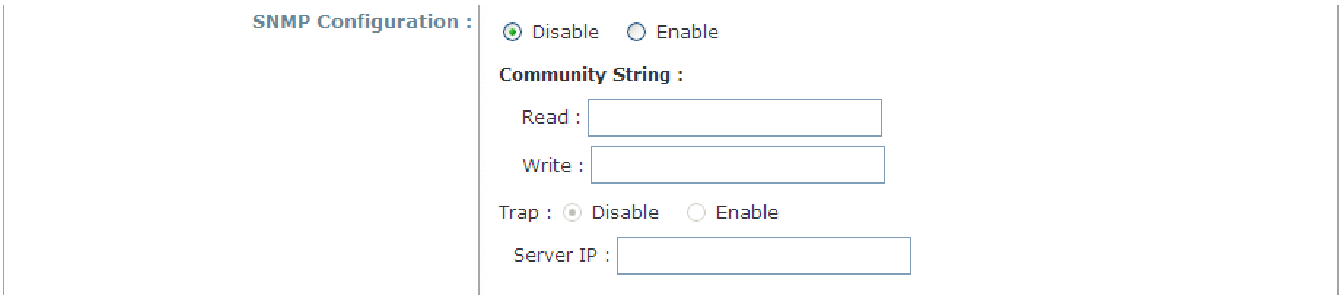
System Log : ● Disable ○ Enable
SYSLOG Server IP : 192.168.1.254
Server Port : 514
SYSLOG Level : Error

Management Services Page

- **VLAN for Management:** When this is enabled, management traffic from the system will be tagged with a VLAN ID. In other words, administrator who wants to access the WMI must send management traffic with the same VLAN ID such as connecting to a specific VAP with the same VLAN ID. Enter a value between 1 and 4094 for the VLAN ID if the option is enabled.

⏩ **Note:** Management is done without the utilization of VLAN IDs on selected AP models.

- **SNMP Configuration:** By enabling the SNMP function, the administrator can obtain the system information remotely.



SNMP Configuration : ● Disable ○ Enable

Community String :

Read :

Write :

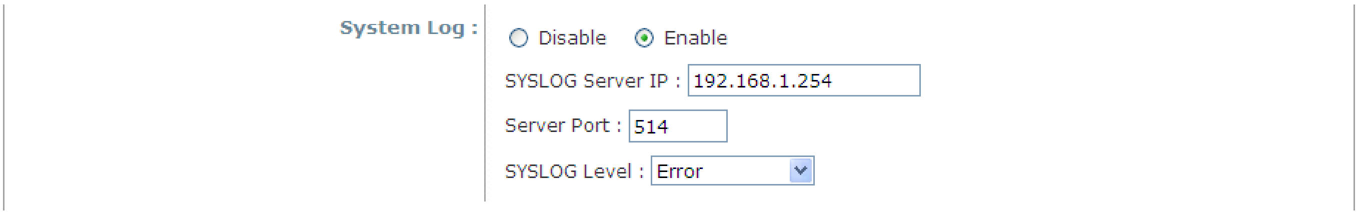
Trap : ● Disable ○ Enable

Server IP :

SNMP Configuration Fields

- ➢ **Enable/ Disable: *Enable*** or ***Disable*** this function.
- ➢ **Community String:** The community string is required when accessing the Management Information Base (MIB) of the system.
  - **Read:** Enter the community string to access the MIB with Read privilege.
  - **Write:** Enter the community string to access the MIB with Write privilege.
- ➢ **Trap:** When enabled, events on Cold Start, Interface UP & Down, and Association & Disassociation can be reported to an assigned server.
  - **Enable/ Disable: Enable** or **Disable** this function.
  - **Server IP Address:** Enter the IP address of the assigned server that will receive the trap report.

- **System Log:** When this function is enabled, specify an external SYSLOG server to accept SYSLOG messages from the system remotely.



System Log : ○ Disable ● Enable

SYSLOG Server IP : 192.168.1.254

Server Port : 514

SYSLOG Level : Error

System Log Fields

- ➢ **Enable/ Disable: *Enable*** or ***Disable*** this function.
- ➢ **SYSLOG Server IP:** The IP address of the Syslog server that will receive the reported events.
- ➢ **Server Port:** The port number of the Syslog server.
- ➢ **SYSLOG Level:** Select the desired level of received events from the drop-down menu.

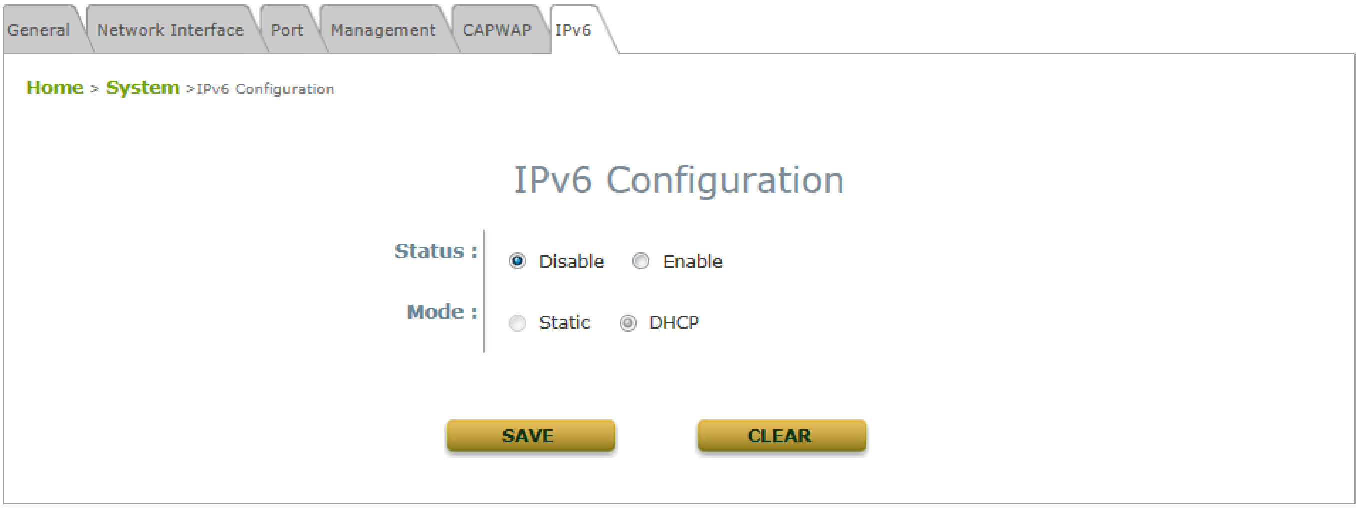
7.1.5 CAPWAP

CAPWAP is a standard interoperable protocol that enables a controller to manage a collection of wireless access points. There are 5 methods of auto AP discovery, namely DNS SRV, DHCP option, Broadcast, Multicast, and Static. Please refer to the Web page at **System > CAPWAP.**

- **CAPWAP:** The CAPWAP feature can be turned on by selecting “Enable” or turned off by selecting “Disable”
- **Certificate Date Check:** To enable this item, select ***Enable*** and click ***Manage Certificates*** to enter the **Upload Certificate** page. Please refer to the section **7.4.4. Upload Certificate**.
- **DNS SRV Discovery:** Using DNS SRV to discover acess controller.
    - **Domain Name Suffix:** Enter the suffix of the access controller, such as example.com.
- **DHCP Option Discovery:** Using DHCP option to discover access controller.
- **Broadcast Discovery:** Using Broadcast to discover access controller.
- **Multicast Discovery:** Using muticast to discover access controller.
- **Static Discovery:** Using Static approach to discover access controller.
    - **AC Address:** The IP address of the access controller. If it can not discover the first AC, it will try to discover the second AC.

7.1.6 IPv6

The NEXCOM Access Point supports IPv6 and IPv4 dual stack addressing capability. IPv6 by default is disabled but it can be enabled on this tab page.



IPv6 Configuration

Status : ● Disable ○ Enable

Mode : ○ Static ● DHCP

Mode: There are two options for acquiring an IPv6 address for this device.

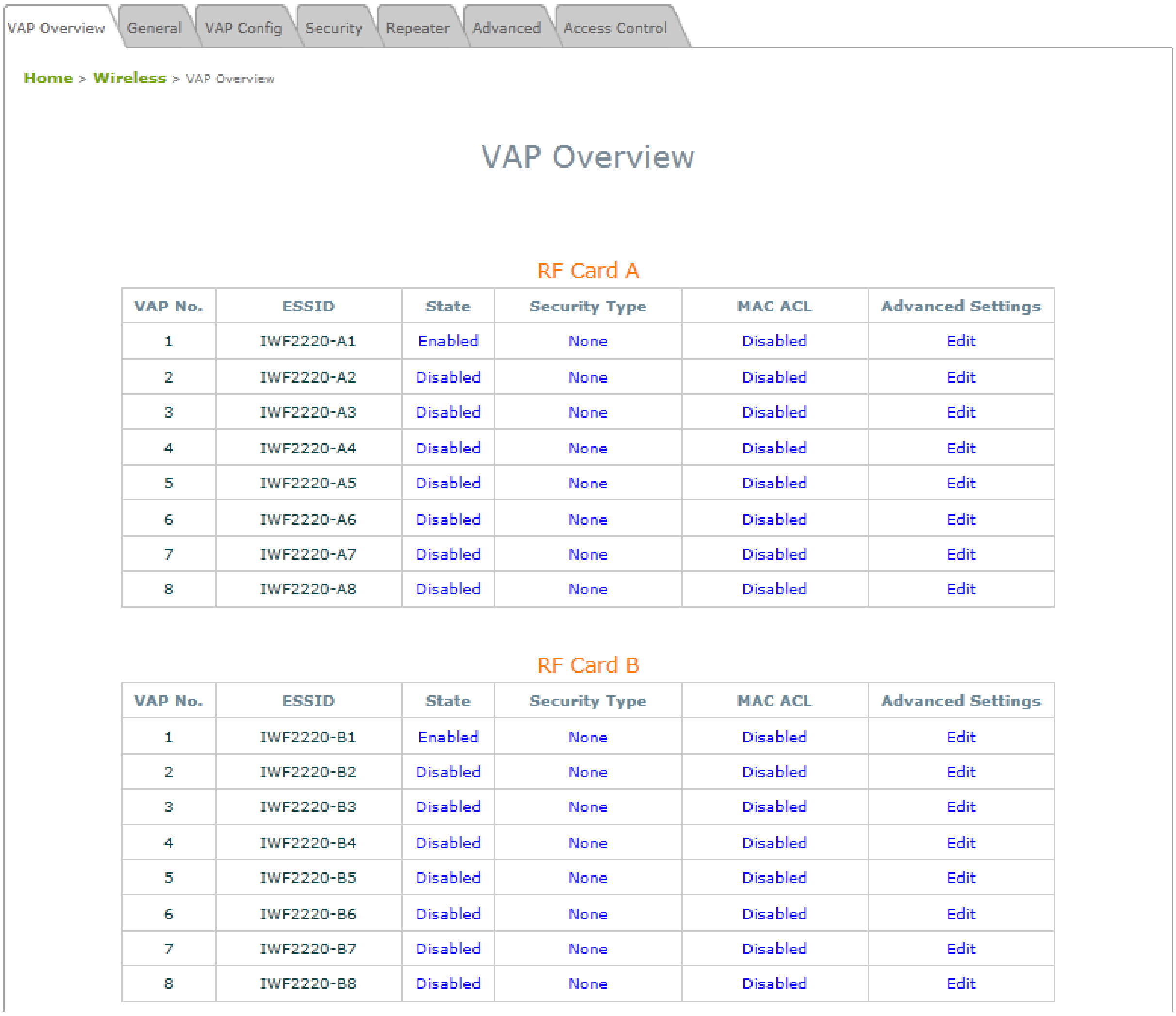
- **Static:** Configuring IPv6 address manually via this option if you have already acquired a permanent IPv6 address for operation.
- **DHCP:** Acquire IPv6 address automatically from upstream server.

7.2 Wireless

This section includes the following functions: **VAP Overview**, **General**, **VAP Configuration**, **Security**, **Repeater**, **Advanced**, and **Access Control**. The NEXCOM Access Point supports up to eight Virtual Access Points (VAPs) per RF card. Each VAP can have its own settings (e.g. ESSID, VLAN ID, security settings, etc.). With such VAP capabilities, different levels of service can be configured to meet network requirements.

7.2.1 VAP Overview

An overall status is collected on this page, including **ESSID**, **State**, **Security Type**, **MAC ACL**, and **Advanced Settings,** where the AP features 8 VAPs with respective settings. In this table, please click on the hyperlink to further configure each individual VAP.



Home > Wireless > VAP Overview

VAP Overview

RF Card A

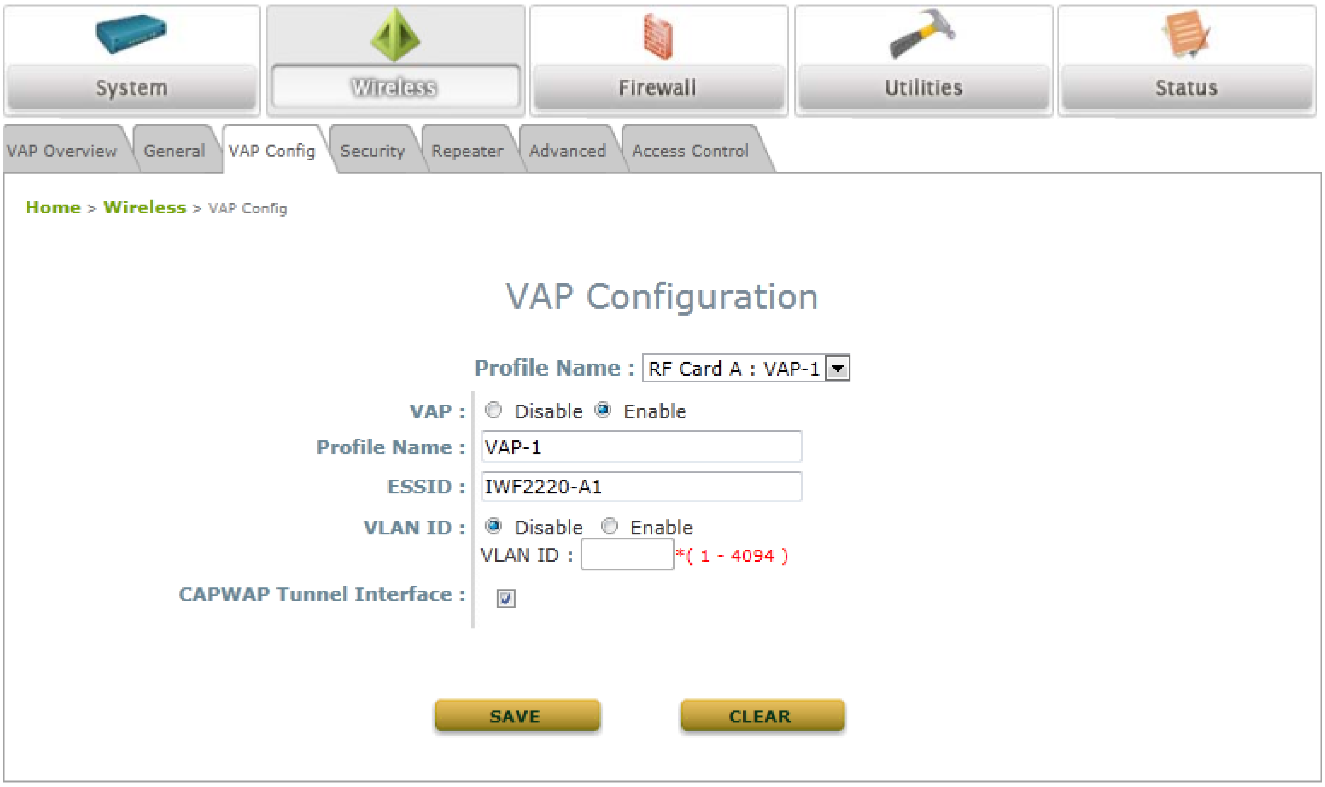
VAP No.	ESSID	State	Security Type	MAC ACL	Advanced Settings
1	IWF2220-A1	Enabled	None	Disabled	Edit
2	IWF2220-A2	Disabled	None	Disabled	Edit
3	IWF2220-A3	Disabled	None	Disabled	Edit
4	IWF2220-A4	Disabled	None	Disabled	Edit
5	IWF2220-A5	Disabled	None	Disabled	Edit
6	IWF2220-A6	Disabled	None	Disabled	Edit
7	IWF2220-A7	Disabled	None	Disabled	Edit
8	IWF2220-A8	Disabled	None	Disabled	Edit

RF Card B

VAP No.	ESSID	State	Security Type	MAC ACL	Advanced Settings
1	IWF2220-B1	Enabled	None	Disabled	Edit
2	IWF2220-B2	Disabled	None	Disabled	Edit
3	IWF2220-B3	Disabled	None	Disabled	Edit
4	IWF2220-B4	Disabled	None	Disabled	Edit
5	IWF2220-B5	Disabled	None	Disabled	Edit
6	IWF2220-B6	Disabled	None	Disabled	Edit
7	IWF2220-B7	Disabled	None	Disabled	Edit
8	IWF2220-B8	Disabled	None	Disabled	Edit

VAP Overview Page

- **State:** The hyperlink showing ***Enable*** or ***Disable*** links to the **VAP Configuration** page.



Home > Wireless > VAP Config

VAP Configuration

Profile Name : RF Card A : VAP-1

VAP : ○ Disable ● Enable

Profile Name : VAP-1

ESSID : IWF2220-A1

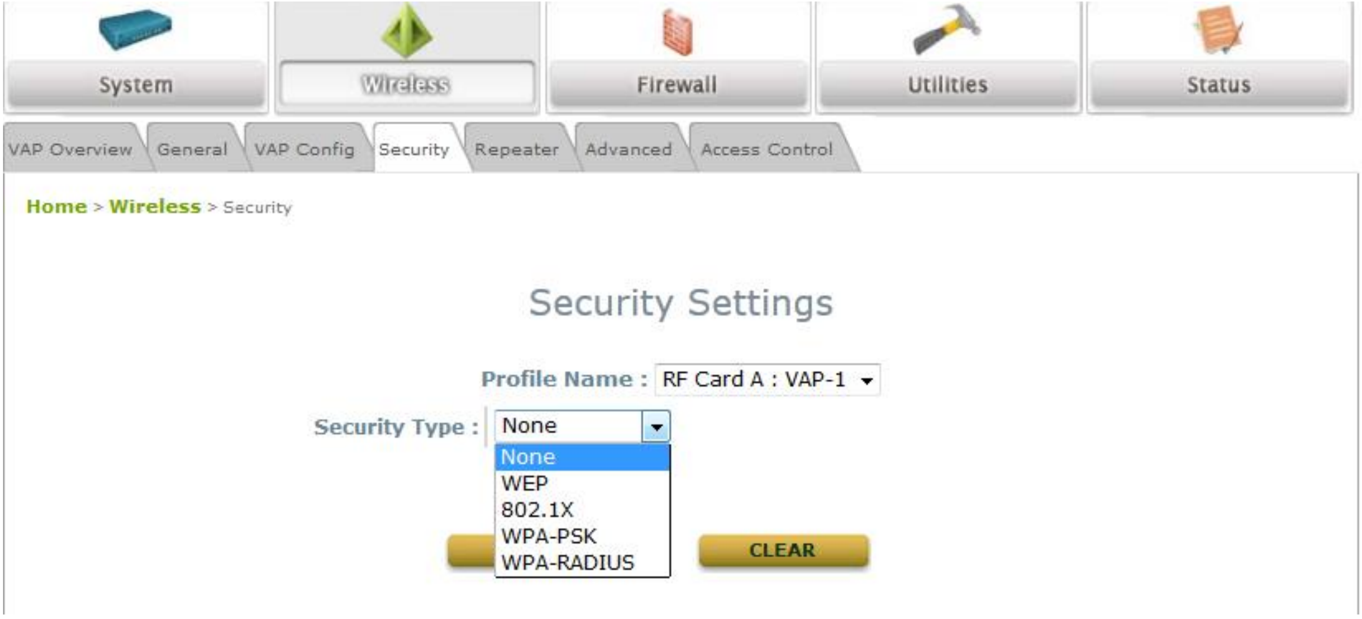
VLAN ID : ● Disable ○ Enable

VLAN ID : *(1 - 4094)

CAPWAP Tunnel Interface : ☑

VAP – State Page

- **Security Type:** The hyperlink showing the security type links to the **Security Settings** Page.



Home > Wireless > Security

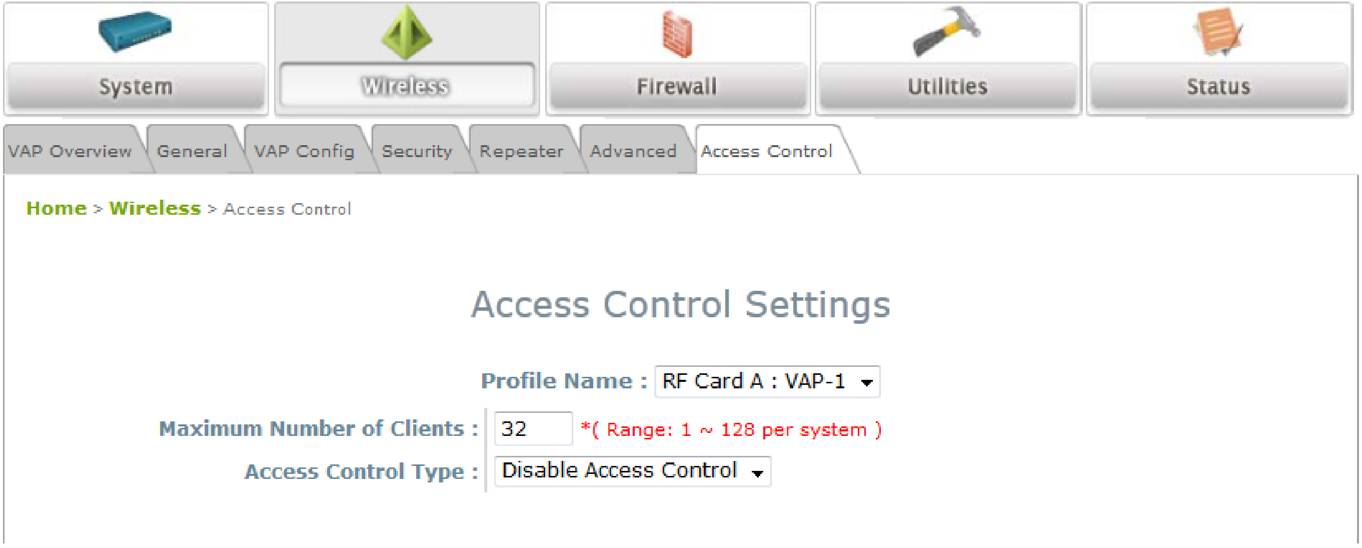
Security Settings

Profile Name : RF Card A : VAP-1

Security Type : None

VAP – Security Type Page

- **MAC ACL:** The hyperlink showing **Allow** or **Disable** links to the **Access Control Settings** Page.



Home > Wireless > Access Control

Access Control Settings

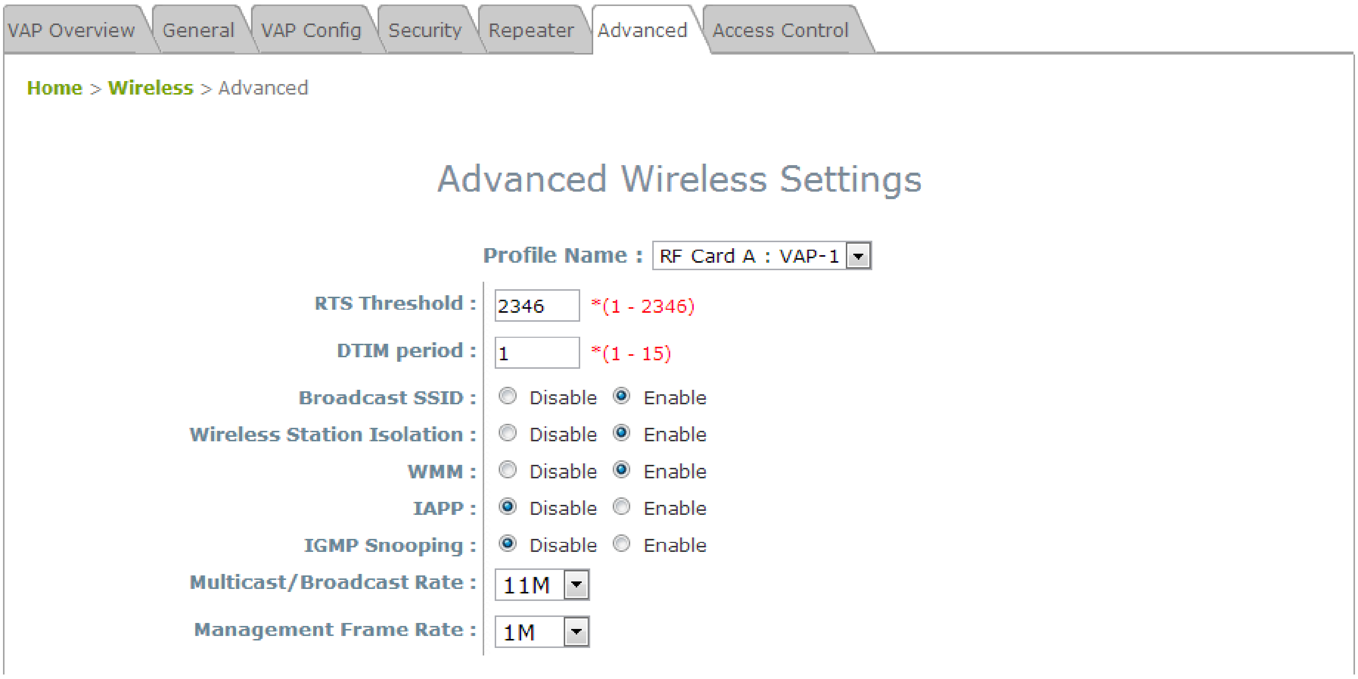
Profile Name : RF Card A : VAP-1

Maximum Number of Clients : 32 *(Range: 1 ~ 128 per system)

Access Control Type : Disable Access Control

VAP – MAC ACL Page

- **Advanced Settings:** The advanced settings hyperlink links to the **Advanced Wireless Settings** Page.



Home > Wireless > Advanced

Advanced Wireless Settings

Profile Name : RF Card A : VAP-1

RTS Threshold : 2346 *(1 - 2346)

DTIM period : 1 *(1 - 15)

Broadcast SSID : ○ Disable ● Enable

Wireless Station Isolation : ○ Disable ● Enable

WMM : ○ Disable ● Enable

IAPP : ● Disable ○ Enable

IGMP Snooping : ● Disable ○ Enable

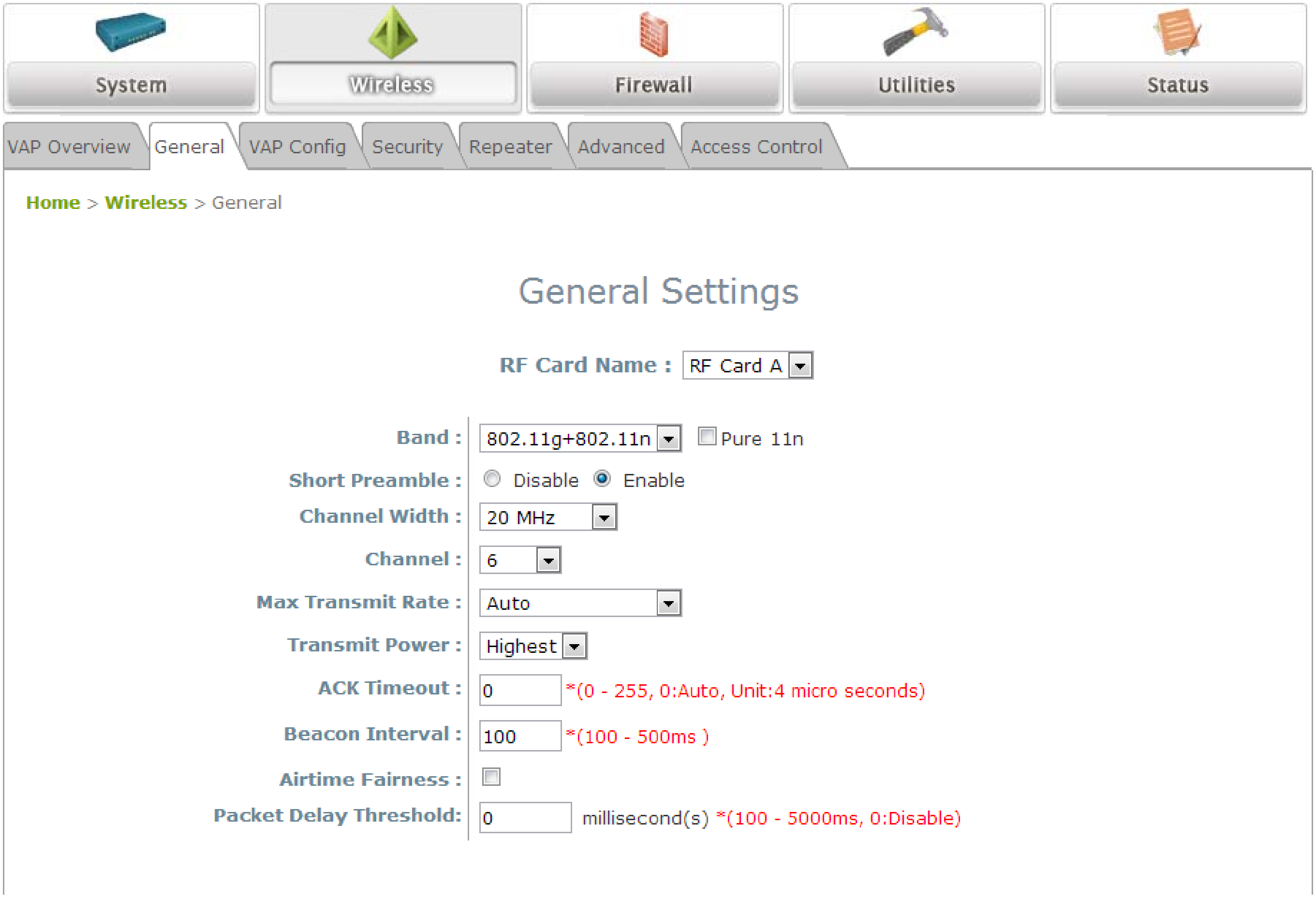
Multicast/Broadcast Rate : 11M

Management Frame Rate : 1M

VAP – Advanced Settings Page

7.2.2 General

AP's general wireless settings can be configured here:



General Settings

RF Card Name : RF Card A

Band : 802.11g+802.11n □ Pure 11n

Short Preamble : ○ Disable ● Enable

Channel Width : 20 MHz

Channel : 6

Max Transmit Rate : Auto

Transmit Power : Highest

ACK Timeout : 0 *(0 - 255, 0:Auto, Unit:4 micro seconds)

Beacon Interval : 100 *(100 - 500ms)

Airtime Fairness : □

Packet Delay Threshold: 0 millisecond(s) *(100 - 5000ms, 0:Disable)

AP General Settings Page

- **RF Card Name:** Select one RF card for further configuration.
- **Band:** Select an appropriate wireless band: ***802.11a, 802.11b***, ***802.11g***, ***802.11b+802.11g***, ***802.11g+802.11n, 802.11a+802.11n*** or select ***Disable*** if the wireless function is not required.
    - **Pure 11n:** Enable 802.11n network only.
- **Short Preamble:** The short preamble with a 56-bit synchronization field can improve WLAN transmission efficiency. Select ***Enable*** to use Short Preamble or ***Disable*** to use Long Preamble with a 128-bit synchronization field.
- **Short Guard Interval (available when Band is 802.11g+802.11n or 802.11a+802.11n):** The guard interval is the space between symbols (characters) being transmitted to eliminate inter-symbol interference. In order to further boost throughput with **802.11n**, short guard interval is half of what it used to be; please select ***Enable*** to use Short Guard Interval or ***Disable*** to use normal Guard Interval.
- **Channel Width (available when Band is 802.11g+802.11n or 802.11a+802.11n):** Double channel bandwidth to 40 MHz to enhance throughput.
- **Channel:** Select the appropriate ***channel*** from the drop-down menu to correspond with your network settings, for example, Channel 1-11 is available in North American and Channel 1-13 in Europe, or choose the default ***6***.
- **Max Transmit Rate:** The maximum wireless transmit rate can be selected from the drop-down menu.

The system will use the highest possible rate when ***Auto*** is selected. Please note that MCS0 ~ MCS15 are transmit rates only for n bands.

- **Transmit Power:** The signal strength transmitted from the system can be selected among ***Auto***, ***Highest***, ***High***, ***Medium***, ***Low**,* and ***Lowest*** from the drop-down menu.
- **ACK Timeout:** It indicates a period of time when the system waits for an Acknowledgement frame sent back from a station without retransmission. In other words, upon timeout, if the Acknowledgement frame is still not received, the frames will be retransmitted. This option can be used to tune network performance for extended coverage. For regular indoor deployments, please keep the default setting.
- **Beacon Interval (ms):** The entered amount of time indicates how often the beacon signal will be sent from the access point.
- **Airtime Fairness:** When enabled, this feature ensures all devices with different band compatibilities have the same air time. This feature is ideal for networks with devices supporting different bands.
- **Packet Delay Threshold (ms):** This is Tx queue flushing mechanism, which purpose is to drop packets and immediately begin to process others if the queue has been processed for more than x milliseconds, where Default = 0 (disabled).

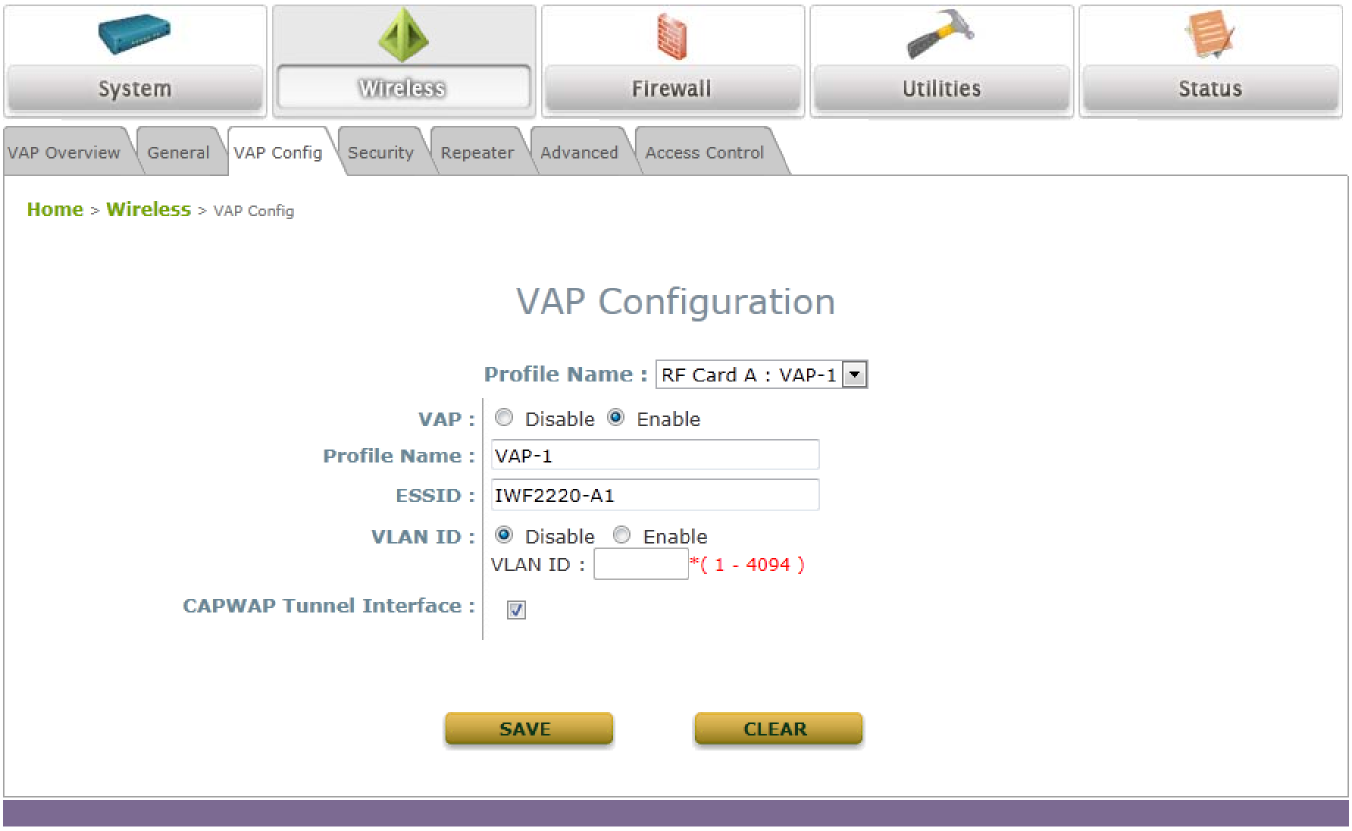
Table 2 RF Configurations (under normal circumstances in certain countries)

Band	Channel	Rate	Power
Disable	N/A	N/A	N/A
802.11a	36, 40, 44, 48, 52, 56, 60, 64, 100, 104, 108, 112, 116, 120, 124, 128, 132, 136, 140	6M, 9M, 12M, 18M, 24M, 36M, 48M, 54M	Auto, Lowest, Low, Medium, High, Highest
802.11b	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1M, 2M, 5.5M, 11M	
802.11g	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	6M, 9M, 12M, 18M, 24M, 36M, 48M, 54M	
802.11b+802.11g	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1M, 2M, 5.5M, 6M, 9M, 11M, 12M, 18M, 24M, 36M, 48M, 54M	
802.11a+802.11n	36, 40, 44, 48, 52, 56, 60, 64, 100, 104, 108, 112, 116, 120, 124, 128, 132, 136, 140	6M, 9M, 12M, 18M, 24M, 36M, 48M, 54M, MCS0~15	
802.11n+802.11g	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1M, 2M, 5.5M, 11M, 12M, 18M, 24M, 36M, 48M, 54M, MCS0~15	

*Please note that available values above will vary depending on the regulation of different countries.

7.2.3 VAP Configuration

This section provides configuration of each Virtual Access Point with settings such as **Profile Name**, **ESSID**, and **VLAN ID**.



VAP Configuration

Profile Name : RF Card A : VAP-1

VAP : ○ Disable ● Enable

Profile Name : VAP-1

ESSID : IWF2220-A1

VLAN ID : ● Disable ○ Enable

VLAN ID : *(1 - 4094)

CAPWAP Tunnel Interface : ☑

SAVE CLEAR

VAP Configuration Page

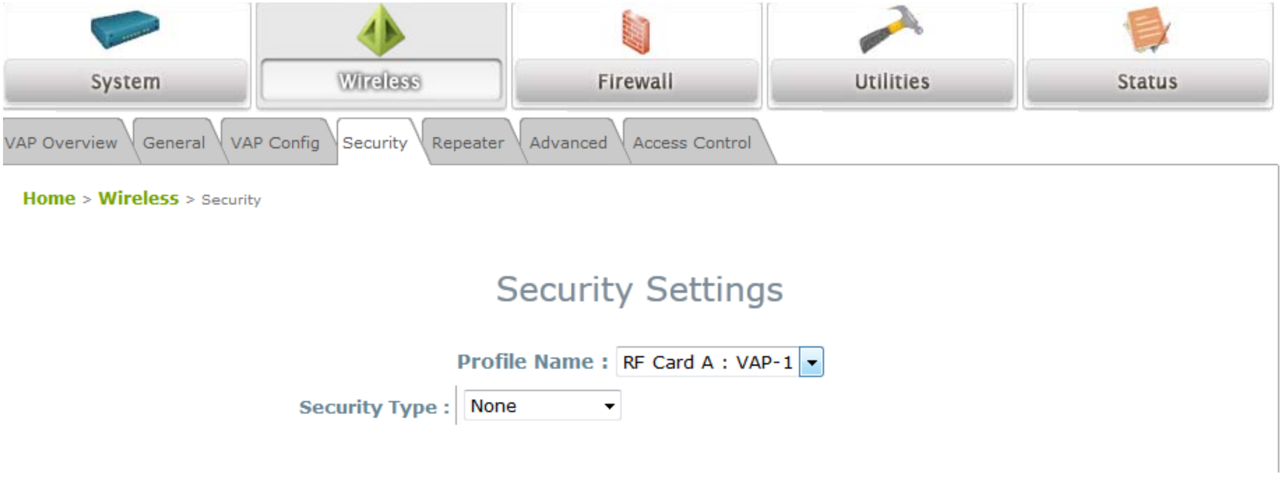
To enable specific VAP, select the VAP from the drop-down list of Profile Name. The basic settings of each VAP are collected in the profile as follows:

- **VAP:** ***Enable*** or ***Disable*** this VAP.
- **Profile Name:** The profile name of a specific RF card and its VAP for identity / management purposes.
- **ESSID:** ESSID (Extended Service Set ID) serves as an identifier for clients to associate with the specific VAP. It can be coupled with different service levels like a variety of wireless security types.
- **VLAN ID:** The NEXCOM Access Point supports tagged VLANs (virtual LANs). To enable VLAN function, each VAP shall be given a unique VLAN ID with valid values ranging from 1 to 4094.
- **CAPWAP Tunnel Interface:** Select Checkbox to designate traffic for the VAP to pass through CAPWAP Tunnel established between the AP and the controller.

7.2.4 Security

The Access Point supports various wireless authentication and data encryption methods in each VAP profile. With this, the administrator can provide different service levels to clients. The security type includes **None**, **WEP**, **802.1X**, **WPA-PSK**, and **WPA-RADIUS**.

- **None:** Authentication is not required and data is not encrypted during transmission when this option is selected. This is the default setting as shown in the following figure.



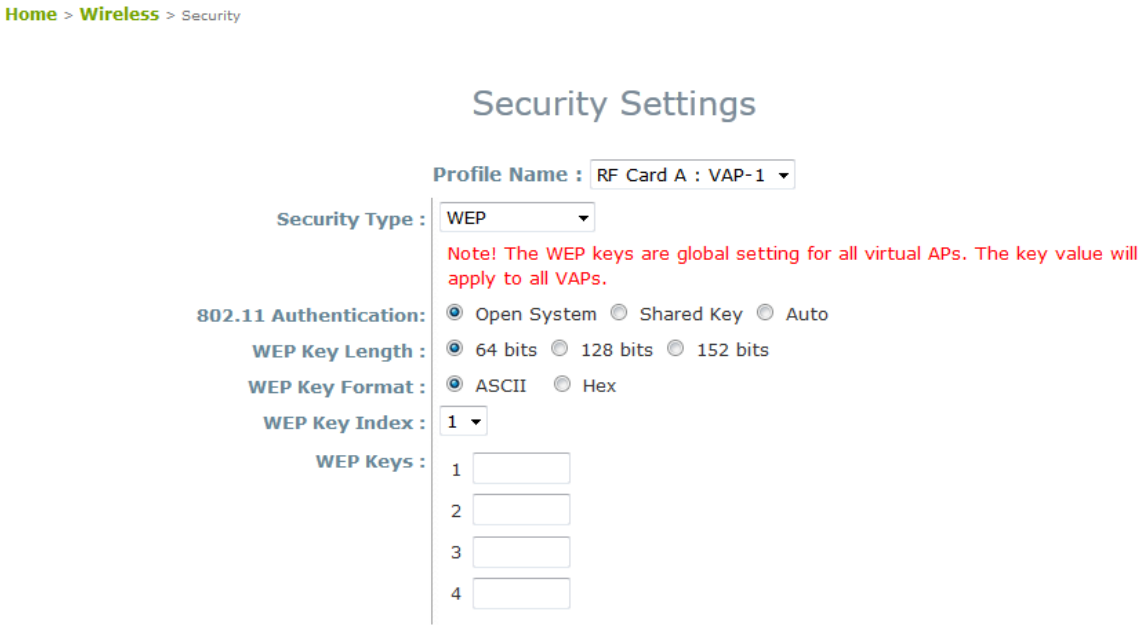
Security Settings

Profile Name : RF Card A : VAP-1

Security Type : None

Security Settings: None

- **WEP:** WEP (Wired Equivalent Privacy) is a data encryption mechanism based on a 64-bit, 128-bit, or 152-bit shared key algorithm.



Security Settings

Profile Name : RF Card A : VAP-1

Security Type : WEP

Note! The WEP keys are global setting for all virtual APs. The key value will apply to all VAPs.

802.11 Authentication: ● Open System ○ Shared Key ○ Auto

WEP Key Length : ● 64 bits ○ 128 bits ○ 152 bits

WEP Key Format : ● ASCII ○ Hex

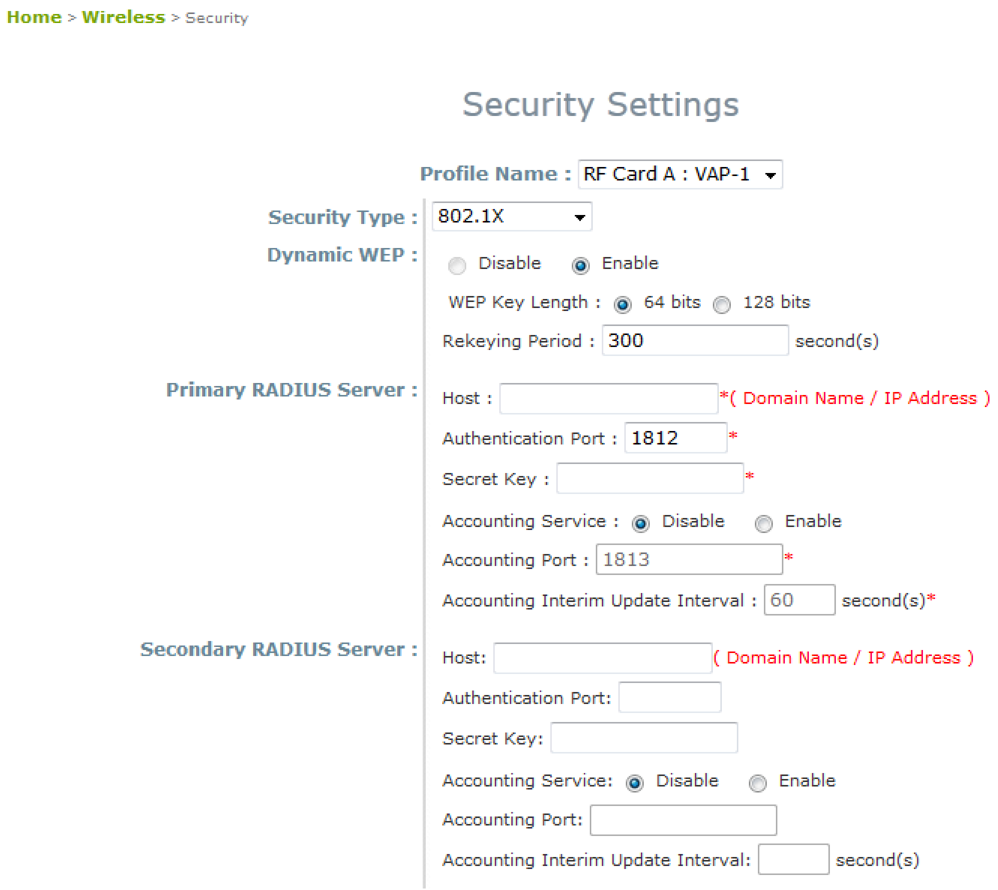
WEP Key Index : 1

WEP Keys : 1 2 3 4

Security Settings: WEP

- **802.11 Authentication:** Select from ***Open System***, ***Shared Key***, or ***Auto***.
- **WEP Key Length:** Select a key length from ***64-bit***, ***128-bit***, or ***152-bit***.
- **WEP Key Format:** Select a WEP key format from ***ASCII*** or ***Hex***.
- **WEP Key Index:** Select a key index from ***1~4***. The WEP key index is a number that specifies which WEP key will be used for the encryption of wireless frames during data transmission.
- **WEP Keys:** Provide the pre-defined WEP key value; the system supports up to 4 sets of WEP keys.

- **802.1X:** When **802.1X Authentication** is selected, RADIUS authentication and Dynamic WEP are provided.



Home > Wireless > Security

Security Settings

Profile Name : RF Card A : VAP-1

Security Type : 802.1X

Dynamic WEP : ○ Disable ● Enable
WEP Key Length : ● 64 bits ○ 128 bits
Rekeying Period : 300 second(s)

Primary RADIUS Server :
Host : *(Domain Name / IP Address)
Authentication Port : 1812 *
Secret Key : *
Accounting Service : ● Disable ○ Enable
Accounting Port : 1813 *
Accounting Interim Update Interval : 60 second(s)*

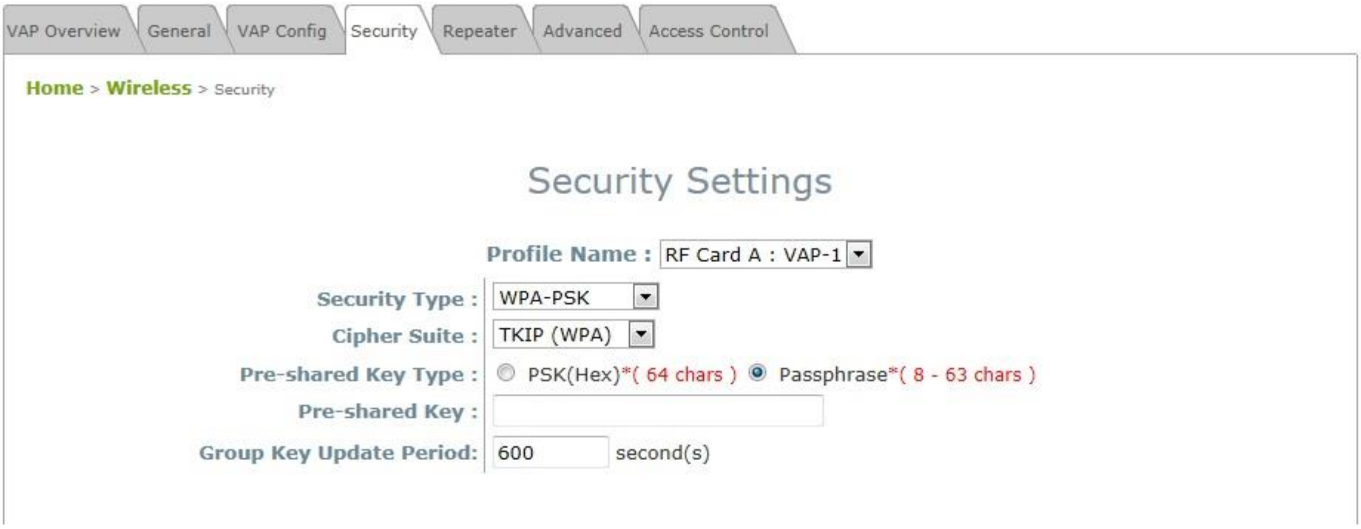
Secondary RADIUS Server :
Host: (Domain Name / IP Address)
Authentication Port:
Secret Key:
Accounting Service: ● Disable ○ Enable
Accounting Port:
Accounting Interim Update Interval: second(s)

Security Settings: 802.1X Authentication

- **Dynamic WEP Settings:**
  - **Dynamic WEP:** For 802.1X security type, Dynamic WEP is always enabled to automatically generate WEP keys for encryption.
  - **WEP Key Length:** Select a key length from ***64-bit*** or ***128-bit***.
  - **Re-keying Period:** The time interval for the dynamic WEP key to be updated; the time unit is in seconds.
- **RADIUS Server Settings (Primary/Secondary):**
  - **Host:** Enter the IP address or domain name of the RADIUS server.

- **Authentication Port:** The port number used by the RADIUS server. Specify a port number or use the default, 1812.
- **Secret Key:** The secret key for the system to communicate with the RADIUS server.
- **Accounting Service:** Enabling this option allows accounting of login and logouts through the RADIUS server.
- **Accounting Port:** The port number used by the RADIUS server for accounting purposes. Specify a port number or use the default, 1813.
- **Accounting Interim Update Interval:** The system will update accounting information to the RADIUS server every interval period.

- **WPA-PSK:** WPA-PSK (Wi-Fi Protected Access Pre-shared Key) is a pre-shared key authentication method, a special mode of WPA.



Security Settings

Profile Name : RF Card A : VAP-1

Security Type : WPA-PSK

Cipher Suite : TKIP (WPA)

Pre-shared Key Type : ○ PSK(Hex)*(64 chars) ● Passphrase*(8 - 63 chars)

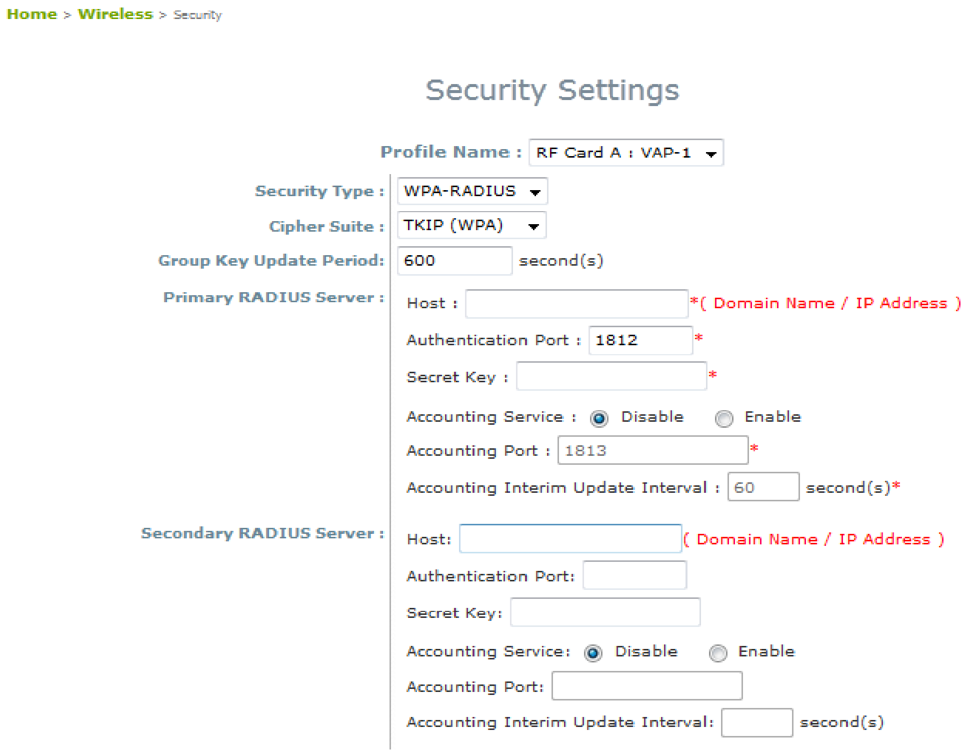
Pre-shared Key :

Group Key Update Period: 600 second(s)

Security Settings: WPA-PSK

- **Cipher Suite:** Select an encryption method from ***TKIP (WPA)***, ***AES (WPA)***, ***TKIP (WAP2)***, ***AES (WAP2)***, or ***Mixed***.
- **Pre-shared Key Type:** Select a pre-shared key type: **PSK (Hex)** or **Passphrase**.
- **Pre-shared Key:** Enter the key value for the pre-shared key; the format of the key value depends on the key type selected.
- **Group Key Update Period:** The time interval for the Group Key to be renewed; the time unit is in seconds.

- **WPA-RADIUS:** If this option is selected, the RADIUS authentication and data encryption will both be enabled.



Home > Wireless > Security

Security Settings

Profile Name : RF Card A : VAP-1

Security Type : WPA-RADIUS

Cipher Suite : TKIP (WPA)

Group Key Update Period: 600 second(s)

Primary RADIUS Server :

Host : *(Domain Name / IP Address)

Authentication Port : 1812 *

Secret Key : *

Accounting Service : ● Disable ○ Enable

Accounting Port : 1813 *

Accounting Interim Update Interval : 60 second(s)*

Secondary RADIUS Server :

Host: (Domain Name / IP Address)

Authentication Port:

Secret Key:

Accounting Service: ● Disable ○ Enable

Accounting Port:

Accounting Interim Update Interval: second(s)

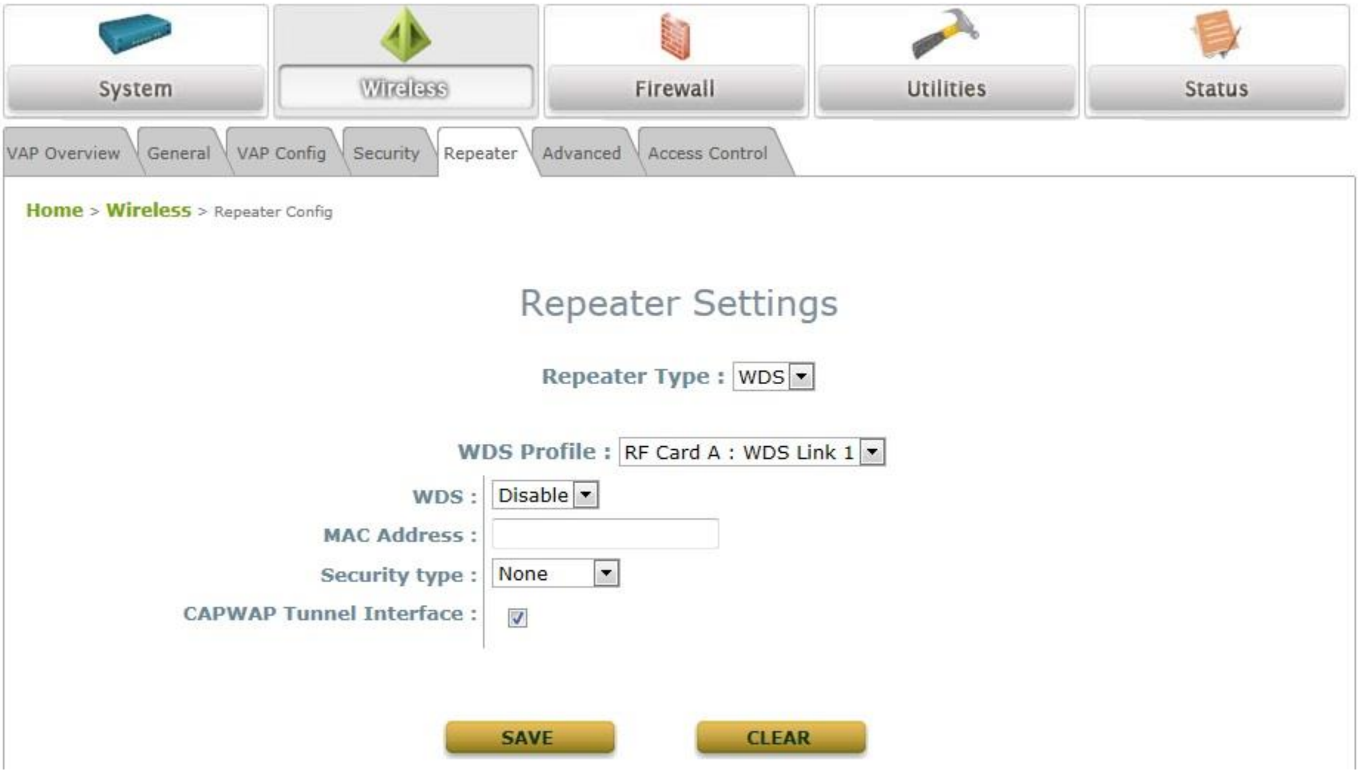
Security Settings: WPA-RADIUS

- **WPA Settings:**
  - **Cipher Suite:** Select an encryption method from *TKIP (WPA)*, *AES (WPA)*, *TKIP(WAP2)*, *AES (WAP2)*, or *Mixed*.
  - **Group Key Update Period:** The time interval for the Group Key to be renewed; the time unit is in seconds.
- **RADIUS Server Settings (Primary/Secondary):**
  - **Host:** Enter the IP address or domain name of the RADIUS server.
  - **Authentication Port:** The port number used by the RADIUS server. Specify a port number or use the default, 1812.
  - **Secret Key:** The secret key for the system to communicate with the RADIUS server.
  - **Accounting Service:** *Enabling* this option allows accounting of login and logouts through the RADIUS server.
  - **Accounting Port:** The port number used by the RADIUS server for accounting purposes. Specify a port number or use the default, 1813.
  - **Accounting Interim Update Interval:** The system will update accounting information to the RADIUS server every interval period.

7.2.5 Repeater

NEXCOM Access Points are capable of utilizing WDS to extend wireless network coverage.

If **WDS** is enabled, the AP can support up to 4 WDS links to its peer APs. **Security Type** (**None**, **WEP**, or **WPA/PSK**) can be configured to decide which encryption is to be used for WDS connections respectively. Please fill in remote peer's MAC address and click ***SAVE*** to proceed; if setting revision is necessary, the ***CLEAR*** button can be used to clear the contents in the above WDS connection list.



Repeater Settings

Repeater Type : WDS

WDS Profile : RF Card A : WDS Link 1

WDS : Disable

MAC Address :

Security type : None

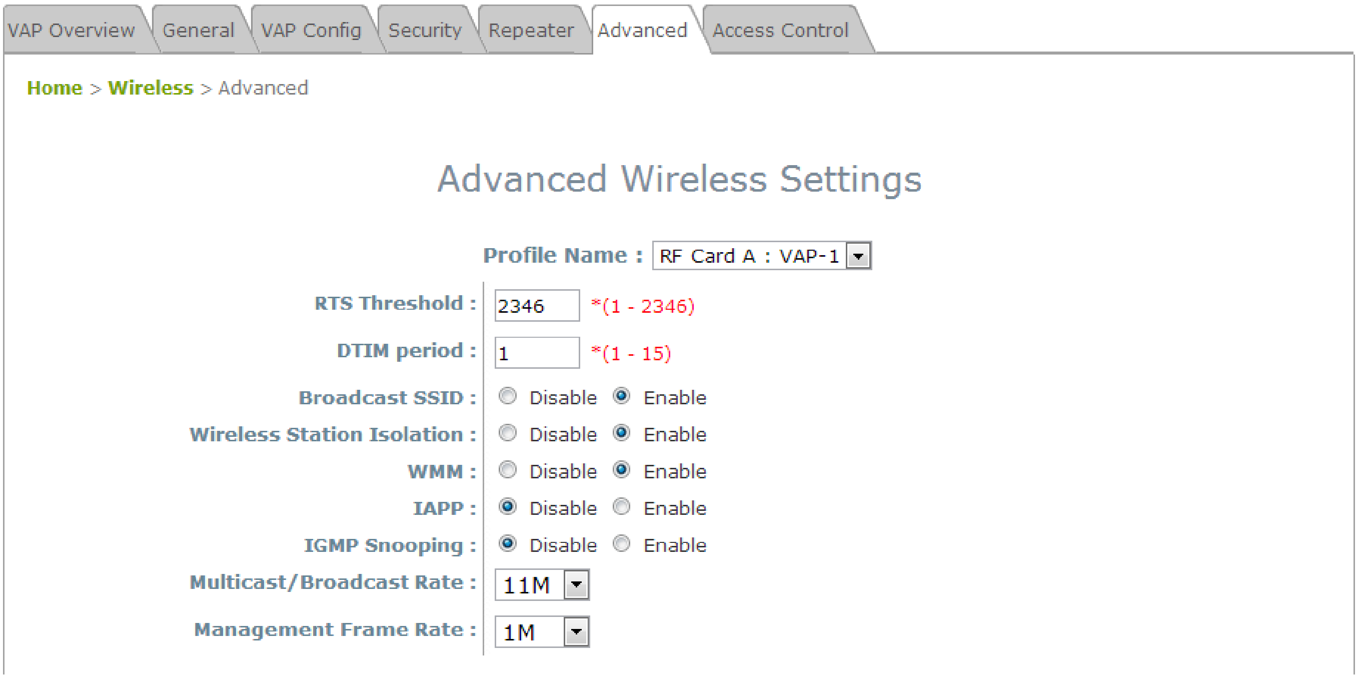
CAPWAP Tunnel Interface : ☑

Repeater Settings: WDS

- **WDS:** Select ***Enable*** to enable the respective WDS links; Select ***Disable*** to remove them.
- **MAC Address:** To input remote peer's MAC address.
- **Security Type:** None, WEP, or WPA-PSK.
- **CAPWAP Tunnel Interface:** Select Checkbox to designate WDS traffic to pass through CAPWAP Tunnel established between the AP and the controller.

7.2.6 Advanced

The advanced wireless settings for the Access Point's VAP (Virtual Access Point) profiles allow customization of data transmission settings. The administrator can tune the following parameters to improve network communication performance if a poor connection occurs.



Home > Wireless > Advanced

Advanced Wireless Settings

Profile Name : RF Card A : VAP-1

RTS Threshold :	2346 *(1 - 2346)
DTIM period :	1 *(1 - 15)
Broadcast SSID :	○ Disable ● Enable
Wireless Station Isolation :	○ Disable ● Enable
WMM :	○ Disable ● Enable
IAPP :	● Disable ○ Enable
IGMP Snooping :	● Disable ○ Enable
Multicast/Broadcast Rate :	11M
Management Frame Rate :	1M

Advanced Wireless Settings Page

- **RTS Threshold:** Enter a value between 1 and 2346. RTS (Request to Send) Threshold determines the packet size at which the system issues a request to send (RTS) before sending the fragment to prevent the hidden node problem. The RTS mechanism will be activated if the data size exceeds the value provided. A lower RTS Threshold setting can be useful in areas where many client devices are associating with the AP or in areas where the clients are far apart and can detect only the AP but not each other.
- **Fragmentation Threshold:** Enter a value between 256 and 2346. The default is 2346. A packet size larger than this threshold will be fragmented (sent with several pieces instead of one chunk) before transmission. A smaller value results in smaller frames but allows a larger number of frames in transmission. A lower Fragment Threshold setting can be useful in areas where communication is poor or disturbed by a serious amount of radio interference.
- **DTIM Period:** Input the DTIM Interval that is generated within the periodic beacon at a specified frequency. Higher DTIM will allow the wireless client to save more energy, but the throughput will be lowered.
- **Broadcast SSID:** Disabling this function will stop the system from broadcasting its SSID. If broadcast of the SSID is disabled, only devices that have the correct SSID can connect to the system.
- **Wireless Station Isolation:** By enabling this function, all stations associated with the system are isolated and can only communicate with the system.

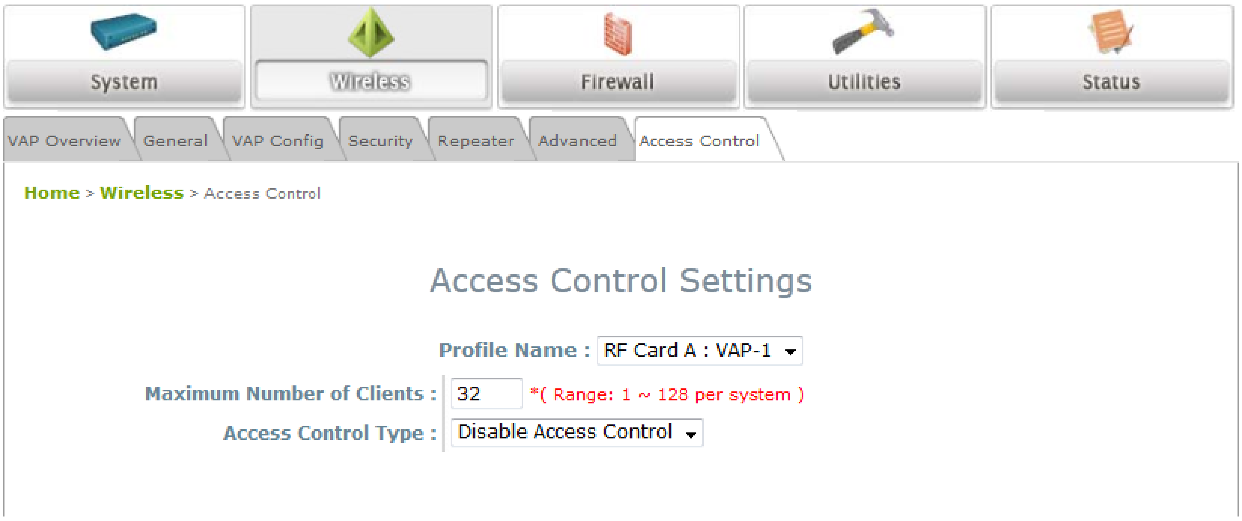
- **WMM:** The default is *Disable.* Wi-Fi Multimedia (WMM) is a Quality of Service (QoS) feature that prioritizes wireless data packets based on four access categories: voice, video, best effort, and background. Applications without WMM and applications that do not require QoS are assigned to the best-effort category, which receives a lower priority than that of voice and video. Therefore, WMM decides which data streams are more important and assigns them a higher traffic priority. This option works with WMM-capable clients only.

  <To receive the benefits of WMM QoS>

  - The application must support WMM.
  - WMM shall be enabled on the Access Point.
  - WMM shall be enabled in the wireless adapter on client’s computer.
- **IAPP:** IAPP (Inter Access Point Protocol) is a protocol by which access points share information about the stations connected to them. When this function is enabled, the system will automatically broadcast information of associated wireless stations to its peer access points. This will help wireless stations roam smoothly among IAPP-enabled access points in the same wireless LAN.
- **IGMP Snooping:** When IGMP snooping is enabled, IGMP packets are transferred via the Access Point’s network interface and the IP multicast host. Registration information is recorded and sorted into multicast groups. The internal switch can then intelligently forward traffic only to those ports that request multicast traffic. Adversely, without IGMP snooping, multicast traffic is treated like broadcast traffic, with packets forwarded to all ports causing network inefficiencies.
- **Multicast/Broadcast Rate:** Bandwidth configuration for multicast/broadcast packets. If your wireless clients require a larger or smaller bandwidth for sending multicast/ broadcast packets, the administrator can customize the Access Point’s multicast/ broadcast bandwidth here.
- **Management Frame Rate:** This feature controls the bandwidth for Management Frames. The higher the rate it, the shorter range the transmission covers

7.2.7 Access Control

On this page, the network administrator can restrict the total number of clients connected to the Access Point, as well as specify particular MAC addresses that can or cannot access the device.



Access Control Settings

Profile Name : RF Card A : VAP-1

Maximum Number of Clients : 32 *(Range: 1 ~ 128 per system)

Access Control Type : Disable Access Control

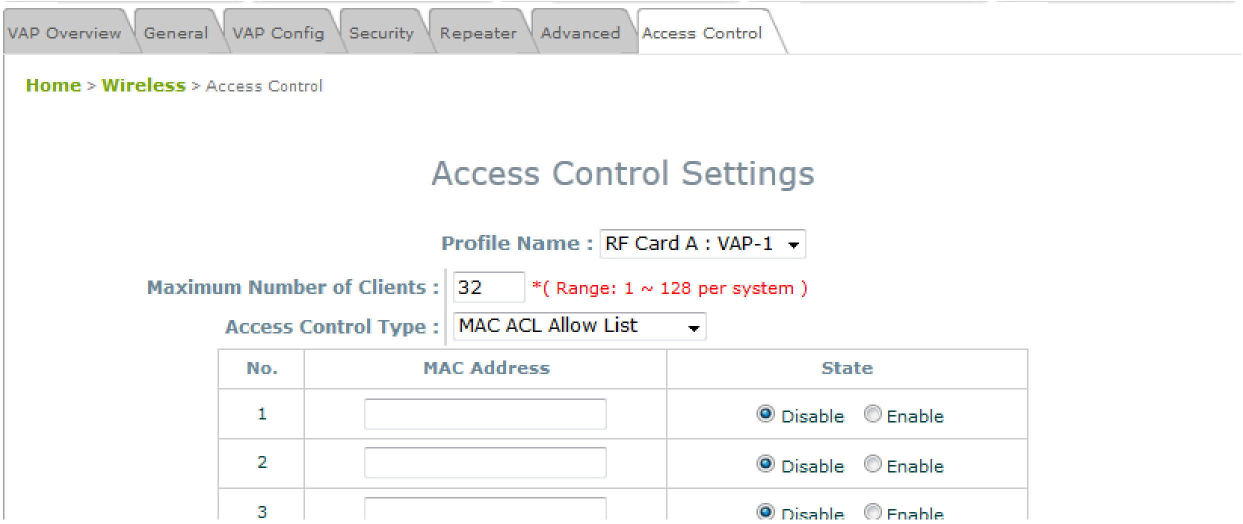
Access Control Settings Page

- **Maximum Number of Clients**
  The NEXCOM Access Point supports various methods of authenticating clients for wireless LAN access. The default policy is unlimited access without any authentication requirement. To restrict the station number of wireless connections, simply change the **Maximum Number of Stations** to a desired number. For example, when the number of stations is set to 20, only 20 stations are allowed to connect to the specified VAP.

- **Access Control Type**

  The administrator can restrict the wireless access of client devices based on their MAC addresses.

  - **Disable Access Control:** When ***Disable*** is selected, there is no restriction for client devices to access the system.
  - **MAC ACL Allow List:** When selecting ***MAC ACL Allow List***, only the client devices (identified by their MAC addresses) listed in the Allow List ("allowed MAC addresses")are granted access to the system. The administrator can temporarily block any allowed MAC address by checking ***Disable***, until the administrator re-Enables the listed MAC.



Access Control Settings

Profile Name : RF Card A : VAP-1

Maximum Number of Clients : 32 *(Range: 1 ~ 128 per system)

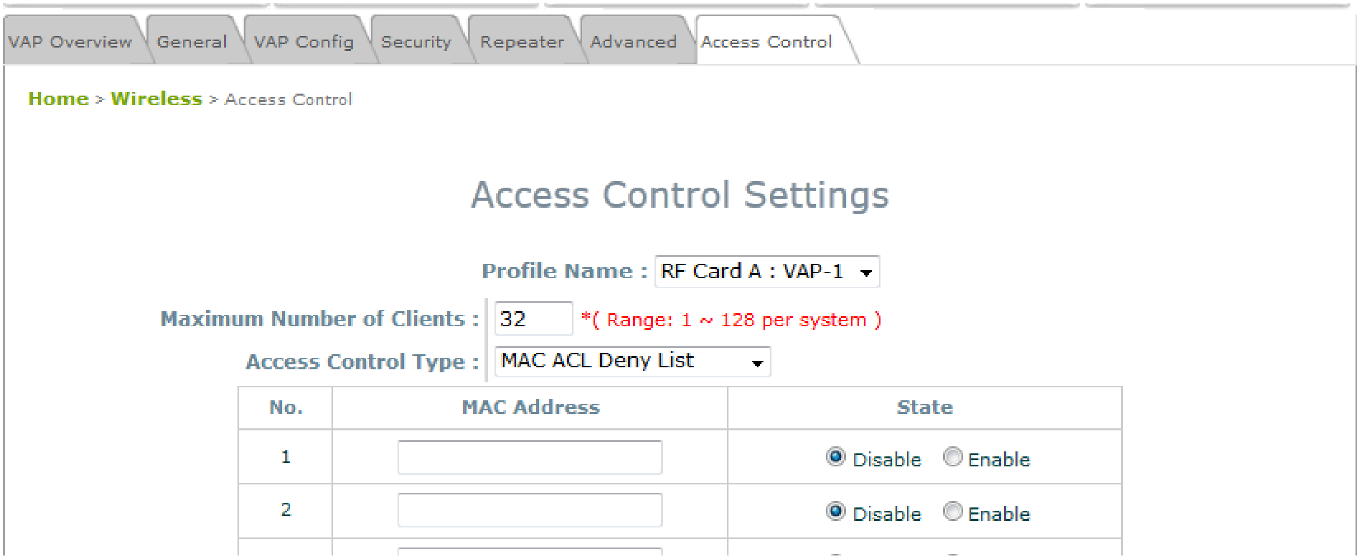
Access Control Type : MAC ACL Allow List

No.	MAC Address	State
1		● Disable ○ Enable
2		● Disable ○ Enable
3		● Disable ○ Enable

MAC Allow List

Note: An empty Allow List means that there is no allowed MAC address. Make sure at least the MAC of the management system is included (e.g. network administrator's computer)

- **MAC ACL Deny List:** When selecting ***MAC ACL Deny List***, all client devices are granted access to the system except those listed in the Deny List ("denied MAC addresses"). The administrator can allow any denied MAC address to connect to the system temporarily by checking ***Disable***.



Access Control Settings

Profile Name : RF Card A : VAP-1

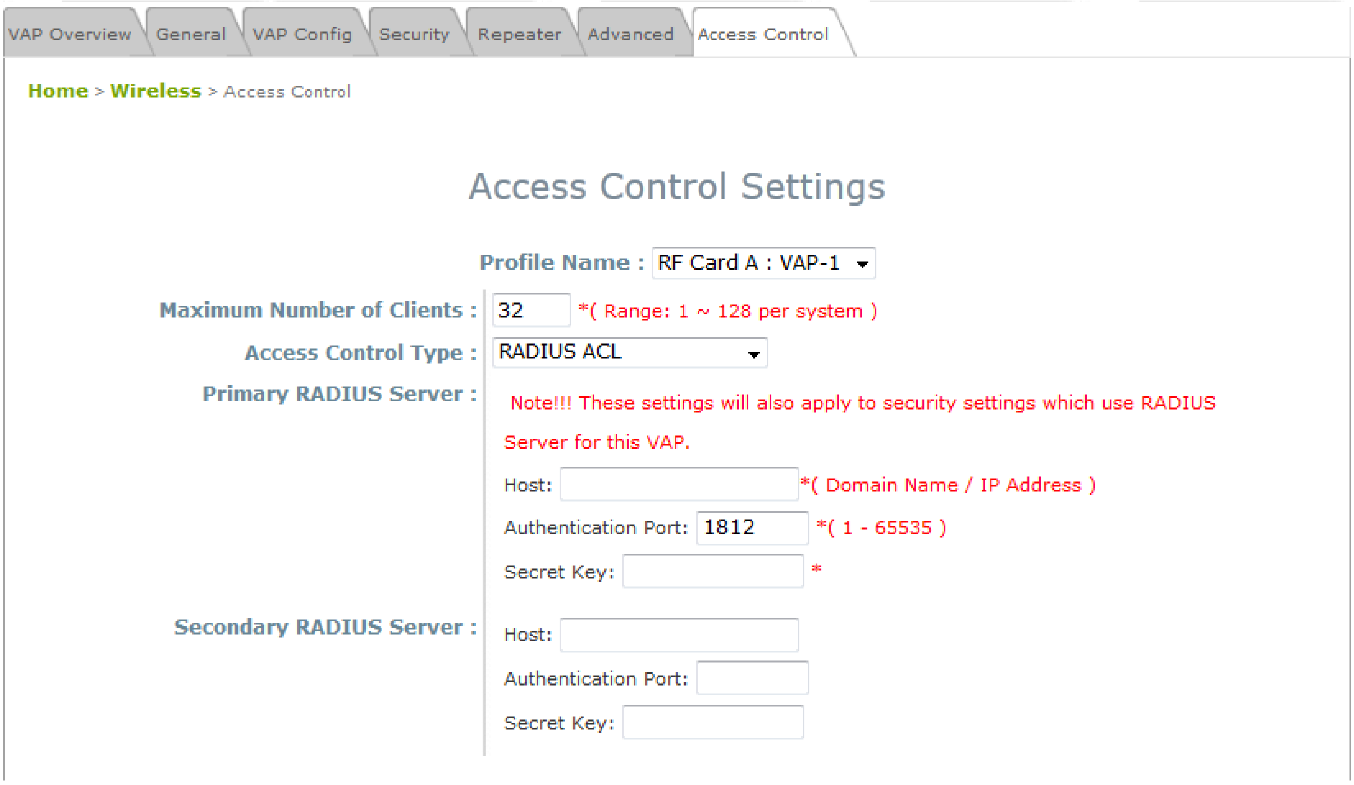
Maximum Number of Clients : 32 *(Range: 1 ~ 128 per system)

Access Control Type : MAC ACL Deny List

No.	MAC Address	State
1		● Disable ○ Enable
2		● Disable ○ Enable

Deny List

- **RADIUS ACL:** Authenticate incoming MAC addresses by an external RADIUS. When ***RADIUS ACL*** is selected, all incoming MAC addresses will be authenticated by an external RADIUS. Please note that each VAP's MAC ACL and its security type (shown on the **Security Settings** page) share the same RADIUS configuration.



Home > Wireless > Access Control

Access Control Settings

Profile Name : RF Card A : VAP-1

Maximum Number of Clients : 32 *(Range: 1 ~ 128 per system)

Access Control Type : RADIUS ACL

Primary RADIUS Server : Note!!! These settings will also apply to security settings which use RADIUS Server for this VAP.

Host: *(Domain Name / IP Address)

Authentication Port: 1812 *(1 - 65535)

Secret Key: *

Secondary RADIUS Server : Host:

Authentication Port:

Secret Key:

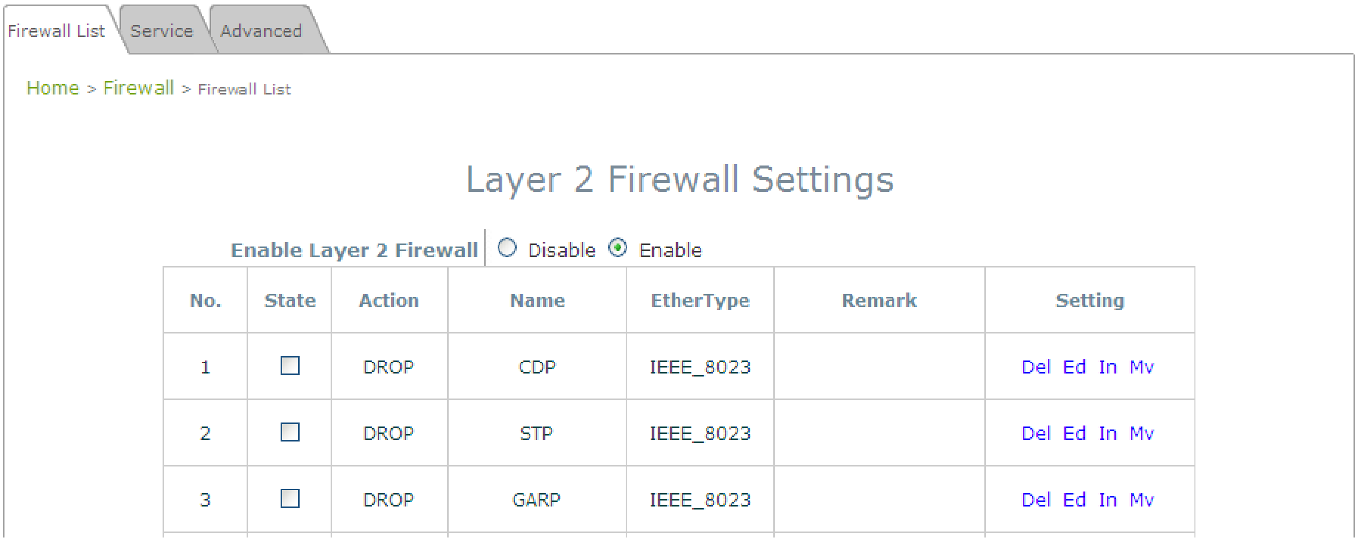
RADIUS ACL

7.3 Firewall

The system provides an added security feature, Layer2 Firewall, in addition to the typical AP security. Layer2 Firewall offers a firewall function that is tailored specifically for Layer2 traffic, providing another choice of shield against possible security threats coming from/going to WLAN (AP interfaces); hence, besides firewall policies configured on gateways, this extra security feature will assist to mitigate possible security breach. This section provides information in the following functions: **Firewall Lists**, **Service** and **Advanced Firewall Settings**.

7.3.1 Firewall List

It provides an overview of firewall rules in the system; 6 default rules with up to a total of 20 firewall rules are available for configuration.



Layer 2 Firewall Settings

Enable Layer 2 Firewall ○ Disable ● Enable

No.	State	Action	Name	EtherType	Remark	Setting
1	□	DROP	CDP	IEEE_8023		Del Ed In Mv
2	□	DROP	STP	IEEE_8023		Del Ed In Mv
3	□	DROP	GARP	IEEE_8023		Del Ed In Mv

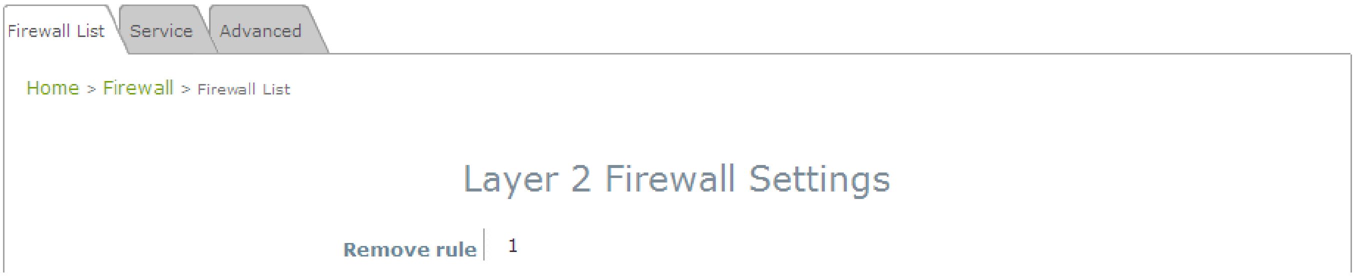
Firewall List Page

From the overview table, each rule is designated with the following field;

- **No.:** The numbering will decide the priority for the system to carry out the available firewall rules in the tables.
- **State:** The check marks will enable the respective rules.
- **Action:** ***DROP*** denotes a block rule; ***ACCEPT*** denotes a pass rule.
- **Name:** Shows the name of the rule.
- **EtherType:** Denotes the type of traffic subjected to this rule.
- **Remark:** Shows the note of this rule.
- **Setting:** 4 actions are available; ***Del*** denotes to delete the rule, ***Ed*** denotes to edit the rule, ***In*** denotes to insert a rule, and ***Mv*** denotes to move the rule.

>>To delete a specific rule,

Del in the **Setting** column of firewall list will lead to the following page for removal confirmation. After the ***SAVE*** button is clicked and system is rebooted, the rule will be removed.



Layer 2 Firewall Settings

Remove rule	1

>>To edit a specific rule,

Ed in the **Setting** column of the firewall list will lead to the following page for detail configuration. From this page, the rule can be edited from scratch or from an existing rule for revision. The following fields will be displayed:

- **Rule ID:** The numbering of this specific rule will decide its priority among available firewall rules in the table.
- **Rule name:** The rule name can be specified here.
- **EtherType:** The drop-down list will provide the available types of traffic subjected to this rule.
- **Interface:** It indicates inbound/outbound direction with desired interfaces.
- **Service** (when EtherType is **IPv4**)**:** Select the available upper layer protocols/services from the drop-down list.
- **DSAP/SSAP** (when EtherType is **IEEE 802.3**)**:** The value can be further specified for the fields in 802.2 LLC frame header.
- **Type** (when EtherType is **IEEE802.3**)**:** The field can be used to indicate the type of encapsulated traffic.
- **VLAN ID** (when EtherType is **802.1 Q**)**:** The VLAN ID is provided to associate with certain VLAN-tagging traffic.
- **Priority** (when EtherType is **802.1 Q**)**:** It denotes the priority level with associated VLAN traffic.
- **Encapsulated Type** (when EtherType is **802.1 Q**)**:** It can be used to indicate the type of encapsulated traffic.
- **Opcode** (when EtherType is **ARP/RARP**)**:** This list can be used to specify the ARP Opcode in ARP header.
- **Source:** MAC Address/Mask indicates the source MAC; IP Address/Mask indicates the source IP address (when EtherType is **IPv4**); ARP IP/MAC & MASK indicate the ARP payload fields.
- **Destination:** MAC Address/Mask indicates the destination MAC; IP Address/Mask indicates the destination IP address (when EtherType is **IPv4**); ARP IP/MAC & MASK indicate the ARP payload fields.

- **Action:** The rule can be chosen to be **Block** or **Pass**.
- **Remark:** Any note of this rule can be specified here.

When the configuration for firewall rule is completed; please click ***SAVE*** and ***Reboot*** system to let the firewall rule take effect.

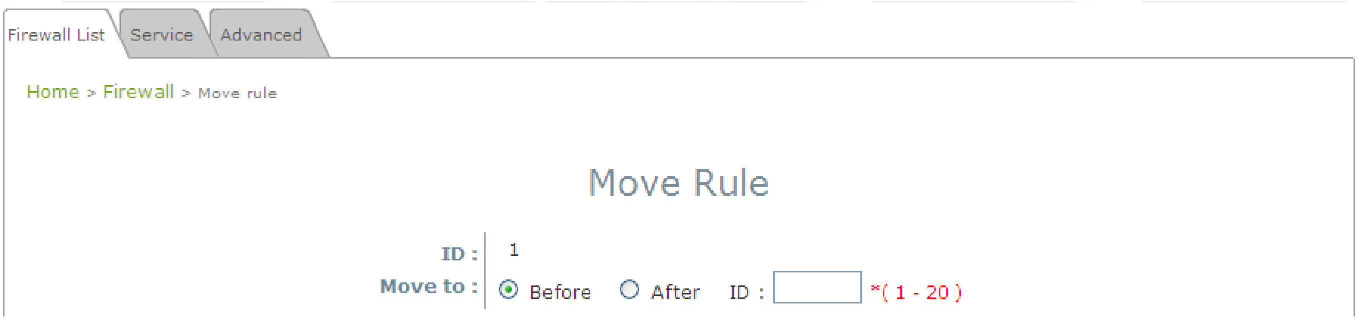
>>To insert a specific rule,

In in the **Setting** column of the firewall list will lead to the following page for detail configuration with rule ID for the current inserted rule.

From this page, a rule can be added or edited from an existing rule for revision.

>>To move a specific rule,

Mv in the **Setting** column of the firewall list will lead to the following page for reordering confirmation. After the ***SAVE*** button is clicked and system is rebooted, the order of rules will be updated.

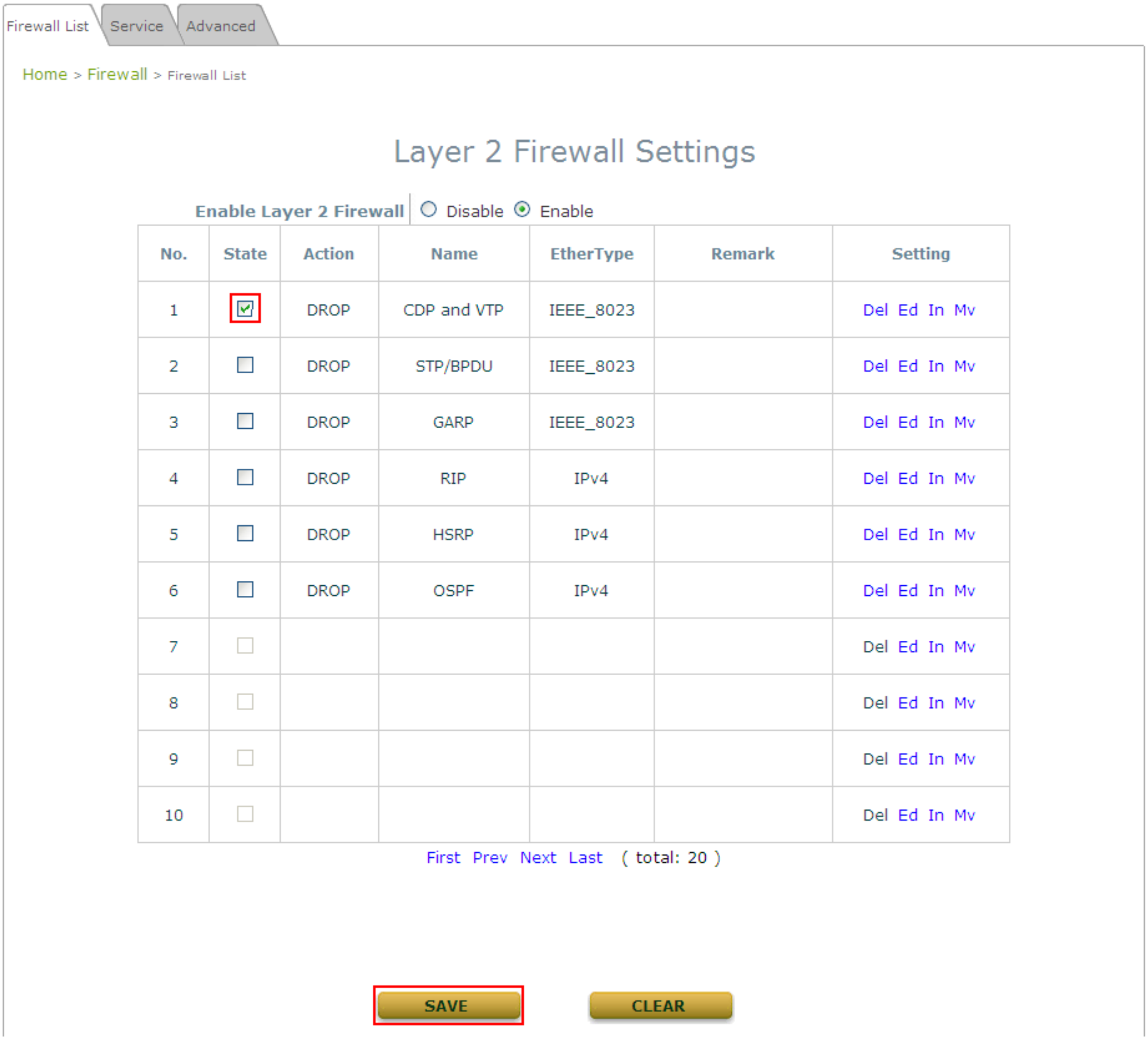


Move Rule

ID : 1

Move to : ● Before ○ After ID : *(1 - 20)

Please make sure all desired rules (state of rule) are checked and saved in the overview page; the rules will be enforced upon system reboot.



Home > Firewall > Firewall List

Layer 2 Firewall Settings

Enable Layer 2 Firewall ○ Disable ● Enable

No.	State	Action	Name	EtherType	Remark	Setting
1	☑	DROP	CDP and VTP	IEEE_8023		Del Ed In Mv
2	□	DROP	STP/BPDU	IEEE_8023		Del Ed In Mv
3	□	DROP	GARP	IEEE_8023		Del Ed In Mv
4	□	DROP	RIP	IPv4		Del Ed In Mv
5	□	DROP	HSRP	IPv4		Del Ed In Mv
6	□	DROP	OSPF	IPv4		Del Ed In Mv
7	□					Del Ed In Mv
8	□					Del Ed In Mv
9	□					Del Ed In Mv
10	□					Del Ed In Mv

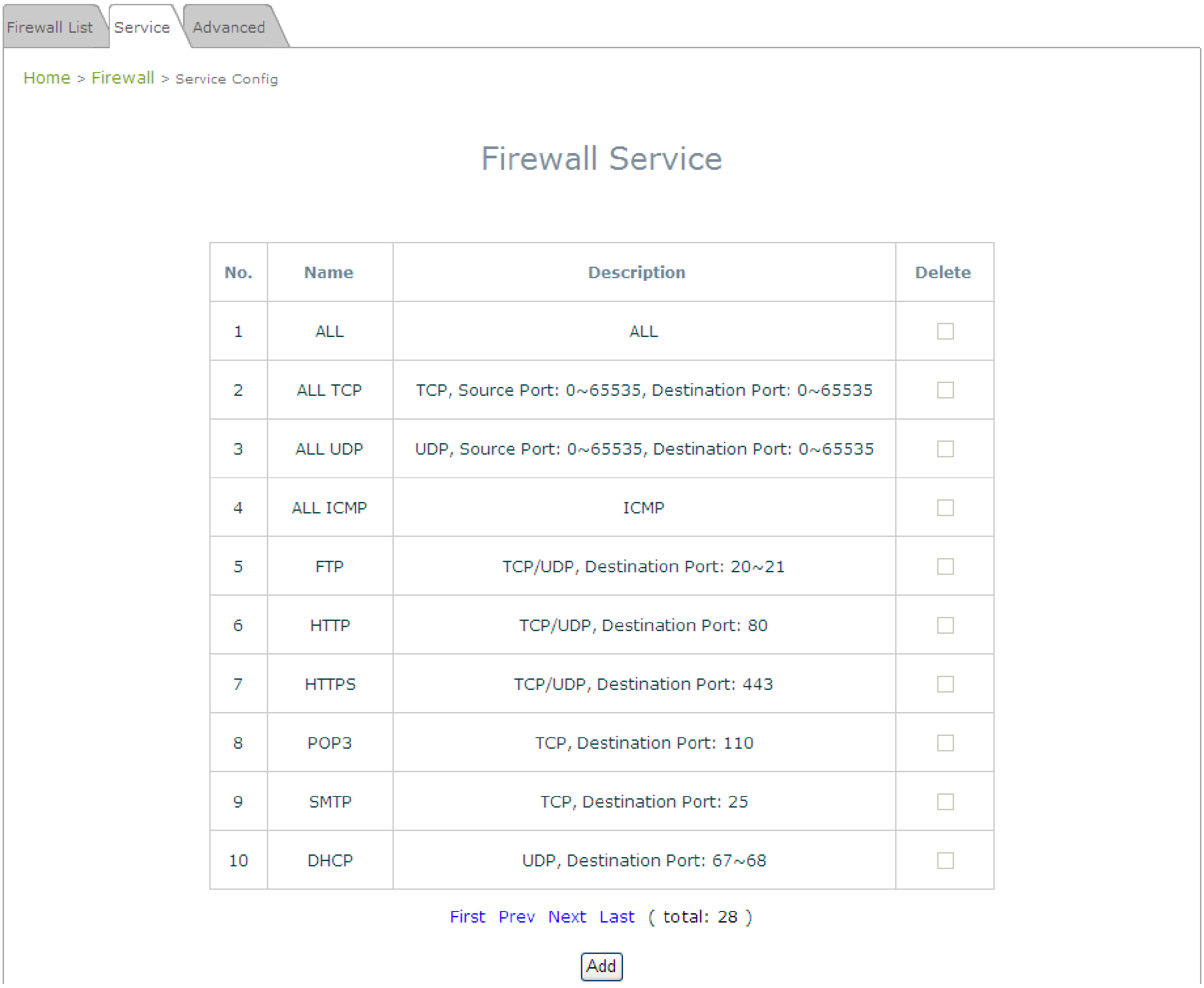
First Prev Next Last (total: 20)

7.3.2 Service

The administrator can add or delete firewall services here; the services in this list will become options to choose in firewall rule (when EtherType is IPv4).

The Access Point provides a list of rules to block or pass traffic of layer-3 or above protocols. These services are available to choose from a drop-down list of layer2 firewall rule edit page with Ether Type IPv4. The first 28 entries are default services and the administrator can add/delete any extra desired services.

There are 28 firewall services available in default settings; these default services cannot be deleted but can be disabled. If changes are made, please click ***SAVE*** to save the settings before leaving this page.



Firewall Service

No.	Name	Description	Delete
1	ALL	ALL	□
2	ALL TCP	TCP, Source Port: 0~65535, Destination Port: 0~65535	□
3	ALL UDP	UDP, Source Port: 0~65535, Destination Port: 0~65535	□
4	ALL ICMP	ICMP	□
5	FTP	TCP/UDP, Destination Port: 20~21	□
6	HTTP	TCP/UDP, Destination Port: 80	□
7	HTTPS	TCP/UDP, Destination Port: 443	□
8	POP3	TCP, Destination Port: 110	□
9	SMTP	TCP, Destination Port: 25	□
10	DHCP	UDP, Destination Port: 67~68	□

Firewall Service Page

7.3.3 Advanced

At **Firewall > Advanced,** more advanced settings on firewall rules can be configured, providing extra security enhancement against DHCP and ARP traffic traversing the available interfaces of the system.

- **Trust Interface**: Each VAP interface can be checked individually to mark as trusted interfaces; security enforcements on DHCP/ARP like DHCP snooping and ARP inspection will be carried out on non-trusted interfaces.
- **DHCP Snooping**: When enabled, DHCP packets will be validated against possible threats like DHCP starvation attack; in addition, the trusted DHCP server (IP/MAC) can be specified to prevent rouge DHCP server.
- **ARP Inspection**: When enabled, ARP packets will be validated against ARP spoofing.
    - **Proxy ARP** option when enabled, AP will reply ARP requests on behalf of downlink stations. The ARP table maintained by the AP will be used as a look up table upon receipt of ARP request from AP uplink. Adversely, without Proxy ARP, ARP request is broadcasted down into the AP's wireless network causing network inefficiencies.
    - **Force DHCP** option when enabled, the AP only learns MAC/IP pair information through DHCP packets. Since devices configured with static IP address does not send DHCP traffic, any clients with static IP address will be blocked from internet access unless its MAC/IP pair is listed and enabled on the **Static Trust List.**
    - **Trust List Broadcast** can be enabled to let other APs (with L2 firewall feature) learn the trusted MAC/IP pairs to issue ARP requests.
    - **Static Trust List** can be used to add MAC or MAC/IP pairs of devices that are trusted to issue ARP request. Other network nodes can still send their ARP requests; however, if their IP appears on the static list (with different MAC), their ARP requests will be dropped to prevent eavesdropping.

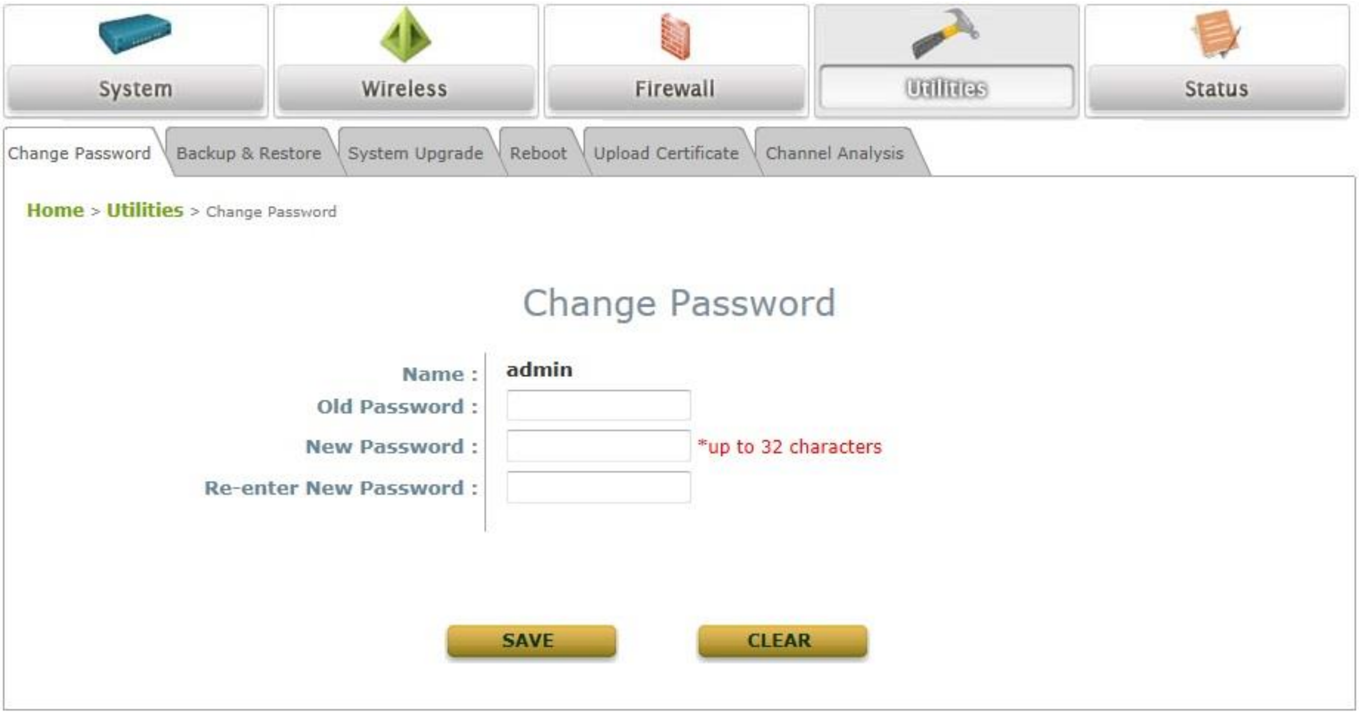
If any settings are changed, please click ***SAVE*** to save the configuration before leaving this page.

7.4 Utilities

The following utility features on this page allow the administrator to maintain the system: **Change Password**, **Backup & Restore**, **System Upgrade**, **Reboot**, **Upload Certificate, Channel Analysis**.

7.4.1 Change Password

To protect the Web Management Interface from unauthorized access, it is highly recommended to change the administrator's password to a secure password. Only alpha-numeric characters are allowed, and it is also recommended to make use of a combination of both numeric and alphabetic characters.



Change Password

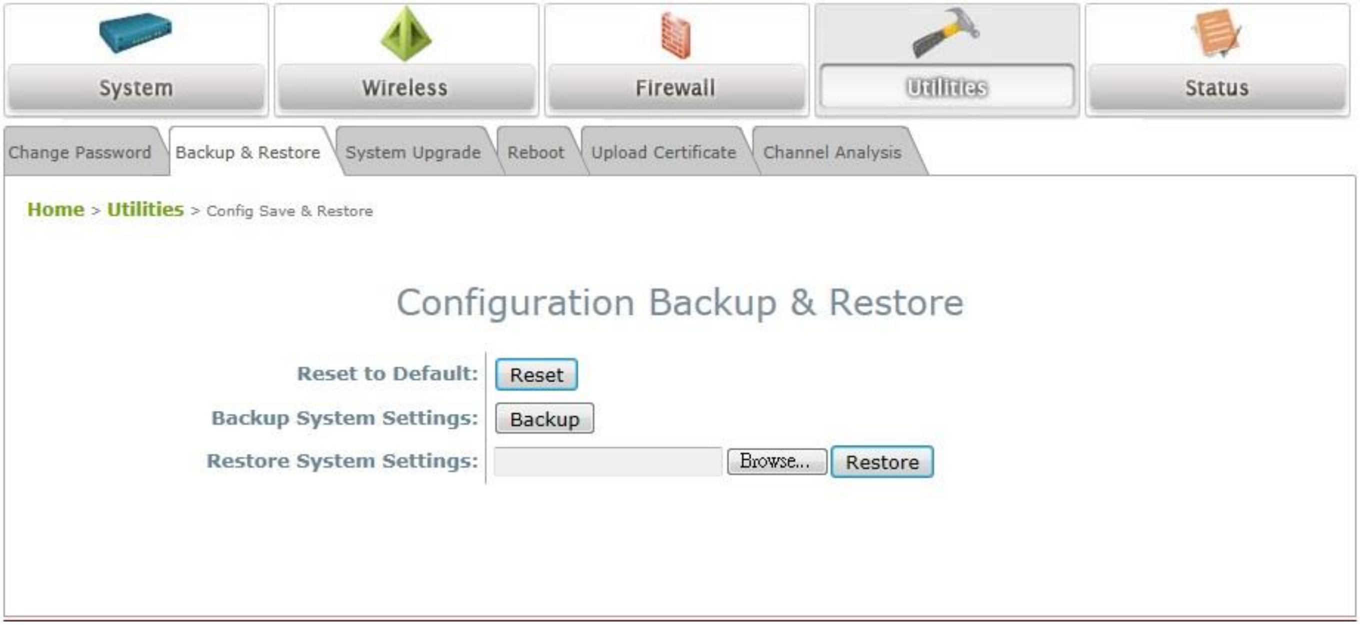
Name : admin
Old Password :
New Password : *up to 32 characters
Re-enter New Password :

Change Password Page

The administrator can change password on this page. Enter the original password (**"admin"**) and new password, and then re-enter the new password in the ***Re-enter New Password*** field. Click ***SAVE*** to save the new password.

7.4.2 Backup & Restore

This function is used to backup and restore the Access Point's settings. The AP can also be restored to factory default using this function. It can be used to duplicate settings to other access points (backup settings of this system and then restore on another AP).



Configuration Backup & Restore

Reset to Default: Reset

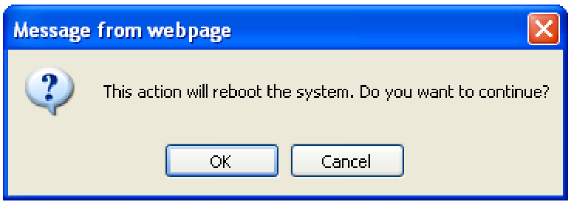
Backup System Settings: Backup

Restore System Settings: Browse... Restore

Backup & Restore Page

- **Reset to Default:**

➢ Click ***Reset*** to load the factory default settings of the Access Point. A pop-up Page will appear to re-confirm the request to reboot the system. Click ***OK*** to proceed, or click ***Cancel*** to cancel the reboot request.



This action will reboot the system. Do you want to continue?

Reboot Confirmation Prompt

➢ A warning message as displayed below will appear during the reboot period. The system power must be kept on before the completion of the reboot process.

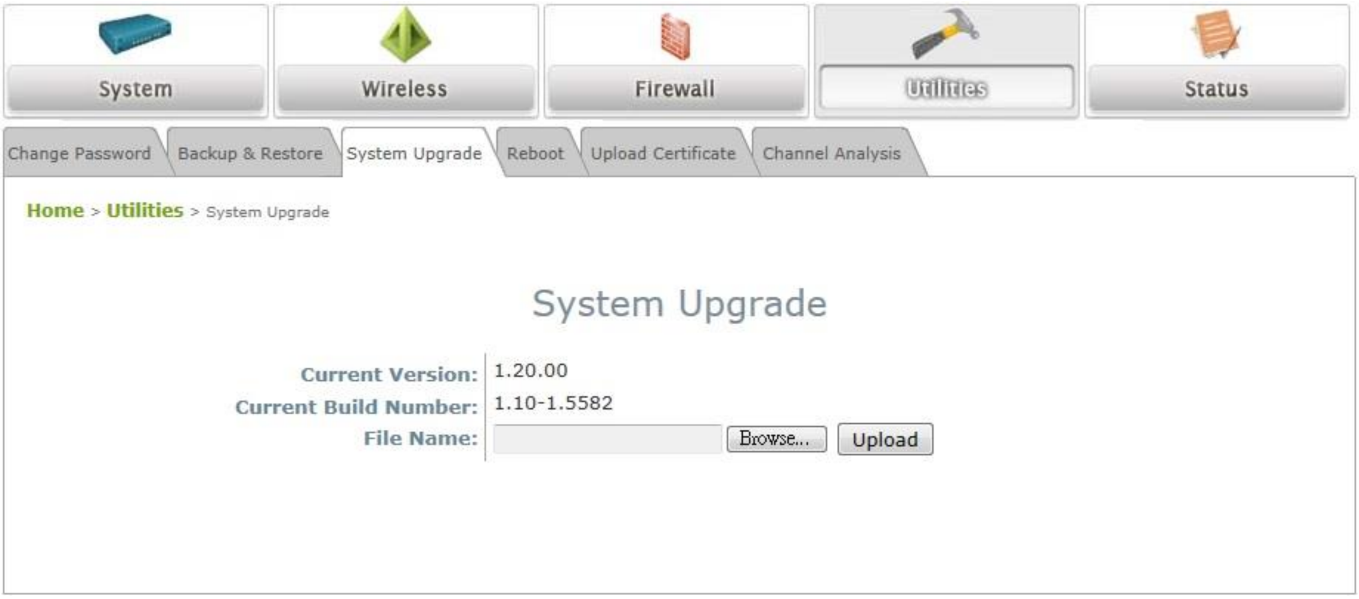
➢ The **System Overview** page will appear upon reboot completion.

- **Backup System Settings:** Click ***Backup*** to save the current system settings to a local disk such as the hard disk drive (HDD) of a local computer or a compact disc (CD).
- **Restore System Settings:** Click ***Browse*** to search for a previously saved backup file, and then click ***Upload*** to restore the settings. The backup file will replace the active configuration file currently running on the system.

⚠ *After network parameters have been reset / restored, the network settings of the administrator PC may need to be changed to ensure that the IP address of the administrator PC is on the same subnet mask as the AP.*

7.4.3 System Upgrade

The Access Point provides a web firmware upload / upgrade feature. The administrator can download the latest firmware from the website and save it on the administrator's PC. To upgrade the system firmware, click ***Browse*** to choose the new firmware file you downloaded onto your PC and then click ***Upload*** to execute the process. There will be a prompt confirmation message to notify the administrator to restart the system after a successful firmware upgrade. Please restart the system after upgrading the firmware.



System Upgrade

Current Version: 1.20.00
Current Build Number: 1.10-1.5582
File Name:

System Upgrade Page

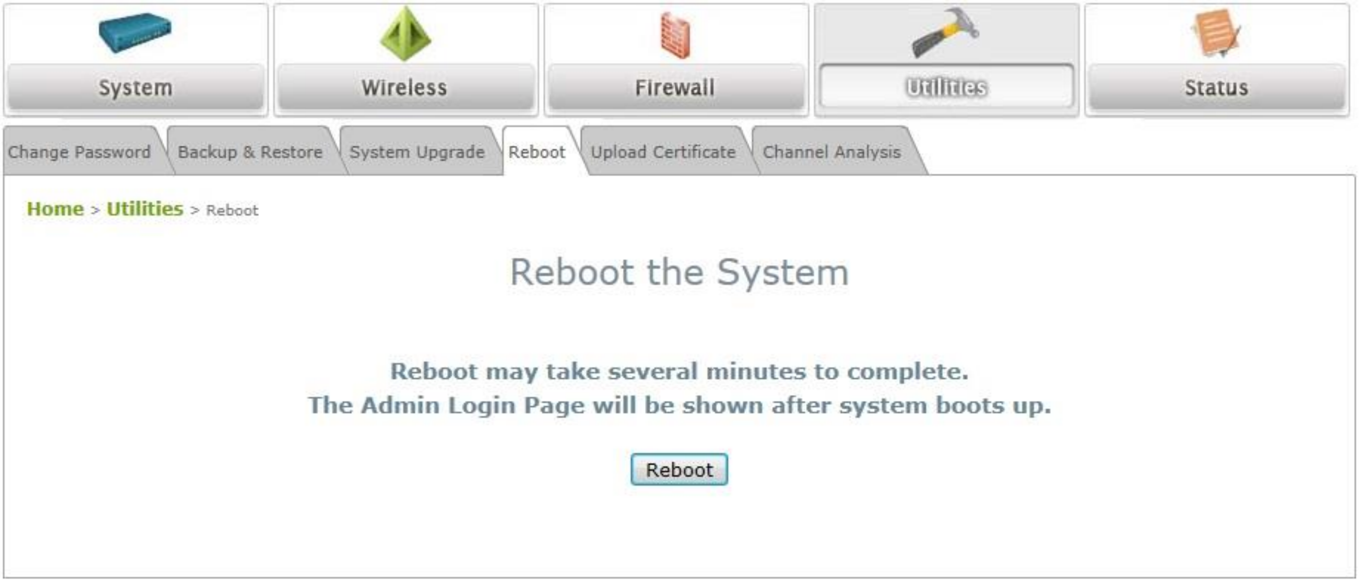
⏩ **Note:**

- It is recommended to check the firmware version number before proceeding further. Please make sure you have the correct firmware file.
- Firmware upgrade may sometimes result in the loss of data. Please ensure that all necessary settings are written down before upgrading the firmware.
- During firmware upgrade, please do not turn off the power. This may permanently damage the system.

7.4.4 Reboot

This function allows the administrator to restart the AP safely. The process takes approximately three minutes. Click ***Reboot*** to restart the system. Please wait for the blinking timer to complete its countdown before accessing the system's Web Management Interface again. The System Overview page will appear after a successful reboot.

Occasionally, it is necessary to reboot the AP to ensure that parameter changes are submitted.



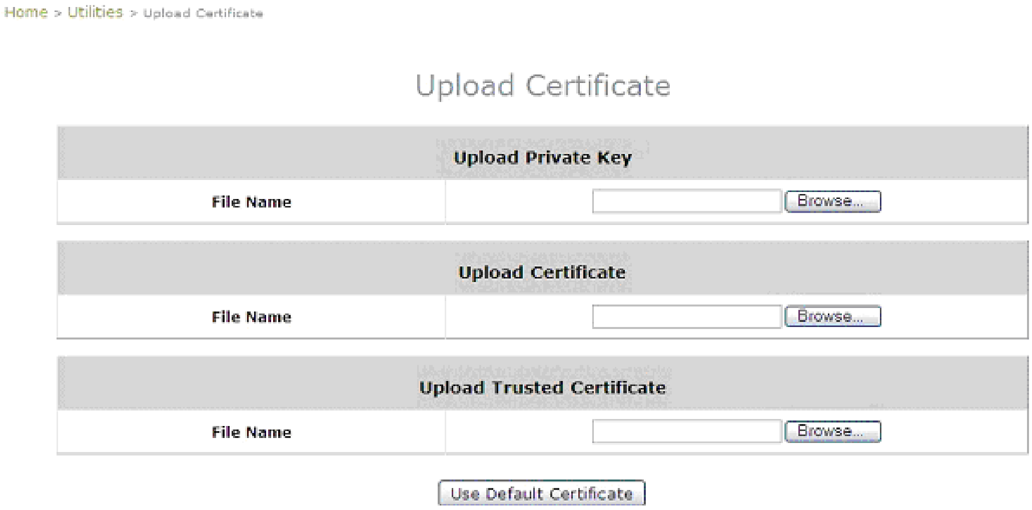
Reboot the System

Reboot may take several minutes to complete.
The Admin Login Page will be shown after system boots up.

Reboot Page

7.4.5 Upload Certificate

This function is used to configure a valid certificate for security validation required in CAPWAP.



Upload Certificate

Upload Private Key	
File Name	Browse...

Upload Certificate	
File Name	Browse...

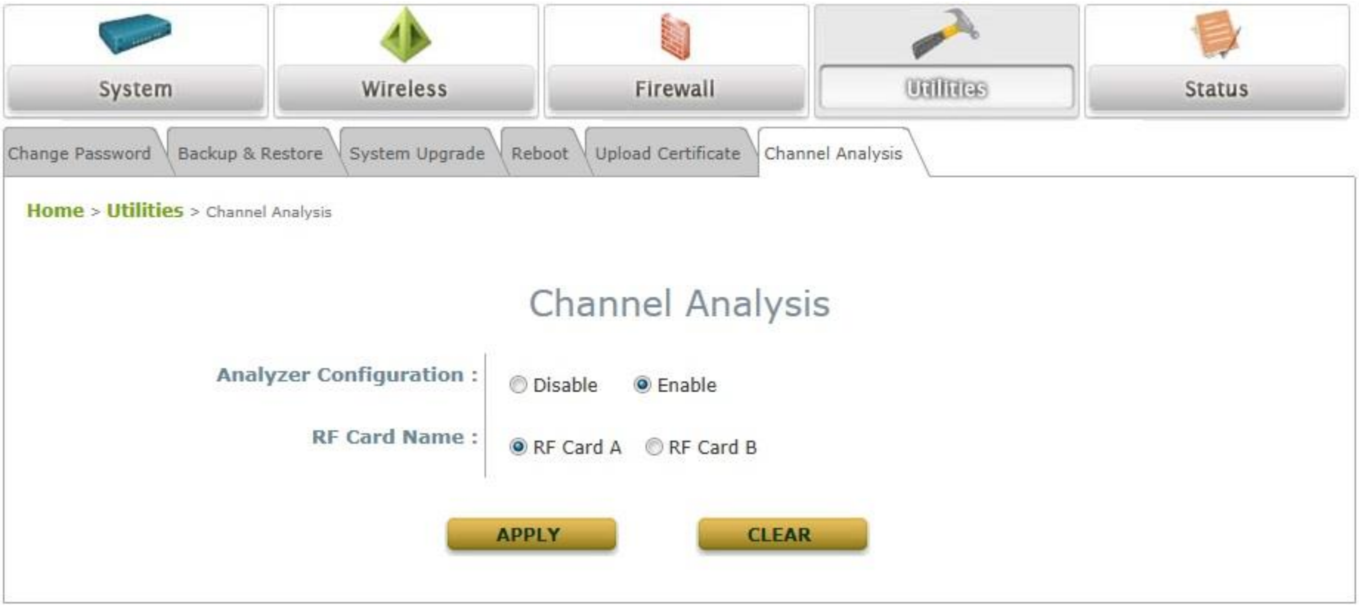
Upload Trusted Certificate	
File Name	Browse...

- **Upload Certificate:** It provides flexibility to support customer's own Certificate, Private Key, or Trusted Certificate for a means of security verification for CAPWAP or other security needs to ensure the authenticity of this AP to other network entities.
- **Use Default Certificate:** Click ***Use Default Certificate*** to use the default certificate and key.

7.4.6 Channel Analysis

The Channel Analysis is an excellent tool for IT staff to quickly grasp an idea of what the channel dynamics are. Included for channel analysis is a spectrogram, density graph and other charts to detect interference from

Bluetooth devices, Microwave devices, Cordless phones, and etc.



Channel Analysis

Analyzer Configuration : ○ Disable ● Enable

RF Card Name : ● RF Card A ○ RF Card B

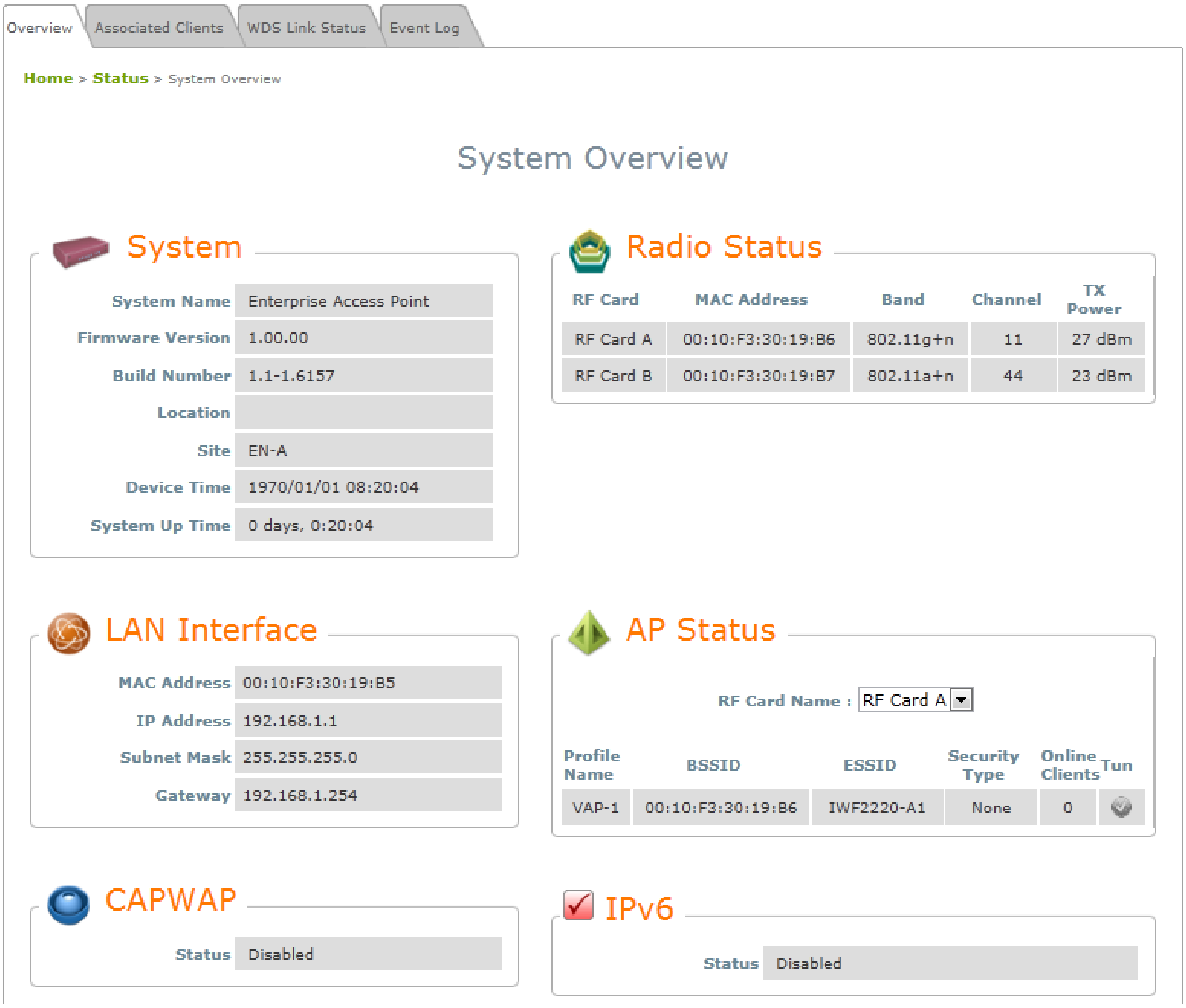
Note:	• Please be reminded that when Channel Analysis is in progress, the RF card loses its capability to serve clients and kicks off current users. • The browser used to implement Channel Analysis should have Java Runtime Environment installed beforehand, or it would not display any information. • The system only allows 1 operator to use this function at one time. • Channel Analysis only runs on the 2.4GHz RF Card A of IWF2220.

7.5 Status

This page is used to view the current condition and state of the system and it includes the following functions: **Overview**, **Associated Clients**, **WDS Link Status** and **Event Log.**

7.5.1 Overview

The **System Overview** page provides an overview of the system status for the administrator.



System Overview

System

System Name	Enterprise Access Point
Firmware Version	1.00.00
Build Number	1.1-1.6157
Location	
Site	EN-A
Device Time	1970/01/01 08:20:04
System Up Time	0 days, 0:20:04

Radio Status

RF Card	MAC Address	Band	Channel	TX Power
RF Card A	00:10:F3:30:19:B6	802.11g+n	11	27 dBm
RF Card B	00:10:F3:30:19:B7	802.11a+n	44	23 dBm

LAN Interface

MAC Address	00:10:F3:30:19:B5
IP Address	192.168.1.1
Subnet Mask	255.255.255.0
Gateway	192.168.1.254

AP Status

RF Card Name : RF Card A

Profile Name	BSSID	ESSID	Security Type	Online Clients	Tun
VAP-1	00:10:F3:30:19:B6	IWF2220-A1	None	0	●

CAPWAP

Status	Disabled

IPv6

Status	Disabled

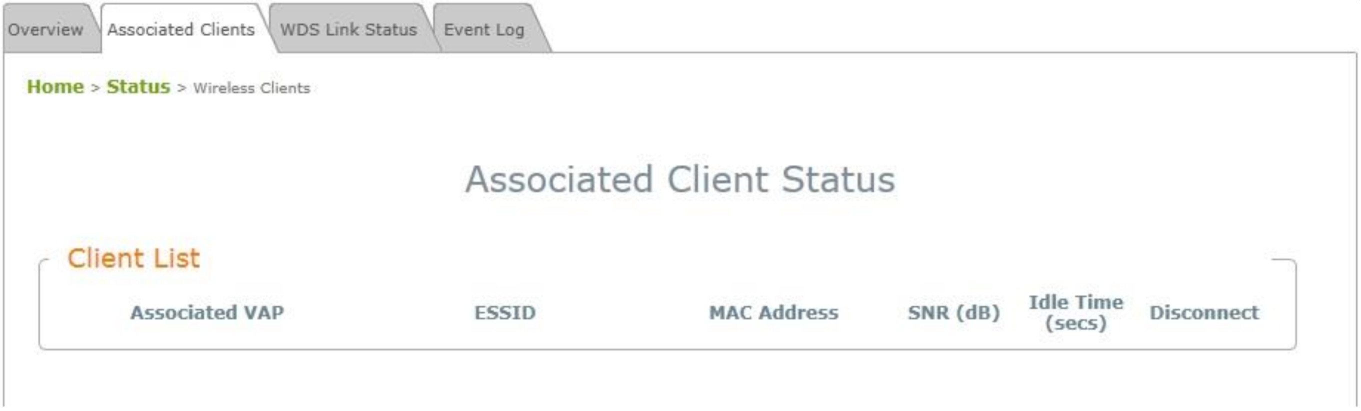
System Overview Page

Table 3 Status Page's Organizational Layout

Item		Description
System	**System Name**	The system name of the Access Point.
	Firmware Version	The current firmware version of the Access Point.
	Build Number	The current firmware build number of the Access Point.
	Location	The location of the Access Point.
	Site	The site of the Access Point.
	Device Time	The system time of the Access Point.
	System Up Time	The time that the system has been in operation.
LAN Interface	**MAC Address**	The MAC address of the LAN Interface.
	IP Address	The IP address of the LAN Interface.
	Subnet Mask	The Subnet Mask of the LAN Interface.
	Gateway	The Gateway of the LAN Interface.
Radio Status	**MAC Address**	The MAC address of the RF Card.
	Band	The RF band in use.
	Channel	The channel specified.
	Tx Power	Transmit Power level of RF card.
AP Status	**Profile Name**	The profile name of AP.
	BSSID	Basic Service Set ID.
	ESSID	Extended Service Set ID.
	Security Type	Security type of the Virtual AP.
	Online Clients	The number of online clients.
	Tunnel	The status of the used Tunnel.
IPv6	**Status**	Enabled/ Disabled.
CAPWAP	**Status**	Enabled/ Disabled.

7.5.2 Associated Clients

The administrator can remotely oversee the status of all associated clients on this page. When a low SNR is found here, the administrator can tune the corresponding parameters or investigate the settings of associated clients to improve network communication performance.



Overview | Associated Clients | WDS Link Status | Event Log

Home > Status > Wireless Clients

Associated Client Status

Client List

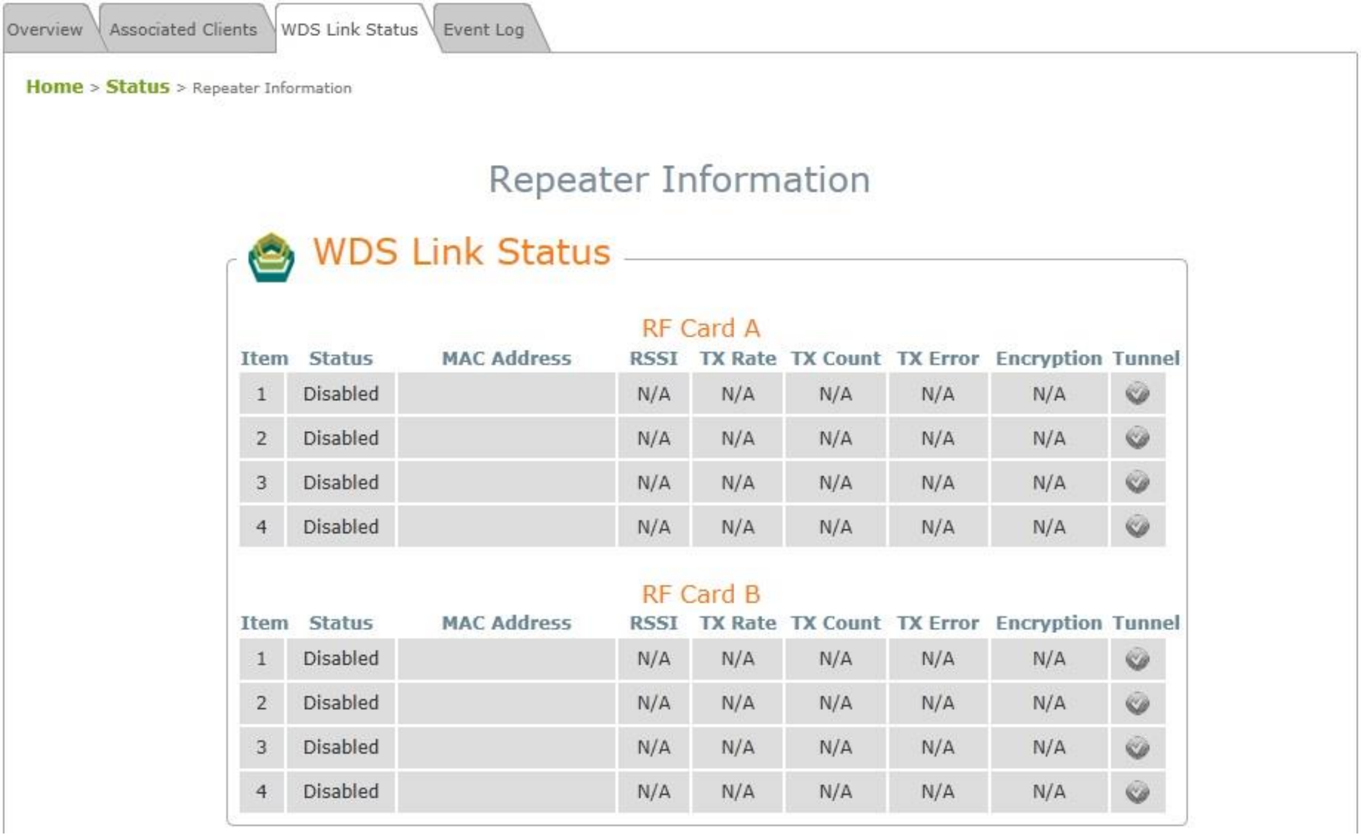
Associated VAP	ESSID	MAC Address	SNR (dB)	Idle Time (secs)	Disconnect

Associated Client Status Page

- **Associated VAP:** The name of a VAP (Virtual Access Point) that the client is associated with.
- **ESSID:** The Extended Service Set ID which the client is associated with.
- **MAC Address:** The MAC address of associated clients.
- **SNR:** The Signal to Noise Ratio of respective client's association.
- **Idle Time:** Time period that the associated client is inactive for; the time unit is in seconds.
- **Disconnect:** Upon clicking ***Kick***, the client will be disconnected from the system.

7.5.3 WDS Link Status

The administrator can review detailed information of the repeater function at **Status > WDS Link Status**. Information of WDS status, traffic statistics, encryption and other details are provided.



Home > Status > Repeater Information

Repeater Information

WDS Link Status

RF Card A

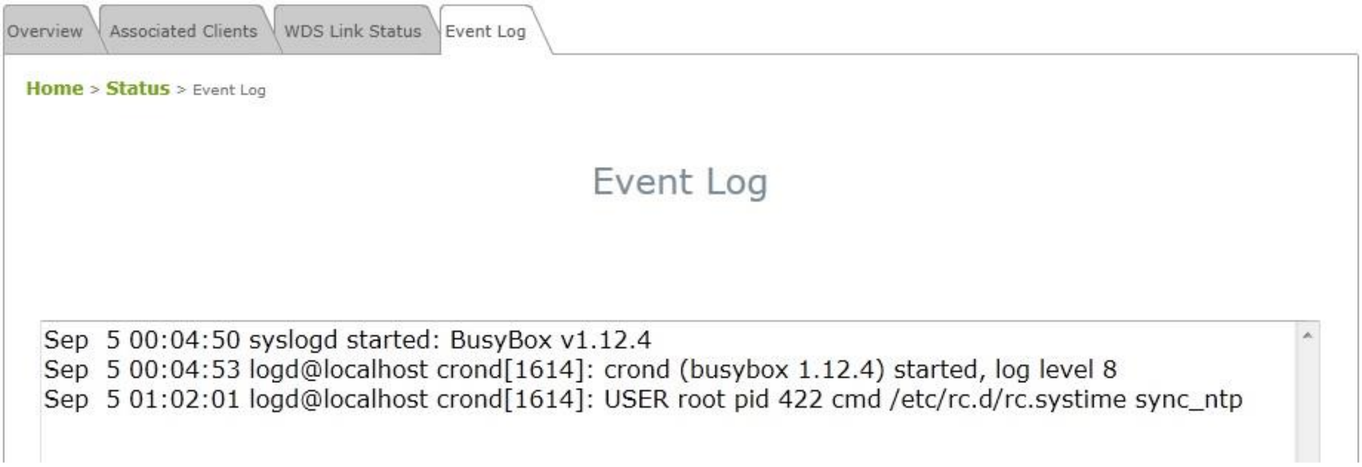
Item	Status	MAC Address	RSSI	TX Rate	TX Count	TX Error	Encryption	Tunnel
1	Disabled		N/A	N/A	N/A	N/A	N/A	✓
2	Disabled		N/A	N/A	N/A	N/A	N/A	✓
3	Disabled		N/A	N/A	N/A	N/A	N/A	✓
4	Disabled		N/A	N/A	N/A	N/A	N/A	✓

RF Card B

Item	Status	MAC Address	RSSI	TX Rate	TX Count	TX Error	Encryption	Tunnel
1	Disabled		N/A	N/A	N/A	N/A	N/A	✓
2	Disabled		N/A	N/A	N/A	N/A	N/A	✓
3	Disabled		N/A	N/A	N/A	N/A	N/A	✓
4	Disabled		N/A	N/A	N/A	N/A	N/A	✓

7.5.4 Event Log

The Event Log provides a record of system activities. The administrator can monitor the system status by checking this log.



Home > Status > Event Log

Event Log

```
Sep  5 00:04:50 syslogd started: BusyBox v1.12.4
Sep  5 00:04:53 logd@localhost crond[1614]: crond (busybox 1.12.4) started, log level 8
Sep  5 01:02:01 logd@localhost crond[1614]: USER root pid 422 cmd /etc/rc.d/rc.systime sync_ntp
```

Event Log Page

Each line in the log represents an event record; in each line, there are 4 fields:

- **Date / Time:** The time & date when the event happened.
- **Hostname:** Indicates which host recorded this event. Note that all events on this page are local events, so the hostname in this field is always the same. In remote SYSLOG service however, this field will help the administrator identify which event is from this Access Point.

- **Process name:** Indicate the event generated by the running instance.
- **Description:** Description of the event.

To save the file locally, click ***SAVE LOG***; to clear all of the records, click ***CLEAR***.

P/N: V10020130328